

Supplementary Material

An economic analysis of cell-fencing in semi-arid rangelands

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Table S1. Livestock herd parameters used in the current study, including initial cohort (representative of a typical livestock enterprise at the time of study), which was used to calculate the starting values for the herd model, and turnoff rate for each cohort ('breeding herd' and 'non-breeding herd' for each following year). For example, 9–10 year-old breeding cattle are assumed to make up 6.8% of each herd, but should all be turned off (100%) at muster, while non-breeding cattle are expected to be turned off before or at 4 years of age.

	Initial cohort % (PLB (2010 – 2019))				Turnoff rate (%)			
	Gascoyne	Goldfields	Murchison-large	Murchison-small	Gascoyne	Goldfields	Murchison-large	Murchison-small
Cattle								
<i>Calves</i>	5.91%	10.63%	10.00%	10.02%	1.61%	0.92%	5.30%	5.33%
<i>Breeding herd</i>								
1–2 y	6.81%	6.81%	6.80%	6.81%	13.28%	12.55%	16.70%	16.68%
2–3 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
3–4 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
4–5 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
5–6 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
6–7 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
7–8 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
8–9 y	6.81%	6.81%	6.80%	6.81%	6.21%	4.20%	9.10%	9.10%
9–10 y	6.81%	6.81%	6.80%	6.81%	100.00%	100.00%	100.00%	100.00%
<i>Non-breeding</i>								
1–2 y	9.95%	8.57%	8.50%	8.45%	13.28%	12.55%	16.70%	16.68%
2–3 y	9.95%	8.57%	8.50%	8.45%	13.28%	12.55%	16.70%	16.68%
3–4 y	9.95%	8.57%	8.50%	8.45%	100.00%	100.00%	100.00%	100.00%
4–10 y	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Breeding Bulls/Rams</i>	3.00%	3.00%	3.00%	3.00%	0.00%	0.00%	0.00%	0.00%
Meat sheep								
<i>Lambs</i>	20.66%	8.31%	11.50%	14.22%	1.59%	1.77%	2.20%	1.10%
<i>Breeding herd</i>								
1–2 y	9.57%	11.71%	10.80%	8.44%	9.25%	0.00%	10.30%	0.00%
2–3 y	9.57%	11.71%	10.80%	8.44%	2.80%	9.53%	5.70%	4.62%
3–4 y	9.57%	11.71%	10.80%	8.44%	2.80%	9.53%	5.70%	4.62%
4–5 y	9.57%	11.71%	10.80%	8.44%	2.80%	9.53%	5.70%	4.62%
5–6 y	9.57%	11.71%	10.80%	8.44%	2.80%	9.53%	5.70%	4.62%
6–7 y	9.57%	11.71%	10.80%	8.44%	100.00%	100.00%	100.00%	100.00%
<i>Non-breeding</i>								
1–2 y	10.07%	4.91%	5.80%	6.98%	40.00%	0.00%	80.00%	0.00%
2–3 y	10.07%	4.91%	5.80%	6.98%	40.00%	12.77%	80.00%	10.54%
3–4 y	10.07%	4.91%	5.80%	6.98%	100.00%	100.00%	100.00%	100.00%
4–7 y	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Breeding Rams</i>	3.00%	3.00%	3.00%	3.00%	0.00%	0.00%	0.00%	0.00%
Wool sheep								
<i>Lambs</i>	16.65%	8.31%	15.80%	20.66%	2.28%	1.77%	2.60%	1.10%
<i>Breeding herd</i>								
1–2 y	8.44%	11.71%	10.80%	9.57%	7.24%	0.00%	8.10%	0.00%
2–3 y	8.44%	11.71%	10.80%	9.57%	3.98%	9.53%	8.10%	4.62%
3–4 y	8.44%	11.71%	10.80%	9.57%	3.98%	9.53%	8.10%	4.62%
4–5 y	8.44%	11.71%	10.80%	9.57%	3.98%	9.53%	8.10%	4.62%
5–6 y	8.44%	11.71%	10.80%	9.57%	3.98%	9.53%	8.10%	4.62%
6–7 y	8.44%	11.71%	10.80%	9.57%	100.00%	100.00%	100.00%	100.00%
<i>Non-breeding</i>								
1–2 y	10.07%	4.91%	5.84%	6.98%	7.24%	0.00%	13.80%	0.00%
2–3 y	10.07%	4.91%	5.84%	6.98%	6.76%	12.77%	13.80%	10.54%
3–4 y	10.07%	4.91%	5.84%	6.98%	100.00%	100.00%	100.00%	100.00%
4–7 y	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>Breeding Rams</i>	3.00%	3.00%	3.00%	3.00%	0.00%	0.00%	0.00%	0.00%

Given low cattle and meat sheep numbers in the small Murchison cell, turnoff rate and starting value from broader Murchison area were used. Given low meat sheep numbers in Goldfields region, turnoff rate from broader Murchison area, and initial cohort from wool sheep was used.

Table S2. The natural mortality and grazing pressure, measured as Dry Sheep Equivalents, of each livestock type used in the current study. These parameters were assumed to be consistent for all four regions modelled.

	Natural mortality (%)			Dry sheep equivalent (DSE)		
	Cattle	Sheep - Wool	Sheep - Meat	Cattle	Sheep - Wool	Sheep - Meat
<i>Calves/lambs</i>				2.8	0.3	0.4
<i>Breeding herd</i>						
1–2 y	6 %	10%	10%	6.3	1.0	1.0
2–3 y	6 %	10%	10%	7.0	1.0	1.0
3–4 y	6 %	10%	10%	7.0	1.0	1.0
4–5 y	6 %	10%	10%	7.0	1.0	1.0
5–6 y	6 %	10%	10%	7.0	1.0	1.0
6–7 y	6 %	10%	10%	7.0	1.0	1.0
7–8 y	6 %			7.0		
8–9 y	6 %			7.0		
9–10 y	6 %			7.0		
<i>Non-breeding</i>						
1–2 y	4%	8%	8 %	7.0	1.0	1.0
2–3 y	4%	8 %	8 %	7.0	1.0	1.0
3–4 y	4%	8 %	8 %	7.0	1.0	1.0
4–5 y	4%	8 %	8 %	7.0	1.0	1.0
5–6 y	4%	8 %	8 %	7.0		
6–7 y	4%	8 %	8 %	7.0		
7–8 y	4%			7.0		
8–9 y	4%			7.0		
9–10 y	4%			7.0		
<i>Breeding Bulls/Rams</i>	4%	8 %	8 %	10.5	1.5	1.5

All natural mortality estimates were estimated based on pastoralist interviews, and Wicks *et al.* (2014). DSE estimates were based on information from the Department of Primary Industries and Regional Development (available from <https://www.agric.wa.gov.au/rangelands/livestock-comparisons-estimating-stocking-rates-and-grazing-pressure-rangelands-western>)