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20th October 2014

Kellogg's Rural Leaders 2014
PO Box 84
Lincoln University
Canterbury

Dear all,

Attached is my report on the 'Canterbury Land and Water Regional Plan (CLWRP) – Is It Equitable? Is There an Alternative Solution? Focusing on Agriculture' this report is for the fulfilment of phase 2 of the Kellogg's Rural Leadership Programme 2014.

My purpose is to summarise the CLWRP and provide real examples of how this may affect farming communities within the allocation zones with a focus on my local "Orari – Opihi – Pareora Zone". These examples have included an array of farming activity including intensification. I will also provide an alternative solution to the current proposals.

My research has helped myself to understand why water is so important for New Zealanders as a whole and has given me belief that we have to protect our number one asset going forward so that we as "Kiwis" can enjoy both recreation activities while using it in a prosperous way.

My report has been prepared for whom ever wants to read, and if there are any points of clarification please do not hesitate to contact myself.

Yours Sincerely,

Simon Cooney

Canterbury Land and Water Regional Plan – Is It Equitable? Is There an Alternative Solution? Focusing on Agriculture.

Prepared for:

Kellogg Rural Leadership Programme 2014

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Executive Summary:

The Canterbury Land and Water Regional Plan (CLWRP) is currently one of the more topical issues in the agriculture community. *Please refer to Appendix one for an illustrated description of this plan*. The proposed plan as it stands could potentially have huge implications on farm succession, development plans, change of land use, retirement plans, viability of individual farming enterprises and a number or combination of these factors could divide local communities.

I believe that the majority of New Zealander's (especially farmers) want to protect their land and water ways. As they want to bring their families up in New Zealand's wonderful rural communities'. Water has been and always will be a major part of any community.

The intent of the proposed CLWRP is 100% correct – no arguments. But the current mechanics and how it is going to be monitored is potentially flawed from the start. I respect that there has to be a "closing of commons" and with any strategy, it will cause some pain for a particular party.

Both Rural and Urban communities need to work together and have an invested interest in cleaning up our water ways as both these user groups need water of the highest quality.

In this report I have given some background on the CLWRP, how it is monitored, by whom and by what method, an overview of the nitrate leaching, three live examples of how this proposed plan could affect each farming business, and lastly provide a potential alternative way of both urban and farmers collaborating together to improve water quality.

This reports purpose is to identify if the CLWRP plan is equitable to all farmers, which will include looking at a potentially more equitable alternative.

Introduction:

The Canterbury Land and Water Regional Plan (CLWRP) is a new planning framework for Canterbury which aims to provide direction on how land and water are too be managed. The plan sets controls on the leaching of nitrates and requires farmers and land users to manage their operations and limit their environmental impact. The plan will have a profound effect upon the farming community, particularly the dairy sector. The plan sets limits for the volume of nutrients which can be leached into the soil. It also limits the ability for conversion to more intensive use of land.

Canterbury has substantial fresh water and land resources. Managing land and water is complex and many of the issues are interconnected. This interrelationship of land and water means that effects of any one activity cannot be considered in isolation. The current environment has been modified by both past and current activities, many of which cannot be easily changed or remedied without significant costs to people and communities. There are no 'quick fixes' to managing Canterbury's land and water resources and it is clear that a range of responses are required.

The key focus of the CLWRP is how the regional councils have come about putting these policies in place. They have looked at various mechanisms or alternative but settled on one. They also appreciate that this may not suit all but believe that this is the best fit to achieve its intent – which is to improve the water quality of our natural fresh water streams.

The purpose of the Canterbury Land and Water Regional Plan ("LWRP" or "the Plan") is to identify the resource management outcomes or goals (objectives in this Plan) for managing land and water resources in Canterbury to achieve the purpose of the Resource Management Act 1991 ("RMA"). It identifies the policies and rules needed to achieve the objectives and provides direction in terms of the processing of resource consent applications.

The CLWRP will provide the regulatory framework to support the Canterbury Water Management Strategy. A key component of the CLWRP is the management of nutrient leaching, specifically nitrogen leaching from farming activities.

The Canterbury region has been divided into a number of zones according to whether water quality outcomes are being met. Monitoring and managing nutrients will become increasingly important and many farming operations will be required to develop detailed nutrient budgets and farm environment plans in order to continue farming.

The plan framework is based upon Nutrient Allocation Zones. These zones take into account the amount of nitrogen being leached by a farming activity, and regulates nitrate leaching accordingly. The red zones, for example, are areas where water quality outcomes are not being met; orange zones are where there is a risk of water quality outcomes not being met; and green and blue zones are where water quality outcomes are presently being met. There are also lake zones, where nutrient discharges are tightly regulated given the sensitivity of these catchments to nutrient enrichment. In general, the poorer the water quality is in an area, the more stringent the rules.

The regulations within each of the zones are to be phased in over the period to January 2017 with implications differing, depending upon the volume of nutrient which farms leach into the system and whether this volume is increasing. In order to assess the latter points, each farm over 5 hectares in size needs to establish a "nitrogen baseline" being the average loss of nitrogen from the property between 1st July 2009 and 30th June 2013.

Within a red zone there can be no increase in nitrogen leaching beyond the leaching baseline. Farms with medium nitrogen leaching rates in the red zone (less than 20kg/ha/yr) can continue to operate as a permitted activity. Farms with higher leaching losses (more than 20kg/ha/yr), can continue to operate until 1 January 2017, but after this date resource consent is required.

In the orange zone, small increases in nitrogen leaching (increases less than 5kg/ha/yr) are permitted until 1 January 2016. After this date, farms which continue to limit their leaching losses to 20kg/ha/yr and under will continue to be permitted activities, while farms with higher leaching losses (more than 20kg/ha/yr) will require a resource consent if the farm is larger than 50ha, or if the nitrogen leaching losses increase.

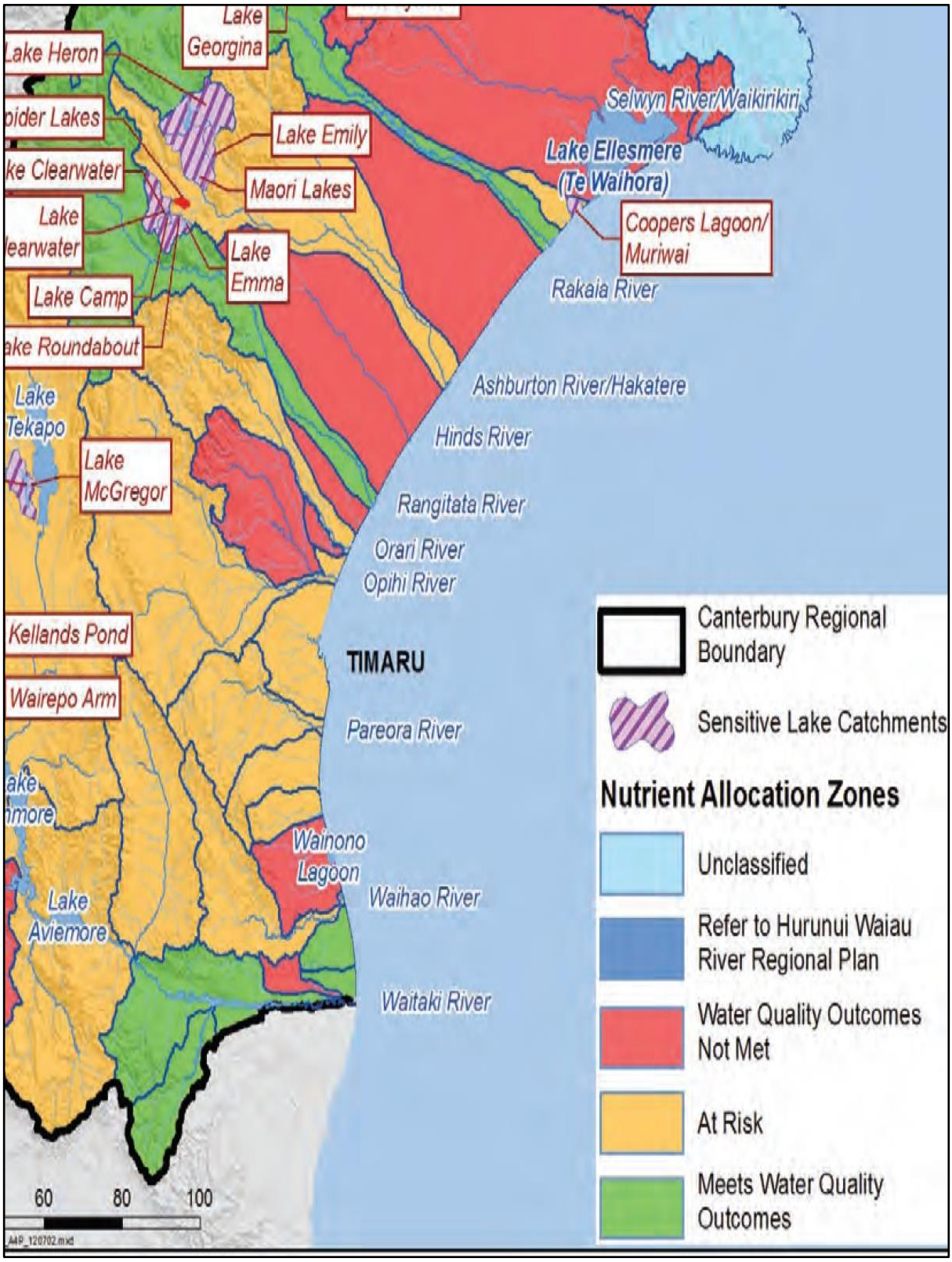
In the green/light blue zone, farms with medium nitrogen leaching rates (less than 20kg/ha/yr) can continue to farm as a permitted activity, provided information about the farm (for example stocking rates, irrigation management, yield, effluent management) and nutrient budgets are kept. For farms with higher nitrogen leaching losses (more than 20kg/ha/yr) a resource consent is required if the property is larger than 50 hectares in area and the nitrogen leaching losses increase by more than 5kg/ha/yr.

In each case when applying for resource consent, producing a completed Farm Environment Plan is an essential component of the application.

The responsibility for gathering information, developing nutrient budgets and plans and demonstrating compliance with the CLWRP requirements rests with land owners. As a result, this will become an increasingly important part of the due diligence process when buying, selling or leasing rural land.

I am going to be focusing on whether the CLWRP plan is fair and equitable to all farmers in each zone. I am going to identify the main issues, give live examples of farming activities, provide an alternative solution and summarise my topic.

The map below shows the nutrient allocation zones as set out by the CLWRP within the South Canterbury area.



What is nitrate (Nitrogen) leaching?

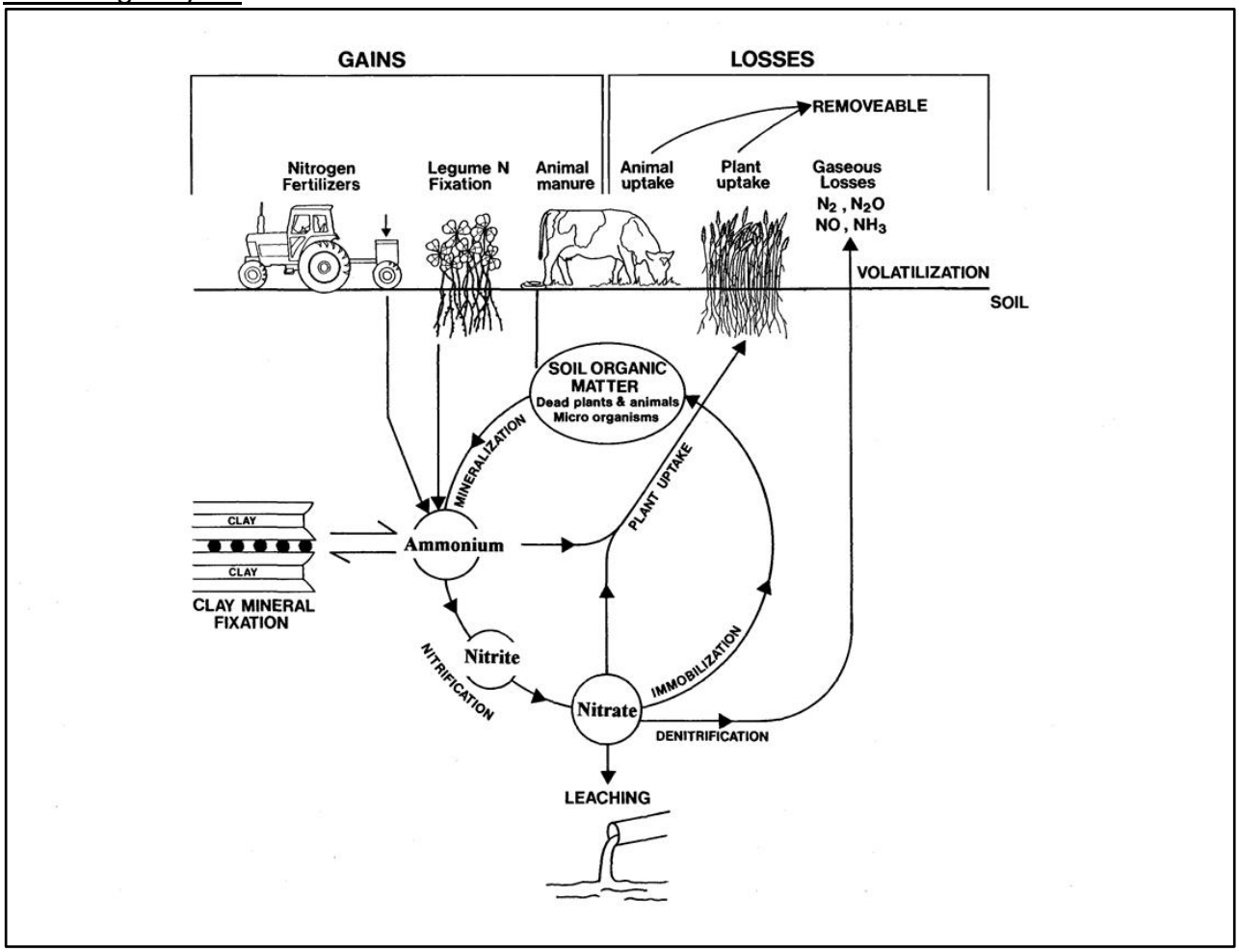
Nitrate leaching is a naturally occurring process, it occurs when nitrate leaves the soil in drainage water. Nitrate is soluble and mobile. It is no problem when it is within the root-zone, but once it gets into the ground water and other fresh water bodies it is an environmental pollutant.

Nitrate levels in fresh water have become an important indicator of pollution and they are the focus of national and regional government strategies to improve water quality. Farmers must understand the risk of leaching and manage their crops to minimise losses from their land. The amount of nitrate leached is governed by two factors:

- Nitrate levels in the soil + Drainage from saturated soils

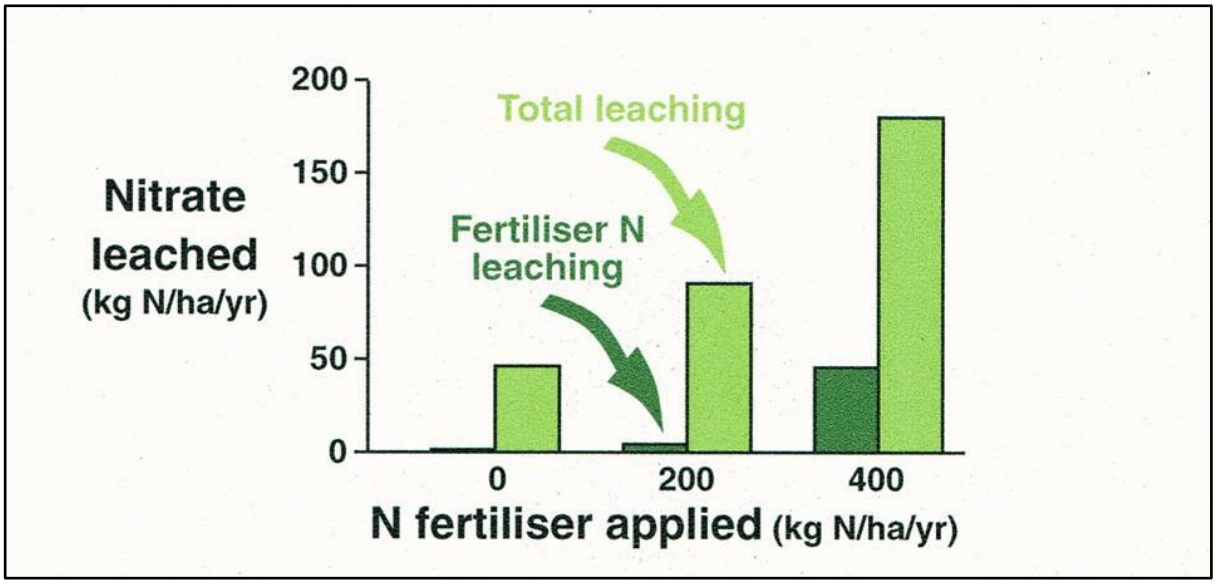
Most crops prefer to take up nitrogen as nitrate. Having an available supply of nitrate when the plant needs it is an asset for the crop. Having too much nitrate in the soil can be a liability. Farmers can reduce leaching risk by matching their fertiliser applications to the crop demand. Split applications are a less risky option. In regions that get dumps of rainfall during spring and summer, a slow - release fertiliser may be the most economical solution.

<u>The nitrogen cycle:</u>



Urine is the major source of Nitrogen that leaches in to groundwater and is emitted as nitrous oxide from grazed pastures. Fertiliser “N” accounts for very little of the emitted “N”, but in steads contributes to pollution through increased pasture growth that requires extra livestock to eat it, thereby contributing more urine and increasing “N” emissions.

The graph below show the relative leaching via fertiliser and urine patches:



Background:

Canterbury Land and Water Regional Plan (CLWRP) – Orari, Opihi and Paeora Catchment Area (OOP)

Canterbury has been categorised into Nutrient Allocation Zones which indicate where the water quality outcomes are or are not being met. The rules in the LWRP regulate nitrogen leaching according to these zones.

Within the OOP command area there are both Orange (Opihi) and Red (Temuka incl. Kakahu) Nutrient Allocation Zones. Across ALL Nutrient Allocation Zones, farms less than 5ha, or farms leaching less than 10kgN/ha/yr are a permitted land use. All other farms are regulated by the rules which apply for that particular Nutrient Allocation Zone.

Two important concepts to understand when looking at the rules are the Nitrogen Baseline and the Nitrogen Loss Calculation:

Nitrogen Baseline – the mean discharge of nitrogen below the root zone over the period 1st July 2009 – 30th June 2013, modelled with OVERSEER and expressed in kgN/ha/yr.

Nitrogen Loss Calculation –the discharge of nitrogen below the root zone, as modelled with OVERSEER averaged over the most recent four years 1st July to 30th June period expressed in kgN/ha/yr.

ALL farms larger than 5ha must establish a nitrogen baseline and it is important that it is robust and accurate. *Your nitrogen baseline has significant implications for the future management of your land and options for the future.*

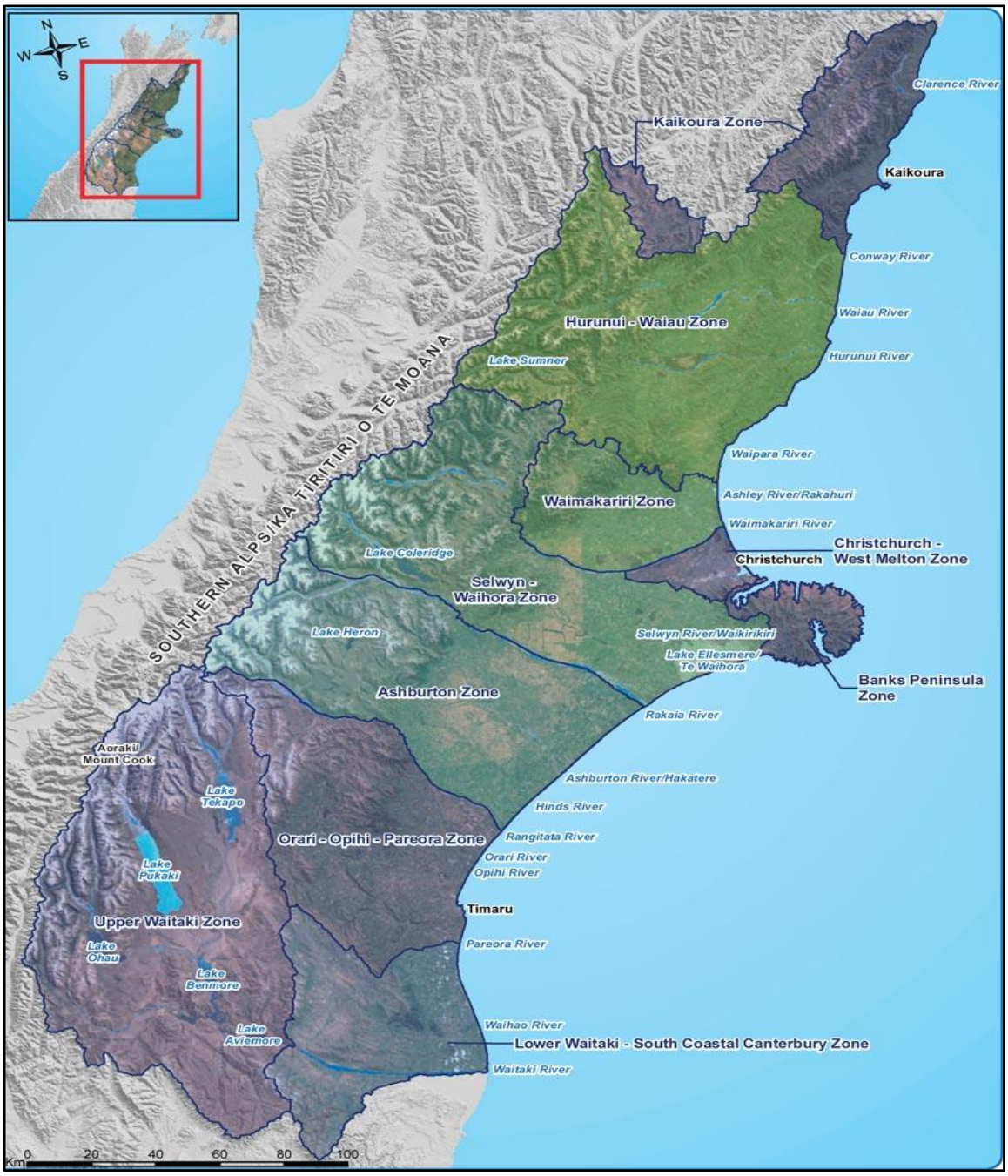
In a RED Nutrient Allocation Zone, there is no flexibility to leach beyond the nitrogen baseline– that is, any increase in N loss is a prohibited activity. This does not prevent development, but it does mean that any development cannot cause an increase in nitrogen loss i.e. other on-farm mitigations may need to be introduced. All farms leaching more than 20kgN/ha/yr will need resource consent by 1st January 2017, and a Farm Environment Plan (FEP) will need to accompany that consent application. The 20kgN/ha/yr is a threshold, not a limit; the limit is the baseline i.e. a farm leaching 40kgN/ha/yr can continue to operate as long as losses do not increase above the baseline and they hold a land use consent and FEP post January 2017.

There is greater flexibility in the ORANGE Nutrient Allocation Zone for development or intensification beyond the nitrogen baseline.

- Farms leaching less than 20kgN/ha/yr are permitted if farm information is recorded (FEP preferably).
- Farms leaching more than 20kgN/ha/yr are permitted provided the property is smaller than 50ha and there is no increase in nitrogen leaching above the baseline.

- All other farms leaching more than 20kgN/ha/yr are permitted until 1st January 2016 provided any increase in nitrogen leaching is limited to less than 5kgN/ha/yr.
- Farms leaching more than 20kgN/ha/yr will need a consent and FEP by 1st January 2016, if their property is over 50ha or if they increase their nitrogen loss above the baseline.
- Nitrogen loss calculation means the discharge of nitrogen below the root zone, as modelled by overseer, averaged over the most recent 4 year 1st July to 30th June and expressed in kg per hectare per year.

The map below shows the sub-regions for the wider Canterbury area.



Nutrient Red & Orange zones – a quick summary (OOP)

The proposed CLWRP provides clear direction on how land and water are to be managed. It aims to help meet community goals for water quality in both urban and rural areas throughout Canterbury. In the Plan, parts of South Canterbury have been classified as either a 'nutrient red zone' where water quality is not acceptable or a 'nutrient orange zone' where water quality is at risk.

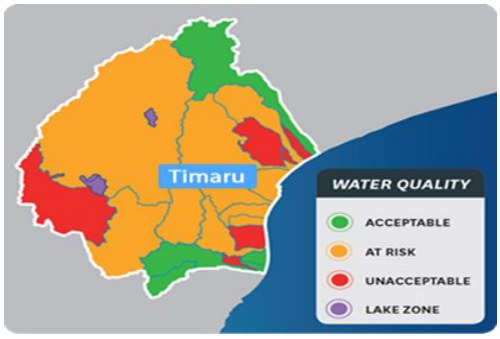
Why is it that in some parts South Canterbury area is nutrient red zone?
A number of water bodies in the South Canterbury area fail to meet cultural, recreational and ecological values as a result of increasing nutrient concentrations. These effects include algae (some are toxic) and water weed growth, as well as high groundwater nitrate concentrations. The nutrient red zoning reflects the need to manage further increases in nitrogen concentrations in surface and ground water, and to ensure environmental outcomes meet community aspirations.

What are the effects of nutrients?
Nitrogen and phosphorus are key nutrients in water and are needed for plants to grow. If nutrient levels are too high (as in nutrient red zones) aquatic life can be impacted and unwanted weeds and algae may take over, and may produce toxins. Silt or sand in water also impacts on water quality as it blocks sunlight from entering water, reduces oxygen levels, and kills aquatic life. Bacteria (such as E.coli) in water can cause sickness in people and animals.

Where do nutrients come from?
Farming is the main cause of nutrients in waterways throughout Canterbury, except in urban areas where there are intense local effects as a result of runoff from roads and properties. Nitrogen comes mainly from urine, fertiliser and effluent, and moves from farms by leaching into drains and groundwater. Phosphorus, sediment, bugs and other contaminants are moved by runoff from land directly into drains and waterways – and can be dissolved or attached to other particles.

What can be done to reduce nutrients in waterways?
Farmers have been working to improve land-management practices to reduce the amount of nutrients and contaminants reaching waterways. There is still plenty of work to do, however, and all land-users are being encouraged to continue to improve what they do. Examples include fencing streams to restrict stock access, planting shrubs alongside streams and drains to filter and reduce the runoff from land, as well as improving stock, fertiliser and irrigation management.

The following diagram illustrates water quality within the Timaru area.



OVERSEER – what does overseer nutrient budgets achieve?

OVERSEER® Nutrient budgets is a strategic nutrient management tool for farmers, advisors and policy makers and is widely used throughout New Zealand. It allows nutrient budgets to be constructed for many enterprises, including dairy, sheep, beef, deer, dairy goats and fruit, vegetables and arable crops.
OVERSEER® Nutrient budgets supports farms with one or more management blocks (defined as an area of the farm that has common physical and management attributes). Nine separate types of management blocks are available:

- Pastoral
- Fodder crop
- Cut and carry
- Fruit
- Vegetable or Arable cropping
- Trees and scrub
- Riparian
- Wetland
- House

The model supports a diverse range of farm systems and offers a wide range of management options and mitigation practices.

Outputs
The OVERSEER model calculates nutrient budgets for the nutrients N, P, K, S, and Ca, Mg, Na. Budgets are available for each management block and a whole farm weighted average of these plus non-block budget representing the farm as a whole. A budget for H^+ (acidity) is available only for the pastoral block.
The model also:

- Estimates animal pasture intake and pasture production. Calculates maintenance fertiliser nutrient and lime requirements.
- Estimates losses to the environment including:
  - N loss to water – nitrogen loss to water
  - P run-off and risk index
  - Greenhouse gas emissions: methane (CH_4), nitrous oxide (N_2O), and direct and embodied carbon dioxide (CO_2) emissions or a per hectare and per kg product basis.
- Overseer also takes into account soil types. Heavier soils have a slower leaching process compared to shallow stoney soil types.

Example 1: Orange Zone Sheep and Beef farming.

Situation: Nitrogen base line of 10 – 4 years cumulative results under overseer.

Sheep and Beef fattening operation.

Guide lines – identify base line, if base line is less than 20 then current farming systems may continue. If farmer wants to increase production via development, base line can rise by 5 to 15 or to 20 only if a Farm Environmental Plan (FEP) is provided.

So if farmer in this example wants to increase production and feed dairy cows in the winter, farmer is unable to and can only go up to 20 via "overseer". Ramifications to this are that farm is capped at 20 'N" to water going forward. So if farmer (Example 1) and farmer (Example 2), decide to sell farms on the same day (say neighbours) – most likely the market will identify properties as very similar in location, infrastructure, soils types and development. Most likely the market will determine that Example 2 is worth more due to the fact of the new CLWRP. Basically Example 2 can have a higher productive use therefore generating higher income on a per hectare basis. Scratching your head?

The challenge in the orange zones I believe, is that the more productive / higher leaching farms will continue to operate at the higher leaching levels as there farming systems rely on these farming practises. With FEP plans in place after January 2016 and resource consents in place. The lower leaching farmers will endeavour to use the leaching target of 20 to aim for, as they are now aware that lower leaching rates could have an effect on their farm values. In effect, orange zone catchments going forward could potentially leach more nitrates than they currently are.

Example 2: Orange Zone intensive Winter Dairy Grazing farm.

Situation: Nitrogen base line of 30 - 4 years cumulative results under overseer.

*Property running an intensive winter dairy cow grazing system, with specialised winter fodder crops***.**

Guide lines – can continue to farm at this level as long as a farm environmental plan (FEP) is recorded annually and resource consent may have to be applied for. Farmer cannot increase above 30 going forward. Still 30 is 10 above determine average baseline.

As mention in Example one, this farm will most likely attract a premium if sold due to the fact that it is historically a higher than average productivity farm with a higher than average "N" to water calculation. Ironically this farming practise is in a period when run off is higher than normal, i.e.: winter months. Plus livestock concentration is very high on a per hectare basis with winter stored feed on hand. So with many animals on a smaller area, nitrogen leaching is highest with urine being spread onto land.

The above system is where I believe are the biggest issues going forward as they are concentrating there leaching in the winters months when leaching is at its highest.

Example 3: Red Zone, intensive Dairy Farming

Nitrogen base line of 55 - 4 years cumulative results under overseer.

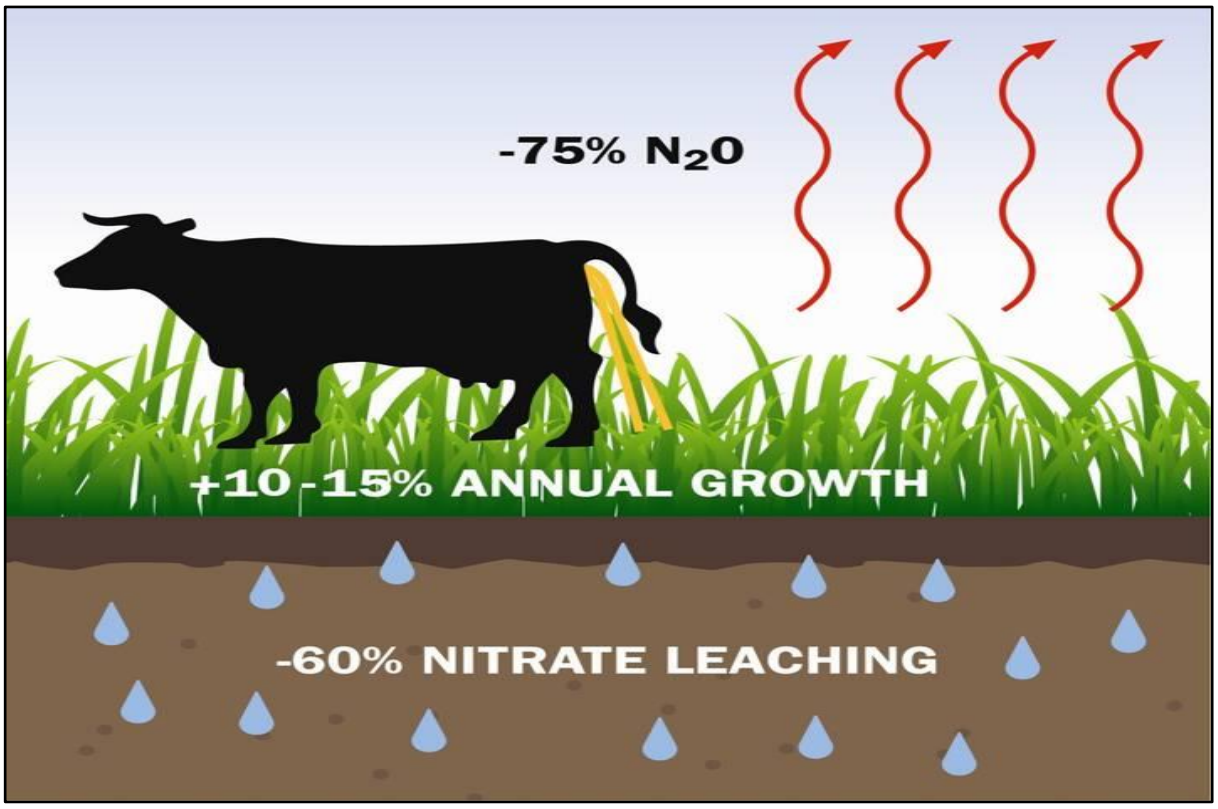
Property running an intensive milking operation, high use of urea, fertiliser and feed inputs.

Guide lines – property can continue to operate "N" to water at 55 along as long as there is a Farm Environmental plan (FEP) in place, then after 1st January 2017 a resource consent will be required. As these examples show, the higher "N" to water properties can continue to operate at present activity levels. The higher the levels the higher the chance our water ways are being contaminated. Red zones have a longer lead in time for resource consent so that they can look at alternative ways of reducing their "N" to water. Part of the reasons why red zones have a longer lead in period is that these properties especially dairy farms have invested a lot of capital into these properties over the past years.

Methods of reducing "N" to water include:

- Fencing off water ways / planting Riparian's
- Reducing urea application
- Reducing stocking rate's i.e. – therefore reducing intensive urine patches
- Using Nitrification inhibitor ('Eco – N') can be applied as a fine suspension spray to improve soil "N" cycle efficiency and reduces nitrate bleaching.

On action of one or more of the above statements, research shows a decrease in Nitrous Oxide emissions, increase on farm pasture production and decreases nitrate leaching.



Alternative Solution

As you can see from my 3 examples, the challenging part of CLWRP is the monitoring of inputs into overseer and the monitoring of outputs going forward. There has been no formal strategy set to monitor these in the future. The main challenge is that the majority of farmers are currently trying to establish as high a base lines as possible to give themselves options going forward and the fear of their property being devalued if put to the market – especially in red and orange zones. We could end up with the situation being that many catchments have higher "N" to water than they currently have – which would be a contradiction to the intent of the plan. Remember, reducing the amount of Nitrogen leached and improving the water quality of our fresh water streams is the plans intent.

So how would an alternative water quality plan look and be more equitable?

We have to remember that both Urban and Rural communities need buy in – as both user groups want to enjoy water that is safe for everyone.

In round figures the pollution of nitrate leaching is from 40% Dairy, 40% Urban and 20% Sheep and Beef (Water Forum – Geraldine)

<u>So starting with farmers:</u>

Each farm over 20 ha needs to monitor any "flowing water way" on a weekly basis, both at the entry and exit points of that stream. This will be done by a simple Nitrate testing stick, and data from these tests will be collaborated by a local authority (say Environment Canterbury). Each catchment data will be logged on to a "Hot Spot" map. So at this stage the local authority would be able to identify hot spots. This practise would form part of legislation of owning any farm – basically part of one's day-to-day farming practise. As part of this process a base line average would be set on all farms in all zones. These would be targeted baselines for each farm, the cap being the average baseline so that the water quality can improve in that area. If the farmers are over this baseline they will need to either:

1) Purchase additional / lower leaching extensive land;
   Or
2) Buy Nitrogen rights from any farmer who is below baseline to lower their cumulative figure – known as "Nitrogen offset Trading"

Please note, an average baseline will have to be calculated so that the target to improve our water quality is met by day one of the plan being implemented. The baseline would be set with the goal in mind for both recreational and productive use of water long term.

This way farmers will activity manage their nitrogen leaching without thinking their farm is going to be devalued and each farming party can work collaboratively together without thinking that either party is getting a better deal than the other. Every farmer has the right to farm the way the want to and knows exactly the legalisation behind it. This also provides an opportunity for the

Crown / DOC to gather additional cash flow resource. They can re-invest these dollars and cents so that our water ways can be returned to their original states ASAP.

The local authority that is monitoring the water quality will be able to audit farmers randomly making sure the information is accurate.

The Urban Population:

At times our urban friends forget that farmers are not the only ones that have been polluting our water ways. Where does the city and town waste go!! Yes, the urban population is also a major contributor to pollution to our water ways. There needs to be some legislation that the urban community contribute to making sure the quality of our water improves. Rate payers are the most obvious way of getting the Urban to contribute just like the farmers. Basically, there could be an additional charge in the rates that would go towards waste management. This would allow the funding of up-to-date technologies to be installed, therefore upgrading a lot of the old infrastructure. Water quality would then be improved. This will help Rural and Urban communities to collaborate together as both user groups would have an invested interest, and both user groups would feel that each party is doing there bit.

One of the biggest challenges lies within the smaller urban areas. This is because the rate payer base is a lot smaller and the technologies for waste-water are a lot older. So rate payer income will be lower, government assistance most likely will be required in these situations. Remembering the government will be getting additional revenue from crown owned land by the nitrogen off set trading.

Conclusion / Summary

As demonstrated in my examples it is hard to come to a firm conclusion that the current proposed CLWRP policy is equitable, taking into account the intent of the plan. My examples clearly highlight some flaws in the plan that contradicts the "intent" of the policy i.e. – the higher nitrate leaching properties being able to continue as long as they have a FEP. This clearly does not help clean up our water ways. The policy makers would argue that because these higher leaching properties have made a significant they have based this investment of past productivity parameters. Therefore, financial viability could be risked if they have to run a much lower "N" to water farming operation going forward – there futures could be uncertain. This is where getting the balance right is very difficult.

The CLWRP plan clearly takes individual decision making / entrepreneur / development opportunities out of individuals hands, basically there is a guideline / manual to follow going forward. This does not put everyone on a level playing field. But as always there will be individuals who push the boundaries and provide information that may not be 100% correct, i.e. input into overseer. Will each FEP be approved? Time will tell and the decision making process for an unapproved FEP will be an interesting day – timing will be key, they can't say yes to everyone, as this would contradict the intent of the policy.

As discussed in my "Alternative Solution," a fairer and more rounded community plan must be the way forward – so that all individuals have equal rights in both urban and rural communities. Then everyone knows exactly where they are at and what measures they have to do to meet the policy plan.

The biggest concerns that I have are, who is going to monitor the policy? And who is monitoring inputs / outputs? Who is checking all the farms regarding stocking policy and fertiliser application? It is ironic that my two major concerns have the most influence on the outcome or intent of the policy. Which, dear I say have the most influence over our water quality going forward. These things will be manipulated and without accurate and up–to-date regularity involvement this policy will be floored from day one.

References

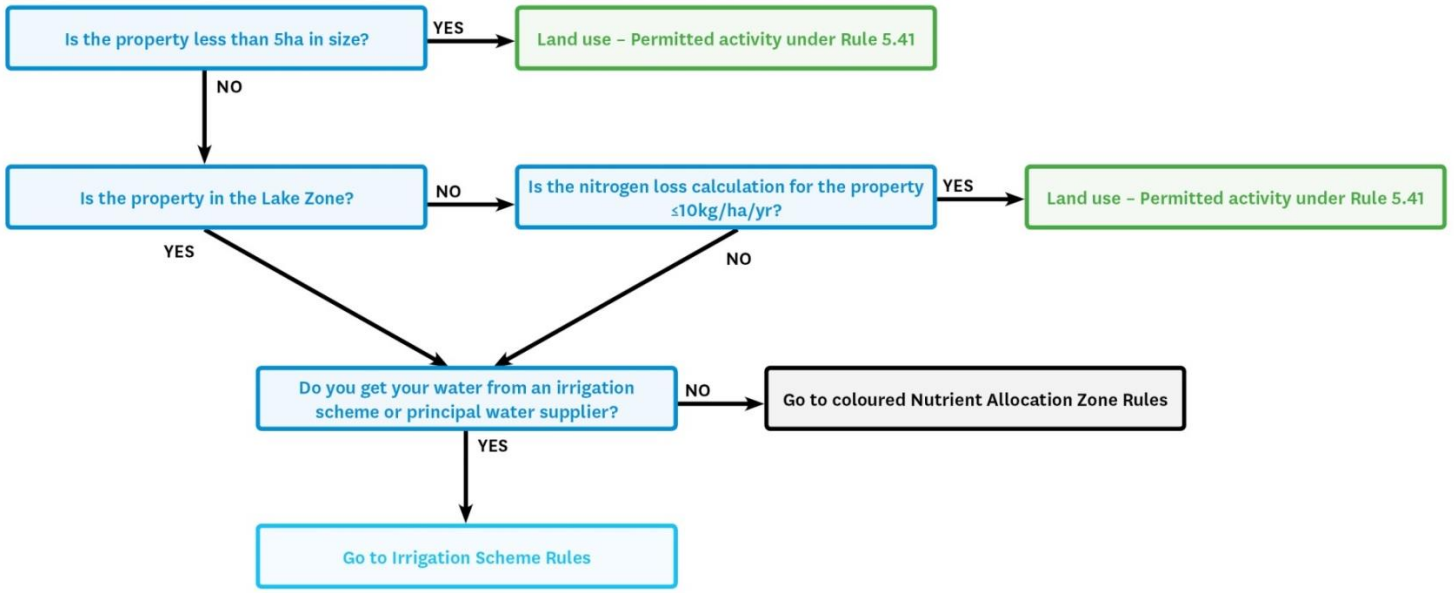
- Environment Canterbury – website and seminars
- Lincoln University website
- Talking with affected farmers
- Water Forum – Geraldine (attended)
- Opuha Water meetings
- Dr Nick Wall – B.Sc (Hon's), M.Sc, PLD, MIM, MIMF, FRSC, FOCCA & C.Eng – Ecotex owner – Environmental Planner.
- Geoff Simmons – Morgan Foundation. Geoff is an economist working for the Morgan Foundation – an independent foundation which aims to stimulate debate on the important issues facing New Zealand. Geoff graduated from Auckland University with an Honours degree in Economics. He has over ten years' experience as an economist working on tricky public policy issues for NZ Treasury and as a manager in the UK civil service. He has co-authored four books alongside Gareth Morgan covering topics such as health (Health Cheque), Fishing (Hook Line & Blinkers), Antarctica (Ice Mice & Men) and Food (Appetite for Destruction). He also works on water quality (MyRiver), Predator Free Rakiura and the infamous "Cats to Go" campaign. Geoff speaks Spanish and is also an experienced speaker, facilitator, trainer, entertainer, actor and improviser.

Land & Water Regional Plan

1

Nutrient Management Rules

All Zone Rules



Green activities are permitted

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

Facilitating sustainable development in the Canterbury region

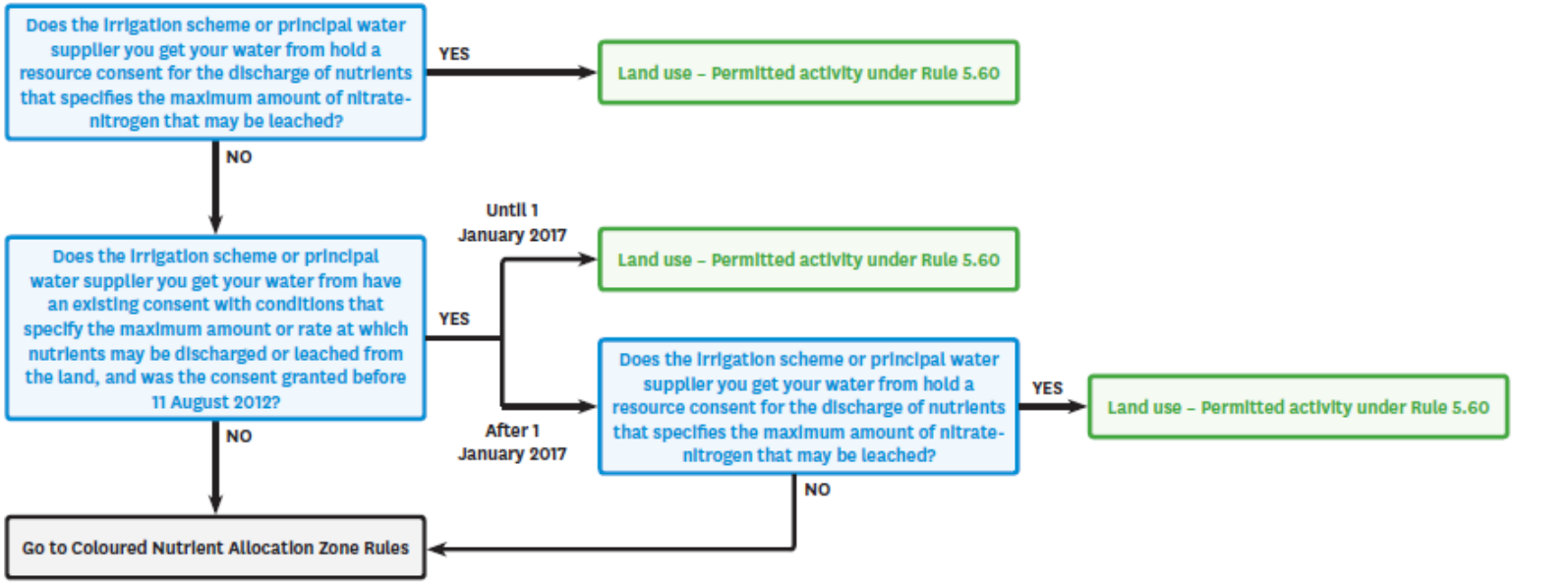
www.ecan.govt.nz

Land & Water Regional Plan

2

Nutrient Management Rules

Irrigation Scheme/Principal Water Supplier Rules



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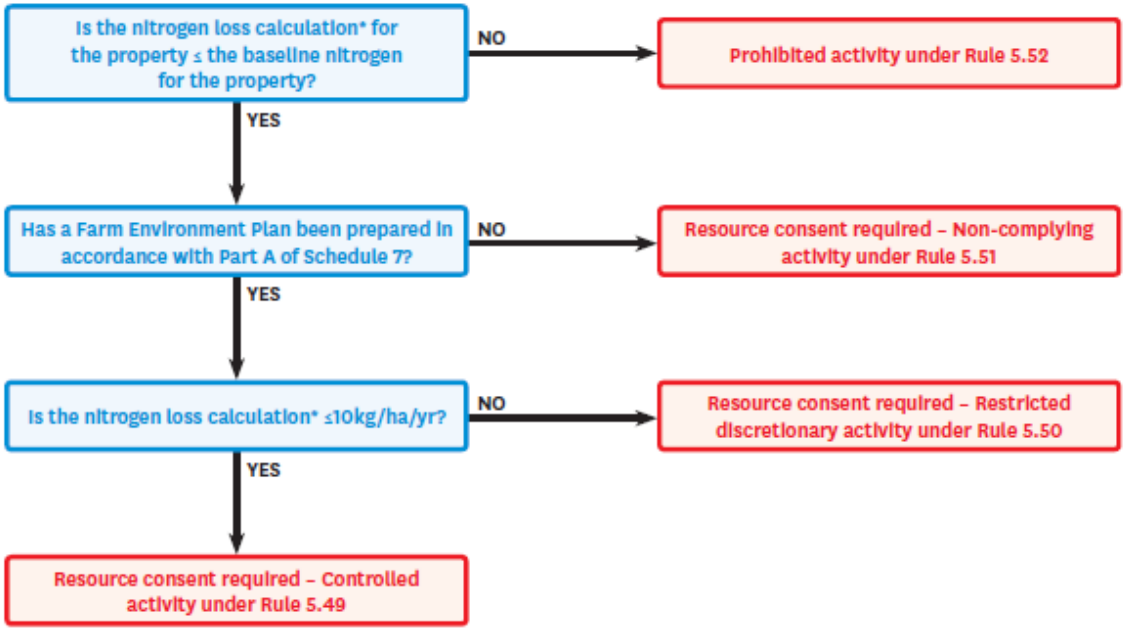
Land & Water Regional Plan

Nutrient Management Rules

Lake Zone Rules

3



Red activities require consent or are prohibited

*Nitrogen loss calculation means the discharge of nitrogen below the root zone, as modelled with OVERSEER™, averaged over the most recent 4-year 1 July to 30 June period and expressed in kilograms per hectare per year. If OVERSEER™ is updated, the most recent version is to be used

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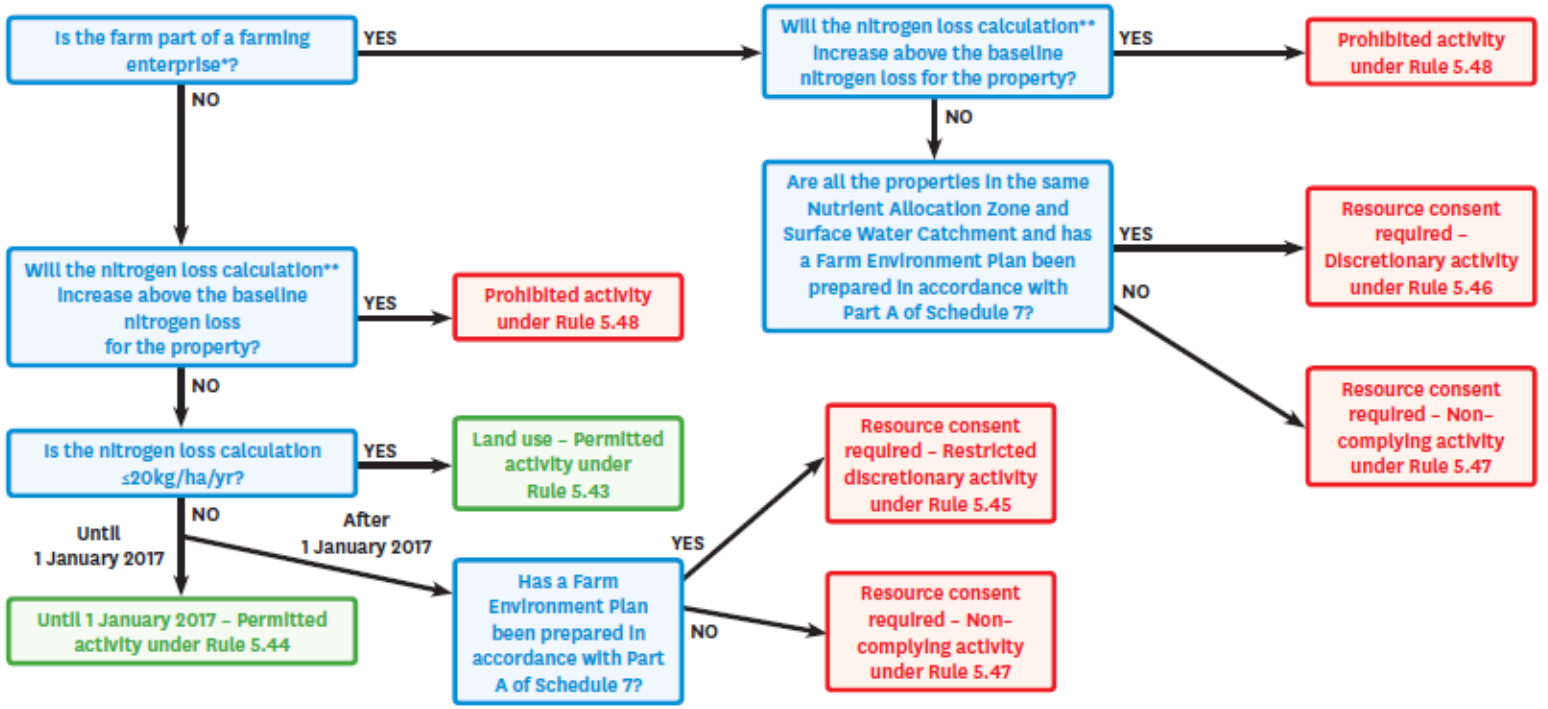
Land & Water Regional Plan

4

Nutrient Management Rules

Red Zone Rules – Water quality outcomes not met



*Farming enterprise means an agglomeration of parcels of land held in single or multiple ownership that constitutes a single operating unit for the purposes of nutrient management

**Nitrogen loss calculation means the discharge of nitrogen below the root zone, as modelled with OVERSEER™, averaged over the most recent 4-year 1 July to 30 June period and expressed in kilograms per hectare per year. If OVERSEER™ is updated, the most recent version is to be used

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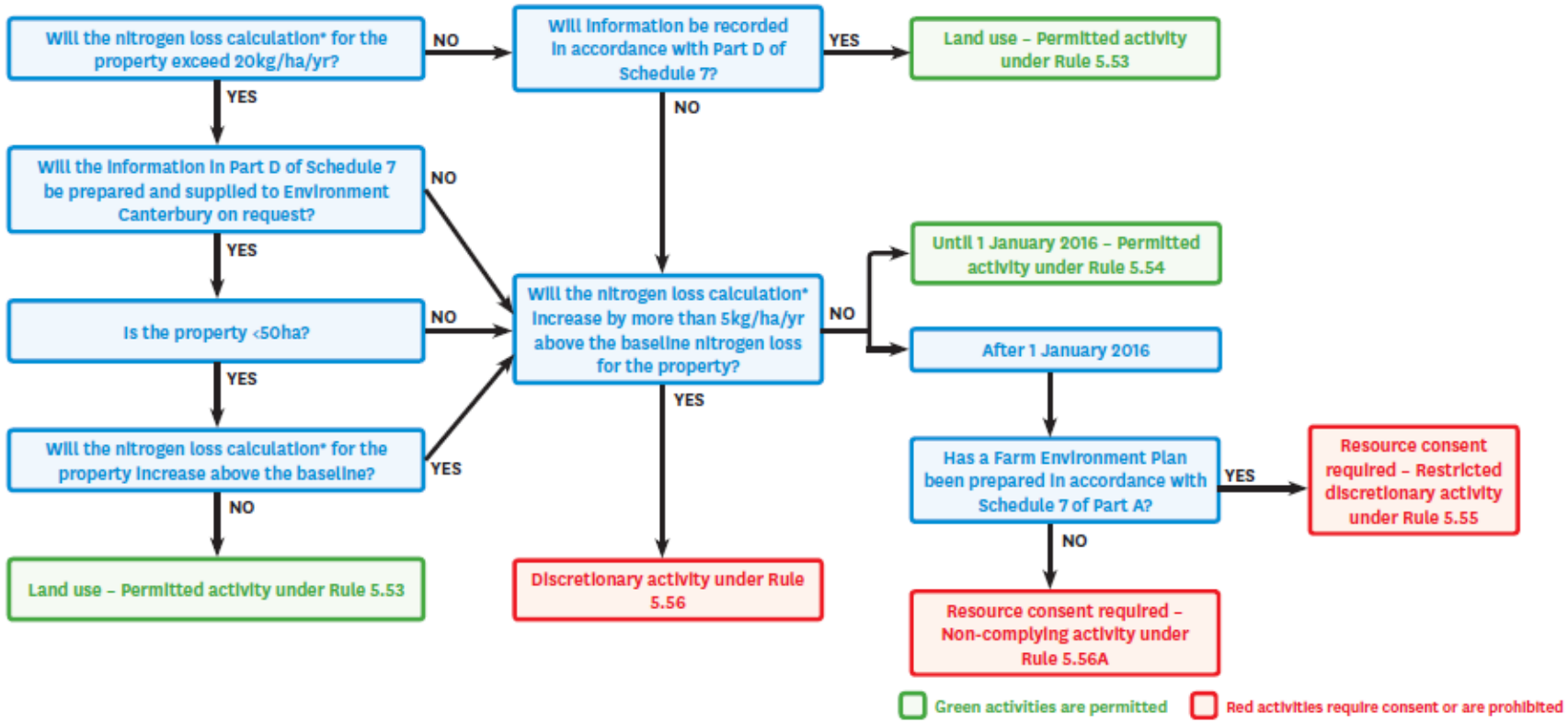
Nutrient Management Rules

Orange Zone Rules – At risk



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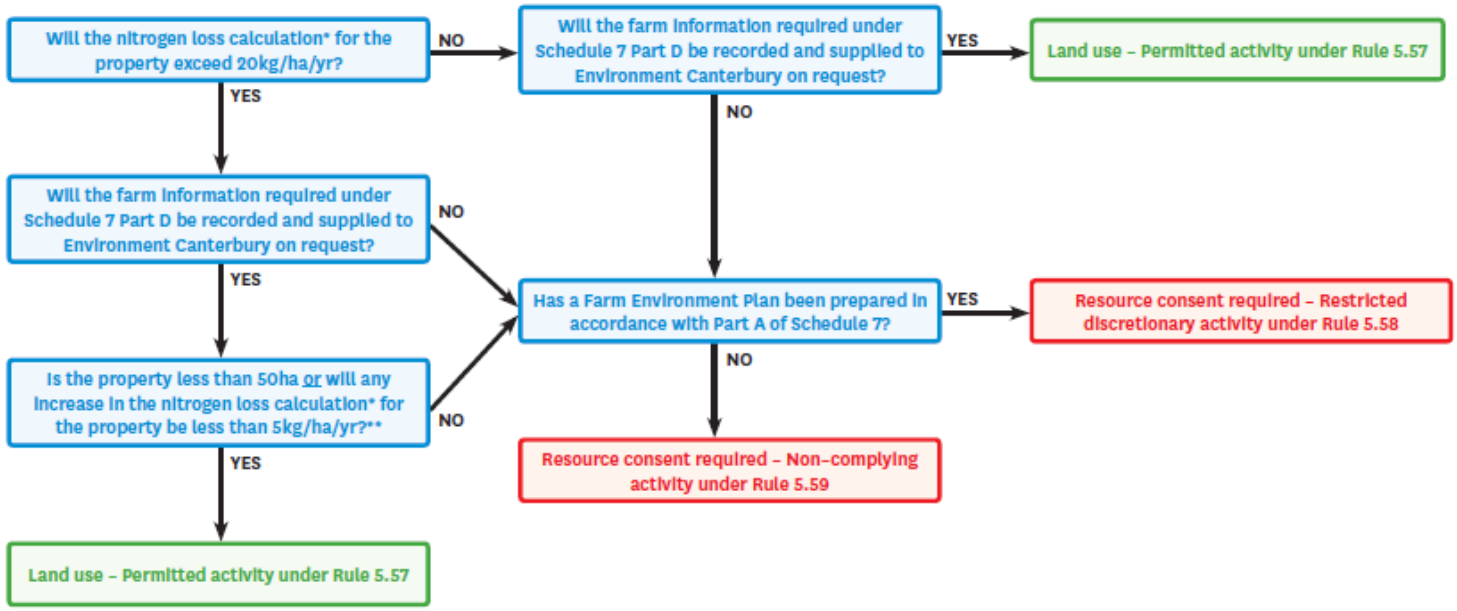
Nutrient Management Rules

Green and Light Blue Zone Rules – Meets water quality outcomes/Unclassified



Green activities are permitted Red activities require consent or are prohibited

*Nitrogen loss calculation means the discharge of nitrogen below the root zone, as modelled with OVERSEER™, averaged over the most recent 4-year 1 July to 30 June period and expressed in kilograms per hectare per year. If OVERSEER™ is updated, the most recent version is to be used

**Note that one clause only needs to be met here, so if a farm is larger than 50ha in area but its N-loss calculation is less than 5kg/ha/yr, the condition is met

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