



**Department of
Primary Industries and
Regional Development**

**Middle East Sheep Exports Policy options discussion paper -
Submission of the Department of Primary Industries and
Regional Development, Western Australia**

4 November 2019

CONTENTS

Preamble	1
Points of clarification	1
The four options in the Discussion Paper	1
Option 1: Apply a 3 month prohibition	1
Option 2: Apply the 2019 prohibition period	1
Option 3: Adopt revised HSRA with risk settings based on heat stress thresholds	1
Option 4: No prohibition	2
DPIRD suggestions	2
Changes to the list of options	2
Definition of areas of risk	2
Further supporting evidence	3
Rationale for retaining a 'pause' (prohibition) on exports	3
Predictability	3
Transparency	3
Timing of heat stress events	4
DPIRD comments on the Heat Stress Risk Assessment Model	6
Risk settings in the HSRA Model	6
DPIRD comments on Animal Welfare Indicators	8
Allometric space allowances	8
References	11

Preamble

Points of clarification

1. This submission is provided by the Department of Primary Industries and Regional Development of Western Australia (DPIRD) in response to the discussion paper on sheep exports to the Middle East (ME) published by the Department of Agriculture (DoA) on 27 September 2019 (Discussion Paper).
2. This submission is written with the understanding that the purpose of the Discussion Paper is to frame options for a subsequent “Regulation Impact Statement” (RIS). Thus, DPIRD considers the list of options as they relate to the welfare of sheep in shipments to/through the ME. Assuming that any ramifications of these options will be addressed in the RIS (e.g. farm stocking rates or farm profitability) we have not addressed them here.
3. The proposed options are listed below. DPIRD notes some of them are somewhat ambiguous; for example, it is not clear if option 3 includes ‘no prohibition’, as shown for option 4 (but we assume that this is the case).
4. DPIRD is concerned that reliance on the use of the Heat Stress Risk Assessment (HSRA) model (Hotstuff) to determine when shipments should be approved does not provide a sufficiently transparent or predictable process. From a public perspective, this puts too much responsibility for decision making in the hands of the live export industry. From an industry perspective, the assessment of shipments ‘case by case’ does not provide sufficient predictability.
5. DPIRD supports the recommendations of the HSRA Technical Reference Panel, including in relation to risk settings and the use of wet bulb temperature (WBT) rather than mortality as the key animal welfare indicator.
6. However, the replacement of mortality by a broad set of generally agreed animal welfare indicators is a long way from practical implementation. Pending the completion of relevant scientific research, DPIRD supports the recommendations of the HSRA Technical Reference Panel.
7. The need for a scientific basis to regulations has been a preeminent component of discussion since Dr McCarthy reported on live sheep export to the ME (McCarthy, 2018). DPIRD is concerned that some of the proposed options have little scientific basis or are contrary to current data. There is a need to compare the risks associated with different options, but options that are not consistent with scientific data are inherently risky.

The four options in the Discussion Paper

In all cases, the conditions of the Australian Meat and Livestock Industry (Export of Sheep by Sea to Middle East) Order 2018 (Middle East Order), introduced on 6 July 2018, apply.

The discussion paper provides the following four options:

Option 1: Apply a 3 month prohibition

- Continue to use the existing HSRA model OR an approach based on agreed animal welfare indicators (AWI).

Option 2: Apply the 2019 prohibition period

- No requirement for an HSRA on live sheep exports to or through the ME.

Option 3: Adopt revised HSRA with risk settings based on heat stress thresholds

- Adopt a revised HSRA with risk settings based on heat stress thresholds (HST) or agreed AWI.

Option 4: No prohibition

- Exports to the ME permitted for 12 months of the year.
- Continue to use the existing HSRA model.

DPIRD suggestions

Changes to the list of options

DPIRD suggests the following changes to the list of options.

1. Maintain option 1, including more explicit language, e.g. the months of the prohibition.
2. Add a new option - effectively, a combination of options 2 and 3:
 - The export of sheep to/through the ME to be prohibited in the period 1 June-22 September 2020. The exact dates to be reviewed in light of current weather data from the Bureau of Meteorology (BOM);
 - The revised HSRA model to be used in other months of the year, as per option 3.
 - Refinement of the HSRA model to be continued during 2020, taking into account the results of sheep exports to all destinations and research in 2019-20.
 - Towards the end of 2020, appropriate variations to this policy to be considered.
3. Maintain option 4 (renumbered 3) as the option that has the least impact on industry.

Definition of areas of risk

The risks of regulatory failure to be assessed in the RIS should include the following (taken from the Discussion Paper and modified):

- Damage to Australia's reputation with regards to animal welfare, and as a producer of high quality livestock
- Loss of trust in government regulation
- Loss of the live export industry's 'social license' to operate
- Lack of predictability and/or sudden suspension of the live export trade
- Decline in consumer trust for livestock production systems in general.
- Loss of income to farmers and associated businesses
- Expected changes to sheep population and lamb production
- Effects on demand for live exports
- Effects on transparency of the live export supply chain.

Further supporting evidence

Rationale for retaining a 'pause' (prohibition) on exports

DPIRD supports the recommendation of Dr McCarthy to move away from animal mortality and instead use animal welfare indicators (AWI) to determine the acceptability (or otherwise) of animal welfare outcomes. The adoption of agreed AWI is a key objective. However, this is a complex matter and we understand that current research is not likely to be completed before 2021. In the interim, given the need to further refine the HSRA model, it is appropriate to maintain a prohibition on exports during the northern hemisphere summer. Rather than support Option 1 (3 month pause) or 2 (pause as per 2019, no further requirement for use of the HSRA model), DPIRD proposes a combination of options 2 and 3 (pause as per 2019, with exact dates to be confirmed by review of BOM data; use of the HSRA model in other months of the year).

Predictability

For the live export industry and sheep producers, it is important that policies on live export are as clear and predictable as possible. A policy that is built upon a 'case by case' assessment does not provide predictability. Options 3 and 4 rely on the use of the HSRA model to determine stocking rates that will provide an acceptable animal welfare risk for voyages to/through the ME during the northern summer months. However, the climatic conditions have been shown to present an unacceptable risk of poor animal welfare outcomes due to heat stress in voyages at this time of the year. A prohibition is predictable and allows the industry to plan shipments outside the specified period with confidence.

It is essential that the industry gets clear guidelines on what months they can trade and that these are then set for at least two years, so producers can plan

Transparency

The HSRA model is complex and the assumptions underlying its use are not accessible to State/Territory Departments of Agriculture or stakeholders. In the Discussion Paper, the DoA acknowledged the need to further refine the HSRA model to take account of diurnal and day-to-day variations in wet bulb temperature (WBT) and the appropriate heat stress threshold for lambs (to be defined).

The underlying principle of Options 3 and 4, with no mandated pause, is to trust exporters to 'do the right thing' with respect to the conditions of live export in the northern hemisphere summer. In light of historical incidents, the community is unlikely to accept this approach.

A period of prohibition, set to coincide with the periods of highest risk to animal welfare, is both transparent and easy to understand.

In opposing the removal of the prohibition period, DPIRD is encouraged by the fact that the live export industry itself acknowledged the risks of export during certain months. In December 2018, announcing a three month voluntary moratorium on sheep shipments to the ME, Mr Crean, Chair of the Australian Livestock Exporters' Council (ALEC) commented that 'the moratorium would provide certainty to sheep producers' (Exporters introduce live sheep trade moratorium, December 2018). The DoA decision to extend the prohibition to 22 September 2019 acknowledged the fact that the export of sheep to/through the ME in the northern hemisphere summer months presents unacceptable animal welfare risks. This decision was couched in terms of a temporary suspension pending clarification through further research. DPIRD acknowledges that extensive research is under way, including trialling of technology

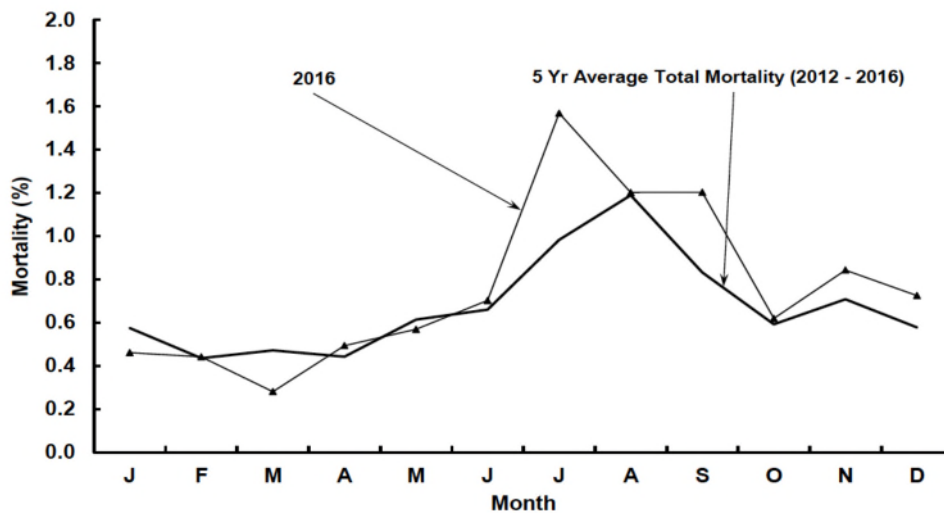
such as dehumidifiers. However, it is too soon to say how new technology is going to help to address heat risk challenges associated with live sheep shipments to/through the ME.

Timing of heat stress events

It is recognised that significant heat stress events occur in voyages to/through the ME, in particular during the northern hemisphere summer months of May to October.

Figure 1 shows the monthly mortality rates in all classes of sheep shipped from Fremantle to the Middle East/North Africa (MENA) in 2016, and the five-year monthly average mortality rates in the period 2012–2016. Mortality rates are higher for sheep loaded in May to October (and, for 2016, in September).

Figure 1. Monthly mortality rates in all classes of sheep shipped from Fremantle to the MENA in 2016 and 5 year monthly average mortality rates in 2012–2016

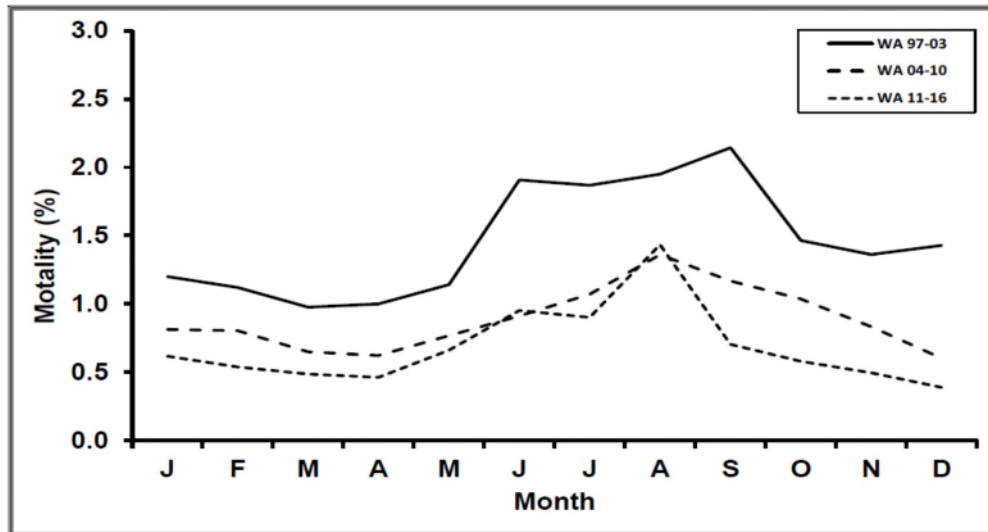


Source: Norman, 2017.

In analysing mortality patterns, Norman (2017) found that seasonal differences can be demonstrated for all classes of sheep. When adult wethers (the main component of overall mortality) are compared with adult rams, although the overall mortality rates for adult wethers have reduced over time, the seasonal difference is relatively stable.

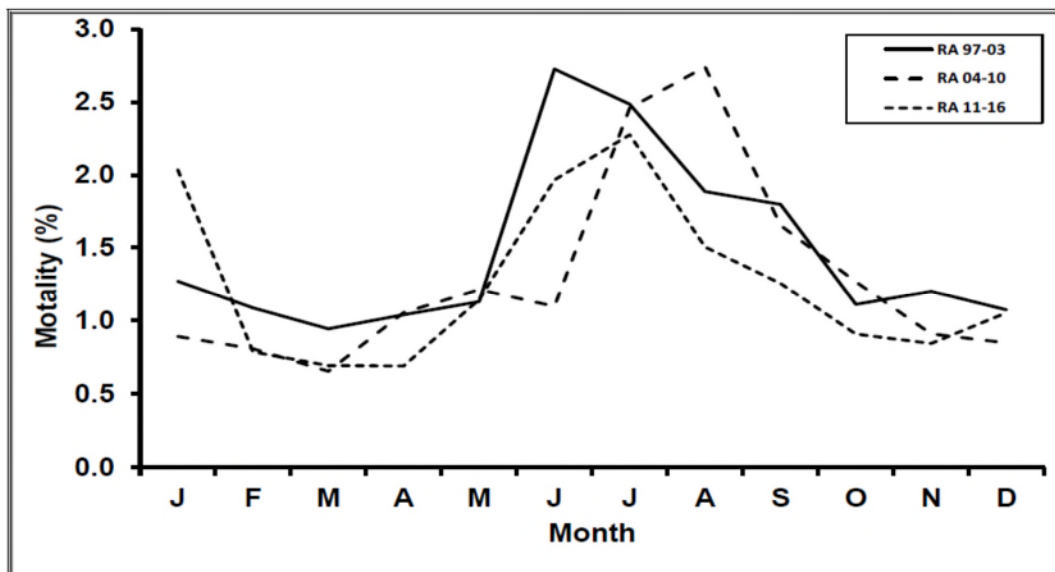
Figures 2 and 3, show monthly mortality as a percentage of total loaded over three periods – 1997-2003, 2004-2010 and 2011-2016 for adult wethers and rams.

Figure 2. Average monthly mortality rate (%) for adult wethers



Source: Norman, 2017

Figure 3. Average monthly mortality rate (%) for adult rams



Source: Norman, 2017.

DPIRD comments on the Heat Stress Risk Assessment Model

Under the Australian Meat and Livestock Industry Act 1997, the Federal Minister for Agriculture must table a report to each House of Parliament summarising the results of live export consignments in the preceding six months (see Table 1). Table 1 shows that the overall mortality rates have been fairly consistent in the period 2010-2017.

In 2018, the volume of exports was lower, reflecting the suspension of a major exporter's licence and uncertainty about the conditions that were going to be applied by the regulator. Overall mortality rates were also lower, presumably reflecting the reduced stocking densities and other conditions imposed under the Middle East Order, with effect from 6 July 2018.

Table 1. A summary of livestock numbers shipped annually from Australia, and associated deaths that occur during loading, shipping and disembarkation

All Voyages	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of Voyages	286	182	203	233	347	350	314	275	324
Cattle Exported	848,265	718,025	626,504	776,583	1,307,579	1,325,527	1,109,513	889,525	1,118,102
Cattle Mortalities	1,192	1,067	681	830	1,638	1,451	1,485	923	836
Total Mortality Rate	0.14%	0.15%	0.11%	0.11%	0.12%	0.11%	0.13%	0.10%	0.07%
Sheep Exported	3,001,976	2,592,028	2,199,999	1,897,270	2,249,643	2,007,549	1,759,340	1,741,314	1,259,860
Sheep Mortalities	26,825	19,212	19,407	14,067	16,147	12,403	14,094	12,377	6,629
Total Mortality Rate	0.89%	0.74%	0.88%	0.74%	0.71%	0.62%	0.80%	0.71%	0.52%
Buffalo Exported	2,358	734	831	798	4,068	5,122	4,230	7,214	7,147
Buffalo Mortalities	1	9	1	1	19	11	22	40	21
Total Mortality Rate	0.04%	1.22%	0.12%	0.13%	0.47%	0.22%	0.52%	0.55%	0.29%
Goats Exported	1,885	0	1,245	1,080	850	1,000	0	0	0
Goats Mortalities	13	0	1	0	1	0	0	0	0
Total Mortality Rate	0.69%	0%	0.08%	0%	0.11%	0%	0%	0%	0%

Source: <http://www.agriculture.gov.au/export/controlled-goods/live-animals/live-animal-export-statistics/reports-to-parliament>).

Risk settings in the HSRA Model

The industry software tool 'HotStuff' is used to predict and mitigate the risks of mortality from a heat stress incident. In 2004, the use of this heat stress risk assessment model (HSRA) was mandated under the Australian Standards for the Export of Livestock (ASEL). HotStuff version 4 has been in use since 2012. The Discussion Paper indicates that HSRA is required for all voyages to/through the ME but DPIRD is not aware of when this requirement commenced. DPIRD notes the comment in the Discussion Paper that "except in the hottest months of the year, HotStuff v.4 is unlikely to require greater pen space allowances than allometric pen space requirements under the Middle East Order". This seems to be the rationale for discontinuing the use of the HSRA as proposed in Option 2.

The details of this model, and the assumptions that underpin its use are not available to State/Territory governments or the public.

In considering possible modifications of the HSRA model, we note that the model is complex, and DPIRD does not have a complete understanding of the assumptions that underpin its use.

DPIRD agrees with the recommendation of Dr McCarthy (McCarthy Report, 2018) and the Heat Stress Risk Assessment Technical Reference Panel Final Report (HSRA Review, (2019) regarding the need to develop animal welfare indicators for use in the HSRA model, instead of basing risk assessments on mortality (HSRA Review, 2019). To this end, the Technical Panel recommended the introduction of wet bulb temperature (WBT) “welfare thresholds” to limit the risk that sheep will be exposed to excessive heat load. As outlined in the HSRA Review (2019), more research is needed to determine the welfare implications of diurnal and day-to-day variations in WBT, the duration of exposure to high WBT, and the susceptibility of lambs (term lamb to be further defined) to high temperatures.

The WBT thresholds mentioned above are consistent with the Heat Stress Thresholds (HST) embedded in HotStuff V4 but not currently used (Discussion Paper)

In the DPIRD submission to the HSRA Review in 2018, we expressed concern that the standard ‘Merino’ estimates for the HST (WBT 30.6°C) and mortality limit (WBT 35.5°C) were too high. Stockman et al. (2011) proposed that WBT 26°C–28°C may cause a rise in the core body temperature and Maunsell (2004) proposed a temperature range of 26°C to 30°C. Collins et al. (2018) concluded that using a higher HST leads to underestimation of heat load and can result in elevated mortality.

DPIRD supports the incorporation of appropriate WBT welfare thresholds in the revised HSRA. We understand that the current HSRA model incorporates many different data sets: weather data; livestock data (species, breed, age, weight, body condition, coat length, month of export and district of origin), and vessel data (ventilation values).

DPIRD reiterates previous comments to the HSRA Review in 2018, that vessel data other than ventilation values should be considered, such as exposure to heat by radiation from hot metal surfaces (Caulfield et al. 2014; Phillips, 2016). Some areas on a ship can be much hotter than others. Pen wall and ceiling temperatures of 50°C have been reported on some voyages and this could increase the heat load on animals by up to 15% (MAMIC, 2001).

Other authors note that the HSRA does not have the capacity to deal with the effects of cumulative heat load on animals where there is no respite (cooling) (Collins et al. 2018). A simulation study by Stockman (2011) found that when sheep are exposed to prolonged high heat and humidity (up to 30°C WBT), similar to ship-board conditions, they accumulate heat, which causes a rise in core temperature indicating heat loss mechanisms do not fully compensate for the increased heat load.

DPIRD comments on Animal Welfare Indicators

DPIRD supports the proposal that animal welfare indicators (AWI) replace the current reliance of mortality rates for animal welfare risk assessment (McCarthy, 2018). This is a complex endeavour and we are concerned that it may take a long time to reach agreement on AWI.

In the DPIRD submission to the HSRA Review (2018), DPIRD supported the recommendation of Dr McCarthy (McCarthy, 2018) that heat stress be scored with reference to sheep panting, which correlates well with core body temperature (Stockman, 2006). However, we are concerned that there are varying interpretations as to panting score. Dr McCarthy identified that a Heat Stress/Panting Score of 3 (Respiratory Rate (RR) 160-220/min) be considered the threshold value. DPIRD recommended consideration of a Heat Stress/Panting score 2 (RR 100-160/min). Level 2 is an indication that sheep are affected by heat but not yet compromised; action can be taken to prevent progression to heat stress. Level 3 indicates that sheep are suffering heat stress and it may be too late for remedial action.

DPIRD has the same concern with respect to information in Table 1. 'Panting score and character' in the report of the HSRA Review (2019). When a sheep has a Panting score 2 (RR 81-120/min), it is highly stressed. At Panting score 3 (RR 121-192), there is open mouth panting, the sheep is very highly stressed and heat affected. Once a Panting score 3 is reached, if no respite is provided, mortalities are likely to occur.

There are varying scientific opinions on the temperature at which panting occurs. Hales and Webster (1967) found first phase panting with rapid shallow respiration occurs at a core body temperature on average 0.5°C above normal, and second phase or open mouthed panting occurs when core temperature on average 1°C above normal. Stockman (2006) report that summer acclimatised sheep start showing open-mouthed panting at 0.5°C above normal core temperature, while winter acclimatised sheep did not start open mouthed panting until they were 1°C above normal. Silanikove (2000) concluded, however, from a controlled elevation of temperature and water vapour pressure study that moderate heat stress exists at lower respiration rates than that suggested by McCarthy.

The Technical Panel concluded that there was a close association between Score 3 panting and a rise in body temperature of 0.5–1 degree above normal (HSRA Review, 2019). DPIRD contends that it is more appropriate to target risk assessment to a panting score = 2, to avoid a heightened risk of adverse welfare outcomes. We note that the Technical Panel identified difficulty in including panting scores in the current HSRA Model (HSRA Review, 2018).

An industry project is considering the development of appropriate animal welfare indicators for live export but is not expected to report final results before 2021.

Allometric space allowances

It is well known that there are seasonal variations in the likelihood of a heat stress event affecting a live export consignment. Such events may occur outside the May-October period (Caulfield et al. 2014, Norman, 2017). Although heat stress events are gradually becoming less common, there is still uncertainty about the usefulness of the current HSRA model in the prediction and *prevention* of such events.

Based on Dr McCarthy's recommendations, the DoA implemented the Middle East Order in July 2018. This requires exporters to calculate an allometric space allowance for sheep using the *k-value* of 0.033 for voyages during May to October. As proposed in the Discussion Paper, the Middle East Order will apply in 2020, regardless of the option chosen.

DPIRD supports the use of allometric principles to calculate stocking density in all live export shipments. However, we have some concerns about the *k-values* chosen. The approach to stocking density recommended by the ASEL Technical Advisory Committee (TAC), using a *k-value* 0.030 for the northern hemisphere winter, provides an increase in space of less than one tenth of a square meter for a 54 kg sheep.

In DPIRD's submission to the HSRA Review (2018), we recommended a *k-value* of 0.033–0.047. In making this recommendation, we referred to the findings of Petherick and Phillips (2009), who reported that using a *k-value* of 0.033 provides “space, below which there are adverse effects on welfare outcomes in intensive housing”. The *k-value* suggested by industry was 0.027 (ALEC, 2018) on the basis that a *k-value* of 0.033 was only applicable to ‘long-term confinement’. The TAC took a similar approach, stating that ‘the *k-value* of 0.033 is described in the literature as providing an acceptable space allowance for production animals in long-term—typically lifetime—confinement’. ALEC (2018) also takes the view that a *k-value* of 0.027 is sufficient because it allows all animals to lie down simultaneously.

However, according to Petherick and Phillips (2009), there is insufficient data to determine whether this allowance ($k=0.027$) on board a vehicle or vessel would enable animals to move and access food and water with ease.

Space is important if restriction results in competition for resources, because group members may have limited access, or access to only poor quality feed and water (Petherick, 2007). Broom and Fraser (2007) state that it is essential to allow animals to feed and drink simultaneously during transportation, as competition may result in exclusion of weaker animals.

Social relationships must also be considered. When unfamiliar animals are mixed and closely confined, fighting and aggression may result in physical exhaustion, stress and injuries. There is generally a need for at least one group member to escape the immediate proximity of another (Petherick, 2007). This cannot occur if animals do not have sufficient space to move about freely.

In observations made on voyages where cattle and sheep were transported, Fisher and Lea (2013) found a common trend for lying behaviour. When offered more space, animals spent more time lying particularly during the critical early stages of the voyage, and the associated welfare benefits with this is that it enhances the capacity of animals to adapt to voyage conditions. This research is supported by earlier studies carried out by The Scientific Committee on Animal Health and Animal Welfare (SCAHAW, 2002), Knowles, (1995) and Broome and Fraser (2007) finding that sheep have a preference to lie after 4 hours of transportation, a finding also supported by Broom and Fraser, 2007)

Petherick and Phillips (2009) also point out that even at space allowances based on a *k-value* of 0.033, animals will be lying in their own excreta, necessitating provision (and changing) of bedding material, and cleaning.

In considering space allowance for ‘transport’ and ‘extended confinement’, DPIRD referred to the Australian Animal Welfare Standards and Guidelines for Land Transport of Livestock (LTS). The LTS requires that once adult sheep and cattle have been off water for 48 hours, then a mandatory minimum spell of 36 hours is required for the animals to access feed, water, and have space to lie down and rest. It is reasonable that if animals are transported on a road vehicle or vessel beyond 48 hours, and are not off-loaded, then they could now be considered as ‘confined for an extended period’. Given voyages can last anywhere from 10 or so days to several weeks, and animals remain confined for the duration of the voyage, then it is equally reasonable to use a *k-value* between 0.033 and 0.047 to ensure animals will have a space

allowance that allows performance of normal behaviours and postures, and to freely access feed and water.

In determining space requirements for livestock transported on ships, the unstable environment must be considered along with the period of confinement. DPIRD considers that transport of livestock by ship constitutes extended confinement, even for journeys up to 10 days, because the animals are not offered any respite by off-loading. In the confined shipboard environment, animals must have enough space to lie down to rest, get up again, move freely to feed and water, self-groom (licking and rubbing), interact socially and brace themselves, and be comfortable in an unstable and unfamiliar environment.

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