Sustainable Land Use for Red Meat and Wool Production in the Mallee Woodlands Sub-Region (Limestone Coast, SA)

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Key messages:

- Sustainable Dry Sheep Equivalent (DSE) figures for the Mallee Woodlands Sub-Region ranged from 2 DSE/ha to 6 DSE/ha
- There are many factors that must be taken into account to work out a potential sustainable carrying capacity on your property/ies
- Management strategies can be implemented to increase carrying capacity, however farmers should be aware that there are also many constraints that impact carrying capacity

Introduction

Determining the correct carrying capacity on the mostly sandy soils of the Mallee Woodlands sub-region for an individual property will depend on many factors including rainfall, soil type and the type of enterprise. Carrying capacity will also depend on the area of a particular property that can be cropped and whether the crop offers opportunities to graze livestock.

Overstocking on sandy soils will result in severe land degradation, particularly due to wind erosion which is difficult and expensive to remediate. Overstocking will also result in the loss of productive pasture species such as dryland lucerne or perennial veldt grass which in turn will significantly reduce livestock production and reduce farm profitability. Loss of productive pasture species increases infestations of troublesome weeds such as silver grass, barley grass and brome grass, which can reduce overall productivity, and more importantly result in seed infestations in lambs.

Determining the correct number of livestock to run on a given area will take into consideration grazing management and livestock feed demand, relative to pasture productivity and the timing of pasture growth production. Landholders in the Mallee Woodlands sub-region are using the following strategies to manage their livestock to maximise sustainable carrying capacity and maintain pasture ground cover particularly in years of lower rainfall:

- Running larger mobs in smaller paddocks and use of rotational grazing
- Later lambing, such as in July, to make it easier to spell paddocks in autumn/early winter to allow pastures to recover especially if

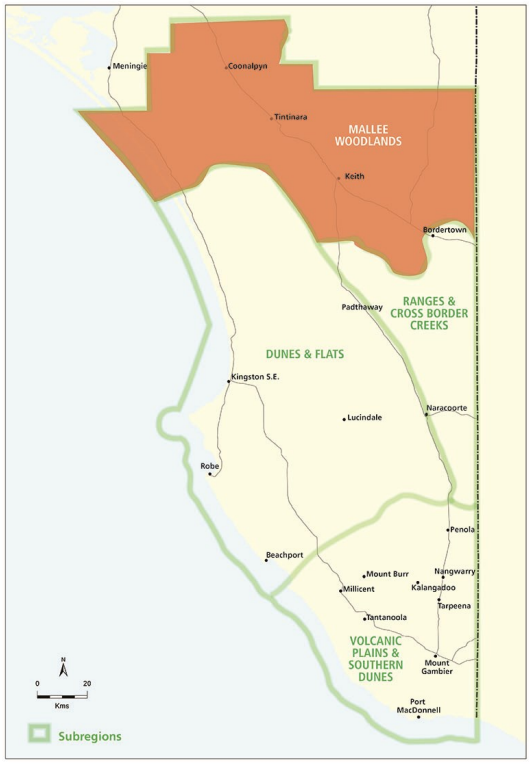

Figure 1: Map showing Mallee Woodlands Sub-region (Limestone Coast, SA)

there is a late break or dry summer

- Trading livestock to provide flexibility in livestock numbers to prevent overgrazing
- Pregnancy scanning females and selling all dry animals
- Destocking or selling particular classes of animals
- Grazing cereals
- Containment or drought lot feeding
- Feed lotting to finish livestock
- Supplementary feeding
- Breeding animals to have moderate frame size
- Maintaining adequate soil fertility

Whilst most landholders are working hard to continue to improve their soils and in particular, better manage their sandy soils, individual landholders can still be caught out in a dry year.

The key is to monitor these sensitive areas closely and make early decisions as required.

Carrying Capacity and Stocking Pressure

Carrying capacity or long term stocking rate refers to the number of livestock that a paddock or whole property can support over a period of time (several years) without damaging either the soil or the pasture. This is usually measured as a dry sheep equivalent (DSE) per hectare (ha).

On the other hand, stocking pressure is how many DSE/ha are grazing or using an area of land at a particular time and is a management decision regarding how many animals you are going to put on a particular pasture or in a paddock, and for how long.

Determining your optimal carrying capacity (long term stocking rate) will rely on many factors including:

- Grazing management
- Livestock type and target markets
- Time of lambing or calving
- Soil type
- Pasture type, persistence and stability
- Labour
- Investment
- Length of the growing season

Actual carrying capacity can be calculated using historical grazing records (number of animals x DSE x number of days divided by grazing area), or by using one of the numerous grazing record computer programs available.

It is dangerous to target a higher stocking rate without a very flexible and well managed grazing system, as soils and pastures can also be easily damaged, even at lower stocking rates, if grazing and fertiliser management is neglected.

Defining a Dry Sheep Equivalent (DSE)

A DSE is a method of standardising the energy requirements of different classes of livestock, based on their metabolisable energy needs. One DSE is the amount of energy required to maintain a 50kg wether (or dry ewe) in condition score 2.5, which is equivalent to a requirement of 8.5 megajoules (MJ) of metabolisable energy (ME) per day.

A DSE does not indicate how many MJ of ME per day the animals are actually eating, as this will depend on the quality and availability of the feed on offer.

A DSE only indicates the animal ME requirements, not the actual ME intake

Table 1: DSE Ratings for Various Classes of Livestock Based on ME Requirements

Mature Ewes

Liveweight (kg)	Dry	Pregnant (last month)		Lactating (average to weaning)		Average for Year
		Single	Twin	Single	Twin	
50	1	1.4	1.6	2.1	2.7	1.5
60	1.2	1.6	1.9	2.5	3.1	1.8
70	1.3	1.8	2.2	2.8	3.6	2

Growing Lambs

Liveweight (kg)	Growth (g/day)			
	50	100	150	350
20	0.7	0.8	1	1.2
30	0.9	1	1.2	1.7
40	1.1	1.3	1.6	2.3

Wethers

Liveweight (kg)	Maintenance
50	1
60	1.2
70	1.4

Breeding Cattle

Liveweight (kg)	Dry	Pregnant	Lactating		Average for Year
			0-3mth	3-9mth	
400	4.6	6.2	10	13.8	9
500	5.4	6.9	10.8	15.4	12
600	6.2	7.7	12.3	16.9	14

Growing Cattle

Liveweight (kg)	Growth (kg/day)		
	Maintenance	0.5	1
200	3.1	5.4	7.7
300	3.8	7.3	9.2
400	4.6	9.2	10.8

Please note that a DSE is only a rough estimate of an animal's feed requirements. The DSE rating will vary considerably depending on whether the calculation is based on actual ME intake, or ME requirements.

For example, if a 60kg ewe with one lamb has a ME requirement of 21MJ/day, then her DSE rating equals:

DSE = 21 ÷ 8.5

= 2.5

If the same ewe is grazing a high quality pasture with 1800kg/ha feed on offer she may have an ME intake of 28MJ/day, so her DSE rating will be:

DSE = 28 ÷ 8.5

= 3.3

Actual kg of pasture/head/day disappearing from a paddock will also include wastage, which will vary from 20% in a high quality green pasture to more than 90% as quality drops.

Estimated carrying capacities for the Mallee Woodlands sub-region

The table below contains estimates of long-term carrying capacity based on information collected at workshops from producers farming across the Mallee Woodlands sub-region. There are many variables affecting the carrying capacity and performance of pastures so these figures are a general guide for normal seasonal conditions.

Table 2: Estimated long term carrying capacities (stocking rate)

Rainfall	Growing season (months)	Soil/pasture	DSE/ha range
350-450mm	6 (May to October)	Clayed or delved then sown to lucerne	4 to 6
350-450mm	6 (May to October)	Sandy soil (no clay) then sown to lucerne	3 to 5
350-450mm	6 (May to October)	Limestone loam/sandy loam with clover or cereals sown	3 to 5
350-450mm	6 (May to October)	Sandy soil (no clay) with veldt grass	2 to 4

NB Anecdotally, high performing producers from the area involved in providing information for this fact sheet have achieved 8 DSE/ha under a high standard of land, feed base and animal management practices.

Strategies to Increase Sustainable Carrying Capacity

Lucerne is an important pasture species and capitalises on any summer rainfall received, significantly contributing to the overall carrying capacity. It is important to implement grazing strategies with lucerne to ensure it is not over grazed and to maintain longevity (and productivity) of the lucerne pasture.

Sowing improved pasture combined with pasture nutrition and fertiliser management, in particular the use of phosphate and trace elements, are key to ensuring sustainable increased pasture production in this region. This allows for increased stocking rates and therefore increased profitability.

Many producers in the Mallee Woodlands sub-region are mixed enterprise farmers who run **complementary cropping and livestock programs.** Stubbles are a major feed source at the end of harvest and are used to maintain core breeding animals as well as finish and provide seed free paddocks for lambs. The cropping program provides an opportunity for producers to grow their own supplementary feed making them less vulnerable to volatile hay and grain markets, particularly in times of widespread drought years.

Figure 3: Cattle grazing lucerne in the Field district of the Mallee Woodlands sub-region

Sowing cereals for feed has become common as cereals enable farmers to have more flexibility in their grazing enterprises. Cereals have helped fill the winter feed gap in the region and sowing cereals for lambing ewes has enabled producers to set stock lambing ewes and minimise feeding during the lambing period. Many producers are sowing cereals with a companion species such as vetch, sub clover/medic or ryegrass to maximise the value of the feed.

Containment feeding sheep to defer grazing is used to increase carrying capacity outside of dry or drought season management. Containment feeding during the autumn allows pastures to germinate, establish a root system and reach a leaf area that maximises pasture growth rate. It also prevents pasture plants from being uprooted by grazing livestock whilst establishing, increasing the pasture density. If paddocks are not spelled from the break of the season sheep will chase the 'green pick' expending more energy than they obtain from grazing, and also preventing pastures from producing enough leaf for optimal winter production.

Time of lambing is an important consideration in the Mallee Woodlands Sub Region as it has a significant effect on optimal stocking rate, lamb and ewe survival and the ability to finish lambs. Autumn lambing can often require significant amounts of supplementary feeding as pasture reserves are often inadequate, however autumn lambing provides greater opportunity to finish lambs before pasture quality declines and grass seed infestations of lambs becomes a problem particularly in situations where grass seed free paddocks have not been prepared. Lambing in winter or spring ensures in the majority of seasons that adequate pasture is offered to meet the demands of lambing ewes increasing ewe and lamb survival. However, a later lambing may impact on the ability to finish lambs particularly if adequate stubbles or alternative means of finishing lambs other than pasture are not available.

Insect control on pastures is important and in particular lucerne flea and red legged earthmite should be monitored. High red legged earthmite population causes severe damage to both established and emerging pastures. Redlegged earth mite have also found to be directly responsible for a reduction in pasture palatability. Severe infestations of lucerne flea can skeletonise the plant leaves and stunt or kill plant seedlings. Pastures are most susceptible to lucerne flea and red legged earth mite at the time of emergence.

Improved grazing and pasture management has significantly contributed to increasing carrying capacity with improved

Figure 4: Sheep grazing in the Mallee Woodlands sub-region. Photo: F. Turner.

pasture species and increased feed utilisation with fencing that allows for paddocks to be rotationally, strip or cell grazed.

Kikuyu has been successfully established on some properties. It handles a variety of soil types and has helped fill feed gaps when other pasture species are not available. Regenerating medics and sub clovers have also been successful and have increased pasture quality.

The type of livestock within an enterprise has a significant impact on the potential carrying capacity. Many producers have reduced their breeder numbers to incorporate a component of trading animals which can be introduced or off loaded depending on feed availability. Some producers are using genetics to influence carrying capacity on their properties by focusing on production traits when selecting sires and replacement females, as well as aiming for a more moderate frame size of their breeding animals, which require less maintenance energy than larger-framed animals.

Unsuccessful Strategies Implemented by Farmers

Saltbush has been planted by some producers in the area and was deemed unsuccessful in some instances given its feed value and the weeds and pests that become problematic following its establishment. Some producers have used saltbush in confinement feeding facilities successfully as shelter. For more information on fodder shrub performance in the Upper SE refer to: https://www.coorong.sa.gov.au/__data/assets/pdf_file/0019/524242/Fodder-Shrubs-Project-Technical-Report.pdf

Grazing crops with the aim of also taking the crop through to grain have been trialled over the years using Grain and Graze strategies. This strategy has had mixed results mainly attributed to the drier finishes in many seasons, particularly in the areas that receive less rainfall within the Mallee Woodlands sub-region.

Constraints Impacting on Potential Carrying Capacity

Soil constraints are the biggest barrier to increasing carrying capacity in the Mallee Woodlands sub-region. Particularly on sandy soils, constraints include water repellence, compaction and acidity. Many producers have already invested in soil modification by clay spreading or delving, applying lime and deep ripping.

If fertiliser inputs are not managed, pasture performance declines and pastures will become rundown and unproductive.

Ongoing investment in infrastructure, particularly fencing and pastures is required to maintain or increase carrying capacity. Many producers are focusing on improving the land they have rather than purchasing additional land as they believe there are still production gains to be made compounded with escalating land prices in recent years.

Figure 5. Sheep grazing a standing crop at Sherwood. Photo: C. Dennerley.

For further information, please contact your local livestock consultant, soils consultant, or agronomist.

This fact sheet has been compiled by Tim Prance, Pastures and Grazing Systems Consultant, T Prance Rural Consulting and Tiffany Bennett, Livestock Consultant, Rural Solutions SA with information sourced from producers farming across the Mallee Woodlands sub-region. The aim of this fact sheet was to capture and formalise local Intel on sustainable land use for red meat and wool production in the Mallee Woodlands Sub-Region.

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