



s 9(2)(a)

20-D-00683

Dear s 9(2)(a)

Thank you for your email of 5 May 2020 requesting the following under the Official Information Act 1982 (the Act):

a copy of any external (not from a Government Ministry) advice commissioned by MfE relating to the economic impacts of Essential Freshwater, including drafts, analysis and commentary. Please include any raw data, Excel workbooks or spreadsheets.

On 8 and 16 June 2020 an official called you on behalf of the Ministry for the Environment (the Ministry) to discuss the scope of this request (20-D-00683) as well as your previous request of 4 May (20-D-00672). In these discussions you agreed to refine the scope of these requests to only including versions of reports used in advice to Ministers, and to exclude email correspondence.

The Ministry has interpreted the scope of this request to include draft reports, analysis results, commentary and raw data that external contractors provided, where those products informed the economic advice to Ministers.

On 30 June the Ministry sent you a letter that listed all of the proactively-released documents. This letter stated that those documents in scope of your request that were not already publicly available would be released to you within 10 working days.

The Ministry has identified four outstanding documents in scope of your request. These include one draft report and three Excel spreadsheets. All four of these documents are listed in the attached document schedule, and released to you in full.

These four documents reflect interim and draft methods, approaches and results, and do not reflect the final advice provided to Ministers. Please refer to the content of our previous letter to you for more information.

You have the right to seek an investigation and review by the Office of the Ombudsman of my decision relating to this request, in accordance with section 28(3) of the Act. The relevant details can be found on their website at: www.ombudsman.parliament.nz.

Please note that due to the public interest in our work the Ministry for the Environment publishes responses to requests for official information on our [OIA responses page](#) shortly after the response has been sent. If you have any queries about this, please feel free to contact our Executive Relations team: ministerials@mfe.govt.nz.

Yours sincerely



Lucy Bolton
Acting Director, Freshwater Policy

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Document schedule

Document no.	Document date	Content	Decisions
1	May 2019	Interim report - Impact of possible environmental policy interventions on case study farms	Released in full
2	March 2020	Interim spreadsheet - Cost of DIN and DRP policies 11 March	Released in full
3	March 2020	Interim spreadsheet - Cost of DIN and DRP policies 18 March	Released in full
4	April 2020	Interim spreadsheet - Cost of DIN and DRP policies 20 April	Released in full

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Impact of possible environmental policy interventions on case study farms

MRB INTERIM REPORT 1

Status Quo farm models

MfE Scenario 1 – Nitrogen cap modelling

10th May 2019

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1. Results – Red Meat / Hill Country

Prepared by Mark Everest, to be peer reviewed by Jamie Gordon.

1.1. Red Meat – Status Quo

1.1.1. Farm description

1.1.1.1. General farm

The 598 ha “Red Meat” hill country farm is intended to represent properties that farm sheep, beef and deer enterprises across a combination of physical land resources, utilising a range of crops and farming techniques. This particular property was selected as representative of the sheep, beef and deer sectors as it contains:

- A combination of hill country tussock, developed rolling downs and developed irrigated flats (approximately 13 per cent of total farm area).
- Both sheep and beef breeding and finishing enterprises. While this Red Meat property does not farm deer, there are a number of properties similar to this that do also farm deer, the deer typically displace sheep.
- Two types of irrigation being sprinklers and centre pivots.
- A combination of soil types including Lismore (lighter in texture and more free draining) and Claremont (heavier and deeper soils that are imperfectly drained).
- Summer forage crops, winter forage crops and conserves pasture and silage for meeting expected and unexpected feed deficits throughout the season.

The modelled property focuses on finishing (animals sold to meat processors) all of the progeny it produces. Within the range of Red Meat farms in the South Island of New Zealand, the focus of individual operations can range from breeding only (animals on-sold to other farmers to be finished), to finishing only, or a combination of the breeding and finishing and can include other enterprises such as dairy support or arable crops. Dairy support and arable enterprises are analysed by other models in other parts of this report.

1.1.1.2. Land

598 ha effective area

- 420 ha tussock hill (steep)
- 70 ha developed downs
 - 6 ha forage rape (winter)
 - 6 ha forage leafy turnip (summer)
 - 58 ha pasture
- 108 ha easy to flat paddocks
 - 28 ha dryland
 - 4 ha lucerne

24 ha pasture
30 ha sprinkler irrigation
6 ha forage rape (multi-graze summer/winter)
6 ha forage rape (winter)
6 ha annual ryegrass
18 ha pasture
50 ha centre pivot irrigation
7 ha forage oats and grass (winter)
7 ha fodder beet
7 ha forage rape (summer)
36 ha pasture

1.1.1.3. Crop rotations

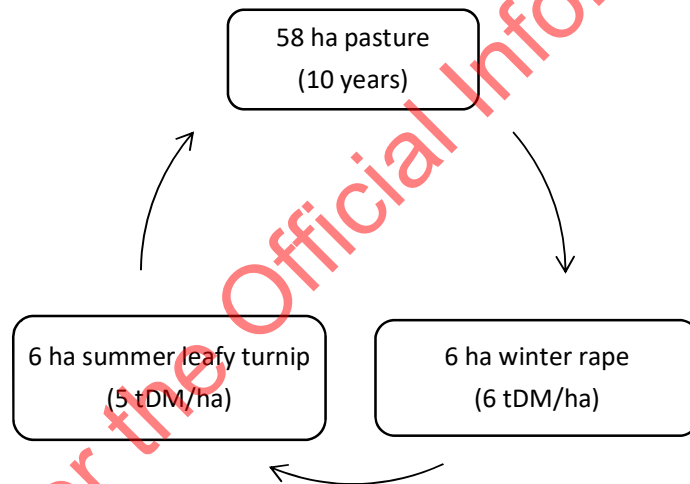


Figure X: Developed downs crop rotation

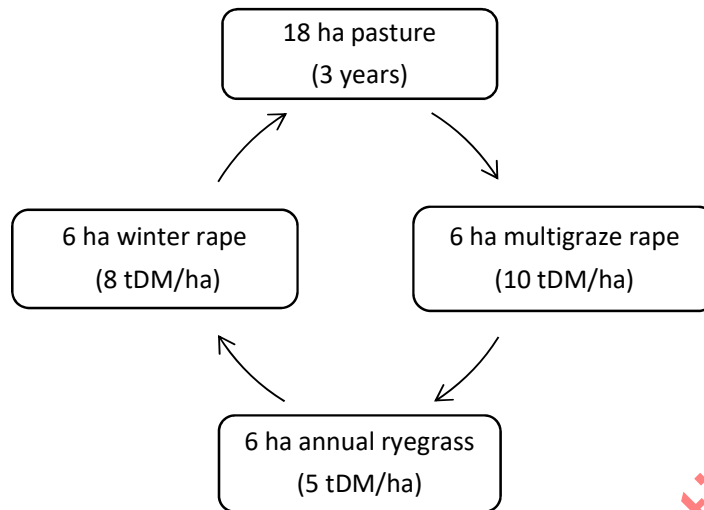


Figure X: Sprinkler paddocks crop rotation

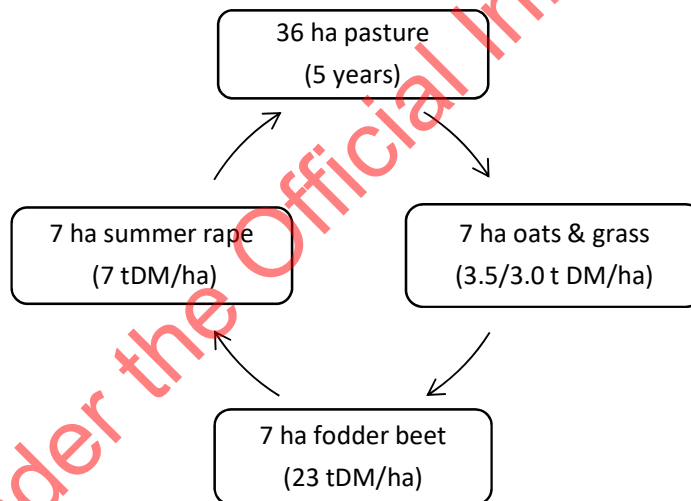


Figure X: Centre pivot paddocks crop rotation

1.1.1.4. Stock numbers and performance

Cattle

- 160 cows (calving 1 August at 94%, finishing progeny).
- 30 R2 heifers mated.
- 45 R2 heifers sold (30 sold store in October at 315 kg liveweight; 15 sold in March at 266 kg carcass weight).
- 75 R1 heifers weaned and wintered.
- 75 R1 bulls weaned and wintered.
- 75 R2 bulls sold (30 sold in October for breeding; 45 sold in March to June at 285 kg carcass weight)

- 5 breeding bulls.

Sheep

- 1100 ewes (lambing 5 September at 150%, 13% weaning draft to works, remainder finished to 18.5 kg carcass weight February to May).
- 300 ewe lambs kept as replacements (lambing 10 September at 71%, lambs finished to 18.5 kg carcass February to May).
- 350 trading lambs bought-in and finished.
- 15 rams.

1.1.1.5. Supplements

- 25 tonnes drymatter pasture and lucerne silage made and fed on crops over winter

1.1.2. Model outputs

1.1.2.1. Financial budget summary

Table X: Budget summary – Red Meat

	Status Quo
Nett Farm Income	\$380,922
less Farm Working Expenses	\$274,065
<i>gives</i> Earnings Before Interest and Tax	\$107,031
less Capital Replacement / Depreciation	\$37,750
less Interest (on Capital Expenditure)	\$0
less Interest (on Working Capital)	\$47,593
<i>gives</i> Taxable Surplus	\$21,687
less Tax Provision (at 30%)	\$6,506
<i>gives</i> Disposable Surplus*	\$15,181

*Note: No debt/principal repayments are made in these models.

1.1.2.2. Emission results

Table X: Emission summary – Red Meat

	Status Quo
Nitrogen	
Total kg	11,588
kg/ha	19
Phosphorus	
Total kg	260
kg/ha	0.4
Greenhouse gases (CO ₂ equivalent)	
Total kg	2,507,414
kg/ha	4,193

1.1.3. Brief Commentary

Nett Farm Income (NFI) generated is \$118 per stock unit, and Farm Working Expenses (FWE) are \$85 per stock unit. 81 per cent of the \$33 per stock unit Earnings Before Interest Tax and Depreciation (EBITD) is used to pay interest, depreciation and tax.

Traditionally Red Meat properties operated a cost structure at approximately 60 per cent of gross farm income, however over time as inflation of inputs costs and have exceeded that of output quantities and commodity returns, the cost structure has increased. The modelled farm spends 72 per cent of the generated gross farm income on costs of production.

An average debt of \$200 per stock unit (\$645,600 total debt) has been used as a representative value for the Red Meat farm. Extensive properties, such as this, rely on modest levels of debt to ensure their long term financial sustainability. As these properties are mostly unirrigated, cash reserves must be available to support the business to feed stock or insulate against lost income at the advent of adverse weather events such as droughts, snow or storms. This model has an interest cover ratio of 2.3. A resilient Red Meat business is maintained with an interest cover ratio (before depreciation and tax) of 2.0 or greater to ensure it has sufficient cash flow to withstand unforeseen costs or lost income.

This farm is profitable currently, however, it has a limited ability to support any additional debt if revenue generation does not increase proportionally and with reliability.

The cumulative nitrogen losses from the property average 19 kilograms per hectare per year, however, it is important to note that the individual blocks of the farm range in their emissions from 7 kilograms per hectare per year to 146 kilograms per hectare per year. A similar trend applies to phosphorus with an average emission of 0.4 kilograms per hectare per year and a range of 0.0 to 1.6 kilograms of phosphorus per hectare per year. The blocks that result in the highest emissions result from the more intensive blocks, both as forage crops and as pasture.

Of the 4,193 kilograms of carbon dioxide equivalent greenhouse gasses emitted by this property, 94 percent of the emissions are nitrous oxide and methane.

1.2. Red Meat – MfE Scenario 1: Nitrogen Cap

1.2.1. Scenario introduction

No additional modelling was undertaken for the Red Meat model for MfE Scenario 1: Nitrogen Cap. The Red Meat - Status Quo modelling indicated losses of 19 kilograms per hectare per year which is less than the 60 kilograms per hectare per year maximum cap emission target proposed by MfE in Scenario 1.

It is important to consider, as discussed in the Status Quo section above, that there are blocks within this property that emit up to 146 kilograms of nitrogen per hectare per year. the blocks that result in the highest emissions result from the more intensive blocks, both as forage crops and as pasture. It is important to consider that if the intensive part of this farm is similar to that of some 'finishing only' Red Meat properties. If the intensive part of this property was to be looked at in isolation, considerable changes to the farm programme would be required to enable the farm to meet the proposed MfE Nitrogen loss cap of 60 kilograms per hectare per year.

2. Results – Dairy

Prepared by Julian Gaffaney, peer reviewed by Jeremy Savage

2.1. Dairy – Status Quo

2.1.1. Farm description

2.1.1.1. Land

318 ha title

- 300 ha effective
- 81 ha rolling downs
- 219 ha flat
 - 10 ha fodderbeet crop rotates over selected blocks
 - 290 ha pasture
 - 10% annual regrassing
- 300 ha irrigated
 - 134 ha centre pivot
 - 166 ha K-Line
- 18 ha in-effective (tracks / yards / other)

Soils

- 196 ha shallow silt loam soils, moderately well drained and slightly stony with moderate profile available water (PAW) Darnleyf.
- 13 ha shallow loam soils, well drained and moderately stony with low to moderate PAW: Rakaiaf.
- 82 ha moderately deep silt loam (hill) soils, imperfectly drained stoneless soil with moderate to high PAW: Timauf.

2.1.1.2. Stock numbers and performance

Cow herd:

- Kiwi-Cross herd
- 94 BW
- 1030 wintered off farm
- 1000 peak milk numbers
- 434,996 kgMS total production

Replacement stock:

- 250 heifer calves reared, grazed off farm from 1st December to 30th April (5 months)
- 250 heifer rising 2-year, grazed off farm 1st May to 30th April (12 months)
- 240 heifer in-calf, grazed off farm for month of May (1 month)

Table X: Supplements.

Feed	tonnes DM offered													kg
	Jun 18	Jul 18	Aug 18	Sep 18	Oct 18	Nov 18	Dec 18	Jan 19	Feb 19	Mar 19	Apr 19	May 19	Total	/milker
F4 Hay/Straw bought		0	20	8									28	28
C2 Fodder Beet											68	131	199	199
F1 Meal and Grains bought		1	13	20	15	30	20		14	15	5		133	133
F2 Pasture Silage		3	60	39								37	139	139
Total													498	498

- 133 tDM Cereal grain bought in and fed in dairy shed.
- 139 tDM pasture silage (27 tDM of which is made on platform) fed in season shoulders.
- 199 tDM fodder beet grown and fed to milking and dry cows in autumn.

Table X: Farmax physical summary

Category	Description	Value	Units
Farm	Effective Area	300	ha
	Stocking Rate	3.3	cows/ha
	Potential Pasture Growth	14.2	t DM/ha
	Nitrogen Use	215	kg N/ha
	Feed Conversion Efficiency (eaten)	10.6	kg DM eaten/kg MS
Herd	Cow Numbers (1st July)	1,030	cows
	Peak Cows Milked	1,000	cows
	Days in Milk	0	days
	Avg. BCS at calving	4.9	BCS
	Liveweight	1,421	kg/ha
Production (to Factory)	Milk Solids total	434,996	kg
	Milk Solids per ha	1,450	kg/ha
	Milk Solids per cow	435	kg/cow
	Peak Milk Solids production	2.01	kg/cow/day
	Milk Solids as % of live weight	102.0	%
Feeding	Pasture Eaten per cow *	3.6	t DM/cow
	Supplements Eaten per cow *	0.4	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	t DM/cow
	Total Feed Eaten per cow *	4.6	t DM/cow
	Pasture Eaten per ha	12.0	t DM/ha
	Supplements Eaten per ha	1.5	t DM/ha
	Off-farm Grazing Eaten per ha	3.9	t DM/ha
	Total Feed Eaten per ha	17.3	t DM/ha
	Supplements and Grazing / Feed Eaten *	23.1	%
	Bought Feed / Feed Eaten *	4.2	%
	(*) feed eaten by females > 20 months old / peak cows milked		

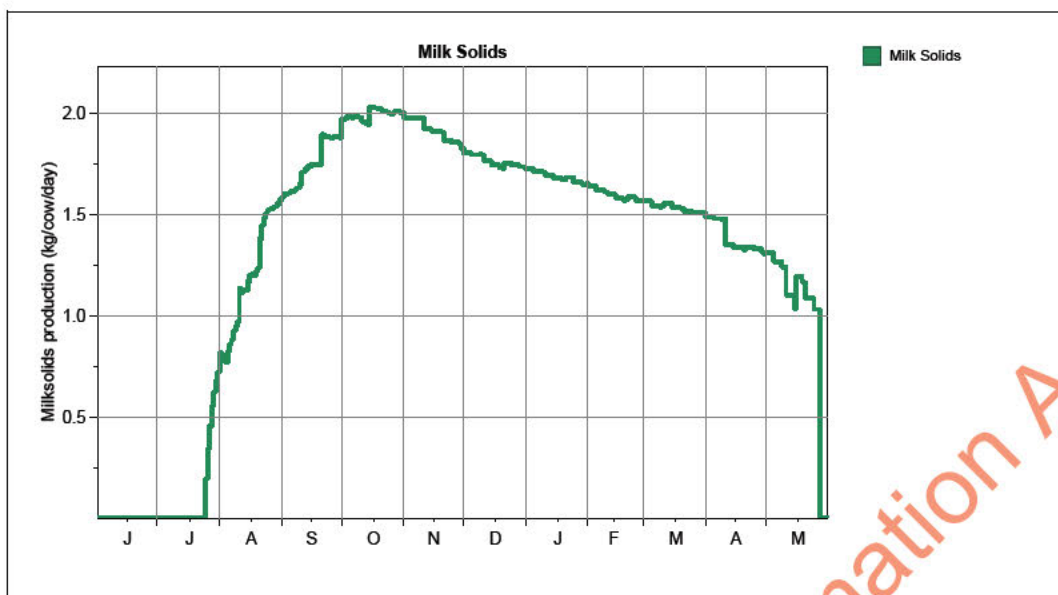


Figure X: Farmax lactation curve.

2.1.1.3. General farm

These models are based on a South Canterbury dairy farm, operating near to steady-state equilibrium due to being converted several years ago. Moderate productivity which is broadly in line with regional dairy statistics with the farm base model producing 435 kgMS per cow against the 2017/18 South Canterbury average of 392 kgMS per cow and 413 kgMS per cow for North Canterbury. Production per hectare is 1450 kgMS compared against the 2017/18 South Canterbury average of 1,350 kgMS per hectare and 1,420 kgMS per hectare for North Canterbury. Stocking rate at 3.3 cows per hectare is slightly lower than the 2017/18 South Canterbury average of 3.44 cows per hectare and 3.43 per hectare for North Canterbury. Overall this farm represents good efficient pasture based milk production, which is supported with grain feeding and silage feeding on the shoulders of the season.

The farm scale is large at 300 hectares against the 2017/18 South Canterbury average of 230 per hectares and 234 hectares for North Canterbury. This scale and the stocking rate assist in simplifying some aspects of analysis. The farm has one minor and two major waterways which run through the dairy platform, providing ample scope for modelling riparian margins and mitigations as requested. All waterways are currently fenced at a setback of 3-5 metres.

The farm operates with five fulltime and two part-time staff, featuring modern efficient infrastructure for operation at Good Management Practice (GMP) levels. Infrastructure includes a rotary dairy shed, effluent storage tank, centre pivot and K-Line (moveable sprayline) irrigation, bridged waterway crossings, a road underpass and soil moisture sensors.

The farm has 219 hectares of relatively flat land and 81 hectares of rolling low hill country with some steep areas, making it a well balanced unit for determining impacts of changes of farm system on different land contour aspects.

The farm supplies Fonterra, having full allowance of supplier shares.

2.1.2. Outputs

2.1.2.1. Financial budget summary

Table X: Budget Summary – Dairy.

Budget Summary - Dairy	
	Status Quo
Nett Farm Income	\$2,911,306
<i>less</i> Farm Working Expenses	\$1,833,772
<i>gives</i> Earnings Before Interest and Tax	\$1,077,534
<i>less</i> Capital Replacement / Depreciation	\$98,375
<i>less</i> Interest (on Capital Expenditure)	\$681,750
<i>less</i> Interest (on Working Capital)	\$4,834
<i>gives</i> Taxable Surplus	\$292,575
<i>less</i> Tax Provision (at 30%)	\$87,773
<i>gives</i> Disposable Surplus*	\$204,803

2.1.2.2. Emission results:

Table X: Emission summary – Dairy.

Emission Summary - Dairy	
	Status Quo
Nitrogen	
Total kg	20,855
kg/ha	66
Phosphorus	
Total kg	462
kg/ha	1.5
Greenhouse gases (CO2 equivalent)	
Total kg	5,517,618
kg/ha	17,351

2.1.3. Commentary

The farm financial performance is solid and reflects an efficient Canterbury dairy farm system operating in presently good market conditions for both milk and meat (the status quo milksolids pricing is \$6.00 per kilogram and a \$0.30 total dividend is used). The cost structure reflects industry averages across individual cost categories within the budgeting with the Farm Working Expenses being \$4.22 per kilogram of milksolids which is in line with Dairybase and MRB financial benchmarks. Nitrate leaching as assessed by Overseer is moderate at 66 kilograms per hectare and phosphorus leaching is moderate to high for a Canterbury dairy farm at 1.5 kilograms per hectare which is reflective of the fact that 27 per cent of the dairy platform area is on rolling hill aspect.

2.2. Dairy – MfE Scenario 1: Nitrogen Cap

2.2.1. Farm Description

2.2.1.1. Area

- As per “Status Quo”
- No physical base model variations

2.2.1.2. Stock numbers and performance

- As per “Status Quo”, and stocking rate has been held at the same level.
- Earlier culling timing: 80 cows cull timing bought forward from 20th April to 15th March.
- This has been done as a mechanism to reduce autumn deposited urine patches and risk of nitrate leaching.
- Drying off date remains the same.

Table X: Farmax physical summary comparison:

		MfE Scenario model base file	MfE Scenario model N Cap file	Difference	
Farm	Effective Area	300	300	0	ha
	Stocking Rate	3.3	3.3	0.0	cows/ha
	Potential Pasture Growth	14.2	14.2	0.0	t DM/ha
	Nitrogen Use	215	177	-39	kg N/ha
	Feed Conversion Efficiency (eaten)	10.6	10.7	0.1	kg DM eaten/kg MS
Herd	Cow Numbers (1st July)	1,030	1,030	0	cows
	Peak Cows Milked	1,000	1,000	0	cows
	Days in Milk	262	259	-2	days
	Avg. BCS at calving	4.9	4.9	0.0	BCS
	Liveweight	1,421	1,421	0	kg/ha
Production (to Factory)	Milk Solids total	434,996	420,630	-14,366	kg
	Milk Solids per ha	1,450	1,402	-48	kg/ha
	Milk Solids per cow	435	421	-14	kg/cow
	Peak Milk Solids production	2.01	2.01	0.00	kg/cow/day
	Milk Solids as % of live weight	102.0	98.7	-3.4	%
Feeding	Pasture Eaten per cow *	3.6	3.5	-0.1	t DM/cow
	Supplements Eaten per cow *	0.4	0.4	0.0	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	0.6	0.0	t DM/cow
	Total Feed Eaten per cow *	4.6	4.5	-0.1	t DM/cow
Diagnostics	Pasture Eaten per ha	12.0	11.6	-0.3	t DM/ha
	Supplements Eaten per ha	1.5	1.5	0.0	t DM/ha
	Off-farm Grazing Eaten per ha	3.9	3.9	0.0	t DM/ha
	Total Feed Eaten per ha	17.3	17.0	-0.4	t DM/ha
	Supplements and Grazing / Feed Eaten *	23.1	23.5	0.4	%
	Bought Feed / Feed Eaten *	4.2	4.3	0.1	%
(*) feed eaten by females > 20 months old / peak cows milked					

2.2.1.3. Crop areas

- As per “Status Quo”
- No physical base model variations

2.2.1.4. Supplements

- As per “Status Quo”
- Same feeding levels in autumn months apply, the only difference is the total kgDM of supplement per cow which drops by 7 kgDM due to the earlier culling.

2.2.1.5. Nitrogen fertiliser

Changes from “Status Quo”:

- Nitrogen fertiliser applications reduced by 17.7% from 215 kgN per hectare in Status Quo model to 177 kgN per hectare in Nitrogen Cap scenario, this has been done as a mechanism to reduce total nitrogen inputs and subsequent leaching risk. April nitrogen application has been removed all together and the balance of the drop is spread evenly over the season’s base applications of nitrogen fertiliser.

2.2.1.6. General farm

The main changes to the farm system to accommodate the Nitrogen Cap scenario have been earlier culling, reduced nitrogen fertiliser application rates over the growing season and removal of April applied nitrogen fertiliser. The biophysical modelling (Farmax Dairy) has been recalibrated with reduced pasture intakes across part of the season to a level that allows the average pasture cover to remain in a feasible zone and the opening and closing average pasture covers remain matched as per the base model.

Reduced pasture intakes and the earlier culling overall reduce milksolids production for the farm, affecting the financial model by reducing costs of less nitrogen fertiliser purchased, freight and application. The earlier culling has a small positive impact on working capital as the cull income is received one month earlier for 80 animals.

2.2.2. Model outputs

2.2.2.1. Financial budget summary

Table X: Budget Summary – Dairy.

Budget Summary – Dairy

	Status Quo	MfE Scenario 1
Nett Farm Income	\$2,911,306	\$2,820,769
less Farm Working Expenses	\$1,833,772	\$1,814,149
gives Earnings Before Interest and Tax	\$1,077,534	\$1,006,620
less Capital Replacement / Depreciation	\$98,375	\$98,375
less Interest (on Capital Expenditure)	\$681,750	\$681,750
less Interest (on Working Capital)	\$4,834	\$5,526
gives Taxable Surplus	\$292,575	\$220,969
less Tax Provision (at 30%)	\$87,773	\$66,291
gives Disposable Surplus*	\$204,803	\$154,678

*Note: No debt/principal repayments are made in these models.

2.2.2.2. Emission results:

Table X: Emission summary – Dairy.

Emission summary - Dairy

	Status Quo	MfE Scenario 1
Nitrogen		
Total kg	20,855	18,612
kg/ha	66	59
Phosphorus		
Total kg	462	454
kg/ha	1.5	1.4
Greenhouse gases (CO2 equivalent)		
Total kg	5,517,618	5,264,172
kg/ha	17,351	16,554

2.2.3. Summary

The physical impacts of the Nitrogen Cap scenario are a reduction in total production of 14,300 kilograms of milksolids or 3.3 per cent, the nitrate leaching is reduced (Table X) by 7 kilograms per hectare (10.7 per cent) down to 59 kilograms nitrate discharge per hectare. Total phosphorus losses reduce marginally by 1.7 per cent. The efficiency of pasture conversion to milksolids drops marginally while the pasture harvested per cow falls from 3.7 tonnes of drymatter to 3.6 tonnes of drymatter. The financial results of the Nitrogen Cap scenario is a 31 per cent reduction in nett income, partially offsetting an 11 per cent reduction in Farm Working Expenditure. The overall impact gives a 24 per cent reduction in Disposable Surplus.

These results apply specifically to this case study farm. A farm running a similar system on lighter soils would likely require a greater degree of mitigation, with subsequent greater negative impact on production and profitability expected.

Note there has been no sensitivity testing regards milk price to determine impact of variations in milk income.

3. Results – Dairy Support

Prepared by Jamie Gordon, to be peer reviewed by Mark Everest.

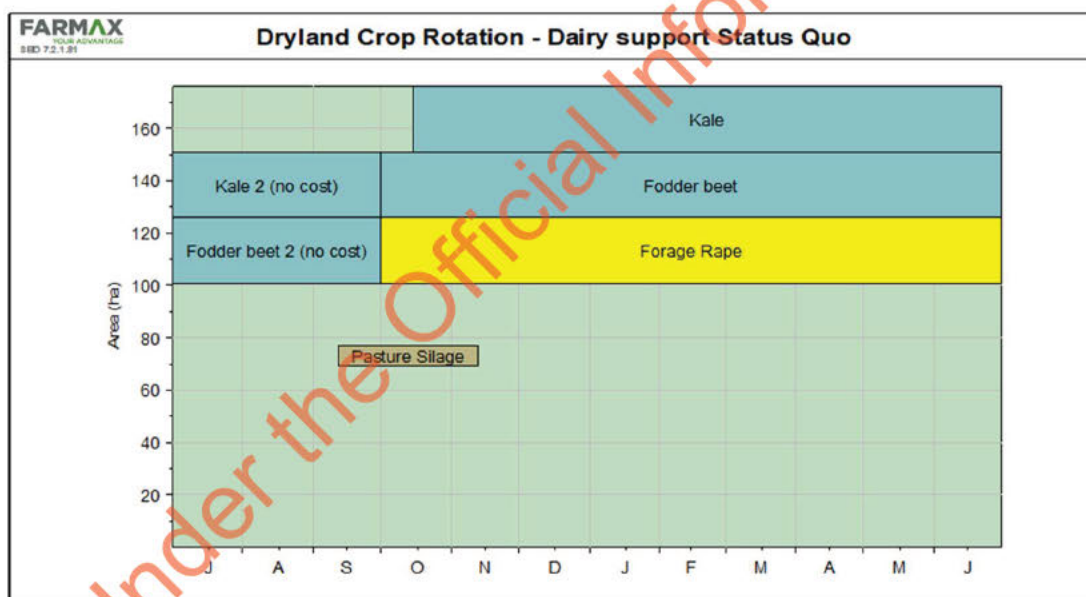
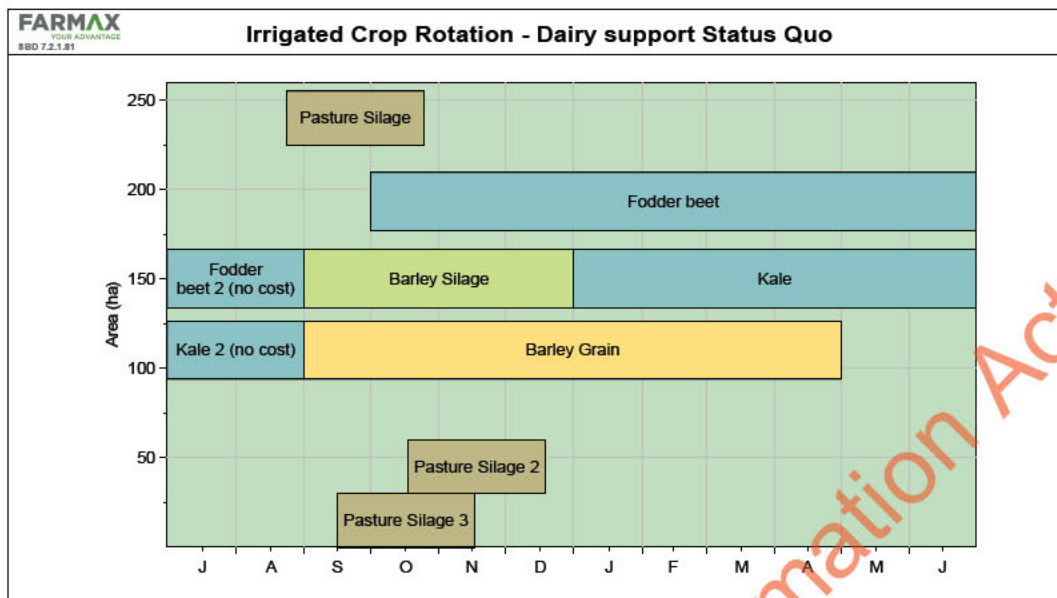
3.1. Dairy Support – Status Quo

3.1.1. Farm Description

3.1.1.1. Land

475ha title

- 260 hectares are Pivot Irrigated – 8 year rotation
 - 32.5 ha fodderbeet (Oct – Aug) – 23 tdm/ha
 - 32.5 ha greenchop cereal silage (Sept – Dec) – 6 tdm/ha
 - 32.5 ha kale (Jan – Aug) – 12 tdm/ha
 - 32.5 ha barley grain (Sept – Feb) – grain sold (8.5 t/a)/straw kept (3.5 tdm/ha)
 - Pasture for 5.5 years – Annual production before nitrogen of 13.12 tdm/ha
- 24 hectares Dryland – Corner areas of pivot irrigators – 8 year rotation
 - 3 ha fodderbeet (Oct – Aug) – 18.5 tdm/ha
 - 3 ha greenchop cereal silage (Sept – Dec) – 4 tdm/ha
 - 3 ha kale (Jan – Aug) – 9 tdm/ha
 - 3 ha barley grain (Sept – Feb) – grain sold (7.5 t/ha)/straw kept (3.5 tdm/ha)
 - Pasture for 5.5 years – Annual production before nitrogen of 8.5 tdm/ha
- 176 hectares Dryland – 7 year rotation
 - 25.1ha kale (Nov – Aug) – 11 tdm/ha
 - 25.1ha fodder Beet (Oct – Aug) – 18.5 tdm/ha
 - 25.1ha summer Rape (Oct – Apr) – 8 tdm/ha
 - Pasture for 4.5 years – Annual production before nitrogen of 8.5 tdm/ha
 - Approximately 100 hectares of the dryland area is rolling downs.
- 15 hectares are in-effective



3.1.1.2. Stock numbers and performance

Heifers:

- Dairy heifers grazed on the property
- 460 calves (on farm for approximately 20 months)
- Arrive in November/December at 105 kilograms
- 23 dry heifers depart in April
- Remaining animals go back to the dairy farm for calving on the 15th of July.
- 15 bulls are on farm to mate the heifers from October to December.

Cows:

- 1,700 cows arrive from dairy farm(s) on the 1st of June and depart on average after 70 days

Steers:

- 155 steer calves purchased at 100 kilograms in November/December
- 320 steer calves purchased at 230 kilograms in April/May
- 364 head are sold from January to June (average date of 7th April) at an average carcass weight of 282 kilograms
- 105 head are taken through the second winter and sold in October and November at an average carcass weight of 338 kilograms

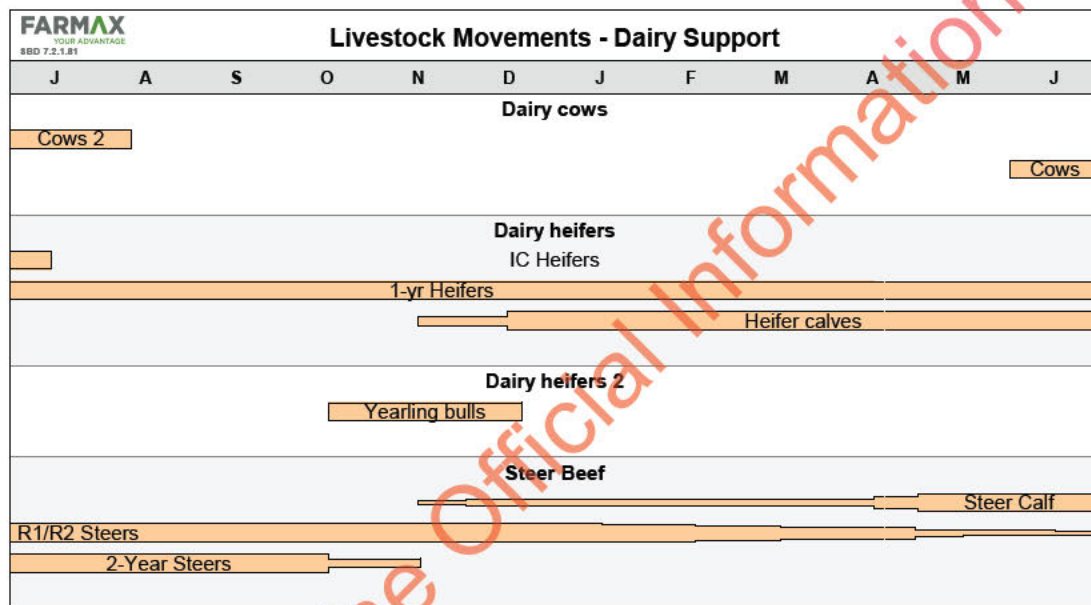


Figure X: Livestock movements throughout the year.

3.1.1.3. Supplements

Barley straw

- 125 tdm is made on the property
- 190 tdm is purchased onto the property

Silage

- 295 tdm of surplus pasture is made into both pit silage and baleage
- 207 tdm of greenchop cereal silage

Barley grain

- 302 t of barley grain sold off farm.

3.1.1.4. General farm

Situated in Canterbury the property has approximately 100 hectares of rolling downs with the remaining area being flat. All of the farmed area is able to be cultivated and harvested. Irrigation is

applied to 260 hectares via three centre pivot irrigators. For the purposes of this project a ratio of approximately 27 per cent heifers to cows grazing has been modelled (ie 460 heifers : 1,700 cows) in an attempt to reflect typical industry standards. This is not what actually takes place on the property. To make the farm system operate efficiently a beef finishing programme has been implemented to balance the feed supply and demand. Most properties undertaking dairy support will be more integrated with other farming enterprises such as cropping and/or sheep and beef and as a result dairy support is often a smaller proportion of the total farm income.

All cropping requirements are undertaken by contractors. Most plant and vehicles are associated with livestock feeding and husbandry. There are only two full time employees, although 640 hours of casual labour is budgeted to cover the busy winter period and staff holidays.

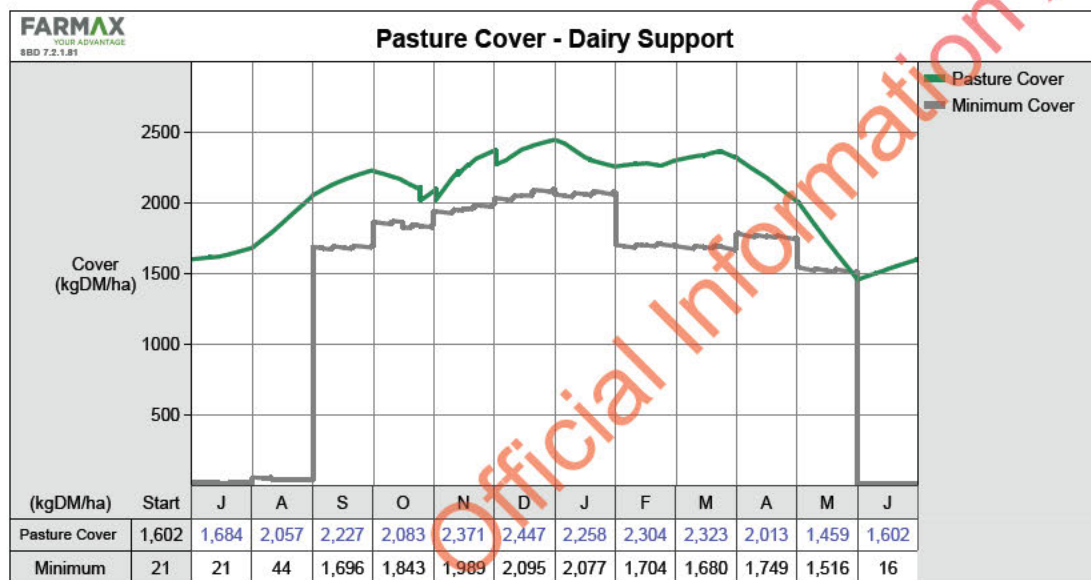


Figure X: Monthly pasture covers.

3.1.2. Modelling outputs

3.1.2.1. Financial budget summary

Table X: Financial summary – Dairy support

Budget Summary - Dairy Support

	Status Quo
Nett Farm Income	\$1,446,792
less Farm Working Expenses	\$958,186
<i>gives</i> Earnings Before Interest and Tax	\$488,606
less Capital Replacement / Depreciation	\$81,800
less Interest (on Capital Expenditure)	\$336,150
less Interest (on Working Capital)	\$14,656
<i>gives</i> Taxable Surplus	\$56,000
less Tax Provision (at 30%)	\$16,800
<i>gives</i> Disposable Surplus*	\$39,200
*Note: No debt/principal repayments are made in these models.	

3.1.2.2. Emission results

Table X: Emissions summary.

	Status Quo
Nitrogen	
Total kg	31,364
kg/ha	68
Phosphorus	
Total kg	102
kg/ha	0.2
Greenhouse gases (CO2 equivalent)	
Total kg	4,485,920
kg/ha	9,752

3.1.3. Commentary

Term debt levels have been based on \$13,000 per irrigated hectare and \$8,000 per effective dryland hectare totalling \$4,980,000. Based on a medium-term interest rate of 6.75% this results in term debt servicing of \$731 per hectare. Working capital debt is relatively low at \$32 per hectare given the majority of livestock are not owned. With an Earnings Before Interest, Tax and Depreciation (EBITD) of \$1055 per hectare, this results in an Interest Coverage Ratio (ICR) of 1.38. Whilst the business can survive at this lower ICR, it is desirable that it be above 1.5 to provide security and enable debt repayment and or further development. To achieve an ICR of 1.6 under the current debt structure an EBITD of \$1,221 per hectare is required or alternatively interest costs need to reduce to \$659 per hectare. Improvements to the EBITD could be enhanced by undertaking more of the cropping internally, although this would require investment in vehicles and plant.

Capital Replacement/Depreciation has been based on replacing plant at \$35,000 per annum (\$350,000 @ 10 per cent) and depreciating the irrigation system at 4 per cent per annum.

The model is an intensive farm system with 277 hectares being drilled into a crop or new pasture each year, with the majority of work undertaken by contractors. Therefore, costs associated with cropping and feed conservation including, contractor's costs, fertiliser & lime, seeds and weed & pest control contribute to 55.9 per cent of the Farm Working Expenditure (excluding interest). Other large cost categories include Labour (14.4 per cent) and Irrigation Charges (9.5 per cent).

The property is situated on well drained Ruapuna silt loam soils with a moderate Plant Available Water (PAW) of 69mm and is in a higher rainfall zone (903mm based on NIWA data). Whilst every attempt has been made to implement a farm system under Good Management Practises (GMP), including utilisation of soil moisture probes, direct drilling where possible, minimising fallow periods and targeted fertiliser applications, the nitrate loss to water is modelled at 68 kilograms per hectare. This is predominately due to the large number of cattle being fed, the free draining soils and higher rainfall.

3.2. Dairy Support – MfE Scenario: Nitrogen Caps

3.2.1. Farm Description

Changes have been made to the farm system in an attempt to target the MfE Scenario nitrogen cap of 60 kilogram nitrate per hectare.

3.2.1.1. Area

Crop policies changes to achieve the nitrogen cap

- 260 hectares are Pivot Irrigated – 7 year rotation
 - 37.1 ha summer rape (Oct - Apr) – 8 tdm/ha
 - 37.1 ha greenchop oat silage (Apr – Sep) – 6 tdm/ha
 - 37.1 ha fodderbeet (Oct – Aug) – 23 tdm/ha
 - 37.1 ha barley grain (Sept – Feb) – grain sold (8.5 t/ha) / straw kept (3.5 tdm/ha)
 - Pasture for 4.5 years – Annual production before nitrogen of 13.12 tdm/ha
- 24 hectares Dryland – Corner areas of pivot irrigators – 8 year rotation
 - 3.4 ha summer rape (Oct - Apr) – 7 tdm/ha
 - 3.4 ha greenchop oat silage (Apr – Sep) – 5 tdm/ha
 - 3.4 ha fodderbeet (Oct – Aug) – 18.5 tdm/ha
 - 3.4 ha barley grain (Sept – Feb) – grain sold (7.5 t/ha) / straw kept (3.0 tdm/ha)
 - Pasture for 4.5 years – Annual production before nitrogen of 8.5 tdm/ha
- 176 hectares Dryland – 7 year rotation
 - 25.1 ha summer rape (Oct - Apr) – 7 tdm/ha
 - 25.1 ha greenchop oat silage (Apr – Sep) – 5 tdm/ha
 - 25.1 ha fodderbeet (Oct – Aug) – 18.5 tdm/ha
 - 25.1 ha barley grain (Sept – Feb) – grain sold (7.5 t/ha) / straw kept (3.0 tdm/ha)
 - Pasture for 4.5 years – Annual production before nitrogen of 8.5 tdm/ha
 - Approximately 100 hectares of the dryland area is rolling downs.

- 15 hectares are in-effective

3.2.1.2. Stock numbers and performance

Changes to livestock numbers as follows:

- Increase in dairy heifer grazing from 460 head to 470 head
- Decrease in cow grazing from 1,700 head to 1,040 head
- Decrease in beef calves from 475 head to 445 head

3.2.1.3. Supplements

Changes to supplements are as follows:

- Barley straw:
 - 140 tdm is made on the property
 - 65 tdm is purchased onto the property
- Silage:
 - 50 tdm of surplus pasture is made into baleage
 - 270 tdm of surplus pasture silage sold
 - 365 tdm of greenchop oaten silage made into pit silage and baleage
 - 250 tdm of barley whole crop silage sold
- Barley grain:
 - 343 t of barley grain sold off farm

3.2.1.4. General farm

Aspects of the farm system were changed in an attempt to achieve the 60 kilogram nitrate discharge per hectare cap. Most winter feed areas of kale were taken out and replaced with a mixture of extra fodder beet, summer rape and cereal silage and grain. To reduce nitrogen loss, urea use on pasture was significantly reduced and cereal crops were grown after all fodder crops to utilise any surplus nitrogen. These changes meant less cows were able to be grazed on the property, and surplus cereal and pasture silage was sold. It should be noted that some dairy farmers prefer to graze their heifers on kale, so this farm system will not suit everyone.

With changes to the farm system the balance of heifers to cows has altered from the Status Quo of 27 per cent to 45 per cent (470 heifers : 1,040 cows). Normally if this occurred the dairy farmer would find alternative grazing arrangements, while the grazing property would find extra heifers to graze. However, from an industry perspective this could not happen on a national scale as it would create an imbalance. To achieve a reduction in the nitrogen loss on dairy support properties through a reduction in the number of cows grazed will require alternative feeding systems for cow wintering, such as wintering barns or feed pads.

The change in ratio of heifers to cows to 45 per cent represents 700 cows less than if the Status Quo 27 per cent ratio was maintained. Based on this analogy these cows would need to be grazed by alternative methods. An analysis of pad/barn feeding has not been undertaken as part of this project, however given the potential impact it could warrant further investigation in a separate project.

3.2.2. Modelling outputs

3.2.2.1. Financial budget summary

Table X: Financial summary – Dairy support

Budget Summary - Dairy Support

	Status Quo	MfE Scenario 1
Nett Farm Income	\$1,446,792	\$1,380,881
less Farm Working Expenses	\$958,186	\$929,589
gives Earnings Before Interest and Tax	\$488,606	\$451,292
less Capital Replacement / Depreciation	\$81,800	\$81,800
less Interest (on Capital Expenditure)	\$336,150	\$336,150
less Interest (on Working Capital)	\$14,656	\$25,302
gives Taxable Surplus	\$56,000	\$8,040
less Tax Provision (at 30%)	\$16,800	\$2,412
gives Disposable Surplus*	\$39,200	\$5,628
*Note: No debt/principal repayments are made in these models.		

3.2.2.2. Emission Results:

Table X: Emission summary.

	Status Quo	MfE Scenario 1
Nitrogen		
Total kg	31,364	27,117
kg/ha	68	59
Phosphorus		
Total kg	102	92
kg/ha	0.2	0
Greenhouse gases (CO2 equivalent)		
Total kg	4,485,920	3,751,760
kg/ha	9,752	8,156

3.2.3. Summary

The EBITD is significantly lower than the Status Quo model, despite the decrease in farm working costs. This is a direct result of reduced grazing income, caused by the reduction in feed produced, hence reduction in surplus feed being sold.

No consideration has been given to the cost of transferring feed to a feed pad/barn, although it can be assumed this would significantly increase the cost of winter cow grazing.

The decrease in nitrogen loss between the two farm systems is not as large as expected (68 compared to 59 kilogram nitrate discharge per hectare) considering the significant changes that were implemented and the cost of achieving this.

4. Results – Arable / Mixed Cropping

Prepared by Anton Nicholls, peer reviewed by Mark Everest.

4.1. Arable / Mixed Cropping – Status Quo

4.1.1. Farm description

4.1.1.1. General farm

This arable / mixed cropping farm system is based on grain and small seeds. 81 per cent of gross farm income is from grain and seed crops, 14 per cent from trading lambs, 3 per cent from dairy calve grazing, and 2 per cent from grass baleage sales.

The modelled farm employs two full time and one harvest / irrigation season casual labour unit. Direct-drilling, spraying, fertiliser spreading and harvesting is all carried with own labour and machinery.

The farm has very skilled management, keenly investing in new technology. The operation is certainly environmentally conscious, operating at Good Management Practice (GMP) levels.

4.1.1.2. Land

348 ha total area modelled

- 315 ha irrigated, flat land (approximately two-thirds pivot irrigators, one-third travelling irrigators, shallow wells)
- 10 ha dryland, flat land
- 10 ha in-effective.
- Soil types
 - 220 ha (approximately two-thirds) of the area classified as Prebbleton silt loam (Prebb_5a.1).
 - 105 ha (approximately one-third) of the area classified as Wakanui silt loam (Wakanui_27a.1).
- Mean annual rainfall 544 mm per annum.
- Annual potential evapotranspiration 877 mm per annum.

4.1.1.3. Pasture

No permanent pasture

- Lambs and calves mostly graze ryegrass seed and white clover seed crops, when those crops are not closed for seed.
- 10 ha of lucerne is also used in the non-winter months for grazing and one baleage cut.

4.1.1.4. Crops

325 ha effective area

- 315 ha irrigated, flat land
- Seven year crop rotation

45 ha Italian ryegrass seed crop
 45 ha Garden seed peas
 45 ha Autumn sown feed wheat
 15 ha Linseed (for food grade oil)
 15 ha Sunflower (for food grade oil)
 15 ha Hemp (for food grade oil)
 45 ha Spring sown malting barley
 45 ha White clover seed crop
 45 ha Winter sown milling wheat.

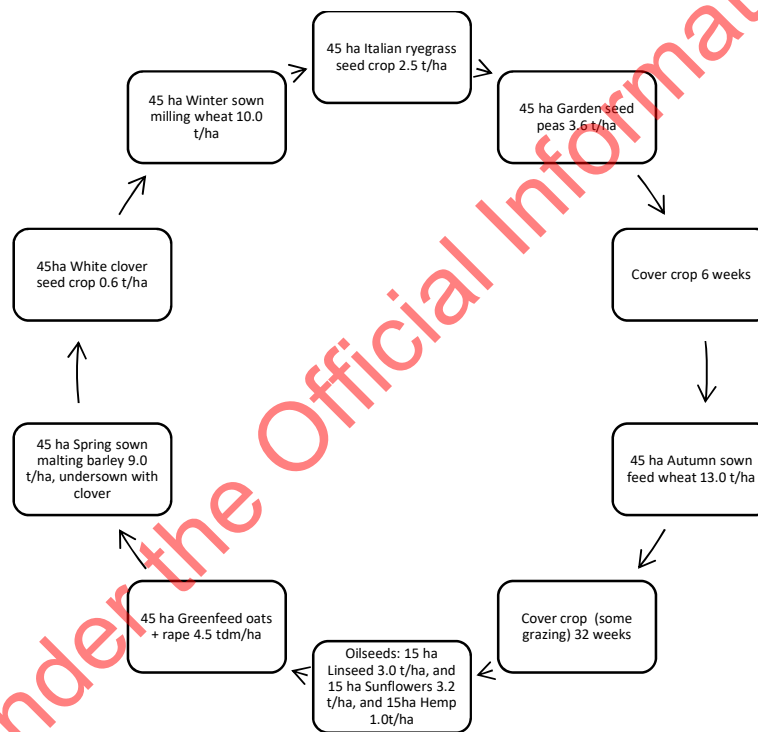


Figure X: Arable mixed cropping 7 year crop rotation, 45ha blocks.

- 10ha dryland, flat land
 10 ha Lucerne.

4.1.1.5. Stock numbers and performance:

Sheep

- 2100 trading lambs purchased 15th March at 30 kg per head liveweight
- 2800 trading lambs purchased 15th April at 31 kg per head liveweight
- 4802 trading lambs sold to freezing works, drafting throughout May to August at 19.6 to 24.9 kg per head carcase weight.

Cattle

- 210 dairy heifer calves, arrive 15th February at 120 kg per head liveweight (five months old), transferred back to dairy farm on 30th June at 148 kg liveweight (nine months old).

4.1.1.6. Supplements

No supplementary feed purchased – self sufficient.

- All wheat, barley and ryegrass straw is chopped/spread/retained at harvest. None is baled.
- 675 bales of pasture baleage @ 250 kilogram drymatter per bale are made on farm
 - 263 bales are used on farm
 - 412 bales are sold.
- 120 bales of lucerne baleage @ 250kg drymatter per bale are made on farm
 - All are used on farm – none sold.

4.1.2. Modelling outputs

4.1.2.1. Financial budget summary

Table X: Financial summary.

Budget Summary - Arable / Mixed Cropping

	Status Quo
Nett Farm Income	\$1,544,759
<i>less</i> Farm Working Expenses	\$972,774
<i>gives</i> Earnings Before Interest and Tax	\$571,985
<i>less</i> Capital Replacement / Depreciation	\$218,200
<i>less</i> Interest (on Capital Expenditure)	\$296,156
<i>less</i> Interest (on Working Capital)	\$21,847
<i>gives</i> Taxable Surplus	\$35,782
<i>less</i> Tax Provision (at 30%)	\$10,735
<i>gives</i> Disposable Surplus*	\$25,047

*Note: No debt/principal repayments are made in these models.

4.1.2.2. Emission results

Table X: Emission summary.

Emission Summary - Arable / Mixed Cropping

	Status Quo
Nitrogen	
Total kg	8,380
kg/ha	25
Phosphorus	
Total kg	178
kg/ha	0.5
Greenhouse gasses (CO2 equivalent)	
Total kg	
kg/ha	6,321

4.1.3. Commentary

This anonymous farm was chosen as a case study farm, due to the significant number of waterways on the property. All paddocks have at least one fenceline adjacent to a waterway. This property does have a high proportion of waterways relative to a typical Canterbury arable farm, although many coastal Canterbury properties do have different types of waterways.

The Farmax biophysical model was used to show that the stock policies and stocking rate (1.1.1.5.) are feasible and sustainable in terms of balancing feed supply with animal demand on a daily time-step throughout the year.

Financial analysis (1.1.2.1.) of the farm model objectively represented a Canterbury arable mixed cropping farm. Gross Farm Income was a strong \$4,750 per hectare and Farm Working Expenses of \$2,990 per hectare were within typical ranges leading to an above typical Earnings Before Interest Tax Depreciation (EBITD) of \$1,760 per hectare (\$572,000). This EBITDA actually represents toward the top 10 per cent of similar type farm systems in Canterbury. The majority of mixed cropping farms in Canterbury would not be as profitable as this farm. However once interest on typical debt and working capital levels were accounted for, plus provisions for capital replacement (proxy for depreciation), provision for income tax the bottomline true (disposable) cash surplus was only \$24,940 per hectare per annum. Note that as soon as the true cash surplus becomes a deficit, this farm would not be financially sustainable in the medium term, due to the model being designed in a steady-state cyclical mode.

Capital Replacement has been based on replacing 10 per cent of the total plant & machinery per annum, and 4 percent of the irrigation hardware.

When the farm was first modelled, it had a good EBITD per hectare, but at only 231ha effective, it did not have enough economy-of-scale to be financially sustainable. MRB made the decision to scale up the effective area (and consequent income and expense items) by 40% therefore to 335ha, which is in fact more aligned to a typical Canterbury mixed cropping farm.

The farm has heavy soils and is in a low rainfall zone. The nitrate discharge to water may well be greater on a lighter (less soil water holding capacity) soil type, especially if greater average rainfall. The nitrate discharge of 25 kg nitrate per hectare would be considered fairly typical of mixed (meaning including arable crop and livestock) cropping farms on heavy soils in Canterbury. The phosphate

discharge of 0.5 kg phosphate per hectare would also be considered fairly typical of mixed (meaning including arable crop and livestock) cropping farms in Canterbury.

The farm operates at GMP levels, for example: direct drilling, cover crops, stock exclusion from waterways, careful and targeted use of soluble phosphate fertiliser (variable rate technology). Fertiliser applications are calculated against crop needs. Livestock impact on the soil is carefully managed during the year. Crop rotations maintain organic matter levels as respectfully as possible including full straw/residue soil incorporation. Soil moisture monitoring is carried out during the irrigation season. Cover crops are utilised to protect topsoil and enhance soil biology in otherwise fallow periods.

4.2. Arable / Mixed Cropping – MfE Scenario 2: Nitrogen Cap

4.2.1. Nitrate cap not applicable to this model

As agreed in the Scope of Works, no nitrogen cap was to be modelled for the arable mixed cropping system. The reason is that for the majority of farms that this case study farm represents, those farms operate below the scenario 60 kg nitrate per hectare cap that MfE were interested in analysing. To achieve the MfE project milestones in a timely manner, it was agreed with MfE that this scenario x model was not initiated.

Note that this arable model includes livestock albeit only to a low relative stocking rate. This model does not include process vegetable / market garden crops. Both these scenarios would likely see an increased nitrate discharge.

Marginal				
Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$81	\$0	\$81	\$1,075
Sheep & Beef	\$6	\$0	\$6	\$157
Other			\$63	\$925
Total			\$150	\$2,157

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for	Total
			full compliance	
Northland	\$0	\$0	\$0	\$1
Auckland	\$1	\$0	\$1	\$1
Waikato	\$50	\$2	\$0	\$52
Bay of Plenty	\$4	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$4	\$0	\$0	\$4
Manawatu-Wanganui	\$5	\$0	\$0	\$5
Hawke's Bay	\$1	\$0	\$1	\$3
Wellington	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlborough	\$0	\$0	\$0	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$3	\$1	\$50	\$55
Otago	\$12	\$2	\$0	\$13
Southland	\$0	\$0	\$11	\$12
Total	\$81	\$6	\$63	\$150
	54%	4%	42%	100%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	1.6%	0%
Waikato	5.3%	1%
Bay of Plenty	2.7%	0%
Gisborne	0.4%	0%
Taranaki	1.2%	0%
Manawatu-Wanganui	1.7%	0%
Hawke's Bay	2.0%	0%
Wellington	0.7%	0%
Tasman	0.4%	0%
Nelson	0.0%	0%
Marlborough	1.4%	1%
West Coast	0.0%	0%
Canterbury	0.6%	1%
Otago	4.8%	1%
Southland	0.1%	0%
Total	2.4%	0%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-5	0	5	-0.3%	0.0%	0.3%
Auckland	-3	0	3	-0.7%	0.0%	0.6%
Waikato	30	0	30	-0.5%	0.0%	0.9%
Bay of Plent	-37	0	37	-3.7%	0.0%	1.3%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-31	0	31	-1.4%	0.0%	10.2%
Manawatu-W	0	0	0	0.0%	0.0%	0.0%
Hawke's Bay	-10	0	10	-3.4%	0.0%	0.5%
Wellington	-4	0	4	-1.0%	0.0%	0.5%
Tasman	-2	0	2	-1.0%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlborough	-4	0	4	-3.3%	0.0%	0.4%
West Coast	0	0	0	0.0%	0.0%	0.1%
Canterbury	-304	0	0	-12.0%	0.0%	0.0%
Otago	-93	0	93	-6.8%	0.0%	5.4%
Southland	-1	0	1	0.0%	0.0%	0.1%
Total	-524	0	220	-2.5%	0.0%	1.0%

EFW

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$229	\$0	\$229	\$2,529
Sheep & Beef	\$82	\$0	\$82	\$911
Other			\$252	\$2,786
Total			\$563	\$6,226

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$1	\$1	\$0	\$2
Auckland	\$2	\$0	\$2	\$4
Waikato	\$71	\$6	\$0	\$77
Bay of Plent	\$8	\$0	\$0	\$9
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$44	\$0	\$0	\$44
Manawatu-l	\$13	\$6	\$2	\$20
Hawke's Bay	\$12	\$10	\$5	\$27
Wellington	\$4	\$2	\$0	\$6
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$12	\$16	\$175	\$203
Otago	\$40	\$10	\$0	\$50
Southland	\$21	\$30	\$67	\$118
Total	\$229	\$82	\$252	\$563
	41%	15%	45%	100%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.4%	1%
Auckland	2.8%	1%
Waikato	7.4%	4%
Bay of Plent	5.3%	2%
Gisborne	0.4%	1%
Taranaki	12.9%	1%
Manawatu-l	4.8%	3%
Hawke's Bay	26.8%	6%
Wellington	6.4%	3%
Tasman	0.5%	0%
Nelson	0.0%	0%
Marlboroug	1.4%	1%
West Coast	0.2%	1%
Canterbury	2.3%	9%
Otago	16.9%	4%
Southland	5.8%	20%
Total	6.8%	5%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-12	0	12	-0.7%	0.0%	0.7%
Auckland	-4	1	4	-1.0%	0.1%	0.8%
Waikato	-89	0	89	-1.5%	0.0%	2.7%
Bay of Plent	-74	0	74	-7.3%	0.0%	2.6%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-346	0	346	-16.1%	0.0%	115.3%
Manawatu-l	-5	0	5	-0.3%	0.0%	0.3%
Hawke's Bay	-128	0	128	-45.1%	0.0%	6.9%
Wellington	-34	0	34	-8.5%	0.0%	4.2%
Tasman	-2	0	2	-1.2%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	-4	0	4	-3.3%	0.0%	0.4%
West Coast	-3	0	3	-0.4%	0.0%	0.6%
Canterbury	-1,205	0	0	-47.8%	0.0%	0.0%
Otago	-325	0	325	-23.7%	0.0%	18.9%
Southland	-160	0	160	-7.9%	0.0%	16.3%
Total	-2,391	1	1,185	-11.6%	0.0%	5.6%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$147	\$0	\$147	\$1,454
Sheep & Bee	\$76	\$0	\$76	\$754
Other			\$188	\$1,860
Total			\$412	\$4,068

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$1	\$0	\$0	\$1
Auckland	\$1	\$0	\$2	\$3
Waikato	\$21	\$4	\$0	\$25
Bay of Plent	\$4	\$0	\$0	\$5
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$40	\$0	\$0	\$40
Manawatu-l	\$8	\$6	\$2	\$16
Hawke's Bay	\$11	\$9	\$4	\$25
Wellington	\$4	\$2	\$0	\$6
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$9	\$15	\$124	\$148
Otago	\$29	\$8	\$0	\$37
Southland	\$20	\$30	\$56	\$106
Total	\$147	\$76	\$188	\$412
	36%	19%	46%	100%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.2%	0%
Auckland	1.3%	1%
Waikato	2.2%	3%
Bay of Plent	2.6%	2%
Gisborne	0.0%	1%
Taranaki	11.8%	1%
Manawatu-l	3.0%	2%
Hawke's Bay	24.8%	6%
Wellington	5.7%	3%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.2%	0%
Canterbury	1.6%	8%
Otago	12.1%	3%
Southland	5.8%	20%
Total	4.4%	5%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-7	0	7	-0.4%	0.0%	0.4%
Auckland	-1	0	1	-0.3%	0.0%	0.2%
Waikato	-59	0	59	-1.0%	0.0%	1.8%
Bay of Plent	-37	0	37	-3.6%	0.0%	1.3%
Gisborne	0	0	0	0.0%	0.0%	0.0%
Taranaki	-315	0	315	-14.7%	0.0%	105.0%
Manawatu-l	5	0	5	-0.3%	0.0%	0.3%
Hawke's Bay	-119	0	119	-41.7%	0.0%	6.4%
Wellington	-30	0	30	-7.5%	0.0%	3.7%
Tasman	0	0	0	-0.2%	0.0%	0.0%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0.0%	0.0%	0.0%
West Coast	-3	0	3	-0.3%	0.0%	0.6%
Canterbury	-901	0	0	-35.7%	0.0%	0.0%
Otago	-232	0	232	-16.9%	0.0%	13.5%
Southland	-159	0	159	-7.8%	0.0%	16.2%
Total	-1,867	0	966	-9.0%	0.0%	4.5%

Marginal				
Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$81	\$0	\$81	\$910
Sheep & Beef	\$6	\$0	\$6	\$119
Other			\$63	\$684
Total			\$150	\$1,714

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$0	\$0	\$0	\$1
Auckland	\$1	\$0	\$1	\$1
Waikato	\$50	\$2	\$0	\$52
Bay of Plent	\$4	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$4	\$0	\$0	\$4
Manawatu-\	\$5	\$0	\$0	\$5
Hawke's Bay	\$1	\$0	\$1	\$3
Wellington	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$3	\$1	\$50	\$55
Otago	\$12	\$2	\$0	\$13
Southland	\$0	\$0	\$11	\$12
Total	\$81	\$6	\$63	\$150
	54%	4%	42%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-5	0	5	-0.3%	0.0%	0.3%
Auckland	-3	0	3	-0.7%	0.0%	0.6%
Waikato	-30	0	30	-0.5%	0.0%	0.9%
Bay of Plent	-37	0	37	-3.7%	0.0%	1.3%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-31	0	31	-1.4%	0.0%	10.2%
Manawatu-\	0	0	0	0.0%	0.0%	0.0%
Hawke's Bay	-10	0	10	-3.4%	0.0%	0.5%
Wellington	-4	0	4	-1.0%	0.0%	0.5%
Tasman	-2	0	2	-1.0%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	-4	0	4	-3.3%	0.0%	0.4%
West Coast	0	0	0	0.0%	0.0%	0.1%
Canterbury	-304	0	0	-12.0%	0.0%	0.0%
Otago	-93	0	93	-6.8%	0.0%	5.4%
Southland	-1	0	1	0.0%	0.0%	0.1%
Total	-524	0	220	-2.5%	0.0%	1.0%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	1.6%	0%
Waikato	5.3%	1%
Bay of Plent	2.7%	0%
Gisborne	0.4%	0%
Taranaki	1.2%	0%
Manawatu-\	1.7%	0%
Hawke's Bay	2.0%	0%
Wellington	0.7%	0%
Tasman	0.4%	0%
Nelson	0.0%	0%
Marlboroug	1.4%	1%
West Coast	0.0%	0%
Canterbury	0.6%	1%
Otago	4.8%	1%
Southland	0.1%	0%
Total	2.4%	0%

EFW

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$229	\$0	\$229	\$2,304
Sheep & Beef	\$82	\$0	\$82	\$661
Other			\$252	\$2,021
Total			\$563	\$4,986

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Improving
Rate of tech change pa	0.0175

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$1	\$1	\$0	\$2
Auckland	\$2	\$0	\$2	\$4
Waikato	\$71	\$6	\$0	\$77
Bay of Plent	\$8	\$0	\$0	\$9
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$44	\$0	\$0	\$44
Manawatu-\\	\$13	\$6	\$2	\$20
Hawke's Bay	\$12	\$10	\$5	\$27
Wellington	\$4	\$2	\$0	\$6
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$12	\$16	\$175	\$203
Otago	\$40	\$10	\$0	\$50
Southland	\$21	\$30	\$67	\$118
Total	\$229	\$82	\$252	\$563
	41%	15%	45%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-12	0	12	-0.7%	0.0%	0.7%
Auckland	-4	1	4	-1.0%	0.1%	0.8%
Waikato	-89	0	89	-1.5%	0.0%	2.7%
Bay of Plent	-74	0	74	-7.3%	0.0%	2.6%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-346	0	346	-16.1%	0.0%	115.3%
Manawatu-\\	-5	0	5	-0.3%	0.0%	0.3%
Hawke's Bay	-128	0	128	-45.1%	0.0%	6.9%
Wellington	-34	0	34	-8.5%	0.0%	4.2%
Tasman	-2	0	2	-1.2%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug\\	-4	0	4	-3.3%	0.0%	0.4%
West Coast	-3	0	3	-0.4%	0.0%	0.6%
Canterbury	-1,205	0	0	-47.8%	0.0%	0.0%
Otago	-325	0	325	-23.7%	0.0%	18.9%
Southland	-160	0	160	-7.9%	0.0%	16.3%
Total	-2,391	1	1,185	-11.6%	0.0%	5.6%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.4%	1%
Auckland	2.8%	1%
Waikato	7.4%	4%
Bay of Plent	5.3%	2%
Gisborne	0.4%	1%
Taranaki	12.9%	1%
Manawatu-\\	4.8%	3%
Hawke's Bay	26.8%	6%
Wellington	6.4%	3%
Tasman	0.5%	0%
Nelson	0.0%	0%
Marlboroug	1.4%	1%
West Coast	0.2%	1%
Canterbury	2.3%	9%
Otago	16.9%	4%
Southland	5.8%	20%
Total	6.8%	5%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$147	\$0	\$147	\$1,393
Sheep & Bee	\$76	\$0	\$76	\$542
Other			\$188	\$1,337
Total			\$412	\$3,272

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Improving
Rate of tec	0.0175

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$1	\$0	\$0	\$1
Auckland	\$1	\$0	\$2	\$3
Waikato	\$21	\$4	\$0	\$25
Bay of Plent	\$4	\$0	\$0	\$5
Gisborne	\$0	\$0	\$0	\$0
Taranaki	\$40	\$0	\$0	\$40
Manawatu-\	\$8	\$6	\$2	\$16
Hawke's Bay	\$11	\$9	\$4	\$25
Wellington	\$4	\$2	\$0	\$6
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$9	\$15	\$124	\$148
Otago	\$29	\$8	\$0	\$37
Southland	\$20	\$30	\$56	\$106
Total	\$147	\$76	\$188	\$412
	36%	19%	46%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-7	0	7	-0.4%	0.0%	0.4%
Auckland	-1	0	1	-0.3%	0.0%	0.2%
Waikato	-59	0	59	-1.0%	0.0%	1.8%
Bay of Plent	-37	0	37	-3.6%	0.0%	1.3%
Gisborne	0	0	0	0.0%	0.0%	0.0%
Taranaki	-315	0	315	-14.7%	0.0%	105.0%
Manawatu-\	-5	0	5	-0.3%	0.0%	0.3%
Hawke's Bay	-119	0	119	-41.7%	0.0%	6.4%
Wellington	-30	0	30	-7.5%	0.0%	3.7%
Tasman	0	0	0	-0.2%	0.0%	0.0%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0.0%	0.0%	0.0%
West Coast	-3	0	3	-0.3%	0.0%	0.6%
Canterbury	-901	0	0	-35.7%	0.0%	0.0%
Otago	-232	0	232	-16.9%	0.0%	13.5%
Southland	-159	0	159	-7.8%	0.0%	16.2%
Total	-1,867	0	966	-9.0%	0.0%	4.5%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.2%	0%
Auckland	1.3%	1%
Waikato	2.2%	3%
Bay of Plent	2.6%	2%
Gisborne	0.0%	1%
Taranaki	11.8%	1%
Manawatu-\	3.0%	2%
Hawke's Bay	24.8%	6%
Wellington	5.7%	3%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.2%	0%
Canterbury	1.6%	8%
Otago	12.1%	3%
Southland	5.8%	20%
Total	4.4%	5%

Marginal				
Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$81	\$67	\$149	\$1,838
Sheep & Beef	\$6	\$44	\$50	\$658
Other	\$0	\$0	\$539	\$6,396
Total			\$738	\$8,892

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$13	\$0	\$68	\$82
Auckland	\$1	\$0	\$9	\$10
Waikato	\$84	\$13	\$169	\$265
Bay of Plent	\$10	\$4	\$59	\$74
Gisborne	\$0	\$0	\$2	\$2
Taranaki	\$7	\$0	\$13	\$21
Manawatu-\	\$13	\$23	\$111	\$147
Hawke's Bay	\$2	\$2	\$14	\$18
Wellington	\$3	\$0	\$9	\$12
Tasman	\$0	\$0	\$3	\$3
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$1	\$3	\$5	\$8
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$3	\$1	\$54	\$59
Otago	\$12	\$2	\$6	\$19
Southland	\$0	\$0	\$16	\$16
Total	\$149	\$50	\$539	\$738
	20%	7%	73%	100%

Change in land area (km2)						
Region	Dairy	Sheep &		Dairy	Sheep &	
		beef	Forestry		beef	Forestry
Northland	-5	0	5	-0.3%	0.0%	0.3%
Auckland	-3	0	3	-0.8%	0.0%	0.6%
Waikato	-30	0	30	-0.5%	0.0%	0.9%
Bay of Plent	-37	0	37	-3.7%	0.0%	1.3%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-31	0	31	-1.4%	0.0%	10.2%
Manawatu-l	-10	0	0	-0.6%	0.0%	0.0%
Hawke's Bay	-10	0	10	-3.4%	0.0%	0.5%
Wellington	-4	0	4	-1.0%	0.0%	0.5%
Tasman	-2	0	2	-1.0%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	-4	0	4	-3.3%	0.0%	0.4%
West Coast	0	0	0	0.0%	0.0%	0.1%
Canterbury	-304	0	0	-12.0%	0.0%	0.0%
Otago	-93	0	93	-6.8%	0.0%	5.4%
Southland	-1	0	1	0.0%	0.0%	0.1%
Total	-534	0	220	-2.6%	0.0%	1.0%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	6.1%	0%
Auckland	2.5%	0%
Waikato	8.8%	8%
Bay of Plent	6.4%	15%
Gisborne	0.5%	0%
Taranaki	2.2%	1%
Manawatu-\	4.8%	10%
Hawke's Bay	3.4%	1%
Wellington	4.0%	1%
Tasman	0.5%	0%
Nelson	0.0%	16%
Marlboroug	3.1%	9%
West Coast	0.0%	0%
Canterbury	0.6%	1%
Otago	4.9%	1%
Southland	0.1%	0%
Total	4.4%	3%

EFW

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$229	\$82	\$311	\$3,437
Sheep & Beef	\$82	\$59	\$141	\$1,561
Other			\$896	\$9,919
Total			\$1,348	\$14,918

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$14	\$1	\$88	\$103
Auckland	\$3	\$0	\$24	\$27
Waikato	\$112	\$17	\$192	\$321
Bay of Plent	\$16	\$5	\$73	\$94
Gisborne	\$0	\$2	\$7	\$10
Taranaki	\$48	\$0	\$16	\$64
Manawatu-\\	\$20	\$32	\$142	\$195
Hawke's Bay	\$14	\$17	\$48	\$78
Wellington	\$6	\$3	\$15	\$24
Tasman	\$0	\$0	\$3	\$3
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$1	\$3	\$5	\$9
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$12	\$16	\$185	\$213
Otago	\$43	\$14	\$14	\$71
Southland	\$21	\$30	\$84	\$135
Total	\$311	\$141	\$896	\$1,348
	23%	10%	66%	100%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	6.8%	1%
Auckland	5.0%	1%
Waikato	11.8%	11%
Bay of Plent	10.1%	17%
Gisborne	1.4%	4%
Taranaki	14.1%	1%
Manawatu-\\	7.5%	13%
Hawke's Bay	30.6%	10%
Wellington	9.8%	4%
Tasman	0.6%	0%
Nelson	1.5%	16%
Marlboroug	3.1%	10%
West Coast	0.2%	1%
Canterbury	2.3%	9%
Otago	17.8%	5%
Southland	5.8%	20%
Total	9.2%	9%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-12	0	12	-0.7%	0.0%	0.7%
Auckland	-5	1	4	-1.0%	0.1%	0.8%
Waikato	-89	0	89	-1.5%	0.0%	2.7%
Bay of Plent	-74	0	74	-7.3%	0.0%	2.6%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-346	0	346	-16.1%	0.0%	115.3%
Manawatu-\\	-36	0	5	-2.2%	0.0%	0.3%
Hawke's Bay	-128	0	128	-45.1%	0.0%	6.9%
Wellington	-34	0	34	-8.5%	0.0%	4.2%
Tasman	-2	0	2	-1.2%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug\\	-4	0	4	-3.3%	0.0%	0.4%
West Coast	-3	0	3	-0.4%	0.0%	0.6%
Canterbury	-1,205	0	0	-47.8%	0.0%	0.0%
Otago	-325	0	325	-23.7%	0.0%	18.9%
Southland	-160	0	160	-7.9%	0.0%	16.3%
Total	-2,422	1	1,186	-11.7%	0.0%	5.6%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$147	\$15	\$162	\$1,599
Sheep & Bee	\$76	\$15	\$92	\$904
Other			\$357	\$3,524
Total			\$610	\$6,026

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$2	\$1	\$19	\$22
Auckland	\$1	\$0	\$15	\$17
Waikato	\$29	\$4	\$23	\$56
Bay of Plent	\$6	\$1	\$14	\$21
Gisborne	\$0	\$2	\$5	\$7
Taranaki	\$41	\$0	\$2	\$43
Manawatu-\	\$7	\$9	\$31	\$47
Hawke's Bay	\$13	\$14	\$33	\$60
Wellington	\$4	\$2	\$5	\$11
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$1	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$9	\$15	\$130	\$154
Otago	\$31	\$12	\$8	\$52
Southland	\$20	\$30	\$69	\$119
Total	\$162	\$92	\$357	\$610
	27%	15%	58%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-7	0	7	-0.4%	0.0%	0.4%
Auckland	-1	0	1	-0.3%	0.0%	0.2%
Waikato	-59	0	59	-1.0%	0.0%	1.8%
Bay of Plent	-37	0	37	-3.6%	0.0%	1.3%
Gisborne	0	0	0	0.0%	0.0%	0.0%
Taranaki	-315	0	315	-14.7%	0.0%	105.0%
Manawatu-\	-26	0	5	-1.6%	0.0%	0.3%
Hawke's Bay	-119	0	119	-41.7%	0.0%	6.4%
Wellington	-30	0	30	-7.5%	0.0%	3.7%
Tasman	0	0	0	-0.2%	0.0%	0.0%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0.0%	0.0%	0.0%
West Coast	-3	0	3	-0.3%	0.0%	0.6%
Canterbury	-901	0	0	-35.7%	0.0%	0.0%
Otago	-232	0	232	-16.9%	0.0%	13.5%
Southland	-159	0	159	-7.8%	0.0%	16.2%
Total	-1,888	0	966	-9.1%	0.0%	4.5%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.7%	0%
Auckland	2.5%	1%
Waikato	3.0%	3%
Bay of Plent	3.7%	2%
Gisborne	0.9%	4%
Taranaki	12.0%	1%
Manawatu-\	2.8%	4%
Hawke's Bay	27.2%	9%
Wellington	5.8%	3%
Tasman	0.1%	0%
Nelson	1.5%	0%
Marlboroug	0.0%	1%
West Coast	0.2%	0%
Canterbury	1.6%	8%
Otago	12.9%	5%
Southland	5.8%	20%
Total	4.8%	6%

Marginal

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$81	\$67	\$149	\$1,463
Sheep & Beef	\$6	\$44	\$50	\$483
Other	\$0	\$0	\$539	\$4,665
Total			\$738	\$6,611

Assumptions

Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	imum estimate
Technical efficiency	Improving
Rate of tech change pa	1.75%

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$13	\$0	\$68	\$82
Auckland	\$1	\$0	\$9	\$10
Waikato	\$84	\$13	\$169	\$265
Bay of Plent	\$10	\$4	\$59	\$74
Gisborne	\$0	\$0	\$2	\$2
Taranaki	\$7	\$0	\$13	\$21
Manawatu-\	\$13	\$23	\$111	\$147
Hawke's Bay	\$2	\$2	\$14	\$18
Wellington	\$3	\$0	\$9	\$12
Tasman	\$0	\$0	\$3	\$3
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$1	\$3	\$5	\$8
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$3	\$1	\$54	\$59
Otago	\$12	\$2	\$6	\$19
Southland	\$0	\$0	\$16	\$16
Total	\$149	\$50	\$539	\$738
	20%	7%	73%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-5	0	5	-0.3%	0.0%	0.3%
Auckland	-3	0	3	-0.8%	0.0%	0.6%
Waikato	-30	0	30	-0.5%	0.0%	0.9%
Bay of Plent	-37	0	37	-3.7%	0.0%	1.3%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-31	0	31	-1.4%	0.0%	10.2%
Manawatu-\	-10	0	0	-0.6%	0.0%	0.0%
Hawke's Bay	-10	0	10	-3.4%	0.0%	0.5%
Wellington	-4	0	4	-1.0%	0.0%	0.5%
Tasman	-2	0	2	-1.0%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	-4	0	4	-3.3%	0.0%	0.4%
West Coast	0	0	0	0.0%	0.0%	0.1%
Canterbury	-304	0	0	-12.0%	0.0%	0.0%
Otago	-93	0	93	-6.8%	0.0%	5.4%
Southland	-1	0	1	0.0%	0.0%	0.1%
Total	-534	0	220	-2.6%	0.0%	1.0%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	6.1%	0%
Auckland	2.5%	0%
Waikato	8.8%	8%
Bay of Plent	6.4%	15%
Gisborne	0.5%	0%
Taranaki	2.2%	1%
Manawatu-\	4.8%	10%
Hawke's Bay	3.4%	1%
Wellington	4.0%	1%
Tasman	0.5%	0%
Nelson	0.0%	16%
Marlboroug	3.1%	9%
West Coast	0.0%	0%
Canterbury	0.6%	1%
Otago	4.9%	1%
Southland	0.1%	0%
Total	4.4%	3%

EFW

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$229	\$82	\$311	\$2,956
Sheep & Beef	\$82	\$59	\$141	\$1,133
Other			\$896	\$7,197
Total			\$1,348	\$11,285

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Improving
Rate of tech change pa	0.0175

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$14	\$1	\$88	\$103
Auckland	\$3	\$0	\$24	\$27
Waikato	\$112	\$17	\$192	\$321
Bay of Plent	\$16	\$5	\$73	\$94
Gisborne	\$0	\$2	\$7	\$10
Taranaki	\$48	\$0	\$16	\$64
Manawatu-\\	\$20	\$32	\$142	\$195
Hawke's Bay	\$14	\$17	\$48	\$78
Wellington	\$6	\$3	\$15	\$24
Tasman	\$0	\$0	\$3	\$3
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$1	\$3	\$5	\$9
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$12	\$16	\$185	\$213
Otago	\$43	\$14	\$14	\$71
Southland	\$21	\$30	\$84	\$135
Total	\$311	\$141	\$896	\$1,348
	23%	10%	66%	100%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	6.8%	1%
Auckland	5.0%	1%
Waikato	11.8%	11%
Bay of Plent	10.1%	17%
Gisborne	1.4%	4%
Taranaki	14.1%	1%
Manawatu-\\	7.5%	13%
Hawke's Bay	30.6%	10%
Wellington	9.8%	4%
Tasman	0.6%	0%
Nelson	1.5%	16%
Marlboroug	3.1%	10%
West Coast	0.2%	1%
Canterbury	2.3%	9%
Otago	17.8%	5%
Southland	5.8%	20%
Total	9.2%	9%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-12	0	12	-0.7%	0.0%	0.7%
Auckland	-5	1	4	-1.0%	0.1%	0.8%
Waikato	-89	0	89	-1.5%	0.0%	2.7%
Bay of Plent	-74	0	74	-7.3%	0.0%	2.6%
Gisborne	0	0	0	-0.7%	0.0%	0.0%
Taranaki	-346	0	346	-16.1%	0.0%	115.3%
Manawatu-\\	-36	0	5	-2.2%	0.0%	0.3%
Hawke's Bay	-128	0	128	-45.1%	0.0%	6.9%
Wellington	-34	0	34	-8.5%	0.0%	4.2%
Tasman	-2	0	2	-1.2%	0.0%	0.2%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug\\	-4	0	4	-3.3%	0.0%	0.4%
West Coast	-3	0	3	-0.4%	0.0%	0.6%
Canterbury	-1,205	0	0	-47.8%	0.0%	0.0%
Otago	-325	0	325	-23.7%	0.0%	18.9%
Southland	-160	0	160	-7.9%	0.0%	16.3%
Total	-2,422	1	1,186	-11.7%	0.0%	5.6%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$147	\$15	\$162	\$1,493
Sheep & Bee	\$76	\$15	\$92	\$649
Other			\$357	\$2,532
Total			\$610	\$4,674

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Improving
Rate of tec	0.0175

Annual costs (\$million)				
Region	Dairy	Sheep & beef	Other for full compliance	Total
Northland	\$2	\$1	\$19	\$22
Auckland	\$1	\$0	\$15	\$17
Waikato	\$29	\$4	\$23	\$56
Bay of Plent	\$6	\$1	\$14	\$21
Gisborne	\$0	\$2	\$5	\$7
Taranaki	\$41	\$0	\$2	\$43
Manawatu-\	\$7	\$9	\$31	\$47
Hawke's Bay	\$13	\$14	\$33	\$60
Wellington	\$4	\$2	\$5	\$11
Tasman	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$1	\$1
West Coast	\$0	\$0	\$0	\$0
Canterbury	\$9	\$15	\$130	\$154
Otago	\$31	\$12	\$8	\$52
Southland	\$20	\$30	\$69	\$119
Total	\$162	\$92	\$357	\$610
	27%	15%	58%	100%

Change in land area (km2)						
Region	Dairy	Sheep & beef	Forestry	Dairy	Sheep & beef	Forestry
Northland	-7	0	7	-0.4%	0.0%	0.4%
Auckland	-1	0	1	-0.3%	0.0%	0.2%
Waikato	-59	0	59	-1.0%	0.0%	1.8%
Bay of Plent	-37	0	37	-3.6%	0.0%	1.3%
Gisborne	0	0	0	0.0%	0.0%	0.0%
Taranaki	-315	0	315	-14.7%	0.0%	105.0%
Manawatu-\	-26	0	5	-1.6%	0.0%	0.3%
Hawke's Bay	-119	0	119	-41.7%	0.0%	6.4%
Wellington	-30	0	30	-7.5%	0.0%	3.7%
Tasman	0	0	0	-0.2%	0.0%	0.0%
Nelson	0	0	0	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0.0%	0.0%	0.0%
West Coast	-3	0	3	-0.3%	0.0%	0.6%
Canterbury	-901	0	0	-35.7%	0.0%	0.0%
Otago	-232	0	232	-16.9%	0.0%	13.5%
Southland	-159	0	159	-7.8%	0.0%	16.2%
Total	-1,888	0	966	-9.1%	0.0%	4.5%

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.7%	0%
Auckland	2.5%	1%
Waikato	3.0%	3%
Bay of Plent	3.7%	2%
Gisborne	0.9%	4%
Taranaki	12.0%	1%
Manawatu-\	2.8%	4%
Hawke's Bay	27.2%	9%
Wellington	5.8%	3%
Tasman	0.1%	0%
Nelson	1.5%	0%
Marlboroug	0.0%	1%
West Coast	0.2%	0%
Canterbury	1.6%	8%
Otago	12.9%	5%
Southland	5.8%	20%
Total	4.8%	6%

Marginal cost of DIN policy, 20% excedence, no P, new bundles					Annual costs (\$million)		Profit impacts %		Change in land use km 2				Change in land use %				regional land use change estimated in sediment study, millions of hectares	
Region					Dairy	Sheep & beef									land use change, region total, 000 hectares			
	Dairy	Sheep & beef	Other for full compliance	Total			Dairy	Sheep & beef	Dairy	Sheep & beef	Forestry	Arable	Dairy	Sheep & beef			Forestry	
Northland	\$0	\$0	\$0	\$1	0%	0%	-5.4	0.0	5.4	0.0	0%	0%	0%	-0.54				
Auckland	\$1	\$0	\$1	\$1	2%	0%	-3.3	0.2	3.0	0.0	-1%	0%	1%	-0.33				
Waikato	\$50	\$2	\$0	\$52	5%	1%	-30.0	0.0	30.0	0.0	-1%	0%	1%	-3.00				
Bay of Plenty	\$4	\$0	\$0	\$4	3%	0%	-37.4	0.0	37.4	0.0	-4%	0%	1%	-3.74				
Gisborne	\$0	\$0	\$0	\$0	0%	0%	-0.1	0.0	0.1	0.0	-1%	0%	0%	-0.01				
Taranaki	\$4	\$0	\$0	\$4	1%	0%	-30.7	0.0	30.7	0.0	-1%	0%	10%	-3.07				
Manawatu-Wanganui	\$5	\$0	\$0	\$5	2%	0%	0.0	0.0	0.0	0.0	0%	0%	0%	0.00				
Hawke's Bay	\$1	\$0	\$1	\$3	2%	0%	-9.6	0.0	9.6	0.0	-3%	0%	1%	-0.96				
Wellington	\$0	\$0	\$0	\$0	1%	0%	-3.8	0.0	3.8	0.0	-1%	0%	0%	-0.38				
Tasman	\$0	\$0	\$0	\$0	0%	0%	-1.9	0.0	1.9	0.0	-1%	0%	0%	-0.19				
Nelson	\$0	\$0	\$0	\$0	0%	0%	0.0	0.0	0.0	0.0	0%	0%	0%	0.00				
Marlborough	\$0	\$0	\$0	\$1	1%	1%	-3.6	0.0	3.6	0.0	-3%	0%	0%	-0.36				
West Coast	\$0	\$0	\$0	\$0	0%	0%	-0.4	0.0	0.4	0.0	0%	0%	0%	-0.04				
Canterbury	\$3	\$1	\$50	\$55	1%	1%	-303.6	0.0	0.0	303.6	-12%	0%	0%	-30.36				
Otago	\$12	\$2	\$0	\$13	5%	1%	-93.1	0.0	93.1	0.0	-7%	0%	5%	-9.31				
Southland	\$0	\$0	\$11	\$12	0%	0%	-0.8	0.0	0.8	0.0	0%	0%	0%	-0.08				
Total marginal impact of EFW	\$81	\$6	\$63	\$150	2%	0%	-523.8	0.2	219.9	-303.6	-3%	0%	1%					
Total impact of EFW and NPS	\$229	\$82	\$252	\$563	7%	5%					-12%							

Cost of farm plans \$m p.a. if amortised over 10 years (total upfront cost \$m)

\$20 (\$200m)

Cost of stock exclusion \$m p.a. if amortised over 10 years (total upfront cost \$m)

\$32 (\$320m)

Net profit impact from sediment policy: scenario A (significant afforestation gives increased profit) \$m per year

-\$253

Net profit impact from sediment policy: scenario B (farm mitigations deliver sediment policy) \$m per year

\$316

Marginal cost of e-Coli policy (nil as delivered by stock exclusion and town urban upgrades)

\$0

1166.6

Marginal EFW, cost of DIN policy, 20% excedence, no P, new bundles					Profit impacts %		Change in land use 000s hectares				Change in land use %		
Region	Annual costs (\$million)				Dairy	Sheep & beef	Dairy	Sheep & beef	Forestry	Arable	Dairy	Sheep & beef	Forestry
	Dairy	Sheep & beef	Other for full compliance	Total									
Northland	\$0	\$0	\$0	\$1	0%	0%	-5.4	0.0	5.4	0.0	0%	0%	0%
Auckland	\$1	\$0	\$1	\$1	2%	0%	-3.3	0.2	3.0	0.0	-1%	0%	1%
Waikato	\$50	\$2	\$0	\$52	5%	1%	-30.0	0.0	30.0	0.0	-1%	0%	1%
Bay of Plenty	\$4	\$0	\$0	\$4	3%	0%	-37.4	0.0	37.4	0.0	-4%	0%	1%
Gisborne	\$0	\$0	\$0	\$0	0%	0%	-0.1	0.0	0.1	0.0	-1%	0%	0%
Taranaki	\$4	\$0	\$0	\$4	1%	0%	-30.7	0.0	30.7	0.0	-1%	0%	10%
Manawatu-Wanganui	\$5	\$0	\$0	\$5	2%	0%	0.0	0.0	0.0	0.0	0%	0%	0%
Hawke's Bay	\$1	\$0	\$1	\$3	2%	0%	-9.6	0.0	9.6	0.0	-3%	0%	1%
Wellington	\$0	\$0	\$0	\$0	1%	0%	-3.8	0.0	3.8	0.0	-1%	0%	0%
Tasman	\$0	\$0	\$0	\$0	0%	0%	-1.9	0.0	1.9	0.0	-1%	0%	0%
Nelson	\$0	\$0	\$0	\$0	0%	0%	0.0	0.0	0.0	0.0	0%	0%	0%
Marlborough	\$0	\$0	\$0	\$1	1%	1%	-3.6	0.0	3.6	0.0	-3%	0%	0%
West Coast	\$0	\$0	\$0	\$0	0%	0%	-0.4	0.0	0.4	0.0	0%	0%	0%
Canterbury	\$3	\$1	\$50	\$55	1%	1%	-303.6	0.0	0.0	-303.6	-12%	0%	0%
Otago	\$12	\$2	\$0	\$13	5%	1%	-93.1	0.0	93.1	0.0	-7%	0%	5%
Southland	\$0	\$0	\$11	\$12	0%	0%	-0.8	0.0	0.8	0.0	0%	0%	0%
Total marginal impact of EFW	\$81	\$6	\$63	\$150	2%	0%	-523.8	0.2	219.9	-303.6	-3%	0%	1%
Total impact of EFW and NPS	\$229	\$82	\$252	\$563	7%	5%					-12%		

Cost of whole farm plans \$m up-front cost (cap ex)

100

Cost of stock exclusion \$m up-front cost, (cap ex)

320

Profits (\$/ha)							Hectares				Total profit				
	Dairy	SB Intensive	SB Hill	SB High	Arable	Forestry		DAIRY	SBINTEN	SBHILL	SBHIGH	DAIRY	SBINTEN	SBHILL	SBHIGH
Northland	\$1,234	\$468	\$250	\$0	\$1,416	\$81	Northland	1,713	2,730	400	0	\$211,391,822	\$127,720,741	\$10,015,661	\$0
Auckland	\$1,234	\$468	\$250	\$0	\$1,416	\$245	Auckland	462	822	55	0	\$57,031,352	\$38,435,632	\$1,370,297	\$0
Waikato	\$1,606	\$468	\$250	\$0	\$3,208	\$31	Waikato	5,932	1,488	3,599	40	\$952,624,887	\$69,597,756	\$90,060,488	\$0
Bay of Plent	\$1,591	\$279	\$246	\$0	\$3,835	\$30	Bay of Plenty	1,010	301	785	105	\$160,721,892	\$8,380,844	\$19,336,346	\$0
Gisborne	\$1,591	\$279	\$246	\$0	\$4,978	\$487	Gisborne	11	265	1,963	10	\$1,671,475	\$7,384,251	\$48,338,352	\$0
Taranaki	\$1,576	\$303	\$237	\$0	\$1,238	\$17	Taranaki	2,150	435	864	35	\$338,884,867	\$13,181,071	\$20,486,581	\$0
Manawatu-	\$1,614	\$279	\$246	\$0	\$2,369	\$41	Manawatu-Wanganui	1,641	2,107	7,436	85	\$264,910,763	\$58,759,825	\$183,066,305	\$0
Hawke's Ba	\$1,614	\$279	\$246	\$0	\$1,802	\$171	Hawke's Bay	284	2,243	4,112	151	\$45,927,942	\$62,549,393	\$101,226,263	\$0
Wellington	\$1,614	\$279	\$246	\$0	\$1,262	\$30	Wellington	397	614	2,042	27	\$64,119,153	\$17,126,020	\$50,274,758	\$0
Tasman	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Tasman	185	188	75	165	\$20,142,957	\$5,208,259	\$602,488	\$1,325,658
Nelson	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Nelson	6	3	1	8	\$620,461	\$83,694	\$4,295	\$60,731
Marlboroug	\$2,174	\$276	\$80	\$80	\$9,341	\$48	Marlborough	109	860	405	555	\$23,642,207	\$23,766,932	\$3,252,818	\$4,456,846
West Coast	\$1,090	\$328	\$80	\$80	\$0	\$45	West Coast	871	194	256	129	\$94,969,067	\$6,366,362	\$2,056,615	\$1,038,670
Canterbury	\$2,174	\$276	\$80	\$80	\$2,075	\$14	Canterbury	2,522	5,159	3,592	883	\$548,320,124	\$142,556,243	\$28,830,823	\$7,084,297
Otago	\$1,745	\$328	\$80	\$80	\$1,849	\$41	Otago	1,369	5,737	7,752	1,405	\$238,793,107	\$188,324,553	\$62,223,961	\$11,276,631
Southland	\$1,745	\$328	\$80	\$80	\$1,978	\$61	Southland	2,026	4,105	1,808	557	\$353,556,353	\$134,735,455	\$14,509,467	\$4,471,105
								20,688	27,250	35,146	4,155	\$3,377,328,430	\$904,177,031	\$635,655,519	\$29,713,937

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Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	-\$4	-\$3
Auckland	\$3	\$0	\$0	-\$1	\$1
Waikato	\$84	\$6	\$0	\$0	\$90
Bay of Plent	\$4	\$0	\$0	-\$3	\$1
Gisborne	\$0	\$0	\$0	-\$1	-\$1
Taranaki	\$4	\$0	\$0	\$0	\$4
Manawatu-l	\$8	\$0	\$0	-\$6	\$3
Hawke's Bay	\$1	\$1	\$0	-\$6	-\$4
Wellington	\$0	\$0	\$0	-\$1	-\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	-\$1	-\$1
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$51	\$2	\$26	\$31	\$109
Otago	\$9	\$1	\$0	-\$1	\$9
Southland	\$22	\$0	\$0	\$0	\$22
Total	\$185	\$11	\$26	\$7	\$229

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$185	\$0	\$185	\$2,388
Sheep & Bee	\$11	\$0	\$11	\$190
Hort	\$26	\$0	\$26	\$354
Other	\$32	-\$24	\$7	\$282
Total	\$253	-\$24	\$229	\$3,214

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-5	0	0	0	5	-0.3%	0.0%	0.0%	0.0%	0.2%	
Auckland	-26	-1	0	0	27	-5.7%	-0.1%	0.0%	0.0%	5.3%	
Waikato	-654	0	0	0	654	-11.0%	0.0%	0.0%	0.0%	20.0%	
Bay of Plent	-31	0	0	0	31	-3.1%	0.0%	0.0%	0.0%	1.1%	
Gisborne	-0	0	0	0	0	-0.7%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-30	0	0	0	30	-1.4%	0.0%	0.0%	0.0%	10.1%	
Manawatu-l	-68	0	0	0	68	-4.1%	0.0%	0.0%	0.0%	4.3%	
Hawke's Bay	-13	0	0	0	13	-4.5%	0.0%	0.0%	0.0%	0.7%	
Wellington	-0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	-2	0	0	0	2	-1.0%	0.0%	0.0%	0.0%	0.2%	
Nelson	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.1%	
Canterbury	-60	0	0	60	0	-2.4%	0.0%	0.0%	2.2%	0.0%	
Otago	-70	0	0	0	70	-5.1%	0.0%	0.0%	0.0%	4.1%	
Southland	-170	0	0	0	170	-8.4%	0.0%	0.0%	0.0%	17.3%	
Total	-1,128	-1	0	60	1,069	-5.5%	0.0%	0.0%	0.5%	5.0%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	4.8%	0%
Waikato	8.8%	4%
Bay of Plent	2.2%	0%
Gisborne	0.4%	0%
Taranaki	1.1%	0%
Manawatu-l	3.0%	0%
Hawke's Bay	2.7%	1%
Wellington	0.0%	0%
Tasman	0.4%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	9.3%	1%
Otago	3.6%	0%
Southland	6.2%	0%
Total	5.5%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$1	\$0	\$12	\$14
Auckland	\$6	\$0	\$0	\$6	\$12
Waikato	\$91	\$13	\$0	\$1	\$105
Bay of Plent	\$5	\$1	\$0	\$11	\$17
Gisborne	\$0	\$0	\$0	\$4	\$4
Taranaki	\$44	\$0	\$0	\$1	\$46
Manawatu-l	\$25	\$4	\$0	\$22	\$51
Hawke's Bay	\$4	\$9	\$0	\$22	\$36
Wellington	\$1	\$1	\$0	\$3	\$5
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$152	\$18	\$84	\$90	\$345
Otago	\$35	\$3	\$0	\$2	\$40
Southland	\$106	\$19	\$0	\$0	\$125
Total	\$470	\$70	\$84	\$175	\$800
	59%	9%	11%	22%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$470	\$0	\$470	\$5,206
Sheep & Bee	\$70	\$0	\$70	\$780
Hort	\$84	\$0	\$84	\$933
Other	\$90	\$85	\$175	\$1,937
Total	\$715	\$86	\$800	\$8,857

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-21	0	0.03	0	21	-1.2%	0.0%	0.0%	0.0%	1.1%	
Auckland	-53	-1	0.3	1	53	-11.4%	-0.2%	0.3%	0.2%	10.4%	
Waikato	-708	0	0.0	0	708	-11.9%	0.0%	0.0%	0.0%	21.6%	
Bay of Plent	-36	0	0.1	0	36	-3.6%	0.0%	0.0%	0.0%	1.3%	
Gisborne	0	0	0.0	0	0	-0.7%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-352	0	0.1	0	351	-16.3%	0.0%	0.4%	0.0%	117.1%	
Manawatu-l	-205	0	0.0	0	205	-12.5%	0.0%	0.0%	0.0%	12.9%	
Hawke's Bay	-40	0	0.0	0	40	-14.0%	0.0%	0.0%	0.0%	2.1%	
Wellington	-10	0	0.0	0	10	-2.5%	0.0%	0.0%	0.0%	1.2%	
Tasman	-2	0	0.0	0	2	-1.2%	0.0%	0.0%	0.0%	0.2%	
Nelson	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-3	0	0.0	0	3	-0.4%	0.0%	1.1%	0.0%	0.6%	
Canterbury	-105	0	0.0	105	0	-4.2%	0.0%	0.0%	3.9%	0.0%	
Otago	-279	0	0.0	0	279	-20.4%	0.0%	0.0%	0.0%	16.2%	
Southland	-825	0	0.0	0	825	-40.7%	0.0%	0.0%	0.0%	84.3%	
Total	-2,640	-1	1	106	2,534	-12.8%	0.0%	0.0%	0.9%	11.9%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.6%	0%
Auckland	10.2%	1%
Waikato	9.5%	8%
Bay of Plent	3.0%	3%
Gisborne	0.7%	0%
Taranaki	13.1%	1%
Manawatu-l	9.5%	2%
Hawke's Bay	8.7%	5%
Wellington	1.8%	2%
Tasman	0.5%	0%
Nelson	0.4%	5%
Marlboroug	0.0%	1%
West Coast	0.2%	0%
Canterbury	27.8%	10%
Otago	14.6%	1%
Southland	29.9%	12%
Total	13.9%	4%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$16	\$17
Auckland	\$3	\$0	\$0	\$7	\$11
Waikato	\$7	\$7	\$0	\$1	\$15
Bay of Plent	\$1	\$1	\$0	\$14	\$16
Gisborne	\$0	\$0	\$0	\$5	\$5
Taranaki	\$41	\$0	\$0	\$2	\$42
Manawatu-l	\$17	\$4	\$0	\$27	\$49
Hawke's Bay	\$3	\$8	\$0	\$29	\$39
Wellington	\$1	\$1	\$0	\$3	\$6
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$1	\$1
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$101	\$17	\$58	\$60	\$236
Otago	\$26	\$3	\$0	\$3	\$31
Southland	\$84	\$19	\$0	\$0	\$103
Total	\$286	\$60	\$59	\$168	\$572
	50%	10%	10%	29%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$285	\$0	\$286	\$2,819
Sheep & Bee	\$60	\$0	\$60	\$589
Hort	\$59	\$0	\$59	\$579
Other	\$58	\$109	\$168	\$1,655
Total	\$462	\$110	\$572	\$5,643

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-17	0	0.03	0	16	-1.0%	0.0%	0.0%	0.0%	0.9%	
Auckland	-27	0	0.3	1	26	-5.8%	0.0%	0.3%	0.2%	5.1%	
Waikato	-54	0	0.0	0	54	-0.9%	0.0%	0.0%	0.0%	1.6%	
Bay of Plent	-5	0	0.1	0	5	-0.5%	0.0%	0.0%	0.0%	0.2%	
Gisborne	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-321	0	0.1	0	321	-14.9%	0.0%	0.4%	0.0%	107.0%	
Manawatu-l	-137	0	0.0	0	137	-8.4%	0.0%	0.0%	0.0%	8.6%	
Hawke's Bay	-27	0	0.0	0	27	-9.4%	0.0%	0.0%	0.0%	1.4%	
Wellington	-10	0	0.0	0	10	-2.5%	0.0%	0.0%	0.0%	1.2%	
Tasman	0	0	0.0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-3	0	0.0	0	3	-0.3%	0.0%	1.1%	0.0%	0.5%	
Canterbury	-45	0	0.0	45	0	-1.8%	0.0%	0.0%	1.7%	0.0%	
Otago	-210	0	0.0	0	210	-15.3%	0.0%	0.0%	0.0%	12.2%	
Southland	-655	0	0.0	0	655	-32.3%	0.0%	0.0%	0.0%	67.0%	
Total	-1,511	0	1	46	1,465	-7.3%	0.0%	0.0%	0.4%	6.9%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	5.5%	1%
Waikato	0.7%	4%
Bay of Plent	0.7%	2%
Gisborne	0.4%	0%
Taranaki	12.0%	1%
Manawatu-l	6.5%	2%
Hawke's Bay	6.1%	5%
Wellington	1.8%	2%
Tasman	0.1%	0%
Nelson	0.4%	5%
Marlboroug	0.0%	1%
West Coast	0.1%	0%
Canterbury	18.5%	9%
Otago	10.9%	1%
Southland	23.8%	12%
Total	8.5%	4%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$3	\$0	\$0	\$0	\$3
Waikato	\$119	\$0	\$0	\$0	\$119
Bay of Plent	\$4	\$0	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$3	\$0	\$0	\$3	\$5
Manawatu-\	\$10	\$0	\$0	\$1	\$10
Hawke's Bay	\$0	\$0	\$0	\$6	\$6
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$6	\$0	\$26	\$38	\$70
Otago	\$3	\$1	\$0	\$0	\$4
Southland	\$14	\$0	\$0	\$10	\$24
Total	\$161	\$1	\$26	\$59	\$247

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$161	\$0	\$161	\$1,923
Sheep & Bee	\$1	\$0	\$1	\$36
Hort	\$26	\$0	\$26	\$355
Other	\$58	\$2	\$60	\$756
Total	\$246	\$2	\$248	\$3,070

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-6	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.3%	
Auckland	-29	-1	0	0	30	-6.2%	-0.1%	0.0%	0.0%	5.8%	
Waikato	-926	0	0	0	926	-15.6%	0.0%	0.0%	0.0%	28.2%	
Bay of Plenty	-34	0	0	0	34	-3.4%	0.0%	0.0%	0.0%	1.2%	
Gisborne	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-21	0	0	0	21	-1.0%	0.0%	0.0%	0.0%	7.1%	
Manawatu-Wanganui	-82	0	0	0	82	-5.0%	0.0%	0.0%	0.0%	5.2%	
Hawke's Bay	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-600	0	0	600	0	-23.8%	0.0%	0.0%	22.3%	0.0%	
Otago	-11	5	0	0	6	-0.8%	0.0%	0.0%	0.0%	0.4%	
Southland	-112	0	0	0	112	-5.5%	0.0%	0.0%	0.0%	11.4%	
Total	-1,820	4	0	600	1,216	-8.8%	0.0%	0.0%	5.1%	5.7%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	5.2%	0%
Waikato	12.5%	0%
Bay of Plent	2.4%	0%
Gisborne	0.0%	0%
Taranaki	0.8%	0%
Manawatu-\	3.7%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	1.1%	0%
Otago	1.1%	0%
Southland	4.0%	0%
Total	4.8%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$7	\$1	\$0	\$2	\$9
Waikato	\$150	\$0	\$0	\$0	\$151
Bay of Plent	\$5	\$0	\$0	\$2	\$8
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$42	\$0	\$0	\$7	\$49
Manawatu-Ō	\$31	\$2	\$0	\$5	\$37
Hawke's Bay	\$0	\$2	\$3	\$20	\$26
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$17	\$6	\$91	\$82	\$195
Otago	\$7	\$4	\$0	\$0	\$11
Southland	\$48	\$8	\$0	\$26	\$82
Total	\$309	\$24	\$94	\$148	\$575
	54%	4%	16%	26%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$284	\$25	\$309	\$3,389
Sheep & Bee	\$18	\$6	\$24	\$264
Hort	\$94	\$0	\$94	\$1,031
Other	\$141	\$13	\$154	\$1,684
Total	\$536	\$44	\$581	\$6,369

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-25	0	0.00	0	25	-1.4%	0.0%	0.0%	0.0%	1.3%	
Auckland	-65	-23	0.0	0	88	-14.1%	-2.6%	0.0%	0.0%	17.1%	
Waikato	-1,169	0	0.0	0	1,169	-19.7%	0.0%	0.0%	0.0%	35.7%	
Bay of Plent	-40	0	0.0	0	40	-3.9%	0.0%	0.0%	0.0%	1.4%	
Gisborne	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-333	0	0.0	0	333	-15.5%	0.0%	0.0%	0.0%	110.8%	
Manawatu-Ō	-258	0	0.0	0	258	-15.7%	0.0%	0.0%	0.0%	16.2%	
Hawke's Bay	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-10	0	0.0	0	10	2.5%	0.0%	0.0%	0.0%	1.2%	
Tasman	0	0	0.0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-1	0	0.0	0	1	-0.1%	0.0%	0.0%	0.0%	0.1%	
Canterbury	-1,708	0	0.0	1,708	0	-67.7%	0.0%	0.0%	63.4%	0.0%	
Otago	-14	5	0.0	0	9	-1.0%	0.0%	0.0%	0.0%	0.5%	
Southland	-323	0	0.0	0	323	-15.9%	0.0%	0.0%	0.0%	33.0%	
Total	-3,944	-18	0	1,708	2,255	-19.1%	0.0%	0.0%	14.6%	10.6%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.6%	0%
Auckland	12.1%	2%
Waikato	15.7%	0%
Bay of Plent	3.2%	0%
Gisborne	0.2%	1%
Taranaki	12.4%	0%
Manawatu-Ō	11.5%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.2%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	3.1%	3%
Otago	2.7%	2%
Southland	13.6%	5%
Total	9.2%	2%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$4	\$44
Manawatu-l	\$21	\$2	\$0	\$4	\$27
Hawke's Bay	\$0	\$2	\$3	\$14	\$19
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$11	\$5	\$65	\$43	\$125
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$34	\$8	\$0	\$16	\$58
Total	\$148	\$23	\$68	\$88	\$328
	45%	7%	21%	27%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$123	\$25	\$148	\$1,465
Sheep & Bee	\$17	\$6	\$23	\$228
Hort	\$68	\$0	\$68	\$677
Other	\$83	\$11	\$94	\$928
Total	\$290	\$43	\$333	\$3,299

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)											
Region	Dairy	Sheep & beef	Horticultur e	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Other	Forestry	
Northland	-19	0	0.00	0	19	-1.1%	0.0%	0.0%	0.0%	1.0%	
Auckland	-36	-22	0.0	0	58	-7.9%	-2.5%	0.0%	0.0%	11.4%	
Waikato	-243	0	0.0	0	243	-4.1%	0.0%	0.0%	0.0%	7.4%	
Bay of Plent	-6	0	0.0	0	6	-0.5%	0.0%	0.0%	0.0%	0.2%	
Gisborne	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-311	0	0.0	0	311	-14.5%	0.0%	0.0%	0.0%	103.8%	
Manawatu-l	-176	0	0.0	0	176	-10.7%	0.0%	0.0%	0.0%	11.1%	
Hawke's Bay	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-10	0	0.0	0	10	-2.5%	0.0%	0.0%	0.0%	1.2%	
Tasman	0	0	0.0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0.0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-1	0	0.0	0	1	-0.1%	0.0%	0.0%	0.0%	0.1%	
Canterbury	-1,108	0	0.0	1,108	0	-43.9%	0.0%	0.0%	41.1%	0.0%	
Otago	-3	0	0.0	0	3	-0.2%	0.0%	0.0%	0.0%	0.2%	
Southland	-212	0	0.0	0	212	-10.4%	0.0%	0.0%	0.0%	21.6%	
Total	-2,124	-22	0	1,108	1,038	-10.3%	0.0%	0.0%	9.5%	4.9%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-l	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	2.0%	3%
Otago	1.7%	1%
Southland	9.6%	5%
Total	4.4%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$3	\$0	\$0	\$0	\$3
Waikato	\$119	\$0	\$0	\$0	\$119
Bay of Plent	\$4	\$0	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$3	\$0	\$0	\$3	\$6
Manawatu-Ō	\$10	\$0	\$0	\$1	\$10
Hawke's Bay	\$0	\$0	\$0	\$7	\$7
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$30	\$0	\$27	\$65	\$122
Otago	\$2	\$1	\$0	\$0	\$3
Southland	\$7	\$0	\$0	\$12	\$18
Total	\$177	\$1	\$27	\$89	\$294
	60%	0%	9%	30%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$177	\$0	\$177	\$2,126
Sheep & Bee	\$1	\$0	\$1	\$36
Hort	\$27	\$0	\$27	\$366
Other	\$87	\$2	\$89	\$1,112
Total	\$292	\$2	\$294	\$3,640

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-6	0	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	
Auckland	-29	-1	0	0	0	30	-6.2%	-0.1%	0.0%	0.0%	0.0%	5.8%	
Waikato	-926	0	0	0	0	926	-15.6%	0.0%	0.0%	0.0%	0.0%	28.2%	
Bay of Plenty	-34	0	0	0	0	34	-3.4%	0.0%	0.0%	0.0%	0.0%	1.2%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-21	0	0	0	0	21	-1.0%	0.0%	0.0%	0.0%	0.0%	7.1%	
Manawatu-Wanganui	-82	0	0	0	0	82	-5.0%	0.0%	0.0%	0.0%	0.0%	5.2%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-258	9	0	249	0	0	-10.2%	0.1%	0.0%	49.7%	0.0%	0.0%	
Otago	-11	0	0	11	0	-0	-0.8%	0.0%	0.0%	28.4%	0.0%	0.0%	
Southland	-97	0	0	97	0	0	-4.8%	0.0%	0.0%	1414.4%	0.0%	0.0%	
Total	-1,463	8	0	357	0	1,098	-7.1%	0.0%	0.0%	3.6%	0.0%	5.2%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	5.2%	0%
Waikato	12.5%	0%
Bay of Plent	2.4%	0%
Gisborne	0.0%	0%
Taranaki	0.8%	0%
Manawatu-Ō	3.7%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	5.5%	0%
Otago	0.8%	0%
Southland	1.9%	0%
Total	5.3%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$7	\$1	\$0	\$2	\$10
Waikato	\$150	\$0	\$0	\$1	\$151
Bay of Plent	\$5	\$0	\$0	\$2	\$8
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$42	\$0	\$0	\$8	\$50
Manawatu-Ō	\$31	\$2	\$0	\$4	\$37
Hawke's Bay	\$0	\$2	\$3	\$23	\$29
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$79	\$6	\$94	\$140	\$319
Otago	\$6	\$4	\$0	\$0	\$10
Southland	\$27	\$8	\$0	\$33	\$68
Total	\$349	\$24	\$97	\$218	\$688
	51%	4%	14%	32%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$327	\$22	\$349	\$3,829
Sheep & Bee	\$18	\$6	\$24	\$264
Hort	\$97	\$0	\$97	\$1,065
Other	\$206	\$12	\$218	\$2,387
Total	\$648	\$40	\$688	\$7,545

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-25	0	0	0	0	25	-1.4%	0.0%	0.0%	0.0%	0.0%	1.3%	
Auckland	-65	-23	0	0	0	88	-14.1%	-2.6%	0.0%	0.0%	0.0%	17.1%	
Waikato	-1,169	0	0	0	0	1,169	-19.7%	0.0%	0.0%	0.0%	0.0%	35.7%	
Bay of Plent	-40	0	0	0	0	40	-3.9%	0.0%	0.0%	0.0%	0.0%	1.4%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-333	0	0	0	0	333	-15.5%	0.0%	0.0%	0.0%	0.0%	110.8%	
Manawatu-Ō	-258	0	0	0	0	258	-15.7%	0.0%	0.0%	0.0%	0.0%	16.2%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	
Canterbury	-662	9	0	615	0	38	-26.2%	0.1%	0.0%	122.5%	0.0%	2.5%	
Otago	-13	0	0	13	0	0	-1.0%	0.0%	0.0%	34.3%	0.0%	0.0%	
Southland	-290	0	0	174	0	116	-14.3%	0.0%	0.0%	2547.3%	0.0%	11.9%	
Total	-2,865	-14	0	802	0	2,077	-13.8%	0.0%	0.0%	8.1%	0.0%	9.8%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.6%	0%
Auckland	12.1%	2%
Waikato	15.7%	0%
Bay of Plent	3.2%	0%
Gisborne	0.2%	1%
Taranaki	12.4%	0%
Manawatu-Ō	11.5%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.2%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	14.4%	3%
Otago	2.4%	2%
Southland	7.6%	5%
Total	10.3%	2%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-ā	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlborough	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$1,703
Sheep & Bee	\$17	\$6	\$23	\$228
Hort	\$70	\$0	\$70	\$698
Other	\$119	\$10	\$129	\$1,275
Total	\$355	\$39	\$394	\$3,905

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Sheep & Horticultur						Sheep & Horticultur						
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-ā	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	366	0	38	-16.0%	0.0%	0.0%	72.8%	0.0%	2.5%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	77	0	116	-9.6%	0.0%	0.0%	1132.9%	0.0%	11.9%	21.6%
Total	-1,402	-22	0	445	0	978	-6.8%	0.0%	0.0%	4.5%	0.0%	4.6%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-ā	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlborough	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Profits (\$/ha)							Hectares				Total profit				
	Dairy	SB Intensive	SB Hill	SB High	Arable	Forestry		DAIRY	SBINTEN	SBHILL	SBHIGH	DAIRY	SBINTEN	SBHILL	SBHIGH
Northland	\$1,234	\$468	\$250	\$0	\$1,416	\$81	Northland	1,713	2,730	400	0	\$211,391,822	\$127,720,741	\$10,015,661	\$0
Auckland	\$1,234	\$468	\$250	\$0	\$1,416	\$245	Auckland	462	822	55	0	\$57,031,352	\$38,435,632	\$1,370,297	\$0
Waikato	\$1,606	\$468	\$250	\$0	\$3,208	\$31	Waikato	5,932	1,488	3,599	40	\$952,624,887	\$69,597,756	\$90,060,488	\$0
Bay of Plent	\$1,591	\$279	\$246	\$0	\$3,835	\$30	Bay of Plenty	1,010	301	785	105	\$160,721,892	\$8,380,844	\$19,336,346	\$0
Gisborne	\$1,591	\$279	\$246	\$0	\$4,978	\$487	Gisborne	11	265	1,963	10	\$1,671,475	\$7,384,251	\$48,338,352	\$0
Taranaki	\$1,576	\$303	\$237	\$0	\$1,238	\$17	Taranaki	2,150	435	864	35	\$338,884,867	\$13,181,071	\$20,486,581	\$0
Manawatu-	\$1,614	\$279	\$246	\$0	\$2,369	\$41	Manawatu-Wanganui	1,641	2,107	7,436	85	\$264,910,763	\$58,759,825	\$183,066,305	\$0
Hawke's Ba	\$1,614	\$279	\$246	\$0	\$1,802	\$171	Hawke's Bay	284	2,243	4,112	151	\$45,927,942	\$62,549,393	\$101,226,263	\$0
Wellington	\$1,614	\$279	\$246	\$0	\$1,262	\$30	Wellington	397	614	2,042	27	\$64,119,153	\$17,126,020	\$50,274,758	\$0
Tasman	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Tasman	185	188	75	165	\$20,142,957	\$5,208,259	\$602,488	\$1,325,658
Nelson	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Nelson	6	3	1	8	\$620,461	\$83,694	\$4,295	\$60,731
Marlboroug	\$2,174	\$276	\$80	\$80	\$9,341	\$48	Marlborough	109	860	405	555	\$23,642,207	\$23,766,932	\$3,252,818	\$4,456,846
West Coast	\$1,090	\$328	\$80	\$80	\$0	\$45	West Coast	871	194	256	129	\$94,969,067	\$6,366,362	\$2,056,615	\$1,038,670
Canterbury	\$2,174	\$276	\$80	\$80	\$2,075	\$14	Canterbury	2,522	5,159	3,592	883	\$548,320,124	\$142,556,243	\$28,830,823	\$7,084,297
Otago	\$1,745	\$328	\$80	\$80	\$1,849	\$41	Otago	1,369	5,737	7,752	1,405	\$238,793,107	\$188,324,553	\$62,223,961	\$11,276,631
Southland	\$1,745	\$328	\$80	\$80	\$1,978	\$61	Southland	2,026	4,105	1,808	557	\$353,556,353	\$134,735,455	\$14,509,467	\$4,471,105
								20,688	27,250	35,146	4,155	\$3,377,328,430	\$904,177,031	\$635,655,519	\$29,713,937

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Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$0	\$0	\$0	\$0	\$0
Waikato	\$3	\$0	\$0	\$0	\$3
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$0	\$0	\$0	\$0	\$0
Manawatu-\	\$0	\$0	\$0	\$0	\$0
Hawke's Bay	\$0	\$0	\$0	\$0	\$0
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$5	\$0	\$7	\$13	\$25
Otago	\$1	\$0	\$0	\$0	\$1
Southland	\$0	\$0	\$0	\$1	\$1
Total	\$8	\$0	\$7	\$15	\$30
	28%	0%	24%	48%	100%

	PV	Difference
NPS(2017)	\$3,579	
EFW (origin	\$4,302	\$723
EFW (revis	\$3,796	\$217
EFW (origin	\$5,131	\$1,552
EFW (revis	\$5,898	\$2,319

Change in land area (km2)												
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry
Northland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Auckland	-0	-1	0	0	0	1	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.2%
Waikato	-23	0	0	0	0	23	-0.4%	0.0%	0.0%	0.0%	0.0%	0.7%
Bay of Plenty	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manawatu-Wanganui	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Canterbury	-42	0	0	42	0	0	-1.7%	0.0%	0.0%	8.4%	0.0%	0.0%
Otago	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Southland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	-66	-1	0	42	0	24	-0.3%	0.0%	0.0%	0.4%	0.0%	0.1%

Marginal

Costs (\$ million)	Annual N	Annual P	Annual total	NPV
Dairy	\$8	\$0	\$8	\$266
Sheep & Beef	\$0	\$0	\$0	\$24
Hort	\$7	\$0	\$7	\$149
Other	\$14	\$0	\$15	\$284
Total	\$30	\$0	\$30	\$723

Assumptions	
Peiphyton	Peri20
DIN	1
Discount rate	3%
Cost assumptions	Median
Technical efficiency	Static
Rate of tech change pa	na

	NPS	EFW	EFW (revised)
Dairy	\$1,561	\$1,827	\$759
Sheep & Beef	\$209	\$233	\$82
Hort	\$640	\$789	\$629
Other	\$1,169	\$1,453	\$538
Total	\$3,579	\$4,302	\$3,824

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.0%	0%
Auckland	0.0%	0%
Waikato	0.3%	0%
Bay of Plent	0.0%	0%
Gisborne	0.0%	0%
Taranaki	0.0%	0%
Manawatu-\	0.0%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.0%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	0.9%	0%
Otago	0.2%	0%
Southland	0.0%	0%
Total	0.2%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$34	\$0	\$0	\$0	\$35
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$45
Manawatu-\	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$54	\$5	\$75	\$89	\$222
Otago	\$4	\$3	\$0	\$0	\$8
Southland	\$20	\$8	\$0	\$22	\$50
Total	\$180	\$23	\$78	\$143	\$424
	42%	5%	18%	34%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$158	\$22	\$180	\$1,827
Sheep & Bee	\$17	\$6	\$23	\$233
Hort	\$78	\$0	\$78	\$789
Other	\$133	\$10	\$143	\$1,453
Total	\$386	\$39	\$424	\$4,302

Assumptions

Peiphyton	Peri20
DIN	2.4

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
	Sheep &		Horticultur				Sheep &		Horticultur			
Region	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%
Auckland	-37	-23	0	0	0	59	-7.9%	-2.6%	0.0%	0.0%	0.0%	11.5%
Waikato	-266	0	0	0	0	266	-4.5%	0.0%	0.0%	0.0%	0.0%	8.1%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%
Manawatu-l	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	2.5%	0.0%	0.0%	0.0%	0.0%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-446	0	0	446	0	0	-17.7%	0.0%	0.0%	88.8%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%
Total	-1,467	-23	0	642	0	848	-7.1%	0.0%	0.0%	6.5%	0.0%	4.0%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.6%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-\	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	9.8%	3%
Otago	1.8%	1%
Southland	5.7%	5%
Total	5.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-\	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$1,561
Sheep & Bee	\$17	\$6	\$23	\$209
Hort	\$70	\$0	\$70	\$640
Other	\$119	\$10	\$129	\$1,169
Total	\$355	\$39	\$394	\$3,579

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Sheep & Horticultur						Sheep & Horticultur						
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-\	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	404	0	0	-16.0%	0.0%	0.0%	80.4%	0.0%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%	21.6%
Total	-1,402	-22	0	600	0	824	-6.8%	0.0%	0.0%	6.0%	0.0%	3.9%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-\	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$0	\$0	\$0	\$0	\$0
Waikato	\$3	\$0	\$0	\$0	\$3
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$0	\$0	\$0	\$0	\$0
Manawatu-\\	\$0	\$0	\$0	\$0	\$0
Hawke's Bay	\$0	\$0	\$0	\$0	\$0
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$5	\$0	\$7	\$14	\$26
Otago	\$1	\$0	\$0	\$0	\$1
Southland	\$0	\$1	\$0	\$0	\$1
Total	\$9	\$1	\$7	\$14	\$31
	28%	3%	24%	45%	100%

Marginal				
Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$9	\$0	\$9	\$63
Sheep & Bee	\$1	\$0	\$1	\$7
Hort	\$7	\$0	\$7	\$54
Other	\$14	\$0	\$14	\$105
Total	\$31	\$0	\$31	\$228

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Auckland	-0	-1	0	0	0	1	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.2%	
Waikato	-23	0	0	0	0	23	-0.4%	0.0%	0.0%	0.0%	0.0%	0.7%	
Bay of Plenty	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	0	0	0	0	0	-0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Manawatu-Wanganui	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-42	0	0	42	0	-0	-1.7%	0.0%	0.0%	8.4%	0.0%	0.0%	
Otago	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Southland	0	0	0	-0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total	-66	-1	0	42	0	24	-0.3%	0.0%	0.0%	0.4%	0.0%	0.1%	

Profit Impacts		
Region	Dairy	Sheep & beef
Northland	0.0%	0%
Auckland	0.0%	0%
Waikato	0.3%	0%
Bay of Plent	0.0%	0%
Gisborne	0.0%	0%
Taranaki	0.0%	0%
Manawatu-\\	0.0%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.0%	0%
Nelson	0.0%	0%
Marlboroug\\	0.0%	0%
West Coast	0.0%	0%
Canterbury	0.9%	0%
Otago	0.2%	0%
Southland	0.1%	1%
Total	0.3%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$1	\$0	\$0	\$0	\$1
Waikato	\$16	\$0	\$0	\$0	\$16
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$5	\$0	\$0	\$0	\$5
Manawatu-\\	\$7	\$0	\$0	\$1	\$8
Hawke's Bay	\$0	\$0	\$3	\$4	\$6
Wellington	\$1	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug\\	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$47	\$5	\$68	\$57	\$176
Otago	\$3	\$0	\$0	\$0	\$3
Southland	\$6	\$4	\$0	\$0	\$10
Total	\$85	\$9	\$71	\$61	\$227
	38%	4%	31%	27%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$83	\$2	\$85	\$759
Sheep & Bee	\$9	\$1	\$9	\$82
Hort	\$71	\$0	\$71	\$629
Other	\$61	\$0	\$61	\$538
Total	\$224	\$3	\$227	\$2,007

Assumptions

Peiphyton	Peri30
DIN	2.4

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
	Sheep &		Horticultur									
Region	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry
Northland	-9	0	0	0	0	9	-0.5%	0.0%	0.0%	0.0%	0.0%	0.5%
Auckland	-10	-1	0	0	0	11	-2.2%	-0.1%	0.0%	0.0%	0.0%	2.1%
Waikato	-123	0	0	0	0	123	-2.1%	0.0%	0.0%	0.0%	0.0%	3.8%
Bay of Plent	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-38	0	0	0	0	38	-1.8%	0.0%	0.0%	0.0%	0.0%	12.7%
Manawatu-\\	-57	0	0	0	0	57	-3.5%	0.0%	0.0%	0.0%	0.0%	3.6%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-4	0	0	0	0	4	1.1%	0.0%	0.0%	0.0%	0.0%	0.6%
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	0	0	0	0	0	0	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-386	0	0	386	0	0	-15.3%	0.0%	0.0%	76.8%	0.0%	0.0%
Otago	-15	0	0	15	0	0	-1.1%	0.0%	0.0%	38.4%	0.0%	0.0%
Southland	-51	0	0	51	0	0	-2.5%	0.0%	0.0%	745.3%	0.0%	0.0%
Total	-694	-1	0	452	0	243	-3.4%	0.0%	0.0%	4.6%	0.0%	1.1%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.2%	0%
Auckland	1.9%	0%
Waikato	1.7%	0%
Bay of Plent	0.0%	0%
Gisborne	0.2%	0%
Taranaki	1.4%	0%
Manawatu-\\	2.6%	0%
Hawke's Bay	0.0%	0%
Wellington	0.8%	0%
Tasman	0.0%	0%
Nelson	0.0%	1%
Marlboroug\\	0.0%	0%
West Coast	0.0%	0%
Canterbury	8.5%	3%
Otago	1.3%	0%
Southland	1.7%	2%
Total	2.5%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$1	\$0	\$0	\$0	\$1
Waikato	\$13	\$0	\$0	\$0	\$13
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$5	\$0	\$0	\$0	\$5
Manawatu-\\	\$7	\$0	\$0	\$1	\$8
Hawke's Bay	\$0	\$0	\$3	\$3	\$6
Wellington	\$1	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$42	\$5	\$60	\$43	\$150
Otago	\$3	\$0	\$0	\$0	\$3
Southland	\$6	\$3	\$0	\$0	\$8
Total	\$77	\$8	\$63	\$48	\$196
	39%	4%	32%	24%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$75	\$2	\$77	\$696
Sheep & Bee	\$8	\$1	\$8	\$75
Hort	\$63	\$0	\$63	\$575
Other	\$48	\$0	\$48	\$433
Total	\$193	\$3	\$196	\$1,779

Assumptions	
Peiphyton	Peri30
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
	Sheep & Horticultur						Sheep & Horticultur						
Region	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-9	0	0	0	0	9	-0.5%	0.0%	0.0%	0.0%	0.0%	0.5%	1.0%
Auckland	-10	0	0	0	0	10	-2.1%	0.0%	0.0%	0.0%	0.0%	1.9%	11.4%
Waikato	-100	0	0	0	0	100	-1.7%	0.0%	0.0%	0.0%	0.0%	3.0%	7.4%
Bay of Plent	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-38	0	0	0	0	38	-1.8%	0.0%	0.0%	0.0%	0.0%	12.7%	103.8%
Manawatu-l	-57	0	0	0	0	57	-3.5%	0.0%	0.0%	0.0%	0.0%	3.6%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-4	0	0	0	0	4	-1.1%	0.0%	0.0%	0.0%	0.0%	0.6%	1.2%
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	0	0	0	0	0	0	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-344	0	0	344	0	0	-13.6%	0.0%	0.0%	68.4%	0.0%	0.0%	0.0%
Otago	-15	0	0	15	0	0	-1.1%	0.0%	0.0%	38.4%	0.0%	0.0%	0.2%
Southland	-51	0	0	51	0	0	-2.5%	0.0%	0.0%	745.3%	0.0%	0.0%	21.6%
Total	-628	0	0	409	0	219	-3.0%	0.0%	0.0%	4.1%	0.0%	1.0%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.2%	0%
Auckland	1.8%	0%
Waikato	1.4%	0%
Bay of Plent	0.0%	0%
Gisborne	0.2%	0%
Taranaki	1.4%	0%
Manawatu-\\	2.6%	0%
Hawke's Bay	0.0%	0%
Wellington	0.8%	0%
Tasman	0.0%	0%
Nelson	0.0%	1%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	7.6%	3%
Otago	1.1%	0%
Southland	1.6%	2%
Total	2.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$0	\$0	\$0	\$0	\$0
Waikato	\$2	\$0	\$0	\$0	\$2
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$0	\$0	\$0	\$0	\$0
Manawatu-l	\$0	\$0	\$0	\$0	\$0
Hawke's Bay	\$0	\$0	\$0	\$0	\$0
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$5	\$0	\$7	\$11	\$23
Otago	\$0	\$0	\$0	\$0	\$1
Southland	\$0	\$0	\$0	\$1	\$1
Total	\$7	\$0	\$7	\$14	\$28
	24%	2%	26%	48%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$7	\$0	\$7	\$29
Sheep & Bee	\$0	\$0	\$0	\$1
Hort	\$7	\$0	\$7	\$53
Other	\$13	\$0	\$14	\$84
Total	\$28	\$0	\$28	\$167

Assumptions

Peiphyton	Peri10
DIN	2.4

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Auckland	-0	-1	0	0	0	1	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.2%	
Waikato	-15	0	0	0	0	15	-0.3%	0.0%	0.0%	0.0%	0.0%	0.5%	
Bay of Plenty	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Gisborne	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	0	0	0	0	0	-0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Manawatu-Wanganui	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Hawke's Bay	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-42	-0	0	42	0	0	-1.7%	0.0%	0.0%	8.4%	0.0%	0.0%	
Otago	0	0	0	-0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Southland	0	0	0	-0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total	-58	-1	0	42	0	16	-0.3%	0.0%	0.0%	0.4%	0.0%	0.1%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.0%	0%
Auckland	0.0%	0%
Waikato	0.2%	0%
Bay of Plent	0.0%	0%
Gisborne	0.0%	0%
Taranaki	0.0%	0%
Manawatu-l	0.0%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.0%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	0.9%	0%
Otago	0.0%	0%
Southland	0.0%	0%
Total	0.2%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$10	\$2	\$0	\$22	\$34
Auckland	\$8	\$3	\$0	\$6	\$17
Waikato	\$138	\$7	\$0	\$42	\$187
Bay of Plent	\$20	\$6	\$0	\$30	\$56
Gisborne	\$0	\$13	\$0	\$41	\$55
Taranaki	\$150	\$6	\$0	\$28	\$184
Manawatu-\	\$162	\$34	\$6	\$100	\$301
Hawke's Bay	\$4	\$19	\$3	\$64	\$90
Wellington	\$26	\$9	\$0	\$25	\$60
Tasman	\$3	\$0	\$0	\$0	\$3
Nelson	\$0	\$0	\$0	\$1	\$1
Marlboroug	\$3	\$4	\$0	\$12	\$19
West Coast	\$1	\$0	\$0	\$1	\$2
Canterbury	\$105	\$11	\$89	\$111	\$316
Otago	\$58	\$24	\$0	\$39	\$121
Southland	\$106	\$18	\$0	\$87	\$210
Total	\$795	\$154	\$98	\$610	\$1,657
	48%	9%	6%	37%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$526	\$269	\$795	\$7,188
Sheep & Bee	\$34	\$120	\$154	\$1,398
Hort	\$98	\$0	\$98	\$874
Other	\$349	\$261	\$610	\$5,499
Total	\$1,007	\$650	\$1,657	\$14,958

Assumptions

Peiphyton	Peri10
DIN	2.4

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
Region	Sheep & Horticultur						Sheep & Horticultur					
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry
Northland	-193	0	0	0	0	193	-11.3%	0.0%	0.0%	0.0%	0.0%	10.5%
Auckland	-77	-76	0	0	0	153	-16.6%	-8.7%	0.0%	0.0%	0.0%	29.7%
Waikato	-1,037	0	0	0	0	1,037	-17.5%	0.0%	0.0%	0.0%	0.0%	31.6%
Bay of Plent	-156	0	0	0	0	156	-15.5%	0.0%	0.0%	0.0%	0.0%	5.5%
Gisborne	-5	0	0	2	0	3	-44.6%	0.0%	0.0%	14.5%	0.0%	0.2%
Taranaki	-1,174	0	0	0	0	1,174	-54.6%	0.0%	0.0%	0.0%	0.0%	391.4%
Manawatu-\	-1,338	0	0	0	0	1,338	-81.5%	0.0%	0.0%	0.0%	0.0%	84.2%
Hawke's Bay	-32	0	0	0	0	32	-11.2%	0.0%	0.0%	0.0%	0.0%	1.7%
Wellington	-214	0	0	0	0	214	-53.9%	0.0%	0.0%	0.0%	0.0%	26.6%
Tasman	-59	0	0	0	0	59	-31.7%	0.0%	0.0%	0.0%	0.0%	6.2%
Nelson	-2	0	0	0	0	2	-36.7%	0.0%	0.0%	0.0%	0.0%	1.9%
Marlboroug	-32	0	0	0	0	32	-29.7%	0.0%	0.0%	0.0%	0.0%	3.9%
West Coast	-25	0	0	0	0	25	-2.9%	0.0%	0.0%	0.0%	0.0%	4.8%
Canterbury	-894	2	0	892	0	0	-35.4%	0.0%	0.0%	177.7%	0.0%	0.0%
Otago	-769	0	0	769	0	0	-56.2%	0.0%	0.0%	1979.2%	0.0%	0.0%
Southland	-1,412	0	0	1,412	0	0	-69.7%	0.0%	0.0%	20664.5%	0.0%	0.0%
Total	-7,418	-74	0	3,075	0	4,418	-35.9%	-0.1%	0.0%	31.0%	0.0%	20.8%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	4.7%	2%
Auckland	14.3%	7%
Waikato	14.5%	4%
Bay of Plent	12.6%	20%
Gisborne	24.6%	23%
Taranaki	44.1%	17%
Manawatu-\	61.2%	14%
Hawke's Bay	8.3%	12%
Wellington	40.7%	13%
Tasman	14.0%	6%
Nelson	21.3%	34%
Marlboroug	13.1%	13%
West Coast	1.5%	1%
Canterbury	19.2%	6%
Otago	24.5%	9%
Southland	29.9%	11%
Total	23.5%	10%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$10	\$2	\$0	\$22	\$34
Auckland	\$8	\$3	\$0	\$6	\$17
Waikato	\$136	\$7	\$0	\$42	\$185
Bay of Plent	\$20	\$6	\$0	\$30	\$56
Gisborne	\$0	\$13	\$0	\$41	\$55
Taranaki	\$150	\$6	\$0	\$28	\$183
Manawatu-\	\$162	\$34	\$6	\$100	\$301
Hawke's Bay	\$4	\$19	\$3	\$63	\$90
Wellington	\$26	\$9	\$0	\$25	\$60
Tasman	\$3	\$0	\$0	\$0	\$3
Nelson	\$0	\$0	\$0	\$1	\$1
Marlboroug	\$3	\$4	\$0	\$12	\$19
West Coast	\$1	\$0	\$0	\$1	\$2
Canterbury	\$100	\$11	\$81	\$100	\$292
Otago	\$58	\$23	\$0	\$39	\$120
Southland	\$106	\$18	\$0	\$86	\$209
Total	\$788	\$154	\$90	\$596	\$1,628
	48%	9%	6%	37%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$519	\$269	\$788	\$7,159
Sheep & Bee	\$34	\$120	\$154	\$1,397
Hort	\$90	\$0	\$90	\$821
Other	\$335	\$261	\$596	\$5,415
Total	\$979	\$650	\$1,628	\$14,791

Assumptions	
Peiphyton	Peri10
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Forestry
Northland	-193	0	0	0	0	193	-11.3%	0.0%	0.0%	0.0%	0.0%	10.5%	1.0%
Auckland	-77	-75	0	0	0	152	-16.6%	-8.6%	0.0%	0.0%	0.0%	29.5%	11.4%
Waikato	-1,021	0	0	0	0	1,021	-17.2%	0.0%	0.0%	0.0%	0.0%	31.2%	7.4%
Bay of Plenty	-156	0	0	0	0	156	-15.5%	0.0%	0.0%	0.0%	0.0%	5.5%	0.2%
Gisborne	-5	0	0	2	0	3	-44.6%	0.0%	0.0%	14.5%	0.0%	0.2%	0.0%
Taranaki	-1,174	0	0	0	0	1,174	-54.6%	0.0%	0.0%	0.0%	0.0%	391.4%	103.8%
Manawatu-Wairarapa	-1,338	0	0	0	0	1,338	-81.5%	0.0%	0.0%	0.0%	0.0%	84.2%	11.1%
Hawke's Bay	-32	0	0	0	0	32	-11.2%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%
Wellington	-214	0	0	0	0	214	-53.9%	0.0%	0.0%	0.0%	0.0%	26.6%	1.2%
Tasman	-59	0	0	0	0	59	-31.7%	0.0%	0.0%	0.0%	0.0%	6.2%	0.0%
Nelson	-2	0	0	0	0	2	-36.7%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%
Marlborough	-32	0	0	0	0	32	-29.7%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%
West Coast	-25	0	0	0	0	25	-2.9%	0.0%	0.0%	0.0%	0.0%	4.8%	0.1%
Canterbury	-852	2	0	850	0	0	-33.8%	0.0%	0.0%	169.3%	0.0%	0.0%	0.0%
Otago	-769	0	0	769	0	0	-56.2%	0.0%	0.0%	1979.2%	0.0%	0.0%	0.2%
Southland	-1,412	0	0	1,412	0	0	-69.7%	0.0%	0.0%	20664.5%	0.0%	0.0%	21.6%
Total	-7,361	-74	0	3,033	0	4,402	-35.6%	-0.1%	0.0%	30.6%	0.0%	20.7%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	4.7%	2%
Auckland	14.3%	7%
Waikato	14.3%	4%
Bay of Plent	12.6%	20%
Gisborne	24.6%	23%
Taranaki	44.1%	17%
Manawatu-\	61.2%	14%
Hawke's Bay	8.3%	12%
Wellington	40.7%	13%
Tasman	14.0%	6%
Nelson	21.3%	34%
Marlboroug	13.1%	13%
West Coast	1.5%	1%
Canterbury	18.3%	6%
Otago	24.5%	9%
Southland	29.9%	11%
Total	23.3%	10%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$0	\$0	\$0	\$0	\$0
Waikato	\$3	\$0	\$0	\$0	\$3
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$0	\$0	\$0	\$0	\$0
Manawatu-l	\$0	\$0	\$0	\$0	\$0
Hawke's Bay	\$0	\$0	\$0	\$0	\$0
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$5	\$0	\$7	\$13	\$25
Otago	\$1	\$0	\$0	\$0	\$1
Southland	\$0	\$0	\$0	\$1	\$1
Total	\$8	\$0	\$7	\$15	\$30
	28%	0%	24%	48%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$8	\$0	\$8	\$171
Sheep & Bee	\$0	\$0	\$0	\$16
Hort	\$7	\$0	\$7	\$95
Other	\$14	\$0	\$15	\$180
Total	\$30	\$0	\$30	\$461

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Auckland	-0	-1	0	0	0	1	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.2%	
Waikato	-23	0	0	0	0	23	-0.4%	0.0%	0.0%	0.0%	0.0%	0.7%	
Bay of Plenty	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Manawatu-Wanganui	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-42	0	0	42	0	0	-1.7%	0.0%	0.0%	8.4%	0.0%	0.0%	
Otago	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Southland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Total	-66	-1	0	42	0	24	-0.3%	0.0%	0.0%	0.4%	0.0%	0.1%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.0%	0%
Auckland	0.0%	0%
Waikato	0.3%	0%
Bay of Plent	0.0%	0%
Gisborne	0.0%	0%
Taranaki	0.0%	0%
Manawatu-l	0.0%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.0%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	0.9%	0%
Otago	0.2%	0%
Southland	0.0%	0%
Total	0.2%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$34	\$0	\$0	\$0	\$35
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$45
Manawatu-\	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$54	\$5	\$75	\$89	\$222
Otago	\$4	\$3	\$0	\$0	\$8
Southland	\$20	\$8	\$0	\$22	\$50
Total	\$180	\$23	\$78	\$143	\$424
	42%	5%	18%	34%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$158	\$22	\$180	\$1,119
Sheep & Bee	\$17	\$6	\$23	\$143
Hort	\$78	\$0	\$78	\$483
Other	\$133	\$10	\$143	\$889
Total	\$386	\$39	\$424	\$2,634

Assumptions

Peiphyton	Peri20
DIN	2.4

Discount ra	6%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
	Sheep & Horticultur						Sheep & Horticultur					
Region	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%
Auckland	-37	-23	0	0	0	59	-7.9%	-2.6%	0.0%	0.0%	0.0%	11.5%
Waikato	-266	0	0	0	0	266	-4.5%	0.0%	0.0%	0.0%	0.0%	8.1%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%
Manawatu-l	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	2.5%	0.0%	0.0%	0.0%	0.0%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-446	0	0	446	0	0	-17.7%	0.0%	0.0%	88.8%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%
Total	-1,467	-23	0	642	0	848	-7.1%	0.0%	0.0%	6.5%	0.0%	4.0%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.6%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-\	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	9.8%	3%
Otago	1.8%	1%
Southland	5.7%	5%
Total	5.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-Ō	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$948
Sheep & Bee	\$17	\$6	\$23	\$127
Hort	\$70	\$0	\$70	\$388
Other	\$119	\$10	\$129	\$709
Total	\$355	\$39	\$394	\$2,172

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	6%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plenty	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-Wairarapa	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	404	0	0	-16.0%	0.0%	0.0%	80.4%	0.0%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%	21.6%
Total	-1,402	-22	0	600	0	824	-6.8%	0.0%	0.0%	6.0%	0.0%	3.9%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-Ō	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$0	\$0	\$0	\$0	\$0
Waikato	\$3	\$0	\$0	\$0	\$3
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$0	\$0	\$0	\$0	\$0
Manawatu-l	\$0	\$0	\$0	\$0	\$0
Hawke's Bay	\$0	\$0	\$0	\$0	\$0
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$5	\$0	\$7	\$13	\$25
Otago	\$1	\$0	\$0	\$0	\$1
Southland	\$0	\$0	\$0	\$1	\$1
Total	\$8	\$0	\$7	\$15	\$30
	28%	0%	24%	48%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$8	\$0	\$8	\$366
Sheep & Bee	\$0	\$0	\$0	\$33
Hort	\$7	\$0	\$7	\$208
Other	\$14	\$0	\$15	\$396
Total	\$30	\$0	\$30	\$1,002

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
Region	Land Use						Land Use					
	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry
Northland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Auckland	-0	-1	0	0	0	1	-0.1%	-0.1%	0.0%	0.0%	0.0%	0.2%
Waikato	-23	0	0	0	0	23	-0.4%	0.0%	0.0%	0.0%	0.0%	0.7%
Bay of Plenty	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manawatu-Wanganui	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Canterbury	-42	0	0	42	0	0	-1.7%	0.0%	0.0%	8.4%	0.0%	0.0%
Otago	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Southland	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	-66	-1	0	42	0	24	-0.3%	0.0%	0.0%	0.4%	0.0%	0.1%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.0%	0%
Auckland	0.0%	0%
Waikato	0.3%	0%
Bay of Plent	0.0%	0%
Gisborne	0.0%	0%
Taranaki	0.0%	0%
Manawatu-l	0.0%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.0%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	0.9%	0%
Otago	0.2%	0%
Southland	0.0%	0%
Total	0.2%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$34	\$0	\$0	\$0	\$35
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$45
Manawatu-\	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$54	\$5	\$75	\$89	\$222
Otago	\$4	\$3	\$0	\$0	\$8
Southland	\$20	\$8	\$0	\$22	\$50
Total	\$180	\$23	\$78	\$143	\$424
	42%	5%	18%	34%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$158	\$22	\$180	\$2,626
Sheep & Bee	\$17	\$6	\$23	\$336
Hort	\$78	\$0	\$78	\$1,134
Other	\$133	\$10	\$143	\$2,088
Total	\$386	\$39	\$424	\$6,184

Assumptions

Peiphyton	Peri20
DIN	2.4

Discount ra	1%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%
Auckland	-37	-23	0	0	0	59	-7.9%	-2.6%	0.0%	0.0%	0.0%	11.5%
Waikato	-266	0	0	0	0	266	-4.5%	0.0%	0.0%	0.0%	0.0%	8.1%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%
Manawatu-\	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	2.5%	0.0%	0.0%	0.0%	0.0%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-446	0	0	446	0	0	-17.7%	0.0%	0.0%	88.8%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%
Total	-1,467	-23	0	642	0	848	-7.1%	0.0%	0.0%	6.5%	0.0%	4.0%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.6%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-\	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	9.8%	3%
Otago	1.8%	1%
Southland	5.7%	5%
Total	5.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-Ō	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$2,260
Sheep & Bee	\$17	\$6	\$23	\$303
Hort	\$70	\$0	\$70	\$926
Other	\$119	\$10	\$129	\$1,692
Total	\$355	\$39	\$394	\$5,181

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	1%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Sheep & Horticultur						Sheep & Horticultur						
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-ŷ	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	404	0	0	-16.0%	0.0%	0.0%	80.4%	0.0%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%	21.6%
Total	-1,402	-22	0	600	0	824	-6.8%	0.0%	0.0%	6.0%	0.0%	3.9%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-Ō	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$0
Auckland	\$3	\$0	\$0	\$0	\$3
Waikato	\$119	\$0	\$0	\$0	\$119
Bay of Plent	\$4	\$0	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$11	\$0	\$0	\$9	\$20
Manawatu-Ō	\$21	\$0	\$0	\$0	\$21
Hawke's Bay	\$0	\$0	\$0	\$17	\$17
Wellington	\$1	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$33	\$0	\$31	\$73	\$138
Otago	\$3	\$0	\$0	\$0	\$3
Southland	\$10	\$4	\$0	\$0	\$14
Total	\$205	\$5	\$32	\$100	\$341
	60%	1%	9%	29%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$205	\$0	\$205	\$1,665
Sheep & Bee	\$5	\$0	\$5	\$40
Hort	\$32	\$0	\$32	\$246
Other	\$99	\$0	\$100	\$805
Total	\$341	\$0	\$341	\$2,755

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-6	0	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	
Auckland	-32	-1	0	0	0	33	-6.9%	-0.1%	0.0%	0.0%	0.0%	6.3%	
Waikato	-931	0	0	0	0	931	-15.7%	0.0%	0.0%	0.0%	0.0%	28.4%	
Bay of Plenty	-34	0	0	0	0	34	-3.4%	0.0%	0.0%	0.0%	0.0%	1.2%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-86	0	0	0	0	86	-4.0%	0.0%	0.0%	0.0%	0.0%	28.7%	
Manawatu-Wanganui	-178	0	0	0	0	178	-10.8%	0.0%	0.0%	0.0%	0.0%	11.2%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-4	0	0	0	0	4	-1.1%	0.0%	0.0%	0.0%	0.0%	0.5%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-281	9	0	272	0	-0	-11.1%	0.1%	0.0%	54.2%	0.0%	0.0%	
Otago	-11	0	0	11	0	0	-0.8%	0.0%	0.0%	28.4%	0.0%	0.0%	
Southland	-97	0	0	97	0	0	-4.8%	0.0%	0.0%	1414.4%	0.0%	0.0%	
Total	-1,659	8	0	380	0	1,272	-8.0%	0.0%	0.0%	3.8%	0.0%	6.0%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	5.8%	0%
Waikato	12.5%	0%
Bay of Plent	2.4%	0%
Gisborne	0.0%	0%
Taranaki	3.2%	0%
Manawatu-Ō	7.9%	0%
Hawke's Bay	0.0%	0%
Wellington	0.8%	0%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	6.0%	0%
Otago	1.3%	0%
Southland	2.8%	3%
Total	6.1%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$0	\$1
Auckland	\$4	\$0	\$0	\$0	\$5
Waikato	\$132	\$0	\$0	\$0	\$132
Bay of Plent	\$4	\$0	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$16	\$0	\$0	\$9	\$25
Manawatu-\\	\$28	\$0	\$0	\$1	\$29
Hawke's Bay	\$0	\$0	\$3	\$20	\$23
Wellington	\$1	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug\\	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$75	\$5	\$92	\$116	\$288
Otago	\$6	\$0	\$0	\$0	\$6
Southland	\$15	\$7	\$0	\$0	\$23
Total	\$282	\$13	\$95	\$147	\$537
	52%	2%	18%	27%	100%

Change in land area (km2)												
	Sheep &		Horticultur						Sheep &		Horticultur	
Region	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry
Northland	-14	0	0	0	0	14	-0.8%	0.0%	0.0%	0.0%	0.0%	0.8%
Auckland	-41	-1	0	0	0	42	-9.0%	-0.1%	0.0%	0.0%	0.0%	8.3%
Waikato	-1,031	0	0	0	0	1,031	-17.4%	0.0%	0.0%	0.0%	0.0%	31.4%
Bay of Plent	-35	0	0	0	0	35	-3.4%	0.0%	0.0%	0.0%	0.0%	1.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-124	0	0	0	0	124	-5.8%	0.0%	0.0%	0.0%	0.0%	41.4%
Manawatu-\\	-235	0	0	0	0	235	-14.3%	0.0%	0.0%	0.0%	0.0%	14.8%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-9	0	0	0	0	9	2.2%	0.0%	0.0%	0.0%	0.0%	1.1%
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	0	0	0	0	0	0	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-624	9	0	616	0	0	-24.8%	0.1%	0.0%	122.6%	0.0%	0.0%
Otago	-26	0	0	26	0	0	-1.9%	0.0%	0.0%	66.8%	0.0%	0.0%
Southland	-148	0	0	148	0	0	-7.3%	0.0%	0.0%	2159.7%	0.0%	0.0%
Total	-2,287	8	0	789	0	1,490	-11.1%	0.0%	0.0%	8.0%	0.0%	7.0%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$280	\$2	\$282	\$2,361
Sheep & Bee	\$13	\$1	\$13	\$115
Hort	\$95	\$0	\$95	\$821
Other	\$147	\$0	\$147	\$1,237
Total	\$534	\$3	\$537	\$4,534

Assumptions	
Peiphyton	Peri30
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.3%	0%
Auckland	7.6%	0%
Waikato	13.9%	0%
Bay of Plent	2.5%	0%
Gisborne	0.2%	0%
Taranaki	4.6%	0%
Manawatu-\\	10.5%	0%
Hawke's Bay	0.0%	0%
Wellington	1.6%	0%
Tasman	0.1%	0%
Nelson	0.0%	1%
Marlboroug\\	0.0%	0%
West Coast	0.0%	0%
Canterbury	13.7%	3%
Otago	2.3%	0%
Southland	4.4%	5%
Total	8.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$1	\$0	\$0	\$0	\$1
Waikato	\$13	\$0	\$0	\$0	\$13
Bay of Plent	\$0	\$0	\$0	\$0	\$0
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$5	\$0	\$0	\$0	\$5
Manawatu-Ō	\$7	\$0	\$0	\$1	\$8
Hawke's Bay	\$0	\$0	\$3	\$3	\$6
Wellington	\$1	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$42	\$5	\$60	\$43	\$150
Otago	\$3	\$0	\$0	\$0	\$3
Southland	\$6	\$3	\$0	\$0	\$8
Total	\$77	\$8	\$63	\$48	\$196
	39%	4%	32%	24%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$75	\$2	\$77	\$696
Sheep & Bee	\$8	\$1	\$8	\$75
Hort	\$63	\$0	\$63	\$575
Other	\$48	\$0	\$48	\$433
Total	\$193	\$3	\$196	\$1,779

Assumptions	
Peiphyton	Peri30
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)																		
Region	Dairy						Sheep & beef						Horticultur e					
	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry						
Northland	-9	0	0	0	0	9	-0.5%	0.0%	0.0%	0.0%	0.0%	0.5%						
Auckland	-10	0	0	0	0	10	-2.1%	0.0%	0.0%	0.0%	0.0%	1.9%						
Waikato	-100	0	0	0	0	100	-1.7%	0.0%	0.0%	0.0%	0.0%	3.0%						
Bay of Plent	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Taranaki	-38	0	0	0	0	38	-1.8%	0.0%	0.0%	0.0%	0.0%	12.7%						
Manawatu-ŀ	-57	0	0	0	0	57	-3.5%	0.0%	0.0%	0.0%	0.0%	3.6%						
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Wellington	-4	0	0	0	0	4	-1.1%	0.0%	0.0%	0.0%	0.0%	0.6%						
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%						
West Coast	0	0	0	0	0	0	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%						
Canterbury	-344	0	0	344	0	0	-13.6%	0.0%	0.0%	68.4%	0.0%	0.0%						
Otago	-15	0	0	15	0	0	-1.1%	0.0%	0.0%	38.4%	0.0%	0.0%						
Southland	-51	0	0	51	0	0	-2.5%	0.0%	0.0%	745.3%	0.0%	0.0%						
Total	-628	0	0	409	0	219	-3.0%	0.0%	0.0%	4.1%	0.0%	1.0%						

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.2%	0%
Auckland	1.8%	0%
Waikato	1.4%	0%
Bay of Plent	0.0%	0%
Gisborne	0.2%	0%
Taranaki	1.4%	0%
Manawatu-Ō	2.6%	0%
Hawke's Bay	0.0%	0%
Wellington	0.8%	0%
Tasman	0.0%	0%
Nelson	0.0%	1%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	7.6%	3%
Otago	1.1%	0%
Southland	1.6%	2%
Total	2.3%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$1	\$2
Auckland	\$3	\$0	\$0	\$1	\$4
Waikato	\$113	\$0	\$0	\$5	\$118
Bay of Plent	\$0	\$0	\$0	\$1	\$1
Gisborne	\$0	\$0	\$0	\$2	\$2
Taranaki	\$3	\$0	\$0	\$2	\$5
Manawatu-l	\$0	\$0	\$0	\$5	\$5
Hawke's Bay	\$0	\$0	\$0	\$6	\$6
Wellington	\$0	\$0	\$0	\$1	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$30	\$0	\$27	\$46	\$103
Otago	\$1	\$0	\$0	\$3	\$4
Southland	\$7	\$0	\$0	\$16	\$22
Total	\$157	\$1	\$27	\$88	\$272
	58%	0%	10%	32%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$160	-\$3	\$157	\$2,426
Sheep & Bee	\$1	\$0	\$1	\$169
Hort	\$27	\$0	\$27	\$365
Other	\$84	\$4	\$88	\$1,522
Total	\$271	\$1	\$272	\$4,482

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-6	0	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	
Auckland	-29	-1	0	0	0	30	-6.2%	-0.1%	0.0%	0.0%	0.0%	5.8%	
Waikato	-903	0	0	0	0	903	-15.2%	0.0%	0.0%	0.0%	0.0%	27.6%	
Bay of Plenty	-4	0	0	0	0	4	-0.4%	0.0%	0.0%	0.0%	0.0%	0.1%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-21	0	0	0	0	21	-1.0%	0.0%	0.0%	0.0%	0.0%	7.1%	
Manawatu-Wanganui	-2	0	0	0	0	2	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-258	9	0	249	0	0	-10.2%	0.1%	0.0%	49.7%	0.0%	0.0%	
Otago	-11	0	0	11	0	0	-0.8%	0.0%	0.0%	28.4%	0.0%	0.0%	
Southland	-97	0	0	97	0	0	-4.8%	0.0%	0.0%	1414.4%	0.0%	0.0%	
Total	-1,329	8	0	357	0	965	-6.4%	0.0%	0.0%	3.6%	0.0%	4.5%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0%
Auckland	5.2%	0%
Waikato	11.9%	0%
Bay of Plent	0.3%	0%
Gisborne	0.0%	0%
Taranaki	0.8%	0%
Manawatu-l	0.1%	0%
Hawke's Bay	0.0%	0%
Wellington	0.0%	0%
Tasman	0.1%	0%
Nelson	0.0%	0%
Marlboroug	0.0%	0%
West Coast	0.0%	0%
Canterbury	5.4%	0%
Otago	0.3%	0%
Southland	1.9%	0%
Total	4.7%	0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$10	\$2	\$0	\$23	\$36
Auckland	\$11	\$3	\$0	\$7	\$21
Waikato	\$249	\$7	\$0	\$47	\$303
Bay of Plent	\$21	\$6	\$0	\$31	\$57
Gisborne	\$0	\$13	\$0	\$43	\$57
Taranaki	\$152	\$6	\$0	\$31	\$189
Manawatu-\	\$162	\$34	\$6	\$105	\$306
Hawke's Bay	\$4	\$19	\$3	\$69	\$96
Wellington	\$26	\$9	\$0	\$26	\$61
Tasman	\$3	\$0	\$0	\$0	\$3
Nelson	\$0	\$0	\$0	\$1	\$1
Marlboroug	\$3	\$4	\$0	\$12	\$19
West Coast	\$1	\$0	\$0	\$1	\$2
Canterbury	\$130	\$11	\$108	\$146	\$395
Otago	\$59	\$24	\$0	\$41	\$124
Southland	\$112	\$18	\$0	\$101	\$231
Total	\$945	\$154	\$117	\$684	\$1,901
	50%	8%	6%	36%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$679	\$267	\$945	\$9,585
Sheep & Bee	\$35	\$120	\$154	\$1,565
Hort	\$117	\$0	\$117	\$1,186
Other	\$420	\$264	\$684	\$6,937
Total	\$1,250	\$651	\$1,901	\$19,273

Assumptions

Peiphyton	Peri10
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
Region	Dairy	Sheep & beef	Horticulturne	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulturne	Arable	Other	Forestry
Northland	-199	0	0	0	0	199	-11.6%	0.0%	0.0%	0.0%	0.0%	10.8%
Auckland	-105	-76	0	0	0	181	-22.8%	-8.7%	0.0%	0.0%	0.0%	35.3%
Waikato	-1,924	0	0	0	0	1,924	-32.4%	0.0%	0.0%	0.0%	0.0%	58.7%
Bay of Plent	-160	0	0	0	0	160	-15.8%	0.0%	0.0%	0.0%	0.0%	5.6%
Gisborne	-5	0	0	2	0	3	-44.6%	0.0%	0.0%	14.5%	0.0%	0.2%
Taranaki	-1,195	0	0	0	0	1,195	-55.6%	0.0%	0.0%	0.0%	0.0%	398.4%
Manawatu-\	-1,339	0	0	0	0	1,339	-81.6%	0.0%	0.0%	0.0%	0.0%	84.3%
Hawke's Bay	-32	0	0	0	0	32	-11.2%	0.0%	0.0%	0.0%	0.0%	1.7%
Wellington	-214	0	0	0	0	214	-53.9%	0.0%	0.0%	0.0%	0.0%	26.6%
Tasman	-59	0	0	0	0	59	-31.7%	0.0%	0.0%	0.0%	0.0%	6.2%
Nelson	-2	0	0	0	0	2	-36.7%	0.0%	0.0%	0.0%	0.0%	1.9%
Marlboroug	-32	0	0	0	0	32	-29.7%	0.0%	0.0%	0.0%	0.0%	3.9%
West Coast	-25	0	0	0	0	25	-2.9%	0.0%	0.0%	0.0%	0.0%	4.8%
Canterbury	-1,110	10	0	1,100	0	0	-44.0%	0.1%	0.0%	219.0%	0.0%	0.0%
Otago	-780	0	0	780	0	0	-57.0%	0.0%	0.0%	2007.6%	0.0%	0.0%
Southland	-1,508	0	0	1,508	0	0	-74.4%	0.0%	0.0%	22078.9%	0.0%	0.0%
Total	-8,690	-66	0	3,390	0	5,366	-42.0%	-0.1%	0.0%	34.2%	0.0%	25.3%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	4.8%	2%
Auckland	19.5%	7%
Waikato	26.2%	4%
Bay of Plent	12.9%	20%
Gisborne	24.6%	23%
Taranaki	44.9%	17%
Manawatu-\	61.2%	14%
Hawke's Bay	8.3%	12%
Wellington	40.7%	13%
Tasman	14.1%	6%
Nelson	21.3%	34%
Marlboroug	13.1%	13%
West Coast	1.5%	1%
Canterbury	23.8%	6%
Otago	24.8%	9%
Southland	31.8%	11%
Total	28.0%	10%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$10	\$2	\$0	\$22	\$34
Auckland	\$8	\$3	\$0	\$6	\$17
Waikato	\$136	\$7	\$0	\$42	\$185
Bay of Plent	\$20	\$6	\$0	\$30	\$56
Gisborne	\$0	\$13	\$0	\$41	\$55
Taranaki	\$150	\$6	\$0	\$28	\$183
Manawatu-l	\$162	\$34	\$6	\$100	\$301
Hawke's Bay	\$4	\$19	\$3	\$63	\$90
Wellington	\$26	\$9	\$0	\$25	\$60
Tasman	\$3	\$0	\$0	\$0	\$3
Nelson	\$0	\$0	\$0	\$1	\$1
Marlboroug	\$3	\$4	\$0	\$12	\$19
West Coast	\$1	\$0	\$0	\$1	\$2
Canterbury	\$100	\$11	\$81	\$100	\$292
Otago	\$58	\$23	\$0	\$39	\$120
Southland	\$106	\$18	\$0	\$86	\$209
Total	\$788	\$154	\$90	\$596	\$1,628
	48%	9%	6%	37%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$519	\$269	\$788	\$7,159
Sheep & Bee	\$34	\$120	\$154	\$1,397
Hort	\$90	\$0	\$90	\$821
Other	\$335	\$261	\$596	\$5,415
Total	\$979	\$650	\$1,628	\$14,791

Assumptions

Peiphyton	Peri10
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Sheep & Horticultur						Sheep & Horticultur						
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-193	0	0	0	0	193	-11.3%	0.0%	0.0%	0.0%	0.0%	10.5%	1.0%
Auckland	-77	-75	0	0	0	152	-16.6%	-8.6%	0.0%	0.0%	0.0%	29.5%	11.4%
Waikato	-1,021	0	0	0	0	1,021	-17.2%	0.0%	0.0%	0.0%	0.0%	31.2%	7.4%
Bay of Plent	-156	0	0	0	0	156	-15.5%	0.0%	0.0%	0.0%	0.0%	5.5%	0.2%
Gisborne	-5	0	0	2	0	3	-44.6%	0.0%	0.0%	14.5%	0.0%	0.2%	0.0%
Taranaki	-1,174	0	0	0	0	1,174	-54.6%	0.0%	0.0%	0.0%	0.0%	391.4%	103.8%
Manawatu-l	-1,338	0	0	0	0	1,338	-81.5%	0.0%	0.0%	0.0%	0.0%	84.2%	11.1%
Hawke's Bay	-32	0	0	0	0	32	-11.2%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%
Wellington	-214	0	0	0	0	214	-53.9%	0.0%	0.0%	0.0%	0.0%	26.6%	1.2%
Tasman	-59	0	0	0	0	59	-31.7%	0.0%	0.0%	0.0%	0.0%	6.2%	0.0%
Nelson	-2	0	0	0	0	2	-36.7%	0.0%	0.0%	0.0%	0.0%	1.9%	0.0%
Marlboroug	-32	0	0	0	0	32	29.7%	0.0%	0.0%	0.0%	0.0%	3.9%	0.0%
West Coast	-25	0	0	0	0	25	-2.9%	0.0%	0.0%	0.0%	0.0%	4.8%	0.1%
Canterbury	-852	2	0	850	0	0	-33.8%	0.0%	0.0%	169.3%	0.0%	0.0%	0.0%
Otago	-769	0	0	769	0	0	-56.2%	0.0%	0.0%	1979.2%	0.0%	0.0%	0.2%
Southland	-1,412	0	0	1,412	0	0	-69.7%	0.0%	0.0%	20664.5%	0.0%	0.0%	21.6%
Total	-7,361	-74	0	3,033	0	4,402	-35.6%	-0.1%	0.0%	30.6%	0.0%	20.7%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	4.7%	2%
Auckland	14.3%	7%
Waikato	14.3%	4%
Bay of Plent	12.6%	20%
Gisborne	24.6%	23%
Taranaki	44.1%	17%
Manawatu-l	61.2%	14%
Hawke's Bay	8.3%	12%
Wellington	40.7%	13%
Tasman	14.0%	6%
Nelson	21.3%	34%
Marlboroug	13.1%	13%
West Coast	1.5%	1%
Canterbury	18.3%	6%
Otago	24.5%	9%
Southland	29.9%	11%
Total	23.3%	10%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$0	\$0	\$0	\$0	\$1
Auckland	\$3	\$0	\$0	\$0	\$3
Waikato	\$119	\$0	\$0	\$0	\$119
Bay of Plent	\$4	\$0	\$0	\$0	\$4
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$3	\$0	\$0	\$3	\$6
Manawatu-Ō	\$10	\$0	\$0	\$1	\$10
Hawke's Bay	\$0	\$0	\$0	\$7	\$7
Wellington	\$0	\$0	\$0	\$0	\$0
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$30	\$0	\$27	\$65	\$122
Otago	\$2	\$1	\$0	\$0	\$3
Southland	\$7	\$0	\$0	\$12	\$18
Total	\$177	\$1	\$27	\$89	\$294
	60%	0%	9%	30%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$177	\$0	\$177	\$1,413
Sheep & Bee	\$1	\$0	\$1	\$7
Hort	\$27	\$0	\$27	-\$569
Other	\$87	\$2	\$89	\$700
Total	\$292	\$2	\$294	\$1,552

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-6	0	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	
Auckland	-29	-1	0	0	0	30	-6.2%	-0.1%	0.0%	0.0%	0.0%	5.8%	
Waikato	-926	0	0	0	0	926	-15.6%	0.0%	0.0%	0.0%	0.0%	28.2%	
Bay of Plenty	-34	0	0	0	0	34	-3.4%	0.0%	0.0%	0.0%	0.0%	1.2%	
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Taranaki	-21	0	0	0	0	21	-1.0%	0.0%	0.0%	0.0%	0.0%	7.1%	
Manawatu-Wanganui	-82	0	0	0	0	82	-5.0%	0.0%	0.0%	0.0%	0.0%	5.2%	
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Wellington	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Tasman	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Canterbury	-258	9	0	249	0	0	-10.2%	0.1%	0.0%	49.7%	0.0%	0.0%	
Otago	-11	0	0	11	0	-0	-0.8%	0.0%	0.0%	28.4%	0.0%	0.0%	
Southland	-97	0	0	97	0	0	-4.8%	0.0%	0.0%	1414.4%	0.0%	0.0%	
Total	-1,463	8	0	357	0	1,098	-7.1%	0.0%	0.0%	3.6%	0.0%	5.2%	

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.1%	0.0%
Auckland	5.2%	0.0%
Waikato	12.5%	0.0%
Bay of Plent	2.4%	0.0%
Gisborne	0.0%	0.0%
Taranaki	0.8%	0.0%
Manawatu-Ō	3.7%	0.0%
Hawke's Bay	0.0%	0.0%
Wellington	0.0%	0.0%
Tasman	0.1%	0.0%
Nelson	0.0%	0.0%
Marlboroug	0.0%	0.3%
West Coast	0.0%	0.0%
Canterbury	5.5%	0.1%
Otago	0.8%	0.3%
Southland	1.9%	0.0%
Total	5.3%	0.1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$7	\$1	\$0	\$2	\$10
Waikato	\$150	\$0	\$0	\$1	\$151
Bay of Plent	\$5	\$0	\$0	\$2	\$8
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$42	\$0	\$0	\$8	\$50
Manawatu-\	\$31	\$2	\$0	\$4	\$37
Hawke's Bay	\$0	\$2	\$3	\$23	\$29
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$79	\$6	\$94	\$140	\$319
Otago	\$6	\$4	\$0	\$0	\$10
Southland	\$27	\$8	\$0	\$33	\$68
Total	\$349	\$24	\$97	\$218	\$688
	51%	4%	14%	32%	100%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$327	\$22	\$349	\$2,975
Sheep & Bee	\$18	\$6	\$24	\$217
Hort	\$97	\$0	\$97	\$70
Other	\$206	\$12	\$218	\$1,869
Total	\$648	\$40	\$688	\$5,131

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Change in land area (km2)												
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry
Northland	-25	0	0	0	0	25	-1.4%	0.0%	0.0%	0.0%	0.0%	1.3%
Auckland	-65	-23	0	0	0	88	-14.1%	-2.6%	0.0%	0.0%	0.0%	17.1%
Waikato	-1,169	0	0	0	0	1,169	-19.7%	0.0%	0.0%	0.0%	0.0%	35.7%
Bay of Plenty	-40	0	0	0	0	40	-3.9%	0.0%	0.0%	0.0%	0.0%	1.4%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-333	0	0	0	0	333	-15.5%	0.0%	0.0%	0.0%	0.0%	110.8%
Manawatu-Wairarapa	-258	0	0	0	0	258	-15.7%	0.0%	0.0%	0.0%	0.0%	16.2%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	2.5%	0.0%	0.0%	0.0%	0.0%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-662	9	0	653	0	0	-26.2%	0.1%	0.0%	130.0%	0.0%	0.0%
Otago	-13	0	0	13	0	0	-1.0%	0.0%	0.0%	34.3%	0.0%	0.0%
Southland	-290	0	0	290	0	0	-14.3%	0.0%	0.0%	4252.3%	0.0%	0.0%
Total	-2,865	-14	0	957	0	1,922	-13.8%	0.0%	0.0%	9.6%	0.0%	9.0%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.6%	0%
Auckland	12.1%	2%
Waikato	15.7%	0%
Bay of Plent	3.2%	0%
Gisborne	0.2%	1%
Taranaki	12.4%	0%
Manawatu-\	11.5%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.2%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	14.4%	3%
Otago	2.4%	2%
Southland	7.6%	5%
Total	10.3%	2%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-Ō	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$1,561
Sheep & Bee	\$17	\$6	\$23	\$209
Hort	\$70	\$0	\$70	\$640
Other	\$119	\$10	\$129	\$1,169
Total	\$355	\$39	\$394	\$3,579

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Dairy	Sheep & beef	Horticulture	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plenty	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-Wairarapa	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	404	0	0	-16.0%	0.0%	0.0%	80.4%	0.0%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%	21.6%
Total	-1,402	-22	0	600	0	824	-6.8%	0.0%	0.0%	6.0%	0.0%	3.9%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-Ō	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$1	\$0	\$1	\$2
Auckland	\$3	\$0	\$0	\$0	\$4
Waikato	\$126	\$1	\$0	\$0	\$127
Bay of Plent	\$6	\$2	\$0	\$2	\$10
Gisborne	\$0	\$0	\$0	\$0	\$0
Taranaki	\$23	\$0	\$0	\$3	\$26
Manawatu-l	\$12	\$9	\$0	\$0	\$21
Hawke's Bay	\$0	\$1	\$0	\$5	\$6
Wellington	\$0	\$0	\$0	\$0	\$1
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$3	\$0	\$0	\$0	\$3
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$40	\$0	\$27	\$56	\$123
Otago	\$4	\$1	\$0	\$0	\$6
Southland	\$7	\$0	\$0	\$10	\$17
Total	\$226	\$15	\$27	\$78	\$346
	65%	4%	8%	23%	100%

Marginal

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$177	\$49	\$226	\$1,811
Sheep & Bee	\$1	\$14	\$15	\$119
Hort	\$27	\$0	\$27	\$205
Other	\$75	\$3	\$78	\$610
Total	\$280	\$66	\$346	\$2,746

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultur e	Arable	Other	Forestry	
Northland	-6	0	0	0	0	6	-0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%
Auckland	-29	-1	0	0	0	30	-6.2%	-0.1%	0.0%	0.0%	0.0%	0.0%	5.8%
Waikato	-929	0	0	0	0	929	-15.7%	0.0%	0.0%	0.0%	0.0%	0.0%	28.3%
Bay of Plenty	-34	0	0	0	0	34	-3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%
Gisborne	-0	0	0	0	0	0	-4.3%	0.0%	0.0%	3.6%	0.0%	0.0%	0.0%
Taranaki	-178	0	0	0	0	178	-8.3%	0.0%	0.0%	0.0%	0.0%	0.0%	59.4%
Manawatu-Wanganui	-82	0	0	0	0	82	-5.0%	0.0%	0.0%	0.0%	0.0%	0.0%	5.2%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tasman	-0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlborough	-32	0	0	0	0	32	-29.1%	0.0%	0.0%	0.0%	0.0%	0.0%	3.9%
West Coast	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Canterbury	-341	9	0	333	0	0	-13.5%	0.1%	0.0%	66.2%	0.0%	0.0%	0.0%
Otago	-48	0	0	48	0	-0	-3.5%	0.0%	0.0%	124.3%	0.0%	0.0%	0.0%
Southland	-104	0	0	104	0	0	-5.1%	0.0%	0.0%	1518.1%	0.0%	0.0%	0.0%
Total	-1,783	8	0	485	0	1,291	-8.6%	0.0%	0.0%	4.9%	0.0%	0.0%	6.1%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0.4%
Auckland	5.6%	0.4%
Waikato	13.3%	0.5%
Bay of Plent	3.5%	6.3%
Gisborne	1.5%	0.1%
Taranaki	6.7%	0.0%
Manawatu-l	4.5%	3.7%
Hawke's Bay	0.3%	0.7%
Wellington	0.5%	0.2%
Tasman	0.2%	1.0%
Nelson	0.0%	15.8%
Marlboroug	12.1%	0.9%
West Coast	0.0%	0.0%
Canterbury	7.2%	0.2%
Otago	1.9%	0.3%
Southland	2.0%	0.0%
Total	6.7%	1.0%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$2	\$1	\$0	\$2	\$5
Auckland	\$7	\$1	\$0	\$2	\$10
Waikato	\$158	\$1	\$0	\$0	\$159
Bay of Plent	\$7	\$2	\$0	\$4	\$13
Gisborne	\$0	\$1	\$0	\$1	\$1
Taranaki	\$62	\$0	\$0	\$8	\$70
Manawatu-\	\$33	\$11	\$0	\$3	\$47
Hawke's Bay	\$0	\$3	\$3	\$21	\$28
Wellington	\$2	\$1	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$3	\$0	\$0	\$0	\$3
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$89	\$6	\$94	\$132	\$320
Otago	\$8	\$4	\$0	\$1	\$13
Southland	\$27	\$8	\$0	\$31	\$66
Total	\$398	\$38	\$97	\$207	\$740
	54%	5%	13%	28%	100%

Change in land area (km2)												
Region	Dairy	Sheep & beef	Horticultr e	Arable	Other	Forestry	Dairy	Sheep & beef	Horticultr e	Arable	Other	Forestry
Northland	-25	0	0	0	0	25	-1.4%	0.0%	0.0%	0.0%	0.0%	1.3%
Auckland	-65	-23	0	0	0	88	-14.1%	-2.6%	0.0%	0.0%	0.0%	17.1%
Waikato	-1,172	0	0	0	0	1,172	-19.8%	0.0%	0.0%	0.0%	0.0%	35.8%
Bay of Plent	-40	0	0	0	0	40	-3.9%	0.0%	0.0%	0.0%	0.0%	1.4%
Gisborne	0	0	0	0	0	0	-4.3%	0.0%	0.0%	3.6%	0.0%	0.0%
Taranaki	-490	0	0	0	0	490	-22.8%	0.0%	0.0%	0.0%	0.0%	163.2%
Manawatu-l	-258	0	0	0	0	258	-15.7%	0.0%	0.0%	0.0%	0.0%	16.2%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	2.5%	0.0%	0.0%	0.0%	0.0%	1.2%
Tasman	-1	0	0	0	0	1	-0.4%	0.0%	0.0%	0.0%	0.0%	0.1%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	-32	0	0	0	0	32	-29.1%	0.0%	0.0%	0.0%	0.0%	3.9%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Canterbury	-745	9	0	736	0	0	-29.5%	0.1%	0.0%	146.6%	0.0%	0.0%
Otago	-51	0	0	51	0	0	-3.7%	0.0%	0.0%	130.2%	0.0%	0.0%
Southland	-298	0	0	298	0	0	-14.7%	0.0%	0.0%	4356.0%	0.0%	0.0%
Total	-3,185	-14	0	1,085	0	2,115	-15.4%	0.0%	0.0%	10.9%	0.0%	10.0%

EFW

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$327	\$71	\$398	\$3,372
Sheep & Bee	\$18	\$20	\$38	\$328
Hort	\$97	\$0	\$97	\$845
Other	\$194	\$13	\$207	\$1,779
Total	\$635	\$104	\$740	\$6,325

Assumptions

Peiphyton	Peri20
DIN	1

Discount ra	3%
Cost assum	Median

Technical e	Static
Rate of tec	na

Profit Impacts

Region	Dairy	Sheep & beef
Northland	1.1%	1%
Auckland	12.5%	3%
Waikato	16.5%	1%
Bay of Plent	4.3%	7%
Gisborne	1.7%	1%
Taranaki	18.3%	0%
Manawatu-\	12.4%	4%
Hawke's Bay	0.7%	2%
Wellington	2.4%	1%
Tasman	0.3%	1%
Nelson	0.0%	18%
Marlboroug	12.1%	1%
West Coast	0.1%	0%
Canterbury	16.1%	3%
Otago	3.5%	2%
Southland	7.8%	5%
Total	11.8%	2%

Annual costs (\$million)					
Region	Dairy	Sheep & beef	Hort	Other	Total
Northland	\$1	\$0	\$0	\$1	\$3
Auckland	\$4	\$1	\$0	\$1	\$6
Waikato	\$31	\$0	\$0	\$0	\$32
Bay of Plent	\$1	\$0	\$0	\$2	\$3
Gisborne	\$0	\$0	\$0	\$1	\$1
Taranaki	\$39	\$0	\$0	\$5	\$44
Manawatu-l	\$21	\$2	\$0	\$4	\$26
Hawke's Bay	\$0	\$2	\$3	\$16	\$22
Wellington	\$1	\$0	\$0	\$1	\$3
Tasman	\$0	\$0	\$0	\$0	\$0
Nelson	\$0	\$0	\$0	\$0	\$0
Marlboroug	\$0	\$0	\$0	\$0	\$0
West Coast	\$0	\$0	\$0	\$0	\$0
Canterbury	\$49	\$5	\$67	\$76	\$197
Otago	\$4	\$3	\$0	\$0	\$7
Southland	\$20	\$8	\$0	\$21	\$49
Total	\$172	\$23	\$70	\$129	\$394
	44%	6%	18%	33%	100%

NPS (2017)

Costs (\$ mill	Annual N	Annual P	Annual total	NPV
Dairy	\$150	\$22	\$172	\$1,561
Sheep & Bee	\$17	\$6	\$23	\$209
Hort	\$70	\$0	\$70	\$640
Other	\$119	\$10	\$129	\$1,169
Total	\$355	\$39	\$394	\$3,579

Assumptions	
Peiphyton	Peri20
DIN	1
Discount ra	3%
Cost assum	Median
Technical e	Static
Rate of tec	na

Change in land area (km2)													
Region	Sheep & Horticultur						Sheep & Horticultur						
	Dairy	beef	e	Arable	Other	Forestry	Dairy	beef	e	Arable	Other	Forestry	Forestry
Northland	-19	0	0	0	0	19	-1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%
Auckland	-36	-22	0	0	0	58	-7.9%	-2.5%	0.0%	0.0%	0.0%	11.4%	11.4%
Waikato	-243	0	0	0	0	243	-4.1%	0.0%	0.0%	0.0%	0.0%	7.4%	7.4%
Bay of Plent	-6	0	0	0	0	6	-0.5%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
Gisborne	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Taranaki	-311	0	0	0	0	311	-14.5%	0.0%	0.0%	0.0%	0.0%	103.8%	103.8%
Manawatu-l	-176	0	0	0	0	176	-10.7%	0.0%	0.0%	0.0%	0.0%	11.1%	11.1%
Hawke's Bay	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Wellington	-10	0	0	0	0	10	-2.5%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%
Tasman	0	0	0	0	0	0	-0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nelson	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Marlboroug	0	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
West Coast	-1	0	0	0	0	1	-0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Canterbury	-404	0	0	404	0	0	-16.0%	0.0%	0.0%	80.4%	0.0%	0.0%	0.0%
Otago	-2	0	0	2	0	0	-0.2%	0.0%	0.0%	5.8%	0.0%	0.0%	0.2%
Southland	-194	0	0	194	0	0	-9.6%	0.0%	0.0%	2837.9%	0.0%	0.0%	21.6%
Total	-1,402	-22	0	600	0	824	-6.8%	0.0%	0.0%	6.0%	0.0%	3.9%	4.9%

Profit Impacts

Region	Dairy	Sheep & beef
Northland	0.5%	0%
Auckland	6.9%	2%
Waikato	3.3%	0%
Bay of Plent	0.8%	0%
Gisborne	0.2%	1%
Taranaki	11.6%	0%
Manawatu-l	7.9%	1%
Hawke's Bay	0.5%	1%
Wellington	1.9%	1%
Tasman	0.1%	0%
Nelson	0.0%	2%
Marlboroug	0.0%	0%
West Coast	0.1%	0%
Canterbury	8.9%	3%
Otago	1.6%	1%
Southland	5.7%	5%
Total	5.1%	1%

Profits (\$/ha)							Hectares					Total profit			
	Dairy	SB Intensive	SB Hill	SB High	Arable	Forestry		DAIRY	SBINTEN	SBHILL	SBHIGH	DAIRY	SBINTEN	SBHILL	SBHIGH
Northland	\$1,234	\$468	\$250	\$0	\$1,416	\$81	Northland	1,713	2,730	400	0	\$211,391,822	\$127,720,741	\$10,015,661	\$0
Auckland	\$1,234	\$468	\$250	\$0	\$1,416	\$245	Auckland	462	822	55	0	\$57,031,352	\$38,435,632	\$1,370,297	\$0
Waikato	\$1,606	\$468	\$250	\$0	\$3,208	\$31	Waikato	5,932	1,488	3,599	40	\$952,624,887	\$69,597,756	\$90,060,488	\$0
Bay of Plent	\$1,591	\$279	\$246	\$0	\$3,835	\$30	Bay of Plenty	1,010	301	785	105	\$160,721,892	\$8,380,844	\$19,336,346	\$0
Gisborne	\$1,591	\$279	\$246	\$0	\$4,978	\$487	Gisborne	11	265	1,963	10	\$1,671,475	\$7,384,251	\$48,338,352	\$0
Taranaki	\$1,576	\$303	\$237	\$0	\$1,238	\$17	Taranaki	2,150	435	864	35	\$338,884,867	\$13,181,071	\$20,486,581	\$0
Manawatu-	\$1,614	\$279	\$246	\$0	\$2,369	\$41	Manawatu-Wanganui	1,641	2,107	7,436	85	\$264,910,763	\$58,759,825	\$183,066,305	\$0
Hawke's Ba	\$1,614	\$279	\$246	\$0	\$1,802	\$171	Hawke's Bay	284	2,243	4,112	151	\$45,927,942	\$62,549,393	\$101,226,263	\$0
Wellington	\$1,614	\$279	\$246	\$0	\$1,262	\$30	Wellington	397	614	2,042	27	\$64,119,153	\$17,126,020	\$50,274,758	\$0
Tasman	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Tasman	185	188	75	165	\$20,142,957	\$5,208,259	\$602,488	\$1,325,658
Nelson	\$1,090	\$276	\$80	\$80	\$5,150	\$37	Nelson	6	3	1	8	\$620,461	\$83,694	\$4,295	\$60,731
Marlboroug	\$2,174	\$276	\$80	\$80	\$9,341	\$48	Marlborough	109	860	405	555	\$23,642,207	\$23,766,932	\$3,252,818	\$4,456,846
West Coast	\$1,090	\$328	\$80	\$80	\$0	\$45	West Coast	871	194	256	129	\$94,969,067	\$6,366,362	\$2,056,615	\$1,038,670
Canterbury	\$2,174	\$276	\$80	\$80	\$2,075	\$14	Canterbury	2,522	5,159	3,592	883	\$548,320,124	\$142,556,243	\$28,830,823	\$7,084,297
Otago	\$1,745	\$328	\$80	\$80	\$1,849	\$41	Otago	1,369	5,737	7,752	1,405	\$238,793,107	\$188,324,553	\$62,223,961	\$11,276,631
Southland	\$1,745	\$328	\$80	\$80	\$1,978	\$61	Southland	2,026	4,105	1,808	557	\$353,556,353	\$134,735,455	\$14,509,467	\$4,471,105
								20,688	27,250	35,146	4,155	\$3,377,328,430	\$904,177,031	\$635,655,519	\$29,713,937

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