

Welcome to week 4

Note that I am aware there is an issue with access to todays document, I am working on fixing but will take 30 mins.

Case Study 4

Nutrition

Housekeeping

- Some movement of students between groups this week to give North American students the chance to attend in a better time zone (otherwise will be 3am for some students)
- For those enrolled in VETS90123 I will provide the group assignment and your groupings in the week post Easter, this will be via the LMS subject VETS90123 rather than this subject
- Your grade for last weeks quiz should be viewable in the grades section of the LMS
- Next mini quiz is the Tuesday afternoon of week 6
- Mid semester quiz is Wednesday morning of week 7 – this will be both MCQ and longer answer questions. I will provide some examples of longer answer questions in week 6 so you can practice
- Calculation error in section 4.3 fixed

Nutrition

- Nutrition is one of the most important areas of extensive animal production, if not the most important area
- When pasture production and consumption is managed optimally it gives the enterprise the best chance of maximising profit and also reduces a range of diseases that can occur when it is managed poorly

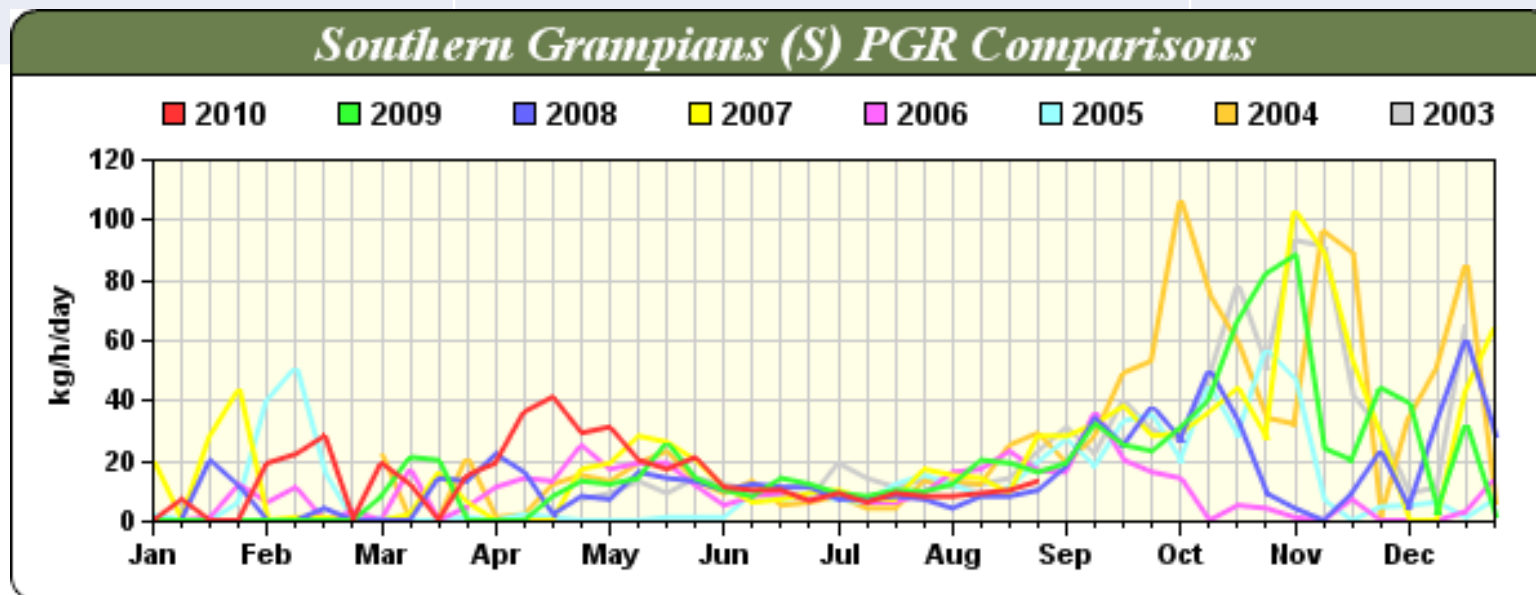
Exercise 1

- Work out how many animals you stock on a property throughout a year under the following scenario.
- Property size = 1000 hectares
- Rainfall = 680mm per year
- Located near Hamilton
- Property has 65% DSE Merino, 35% beef cattle (% DSE in winter)

Enterprise structures

Activity	Sheep	Cattle
Birth	20 August to 23 September	10 August to 25 September
Weaning	30 November	From 30 Jan to early June (varies each year)
Sales	Wether sold 2.25 year old, Ewes CFA at 6.25 year old	Steers sold at 17 months Cows CFA st 8 to 10 years old

Southern Grampians (S) PGR Comparisons



For each enterprise fill in the following table

Time of year	Cattle DSE	Sheep DSE
July (winter)		
October (spring)		
January (summer)		
April (autumn)		

You will need to make a number of assumptions to be able to complete this table

E.g. % surviving lambs/calves, size of adult cattle etc

Please list these

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
Average (year) ewe	-	1.5	1.6	1.8
Beef cattle	400 kg	500 kg	600 kg	
Dry cows or store steers (maintaining weight)	6	7	8	
Dry cows or store steers (growth rate 0.5 kg/day)	8	11	12	
Dry cows or store steers (growth rate 1.0 kg/day)	11	13	15	
Last 3 months of pregnancy	8	9	11	
Cows with 0-3 month calves	13	14	17	
Cows with 3-9 month calves	19	21	24	
Average (year) cow and calf	15	16	19	

Changing times

- What happens to the match of DSE and pasture supply if you move the time of birth back to March?

- We are going to spend one hour in breakout groups on this topic for a start
- You may find you want some questions answered as you go through this – if so, you can request assistance and we can come into your room or you can drop back into the main room.

French equation

- 680mm
- French equation (SR/ha) = $1.3 * (680 - 250) / 25 = 22.36$ DSH/ha
- 1000 hectare * 22.36 DSE/ha = 22360 DSE
- ie.. This property could manage 22,360 Merino wethers (or non pregnancy ewes) through winter.
- But we actually have 65% sheep and 35% cattle in DSE so this means we have:
 - $0.65 * 22360$ DSE sheep = 14534 DSE in sheep
 - $0.35 * 22360$ DSE cattle = 7826 DSE on cattle
 - (we can check no mistakes by adding the DSE – should equal 22360)

Stock classes

- Total cattle DSE and assumptions
- We know cows are giving birth in August and September so in winter are in late pregnancy
- Steers sold in January
- CFA cows sold after weaning/pregnancy testing
- Heifers sold after pregnancy testing – likely all pregnancy testing two months after six week joining (mid Feb or later)

Activity	Sheep	Cattle
Birth	20 August to 23 September	10 August to 25 September
Weaning	30 November	From 30 Jan to early June (varies each year)
Sales	Wether sold 2.25 year old, Ewes CFA at 6.25 year old	Steers sold at 17 months Cows CFA at 8 to 10 years old

Cattle stock classes winter

- Late pregnancy cows
- 10-11 month old heifers (have retained all from birth)
- 10-11 month old steers

Assume for the 10-11 month old weaners that there are 0.9 weaners per cow (90 per 100)

- Bulls – assume we have 2.4% ie. 1 bull per 40 cows
- We know we have a total of 7826 DSE

Lets work this out on 100 cow herd as an example way to do it

- For every 100 cows we have 90 weaners and we have 2.5 bulls (if you wanted to make the maths easier you could double this so you didn't have any half animals!)
- Cow DSE (500kg) = 9 DSE
- Weaners = 7 DSE (opted for this DSE rating from evergraze reference below)
- Bulls 15 DSE (same as week 2)

https://www.evergraze.com.au/wp-content/uploads/2013/08/Feed-Budget-table-15_web.jpg

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
Average (year) ewe	-	1.5	1.6	1.8
Beef cattle	400 kg	500 kg	600 kg	
Dry cows or store steers (maintaining weight)	6	7	8	
Dry cows or store steers (growth rate 0.5 kg/day)	8	11	12	
Dry cows or store steers (growth rate 1.0 kg/day)	11	13	15	
Last 3 months of pregnancy	8	9	11	
Cows with 0-3 month calves	13	14	17	
Cows with 3-9 month calves	19	21	24	
Average (year) cow and calf	15	16	19	

Winter cows continued

- 100 cows * 9 DSE = 900
- 90 weaner * 7 DSE = 630 DSE
- 2.5 bulls * 15 DSE = 37.5 DSE
- Total DSE Cattle per 100 cows = 1567.5
- Total winter cattle DSE = 7826
- **Total Cows = 100 * 7826/1567.5) = 499**
- **Total weaners = 90 * 7826/1567.5 = 449**
- **Total bulls = 2.5 * 7826/1567.5 =13**

Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	
October (spring)		
January (summer)		
April (autumn)		

Winter cows continued

- We assume we are working with a self replacing herd and flock so are not aiming on increasing/reducing numbers of breeding cows/sheep
- Through the year we will breed heifers (young female cows) and they will replace old cows that are CFA (cast for age =- sold) or culled (sold because they are off type, not pregnant etc)
- Throughout the year animals will move between categories e.g. weaners turn into sale steers and weaner heifers end up growing into mated heifers and then 2 year olds that join the cow herd (or might be sold at PTIC heifer or heifer not in calf etc).

Winter sheep

- Total DSE = 14534 DSE
- Classes of stock
- Late pregnant ewes (lambing in Aug/Sept)
- Almost 2 y.o. wethers present in winter – sold in spring
- All weaners present in winter (male castrate (wether) and ewe)
- Rams
- Assumptions. In this case assume one ram per 100 ewes (normally use slightly more rams than this but makes the maths easier)
- Assume wean 75% lambs – all retained, nothing sold until sell CFA ewes (sell in January/February), 2 year old wethers sold in December

Activity	Sheep
Birth	20 August to 23 September
Weaning	30 November
Sales	<u>Wether</u> sold 2.25 year old, Ewes CFA at 6.25 year old

Working out stock numbers per 100 ewes

- 100 ewes
- 75 weaners (male and female) – just under 1
- 37.5 almost 2 y.o. wethers
- 1 ram
- Note that we have moved the almost 2 y.o. ewes into the lambing flock at this point so I am counting them in there in this instance as they are the same DSE
- Assume ewes pregnancy with single (reality would be twins)

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
Average (year) ewe	-	1.5	1.6	1.8
Beef cattle	400 kg	500 kg	600 kg	
Dry cows or store steers (maintaining weight)	6	7	8	
Dry cows or store steers (growth rate 0.5 kg/day)	8	11	12	
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Average (year) cow and calf	15	16	19	

- 100 ewes @ 1.4
- 75 weaners (male and female) – just under 1 @ 1.1
- 37.5 almost 2 y.o. wethers @ 1
- 1 ram @ 2
- Assume ewes pregnancy with single
(reality would be twins)

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
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Cows with 3-9 month calves	19	21	24	
Average (year) cow and calf	15	16	19	

- 100 ewes @ 1.4 = 140
- 75 weaners (male and female) @ 1.1 = 82.5
- 37.5 almost 2 y.o. wethers @ 1 = 37.5
- 1 ram @ 2 = 2

- DSE per 100 ewes = 262 DSE
- Total DSE = 14534 DSE
- Total ewes = $100 * 14534 / 262 = 5547$
- Weaners = $75 * 14534 / 262 = 4160$
- Wethers = $37.5 * 14534 / 262 = 2080$
- Rams = $1 * 14534 / 262 = 56$ rams

Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	14534
October (spring)		
January (summer)		
April (autumn)		

Completing the table

- Even though we knew what DSE we had for sheep and cattle in winter we had to work out the distribution across each category to know what we would likely have in 3 months time
- The DSE on a self replacing enterprise will NOT be static throughout the year – the French equation helps solve for our winter feed budget but how we manage reproduction will drive the rest of the DSE budget for the year
- This is a simple example compared to the sorts of budgets that a farmer would prepare (even though it is not simple) but hopefully it will help understand the cycle of livestock in an enterprise and how they move through various age groups over time

October DSE

- Have there been any sales? (No)
- Has there been a change in reproductive status? Yes, all ewes and cows now have progeny – we know our ewes will have one lamb or less as they started with singles

Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	14534
October (spring)		
January (summer)		
April (autumn)		

October DSE cattle

- **Total Cows = 499 @ 14**
- **Total yearlings = 449 @ 7.5 (slight increase to factor in bodyweight increase)**
- **Total bulls = 13 @ 15 (no change in DSE)**
- **TOTAL = 10549**

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
Average (year) ewe	-	1.5	1.6	1.8
Beef cattle	400 kg	500 kg	600 kg	
Dry cows or store steers (maintaining weight)	6	7	8	
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Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	14534
October (spring)	10549	
January (summer)		
April (autumn)		

October DSE sheep

Total ewes = 5547 @ 2.7 DSE = 14977

- Yearlings wether & ewe = 4160 @ 1.2 DSE = 4992
- Wethers = 2080 @1 DSE = 2080 (these will be sold by Jan)
- Rams = 56 rams @ 2 DSE = 112
- TOTAL DSE = 22161

- Notes – allowed extra growth for weaners (now yearlings)

Excess allowance for ewes as some not with Lamb at foot (only 75% weaned = slight Overallowance of feed for that category)

Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	14534
October (spring)	10549	22161
January (summer)		
April (autumn)		

Note the very significant increase in DSE for spring compared to winter

January DSE

- Have there been any sales? Yes, assuming one age group of ewes sold, assuming steers sold at 17 months. No change in heifers or cows as not yet PTIC.
- Has there been a change in reproductive status? Yes, all ewes are now dry (not lactating) and not yet pregnant. Cows still lactating but soon to have calves weaned.

January DSE cattle

- **Total Cows = 499 @ 21**
- **Total yearling heifers= 225 @ 8 (slight increase to factor in bodyweight increase)**
- **Total bulls = 13 @ 15 (no change in DSE)**
- **TOTAL = 12474**

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
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Last 3 months of pregnancy	8	9	11	
Cows with 0-3 month calves	13	14	17	
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July (winter)	7,826	14534
October (spring)	10549	22161
January (summer)	12474	
April (autumn)		

January DSE sheep

Total ewes = 5547 @ 1 DSE = 5547 (now dry ewes) but during month sell one fifth (lets call it 1100) of these so remaining = 4447@1 = 4447

- Weaners = 4160 @ 1.1 = 4576
- Yearling (hogget) ewes = 1100 @ 1 DSE = 1100 (no longer growing).
Also sell extras not needed for joining before Jan
- Yearling or hogget (Wethers) = 2080 @1 DSE = 2080
- Rams = 56 rams @ 2 DSE = 112
- TOTAL DSE = 12315

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
Weaners (growth rate 100 g/day)	1.1	1.3	-	-
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Time of year	Cattle DSE	Sheep DSE
July (winter)	7,826	14534
October (spring)	10549	22161
January (summer)	12474	12315
April (autumn)		

April DSE

- Have there been any sales? Yes, sell cows not in calf, sell any extra heifers not needed as replacements
- Has there been a change in reproductive status? No animals in last trimester yet (last third of pregnancy). However we have decided to wean the calves so now have weaners and cows without calves at foot.
- It is early joining time for ewes

April DSE cattle

- **Total Cows = 379 @ 9** - slight increase in condition hence DSE(sold 50 cows not pregnant and 70 old cows)
- **Weaned calves = 449 @ 7**
- **Total yearling heifers= 120 @ 8.5** (slight increase to factor in bodyweight increase, sold not pregnant and few PTIC)
- **Total bulls = 13 @ 15** (no change in DSE)
- **TOTAL =7769**

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
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April (autumn)	7769	

April DSE sheep

Total ewes = 4447 @ 1 DSE = 4447

Weaners = 4160 @ 1.1 = 4576

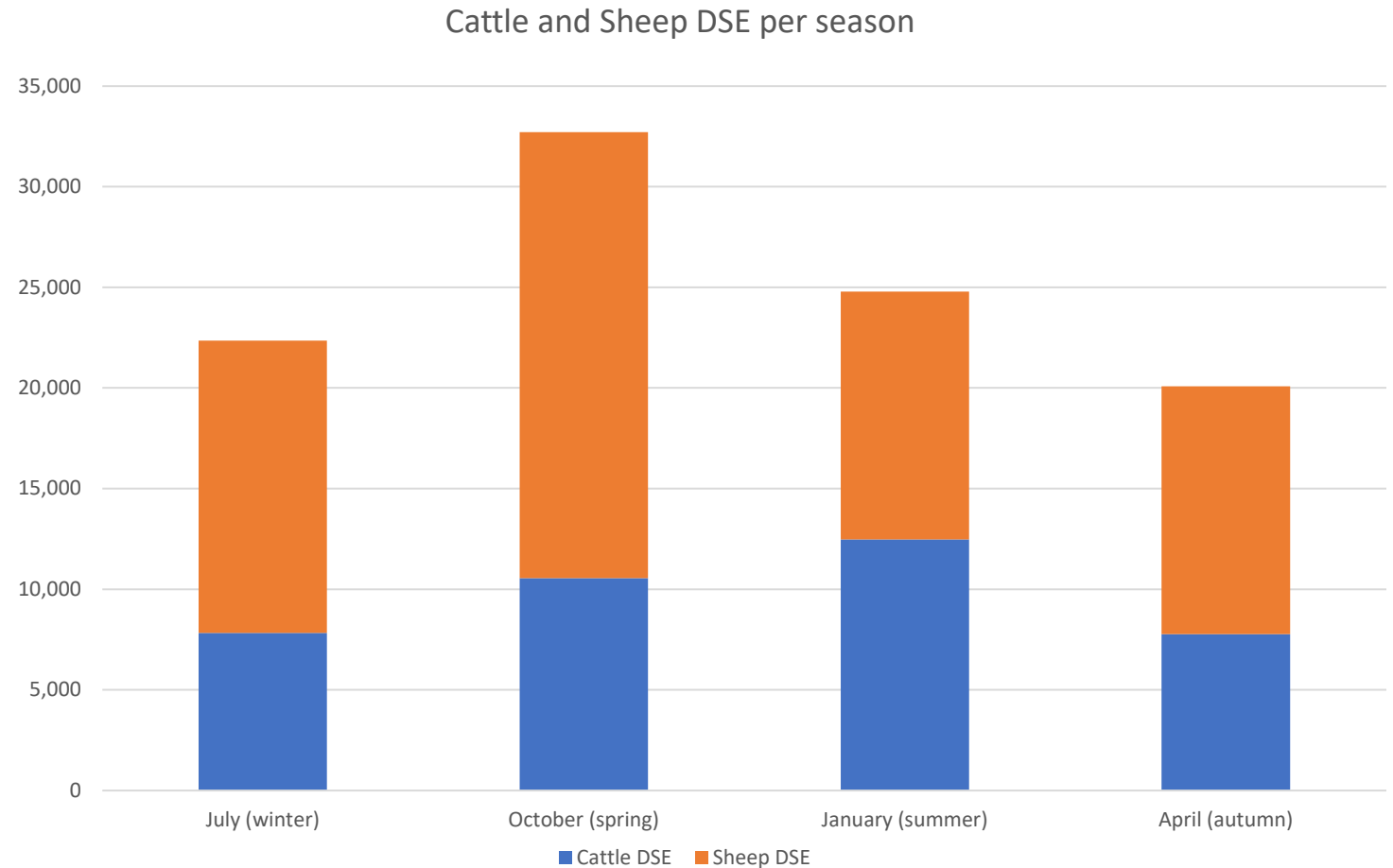
- Yearling (hogget) ewes = 1100 @ 1 DSE = 1100 (no longer growing).
- Yearling or hogget (Wethers) = 2080 @1 DSE = 2080
- Rams = 56 rams @ 2 DSE = 112
- TOTAL DSE = 13295

Sheep	30 kg	40 kg	50 kg	60 kg
Dry ewes or wethers (maintaining weight)	-	0.9	1.0	1.2
Last month of pregnancy (singles / twins)	-	1.2 / 1.4	1.4 / 1.6	1.6 / 1.9
Lactation (singles / twins)	-	2.6 / 3.7	2.7 / 3.9	2.9 / 4.4
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How does this look like DSE/season?

- Note that lowest DSE is Autumn and Winter
- Ideally low SR in autumn allows a feed “wedge” (extra grass)
- This grazed through winter and then as animals give birth spring pasture supplies large increase in needs to match



Moving time of calving/lambing

- The time of lambing has a large impact given the large increase in DSE in spring and some stock sales prior to feed quality/quantity reducing significantly
- Cattle SR changes less but there is still in advantage in matching the pasture growth
- Please note that I have done the above calculations quickly so there may be one or two errors but I preferred to get it available as soon as possible – if you notice anything please let me know.

Content questions ??????????????

Exercise 2: Trace element deficiency

- In mid September 2014, two separate properties were attended due to lameness progressing to weakness, collapse and death in spring born merino lambs.

Property 1

- Property 1 only had one mob of ewes clinically affected. These were 2 year old, maiden, fine wool merino ewes that had not received trace element in their pre-lambing drench. They were grazing on country that had not received any superphosphate for more than 15 years, but it was one of their better pastures and had grown more clover than other paddocks. The property has acidic granite based soils, and the annual rainfall for 2014 was >700mm.
- Three dead lambs had been found in the paddock over the previous week. The examined lamb was able to stand but unable to walk without dragging the hind legs. It appeared to be a hind limb stiffness and paresis. There was no swelling of any of the joints, its temperature was normal, it was bright and alert with pink mucous membranes

Property 2

- Property 2 had an outbreak of affected lambs in a mob of 220 maiden fine wool merino ewes. This property had a history of regular superphosphate use. In the previous 4 years in each year they had applied 100kgs/hectare single superphosphate to the paddocks. The soil type is pipe clay and soil ph (CaCl) levels generally sit around about pH 4.5. Annual rainfall for the previous 12 months had exceeded 700mm. The paddock that these sheep were in had been grazed short the previous summer and had a fantastic clover response in the autumn. The winter was mild and the clover grew unchecked into the spring. The owner estimated that the spring pasture was 80-90% clover.



Research

- What trace element is most likely responsible for these signs?
- What options are there to test to assess this was the problem?
- How could you reduce the problem immediately and for the longer term?

Too much/too little

- In what areas would you expect to see signs of trace element deficiency and why?
- What are likely events leading to trace element toxicity (too much)?

Selenium deficiency

- For discussion around these two cases please read the article below as the case information comes from this study
- <http://flockandherd.net.au/sheep/reader/selenium-deficiency-monaro.html>