Owl Farm

Providing knowledge

St Peter's School/Lincoln University
Demonstration Dairy Farm

ST PETER'S · CAMBRIDGE
NEW ZEALAND

Lincoln University
Te Whare Wānaka o Aoraki
AOTEAROA · NEW ZEALAND
New Zealand's specialist land-based university

Farm Focus Day

Wednesday, 25 November 2015

St Peter's School / Owl Farm Hazard Notifications

Children are the responsibility of their parent or guardian

Normal hazards associated with a dairy farm

Other vehicle traffic on farm roads and races

Races may be slippery

OPUS LIC PGG Wrightson Seeds DairyNZ Ballance NEW ZEALAND FARM SOURCE

HAZARD SUMMARY

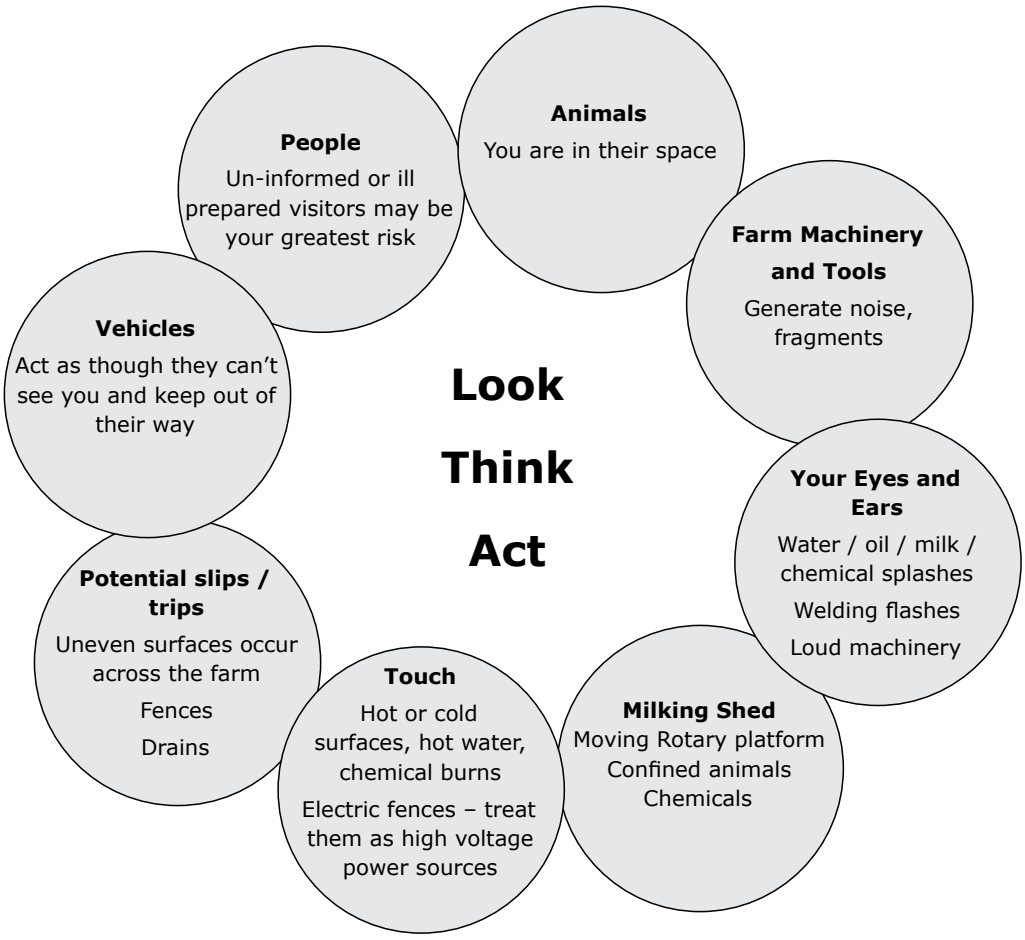
Welcome to Owl Farm

Owl Farm is a fully operational commercial dairy farm with a number of potential hazards to both visitors and staff.

Many of these potential hazards cannot be eliminated while providing access to visitors therefore all staff and visitors MUST watch for potential hazards and act with caution.

Hazard Summary

The following diagram provides a reminder of the types of hazards present.



ARE YOU TRAINED FOR WHAT YOU ARE ABOUT TO DO?

If not, STOP.

If you are uncertain how you should act or proceed stop and contact the farm manager, other farm staff or your host.

In being on Owl Farm you are acknowledging your receipt of this hazard summary. By doing so you also agree to be personally responsible for monitoring any potential hazards and agree to act conscientiously to protect yourself and any others who are also on-farm.

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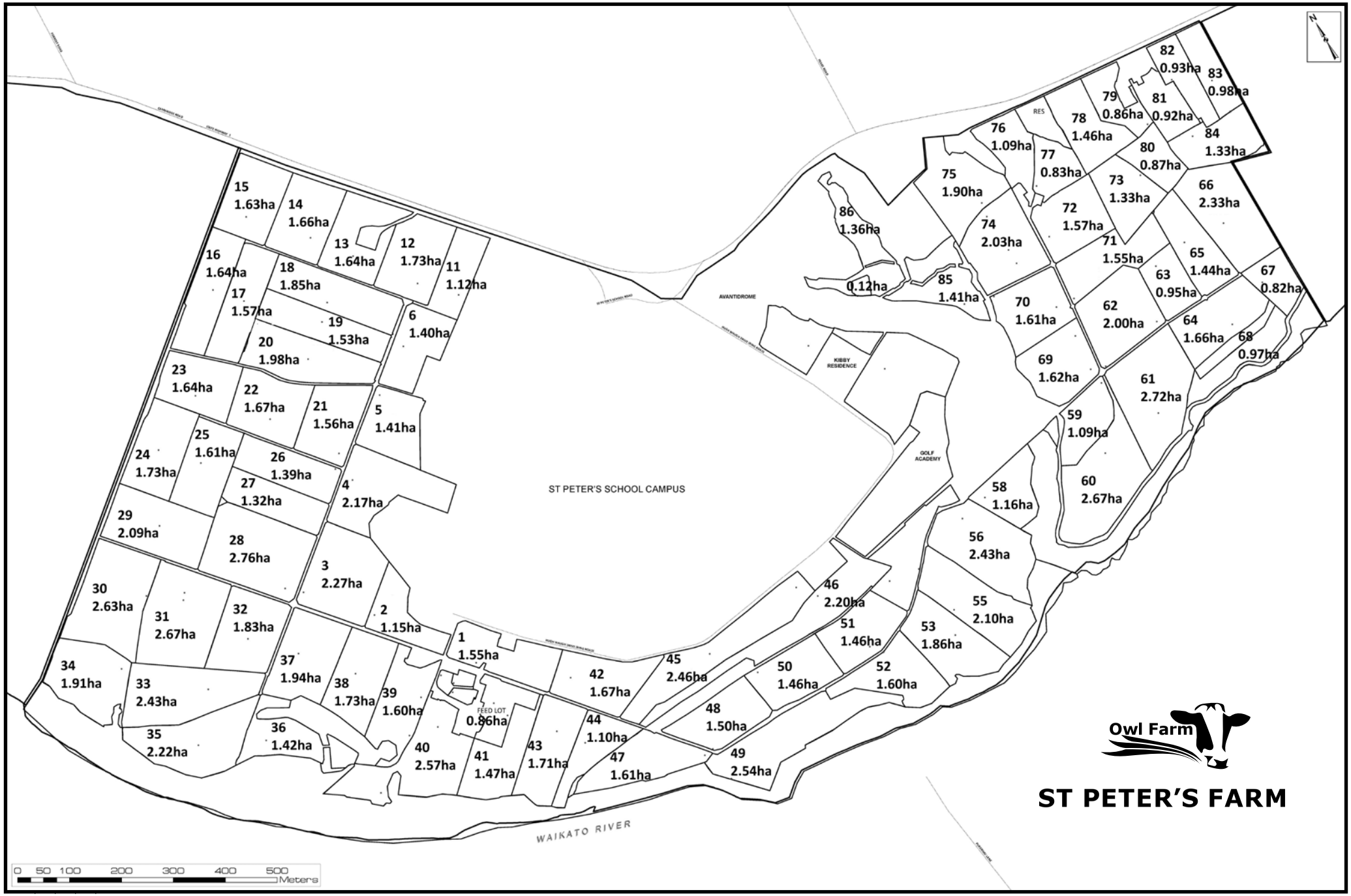
ST PETER'S SCHOOL CAMPUS
AVANTIDROME
KIBBY RESIDENCE
GOLF ACADEMY
FEED LOT
0.86ha
RES
WAIKATO RIVER
1 1.55ha
2 1.15ha
3 2.27ha
4 2.17ha
5 1.41ha
6 1.40ha
11 1.12ha
12 1.73ha
13 1.64ha
14 1.66ha
15 1.63ha
16 1.64ha
17 1.57ha
18 1.85ha
19 1.53ha
20 1.98ha
21 1.56ha
22 1.67ha
23 1.64ha
24 1.73ha
25 1.61ha
26 1.39ha
27 1.32ha
28 2.76ha
29 2.09ha
30 2.63ha
31 2.67ha
32 1.83ha
33 2.43ha
34 1.91ha
35 2.22ha
36 1.42ha
37 1.94ha
38 1.73ha
39 1.60ha
40 2.57ha
41 1.47ha
42 1.67ha
43 1.71ha
44 1.10ha
45 2.46ha
46 2.20ha
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48 1.50ha
49 2.54ha
50 1.46ha
51 1.46ha
52 1.60ha
53 1.86ha
55 2.10ha
56 2.43ha
58 1.16ha
59 1.09ha
60 2.67ha
61 2.72ha
62 2.00ha
63 0.95ha
64 1.66ha
65 1.44ha
66 2.33ha
67 0.82ha
68 0.97ha
69 1.62ha
70 1.61ha
71 1.55ha
72 1.57ha
73 1.33ha
74 2.03ha
75 1.90ha
76 1.09ha
77 0.83ha
78 1.46ha
79 0.86ha
80 0.87ha
81 0.92ha
82 0.93ha
83 0.98ha
84 1.33ha
85 1.41ha
86 1.36ha
0.12ha
0 50 100 200 300 400 500 Meters
Owl Farm
ST PETER'S FARM

Owl Farm
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WAIKATO RIVER
0 50 100 200 300 400 500
Meters

OWL FARM

St Peter's School / Lincoln University Demonstration Dairy Farm

Goal

To apply proven research, utilising good on farm practice and scientific monitoring for the farm to become an exemplar in dairy production, economic performance and environmental footprint.

Strategic Objectives

To work in collaboration with the wider dairy industry and community to maximise sustainable profit embracing the whole farm system by

- Increasing productivity
- Achieving an acceptable farm environmental footprint
- Meeting or exceeding animal welfare targets
- Providing leadership to dairy farmers by demonstrating practices that can be achieved by progressive farmers
- Demonstrating career opportunities to students
- Provide educational opportunities for students

Farm Development

The development of farming systems and demonstration activities on the farm will proceed in two stages

Stage 1

To establish credibility by addressing current issues and performance, whilst setting up the farm for future development (Years 1-3; 2014/15-2016/17).

Specific Objectives During Stage 1:

- To establish Owl Farm to develop and demonstrate good practice in pasture based dairy farming systems and to transfer them to dairy farms
- To generate profit through tight control management with appropriate re-investment
- To appoint a Farm Demonstration Manager
- To delineate areas of farmland assigned to milking platform, dairy support and wintering
- To include the farm's full environmental footprint, land requirement and resource efficiency in system decision making and reporting
- To use good environmental management systems in the development and implementation of farm practices that achieve sustainable growth and profit and protect the wider environment
- To engage with Waikato Regional Council and Waikato River Authority staff to accelerate progress towards their goals relating to the environment and Waikato River
- To develop a communications plan (including photos of the journey to establish and develop Owl Farm)
- To implement optimal use of all nutrients on farm including effluent, fertilizer, and nutrients imported from supplements
- To implement nutrient recycling so that there is no significant contamination of water and that the farm meets all resource consents
- To show leadership in establishment of biodiversity management practices relevant to the Waikato
- To implement a staff training matrix
- To implement a Health & Safety plan
- To implement a time and motion study for staff with associated rosters
- To optimise pasture growth and pasture management so that cows consume as much metabolizable energy as practical from grazed pastures and supplements
- To achieve industry targets for mating performance with a 10 week mating period, including a 6 week in-calf rate of 78% and 10 week in-calf rate of greater than 90% (empty rate < 10%)
- To assist St Peter's School and Lincoln University to attract top quality domestic and international students into their organisation and into the New Zealand Primary Sector.

Stage 2

To develop, in conjunction with partners, higher risk strategies to lead sustainable profit (Years 4-6; 2017/18-2020-2021).

The farm system will be developed over years 1-3 and reflect the demonstration requirements of the industry that are relevant and appropriate at that time.

Specific objectives during stage 2

- To push the boundaries of sustainable profit through increasing productivity without increasing the farm's environment footprint.

OWL FARM SNAPSHOT

Year One and Two Objectives:

- To maximise our current system and dramatically improve both our economic and environmental sustainability
- To get accurate baseline data so that we can benchmark the property for future management and comparison

Area:

Milking	160 hectares effective
Free hold land	137 hectares
Lease land	32 hectares

- The area that has been available has varied from year to year depending mainly on availability of lease land from the McGrath block. Ultimately, the area will be set in concrete so that we have a fixed base and this will be the freehold area owned by St Peter's

Soils:

- Vary dramatically from heavy clays to light sands. The topography is flat contour over three terraces
- The farm is long and narrow with 3.4 kilometres bordering the Waikato River

Soil type:	*Location:*
Otorohanga deep clay	SH1, river and centre north
Pukehina deep sand	North of farm
Kainui deep silt clay	Behind Kahikatea Stand
Turangi deep sand	Deer block
Rotokauri deep clay loam	School grounds
Kaipaki deep peat	Gully below the Avantidrome

Fertility:

pH average	6.0
Phosphate	53
Potassium	9
Sulphur	15
Magnesium	122

Nitrogen:

- 150kgN/ha is being budgeted for the coming season
- Soil testing in September will still determine what final amount is applied

Production:

	2011/12	**2012/13**	**2013/14**	**2014/15**
Production kgMS	181,625	153,049	158,207	201,000
Cows Milked	465	453	446	453
Calves reared	174	171	158	150
Heifers grazed	100	102	112	104
Production/ha	1,094	945	993	1,256

Stock:

BW 147/48

PW 196/69

- Historically there has been a lot of AB mating using DNA semen and mating all the Yearlings to AB with herd now in the top 3% in NZ
- The objective has been to rear as many heifer replacement animals as possible and sell surplus (usually February)
- There have been six weeks AB followed by a further ten weeks use of the bulls

Calving Date: 01 July 2016

Cowshed:

- 36 bale rotary shed with cup removers, built in 1970 and the plant is Waikato
- Need to run two herds as yard has only capacity to hold 400 cows

Effluent:

- Effluent holding pond used when conditions don't suit application
- Otherwise effluent applied directly when suitable over 36 hectares using a cobra travelling rain-gun

Staff:

Farm Manager, Assistant Farm Manager and Farm Assistant (3 FTE)

Cropping:

- 14 ha of chicory and potentially 5ha of maize to come onto the milking platform
- This will work in with a planned pasture regeneration plan given little cultivation has occurred on farm over the past 10 years

Supplement:

- The farm has made between 100 and 200 tonnes of grass silage per year in the past
- With regular pasture metering and the ability to be able to identify surplus in advance we think it will be somewhere between 150-200 tonnes this coming season (weather and season dependent)
- 170 tonnes of maize silage was fed late in the season and still feeding over winter
- 120 tonnes of Maize expected again this season
- 300 tonnes of PKE has been contracted for the 2015/16 season

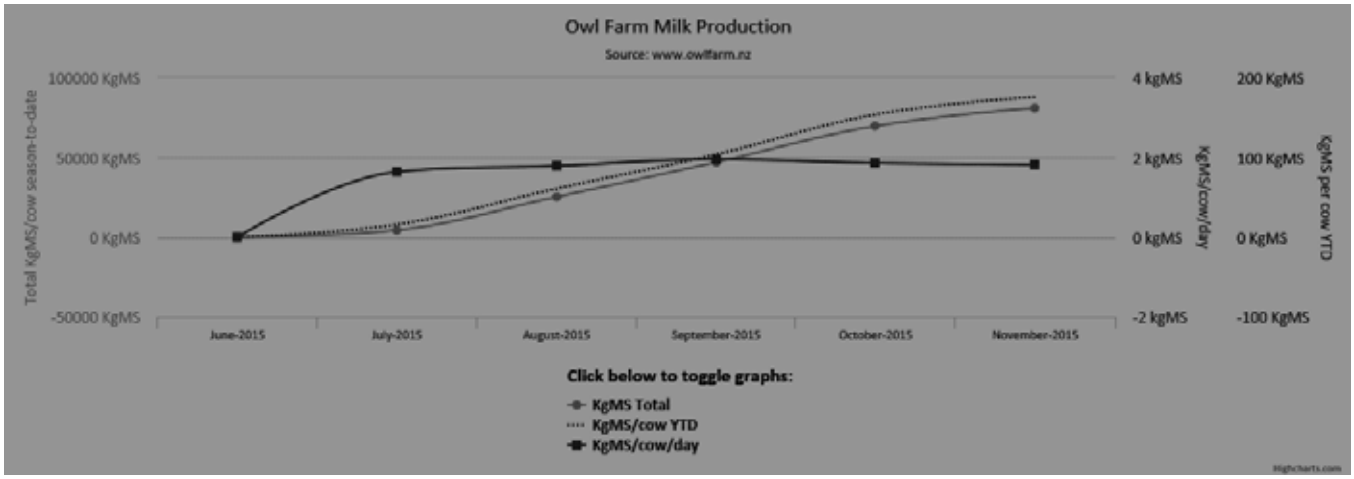
NOTES

OWL FARM REPORT – SEASON TO DATE

NB: All information below can be found on our new and interactive website **www.owlfarm.nz**

Milk Production

- As expected milk production remains down for the season and month to date
  - Season to date 5.9% down
  - Month to date 3.6% down (October was 7.2% down)
- Have struggled largely due to climatic influences and continually being behind on growth targets and pasture covers.
- We achieved 2kgMS/cow for two weeks in September but have otherwise consistently been producing in the range of 1.8-1.9kgMS/cow.
- We are currently modelling scenarios to identify how we can minimises losses going into what is likely to be a dry summer and looking at our ability to maintain our current milk production for as long as possible rather than aiming for any increases.



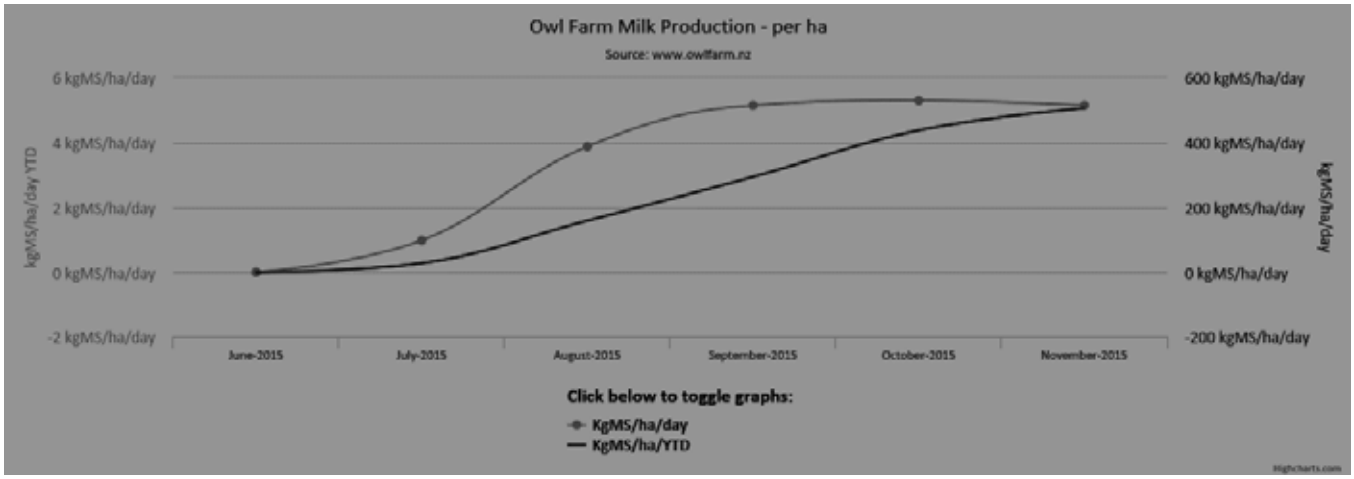
Month to date (12 Nov)

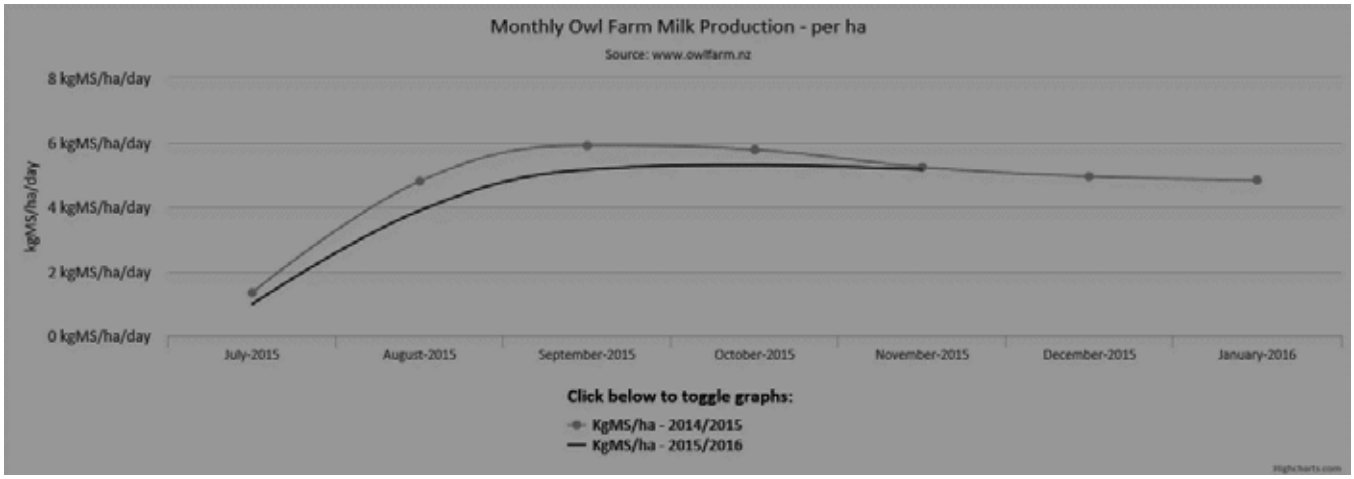
Period	Litres	KgMS	KgMS %	Fat (Kgs)	Protein (Kgs)	Protein/Fat ratio	SCC
Nov 2015	101,544	8,485.1	9.1	4,737.3	3,747.8	0.79	74.8
Nov 2014	107,948	8,803.9	8.9	4,927.2	3,876.7	0.79	77.6
% Variance	↓ 5.9%	↓ 3.6%	↑ 2%	↓ 3.9%	↓ 3.3%	↑ 0.6%	↓ 3.6%

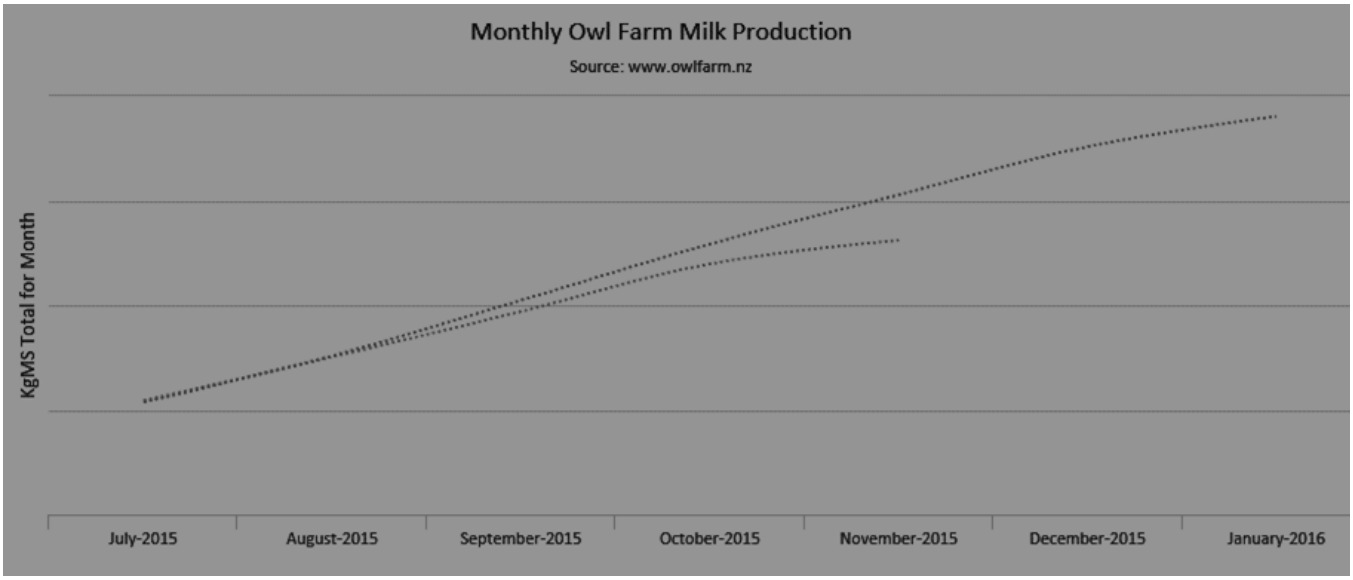
Season to date

Period	Litres	KgMS	KgMS %	Fat (Kgs)	Protein (Kgs)	Protein/Fat ratio	SCC
This Season	892,364	82,838.6	9.4	46,875.6	35,963.0	0.77	107.5
Last Season	971,924	88,070.3	9.1	50,318.2	37,752.1	0.75	91.7
% Variance	↓ 8.2%	↓ 5.9%	↑ 2.4%	↓ 6.8%	↓ 4.7%	↑ 2.3%	↑ 17.2%

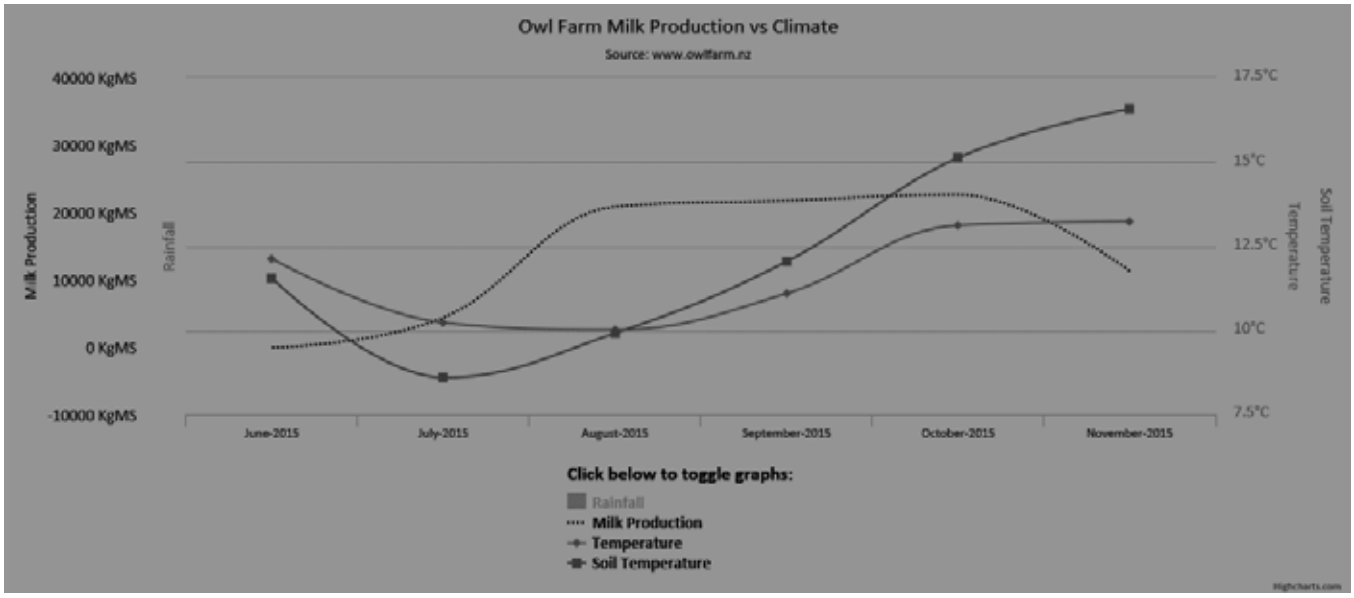
NOTES


Owl Farm Milk Production - per ha
Source: www.owlfarm.nz
6 kgMS/ha/day
4 kgMS/ha/day
2 kgMS/ha/day
0 kgMS/ha/day
-2 kgMS/ha/day
kgMS/ha/day YTD
600 kgMS/ha/day
400 kgMS/ha/day
200 kgMS/ha/day
0 kgMS/ha/day
-200 kgMS/ha/day
kgMS/ha/day
June-2015
July-2015
August-2015
September-2015
October-2015
November-2015
Click below to toggle graphs:
KgMS/ha/day
KgMS/ha/YTD


Monthly Owl Farm Milk Production - per ha
Source: www.owlfarm.nz
8 kgMS/ha/day
6 kgMS/ha/day
4 kgMS/ha/day
2 kgMS/ha/day
0 kgMS/ha/day
kgMS/ha/day
July-2015
August-2015
September-2015
October-2015
November-2015
December-2015
January-2016
Click below to toggle graphs:
KgMS/ha - 2014/2015
KgMS/ha - 2015/2016


Monthly Owl Farm Milk Production
Source: www.owlfarm.nz
KgMS Total for Month
July-2015
August-2015
September-2015
October-2015
November-2015
December-2015
January-2016

NOTES



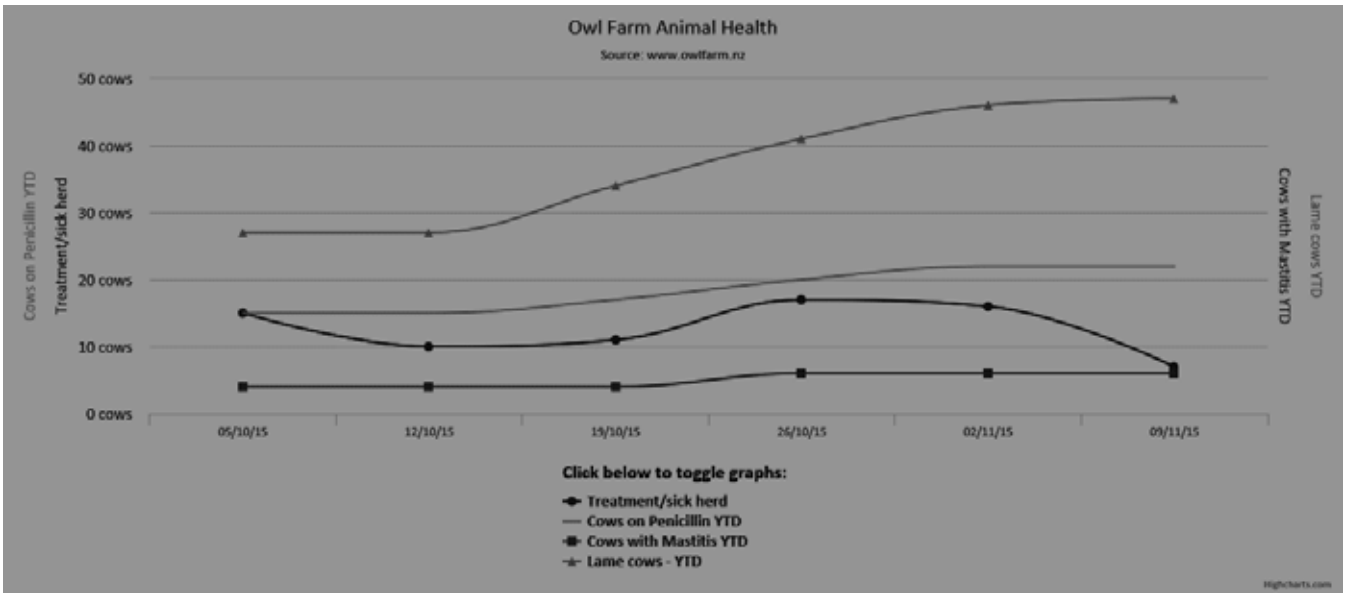
Milk Production - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
Cow's in milk	455	454	454	454	460	457	-3
Springer herd/dry cows	0	0	0	0	0	0	-
Number of cows in big herd	279	278	294	277	289	290	+1
Number of cows in small herd	160	160	155	160	155	160	+5
Number of cows in colostrum herd	1	0	0	0	0	0	-
Number of Cows in the Treatment/Sick herd	15	10	11	17	16	7	-9
KgMS/cow/day (cows in the vat only)	1.85	1.88	1.79	1.91	1.80	1.83	+.03
KgMS/cow YTD	115.70	128.30	140.83	154.20	163.40	176.21	+12.81
Milk production for week ending (kgMS)	5565.00	5612.10	5673.90	5828.10	5403.90	5892.60	+488.7
Total milk production - YTD (kgMS)	52642.00	58254.10	63928.00	69756.10	75160.00	81052.60	+5892.6
Milk production per ha (kgMS/ha/day)	5.30	5.40	5.10	5.40	5.10	5.20	+.1
Total milk production per ha - YTD (kgMS/ha/YTD)	329.00	364.09	399.79	437.59	469.75	506.15	+36.4
Protein/Fat ratio	0.71	0.67	0.77	0.78	0.77	0.77	-
Bulk Milk SCC (SCC x 1000)	97	88	101	85	82	79	-3

Animal Health

- The cows struggled to maintain body condition coming out of a cold and wet winter and spring where pasture growth rates were lower than budgeted but fortunately are currently holding due to a late spring flush. There is a BCS spread across the herd of 4-5 with an average of 4.3 in the heifers and 4.5 in the cows – nothing in the herd is below BCS 4.
- Our young stock (1st and 2nd calvers) particularly struggled post calving having never really had the stature coming into the season. The combination of stature, condition and climatic factors lead to poor pre mating cycling being observed where 50% didn't cycle. Following this discovery a number of CIDR's were used in an effort to synchronise cycling and the management decision was made to place this group on once a day effective immediately in a bid to reduce pressure and conserve energy. Fortunately this was early October when the sun decided to finally play its role and grass growth quickly responded. This group responded well and with visible improvements identified this group was placed back onto twice a day after 2 weeks.
- In total we used 112 CDIR's which is nearly 25%.
- AB went for 5.5 weeks starting the 30th of September followed by 1 week of short gestation. The Bulls went out on the 14th of December and will remain with the cows until the 16th of December. Mating period is planned for 10 weeks.

NOTES

- We put up 445 cows up for insemination (including the CDIR's) which is 95% of the herd, and had a total of 630 inseminations for a 30% return rate. Of the 112 CDIR's we used, a total of 26 returned 3 weeks after insemination (including 4 short returns). A further 11 returned after the second round, these 37 returns equate to 33%.
- Higher lame numbers have been identified through mating, much of which is likely attributed to riding on the yard and the time on concrete – most of the issues are related to white wall. Our races are also an area of concern as there are a lot of small stones which sit at the surface. We have changed management of the yard to bring half forward with the backing gate at a time rather than push everything from the back and continue to work closely with Cambridge Vets to manage. Numbers of lame cows have dropped dramatically in recent weeks



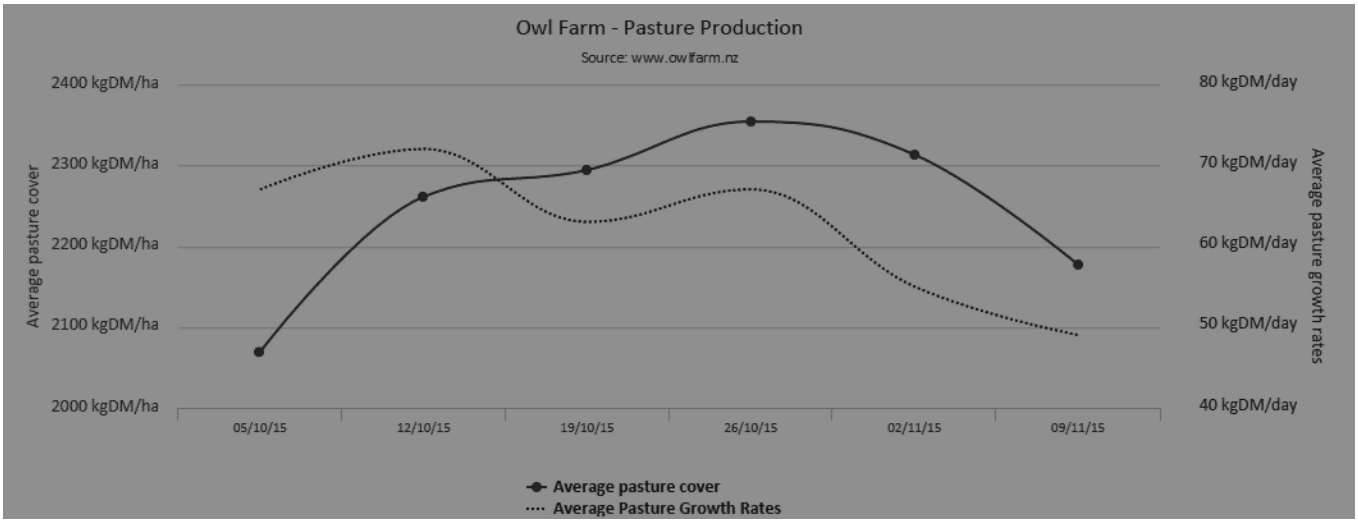
Animal Health - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
BCS (average whole herd)	4.40	4.50	4.50	4.50	4.50	4.50	-
BCS (average heifers)	4.30	4.30	4.30	4.30	4.30	4.30	-
Lame cows - new cases	6	0	7	7	5	1	-4
Lame cows - YTD	27	27	34	41	46	47	+1
Mastitis - new cases	0	0	0	2	0	0	-
Mastitis - YTD	4	4	4	6	6	6	-
Number of cows on penicillin	1	0	2	3	2	0	-2
Number of cows on penicillin YTD	15	15	17	20	22	22	-
Culls - new cases	0	0	0	0	0	2	+2
Culls - YTD	13	13	13	13	13	15	+2
Deaths - new cases	0	1	0	0	0	1	+1
Deaths - YTD	3	4	5	5	5	6	+1

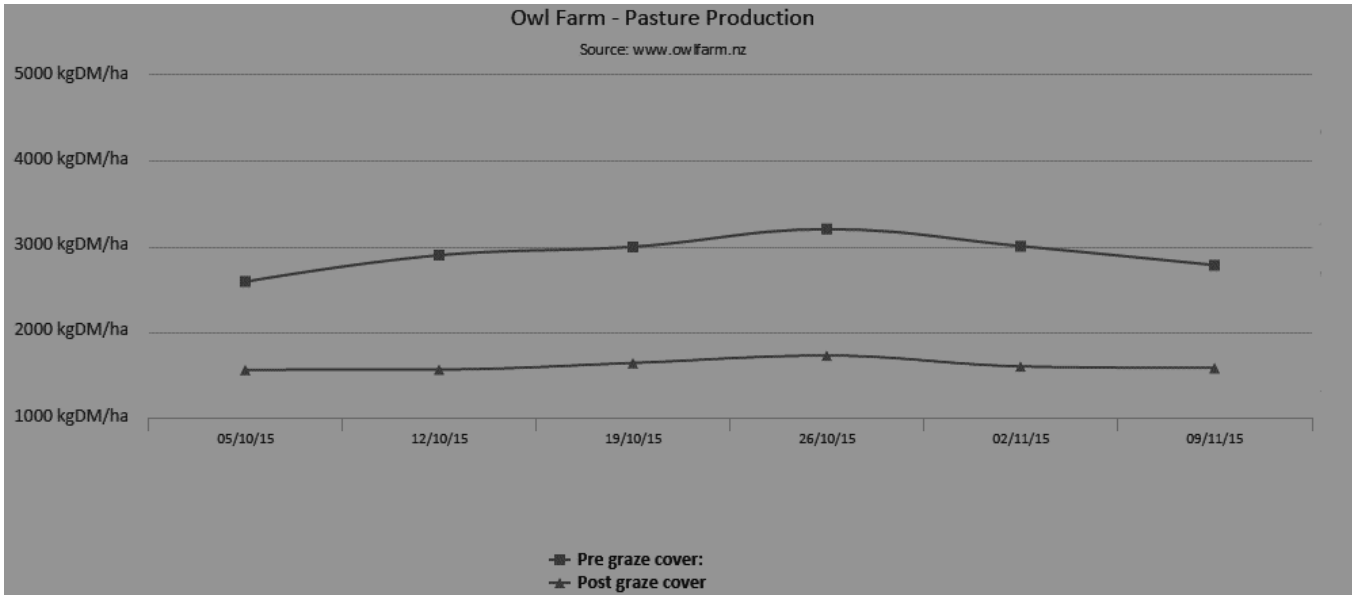
Pasture Production

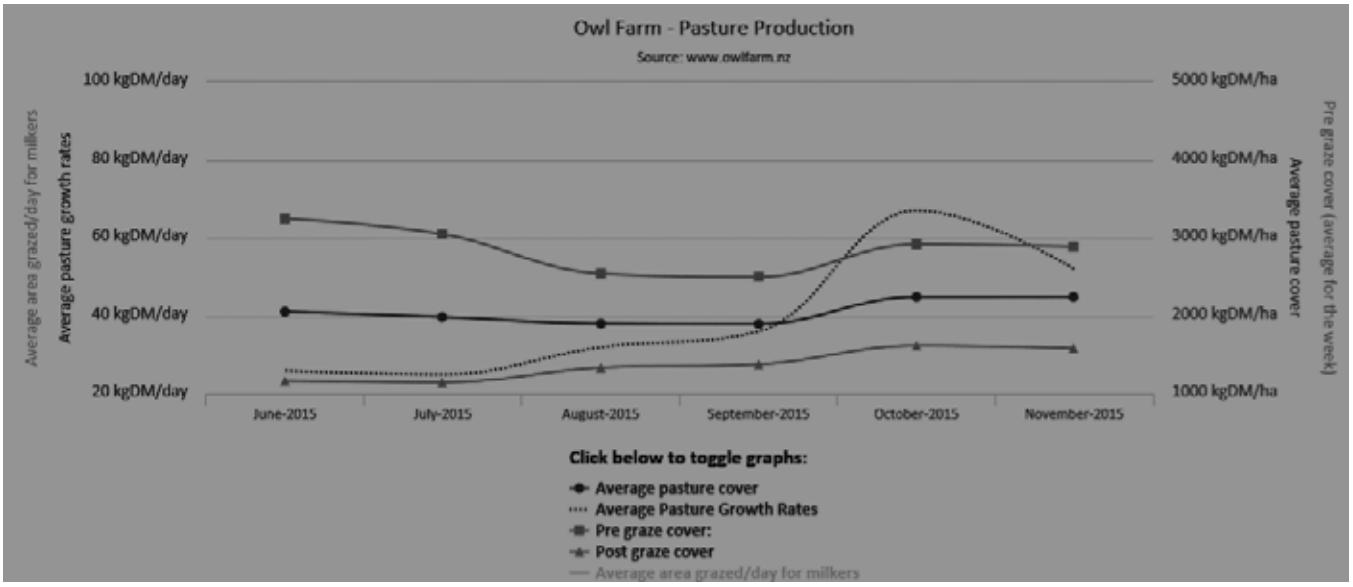
- Finally a month and a half after where historically balance day has been observed we started to receive some good growth rates and average pasture covers responded. Throughout October we have had growth rates in the high 60's and low 70's which related to strategic use of nitrogen and sulphur and more conducive growing conditions. Moisture is now definitely becoming the limiting factor and growth rates have fallen significantly in the past couple of weeks.
- Corresponding average pasture covers have been up around the 2200-2300kgDM with cows going into 2800-3000kgDM/ha. We have been topping in front of the cows through October to maintain pasture quality and to achieve a consistent post graze residual. Covers are now starting to fall in line with growth rates.
- Have been on a 20 day round for the past month with the cows receiving on average 7ha per day, we will remain on the current rotation until Chicory comes into the mix in mid-December. Over October the cows were getting offered up to 20kgDM/cow, with declining growth rates we have remained on the same round length but reduced the cows pasture intake to approximately 17kgDM/cow.
- Given we took 14ha out for chicory and late September still didn't provide the growth rates we were after we didn't manage to shut up as much silage as we would have liked. We managed to take 4ha out which has been baled and wrapped.

NOTES

- We were planning a spring pasture weed spray of those paddocks identified as a 3 or less through the pasture condition scoring exercise however on closer inspection most of the weeds are autumn germinating so we will undertake the spray and undersowing at that point.
- Currently planning to undertake some modelling work on options to manage feed over summer through using predictive growth rates and understanding deficits and determining what feed source or management strategy will fill the void.





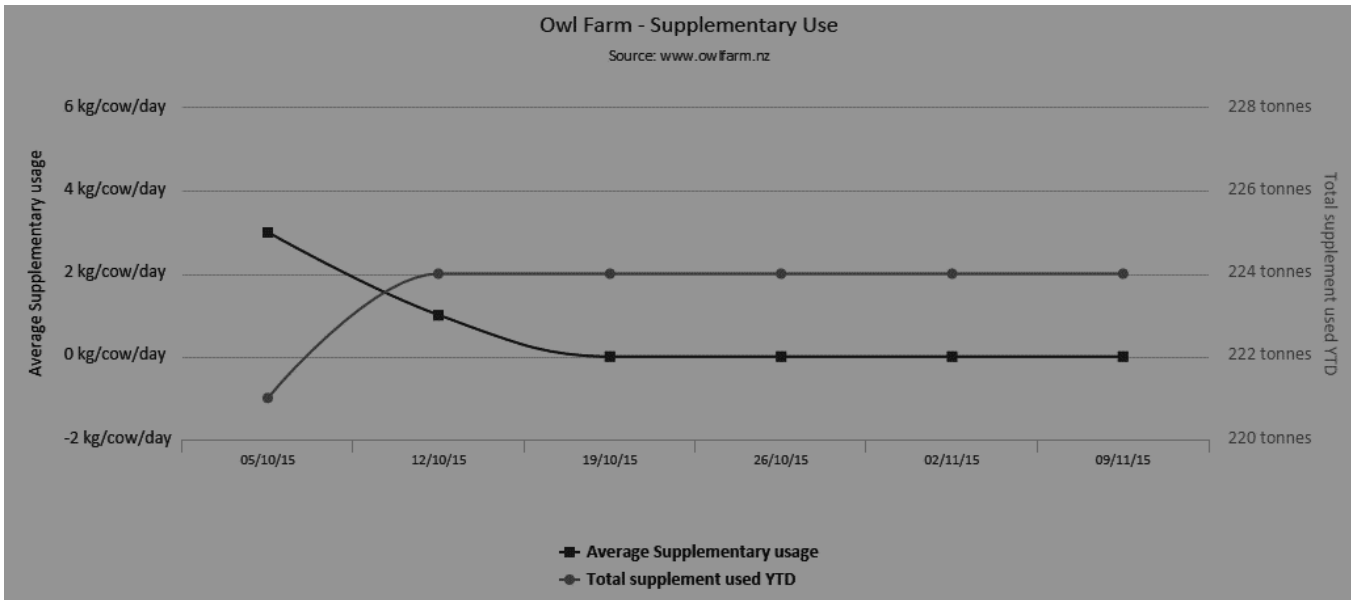


NOTES

Pasture Production - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
Average pasture cover (kgDM/ha)	2069	2261	2294	2354	2313	2177	-136
Average pasture growth rates (kgDM/day)	67	72	63	67	55	49	-6
Pre graze cover (average for the week) (kgDM/ha)	2588	2896	2994	3200	3001	2780	-221
Post graze cover (average for the week) (kgDM/ha)	1559	1561	1638	1725	1597	1579	-18
Lowest post graze residual (kgDM/ha)	1445	1448	1468	1533	1497	1496	-1
Highest pre graze cover (kgDM/ha)	2669	3085	3058	3424	3229	2988	-241
Average area grazed/day for milkers (ha)	7.20	7.00	7.00	7.00	7.00	7.00	-
Round length	22	22	20	20	20	20	-
Total Biomass Measured (kgDM))	331048	351221	339323	345741	339621	317800	-21821

Supplementary Use

- We had to continue feeding PKE up until the first week of October to allow for the speed up round length which we had gambled with earlier. As growth rates hit maintenance we phased PKE out. We have approximately 100 tonne of our 300 tonne contract left and will likely be looking to contract more to get us through summer.



Supplementary Use - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
Average PKE (kg/cow/day)	3.00	1.00	0.00	0.00	0.00	0.00	-
PKE YTD	189.10	192.10	192.10	192.10	192.10	192.10	-
Average maize (kg/cow/day)	0.00	0.00	0.00	0.00	0.00	0.00	-
Maize YTD	30.94	30.94	30.94	30.94	30.94	30.94	-
Average silage (kg/cow/day)	0.00	0.00	0.00	0.00	0.00	0.00	-
Silage usage YTD	4.80	4.80	4.80	4.80	4.80	4.80	-
Silage Harvested Tonnes (DM)	0.00	0.00	0.00	0.00	0.00	0.00	-
Total Supplement Feed (per cow kgDM)	21.00	7.00	0.00	0.00	0.00	0.00	-
Total Supplement YTD (Tonnes)	221.00	224.00	224.00	224.00	224.00	224.00	-

NOTES

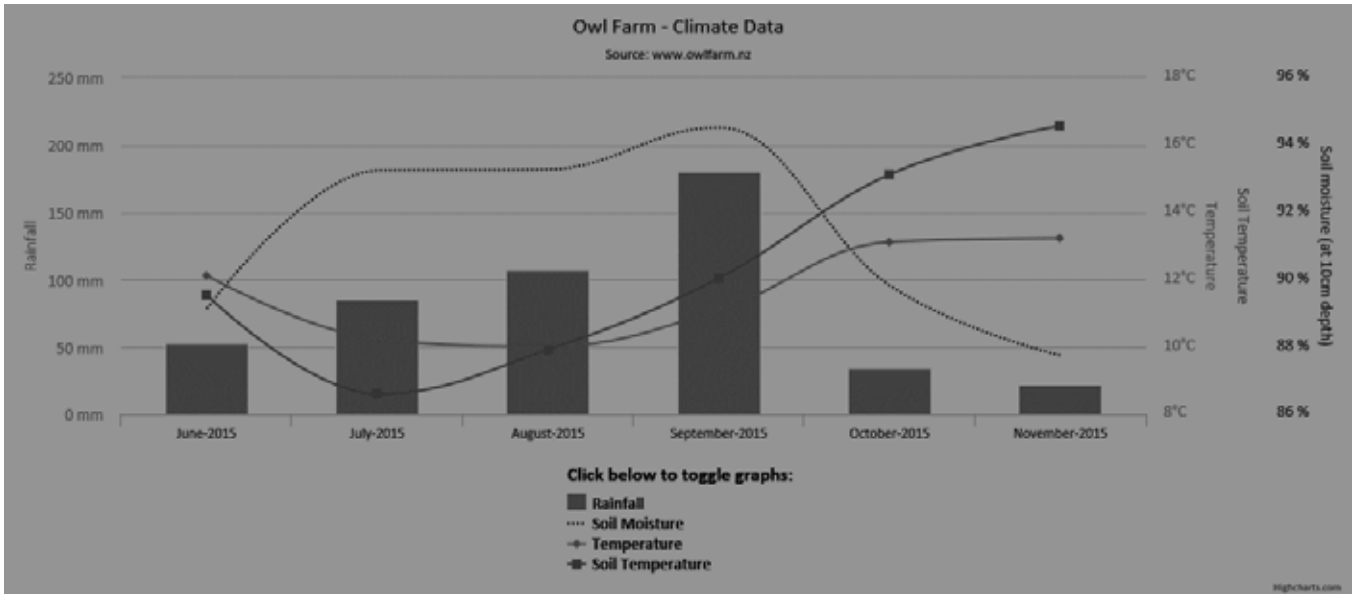
Nitrogen and fertiliser

- Have completed an entire round of 33kgN which came through a combination of both PhaSedN at 100kg/ha and SustaiN at varying rates. A total of 80khN/ha has currently been applied to the milking platform.
- Currently undertaking another round of sustaiN at various rates to try and build a feed bank up in front of us. Using N-Guru to determine the rates this is applied to different blocks.
- Have put Superten 10K on certain areas of the farm at 450kg/ha.
- Some area's in need of Lime at 2tonne/ha which will be applied once the current round of nitrogen and fertiliser has been completed.

Nitrogen and Gibberellic Acid - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
kgN applied per ha/% of farm	33kgN/66%	0	0	33kgN/17%	0	33kgN/20%	-
kgN applied YTD (average kgN/ha)	60.50	60.50	60.50	65.50	65.50	80.00	+14.5
GA applied (20gm/ha)	0.00	0.00	0.00	0.00	0.00	0.00	-
Effluent applied							
Effluent Applied y/n	Y	Y	Y	Y	Y	Y	-
Paddocks effluent applied	25	26	38	39	25	28	+3
Application Depth (mm)	6.50	6.50	6.50	6.50	6.50	6.50	-

Climate

- September was incredibly wet and October incredibly dry. The high winds we have experienced through October have now started to dry the soils up significantly and growth rates are reflecting the moisture requirement.



Climate - Week ending	5/10/2015	12/10/2015	19/10/2015	26/10/2015	2/11/2015	9/11/2015	Variance
Temperature (ave. °C)	12.50	12.78	13.60	13.60	13.60	12.85	-.75
Rainfall	14.80	0.80	11.40	7.60	4.00	18.00	+14
Rainfall Season-to-Date	440.40	441.20	452.60	460.20	464.20	482.20	+18
Soil temperature (ave. °C at 10cm depth)	14.10	14.70	15.90	15.80	16.88	16.28	-.6
Soil Moisture(% at 10cm depth)	92.30	90.00	89.00	88.00	88.00	87.50	-.5

NOTES

Summer Crops

- Chicory

  14ha of chicory has been planted, this includes a mixture of Choice and Puna which was the recommendation of PGGW Seeds. This was sprayed out in early October in two separate events to fit with the grazing rotation. The spray mix consisted off:

  - Weedmaster TS540 @ 4ltrs/Ha – 3 day withholding from grazing with all stock
  - Add Pluse Penetrant @ 150mls/150ltrs water
  - Add Dew 600 @ 400mls/Ha

  The chicory was direct drilled at 8kg/ha and establishment has been a little bit mixed due to moisture now being the limiting factor, but in general the crops are currently above average.

  We have completed a post emergence weed spray to 5ha with the remaining due to be done. Our post emergence weed spray consisted of

  - Valdo @ 65 grams/ha
  - Sequence @500ml/ha
  - Bonza @ 500ml/100L water

  We have also just completed side dressing of 65kg/ha of SustaiN.

- Maize

  We have secured 5ha of maize outside of the milking platform.

  This 5ha was sprayed out using

  - WeedmasterTS540 @ 2.7ltrs/Ha
  - Add Pulse Penetrant @ 150mls/150ltrs water
  - Add Nail @ 100mls/150ltrs water

  The species we have selected in Z71-F1 hybrid which was the recommendation of Corson Seeds and it was sown at 95,000 seeds/ha around the 14th of October.

  Ended up giving the paddock a light power harrow as had previously come out of small fruit trees.

  Direct drilled with 200kg/ha of DAP

  Targeting 20-25tonne/ha yield.

NOTES

HEIFER MANAGEMENT

Heifers that meet liveweight targets have improved production in at least the first two lactations and probably beyond, and are more likely to have improved reproductive performance in their first lactation.

	Growth from 80 to 100% of target liveweight	Growth from 90 to 100% of target liveweight
Milksolids	35.4 kg	16.3 kg
Calving date	-4.3 days	-2.0 days
3wk submission rate	5%	1.7%
6wk incalf rate	4%	1.3%

Important points for growing heifers:

- Important ages for heifers to meet target are 3 months (weaning),15 months (mating) and 24 months (calving)
- Monitor calves carefully when transitioning out grazing to avoid a growth check. For every day they do not put on weight they'll need to grow twice as quickly another day to catch that up!
- Look after the babies- calving start is the same for everyone, irrespective of birth date. Younger replacements need to grow faster (6 weeks younger equates to a 12% faster growth rate requirement per day), so thought needs to be given to management of later born calves.
- Puberty in cattle is driven by liveweight and reached at approximately 45-50% of expected mature liveweight
- Fertility improves after the first two cycles post-puberty
- Aim to have heifers reach puberty at least 6 weeks before mating at 15 months to optimise fertility
- Aim to have heifers on a rising plane of nutrition coming into mating at 15 months
- Do not deviate so far below the target line that you cannot reach target at the key times (ideally do not let the mob drop more than 5% below target)
- First calvers take 7-10 days longer on average to recommence cycling than cows
- Mating yearling heifers 7-10 days ahead of the main herd is recommended best practice

Owl Farm Heifers:

Expected mature liveweight for the 2014 crop of St Peters heifers is 508 kg. This equates to a 22 month target of 458kg Lwt.

The 2015 born calves are due to transition out to grazing on 1st December.

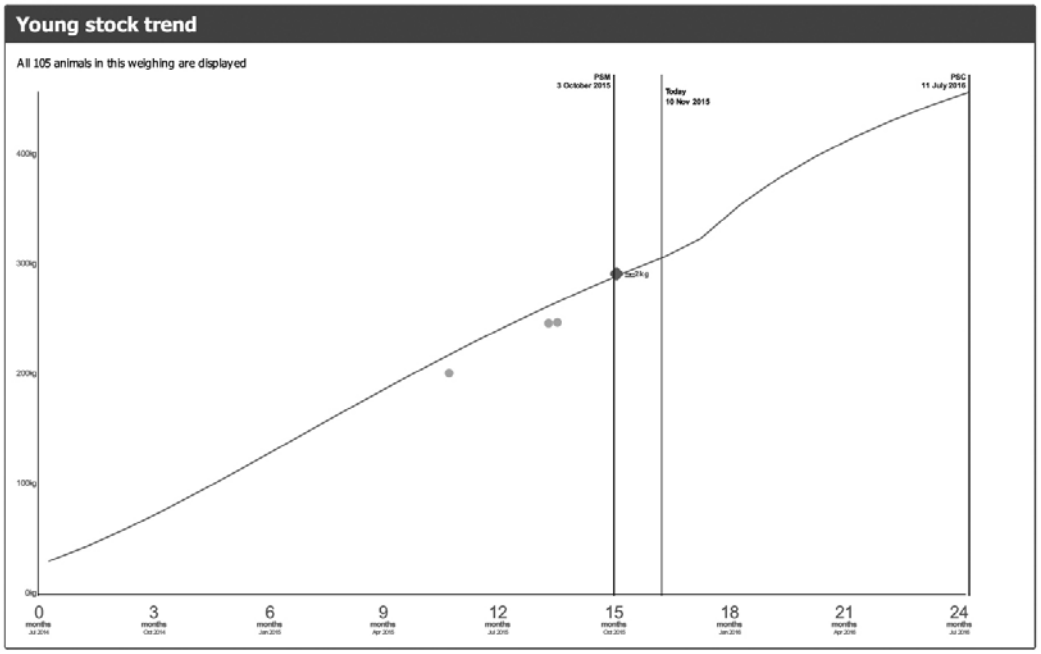
Currently the 2014 born heifers are on target and are being mated 3 days ahead of the herd, natural mating for 9 weeks

2014 Spring Born

HEIFERS OCTOBER 2015

5/10/2015

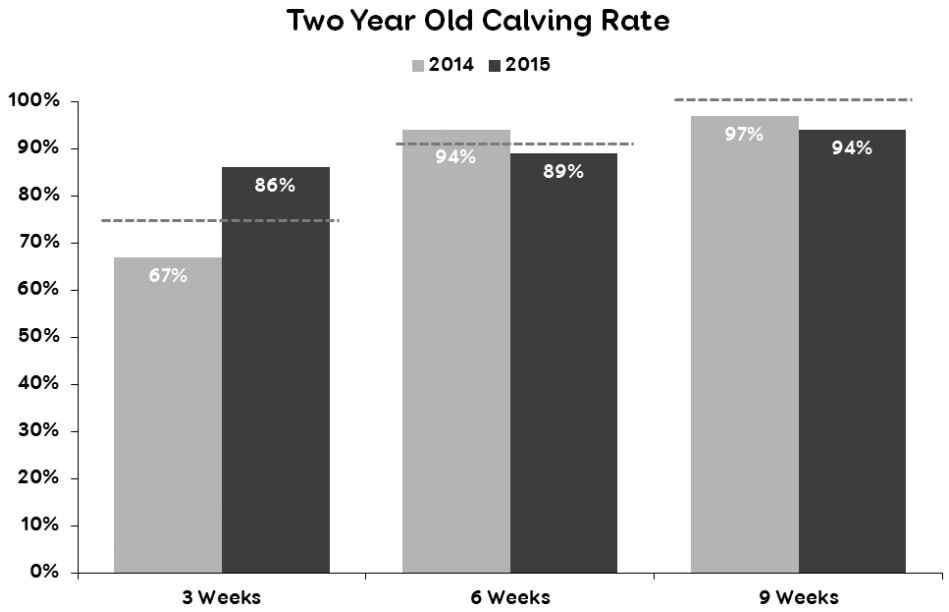
HPTT



NOTES

Calving Pattern of First Calvers:

Young stock growth is an area of focus for Owl Farm, with Weights being monitored on MINDA weights.



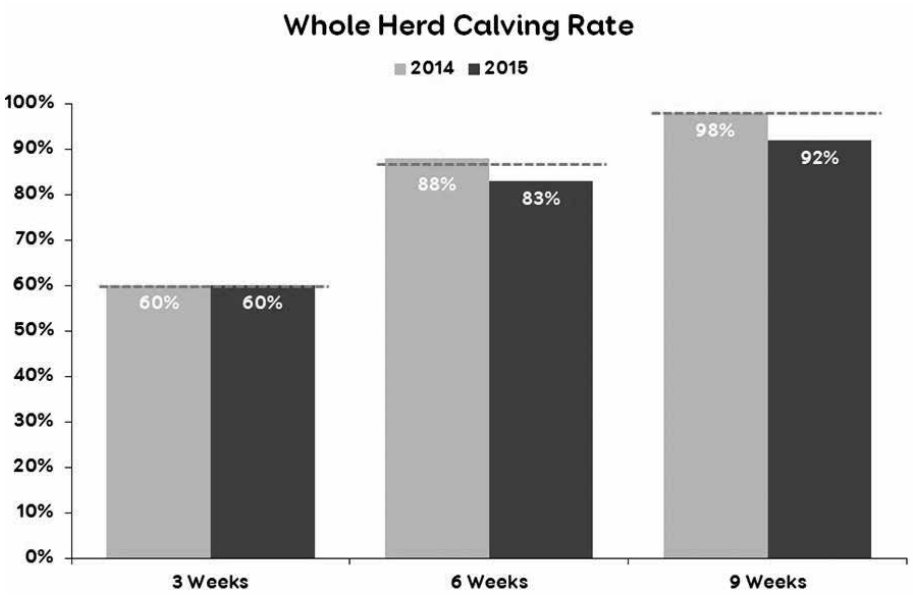
In 2015 the first calvers calved more quickly and were mated ahead of the main herd, whereas in 2014 they had the same calving start date and their 3 week calving rate at 67% was 8% behind target 75% target.

Calving pattern for the first calvers was fast in the first 3 weeks, but slowed through the middle of calving leaving 11% late calving heifers

In 2014 the first calvers calved down at the same time as the herd and calving rate was slow with a 3 week calving pattern of 67% (target 75%).

In 2014 and 2015 significant CIDR intervention occurred in 2 and 3 year olds.

Calving pattern of the herd was below target in weeks 3-9. Reducing the % of late calvers will help drive future performance.



NOTES

MATING

Owl Farm Mating Progress:

Mating plan and Fertility Focus Report are included in the Appendix.

Mating progress to date is on-track, with 6.5 weeks AB completed (5.5 weeks Premier Sires ™ and then 1 week Short Gestation Length semen) and now into the 4.5 weeks natural mating. Total mating length 11 weeks.

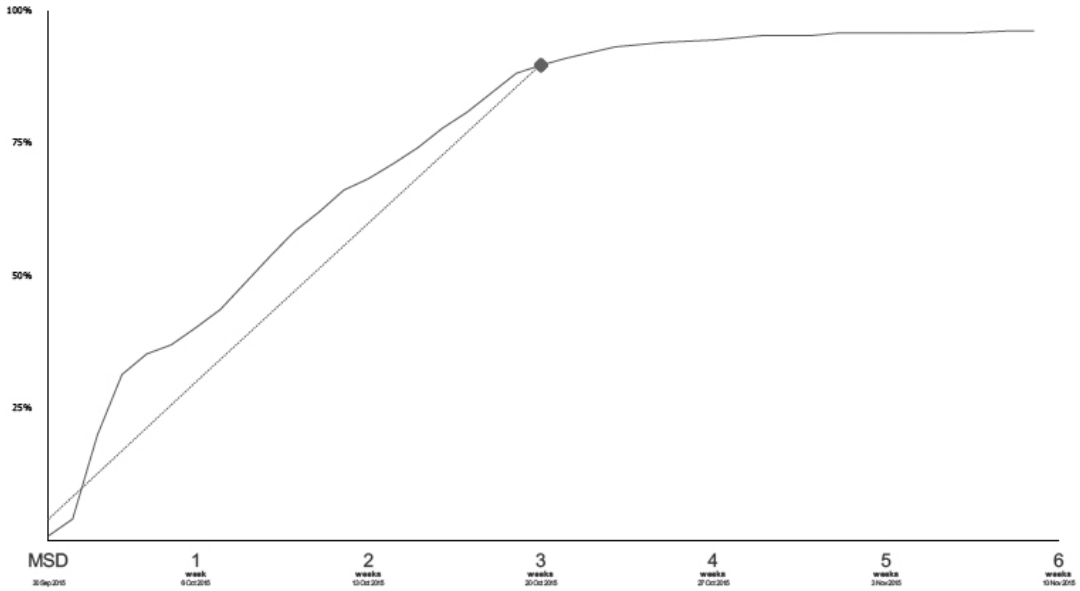
- Mating Start Date 30 September
- Non-cycler treatments 112 cows (25%), at start of mating
- 3 week Submission rate 90%
- FFR non-return rate 64%
- Heat detection indicators on-track
- AB mating for 6.5 weeks with the last week being Short Gestation dairy semen,
- Natural mating for 4.5 weeks
- Natural mating 10 bulls, estimated required number for ratio of 1:30 non-pregnant cows. Two teams

An intermediate Fertility Focus Report can now be generated and the estimated 6 week in-calf rate is 71%.

Early aged pregnancy testing will allow a detailed Fertility Focus Report to be generated which will calculate an actual 6 week in-calf rate later in the season.

Daily Submission Rates

Animals that are removed from the herd in the first 21 days of mating will be excluded from any calculations.



		Submission rate		
	Count	1 Week	2 Weeks	3 Weeks
Spring 2015	462	40%	68%	90%
Spring 2014	459	22%	73%	87%
Spring 2013	470	27%	70%	89%
Spring 2012	467	20%	60%	90%

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NOTES

Fertility Focus 2015: Seasonal

St Peters School Farm
Doug Dibley

Report date:	10/11/15
PTPT:	HPTT
Herd Code:	2/1884
No of cows included:	463
These cows calved between:	23/05/15 and 28/11/15
Mating start & end date: (based on AB or pregnancy test data)	30/09/15 - 09/11/15
Next planned start of calving:	08/07/16
Duration of mating:	41 days
Duration of AB period:	41 days

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1 Overall herd reproductive performance

6-week in-calf rate
Percentage of cows pregnant in the first 6 weeks of mating

Your herd	71%
Aim above	78%

☆☆☆

Your herd's 6-week in-calf rate has been estimated.
Supply results of early aged rectal pregnancy testing for greater accuracy.

Not-in-calf rate
Percentage of cows not pregnant

Your herd	
Aim for	

% of herd in calf
Cumulative by week of mating

A graph of % herd in calf through the mating period could not be plotted.

Supply the results of early aged rectal pregnancy testing.

2 Drivers of the 6-week in-calf rate

3-week submission rate
% of cows that were inseminated in the first 3 weeks of mating

Your herd	90%
Aim above	90%

☆☆☆☆☆

Non-return rate
% of inseminations that were not followed by a return to heat

Your herd	64%
Aim above	64%

OK

Conception rate
% of inseminations that resulted in a confirmed pregnancy

Your herd	
Aim above	

3 Key indicators to areas for improvement

Calving pattern of first calvers
Well managed heifers get in calf quickly and calve early.

Calved by	Week 3	Week 6
Your herd	89%	91%
Aim above	75%	92%
	☆☆☆☆☆	☆☆☆☆☆

Calving pattern of whole herd
Did late calvers reduce in-calf rates?

Calved by	Week 3	Week 6	Week 9
Your herd	65%	84%	94%
Aim above	60%	87%	98%
	☆☆☆☆☆	☆☆☆☆☆	☆☆☆

Pre-mating heats
A high % of well managed cows will cycle before the start of mating.

Your herd	0%
Aim above	85%

☆

3-week submission rate of first calvers
Well managed heifers cycle early

Your herd	92%
Aim above	90%

☆☆☆☆☆

Heat detection
A high % of early-calved mature cows should be inseminated in the first 3 weeks of mating.

Your herd	91%
Aim above	95%

☆☆☆

Non-cycling cows
Treated non-cyclers get in calf earlier.

Treated	By MSD	Wks 1-3	Wks 4-6
Your herd	0%	0%	0%

Rating	What does it tell me?	What should I do?
☆☆☆☆☆	Top result	Ideal - keep up the good work!
☆☆☆	Above average	Getting there - focus on getting the details right.
☆	Below average	Plenty of room to improve - seek professional advice.
	No result	Not enough information provided - seek help with records.

Performance after week 6
Expected not-in-calf rate helps assess management affecting performance after week 6 (including bull management and herd nutrition).

	Not-in-calf rate
Your herd	
Expected	

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Behind Your Intermediate Fertility Focus Report

Report period: Cows calved between 23/05/15 and 28/11/15.
This was the most recent period with sufficient herd records that enabled an analysis to be completed.

Calving system: Seasonal
Your herd has been classified as seasonal calving because most calvings occurred in a single batch lasting less than 21 weeks.

Level of analysis: Intermediate.
To obtain a more detailed and accurate report, pregnancy test more cows at an early stage of pregnancy. Pregnancy testing including aging of pregnancies when cows are less than 17 weeks is recommended.

Report date:	10/11/15
PTPT:	HPTT
Herd Code:	2/1884
Calvings up to this date requested for analysis:	09/11/15
No of cows included:	463
These cows calved between:	23/05/15 and 28/11/15
Mating start & end date: (based on AB or pregnancy test data)	30/09/15 - 09/11/15

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Part A) Herd records cross check

Check that the herd records in the table are complete and correct.

2015/16	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	Total
No. of calvings		38	283	95	54	1							471
No. of AB matings					4	549	55						608
No. of preg tests													0
No. of non-aged/late aged positive preg tests													0
No. of cows culled or died	6	1		5	10	1	3						26

Part B) Notes on the calculations

Use the following notes to see how your results were calculated.

1 Overall herd reproductive performance

6-week in-calf rate

The 6-week in-calf rate reported HAS BEEN ESTIMATED from the mating information you provided. An actual result can only be calculated if early pregnancy test results are available. Supply results of early rectal pregnancy testing including ages of pregnancies for greater accuracy.

Not-in-calf rate

The not-in-calf rate COULD NOT BE CALCULATED because insufficient pregnancy test results were available. Supply pregnancy test results for at least 80% of cows.

2 Drivers of the 6-week in-calf rate

3-week submission rate

462 cows had calving dates in the required range and were not culled before day 21 of mating and 90% of these were submitted during the first 21 days of mating.

Non-return rate

The non-return rate was calculated for 385 AB inseminations on and between 30.09.15 and 17.10.15.

Conception rate

A conception rate COULD NOT BE CALCULATED because insufficient pregnancy test results were available. Supply early pregnancy test results from whole herd pregnancy testing.

3 Key indicators to areas for improvement

Calving pattern of first calvers

89 cows with eligible calving dates were recorded as calving at less than 34 months of age. The calving pattern of first calvers was calculated from their records.

Calving pattern of whole herd

471 cows had calving dates that were eligible for this report.

3-week submission rate of first calvers

89 first calvers had calving dates in the required range and were not culled before day 21 of mating and 92% of these were submitted during the first 21 days of mating.

Heat detection

198 cows at least 4 years old at calving had calved at least 8 weeks before mating start date and were not culled before day 21 of mating and 91% of these were submitted during the first 21 days of mating.

Pre-mating heats

462 cows had calving dates in the required range and were not culled before day 21 of mating and 0 of these had a pre-mating heat recorded.

Non-cycling cows

No cows were identified as being treated for non-cycling. If you did treat non-cycling cows, please supply records to ensure those cows are identified.

Performance after week 6

Early pregnancy test results are required to allow performance after the first six weeks of mating to be assessed.

Induced cows

No cows were identified as having induced calvings. If cows were induced, ensure all inductions are recorded.

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Users should obtain professional advice for their specific circumstances.

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Mating Plan - St Peters Farm HPTT 2015/16

Planned Start of Mating	**30-Sep-2015**
Desired Length of AB (wks)	**6.5**
Total Length of Mating (wks)	**11**

Planned Start of Calving	**8-Jul-2016**
Body condition score herd at PSC	**8-Jul-2016**
Weigh Yearling Hfrs	22-Jul-2015
Source service bulls, ensure they are TB free, BVD tested and fully vaccinated including Lepto before they come on Farm	
Staff heat detection training/ refresher - DairyNZ event at Taupiri	10-Sep-2015
Apply Red tail paint to all cows that have calved - touch up weekly.	**1-Sep-2015**
Apply Blue tail paint to all cows with a clear heat from now on. (Record heats if possible)	**2-Sep-2015**
Consider MetriChecking at risk cows - consult with vet to see if this is appropriate for your situation	8-Sep-2015
Consider blood testing 10 monitor cows of various ages to monitor minerals and nutritional status	8-Sep-2015
Start weighing calves to prepare for weaning (wean on weight not age,use Minda Weights targets)	6-Sep-2015
Body condition score herd and manage cows below 4 BCS	**31-Aug-2015**
You are 11 days out from the start of AB. How many cows haven't cycled?	**19-Sep-2015**
Organise visit with vet to assess anoestrus cows and treat early	
Non- cycling cow treatments	**21-Sep-2015**
Weigh Yearlings & Weaners	20-Sep-2015
Put bulls out with yearlings / mate to AB	**26-Sep-2015**
Heifers generally take 7-10 days longer to recover from their first calving. This is why you need to put the bull out early	
Consider MetriChecking late calving at risk cows - consult with vet to see if this is appropriate for your situation	21-Sep-2015
Apply heat detection aids (e.g. Kamars, touch up tail paint etc) to assist in heat detection for AB (AM milking)	29-Sep-2015
START MATING	30-Sep-2015
30% of herd should be submitted - Apply yellow tailpaint to cows once mated.	7-Oct-2015
Non-cycling cow treatment for late calving cows	**21-Oct-2015**
60% of herd should be submitted	14-Oct-2015
90% of herd should be submitted	21-Oct-2015
Review 1st 3 Week Mating Period	**24-Oct-2015**
Weigh Yearlings & Weaners	4-Nov-2015
End of AB put bulls out - Check No's, rotate frequently, are the bulls working? Check for lameness. Run 1 Bull per 30 non pregnant animals Check for lameness	**14-Nov-2015**
Review AB Mating Period	**16-Nov-2015**
End of Yearling Mating 9 weeks mating - remove bull from yearling heifers	**28-Nov-2015**
End of mating take bulls out	**16-Dec-2015**
Weigh both classes of young stock.	16-Jan-2015
Pregnancy Detection	
1st Preg scan < 17 wks after the start of mating (enter <u>all</u> results into MINDA for Detailed Fertility Focus Report)	20-Jan-2016
Print off the "Pregnancy Test Worksheet" in MINDA Pro so the Vet can age to pregnancies (use days rather than weeks for the ages). The critical thing is to record in MINDA the status of <u>all cows</u> that are scanned on the day.	
Weigh both classes of young stock.	20-Feb-2015
Final Pregnancy Scan (6 weeks after the end of mating - verify empties)	3-Feb-2016
On the 2nd round of scanning only PD the doubtful cows from the first scan	
Once again, record in MINDA the status of all cows that are scanned on the day.	
Culling decisions	
Identify and plan removal of surplus stock	20-Jan-2016
Review Reproduction Performance with LIC FSM, your rural professional and staff : Industry Targets	**1-Feb-2016**
3 week Submission Rates = 90%	
Conception Rate to first mating= 60%	
Heat Detection = 95% of early calving mature cows submitted in first 3 wks	
6 wk in-calf rate = 78%	
Weigh both classes of young stock.	27-Mar-2015
Body condition score herd and manage cows below 4 BCS	**31-Mar-2015**
Either dry them off or feed them more or put them on Once-a-Day. Your rural professional consultant can provide objective assessment of BCS.	
Aim for the whole herd to be at body condition score 5 to 5.5 at their expected calving date	
It takes at least 60 days for udder tissue to repair before the next lactation. As a rule of thumb cows will put on 0.5 of a body condition score per month	
Body condition score herd and start thinking about your drying-off plan if you haven't done so already	**30-Apr-2015**
Weigh both classes of young stock, review feed budget and nutrtional plan for winter	1-May-2015
Body condition score herd during the dry period to ensure herd reaches calving BCS	**31-May-2015**
Weigh both classes of young stock. Review nutrition plan for spring. Review animal health plan for spring	5-Jul-2015

CULLING DECISIONS

Understand who your negative PW and LW cows are

There are a number of factors to consider when culling cows but a very good place to start is identifying your cows that are negative on both PW and LW. Even after just one herd test the PW of the Owl Farm heifers show a strong correlation to milksolids production.

The Owl Farm herd has 15 cows that are negative on both PW and LW and as a group, these animals have produced, on average **31KgMS** less in this current season, than the whole herd average – that's a 25% difference in YTD milk production.

It is useful to use both indexes when culling as Production Worth looks at **lifetime performance** and Lactation Worth looks at **current season** performance. You want to be getting rid of cows that are poor on both measures.

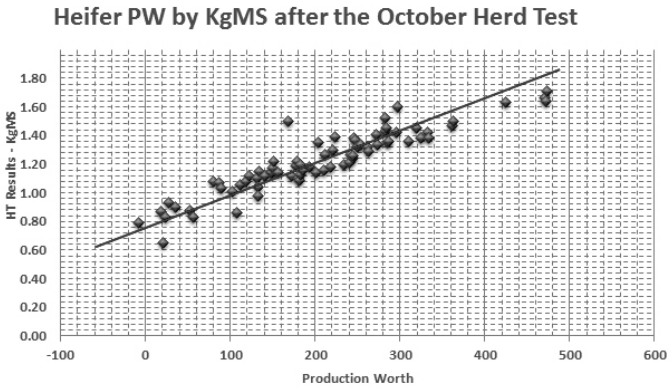
It always amazes me how, two cows, given the same opportunity, one cow can consistently turn the same resources into more milksolids at a level the other cow couldn't, yet still remain health and still get in calf. Let's look at two 4 year old cows – No. 137 and No. 110. Both born in the same year, with the same breed split (both F9J7) and within 7kgs liveweight. **Cow No. 110 has produced 178% more than Cow No. 137** over the last 3 herd tests (see table over page). It makes good business sense to get rid of the poor performing cow (and avoid bringing into the herd any of her daughters!!).

Somatic Cells – look at the history

The second report that is invaluable when culling cows is the Somatic Cell Count Report. Ordering the report using the Latest SCC Result – Descending makes identification of repeat SCC offenders very easy. With this report we can put a question mark around Cow No.322 – she is well below the herd average on PW and her SCC history leads me to believe that she will continue to have high SCC results. Cow. No.452 is slightly more difficult – she is a great producer (PW 284) and she is still producing really well this year (LW 368, 2.16 kgMS in the October Herd Test). If SCC is a problem then this cow might have to go, if bulk milk SCC is under control then this cow might stay.

Culling Guide

This is a very useful report which you can find in MINDA. It brings together a lot of information is a fairly simple format and is a good starting point to ensure to make accurate decisions using the culling criteria that is important to you.



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Cambridge 3450

Herd Lactation Averages

Lactations Started From 01/06/2015

Herd Averages as at 07/11/2015
Ancestry: 98 % BW:159/47 PW: 185/68
Herd EBL Status: EBL Free

Date: 12/11/2015
Report Starts: 01/06/2015
Report Ends: 12/11/2015
PTPT Code: HPTT
Herd Code: 2/1884

Animals Included: 462 **Group:** Numbered Animals **Current as at:** 09/11/2015

Year Born	No. of Cows	No. of Dry Cows	Milk (l)	Milkfat (%)	Milkfat (kg)	Protein (%)	Protein (kg)	Milksolids (kg)	Days in Milk	Cell Count	BW $	PW $	LW $
2001	2	0	1512	5.09	77	3.75	57	134	75	529	63/54	140/83	77
2002	6	0	1464	4.85	71	3.63	54	125	68	819	67/53	168/83	128
2003	4	0	1057	3.66	51	2.93	41	93	51	36	134/53	222/82	128
2004	3	0	1403	3.00	63	2.56	54	117	50	44	154/53	265/83	402
2005	13	0	1572	5.22	81	4.00	62	143	71	174	136/52	221/82	229
2006	14	0	1442	4.28	66	3.59	56	121	65	86	118/51	129/82	170
2007	39	0	1519	4.91	78	3.75	60	137	68	146	119/51	165/82	162
2008	39	0	1570	4.75	78	3.77	62	140	67	94	152/50	206/81	199
2009	45	0	1781	4.75	83	3.92	69	152	73	42	152/49	194/78	213
2010	54	0	1544	5.09	77	3.97	61	138	69	37	147/47	159/75	166
2011	67	0	1560	4.64	75	3.76	61	136	68	51	162/47	177/70	183
2012	87	0	1253	4.87	62	3.94	51	112	68	79	177/44	182/60	183
2013	89	0	868	5.34	48	3.90	36	84	69	208	189/41	204/43	202
WHOLE HERD	462	0	1376	4.90	68	3.85	55	123	68	112	159/47	185/67	187
Excess	0		0	0.00	0	0.00	0	0	0				

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Cambridge 3450

Herd Lactation Averages

Lactations Started From 01/06/2015

Herd Averages as at 07/11/2015
Ancestry: 98 % BW:159/47 PW: 185/68
Herd EBL Status: EBL Free

Date: 12/11/2015
Report Starts: 01/06/2015
Report Ends: 12/11/2015
PTPT Code: HPTT
Herd Code: 2/1884

Animals Included: 15 **Group:** negative PW and LW cows **Current as at:** 09/11/2015

Year Born	No. of Cows	No. of Dry Cows	Milk (l)	Milkfat (%)	Milkfat (kg)	Protein (%)	Protein (kg)	Milksolids (kg)	Days in Milk	Cell Count	BW $	PW $	LW $
2010	4	0	1022	5.50	56	4.08	42	98	75	37	71/42	-76/75	-135
2011	5	0	1112	4.79	54	4.00	44	98	75	61	106/47	-45/71	-81
2012	5	0	1091	4.44	46	3.84	41	87	72	68	87/38	-109/61	-106
2013	1	0	638	5.49	35	3.85	25	60	75	31	163/42	-8/47	-76
WHOLE HERD	15	0	1049	4.91	50	3.96	41	92	74	55	94/42	-72/67	-103
Excess	0		0	0.00	0	0.00	0	0	0				

	No. 137	No. 110	Difference	
Year Born	2010	2010		
Breed	F9J7	F9J7		
Liveweight	492kg	499kg		
15-Oct-15	0.92	2.67	1.75	190%
09-Mar-15	0.6	1.69	1.09	182%
16-Oct-14	1.02	2.66	1.64	161%
05-Jan-14	1.22	1.51	0.29	24%
23-Oct-13	1.24	2.18	0.94	76%
27-Aug-13	1.96	3.34	1.38	70%
05-Mar-13		0.64		
08-Jan-13	1.07	1.28	0.21	20%
28-Oct-12	1.42	1.74	0.32	23%
28-Aug-12	1.53	1.75	0.22	14%
BW	$69/45	$212/48		
PW	-$197/74	$387/76		
LW	-292	330		

NOTES

Somatic Cell Count Report

Sorted by Latest SCC Result

LIC
Private Bag 884
Cambridge 3450

Date: 12/11/2015

PTPT Code: HPTT
Herd Code: 2/1884

Animals Included: 464 **Group:** Numbered Animals **Current as at:** 09/11/2015

Cow Number	Year Born	PW $	Previous SCC Exceeded	AUG 2012 Count (000)	OCT 2012 Count (000)	JAN 2013 Count (000)	MAR 2013 Count (000)	AUG 2013 Count (000)	OCT 2013 Count (000)	JAN 2014 Count (000)	OCT 2014 Count (000)	MAR 2015 Count (000)	OCT 2015 Count (000)	Current SCC Exceeded
454	2013	214/13											10799	1/1
4	2002	177/82	1/2	2019	452	1404	493	13	422	211	2423	85	4421	1/1
224	2008	363/81	0/2		16	32	116	24	26	40	10	33	1584	1/1
191	2007	165/82	0/2	72	31	16	356	1593	25	15	19	21	1526	1/1
15	2012	275/60	0/2								21	57	869	1/1
325	2007	124/82	1/2	50	40	87	229	27	27	152	14	303	757	1/1
204	2013	122/45											680	1/1
452	2005	284/82	2/2	130	127	564	3530	70	241	503	1067	2907	671	1/1
322	2001	97/83	2/2		241	932	1184	586	533	469	515	989	667	1/1
47	2005	371/82	1/2	1693	282	263		19	96	274	16	203	661	1/1
380	2011	79/70	0/2					77	53	255	18	137	651	1/1
52	2008	212/81	0/2	45	39	15		32	19	44	64	23	555	1/1
104	2005	291/82	2/2	47	49	519	364	14	46	1117	253	392	545	1/1
413	2012	51/64	0/2								27	49	539	1/1
524	2006	28/81	2/2	27	34	81	1967	23	91	121	842	296	463	1/1
458	2013	52/46											417	1/1
456	2013	220/13											416	1/1
393	2001	182/83	0/2	20	15	153	602	1116	565	96	47	147	391	1/1
54	2007	159/82	1/2	41	72	258	861	24	63	524	88	520	389	1/1
429	2013	219/45											384	1/1

NOTES

LIC
Private Bag 884
Cambridge 3450

Culling Guide

Sorted by PW

Date: 13/11/2015

PTPT Code: HPTT
Herd Code: 2/1884

Animals Included: 55 **Group:** Numbered Animals **Current as at:** 09/11/2015

Cow Details			Indexes			Current Reproductive Detail						Recent Health History (This Lactation)				
Cow No	Official ID	Year Born	PW $	LW $	BW $	Status	Date Due to Calve	Sire of Due Calf	Last Test SCC	Exceeded SCC of 500 (,000 cells/ml)	BVD Status	Mastitis Cases	Lameness Cases	Selected Health Diagnoses	Most Recent Selected Health Diagnosis	Number of criteria met
137	10-99	10	-197/74	-292	69/45		16/07/16	514064	41	0/1						2
301	12-13	12	-178/63	-262	108/46		07/08/16	814404 S	55	0/1						2
150	12-168	12	-159/61	-35	26/28		10/07/16	508154	183	0/1						1
232	12-169	12	-108/62	-50	46/27		27/07/16	508154	69	0/1						1
184	11-69	11	-98/72	-220	104/48		19/07/16	514011	52	0/1						2
60	11-106	11	-81/69	-19	82/47		25/07/16	511051	138	0/1						1
182	12-67	12	-62/62	-11	123/45		11/07/16	514064	12	0/1						1
272	10-135	10	-59/74	-118	-5/27		19/07/16	514011	33	0/1						1
68	10-56	10	-43/77	-120	115/47		08/07/16	514064	39	0/1						1
201	10-146	10	-41/77	62	113/48		01/08/16	512020	19	0/1						1
205	12-139	12	-37/58	-170	132/44		26/07/16	511051	20	0/1						2
235	11-109	11	-26/70	-139	160/47		28/07/16	512050	44	0/1						1
18	11-141	11	-22/72	31	96/47		18/07/16	513070	20	0/1						1
173	11-110	11	-17/72	-7	96/47		10/08/16	508154	51	0/1						1
237	12-118	12	-16/60	43	128/45		03/08/16	508154	130	0/1						1
378	09-148	09	-13/77	119	81/49		21/07/16	508154	36	0/1						1
280	13-16	13	-8/47	-76	163/42		01/07/16	512017	31	0/1						1
126	11-84	11	-5/72	-19	86/47		14/07/16	514064	19	0/1						1
374	10-147	10	-5/76	-10	104/49		23/07/16	512050	35	0/1						1
247	11-166	11	5/71	9	191/66 g		18/07/16	514047	45	0/1						1
510	06-102	06	10/82	-48	47/50				69	0/1						1
93	12-19	12	11/59	40	152/45		05/07/16	514064	83	0/1						1
28	12-148	12	13/59	97	151/35		08/07/16	112064	61	0/1						1

Indices evaluated by LIC using genomic information where applicable
S Short Gestation Length

BVD Status:
PI = Persistently Infected
PPI = Probable PI
Not = Not PI

Cow Details			Indexes			Current Reproductive Detail						Recent Health History (This Lactation)				
Cow No	Official ID	Year Born	PW $	LW $	BW $	Status	Date Due to Calve	Sire of Due Calf	Last Test SCC	Exceeded SCC of 500 (,000 cells/ml)	BVD Status	Mastitis Cases	Lameness Cases	Selected Health Diagnoses	Most Recent Selected Health Diagnosis	Number of criteria met
441	08-21	08	37/80		81/50		13/07/16	511051	51	0/1						1
413	12-173	12	51/64	28	131/46		09/07/16	511051	539	1/1						1
368	07-112	07	76/81		104/51		15/07/16	508154	24	0/1						1
380	11-57	11	79/70	-65	151/47		17/07/16	511051	651	1/1						1
419	11-154	11	91/57		139/46		31/07/16	512020	20	0/1						1
194	05-133	05	94/82	207	121/51	Pregnant	15/07/15	510048	690	1/1						1
322	01-40	01	97/83	57	48/54		08/08/16	814404 S	667	1/1						1
199	08-3	08	109/82	-159	109/51		20/07/16	508154	230	0/1						1
204	13-52	13	122/45	95	138/42		12/08/16	510048	680	1/1						1
325	07-115	07	124/82	230	103/50		25/07/16	511051	757	1/1						1
254	09-76	09	141/78	-164	166/49		15/07/16	513070	12	0/1						1
186	04-56	04	165/83		147/53		18/07/16	511051	21	0/1						1
191	07-135	07	165/82	52	97/50		06/07/16	514033	1526	1/1						1
345	12-21	12	169/37		176/43		07/07/16	514064	17	0/0						1
4	02-18	02	177/82	-36	89/57		18/07/16	514011	4421	1/1						1
117	11-77	11	188/57		155/46		27/07/16	512053	25	0/1						1
381	12-162	12	195/34		164/31		08/07/16	112064	53	0/0						1
52	08-4	08	212/81	-449	120/49		23/07/16	513098	555	1/1						2
454	13-31	13	214/13		187/37		01/08/16	508154	10799	1/1						2
37	13-18	13	216/12		196/36		17/07/16	514047	0	0/1						1
290	13-74	13	217/12		185/34		26/07/16	508154	0	0/1						1
435	13-116	13	219/13		209/38		28/07/16	511051	43	0/1						1
456	13-4	13	220/13		208/37		29/07/16	511051	416	0/1						1
157	08-85	08	227/81		147/51		31/07/16	508154	33	0/1						1
312	07-30	07	230/80		203/53		30/07/16	511051	28	0/1						1
274	03-53	03	240/81		148/54		04/07/16	511051	396	0/0						1
539	07-108	07	263/82	-384	154/51				77	0/1						1
15	12-20	12	275/60	205	170/45		31/07/16	511051	869	1/1						1
452	05-63	05	284/82	368	107/52		05/08/16	514033	671	1/1						1
104	05-44	05	291/82	280	173/54		21/07/16	511051	545	1/1						1
224	08-37	08	363/81	182	201/50		31/07/16	508154	1584	1/1						1

Indices evaluated by LIC using genomic information where applicable

S Short Gestation Length

BVD Status:
PI = Persistently Infected
PPI = Probable PI
Not = Not PI

Cow Details			Indexes			Current Reproductive Detail						Recent Health History (This Lactation)				
Cow No	Official ID	Year Born	PW $	LW $	BW $	Status	Date Due to Calve	Sire of Due Calf	Last Test SCC	Exceeded SCC of 500 (,000 cells/ml)	BVD Status	Mastitis Cases	Lameness Cases	Selected Health Diagnoses	Most Recent Selected Health Diagnosis	Number of criteria met
47	05-10	05	371/82	288	194/50		19/07/16	514086	661	1/1						1
Averages			**87**	**-12**	**129**				**515**							

Animals Included on this report meet any of these criteria:

- Production Worth is within the bottom 5 % of the group
- Lactation Worth is within the bottom 5 % of the group
- Has had 1 or more Mastitis Cases within this lactation
- Have exceeded a SCC threshold of more than 500 (,000) cells/ml at least 1 times in this lactation

Indices evaluated by LIC using genomic information where applicable
S Short Gestation Length

BVD Status:
PI = Persistently Infected
PPI = Probable PI
Not = Not PI

All information contained in this report is confidential to the Supplier Number(s) listed below. Copyright Fonterra Co-operative Group Ltd 2014.

SUPPLY FONTERRA

Nitrogen Report 2014/15 Season

SUPPLIER NUMBER:

72847

Fonterra

Dairy for life

This is your farm's Nitrogen Management Report for the 2014/15 season.

It provides you with your farm's Nitrogen Conversion Efficiency (NCE) and Nitrogen Leaching Risk (NL), to help you identify opportunities for further nitrogen use efficiency on your farm. It also gives you a better understanding of the potential business risks to your farm, particularly in regions where nitrogen limit setting is underway by regional councils.

Note: The information presented in this report is only a summary of a more detailed OVERSEER file. We recommend you seek further advice before making any changes to your farm system(s).

OVERSEER **NUTRIENT BUDGETS**

Overseer is the preferred farm systems modelling tool used by fertiliser companies, farm consultants, regional councils and the dairy industry to demonstrate improved nutrient management practice on New Zealand dairy farms. It is well suited to providing an assessment of relative change (year-on-year and farm-to-farm). Your data has been processed through Overseer in accordance with the Overseer Input Use Standard.

The information in this report is based on the Nitrogen Form you sent to Fonterra in mid-2015. If this form was incomplete, our processing teams may have made some assumptions while processing the data through Overseer.

Key information used to model your farm's nitrogen use:	
Total effective dairy farm area	165ha
Farm Management Blocks:	
Main	129ha
Effluent	36ha
Total cows calved	465
Total milk solids produced	201,490 KgMS
Average kilograms of nitrogen applied per hectare (across whole farm)	120 KG/HA/YR
Supplementary feed brought onto farm (dry weight)	542t

YOUR NUMBERS **AT A GLANCE**

33

KG/HA/YR

Nitrogen Leaching Risk

This indicates the risk of the loss of nitrogen from the farming system into either the groundwater system or into waterways.

A small number indicates a lower risk of nitrogen loss.

28%

Nitrogen Conversion Efficiency

This is the percentage of nitrogen that is brought into the farming system (fertiliser, supplementary feed and clover fixation) that is converted to products (milk and meat).

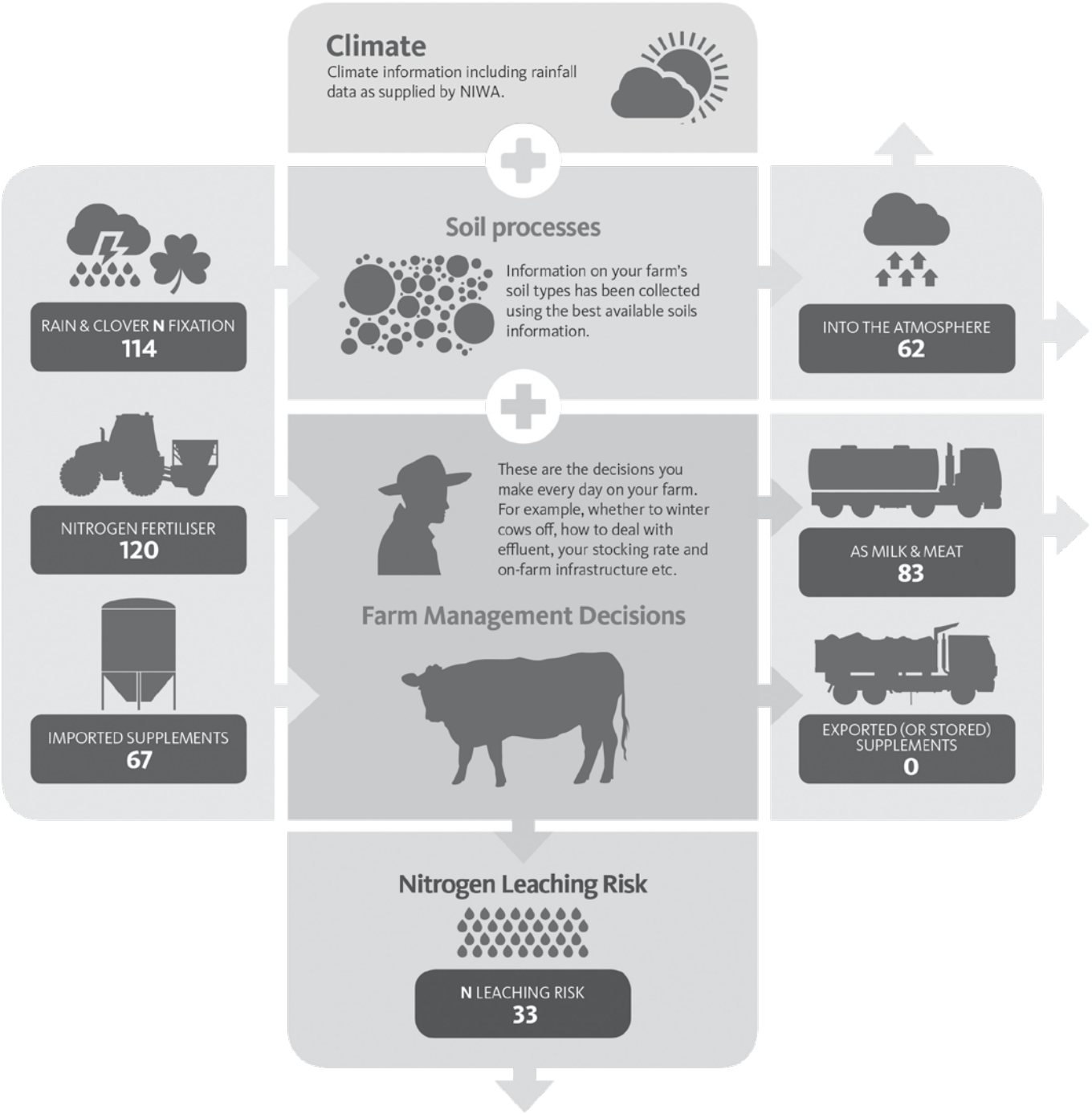
The higher the percentage, the more efficient the farm is at using its nitrogen resources.

Indicative range: 10% to 45%

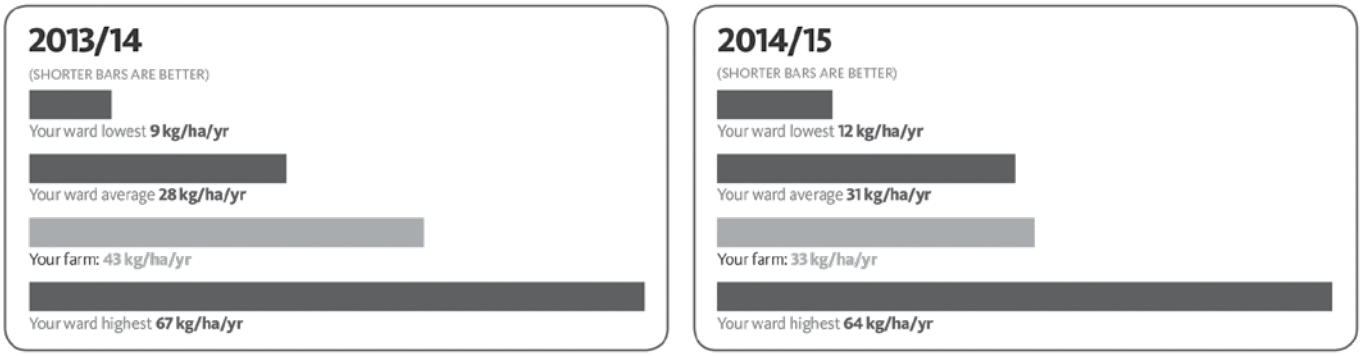
IMPORTANT OVERSEER INFORMATION: There have been significant improvements to the detail of the soil drainage information used by **OVERSEER.** There have also been changes to the way in which **OVERSEER** models irrigation. In some cases these changes will impact on your farm's Nitrogen Leaching Risk number. If you are concerned that the reported numbers are significantly different from last seasons numbers please contact your Sustainable Dairy Advisor to discuss.

YOUR FARM'S **NITROGEN MODEL**

All numbers on the diagram below refer to kilograms of nitrogen per hectare per year **(KG/HA/YR)**, often called units of N.



COMPARISON OF YOUR FARM'S **NITROGEN LEACHING RISK**



INTERPRETING **YOUR REPORT**

Gains

Rain & Clover N Fixation
Nitrogen entering the dairy farm through rainfall collecting atmospheric nitrogen and clover fixation of nitrogen in the soil.

Nitrogen Fertiliser
This is the nitrogen contained in the fertilisers you have applied.

Supplements
There is nitrogen contained in the protein content of supplementary feeds brought on farm.

Losses

Milk & Meat
There is nitrogen in the protein contained in the milk produced and animals that are sent off farm.

Atmospheric
Nitrogen is lost to the atmosphere (primarily as nitrous oxide gas) from urine patches, dung and effluent ponds.

Exported Supplements
Where supplements are grown on farm and exported (or stored into the next season) there will be a loss of nitrogen from the farm.

Transfers

Stock
Cows and other animals on farm transfer nitrogen around the farm by eating grass and depositing dung and urine.

WHAT TO DO **NEXT**

For more information:

If you would like to discuss this report in more detail please contact your Area Manager or our Service Centre on **0800 65 65 68**

If you would like to view your complete Overseer results in more detail and start exploring ways in which you can reduce your Nitrogen Leaching Risk please contact your Sustainable Dairy Advisor.

If you would like to request a complete Overseer XML file for your own use, or to use with a farm consultant, fertiliser consultant or Regional Council please contact our Service Centre on **0800 65 65 68**

You can download electronic copies of this report from Farm Source to share with other people who work with you on your farm.

Fonterra will keep all of your individual information confidential and will only provide it to third parties with your permission.

Remember to keep records of your farm inputs during the season and complete your Nitrogen Recording Pages for the 2015/16 season.

FERTILISER – BALANCING PROFIT WITH PERFORMANCE

Ballance Agri-Nutrients

Summary

- The traditional soil testing strategy was revised in order to deliver more detailed information on farm nutrient status
- The farm was divided into seven blocks for soil testing purposes, based on soil type
- Testing showed considerable variation in nutrient status between these areas
- Our goal is to address this so that all areas of the farm have similar nutrient levels, and hence better production potential and economic performance
- The timing of the soil testing was changed to autumn, to better serve farm needs
- Total nitrogen tests showed variability between blocks and analysis with N-Guru showed that more pasture could be grown by variable rate nitrogen fertiliser applications, compared to uniform rate applications
- Short-term sulphur and potassium deficiencies were identified as a cause of poor pasture performance and addressed in spring
- Pre-calving herbage testing identified a selenium deficiency. This was addressed by direct animal supplementation
- Future work may include more detailed soil testing (e.g. all-paddock testing) to further clarify nutrient deficiencies and to provide a scientific basis for recommendations to address these issues, improve farm performance and minimise any environmental impacts.

The challenge

Develop a fertiliser strategy for Owl Farm that increases productivity and enhances economic performance, while also enabling the farm to achieve an acceptable environmental footprint

The approach

Understand the current fertility status of the farm and use this information to develop an appropriate fertiliser recommendation. The tools used in this approach include:

- Detailed soil maps
- Soil testing
- Herbage testing
- Overseer
- N-Guru

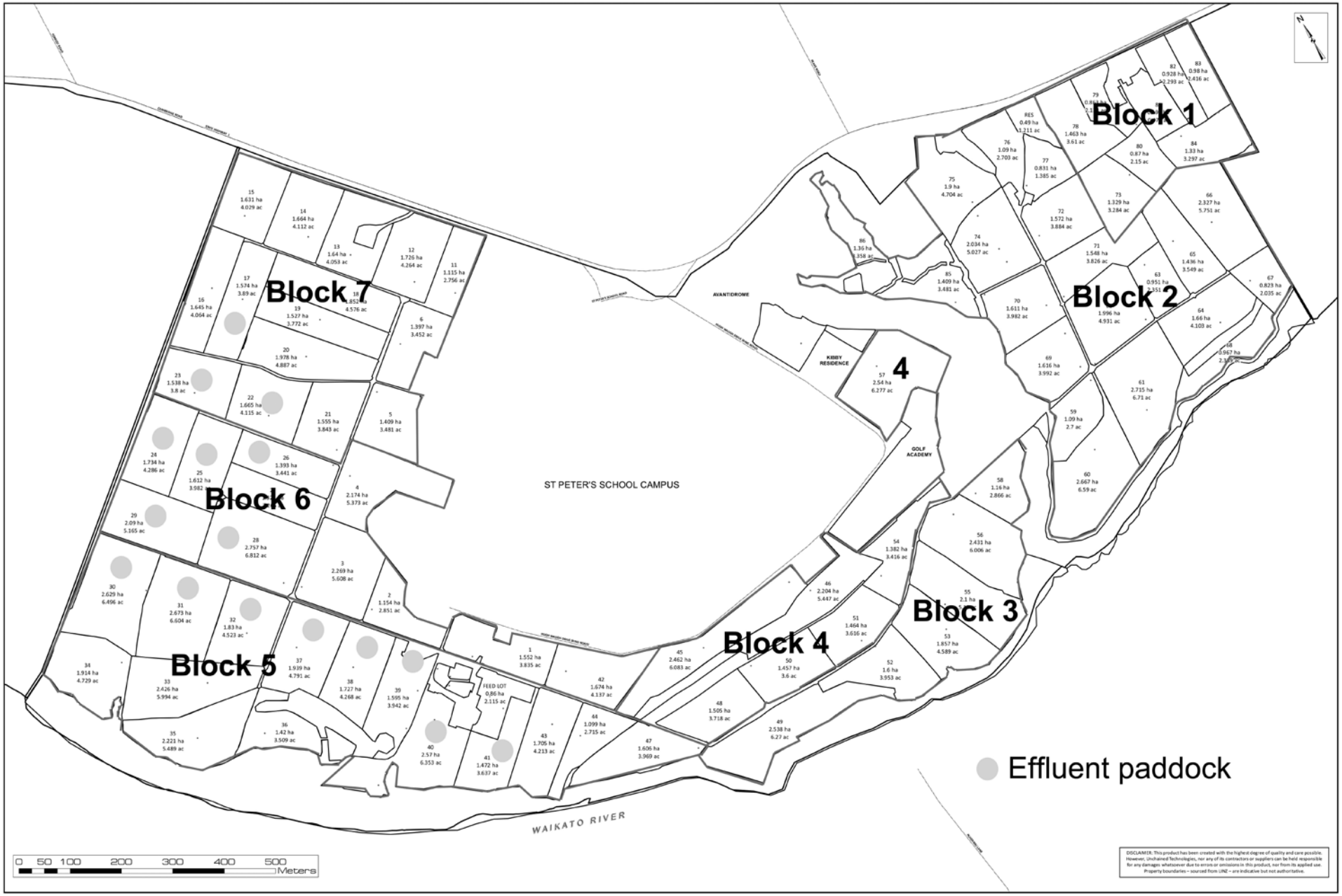
Soil testing

Historically, the farm had been divided into three blocks for soil testing:

- Effluent block
- Non-effluent block
- Maize block

An analysis of the soil types on the farm showed that more detailed information could be obtained if the land was divided into seven blocks. These blocks are shown in the map below.

NOTES



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UNCHAINED TECHNOLOGIES LTD

ST PETER'S FARM

DATE FLOWN: 2 DECEMBER 2014
PIXEL RESOLUTION: 5 cm
PROJECTION: NZTM2000
UAV PLATFORM: SENSEFLY eBEE
SOFTWARE: ESRI ARCGIS v10.2
MAPPED BY: OREGANPR
CREATED: 28 DECEMBER 2014.

www.unchainedtechnologies.com

Soil testing had traditionally been carried out in September. However, this timing was not optimum, in terms of other farm activities, including planning fertiliser applications. As a result, it was decided to change the soil testing protocol, so that it would be conducted in autumn.

From autumn 2016, therefore, soil testing will be conducted using the seven soil type blocks shown above.

In order to transition the farm to the new soil testing regime, an interim testing strategy was used this spring (2015). Samples were taken (11 September) from the following areas:

Paddock number	**Use**	**New block location**
63, 64, 65	Pasture (non-effluent)	Block 2
50	Pasture (non-effluent)	Block 4
6, 13, 18	Pasture (non-effluent)	Block 7
29, 30	Effluent (mainly silage)	Blocks 5 & 6
Maize	Maize	Leased land

Soil test results and fertiliser recommendations

The results of soil tests taken 11 September 2015 are shown in the accompanying report from Hill Laboratories. These data highlight several opportunities to improve farm productivity.

NOTES

agri-nutrients Ballance™

Hill Laboratories
BETTER TESTING BETTER RESULTS

R J Hill Laboratories Limited
1 Clyde Street
Private Bag 3205
Hamilton 3240, New Zealand

Tel +64 7 858 2000
Fax +64 7 858 2001
Email mail@hill-labs.co.nz
Web www.hill-labs.co.nz

ANALYSIS REPORT

Client:	St Peters School	**Lab No:**	1474105 s2chpv1
Address:	Private Bag 884 CAMBRIDGE 3450	**Date Registered:**	11-Sep-2015
		Date Reported:	18-Sep-2015
		Quote No:	71434
		Order No:	
		Client Reference:	4051959
		Add. Client Ref:	Owl Farm
Phone:	07 827 9899	**Submitted By:**	M Ter-Morshuizen

Soil Analysis Results

Sample Name:	pH pH Units	Olsen Phosphorus mg/L	Anion Storage Capacity (estimated)* %	Sulphate Sulphur mg/kg	Potassium MAF units	Calcium MAF units	Magnesium MAF units
50	5.7	46	77	14	8	7	16
29 & 30	5.9	25	85	25	9	6	18
Maize	6.0	40	54	14	12	9	14
6, 18, 13	5.8	47	46	7	4	10	20
63, 64, 65	5.5	81	21	4	9	7	23

Sample Name:	Sodium MAF units	Extractable Organic Sulphur mg/kg	Available Nitrogen (15cm Depth)* kg/ha	Anaerobically Mineralisable N* µg/g	Resin P mg/kg	Total Nitrogen* %	'Total' Cadmium* mg/kg
50	3	15	-	-	85	0.77	0.62
29 & 30	5	12	-	-	35	0.62	0.56
Maize	3	9	223	167	83	-	0.50
6, 18, 13	4	10	-	-	94	0.56	0.55
63, 64, 65	3	5	-	-	155	0.68	0.70

Sample Name:	Soil Sample Depth* mm						
50	0-75	-	-	-	-	-	-
29 & 30	0-75	-	-	-	-	-	-
Maize	0-150	-	-	-	-	-	-
6, 18, 13	0-75	-	-	-	-	-	-
63, 64, 65	0-75	-	-	-	-	-	-

ilac-MRA IANZ ACCREDITED LABORATORY

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

Pasture, non-effluent

- Block 2, paddocks 63, 64, 65 – this area is characterised by a relatively low pH (5.5) and very high Olsen P (81). Phosphate fertiliser could safely be withheld from this block, although as the area has a low anion storage capacity (ASC 21) we would expect the Olsen P to drop relatively quickly as a result, i.e. within a period of 2-3 years. Potassium levels are adequate, although if the budget allows, a maintenance dressing would be worthwhile. Sulphate-sulphur levels are low (4) and elemental sulphur should be applied in autumn. Magnesium levels are sufficient for plant health.
- Block 4, paddock 50 – this area has a marginally low pH (5.7) and slightly high Olsen P (46). In this instance, either full or half maintenance phosphate fertiliser could be applied, depending on the budget. The soil has a much higher ASC (77), which means phosphate retention will be relatively good, and loss through leaching not likely. As with Block 2, potassium levels are adequate (8), although a maintenance dressing would be worthwhile if the budget permits. Sulphur and magnesium levels are both sufficient
- Block 7, paddocks 6,13, 18 – this area has acceptable pH (5.8) and a slightly high Olsen P (47). As for Block 4, either full or half maintenance phosphate fertiliser could be used, depending on budgetary constraints. The ASC of this soil is medium-low (46), so some leaching loss may be experienced. Potassium levels are low (4) and a full maintenance dressing will be required. Sulphate-sulphur levels are also low (7) and elemental sulphur should be applied in autumn. Magnesium levels are adequate.

Block	**Recommendation**	**Reason**
Block 2	Lime (2 t/ha). Apply after calving	Raise pH closer to optimum
	Superten 10K (450 kg/ha)	Spring application to supply maintenance P, K, S
	PhaSedN (120 kg/ha)	Autumn application to boost late pasture growth and supply elemental S
Blocks 1, 3, 4	Lime (2 t/ha). Apply after calving	Raise pH closer to optimum
	PhaSedN (120 kg/ha)	Autumn application to boost late pasture growth and supply elemental S
Block 7	Superten 10K (450 kg/ha)	Spring application to supply half maintenance P and 45 kg of the full maintenance K requirement (70-80 kg)
	SustaiN 25K (130 kg/ha)	Late spring application to boost pasture growth and supply remaining maintenance K
	PhaSedN (120 kg/ha)	Autumn application to boost late pasture growth and supply elemental S

Pasture, effluent

- Blocks 5, 6, paddocks 29, 30 – this area has good pH (5.9), suitable Olsen P (25), and adequate levels of all other macronutrients. The interesting feature of this sample was the relatively low potassium level: effluent blocks are typically very high in potassium. However, as the effluent paddocks have been used as the sole source of grass silage, this has removed excess potassium and kept soil potassium at a reasonable level

Block	**Recommendation**	**Reason**
Blocks 5, 6	No fertiliser required	Effluent sufficient for current needs

Maize

- Leased land – this land has an appropriate pH (6.0), suitable Olsen P (40) and adequate levels of sulphur, potassium and magnesium. As a result, it would appear that no base fertiliser is required for the maize crop. However, if the land was going to be cultivated, lime could safely be incorporated. No hot water soluble boron (HWSB) test was conducted, so the boron status is unknown

Block	**Recommendation**	**Reason**
Maize	DAP (200-250 kg/ha). Apply down drill	Starter fertiliser to support crop establishment
	SustaiN (200-250 kg/ha). Apply at 6 true-leaf stage	Post-emergence nitrogen to boost crop growth

Cadmium levels in all samples were of no concern, being at or about the natural background level

NOTES

Chicory crop

Eight paddocks (5, 6, 11, 15, 45, 52, 55, 56) totalling 14.2 ha were selected to go into chicory. This work was conducted in partnership with PGG Wrightson Seeds, and has been reported elsewhere, so will not be covered in detail in this review.

- Block 3, paddocks 52, 55, 56 – this area has adequate pH (5.6), high Olsen P (73), low sulphate-sulphur (5) and adequate potassium (13) and magnesium (15)
- Block 4, paddock 45 – this area has low pH (5.5), ample Olsen P (47), low potassium (7) and adequate sulphate-sulphur (12) and magnesium (13)
- Block 7, paddocks 5, 6, 11, 15 – this area has adequate pH (5.9), Olsen P (26), sulphate-sulphur (11) and magnesium (15), but low potassium (7)

Block	Recommendation	Reason
All chicory paddocks	Cropzeal 16N (200 kg/ha). Apply down drill at planting	Helps to correct K and S levels and supports general soil fertility
	SustaiN (65 kg/ha). Apply at 4 weeks post-germination and again after each grazing	Provides nitrogen to boost crop growth

Fertiliser applications this season

Pasture, non-effluent

As noted in the soil test results above, many of the paddocks had low sulphate-sulphur and low potassium levels. These factors limited the ability to grow grass, resulting in less feed than required.

To overcome this, PhaSedN Quick Start (100 kg/ha) and MOP (60 kg/ha) were applied on 19 October.

Spring applications of Superten 10K have also been made to the target pastoral blocks.

Chicory

The soil testing results indicated that the chicory paddocks had reasonably good fertility status, which meant that a base dressing was not critical to the long-term success of the crop. This, combined with the likelihood of a low payout year, contributed to the decision to not apply the Cropzeal 16N.

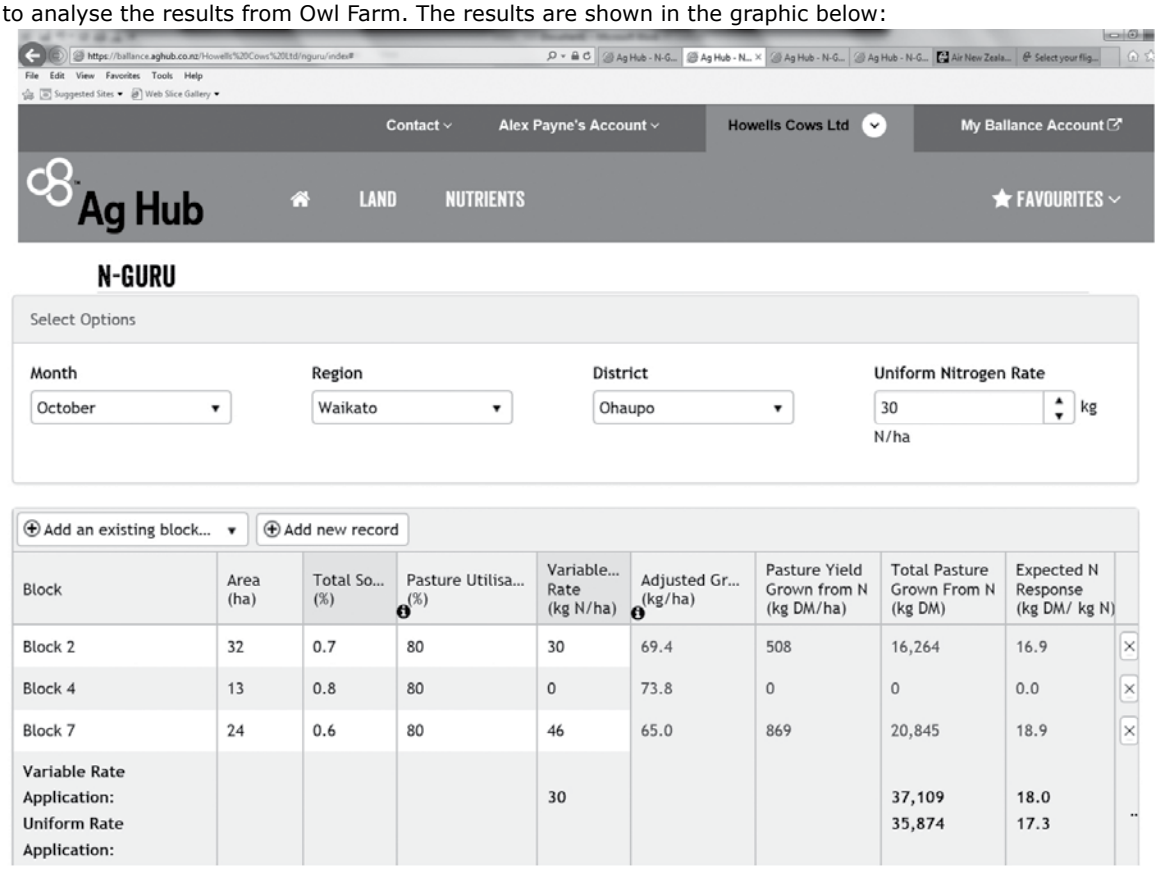
Maize

The maize crop was sown with the recommended starter fertiliser, DAP (250 kg/ha).

Variable rate nitrogen use

Soil testing revealed that the level of total nitrogen was variable across the test paddocks, ranging from 0.56% to 0.77%. This raised the possibility that economic and production gains could be achieved by using variable rate nitrogen fertiliser applications.

N-Guru, a software program that is designed to improve the efficiency of nitrogen use on New Zealand's pastoral farms, was used to analyse the results from Owl Farm. The results are shown in the graphic below:



Soils with higher levels of total nitrogen require lower rates of nitrogen fertiliser, while those with lower levels of total nitrogen can grow more pasture if higher rates of nitrogen fertiliser are applied. This can lead to overall production gains, as shown here. For Owl Farm, using variable rate nitrogen fertiliser (0, 30 or 46 kg N/ha, depending on the block) would result in a predicted yield of 37,109 kg DM pasture grown, at a response rate of 18.0 kg DM/kg N applied. This is an improvement over the yield (35,874 kg DM) and response rate (17.3 kg DM/kg N) from a fixed rate of nitrogen (30 kg N/ha).

Furthermore, by avoiding nitrogen applications where they are not required, there is likely to be an environmental benefit, through a small reduction in the potential for nitrate leaching from these areas.

Herbage testing

Pre-calving herbage testing in was carried out in late May 2015, to determine the nutritional quality of the pasture going down the cows' throat, Results showed a selenium deficiency, with levels at 0.02 mg/kg (levels below 0.03 mg/kg are considered deficient and indicate that action is required). To correct this, animals received direct supplementation of selenium.

Nitrogen report 2014/15

The Fonterra Nitrogen Report for Owl Farm showed the following:

- Nitrate leaching risk – 33 kg/ha/year
- Nitrogen conversion efficiency – 28%

The nitrate leaching risk has declined significantly from the previous year, when it was 43 kg/ha/year, and is now only marginally above the ward average of 31 kg/ha/year. However, there is still plenty of scope for improvement, and the team is examining a number of options to determine the best course of action.

One factor that will definitely influence the nitrate leaching figures for the farm is the improved information about the various soil types involved, and the division of the farm into blocks based on these soil types. Some of these soils are heavy and poorly drained, which will retard nitrate leaching. In addition, the decision to reduce the use of imported supplementary feed will also reduce nitrogen inputs, and hence the risk of leaching loss.

Ballance team

Nutrient Specialist: Mark Ter-Morshuizen

Forage Specialist: Murray Lane

Environmental Management Specialist: Ian Power

Science Extension Manager: Ian Tarbotton

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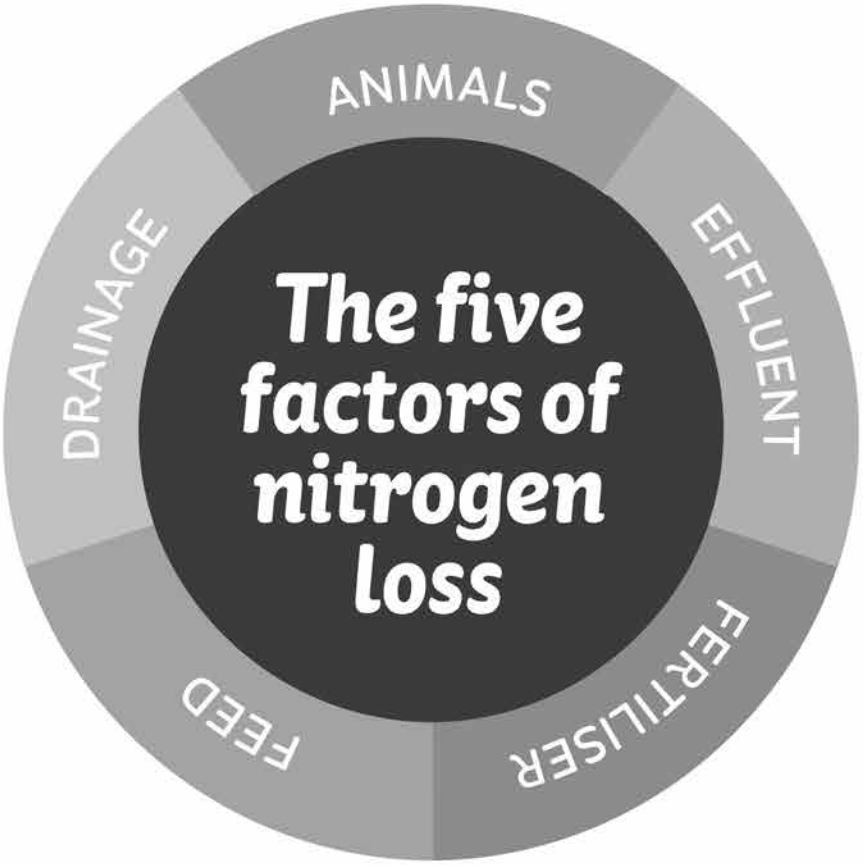

agri-nutrients Ballance

UNDERSTANDING WATER AND NUTRIENT MOVEMENT AND STATUS ON FARM

Roger MacGibbon, National Technical Director, Environmental Services, Opus.

Farmers who develop an understanding of how water and nutrients move across the farm surface and through the soil profile will be in the best position to make the best and most cost-effective decisions about the actions to take to reduce nutrient loss.

Don't commit to expensive nutrient management practices until you fully understand the sources, causes and transport modes of nutrients on your farm.

Understanding water movement is most critical because water is the transport mechanism for most nutrients, sediment and faecal pathogens across the farm and into waterways. Nutrient loss is greatest where and when the volume and speed of water flow is greatest.

Two routes for water flow:

1. Across the surface = surface runoff.
   This is the principal transport mechanism for phosphorus, sediment and pathogens
2. Down through the soil = leaching.
   This is the principal transport mechanism for nitrogen.

There are no affordable methods to determine actual nutrient losses from a farm. However, there are a number of ways to develop a reasonable understanding of what is occurring on farm:

- Know your soil types and especially soil water holding capacity and permeability.
  - Light porous soils leach N the most readily
  - Heavy soils leach less rapidly but lose high N and P when saturated
- Understanding runoff patterns and seasonally wet areas.
- Use OVERSEER® to gain a general understanding of nutrient loss.
- Monitoring of water quality in farm streams and drains.

Understanding stream water quality data

Taking water samples from streams or drains just before they leave the property can provide a useful picture of what the impact of your farming operations is on surface water quality, especially if the water feeding the stream or drain originates on the farm.

The analysis of water samples can be very expensive if too many aspects of water quality are measured and too many samples are taken, but costs can be kept low if the following approach is taken:

- Take water samples at the same location and same time each year.
- For streams that originate on farm locate your sample point close to where the stream leaves the farm.
- If the stream flows into your farm from other farms up-catchment measure at both the point at which the stream enters the farm and where it leaves. Sample both locations immediately one after the other.
- One or two samples a year are all that is necessary to gain an understanding of relative nutrient concentrations and what contaminants need management attention. Autumn, when soils become wetter, springs begin to seep and drains begin to flow, is a good time to gauge nitrate status. Autumn/early winter is when most farms leach /lose the most nitrate. Late spring is another good time to take stream/drain water samples.
- Take samples during base flow periods, not straight after heavy rain events.
- To gain a reasonable picture of how the farm might be affecting water quality at least 3 variables are recommended for measurement:
  i. nitrate N (the soluble form of nitrogen that is the biggest nutrient issue ion most dairy farms)
  ii. total phosphorus [TP] -this captures the P that is most carried to waterways attached to sediment, as well as the soluble DRP component.
  iii. E coli - a good measure of the faecal contamination arising from livestock.

  Two additional variables to measure to provide a better picture of water quality would be:
  i. total nitrogen [TN] because forms of nitrogen can also cause problems in streams.
  ii. DRP – the soluble form of phosphorus.

Cost: typically the cost to have these 5 variables tested is around $100 per sample.

NOTES

Owl Farm water quality data:

Four streams were sampled on 11 November at St Peters as shown below:

● = high quality habitat/conditions suitable for swimming

Table 1: Owl Farm Water Quality Data – collected 11/11/15

	Unit	Site 1	Site 2	Site 3	Site 4	Waikato River at the Narrows (2013)	High quality habitat*	National bottom line
Nitrate N	g/m3	O.7	3.3	9.9	8.1	0.28	<1 g/m3	6.9 g/m3
Total N	g/m3	1.17	3.7	10.3	9.9	0.45	< 0.16 g/m3	0.75 g/m3
DRP	g/m3	0.048	0.017	0.011	0.021	0.016		
Total P	g/m3	0.074	0.026	0.030	0.041	0.028	<0.01 g/m3	0.05 g/m3
E. coli	Ecoli/ 100mL	190	300	470	290	65	<260 / 100mL	1000 /100mL

(Thanks to Hill Laboratories for their speedy analysis of the samples)

NOTES

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ANALYSIS REPORT

Client:	OPUS International Consultants	**Lab No:**	1500003 SPv1
Contact:	R MacGibbon	**Date Registered:**	11-Nov-2015
	C/- OPUS International Consultants	**Date Reported:**	18-Nov-2015
	Private Bag 3057	**Quote No:**	72859
	HAMILTON 3240	**Order No:**	
		Client Reference:	Owl Farm St Peters School
		Submitted By:	R MacGibbon

Sample Type: Aqueous

Sample Name:		Site 1: East Stream 11-Nov-2015 11:35 am	Site 2: Cycleway Stream 11-Nov-2015 11:50 am	Site 3: Riparian Stream 11-Nov-2015 12:45 pm	Site 4: Western Confluence 11-Nov-2015 12:30 pm	
Lab Number:		1500003.1	1500003.2	1500003.3	1500003.4	
Total Nitrogen	g/m³	1.17	3.7	10.3	9.9	-
Nitrite-N	g/m³	0.008	0.008	0.005	0.008	-
Nitrate-N	g/m³	0.70	3.3	9.9	8.1	-
Nitrate-N + Nitrite-N	g/m³	0.70	3.3	9.9	8.1	-
Total Kjeldahl Nitrogen (TKN)	g/m³	0.47	0.35	0.39	1.76	-
Dissolved Reactive Phosphorus	g/m³	0.048	0.017	0.011	0.021	-
Total Phosphorus	g/m³	0.074	0.026	0.030	0.041	-
Escherichia coli	cfu / 100mL	190	300	470 #1	290	-

Analyst's Comments

Please interpret this result with caution as the sample was > 8 °C on receipt at the lab. The sample temperature is recommended by APHA to be less than 8 °C on receipt at the laboratory (but not frozen). However, it is acknowledged that samples that are transported quickly to the laboratory after sampling, may not have been cooled to this temperature.

#1 Statistically estimated count based on the theoretical countable range for the stated method.

SUMMARY OF METHODS

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.

Sample Type: Aqueous

Test	Method Description	Default Detection Limit	Sample No
Filtration, Unpreserved	Sample filtration through 0.45µm membrane filter.	-	1-4
Total Kjeldahl Digestion	Sulphuric acid digestion with copper sulphate catalyst.	-	1-4
Total Phosphorus Digestion	Acid persulphate digestion.	-	1-4
Total Nitrogen	Calculation: TKN + Nitrate-N + Nitrite-N. Please note: The Default Detection Limit of 0.05 g/m³ is only attainable when the TKN has been determined using a trace method utilising duplicate analyses. In cases where the Detection Limit for TKN is 0.10 g/m³, the Default Detection Limit for Total Nitrogen will be 0.11 g/m³.	0.05 g/m³	1-4
Nitrite-N	Automated Azo dye colorimetry, Flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).	0.002 g/m³	1-4
Nitrate-N	Calculation: (Nitrate-N + Nitrite-N) - NO2N. In-House.	0.0010 g/m³	1-4
Nitrate-N + Nitrite-N	**Total oxidised nitrogen. Automated cadmium reduction, flow injection analyser. APHA 4500-NO_3^- I 22nd ed. 2012 (modified).**	0.002 g/m³	1-4
Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl digestion, phenol/hypochlorite colorimetry. Discrete Analyser. APHA 4500-N_{org} D. (modified) 4500 NH_3 F (modified) 22nd ed. 2012.	0.10 g/m³	1-4
Dissolved Reactive Phosphorus	Filtered sample. Molybdenum blue colorimetry. Discrete Analyser. APHA 4500-P E (modified from manual analysis) 22nd ed. 2012.	0.004 g/m³	1-4

ilac-MRA IANZ ACCREDITED LABORATORY

This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised.
The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked *, which are not accredited.

NOTES

NUTRIENT MANAGEMENT OPTIONS FOR OWL FARM

At a high level we have undertaken some modelling work to look at several scenarios which could be considered in the future to manage nutrient losses to some extent. These are intended to provide an insight at a high level only into the type of reductions different options may be capable of achieving with regard to nutrient loss relative to associated costs which are only provided through loose estimates.

	N Leaching	FWE	Capital cost	$/kgN reduced
Current System	32kgN/ha	$3.72	-	-
Wetland (using overseer)	32kgN/ha	$3.72	$60,000	
Wetland using extrapolation	28kgN/ha	$3.72	$60,000	$90
Low input	28kgN/ha	$3.64	-	+ $90
Current system off pasture	21kgN/ha	$3.88	$2,000,000	$1100
High input off pasture	31kgN/ha	$4.85	$4,000,000	$25,000

General assumptions to consider:

- These changes have been modelled using the 14/15 season ending Overseer file – there have been slight changes to the system with regards to nitrogen fertiliser and imported supplements since last season so this is no longer a direct comparison of the farm system rather a comparison to our reflect our nitrogen report– this is intended to demonstrate the impact that system changes can have at a broad scale.
- Have changed the base file to reflect young stock off farm as this is going to be standardised with all scenarios modelled – reduced 1kgN/ha on average which is reflected in the current system reduction from 33kgN/ha to 32kgN/ha.
- A replacement rate of 22% has been standardised across all models.

Wetland using overseer –

- The contribution of wetlands to reduce nitrogen losses is not currently well modelled within Overseer which is why there is no reduction in modelling the construction of a wetland within Overseer.
- We intend to monitor water quality in and out to the constructed treatment wetland which will allow us to better validate the impact this system is having on reducing nitrogen lost from the farm.

Wetland using extrapolation – assumptions

- Assumed 45ha of the farm is draining towards the wetland site – equivalent to ~30% of effective milking platform.
- Assumed a 50% reduction in nitrate levels from that 45ha. Which at an average of 32kg/N leached per ha it is assumed that was 16kgN for that 45ha that would bring the overall average down from 33kgN/ha to 28kgN/ha.
- This would be equivalent to a reduction of 660kgN over the entire farm $60,000/660 = $72 per kg of Nitrogen reduced.

Low Input – Assumptions

- 430 cows rather than 460 - Less cow's feed better targeting similar overall production just the more kgMS/cow than the current system.
- Have included all replacements taken off farm
- No nitrogen applied over

Farm system same as above but with off pasture facility – assumptions

- Assume cows are managed via duration controlled grazing and are off pasture 12 hours a day across the entire year
- PKE imported at 225t down from 400t in base file
- Lower nitrogen rates to reflect the redistribution of nutrients from effluent.
- Capital cost assumed at $3000/cow housing – 1,400,000, plus $500,000 for effluent system and $100,000 for supporting infrastructure i.e. mixer wagon etc.
- 21kgN/ha is 1815kg less leached over the farm than the base file. $2,000,000/1815kgN = $1100/kgN

High input off pasture system – assumptions

- 800 cows split calving
- Increased feed to reflect increase in numbers – numbers shown below.
- Same capital costs as above
- 31kgN/ha is only 160kg less than baseline. $4,000,000/160kgN = $25,000/kgN

NOTES

FARMAX
YOUR ADVANTAGE

Compare Physical Summary

Jun 15 - May 16

Category	Description	Plan 15/16	reduced cows	Barn Current Input	Barn High Input	Units
Farm	Effective Area	160	160	160	160	ha
	Stocking Rate	2.9	2.6	2.7	5.0	cows/ha
	Comparative Stocking Rate	72.0	68.8	69.9	85.1	kg Lwt/t DM offered
	Potential Pasture Growth	15.3	15.3	15.3	15.3	t DM/ha
	Nitrogen Use	114	92	61	93	kg N/ha
	Feed Conversion Efficiency (offered)	13.3	13.0	13.1	13.6	kg DM offered/kg MS
Herd	Cow Numbers (1st July)	470	430	440	800	cows
	Peak Cows Milked	461	421	431	799	cows
	Days in Milk	215	208	209	197	days
	Avg. BCS at calving	4.9	5.0	4.9	5.4	BCS
	Liveweight	1,232	1,132	1,163	2,609	kg/ha
Production	Milk Solids total	205,926	201,876	203,421	361,464	kg
(to Factory)	Milk Solids per ha	1,287	1,262	1,271	2,259	kg/ha
	Milk Solids per cow	447	480	472	452	kg/cow
	Peak Milk Solids production	2.12	2.24	2.24	2.04	kg/cow/day
	Milk Solids as % of live weight	104.5	111.4	109.3	86.6	%
Feeding	Pasture Offered per cow *	4.5	4.8	5.0	2.9	t DM/cow
	Supplements Offered per cow *	1.4	1.3	1.1	3.1	t DM/cow
	Off-farm Grazing Offered per cow *	0.1	0.1	0.1	0.2	t DM/cow
	Total Feed Offered per cow *	5.9	6.3	6.2	6.1	t DM/cow
Diagnostics	Pasture Offered per ha	12.9	12.8	13.6	14.5	t DM/ha
	Supplements Offered per ha	4.2	3.6	3.0	15.6	t DM/ha
	Off-farm Grazing Offered per ha	1.7	1.7	1.7	3.6	t DM/ha
	Total Feed Offered per ha	18.8	18.1	18.3	33.7	t DM/ha
	Supplements and Grazing / Feed Offered *	25.0	22.4	19.1	53.1	%
	Bought Feed / Feed Offered *	15.8	14.5	16.2	49.8	%

(*) feed offered to females > 20 months old / peak cows milked

Waikato River Authority

NOTES

FARMAX
YOUR ADVANTAGE

Compare Forecast Profit and Loss

Jun 15 - May 16

			Plan 15/16	reduced cows	Barn Current Input	Barn High Input
Revenue	Stock	Net Milk Sales - this season	1,228,553	1,204,334	1,213,579	2,228,281
		Net Milk Sales - last season	0	0	0	0
		Net Milk Sales - dividend	0	0	0	0
		Net Livestock Sales	53,075	50,949	51,655	89,771
		Contract Grazing	0	0	0	0
		Change in Livestock Value	65,179	68,489	68,489	156,543
		Total	**1,346,807**	**1,323,772**	**1,333,724**	**2,474,595**
	Crop & Feed	Capital Value Change	-3,959	4,394	8,420	0
		Total	-3,959	4,394	8,420	0
	Total Revenue		**1,342,848**	**1,328,166**	**1,342,144**	**2,474,595**
Expenses	Wages	Wages	188,168	188,168	188,168	313,000
	Stock	Animal Health	36,560	33,360	34,160	62,960
		Breeding	25,455	23,227	23,784	43,836
		Farm Dairy	9,140	8,340	8,540	15,740
		Electricity	15,995	14,595	19,215	27,545
	Feed/Crop	Pasture Conserved	8,078	11,360	11,360	0
		Feed Crop	9,600	9,600	0	0
		Bought Feed	108,603	95,102	121,888	800,376
		Calf Feed	3,000	3,000	3,000	3,000
	Grazing	Grazing	80,613	70,500	70,500	121,000
		Run-Off Lease	4,320	4,320	4,320	4,320
		Owned Run-Off Adj.	5,920	5,920	5,920	5,920
	Other Farm Working	Fertiliser (Excl. N)	30,000	30,000	30,000	0
		Nitrogen	26,695	21,603	14,168	21,772
		Irrigation	640	640	640	640
		Regrassing	7,200	7,200	7,200	7,200
		Weed & Pest Control	15,000	15,000	15,000	15,000
		Vehicle Expenses	24,000	24,000	24,000	40,000
		Fuel	12,000	12,000	12,000	18,000
		R&M Land/Buildings	40,000	40,000	70,000	70,000
		R&M Plant/Equipment	10,000	10,000	10,000	20,000
		Freight & Cartage	16,000	16,000	16,000	16,000
		Other Expenses	45,000	45,000	55,000	55,000
	Overheads	Administration Expenses	2,500	2,500	2,500	2,500
		Insurance	21,000	21,000	21,000	21,000
		ACC Levies	4,960	4,960	4,960	4,960
		Rates	16,480	16,480	16,480	16,480
	Total Farm Working Expenses		**766,926**	**733,875**	**789,804**	**1,706,248**
	Depreciation		46,560	46,560	46,560	46,560
	Total Farm Expenses		**813,486**	**780,435**	**836,364**	**1,752,808**
Economic Farm Surplus (EFS)			**529,362**	**547,731**	**505,780**	**721,787**
Other Expenses		Rent/Lease	0	0	67,000	120,000
		Interest	0	0	81,000	144,000
Farm Profit before Tax			**529,362**	**547,731**	**357,780**	**457,787**
Farm Profit per ha before Tax			**3,309**	**3,423**	**2,236**	**2,861**

EFS is a measure of farm business profitability independent of ownership or funding, used to compare performance between farms.

EFS should include an adjustment for unpaid family labour and management. This can be added to the expense database as management wage.

NOTES

Owl Farm

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Owl Farm

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Wednesday, 2 March 2016

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