PROUDLY GROWING VALUE
FROM AUSTRALASIAN KNOW-HOW,
SUNLIGHT, SOIL AND WATER

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ASEL VERSION 3.0 (AND LATER VERSIONS) REVIEW CONSOLIDATED PASTORAL COMPANY

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CPC PROUDLY GROWING VALUE FROM AUSTRALASIAN KNOW-HOW, SUNLIGHT, SOIL AND WATER

Friday, 11 August 2023

Dr [redacted]
Assistant Secretary, Animal Welfare Branch
Traceability, Plant and Live Animal Exports Division
Department of Agriculture, Fisheries and Forestry
Via email: ASELreview@aff.gov.au

Dear Dr [redacted]

Consolidated Pastoral Company [CPC] welcomes the opportunity to participate in this review of ASEL 3.0 (and later versions).

CPC notes that this submission has been prepared based on animal health and performance data from CPC's vertically integrated supply chain in Australia and Indonesia in conjunction with a literature review from Bovine Dynamics.

Please note that this submission and report is in support of the issues I raised in Canberra on 20 April 2023.

Please note that our submission can be made public, however, the Bovine Dynamics report cannot be made public – it is important that CPC maintains the IP to this report and expect that this is only shared with the department.

If you wish to discuss this submission, you can call me directly on [redacted] or you can call [redacted], our Business Development and Performance Manager on [redacted].

Yours sincerely,

Troy Setter

CEO, Consolidated Pastoral Company

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CPC PROUDLY GROWING VALUE FROM AUSTRALASIAN KNOW-HOW, SUNLIGHT, SOIL AND WATER

1. Overview

Consolidated Pastoral Company (CPC) runs 300,000 head of cattle over 3.6 million hectares in Australia and has the majority shareholding in two feedlots in Sumatra Indonesia. Each year CPC Australia exports with Australian licenced exporters approximately 60,000 to 70,000 head of Australian cattle to the CPC owned [redacted] feedlots. [redacted] feedlots are Indonesia's largest importer of Australian cattle and account for 17% of Australian cattle exported to Indonesia in 2022.

The welfare of CPC cattle is a priority across our company, data is collected throughout the supply chain process to ensure the best standards of practice and animal welfare are in place. This includes an extensive dataset collected on cattle health and performance. Evaluation of our exported cattle and the performance of these animals in the feedlot was recently completed. CPC and [redacted] recognise that we are in a unique position to record and provide data from throughout the supply chain that individual producers, exporters, and importers are unable to.

Our analyses revealed there was a reduction in performance and health in several categories of cattle, especially within the male cattle that we have focused our submission on after the change in Regulation Farmwork, Australian Standard for the Export of Livestock (ASEL), that occurred in November 2020. It was apparent from our results that overhandling and commingling of cattle prior to export under the ASEL preparation and penning requirements, had a large negative impact on the health and welfare of significant numbers of cattle.

Our results are consistent with the recent global literature review on the effects that commingling has on animal health and welfare by Australia's largest feedlot and cattle health consultants, Bovine Dynamics (attached). Combining our data-driven results with the wider scientific findings from the Bovine Dynamics we have attributed three key factors to this reduction in CPC and [redacted] cattle health, welfare, and performance:

Overhandling and Commingling

(1) Animals experience increased cortisol levels that leads to immunosuppression, reduced feed intake and inflammation after experiencing multiple stressful events,

Commingling

(2) Social hierarchies have to be reestablished within animal groups resulting in bullying, headbutting and fighting, and
(3) Mixing animals has impacts on herd immunity and increases risk of infectious diseases of previously unexposed animals.

Here we recommend the regulator update its framework on penning requirements to allow entire and castrated males to be penned together, and for weight ranges from ASEL version 2.3 section 4.11 to be reinstated. Specifically, cattle below 500kg to be penned within 75kg of the average and for any cattle heavier than 500kg to be penned within weight ranges of 100kg from the average. Finally, we recommended that the horn length allowance of 12cm be revised to 16cm. These changes to AESL would reduce stress, animal health incidences and increase the performance of the cattle on board vessel and in the feedlot.

2. Key Findings

2.1. Highlights from Literature Review

Bovine Dynamics literature review concluded that cattle are a social species that have hierarchies within groups. Namely, when cattle are commingled (mixed into new groups of cattle from different source mobs) it creates psychological stress by disrupting the social hierarchy of the cattle. Furthermore, mixing animals increases the risk of infectious diseases being passed onto to other cattle that have not had previous exposure. Often to re-establish the social hierarchy in a group of cattle, aggressive behaviour occurs, which can cause displacement from the feed bunk or water trough, bullying, headbutting and fighting. Commingling can also cause an increase in cortisol levels, which over an extended period leads to immunosuppression, reduced feed intake and inflammation. Chronic immunosuppression compromises an animal's ability to defend against pathogens and therefore significantly increases the risk of viruses such as Bovine Respiratory Disease (BRD). BRD is the most prominent health issue faced by live exporters and feedlots and it has been found to be the most common cause of death on long haul live export voyages.

2.2. Highlights from CPC heath and performance data analyses

Five years of cattle data was examined, this included observations 177,721 head of cattle exported from Australia and managed at CPC's [redacted] feedlot. For statistical analyses, data was subset into two groups based on cattle treatment under Australian Standard for the Export of Livestock (ASEL). This included cattle that were handled under ASEL v2.3, and cattle exposed to increased handling and comingling as required by ASEL v3.0 and later, that came into effect in November 2020. Overall, the economic impact on lost performance, animal health incidences and increased mortalities is AUD $8.15 million over the 2.5-year period after ASEL v3.0 and later came into effect.

2.2.1. Increase in Mortality and Emergency Slaughters

During the two-year period after ASEL 3.0 came into effect in November 2020, CPC's [redacted] feedlot also experienced increased emergency slaughters of 8% and increased mortalities of 107%.

2.2.2. Increase in Relative Risk of Illness

Furthermore, the Relative Risk of cattle and buffalo developing an illness under the penning requirements for ASEL V 3.0 and later, found:

- Animal health incidences are 2.3 times more likely to occur,
- Respiratory illness is 3.8 times more likely occur,
- Lameness is 2.1 times more likely occur, and
- Digestive distress and treatments are 2.1 times more likely to occur.

Overall, the increased health incidences, emergency slaughters and mortalities over the period had an economic impact of AUD $2.13 million.

2.2.3. Feedlot Performance with Reduced Weight Gain

Male cattle had reduced capacity to gain weight as found in reduced Average Daily Gains. The data shows a 13% reduction in feedlot performance of 44,470 feeder males on feed in the 2.5-year period after ASEL v3.0 and later came into effect. This has an economic impact of $115 per head or

AUD 5.12 million. Similarly, 8,232 cattle from other male lines (medium bulls, medium steers, heavy bulls combined) had decrease in average daily weight gains of 23% with an economic impact of AUD $138 per head or $1.14 million. The reduced weight gain and increased morbidity and mortality is a direct result of increased stress and has caused the export and feed lotting of live cattle in Indonesia to become economically marginal at best. This has flowed back to the viability Australian exporters and cattle producers.

2.2.4. Vessel Performance

A decrease in performance in cattle on-board vessels from Panjang Port to the [redacted] feedlot was identified across feeder male, heavy steer, and medium bull lines (which in addition to some increases in performance across heavy bull, cow, and heifer lines) has an economic impact of AUD $250,583.

2.3. Regulatory Farmwork impacting Animal Health and Welfare

Commingling of cattle and extra drafting has increased significantly to meet the requirements present in ASEL v3.0 and later. The new regulations after November 2020 were identified as to have the highest impacts on animal health and welfare are:

- **ASEL version 3.2 sections 3.1.16 c (iv)** regarding the extra drafting and commingling of cattle to separate entire and castrated males,
- **ASEL version 3.2 section 3.1.16 c (iii) & section 5.3.1 b)** the extra drafting and commingling of cattle for the penning requirement of weight lines of 50kg from the average, and
- **ASEL version 3.2 section 5.3.1 (d)** horns are no longer than 12cm at the time of export unless otherwise provided in a long-horned livestock management plan.

2.4. Key Recommendations

It is recommended that future ASEL framework priorities for animal health and welfare should facilitate practices that decrease extra drafting and comingling. It is recommended that the penning requirements are reinstated following the practices applied in ASEL 2.3 section 4.11) to allow for more cattle from the same source location to be penned together and to decrease drafting of cattle, adjusting the requirements ASEL 3.2 section 3.1.16 c) (iii) (iv) and section 5.3.1 (b) (d). This would thereby increase animal health, welfare, and performance.

Specifically, this would include the ability to pen entire and castrated males together when under 380 kg and from the same source mob and adjust the penning weight ranges of cattle to be 75kg from the average for cattle under 500 kg and 100kg from the average for cattle over 500kg (that are much stronger and do not struggle to compete). It is worth noting the Indonesian feeder cattle is below 380kg.

It is also recommended that ASEL Version 3.2 section 5.3.1 d) be revised so that any cattle with horn longer than 16cm to have a long-horned livestock management plan. A trial for horn cattle has been recommended to have more data to validate the penning requirements of horned cattle.

3. Current Scientific Understanding

3.1. Literature review on health and welfare risks of commingling cattle

Australia's largest feedlot and cattle health consultants Bovine Dynamics, on behalf of CPC, has completed a detailed literature review on the effects that commingling has on animal health and welfare.

Cattle are a social species with hierarchies within groups and commingling cattle into new groups is recognized as a critical stressor during feedlot receiving[1]. Commingling can be perceived as an acute or chronic stressor on cattle depending upon how much time is required for social structures to reform and stabilize[2].

Mixing of cattle from various sources, or commingling, is a widely accepted stressor of beef cattle, for two main reasons. Firstly, cattle being mixed from multiple sources increases the risk of exposure to infectious agents in naive cattle and secondly, commingling imposes psychological stress by disrupting the social hierarchy of the pen. Therefore, commingling increases the exposure to pathogens at a time when the animal has increased psychological stress. Commingling also often occurs near other stressful events like transport, creating a scenario where cattle are experiencing multiple stressful events[3].

Stricklin et al.[4] found that dominance orders were formed soon after weaning and remained stable even if the group was moved to another pen. However, when cattle are commingled from separate sources, they re-establish social hierarchies through aggressive behaviors[5]. Such behaviours include displacement from the feed bunk or water, bullying, headbutting and fighting. Commingling has also been shown to increase cortisol levels (stress hormone)[6]. Extended periods of elevated cortisol circulation lead to immunosuppression, reduced feed intake and inflammation[7].

Chronic immune suppression opens the door for pathogens, which include respiratory viruses such as Bovine Viral Diarrhea Virus (BVDV) which is known to be the catalyst for BRD. BRD is the most prominent health issue faced by modern feedlots. Economic losses arise from reduced animal performance and morbidity, increased veterinary and administration costs, and mortalities. The main risk factors of BRD include stress and its impact on host immunity, viral and bacterial pathogens, and factors that favour pathogen transmission. BRD is also a risk at pre-export feedlots and during ocean transport[8]. Moore et al[9] found that on 20 long-haul voyages from Australia to other countries the most common cause of death was BRD (59.4%) followed by lameness (12.2%).

1 Cooke, 2017

2 Grant and Albright, 2000

3 Cusack et al., 2003; Duff and Galyean, 2007; Hubbard et al., 2019; Hubbard et al., 2021; Cusack, 2023

4 Stricklin et al 1980

5 Lamb, 1976

6 Mench et al. 1990

7 Carroll and Forsberg, 2007; Chen et al., 2015; Gouvêa et al., 2022

8 Bovine Dynamics, S. Platts (BRuSc Hon), MM. George (BVSc Hon, BS, MS, PhD), B. Berry (BS, MS, PhD), MH. George (BVSc, MS, PhD)

9 Moore et al 2014

Croft et al[10] in an Australian study found that BRD incidence was higher in cattle purchased from saleyards, that had been commingled, compared with cattle purchased out of paddocks (12.4% versus 5.7%, P < 0.001). There are several other Australian studies have examined commingling on the incidence of disease, Hay et al[11] found that cattle that were not commingled prior to feedlot entry and then exposed to a high level of commingling (≥ 4 groups of animals mixed) had a far greater risk of developing BRD (Odds Ratio 3.7), than animals commingled at least four weeks prior to feedlot entry from less than four groups of animals. Hay et al[12] also concluded a nationwide study to estimate the risk factors associated with BRD. The greatest risk factor was shared pen water, followed by breed and commingling.

This is also evident in research by Ribble at al. in a 1995 study[13] of calves entering a feedlot in the United States found a positive linear relationship between the mixing of calves and subsequent BRD risk, suggesting that increasing commingling (to make up a truck load) increased the risk of BRD at the feedlot. In a later study Ribble et al[14], using data from a Canadian feedlot, reported that increased BRD incidence was associated with those feedlot pens filled with cattle from a greater number of source mobs.

In a South African study, Gummow et al[15] concluded that auction sourced cattle, which have a higher instance of commingling at saleyards were 1.6 times more likely to develop respiratory disease than cattle purchased at private sales.

4. Regulatory impact on animal health and performance

Regulator changes that have occurred after ASEL V 2.3 was updated, as of November 2020 (Table 1).

10 Croft et al, 2014

11 Hay et al. 2014

12 Hay et al. 2017

13 Ribble et al 1995

14 Ribble et al 1998

15 Gummow et al 2000

Table 1. Summary of key findings between requirements under ASEL v3.0 and later

New Requirement as per ASEL V 3.0 and later	Impact on Cattle	Impact on performance
ASEL Version 3.2 Section 3.1.16 c) (iii) Page 32.	Cattle must be penned so that each animal does not vary from more than 50kg from the pen average.	Cattle to be penned in very tight weight lines of 50kg from the average is leading to considerable extra drafting (sometimes up to 6 times being drafted). This penning and increased drafting requirement is causing a high level of commingling of cattle from different source mobs, whereby they must re-establish their social hierarchy having an increase in aggressive behaviour and higher stress levels. Increased stress has been found to led to lower feed and water intakes causing higher incidence in detrimental animal health outcomes.
ASEL 3.2 Section 3.1.16 c) (iv) Page 32.	Livestock must be penned to separate entire and castrated males.	Extra drafting of animals to separate castrated and entire males. This penning and increased drafting requirement is causing a high level of commingling of cattle from different source mobs, whereby they must re-establish their social hierarchy having an increase in aggressive behaviour and higher stress levels. Increased stress has been found to led to lower feed and water intakes causing higher incidence in detrimental animal health outcomes.
ASEL Version 3.2 Section 5.3.1 (d)	Horns are no longer than 12cm at the time of export unless otherwise provided in a long-horned livestock management plan.	Extra drafting of animals to separate castrated and entire males. This penning and increased drafting requirement is causing a high level of commingling of cattle from different source mobs, whereby they must re-establish their social hierarchy having an increase in aggressive behaviour and higher stress levels. Increased stress has been found to led to lower feed and water intakes causing higher incidence in detrimental animal health outcomes. It also leaves small groups of cattle penned together, separating them from the larger mob.

4.1. Separation of castrated and entire males

In comment to ASEL v3.2 section 3.1.16 c) (iv) the separation of castrated and entire male cattle. When cattle are being prepared for export in a Registered Establishment (RE) it has been stated by Regional Veterinarian Officers (RVO's) that males that have descended testicles are a mature male and therefore must be penned separate to castrated males. In most circumstances castrated and

entire males have been socialised in the same source mob from their property of origin and have not had any issues with buller activity prior to arrival in the RE.

Furthermore, testicles of male cattle under the weight of 380kg are very difficult to determine in a race when drafting in the RE. This results in livestock handlers having to manually palpate testicles which is a workplace health and safety risk.

Dominant behaviour of uncastrated males has been observed by industry livestock handlers and does not significantly differ from castrated males in animals under 380kg when the animals have an established social hierarchy and are from the same source mob.

As defined in the literature review in section 3.0 of this submission, when animals are separated from their source mob and commingled, they become more stressed and must re-establish a new social hierarchy. If cattle are commingled before another stressful event, in this circumstance, prior to shipping and entry into a feedlot, the immune function suffers, and cattle will have decreased feed and water intake and be more susceptible to illness.

A simplified example of entire and castrated male feeder cattle from three different station of origins coming into a RE (Table 2). This demonstrates how cattle could be penned based on their station of origin if they did not need to be separated into castrated and entire males (and how cattle could be penned under ASEL V2.3 S4.11). Table 3 presents an example of the changes in the lines of cattle and commingling of cattle from different source mobs after drafting of these animals for the penning requirements for ASEL V3.2 section 3.1.16 c) (iv) (Table 3).

Table 2. Example of feeder male coming into RE

CATTLE IN LINES ARRIVING AT REGISTERED ESTALISHMENT		
LINE 1	FEEDER STEERS/FEEDER BULLS	STATION OF ORIGIN 1
LINE 2	FEEDER STEERS/FEEDER BULLS	STATION OF ORIGIN 2
LINE 3	FEEDER STEERS/FEEDER BULLS	STATION OF ORIGIN 3

Table 3. Feeder males after commingling and re-handling under ASEL 3.2

CATTLE IN LINES AFTER DRAFTING FOR PENNING REQUIREMENTS		
LINE 1	FEEDER STEERS	STATION OF ORIGIN 1, 2, 3,
LINE 2	FEEDER BULLS	STATION OF ORIGIN 1, 2, 3,

4.2. Penning into weight ranges

Under ASEL V3.2 cattle are required to be penned 50kg from the group average, which has led to considerable extra drafting (up to 6 times being drafted) and comingling of cattle from different source mobs. Often heavier cattle that are presented for export have been handled less prior to delivery to the RE than feeder cattle and therefore are more easily stressed. They are also often purchased in smaller lines than feeder cattle. These are the type of cattle that should have less handling and more time to adapt to bunk feeding and settling prior to loading onto the vessel.

As outlined in literature review in section 3.0 of this submission, commingling of animals increases the risk of cattle developing illnesses such as BRD and increases the risk of injury or other animal health instances and can lead to decreased feed and water intakes due to aggressive behaviour as cattle re-develop their social hierarchy.

In addition to commingling, under ASEL 3.2 section 3.1.16 c) (iii) and section 5.3.1 b) very small penning groups of cattle are formed due to the tight weight restriction of 50kg from the average. Small cattle groups separated from the main mob is counterproductive to animal health and welfare as cattle are herd animals that do not like to feel exposed and separated from a larger group.

An example of cattle coming into an RE in their source mobs (Table 4). Example of cattle mobs commingled after applying the ASEL V3.2 penning requirements for cattle to be penned in weight ranges of 50kg from the average (Table 5).

Table 4. Example of cattle lines coming into RE

CATTLE IN LINES ARRIVING AT REGISTERED ESTALISHMENT		
LINE 1	BULLS 400-550 KG	STATION OF ORIGIN 1
LINE 2	BULLS 500 - 700 KG	STATION OF ORIGIN 2
LINE 3	BULLS 500 - 700 KG	STATION OF ORIGIN 3
LINE 4	BULLS 600-800 KG	STATION OF ORIGIN 4
LINE 5	HEAVY BULLS/STEERS 400-600KG	STATION OF ORIGIN 5
LINE 6	HEAVY BULLS/STEERS 400-600KG	STATION OF ORIGIN 6

Table 5. Cattle after commingling and re-handling ASEL 3.2

CATTLE IN LINES AFTER DRAFTING FOR PENNING REQUIREMENTS		
LINE 1	MEDIUM BULLS 400-500 KG	STATION ORIGIN 1,2,3,5,6
LINE 2	HEAVY BULLS 500-600 KG	STATION ORIGIN 1,2,3,4,5,6
LINE 3	HEAVY BULLS 600-700 KG	STATION ORIGIN 2,3,4,5,6
LINE 4	HEAVY BULLS 700-800 KG	STATION ORIGIN 2,3,4
LINE 5	MEDIUM STEERS 400-500KG	STATION ORIGIN 5,6
LINE 6	MEDIUM STEERS 500-600KG	STATION ORIGIN 5,6
LINE 7	MEDIUM BULLS 400-500 KG - HORN	STATION ORIGIN 1,2,3,5,6
LINE 8	HEAVY BULLS 500-600 KG - HORN	STATION ORIGIN 1,2,3,4,5,6
LINE 9	HEAVY BULLS 600-700 KG - HORN	STATION ORIGIN 2,3,4,5,6
LINE 10	HEAVY BULLS 700-800 KG - HORN	STATION ORIGIN 2,3,4
LINE 11	MEDIUM STEERS 400-500KG - HORN	STATION ORIGIN 5,6
LINE 12	MEDIUM STEERS 500-600KG - HORN	STATION ORIGIN 5,6

4.3. Horn length requirements

Over the past five years CPC feedlots have had an intake of approximately 300,000 head of cattle, and horned and non-horned cattle are often penned together on arrival in Indonesia due to limited pen space in the quarantine area of the feedlot. There have been 0 health reports on injury caused from horned cattle and aggressive activity.

The horn requirements in ASEL 3.2 section 5.3.1 (d) in conjunction with the penning weight requirements of ASEL 3.2 section 3.1.16 c) (iii) and 5.3.1 (b) have resulted in very small lines of horn cattle in the RE. Cattle are herd animals that do not like to be segregated into small groups from the main mob, and drafting into smaller lines is counterproductive to animal health and welfare. It has contributed to an increase in commingling, which as outlined in section 3.0 of this submission causes a higher incidence in animal health issues and decreased performance. Additionally, these horned cattle are often less handled and therefore more easily to take fright, if too much extra space is given.

Due to the mentioned above small lives, horned cattle lines often take up much more pen space in REs and room on cattle trucks from RE to the vessel, which has a very large economic impact to both RE's and the exporter of approximately 50-70% higher costs than non-horned animals. Under ASEL v3.2 section 5.3.1 d) horned animals with horns longer than 12cm may be shipping under a long-horned livestock management plan, whereby these animals are usually given 30% extra space on board vessels. The extra cost to ship a horned animal is approximately AUD $100-$150 more per head than a non-horned animal, which in conjunction to the extra RE and trucking costs makes the viability of shipping these animals very low.

5. Economic impact of health and performance losses attributed to penning

5.1. Impact on Performance

Dataset consisted of 93,826 head of male cattle across feeder male, medium steer, medium bull and heavy bull lines. Data was subset based on handling practices under ASEL v2.3 (May 2018 to November 2020) (n=41,124 head) to handling requirements under ASEL v3.0 and later (November 2020 to April 2022) (n= 52,702 head). The handling practice assumed to be captured by this divide in the dataset, is attributed to the penning requirements for cattle under ASEL v3.2 Section 3.1.16 c) (iii), (iv) and section 5.3.1 b) and d).

Over each situation, the Regulatory Farmwork was identified to have a significant effect on the median value for 'Average Daily Gain' on typical male cattle at the feedlot from 30 to 160 d, using the Kruskal-Wallis rank sum test (Table 6).

Table 6. Average Daily Gain in cattle exposed to two different handling practices as determined by Regulation ASEL v2.3 and v3.0 and later, that were sold within 30 d to 160 d of arrival at the feedlot.

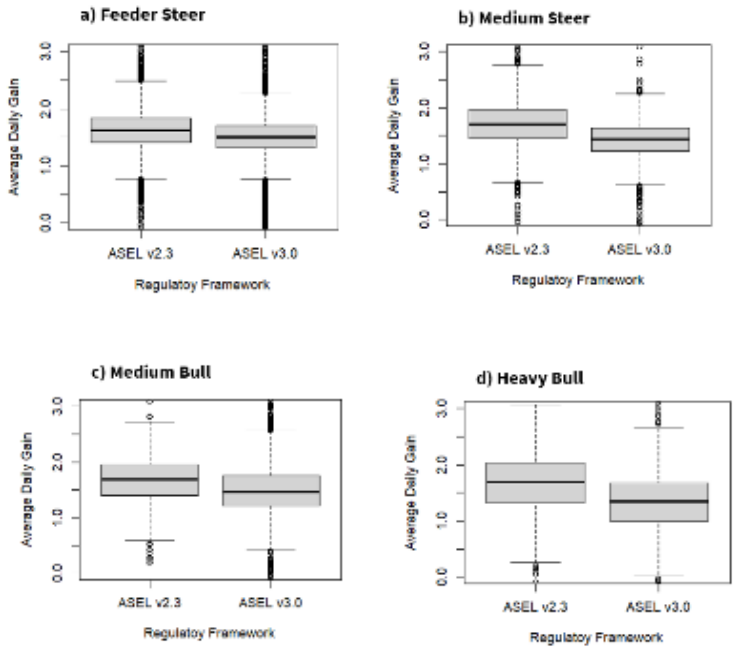
Type	Regulation	N	Average Daily Gain (Median)	SD	χ^2	P value
Feeder Males	ASEL v2.3	32647	1.71	± 0.45		
	ASEL v 3.0	44470	**1.51**	± 0.33	5183.5	***
Medium Steer	ASEL v2.3	5935	1.75	± 0.48		
	ASEL v 3.0	2752	**1.45**	± 0.40	928.28	***
Medium Bulls	ASEL v2.3	1604	1.77	± 0.59		
	ASEL v 3.0	4215	**1.44**	± 0.55	524.88	***
Heavy Bull	ASEL v2.3	938	1.70	± 0.70		
	ASEL v 3.0	1265	**1.30**	± 0.80	195.9	***

*** *P < 0.001* Kruskal-Wallis rank sum

Feeder Male ADG 1.51±0.33 kg d-1 under ASEL v3.0 and later was significantly lower than under v2.3, 1.71±0.45 kg d-1 (χ2 5,183, df =1, *P<0.001*). Applying 'Average Daily Gain' values to cattle under Regulatory Farmwork, ASEL v3.0 and later, it was calculated that the loss of performance on Feeders Males has an economic impact of $115.20 per head or $5.12 million AUD over the 44,470 head on feed during the period.

A decrease of 23% in performance across all other male lines (medium steer, medium bull and heavy bull) was also identified (Table 6) and had an economic impact of approximately $138.45 per head AUD, equating to $1.14 million AUD.

Figure 1. Average Daily Gain ASEL v2.3 and ASEL v3.0 and later



5.2. Impact on Health

The Relative Risk of cattle and buffalo developing an illness under the penning requirements for ASEL v3.0 and later was evaluated comparing data from 177,721 head of cattle and buffalo. Data was subset based on handling practices under ASEL v2.3 (May 2018 to November 2020) (n=72,071 head) to handling requirements under ASEL v3.0 and later (November 2020 to April 2022) (n= 105,650 head).

The Relative Risk is the ratio of the probability of the illness occurring after exposure (extra drafting and comingling under ASEL v3.0 and later versus the probability of the illness occurring without the exposure (under ASEL v2.3).

In all cases, the Relative Risk of developing a health incidence across lameness, digestive problems, and respiratory illness increased by 2 to 3 times for cattle managed under ASEL v3.0 and later (Table 7). This was supported by the significant associate between the each of the variables for Health and Regulations (v2.3 verses v3.0 and later) (Pearson's Chi-squared test $P < 0.001$) (Table 7).

Table 7. Relative risk of health implications measured in cattle managed under two different Regulations (observations ASEL V2.3 N = 72,071 and ASEL V3.0 and later N = 105,650).

Relative Risk of Health Implications	Times more likely to occur in cattle managed under Regulations v3.0	Significant associate between binary variables for Health (0, 1) and Regulation (ASEL v2.3 vs ASEL v3.0 and later)
Illness (any illness)	2.3 x	Pearson's Chi-squared test χ^2 776, df =1, P < 0.001
Lameness	2.1 x	Pearson's Chi-squared test χ^2 1012, df =1, P < 0.001
Digestive Problems	2.1 x	Pearson's Chi-squared test χ^2 642, df =1, P < 0.001
F-R-P	3.8 x	Pearson's Chi-squared test χ^2 2708, df =1, P < 0.001

^Relative Risk or risk ratio (the probability of an event occurring in an exposed group divided by the probability in a non-exposed group), is a different measure to the Odds ratio.

Across the 105,650 head of cattle on feed during the period after ASEL v3.0 and later, came into effect, there has been increased emergency slaughter rates of 8% and increased mortality rates of 107%. Overall, from the increased animal health incidences outlined in table 7, increased emergency slaughter rates and increased mortality rates there was an economic impact of approximately AUD 2.13 million of productivity loss and animal health costs.

5.3. Performance on Vessel Impacted

The average vessel performance, from Australia to [redacted], was lower across feeder male, heavy steer, and medium bull lines since the introduction of ASEL v3.0 and later (Table 8, n=198,239 head). This performance loss, in addition to the increased performance seen across heavy bull, cow, buffalo and heifer lines, equates to an economic impact of $250,583 AUD.

Table 8. Average Performance CPC cattle on Vessel

CPC VESSEL PERFORMANCE LAMPUNG FEEDLOT*						
ASEL VERSION	ASEL 2.3 (01/11/2018 - 01/11/2020)			ASEL 3.0 (01/11/2020 - 01/11/2022)		
CATTLE TYPE	HEAD	GAIN (LOSS) %	GAIN (LOSS) KG	HEAD	GAIN (LOSS) %	GAIN (LOSS) KG
FEEEDER MALES	50,308	0.89%	2.82	45,816	0.48%	1.57
HEAVY STEER	5,825	(0.56%)	(2.22)	3,005	(3.48%)	(14.22)
MICKEYS/2NDS	2,061	0.81%	2.90	4,100	(1.08%)	(4.44)
HEAVY BULLS	1,448	(1.08%)	(5.76)	2,030	(0.32%)	(1.89)
HEIFER FEEDER	13,963	(1.81%)	(5.71)	23,080	(1.75%)	(5.49)
COWS	11,252	(2.56%)	(10.15)	16,290	(2.26%)	(9.05)
BUFFALO	8,721	(3.94%)	(12.46)	10,340	(1.93%)	(6.37)
Grand Total	**93,578**	**(0.56%)**	**(1.88)**	**104,661**	**(0.92%)**	**(3.18)**

**** Calculated from Australia Port to [redacted] Weigh Bridge (approximately 1.5% shrink from Indonesian Port to [redacted] Weigh Bridge).***

6. Stockman's report on penning requirements of cattle

Observations from three experienced on-board stockman have been included to give feedback on how ASEL penning regulations affect cattle on board.

ASEL weight groups

Once heavy cattle are over 500kg they are strong enough to be able to cope with competition from other cattle that are heavier. It is more detrimental to the health and welfare of these animals on board to have had multiple handlings and mixing of cattle from different source locations in the registered establishment.

Horned Cattle On-Board

An injury from horned cattle has not been observed on-board, and just like trucking in Australia you want cattle to have enough space to be comfortable, but you don't want to give them too much space to be able scare and run and injure themselves or other cattle. This is especially relevant for horned cattle that have often not had the same level of handling as dehorned cattle and have a wider flight zone. The same level of aggression in horned animals compared to non-horned animals has been observed on board. Horned animals require either some extra bunk space or ad lib feeding to ensure that all animals have a chance to eat at the bunk. This can be achieved by a management plan with the on-board stockman for these types of animals.

Buller activity in castrated vs non-castrated cattle under 380kg

It has been found over the years that there is buller activity in both groups and the separation of these animals does not eliminate buller activity. It is much better to have cattle penned with cattle from an established group, so they don't have to make a new pecking order once on board the vessel.

7. Recommendations

The current scientific understanding on cattle handling and commingling has animal health and welfare, as presented by literature review by Bovine Dynamics, in conjunction with CPC's data analyses across the supply chain, demonstrations that the following outcomes are a result of the increased drafting and commingling that has occurred under the penning requirements of ASEL v3.0 and later, Section 3.1.16 c) and 5.3.1 b) and d).

- Increased instances of BRD morbidity and mortality as a result of increased phycological stress and subsequent immunosuppression.
- Increased incidence of lameness in cattle resulting from a considerably higher amount of drafting and more aggressive behaviour in animals when re-establishing a new hierarchical order.
- Increased incidences of digestive problems resulting from increased stress levels and aggressive behaviour when re-establishing a new hierarchical order.
- Decreased average daily weight gain performance in the feedlot resulting from increased stress, decreased feed, and water intakes, increased in animal health incidences and the time taken to re-establish a new hierarchical order.

7.1. Recommendation on ASEL 3.2 Section v3.1.16 c) (iv)

Based on the findings in this submission regarding extra drafting and commingling that has occurred under the penning requirements under ASEL v3.0 and later it is recommended that the framework reinstates ASEL v2.3 section 4.11 whereby entire and castrated males can be penned together. Specifically, it is recommended that the regulation changes to allow entire and castrated males to be penned together when they are from the same source mob and are under 380 kg. This recommendation would decrease the amount of commingling of cattle from different source mobs and eliminate extra drafting which would reduce stress, animal health incidences and mortalities as well has increased performance of the cattle on board vessel and in the feedlot.

7.2. Recommendation on ASEL v3.2 Section 3.1.16 c) (iii) and section 5.3.1 b)

Based on the findings in this submission regarding extra drafting and commingling that has occurred under the penning requirements in ASEL v3.0 and later it is recommended that the framework reinstates ASEL v2.3 section 4.11. Specifically, the ideal weight ranges to reduce comingling and excessive drafting in the RE prior to export would be for any cattle below 500kg to be penned within 75kg of the average and for any cattle heavier than 500kg (that are much stronger and do not struggle to compete) to be penned within weight ranges of 100kg from the average.

7.3. Recommendation on ASEL v3.2 Section 5.3.1 d)

Based on the findings in this submission regarding extra drafting and commingling that it is occurring and the very small groups of animals that are penned by themselves under the penning requirements in ASEL it would be recommended that the horn length allowance of 12cm be revised to 16cm. This would allow less cattle to be separated from the main source mob, and (in conjunction with the recommendations in section 7.2 of this submission), to have a larger mob of horned cattle penned off in the long-horn management plan.

Currently cattle under a long-horn approved arrangement receive 30% extra space onboard a vessel. It is recommended that the space requirements for horned cattle be revisited to have better pen spacing allocation for horned animals on board vessels. It is recommended that for cattle between 380 – 480 kg be given an extra 10% space and any cattle over 480kg have an extra 15% space in addition to the standard density requirements in ASEL v3.2. This extra space will assist in feed bunk access whilst not increasing the animal's ability to take flight and cause injury and make the shipping of horned animals more economically viable.

Given that there is limited trials and research on horned cattle it would be recommended that a research trial be carried out to determine the impacts of horn animals traveling on board a vessel. The proposed research trial would be to compare the difference in health and of horned cattle when separated from non-horn cattle at 12cm in comparison to 16cm. Another possible trial would be regarding the impact of the width of an animal's shoulders have on bunk space compared to the length of its horns. It is currently believed that the shoulder width of cattle has a greater bearing on bunk space availability than the unspecified length of the animal's horns. This trial could be achieved by measuring shoulders and horn lengths and then capturing the data of voluntary feed intake.

8. Appendix Regulatory Farmwork

ASEL V 2.3

Section 4.11 Livestock for export must be presented for loading, and penned on the vessel, in lines segregated by species, class, age, weight, criteria in S2.10(e)(i) to (iii), and any other relevant characteristic (and, where relevant, port of destination), in accordance with the approved loading plan.

Section 2.10 (e) Cattle lacking horns may be mixed with cattle with horns up to 12cm in length and tipped (blunt);

ASEL V 3.0

3.1.16 Livestock must be penned so that:

a) animals of different species are not mixed in a single pen; and

b) different classes of animals are not mixed in a single pen; and

c) animals of different sexes, pregnancy status, or physical characteristics (such as those covered under any applicable management plans) are not mixed in a single pen; and

d) animals of different health status are kept separated; and

e) young animals are separated from older animals; and

f) animals of a dissimilar size and/or weight are separated.

5.3.1 The minimum pen space allocations for cattle exported by sea are contained in Table 9, Table 10a, Table 10b, Table Standard 5 Loading and onboard management requirements Australian Standards for the Export of Livestock 3.2 62 11a, Table 11b, Table 12a and Table 12b. These penning criteria apply:

a) where a curfew of more than 12 hours will be undertaken at the registered establishment prior to transport to the port of embarkation, a curfew factor of an additional 5% must be applied when calculating liveweight (cumulative with other additional space requirements and must be calculated first); and

b) the weight of each animal in a pen must not vary from pen average weight by more than 50kg. The pen average weight is calculated by dividing the total weight of the cattle in the pen by the number of cattle in the pen; and

c) for pregnant cattle, a minimum additional 15% space must be provided; and

d) cattle without horns may be penned with cattle with horns up to 12cm in length and where the horns are tipped (blunt); and

e) cattle outside of the weights shown in Table 9, Table 10a, Table 10b, Table 11a, Table 11b, Table 12a and Table 12b must only be sourced for export or exported in accordance with a light or heavy cattle management plan where an exporter has approval under Standard 1.4.2.

ASEL V 3.2

Section 3.1.16 Livestock must be penned so that:

a) animals of different species are not mixed in a single pen; and

b) different classes of animals are not mixed in a single pen; and

c) animals of different sexes, pregnancy status, or physical characteristics (such as those covered under any applicable management plans and entire vs castrated male livestock) are not mixed in a single pen. This excludes differences in the following categories where animals may be penned together:

i) ewe and wether lambs;

ii) entire and spayed female livestock; Standard 3 Management of livestock in registered establishment Australian Standards for the Export of Livestock 3.2 32

iii) ≤500kg and >500kg cattle and buffalo (provided the weight of each animal in the pen does not vary from the pen average weight by more than 50 kg, and that all animals in the pen are managed in accordance with ASEL and an approved heavy management plan); and

iv) immature bulls and steers which have been socialised in the source mob.

d) animals of different health status are kept separated; and

e) immature animals are separated from mature animals; and

f) animals of a dissimilar size and/or weight are separated.

Section 5.3.1 The minimum pen space allocations for cattle exported by sea are contained in Table 9, Table 10a, Table 10b, Table Standard 5 Loading and onboard management requirements Australian Standards for the Export of Livestock 3.2 62 11a, Table 11b, Table 12a and Table 12b. These penning criteria apply:

a) where a curfew of more than 12 hours will be undertaken at the registered establishment prior to transport to the port of embarkation, a curfew factor of an additional 5% must be applied when calculating liveweight (cumulative with other additional space requirements and must be calculated first); and

b) the weight of each animal in a pen must not vary from pen average weight by more than 50kg. The pen average weight is calculated by dividing the total weight of the cattle in the pen by the number of cattle in the pen; and

c) for pregnant cattle, a minimum additional 15% space must be provided; and

d) cattle without horns may be penned with cattle with horns up to 12cm in length and where the horns are tipped (blunt); and

e) cattle outside of the weights shown in Table 9, Table 10a, Table 10b, Table 11a, Table 11b, Table 12a and Table 12b must only be sourced for export or exported in accordance with a light or heavy cattle management plan where an exporter has approval under Standard 1.4.2

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