AUSTRALIAN LOT FEEDERS' ASSOCIATION

GUIDE: MANAGING SUMMER HEAT IN AUSTRALIAN FEEDLOTS

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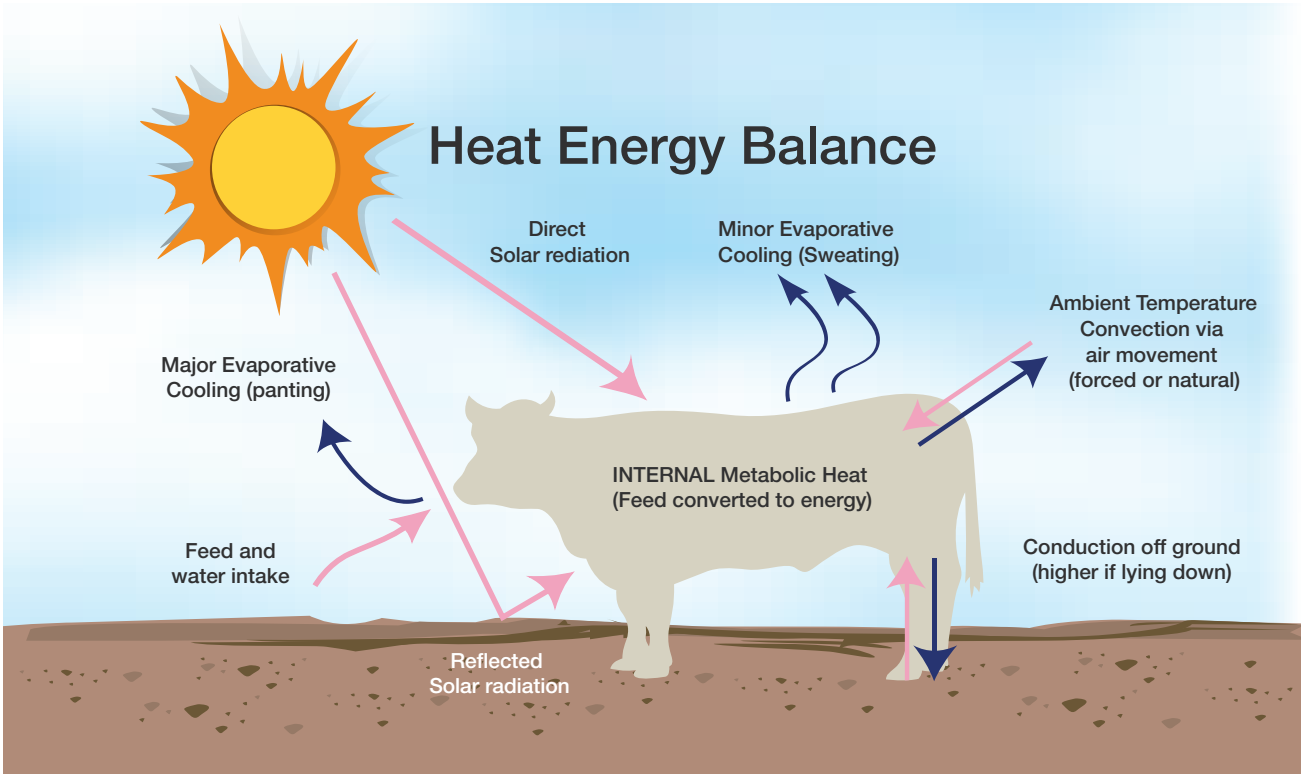
WHAT IS HEAT LOAD?

To remain healthy, an animal must maintain its body temperature within an optimal range. This means balancing the metabolic heat produced and the heat lost to the surrounding environment. Cattle actively manage their 'heat load'.

If the amount of metabolic heat produced internally by the animal and the heat gained from the external environment exceeds the heat lost by the animal to the surrounding environment, the animal starts to store heat, that is, they accumulate a *heat load*.



Although metabolic heat production is the major contributor to body heat load, cattle also take in additional heat from direct solar (sun) radiation, reflected solar radiation from the feedlot pad and other physical structures in the pen, and from the air itself, if air temperature is higher than the animal's body temperature.

In the event of a heatload incident, under NFAS requirements you must notify ALFA within 12 hours. Notification must include telephone contact on 02 9290 3700 and then follow up in writing.

UNDERSTANDING HEAT LOAD

Heat gain into the system	Heat loss out of the system
Metabolic – produced during digestion and metabolism of food; is the major contributor of heat into the system.	**Evaporation** of moisture through the respiratory system by panting or through the limited ability to sweat.
The air – if ambient temperature is greater than skin temperature, heat will transfer from the air to the animal.	**Convection** – air movement, either passive or forced, takes hot air away from the body surface.
Radiation – through direct sun and reflective surfaces.	**Night cooling** – occurs from exposure to a clear night sky and is an important heat sink for animals.
Conduction – through contact with hot surfaces, only very minor unless cattle are lying down.	**Conduction** – through contact with cool surfaces, only very minor unless cattle are lying down.

If heat gain into the system is greater than heat loss out of the system, then heat will be stored by the animal. **This is called heat load.**

Evaporation is the major mechanism cattle use to dissipate heat. If humidity levels are high, the effectiveness of evaporative cooling is reduced. Therefore, cattle are more likely to gain heat if the conditions are humid.

WHAT HAPPENS TO AN ANIMAL WITH HEAT LOAD?

With severe or prolonged elevations in **body temperature** above acceptable levels, body tissues and organs can be damaged, and the animal may die. Along with the increased risk of **cattle deaths**, the **economic losses** associated with **reduced feed intake** and subsequent lowered production can be substantial.

The animal's **appearance** and **behaviour** can be used to assess the impact of heat load on feedlot cattle.

Respiration rate and **panting score** are especially useful indicators of heat load in cattle. They are generally the first visual indicators seen with increasing heat load, and panting score can be quickly assessed by feedlot staff.

Panting scores range from 0 (normal) to 4.5 (animal severely stressed) and are described in the table below.

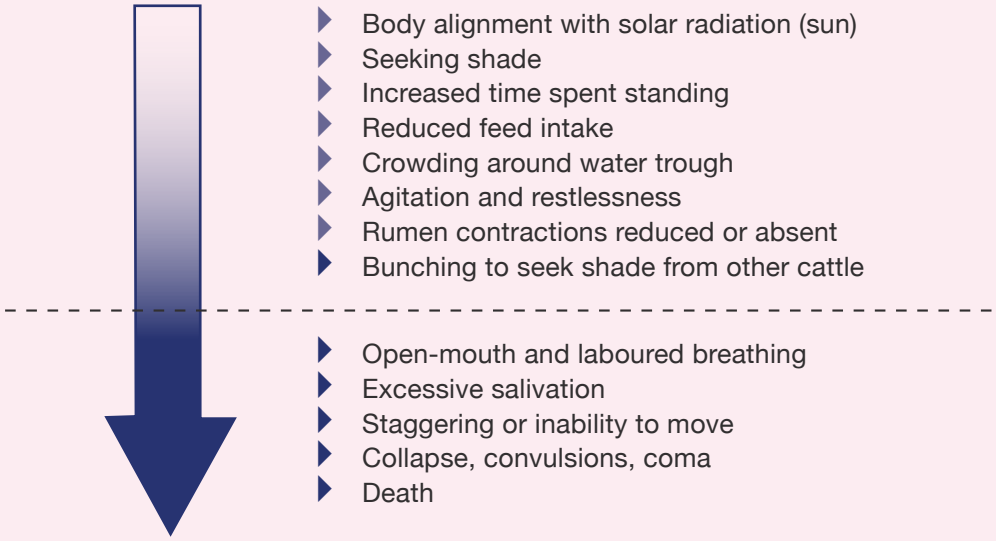
Panting Score	Animal Description	Respiration Rates (breathes/min)
0	**No panting – normal:** Difficult to see chest movement	<40
1	**Slight panting, mouth closed, no drool or foam:** Easy to see chest movement	40-70
2	**Fast panting, drool, or foam present:** No open mouth panting	70-120
2.5	**As for 2 but with occasional open mouth:** Tongue not extended	70-120
3	**Open mouth + some drooling:** Neck extended and head usually up	120-160
3.5	**As for 3 but with tongue out slightly:** Occasionally fully extended for short periods + excessive drooling	120-160
4	**Open mouth with tongue fully extended for prolonged** periods + excessive drooling, neck extended and head up	>160
4.5	**As for 4 but head held down:** Cattle 'breathe' from flank, drooling may cease	Variable – Respiration rate may decrease

If more than 10% of cattle are exhibiting panting scores of 2 or above, handling and movement of affected cattle should stop. Cattle with panting score of 3.5 or greater are in danger of death if they do not receive some relief from the hot conditions.

There are several other behavioural signs that can be observed in cattle as they try and manage their heat load. See the list below for the behavioural signs that may be seen in cattle as they are progressively exposed to increasing heat load.

In most cases, cattle will cope up until bunching to seek shade from other cattle, however the onset of open-mouthed and laboured breathing is an indication that the animal's system is failing to cope with the heat load.

OBSERVABLE SIGNS OF INCREASING HEAT LOAD



In some cases, severe or prolonged elevations in body temperature during heat load events can result in permanent productivity losses through tissue and organ damage. However, proactive management of heat load in cattle not only leads to improved animal welfare outcomes but also improved feedlot productivity and profitability.

HEAT LOAD ACTION PLAN: PROACTIVE NOT REACTIVE

If you have not done so already, now is a good time to ensure that your feedlot is prepared for an excessive heat load event.

It is important that management of heat load be proactive rather than reactive. A pre-season review of each feedlot's risk profile, infrastructure and resources together with the development of heat load monitoring strategies and action plans will assist you in minimising heat load before an event occurs, rather than simply responding to an event, if and when it does occur.

There are four key components to an effective Heat Load Action Plan to consider:

1. **Pre-summer review and preparation**
2. **Managing and monitoring heat through the summer period**
3. **Responding to a specific Excessive Heat Load Event**
4. **Deactivation and review**

Pre-summer review and preparation

- ☑ **Subscribe to commercially available Heat Load Forecasting Service.** Confirm and update contact details and e-mail addresses. Remove any users from your account who may no longer be associated with your feedlot.

- ☑ **Conduct a risk assessment using the Risk Assessment Program (RAP)** for the various classes of cattle in the feedlot. The RAP can be found on the commercially available Heat Load Forecasting Service websites (subscription required). The RAP is a tool to help feedlot operators assess their potential risk of a heat event at their site based on historical climatic conditions, cattle characteristics and feedlot management practices.

- ☑ When conducting the RAP, **make a record of the Heat Load Index (HLI) threshold and Accumulated Heat Load Unit (AHLU) risk level** for each class of cattle in the feedlot.

- ☑ **Check your alert settings** on your subscribed Heat Load Forecasting Service and reset if required, based on the AHLU risk level calculated using the RAP. Alerts help warn of impending heat events, assuming they have been set correctly.

- ☑ **Register** your veterinarian and nutritionist to your subscribed Heat Load Forecasting Service for alerts.

- ☑ **Service and maintain equipment and infrastructure** including weather stations, backup generators, watering systems and sprinklers.

- ☑ **Check your weather station** is uploading data correctly to your subscribed Heat Load Forecasting Service.

- ☑ **Ensure contingency plans are in place** for power, water and communications including internet access.

- ☑ **Ensure your Heat Load Action Plan is up to date** with practical actions listed against specified triggers. Discuss suitable triggers and actions for your site with your consultant veterinarian and nutritionist.

- ☑ **Ensure emergency contact details are up to date** and available to staff.

- ☑ **Undertake staff training on responsibilities** under your Heat Load Action Plan:
  - Knowledge of the threshold of activation for the Heat Load Action Plan;
  - Requirements for daily monitoring of livestock, weather conditions, pen conditions, water, and feed;
  - Actions to be implemented when triggers are exceeded; and
  - Records to be maintained of daily activities and actions taken when required.

- ☑ **Consider undertaking a heat load event simulation** to prepare your staff.

- ☑ **Ensure pen conditions are optimal** and pen cleaning schedules are set.

- ☑ **Ensure additional water troughs** are available onsite.

- ☑ **Consult with your nutritionist regarding summer feeding strategy** and formulate a heat load ration for use when needed.

- ☑ **Confirm location of mass burial site** or procedures for composting mass deaths.

- ☑ **Investigate the installation of shade** in any unshaded feedlot pens in accordance with ALFA's Shade Initiative.

MANAGING AND MONITORING HEAT THROUGH THE SUMMER PERIOD

☑ Regularly check your subscribed Heat Load Forecasting Service for 7-day weather and Accumulated Heat Load Unit (AHLU) forecasts for your feedlot site.

☑ Commence daily monitoring of your selected monitoring points including potential heat load impact on cattle using a risk based approach and ensuring those groups of cattle most vulnerable to heat load events are targeted including heavily finished cattle, newly received cattle and sick cattle.

COMMERCIALLY AVAILABLE HEAT LOAD FORECASTING SERVICES

Heat Load Forecasting Services are valuable programs that help in the management of summer heat in Australian feedlots. They provide the resources to allow Australian feedlot managers to develop a heat management plan and proactively manage the risk of a heat load event at their feedlot site.

As of October 2024, there are two commercially available Heat Load Forecasting Services:

- **Kite Feedlot (by Katestone) https://kitefeedlot.com.au/**
- **Misteo https://misteo.co/**

These services are available via subscription and provide feedlot site specific weather forecasts, as well as tools to monitor Heat Load Index (HLI) and Accumulated Heat Load Units (AHLU).

Some automated weather stations also have the ability to monitor HLI and AHLU in real time, however they are not able to provide weather forecasts.

Manage heat at your site with Heat Load Forecasting Services:

1. Undertake pre-summer preparation
   a. identifying your high-risk animals
   b. calculating your overall site risk of a heat event
   c. accessing tools for training your team to identify the early signs of heat stress in animals
2. Have access to a detailed 7-day forecast of heat events specific to your location, not just the closest major town
3. View your weather station observations and calculated heat load at anytime
4. Receive alerts of impending poor conditions via SMS or e-mail alerts
5. Keep everyone informed. You can register multiple staff to your site as well as your veterinarian and nutritionist

For managing your heat risk, having a weather station on site is highly recommended.

ALFA SHADE RESOURCE HUB

The ALFA Shade Resource Hub provides lot feeders with useful information and tools to understand the benefits of shade and how to implement the right shade at your feedlot. ALFA encourages all feedlots to consider the benefits that shade brings to the cattle they care for, their enterprise and collectively as an Industry.

Access the Shade Hub at www.feedlots.com.au/shade

RESPONDING TO A SPECIFIC HEAT LOAD EVENT

- Once a heat load event is confirmed either via forecasts or the identification of event triggers you should respond to the event by implementing the actions in your feedlot's Heat Load Action Plan. The table below gives example triggers and actions. Site specific triggers and actions should be determined with your veterinarian and nutritionist as part of your Heatload Action Plan.

- Focus on monitoring and responding to cattle behaviour such as bunching activity, breathing condition and panting score.

- Ensure that all staff are aware of triggers and associated actions and have a methodology for recording these.

Trigger	Possible Action/s
Weather forecast predicts rainfall followed by several days of high temperatures, high humidity, and low wind speed.	Inform feedlot manager of weather forecast; instigate Heat Load Action Plan.
Forecast maximum AHLU to exceed 50 units in 2-3 days time.	Instigate Heat Load Action Plan; notify veterinarian; discuss implementing heat load ration with nutritionist; introduce extra water troughs into pens; clean high risk or wet pens/ pen areas; complete livestock handling and pen riding earlier in the day.
• Forecast maximum AHLU to exceed 50 units today; and/or • Forecast maximum AHLU to exceed 50 units tomorrow; and/or • Less than 6 hours with AHLU at zero overnight; and/or • Finisher ration intake falls >10% from previous day actual intake to todays feed call; and/or • More than 10% of finisher phase cattle exhibiting panting score >2 in the early morning	Monitor cattle panting scores and behaviour every 2-3 hours between 6am-8pm; notify veterinarian and nutritionist; continue Heat Load ration and hold any ration transitions; limit or cease cattle movements; and be aware of, and consider heat load of destination for exit cattle; avoid moving cattle from shaded to unshaded pens; continue use of additional water troughs in pens.
Cattle begin to die.	**Notify ALFA of the incident within 12 hours. Notification must include telephone contact on 02 9290 3700 and then follow up in writing.**

MANAGING STAFF DURING A HEAT LOAD EVENT

While managing the welfare of the cattle during a heat load event is of upmost importance, we must also remember to look after the health, safety, and well-being of our staff. People working outside are particularly vulnerable during heat load events.

Ensure staff:

- Plan their day to keep activity to a minimum during the hottest part of the day (11am–3pm).
- If they do go out, wear lightweight, light-coloured, loose, porous clothes, a wide-brimmed hat and sunscreen.
- Regularly rest in the shade and drink plenty of water, 2 to 3 litres of water a day at regular intervals, even if they do not feel thirsty.
- Limit intake of alcohol, soft drinks, tea or coffee.
- Eat as you normally would but try to eat cold foods, particularly salads and fruit.
- Use fans and/or air-conditioners while indoors to keep cool.

Altering rosters during heat load events to ensure sufficient staff are available of a night or early morning to undertake necessary activities and avoid the heat of the day is often the best option.

LIVESTOCK INCIDENT REPORTING

The Incident Reporting requirements of the NFAS are a core component of the Standards, in relation to Animal Welfare and Environment. It is essential that all Accredited Feedlots ensure that the reporting requirements as prescribed in the NFAS Standards (Element LM8 and EM6) are known and understood by Management and feedlot staff.

NFAS requires feedlots to undertake certain actions pertaining to morbidities and mortalities within any 24-hour period; any consecutive 3-day period; or any consecutive 14-day period, as represented in the following tables.

Table 1 - Morbidity and Mortality Triggers over a 24-hour period

	LEVEL 1		LEVEL 2	LEVEL 3
Cattle on Feed (*head*)	**Morbidity (*pulls*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**
50 to 150	10	3	6	15
151 to 500	10	3	7	16
501 to 1,000	15	3	8	17
1,001 to 3,000	25	3	11	20
3,001 to 5,000	40	4	12	21
5,001 to 7,500	55	6	30	60
7,501 to 10,000	70	7	30	60
10,001 to 20,000	140	9	50	100
20,001 to 40,000	280	11	50	100
40,001 to 60,000	350	15	50	100
60,001 and above	400	20	60	100

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TABLE 2 - Morbidity and Mortality Triggers within any consecutive 3 day period

	LEVEL 1		LEVEL 2	LEVEL 3
Cattle on Feed (*head*)	**Morbidity (*pulls*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**
50 to 150	42	6	12	31
151 to 500	42	6	14	33
501 to 1,000	42	6	16	35
1,001 to 3,000	63	6	23	42
3,001 to 5,000	84	8	25	44
5,001 to 7,500	115	12	63	126
7,501 to 10,000	147	14	63	126
10,001 to 20,000	294	18	140	230
20,001 to 40,000	588	23	160	250
40,001 to 60,000	735	31	160	250
60,001 and above	750	40	160	250

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TABLE 3 - Morbidity and Mortality Triggers within any consecutive 14 day period

	LEVEL 1		LEVEL 2	LEVEL 3
Cattle on Feed (*head*)	**Morbidity (*pulls*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**	**Mortality (*deaths*)**
50 to 150	84	12	25	63
151 to 500	84	12	29	67
501 to 1,000	84	12	33	71
1,001 to 3,000	126	12	46	84
3,001 to 5,000	168	16	50	88
5,001 to 7,500	231	25	126	252
7,501 to 10,000	294	29	126	252
10,001 to 20,000	1150	37	210	400
20,001 to 40,000	1500	46	210	420
40,001 to 60,000	2100	63	210	420
60,001 and above	2500	70	210	420

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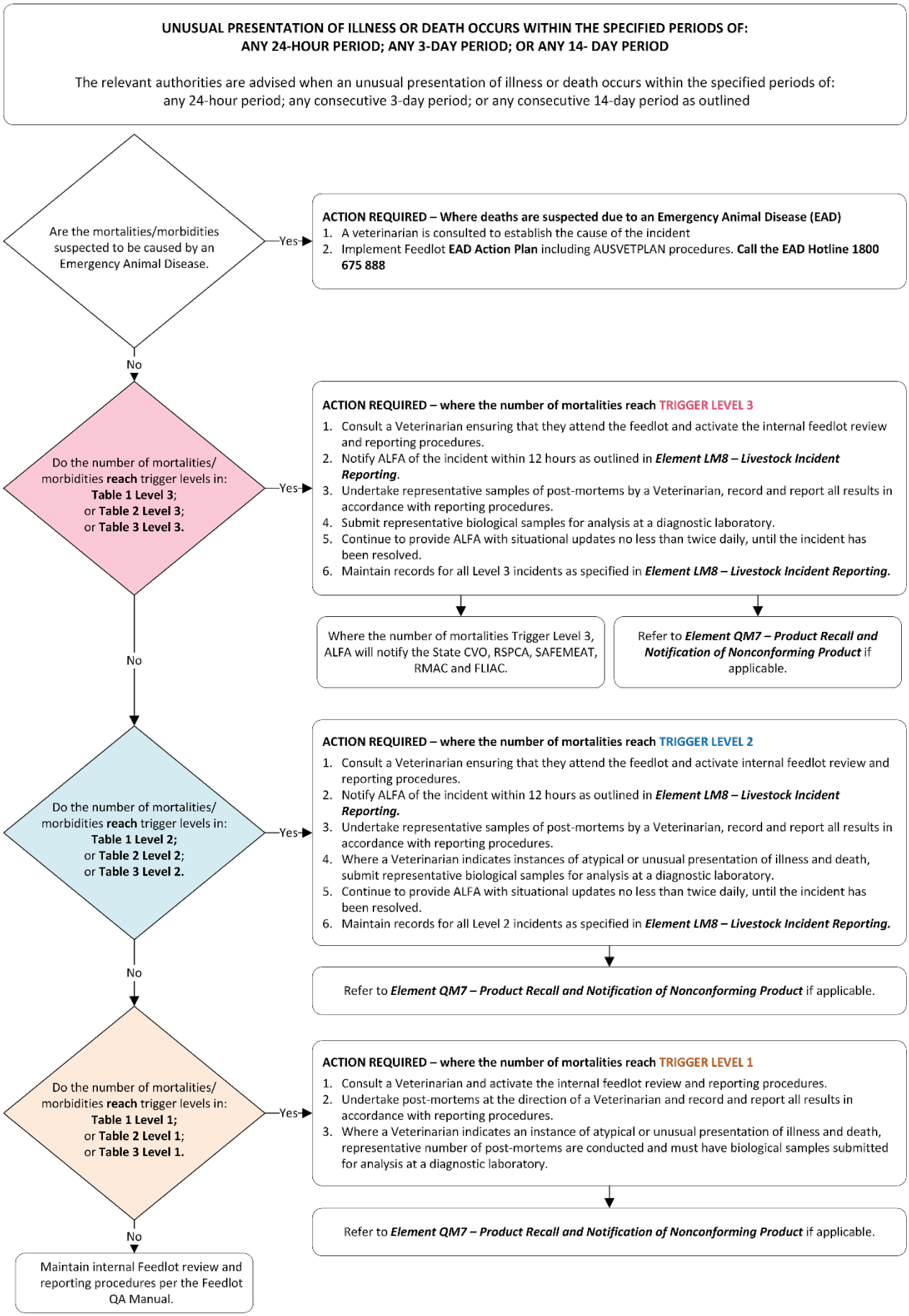
Appendix 7 of NFAS standards provides a useful decision diagram to support lot feeders' in understanding their reporting requirements in relation to livestock incidents pertaining to morbidity and mortality.

APPENDIX 7 INCIDENT REPORTING DECISION DIAGRAM



LESSONS LEARNT

In reviews of excessive heat load incidents in recent years there have been several recurring recommendations from the Incident Response Group Review Panel. These include.

- ☑ Provide shade - consider the provision of appropriate shade for all cattle. Shade lowers respiration rate, panting score and stress hormones in feedlot cattle; shade alleviates dehydration of cattle and assist in alleviating mortality, fear, and distress during heat load conditions, with both Bos taurus and Bos indicus cattle positively responding to shade.

- ☑ Update and communicate contingency plans - it is important that emergency contingency plans and the agreed chain of command are communicated and understood by everybody before a heat load event. This includes outlining contingency arrangements if key management staff are not able to be present at the feedlot and if power/ phones are inoperable. Contact your consultant veterinarian and nutritionist prior to the anticipated onset of a heat load event so everyone is aware of the situation. The contact details of alternative consultants if required at short notice should also be sourced.

- ☑ Maintain pen conditions - wet pens or ones with high manure loads increase reflected solar radiation (as they have a darker surface) whilst raising humidity levels within the pen. Manure also increases ammonia levels which are also thought to negatively affect the ability of cattle to cool down. Implement a more regular pen maintenance schedule to optimise pen conditions during high risk periods.

- ☑ Provide extra water troughs - the increased stocking density created by cattle crowding water troughs can exacerbate excessive heat load conditions. Cattle suffering from excessive heat load are also likely to want to drink more in an attempt to cool themselves down. Consider the installation of additional water troughs in each pen to help cool and disperse cattle during excessive heat load events.

- ☑ Implement your heat management feeding strategy - your heat management feeding strategy should be implemented prior to an event to reduce the impact of adverse conditions. This is likely to include a heat load ration, so ensure that there are sufficient commodities on hand so the heat load ration can be introduced preferably 24 – 48 hours before the anticipated onset of a heat load event and be in place for a period up to 48 hours after the event.

- ☑ Reduce pen stocking density - high pen stocking densities, even if they are consistent with legislative and license obligations, can aggravate the heat generated and felt by cattle within pens. Consider reducing pen stocking densities during this high-risk period.

- ☑ Ensure all staff are adequately trained - the heat load risks over the summer period can be exacerbated if staff rostering is already different from normal, including increases in the employment of casual/holiday staff. It is important that all employees, staff members and management have a knowledge of the strategies in place to reduce the impact from heat events and recognise the warning signs, triggers and actions to be taken during a heat load event.

For further information on preparing for and managing an excessive heat load event contact ALFA Technical Services Officer (free service):

Jeff House

0419 262 207

jeff.house@feedots.com.au

Jeff can provide information or advice to feedlot operators on managing summer heat.

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