

Middle East sheep exports policy options discussion paper

Live Animal Exports division

September 2019



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Summary

This policy options discussion paper initiates a Regulation Impact Statement (RIS) process to inform future regulation of live sheep exports to, or through the Middle East, from 2020 onwards. It will be open for public comment for 30 days.

The Department of Agriculture seeks feedback from interested stakeholders about the impact of possible policy options that are being considered for regulating sheep exports to, or through the Middle East. These options are provided to generate considered feedback which may include alternative ideas or options.

The department will use information received during public consultation to inform the development of a draft RIS. The RIS will outline the economic and regulatory benefits and impacts of each policy option identified through the consultation process. The draft RIS will be released for a second period of public consultation and all responses from stakeholders will be considered when making final policy recommendations to government.

The intended outcome of adopting one of these policy options, or a valid alternative, is to manage the risk of heat stress in live sheep exports and welfare outcomes on voyages while supporting a sustainable live sheep export trade.

Policy options presented in the discussion paper have been developed after considering information available to the department including the Independent Review of Conditions for The Export of Sheep to the Middle East During the Northern Hemisphere Summer (McCarthy Review), the final report of the Heat Stress Risk Assessment (HSRA) Review (HSRA Review), submissions from the McCarthy Review and HSRA Review, analysis of climatological data provided by the Bureau of Meteorology, voyage reports including analysis of May 2019 voyages, independent observer reports, environmental data and environmental observations aboard vessels that travelled to the Middle East during 2018 and 2019. The department also met with the Western Australian Live Export Reference Group to discuss the possible impact of changes to the regulation of the live sheep export industry.

1 Make a submission

This discussion paper encourages individuals and organisations to make submissions regarding the **impact of the proposed policy options** outlined in [section 5](#).

Submit your feedback through our online stakeholder engagement platform, [Have Your Say](#).

Submissions close 5pm 28 October 2019.

For more information, contact MEsheepexports@agriculture.gov.au.

The department is particularly seeking to **collect evidence and factual data on the impact of each option on you, your organisation and the community**.

We encourage you to consider these questions in your submission:

- **For each option, what do you consider would be the benefits to and impacts on you, your organisation and the community? Please provide any supporting evidence or data that would aid in the assessment of impacts under each option.**
- **Is there a policy option not stated here that would both support a sustainable live sheep export trade and meet the high animal welfare standards expected by the Australian community?**
- **The department is developing an information base to support ongoing analysis and improvements to live animal export regulation. This includes environmental data collected on board live export voyages. What other data should the department consider collecting?**

In making a submission, please provide:

- evidence and data of the benefits and impacts of each option to you, your organisation and the community. The department will respect any request for confidentiality. Please mark your submission as confidential if this is the case. The department may need to incorporate de-identified general evidence in the RIS in consideration of a final decision.
- a copy or link to any supporting evidence relevant to your submission.

Please include in your submission:

- name
- title
- contact address
- telephone number
- organisation, if applicable.

2 Background

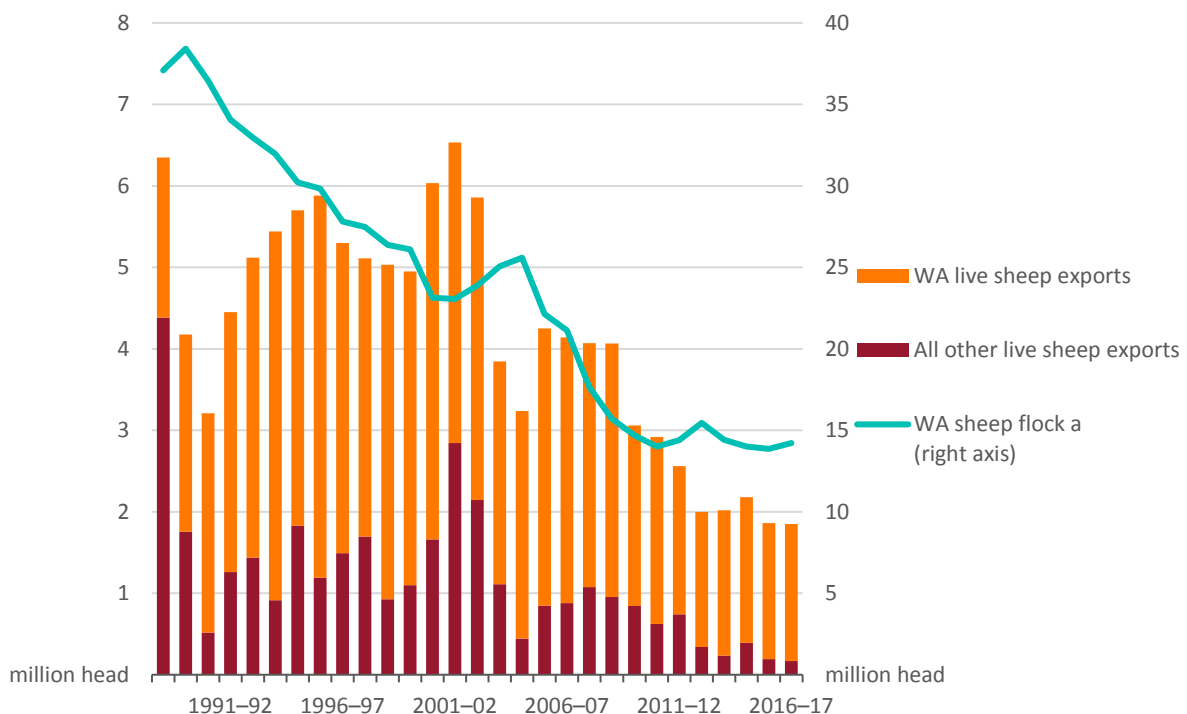
2.1 Live exports industry

In 2017–18 Australia exported 2.0 million live sheep (\$239 million). In that year, live sheep exports contributed 7% of the value of Australia's sheep and sheep meat exports, which represented about 3% of the global trade in sheep meat. Live sheep exports contribute around 0.5% of the value of Australia's total agricultural exports (ABARES 2019).

Exports of live sheep have declined since the 1990s due to a decline in the size of Australia's sheep flock and growing acceptance of chilled and frozen sheep meat in the Middle East (Figure 1). Low wool prices following the collapse of the wool reserve price scheme in 1991 provided a long term incentive for farmers to switch from sheep to cropping. As a consequence, Australia's flock numbers fell from 170 million in 1988–89 to 70 million in 2017–18 (ABS 2013, 2019a).

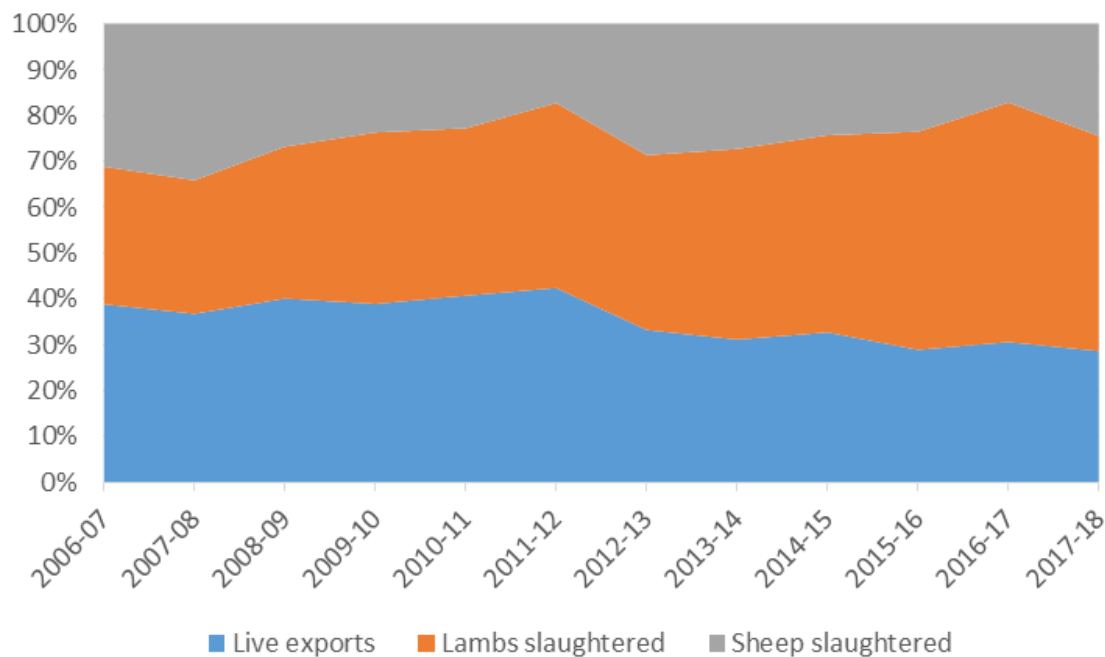
The Western Australian sheep flock was estimated to be 14.5 million in 2017–18 (ABS 2019a). In this financial year, 1.6 million sheep were exported live from WA which equated to 81% of Australia's total (Figure 1).

Figure 1 Australian live sheep exports and Western Australian sheep flock, 1988–89 to 2017–18



Sources: Australian Bureau of Statistics (ABS) 2019, ABS 2013; Australian Bureau of Agricultural Research and Economic Sciences (ABARES).

As a share of total WA turn-off, over the last 5 years, live sheep exports have comprised an average of 30% (Figure 2).

Figure 2 Breakdown of WA sheep turn-off, 2006–07 to 2017–18

Source: ABS 2019b; ABARES

Within Australia, the live sheep export industry has a range of key stakeholders. The export supply chain includes producers, exporters, ship owners and operators, land transporters, operators of registered premises and stock feed manufacturers. [A schematic of the supply chain](#) is outlined in LiveCorp’s road map provided in [Appendix A](#). Other interested parties in live sheep export policy include animal welfare lobby groups, industry groups, meat processors and state and territory governments.

Producers

There are diverse pathways through which sheep are ‘turned off’ or sent to market, making it difficult to identify which farms sell live sheep for export, and what proportion of their income is generated from live exports. Sheep destined for live export are mostly sold directly to buyers representing exporters, although sheep sold through saleyards may also be exported live. In some cases, at the time of sale through saleyards it may not be known if sheep are processed locally or exported live.

A proportion of sheep farms sell sheep for live export every year and most of these are in Western Australia. In 2017–18 there were an estimated 1,800 sheep specialist farms (more than half of their income derived from sheep, lambs and wool), and 2,400 mixed-cropping sheep farms in WA. It is acknowledged that the WA sheep flock has evolved over the last 30 years, from being a wool-dominant flock to a flock producing both wool and sheep meat. In 2017–18, 47% of WA turn-off was lamb slaughter (Figure 2).

Live sheep exports complement and add to the profitability of lamb production for Australian sheep farmers. This is especially true for sheep farmers in WA where a combination of transport, market and agronomic factors have oriented the sheep industry towards live exports. Most of WA’s pastoral areas have a short growing season before hot summer conditions restrict pasture

growth. Therefore lambs may not reach the weight and quality standards of the 'prime' lamb market without supplementary feeding. In these situations, live sheep exports provide Western Australian sheep farmers with a profitable alternative to the local 'prime' lamb market. This means that a farmer can set out at the beginning of the season to produce prime lambs, but sell the same sheep for live export at reasonable prices if seasonal conditions are not favourable. In addition to this, due to proximity, WA has a significant transport advantage to the Middle East relative to eastern states.

Transporters

The Australian Livestock and Rural Transporter's Association is a federation of six state associations, representing around 850 transport businesses. It includes owner-drivers, small fleet operators and large fleet operators. The number of businesses heavily reliant on live exports is likely to be much smaller than this.

In a submission to the HSRA review, the Livestock and Rural Transport Association of Western Australia (LRTAWA) expressed concern for the viability of members' businesses if the live sheep export trade were to end. The LRTAWA stated that uncertainty in the live exports industry was having a 'severe impact' on members' businesses, with some under significant financial pressure.

Registered premises

Registered premises are used for holding and assembling livestock prior to export by sea. Sheep are quarantined for between 3 and 5 days in a registered premises where they undergo inspection for health and welfare and other preparations prior to export.

In Australia, there are currently 13 registered premises approved to hold sheep prior to export. Depending on the time of year, between 75 and 100% of sheep destined for live export to the Middle East will be prepared at 3 of these premises, with all 3 located in WA.

A registered premises may be purpose-built indoor housing in elevated sheds or outdoor housing in paddocks, or a combination of both. Approved holding capacities for premises varies seasonally. The largest premises has a winter holding capacity of 140,000 sheep and a summer holding capacity of 84,000 sheep.

Stock feed manufacturers

Research by the department indicates that there are 6 feed mills supplying feed to the live export sheep trade, 3 in WA, 2 in South Australia and 1 in Victoria. In discussion with industry, it is estimated that for these 6 feed mills, between 50% and 90% of production is for the live sheep trade, producing fodder specifically for consumption at registered premises and during voyages. It is estimated that these feed mills combined would employ around 100 staff.

Meat processors

In 2018, around 70% of sheep sold for meat by WA producers were processed in Australian abattoirs. Approximately 72% of this processed meat was exported as chilled or frozen sheep meat, and 28% was consumed domestically (Western Australian Agriculture Authority 2016).

There are 5 export establishments currently processing sheep meat in WA primarily for export markets. These establishments collectively processed 1.23 million head of sheep between May

2018 and May 2019. Most establishments are running a single chain with slaughter completed between 2.30pm and 4.30pm daily.

Research by the department indicates that the meat processing industry in WA is operating well below capacity as a result of the long-term decline in the state's sheep flock. Based on discussion with industry experts in 2018, it is estimated the under-utilised sheep meat processing capacity in Western Australia is around 2 million head per year. There is the potential for additional capacity to be made through extending processing shifts per day in established premises, however it is recognised that a limiting factor could be availability of skilled labour.

Meat processing often operates seasonally and routinely adapts to quite large fluctuations in demand. The department is aware of some industry interest in increasing existing capacity.

Exporters

There are 40 licensed exporters of sheep from Australia, with 32 of these licensed to export sheep by sea. The majority of sheep exports are undertaken by 15 companies. Two exporters account for just over 50% of the trade.

An estimated 8,000 to 10,000 people are employed in the live export (sheep and cattle) industries (Clarke et al. 2007) including all ancillary industries such as transport, veterinary and feedlot services. The number of people employed exclusively in live exports is expected to be much smaller than this and includes buyers, staff operating registered premises, staff of exporting companies and specialist livestock staff working on ships (who may not be employed under Australian contracts).

Some operators in the live export industry are vertically integrated, owning vessels, feed mills, abattoirs and registered premises.

Ship owners

Fifteen different vessels carried live sheep to the Middle East from 2015 to 2019. Three vessels accounted for almost 75% of live sheep exports from 2015 to 2018. At least 3 vessels currently servicing the Middle East market from Australia are owned by exporters.

Destination markets

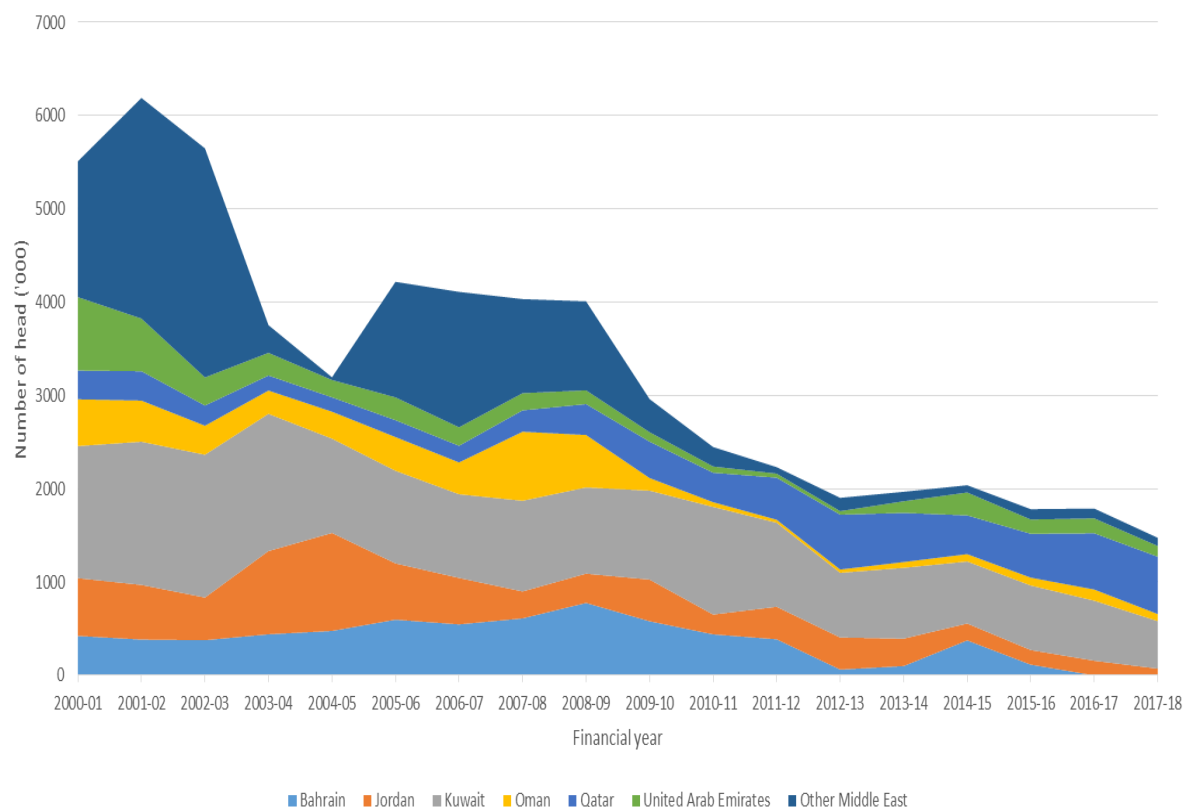
The Gulf Cooperation Council (GCC) countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates are the largest market for Australian live sheep exports, accounting for an average of 81% of exports since 1988. However, Australia has not exported live sheep to Saudi Arabia since 2012. The Middle East, including the GCC plus Turkey, Jordan and Israel, as a whole received an average of 96% of Australia's live sheep exports over the same period (Figure 3).

Many countries in the Middle East that import live sheep have historically subsidised consumer prices for food staples. Subsidies generally apply to live animal imports but not to imports of processed meat to assist domestic meat processors. A combination of food subsidies and lower labour costs for meat processing in the Middle East enable exporters to pay Australian farmers a premium for live sheep.

The Middle East is also Australia's largest export market for sheep meat. Growing populations, incomes and changing consumer preferences are driving an increased demand for pre-packaged meat in supermarkets. In response, frozen and chilled sheep meat exports to the Middle East

from Australia increased from around 24,000 tonnes in 2006 to over 50,000 tonnes in 2018. Due to cultural preferences however, it is unlikely that frozen and chilled meat would entirely replace live sheep in the short term.

Figure 3 Australian live sheep exports to Middle East destinations



Source: ABARES 2018

2.2 Heat stress risk assessment

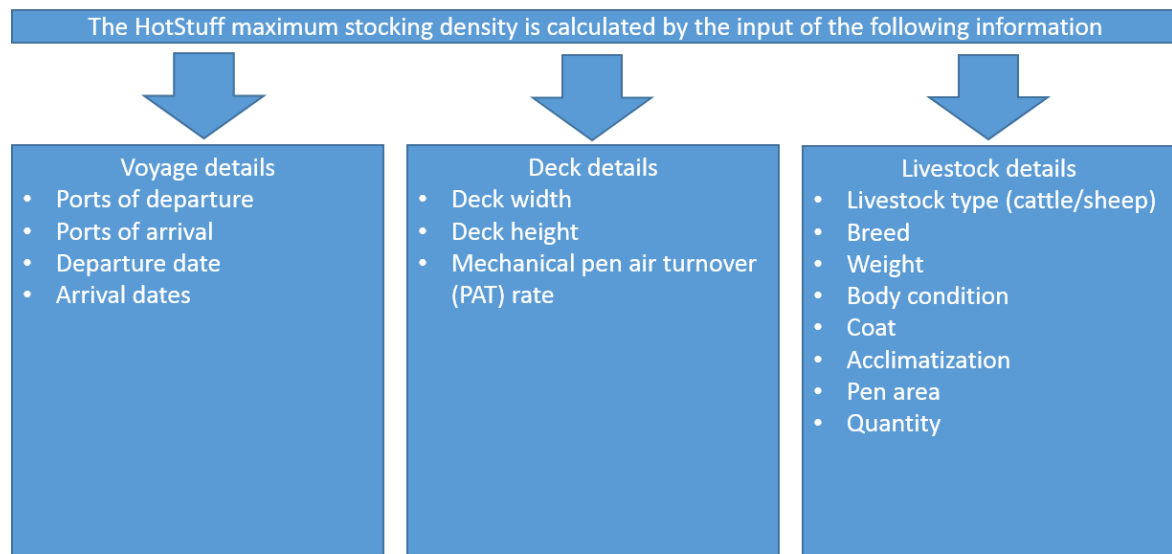
In early 2000, after a series of voyages with unacceptably high levels of heat stress and mortality in livestock, industry moved to develop a scientific method to determine the risk of heat stress for export voyages to the Middle East. A predictive heat stress modelling software tool was developed to assist in risk management planning for voyages to the Middle East. This tool was called HotStuff and is the heat stress risk assessment (HSRA) model used by industry to calculate heat stress risk.

Version 4 of the HotStuff software combines naval and land-based weather data from 2002 to 2010 inclusive, vessel configuration (including ventilation parameters), and voyage and livestock data (Figure 4). HotStuff is designed based on the principle of altering stocking densities and adjusting for the time of year in order to allow sufficient space for airflow and heat removal from livestock vessels (including factoring in the heat generated by animals themselves).

The level of risk, as calculated by HotStuff, was set by industry in 2003 as a 2% risk of a 5% mortality event. The risk level is a 3-part criterion. The first part is the number of animals affected (5%). The second is the probability of the weather conditions that will affect 5% of

animals (2% probability). The third part of the criterion is the physical state of the 5% of animals in the 2% chance of extreme weather; in the current HSRA model, this state is death.

Figure 4 HotStuff inputs



Source: Maunsell 2003

The HSRA model uses wet bulb temperature (WBT) as the environmental measure which combines dry bulb temperature and relative humidity to indicate the capacity of livestock to lose heat. The WBT has been shown to be the most useful measure related to heat stress in a shipboard environment as it most closely influences the physiological impacts of heat load on the animal. If there is effective ventilation, hot and saturated air is blown away from the animals, providing capacity for both convective and evaporative cooling (HSRA Review technical reference panel 2019).

A heat stress risk assessment [was made a regulatory requirement](#) under the Australian Standards for the Export of Livestock (ASEL) in 2004 and is now required for any shipment to, or through, the Middle East. HotStuff version 4 has been the agreed version between industry and the department since 2012.

Wet bulb temperature

WBT can be measured using a standard mercury-in-glass thermometer wrapped in wet muslin, or an environmental data logger. In the case of a standard thermometer, the evaporation of water from the thermometer has a cooling effect, so the 'wet bulb' temperature indicated is less than the temperature indicated by a dry-bulb (normal, unmodified) thermometer (DBT). The rate of evaporation from the wet-bulb thermometer depends on the humidity of the air. For this reason, the difference in the temperatures indicated by WBT and DBT gives an approximate measure of atmospheric humidity.

Data loggers are electronic devices which automatically monitor and record environmental parameters over time. They contain humidity and temperature sensors to receive information and a computer chip to store it. The digital data can be retrieved, viewed and evaluated, giving accurate and reliable information regarding on-deck conditions of sheep.

2.3 Current regulatory framework

The Australian Meat and Live-stock Industry (Standards) Order 2005 requires livestock export licence holders to comply with the Australian Standards for the Export of Livestock (ASEL) (Version 2.3, which is incorporated by reference) when exporting livestock. Compliance with ASEL is, by virtue of the Australian Meat and Live-stock Industry (Standards) Order 2005 and subsection 17(5) of the *Australian Meat and Live-stock Industry Act 1997*, a condition of a livestock export licence. The ASEL represents the minimum animal health and welfare requirements for the conduct of the livestock export industry that the Australian Government expects industry to meet.

ASEL (version 2.3), S4.12 requires that:

‘Stocking densities and pen-group weight-range tolerances for species of livestock must be in accordance with specifications in Appendix 4.1 and heat stress assessment using an agreed heat stress risk assessment...’

[Export Advisory Notice 2012–08](#) identifies HotStuff Version 4 as the agreed model presently used by industry in conducting heat stress risk assessments.

In 2018, based on the McCarthy recommendations, the department implemented changes, outlined in the Australian Meat and Live-stock Industry (Export of Sheep by Sea to Middle East) Order 2018 (Middle East Order) which requires exporters to have a heat stress management plan for each voyage. This includes:

- a reduction in reportable mortality levels from 2% to 1%
- exporters to have a heat stress management plan
- allometric stocking densities requiring between 11–39% more space per sheep depending on weight
- independent verification of pen air turnover
- 10% extra space for horned rams
- all vessels to be installed with automated watering systems
- additional bedding.

The department also implemented a [requirement for independent observers on board live-stock vessels](#) and certain conditions were introduced for exports during the northern winter under the Australian Meat and Live-stock Industry (Export of Sheep by Sea to Middle East – Northern Winter) Order 2018 (Northern Winter Order).

For 2019 only, the Australian Meat and Live-stock Industry (Prohibition of Export of Sheep by Sea to Middle East-Northern Summer) Order 2019 was implemented to prohibit live sheep exports to the Middle East from 1 June 2019 to 30 August 2019. This prohibition was extended to 22 September, for 2019 only, as detailed in the Australian Meat and Live-stock Industry Legislation Amendment (Prohibition of Export of Live Sheep to Middle East-Northern Summer) Order 2019.

3 What is the policy problem?

In April 2018, video footage provided by Animals Australia showed Australian sheep in severe heat stress while being transported to the Middle East on five consecutive voyages, with most footage taken during a voyage in August 2017. The footage publicly exposed unacceptable animal welfare outcomes, shocked the Australian community and undermined public confidence in the live export trade. For the livestock export trade to continue, the public expects transparent regulation of the industry and industry participants to uphold animal welfare standards throughout the entire supply chain.

The unacceptable animal welfare outcomes on the Awassi voyages were not adequately captured by mortality reports or reports by the on board Australian Accredited Veterinarian (AAV). The high mortality incident highlighted weaknesses in the application of heat stress risk management of sheep on these voyages. Animal welfare outcomes have become critical to the ongoing sustainability of the live sheep trade. Consequently there is a need for government to review its regulatory approach to managing animal welfare and heat stress during sheep export voyages to, or through, the Middle East.

4 Need for government action

The Australian Government regulates the live animal export trade under the *Australian Meat and Livestock Industry Act 1997*, the *Export Control Act 1982* and the regulations and instruments subordinate to these acts. The department, as the regulator, is responsible for setting the operating rules for live exports and responding to regulatory failures and non-compliances. The regulatory framework for live animal exports places the responsibility on exporters to ensure the health and welfare of animals throughout the export supply chain. Accordingly, the department relies significantly on industry compliance and reporting.

The Australian Government has committed to upholding the highest standards of animal welfare whilst supporting a sustainable live export trade. In addition to responding to concerns about heat stress on Middle Eastern voyages, the government also responded to public criticism regarding its role as regulator of the live export trade by announcing the Review of the Regulatory Capability and Culture of the Department of Agriculture and Water Resources in the Regulation of Live Animal Exports by Phillip Moss (the Moss review) in April 2018. The department supports, or supports in principle, all 31 recommendations of the Moss review and is working to implement these recommendations as a matter of priority. Examples of this are the establishment of a Principal Regulatory Officer and interim Inspector General of Live Animal Exports and the re-establishment of an Animal Welfare Branch in October 2018, reintroducing animal welfare as a consideration in the department's live animal exports regulatory activities.

4.1 Animal welfare initiatives implemented by the department

In response to the footage, the then Minister for Agriculture and Water Resources announced the [Independent Review of Conditions for the Export of Sheep to the Middle East during the Northern Hemisphere Summer](#) by Dr Michael McCarthy (McCarthy review). Dr McCarthy made 23 recommendations for conditions and actions to assure health and welfare outcomes for sheep being transported to the Middle East during the northern summer.

The Australian Government supported the McCarthy review recommendations for the development of effective measures to manage heat stress for sheep in the live export trade. In particular, the recommendation that there should be a move 'from a risk assessment based on mortality to a risk assessment based on animal welfare'. In terms of immediate action based on the McCarthy recommendations, the department implemented the Australian Meat and Live-stock Industry (Export of Sheep by Sea to Middle East) Order 2018 (Middle East Order) (Section 2.3).

In addition to these changes, the department implemented a [requirement for independent observers on board livestock vessels and certain conditions were required for exports during the northern winter](#) under the Australian Meat and Live-stock Industry (Export of Sheep by Sea to Middle East – Northern Winter) Order 2018 (Northern Winter Order).

The department implemented interim conditions for the 2019 Northern Hemisphere summer. This included the prohibition of live sheep exports from 1 June to 22 September 2019 to, or through, the Middle East. Exporters were also required to take automated environmental

measurements on all decks on sheep voyages to the Middle East during May, September and October 2019.

4.2 Determining a way forward for management of heat stress

In May 2018, the then Minister for Agriculture and Water Resources accepted the McCarthy report recommendations, including recommendations 3–5, 7 and 8 relating to the management of heat stress on voyages to, or through, the Middle East. The department established an independent technical reference panel in June 2018 to guide consultation with stakeholders and provide expert advice on HSRA and the science of heat stress in sheep exported live by sea. [The final report by the panel](#) made recommendations on the development of a new HSRA framework based on animal welfare, moving away from the current framework based on mortality rates .

In developing the proposed policy options in this document, the department considered:

- the HSRA review
- the McCarthy Review
- submissions to the HSRA review issues paper and draft report
- voyage reports
- independent observer reports
- environmental observations aboard vessels that travelled to the Middle East during May 2018 and 2019.

The department also engaged with the West Australian Live Export Reference Group.

The department recognises there are risks of not reviewing regulation about heat stress in sheep on Middle East voyages including:

- unacceptable animal welfare outcomes on voyages to, or through, the Middle East
- 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
- cessation of the live export trade
- decline in consumer trust for livestock production systems in general.

The regulatory policy will consider the responses to this discussion paper and to the later draft RIS. Decisions on policy settings will provide clarity about the future of the trade for those directly impacted, including international trading partners. The policy on the management of heat stress in sheep exports to, or through, the Middle East will make tangible, positive steps towards improved animal welfare outcomes and support the sustainability of the live sheep export trade.

The department notes that future regulatory policy settings could consider validated, new technology, such as dehumidification, which may help mitigate the risk of heat stress in live sheep export voyages to the Middle East.

5 Proposed policy options

The department is seeking feedback on 4 possible policy option ideas as it considers framing options for the Regulation Impact Statement. Alternative policy ideas are invited in feedback from stakeholders.

The 4 policy option ideas are:

- 1) Three month prohibition—Conditions under the Middle East Order apply for the northern summer months and industry continue to use the existing HSRA model or agreed animal welfare indicators.
- 2) Apply the 2019 prohibition period—Conditions under the Middle East Order apply for the northern summer months. The department would remove the requirement for a HSRA on live sheep export voyages to, or through, the Middle East.
- 3) Adopt a revised HSRA model with risk settings based on heat stress thresholds or agreed animal welfare indicators.
- 4) No prohibition—live sheep exports to, or through the Middle East would be permitted 12 months of the year. Conditions under the Middle East Order apply for the northern summer months and industry continue to use the existing HSRA model.

5.1 Option 1: three month prohibition

Option 1 would include a 3 month prohibition during the hottest period of the northern summer. The department seeks feedback from industry on the most appropriate months to be included in the prohibition. Exporters would continue to comply with the additional regulatory requirements in the Middle East Order and any further changes that may arise from the ASEL sea review.

The existing HSRA model, with current risk settings, or an approach based on agreed animal welfare indicators would be used to assess risk in sheep voyages to, or through, the Middle East. The reference to welfare indicators in this option provides an opportunity for stakeholders to comment on the role they may play in a future regulatory framework. The department is aware of an industry project still in progress to develop and trial animal welfare indicators for the livestock export industry.

The department is also interested to receive feedback from stakeholders on whether the current risk settings in the HSRA model remain appropriate.

Initial analysis by the department indicates that, excluding the hottest months of the year, HotStuff version 4 is unlikely to require greater pen space allowances than allometric pen space requirements under the Middle East Order.

In addition:

- the department could assess the ‘shoulder’ periods of the prohibition on a case by case basis to give consideration to weather forecasts that may significantly differ from historical averages. This may extend or reduce the prohibited period for a given shoulder period.

- exporters would be required to place automated data (WBT) logging equipment on board vessels during the northern summer months, and to report that data to the department. This would better inform future regulation.

This option recognises the regulatory changes already implemented in the interest of animal welfare with a reduced prohibited period compared to 2019. Industry have acknowledged the appropriateness of a prohibition as a balance between animal welfare and trade, as demonstrated by the moratorium on exports in 2019.

Option 1 would have minimal further impact on industry. With this option, there remains some risk of a heat stress incident, particularly during the 'shoulder' periods of the prohibition. The science and evidence reviewed by the department does not support a shorter prohibition because ships departing in late May and June travel into much hotter weather and September remains very hot.

5.2 Option 2: apply the 2019 prohibition period

Option 2 would include a prohibition as applied in 2019. Outside the prohibition period, exporters would continue to comply with the additional regulatory requirements under the Middle East Order during the northern summer and any further changes that may arise from the ASEL sea review.

This option takes an adaptive approach to regulation through these measures:

- the prohibition would exclude the hottest times of the year from trade, when sheep are acclimatised to cooler Australian temperatures, to provide more confidence that heat stress and animal welfare are managed.
- exporters would be required to place automated data (WBT) logging equipment on board vessels during the northern summer months, and to report that data to the department. This would better inform future regulation.

Recognising the benefits of allometric space allowances, the department would remove the requirement for a HSRA, reducing the regulatory burden for exporters.

The practical implications of option 2 mean:

- the trade would occur for just over 8 months of the year.
- exports would be permitted during May. May is an important month for sheep turn off in Western Australia and allowing trade for May will maintain this channel for producers.

5.3 Option 3: adopt a revised HSRA model with risk settings based on heat stress thresholds or agreed animal welfare indicators

Under option 3 a revised HSRA model would be adopted where risk settings were based on heat stress thresholds (HSTs) or an approach based on agreed animal welfare indicators (refer to Section 5.1). Exporters would continue to comply with the regulatory requirements in the Middle East Order and any further changes that may arise from the [ASEL sea review](#). Using an HSRA model based on HSTs would significantly lower the risk that any sheep exported to the Middle East would experience unsatisfactory welfare from heat stress in any given month.

One approach to recognising that a sheep's welfare is adversely affected well before mortality occurs, is to base the assessment of heat stress risk on a WBT welfare threshold instead of a mortality limit, as currently used. The WBT welfare thresholds in this option are consistent with the HSTs currently embedded (but not used) in the HSRA model, HotStuff V4.0 ([refer to section 2.2](#)).

In practical terms, using a revised HSRA model based on HSTs or an approach based on agreed animal welfare indicators could significantly reduce volumes of sheep permitted to be exported to the Middle East during the Northern Hemisphere summer. The magnitude of impact will differ across different classes of sheep, ship ventilation efficiency and at different times of the year. Based on preliminary analysis a revised HSRA could have these impacts:

- prohibiting or substantially reducing exports from May to September (inclusive)
- reduce annual exported volumes of adult sheep by approximately 40–60% (or more) for October due to greater requirements for pen space
- effectively prohibit lamb exports for the Northern Hemisphere summer period. Recommendation 3 of the HSRA review proposes that the definition of lamb and appropriate associated HSTs in the HSRA model be revised.

[The HSRA Review](#) recommended the revised HSRA model be set at a 2% probability that deck temperatures would exceed a sheep's HST. The department also considered a 5% probability marker, however our initial analysis found that this did not materially affect volumes of sheep able to be exported. The department would be interested in receiving commentary from stakeholders regarding their views on risk settings.

5.4 Option 4: No prohibition

Option 4 would regulate live sheep exports to, or through, the Middle East during the northern hemisphere summer in accordance with requirements implemented under the Middle East Order, and any further changes that may arise from the ASEL sea review. This would include using allometric pen space allowances. There would be no prohibition on trade.

The existing HSRA model would continue to determine stocking densities for voyages, however initial analysis by the department indicates that this may have little impact on allometric pen space allowances.

Option 4 would have the least impact on industry, however, the science and evidence (including historical voyage outcomes) indicates that with this option there is a significant risk of a heat stress incident. The department seeks feedback from industry on how it would manage this risk.

Appendix A: Export roadmap

Figure 5 Australian livestock export roadmap



Source: LiveCorp; Meat & Livestock Association

Glossary

Term	Definition
Allometric	The relationship of body size to shape, anatomy, physiology and behaviour
Heat load	Exposure of livestock to hot environmental conditions likely to require physiological changes to allow them to maintain homeostatic body temperature
Heat stress	Excessive heat load
HotStuff V4.0	Software program for the assessment of heat stress risk for live export voyages
McCarthy review	Independent review into conditions for sheep being transported to the Middle East during the Northern Hemisphere summer published May 2018
Mortality limit	The wet bulb temperature at which the animal will die
Northern Hemisphere summer	Refers to the months of May to October
Northern Hemisphere winter	Refers to the months of November to April
Stocking density	Number of stock per unit area in a high-density housing situation
Summer months	Referring to Northern Hemisphere: May to October
The department	The Australian Government Department of Agriculture
The HSRA model	Heat stress risk assessment model (HotStuff V4.0)
The panel	Heat Stress Risk Assessment Review Technical Reference Panel
WBT welfare threshold	Using animal characteristics such as sheep class, weight, acclimatisation, body condition and fibre length, a temperature threshold is set to minimise the risks to the welfare of sheep (HSRA review technical reference panel, 2019).
Winter months	Referring to Northern Hemisphere: November to April

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