

Monaro Seasonal Outlook (Sept 2018)

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Summary

- Current and projected conditions of pasture and livestock have been modelled for each of five pasture systems across 4 soil moisture probe sites on the Monaro for the period from the end of August until mid-December 2018.
- Conditions from the April projections have followed close to or below the 10th percentile projected at this time for all sites except Muniong which has ended just below the median at the end of winter.
- At the end of August, green herbage mass ranks well below 500kgDM/ha at all sites except at Delegate and Muniong which still only sits around 500kgDM/ha which is well below the benchmark required for lambing/lactating ewes.
- There is effectively very little soil water available to plants (PAW) at any of the sites except Muniong.
- Mature ewe condition score (CS) in all systems is well down in the bottom quartile except for Muniong which remains in the third quartile and above CS 3. Due to current pasture insufficiencies, on-going feeding is required at all sites other than Muniong to maintain a CS above 2.5.
- The current state of the system locks us into an **ongoing requirement to continue livestock feeding for at least September and most likely well into October.**
- At Bungarby and Bukalong, feeding rates required are amongst the highest in the historical simulations and are equivalent to a full drought ration.
- The BOM 3 month outlook currently follows the long term distribution with an equal likelihood of above or below median rainfall across the forecast period however the outlook does suggest ongoing warmer than average conditions. By October a definitive weather pattern should be more obvious.
- The Bungarby improved pasture site gives a 90% chance that green herbage will remain below median level in early December.
- Projections for green herbage are similar for the Delegate improved pasture but significantly worse for the Bungarby native and Bukalong pastures with the projected 90th percentile ie. best case scenario never exceeding the long term median and a 50% chance of remaining in the worst 10% of years until late October – early November.
- By the average lambing date of the 15th of Sept ewe condition score is below the 10th percentile for all systems.
- Early weaning only appeared profitable at the Delegate site indicating that the decision would return a profit in 75% of potential seasonal outcomes using a value of \$2/kg of extra liveweight at normal weaning time. At all other sites there was a 90% chance of a loss if adopting this strategy.
- A cost-benefit analysis of creep feeding of XBred lambs resulted in a total cost of \$27 per lamb with a total dollar value of gain of \$38/lamb assuming the 3 year median lamb price of \$6.04/kg cwt. This may be a beneficial strategy however will remain highly sensitive to grain costs and lamb prices.

Introduction

Dry conditions endured through the autumn of 2018 have continued through the winter leaving soils dry and very low herbage mass available for grazing. This has meant conditions from the April projections have followed close to or below the 10th percentile projected at this time.

Current and projected conditions of pasture and livestock have been modelled for each of five pasture systems across 4 soil moisture probe sites on the Monaro for the period from the end of August until mid-December. This has been done to explore the potential ongoing feeding requirements and impact on ewe and lamb performance up to weaning. For this outlook analysis the impact of early weaning on the physical and financial outputs will be explored at all four locations.

All of the systems modelled indicate an ongoing requirement for relatively high levels of supplementary feeding until at least mid-october. Early weaning gave a better outcome in terms of lamb live weight and ewe condition score in mid-December but this strategy only yielded a reliable economic return at one of the four modelled sites.

Method

Weather data is sourced from the SILO data drill for all four sites. A base historical simulation (starting 1 Jan 1968) was run up to the 28th of August 2018 to establish the current conditions then a tactical simulation carried out using current state of the historical run as its starting point.

The projections for this outlook analysis have applied weather data for the period 29th of August to the 15th of December for each year from 1968 to 2017 to explore the distribution of possible seasonal outcomes based on the historical distribution of performance.

Additional tactical simulations using the same range of weather were conducted where lambs were weaned from their mothers a month early on the 15th of November and fed a high protein mix of the base cereal (wheat) with Cottonseed Meal.

Limited graphical outputs will be embedded in the body of this report but matching outputs for all other systems modelled will be included as an appendix to this report so that the reader can choose to look at the outputs most relevant to their on location.

Conditions entering Spring 2018

Weather

On the back of a dry autumn the rainfall throughout winter 2018 was also very much below average at all sites other than Muniong in the North west of the region.

Figure 1(a) shows that at Bungarby the cumulative rainfall for the season ran close to the median until the end of June but that very little rain has fallen

since that time and that at the end of August the cumulative rainfall is below the 10th percentile i.e. a 1 in 10 year dry spell. All other sites have a similar pattern of winter rainfall except Muniong (Fig 1 (b)) which tracked the median up until mid-July and ending the season below the median but well above the 10th percentile. This is largely as a result of a couple of cold fronts with snow events which made it as far as Muniong but did not penetrate east to the other monitor sites.

Figure 1(a). Cumulative seasonal rainfall total at Bungarby from the 1st of Jun 2018 to 28th Aug 2018 compared to the long term.

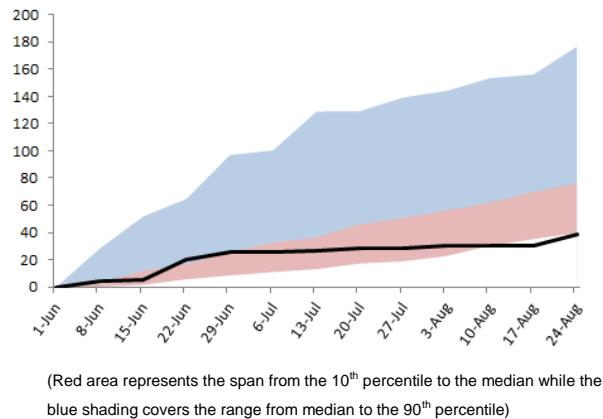
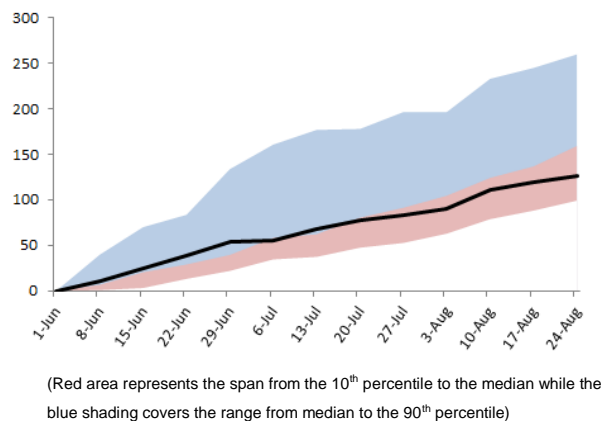


Figure 1(b). Cumulative seasonal rainfall total at Muniong from the 1st of Jun 2018 to 28th Aug 2018 compared to the long term.



BOM records show mean temperature anomaly across the region is very close to zero being a balance between decile 8-9 maximum daily temperatures and decile 4-7 minimum daily temperatures.

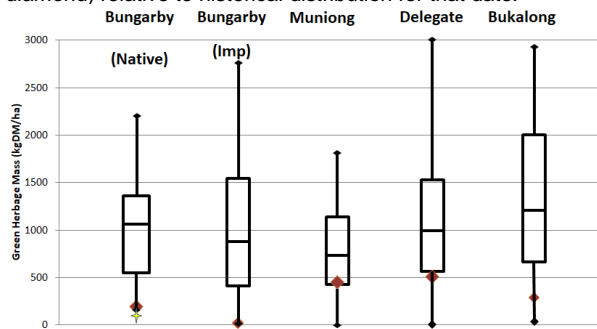
Herbage Mass

After a dry autumn the region entered winter with low levels of green herbage and this relatively low herbage mass persisted to the end of August. This is not unexpected as winter pasture growth rates are always low and usually far more related to low temperatures than lack of soil moisture.

The current ranking of available green herbage mass is low for all simulations with virtually no green herbage available on improved or native pasture at Bungarby and very low levels at Bukalong (Figure 3.). Green herbage at Delegate and Muniong ranked around the 25th percentile but was still only around 500kgDM/ha which is well

below the benchmark required for lambing/lactating ewes.

Figure 3. Green herbage mass on 28th of August (brown diamond) relative to historical distribution for that date.



The gold star represents the amount of green in the native pasture which is not *Poa*.

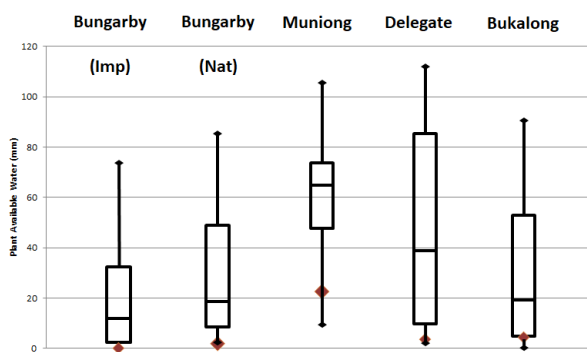
Spring is starting with a relatively low level of green leaf at all sites which does put a handbrake in initial growth rates regardless of whether early spring rainfall occurs.

Soil Moisture

A lack of green in pastures is usually the reflection of ongoing low plant available water (PAW). Figure 4 shows the current PAW for each of the model runs.

There is effectively very little soil water available to plants at any of the sites except Muniong but given its location in the landscape, significantly higher PAW is expected at Muniong at this time of year anyway and the current PAW is still well down into the lowest quartile.

Figure 4. Plant Available Water on 28th of August (brown diamond) relative to historical distribution for that date.

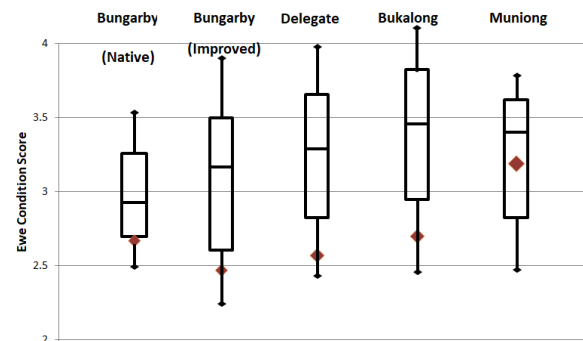


Animal Condition

With dry conditions through both autumn and winter 2018 animals have continuously lost body condition in the lead up to lambing. Mature ewe condition score (CS) in all systems is well down in the bottom quartile except for Muniong which remains in the third quartile and above CS 3.

Of more importance is the sufficiency of the current pasture to maintain condition score and in this regard conditions are poor. In all cases but Muniong the animal group in the poorest condition has already reached CS 2.5 and feeding is ongoing.

Figure 5. Ewe condition score on 28th of August (brown diamond) relative to historical distribution for that date.

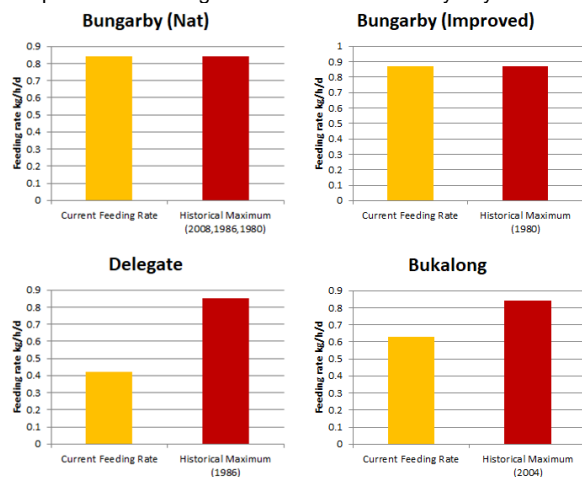


Ewe Feeding Rate.

All simulations other than Muniong show that ewes are being fed to maintain condition. In the case of Muniong the current modelled condition score is still above the feeding threshold but feeding is still likely to be happening on real farms in the area to avoid issues with metabolic diseases such as pregnancy toxemia due to very high levels of weight loss close to lambing.

Due to the very low levels of green herbage available at Bungarby and Bukalong the feeding rates modelled at the 28th of August were equal to the highest in the historical simulation and is equivalent to a full drought ration. At Delegate the feeding rate is half the worst on record reflecting the model showing more than 500kg/ha available green DM.

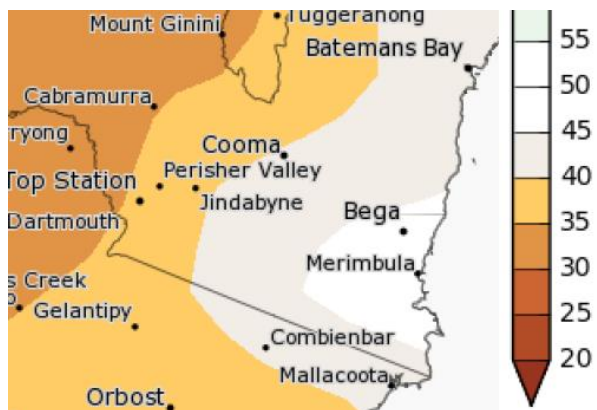
Figure 6. Ewe Breeding ewe feeding rate at the 28th of August compared with the highest on record for the day of year



BOM weather outlook Spring 2018.

The three month rainfall outlook (figure 7) shows probabilities of exceeding median rainfall of just 40 – 45% for most of the district and 45%-50% for a small part of the district in the east. Past forecast reliability for this period under the current weather patterns has been moderate but at these probability levels the chances of rain are really no different to the long term distribution with the BOM considering there is equal likelihood of above or below median rainfall across the forecast period.

Figure 7. BOM Sept - Nov Rainfall Outlook.
Probability of exceeding median rainfall totals.



For the purposes of interpreting the GrassGro outputs in this report the probability distribution needs no adjustment and raw percentiles will be reported below.

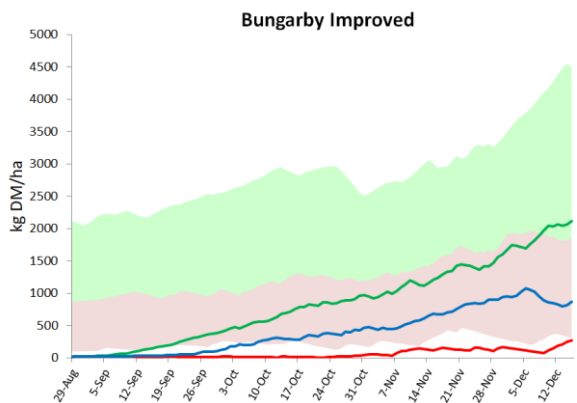
The outlook does suggest ongoing warmer than average conditions. Should higher than average temperatures eventuate this will keep evaporation rates higher than usual and exacerbate any rainfall deficit.

Projections 28th Aug. – 15th Dec

Pasture availability expected to be well below the long-term median

The modelled green herbage available on the 28th of August for the Bungarby simulation is close to zero for the improved pasture model which is below the long term 10th percentile. There is an even chance that that green herbage will remain below the long term at the start of October. There is little to no chance of the probability distribution for green herbage returning to the long term range in the period of this projection. There is a 90% chance that green herbage will remain below median level in early December.

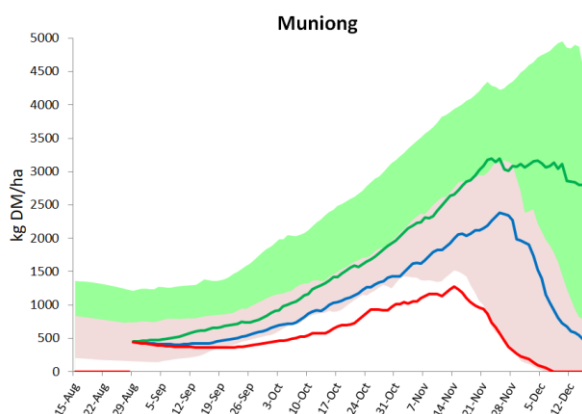
Figure 10(a). Projected green available herbage (kgDM/ha) at Bungarby (Imp) relative to historical variation.



Projections for green herbage are similar for the Delegate improved pasture but significantly worse for the Bungarby native and Bukalong pastures with the projected 90th percentile never exceeding the long term median and only a 50% chance of remaining in the worst 10% of years until late October – early November.

Projections for Muniong are more positive however largely due to the higher starting green herbage mass and higher initial soil moisture. From this starting point (figure 10 (b)) there is a 10% chance that herbage mass will reach median levels by mid-October and projected 10th and Median percentiles are approaching the long term distribution by the end of the simulation.

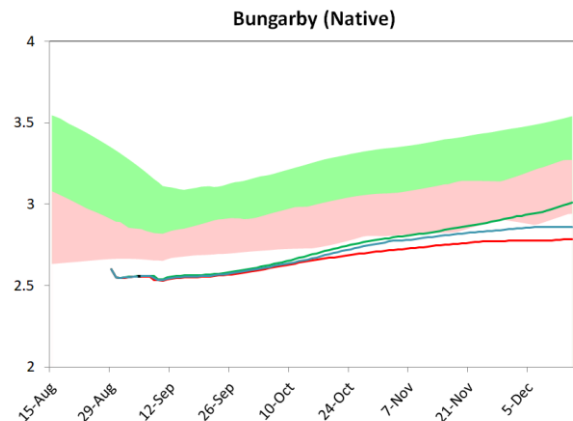
Figure 10(b). Projected green available herbage (kgDM/ha) at Muniong relative to historical variation.



Ewe body condition (CS)

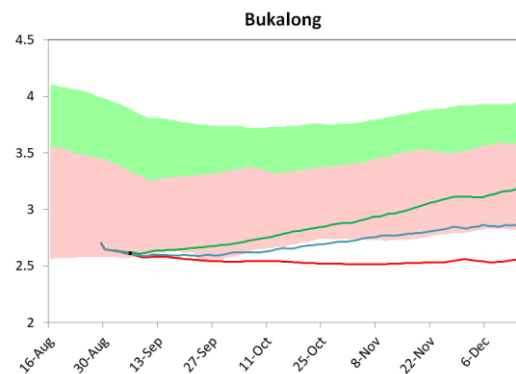
By the mean lambing date of the 15th of Sept ewe condition score is below the 10th percentile for all systems. Due to the low probability of green herbage mass meeting animal requirements during the lambing phase the projected CS percentiles on native pasture at Bungarby do not begin to diverge until mid October and there is a 90% chance CS will remain in the long term worst 10% of years for the duration of the period.

Figure 11 (a) Projected ewe condition score on the Bungarby Native system relative to historical variation.



All other simulation indicate the most likely case for condition score at the time of weaning will be between the long term 10th percentile and the median. No systems indicate any chance of exceeding the long term median.

Figure 11 (b) Projected ewe condition score on the Bungarby Native system relative to historical variation.



Since GrassGro manages body condition by triggering supplementary feeding at threshold CS levels and this seasonal outlook analysis uses CS 2.5 as the maintenance feeding trigger then the red line should hover around CS 2.5.

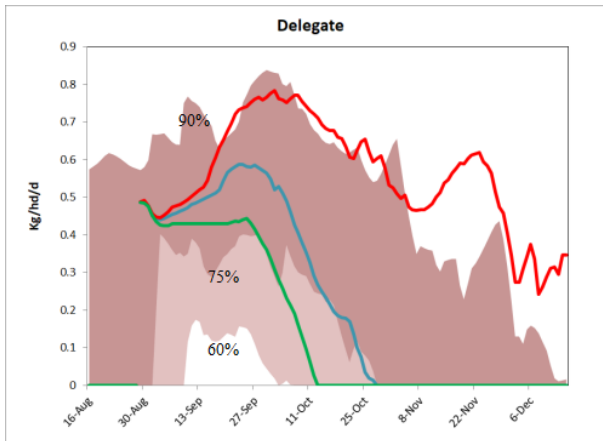
Feeding amounts

The feeding threshold is triggered in all 5 of the outlook simulations. Since over the long term simulation no feeding is required at all in 50% of years the graphs represented below compare this year's projections against the 60th, 75th, and 90th percentiles.

At Delegate even though the pre-lambing feeding is only around 0.5kg/h/d this is still in the worst

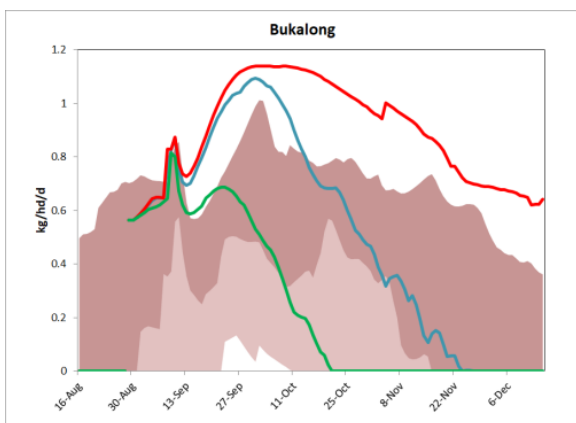
25% of all years. There is a 90% chance feeding will remain above the highest quartile until late September and that some feeding will be required until mid-October. There is an even chance that the feeding rate will remain at or above current levels until early October. The projected 90th percentile tracks close to the long term 90th percentile simply indicating that feeding is approaching full hand feeding rates in around 10% of years.

Figure 12(a) Probability of total feed requirements exceeding any given level for ewes at Delegate



At Bukalong and for both Bungarby simulations there is an even chance of feeding rates remaining above the long term 75% percentile for the duration of the period and above the long term 90th percentile until mid-October. The 90th percentile sits well above the long-term distribution suggesting there is a significant chance this year's feeding rates could be the worst since 1968.

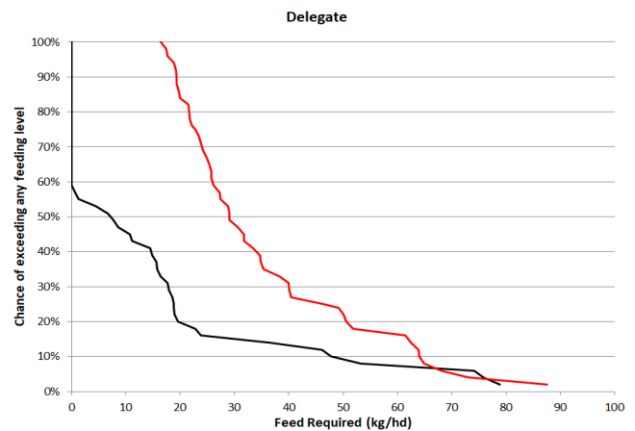
Figure 12(b) Probability of total feed requirements exceeding any given level for ewes at Bukalong



The total feed requirements at Delegate are predicted to certainly exceed 20kg/ewe over the projected period whereas there is only a 20% chance of this amount of feed being required over the long term. There is a 25% chance that the total feed requirement will be a 1 in 10 year but about the same chance of being a 1 in 20 year as the long term. Total feed requirement is unlikely to exceed 80kg/ewe over the 15 week period. The Bukalong projections show a very similar

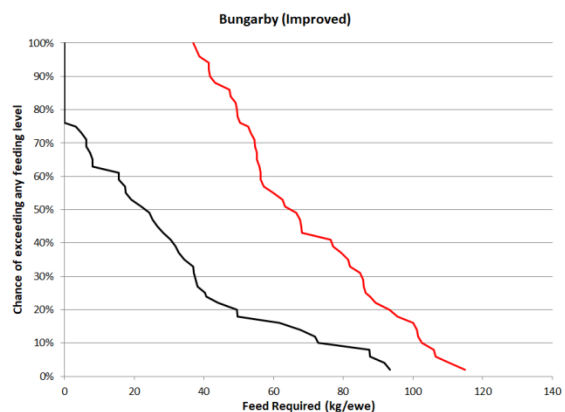
distribution to Delegate albeit with a slightly higher minimum total feed requirement of around 25kg/ewe.

Figure 13(a) Probability of total feed requirements exceeding any given level for ewes at Delegate (red line is the 2018 projection black line is over the long term)



On the improved pasture at Bungarby while the system is locked into being a 1 in 4 year in terms of total feed required, there is also a 25% chance that this year could be a 1 in 20yr event in terms of total feed required and a 20% chance it could be the worst in the record by a small margin. This probability distribution is similar for the Bungarby Native pasture.

Figure 13(b) Probability of total feed requirements exceeding any given level for ewes at Bungarby (Imp) (red line is the 2018 projection black line is over the long term)



The relative probabilities at Muniong are actually similar to the Bungarby distributions with a chance the feed required may be the highest in the record however because pasture condition in spring are generally so reliable at this site the maximum feed required per ewe is limited to just 70kg/hd in the worst case projection compared to 120kg/hd for the Bungarby simulation

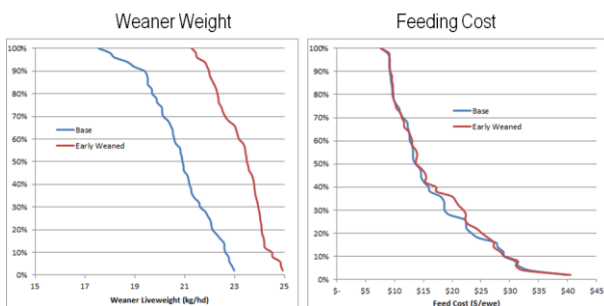
Seasonal Management Options.

Early Weaning

A management option being considered around the state this year is that of early weaning to reduce ewe feeding rates and feed weaners separately for increased weight gain and performance.

All five simulations were set up to wean the lambs on the 15th of November and feed them separately to the ewes. The lambs were fed *ad lib* a mix of wheat and protein meal to give an average of 12.9 MJ/kgDM and 21% crude protein at a cost of \$520/tonne. Weaned lambs continued to be fed until green available pasture exceeded 2000kgDM/ha. GrassGro automatically calculated the appropriate change in feeding rate for the drying off ewes according to their CS and the available herbage.

Figure 14(a) Distribution of final weaner weight and total feed cost for early weaning vs normal weaning at Delegate.



It can be seen that weaning early at Delegate increased the weight of the lambs on the 15th of December by 2-3kg/hd. This improvement came at very little extra cost since across most years the extra cost of feeding lambs was offset by a similar saving in ewe feeding costs.

Figure 14(b) Distribution of net return for early weaning vs normal weaning at Delegate.

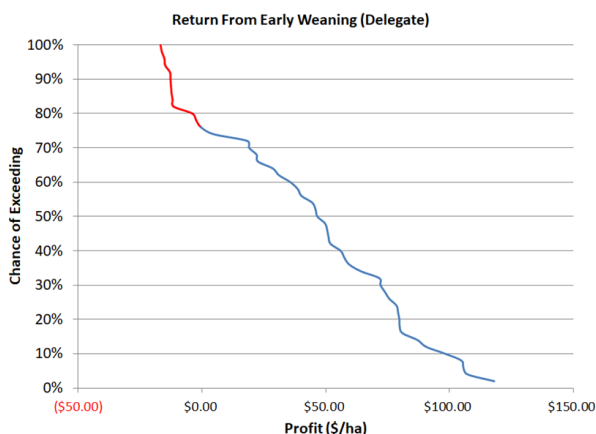
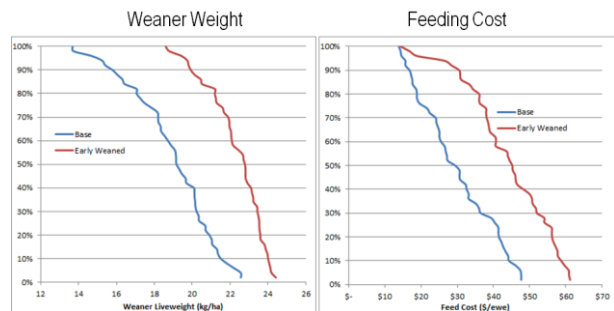


Figure 14 (b) shows the distribution of net return from early weaning indicating that the decision would return a profit in 75% of potential seasonal outcomes using a value of \$2/kg of extra liveweight at the date of normal weaning. Any benefit of higher ewe CS (approx. 0.2 CS across the range) and better weaner survival (not modelled) has not

been valued so returns are potentially a little higher.

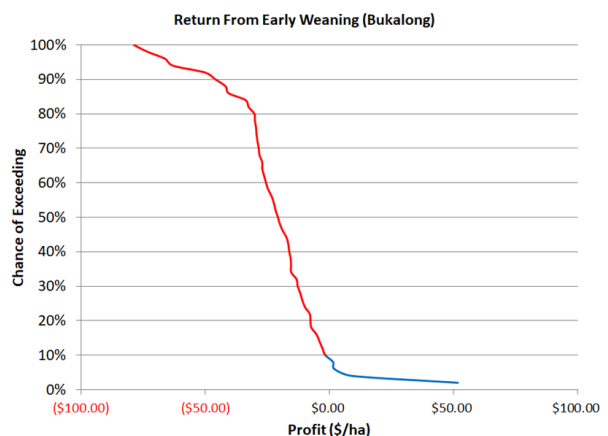
The weight of extra lamb weaned at Bukalong was very similar at a round 2kg/hd but except for the very best seasonal outcomes there was a significant increase in the cost of feeding. This is a two-fold effect. Due to the lower probability of adequate green herbage mass over the spring period the savings on ewe feeding are less and the need to continue to feed lambs late in the period is higher leading to a higher overall quantity fed. Since lambs are fed a dearer mix the overall cost of feeding is higher in most years.

Figure 15(a) Distribution of final weaner weight and total feed cost for early weaning vs normal weaning at Bukalong.



Overall the value of the extra lamb weight at normal weaning time was not enough to offset the extra costs in individual years so for Bukalong the choice of early weaning was not economic with only a 10% chance of a net profit and 20% chance losses on the decision could exceed \$25/ha. Again, extra ewe CS and higher weaner survival have not been valued in this calculation.

Figure 15(b) Distribution of net return for early weaning vs normal weaning at Bukalong.



Analyses for each of the other systems tested showed a similar result to Bukalong with a low probability of an economic return to early weaning

Creep Feeding.

Since early weaning does not appear to be an economic option for gaining improved weaner liveweight at all sites, creep feeding may be another option worth considering. Since unweaned lambs cannot be fed separately in the GrassGro management framework this option could not be considered within the systems

modelled. Instead the option was modelled using a staged approach through the GrazFeed model which is the animal component of the GrassGro model.

Technical aspects of how to creep feed are covered in a Primefact I wrote while still with NSW DPI during the mid 2000's.

https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0003/77781/Creep-feeding-lambs-Primefact-224---final.pdf

I recently had cause to review the response to creep feeding for a recent Ewe Time forum and I will present the results here as an indication of the potential response to preferential feeding of the unweaned lamb.

Core assumptions for this work are

- Merino Ewes joined to Dorset Rams
- Ewes in light condition (CS 1.5)
- Feeding in the lambing paddock
- Lamb losses and mismothering occurring
- Little paddock feed (200 kg Green DM/ha)
- Lamb growth rates (< 150 g/h/d).
- 700g/h/d base ewe feeding rate.
- Ad lib feed 80% Barley 20% CSM +Lucerne hay in the creep

The impact of creep feeding was calculated by modelling the unweaned lambs in GrazFeed and calculating the remaining unsatisfied appetite and supplying this quantity of extra feed through a creep. Extra weight gain was by applying the reported gain efficiency from GrazFeed to the extra feed consumed.

Table 1. Impact on live weight gain from creep feeding 1st cross lambs

Days since Lambing	* Wt & Gain w/o Creep (Kg) &(g/h/d)	Creep Allowance (g/h/d)	Extra Daily Gain (g/h/d)	Wt. & Gain Creep Fed (Kg) &(g/h/d)
28 (18)	8			8
	146	167	90	236
42 (30)	10			11.3
	133	333	165	298
56 (42)	12			15.5
	104	555	243	350
77 (65)	14			22.8
	87	667	180	357
98 (84)	16			30.3
		33 kg	14.3 kg	

It can be seen in Table 1. that the amount of creep feed able to be consumed by month old lambs is relatively small but the efficiency of gain is very high giving an extra 90g/h/d weight gain for the input of just 167g/h/d of extra feed. The extra daily gain peaks at 243g/h/d in 6-8 week old lambs and the total anticipated extra gain totals just more than 14kg/hd up to 100 days of age for a total intake of

creep feed of just 33kg/hd. At a cost for creep feed of \$800/tonne this is a total cost of \$27 per lamb with a total dollar value of gain of \$38/lamb assuming the 3 year median lamb price of \$6.04/kg cwt.

Conclusions

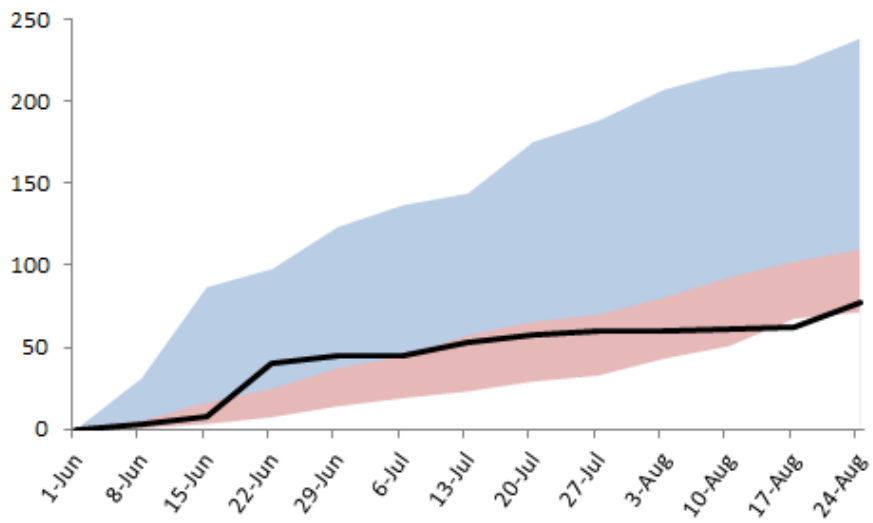
This spring is shaping to be as bad as some of the worst seasons seen over the past 50 yrs. The current state of the system with ewes at the low end of their normal range of condition and very low green herbage mass along with very dry soil means that pasture growth response going into spring will be slow locking us into an ongoing requirement to continue livestock feeding for at least September and most likely well into October.

The much discussed strategy of early weaning appears to only give reasonable returns for the Delegate locality while all other locations modelled returned 90% likelihood of a loss on the decision to wean a month early in mid-November.

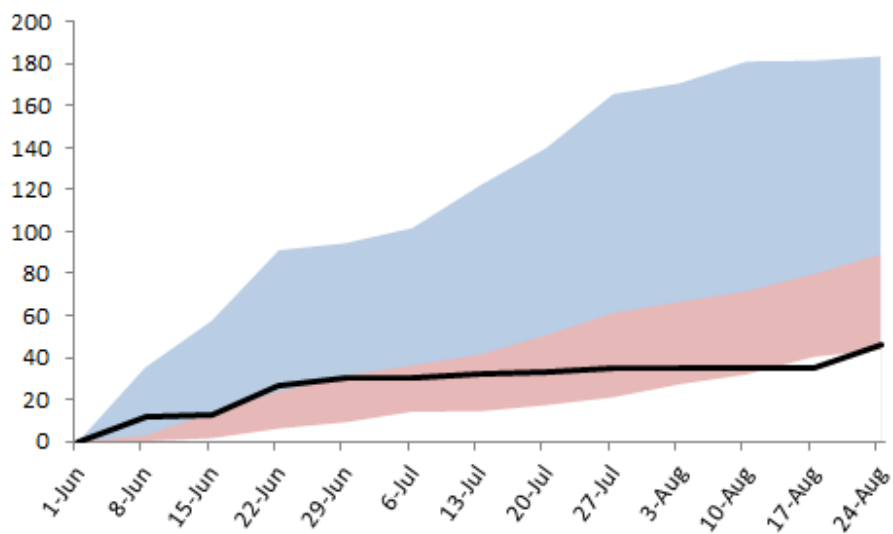
Creep feeding remains another potential alternative strategy to lift lamb growth rates and weaning weights without having to wean but returns to the strategy remain sensitive to the relative price of supplement and finished lamb.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (September 2018). However, because of advances in knowledge and changes in market conditions, users are reminded of the need to ensure that information upon which they rely is up to date and to independently check the accuracy and currency of the information.

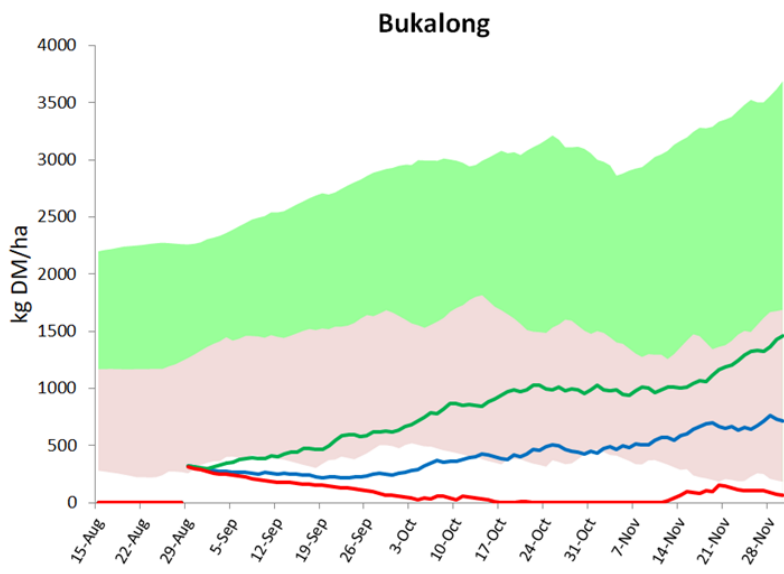
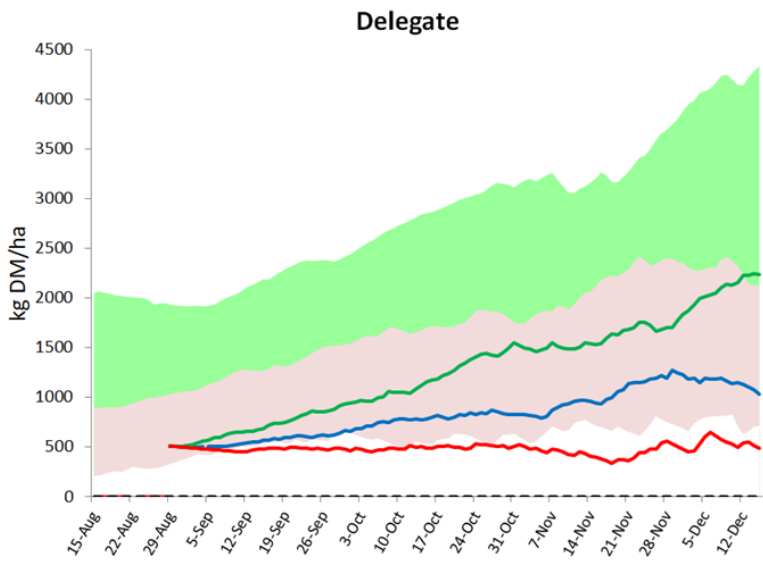
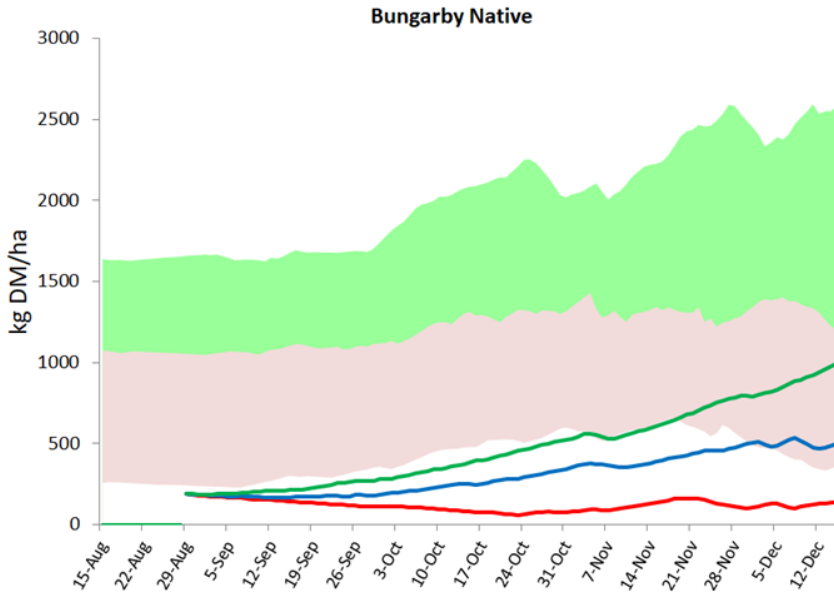
Delegate



Bukalong

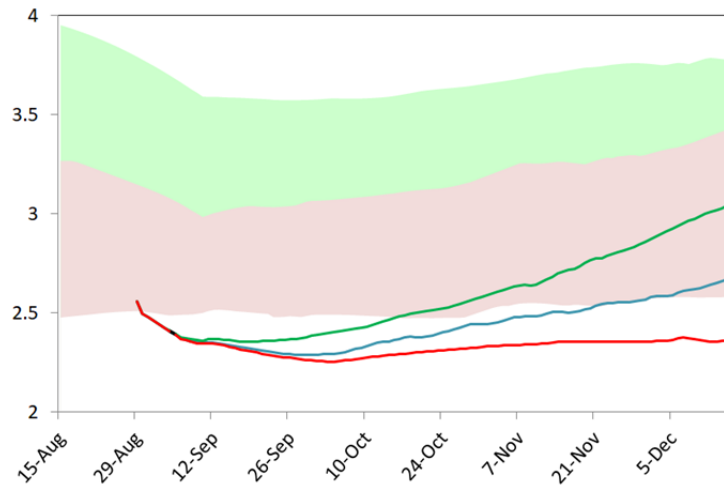


Appendix 2 Green available herbage projections

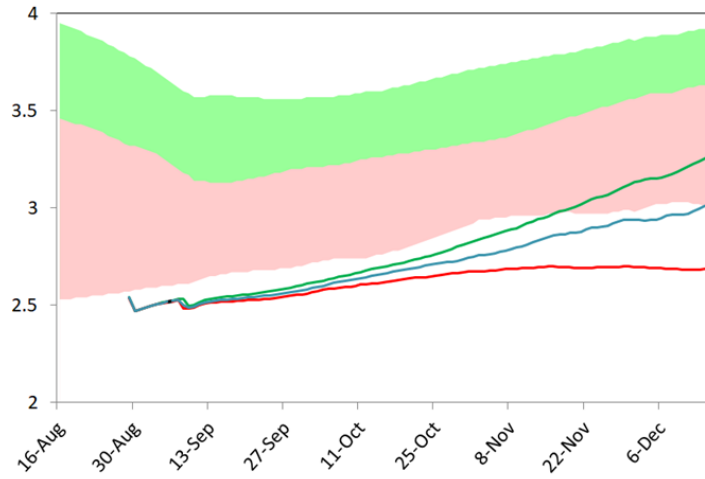


Appendix 3 Ewe condition score projections

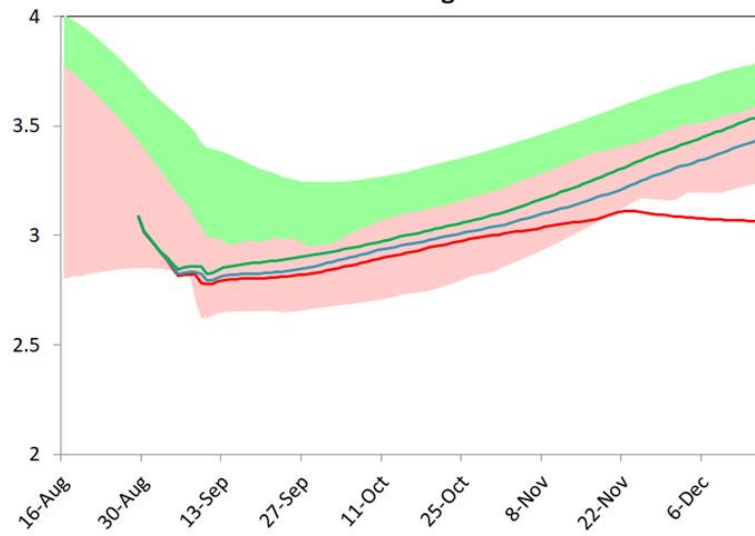
Bungarby (Improved)



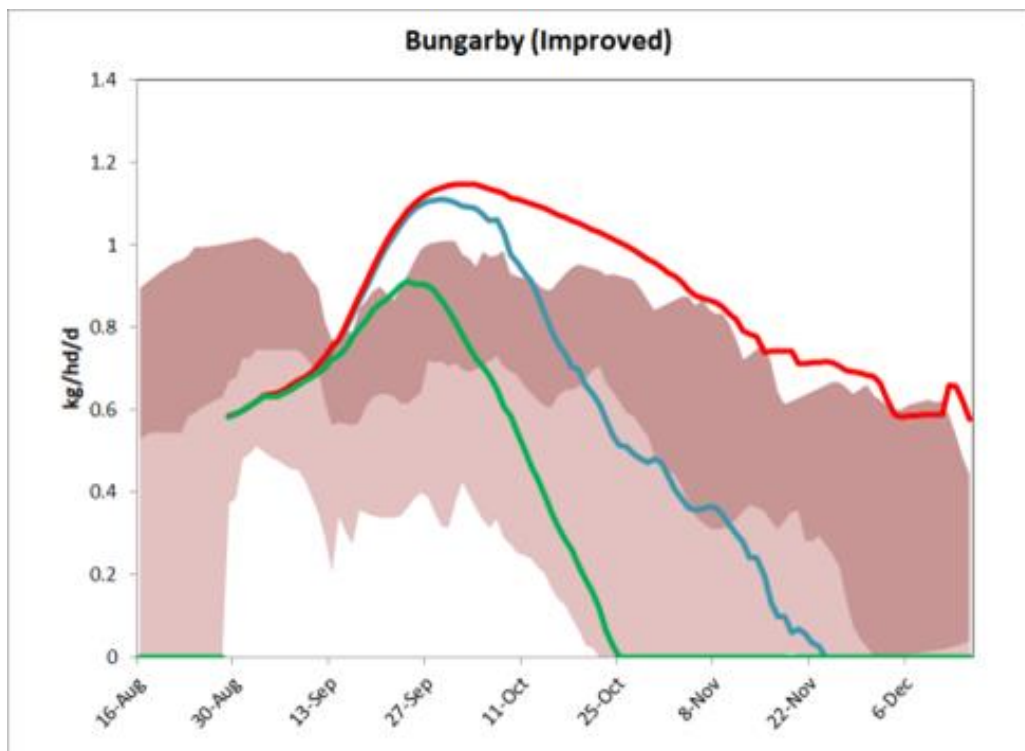
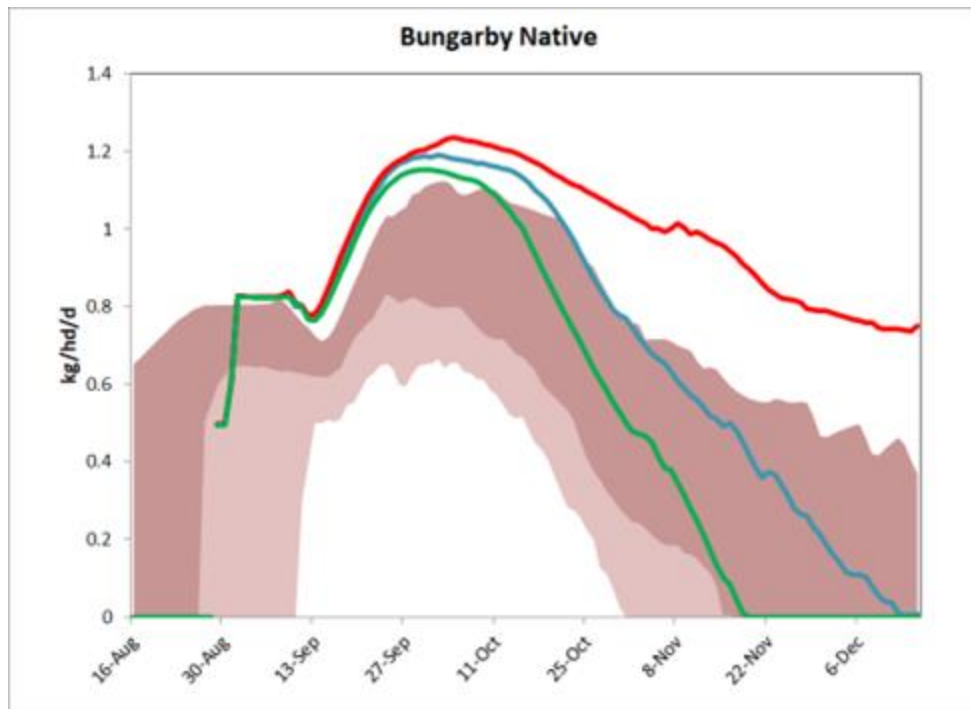
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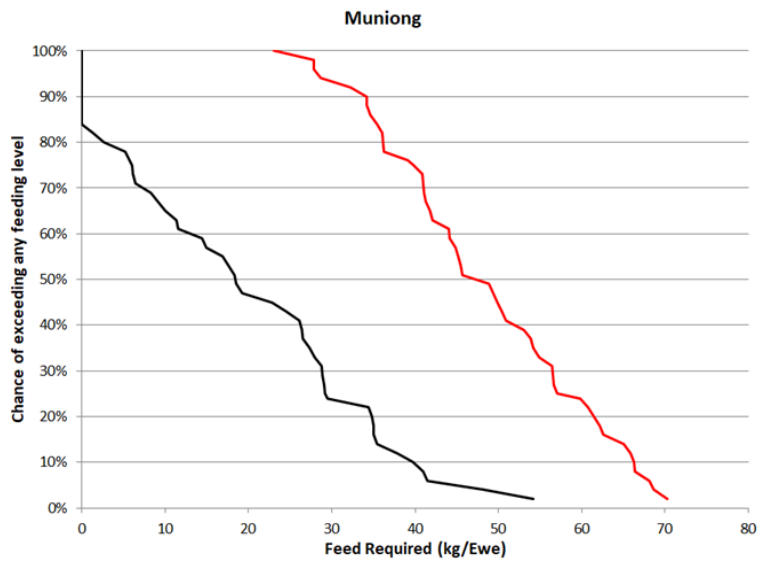
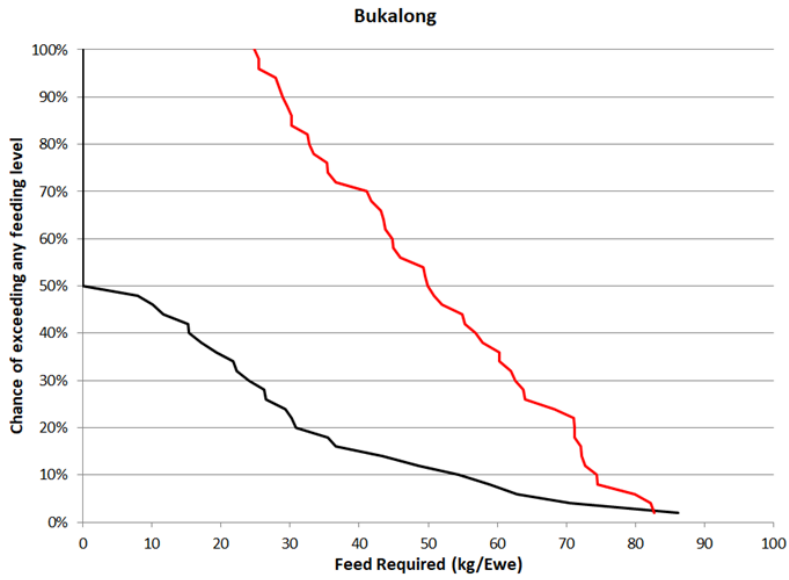
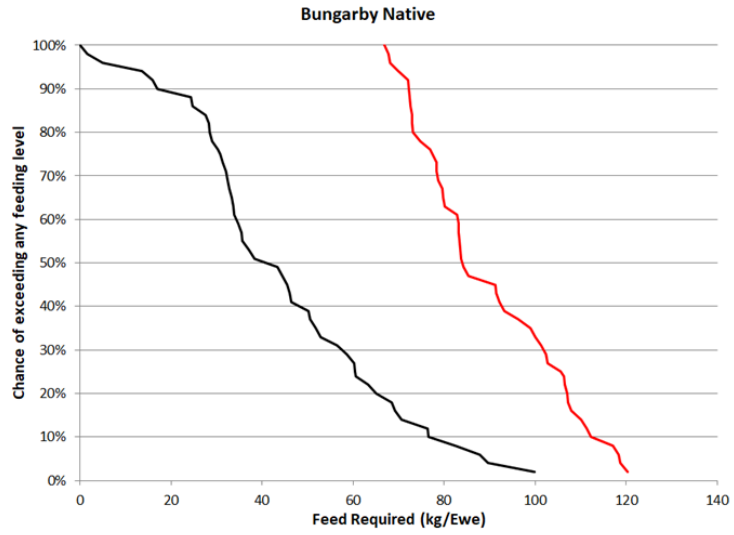
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Appendix 4 Feeding rate projections



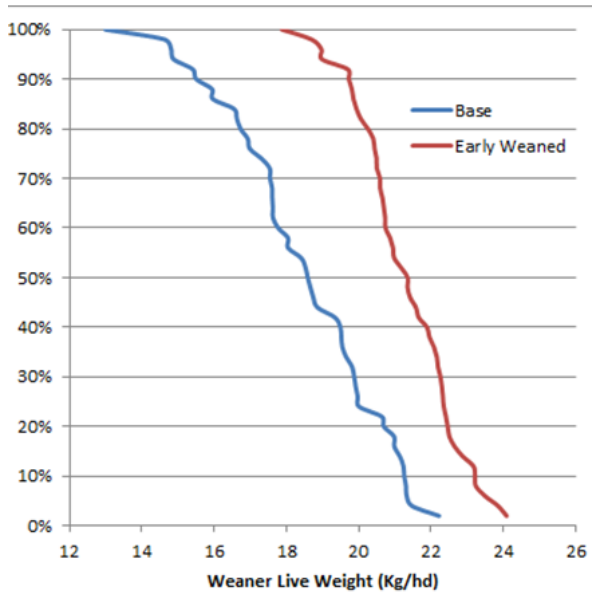
Appendix 5 Total feed required per breeding ewe during Spring 2018



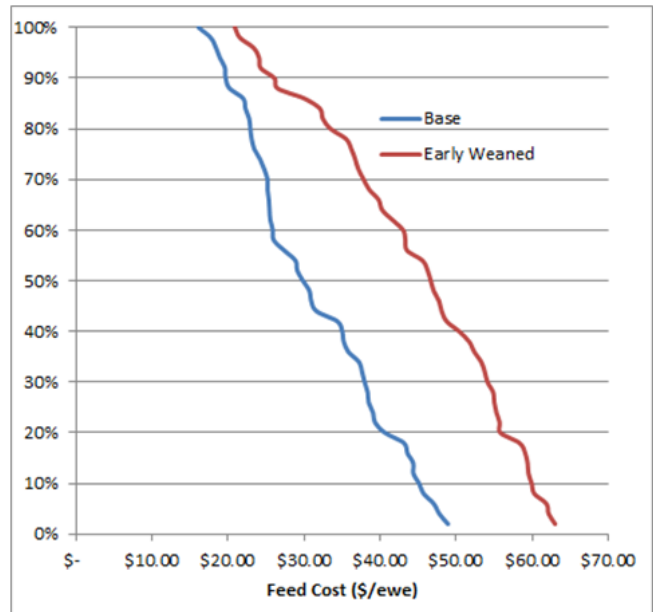
Appendix 6 Difference in final weaner weight and feeding cost by early weaning

Bungarby Improved

Weaner Weight

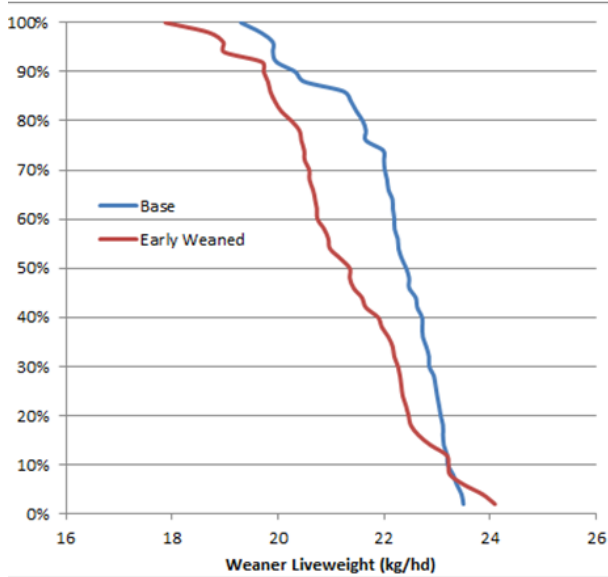


Feeding Cost

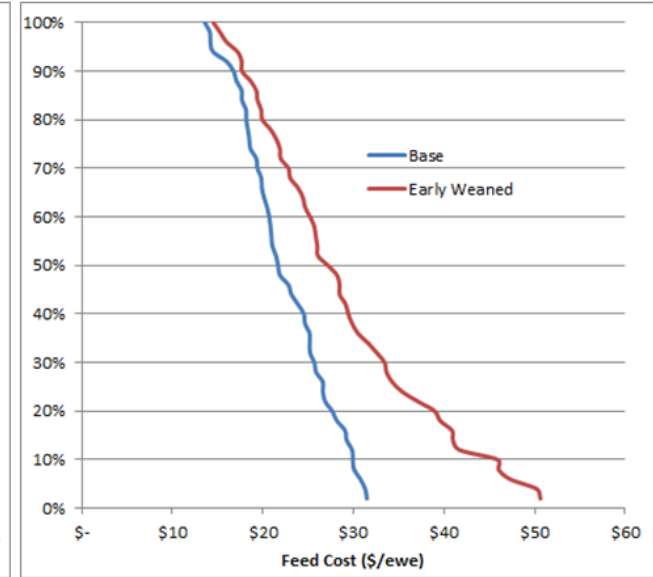


Muniong

Weaner Weight



Feeding Cost



Appendix 7 Economic return from early weaning

