BEFORE THE ENVIRONMENT COURT **ENV-2010-WLG-000148**

UNDER	the Resource Management Act 1991
IN THE MATTER	of an appeal under Clause 14 of the First Schedule to the Act
BETWEEN	**FEDERATED FARMERS OF NEW ZEALAND**
	APPELLANT
AND	**MANAWATU-WANGANUI REGIONAL COUNCIL**
	RESPONDENT

EVIDENCE OF ANDREW JOHN HOGGARD

Federated Farmers of New Zealand
159 Khyber Pass
Private Bag 92-066
AUCKLAND 1142
Phone (09) 379-0057
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Contact Person: Richard Gardner

Introduction

1. My name is Andrew John Hoggard. I hold a Bachelor's degree in Applied Economics majoring in Agricultural Economics from Massey University (1996).

2. I have been farming since 1997, firstly as a sharemilker of 150 cows north of Upper Hutt, then shifting to the Manawatu in 1998 to sharemilk 440cows at Kiwitea. In 2008 we merged the family businesses into an equity company, of which I am now the Managing Director. We currently run 560 cows on the Kiwitea property.

3. I have competed in the Young Farmer of the Year contest gaining first place in the district finals three years in a row and won the regional final and progressed to the grand final in 2003, where in placed 7^{th}. I have also competed in the sharemilker of the year contest, gaining 2^{nd} place in the regional final in 2008.

4. I have been a District and Regional Chairman for Young Farmers of New Zealand, and then in Federated Farmers at the Provincial Level I undertook the roles of Dairy Section chairman (3 years), Provincial Vice President (3 years), and Provincial President (1 year/current). At a National Level for Federated Farmers I have held the role of Executive Member of the Dairy Industry Group (3 years), and the Vice Chairman of Dairy Industry Group (1 year/current). I am also a Trustee of the New Zealand Dairy Industry Awards Trust (3 years/current).

Scope of Evidence

5. In this evidence I describe from my own experience the practices dairy farmers currently undertake in order to minimise the environmental impact of dairy farming and most specifically to address the impacts of dairy farming activities on water quality.

6. Most of the environmental tools that farmers have at their disposal can also have on farm production/efficiency benefits. Farmers who adopt these tools

generally do so on the basis of the on-farm benefits primarily and secondly on the environmental benefits.

Intensification

7. The increased Intensification of dairy farms (as referenced in the decisions version of the One Plan) is cited as a reason behind the need for increased regulation of dairy farming in the Horizons region. However the Dairy Industry Statistics published each year by DairyNZ and LIC and available from the DairyNZ website, shows that for the last decade the average stocking rate for the Manawatu Region (this includes Manawatu, Rangitikei, Wanganui, and Kapiti districts) has been 2.7 cows to the hectare, the last year we have records for, the rate was 2.71 cows to the hectare, and this is a decrease from the previous two years. Looking back at the statistics you can see that the number fluctuates around the 2.7 cow/ha mark. This mirrors my own farm. If I have had a good result in terms of cows in calf, and also have a good number of new heifers coming in then I might for a season have a slightly higher than normal stocking rate, and vice versa if things haven't been as good, the stocking rate could well be lower. But my aim is to be around the 2.7cow/ha mark, as that is what I feel is a reasonable stocking rate for this region and appropriate for my farm.

Nutrient Budgets (NB)

8. I believe that almost all dairy farmers do a nutrient budget (NB). For most it is done for them by their Fertiliser Rep, using the OVERSEER nutrient modelling programme. From the farmer perspective these NB are done for the purpose of determining the quantities of fertiliser to be used in the coming year to ensure that the farms fertility goals will be meet. These NB are usually done in conjunction with soil tests on the farm to determine the fertility status of blocks on the farm. The farmer then decides whether they need to increase the soil fertility to meet production goals, or whether fertility is at an optimum level, or above optimum. Fertiliser is then selected to be applied at rates that will achieve the optimum.

9. The Environmental benefits of this approach are that it avoids over-application of fertiliser. If too much fertiliser is applied then there is an

increased risk of these expensive nutrients being lost to the wider environment. By avoiding over-application the farmer also saves money, by only buying the fertiliser that is required.

10. A NB is not something that a farmer will constantly check up on. Once you have planned your fertiliser applications for the year, you will then just refer to your fertiliser plan around the time of application to ensure the right fertiliser goes on the right block.

11. Some view the fact that farmers don't regularly look at their NB as a sign they don't care about it. The reality is that you don't actually need to repeatedly look at it.

12. As an example of the benefits of NBs, when my family moved to Kiwitea back in 1998, the previous owners had just applied the same fertiliser year after year, with some blocks which did not need certain nutrients having them applied. The result was a number of animal health issues in the first few years. By doing soil tests, using OVERSEER and doing a NB we were able to apply the correct amount of fertiliser, and the animal health problems disappeared after 4 years.

Nutrient Management Plans (NMP)

13. It is my understanding that NMPs are a step up from NBs, with scenarios being presented to the farmer of various options that will theoretically achieve the farmer's production and environmental goals. The farmer can then choose to apply those options or not. Some options may be complementary to others, while others will be exclusive of other options. In recent years I have had NMP's prepared for my farm. The most recent NMP prepared for my farm is attached as appendix 1.

14. As an example, there could be several options around upgrading the farm effluent system, whilst there could be many options, only one will be selected. NMP do not currently take into account financial information, farm physical limitations, or labour limitations. Those factors could well rule out certain options.

15. Farmers who use their NMP should see gains in terms of cost savings and/or production improvements over just using a NB, and also should result in reduced nutrient loss over a NB only.

16. I understand following discussions with fertiliser companies that they have delivered NMPs to around 40-50% of dairy farmers in the Horizons region. Knowledge of these NMP and their implementation is increasing.

17. It is from my own experience that I suggest a NMP for a farm will most likely adapt and change from year to year, and weather extremes could well force changes within a season. This could then mean that in order for a farmer to comply with their NMP, which could require key items in the NMP being made consent conditions, would be to potentially require a variation to their consent issued nearly every year. It is my view that this is not practical. I therefore have concerns with wording in the rules that states a farmer must "comply" with their NMP.

18. It is my experience that logical farmers will strive towards achieving those gains identified within the NMP but if the on-farm situation changes, which it can do quickly and without warning, farmers need the flexibility to adapt.

19. I know that DairyNZ is currently working on what it calls a Sustainable Milk Production Plan which is a step up from NMP's. It is intended to be modular, bringing together a NMP, a Feed Plan, and a Riparian Management Plan along with financial goals and considerations.

Effluent Recycling

20. Within the Horizons region most farmers apply their effluent to Land via travelling irrigators or sprinklers, there was a move to this over a decade ago from two pond systems which discharged directly to water.

21. In my time in the dairy industry I have gone from treating effluent as an annoying waste product to be disposed of, through to viewing it as a good source of nutrients that is difficult to manage due to the poor available technology at that time through to now where it is identified as an excellent source of nutrients, which are then applied highly efficiently with a low

application spreader, and stored during periods when the effluent would be wasted. I now also take great care in ensuring that accidents don't happen and have put in place many safeguards to ensure this. With the technology, knowledge, and advice available to dairy farmers I see that there will continue to be improvements in this field for a time to come.

22. Gains that I can see happening are:
    a. More farms switching to deferred irrigation through the current consenting process;
    b. Better system design through the new codes of practice;
    c. More farms switching to low application spreaders, as their older ones need replacing. Big gains could be made here through the reduced preferential flow occurring on mole drained paddocks, where application depths over 10mm will result in effluent quickly finding its way into mole drains then to farm drainage ditches and finally into waterways;
    d. Increased awareness of effluent management from other areas such as feed pads and underpasses.

Feed Pads and Herd Homes

23. The use of feed pads and herd homes is another activity on-farm that can have economic and environmental gains. Due to the high cost of them farmers will only install them if they make financial sense. Those farms that have predominately heavy soil, and/or high rainfall, will see benefits in the use of them through:
    a. Improved animal welfare as the cows are able to get off wet paddocks and stand on dry ground and under cover or out of the wind;
    b. Improved utilisation of supplementary feed with the feed being put on dry ground where the cows can't stand it will not be trampled into a muddy paddock rather than consumed;
    c. Cows will also spend less time in the paddock which means less pugging damage to soil structure. A heavily pugged paddock takes longer to regrow grass, and the yields on the paddock are reduced.

24. Overall this should result in increased milk production, as well as reduced animal health costs.

25. The environmental benefit include reduced levels of urine hitting the paddock and more occurring within the feed pad where it is captured and stored for latter application at a vastly lower rate of Nitrogen (N) per hectare via the effluent system.

26. If the deferred irrigation is managed correctly then the N will be better retained in the root zone of the soil and taken up by pasture for growth, rather than leached from the soil profile.

27. Additionally, soil with poor structure appears to lose plant available N to a greater extent than paddocks free from pugging damage. From observations I have noted that a paddock that has been pugged looking almost yellow in colour which indicates low plant N levels when compared to the dark green colour of grass in a paddock that has no pugging damage.

28. In my own situation we have looked at the potential for a feedpad, and have considered it quite thoroughly. The focus of our thoughts, was in what way could we make further improvements to our farming system. There were three options, irrigation, in-shed meal feeding, or a feed-pad. Irrigation was ruled out due to lack of available water. Both in-shed meal feeding and the feedpad would have been around the same cost, but then the added cost of upgrades to our effluent system would have made it more expensive to incorporate a fed pad. Our soils are generally free draining so the gains from a feed pad would have only been slight, there would have been some time savings in way of more centralised feeding of supplements, however then we would have more time required of us for maintaining the feedpad. In-shed feeding offered similar efficiency benefits but with less labour input. Hence that was the decision we made.

29. Some comments I have seen regarding the use of herd homes has suggested that cows be stood of for 18 hours a day. I believe that would be very negative for the animal's welfare, with the exception of extreme weather events. Maintaining animals in a housed or contained situation like a herd home for 18 hours a day will present additional management challenges in achieving good animal welfare outcomes.

30. Also in this category you have free stall barns, there are none of these in the Manawatu currently. In these the cow spends all day inside the barn, and they have stalls with bedding material where the cows can go and sleep. These barns would dramatically reduce N leaching from the farm, through the collection of all wastes from the cow. However not only is there a very high capital cost to constructing them, but you also have higher running costs with the need to cut and carry all the feed to the cows. There also seems to be very little appetite from the public at large for these barns as they are generally viewed as factory farming.

31. I believe these examples, show the challenge farmers face in the need to balance many different criteria, the environment, animal welfare, staff welfare, market perceptions, financial sustainability, and also their personal time. Thus we need to ensure that any rules around farming, take into account the full scope of issues and considerations.

Urease Inhibitors

32. The main product on the market is Eco-N from Ravensdown. There has been some uptake of this product in the region, but it isn't as effective in this region as it is in Canterbury, due to higher rainfall in some parts of the catchment and also warmer winter temperatures. Thus there is a perception that it is not effective. It is still effective at reducing N losses, but the pasture growth gains are quite small. Thus for many farmers it doesn't pass the good for the bottom line and for the environment test.

Wetlands and Trees

33. The use of wetlands and stands of trees on farms will have an impact on the N leaching from a property. In our own case the farm has a 10 ha stand of native trees on it, and we have left it alone. When we purchased the farm we brought it based on the productive capability of the farm. A stand of native trees has no productive capability and effectively it came free with the farm.

34. When you look at a NMP that includes the native bush block and other sidlings and non effective hectares, to one that is just based upon effective hectares then there is around a 6kgN/ha leaching loss difference over the

whole farm. This non-farmed land effectively has a dilution effect with regard to N loss.

35. Shelter belts and windbreaks, could add to the farms biodiversity and potentially reduce N leaching. Shelter and wind breaks also provide shade and shelter for the cows which will have production improvements as less energy is needed by the cows to stay warm (or cool) and can instead then be used for producing milk.

36. As far as I know this can't be modelled at present but surely such activity should be encouraged.

37. As I understand it wetlands can also reduce of N losses to water, and are potentially an option that could be used by farmers on their non-productive parts of the farm if these areas exist.

38. There could be gains for the wider community in terms of biodiversity and waterfowl habitat. As a farmer if I was approached groups or council who wished to create a wetland on a non-productive part of the farm, I would be happy to engage in a collaborative approach to making that happen. I think that this sort of collaborative approach would be the best way to achieve such outcomes.

Chicory

39. Many farmers are sowing chicory for use as a summer feed, chicory is a herb that is highly palatable to cows, provides a good source of nutrients to cows, improves soil condition through its fibrous root structure, and to top it off it is understood to reducing nitrogen losses due to its deep roots being able to absorb more nitrogen than normal pasture would. I understand that work is currently being done that hopes to show these leaching reductions in OVERSEER, which could well lead to increased uptake of Chicory amongst farmers. I have personally used it for the first time this year, on a paddock we had struggled to find another productive use for. This paddock had been damaged by the 2004 floods and was covered by 1 -2 metres of sand and gravel. We tried many options none giving a decent production. Last year we sowed the paddock into chicory and it has been a tremendous success from

a purely farming basis, if it also helps reduce your N leaching then even better.

Irrigation

40. The ability of farmers to irrigate pastures is also another win-win situation, obviously the farmer is able to grow more grass and thus have higher milk production, but also because the grass that gets grown uses the N being mineralised and made plant available. If the farm went into soil moisture deficit and grass growth slowed down, then N which will continue to accumulate in the soil through mineralisation (although slower as soil moisture is also a driving force here) could well be lost through leaching when the first decent downpour occurs. Irrigation has the ability to maintain soil moisture conditions at optimal levels for pasture grow and thus N uptake.

Maize Silage

41. I have seen that the feeding of maize silage has an effect in reducing N leaching, as it is a low N feed and lowers the N levels in the cows urine. It is also a very good feed for cows, and will have production gains, and financial gains if used correctly. But to suggest the use of maize silage to a farm that is a class 1 farming system (all grass, low levels of supplements) i.e. a low intensity operation would change this farming system to a different farm class with more intensive inputs. If the farmer does not have the management systems to handle such a change in farm class then it may not provide benefit, either financial or environmental.

Other Activities

42. There are a whole range of other things that farmers do, that have farming and environmental benefits, that I just think of as smart farming, you can't measure it, and it is hard/impossible to police it. For example – we have less effluent generated in the cow shed if everyone in the cowshed is calm and quiet. Thus less effluent that needs to spread onto land, and less water required for hosing down. Also less time spent in the cowshed, and power savings.

43. The same goes for shifting stock in the races, calm and quiet, then they make less mess in the races that can be washed off, potentially to waterways, or leach through. Also by maintaining good races you will also reduce effluent on the races. This will also help with cow flow to the cowshed (saving time, and petrol) and also reduce lameness.

44. By being aware of my paddocks I take precautions to ensure that I minimise any pugging damage during wet weather, even if it means shifting the cows at 11pm.

45. Applying N fertiliser at light rates and regularly, will result in better utilisation, reduced leaching, and more pasture growth. By making good decisions about when to apply that fertiliser will also give efficiency gains for the nutrients applied. For example if it is a cold and wet September like 2010, then it will be a waste of money to apply N, however fertiliser applied during the 2011 September delivered fantastic results.

What is Reasonably Practicable?

46. To me as a farmer reasonably practicable in summary constitutes making improvements to my farm that not only have a financial benefit (or are at least cost neutral), a physical benefit or human benefit in that they make my life easier, reduce work and or stress, and that the environmental benefit is measurable.

47. I suggest that if a farm is certified organic, then that farm has already been through a fairly rigorous audit process to get that certification, I wonder if further examination would be needed.

48. From my own experience of seeing how much our N leaching changed when we included the native forest block. Then perhaps a recognition of land set aside as protected (e.g. wetlands, QEII blocks etc.) could be recognised as a significant part of doing what is reasonably practicable.

49. Funding was recently announced for environmental farm plans to be done on diary farms within the Manawatu catchment as part of the Manawatu River Accord. My understanding is that it will be similar to the SLUI project, I would

suggest that any farms that volunteer for these plans are considered to be doing what is reasonably practicable.

50. Another appropriate step could be to use the new regionally based industry N leaching benchmarking guidelines. From these you will see what range of N leaching is currently occurring for the region and also identify to top and bottom performance levels regarding N leaching loss. Because benchmarking guidelines are an accurate reflection of what the current practice is within the region they have relevance.

51. I disagree with the use of Land Use Capability (LUC) targets based on what I see as the lack of fairness with it. This is because I fail to see how it could it be considered fair when two farmers may have identical levels of N leaching, and yet one is acceptable and the other isn't based solely on the LUC class of soil on their property. The effect on the environment is the N leaching not the soil class. As I understood the belief is that a higher class of soil will mean a higher level of production, and so for the economic benefit of the region we will allow higher levels of leaching on the better soil to get the higher production.

52. It is my experience that whilst better soil is definitely helps production it is in no way a guarantee of higher production. There are a large number of factors that contribute to a highly productive farm.

53. Finally for those farms that don't meet any of the above criteria then the farms NMP will contain a list of suggested actions, I would then expect the farmer to have a discussion with council on which of those practices are reasonably practicable for them to do and the reasons why or why not.

54. As an example in my own NMP, where my goals were to either maintain or reduce my N leaching, but also increase my production, there was one main suggestion around nitrogen application, mainly reducing it on one block and increasing it on all the others.

55. There are also long lists of standard actions that are generally viewed as environmentally good practice. I was already doing all of them with the exception of harvesting my supplements silage from the effluent block. I do

harvest some from the effluent block, but not all and it wouldn't fit in with my management techniques to do this.

56. The reasons for this are as follows: the effluent block is where the 2nd herd goes during the day. Whilst I can swap a couple of day and night paddocks back and forward, I can't swap paddocks between the herds as it will be a logistical nightmare/impossibility in terms of cows arriving at the shed and leaving from the shed. So when I identify a feed surplus on farm, and decide to shut paddocks up for hay or silage, then I skip whatever paddocks happen to be in front of the cows at that particular time. So some night and day paddocks from both herds will be shut up. For these reasons the particular 'good practice suggestion' is not reasonably practicable for me. Thus I would consider that I was already doing what was reasonably practicable.

57. A copy of my NMP is attached and the list of good practices is listed in Part E. This is by no means the full list, and I am sure that Horizons in conjunction with the Dairy Industry could come up with a more comprehensive list, that could be included in NMP's for this region, and these can form the starting point for the discussion on what is reasonably practicable for each farm.

58. The use of reasonably practicable considerations are highly relevant for the effective operation of dairy farms. The determination of what constitutes reasonably practicable must be determined case by case for individual farms and must have considerations that encompass cost for benefit and practical ability to apply. The requirement for farmers to use reasonably practicable measures offers the advantage of flexibility with the commitment to continuous improvement within the dairy farms of the Horizons region.

Conclusions

59. Dairy farmers are innovative and have in recent years adopted significant technologies to reduce the impacts of nutrient loss from farms to the wider environment.

60. Farms are all individual so what may be appropriate for one may not work for another. What is reasonably practicable must be integrated as part of the

overall farm management and consider the management , financial and other constraints that contribute to the farm system.

61. NMP's must allow for the flexibility of rapid responses by the farmer depending on unforeseen events.

Andrew Hoggard

March 2012

Appendix 1

Goals

Farmers Goals

Andrew has some simple but specific and measurable goals for the property from a nutrient management perspective.

Production

Achieve 1200kg MS/ha

Environmental

Keep N leaching at current level
Keep phosphate runoff risk at current level

Achieving these Goals from a Nutrient Management Perspective

Soil Test Level

To achieve this production target soil test levels will need to be at the upper end of the optimum range to ensure nutrient is available for good seasons of growth. Capital phosphate is already being applied to achieve higher soil phosphate levels. Given phosphate runoff risks are low on all risk factors, an increase in phosphate levels to the upper end of the optimum range will not increase the risk of phosphate runoff.

Nitrogen Fertiliser

Nitrogen fertiliser presents the first opportunity to reach production targets. At current prices Urea costs 14c/kg DM when used correctly compared to other supplements upwards of 30c/kgDM

Wise use of N does not necessarily mean an increase in the amount of N leached from the property. Current N leaching is shown below.

	N in drainage* (ppm)	N leached (kg N/ha/yr)	N surplus (kg N/ha/yr)	Added N** (kg N/ha/yr)	Wetland reduction (%)
Overall farm	5.1	21	106		
Block name					
Mataiawa Top terrace	7.2	27	151	100	0
Mataiawa Bottom	5.5	21	141	100	0
Waimara Top terrace	5.6	22	135	100	0
Waimara Bottom terrace	6.1	23	137	100	0
Waimara Drystock	4.7	18	76	30	0
Effluent	4.9	20	186	142	0

Using 150-180kgN/ha/yr (increase from 100) on all blocks with the exception of:

- Effluent block – increased from no N to 50N
- Mataiawa Top terrace – hot spot for N leaching, N use decreased from 100 to 80kg N/ha/yr
- Drystock block – continue at 30kgN/ha/yr (area for grazing dairy replacements)

	N in drainage* (ppm)	N leached (kg N/ha/yr)	N surplus (kg N/ha/yr)	Added N** (kg N/ha/yr)	Wetland reduction (%)
Overall farm	5.5	22	117		
Block name					
Mataiawa Top terrace	6.9	26	141	80	0
Mataiawa Bottom	7.2	27	195	180	0
Waimara Top terrace	6.7	25	163	150	0
Waimara Bottom terrace	7.2	27	166	150	0
Waimara Drystock	4.7	18	76	30	0
Effluent	5.4	22	218	195	0

As seen, the N leaching has increased by only 1 unit and the N concentration in drainage by only 0.5ppm using this alternative strategy. Using industry standard numbers shows how this change in N policy will affect production:

					15	80%	12	
Block	**Area**	**Current N Rate**	**Proposed N Rate**	**Change**	**Extra DM/ha**	**Utilisation**	**MS/ha**	**MS/Block**
Mataiawa Top	97	100	80	-20	-300	-240	-20	-1940
Mataiawa Bottom	28	100	180	80	1200	960	80	2240
Waimara Top	34	100	150	50	750	600	50	1700
Waimara Bottom	39	100	150	50	750	600	50	1950
Waimara Drystock	29	30	30	0	0	0	0	0
Effluent	26	0	50	50	750	600	50	1300
Total	**253**							**5250**

This strategy is not a recommendation but an example of how wise N use accounting for variability across the farm can potentially increase production with little effect on the environment. Obviously this strategy is more complicated than consistent N applications across the farm, but illustrates how production can be gained from accounting for the differences between blocks. Andrew should feel confident with his current N policy, with awareness that the Mataiawa Top block is a hot spot due to the soil type.

Other options to increase production are increase in the use of supplementary feeds and animal nutrition, but are beyond the scope of this report.

Further guidelines on N leaching from the regional council will help guide targets for the strategic use of N fertiliser.

'To create value for shareholders by the efficient supply of innovative products and services that meet clients' plant nutrient needs'

Nutrient management plan

For

HOGGARD

Prepared by

Jennie Lloyd

Date completed:	9 February 2011
Valid for period* :	2 years
Date to be revised* :	9 October 2013

* Unless significant change to farm management occurs within this period

Aim of report

The aim of this report is to provide a comprehensive plan for the management of macro- and micro-nutrients, specific to this property. Implementing the options recommended within this plan will improve nutrient management and provide a more sustainable farm-business operation, through:

- Tailoring fertiliser inputs based on block-specific nutrient requirements
- Optimising dairy shed effluent application so as to meet local regulatory requirements and improve the recycling of valuable nutrients within the effluent
- Increasing plant nutrient utilisation efficiency and therefore return on fertiliser expenditure
- Reducing nutrient loss to subsequent receiving environments while maintaining or enhancing production
- Reducing the risk of inducing animal health disorders by providing a more balanced fertiliser program
- Providing a clear record of on farm nutrient awareness and best practice
- Accounting for all nutrient inputs and outputs within the farm system, rather than just managing fertiliser nutrient use

This Nutrient Management Plan complies with the industry standard 'Code of Practice for Nutrient Management [with emphasis on Fertiliser Use]' (hereafter referred to as 'the Code'). Included in Part D of this report is a summary of some key BMPs outlined within the Code. The Code can be found on-line in full at www.fertresearch.org.nz/code-of-practice.

The BMPs and recommendations outlined in this report have been made in good faith but without warranty. Decisions and actions made as a result of these recommendations are the responsibility of those persons detailed in Part A of this report.

Order of content

The content of this document runs in the following order:

Part A: Action plan

Part B: Key property details

Part C: Soil fertility trends – property average

Part D: Soil fertility and nutrient budgets

- Property level report
- Block level report(s)

Part E: Guidelines and industry requirements

- Land and stock management
- Fertiliser management
- Dairy shed effluent management

Part F: Farm map

Part G: Overseer 'parameters report'

Part H: Fertiliser application records

Part I: Fertiliser recommendations / plans

Part A: Action plan

The following summary highlights key points taken from the body of this nutrient management plan, indicating where actions can be taken to improve on-farm nutrient management and profitability of fertiliser use.

General farm issues and opportunities
✓ The risk of phosphate runoff is low across this farm. All three risk factors (effluent, fertiliser and soil) are low across all blocks, no hot spots are seen. Continuing to keep soil phosphate levels in the optimum range and using RPR which ensure this risk stays low. ✓ N leaching losses for the property are low at 21kg N/ha/yr. This is confirmed by the nitrate level in drainage being 5.1ppm - well below the drinking water standard of 11.3ppm.

Mataiawa Top terrace	***97 ha***
✓ This block represents a 'hot spot' for nitrate leaching losses and 27kg N/ha/yr is being leached compared to the property average of 21kg N/ha/yr. This is due to the soil type (allophanic) and can only be managed rather than changed.	

Mataiawa Bottom	***28 ha***
✓ The nutrient budget suggests a small surplus of potassium, indicating that soil test levels will slowly increase over time. QTK levels are above optimum on this block, consider reducing potassium application rate. Monitor soil test levels to verify this trend is real.	

Waimara Top terrace	***34 ha***
✓	

Waimara Bottom terrace	***39 ha***
✓	

Waimara Drystock	***29 ha***
✓	

Effluent	***26 ha***
✓ Effluent N application is 142kg N/ha/yr and Horizions Regional Council set a limit of 150kg N/ha/yr. The effluent area is currently large enough but may need to increase in the future if production increases.	

Part B: Key property details

Property name	HOGGARD
Property type	Dairy
Address book N°.	3077517
Supply N°.	
Property address	244 Coulters Lane RD 7 Feilding

Owner name	HOGGARD		
Postal address			
Phone N°.	063289677	Mobile N°.	
Email address	ajhoggard@airstream.net.nz		

Contact name	Mr Andrew & Audra HOGGARD		
Postal address			
Phone N°.		Mobile No.	
Email address			

Blocks within the property

We have identified the following blocks within this property (See 'LMU' description in the Code, pages 20 & 54):

Block description	Effective area (ha)
Mataiawa Top terrace	97
Mataiawa Bottom	28
Waimara Top terrace	34
Waimara Bottom terrace	39
Waimara Drystock	29
Effluent	26
Total farm effective area	253

- Indicate these blocks on a farm map and attach as Part F of this report
- For full farm details, see 'Overseer parameters report' summary sheet in Part G of this report

Part C: Soil fertility trends – property average

Soil fertility trends for individual blocks are tabulated later in this report. Property-average soil fertility trends are shown graphically on the following page. To summarise these trends:

pH – The optimum range for most soils including those on this farm is 5.8-6.0. Ensure pH stays in this range with a sound liming programme to maximise production.

Phosphorus (Olsen-P) – Given this is a intensive dairy farm with ambitious goals for production, Olsen P values should be at the high end of the optimum range to maximise production. Targeting Olsen P values of around 30 is desirable. Don't forget to adjust Olsen P for long term RPR use by dividing Resin P by 1.7 to get an 'Olsen P equivalent'.

Potassium (QT K) – The optimum range for most soil types on the farm is 5-8, slightly higher on the allophanic soil (Mataiawa Top block). Target a QTK of 10 on this soil and 8 on the rest of the soils.

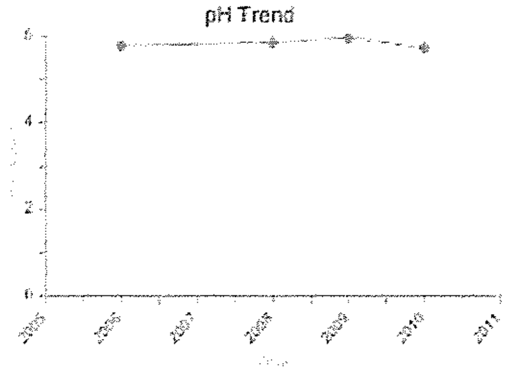
Sulphur (S-SO_4) – Sulphate sulphur is a snapshot measure and only provides an indication of immediate sulphur concerns. This property has some blocks with very low organic sulphur levels in which case regular sulphur applications will be needed to maximise production.

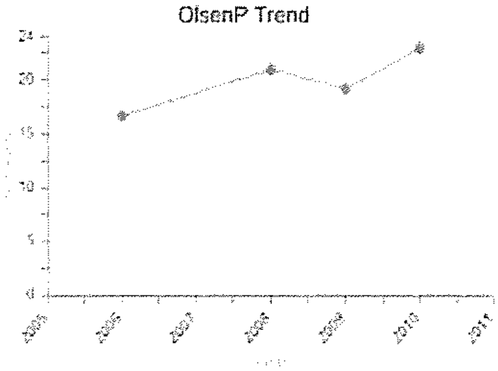
Magnesium (QT Mg) – Being in the range of 25-30 is optimum to ensure a good supply of magnesium in the diet of dairy cows. Target QTMg levels of 30 to provide a good dietary source of magnesium.

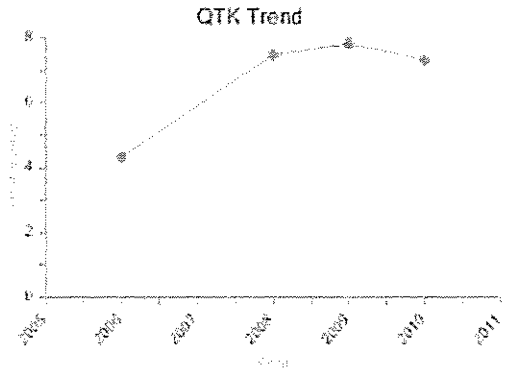
Calcium (QT Ca) – Calcium levels are best addressed with a liming programme and ensuring pH stays in the optimum range.

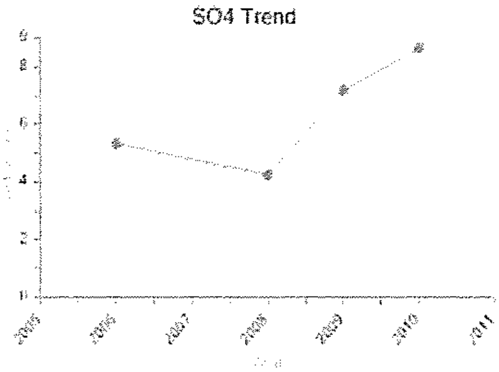
Sodium (QT Na) – Sodium levels are best assessed relative to potassium levels, ensure these two cations are always in a balanced ratio.

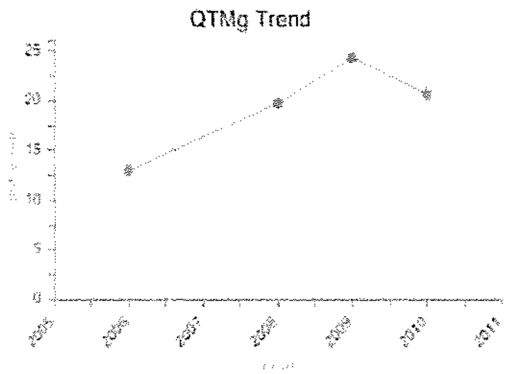
Soil fertility trends – property average

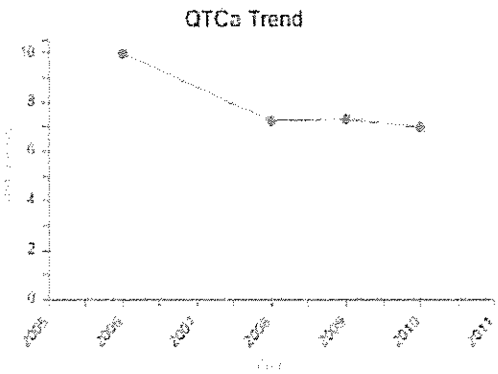


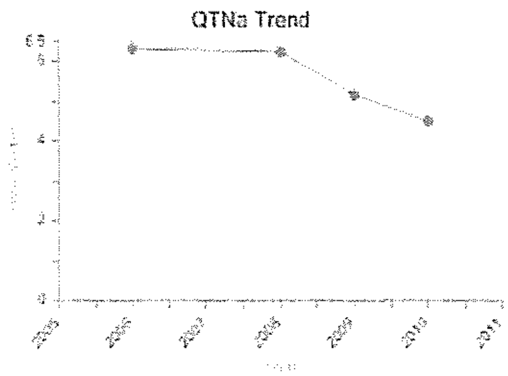












Part D: Soil fertility and nutrient budgets

Nutrient budgets are extremely useful to help predict changes in fertiliser requirements that may be required as a result of changes to farm management.
In the nutrient budget below, the bottom row entitled 'Change in inorganic soil pool' represents the net effect of the nutrient inputs and outputs that have been described for this farm. For each nutrient, if this number is close to zero, then soil fertility is likely to be maintained. If this number is negative, there is likely a nutrient deficit and the soil test for that nutrient is likely to decrease over time. If this number is positive, there is likely a nutrient surplus and the soil test for that nutrient should increase over time.

Property summary

Note that the nutrient budget below represents a whole-farm summary; nutrient flows within individual blocks may be quite different and are assessed individually in the following pages.

Nutrient budget for the property

		N	P	K	S (kg/ha/yr)	Ca	Mg	Na	H+
Inputs									
	Fertiliser and lime	69	33	11	18	79	2	57	-1.0
	House block imports	0	0	0	0	0	0	0	0.0
	Atmospheric/clover N	84	0	2	4	2	4	19	0.0
	Irrigation	0	0	0	0	0	0	0	0.0
	Slow release	0	3	13	4	2	3	5	0.0
	Supplements imported	2	0	2	0	0	1	0	-0.1
Outputs									
	Product	49	8	12	3	10	1	3	0.0
	Effluent removed	0	0	0	0	0	0	0	0.0
	Supplements removed	0	0	0	0	0	0	0	0.0
	Atmospheric	46	0	0	0	0	0	0	0.0
	Leaching/runoff	21	0	17	23	39	9	22	-1.3
	Net immobilisation/absorption	40	16	0	0	0	0	0	-0.1
	Change in inorganic soil pool	0	12	-2	0	35	1	55	0.3

Nitrogen loss indices for the property

N-leaching from farm systems can affect surface and groundwater quality. In some regions, N leaching caps have been imposed for individual farming properties. It is very important you understand the implication of this N-loss cap, and your obligation to ensure that your farming property does not exceed the maximum permissible N loss.

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	21
N concentration in drainage water (ppm)	5.1

Phosphorus loss indices for the property

Along with nitrogen, phosphorus is a key driver of algal growth in surface waterways. Minimising P loss will help to reduce the environmental footprint of your property. In most soils, P is lost mainly through surface runoff and erosion of soil particles.

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	Low	Low*	0.1 *

Issues identified for the property

→ The risk of phosphate runoff is low across this farm. All three risk factors (effluent, fertiliser and soil) are low across all blocks, no hot spots are seen. Continuing to keep soil phosphate levels in the optimum range and using RPR which ensure this risk stays low.

→ On high-loss soils (high rainfall, coarse texture and/or low ASC) elemental sulphur should be used as part of the fertiliser program, particularly if fertiliser application only occurs in autumn. Sulphate sulphur should not be solely used in this case, since potential sulphate leaching losses over winter can be high.

→ Animal blood/liver tests are recommended to provide definitive resolution as to the need for trace element supplementation

→ N leaching losses for the property are low at 21kg N/ha/yr. This is confirmed by the nitrate level in drainage being 5.1ppm - well below the drinking water standard of 11.3ppm.

→ Use herbage tests to refine fertiliser and trace element requirements with regard to plant health (clover-only sample) or animal health (mixed-pasture sample)

→ Approximatley 0.1 kg P/ha/yr will be lost from each block if surface runoff occurs

→ Use clover-only herbage tests to check adequacy of molybdenum (Mo) supply to legumes. Low Mo may limit N-fixation and therefore production potential.

Block: Mataiawa Top terrace

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
2009	6.0	23	11	13	39	9	7	0	0	83
2010	5.5	25	10	10	20	5	4	0	0	61
Average of last 3 years	5.8	24	11	12	30	7	6	0	0	72
Biological Optimum	5.8-6.0	20.00-30.00	7.00-10.00	10.00-12.00	8.00-10.00	N/A	N/A	N/A	900.00-1,000.00	N/A

Nutrient budget for this block

	N	P	K	S	Ca	Mg	Na	H+
				(kg/ha/yr)				
Inputs								
Fertiliser and lime	100	40	0	16	109	0	50	-1.6
Effluent added	0	0	0	0	0	0	0	0.0
Atmospheric/clover N	93	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	10	0	2	1	6	0.0
Supplements imported	27	3	19	1	5	3	1	0.0
Outputs								
Product	69	11	17	4	14	1	5	0.0
Net transfer by animals	38	4	34	3	6	3	1	-0.9
Supplements sold	0	0	0	0	0	0	0	0.0
Atmospheric	47	0	0	0	0	0	0	0.0
Leaching/runoff	27	0	25	35	78	22	44	-1.7
Net immobilisation/absorption	39	22	0	-20	0	0	0	0.0
Change in inorganic soil pool	0	9	-45	0	19	-17	30	1.1

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	27
N concentration in drainage water (ppm)	7.2

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	n/a	Low	0.1

Issues identified for this block

- → The nutrient budget shows a deficit of magnesium, indicating QT-Mg levels will fall over time. With good magnesium levels on this block, it is not an undesirable trend.
- → The nutrient budget suggests a significant surplus of phosphate, indicating that Olsen-P

levels are likely to increase over time. Consider target phosphate levels for production and amend fertiliser policy if necessary.

→ The nutrient budget suggests a significant deficit of potassium, indicating that QT-K levels are likely to decrease over time. With an above optimum QT-K on this block, this is a desirable trend.

→ This block represents a 'hot spot' for nitrate leaching losses and 27kg N/ha/yr is being leached compared to the property average of 21kg N/ha/yr. This is due to the soil type (allophanic) and can only be managed rather than changed.

Block: Mataiawa Bottom

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
Average of last 3 years	0.0	0	0	0	0	0	0	0	0	0
Biological Optimum	0.0-0.0	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	N/A	N/A	N/A	0.00-0.00	N/A

Nutrient budget for this block

	N	P	K	S	Ca	Mg	Na	H+
				(kg/ha/yr)				
Inputs								
Fertiliser and lime	100	40	40	31	109	0	50	-0.6
Effluent added	0	0	0	0	0	0	0	0.0
Atmospheric/clover N	69	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	19	0	3	5	6	0.0
Supplements imported	27	3	19	1	5	3	1	0.0
Outputs								
Product	55	9	14	3	12	1	4	0.0
Net transfer by animals	31	3	28	2	5	3	1	-0.7
Supplements sold	0	0	0	0	0	0	0	0.0
Atmospheric	45	0	0	0	0	0	0	0.0
Leaching/runoff	21	0	33	20	10	1	24	-1.3
Net immobilisation/absorption	44	15	0	12	0	0	0	0.0
Change in inorganic soil pool	0	19	5	0	92	8	50	1.4

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	21
N concentration in drainage water (ppm)	5.5

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	n/a	Low	0.3

Issues identified for this block

→ The nutrient budget suggests a small surplus of potassium, indicating that soil test levels will slowly increase over time. QTK levels are above optimum on this block, consider reducing potassium application rate. Monitor soil test levels to verify this trend is real.

→ The nutrient budget shows a surplus of sodium, indication QT-Na will increase over time. Consider goals and amend fertiliser policy if necessary.

→ The nutrient budget suggests a significant surplus of phosphate, indicating that Olsen-P levels are likely to increase over time. With a below optimum Olsen-P on this block, this is a desirable trend.

Block: Waimara Top terrace

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
2009	5.9	14	7	8	19	10	9	0	0	64
2010	5.8	18	4	9	15	10	8	0	0	67
Average of last 3 years	5.9	16	6	9	17	10	9	0	0	66
Biological Optimum	0.0-0.0	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	N/A	N/A	N/A	0.00-0.00	N/A

Nutrient budget for this block

	N	P	K	S	Ca	Mg	Na	H+
				(kg/ha/yr)				
Inputs								
Fertiliser and lime	100	50	0	24	84	0	50	-1.7
Effluent added	0	0	0	0	0	0	0	0.0
Atmospheric/clover N	112	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	31	0	3	5	6	0.0
Supplements imported	27	3	19	1	5	3	1	0.0
Outputs								
Product	63	10	15	3	13	1	4	0.0
Net transfer by animals	35	3	31	3	5	3	1	-0.8
Supplements sold	41	4	28	3	8	3	2	0.2
Atmospheric	49	0	0	0	0	0	0	0.0
Leaching/runoff	22	0	10	26	47	5	14	-1.4
Net immobilisation/absorption	30	13	0	-5	0	0	0	0.0
Change in inorganic soil pool	0	25	-32	0	20	1	58	0.3

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	22
N concentration in drainage water (ppm)	5.6

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	n/a	Low	0.0

Issues identified for this block

→ The nutrient budget suggests a significant surplus of phosphate, indicating that Olsen-P levels are likely to increase over time. With a below optimum Olsen-P on this block, this is a desirable trend.

→ The nutrient budget shows a surplus of sodium, indication QT-Na will increase over time.

Consider goals and amend fertiliser policy if necessary.

→ The nutrient budget suggests a significant deficit of potassium, indicating that QT-K levels are likely to decrease over time. With a QT-K in the optimum range on this block, maintenance potassium should be applied.

Block: Waimara Bottom terrace

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
2009	6.0	21	8	0	13	5	2	0	0	16
2010	5.7	22	8	5	17	7	5	0	0	44
Average of last 3 years	5.9	22	8	3	15	6	4	0	0	30
Biological Optimum	0.0-0.0	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	N/A	N/A	N/A	0.00-0.00	N/A

Nutrient budget for this block

	N	P	K	S (kg/ha/yr)	Ca	Mg	Na	H+
Inputs								
Fertiliser and lime	100	50	40	33	108	0	195	-1.1
Effluent added	0	0	0	0	0	0	0	0.0
Atmospheric/clover N	110	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	24	0	3	5	6	0.0
Supplements imported	27	3	19	1	5	3	1	0.0
Outputs								
Product	63	11	16	3	13	1	4	0.0
Net transfer by animals	35	3	31	3	6	3	1	-0.8
Supplements sold	36	4	21	2	6	3	1	0.1
Atmospheric	48	0	0	0	0	0	0	0.0
Leaching/runoff	23	0	11	22	18	3	6	-1.5
Net immobilisation/absorption	31	14	0	8	0	0	0	0.0
Change in inorganic soil pool	0	24	7	0	75	3	212	1.0

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	23
N concentration in drainage water (ppm)	6.1

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	n/a	Low	0.1

Issues identified for this block

→ The nutrient budget suggests a significant surplus of potassium, indicating that QT-K levels are likely to increase over time. With a below optimum QT-K on this block, this is a desirable trend.

→ The nutrient budget shows a surplus of sodium, indication QT-Na will increase over time.

Consider goals and amend fertiliser policy if necessary.

→ The nutrient budget suggests a significant surplus of phosphate, indicating that Olsen-P levels are likely to increase over time. With a below optimum Olsen-P on this block, this is a desirable trend.

Block: Waimara Drystock

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
Average of last 3 years	0.0	0	0	0	0	0	0	0	0	0
Biological Optimum	0.0-0.0	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	N/A	N/A	N/A	0.00-0.00	N/A

Nutrient budget for this block

	N	P	K	S	Ca	Mg	Na	H+
				(kg/ha/yr)				
Inputs								
Fertiliser and lime	30	30	20	18	55	0	50	-0.8
Effluent added	0	0	0	0	0	0	0	0.0
Atmospheric/clover N	136	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	10	0	3	5	6	0.0
Supplements imported	11	1	7	1	2	1	0	0.0
Outputs								
Product	0	0	0	0	0	0	0	0.0
Net transfer by animals	4	0	3	0	1	0	0	-0.1
Supplements sold	101	12	77	4	17	7	1	0.4
Atmospheric	29	0	0	0	0	0	0	0.0
Leaching/runoff	18	0	15	20	22	7	31	-1.1
Net immobilisation/absorption	25	17	0	-1	0	0	0	0.0
Change in inorganic soil pool	0	5	-56	0	23	-4	46	0.1

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	18
N concentration in drainage water (ppm)	4.7

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	n/a	Low	0.2

Issues identified for this block

→

Block: Effluent

The information in this section is relevant only to this block within the property. Recent soil test history and the Overseer nutrient budget for this block is given below.

Soil test history for this block

Year	pH	OlsenP	QTK	SO4	QTMg	QTCa	QTNa	TBK	TotalS	ASC
2009	6.0	22	6	5	34	9	5	0	0	37
2010	5.7	39	8	2	22	6	3	0	0	27
Average of last 3 years	5.9	31	7	4	28	8	4	0	0	32
Biological Optimum	0.0-0.0	0.00-0.00	0.00-0.00	0.00-0.00	0.00-0.00	N/A	N/A	N/A	0.00-0.00	N/A

Nutrient budget for this block

	N	P	K	S	Ca	Mg	Na	H+
				(kg/ha/yr)				
Inputs								
Fertiliser and lime	0	18	0	15	58	25	0	-0.2
Effluent added	142	20	191	16	34	20	5	-4.8
Atmospheric/clover N	86	0	2	4	2	5	22	0.0
Irrigation	0	0	0	0	0	0	0	0.0
Slow release	0	3	9	0	3	5	6	0.0
Supplements imported	27	3	19	1	5	3	1	0.0
Outputs								
Product	69	11	17	4	14	1	5	0.0
Net transfer by animals	38	4	34	3	6	3	1	-0.9
Supplements sold	0	0	0	0	0	0	0	0.0
Atmospheric	61	0	0	0	0	0	0	-0.3
Leaching/runoff	20	0	19	18	30	1	7	-1.3
Net immobilisation/absorption	68	15	0	12	0	0	0	-0.4
Change in inorganic soil pool	0	14	150	0	52	52	21	-2.1

Nitrogen loss indices for this block

N leaching cap for this property (kg N/ha)	N/A
Current N leaching estimate (kg N/ha)	20
N concentration in drainage water (ppm)	4.9

Phosphorus loss indices for this block

Soil	Fertiliser	Effluent	Overall	P lost (kg P/ha)
Low	Low	Low	Low	0.2

Issues identified for this block

→ Consider expanding the effluent block to reduce nutrient loading in this area, and to improve effluent nutrient utilisation. If you plan to modify your effluent area in any way, ensure you check with your Regional Council for approval before doing so

→ The nutrient budget shows a surplus of magnesium from a pasture production perspective, due to large inputs from supplements. As a dairy farm this surplus is not an issue in consideration of the large amount of potassium in the effluent application and current QT Mg levels.

→ The nutrient budget suggests there is a significant surplus of potassium, indicating that QTK levels are likely to increase over time. This is due to effluent application and no fertiliser K is applied.

→ The nutrient budget suggests a significant surplus of phosphate, indicating that Olsen-P levels are likely to increase over time. Consider target phosphate levels for production and amend fertiliser policy if necessary.

→ Effluent N application is 142kg N/ha/yr and Horizions Regional Council set a limit of 150kg N/ha/yr. The effluent area is currently large enough but may need to increase in the future if production increases.

→ The nutrient budget shows a surplus of sodium, indication QT-Na will increase over time. Consider goals and amend fertiliser policy if necessary.

Part E: Guidelines and industry requirements

Land and stock management

Changes to land and stock management practices can be implemented that will reduce the risk of adverse environmental impacts resulting from farm system nutrient loss.
The items identified below represent land and stock management factors that are deemed suitable and appropriate means for this farm system to reduce its environmental impact.

Issues identified	Discussed
Ensure stock have adequate water supply through a reticulated water system; this reduces the likelihood of stock entering surface waterways	☐
Maintain uncultivated buffer strips around perimeters of cultivated paddocks to trap sediment and nutrients	☐
Develop and maintain vegetated buffer zones along riparian (stream bank) areas to filter sediment and nutrients from run-off waters	☐
Ensure natural wetlands are fenced to prevent stock entry	☐
Remove stock from paddocks when soils are saturated to protect soils from structural damage and reduce risk of nutrient leaching/run-off	☐
Ensure stock have adequate transfer points (bridges/culverts) to cross waterways	☐
Ensure streams are fenced where practical to prevent direct stock access	☐
Consider erosion control options and stream bank stabilisation measures to reduce sediment and nutrient loss	☐

Fertiliser management

Industry and legal requirements

Specific industry requirements *(Contact industry representative and see the Code for details)*
o It is recommended that only Spreadmark-certified spreaders are used to apply fertiliser
o It is recommended that only Fertmark-registered fertilisers are used
o 100% of dairy farms to have in place systems to manage nutrient inputs and outputs by 2007.

Specific Regional Council requirements *(Contact local Regional Council for their requirements)*
o Proposed 'One Plan': 1. Dairy farming, cropping, market gardening, and intensive beef farming and associated activities in specific areas (water management zones) [Rule13-1] - Controlled Activity in specified water management zones of the Mangapapa, Mowhanau, Mangatainoka, Upper Manawatu River, Lake Horowhenua, Waikawa, south west coastal, coastal lake, coastal Rangitikei, Mangawhero and Makotuku catchments. Note: Inclusion in this rule is staged over the life of the plan. - Activity must be undertaken in accordance with a Farmer-Applied Resource Strategy (FARMS) that includes nutrient management planning and a "multiple activities – one consent" approach. 2. Land use activities in water management zones not covered by Rule 13-1 Fertiliser [Rule 13-2] - Permitted Activity unless undertaken in areas (water management zones) where intensive farming land-use activities will be specifically controlled; - Includes consequential discharges to air, but excludes off-property odour or drift ; - Excludes discharge into rare, threatened or at-risk habitats, and waterbodies; and - Requires Nutrient (nitrogen) budgeting and compliance with the Code of Practice for Fertiliser Use 2002. Fertiliser application should be carried out in accordance with the Code of Practice for Nutrient Management (2007) [www.fertresearch.org.nz].

Potential best management practices to adopt

The following management practices will be implemented in accordance with the Code, as part of meeting the industry and legal requirements outlined above.

Management practices implemented to achieve our objectives *(See chapter 5 of the Code for examples)*	**Discussed**
Sites for storing and loading fertiliser should be more than 50 m from open water	☐
For pastoral systems apply N-fertiliser in split dressings of 50 kg N/ha or less	☐
For pastoral systems the maximum annual rate of 200 kg N/ha/y should not be exceeded	☐
N is not applied when the 10cm soil temp at 9am is less than 6 degrees Celsius and falling	☐
For cropping systems match total N inputs and timing to crop N demands	☐
Ensure pasture is at least 25 mm (approx 1000 kg DM/ha) high before N or P is applied	☐
N & P fertiliser is not applied following a dry period until sufficient regrowth has occurred following rainfall	☐

N & P fertiliser should not be applied when the soil is saturated or when drains are running, or when heavy rain is likely	☐
Ensure grazing does not occur within 21 days of P-fertiliser application, or until 25 mm of rain has fallen	☐
Soluble P-fertiliser should be applied in split dressings if the single application rate would exceed 100 kg P/ha	☐
Ensure P-fertilisers that comply with the industry limit of 280 mg Cd/kg P are used	☐
Avoid application of any fertiliser to non-target areas	☐
Use only Fertmark-registered fertiliser products to be certain of product quality	☐
Use Spreadmark-certified spreaders for improved spreading accuracy	☐

Dairy shed effluent management

Do you apply dairy shed effluent? Yes

Industry and legal requirements

Specific industry requirements *(Contact industry representative and see the Code for details)*
○ 50% of regular crossing points have bridges or culverts by 2007, 90% by 2012 ○ 100% of farm dairy effluent discharges to comply with resource consents and regional plans immediately ○ 50% of regionally significant wetlands to be fenced by 2005, 90% by 2007 ○ Dairy cattle excluded from 50% of streams, rivers and lakes by 2007, 90% by 2012 ○ 100% of dairy farms to have in place systems to manage nutrient inputs and outputs by 2007.

Specific Regional Council requirements *(Contact local Regional Council for their requirements)*
○ Proposed 'One Plan': 1. Dairy farming, cropping, market gardening, and intensive beef farming and associated activities in specific areas (water management zones) [Rule13-1] - Controlled Activity in specified water management zones of the Mangapapa, Mowhanau, Mangatainoka, Upper Manawatu River, Lake Horowhenua, Waikawa, south west coastal, coastal lake, coastal Rangitikei, Mangawhero and Makotuku catchments. Note: Inclusion in this rule is staged over the life of the plan. - Activity must be undertaken in accordance with a Farmer-Applied Resource Strategy (FARMS) that includes nutrient management planning and a "multiple activities – one consent" approach. 2. Land use activities in water management zones not covered by Rule 13-1 Farm animal effluent onto production land [Rule 13-6] - Controlled activity unless undertaken in areas (water management zones) where intensive farming land-use activities will be specifically controlled; - Includes dairy shed and feed pad effluent, farm effluent pond sludge, poultry farm litter and effluent, and effluent from existing piggeries; - Excludes discharge into waterbodies or off-property odour or spray drift; - Requires separation distances from specified sensitive areas, exclusion of storm water, and nutrient (nitrogen) budgeting; and - Sets permeability of storage and treatment facilities.
Conditions of effluent management consent (list these): ○

Effluent area nutrient loading

Current effluent area (ha)	26.0
Approximate total value of nutrients contained in effluent ($)	16,055.00
Approximate value of nutrients in effluent being utilised effectively ($)	7,235.00
Estimated effluent area needed to keep N applications below 150 kg N/ha (ha)	19.3
Effluent area needed to apply maintenance potassium (ha)	114.0

Potential best management practices to adopt

The following management practices will be implemented as part of meeting the industry and legal requirements outlined above.

Management practices implemented to achieve our objectives *(See chapter 5 of the Code for examples)*	**Discussed**
Assign responsibility for maintenance of the effluent system, and also for routine monitoring	☐
Apply effluent at a rate suitable to match your soil type, so that surface ponding or deep drainage does not occur	☐
Ensure adequate storage is available so that effluent does not have to be applied when the soil is saturated	☐
Minimise the volume of dairy shed effluent by installing an effective stormwater/washwater diversion system	☐

Effluent application rates that meet N loading requirements may still result in excessive build up of soil potassium, elevating pasture K levels. Check K loading using the nutrient budget and adjust effluent application area or management if necessary	☐
Harvest conserved feed from the effluent block to 'mine' high soil N and K levels	☐
Grow 'depletive' crops such as maize in the effluent area, in order to 'mine' high soil N and K levels	☐
Effluent can be highly variable over time and between farms. Effluent analysis may help you to understand the nutrient value of effluent, particularly when stored ponds before application. Sampling effluent is unlikely to be of value when irrigated daily from a sump, since nutrient content fluctuates greatly	☐
Ensure there is a backup plan in case of an effluent system breakdown	☐

Part F: Farm map

A farm map might be an aerial photograph of your land, a topographical farm layout, or another document you have created to show your farm's layout and specific details. Blocks identified in this report should be indicated on the farm map. Additional maps showing fertiliser recommendations and fertiliser placement may also be attached in this section.

Part G: Overseer parameters report

As part of the record keeping process, a signed 'Parameters report' as produced from Overseer should be inserted here. This record contains the key details that describe your farm system. As the farm owner or management authority responsible for the running of this property, you should verify that these parameters are accurate before signing them off.

Part H: Fertiliser application records

Each block as defined in this report, should have a complete record of what fertiliser type has been applied, the rate at which it was applied, and when it was applied. In addition, any comments around who applied the product and the method used, should also be included. If you have 'proof of placement' spreading maps, then these can substitute for the tables below.

Block: Mataiawa Top terrace

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Block: Mataiawa Bottom

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Block: Waimara Top terrace

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Block: Waimara Bottom terrace

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Block: Waimara Drystock

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Block: Effluent

Date	Fertiliser type	Application rate (kg/ha)	Major nutrients (kg/ha)						Operator	Method	Other nutrients | comments
			N	P	K	S	Mg	Ca			
		Annual total									

Part I: Fertiliser recommendations / plans

All current and future fertiliser recommendations or plans should be attached at the rear of this nutrient management plan. Fertiliser plans need some degree of flexibility, given that changes may be desirable as a result of changes in relative product pricing or some other influencing factor.