Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments.

Submission form on publicly notified – Proposed Waikato Regional Plan Change 1 – Waikato and Waipa River Catchments.

SubForm	PC12016	COVER SHEET	
FOR OFFICE USE ONLY			
		Submission Number	
Entered		Initials	
File Ref		Sheet 1 of	

FORM 5 Clause 6 of First Schedule, Resource Management Act 1991

SUBMISSIONS CAN BE	
Mailed to	Chief Executive, 401 Grey Street, Private Bag 3038, Waikato Mail Centre, Hamilton 3240
Delivered to	Waikato Regional Council, 401 Grey Street, Hamilton East, Hamilton
Faxed to	(07) 859 0998 ***Please Note:*** *if you fax your submission, please post or deliver a copy also*
Emailed to	healthyrivers@waikatoregion.govt.nz ***Please Note:*** *Submissions received my email must contain full contact details. We also request you send us a signed original by post or courier.*
Online at	www.waikatoregion.govt.nz/healthyrivers
We need to receive your submission by 5pm, 8 March 2017.	

YOUR NAME AND CONTACT DETAILS		
Full name Graeme Monk		
Full address 433 Forest Road R.D.2 Reporoa		
Email shelley.monkee@gmail.com	Phone 07 3338775 021899450	Fax

ADDRESS FOR SERVICE OF SUBMITTER		
Full name		
Address for service of person making submission		
Email	Phone	Fax

PLEASE INDICATE WHETHER YOU WISH TO BE HEARD IN SUPPORT OF YOUR SUBMISSION
☑ I wish to speak at the hearing in support of my submissions.
☐ I do not wish to speak at the hearing in support of my submissions.

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

SIGNATURE OF SUBMITTER *(or person authorised to sign on behalf of submitter)* *ignature is not required if you make your submission by electronic means.*	
Signature 	Date 3/3/17
Personal information is used for the administration of the submission process and will be made public. All information collected will be held by Waikato Regional Council, with submitters having the right to access and correct personal information.	

SUBMISSION POINTS: General comments

I own a 78 ha dairy farm milking just under 200 cows .My farm is in Reporoa and in priority 1

We run a profitable system based on wintering our stock on the farm using winter crops. We have fenced our water ways are progressively planting the steam

In the future, we plan to continue running our farm sustainably and profitably

I am concerned about the following issues with PC1 that the science that overseer is biased on is to slow to be used as a regulatory tool and is not keeping up with farmers who are proactive in improving methods to mitigate there out puts .

I support the submission that has been lodged by Federated Farmers. I am particularly concerned about the following aspects of Plan Change 1:

- The significant negative effect on rural communities
- The cost and practicality of the rules.
- The effect that the Nitrogen Reference Point will have on my business and my economic wellbeing.
- The Farm Environment plan requirements leading to unnecessary and costly regulation of inputs, outputs, normal farming activity and business information
- The costs and practicality of the rules and requirements for stock exclusion, the Nitrogen Reference Point and the Farm Environment Plan.
- The timeframes for complying with the Nitrogen Reference Point rules which are too short and unachievable
- The plan significantly exceeding the 10 year targets in many attributes and areas
- The lack of science and monitoring at the sub catchments level

I wish to be heard at the Hearing.

I am concerned about the implications all of this will have for my property and for my current activity as described above. I set out my concerns more specifically in the table below.

SUBMISSION POINTS: Specific comments

Page No	Reference (e.g. Policy, or Rule number)	Support or Oppose	Decision sought Say what changes to Plan Change 1 you would like	Give Reasons
40	**Rule 3.11.5.2** Permitted Activity Rule – Other farming activities			
41	**Rule 3.11.5.3** Permitted Activity Rule – Farming activities with a Farm Environment Plan under a Certified Industry Scheme	**OPPOSE**	Amend 3.11.5.3 as requested by Federated Farmers in their submission.	This proposal will impose significant costs on my farming activities including [I am also concerned that this is not practical because

Page No	Reference (e.g. Policy, or Rule number)	Support or Oppose	Decision sought **Say what changes to Plan Change 1 you would like**	Give Reasons
42	**Rule 3.11.5.4** Controlled Activity Rule – Farming activities with a Farm Environment Plan not under a Certified Industry Scheme	**OPPOSE**	Amend 3.11.5.4 as requested by Federated Farmers in their submission.	This proposal will impose significant costs on my farming activities including I am also concerned that this is not practical because
44	**Rule 3.11.5.5** Controlled Activity Rule – Existing commercial vegetable production			
45	**Rule 3.11.5.7** Non-Complying Activity Rule – Land Use Change	**OPPOSE**	Amend 3.11.5.7 as requested by Federated Farmers in their submission.	This proposal will impose significant costs on my farming activities including I am also concerned that this is not practical because
46	**Schedule A:** Registration with Waikato Regional Council			

Page No	Reference (e.g. Policy, or Rule number)	Support or Oppose	Decision sought **Say what changes to Plan Change 1 you would like**	Give Reasons
47	**Schedule B:** Nitrogen Reference point	**OPPOSE**	Amend Schedule B as requested by Federated Farmers in their submission.	This proposal will impose significant costs on my farming activities includin
50	**Schedule C:** Stock Exclusion	**OPPOSE**	Amend Schedule C as requested by Federated Farmers in their submission.	This proposal will impose significant costs on my farming activities includiam also concerned that this is not practical because

Page No	Reference (e.g. Policy, or Rule number)	Support or Oppose	Decision sought Say what changes to Plan Change 1 you would like	Give Reasons
51	**Schedule 1:** Requirements for Farm Environment Plans	**OPPOSE**	Amend Schedule 1 as requested by Federated Farmers in their submission. Farmers who are actively using mitigations be given reductions in there overseer file I enclose an article from dairy nz regarding catch cropping after winter crops I have and still use these but my overseer does not reflect this	This proposal will impose significant costs on my farming activities including . I am also concerned that this is not

Page No	Reference (e.g. Policy, or Rule number)	Support or Oppose	Decision sought Say what changes to Plan Change 1 you would like	Give Reasons

Catch crops for production and environmental benefits

The fallow period after winter grazing of kale or fodder beet crops creates a potential risk for nitrogen leaching. This risk can be significantly reduced when a catch crop is established directly after grazing in winter.

Brendon Malcolm, Edmar Teixeira, Shane Maley, Paul Johnstone, John de Ruiter, **Plant & Food Research**

Catch crops, often referred to as cover crops, are by no means a new phenomenon in the response to reducing nitrogen (N) leaching risks. In arable cropping systems, catch crops are often established in autumn and are very effective at reducing N leaching losses during the following winter period[1,2]. Using this concept to 'mop-up' N after winter forage crop grazing is a novel approach that has only recently generated interest in New Zealand, particularly in the South Island.

The challenge

Winter forage kale and fodder beet are important single-graze crops in livestock production systems. However, given the high-yielding nature of these winter crops, animal stocking densities are typically high, resulting in a large number of urine patches within a relatively small area of land[3]. Urine is the main source of N leaching in grazed systems, particularly when there is no forage growing to use it. Therefore the potential for N leaching losses after crop grazing is high[4,5]. Furthermore, ground often remains fallow for three to five months after grazing. During the fallow period, urinary N is converted into nitrate, which is especially susceptible to leaching loss.

The question is – "can a catch crop be successfully established during the winter-spring fallow period to reduce N leaching, and also produce additional forage biomass?"

Key findings

- A winter-sown cereal catch crop can reduce soil mineral nitrogen and reduce nitrogen eaching by 22–40%.
- Additional forage production is an extra benefit of catch crop establishment in winter.
- The reduction of N leaching risks by growing catch crops varies from year to year depending on weather conditions, particularly during catch crop establishment.
- Oat catch crops could be successfully established by direct-drilling after kale grazing. However, cultivation may be necessary after fodder beet grazing because of greater soil compaction from animal treading.

Reducing N leaching

Research has demonstrated that growing catch crops after winter forage grazing has significant environmental benefits. A Pastoral 21 (P21) programme experiment at Lincoln University indicated that on a stony soil a catch crop of oats sown between 21 and 63 days after urine deposition in early winter could reduce the amount of N leaching loss by 22–40% compared with no catch crop[6] (Figure 1).

In general, the earlier the crop was established after grazing, the greater the potential to reduce N leaching.

On other deeper Canterbury soils, reductions in N leaching are also likely. Data generated from the Forages for Reduced Nitrate Leaching (FRNL) programme indicates that oats sown in either July or August substantially reduced the amount of N remaining in the soil profile, by up to 86% compared with that in fallow plots[7] (Figure 2).

Figure 1: Relative effect of delaying the sowing of oats, following simulated winter forage grazing in 2014, on mineral - N leaching after applying urine to lysimeters[6] (P. Carey pers comms). Based on these findings, earlier sowing of catch crops is recommended.

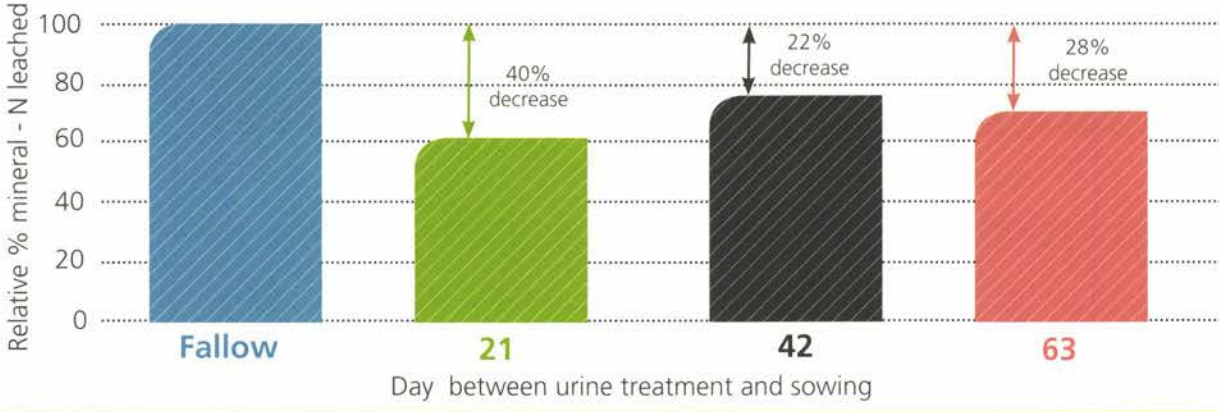
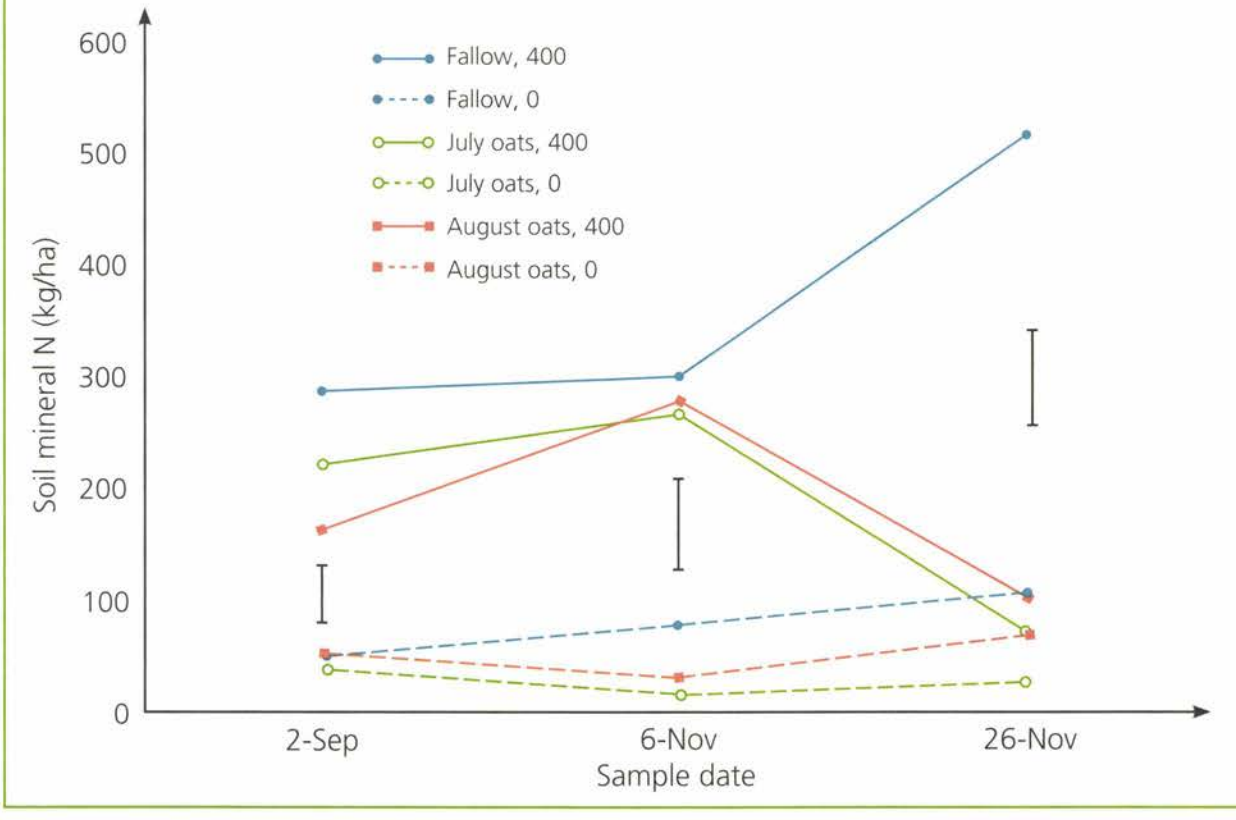


Figure 2: Change in soil mineral nitrogen (kg N/ha between 0–120 cm depth) under an oat catch crop sown in either July or August on Templeton silt loam[7]. Fertiliser rates of either 0 or 400 kg N/ha represent non-urine and urine patch areas of a paddock, respectively, applied on 1 July as urea. Vertical bars represent the least significant difference (LSD) at the 5% level.



Although this is not a direct measure of N leaching outcomes, and the effect is perhaps overemphasised by the apparent high rates of mineralisation in the fallow treatment during November, it demonstrates the ability of a winter-sown oat crop to 'mop-up' residual soil N.

Similar work in the North Island (Central Plateau) also indicates that deep-rooted chicory, sown in spring after winter grazing of a kale-swede mixed forage, could reduce the amount of soil mineral N at a 60–90 cm depth by 35% compared with ryegrass, by the following autumn[8].

It is important to recognise that N leaching is strongly dependent on crop management and the timing and amount of rainfall. Therefore, the reduction in N leaching loss from a catch crop will vary with sowing time and also from year to year[9]. Weather, particularly rainfall and temperature, influences how much N moves through the soil profile and how much, and how quickly, N is used by the catch crop.

Table 1: Average cost of production of crops grown in a kale-only or in a sequence cropping system on a stony Canterbury soil, over three years. Data sourced from DairyNZ website article[10], http://www.dairynz.co.nz/media/3360233/sequence_cropping_kale_and_oats.pdf.

Treatment	Mean yield at time of grazing	Costs	
	(t DM/ha)	($/ha)	(c/kg DM)
Kale-only +	13.4 ±1.7*	$2,789 ± $302	21.1 ± 4.2
Sequence cropping			
Late-sown kale	12.0 ± 2.4	$2,299 ± $341	19.8 ± 5.4
Oats	7.6 ± 2.2	$1,338 ± $82	18.6 ± 4.7
Late-sown kale + oats	19.6 ± 2.3	$3,637 ± $316	18.9 ± 3.7

**± One standard deviation*

+To account for the full cost, imported feed must be added to the early-grown kale scenario; the exact cost will depend on the type of supplement imported.

Biomass production potential

Establishing an oat crop after winter grazing can offer additional annual biomass production, and, in turn, higher farm productivity. For example, an oat crop grown in sequence with kale in Canterbury can yield 3–7 t DM/ha per year more feed than a kale-only system, at a similar cost of production per kg DM[10].

An estimated cost analysis of a kale-oat cropping sequence compared with one of kale-only is provided in Table 1. In this example, the kale–oat sequence crop system provided all the feed needed for dry cows from the end of May until early to mid-August for approximately $0.19/kg DM.

On deeper soils, the production potential of an oat crop is likely to be greater than those grown on stony soils, because of higher soil water-holding capacity. Yields of 6–12 t DM/ha in large field plots have been reported on Templeton silt loam soil when grown through until 'green-chop' maturity stage[7] (50% ear emergence). Importantly, it is evident from this work (and in current FRNL experiments) that most of the biomass is accumulated during October and November.

Therefore, not harvesting before 'green-chop' can result in significant yields. However, delaying harvest beyond 'green-chop' will compromise quality in terms of the amount of metabolisable energy per unit of DM.

It is important that the use of catch crops be analysed in the context of each system. For example, in dryland systems, where subsequent spring crops rely heavily on stored water from winter rains, catch crops may not be a suitable option because they can deplete valuable soil water through transpiration in early spring.

Method of catch crop establishment

There can be practical challenges to sowing a catch crop in the middle of winter, particularly in the South Island. In particular, it is unclear what are the most appropriate methods for successfully establishing catch crops to ensure sufficient soil-to-seed contact without restricting emergence. This will undoubtedly be dependent on soil conditions both at the time of grazing and at sowing. Recent on-farm research in FRNL has investigated three different approaches to sowing catch crops following grazing of either kale or fodder beet, on a free-draining soil:

1. Broadcast (after surface grubbing), then maxi-till
2. Tillage (grub, power-harrow, roll), then drill
3. No tillage (direct-drill).

Preliminary emergence and yield data from this work indicate that the method of establishment is important when establishing oats, particularly after grazed fodder beet. As a result of heavy treading and the formation of a hard surface crust under fodder beet grazing, tillage was necessary for two reasons:

1. to enable the drill coulters to penetrate the soil surface and ensure seed was placed at the appropriate soil depth, and
2. to allow seedlings to emerge without undue surface resistance.

Direct-drilling, after kale grazing, was shown to be a viable option, with good emergence and DM yields that were not too dissimilar to the tillage treatment. Although broadcasting oat seed after grazing seems an attractive low cost option from an operational point of view, some form of surface working is likely necessary to achieve sufficient soil-to-seed contact and a good catch crop establishment.

Overall, yields ranged from 7–10 t DM/ha. For oat seed broadcast two–three days before fodder beet grazing on a 4 m x 20 m strip ('proof-of-concept') results were particularly poor, with <1% of plants successfully establishing. This was also attributed to the compacted soil.

On soils that are heavier or more prone to surface capping, successful catch crop establishment relies on good management of the fallow soil after grazing to ensure optimum conditions for germination. For example, as conditions allow, immediately grubbing/ripping recently grazed land will facilitate drainage and evaporation of subsequent rain events, and soils will dry out more quickly. This might allow machinery access earlier for catch crop sowing than what might have otherwise been possible.

Conclusions

Growing a catch crop of oats after winter forage grazing can offer significant yield benefits, as well as reduce N leaching losses. The degree of benefit is largely dependent on management for achieving high catch crop yields (e.g. early sowing and establishment method) and on seasonal weather, particularly timing and amounts of rainfall.

The majority of the biomass accumulation in catch crops is during October and November. Therefore, delaying harvesting by only two–three weeks around the 'green-chop' maturity stage (early ear emergence) can have significant yield advantages. This will be governed by the requirements for timing of the following crop.

It is important to consider the most appropriate method for establishing the crop, which will depend on the surface conditions at the time of grazing and at sowing. Fodder beet grazing can result in heavily compacted soils and therefore some form of cultivation may be necessary.

Fast facts

- Growing catch crop oats after winter forage grazing can reduce risks of N leaching.
- Catch crop oats provide additional feed at a similar cost/kg DM as the kale.
- Oat yields at 'green-chop' silage maturity stage can range between 5 and 12 t DM/ha.

Acknowledgement

Forages for Reduced Nitrate Leaching is a DairyNZ-led collaborative research programme across the primary sector delivering science for better farming and environmental outcomes. The aim is to reduce nitrate leaching through research into diverse pasture species and crops for dairy, arable and sheep and beef farms. The main funder is the Ministry of Business, Innovation and Employment, with co-funding from research partners DairyNZ, AgResearch, Plant & Food Research, Lincoln University, Foundation for Arable Research and Landcare Research.

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