



## **Feedback on Heat Stress Risk Assessment Draft Report: December 2018**

1. The Department of Primary Industries and Regional Development (DPIRD) welcomes the opportunity to provide feedback on the Heat Stress Risk Assessment (HSRA) draft recommendations. This submission draws upon the Departments submission 19 October 2018 - Heat Stress Risk Assessment Issues Paper
2. DPIRD supports the principle that the risk assessment be based on science. Our understanding of the word “scientific” is that parameters can be measured, principles have been proven by peer review and methodologies have been published in a way that allows results to be repeated. Some of the information published would not satisfy all these criteria, particularly the predictions of risk that are difficult to follow hence repeat.
3. Risk assessment should consider the value of failure as well as the probability. Currently the HSRA seems to focus on probability without defining the cost of failure.
4. DPIRD supports the move away from the current framework focused on mortality, to a framework focused on animal welfare. However, DPIRD also acknowledges the newness of the methodology in this area. Measuring animal welfare parameters at the ship level may require more investigation and automation with new technologies to enable this. This should be considered a priority for research and implementation.
5. Given that heat stress is not the only cause of mortality on ship, the mortality limits will still need to exist but perhaps revised to take into account changes to heat stress limits based on animal welfare. The mortality limits might therefore be expected to decrease.
6. DPIRD supports the measurement of both environmental and animal parameters for:
  - the assessment of heat stress on ship,
  - the prediction of heat stress prior to embarkation, and
  - the definition of time periods when shipping is not allowable.
7. The use of wet bulb temperature (WBT) appears to be the best environmental parameter for the prediction of heat stress. However we are unsure about how the threshold value of a 98 percentile of 28°C was derived and seek further clarification in this area. The source of the data that this relates to is unclear from the documentation available about the Hotstuff model. Given the importance of the WBT value as a threshold value, we would like assurance that this has been based on all available data, published and unpublished.
8. It is noted that the use of 28°C WBT as the heat stress threshold is for a 56 kg Merino adult, zone 3, recently shorn animal travelling from the southern

Australian winter. Consideration should be given to “road-testing” the matrix of WBT for different classes of sheep to ensure that it is as clear as possible to interpret by industry. This should include measurement of times allowable for environmental temperature to exceed the WBT limit.

9. Panting scores appear to be the best available animal parameter to measure heat stress. However, we suggest that further parameters may need to be included with the standards for panting. Specifically the time that panting can continue for and the proportion and location of animals on a ship that exceed critical panting levels. We note that score suggested, score3, indicates the animal is no longer in the thermoneutral zone (TNZ). Using score 2 provides an indication that animals are heat affected, but not yet compromised, and actions can be taken to prevent the animal progressing to outside its TNZ. If an animal reaches score 3 there should at least be time limits set for this.
10. Where possible any modelling predictions should be validated by on board measurements. For example, to what extent would the results presented in figure 2 on page 21 of the HSRA document, have been validated with animal data collected on board ship? Specifically, did the animals on these voyages have high respiratory rates consistent with heat stress and if so for how long?
11. DPIRD supports the recommendation to consider the environmental conditions that sheep may be exposed to at their destination ports. Given sheep are often transported further within country from their port of unloading, we suggest that this consideration is extended further to include their final destination (destination at which they are slaughtered).
12. Ideally information collected along a supply chain should be available to all members of a supply chain. For example, data collected on ship should be available to a farmer supplying the ship. Data collected in country should be available to the shipping agent.
13. The profitability of shipping will likely determine the response of shippers to any proposed changes within the industry. If the proposed recommendations have a significant effect on the live export trade this will be most important for the Western Australian sheep industry. We note that several studies have been done previously to elucidate the effect of cessation of the trade to the sheep industry. These have varied but in the main have suggested considerable financial loss when the only alternative considered was complete cessation of the trade. There hasn't to date been an investigation of how best to deal with cessation for a set period of the year (the northern summer only) or how the industry should adapt to this. This should be done as a matter of urgency in conjunction with trading partners in the Middle East.
14. The Literature Review conducted by Murdoch University and referred to in 3.4 needs to be referenced. DPIRD commissioned Murdoch University to undertake a literature review (Collins et al, 2018) and if this is the same report then it needs to be clarified that it was DPIRD and not DAWR that commissioned this review.
15. The review of Collins et al (2018) refers to the role that diet composition can have by ameliorating biochemical changes associated with heat stress. In particular, the potential benefit of supplements such as betaine as a methyl donor and vitamin E as an antioxidant. Industry should be encouraged to conduct research during voyages to determine the potential benefits of diet composition to animal welfare, or if products like these are being used then this should be explained to industry.