SIDDC
South Island Dairying Development Centre

LINCOLN UNIVERSITY
DEMONSTRATION DAIRY FARM

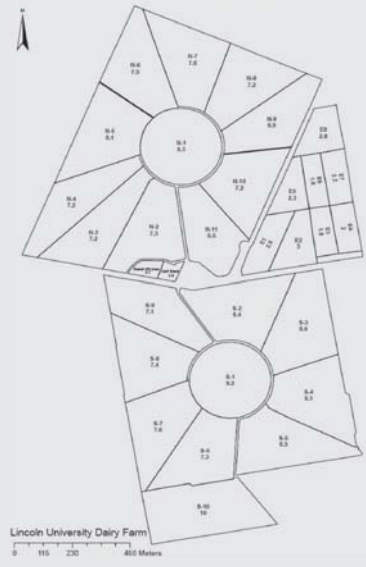
FOCUS DAY - MAY 2016

STAFF

Peter Hancox	– Farm Manager
Matt Weatherhead	– 2IC
Matthew Costello	– Dairy Assistant
Vacant	– Dairy Assistant

LUDDF HAZARDS NOTIFICATION

1. Children are the responsibility of their parent or guardian
2. Normal hazards associated with a dairy farm
3. Other vehicle traffic on farm roads and races
4. Crossing public roads
5. Underpass may be slippery



Partners Networking To Advance South Island Dairying

Lincoln University
New Zealand's specialist land-based university

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LIC

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

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SIDE
SOUTH ISLAND DAIRY EVENT

INTRODUCTION

The LUDDF is a progressive farming development facility that is committed to advancing dairy farming practice across the South Island, with particular consideration to productivity and environmental sustainability. Formerly the University sheep farm, the converted 186 hectare Dairy Farm is an excellent cross section of the various soil types evident across the Canterbury Plains. The property, of which 160 hectares is the milking platform, is irrigated using a spray system that includes two centre pivots, small portable lateral sprinklers and k-lines.

Stage 1: 2001/2 and 2002/3

The farm initially wintered approximately 630 cows, peak milking just over 600 and producing about 1400kgMS/ha from 200kgN/ha and up to 550kg DM/cow of imported feed. The milk payout (income) in 2002/3 was $4.10/kgMS.

Stage 2: 2003/4 through to 2010/11

During this period the primary development was the increase of the stocking rate to between 4 and 4.3 cows per ha. 654-683 cows peak milked and as a result production averaged 1700kgMS/ha and 411kgMS/cow. LUDDF ran a single herd during stage two, to allow us to focus primarily on simple systems, and low and consistent grazing residuals.

Stage 3: 2011/12 to 2013/14

The further development of LUDDF during stage 3 was a move into 'Precision Dairying', resulting from the implementation of the strategic objective (below). This stage focused on minimum standards, two herds were run to increase productivity and profitiability, from a similar environmental impact. Production lifted to 1878kgMS/ha or 477kgMS/cow (630 cows). A change in farm practice was initiated in 2013/14, with the temporary suspension of Eco-n (DCD), in an attempt to hold nitrogen losses without the mitigation effect of Eco-n.

Stage 4: 2014/15

LUDDF is adopting a 'Nil-Infrastructure, low input' farm system emerging from the P21 (Pastoral 21) research programme, in partial response to the tightening environmental requirements of some catchments across NZ. Targeted milk production is 1750kgMS/ha or 500kgMS/cow from 3.5 cows/ha with up to 150kgN/ha and 300kgDM/cow imported supplement.

LUDDF STRATEGIC OBJECTIVE 2011-2015:

To maximise sustainable profit embracing the whole farm system through increasing productivity;

- without increasing the farm's total environmental footprint;
- while operating within definable and acceptable animal welfare targets; and
- remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.
- LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.

ADDITIONAL OBJECTIVES

1. To develop and demonstrate world-best practice pasture based dairy farming systems and to transfer them to dairy farms throughout the South Island.
2. To ensure optimal use of all nutrients on farm, including effluent, fertiliser, nutrients imported from supplements and atmospheric nitrogen; through storage where necessary, distribution according to plant needs and retention in the root zone.
3. To manage pastures and grazing so per hectare energy production is optimised and milkers consume as much metabolisable energy [ME] as practicable (within the constraints of the current system and the associated nutrient losses).
4. To optimize the use of the farm automation systems and demonstrate / document improved efficiencies and subsequent effect on the business.
5. To achieve industry targets for mating performance within a 10 week mating period, including a 6 week in-calf rate of 78% and 10 week in calf rate greater than 89% i.e. empty rate of less than 11%.
6. To actively seek labour productivity gains through adoption of technologies and practices that reduce labour requirements or makes the work environment more satisfying.
7. To assist Lincoln University to attract top quality domestic and international students into the New Zealand dairy industry.

ONGOING RESEARCH

- The effect of farm management on groundwater and nutrient losses. (includes 10 groundwater monitoring wells, 60 lysimeters and 6 drainage plots to monitor and manage the effect of fertiliser, grazing, irrigation and effluent inputs over a variety of contrasting soil types.
- Pasture growth rates, pests and weeds monitoring, including a Forage Value Index paddock scale cultivar trial.
- Winter cropping effects on subsequent cow and calf performance.
- Yield mapping of pastures across the season
- Native Plantings – biodiversity effects
- Resource Inventory and Greenhouse Gas Footprint

CLIMATE

Mean Annual Maximum Temperature **32° C**
Mean Annual Minimum Temperature **4° C**

Average Days of Screen Frost
36 Days per annum

Mean Average Bright Sunshine
2040 Hours per annum

Average Annual Rainfall **666 mm**

SOIL TYPES

Free-draining shallow stony soils (Eyre soils) **5**

Deep sandy soils (Paparua and Templeton soils) **45**

Imperfectly drained soils (Wakanui soils) **30**

Heavy, poorly-drained soils (Temuka soils) **20**

FARM AREA

Milking Platform **160 ha**
Runoff [East Block] **15 ha**
Unproductive land on platform **6.7ha**

SOIL TEST RESULTS AND FERTILISER APPLICATIONS

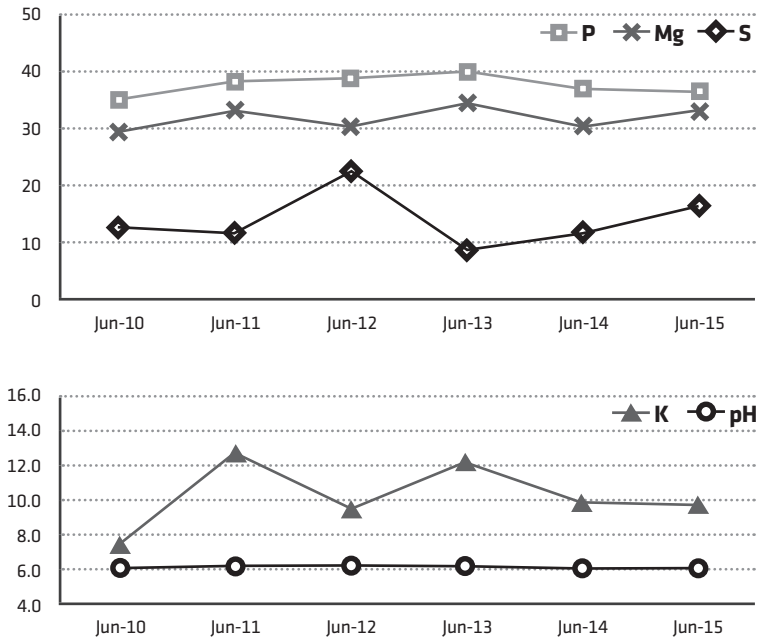
Target Soil Test Ranges:

pH: **5.8 – 6.2** P: **30 – 40** K: **5 – 8**
S: **10 – 12** Mg: **20+**

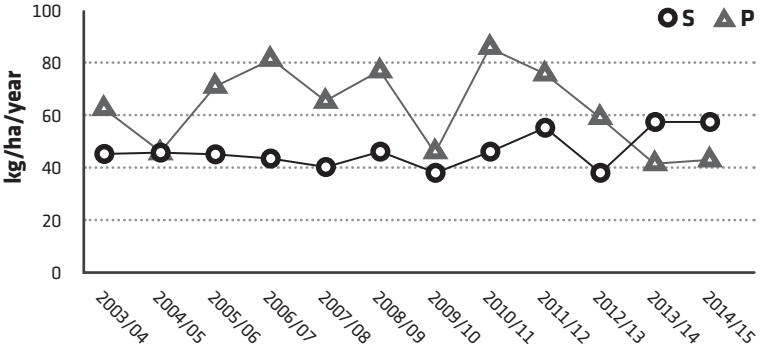
PASTURE

The milking platform was sown at conversion [March 2001] in a mix of 50/50 Bronsyn/ Impact ryegrasses with Aran and Sustain white clovers, and 1kg/ha of Timothy.

WHOLE FARM AVERAGE SOIL TEST RESULTS



WHOLE FARM AVERAGE P AND S APPLICATIONS 2003/04 – 2014/15



Paddock	Period Regrassed	Grass Cultivar
N1	Feb-01	Brons. Imp
N2	Feb-11	Trojan
N3	Nov-12/Sept-13	Shogun/Chicory/Plantain/Troj
N4	Feb-15	Base/Troj/Chicory/Plantain
N5	Dec-11/Aug-13	Shogun
N6	Apr-14	Shogun (spray/drill)
N7	Jan-14	Bealey/Troj/Chicory/Plantain
N8	Jan-13	Bealey/Troj/Chicory/Plantain
N9	Oct-13	Bealey/Troj/Chicory/Plantain
N10	Jan-12	Tetraploids
N11	Nov-07	Bealey

Paddock	Period Regrassed	Grass Cultivar
S1	Dec-05	Bealey
S2	Dec-10	Troj. Bealey
S3	Feb-10	Bealey/Arrow
S4	Dec-13	Bealey/Troj/Chicory/Plantain
S5	Dec-08	Arrow - Alto
S6	Dec-14	Shogan/Chi/Plant (spray/drill)
S7	Sep-06	Base/Troj/Plantain
S8	Oct-11	Troj. Bealey
S9	Dec-09	Bealey/Arrow
S10	Nov-14	Shogan/Chicory/Plantain
All paddocks also sown with clover		

STAFFING AND MANAGEMENT

Roster System – 8 days on 2 off, 8 days on 3 off
Milking Times – cups on 5.00am / 2.30pm

IRRIGATION AND EFFLUENT SYSTEM

Centre-pivots	127 ha
Long Laterals	24 ha
K-Lines	10 ha
Irrigation System Capacity	5.5 mm/day
Length of basic pivot	402
Well depth	90m

A full rotation completed in 20.8 hours for 5.5 mm [at 100% of maximum speed].

- Average Annual Rainfall = 666 mm. Average irrigation input applies an additional 450 mm.
- Average Evapotranspiration for Lincoln is 870 mm/year.

Effluent

- Sump capable of holding 33,000 litres and a 300,000 litre enviro saucer.
- 100 mm PVC pipe to base of North Block centre pivot, distribution through pot spray applicators.

MATING PROGRAMME – SPRING 2015

KiwiX DNA for 365 cows [F8-F16]; Holstein Friesian Daughter Proven for 280 cows [F0-F7 then follow with Jersey bulls.
Heifers start mating 10 days early, natural mate for 9 weeks.
10 weeks mating for milking herd. Expect to rear 150 heifers.

HERD DETAILS – FEBRUARY 2015

Breeding Worth 152 / 47%
(rel%) / Production Worth (rel%)185 / 69%
Recorded Ancestry 99%

Average weight / cow (Dec)
Herd monitored walk over weighing
474 kg [Dec 2014]

Calving start date
Heifers 23 July, Herd 2 August 2015

Est Median calving date
17 August 2015

Mating start date
25 October 2015

Empty rate (nil induction policy) after 10 weeks mating - 13% (2014-15 mating). 6 week in-calf rate 71%.

	2002/03	2003-07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Total kg/MS supplied	228,420	**277,204**	278,560	261,423	273,605	264,460	297,740	300,484	276,019	278,654
Average kg/MS/cow	381	**425**	409	384	415	395	471	477	440	498
Average kg/MS/ha	1,414	**1,720**	1,744	1,634	1,710	1,653	1,861	1,878	1,725	1742
Farm working expenses /kgMS	$2.98	**$2.68**	$3.37	$3.88	$3.38	$3.86	$3.91	$3.84	$4.28	$3.87
Dairy operating profit/ha	$1,164	**$2,534**	$8,284	$2,004	$4,696	$6,721	$4,553	$4,665	$7,578	$1200
Payout (excl. levy) $/kg (Milk price + div.)	$4.10	**$4.33**	$7.87	$5.25	$6.37	$7.80	$6.30	$6.12	$8.50F	$4.60
Return on assets	4.4%	**6.18%**	14.6%	4.8%	7%	7%	6%	6%	10%	1.6%
1 July cow numbers	631	**675**	704	704	685	694	665	650	650	580
Max. cows milked	604	**654**	680	683	660	669	632	630	628	560
Days in milk	-	**-**	263	254	266	271	272	273	259	263
Stocking rate cow equiv./ha	3.75	**4.05**	4.2	4.3	4.13	4.18	3.95	3.94	3.92	3.5
Stocking rate Kg liveweight/ha	1,838	**1964**	2,058	2,107	1,941	1914	1860	1878	1872	1680
No. cows/weeks wintered off	500/8	**515/7.8**	546/9	547/7	570/9	652/8.4	650/9.8	650/9.8	650/11.4	580/10.7
No. yearlings grazed - On/Off	0/118	**0/157**	0/171	0/200	0/160	0/166	0/141	0/138	0/140	0/126
No. calves grazed - On/Off	0/141	**0/163**	0/200	0/170	0/160	0/194	0/190	0/156	0/150	0/126
Past eaten (dairybase) (tDM/ha)	-	**-**	17.9	17.2	16.2	16.9	17.3	16.8	14.9	15.7
Purch. Suppl - fed (kgDM/cow)	550	**317**	415	342	259	463	359	434	506.8	300
Made on dairy/platform (kgDM/cow)	0	**194**	95	64	144	160	154	93	0	40
Applied N/160 eff. Ha	-	**-**	164	200	185	260	340	350	250	143

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Contents

WorkSafe

Keep Safe, Keep Farming

Presented by Dave Hulston, WorkSafe NZ. **See also:** http://saferfarms.org.nz/

Why be safe?

It's about the people

Health and safety on farms is about looking after people – farm workers, contractors, farm visitors, yourself and your family.

It's about productivity

Fit and healthy people are a critical factor for successful farming. Good health and safety practice enables your farm to keep working. Keeping everyone on your farm safe and healthy helps ensure your people remain productive and your farm is profitable.

It's the law

Health and Safety at Work Act 2015. (The Act) applies to all workplaces in New Zealand – including farms.

To meet your obligations under The Act, you must take all (reasonably practicable) steps to provide and keep a safe work environment. This includes identifying risks and finding practical ways to manage hazards.

A workplace health and safety inspector can turn up at your gate and conduct a health and safety inspection at any time. Serious injuries or fatalities will result in an investigation. If you fail to meet your legal duties under The Act, you may be subject to prosecution or other enforcement action, which may result in significant fines or other penalties.

Need help getting started?

The Worksafe publication available today "Keep Safe, Keep Farming" will help you work through what is required and get you started on making a plan. The website Saferfarms.org.nz also has further information which will assist you.

Where next?

	2013/14	2014/15	2015/16 F*
FWE	**$4.28**	**$3.87**	**<$3.50**
Imported Feed	**318tDM**	**168tDM**	**70tDM**
N fert kgN/ha	**250kgN**	**143kgN**	**179kgN**

Forecast Year End Results for 2015/16

LUDF has been challenged to get FWE to $3.25/kgMS. It must also sustain the farm and meet its environmental objectives.

Considerations:

1. **Feed Supply**
2. **Feed Demand**
3. **Conversion efficiency**
4. **Costs of production**
5. **Synergistic effect of combining all these above factors**

LUDF Strategic Objective

To maximise sustainable profit embracing the whole farm system through:

- *increasing productivity;*
- *without increasing the farm's total environmental footprint;*
- *while operating within definable and acceptable animal welfare targets; and*
- *remaining relevant to Canterbury (and South Island) dairy farmers by demonstrating practices achievable by leading and progressive farmers.*
- *LUDF is to accept a higher level of risk (than may be acceptable to many farmers) in the initial or transition phase of this project.*

2011/12 to 2013/14

The strategic objective (above) was implemented in a move into 'Precision Dairying' in the 2011/12 season. This focused on minimum standards not averages, two herds, higher productivity and initially higher profitability from a similar environmental impact. Production lifted to 1878kgMS/ha or 477kgMS/cow from 630 cows and costs were similar per kgMS in 2011/12 and 2012/13.

The temporary suspension of Eco-n (DCD) in 2013 required a change in farm practice in 2013/14 in the attempt to hold nitrogen losses without the mitigation effect of Eco-n. The farm had to cull its surplus cows early in autumn 2014 to meet the farms N-loss target (at a cost of $84,000 in loss profit).

2014/15 and 2015/16

In 2014/15 LUDF adopted a 'Nil-Infrastructure, low input' farm system emerging from the P21 (Pastoral 21) research programme, in response to the tightening environmental requirements of some catchments across NZ, and to meet its historical N-loss (as above). In essence LUDF sought to upscale results from the P21 – LSE herd where 3 years of data have shown similar total production and profit was achieved with less total N-leaching than had occurred at LUDF.

The systems targets and results for last season, and forecast for 2015/16 are as follows:

	2014/15 Target	2014/15 Result	2015/16 Forecast
Stocking Rate	3.5 cows /ha		
Nitrogen Fertiliser Input	150 kgN/ha	143 kgN/ha	179 kgN/ha
Imported Supplement	300 kgDM/cow + winter off		126 kgDM/cow + winter off
Milk Production	500 kgMS/cow and 1750 kgMS/ha	498 kgMS/cow and 1742 kgMS/ha	> 500 kgMS/cow and > 1750 kgMS/ha
Farm Working Expenses	$4.00 /kgMS	$3.87 /kgMS	<$3.50 /kgMS

Summary of Performance – Results to the End April:

All data to end April:	2012/13	2014/15	2015/16
Total kgMS sold	285,707 kgMS	261,570 kgMS	276,562 kgMS
Total Cows in Milk	549	466	520
Total N fert applied	351 kgN/ha	143 kgN/ha	179 kgN/ha
Total Purchased Silage Fed kgDM/cow	373 kgDM/cow	255 kgDM/cow	126 kgDM/cow
Total Purchased Silage Fed tDM	235 tDM	143 tDM	70 tDM
Whole Herd WOW	501 kg	512 kg	507 kg
Herd Ave CS	4.3	4.3	4.3
Silage made on farm (kgDM/cow)	93	40	275

Note: data for the 2013-14 season is available on the SIDDC website, it has been excluded from the table above as LUDF constrained production midway through that season to meet the farms N-loss target.

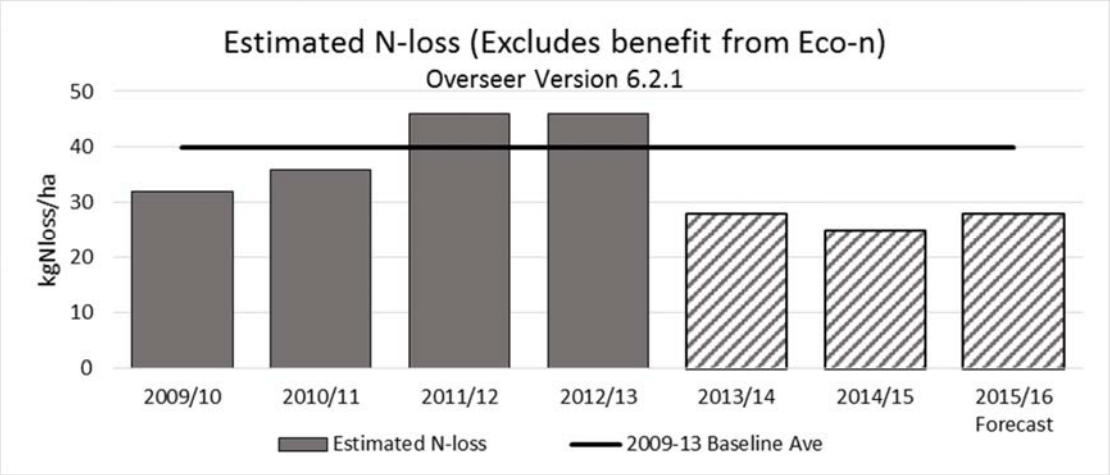
Comparing LUDF results across seasons:

This season and last season were similar till the end of February, however the farm has produced better this autumn than last year as it has been able to keep cull cows on farm through March and April with the use of home grown silage. Compared to the higher input farm systems of 2012-13 season, results to date show

- Similar milk production, (4% less than 2012/13, but 5% higher than last year)
- from 12% fewer cows (peak milked) with the use of
- approximately 50% less nitrogen fertiliser and
- less than one third previously purchased silage.

In addition, whole herd liveweight and average cow condition remain similar. Farm Working Expenses are lower this season, see below for details.

Indicative N-losses across years / farm systems at LUDF:

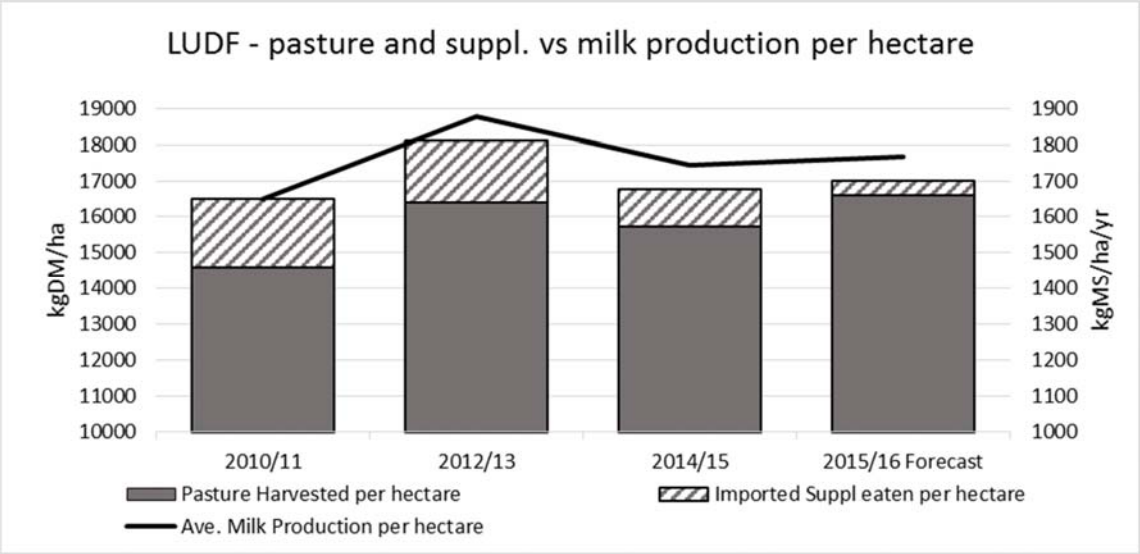


Note: N-losses are indicative only.

Farm System Considerations regarding lifting profitability

1. **Feed Supply**
   a. Pasture Available / Eaten
   b. N-fert use
   c. Supplement use, including type and quality
   d. Expected wastage, available facilities for feeding out
   e. Leaf stage and impact on total growth
   f. Pasture quality
   g. Grazing residuals and return period.

2. **Feed Demand**
   a. Stocking rate - Cows per ha / BW per ha /Liveweight per ha
   b. Production per cow / per hectare
   c. Grazing off young stock / dry cows / late calvers / springers

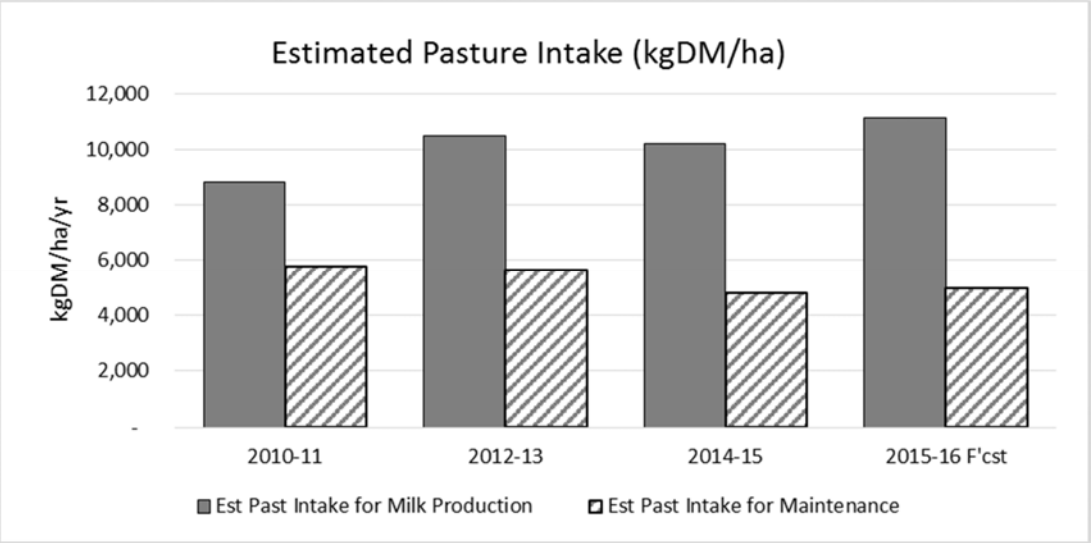


Feed demand above has been calculated from milk production, while feed supply is similarly estimated from feed demand plus feed available from imported supplements. As seen in the graph above, feed harvested per hectare (as pasture) has fluctuated from around 14,500 kgDM/ha back in 2010-11 to close to 17,000 kgDM/ha estimated for 2015-16. Similarly milk production has ranged from 1650 kgMS to nearly 1900 kgMS /ha over this period.

- **Pasture harvested has generally increased** year on year
- Imported **Supplementary feed by comparison has decreased** year on year for the past 3 years
- Total **milk produced has increased** over the past 3 years.
- In 2011-13, higher inputs of N-fert and supplements contributed to more pasture consumed and with more supplements used, total milk production was higher

Achieving more pasture eaten becomes much more valuable when this also results in a greater percentage of pasture converted into milk production.

3. **Feed Conversion Efficiency**
   a. Volume feed required per unit milk produced (sold)
   b. Proportion feed for maintenance vs milk production



Using energy requirements for maintenance, walking, change in CS and milk production, enables calculation of the proportion of pasture consumed for milk production compared to that required for maintenance (etc). Total pasture consumed for milk production has increased since 2010-11 and changed from 61% of pasture eaten to 69% pasture. The farm is thus now both 'harvesting' more pasture, AND turning this into more milk for sale.

4. Cost of production

a. Total $ costs
b. Cost per kg MS produced
c. Cash surplus per hectare

LUDF is forecasting to spend almost $1.0 million on farm working expenses this season. By also achieving production of approximately 1800kgMS/ha, the farm is forecasting FWE of less than $3.50/kgMS.

Higher than average production from pasture can support somewhat higher farm working expenses compared to lower production. For example, If gross income is $5.00/kgMS (livestock income, milk income and dividend) then LUDF's farm working expenses of $3.50/kgMS at 1800kgMS generates the equivalent return per hectare as a farm with Canterbury's average production (1450 kgMS/ha) and FWE of $3.14/kgMS.

	1800 kgMS/ha	**1450 kgMS/ha**
Gross Farm Revenue	$5/kgMS / $9000/ha	$5/kgMS / $7250/ha
FWE	$3.50/kgMS / $6300/ha	$3.14/kgMS / $4550/ha
Cash Operating Surplus	$1.50/kgMS / $2700/ha	$1.86/kgMS / $2700/ha

If gross income however is only $4.50/kgMS, then production of 1450kgMS/ha must have FWE of no more than $3.26/kgMS to generate the same cash surplus per hectare ($1800/ha).

As shown in the following table, the cost of production at LUDF per kgMS is sensitive to production levels. Increasing production without increasing costs by harvesting more pasture into milk can decrease costs per kgMS at LUDF by approximately 6 cents for every additional 5000kgMS produced.

NOTE – this however cannot be undertaken at the expense of next year's production by undermining cow condition score or average pasture cover targets at the end of May.

Production level	**275,000**	**280,000**	**285,000**	**290,000**
Farm Working Exps	1,000,000	1,000,000	1,000,000	1,000,000
FWE/kgMS	3.64	3.57	3.51	3.45

5. Synergistic effect of combining all these above factors

Its possible there is a 'sweet spot' – effectively a combination that together is achieving more than the individual aspects above. From LUDF's experience the combination of the following appear significant in the results achieved this season:

a. Matching Stocking rate to feed supply: this is not just cows per hectare, but matching the number of cows x expected production per cow with the available feed supply from home grown pasture plus imported supplements. The objective is to grow and harvest all available pasture with the least number of cows realistically possible, so that more milk is exported and less feed required for maintenance.

b. Longer grazing rotations which result in higher pregraze masses while still achieving tidy grazing residuals in a timely manner. This results in more of the farm capable of higher growth rates and therefore more total pasture production compared to earlier years and higher use of inputs (see below).

c. Returning to the use of home-made high quality silage to transfer summer pasture production into the autumn, enabling more days in milk without the use of more expensive bought in supplements.

d. Continuing to use low but frequent applications of N fertiliser in the summer recognising the farm can deliver higher response rates at this time, rather than accepting lower N response rates into the autumn with correspondingly higher risks of N-loss.

e. Using surplus summer pasture to make silage for subsequent use in the autumn rather than additional regrassing provides a low cost source of high quality autumn silage and can aid with grazing residuals as required. Less regrassing however limits the farms ability to benefit from newer pasture genetics, and over time risks eroding the farms productivity.

Where next?

	2013/14	2014/15	2015/16 F*	2016-17 Budget
FWE	**$4.28**	**$3.87**	**<$3.50**	**$3.40 – 3.70**
Imported Feed	**318 tDM**	**168 tDM**	**70 tDM**	**84-168 t DM**
N fert kgN/ha	**250 kgN**	**143 kgN**	**179 kgN**	**180 kgN**

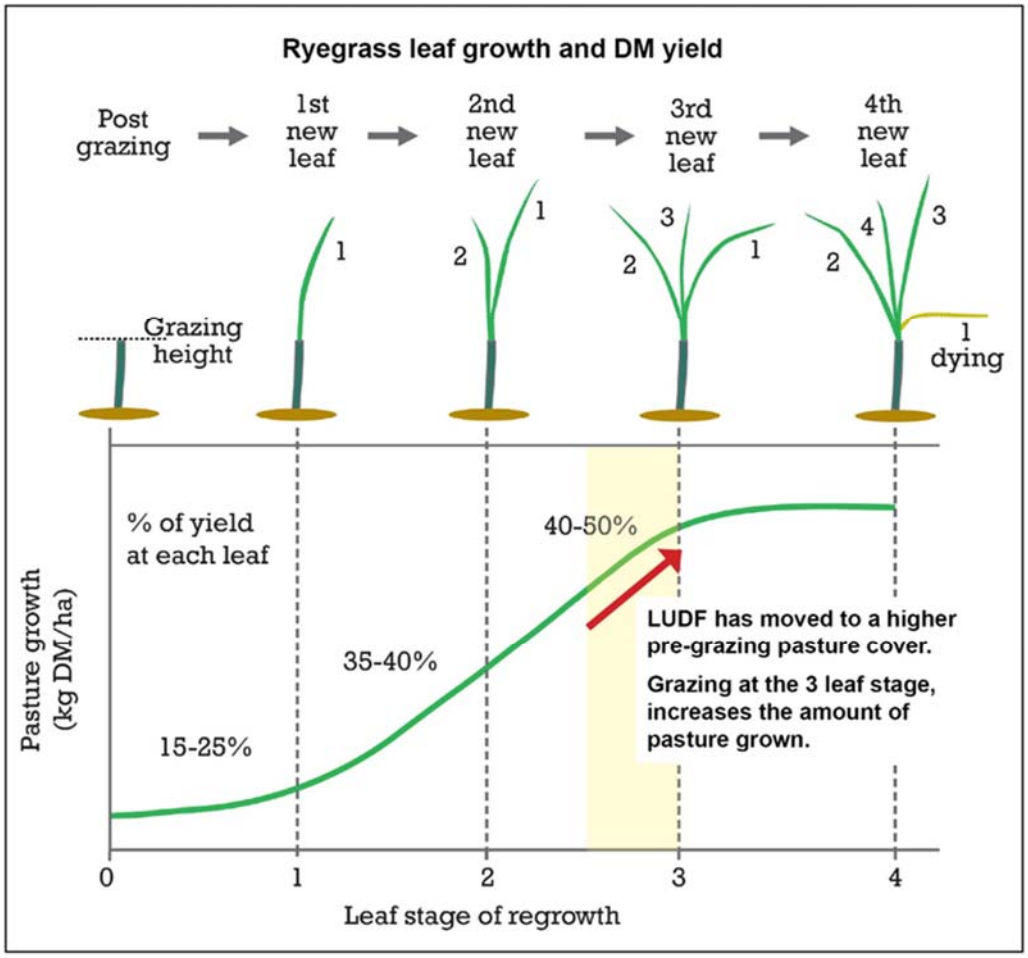
Forecast Year End Results for 2015/16

Why (how) LUDF has grown more pasture

A key reason is that LUDF has increased its pre-grazing pasture cover by 200 kgDM/ha. The science behind this is shown in the diagram below.

The farm has moved from grazing ryegrass at around *2.5 leaves/tiller* to around *3 leaves/tiller*. This has a significant effect as 40-50% of the ryegrass DM yield in a regrowth cycle is produced with the third leaf. Simply put "grass grows grass", and with more leaves the pasture captures more light, has greater photosynthesis, and grows faster.

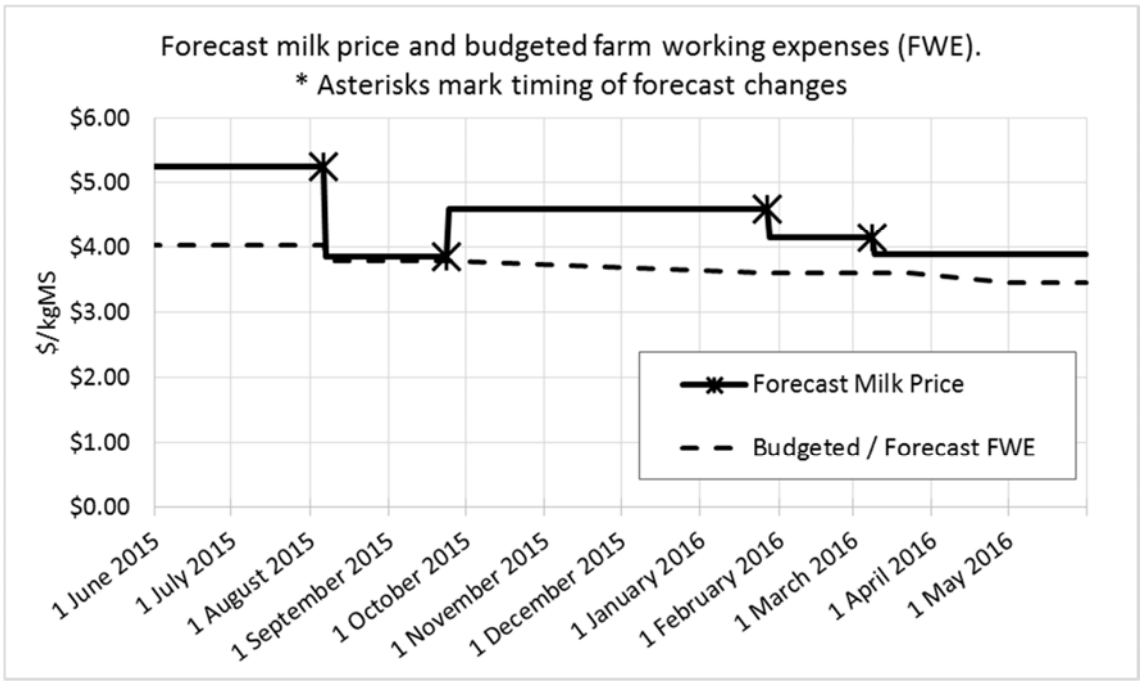
Post-grazing residual has remained similar to previously (average 15 kgDM/ha higher) and a consistent, even post-grazing residual remains a key requirement for LUDF. Running higher pre-grazing covers means the grazing round is longer (by an average of 6 days) and each paddock will be grazed 1-2 times less over the season.

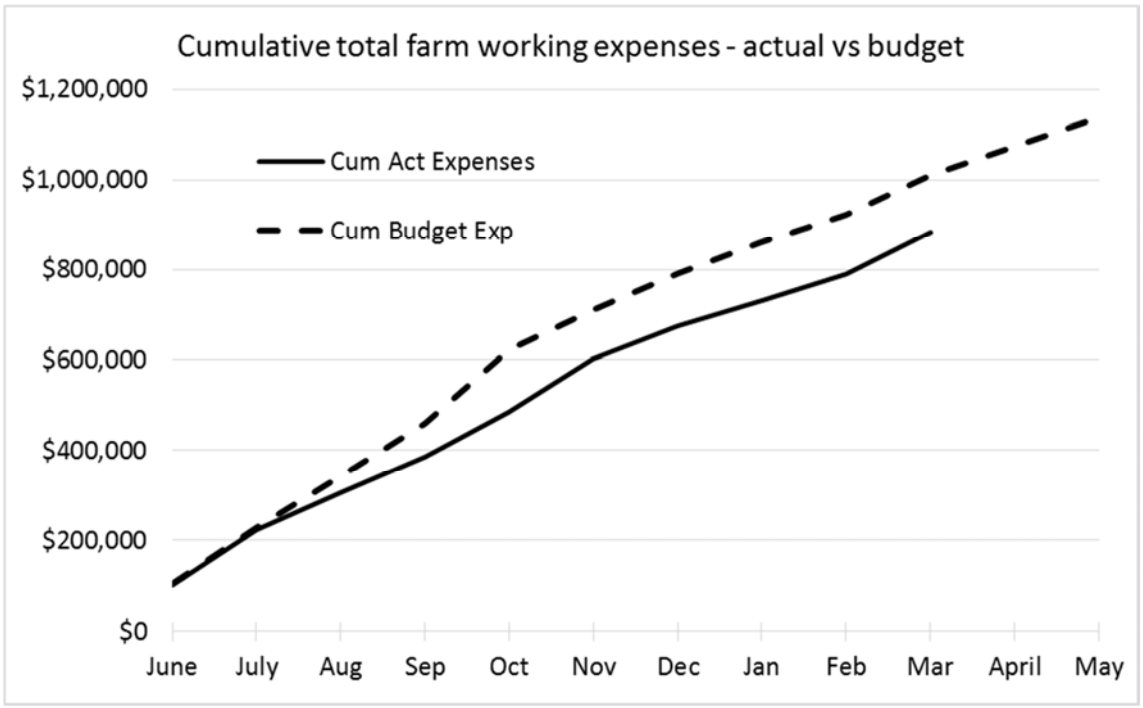


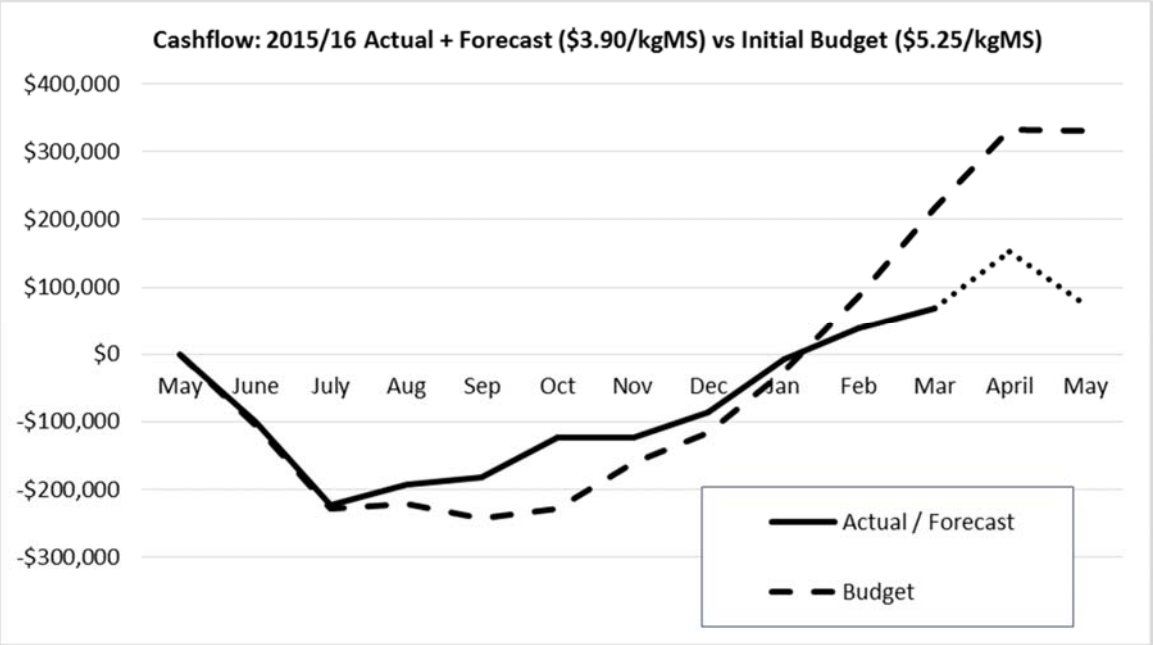
Two other things are key to managing higher pre-grazing covers (as LUDF has):

1. Tetraploid ryegrass, or a tetraploid/diploid ryegrass mix, have a significant advantage for this system. On LUDF 18 of its 21 paddocks have tetraploids, which maintain high cow intakes at higher covers. Whereas cows may struggle to graze a straight diploid ryegrass >3300 kgDM/ha, a tetraploid/diploid mix will typically still be well grazed at 3600.
2. Pasture quality issues occur more quickly – Pasture ME is still very high (12+) at the 3 leaf/tiller stage of ryegrass growth, but beyond this it starts to drop off. Having higher covers means your farm is growing more, and you can move past 3 leaves/tiller into quality issues more quickly. Monitoring and controlling pasture quality when necessary (e.g. pre-graze mowing, making silage) are important.

Financial Results – Forecast Year End







Note - FWE and Overdraft Interest only - excludes long term debt, tax, etc

Adjustments / forecast Year End Projections:

1. **Forecast milk production:**
   Production to 30 April = 276,562 kgMS.
   + 4 days 520 cows @ 1.5 = 3120
   + 20 days 300 cows @ 1.5 = 9000
   Total est milk prod = 276,562 + 3120+9000=288,682 kgMS

2. **Milk income** lowered to 3.90

3. **Dividend** increased to 40 cents

4. **Stock Sales / purchase of additional heifers:**
   Sale of:
   15 Johnes cows (18 were confirmed but 3 returned as negative)
   76 MA MT cow
   15 necessary culls
   Total 106 culls.

MA cows on hand end March = 545
Less 106 culls = 439
Plus 102 Incalf R2yr's = 541
Plus 40 Incalf R2yr's to purchase = 581 to winter.

Financial Impact:
Reduction in net stock income of $85,800 or 30 cents/kgMS.

Year ending May 31	2015/16 Budget	Actual to end Mar	Budget to End Mar	Variance (Act—budg)	Forecast Year End	Notes
Milk production (kgMS)	280,147	250,437	252,506	-2,069	288,682	1.
160ha	1751 /ha				1804 /ha	
Peak Cow Nos and Prod.	560					
Staff	3.7					
Income						
Milksolid Payout $/kgMS	$3.90					
Dividend /share	$0.40/share					
Milksolid Revenue	$1,092,573	$976,704	$984,773	-8,069	1,125,860	
Dividend	$112,059	$100,175	$101,002	-828	115,473	
Surplus dairy stock	$138,510	$55,505	$138,509	-83,004	114,470	2
DairyNZ Levy	-$10,085	-$9,016	-$9,090	74	-10,011	
Stock Purchases	-23,200	-26,960	-26,960	0	-84,960	3
Gross Farm Revenue	**$1,309,857**	**$1,096,408**	**$1,188,235**	-$91,826	**$1,260,832**	
Expenses				$0	0	
Cow Costs Animal Health	$54,200	$48,364	$38,958	$9,406	63,606	4
Breeding Expenses	$39,215	$39,380	$43,921	-$4,541	34,674	**5**
Replacement grazing & meal	$139,766	$102,828	$111,491	-$8,663	131,103	**6**
Winter grazing - Herd incl. freight	$200,772	$186,521	$187,022	-$501	200,271	
Feed Grass silage purch.	$70,502	$58,425	$70,502	-$12,077	24,539	**7**
Silage making & delivery	$9,728	$20,088	$9,728	$10,360	20,088	**8**
Giberillin	$13,120	$234	$9,120	-$8,886	234	**9**
Nitrogen	$32,754	$45,093	$43,237	$1,856	45,093	**10**
Fertiliser & Lime	$33,317	$14,853	$33,317	-$18,464	14,853	**11**
Irrigation - All Costs	$70,600	$65,767	$63,200	$2,567	73,167	
Re-grassing	$25,535	$8,654	$25,535	-$16,881	8,654	**12**
Staff Employment	$260,400	$187,554	$216,595	-$29,041	231,359	**13**
Land Electricity-farm	$37,200	$21,243	$30,200	-$8,957	28,243	**14**
Administration	$24,700	$21,093	$20,842	$251	24,951	
Rates & Insurance	$21,020	$21,020	$21,020	$0	21,020	
Repairs & Maintenance	$54,500	$30,066	$43,690	-$13,624	40,876	**15**
Shed Expenses excl. power	$9,850	$8,449	$9,850	-$1,401	8,449	
Vehicle Expenses	$31,336	$20,885	$31,336	-$10,451	20,885	**16**
Weed & Pest	$500	$1,174	$500	$674	1,174	
Cash Farm Working Expenses	**$1,129,015**	**$901,691**	**$1,010,064**	-$108,373	**$993,238**	**17**
FWE/kgMS	**$4.03**				**$3.44**	
Depreciation est.	$116,000				116,000	
Total Operating Expenses	$1,245,015	$901,691	$1,010,064	-$108,373	1,109,238	
Dairy Operating Profit	$64,842				$151,594	**18**
DOP/ha	**$405**				**$947**	
Cash Operating Surplus	$180,842				$267,594	
Cash Operating Surplus per ha	**$1,130**				**$1,672**	

Notes to Forecast Year End result:

1. Milk production forecast as above, 288,652kgMS = 520kgMS/cow
2. Reduction in total income earned from livestock sales with sale of higher number of empty stock (heifers and MA cows) and sale of a further 18 cows culled for Johnes.
3. Purchase of 40 replacement heifers was not budgeted, in part the result of attempting to manage with carrying 126 rather than 150 R2yr's to reduce the grazing costs incurred.
4. Animal health costs are higher overall with increased expenditure (compared to budget) on Mastitus, teat spray, and small increases across a range of items.
5. Breeding expenses are lower, largely the result of using bulls rather than AI for the heifers ($2500), and savings in replacement tags and protrack maintenance.
6. LUDF has not achieved savings in replacement grazing costs (against budget) but was able to reduce expenditure on calf meal and milk powder by $10,000.
7. High quality grass silage was purchased early in the season at a lower price than budgeted. Due to the reduced forecast milk price purchased silage has not been fed since a little was required in early December. Previously purchased silage not used has been removed from the LUDF expenses and will be purchased again into next seasons accounts.
8. Additional silage made on the platform has increased silage making costs above budget.
9. As detailed in the October focus day and October focus day notes, very little GA was applied this season
10. Effect of application cost of nitrogen not flowing through to initial budget, plus an increase from 150 to 179 kgN applied per hectare.
11. (Short term) savings from not applying maintenance Phosphate fertiliser (see October Focus day notes).
12. Minimal regrassing required to patch damaged pastures from early spring grazing, coupled with earlier decision to only regrass 1 paddock rather than 2 has created significant savings in this financial year.
13. Delayed start to the employment of a new farm assistant reduced staff expenses in June, coupled with a gap between the resignation of our other farm assistant in November and a short term replacement in February has delivered savings in employment expenses, but inhibited some staff leave – thereby contributing to a future cost for the farm.
14. Silowraps and more efficient refrigeration (investments in 2014-15) are resulting in less electricity usage at the shed compared to past years.
15. Overall effect of limiting all spending – with small savings across most areas of R&M, except for some repairs associated with the cowshed. R&M has not been deferred if this is likely to result in higher costs in the future.
16. Price reductions in petrol and diesel contributed nearly $4000 in savings, however the delayed replacement of the 4-wheeler has incurred higher than anticipated maintenance costs for this vehicle. Ute and tractor R&M to date is below budget.
17. Overall, significant saving to date against budget. The overall expenses however be considered in light of the required level of fertiliser, regrassing, R&M etc to maintain the ongoing productivity of the farm.
18. Dairy Operating Profit and Cash Surplus are significantly higher than budgeted as the combined result of a 'survival focus' (point 16) and 3% higher production. As shown above, the farms performance is sensitive to production with every additional 5000kgMS diluting farm working expenses by approximately 6 cents/kgMS.

2016-17 Budget

LUDF has prepared two budget versions for the coming season, the most likely (optimistic) and a constrained version that shows the impact of reducing or eliminating certain aspects of farm expenditure to create a higher margin of income above costs. Some may have long term impacts, others may impact the farm in a shorter time frame. In all cases they show the level of variance possible if income reduces further or fixed costs (interest) require a higher level of operating profit than is forecast to be achieved with the optimistic budget.

Budget assumptions:

- Desire to deliver maximum sustainable profit to Lincoln University, year on year
- Use of long term sustainable farm inputs (fertiliser, regrassing, maintenance etc)
- Consistent / steady level of maintenance and staffing year on year
- Occasional use of higher profit years to take on additional / periodic R&M / long term maintenance and development
- Adherence to coming environmental constraints while delivering highest possible earnings before interest and tax (EBIT – or effectively – Dairy operating profit)
- Rearing and grazing of a higher number of replacements to give the farm options in regard to selection and the number of incoming heifers and the farms focus on identifying and removing Johnes cows
- Use of whole paddock soil testing to drive fertiliser recommendations at a paddock level, along with revised econometric modelling to ensure the target Olsen P levels are appropriate for the current costs of fertiliser, interest rates, milk returns etc
- Resilient farm system capable of maintaining a reasonable margin in periods of low payout and providing high levels of profitability in years of higher payout

Farm System:

- 3.5 cows / ha,
- 300kgDM/cow imported feed + wintering off,
- 180 kgN/ha
- >500 kgMS /cow and 1750 kgMS/ha
- Offering high volume, high quality pasture to cows every day to maximise milk production from pasture
- Target intake through spring and early summer of 240-250MJME/cow /day. At 12 MJME/kgDM requires 20kgDM/cow/day to achieve 240 MJME/cow every day.

In constructing the 2016-17 budget, it became evident some of the previously held assumptions need reviewing in light of the current economic environment. For example, do the assumptions regarding BVD management still hold true with the current costs of BVD management and milk

prices. Similarly with the farms limited opportunity for production based culling (after accounting for Johnes and empty cows), the need for herd testing to identify cull cows is limited. This analysis is still underway and could result in some on farm changes.

Analysis of LUDF's profitability compared to its benchmark farms (see July Focus day handouts) typically shows LUDF is slightly more productive (higher income), but typically carries higher costs – ie is less efficient in cost management. The constrained budget removes some of these additional costs from the budget and in doing so removes $90,000 from working expenses, or over 30 cents/kgMS.

The main changes in the two budget versions are as follows:

Expenditure category	**Constrained budget**	**Optimistic budget**
Animal Health – removing BVD vaccination and DCT	$41,800	$53,600
Breeding Expenses – No HT, DNA	$34,500	$41,000
Replacements – reducing replacements from 155 to 125	$127,000	$149,500
Grass Silage Purchased – reduced volume to 150kgDM/cow (grow additional silage on platform)	$31,000	$62,000
Fertiliser and Lime – reduced maintenance P	$15,700	$26,200
Regrassing – limited undersowing post calving and 5% rather than 10% annual regrassing	$12,200	$20,200
Total Savings	**$91,000 or 32 cents / kgMS**	

Note: consistent (current market) prices for purchased silage, heifer grazing and winter cow grazing have been used in both versions above.

2016/17 budget (right hand columns) and actual expenses over past 4 seasons

Year ending May 31	2012 -13 Actual	2013-14 Actual	Actual Year End 2014-15	Forecast Year End 2015-16	Constrained Budget 2016-17	Optimistic Budget 2016-17
Total Milk prodtn (kgMS)	300,484	276,019	278,654	288,652	288,324	288,206
Milk Prod kgMS/ ha -160ha	1,878	1,725	1,742	1,804	1,802	1,801
Milk Prod kgMS/cow	477	438	498	520	515	515
Peak Cow Nos	630	630	560	555	560	560
Staff	3.7	3.7	3.70	3.70	3.70	3.70
Income - Milk price$/kgMS	3.9	$3.90	$3.90	$3.90	$3.90	$3.90
Dividend /share	$0.40	$0.40	$0.40	$0.40	$0.40	$0.40
Milksolid Revenue	$1,171,888	$1,076,474	$1,086,751	$1,125,860	$1,124,464	$1,124,003
Dividend	$120,194	$110,408	$111,462	$115,473	$115,330	$115,282
Surplus dairy stock	$182,337	$197,597	$161368	$114470	$112961	$112959
Less DairyNZ Levy	-$10,817	-$9,937	-$10,032	-$10,393	-$10,380	-$10,375
Stock Purchases	-$25,740	-$23,165	-46280	-84960	-24000	-24000
Gross Farm Revenue	**$1,437,861**	**$1,351,377**	**$1,303,269**	**$1,260,450**	**$1,318,375**	**$1,317,869**
Expenses						
Cow Costs - Animal health	$60,886	$54,275	$57,168	$63,606	$41,771	$53,562
Breeding Expenses	$51,644	$51,929	$51,081	$34,674	$34,464	$41,081
Replacemt grazing & meal	$163,852	$160,642	$155,976	$131,103	$126,982	$149,452
Winter graz Herd + freight	$137,904	$201,452	$177,192	$200,271	$149,332	$149,588
Feed - Grass silage purch	$93,492	$112,115	$64,832	$24,539	$31,080	$62,160
Silage making & delivery	$9,087	$0	$2,622	$20,088	$18,240	$18,240
Giberillin	$58,441	$9,768	$6,365	$234	$13,120	$13,120
Nitrogen	$112,973	$71,041	$37,922	$45,093	$45,500	$45,500
Fertiliser & Lime	$33,288	$39,672	$31,100	$14,853	$15,680	$26,240
Irrigation - All Costs	$55,471	$46,929	$72,072	$73,167	$70,600	$70,600
Re-grassing	$14,790	$35,181	$24,083	$8,654	$12,200	$20,215
Staff Employment	$217,865	$223,920	$229,782	$231,359	$261,945	$261,945
Land Electricity-farm	$27,049	$28,654	$24,722	$28,243	$30,000	$30,000
Administration	$21,528	$22,190	$23,672	$24,951	$24,700	$24,700
Freight & Cartage	$89	$14,483	$7,318	-	-	-
Rates & Insurance	$21,020	$21,020	$21,020	$21,020	$21,020	$21,020
Repairs & Maintenance	$61,766	$55,412	$55,214	$40,876	$35,000	$35,000
Shed Exps excl. power	$7,560	$6,744	$7,180	$8,449	$9,850	$9,850
Vehicle Expenses	$34,922	$25,834	$27,046	$20,885	$31,336	$31,336
Weed & Pest	$1,340	$856	$1,350	$1,174	$500	$500
Cash FWE	**$1,184,967**	**$1,182,117**	**$1,077,717**	**$993,239**	**$973,320**	**$1,064,109**
FWE /kgMS	**$3.94**	**$4.28**	**$3.87**	**$3.44**	**$3.38**	**$3.69**
Depreciation est.	$105,000	$116,000	$116,000	$116,000	$116,000	$116,000
Total Operating Expenses	$1,289,967	$1,298,117	$1,193,717	$1,109,239	$1,089,320	$1,180,109
Dairy Operating Profit	$147,894	***$53,260***	***$109,552***	***$151,211***	***$229,055***	***$137,760***
DOP/ha	**$924**	**$333**	**$685**	**$945**	**$1,432**	**$861**
Cash Operating Surplus	$252,894	$169,260	$225,552	$267,211	$345,055	$253,760
Cash Op Surplus per ha	**$1,581**	**$1,058**	**$1,410**	**$1,670**	**$2,157**	**$1,586**

Notes and considerations regarding the farms 'Optimistic' 2016-17 Budget:

1. 160 ha, fully irrigated, growing approximately 19 tonne DM/ha / utilising approximately 15 tonne DM/ha (80% utilisation).
2. 180 kgN fertiliser /ha
3. 168 tonne DM imported grass silage (300kgDM/cow)
4. 80 cows grazed on platform over winter, remainder off farm and return to farm as springers / calved cows depending on winter growth rates
5. Calves and Replacements off farm
6. 600 kgDM/ha silage made on farm (96 t DM / 171 kgDM/cow)
7. 580 cows wintered, 560 cows peak milked, 155 R1yrs and 155 R2yr's
8. Calves reared on colostrum then purchased calf milk replacer and meal
9. 15 ha regrassed (spray / cultivation / drill) + 8 ha undersowing as required
10. R&M pivot ruts non-negotiable, other maintenance based on experience of plant and machinery to date
11. Administration, rates, insurance, accountancy modelled based on similar sized owner operator farms
12. Farm manager, assistant farm manager (2IC) and two farm assistants. Staff paid rental allowance and rent charged for house on farm
13. 25kgN applied as Ammo 36 (first round, whole farm) then urea for subsequent rounds
14. 400kg/ha Superphosphate as maintenance phosphate fertiliser
15. No lime (based on historic soil tests)
16. 2 application GA to whole farm early spring
17. 15 deaths within herd (2.6% cows wintered). 2 / 3 deaths in replacements
18. 119 culls from milking herd
19. 134 R2yr's to enter herd as replacements May 2017
20. 16 bulls purchased then sold for yearlings and following AI mating in herd
21. Animal health comprises minerals, annual Lepto vaccine and BVD vaccine (double shot) for herd, BVD blood tests for calves, lepto and 5in1 vaccines for calves, calf drench, mastitis, bloat and lameness treatments, teat spraying, teat sealing and dry cow therapy (DCT), calving / calf rearing expenses
22. Breeding expenses include PG and AI for heifers, DNA for replacement calves, 6 weeks AI for main herd (1.35 straws per cow), KAMARS, bull grazing and bull fertility checks, pregnancy testing, herd testing and protrack maintenance.

Fodder beet – an option?

Fodder beet is increasingly seen as an option to provide additional high energy (relatively) low cost feed, grown on the milking platform for use in late lactation and to winter a portion of cows at home.

LUDF continues to watch this with interest and has considered its role in light of both the possible impact financially and environmentally. The LUDF 2015 October focus day notes presented an analysis of some of the considerations required when evaluating the impact of this. These are summarised as follows:

- **The difference between current pasture eaten and crop eaten per ha drives profitability. Yields and utilisation are king.**

  Eg if you currently grow 18T pasture (consume 85%, i.e. eat 15 T) and achieve fodder beet yields of 25T DM/ha (consume 90%, i.e. eat 22.5T) then the difference in yield of 7.5TDM/ha eaten is a significant increase in total home grown feed. If the fodder beet yields only 20T DM/ha (consume 80%, i.e. eat 16T DM) then you are only achieving a 1T difference, much less likely to be worthwhile.

- **Skill and/or experience in growing and feeding crops is needed.**
- **There is additional complexity with more groups of animals to manage.**
- **There is additional labour required for feeding out crops (staff implications).**
- **Changes will occur to the nutrient loss for the milking platform, and the catchment where grazing has previously occurred.**

Recent analysis using Farmax shows theoretically fodderbeet may result in a small increase in profitability, however this is likely to cause an increase in nitrate leaching losses from the milking platform. While this aspect will offset some loss elsewhere in the catchment, this may be difficult to claim for farms like LUDF where the winter grazing is contracted out.

The Farmax analysis uses a standard set of farm costs for Canterbury and a long run milk price (currently using $5.80). The scenario has effectively replaced grass silage harvested in the summer (on the platform) with fodderbeet grown through this period and fed in late autumn, and to a portion of cows over the winter. This is evident in the pasture conserved feed expenses which drop by $14,640. Of interest also are the establishment costs for the fodderbeet (of approx. $18,640) which are less than the reduction in (winter) grazing cost of $25,200.

Interestingly milk production in the way Farmax modelled the scenario is virtually unchanged, so the answer is insensitive to milk price (though remains sensitive to the relative winter grazing price). It could be argued that while the overall $25,700 difference in farm working expenses is substantial, it is 2.8% of total farm working expenses and therefore this level of overall difference is perhaps within the margin of error of both the modelling, and practicality of implementing the system as modelled.

Simple aspects such as delayed pasture establishment could be sufficient to tip the analysis in favour of the current situation.

The Farmax outcomes are presented below (on an annual basis). The fodderbeet example is on the left while the farms current performance (labelled 'Monitoring') is the second data column.

(Thanks to Jeremy Savage, Macfarlane Rural Business for the Farmax analysis, and DairyNZ for the system analysis above)

FARMAX
YOUR ADVANTAGE

Compare Forecast Profit and Loss

Jun 15 - May 16

			Fodderbeet	Monitoring	Difference
Revenue	Stock	Net Milk Sales - this season	1,699,095	1,689,250	-9,845
		Net Milk Sales - last season	0	0	0
		Net Milk Sales - dividend	0	0	0
		Net Livestock Sales	55,502	61,670	6,168
		Contract Grazing	0	0	0
		Change in Livestock Value	0	0	0
		Total	**1,754,596**	**1,750,920**	-3,677
	Crop & Feed	Capital Value Change	784	-415	-1,199
		Total	784	-415	-1,199
	Total Revenue		**1,755,380**	**1,750,505**	-4,876
Expenses	Wages	Wages	156,782	156,782	0
		Management Wage	31,024	31,024	0
	Stock	Animal Health	60,940	60,940	0
		Breeding	24,930	24,930	0
		Farm Dairy	12,742	12,742	0
		Electricity	19,944	19,944	0
	Feed/Crop	Pasture Conserved	7,680	22,320	14,640
		Feed Crop	18,640	0	-18,640
		Bought Feed	28,640	33,165	4,525
	Grazing	Grazing	212,387	237,596	25,209
	Other Farm Working	Fertiliser (Excl. N)	30,240	30,240	0
		Nitrogen	49,212	49,212	0
		Irrigation	114,880	114,880	0
		Weed & Pest Control	5,920	5,920	0
		Vehicle Expenses	19,200	19,200	0
		R&M Land/Buildings	52,800	52,800	0
		Freight & Cartage	6,648	6,648	0
	Overheads	Administration Expenses	16,800	16,800	0
		Insurance	6,080	6,080	0
		ACC Levies	5,760	5,760	0
		Rates	10,880	10,880	0
	Total Farm Working Expenses		**892,129**	**917,863**	25,734
	Depreciation		53,280	53,280	0
	Total Farm Expenses		**945,409**	**971,143**	25,734
Economic Farm Surplus (EFS)			**809,972**	**779,362**	-30,610
Farm Profit before Tax			**809,972**	**779,362**	-30,610
Farm Profit per ha before Tax			**5,062**	**4,871**	-191

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.

FARMAX
YOUR ADVANTAGE

Compare Physical Summary

Jun 15 - May 16

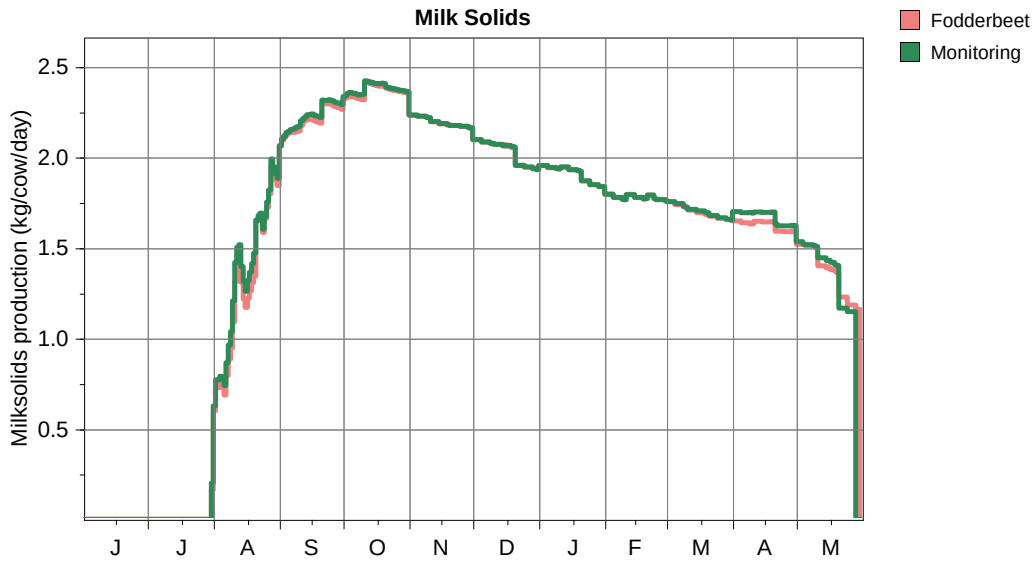
Category	Description	Fodderbeet	Monitoring	Difference	Units
Farm	Effective Area	160	160	0	ha
	Stocking Rate	3.5	3.5	0.0	cows/ha
	Potential Pasture Growth	23.0	22.8	-0.2	t DM/ha
	Nitrogen Use	176	176	0	kg N/ha
	Feed Conversion Efficiency (eaten)	10.6	10.5	0.0	kg DM eaten/kg MS
Herd	Cow Numbers (1st July)	555	555	0	cows
	Peak Cows Milked	555	555	0	cows
	Days in Milk	281	276	-5	days
	Avg. BCS at calving	5.3	4.8	-0.5	BCS
	Liveweight	1,705	1,694	-11	kg/ha
Production	Milk Solids total	294,675	292,967	-1,707	kg
(to Factory)	Milk Solids per ha	1,842	1,831	-11	kg/ha
	Milk Solids per cow	531	528	-3	kg/cow
	Peak Milk Solids production	2.40	2.41	0.01	kg/cow/day
	Milk Solids as % of live weight	108.0	108.1	0.1	%
Feeding	Pasture Eaten per cow *	4.5	4.5	0.0	t DM/cow
	Supplements Eaten per cow *	0.5	0.4	-0.1	t DM/cow
	Off-farm Grazing Eaten per cow *	0.6	0.6	0.0	t DM/cow
	Total Feed Eaten per cow *	5.6	5.6	0.0	t DM/cow
Diagnostics	Pasture Eaten per ha	15.7	15.8	0.1	t DM/ha
	Supplements Eaten per ha	1.8	1.4	-0.4	t DM/ha
	Off-farm Grazing Eaten per ha	3.7	3.9	0.2	t DM/ha
	Total Feed Eaten per ha	21.3	21.1	-0.1	t DM/ha
	Supplements and Grazing / Feed Eaten *	20.0	18.9	-1.1	%
	Bought Feed / Feed Eaten *	4.6	5.6	1.0	%

(*) feed eaten by females > 20 months old / peak cows milked

FARMAX
YOUR ADVANTAGE

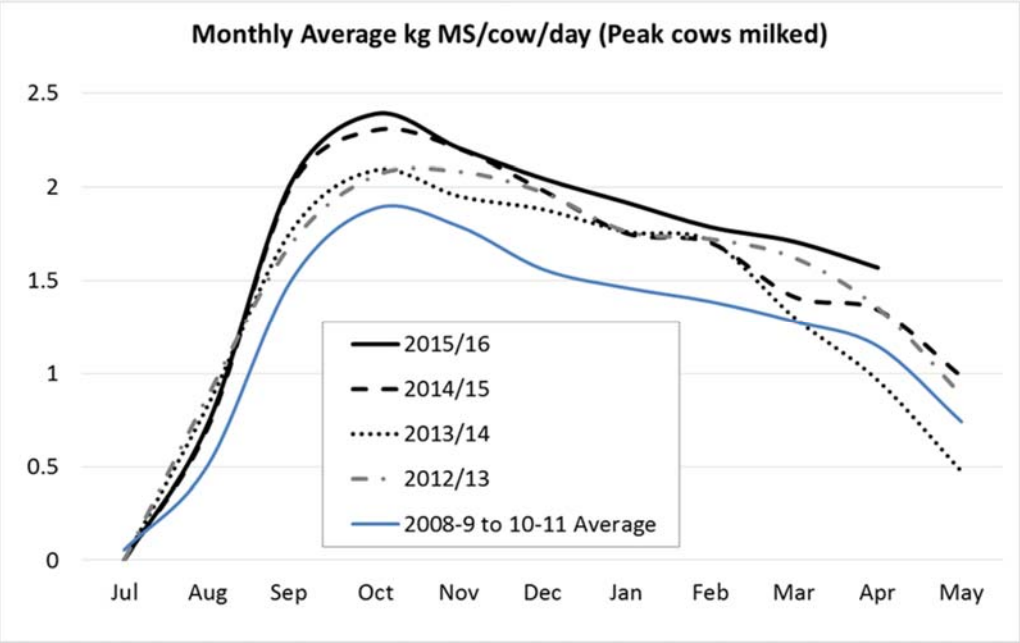
Compare Milk Solids

Jun 15 - May 16

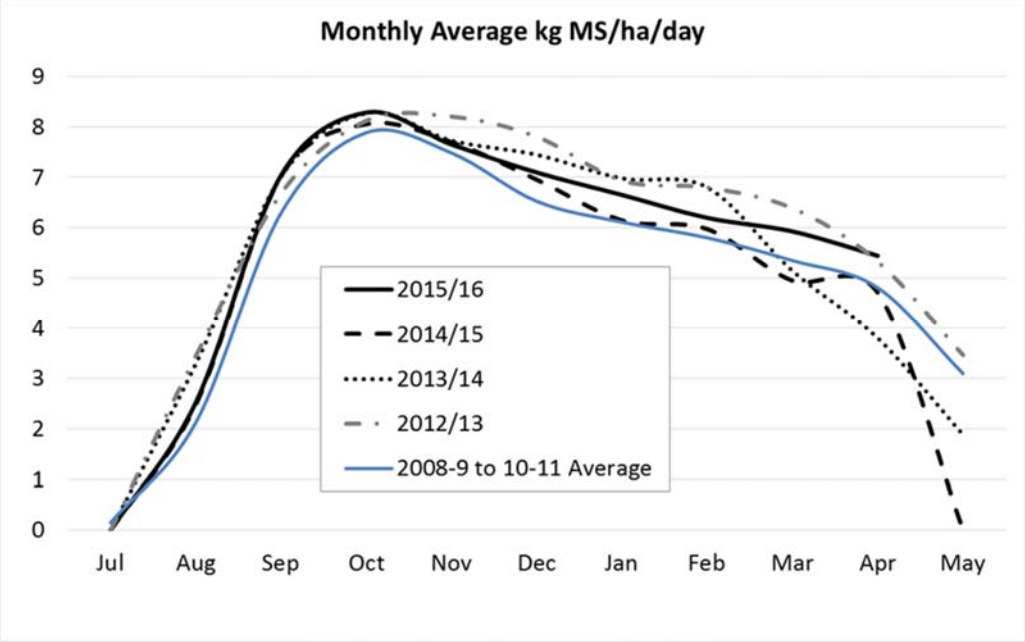


Update on LUDDF performance season-to-date

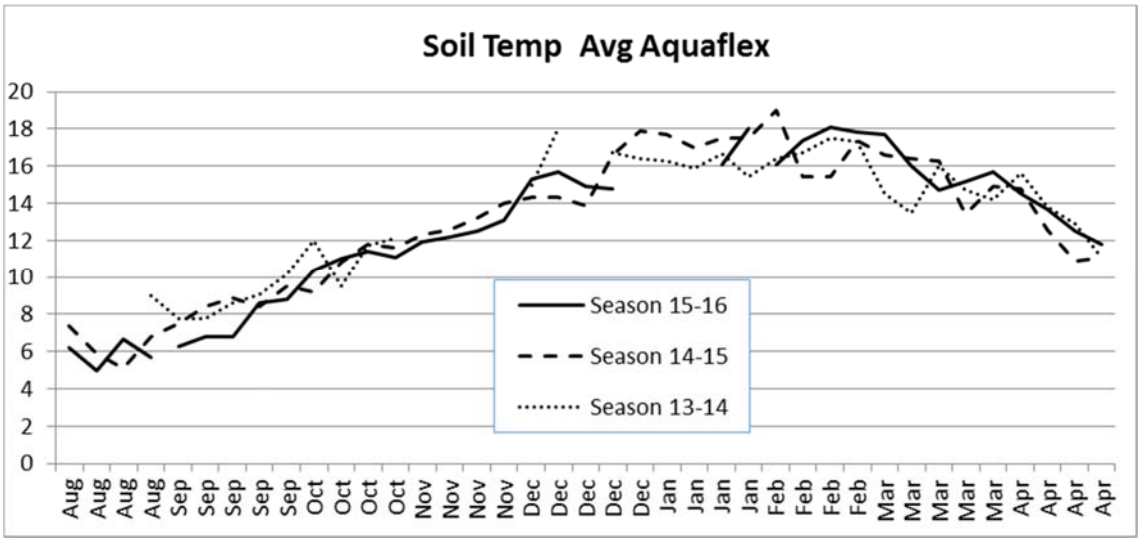
Milk Production



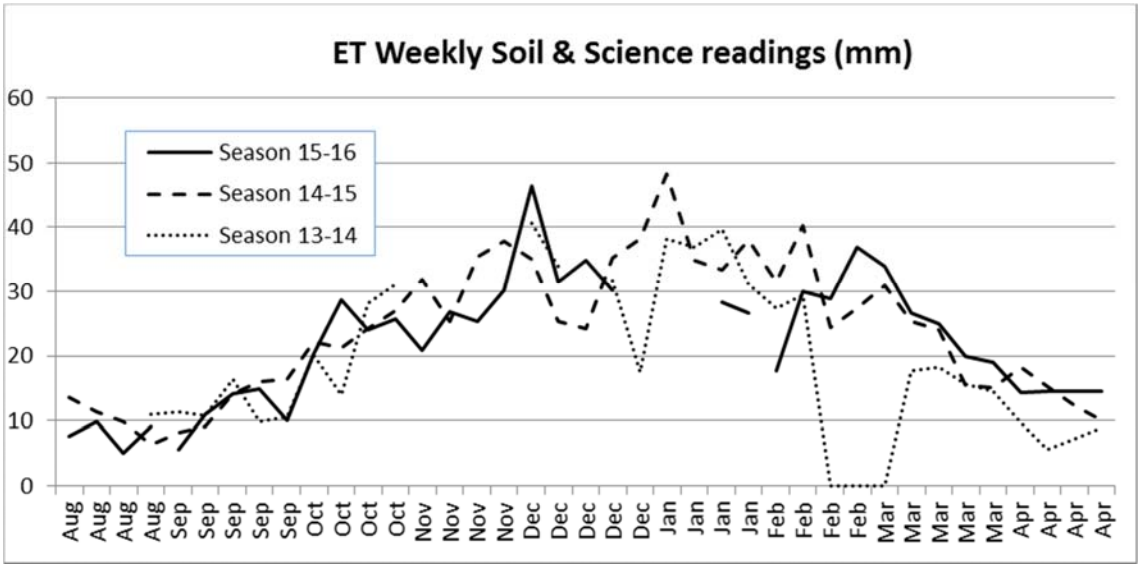
In terms of the milk production/cow, the graph above shows that cows this season the herd has produced more milk/cow than ever before at LUDF. Once the November dip passed, the drop from peak has been relatively smooth and the herd has been maintained production of around the 1.7 kgMS/cow/day up until late April.



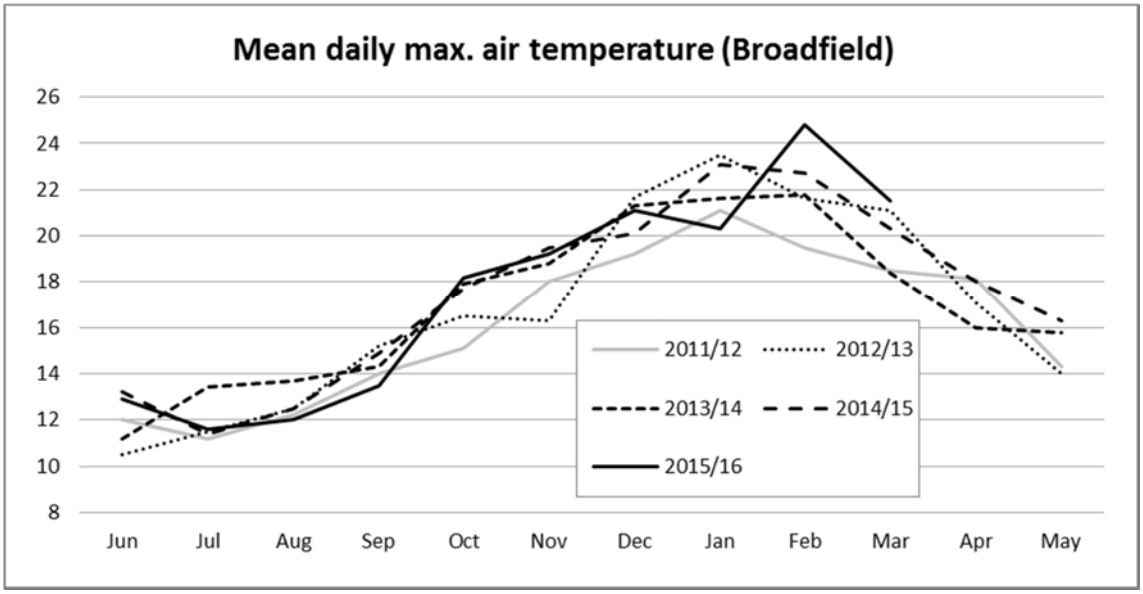
Weather and Environment



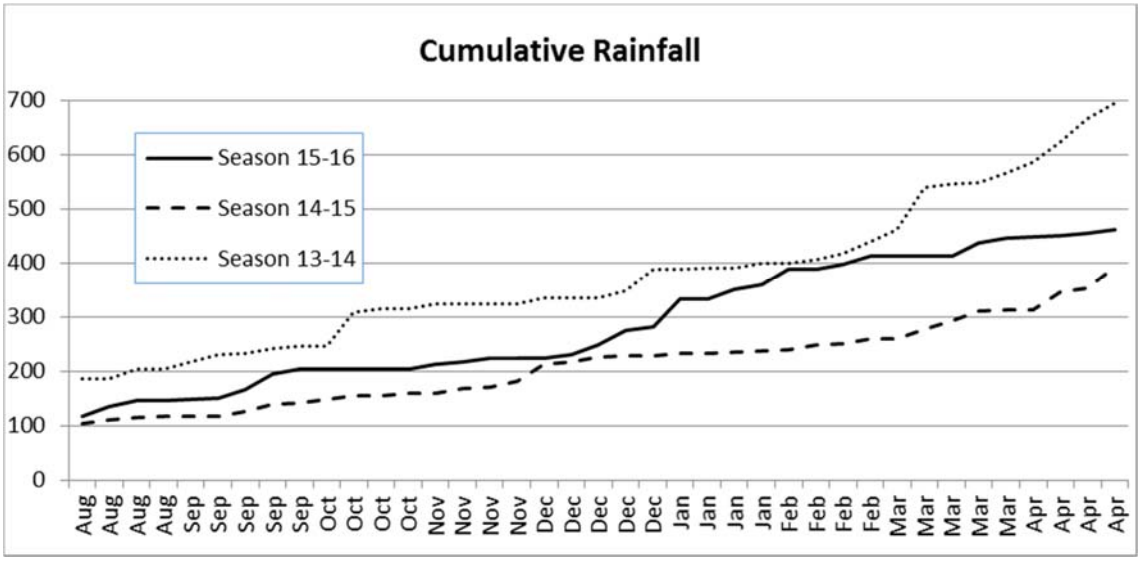
Soil temperatures have been keeping on par or slightly above last season's for the autumn. This has allowed for some good growth rates with a more even April than in previous years.



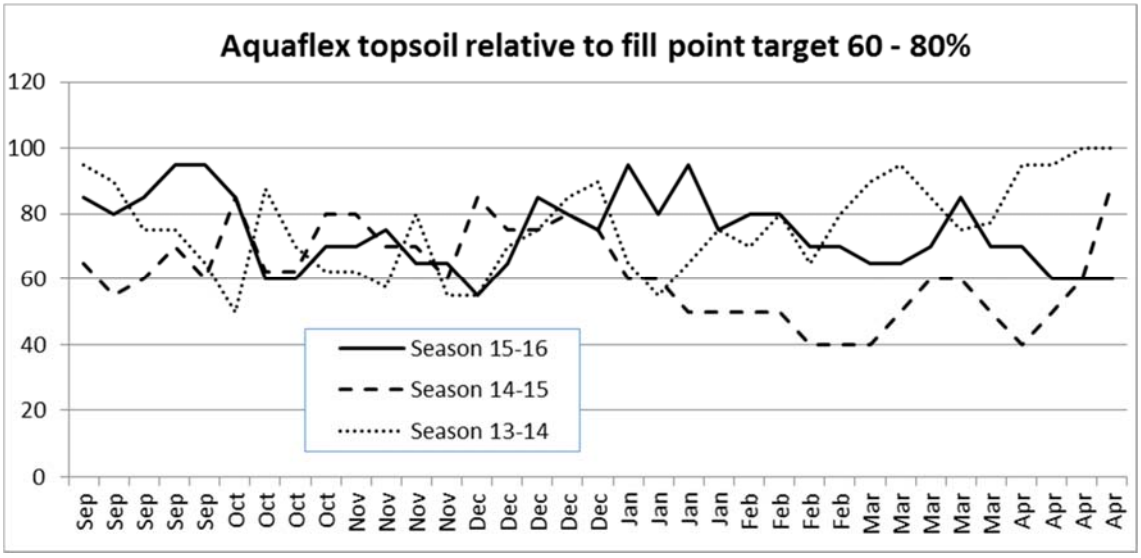
In terms of ET, the milder temperatures and the occasional north-west wind have kept the ET slightly above previous seasons.



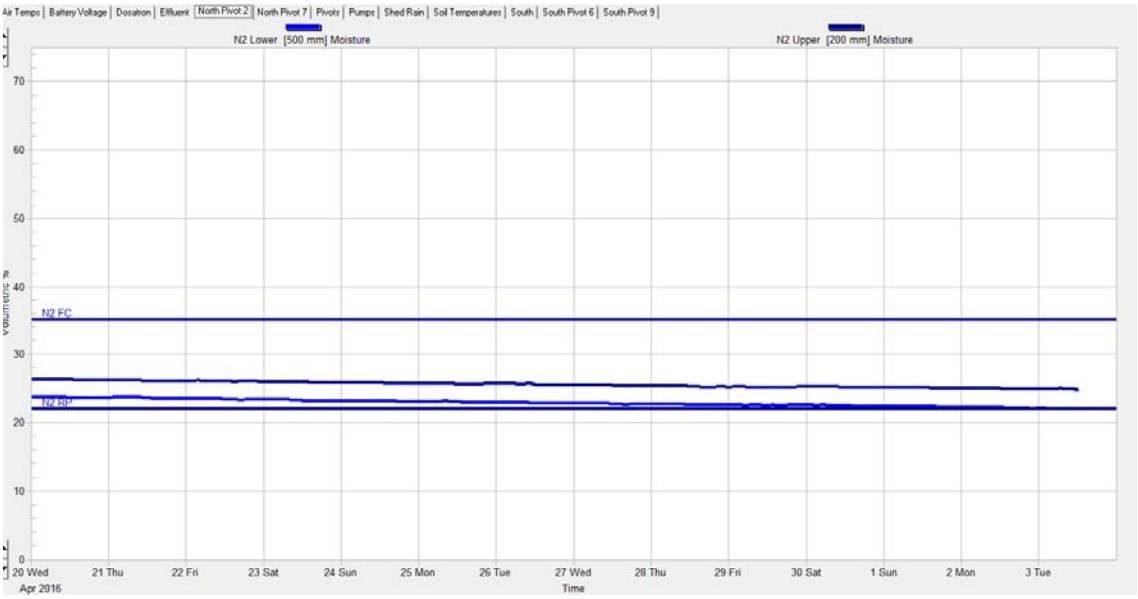
February was a hotter month than previously experienced on the farm. However, with the rain that feel through the December/January period and the full use of irrigation, the temperatures provided ideal growing weather for pastures. This allowed good responses to nitrogen fertiliser to both feed cows and harvest a surplus to feed in the autumn.

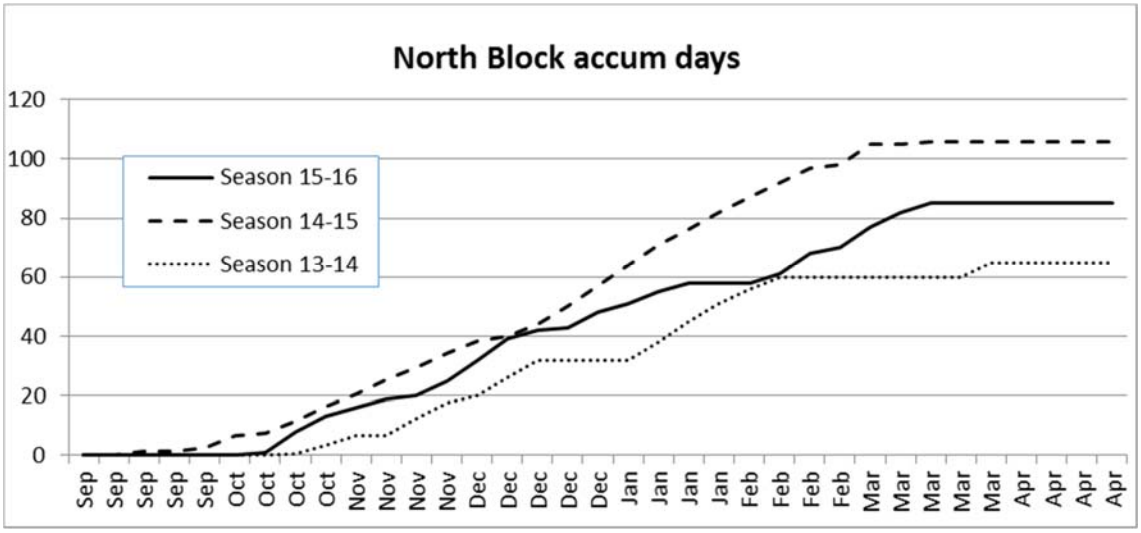


In terms of rainfall, after those December/January falls, there has been little to no rain of any significance.



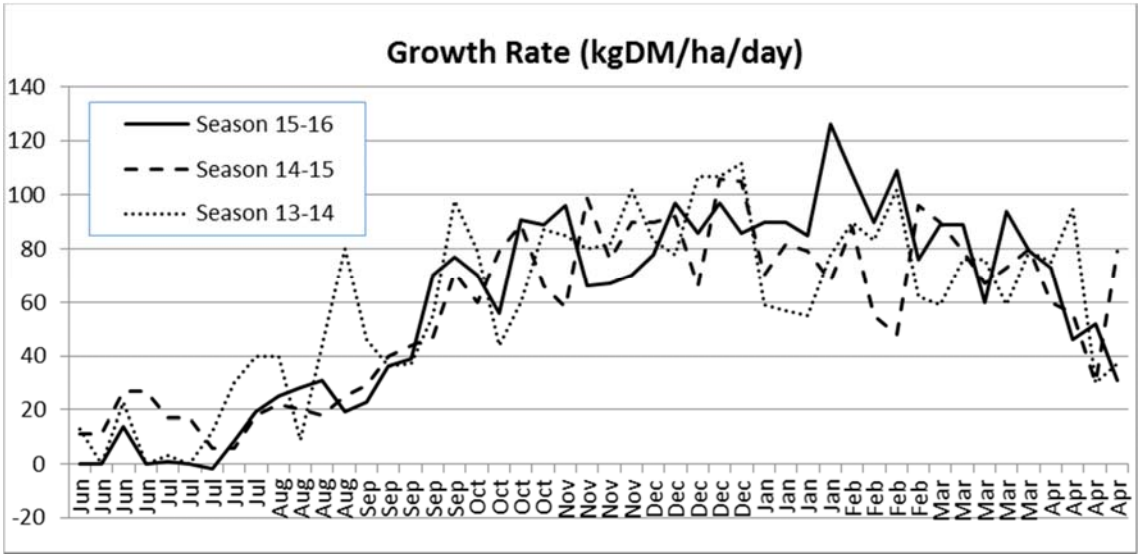
Soil moisture tape data above shows the moisture levels dropping steadily from mid-March when irrigation was stopped. It was felt the farm was still above stress point and for much of April, low ET and heavy dews kept pasture growing while maintaining capacity in the soil to hold any significant rainfall that may have occurred. The continued decline in soil moisture, enhanced by relatively warmer daytime and night time temperatures in late April / early May (+20°C / 10°C) has however resulted in a further reduction in soil moisture (as below) and a decision to apply 10 mm further irrigation.





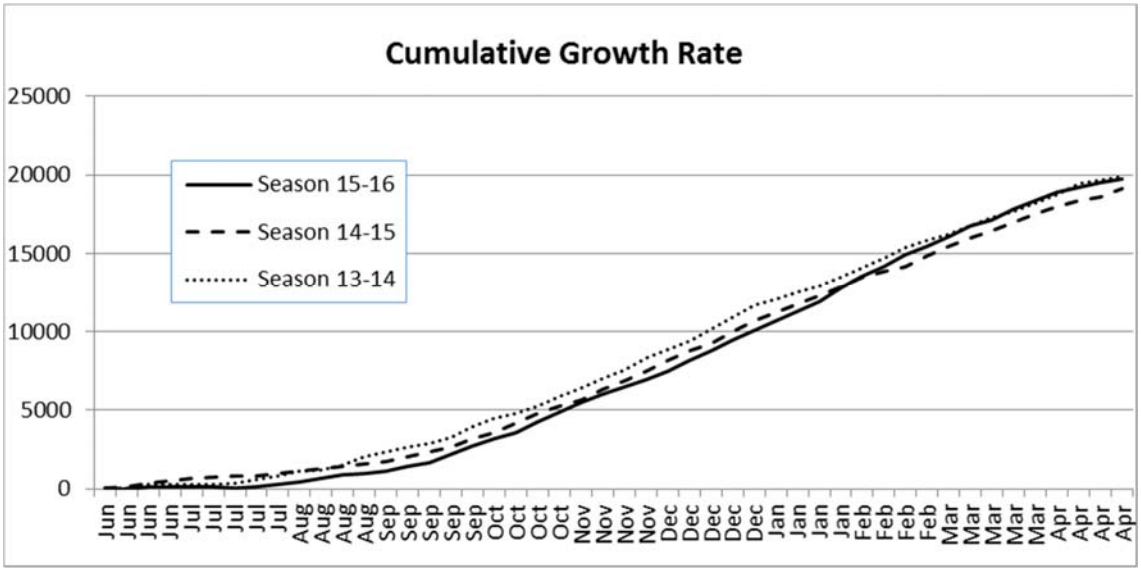
Irrigation stopped in March as in the above graph, however a further 2 days irrigation are now being applied in early May in response to the low soil moisture and continued dry warm weather forecasted into the middle of May. With the rain events of earlier in year, this season the farm has used far less irrigation than last season.

Pasture Management (grazing and quality)

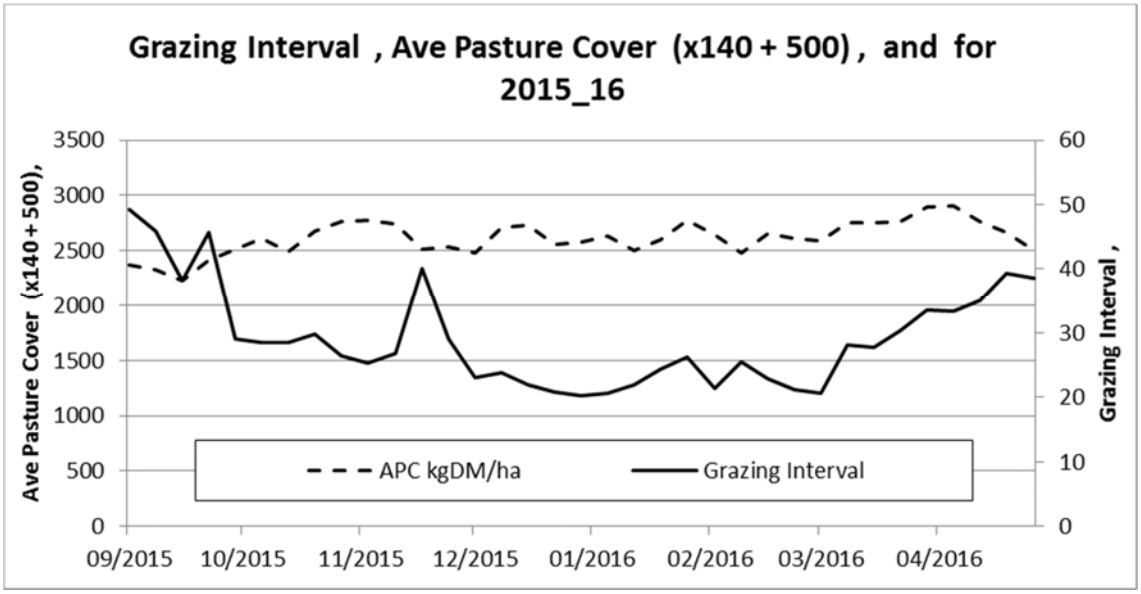


The start of 2016 provided very good pasture growth. Warm temperatures and adequate rainfall / irrigation meant that the Nitrogen appeared to provide very good responses, with a couple of weeks of growth over 100 kgDM/ha/day. This allowed the harvesting of surplus summer pasture for use on the shoulder of the season and the milking of all culls to late April.

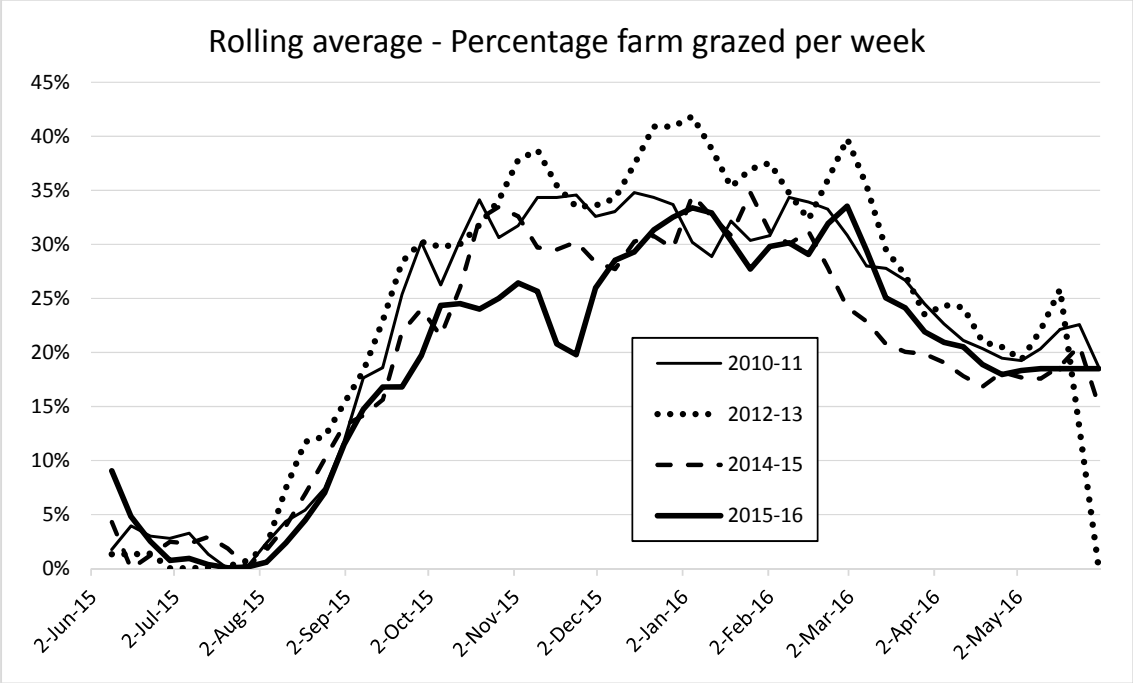
With growth rates dropping to below 40 at the end of April the farm is now reducing demand by drying off a small number of light condition cows and selling all culls. Pasture growth through the month of April have been more consistent than in previous seasons.



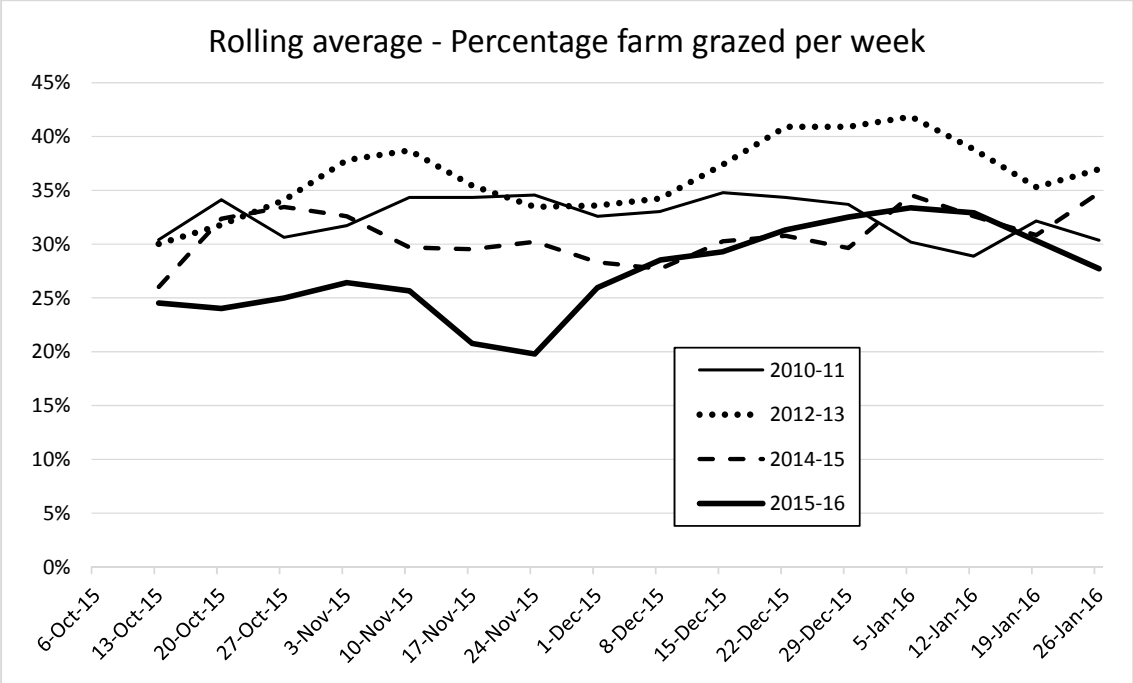
Cumulative growth over the season shows total pasture production is now on par with the 2013-14 season when Nitrogen use was 250 kgN/ha, compared to 179 kgN/ha this season. Pasture production is higher this February – which reflects the higher level of N use in January and the favourable growing conditions.

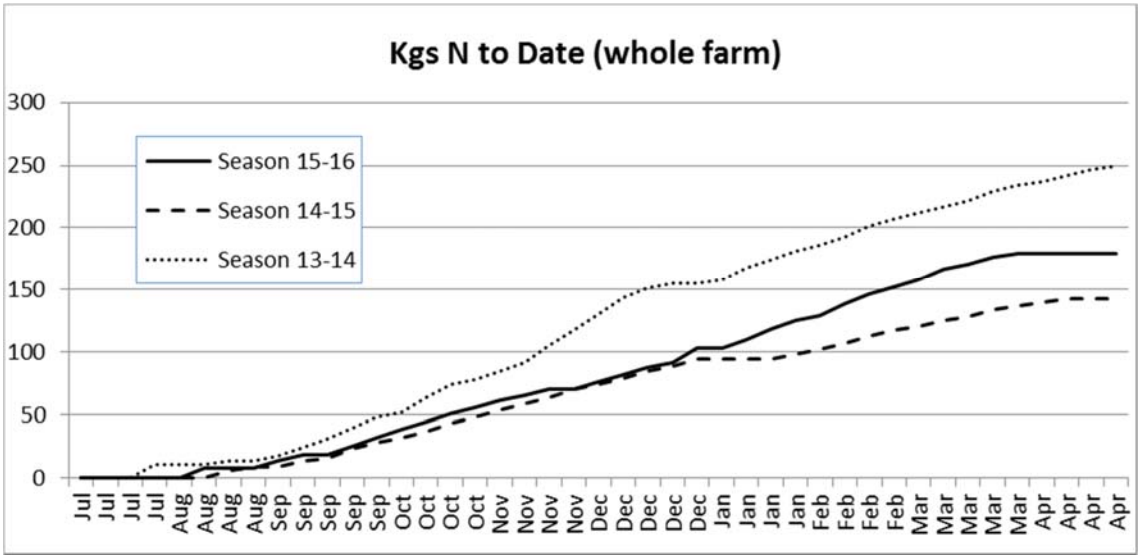


Average pasture covers at LUDF have primarily ranged between the 2500-2700 kgDM/ha through the whole season, with the exception of the months of March-April. The accumulation of cover was possible due to the type of grasses this farm carries (mostly late seeding tetraploids) which can more easily carry higher covers without losing quality (particularly at this time of year). The cover accumulated through late summer plus the surpluses harvested during the high growth periods, have contributed to the farm being able to continue milking the whole herd (including culls) up until this week, achieving last season's production 2 days ago.



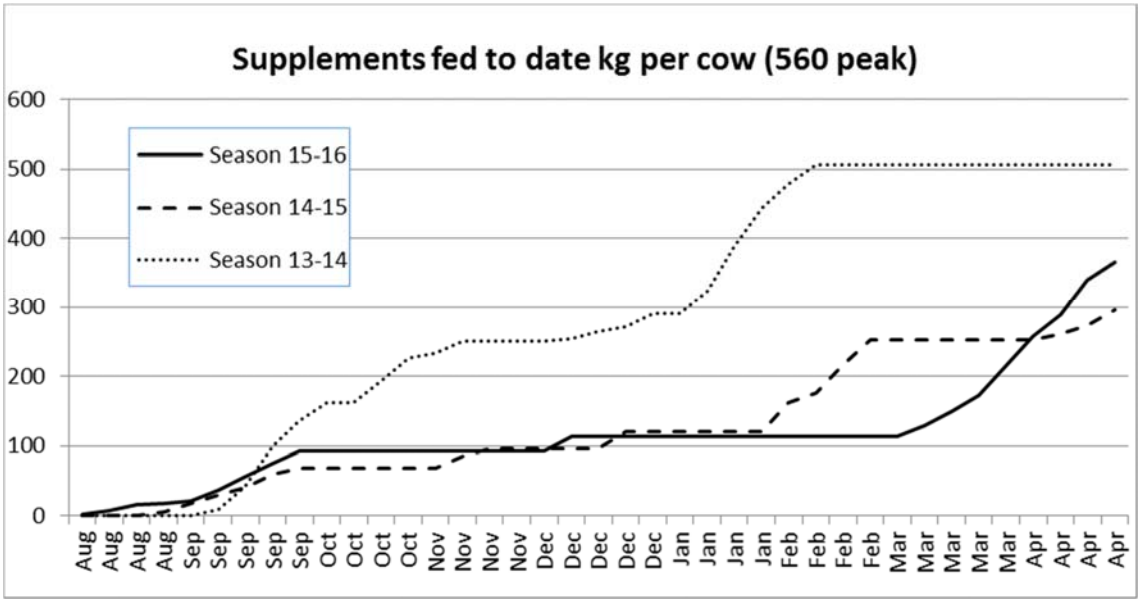
An alternative to grazing interval is the percentage of the farm grazed per week. The graph above shows the average percentage of the farm grazed each week across the season while the graph below shows this over the critical spring – summer period where the slower grazing rounds have clearly resulted in less area grazed per week in the last two seasons compared with past years.





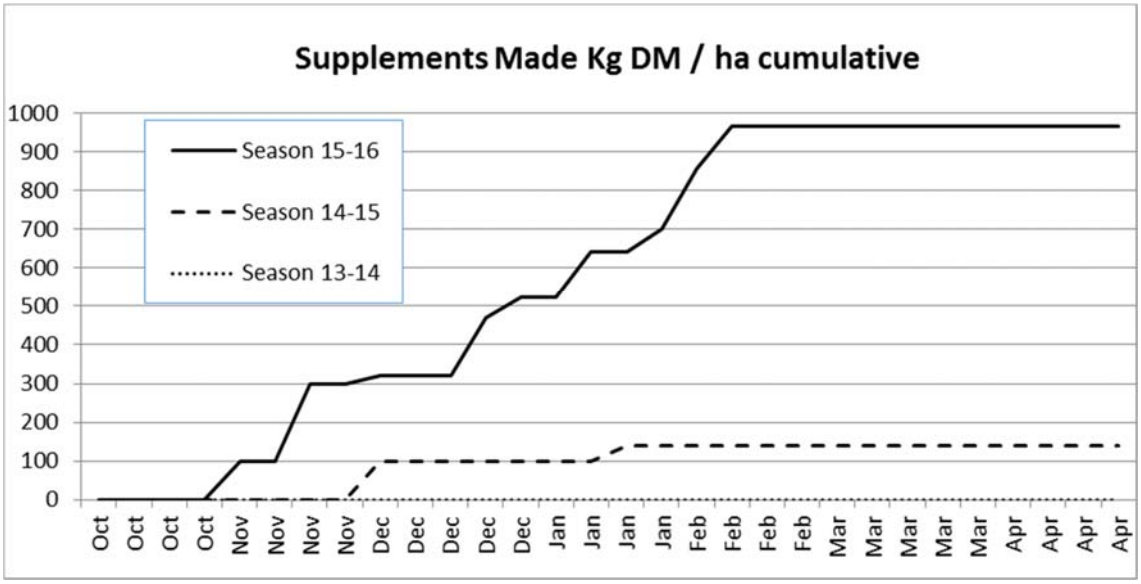
The total amount of nitrogen planned for the season was initially 160kgN/ha however this was subsequently allowed to lift a little with the total N use reaching 179kgN/ha. Last season, the farm targeted 150kgN/ha and used 143 kgN/ha however hindsight showed the farm had clearly missed some pasture growth potential in mid-summer. Secondly, Overseer modelling from last year showed the farm was well below its baseline, so the opportunity was taken to use more of the farms ability to grow pasture by targeting more Nitrogen use when high N-responses were expected. Overseer modelling (see February Focus Day notes) showed cumulative small increases for more summer N resulting in more cows in milk (and thus on the platform) in the autumn and more total milk production.

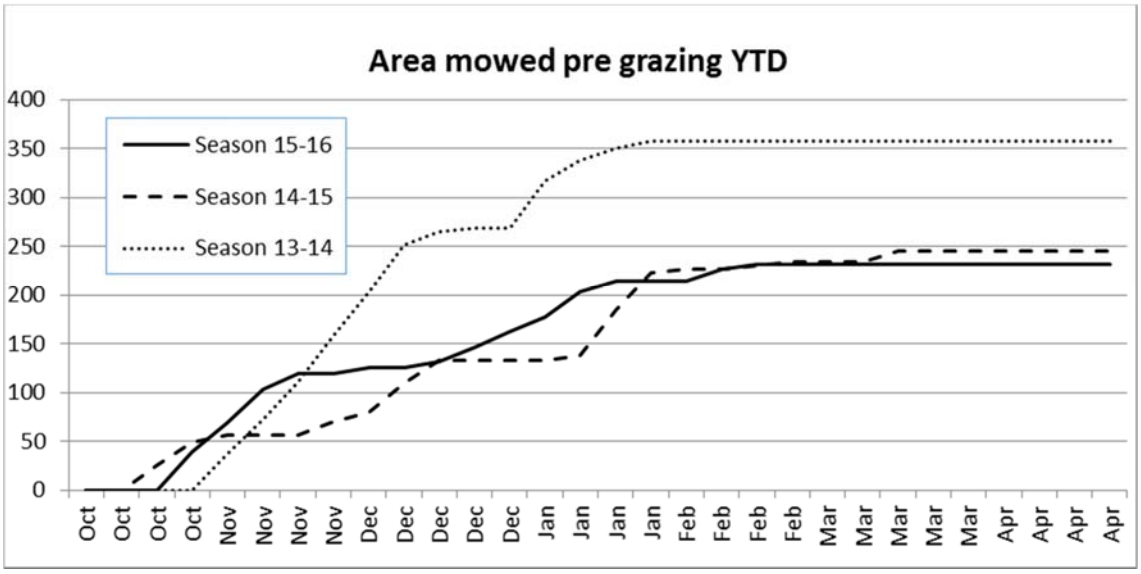
The increased N contributed to production on farm of 275 kgDM/cow silage that was subsequently fed in the autumn. This also replaced 150 kg/cow imported silage which may otherwise have been fed at this time (payout considerations excluded).



The graph above shows the total amount of supplement fed to cows including the purchased and the homemade silage. A total of 401 kgDM/cow was fed in the form of 275 kgDM/cow of homemade silage and 126 kgDM/cow of purchased supplement.

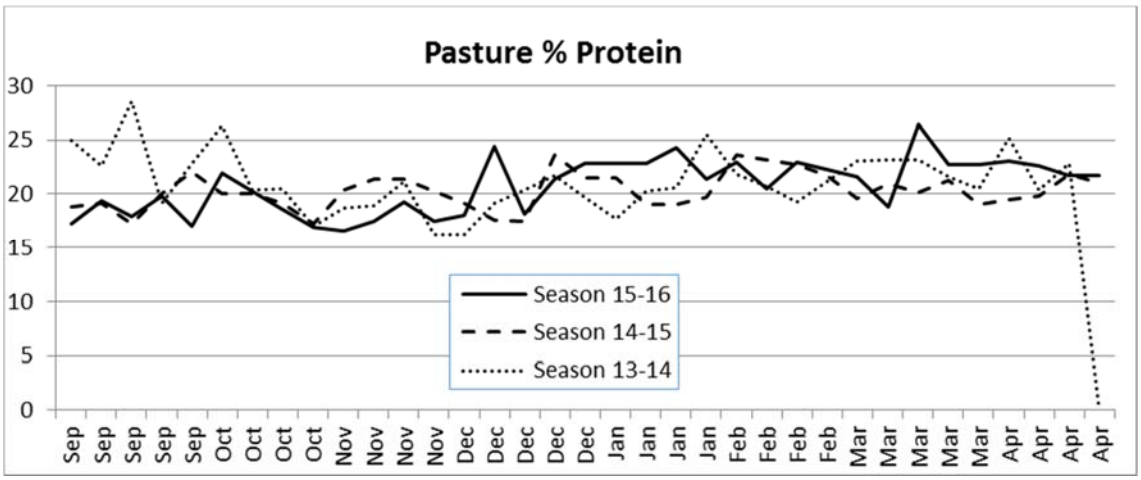
As explained earlier, the strategic use of Nitrogen allowed for high levels of growth which contributed to additional silage harvested (as below). This, and the impact of only regrassing one paddock, increased the surplus feed that was transferred to the autumn as silage.

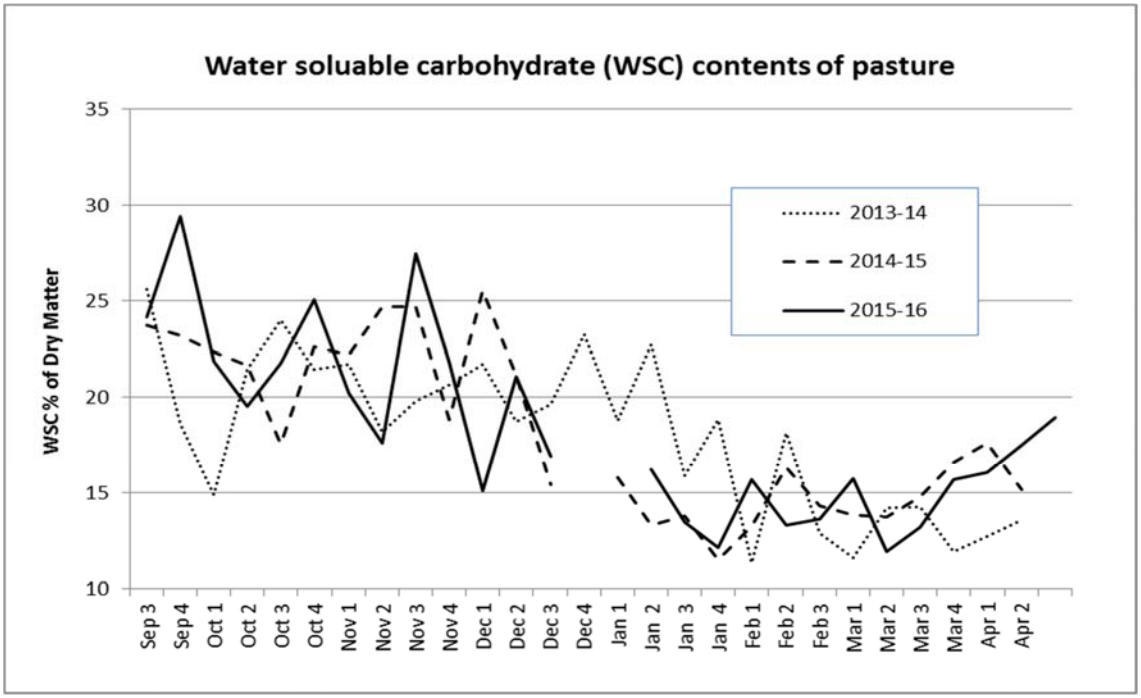




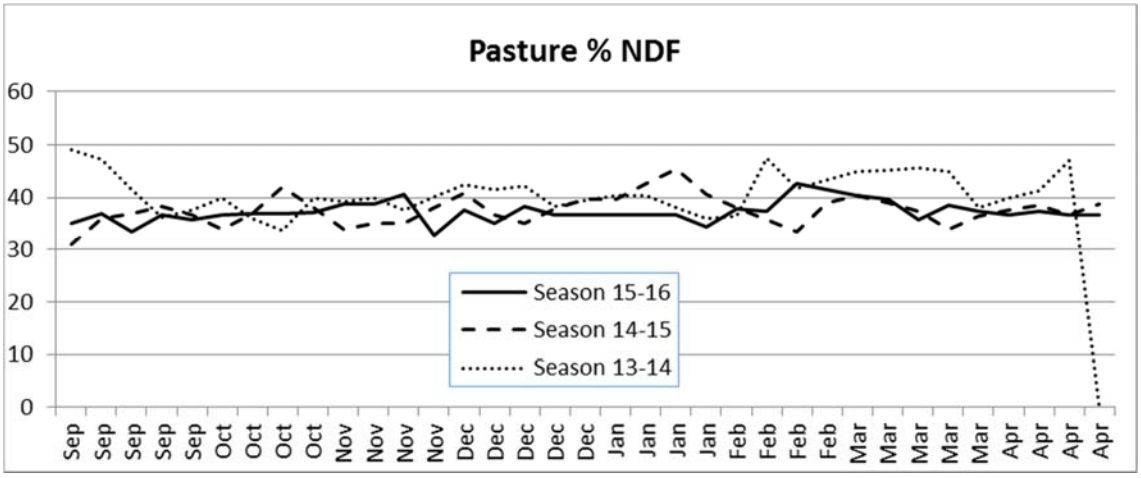
The above graph of pre-graze mowing shows a difference in timing of pre-graze mowing compared to last year, but a similar total area mowed, and a reduction compared to 2013-14. Thus this season's slightly higher growth rates and use of Nitrogen did not result in more pre-graze mowing. The total area pregraze mown is about 15% of the total area grazed over the season. Pre-graze mowing has continued to be an important part of achieving good residuals in a timely manner and managing seedhead.

Pasture Quality

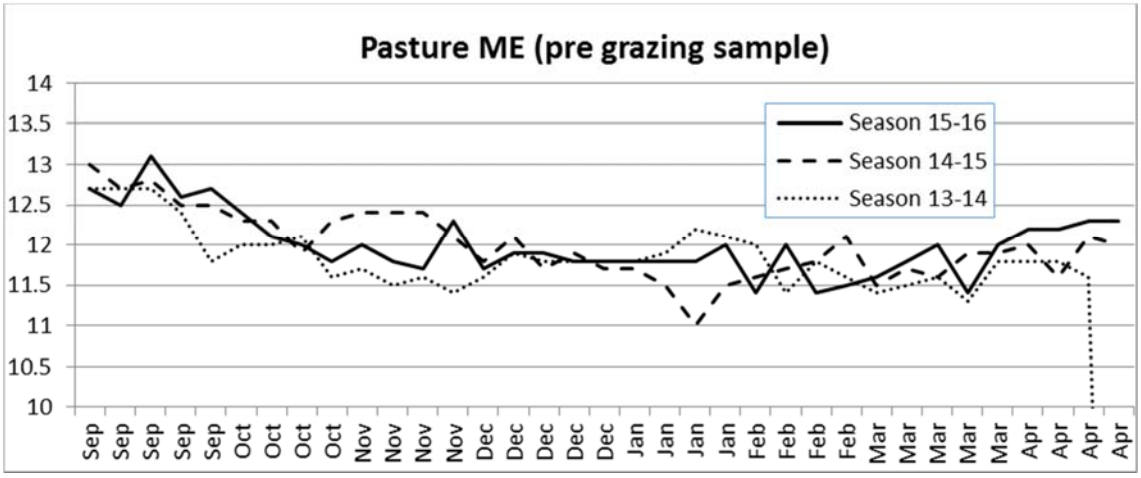




Pasture protein levels continue to track at very similar levels to previous years. Given the wide variance in N use over the last three years (351, 143 and 179kgN/ha for the 13/14, 14/15 and 15/16 seasons respectively), it's interesting that protein levels don't seem to have been particularly changed by different N use. Given the excellent per cow MS production and body condition score outcomes for the cows being similar across years, it would appear that lower N use hasn't impacted on the ability for cows to produce milk or change partitioning of nutrients to liveweight loss or gain.

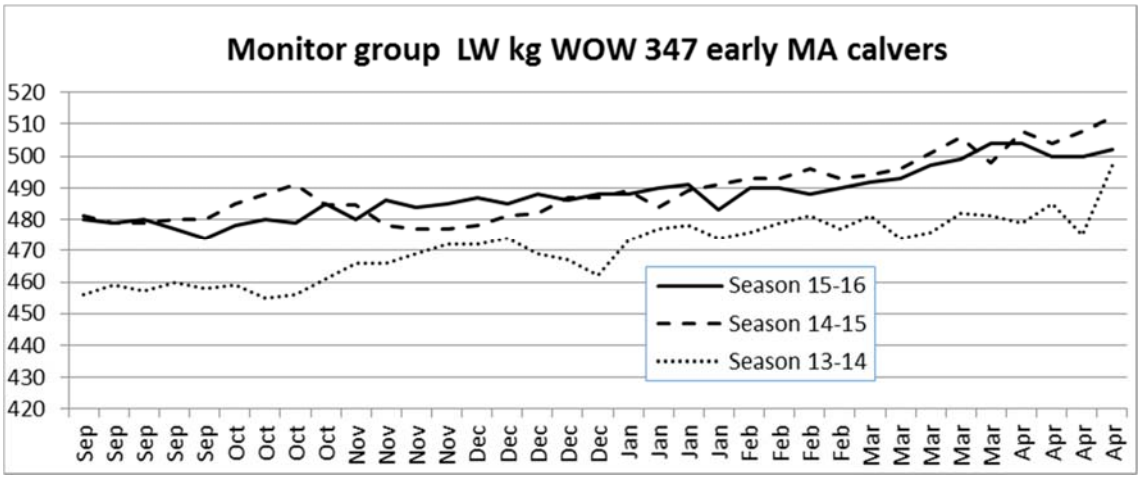


As for pasture protein, on face value it appears that this 2015/2016 season continues to track in a similar manner to previous years. This is reassuring that the LUDFs slightly slower round and higher average pasture covers over the last season do not appear to have impacted greatly on pasture quality compared to faster grazing rounds and lower APC for previous seasons.



The MJME/kgDM content of pasture shows similar trends as to the previous two seasons. Again, as for protein and NDF, this is reassuring that the change to longer grazing intervals and slightly higher APC don't appear to have impacted greatly on the MJME value of pasture for samples harvested down to low and consistent post-grazing residual heights.

Herd BCS and Health 2015/2016

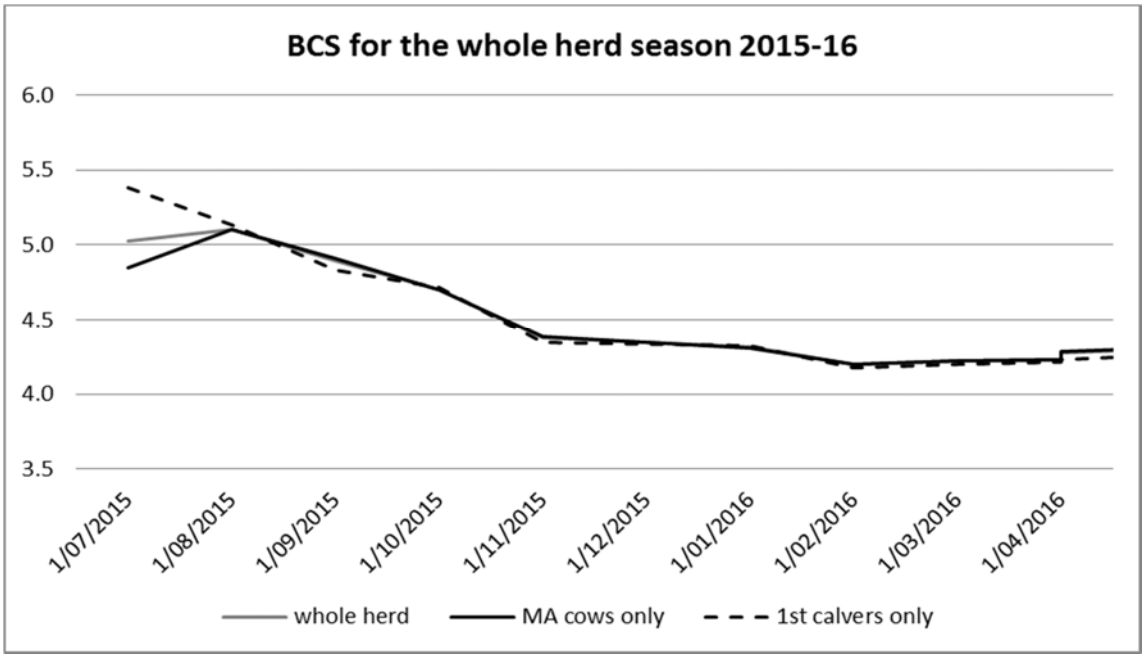


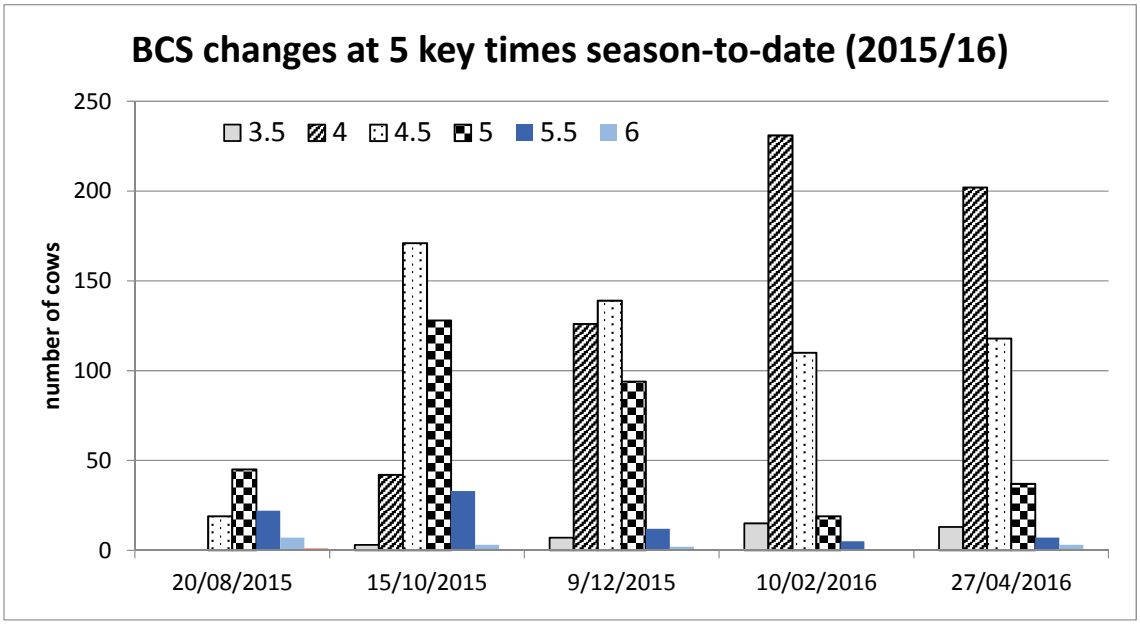
The graph above shows the live weight changes over the current season resulting in cows that are slightly lighter than at the same time last year.

First calving cows entered the herd in spring 2015 at just under target of 5.5 BCS and have, since then, tracked an almost identical change in BCS as for the MA cows.

Body condition score in both the MA and 1st calving cows has remained relatively consistent since Christmas time. Given milk production has also been similarly consistent, it is likely the majority of nutrients consumed during that time were partitioned to MS production and not BCS gain.

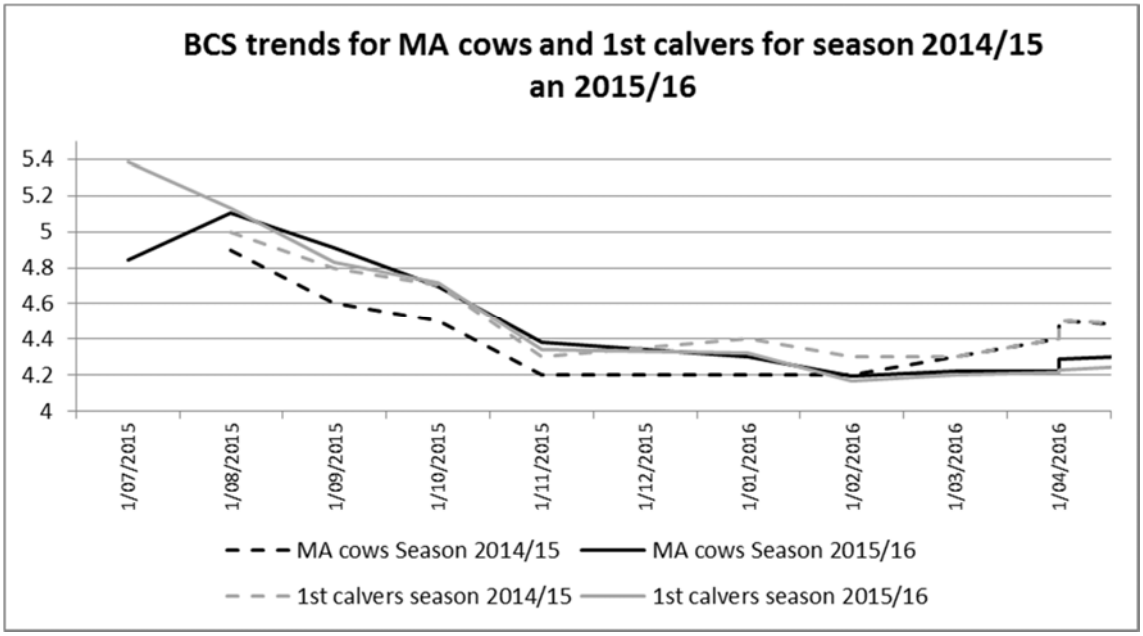
BCS trends for the whole herd, MA cows and 1st calvers through the 15-16 season follows:





The distribution of cows scored at each of the 0.5 BCS scores is shown above. The proportion of cows in the lower BCS range (3.5 and 4.0) has reduced through the latter part of the season with more cows scoring at either 4.5 or 5.0 or better at the last BCS scoring done on 27th April 2016. The shift in more cows in these higher BCS groups is required as the farm heads into the end of lactation.

The regular BCS of cows has once again proved an excellent tool for LUDF, enabling the farm team to move cows between mobs for preferential feeding in the smaller herd that is typically feed more and better quality feed, as well as keeping social pressures off cows by retaining lower numbers of cows in the smaller herd. Individual BCS scores also enables LUDF to draft cows for winter grazing with the option to feed lighter and earlier calving cows more feed when they're away grazing.



	20-Aug	15-Sep	15-Oct	12-Nov	09-Dec	13-Jan	10-Feb	10-Mar	06-Apr	27-Apr
MA cows Season 2014/15	4.9	4.6	4.5	4.2	4.2	4.2	4.2	4.3	4.4	4.5
1st calvers season 2014/15	5	4.8	4.7	4.3	4.3	4.4	4.3	4.3	4.4	4.5
BCS difference	**0.1**	**0.2**	**0.2**	**0.1**	**0.1**	**0.2**	**0.1**	**0**	**0**	**0**
MA cows Season 2015/16	5.1	4.9	4.7	4.4	4.5	4.3	4.2	4.2	4.2	4.3
1st calvers season 2015/16	5.1	4.8	4.7	4.3	4.5	4.3	4.2	4.2	4.2	4.2
BCS difference	**0.0**	**-0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**-0.1**

Despite the LUDF herd showing little change in BCS since Christmas, on average when comparing BCS of MA cows and 1st calvers with last season, both categories of animals are between 0.2 and 0.3 BCS below this same time last season. Winter grazing on pasture and pasture silage will aim to feed all cows such that they will gain 0.7 – 1 CS over the coming winter so that at this point in time, the farm is comfortable with current cow BCS. LUDF will however continue to apply the necessary rules of dry off on BCS to allow cows sufficient time to return to target BCS of 5.0 (MA cows) and 5.5 (rising three year olds) by calving 2016. Dry off rules are shown in the table below.

Only 6 animals were identified at the late April condition scoring event as being under BCS 4.0, and have been dried off. Some further dry off events will occur over the next two weeks to enable cows to meet BCS targets at calving.

Dry-off Rules used by LUDF.

Note that the timing below allows for sufficient gain in BCS from dry off to calving only when sufficient quantities of good quality feed are offered at above requirements needed for maintenance and pregnancy demands.

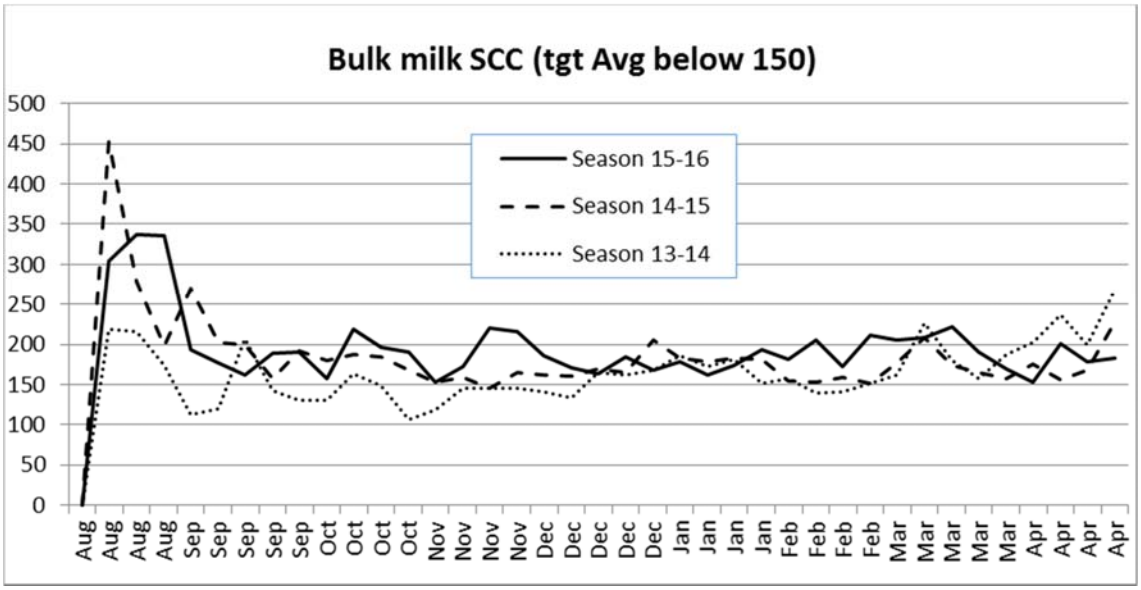
Cows (4 years old and older)

Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	100	20 April – 5 May	5-15 May
4	80	10-20 May	20 -30 May
4.5	60	NA	NA

Rising 3 year Old

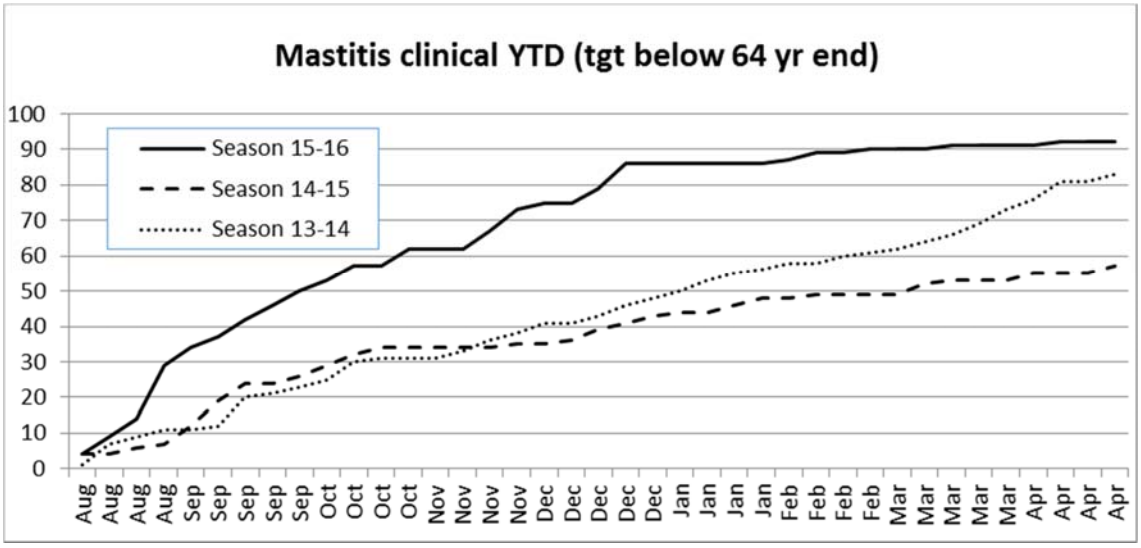
Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	120	1-15 April	15-30 April
4	100	20 April -5 May	5-15 May
4.5	80	10-20 May	20 -30 May
5	60	NA	NA

Cow Health



Somatic cell counts (SCC) have remained above target levels this season, despite best efforts to keep bulk SCC lower than 150,000. This issue has been the subject of both management and veterinary discussion over recent months. LUDF has improved control of clinical mastitis since Christmas time, and this combined with a small amount of selective culling and appropriate use of dry cow therapy should contribute to meeting the target SCC levels for the 2016/2017 season.

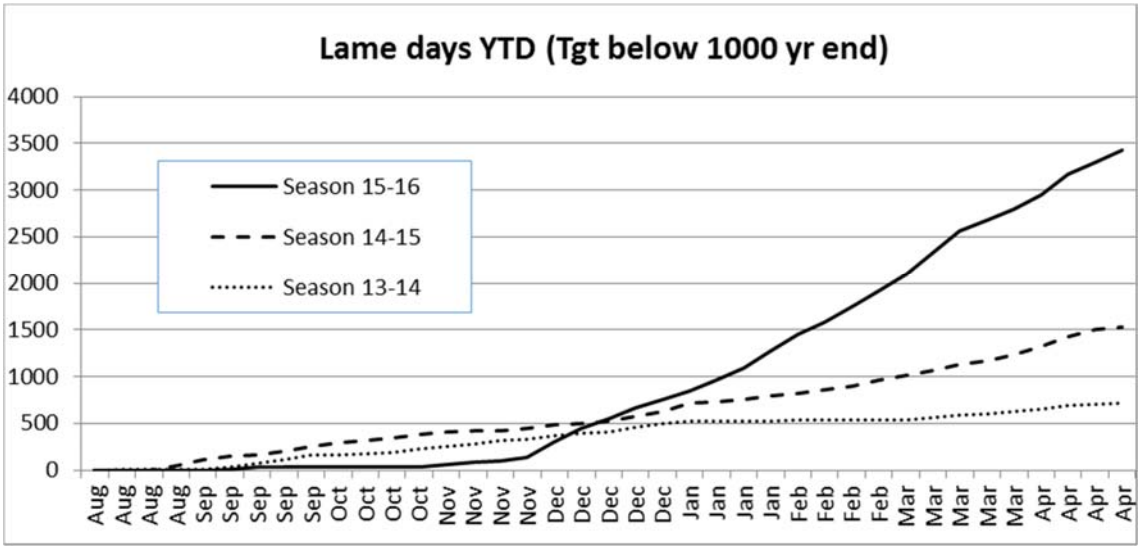
Mastitis



Incidence of clinical mastitis was an issue on the farm up until December with ongoing challenges with teat end lesions. Following changes made to teat-spray use and the vacuum of the plant, the issue of teat end lesion and teat condition improved. This seems to have controlled the occurrence of clinical mastitis however, the bulk SCC has remained high through the season (as can be the case following an early season challenge of a high incidence of clinical mastitis).

A number of treatment options have been discussed, including antibiotic treatment of high SCC cows (based on individual SCC at herd test). Following management and veterinary advice, this option was not implemented given the unlikely cost beneficial gains to be made from this process.

Lameness



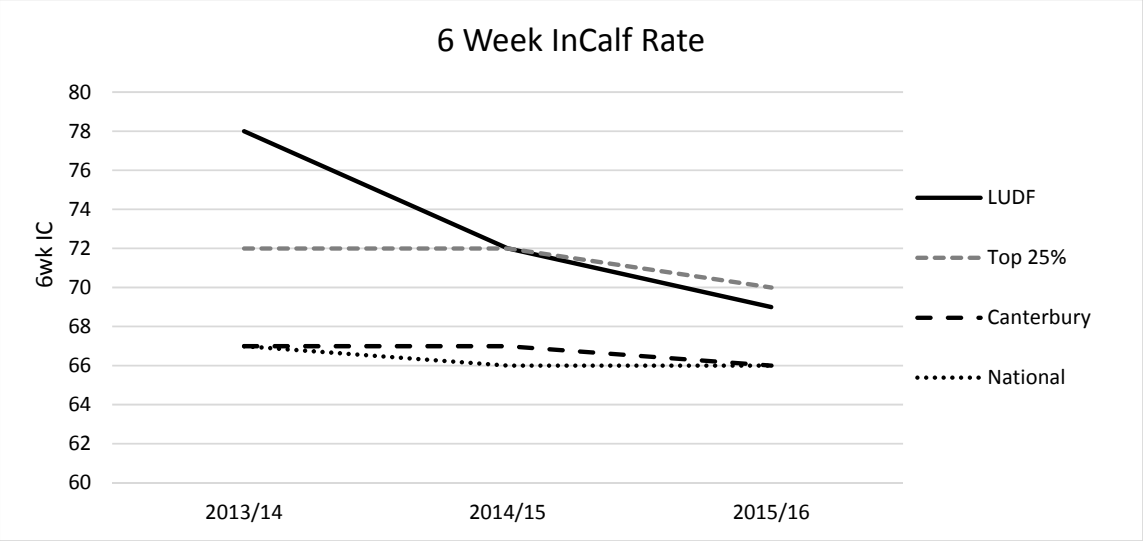
Lameness has been an ongoing issue for farm since after the rain in December/January. Cows are identified early and treated by hoof trimming and treatment as required. No preventive hoof trimming

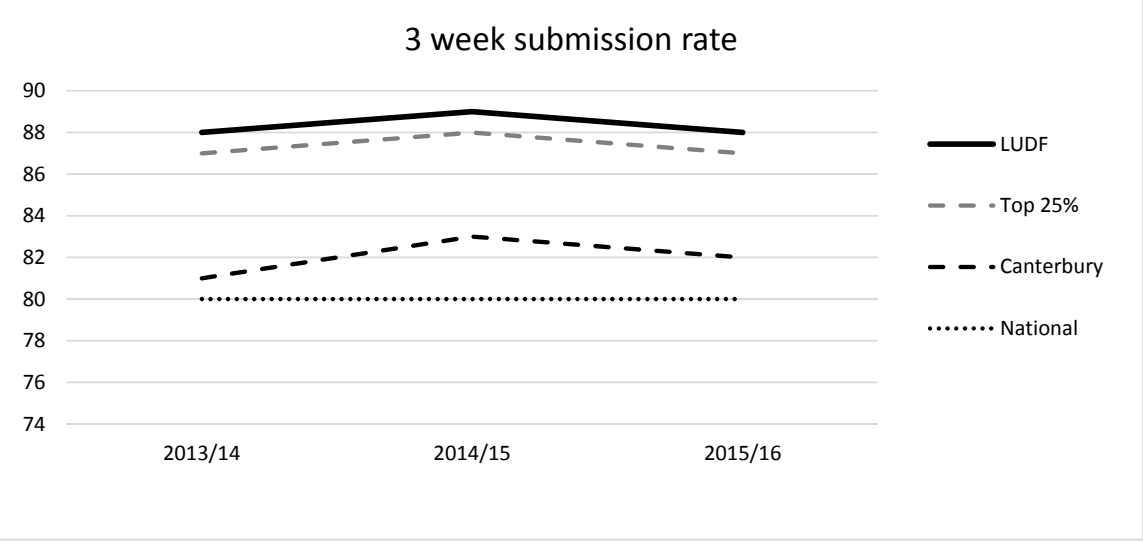
is done. Milking techniques, use of backing gate and stock management on lanes continue to be re-evaluated and conclusions are that these aspects of cow management are appropriate and unlikely to be a major contributor to the current lameness issue.

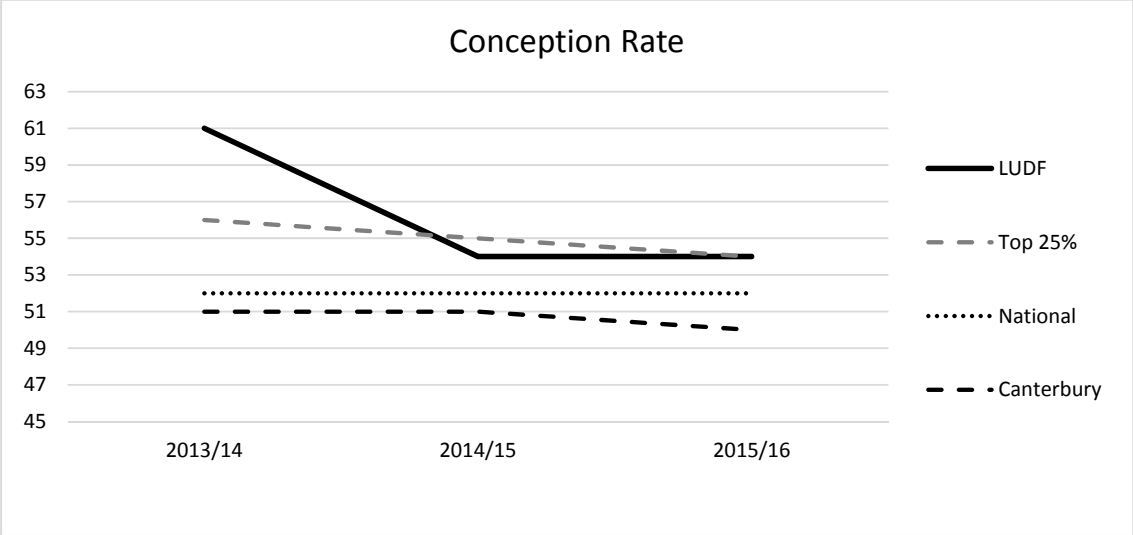
Potentially there could be some work to be done on some lanes on the South Block where the cap on the lane requires some remedial work.

6 Week InCalf Rate

As presented at the February 2016 focus day event, substantial analysis of the decline in incalf results for LUDF provided limited answers. LUDF results are presented below for the past 3 years, along with the Canterbury average results, top 25% and National results. These show a similar decline for all groups from 2014-15 to 2015-16.






Conception Rate
63
61
59
57
55
53
51
49
47
45
2013/14
2014/15
2015/16
LUDF
Top 25%
National
Canterbury

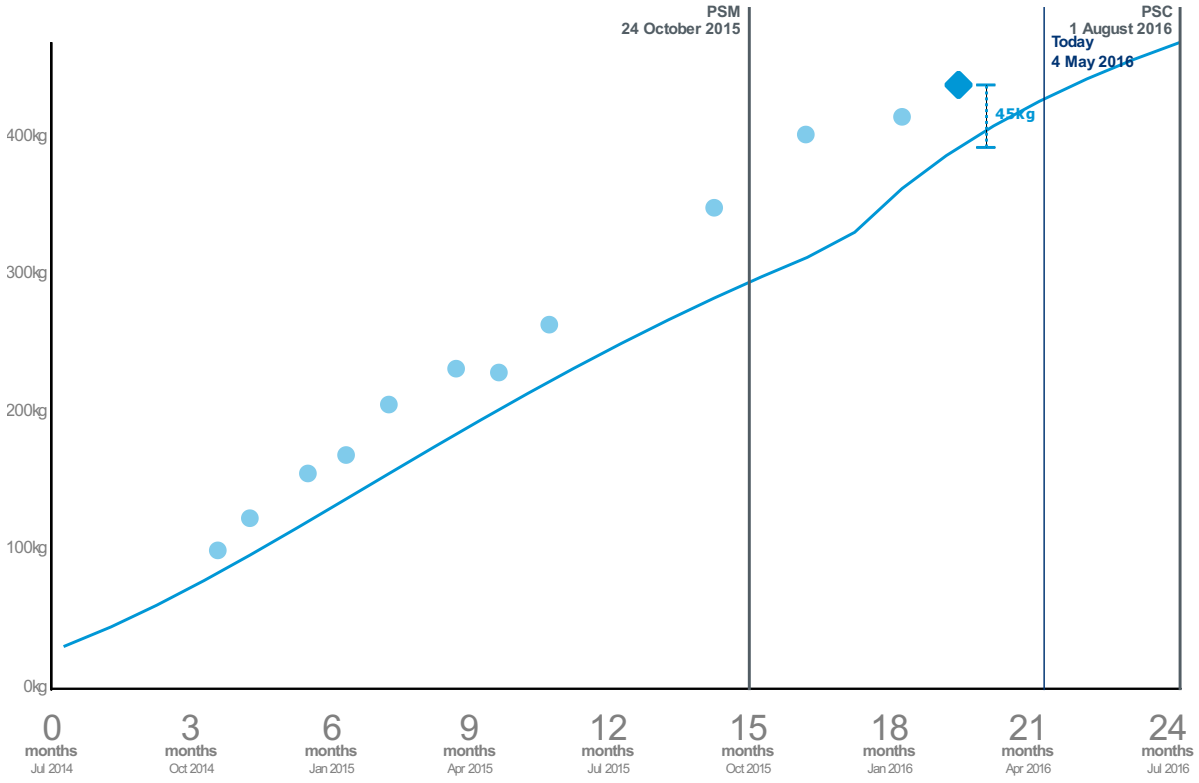
2014 Spring Born

9/03/2016

BQCY

Young stock trend

All 102 animals in this weighing are displayed



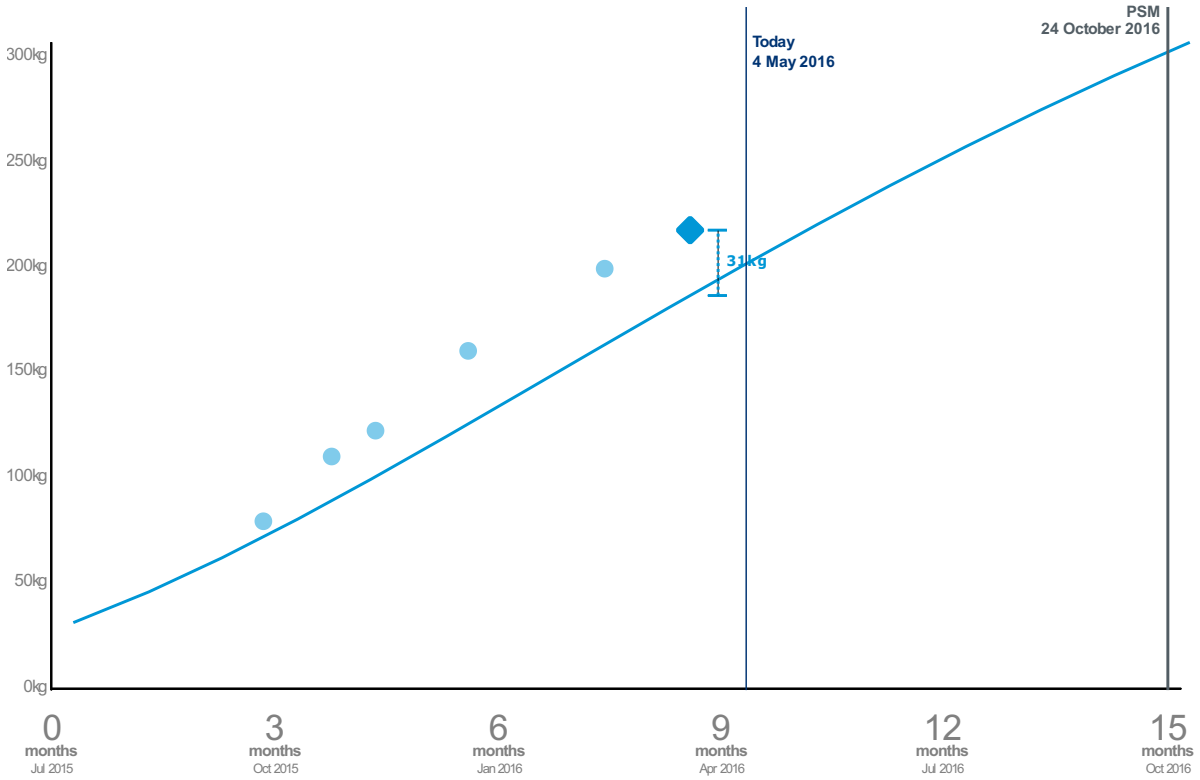
2015 Spring Born

11/04/2016

BQCY

Young stock trend

All 155 animals in this weighing are displayed



Summary of LUDF Management Practices – Changes over time:

	Historically	Season 2014-15	Season 2015-16
Peak cows	630 (3 season's average)	560	555
Replacement wintered as R2		127 (23%)	102 InCalf (18%) + 40 carry overs purchased
6-weeks InCalf	75% (3 season's average)	72%	69%
Not InCalf rates	12% (3 season average)	13%	13%
Spring Rotation Planner (SRP)	Used as a guideline in conjunction with silage, N, fert, GA. Typically ending mid-September	Proactively managed SRP, holding the first round out to the 23rd September. APC at start of calving actual: 2600 kdDM/ha	Proactively managed SRP, holding till balance date on 29th September. APC at start of calving 2500 kgDM/ha
Rotation length	Average 22 days Sept-Jan 27 days Sept 22 days Oct-Nov 19 days Dec-Jan 22 days Feb 22 days March 33 days April	Average 26 days Sept-Jan 39 days September 23 days Oct-Nov 21 days Dec-Jan 23 days Feb 33 days March 38 days April	Average 29 days Sept-Jan 41 days September 29 days Oct-Nov 22.5 days Dec-Jan 22 days Feb 28 days March 37 days April
	Approx 12.3 grazing rounds	Approx 10.4 grazing rounds (15% fewer grazings)	Approx 10.1 grazing rounds (18% fewer grazings than historically)
Average Pre-grazing covers	3118 kgDM/ha (average Sept-Jan) 3435 kgDM/ha (average Feb-Apr)	3328 kgDM/ha (average Sept-Jan) 3625 kgDM/ha (average Feb-Apr)	3388 kgDM/ha (average Sept-Jan) 3555 kgDM/ha (average Feb-Apr)
Average post-grazing cover	1607 kgDM/ha till end Jan 1690 kgDM/ha Feb-April	1652 kgDM/ha till end Jan 1676 kgDM/ha Feb-April	1625 kgDM/ha till end jan 1650 kgDM/ha Feb-Apr
Phosphate fertilizer	Maintenance	Maintenance	Below maintenance (cost control)

Nitrogen fertilizer Use	200-350 kgN/ha	143 kgN/ha (intention was no more than 150 kgN/ha)	179 kgN/ha (intention was to use 160 – 170kg N/ha while remaining below N Baseline)
Frequency of N-fert application	Before calving on pdks with less than 2200kgDM/ha, then after every grazing, limited use mid-summer	No N pre-calving. Following each grazing till end December, start again end January. Slower grazing rotation means 14% decrease in number of applications	No N pre-calving Following each grazing from start of September through to late March.
Time and amount of N used		95 kgN/ha to end Dec 3 kgN/ha January 21 kgN/ha February 19 kgN/ha March 7 kgN/ha April	103 kgN/ha to end Dec 26 kgN/ha January 29 kgN/ha February 21 kgN/ha March None in April
Last N application	8 May/23 April/ 29 April	14 April	24 March
Application Rates	25-40 kgN/ha/application	25 kgN/ha/application for all applications	25 kgN/ha/application Sept-Feb 20 kgN/application through March
Overseer Est N-loss (Version 6.2.1)	40 kgN	25 kgN	28-30 kgN (mostly due to carrying more cows in autumn)
Regrassing	Typically 3 paddocks (15% of the area)	3 paddocks regrassed (15% of the area)	1 paddock regrassed (5% of the area)
Gibberellic Acid	Apply immediately following grazing from late August till late Sept/early Oct and again in March/April periods based on suitable conditions	As previously used except that slower grazing rotations result in less ability to apply GA in a timely manner following grazing.	Slow first grazing rotation resulted only 1 paddock receiving GA
Area pre-graze mown	534 ha (3.3 times, average 2 seasons)	245 ha (1.5 times)	236 ha (1.5 times)
Supplements harvested from the paltform		22 tDM 40 kgDM/cow 14 ha	154 tDM 280 kgDM/cow 80 ha

Autumn cows in milk **March** **April**		 470 468	 546 536
Milk production to end-April	276,570 Average 3 seasons	261,570	276,562
Average production/cow to end April	438 kgMS/cow Average 3 seasons	467 kgMS/cow	498 kgMS/cow
Average milk production/ha to end April	1,728 kgMS/ha Average 3 seasons	1,634 kgM/ha	1,728 kgMS/ha
Tight cost control	Good cost control to keep total expenses low without eroding future profitability of the far. High and efficient production from pasture offsets farm working expenses to produce a lower than average operating cost and a sustainable profit (relative to payout)		Good cost control overall. See budget notes above
Weekly farm walk	Actively measure pasture covers weekly, calculate APC, predict future cover, plan and respond to surplus/deficits		
Pasture allocation	Allocate daily area/cow based on farm walk/feed wedge/APC, milk production, cow response, grazing residual. Move to new break / paddock when grazing residuals achieved.		
Split herd	Split herd based on 1/3-2/3 split with small herd initially comprising heifers and light CS MA cows. Through late spring, some well-condtioned heifers would be moved into the main herd and replaced by low BC MA cows. Following early pregnancy scan and BCS event, the small herd typically becomes all light BCS, early calving cows to assist condition score gains for the following season. The small herd may be merged with the main herd as cow numbers drop through Autumn or become a herd of culls to follow the main herd.		
BCS autumn dry-off rules	Frequent BCS including adhering to BCS targets for drying off based on current CS and days remaining till next calving. Milk production is not/will not be chased at the expense of BCS targets (per individual cow) at calving		
Herd test to identify cows performance and disease risk	Routine herd testing allows identification of low producing cows, particularly important when considering drying off low producing cows		
Heifer mating 2 weeks prior to MA cows	Mating heifers early at LUDF has become part of the reproduction management at LUDF to aid 6weeks InCalf results – this allows the freshly calved heifer more time to cycle and get back in calf in a timely manner.		

Winter feeding plan

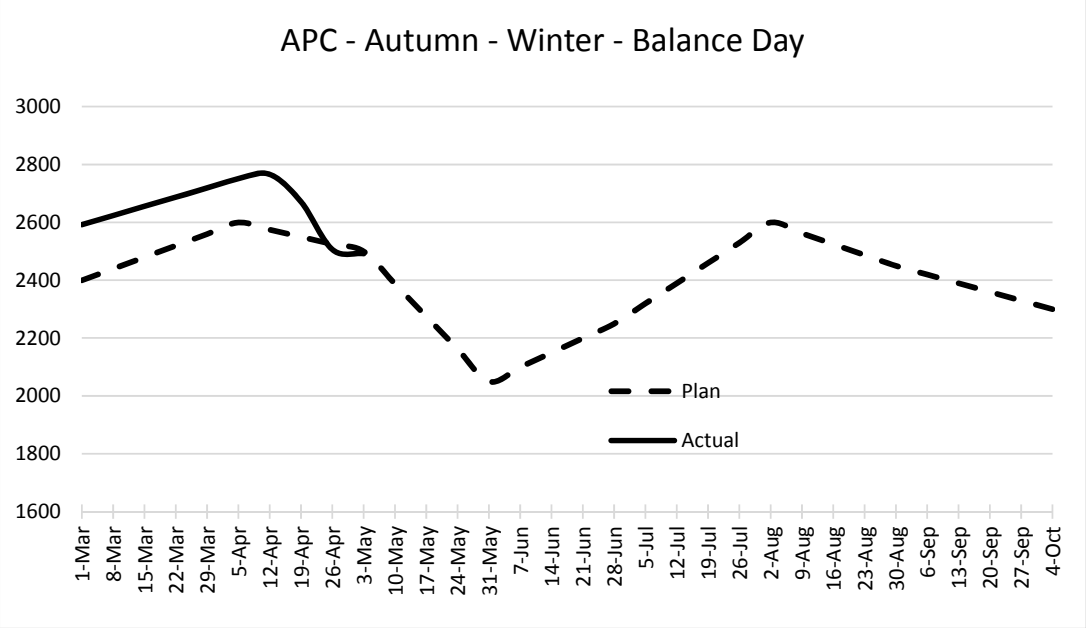
581 cows and R2'yrs to winter as follows:

- 130 MA light CS cows to be offered 16 kgDM/cow/day
- 170 MA cows to be offered 14 kgDM/cow/day
- 80 MA late calving cows to be offered 14 kgDM/cow/day
- 142 R2yr heifers to be offered 12kgDM/cow/day
- 59 MA cows to be wintered on the LUDF milking platform. These cows are likely to be better CS cows that will tolerate some standing off on the cowshed yard if wet weather would otherwise cause pasture damage. Keeping better CS cows on the platform also enables them to be pushed to clean out a few paddocks if they require this over the winter.

The first 3 groups of cows above will leave LUDF in late May and return late July or into August if a cold winter occurs and feed supply is limited on the LUDF milking platform.

The heifers will be teat sealed at the end June and return to LUDF in early July (expected start calving 23 July).

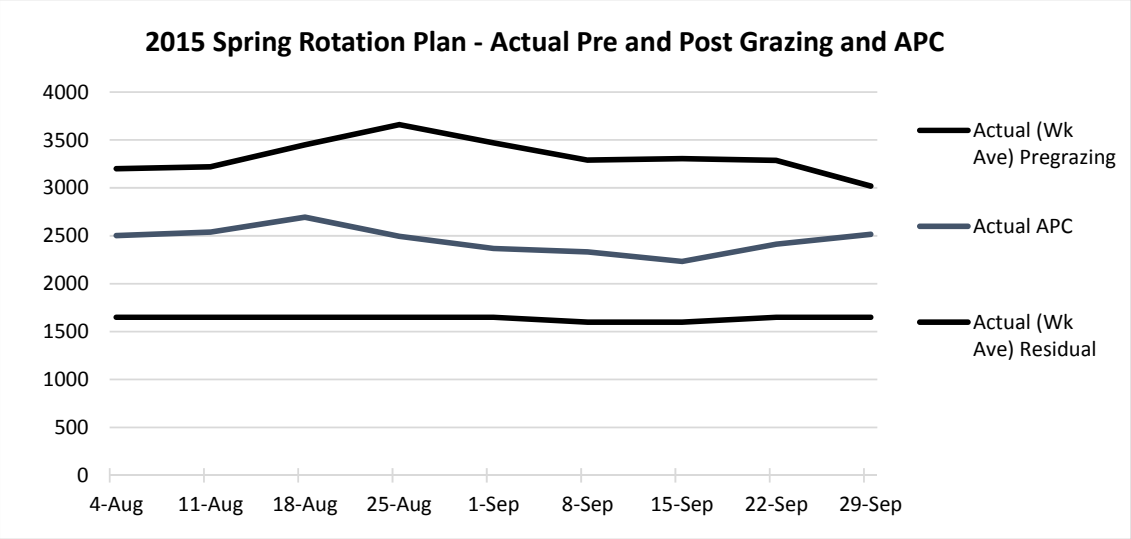
MA cows are due to start calving 2 August.

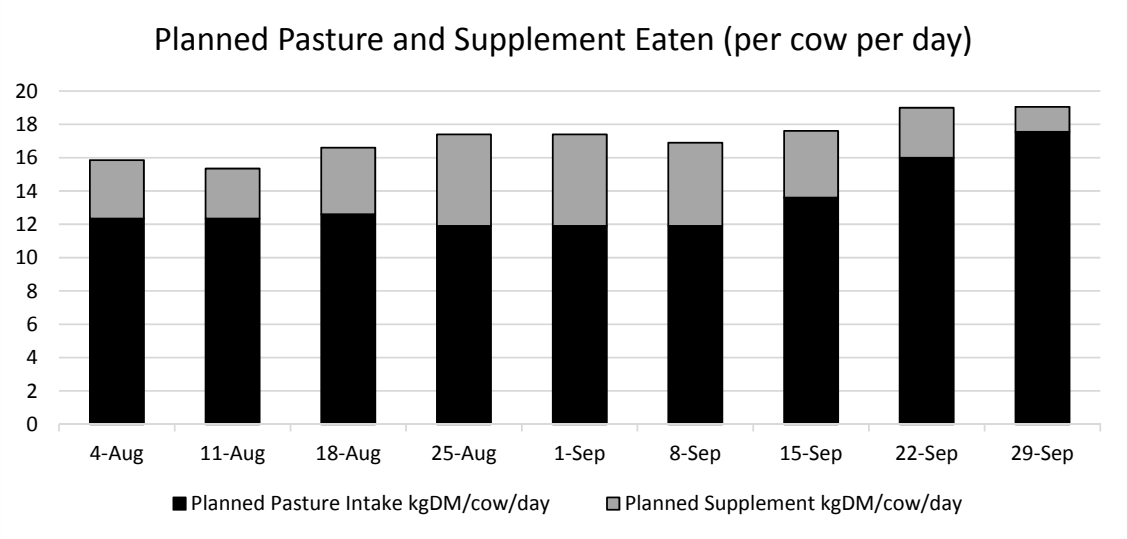


Note:
Planned increase in APC from 1 June to 1 August requires an additional 550kgDM/ha. Over 61 days this is an average growth rate of 9 kgDM/ha/day. Historically this is achievable, but recent years have shown wide ranging winter growth rates, hence the flexibility in keeping some cows grazing on the platform, and flexible return period at calving.

60 cows eating 14kgDM/cow/day over 160 ha is a daily demand of 5kg/ha/day on top of the 9 kgDM/ha /day required to increase APC to 2600 at calving.

Spring Rotation Plan:





Lincoln University Dairy Farm - Farm Walk notes

Tuesday 3rd May 2016

LUDF – focus for 2015/16 Season: Nil-Infrastructure, low input, low N-loss, maximise profit. Farm system comprises 3.5 cows/ha (peak milked), Target 150kgN/ha, 300kgDM/cow imported supplement, plus winter most cows off farm. FWE of less than $1.08 million and Target production of 500kgMS/cow (>100% liveweight in milk production).

Critical issues for the short term

1. **Monitor average pasture cover on the milking platform as head towards planned cover at end of May.**
2. **Focus on grazing paddocks down through the last round of the season to set the farm up for winter.**
3. **Watch cow BCS and dry off targets to ensure all cows meet BCS targets at calving (min 5 for MA cows and 5.5 for R3yr's)**
4. **Supplement cows with Magnesium**

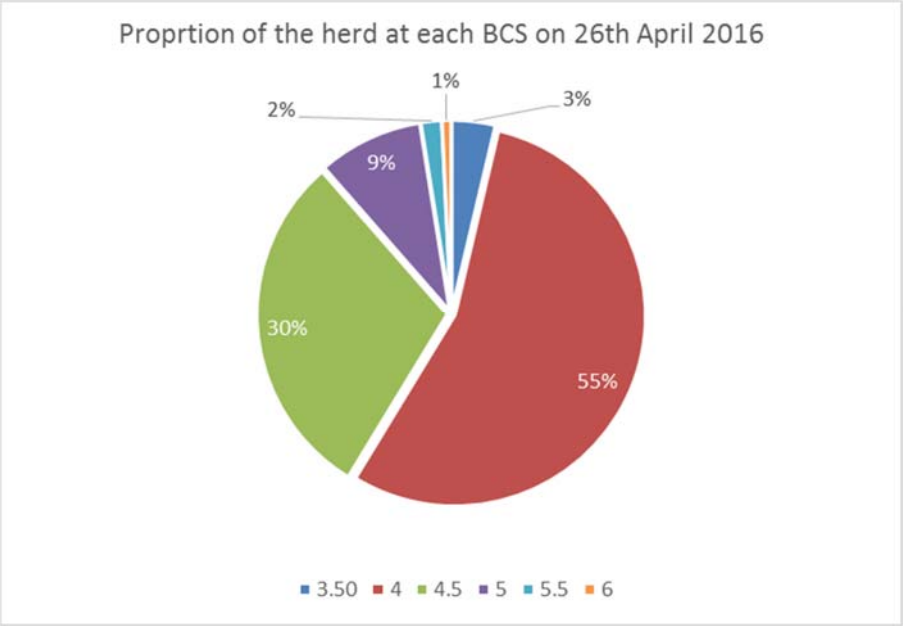
Key Numbers - week ending Tuesday 3rd May 2016

Ave Past Cover	2492 kgDM/ha	Past Growth Rate	39 kgDM/ha/day
Round length	38 days (for 160 ha)	Ave Supplement used (Total year to date*)	4.5 kgDM/cow/day (396.5kgDM/cow YTD)
No Cows on farm	520 (430 for the coming week)	Ave Soil Temp (week)	11.8 degrees
Ave Milk Production	1.77 kgMS/cow (cows milked into vat)	SCC	248,000

** includes silage made on farm and 126 kgDM/cow imported supplement used in early spring*

Herd Management

1. There are currently 520 milkers on farm. 18 cows are on once-a-day milking (lames).
2. This week we had 3 new lame cows and 2 new cases of mastitis.
3. The whole herd was BCS on 26th April. The BCS average for the whole hers is 4.3. The spread of BCS is as follows:



4. The average BCS for heifers and MA cows is below the BCS of the same groups of animals at the same time last season by 0.2 and 0.3 BCS respectively**.**
5. The farm has continued to run two herds until now, however upon removal of all culls today and tomorrow, as well as starting drying low BCS cows and heifers from tomorrow, the herd will run as one herd from now onwards
6. The BCS from last week is being used in conjunction with the dry-off rules presented below. These are used on an individual cow basis and assumes the typical time required to get cows to appropriate calving BCS targets. As LUDF has secured high quality winter grazing that has historically resulted in good CS gain over the winter, the farm is comfortable with the later end of the date range for the small number of cows currently under BCS 4. Following these dry-off rules, there is 20 animals that have been identified for dry-off for this week.

Cows (4 years old and older)

Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	100	20 April – 5 May	5-15 May
4	80	10-20 May	20 -30 May
4.5	60	NA	NA

Rising 3 year Old

Cow Condition	Dry off time (days before Calving)	Date cow need to be dried off (calving date 1-15 August)	Date cow need to be dried off (calving date 15-30 August)
3.5	120	1-15 April	15-30 April
4	100	20 April -5 May	5-15 May
4.5	80	10-20 May	20 -30 May
5	60	NA	NA

This strategy requires the feeding of appropriate quantities of good quality feed to the cows that are being dried off, i.e. - above maintenance levels.

7. The first 20 cull cows left the farm on Friday 22nd April. There is another 40 culls booked to leave the farm today, followed by a further 30 cows being culled on Wednesday. There is a further 20 cows to be dried off according to the above dry-off rules. This will bring cow numbers on farm from the current 520 down to 430 cows.
8. Magnesium is being supplemented to the milking herd as Mag Chloride in the stock water.
9. All 2015 born heifer replacements (total 155) are away grazing. They were vaccinated against BVD and Leptospira on Monday the 7th March. A booster vaccination of BVD-Lepto plus a drench of Selenium was given to them on Monday the 11th of April.
10. The East Block (15 ha) is now destocked to allow pasture cover to accumulate in time for calving.

Growing Conditions

11. The average 9 am soil temperature for the week dropped slightly from last week to reach 11.8°C. The cooler nights during the week have been counteracted by the high temperatures during the day (20 degrees and above).
12. There was no rain over the last week, and no rain is forecasted for the next 10 days.

Figure 1: Soil temperature history for the last 2 weeks

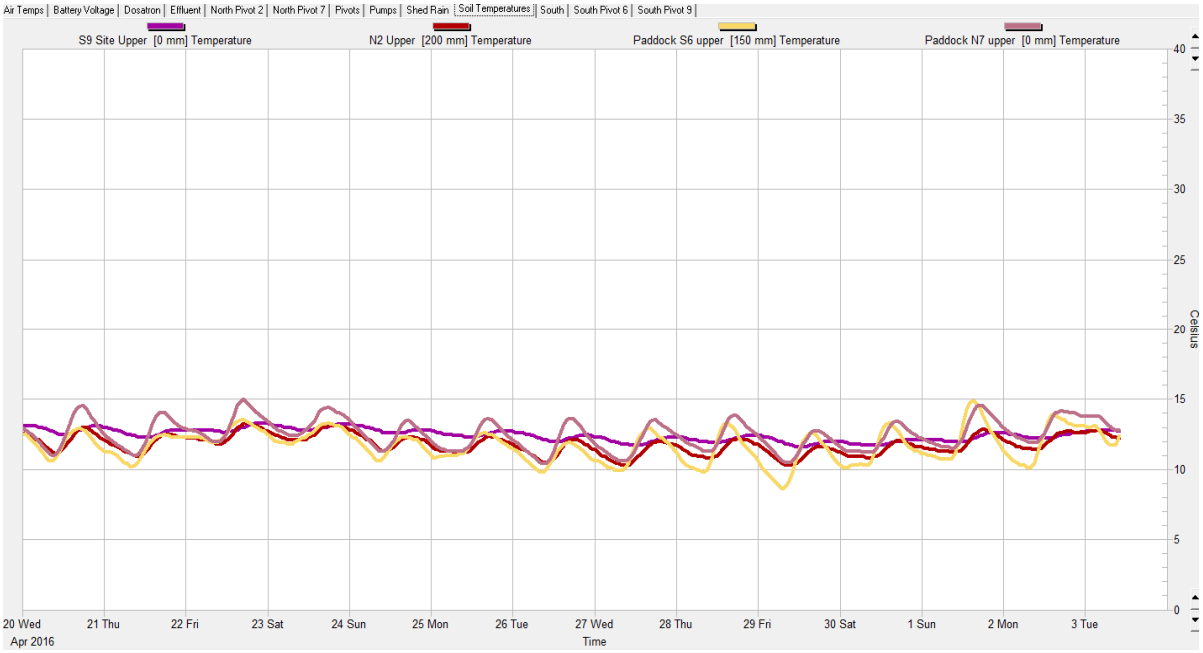
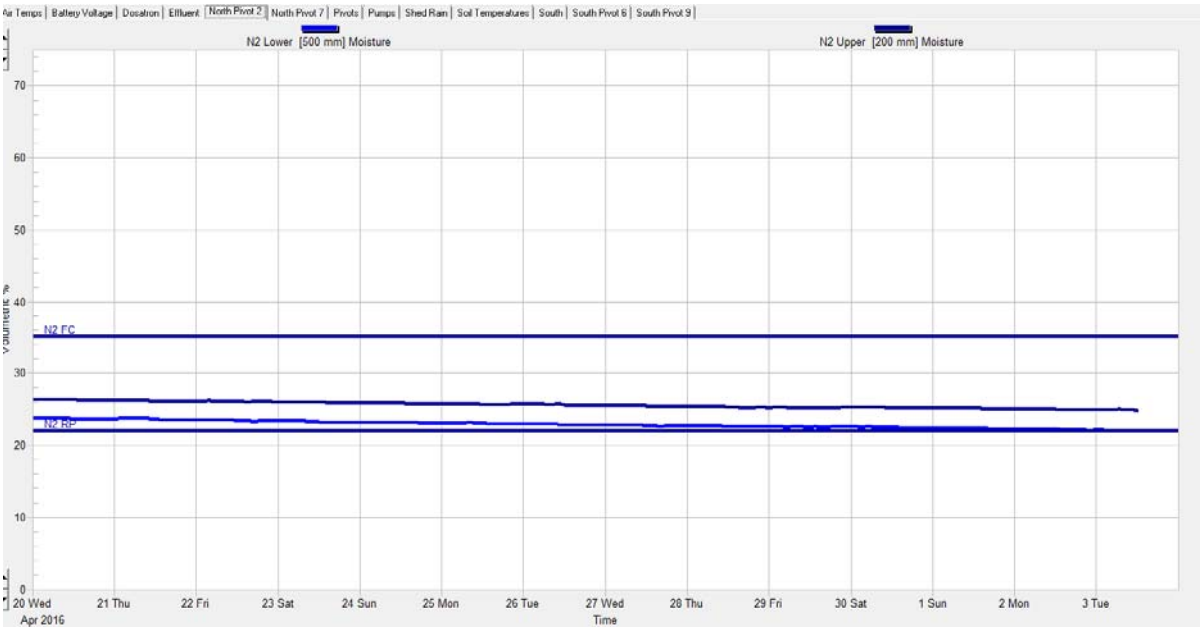


Figure 2: Soil moisture history for the last 2 weeks (Paddock N2).



13. The deep Aquaflex probe reading has now touched the stress point in the graph, so the irrigation has been started again. The plan is to apply a couple of rounds to allow the reading to get back above the stress point, but not too high within the range. This will allow pastures not to be stressed for lack of water, but still have enough of a buffer zone in case there is any heavy rainfall happening. This is unusual for this time of the season but we are relying of having the best growths these temperatures and sunshine can give us to produce any further milk in May, as long as the BCS of the herd allows for it.

Nitrogen

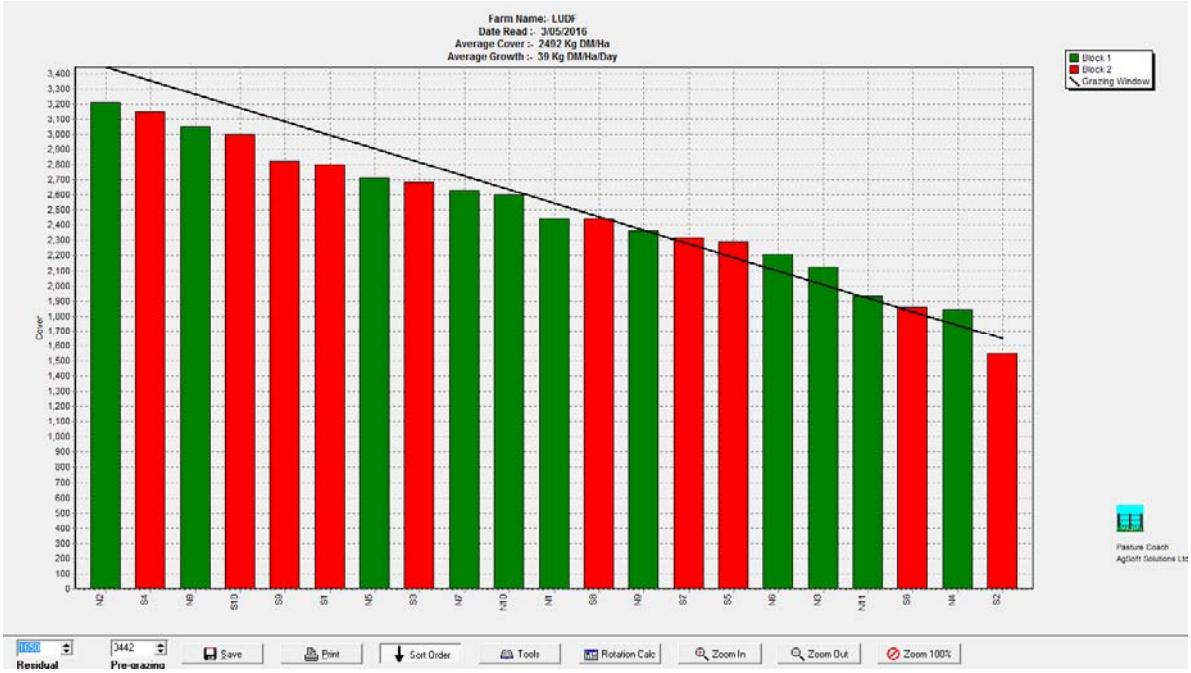
14. Nitrogen fertiliser applications finished for this season with the last application of N on 29th March 2016. A total of 179 kgN/ha has been applied season-to-date. This level of nitrogen use has slightly exceeded the target for this season (170 kgN/ha/season) as per the modelled farms N losses through Overseer. The total N-leached as per Overseer model for the season still remains below Baseline.

Pasture and Feed Management

15. Fertility patches have become a bit more obvious again, particularly in paddocks at the top of the wedge. Whereas further use of nitrogen would probably have reduced this following the last grazing (late March), the decision was made earlier in the season to use N mid-summer when responses are expected to be higher.
16. Estimated pasture growth rates have increased to 39kgDM/ha/day, compared to last week's growth of 31kgDM/ha/day. Growth rates for the same week last year were 36kgDM/ha/day.
17. Three weeks ago, taking into account weather conditions, growth rates and cow behaviour, it was decided to increase round length to around 39 days. This was achieved by feeding

approximately 7 kg DM silage/cow/day for a week. The quantity of silage on offer was subsequently dropped to around 3-4 kgDM/cow/day for the last 2 weeks. This appears all that has been required to hold the round at around 38 days.

Figure 3: This week's feed wedge



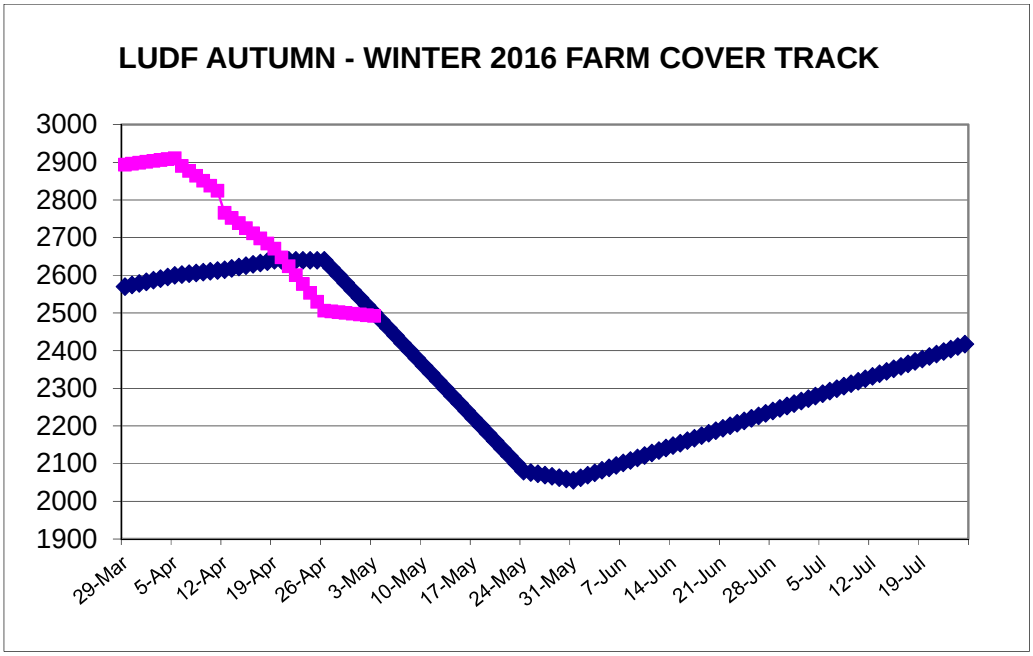
18. Based on the full farm area of 160 ha in the grazing round, the target pregrazing cover and demand line in the feed wedge has been calculated using:
    - A target rotation length of 39 days
    - An average dry matter intake of 18.0 kgDM/cow/day
    - 430 cows (for the week ahead, taking into account culls leaving the farm and dried off animals which will eat less than the 18 kgDM/cow/day)
    - A post grazing residual of 1600 kgDM/ha.

    Target pregrazing cover is therefore:

    (Stocking rate x ***Intake from pasture*** x Rotation) + Optimum residual = Pre-grazing Cover.
    (430 cows / 160ha x 18.0 kgDM/cow/day x 38 days) + **1600** = 3438 kgDM/ha.
19. In this week's feed wedge the feed deficit decreased to 11 tDM total (just over 1 days grazing) and the Average Pasture Cover remain almost at the same level, changing from 2501kgDM/ha (last week) to 2492 kgDM/ha.
20. At the current rate of silage (4 kgDM/cow/day for 520 cows), LUDF is feeding 2.1 tDM. At an average intake of 18 kgDM/cow/day, this amount silage is effectively feeding 115 cows. In reality the farms home grown silage is now finished and the economics of feeding purchased silage are not warranted at the current milk price. Instead there are 70 cull cows and 20 light CS cows that are lined up to leave the farm in the next 2 days. Technically there would be a requirement of

reducing demand by another 20 animals to fit supply as the silage gets pull out of the diet, and this will be continuously monitored through the week.

21. Keeping the additional 20 cows may result in an earlier dry off for all cows if the growth rates and desired drop in APC don't meet demand. Growth rates will have a huge influence in these decisions through the next 20 days.
22. The plan for the remainder of May is as follows:
    a. 442 kgDM/ha to be supplied by the mining of the current average pasture cover down to dry-off levels (2492 kgDM/ha – 2050 kgDM dry-off target = 442 kgDM/ha). On 160 ha, this is a total supply of 70.7 tDM.
    b. An estimated growth rate of 30 kgDM/ha/day for the next 20 days would supply 96 tDM total from the 160 ha of the farm.
    c. Total supply till approx. 24 May is therefore: 70.7 tDM + 96 tDM = 166.7 tDM total
    d. At a requirement level of 18 kgDM/cow/day, this supply would allow us to feed 430 cows for a total of 21 days.
    e. Some cows may be dried of on CS within this time, reducing demand a little.
23. Below is our autumn pasture cover tracker. The aim of the pasture tracker is to make sure we're on track to gradually drop average pasture cover down to our required target of 2050kgDM/ha at dry off in late May.
24. The pasture tracker indicates that the higher than budgeted average pasture covers on hand through March 2016 have helped hold the higher number of cows (including culls) currently still on farm through autumn. In addition, the lower cost home grown silage on hand and high milk production per cow has also allowed us to feed cull cows in a relatively cost effective manner. In contrast last season, during autumn cull cows were sold in early March.



25. As per last week's notes around the comparison Actuals vs Budget lines, the previous drop in Actual (pink on graph) average pasture cover to slightly below Target (blue on graph) was not of major concern to us at the time. Based on our calculations, once we drop the cull cows from the herd on 4th May, we would still have enough cover to see us through to around the 20th of May.
26. The availability of the home-grown silage has allowed the farm to carry all culls into this week of May, achieving 1.7 kgMS/cow/day average for the last couple of months. LUDF will have produced last season's production by tomorrow, which results in all additional milk produced through May helping to dilute costs to the end of the season. It is, however, very important to remember that whatever milk is produced through May must:
    a. be produced from grass only (the home-grown silage is now finished and our calculations say feeding purchased silage is not profitable at this stage)
    b. must not jeopardize next season's performance from the herd, hence why the dry-off rules on CS are followed no matter what the rest of the season brings.
27. It is important to repeat that carrying the high average pasture covers earlier this Autumn appeared feasible for LUDF on our high quality tetraploid ryegrass pastures. On average diploid paddocks are less able to successfully carry these higher average pasture covers.
28. In today's walk:
    a. Fertility patches have become more obvious than in previous weeks, making the plating of those paddocks a challenge given the difference between patch and non-patch areas in terms of DM, patches were particularly notable in paddocks S1 and S2.
    b. No signs of pasture quality losses anywhere else were observed.
29. We are now in the last round of grazing for the farm. We have some strategies available when it comes to ensure paddocks are well cleaned up before dry-off date. Also late calving good BCS cows could be used for this. Having these strategies allows us to ensure the farm is well set up to make the best of any winter growth.

Feeding Management for the coming week:

30. For the coming week our aims are to:
    i. Keep the round to 39 days, silage is finished.
    ii. Drop demand by having 70 cull leave the farm by tomorrow and drying off a further 20 cows based on BCS dry-off rules. Potentially add another 20 cows to be dried off if weather conditions turn bad and growth declines.
    iii. Last season's average growth rate for the month of May was 36 kgDM/ha/day. If the same holds true for this season, the farm should be able to hold onto the 430 cows till the 24th May. However, growth rates and rainfall will be the key determining factors as to how long the season will go into May.
    iv. Continue to monitor rate of drop off peak milksolids production (which continues to be remarkably stable over the last 3 weeks) as an important indicator of both feed intake as well as pasture quality.

LUDF Weekly report	5-Apr-16	12-Apr-16	19-Apr-16	26-Apr-16	3-May-16
Farm grazing ha (available to milkers)	160	160	160	160	160
Dry Cows on farm / East blk /Jackies/other	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0	0/0/0/0
Culls (Includes culls put down & empties)	2	2	0	0	40
Culls total to date	20	22	22	22	62
Deaths (Includes cows put down)	0	0	0	0	0
Deaths total to date	12	12	12	12	12
Calved Cows available (Peak Number 560)	543	541	541	520	520
Treatment / Sick mob total	2	3	0	0	2
Mastitis clinical treatment	0	1	0	0	2
Mastitis clinical YTD (tgt below 64 yr end)	91	92	92	92	94
Bulk milk SCC (tgt Avg below 150)	153	201	179	183	248
Lame new cases	6	5	3	2	3
Lame ytd	163	168	171	173	176
Lame days YTD (Tgt below 1000 yr end)	2949	3173	3294	3420	3497
Other/Colostrum	0	0	0	0	0
Milking twice a day into vat	519	506	522	502	507
Milking once a day into vat	22	32	18	18	13
Small herd	138	136	136	136	136
Main Herd	381	370	370	350	350
MS/cow/day (Actual kg / Cows into vat only)	1.65	1.71	1.70	1.72	1.77
MS/cow to date (total kgs / Peak Cows	458	468	478	491	501
MS/ha/day (total kgs / ha used)	5.57	5.78	5.76	5.82	5.73
Herd Average Cond'n Score	0.00	4.20			4.30
Monitor group LW kg WOW early MA calvers	504	500	500		507
Soil Temp Avg Aquaflex	14.5	13.7	12.5	11.8	11.8
Growth Rate (kgDM/ha/day)	73	46	52	31	39
Plate meter height - ave half-cms	17.2	16.2	15.5	14.3	14.2
Ave Pasture Cover (x140 + 500)	2911	2766	2671	2506	2492
Surplus/[defict] on feed wedge- tonnes	27	4	[34]	[42]	[11.5]
Pre Grazing cover (ave for week)	3647	3861	3735	3186	3100
Post Grazing cover (ave for week)	1650	1650	1650	1650	1650
Highest pregrazing cover	3762	3937	3706	3400	3482
Area grazed / day (ave for week)	4.81	4.57	4.06	4.15	4.23
Grazing Interval	33	35	39	39	38
Milkers Offered/grazed kg DM pasture	12.5	14.1	11.3	14.8	14
Estimated intake pasture MJME					0
Milkers offered kg DM Grass silage	6	4.4	7.3	3.7	4.5
Silage MJME/cow offered					
Estimated intake Silage MJME					
Estimated total intake MJME	220	220	220	220	220
Target MJME Offered/eaten (includes 6% waste)					
Pasture ME (pre grazing sample)	12.2	12.2	12.3		0.0
Pasture % Protein	23.1	22.6	21.7		0.0
Pasture % DM - Concern below 16%	14.6	16.0	16.5		0.0
Pasture % NDF Concern < 33	36.6	37.4	36.6		0.0
Mowed pre or post grazing YTD	236.5	236.5	236.5	236.5	236.5
Total area mowed YTD	312.3	312.3	312.3	312.3	312.3
Supplements fed to date kg per cow (560 peak)	258.2	288.7	339.5	365.4	396.6
Supplements Made Kg DM / ha cumulative	964.35	964.35	964.35	964.35	964.35
Units N applied/ha and % of farm	0	0	0		0

Kgs N to Date (whole farm)	179	179	179	179	179
Rainfall (mm)	1.4	3.4	5	0	0
Aquaflex topsoil rel. to fill point target 60 - 80%	60-80	50-70	50-70		

We walk the farm every Tuesday at 9am. Farmers or their managers and staff are always welcome to walk with us. Please call to notify us of your intention and bring your plate meter and gumboots. Phone SIDDC – 03 423 0022.

Peter Hancox, Farm Manager, Natalia Benquet, Charlotte Westwood.

Calculating Pasture Eaten – a simple analysis:

(Note: DairyNZ has an excellent resource available which enables this exercise to be conducted in more detail – please see your local CO for more details)

Calculating Stocking rate based on target feed eaten:

$$\text{Stocking Rate} = \frac{\text{Feed harvested per hectare}}{\text{Feed harvested per cow}}$$

Estimating Feed Harvested per Cow

1. Determine average use supplements per cow (for lactation)
2. Calculate milk production from lactation supplement at 10kgDM/kgMS
3. Deduct milk production from supplements from average milk production per cow
4. Balance of milk production has come from pasture
5. Calculate milk production from pasture eaten during lactation. A conversion efficiency of 10:1 for cows producing greater than 450kgMS/cow possibly over estimates feed required.

See example below:

	2010/11	2012/13	2014/15	2015/16 Forecast
Imported Supplement	463	434	300	114
Feed Conversion Supp to Milk	10	10	10	10
Milk Production from Supplement	46	43	30	11
Average Milk Prod /cow/yr	395	477	498	510
Est Milk Prod /cow / yr from Pasture	349	434	468	499
Feed Conversion Pasture to Milk	10	10	10	10
Est Pasture harvested per cow	3487	4336	4680	4986
Stocking Rate	4.2	3.9	3.5	3.5
Number cows peak milked	669	630	560	555
Pasture Harvested per hectare	**14580**	**17073**	**16380**	**17295**
Ave. Milk Production per hectare	1652	1878	1743	1769

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Focus Day Feedback – May 2016

1. What is your on farm role (please circle)?

- Farm Owner
- Farm Consultant
- Sharemilker
- Rural Professional
- Farm Manager
- Farm Staff
- Other - please specify _____

2. When was the last LUDF Focus Day you attended (please circle)?

- This is my first
- 2015 - I'm a regular attendee
- I attend when I can but not regularly
- Not for a year or so

3. Did you find the topics covered today useful?

	Very useful	Somewhat useful	Interesting but not useful	Not useful	Waste of time
WorkSafe					
Feed Supply and Demand					
Financial Update / 2016/17 Budget					
LUDF Seasonal Review					
Winter Plan					

4. Any other comments or suggestions for future Focus Days?

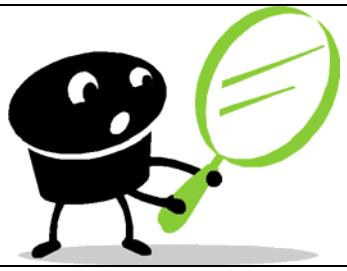
5. Name: (optional)

Welcome to Lincoln University Dairy Farm (LUDF).

The farm is a fully operational, commercial dairy farm with a number of potential hazards for both visitors and staff. Many of the potential hazards cannot be eliminated while also providing access to visitors therefore all staff and visitors MUST watch for potential hazards and act with caution.

Hazard Summary: Look, think, act.

The following chart provides a reminder of the types of hazards at LUDF. Watch for these and any other hazards that may be on farm today.

People: • Uninformed / ill prepared visitors may be the greatest risk	**Animals:** • **You are in their space**	**Milking shed:** • Moving rotary platform • Confined animals • Chemicals
Eyes / Ears: • Water / oil / milk / chemical splashes • Welding flashes • Loud machinery		**Touch:** • Hot / cold surfaces, hot water, chemical burns • Electric fences – treat them as high voltage power sources
On farm machinery and tools • Chainsaws, hand tools etc. generate noise, fragments	**Potential slips / trips:** • Uneven surfaces occur across the farm • Fences • Drains • Underpass • Effluent pond	**Vehicles:** • Contractors and farm equipment – **act as though they can't see you** – keep out of their way • Centre Pivot takes precedence over your plan

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.

By entering this farm, you are acknowledging your receipt of this hazard summary, and your agreement to take personal responsibility to watch out for potential hazards, and act in such a manner as to protect yourself and any others also on-farm.