

# A practical methodology for defining and applying animal units to Australia's livestock industries

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Received: 28 March 2025

Accepted: 18 June 2026

Published: 16 September 2026

Cite this: McLean IA *et al.* (2026)

A practical methodology for defining and applying animal units to Australia's livestock industries. *The Rangeland Journal* 48, RJ25012. doi:10.1071/RJ25012

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## ABSTRACT

Animal units are a standard metric used for calculating, combining, comparing and managing the financial, biological, and other effects of different herbivore species and classes. The concept has evolved over many decades because of the need for more uniform and accurate property valuations, enterprise analyses, and stocking rate calculations and assessment of grazing pressure. Historically, Australia has used a confusing range of animal-units names and definitions. Units with the same name were often based on standard animals that differed in liveweight (LW), age, sex, reproductive state, and level of activity. In addition, units with the same name were based on different attributes, including LW, metabolic LW ( $LW^{0.75}$ ), metabolisable energy (ME) demand, and forage demand. This paper addresses these inconsistencies and describes an animal-unit methodology that accommodates multiple grazing species and animal classes. The methodology provides common units of measurement for a range of applications and across grazing industries. Two animal units are proposed: (1) the animal equivalent (AE); and (2) the dry sheep equivalent (DSE). The measurable attribute for these animal units is ME demand, calculated using the Nutrient Requirements of Domesticated Ruminants (NRDR) equations and assumptions. Equivalence is derived by estimating the ME demand of animals according to sex, age, LW, and production level using the same equations and expressing the result relative to a standard animal unit. The methodology also enables estimation of forage intake through intake constants of 7.5, 8.0, or 8.5 kg dry matter (DM)/AE.day for cattle in regions of high-, moderate- or low-productivity, respectively, and 0.96 kg DM/DSE.day for sheep and goats. This approach improves consistency and comparability in grazing management and analysis.

**Keywords:** adult equivalents, animal equivalents, carrying capacity, dry sheep equivalents, enterprise analysis, forage budgeting, grazing management, pasture intake, stock days.

## Introduction

Many livestock, financial, and grazing land management practices are recommended for the purpose of improving the productivity, profitability, and sustainability of livestock grazing enterprises in southern (Dorrough *et al.* 2004; Scott *et al.* 2013) and northern Australia (Hunt *et al.* 2014; Ash *et al.* 2015). These grazing enterprises vary considerably in the species and classes of grazing livestock carried, and thus, in their sex, age, liveweight (LW), liveweight gain (LWG), and reproductive status. Differences in the requirements and impacts of species and classes of grazing animals present on properties pose challenges for the successful application of recommended management practices, and for comparisons of the productivity, profitability, and sustainability of grazing enterprises. This has driven the need to determine the extent to which different animal species and classes are equivalent, and hence the extent to which different grazing enterprises are equivalent (Hinnant 1994). Accordingly, animal units 'have evolved as a means of expressing different types and classes of livestock in a common form' (Scarnecchia 1985). Commonly used animal units in Australia have been the adult equivalent (AE), cattle unit (CU), large or livestock unit (LSU), and dry sheep

equivalent (DSE) (McLennan *et al.* 2020). An animal unit must be a clearly definable attribute of an animal that can be accurately measured (Scarnecchia 2004), such as LW or energy demand. While a comprehensive review of animal unit literature is given in McLennan *et al.* (2020), a summary is provided here to highlight how inconsistencies in animal unit definitions affect their application.

The animal unit concept originated in the USA, where there has been ongoing debate in the range science literature regarding its definition, calculation, and application. This commenced with cattle in the early 20th century, with the animal unit defined as '1000 lb (454 kg) LW, or roughly equivalent to the LW of a cow and a calf' (Scarnecchia 1985, p. 347). However, variation in the impacts and requirements of animals with the same LW reduced the value of this form of animal unit. Hence, animal units based on metabolic LW ( $LW^{0.75}$ ) (Edwards 1981), forage intake (Scarnecchia and Kothmann 1982; SRM 1998), and energy demand (Scarnecchia and Gaskins 1987) were developed as alternatives to LW (Stoddart and Smith 1955). These were included in the list by Scarnecchia (2004) of eight attributes commonly used to define animal units. This author explained that some attributes, such as LW and energy demand, are largely independent of the environment, and are regarded as animal-only attributes. Others such as forage intake are influenced by forage quantity and quality, and are animal-environmental attributes. Scarnecchia (2004) argued that animal-environmental attributes confounded both the definition and application of animal units; as for example, 'a cow has different animal unit equivalence depending on where it is, what it is eating, and what it is doing' (p. 115).

While the less confounded animal-only attributes such as energy demand provide more consistent results of applications of animal units, the choice of attribute to be used is also heavily influenced by the objectives of the user (Scarnecchia 1996, 2004). However, where possible, the attribute chosen should serve multiple applications. This is more likely when the animal unit is a unit of energy demand (Scarnecchia and Gaskins 1987; Scarnecchia 2004).

We propose that grazing livestock units in Australia be based on ME demand, which can then be used to estimate forage demand. This provides a 'common currency' that combines the effects of different species and classes of livestock under the wide range of grazing conditions experienced across Australia and potentially elsewhere. This paper provides a standard definition for animal units in Australia and how they should be derived. Its objectives are:

1. Define standard animal units that can be used to determine animal unit ratings (equivalencies) of livestock throughout Australia; and
2. Provide animal unit ratings of species and classes of livestock that can be used in a wide variety of

applications, including those to determine long-term carrying capacity (LTCC), calculate stocking rates, formulate forage budgets, and compare the financial performance of enterprises within and across regions.

## Inconsistencies in the definitions of animal units used in Australia

Several animal unit approaches are currently used within Australia, with inconsistencies in how they are named and defined. For example, while many government departments and authors have adopted the DSE animal unit, this can be based on LW, ranging from 45 to 50 kg and different requirements for energy and forage (Table 1).

Whereas DSE is the most widely used animal unit for sheep and goats in Australia, several animal units are also used for cattle. The commonly used cattle unit is the AE, generally defined as a dry animal (450 kg or 455 kg) at maintenance (Meat and Livestock Australia 2003; Holmes *et al.* 2020). Also used are the LSU, defined as a steer weighing 400 kg with no LWG (AgriWebb 2026), and the CU, being a 400 kg steer (Department of Primary Industries and Regional Development 2018).

Recent definitions of animal units place greater emphasis on energy demand (McLean and Blakeley 2014; EDGE network 2017; McLennan *et al.* 2020) rather than LW or metabolic LW. The LW (Holmes *et al.* 2020) and metabolic LW ( $LW^{0.75}$ ) (Edwards 1981) approaches calculated equivalence as the ratio of LW or metabolic LW respectively of the animal in question relative to that of the standard animal (a steer of 450–455 kg). Both approaches failed to account for the energy requirements associated with LWG and reproductive state, leading to errors in the calculation of animal equivalency. For example, a steer at pasture for a 200-day period with an initial LW of 250 kg and final LW of 350 kg, has an average LW of 300 kg and a daily LWG of 0.5 kg. Another steer on a different pasture for the same period, with an initial LW of 200 kg and a final LW of 400 kg, resulted in the same average LW of 300 kg, but a daily LWG of 1 kg. Clearly, the second steer had higher energy requirements, but this is not reflected using the LW or metabolic LW methods.

Substantial differences are evident in the AE ratings of steer age groups from the high productivity regions of Queensland (Bray *et al.* 2015) when growth was and was not accounted for (Fig. 1). The AE ratings calculated using the Nutrient Requirements of Domesticated Ruminants (NRDR) equations (CSIRO 2007), or the McLennan *et al.* (2020) modified versions of these, both of which include the energy required for growth, were considerably higher than those that only use metabolic LW or LW.

These differences in AE ratings occurred because the metabolic LW and LW calculations represent the ME requirements for maintenance only, while the NRDR

**Table 1.** Dry sheep equivalent (DSE) definitions based on liveweight (LW), metabolisable energy (ME) demand, and dry matter (DM) intake used in Australia.

| Region and reference                                                                              | DSE definition                                                                                                      | ME demand    | Forage requirement                                     |
|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------|
| South Australia<br>(Department for Environment and Water <i>n.d.</i> )                            | 50-kg Merino sheep (wether or nonlactating, nonpregnant ewe) to maintain its weight at fat score 2.5                | 7.6 MJ/day   | Not provided                                           |
| South Australia<br>(Adelaide and Mt Lofty Ranges Natural Resources Management Board <i>n.d.</i> ) | 2 year old, 45-kg Merino sheep (wether or non-lactating, non-pregnant ewe)                                          | Not provided | Not provided                                           |
| South Australia<br>(South East Natural Resources Management Board 2019)                           | Amount of energy required to maintain a 50-kg wether (or dry ewe) in condition score 2.5                            | 8.5 MJ/day   | Not provided                                           |
| Tasmania<br>(NRM South <i>n.d.</i> )                                                              | Amount of feed or dry matter (kg DM) required to maintain a wether or non-lactating ewe per day (weighing 45–50 kg) | 7.6 MJ/day   | 1 kg DM/DSE to maintain body weight                    |
| Victoria<br>(McLaren 1997)                                                                        | 2 year old, 45-kg Merino sheep (wether or non-lactating, non-pregnant ewe)                                          | 7.6 MJ/day   | Not provided                                           |
| Southern Australia<br>(Sargeant and Saul 2013)                                                    | Dry 50-kg ewe                                                                                                       | 8.3 MJ/day   | 1 DSE will consume 1 kg DM (green)/head.day            |
| National<br>(Griffiths 1989 in Turner and Alcock 2000)                                            | Amount of feed required to maintain a 48-kg dry sheep from 1 year to the next                                       | Not provided | Not provided                                           |
| National<br>(Turner and Alcock 2000)                                                              | Daily ME intake required to maintain a 50-kg Merino wether of 3 years of age                                        | 9.7 MJ/day   | Not provided                                           |
| Northern Australia<br>(McLean and Blakeley 2021)                                                  | 2year old 45-kg wether with zero LW gain, walking 7 km/day                                                          | 8.7 MJ/day   | 0.9–1.0 kg DM/day, varying with productivity of region |

equations combine energy requirements for maintenance, activity, growth, and reproduction. Consequently, calculations of equivalence under commercial livestock conditions based only on maintenance energy requirements will be inaccurate, as they do not fully reflect total or relative differences in energy demand. Given the importance of LW production and reproduction to livestock enterprises, we propose they be accounted for in animal equivalence calculations. This has not always occurred, as animal equivalence derived by LW alone are still used, such as the Breedcow and Dynama software (Moravek 2020), and extension literature (Murphy *et al.* 2024).

There is also inconsistency in the conversion of AE to DSE units. An AE has been allocated DSE ratings of 6 (Blackwood *et al.* 2006), 6.8 (Millar *et al.* 2003), 7.5 (McLaren 1997), 7.6–8.3 (Pahl 2020), 9 (Meat and Livestock Australia 2017) and 10 (Adelaide and Mt Lofty Ranges Natural Resources Management Board *n.d.*).

Overall, there is no standard definition of animal units, nor uniformity between regions and users in what animal attribute is measured. This confounds the application of fundamental grazing land management concepts such as stocking rate, grazing pressure, forage budgeting and LTCC,

and confounds comparisons of livestock productivity and profit across grazing properties.

## Defining standard animal units

To be consistent with the most common existing names for animal units used in Australia, we use AE and DSE. The DSE is widely used in southern Australia, while AE is more widely used in northern Australia. The term ‘animal equivalent’ is deliberately used here instead of the traditional ‘adult equivalent’ to distinguish it from the various and inconsistent definitions and calculations previously used.

The quantifiable animal attribute used as the basis for these two standard animal units (AE or DSE) is ME demand (MJ/day). It is critical that the ME demand for both the standard animal unit and animals it is compared with are derived using the same NRDR equations, with the same assumptions applied (for variables such as diet quality and distance walked). However, the NRDR equations are based largely on stock consuming temperate pastures, and McLennan (2014) found these equations over-estimated

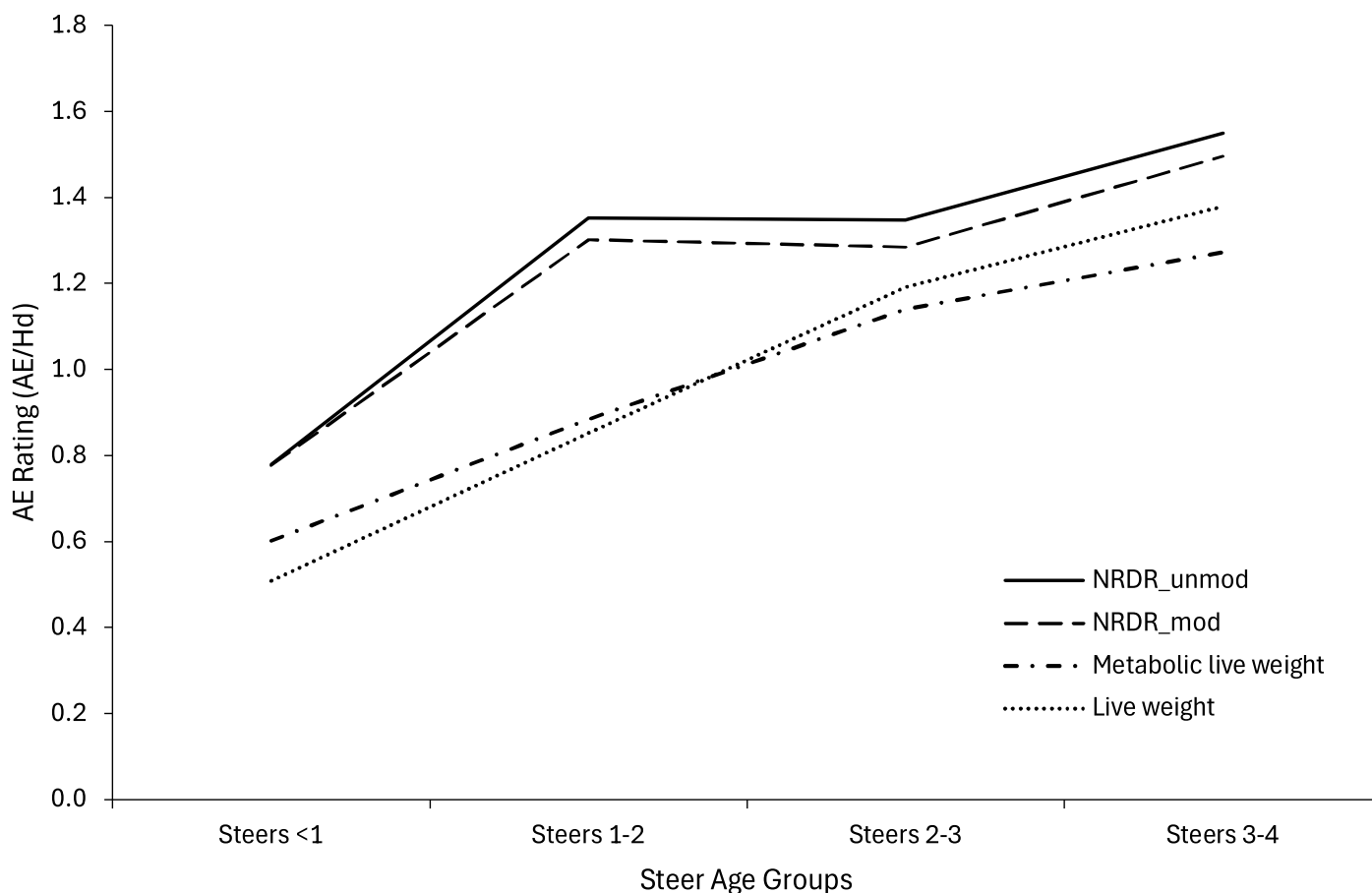


**Fig. 1.** Comparison of animal equivalent (AE) ratings of growing steers over four years using four different methods of calculating equivalence (NRDR\_unmod are the unmodified NRDR equations. NRDR\_mod are the modified NRDR equations, metabolic liveweight is  $LW^{0.75}$ , and liveweight is LW).

the ME requirements of cattle consuming tropical forages at known LWG, which led to an over-prediction of their DM intake and cast doubt on using these equations for calculating equivalencies of animals grazing in northern Australia. Consequently, McLennan *et al.* (2020) modified the NRDR equations to correct for cattle grazing tropical forages. However, using the modified NRDR equations for calculating AE ratings limits their use to cattle grazing tropical and sub-tropical forages only. As there is little difference between the ratings using either set of equations (Fig. 1), the unmodified NRDR equations were chosen for deriving AE ratings, as they are applicable across Australia and across species of livestock. Therefore, we propose that the NRDR equations be used to calculate the ME demand of an animal unit and all animals compared with it.

### Using a constant quality of diet

Diet quality, delineated by dry matter digestibility (DMD), is an environmental variable, not an animal-specific variable, but it does influence ME demand (CSIRO 2007). If an animal's absolute energy demand was required for

calculating equivalence, then a representative figure for diet quality would be essential. However, while DMD of forages consumed by cattle may be known from the results of F.NIRS analyses (Coates and Dixon 2007, 2011), these are not needed to calculate equivalence, which is relative. Accordingly, equivalence can be determined accurately using a fixed DMD of forage. Using McLean and Blakeley (2014) as a guide, a fixed value of 55% DMD (7.75 MJ ME/kg DM) was selected, as this was the median figure from diet quality assessments undertaken by the Beef Cooperative Research Centre (Sullivan and Grant 2007) and CashCow projects (McCosker 2013). This figure was deemed representative for animals under normal grazing conditions across northern Australia. When the AE ratings of Bray *et al.* (2015) classes of cattle located in seven regions of Queensland and Northern Territory were calculated using the NRDR equations with their region-specific DMDs, they were found to be the same as those calculated for the same cattle but with DMD fixed at 55% (Fig. 2).

Not fixing diet quality would limit the practical application of animal units, as animal unit calculations would need to be adjusted seasonally and geographically. Our

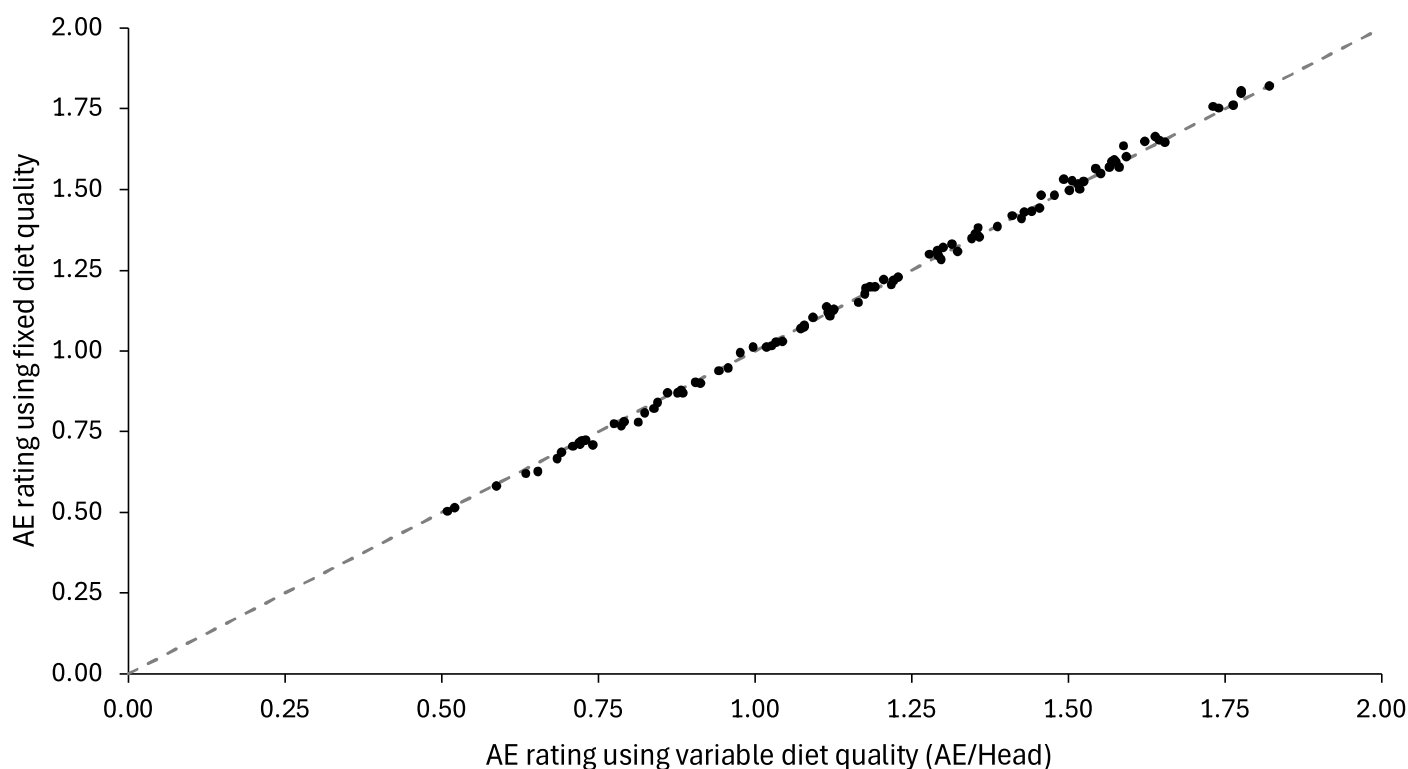


**Fig. 2.** Regression of animal equivalent (AE) ratings calculated using NRDR equations and variable diet quality (x-axis) from [Bray et al. \(2015\)](#) compared with those calculated using diet quality fixed at 55% DMD (y-axis) ( $R^2$  0.9987, RSE 0.0126). Grey dotted line is  $X = Y$ .

experience is that most producers would not have accurate estimates of highly variable diet quality under typical grazing conditions, thus introducing additional error and complexity.

### Using a constant level of activity

As the animal units defined in this paper need to represent animals grazing in commercial paddocks, energy used while walking, as a component of grazing behaviour, must be considered. [McIvor \(2010\)](#) found that ‘in broad terms, cattle walk a similar distance each day, irrespective of paddock size’. To accommodate the energy required for walking, a daily distance walked of 7 km is applied in this methodology, as suggested by [McLean and Blakeley \(2014\)](#).

### The standard animal units and their ME demand

The definition of an AE used here is a 2.25-year-old, 450 kg *Bos taurus* steer with zero LWG, walking 7.0 km/day ([McLean and Blakeley 2014](#)). The definition of a DSE used here is largely that provided by [McLaren \(1997\)](#), being a 2-year-old 45 kg Merino wether with zero LWG, walking 7.0 km/day with no wool growth beyond that included in maintenance. Previous definitions of AEs and DSEs often included ‘at maintenance’ or similar ([Turner and Alcock 2000](#); [Meat and Livestock Australia 2003](#); [South East Natural Resources](#)

[Management Board 2019](#)), leading to the misconception that the standard animal was on a maintenance diet, or that calculations had to be performed using a maintenance diet. Thus, ‘zero LWG’ is used in the above definitions.

When the NRDR equations are applied to these AE and DSE animal units, their ME demands are 72.6 MJ ME/AE.day and 8.68 MJ ME/DSE.day, respectively. The following calculations of equivalence of species and classes of grazing animals are all based on these animal unit ME demands.

### Estimating equivalence

Equivalence is calculated here by estimating the daily ME demand of an animal (or class of animals) and expressing it relative to the daily ME demand of a standard animal unit. Animal equivalence is best determined over a period of time, not for a point in time, since the energy required for phases of the livestock production cycle, such as LWG, pregnancy, lactation, and calf growth occur over many months.

It is often challenging to calculate the ME demands of animals or classes of animals that are to be compared with the ME demands of the standard animals. There are many variables that determine energy demand, such as breed, sex, age, LW, LWG, distance walked, pregnancy, and lactation status, and with some often unknown or only roughly

estimated. Consequently, animal equivalence can be derived and applied with varying levels of sophistication and accuracy, depending on information available and user needs.

Multi-variate models which use the NRDR equations provide the most accurate method of calculating ME demand and thus determining the equivalences of classes of cattle, sheep, and goats. Examples include QuikIntake (McLennan and Poppi 2016, 2019), Herd-Flow (Bush AgriBusiness 2026a), and GrazFeed (Graz-feed 2025). These models rate animals or classes of animals according to all variables influencing energy demand.

As these models are often not available to or suitable for use by end users, or because the information needed by these models is not available, this paper provides tables containing equivalence ratings of classes of cattle, sheep and goats (intra-species). Additionally, in multi-species grazing systems (inter-species), estimates are provided of the extent that cattle, sheep and goats are equivalent. Tables of AE and DSE ratings for several classes of livestock are provided as examples below. For additional tables of AE and DSE ratings for *B. taurus* cattle, *Bos indicus* cattle, sheep, and goats, see Supplementary material and Bush AgriBusiness (2026b).

## Intra-species equivalence

### Cattle

A relatively simple application of the AE standard animal unit is to estimate the equivalence of different classes (age and sex) of cattle with different growth and reproductive rates. This was done by combining the growth path and production data of cattle in northern Australia provided in Bray *et al.* (2015) into three levels of production, based on three levels of steer annual LWG. The ME demand of each class of cattle was calculated using the NRDR equations and then divided by the ME demand of the standard animal unit, also calculated using the NRDR equations. Relatively simple estimates of the annual AE ratings of female and male classes of cattle, differentiated only by differences in typical steer LWGs of locations are in Table 2. If productivity is unknown, then the moderate ratings should be used.

Table 3 shows average annualised AE ratings for herds of crossbred breeding females (including calf to weaning) which have different LWs and different weaning rates. The AE ratings of both breeders that raise a calf to weaning and those that do not are used to derive average AE ratings for each column of weaning rate.

The equivalence of cattle can be more accurately rated for shorter periods of time (months or seasons) if their LW, LWG, and weaning rates are known. Table 4 shows an example of AE ratings of dry, growing crossbred cattle (steers and non-pregnant, non-lactating females). Crossbred has been used as it is the most common genotype in the rangelands of Australia. The AE ratings in Table 4 account

**Table 2.** Generic whole herd animal equivalent (AE) ratings for cattle at different levels of productivity where productivity is quantified by annual steer liveweight gain (LWG) per year.

| Livestock group<br>(gender and age in years) | AE ratings for classes of cattle on properties with different steer annual LWG (ranges in brackets) |                       |                |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------|----------------|
|                                              | Low (<110 kg)                                                                                       | Moderate (110–150 kg) | High (>150 kg) |
| Females <1 <sup>A</sup>                      | 0.57                                                                                                | 0.68                  | 0.77           |
| Females 1–2 <sup>B</sup>                     | 0.72                                                                                                | 0.91                  | 1.10           |
| Females 2–3 <sup>B</sup>                     | 0.96                                                                                                | 1.12                  | 1.74           |
| Females 3–4 <sup>B</sup>                     | 1.18                                                                                                | 1.49                  | 1.61           |
| Females 4+ <sup>B</sup>                      | 1.09                                                                                                | 1.29                  | 1.53           |
| Steers <1 <sup>A</sup>                       | 0.60                                                                                                | 0.72                  | 0.80           |
| Steers 1–2                                   | 0.78                                                                                                | 1.03                  | 1.31           |
| Steers 2–3                                   | 1.02                                                                                                | 1.27                  | 1.60           |
| Steers 3–4                                   | 1.15                                                                                                | 1.39                  | 1.52           |
| Bulls                                        | 1.48                                                                                                | 1.73                  | 1.78           |

<sup>A</sup>From weaning to 1 year old.

<sup>B</sup>Includes calf to weaning and accounts for reproductive rate (i.e. average of all females).

for the different ME demands of this genotype as the standard animal, which by definition is *B. taurus*.

### Sheep and goats

The NRDR equations are the same for sheep and goats, indicating that sheep and goats of the same LW and production level have the same ME demands, and therefore the same DSE ratings. Ratings are first provided for sheep and goats which differ in frame size, a common and appropriate method of differentiating sheep and goats of varying LW (McLean and Blakeley 2021). Table 5 shows generic DSE ratings for sheep and goats with small, medium, and large frame sizes, derived by applying the animal unit methodology to growth path and production estimates for sheep and goats (McLean and Blakeley 2021). As with cattle, these enable users to quickly look up animal ratings to apply to classes of sheep and goats, without requiring estimates of LW, LWG, or weaning rates. Table 6 shows average annualised DSE ratings for flocks of breeding female sheep and goats (including progeny to weaning) that have different LW and different weaning rates. Table 7 shows DSE ratings for dry sheep and goats based on their LW and LWG.

## Inter-species equivalence

Applications of animal units often require knowledge of the extent that cattle, sheep, and goats are equivalent, which is necessary for calculating grazing pressure and forage budgets for properties or paddocks containing

**Table 3.** Annual animal equivalent (AE) ratings for breeding female cattle (crossbred example) with liveweights (LW) ranging from 350 to 600 kg.

| Average LW (kg) | Weaning rate (%) |      |      |      |      |      |      |
|-----------------|------------------|------|------|------|------|------|------|
|                 | 60               | 65   | 70   | 75   | 80   | 85   | 90   |
| 350             | 1.11             | 1.14 | 1.17 | 1.20 | 1.23 | 1.26 | 1.29 |
| 375             | 1.16             | 1.19 | 1.22 | 1.25 | 1.28 | 1.31 | 1.34 |
| 400             | 1.20             | 1.23 | 1.26 | 1.29 | 1.32 | 1.35 | 1.38 |
| 425             | 1.25             | 1.28 | 1.31 | 1.34 | 1.37 | 1.40 | 1.43 |
| 450             | 1.29             | 1.32 | 1.35 | 1.38 | 1.41 | 1.44 | 1.47 |
| 475             | 1.34             | 1.37 | 1.40 | 1.43 | 1.46 | 1.49 | 1.52 |
| 500             | 1.38             | 1.41 | 1.44 | 1.47 | 1.50 | 1.54 | 1.57 |
| 525             | 1.43             | 1.46 | 1.49 | 1.52 | 1.55 | 1.58 | 1.61 |
| 550             | 1.47             | 1.51 | 1.54 | 1.57 | 1.60 | 1.63 | 1.66 |
| 575             | 1.52             | 1.55 | 1.58 | 1.61 | 1.64 | 1.67 | 1.70 |
| 600             | 1.57             | 1.60 | 1.63 | 1.66 | 1.69 | 1.72 | 1.75 |

Note: AE rating is for the whole herd (i.e. includes females that did not produce a weaner) and includes energy demand of calf to weaning.

**Table 4.** Animal equivalent (AE) ratings for growing steers and heifers by liveweight (LW) and average daily gain (ADG) (kg).

| Average LW (kg) | ADG (kg LWG/head.day) |      |      |      |      |      |
|-----------------|-----------------------|------|------|------|------|------|
|                 | 0                     | 0.2  | 0.4  | 0.6  | 0.8  | 1.0  |
| 150             | 0.43                  | 0.53 | 0.64 | 0.75 | 0.86 | 0.98 |
| 200             | 0.49                  | 0.61 | 0.74 | 0.86 | 1.00 | 1.13 |
| 250             | 0.59                  | 0.73 | 0.87 | 1.02 | 1.17 | 1.32 |
| 300             | 0.68                  | 0.84 | 1.00 | 1.17 | 1.34 | 1.51 |
| 350             | 0.76                  | 0.95 | 1.13 | 1.31 | 1.50 | 1.69 |
| 400             | 0.85                  | 1.05 | 1.24 | 1.44 | 1.64 | 1.84 |
| 450             | 0.94                  | 1.14 | 1.35 | 1.56 | 1.76 | 1.97 |
| 500             | 1.01                  | 1.23 | 1.44 | 1.66 | 1.87 | 2.09 |
| 550             | 1.09                  | 1.31 | 1.53 | 1.75 | 1.96 | 2.18 |
| 600             | 1.17                  | 1.39 | 1.61 | 1.83 | 2.05 | 2.27 |
| 650             | 1.24                  | 1.46 | 1.68 | 1.90 | 2.13 | 2.35 |
| Bulls add:      | 11%                   | 7%   | 5%   | 3%   | 1%   | 0%   |

two or more livestock species, and for comparing the productivity and/or profits of enterprises comprised of different livestock species.

The extent that the AE and DSE standard animal units are equivalent can be determined, allowing them to be used interchangeably. As the standard DSE animal unit has a daily energy demand of 8.7 MJ and the standard AE animal unit has a daily energy demand of 72.6 MJ, the relativity of the two is 8.4:1 (DSE:AE). Therefore, AE can be converted to DSE. An example of these calculations is shown in [Box 1](#).

## Using equivalence to estimate forage intake

Estimates of forage intake are necessary in applications of animal units that align forage supply with forage demand, for the purpose of improving the productivity and sustainability of grazing enterprises ([Hunt 2008](#); [Pahl et al. 2016](#)). Prominent examples are forage budgeting ([Stocktake 2017](#); [Meat and Livestock Australia 2026](#)) and calculation of LTCC ([Johnston et al. 1996](#); [Zhang et al. 2021](#)). Amongst other requirements, grazing animals obtain energy for maintenance, activity, growth, and reproduction from daily forage

**Table 5.** Generic whole flock dry sheep equivalent (DSE) ratings for sheep and goats based on frame size.

| Livestock group<br>(gender and age in years) | DSE ratings of Merino sheep by frame size |        |       | DSE ratings of meat sheep and goats by frame size |                        |             |
|----------------------------------------------|-------------------------------------------|--------|-------|---------------------------------------------------|------------------------|-------------|
|                                              | Small                                     | Medium | Large | Rangeland goat                                    | Med. sheep/ large goat | Large sheep |
| Ewes <1 <sup>A</sup>                         | 1.0                                       | 1.2    | 1.5   | 0.9                                               | 1.4                    | 1.9         |
| Ewes 1–2 <sup>B</sup>                        | 1.1                                       | 1.3    | 1.5   | 1.1                                               | 1.4                    | 1.6         |
| Ewes 2–3 <sup>B</sup>                        | 1.5                                       | 1.8    | 2.1   | 1.4                                               | 2.3                    | 2.5         |
| Ewes 3+ <sup>B</sup>                         | 1.4                                       | 1.6    | 1.9   | 1.3                                               | 2.1                    | 2.4         |
| Wethers <1 <sup>A</sup>                      | 1.0                                       | 1.2    | 1.5   | 0.9                                               | 1.6                    | 1.9         |
| Wethers 1–2                                  | 1.2                                       | 1.4    | 1.5   | 1.2                                               | 1.8                    | 2.2         |
| Wethers 2–3                                  | 1.3                                       | 1.5    | 1.7   | 1.3                                               |                        |             |
| Wethers 3+                                   | 1.1                                       | 1.3    | 1.5   |                                                   |                        |             |
| Grown rams                                   | 2.0                                       | 2.3    | 2.4   | 1.6                                               | 2.2                    | 2.6         |

<sup>A</sup>From weaning to 1 year old.<sup>B</sup>Includes offspring to weaning and accounts for reproductive rate (i.e. average of all females).**Table 6.** Annual dry sheep equivalent (DSE) ratings for breeding female sheep and goats that differ in liveweight (LW) and weaning rate.

| Average LW (kg) | Weaning rate (%) |     |     |     |     |      |      |
|-----------------|------------------|-----|-----|-----|-----|------|------|
|                 | 50%              | 60% | 70% | 80% | 90% | 100% | 110% |
| 35              | 1.0              | 1.1 | 1.2 | 1.2 | 1.3 | 1.3  | 1.4  |
| 40              | 1.1              | 1.2 | 1.2 | 1.3 | 1.4 | 1.4  | 1.5  |
| 45              | 1.2              | 1.3 | 1.3 | 1.4 | 1.4 | 1.5  | 1.6  |
| 50              | 1.3              | 1.4 | 1.4 | 1.5 | 1.5 | 1.6  | 1.6  |
| 55              | 1.4              | 1.5 | 1.5 | 1.6 | 1.6 | 1.7  | 1.7  |
| 60              | 1.5              | 1.5 | 1.6 | 1.7 | 1.7 | 1.8  | 1.8  |
| 65              | 1.6              | 1.6 | 1.7 | 1.7 | 1.8 | 1.9  | 1.9  |
| 70              | 1.7              | 1.7 | 1.8 | 1.8 | 1.9 | 1.9  | 2.0  |
| 75              | 1.7              | 1.8 | 1.9 | 1.9 | 2.0 | 2.0  | 2.1  |
| 80              | 1.8              | 1.9 | 2.0 | 2.0 | 2.1 | 2.1  | 2.2  |

Note: DSE rating is for the whole herd (i.e. includes females that did not produce a weaner) and includes energy demand of progeny to weaning.

consumption. However, while daily DMI (DDMI) of animals varies with differences in their size and production levels, it also varies considerably with differences in the quantity and quality of forage available to them (Meyer *et al.* 2010; Pahl 2020). Although the intake of individual animals can be measured over relatively short periods of time in the confined conditions of experimental pen trials, there has been no practical method available for measuring intake of numerous livestock at the spatial and temporal scales of commercial grazing properties (Galyean and Gunter 2016; Smith *et al.* 2021). Consequently, the total DMI of livestock herds or flocks on typical grazing properties is often unknown, or at best, inconsistently and crudely estimated.

A relatively simple way of estimating forage demands has been to multiply animal units based on LW (Mora-vek 2020; Murphy *et al.* 2024) or metabolic LW ( $LW^{0.75}$ ) (Edwards 1981) by a standard or constant DDMI. In

Australia, it has been common for an AE to be assigned an intake of 10 kg DM/day, and 3 kg (0.3 of an AE) was added for breeding females to account for reproduction (Meat and Livestock Australia 2003; Chilcott *et al.* 2005). These approaches did not account for the additional energy and thus forage requirements associated with LWG, and the additional rating of 0.3 AE was, at best, a rule-of-thumb for the energetic costs of reproduction.

When the energy requirements of LWG and reproduction of cattle in northern Australia were included using the NRDR equations (McLean and Blakeley 2014), multiplying their AE ratings by 10 kg DM/day over-estimated their DDMI (EDGE network 2017; Stocktake 2017). Further work by McLennan (2014) and McLennan *et al.* (2020) found that an AE, as defined in this paper, required 8 kg instead of 10 kg of DM/day when grazing tropical and sub-tropical pastures. While this improved predictions of

**Table 7.** The dry sheep equivalent (DSE) ratings for dry growing sheep and goats based on liveweight (LW) and average daily gain (ADG)

| Average LW (kg) | ADG (kg LWG/head.day) |      |      |      |      |      |      |
|-----------------|-----------------------|------|------|------|------|------|------|
|                 | 0.00                  | 0.05 | 0.10 | 0.15 | 0.20 | 0.25 | 0.30 |
| 20              | 0.6                   | 0.8  | 1.1  | 1.4  | 1.7  | 2.0  | 2.3  |
| 25              | 0.6                   | 0.9  | 1.2  | 1.6  | 1.9  | 2.2  | 2.6  |
| 30              | 0.7                   | 1.1  | 1.4  | 1.8  | 2.1  | 2.5  | 2.9  |
| 35              | 0.8                   | 1.2  | 1.6  | 2.0  | 2.4  | 2.8  | 3.2  |
| 40              | 0.9                   | 1.3  | 1.7  | 2.2  | 2.6  | 3.0  | 3.4  |
| 45              | 1.0                   | 1.4  | 1.9  | 2.3  | 2.7  | 3.2  | 3.6  |
| 50              | 1.1                   | 1.5  | 2.0  | 2.4  | 2.9  | 3.3  | 3.8  |
| 55              | 1.2                   | 1.6  | 2.1  | 2.5  | 3.0  | 3.5  | 3.9  |
| 60              | 1.3                   | 1.7  | 2.2  | 2.6  | 3.1  | 3.6  | 4.0  |
| 65              | 1.3                   | 1.8  | 2.3  | 2.7  | 3.2  | 3.7  | 4.1  |
| 70              | 1.4                   | 1.9  | 2.4  | 2.8  | 3.3  | 3.7  | 4.2  |
| 75              | 1.5                   | 2.0  | 2.4  | 2.9  | 3.4  | 3.8  | 4.3  |

**Box 1. Example of AE and DSE equivalence**

- A wether (either sheep or goat), growing from 35 kg to 55 kg LW over 12 months has an average daily ME demand of 12.8 MJ. This equates to 1.47 DSE (12.8/8.7) or 0.18 AE (12.8/72.6).
- A *Bos taurus* steer, growing from 370 kg to 530 kg LW over 12 months, has an average daily ME demand of 105.5 MJ. This equates to 1.45 AE (105.5/72.6) or 12.13 DSE (105.5/8.7).

intakes, DDMI of cattle were over-estimated when DMD was >55% (likely for the regions with higher LWG) and under-estimated intakes when DMD <55% (likely for the regions with lower LWG).

The accuracy of predicted intakes was then improved through the application of correction factors, called intake constants (McLennan *et al.* 2020). Accordingly, an intake constant of 7.5 kg DM/AE.day was used for regions with the highest (steer) LWGs (>150 kg/year), 8.5 kg DM/AE.day for regions with the lowest LWGs (<110 kg/year), and 8.0 kg DM/AE.day for regions with moderate LWGs (110–150 kg/year) (Table 8). In this way, DDMI of a class of animals was estimated by multiplying their AE rating, differentiated by steer LWG (Table 2), by the appropriate intake constant (Table 8).

Prediction of forage intakes for AE ratings calculated using the NRDR equations and 55% DMD, multiplied by variable intake constants, changing with the annual productivity of steers, can be applied at a national scale, despite high variability in animal productivity and diet quality (McLennan *et al.* 2020). Furthermore, because animal ratings or equivalencies in this paper are based on energy demand calculated using the NRDR equations, this method is nationally applicable to cattle, sheep and goats, and accommodates future published changes to the NRDR equations and their parameters. However, forage intake constants for intensive southern systems with very high livestock productivity (e.g. ryegrass, clover, medic, and other temperate sown pastures and fertilised or irrigated crops and pastures) were not investigated as part of this work, and thus application of the high steer productivity

**Table 8.** Forage intake constants per animal equivalent (AE) for cattle in northern and rangelands of Australia grazing tropical and sub-tropical pastures and for dry sheep equivalents (DSE) generally, differentiated by three levels of annual steer liveweight gain (LWG).

| Animal unit | Recommended forage intake constant (kg DM/day) |         |      |
|-------------|------------------------------------------------|---------|------|
|             | Annual steer LWG (kg)                          |         |      |
|             | <110                                           | 110–150 | >150 |
| AE          | 8.5                                            | 8.0     | 7.5  |
| DSE         | 1.02                                           | 0.96    | 0.90 |

feed intake constant to these systems is not advised until comparable investigations are completed. Furthermore, when applying the forage intake constants for forage budgeting at times of high production, the minimum period should be three months. Applying the constant for shorter periods when feed quality is high risks overestimating intake. In these circumstances it is preferable to use a suitable multivariate model to estimate intake based on actual diet quality.

While the application of forage intake constants for sheep was not investigated in the same way as that for cattle, the intakes recommended for a DSE in Table 8 were derived in accordance with the DSE:AE equivalence ratio of 8.4:1. This also aligns with the relative DMI of sheep and cattle reported by Pahl (2020) who found that, on a DMI basis (kg DM/kg LW/day), one AE was equivalent to 7.6 DSE when consuming high-quality forage, and 8.3 DSE when consuming low-quality forage. These equivalencies were for an AE defined as a 450 kg steer/dry cow maintaining LW, and a DSE defined as a 50 kg wether/dry sheep maintaining LW, which both differ from those used in this paper. However, applying a 45-kg standard animal to Pahl (2020) intake equations for a DSE resulted in a range of 8.2–8.8 DSE:AE, effectively overlapping the 8.4:1 ratio proposed here. Pahl (2020) also found that the DDMI of sheep and goats of the same LW were not significantly different. This gives confidence that the forage intake constants provided for a DSE in Table 8 can be applied to both sheep and goats. However, given the different forage intake constants are based on steer LW gain, it is recommended that the moderate forage intake constant of 0.96 kg DM/DSE.day be applied to sheep and goats. Furthermore, Pahl (2020), based on published DDMIs of macropods (grey, red kangaroo, euro) confined to pens, concluded that a macropod with a LW of 45 kg consumed the same amount of forage daily as sheep and goats with the same LW. However, as the average LW of macropods is 25 kg (L. Pahl, unpubl. data), their DDMI would be approximately 0.55 that of a DSE (0.066 AE), or around 0.53 kg DM.

## Application of animal unit methodology in Australia

Consistent definitions of standard animal units ('common currency'), combined with accurate estimates of the equivalence of different species and classes of grazing animals, are prerequisites for the successful adoption of practices that improve the productivity, profitability and sustainability of livestock grazing enterprises. For example, using different definitions of animal units can result in estimates of LTCC varying by as much as 48% (Gulbrandsen 1996).

Important applications of animal units include:

1. Calculating stocking rates of all species and classes of animals grazing a given land area (animal units per unit area) (Hunt *et al.* 2014; Young *et al.* 2022).
2. Summing the feed requirements of domesticated species and classes of grazing animals (Johnston *et al.* 1996; Walsh and Cowley 2011)
3. Summing the feed requirements of non-domesticated animals to quantify total grazing pressure (Waters *et al.* 2018; Atkinson *et al.* 2020; Hacker *et al.* 2020).
4. Forage budgeting, to sustainably align forage demand with seasonal forage supply (Stocktake 2017; Meat and Livestock Australia 2026).
5. Quantifying LTCC of properties and paddocks for management and valuations (Johnston *et al.* 1996; Zhang *et al.* 2021).
6. Undertaking business and enterprise analysis and decision-making (McLean *et al.* 2023; Murphy *et al.* 2024).

Consistent definitions of animal units and calculations of equivalencies provide a 'common currency' that can be used by different end users. Also, standardising the method of defining animal units is required to improve communication between researchers and grazing land managers (Scarnecchia and Gaskins 1987). Detailed, step-by-step examples of three common applications of animal units (LTCC, forage budgeting, and stock days) are provided in Appendix 1.

## Conclusion

This paper provides revised definitions for two standard grazing animal units widely used in Australia, the DSE and AE, and how they and animal equivalents should be derived. An AE is a 2.25-year-old 450 kg *B. taurus* steer with zero LWG walking 7 km/day, and a DSE is a 2-year-old 45-kg Merino wether with zero LWG, no wool growth above that included in maintenance, and walking 7 km/day. These animal units are defined by their ME demand (MJ/day), which enables them to be used consistently across Australia's highly variable grazing lands. It is critical that the ME demand for both the standard animal unit and animals it is compared with are derived using the same NRDR equations, with the same assumptions applied (for variables such as diet quality and distance walked).

Consistent definitions of standard animal units combined with accurate estimates of the equivalence of different species and classes of grazing animals are prerequisites for the profitable and sustainable alignment of their forage demands with forage supplies. Using our animal unit methodology to calculate animal unit ratings and their

associated forage intakes will provide a more sustainable alignment between forage demand and forage supply.

Previous LTCC estimates of paddocks and properties may need to be revised, depending on which forage intake constant the original estimates were based. For example, if a historic LTCC was based on a 10 kg DM/AE.day intake constant, then the LTCC could potentially be increased by 33% by using an intake constant of 7.5 kg DM/AE.day. However, such large increases in estimates of LTCC are unlikely, as historic estimates of LTCC were often for animal units based on LW alone and did not account for the additional energy and forage requirements associated with LWG and reproduction. More recent estimates of property LTCCs provided by the Queensland Government FORAGE online system (FORAGE 2026) now use an intake constant of 8 kg of DM/AE.day and 0.96 kg of DM/DSE.day, based on the findings of McLennan *et al.* (2020) and consistent with the methodology provided here.

While this methodology is predominantly used to calculate the equivalencies of different classes of the same species of domestic livestock, it can also be used to calculate equivalencies of native and feral species of grazing animals, thereby providing an estimate of total grazing pressure. One AE of cattle is equivalent to 8.4 DSE of sheep weighing 45 kg with zero LWG and walking 7 km/day. A goat weighing 45 kg is 1 DSE, and an average sized macropod weighing 25 kg with zero LWG is estimated to be 0.55 DSE.

## Supplementary material

Supplementary material can be accessed from the article page online.

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**Data Availability Statement.** The data that support this study will be shared upon reasonable request to the corresponding author.

**Conflicts of interest.** The authors declare that they have no conflicts of interest.

**Declaration of funding.** This research did not receive any specific funding.

**Acknowledgements.** The constructive criticism and suggestions for improvement made by many producers, researchers and extension personnel have all contributed to the evolution of this Animal Unit methodology and is gratefully acknowledged. Shane Blakeley contributed significant time and intellect in the development of this methodology. Meat and Livestock Australia projects B.NBP.0779, B.GBP.0036 and NB2 Pathways to Practice contributed to the evolution of Animal Units in Australia and this work. We are grateful for the critical feedback provided by Dr Stu McLennan, Dr Dionne Walsh, Dr Michael Wellington, Dr Tony Parker, Dr Nigel Tomkins and Professor Luis Prada e Silva on early drafts of this paper.

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## Appendix 1. Common applications of animal units

### Long-term carrying capacity (LTCC)

The text box (Box A1) below steps through a real property example to describe the method used for calculating LTCC with the results given in Table A1.

Table A1 shows the LTCC of the property is 326 AE. If the entire property was in A condition, LTCC would be 570 AE (3987 ha divided by 7.0 ha/AE when in A condition), a 75% increase in LTCC.

Tumbleweeds has a breeder herd of 250 head (Table A2), with steers and surplus heifers sold at weaning. The total AEs of this cattle herd, based on average numbers carried over a 12 month period and using the AE ratings provided in Table 2, is 348, slightly above its LTCC of 326 AE in Table A1. However, if current seasonal conditions were favourable, resulting in above-median pasture growth, it is likely that this number of stock could be carried without overgrazing. A forage budget would help determine if there was sufficient forage available for this herd.

### Forage budgeting

The text box (Box A2) below describes the methods used to calculate a forage budget for the Tumbleweeds property, with the results given in Table A3.

### Stock-days and annualised animal units

The full application of animal units requires accounting for varying animal numbers over varying time periods. The concepts of stock days and annualised animal units allow this temporal dimension to be understood and expressed. Stock days (either AE-days or DSE-days) can be calculated by multiplying the number of head under consideration by their average animal unit rating (e.g. Table 2), then by the number of days they grazed a nominated area, either a paddock or on a per hectare basis. This produces a measure which allows direct comparison of different numbers of animals over different time periods. The stock days divided by 365 will give a figure for annualised animal units. This is demonstrated by an example in the following text box (Box A3).

Expressing enterprise size and stocking rates as annualised animal units is essential in undertaking economic or production analyses of the enterprise and for comparing stocking rates over different periods or against the LTCC.

**Table A1.** Calculations of long-term carrying capacity (LTCC) for an example property with areas of land in various condition states.

| Property    | Area (ha) in condition A, B, C or D |      | Median pasture growth (kg DM/ha) | Safe utilisation rate (%) | Pasture available for grazing (kg DM/ha) | Annual pasture consumption by an AE (kg DM) | LTCC (ha/AE) | Number of AE that can be carried |
|-------------|-------------------------------------|------|----------------------------------|---------------------------|------------------------------------------|---------------------------------------------|--------------|----------------------------------|
|             |                                     |      |                                  |                           |                                          |                                             |              |                                  |
| Tumbleweeds | A                                   | 632  | 1565                             | 25                        | 391                                      | 2738                                        | 7.0          | 90.3                             |
|             | B                                   | 477  | 1174                             | 25                        | 293                                      | 2738                                        | 9.3          | 51.1                             |
|             | C                                   | 2858 | 704                              | 25                        | 176                                      | 2738                                        | 15.6         | 183.8                            |
|             | D                                   | 21   | 313                              | 25                        | 78                                       | 2738                                        | 35.0         | 0.6                              |
| Totals      |                                     | 3987 |                                  |                           |                                          |                                             |              | 326                              |

**Table A2.** Cattle stock classes, numbers, animal equivalent (AE) ratings and AE currently run on example property.

| Stock class              | Average number | AE rating | AE    |
|--------------------------|----------------|-----------|-------|
| Females < 1 <sup>A</sup> | 27             | 0.77      | 10.4  |
| Females 1–2              | 25             | 1.10      | 27.5  |
| Females 2–3              | 24             | 1.74      | 41.8  |
| Females 3–4              | 23             | 1.61      | 37.0  |
| Females 4+               | 143            | 1.53      | 218.8 |
| Grown Bulls              | 8              | 1.55      | 12.4  |
| Totals                   | 250            |           | 348   |

<sup>A</sup>Only included for 6 months post weaning.

### Box A1. Calculations for determining LTCC using a hypothetical property located in the Maranoa Balonne region of Queensland

Property description: Tumbleweeds has an area of 3,988 ha composed of a single land type known as Poplar box (*Eucalyptus populnea*) with mulga (*Acacia aneura*) understorey (State of Queensland 2022). The entire property has experienced mulga regrowth (thickening) and has variable land condition (Meat and Livestock Australia 2006; FutureBeef 2024).

Calculations of LTCC are usually done on a paddock-by-paddock basis and summed to the property level. However, the calculations given here were made at the property level for simplicity, to demonstrate the use of AE ratings and forage intake constants in these exercises.

Calculating LTCC: When land is in A condition, median annual pasture growth for this land type and tree density is 1,565 kg DM/ha. Median annual pasture growth declines with deterioration of land condition. That of B condition land is 75% of A, that of C condition land is 45% of A, and that of D condition land is 20% of A (Stone *et al.* 2021). An assessment of land condition across the property determined that 632 ha of the property was in A condition, 477 ha in B condition, 2,858 ha in C condition and 21 ha in D condition, where median annual pasture growth ranged from 313 to 1565 kg DM/ha (Table A1). Given that the safe annual pasture utilisation rate for this land type in the Maranoa Balonne region is 25%, the amount of forage available to be grazed annually varied from 78 for D condition land to 391 kg DM/ha for A condition. As the annual LWG of steers on this property is frequently >150 kg, the forage intake constant used is 7.5 kg DM/AE.day (Table 8), resulting in an annual requirement of 2,738 kg DM. Given that the number of hectares of land needed by 1 AE ranged from seven for land in A condition to 35 for land in D condition, the number of AE that could be supported by each area of land condition ranged from 0.6 to 90.3, and the total LTCC is 326 (Table A1).

### Box A2. Forage budget

While forage budgets can be calculated for periods of just a few months, they are generally based on the period of time from the end of one growing season to the commencement of the next. For Tumbleweeds, this was the beginning of May to the 15 December, a period of 228 days (Table A3). The average whole property (3988 ha) pasture biomass present at the beginning of May was 1550 kg DM/ha, of which 15% would be lost to trampling and leaf fall, 15% was unpalatable species and 10% was rank material of palatable species. As pasture growth for the forage budget period was likely to be zero, the amount of useful pasture available for cattle was 1120 kg DM/ha. To avoid soil loss from rainfall at the commencement of the next growing period, the minimum amount of residual pasture biomass to be retained is estimated for the land type, topography and climate, in this case 1,000 kg DM/ha, leaving 120 kg DM/ha available for grazing.

The breeding herd of 348 AE, with a forage demand of 7.5 kg/AE.day, required a pasture yielding 149 kg DM/ha (Table A3). However, the forage budget shows the available pasture will last only 183 days, not the required 228 days. It also shows this property will only carry 279 AE for the full period until mid-December. The forage budget indicates that maintaining the current stock numbers over the dry season will lead to a potential feed deficit and that a reduction in stock numbers is desirable.

### Box A3. Examples of stock days and annualised AE calculations

A forage budget for Tumbleweeds has determined that a 400 ha paddock has sufficient dry matter for 100 AE for the next 12 months.

A herd of young steers which could be used to stock the paddock will average 0.89 AE/hd over 6 months or 0.96 AE/hd over 9 months. The 100 AE capacity equates to 36,500 AE-days (100 AE for 365 days). If stocking the paddock for 6 months (183 days), then 225 head could be run (36,500 days divided by 183 days divided by 0.89 AE/hd), equivalent to 200 AE (225 hd @ 0.89 AE/hd). If stocking the paddock for 9 months (274 days), then 139 head could be run (36,500 divided by 274 days divided by 0.96 AE/hd), equivalent to 133 AE (139 hd @ 0.96AE/hd).

The stocking rate under the two scenarios is different for the periods stocked, with 200 AE or 0.5 AE/ha for 6 months, and 133 AE or 0.33 AE/ha for 9 months. However, the annualised AE, at 100 AE/yr, is the same for both scenarios (36,500 AE days divided by 365) and therefore the annualised stocking rate is the same for both at 0.25 AE/ha (100 AE on 400 ha).

**Table A3.** Forage budget for the dry season on example property.

| Production zone                                             |     | High        |
|-------------------------------------------------------------|-----|-------------|
| Property                                                    |     | Tumbleweeds |
| Paddock Area (ha)                                           |     | 3987        |
| Start Date                                                  |     | 01-May-25   |
| End Date                                                    |     | 15-Dec-25   |
| Number of Days                                              |     | 228         |
| Pasture                                                     |     |             |
| Start Yield (kg DM/ha)                                      |     | 1550        |
| Detachment (%)                                              | 15% | 232.5       |
| Unpalatable species (%)                                     | 15% | 198         |
| Unpalatable 3Ps component (%) <sup>A</sup>                  | 10% | 132         |
| Anticipated growth (kg/ha)                                  |     | 0           |
| Useful Pasture (kg/ha)                                      |     | 1120        |
| Desired residual (kg/ha)                                    |     | 1000        |
| Available for grazing (kg/ha)                               |     | 120         |
| Demand                                                      |     |             |
| Class of Cattle                                             |     | Breeders    |
| Total Number of head                                        |     | 250         |
| Animal Equivalents                                          |     | 348         |
| Dry matter forage demand (kg/AE.day)                        |     | 7.5         |
| Demand (kg/ha)                                              |     | 149         |
| Results                                                     |     |             |
| If stocked to achieve desired residual;                     |     |             |
| How many days will pasture last with current stock numbers? |     | 183         |
| How many AE's will paddock carry to end date?               |     | 279         |
| If 348AE carried over whole period;                         |     |             |
| Pasture eaten as % of Useful Pasture                        |     | 13          |
| Residual Useful Pasture (kg/ha)                             |     | 971         |

<sup>A</sup>If unpalatable 3P's component is less than residual it becomes part of the residual, if greater than the residual it becomes all of the residual.