final report

Project code: B.COM.0352

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Date published: July 2014

ISBN: 9781741919639

PUBLISHED BY
Meat & Livestock Australia Limited
Locked Bag 991
NORTH SYDNEY NSW 2059

Benefit cost analysis of non-compliance within a Victorian pasture-fed beef supply chain

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Abstract

Demand for pasture fed beef is increasing globally. However, due to the very nature of pasture growth and finishing pasture-fed beef, value chains are challenged to maintain continuity of supply and consistent quality of product year round. Pasture based systems are influenced extensively by weather conditions, pasture species, grazing management, genetics and livestock production systems. These issues along with market forces all impact on long term viability and profitability of producers in the supply chain. Few specific pasture based value chains have been analysed to determine the level of non-compliance, particularly within the more intensive grazing regions of southern Australia.

This project aimed to assess the level of non-compliance in a southern pasture-fed value chain, with the intention of using the results to focus further work on areas of production and supply most critical to sustaining the market. Nineteen months of carcase grading data over 2012 and 2013 were evaluated to determine what carcase characteristics resulted in the highest levels of non-compliance to the relevant company specifications. Hot standard carcase weight (HSCW), fat depth (P8 mm) and sex were the carcase attributes that were compared and analysed.

The 2012 data set comprised 3,905 heifers and 9,922 steers. Sixty six percent of the heifers and 62% of the steers did not meet the company specifications for carcase weight or fat depth. For heifers the cost of non-compliance was estimated to be $63 per carcase and for steers it was $47 per carcase. The 2013 data set comprised 19,099 heifers and 30,014 steers. Only 22% of the heifers met the highest value specification on the 2013 grid, with more than 50% of heifer carcases being too light. Approximately 40% of steer carcases met the 2013 weight and fat specifications while 39% of all the steers were overweight. The foregone value in non-compliance for heifers was estimated to be $84 per carcase and for steers, $87 per carcase.

Executive summary

Few pasture-fed beef supply chains have been analysed to determine the level of non-compliance and subsequent lost value to the supplier and processor within the intensive grazing regions of southern Australia. Pasture fed systems are challenging and variable due to different regional climatic conditions and farming systems. Maintaining consistency in the quality and quantity of finished cattle through the supply chain is often problematic as is sourcing stock to ensure continuity for supply into processor markets.

This project was completed to assess the level of non-compliance in a pasture-fed commercial supply chain based in the southern mild and cool temperate agri-climatic zones. Nineteen months of carcase grading data was evaluated to determine what carcase characteristics resulted in the highest levels of non-compliance to the target company grid. Carcases were Meat Standards Australia (MSA) graded as a requirement of the processor, however only company specifications; hot standard carcase weight (HSCW), fat depth (P8 mm) and sex were compared and analysed against the company's highest value HSCW and P8 grid payments. Location source of stock and consignment size was also analysed. The processor in conjunction with MSA under takes analysis of MSA compliance however there has been minimal documented analysis of compliance to company specifications and the associated costs.

To support pasture-fed beef supply, processors offer higher prices ($/kg carcase weight) on grids which relate to carcase weight and fat depth. When producers hit the preferred weight and fat specification and the carcase is MSA eligible prices offered can be up to 5% higher than non-MSA pasture-fed product. On the grid, steers typically realise up to 5% higher prices than heifers in reflection of their higher saleable meat yield.

Data, from over nineteen months, were assessed from one southern processing plant. A total of 13,827 carcases in 2012 and 49,113 in 2013. The second year data set has a much larger number of carcases as the processor continued to refine their grid and procurement processes specifically for the pasture fed market. The individual carcases for each dataset were matched to the processor grid relevant to each year and analysed against the company specifications (HSCW, fat and sex). HSCW and fat specifications did not alter across the two years. The carcases were then categorised and grouped according to how they met or failed to meet the grid based on being too heavy or too light and too fat or too lean for each sex.

The grouped carcases were also evaluated against each month of the year to assess when the highest non-compliance to specification occurs along with which trait or combination of traits results in missing the sweet spot on the grid in that particular month. Each carcase was matched to the grid and a value allocated based on the c/kg discount or downgrade relevant to the reason for non-compliance.

For this study highest grid prices applied in 2012 were $3.30/kg and $3.15/kg for steers and heifers respectively and in 2013 $3.65/kg and $3.55/kg. The processor typically adjusts grids on a fortnightly basis depending on market forces.

The 2012 data set comprised 3,905 heifers and 9,922 steers. Sixty six percent of the heifers and 62% of the steers did not meet the company specifications for carcase weight and fat depth. For heifers the cost of non-compliance was $63 per carcase and was $47 per carcase for steers in 2012.

In 2013 the number of carcases comprised 19,099 heifers and 30,014 steers in the data set. Twenty two percent met the highest value specification on the 2013 grid. More than 50% of the carcases overall were too light. Forty percent of steer carcases met the 2013 weight and fat specifications, while 39% of all the steers were overweight and 13% steers underweight.

The value of non-compliance for heifers was estimated to be $84 per carcase and $87 per steer carcase in 2013.

The results from this work identified a cost of non-compliance and opportunity missed to the producer and processor through not meeting company specifications. To maintain a pasture-fed market supply chain producers will need to assess how their whole farm system is able to profitably produce cattle to fit into this market considering the number of factors that impact on livestock productivity. Furthermore, processors will need to provide appropriate, timely pricing signals and incentives to ensure producers manage their cattle to finish in a way that meets processor requirements.

The results also support the opportunity to demonstrate the value in identifying causes of non-compliance and analysing the costs associated with missing the target market specifications. The project demonstrates the potential opportunity and improved profitability throughout the supply chain if all segments worked together to generate increased value. Further work or recommendations from the outcomes of this project include:

- Processors improving utilisation of carcase data to assess producer compliance to specifications in a timely manner where by changes can be reflected in future consignments, and an improved understanding of successful production systems and supply and procurement can be gained.
- Extending the use and provision of the BeefSpecs decision support tool
- Implementing the adoption of the Livestock Data Link (LDL) tool to improve the provision of carcase feedback and explore how it may be used to support producers to better meet processor specifications especially in the pasture-fed supply chain.
- Analysis of the impact of pricing signals on carcase compliance to specifications and models for clear market signals for suppliers.

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1. Background

An emerging demand from export and domestic markets for pasture fed beef has led to a number of processors and value chains focusing a portion of their business towards this market. For a consumer demographic that places value on environmental, ethical and natural production of beef and can afford to purchase it, a market exists for the year round supply of this product. To enable processors to supply this market consistently, defined carcase weight and fat specifications with associated payment grids have been implemented for producers to target.

However, pasture fed beef value chains are struggling to maintain continuity of supply and consistent quality of product year round. Producing cattle to meet specific pasture-fed specifications is by its nature more prone to variation and seasonal conditions hence carrying more risk than grain feeding. Pasture based systems are influenced extensively by weather conditions, pasture species, grazing management and livestock management systems. This variability compounded by variability in market outcomes impact on the long term viability and profitability of producers in the value chain.

An increase in compliance rates improves the profitability of pasture-fed systems for the supplier through less price discounting, and for the processor in carcase breakdown and management through the plant and with marketing. Measuring current rates and types of non-compliance so as to implement practices to reduce non-compliance is therefore a worthwhile objective.

Little research has been done on compliance in any Australian beef value chain. Slacksmith et al (2009) analysed two grain-fed data sets and found that the costs of non-compliance to Australian beef market specifications were substantial. Over all of the 40,000 animals in these two datasets, the minimum total cost of non-compliance was approximately $1,628,000 or around $40/head.

McPhee and Walmsley (2014) conducted an analysis of non-compliance over two commercial data sets (n = 65,520 animals) of pasture fed cattle supplied from specific processors. Over both data sets the results showed that 10-20% of carcases are not compliant with hot standard carcase weight and/or fatness specifications. However, there were some questions about the comparability of the animal data with the grids provided.

Thus there is limited information available explaining where the major non-compliances exist in pasture-fed beef cattle systems.

2. Objectives

First, this study aimed to analyse the level of non-compliance to a high value southern pasture-fed Meat Standards Australia (MSA) grid between January 2012 to July 2013. Specific carcase characteristics such as Hot Standard Carcase Weight (HSCW), fat depth and sex were analysed and interactions between these traits examined in relation to seasonal influences.

Second, the study aimed to quantify the costs of non-compliance and to identify reasons for non-conforming cattle carcases.

Third, the study aimed to assess where the potential benefits for both the supplier and the processor might lie through higher compliance rates.

3. Methodology

The project focus was on a pasture-fed specification from a major commercial processing plant in southern Australia. To meet specifications steer or heifer carcases must have been MSA graded, fit within boning groups 1-4 and meet company specifications, specifically HSCW 280–340kg and P8 fat depth 5-22mm.

Individual company carcase data (>100,000 records) and MSA grading data (>20,000 records) were provided in MS Excel files. The processor indicated that carcase data was extracted differently in each year. Data were analysed for compliance to the relevant pasture-fed company and MSA grid, between January 2012 and July 2013.

Data were compiled through MS Excel and MS Access for data analysis and graphing. Higher level investigation of data utilised the Genstat statistical program.

Company data variables analysed include

- Hot Standard Carcase Weight (HSCW kg)
- P8 fat depth (mm)
- Sex differences in HSCW non-compliance
- Sex differences in fat specification non-compliance
- Seasonal variability and sex difference non-compliance
- Seasonal variability and sex differences in meat quality (pH and meat colour) non-compliance
- Effects of location of source stock and non-compliance.

Initially, carcase data was obtained from 69,679 cattle between Jan 2012 and July 2013, and examined for non-compliance to company specifications. Data exceptions (missing, ungraded carcases and outliers) were excluded from the analyses. The final data set comprised 62,940 cattle.

Wholesale pricing schedules available to producers in 2012 and 2013 (Appendix 2 and 3) were used to estimate carcase value and assess where changes to the procurement model would impact upon the marketing of grass fed brands.

The carcase data examined in 2012 was applied to the MSA pasture-fed and company specifications of HSCW 280–340kg and P8 fat depth 5–22mm. When these carcase specifications were met no price discount was imposed on the supplier. Outside these specifications an amount of price discounting was applied dependent upon the level of non-compliance to either carcase weight or fat depth.

A $0.10 discount was applied at 23-32mm P8 fat and carcase weight 260–280kg's. Outside these immediate parameters further discounting applied. Where cattle did not meet company specifications carcases were not MSA graded. Refer to Appendix 2 and 3 for grid schedule.

3.1 Grass Fed Company Specifications

MSA specifications
pH <5.71
Meat colour 1b-3
AUS-MEAT fat colour 0-4

HSCW: 280-340 kg
P8 fat depth: 5-22mm

When these carcase specifications were met no price discount was received by the supplier. For example, based on the 2012 MSA grid, compliant steers would receive $3.30/kg and compliant heifers would receive $3.15/kg. Outside these specifications an amount of price discounting was applied dependent upon the level of non-compliance to either carcase weight or fat depth.

If carcases were 20kg too heavy or too light, thus 260-280kg or 340-360kg, a $0.10/kg discount applied. If carcases were in the weight range 240-260kg, a further $0.05/kg discount was applied. A flat $0.10/kg discount was applied at 23-32mm P8 fat and carcase weight 240–360kg's. If the steer carcases were graded MY2 instead of MY0, or the heifers were graded MY7 instead of MYH, a further $0.15/kg discount was applied. So carcases could still be graded MSA, but due to being under or over fat, or under or overweight, they could be discounted up to $0.40/kg.

Outside these immediate parameters further discounting applied. Where cattle did not meet company specifications carcases were not MSA graded, and they were assessed against a non-MSA grid. For example, heifers that did not meet the MSA grid were assessed against a trade yearling heifer grid or a Jap heifer grid. Heifers that were very light could be discounted by up to $0.75/kg from the MSA compliant price; heifers that were older, very heavy and very fat could be discounted up to $1.20/kg from the MSA compliant price. The same sorts of discounts are evident for steers and for the 2013 data set.

3.2 Cost analysis

3.2.1 Calculating the cost of non-compliance

The individual carcases making up the raw data were re-categorised into whether they met the HSCW specification or not, whether they met the P8 fat specification or not, or whether they met both the HSCW and P8 specifications, or not. This gave a 9*9 matrix of categories (too light, acceptable weight range, too heavy; times too lean, acceptable P8 fat range, too fat). This was done separately for steers and heifers and separately for the 2012 dataset and the 2013 dataset.

Each carcase was matched to the appropriate grid (Appendices 2 and 3) and a c/kg discount was calculated where necessary. The total value of each carcase, and an estimate of the value of forgone income due to non-compliance, was then calculated. Individual carcase values were then summed or averaged as appropriate across all carcases in the various categories. These calculations are shown in Tables 1 and 2 for 2012 and 2013 data respectively.

An analysis of the production systems implemented by the producers supplying this market and their attitudes towards meeting specifications, would begin to provide reasons for the amount of non-compliance detailed within this analysis. That type of analysis is outside the scope of this project, however it is being addressed by another project currently underway specifically examining producers supplying into a pasture fed value chain. Evidence of decision making and ability to meet target specifications is being collated and analysed. Consignment size and locality of source stock provides for an initial analysis

3.2.2 BeefSpecs analysis

The BeefSpecs decision support tool (McKiernan, 2011), was used to run a case study scenario to model the outcome whereby proportions of carcases assessed as non-compliant were reduced by half.

That is, half of the heifers and steers that were too light and half that were too heavy moved

into the acceptable weight range.

3.2.3 Decision making by the processor

A structured interview with the company's regional beef management contributed to analysis around different scenarios including decision making based on supply, how non-compliance is currently managed, what would change should compliance levels improve and how profits could be maximised if the costs of non-compliance were reduced. To gain a better understanding of the commercial imperatives, the following points were raised:

- Factors affecting plant efficiency and costs to the company from groups of cattle that are non-compliant compared to cattle that are compliant (including risk avoidance strategies)
- Brand structure and pricing
- Plans for brand adoption and development
- How wholesale meat pricing schedule is affected or influenced by the current cattle supply grid

The compliance data, in conjunction with the detailed interview responses, was utilised to analyse the management strategies available to mitigate noncompliance and estimate the rate of adoption of on farm strategies.

4. Results

4.1 Compliance data

Tables summarising non-compliance data over the two years are detailed in appendix 1.

4.1.1 Combined steer and heifer data 2012

Figure 1 shows the range of HSCW and fat depth for steers and heifers in 2012. The preferred HSCW range (280-340kg) and P8 fat depth (5-22mm) is indicated between vertical lines and horizontal lines respectively.

Between 1January and 31 December 2012, 13,827 carcases (9,922 steers and 3,905 heifers) were applied to the MSA grass-fed grid.

Twenty three percent (n=2,424) of all steers and heifers were out of specification for both HSCW and P8 fat in 2012. (that is, the upper left and right areas, and the lower left and right areas).

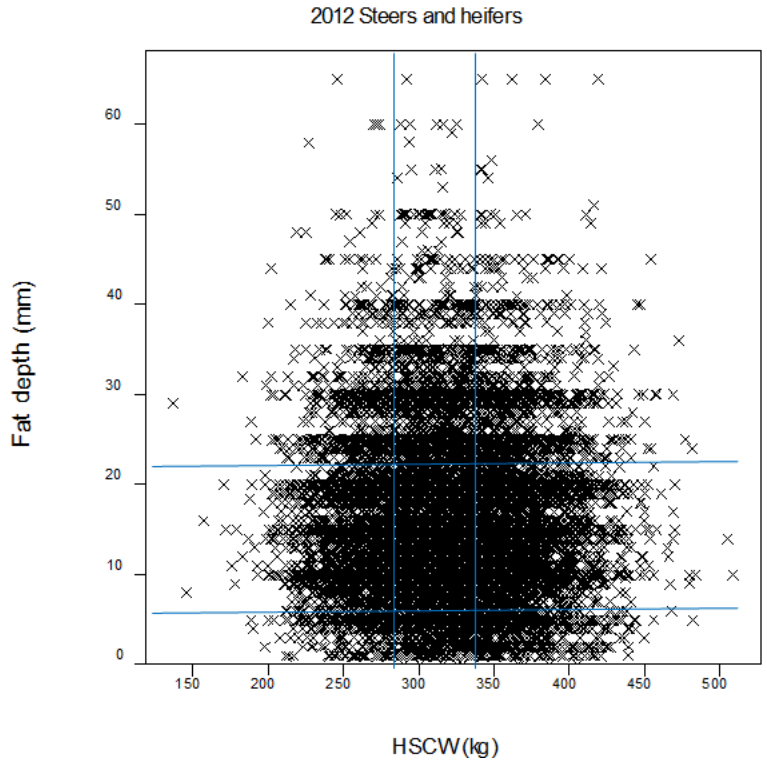

Figure 1. HSCW and P8 fat depth steers and heifer carcases combined 2012

4.1.2 2012 compliance data

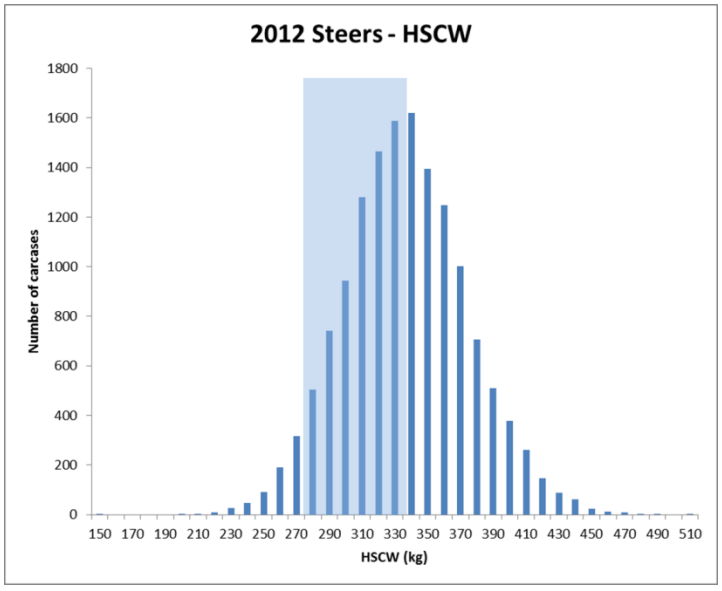

Figure 2. Hot standard carcase weight (HSCW) and number of steers, 2012

Figure 2 shows the distribution of steer HSCW in 2012. The shaded area indicates the preferred weight range. In 2012, 47.5% of carcases did not meet HSCW specification.

Figure 3 shows the disitribution of P8 fat depth in steer carcases in 2012. The shaded area shows the preferred fat range.

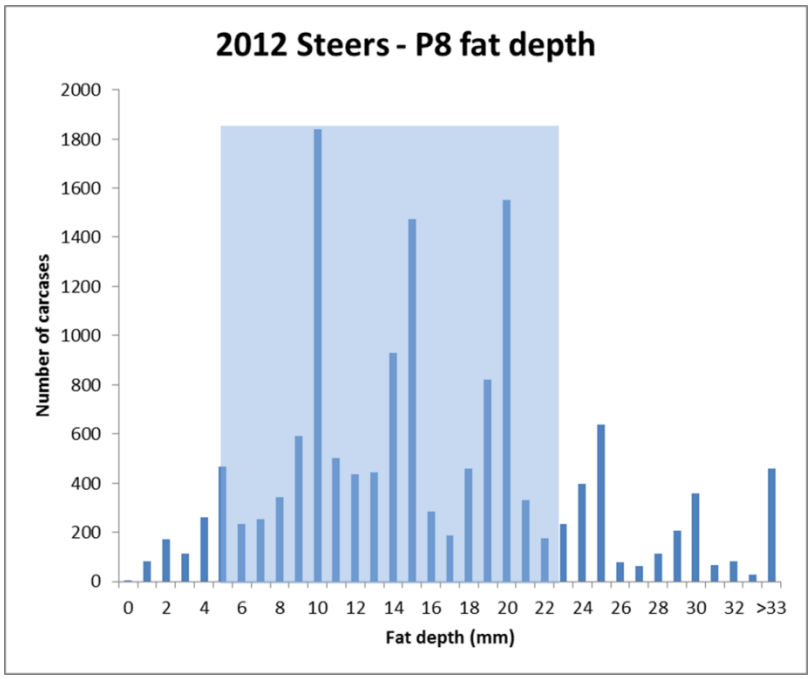

Figure 3. P8 fat depth and number of steers

In 2012, 23% of carcases were outside the preferred weight range. Further analysis showed that 18.6% of carcases had more than 22mm of fat, while 4.3% had less then 5mm of fat.

Figure 4 shows the distribution of heifer HSCW processed in 2012 with the preferred weight range indicated by blue shading.

The majority of non-compliance to 280-340kg target area of the grid was with carcases weighing less than 280kg HSCW. Forty percent of carcases weighed less than 280kg HSCW while a further 22% of carcasses were outside the preferred HSCW specification on the heavy side. Overall 62% of heifer carcases were non-compliant to weight.

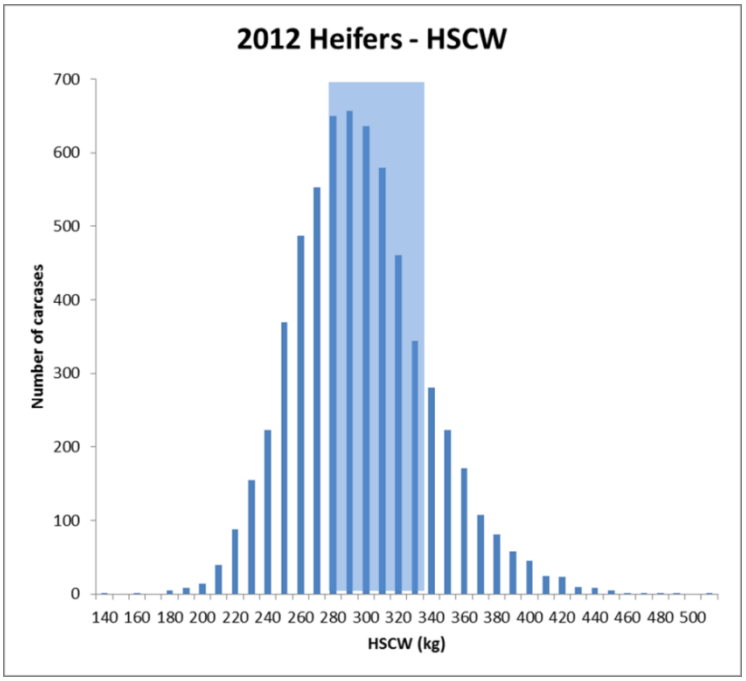

Figure 4. Hot standard carcase weight (HSCW) and number of heifers

Figure 5 shows the distribution of fat depth in heifer carcases during 2012 with the preferred fat depth indicated with blue shading.

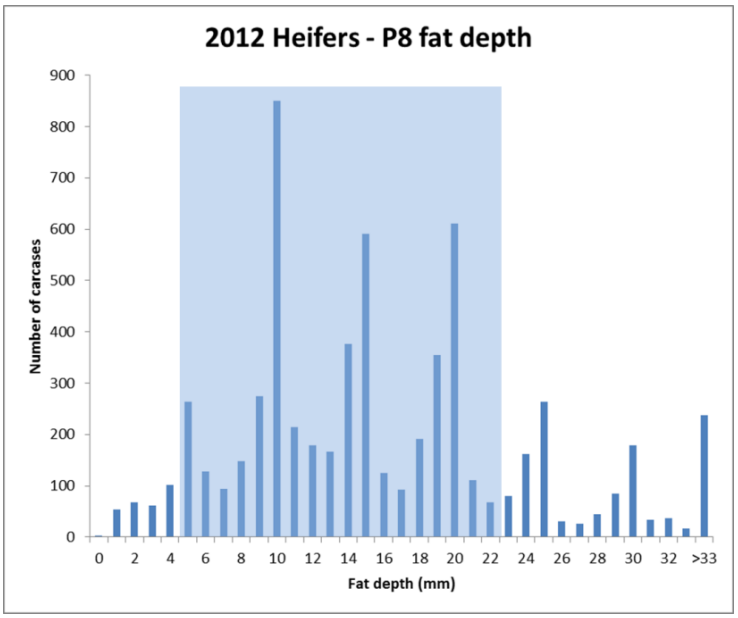

Figure 5. Distribution of P8 fat depth in heifer carcases 2012

Twenty three percent of carcases were outside the preferred fat range. The majority of those, 18.9% were from carcases with fat depths exceeding 22 mm.

Figure 6 shows the HSCW and fat depth of steer carcasses from 2012. The preferred fat depth range of 5-22mm and HSCW range 280-340kg are indicated by the horizontal and vertical lines respectively.

Overall carcase value decreased slightly in line with the first step down in price at 22mm, then more substantially at 32mm fat depth.

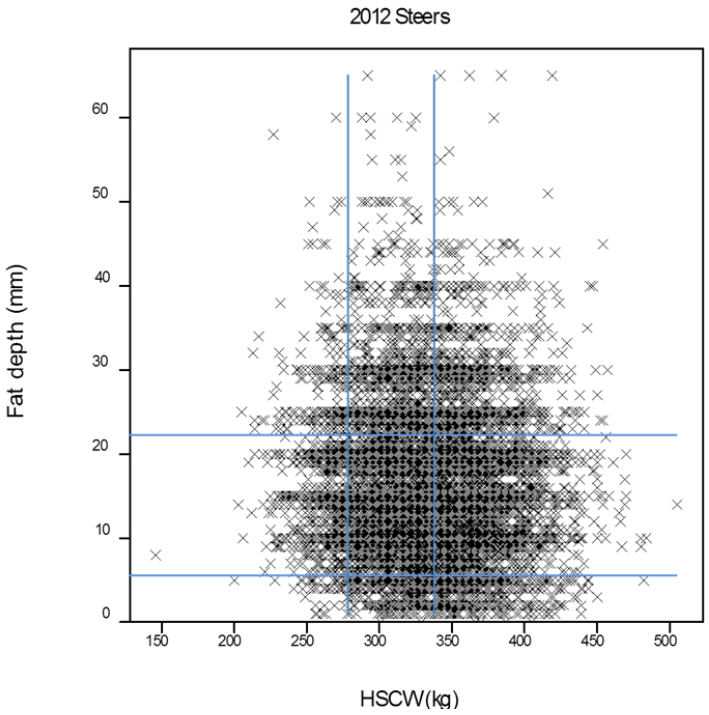

Figure 6. HSCW and fat depth 2012 steers

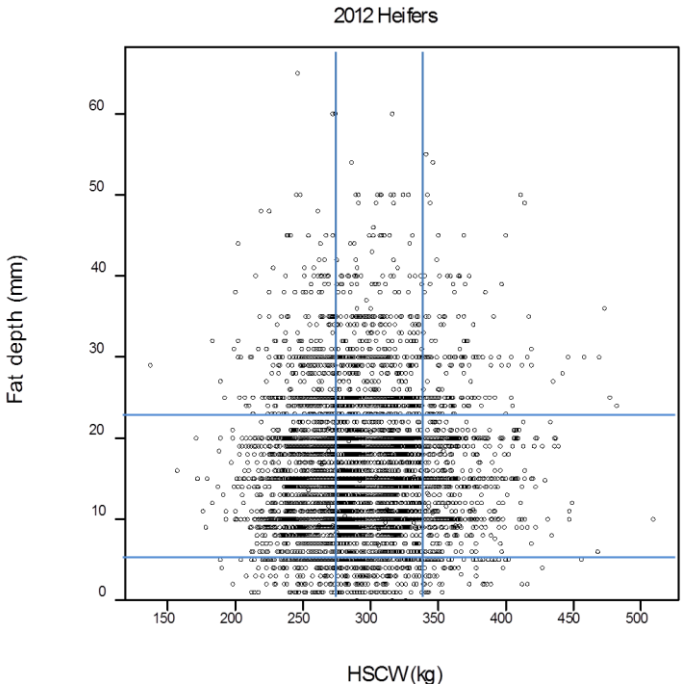

Figure 7. HSCW and fat depth 2012 heifers

In 2012, 11.4% of steer carcases were non-compliant to both HSCW and fat depth with the majority of the non-compliance comprising carcases being overweight (>340kg) with P8 fat depth in excess of 22mm.

Figure 7 shows HSCW and fat depth specifications for heifers during 2012. Preferred fat depth and carcase weight requirements are indicated by the horizontal and vertical lines respectively.

Twelve percent of heifers were outside both the preferred carcase weight and fat depth specification.

As an example of the financial impact of this non-compliance, Figure 8 shows fat depth distribution and estimated carcase value when applied to the company pasture-fed grid during 2012. The shaded area shows the preferred fat depth where no price discount applies.

Overall carcase value decreased slightly in line with the first step down in price at 22mm, then more substantially at 32mm fat depth.

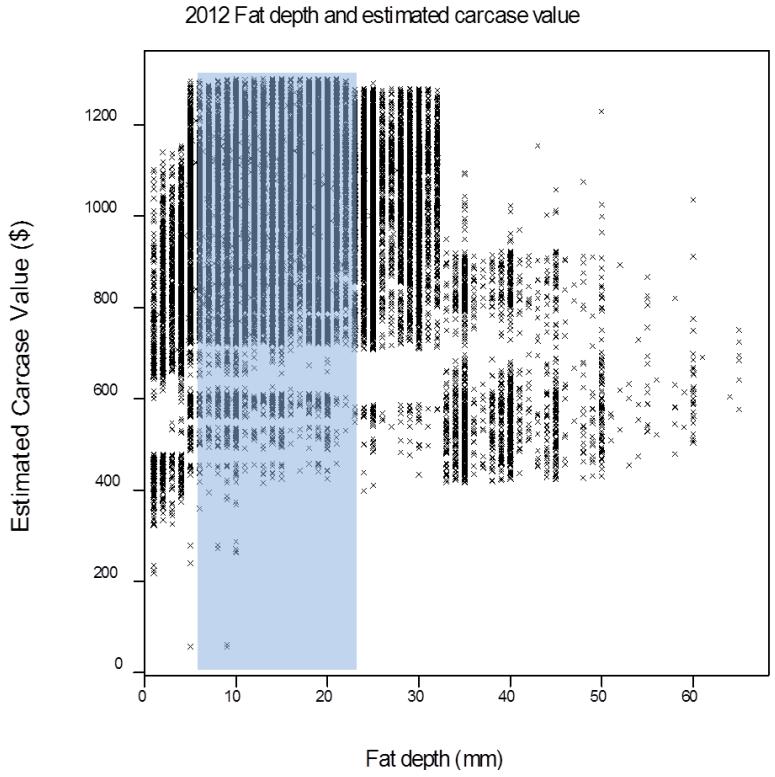

Figure 8. Fat depth and estimated carcases value 2012

4.1.3 2013 Combined steer and heifer data

Figure 9 shows the range of HSCW and fat depth for steers and heifers in 2013. The preferred HSCW range (280-340kg) and P8 fat depth range (5-22mm) is indicated between vertical lines and horizontal lines respectively.

The total number of carcases was 49,113, made up of 30,014 steers and 19,099 heifers.

For steers and heifers, 24% (n=4,994) of carcases did not meet the preferred specification for both HSCW and P8 fat. A greater portion of these were heifers (21% of heifers) while 3% of steers were non-compliant to both weight and fat.

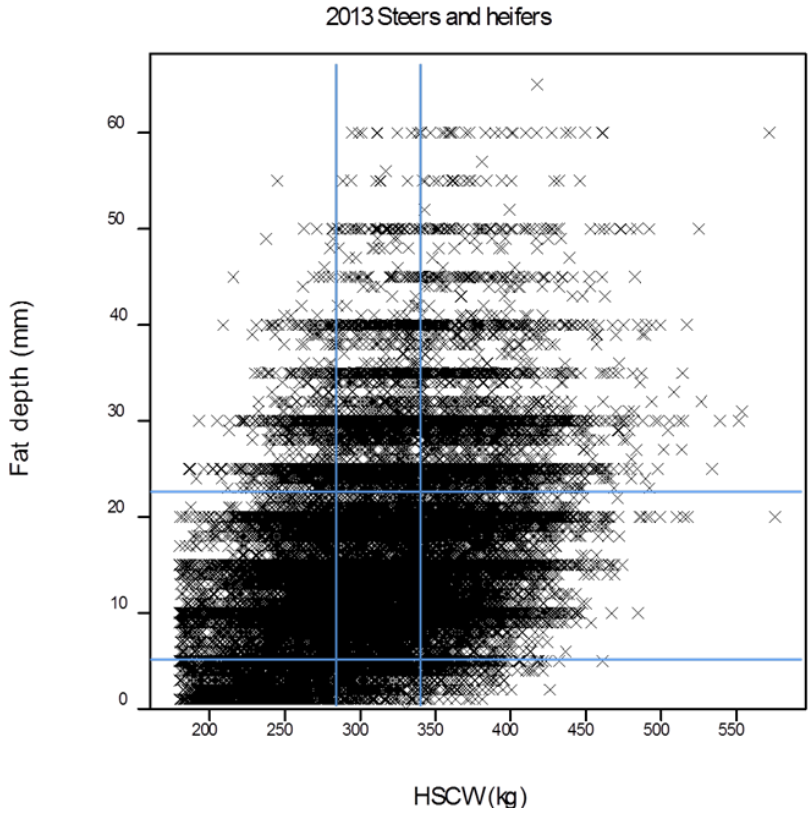

Figure 9. HSCW and P8 fat depth, steer and heifer carcases combined, 2013

Steer and heifer carcase data across the two years showed similar levels of non-compliance. Discounting steers for overweight (>340kg HSCW) was the major reason for carcases not meeting the preferred weight for both data sets. In contrast, a greater proportion of heifers over both years were underweight (<280kg HSCW). The data showed heifers having higher numbers of carcases out of specification for fat depth than steers and overall levels of non-compliance being greater in the heifer groups over both years.

4.1.4 2013 compliance data

In 2013 the number of carcases evaluated totalled 49,163, comprising 30,014 steers and 19,099 heifers. Seven months data from January to end of July was included. An MSA pasture fed company grid was used with specifications HSCW 280–340kg and fat depth at P8 5-22mm.

Where carcases met these specifications no price discounting applied. Where carcases were between 280 and 260kg a $0.05 discount applied, carcases with 22–32mm fat also received a $0.05 discount. Further away from these ideal ranges discounts of up to $0.60 applied.

Figure 10 illustrates the number of steer carcases and range of HSCW, the shaded blue area indicates the ideal specification where no discounts apply.

Of the 30,014 steer carcases, 14,911 were outside the preferred weight range. 13% were under 280kg whilst 37% were more than 340kg. Overall half the carcases did not receive the highest rate payable, based on weight specification alone.

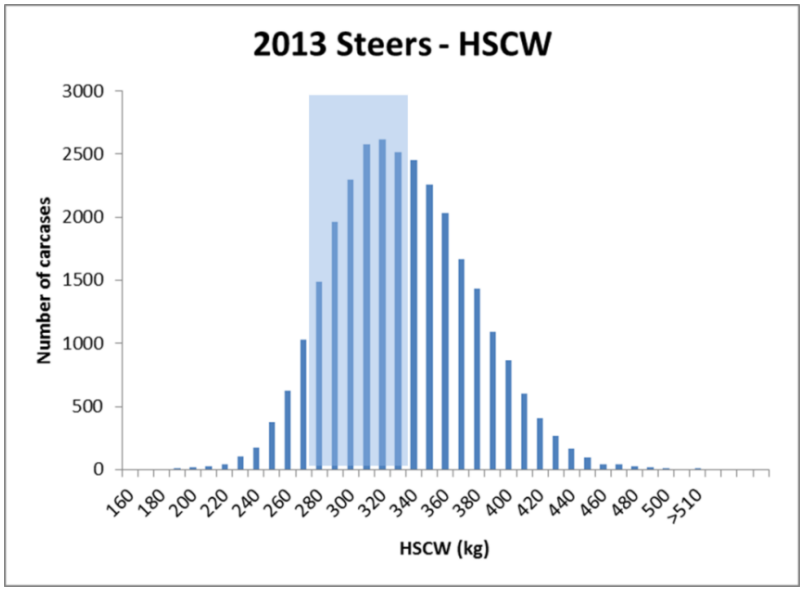

Figure 10. Hot standard carcase weight (HSCW) and number of animals

Figure 11 shows the number of steer carcases and the range of P8 fat depth. The shaded blue area is where no price discounts apply based on fat depth.

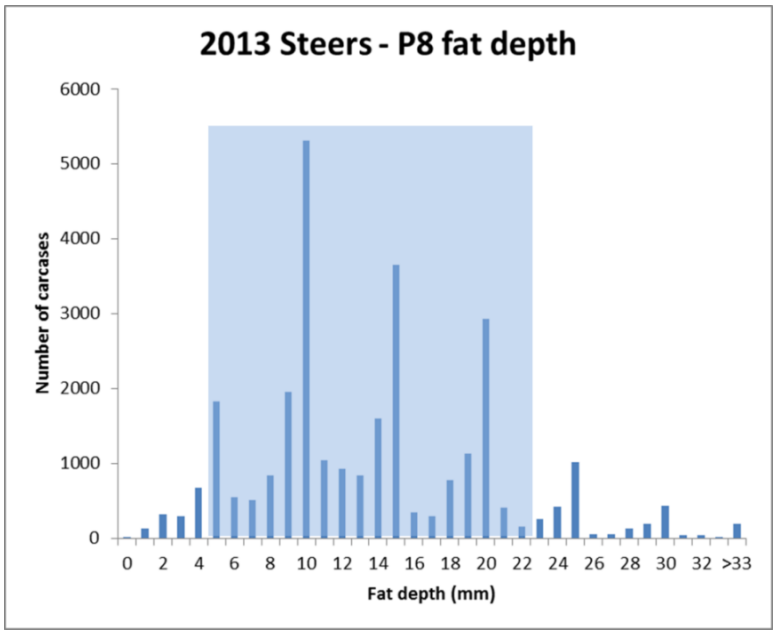

Figure 11. P8 Fat depth and number of steer carcases 2013

A total of 4,289 carcases were outside the ideal fat depth range, or almost 15%.

Figure 12 shows the distribution of steer carcases that meet HSCW and fat depth as well as those carcases outside of the ideal specification. The two blue vertical lines indicate the ideal carcase weight whilst the horizontal lines define the fat depth range where no discount applies.

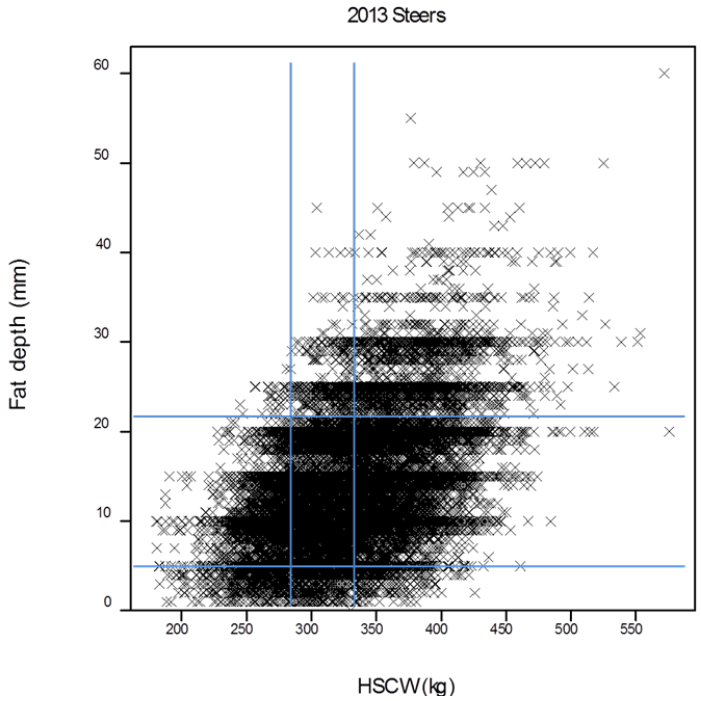

Figure 12. HSCW and Fat depth (mm) steers 2013

Figure 13 shows the number of heifer carcases and HSCW distribution, the shaded blue area indicates the ideal HSCW and fat depth range where no price discounts apply on the company grid.

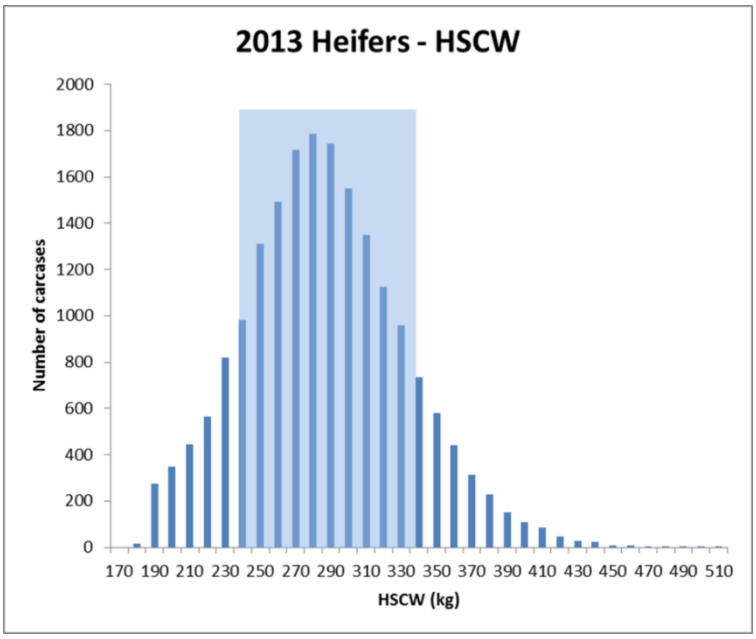

Figure 13. HSCW and number of carcases 2013

Figure 14 shows the distribution of fat depths for heifers carcases in 2013. The shaded blue area defines the preferred fat specification for the grid where no price discount applies.

The number of heifer carcases that did not meet the fat depth specification totalled 7,262, or almost 38%. In this dataset the majority of heifer carcases were too fat with 5,522 over 22mm.

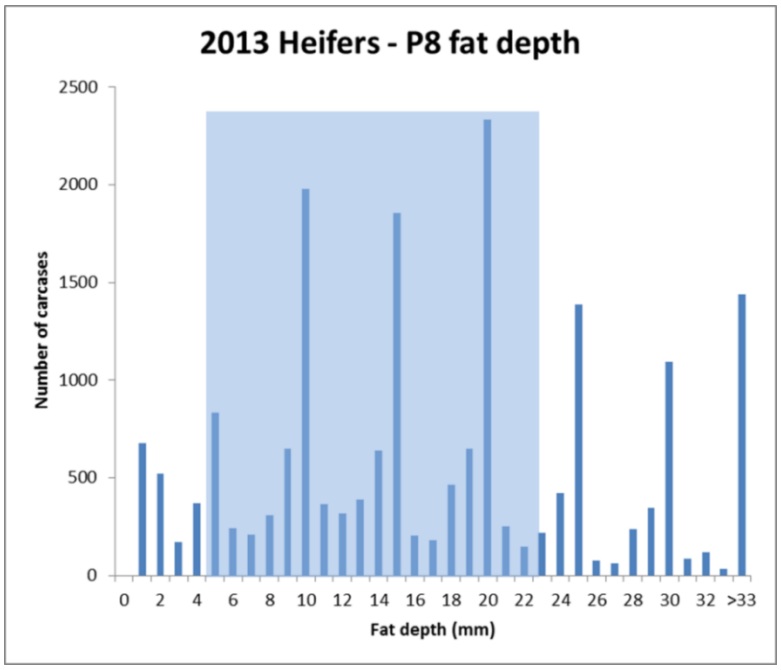

Figure 14. P8 fat depth and number of heifer carcases 2013

Figure 15 shows the number of heifer carcases meeting the preferred grid specifications in 2013. Vertical blue lines show the preferred HSCW range and the horizontal lines indicate the preferred fat depth where no price discount applies.

A total of 11,694 heifer carcases (60%) did not meet preferred weight and fat on the grid predominantly as a result of being underweight. The figure also illustrates the large number of carcases that were over fat (>22mm fat).

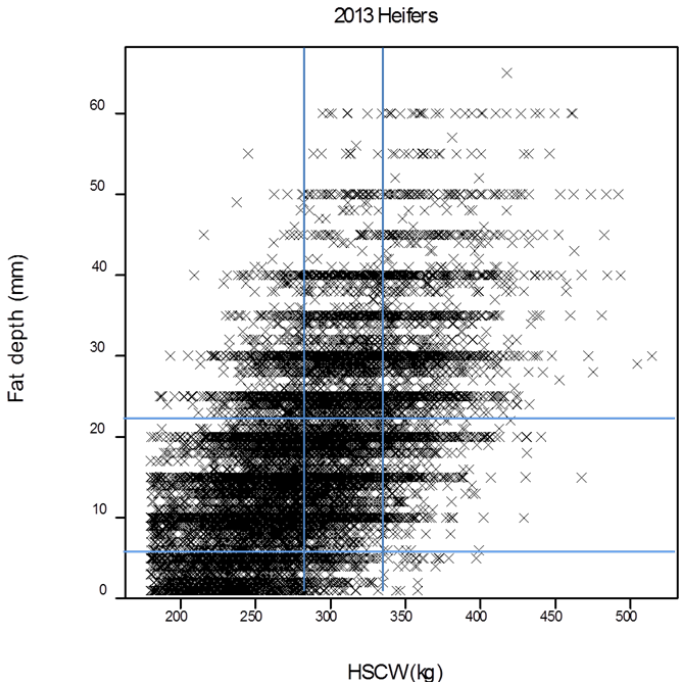

Figure 15. HSCW and fat depth heifers 2013

The figure illustrates the large number of carcases underweight (<280kg) or over fat (>22mm fat).

Figure 16 shows the preferred (blue shading) P8 fat depth specifications and estimated carcase values based for 2013 carcase data.

Carcase values are highest in the range of 5-22mm. Estimated values are lower when carcases had<5mm fat and >32mm.

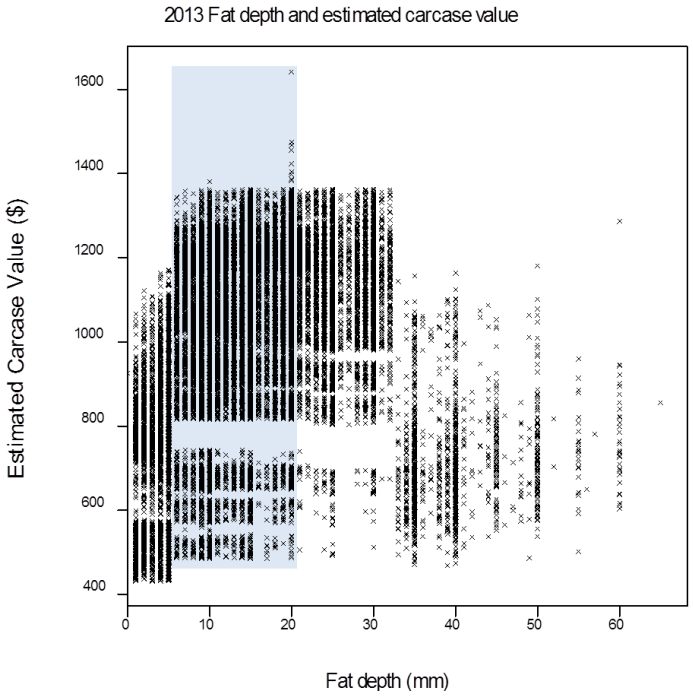

Figure 16. P8 fat depth (mm) and estimated carcase value ($) 2013

4.1.5 Annual non compliance

Figure 17 demonstrates the monthly percentage non-compliance for weight in heifer and steer carcases (>340kg and <280kg) over the 2012 data collection period.

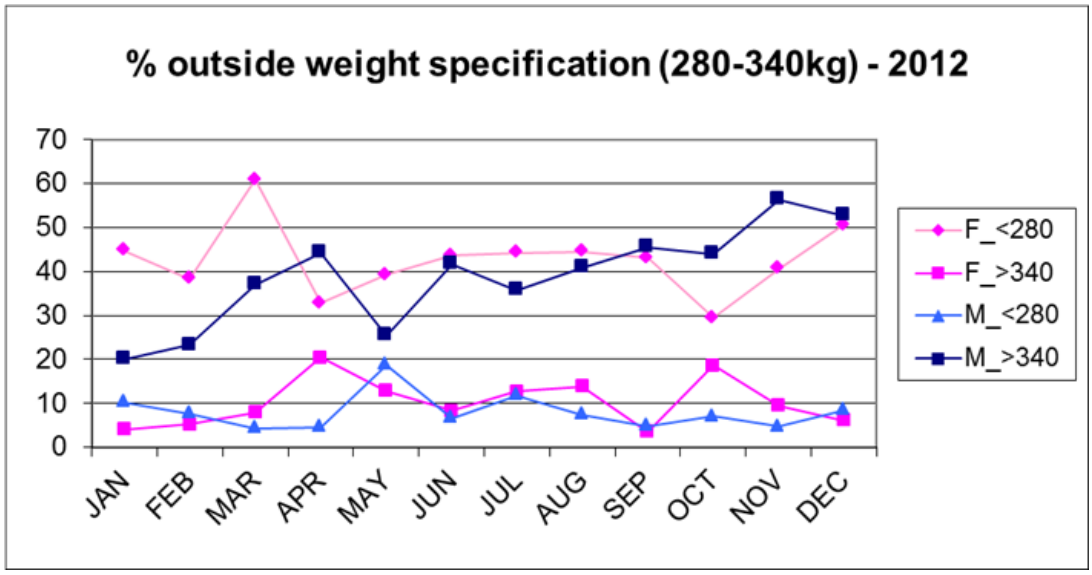

Fig 17. Percentage steers (M) and heifers (F) outside Hot Standard carcase weight (HSCW) specification 2012

The highest levels of non compliance were amongst steers weighing >340kg and heifers weighing <280kg. The graph demonstrates a trend towards heavier steer carcases as the year progressed with the exception of May. In November steer carcases peaked at around 57% non compliant in the >340kg range. Heifer carcases <280kg were a consistent feature across the year. The reverse was demonstrated with steers <280kg. The month of May illustrates the highest percentage of steer carcases <280kg and a corresponding lower percentatge of steers >340kg.

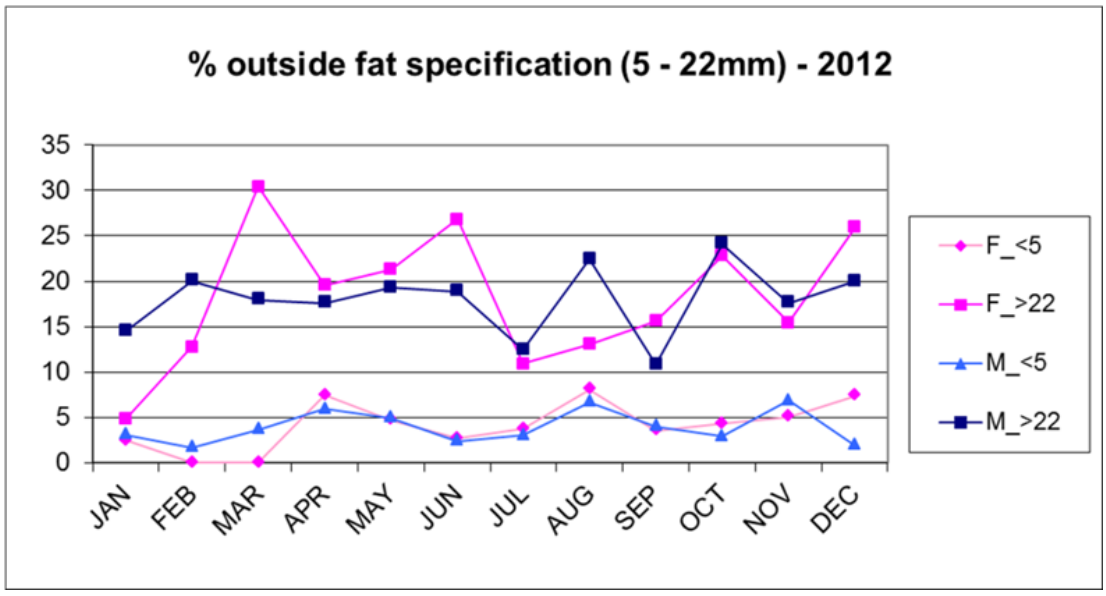

Figure 18. Percentage steers (M) and heifers (F) outside fat depth specification 2012

Figure 18 shows the percentage of steer and heifer carcases falling outside specification each month for either having <5mm fat or >22mm fat.

Heifer carcases with more than 22mm fat provided the highest levels of non-compliance across the year. Thirty percent of heifer carcases with >22mm fat were processed in March, with three more spikes, over 20%, in June, October and December 20%.

The other group with higher levels of non-compliance throughout the year were steer carcases with >22 mm fat.

Figure 19 shows the monthly percentage of non-compliance to weight specification (<280 kg and >340kg) for heifer and steer carcases over the 2013 data collection period.

From January through to July heifers <280kg ranged from over 60% to just over 40% non compliant. The number of steers in the lower weight range category <280kg stayed relatively stable between 10 and 20% across this time.

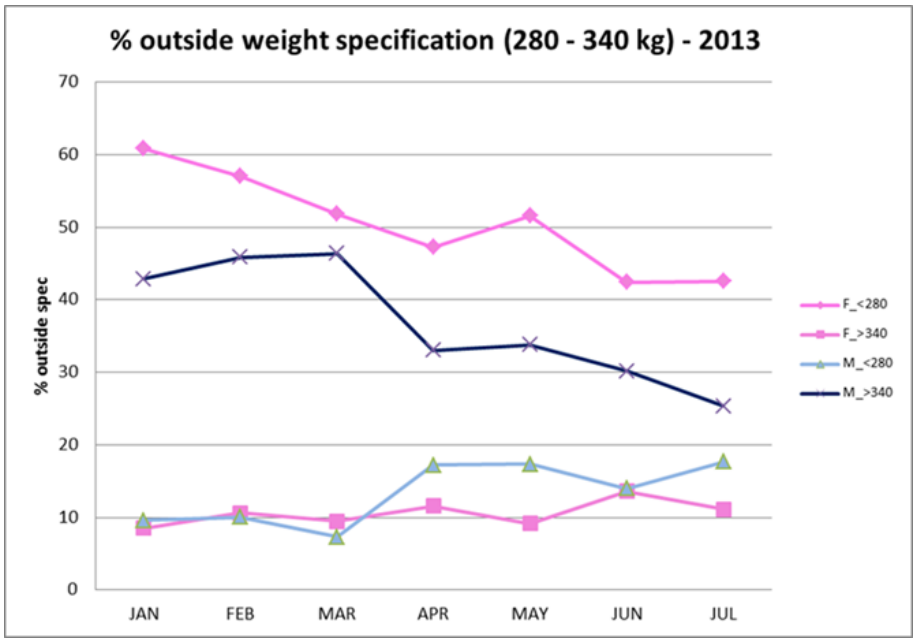

Figure 19. Percentage steers (M) and heifers (F) outside HSCW specification 2013

Heavier steer carcases in the >340kg out of specification group ranged from between 40% and 50% in the first three months to less than 30% in July.

Other than the heifers with <5mm fat, the percentage of non-compliance for heifers over fat or steers either over or under fat were within the 5-7% out of specification range across the seven months. As with the heifer carcases shown in Figure 21 the heifers over this seven months were both underweight with regards to meeting specification as well as having <5mm fat.

Figure 20. shows the percentage non-compliant to 5-22mm P8 fat depth specification for heifers and steers for 2013.

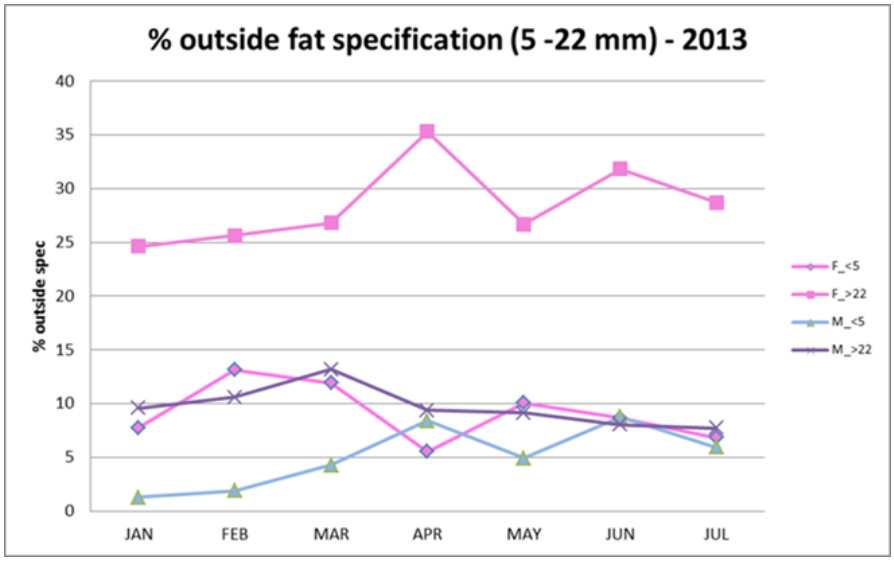

Figure 20. Percentage steers (M) and heifers (F) outside fat depth specifications 2013

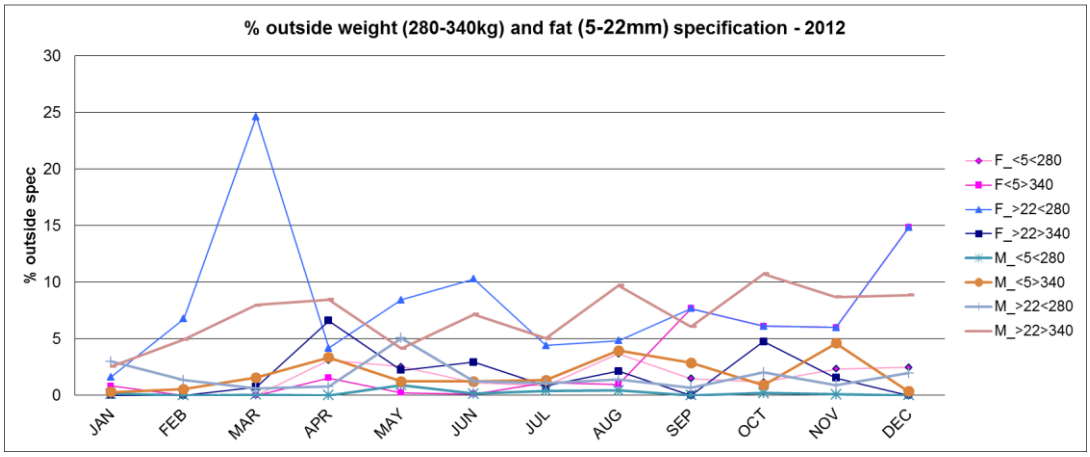

Figure 21. Percentage steers (M) and heifers (F) outside weight and fat specifications 2012

Figure 21 shows the percentage outside weight and fat specifications for heifers and steers in 2012.

The greatest inconsistency in meeting specification was the females with >22mm fat and a carcase weight <280kgs. A spike of up to 25% outside specification during March and again up to 15% in December is evident. No clear reason can be provided for the spike in specification for over fat light weight heifers in 2012. It is possible that a good spring in 2011 continuing through to a wet summer led to over conditioned heifers being supplied into the market. Similarly a higher prevalence of over conditioned steers were observed in the same period.

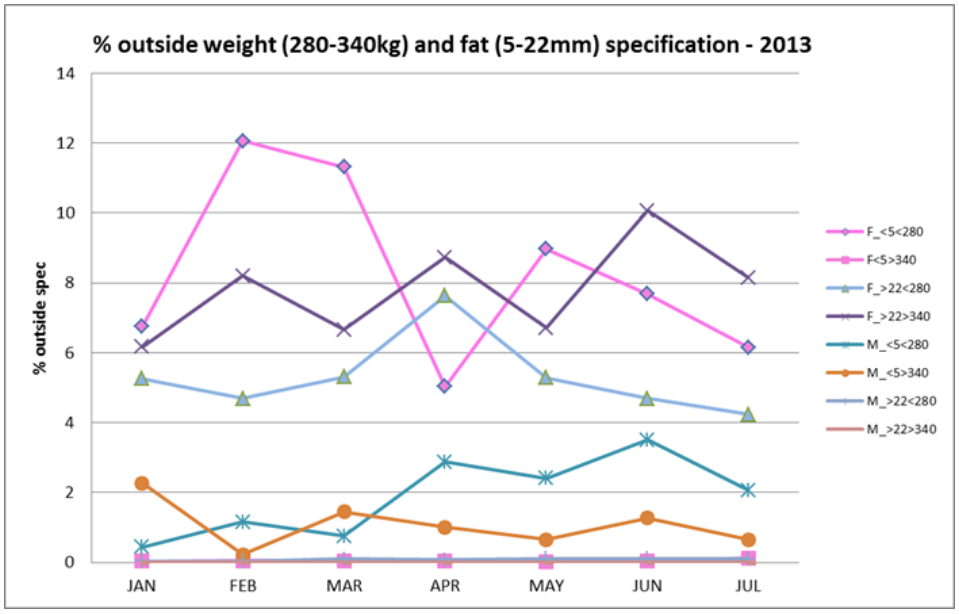

Figure 22. Percentage steers (M) and heifers (F) outside weight and fat specifications 2013

Figure 22 illustrates over the six month period in 2013 the percentage outside weight and fat specifications for steers and heifers.

Across 2013 steer carcases showed increasing levels of compliance to specifications, whilst the heifers showed higher levels of non-compliance and variation throughout the year.

Cull breeding heifers in February may have caused the spike in the supply of light heifers as well as poor seasonal conditions across the procurement area in autumn 2013. The poor autumn may also have contributed to a general turnoff of heifers, reducing breeding numbers within herds.

4.2 Cost from non-compliance

4.2.1 2012 Cost of non-compliance

Table 1 shows 3,905 heifers in this 2012 dataset derived from the grid with 1,342 (34%) having met both the weight and fat specification for the 2012 grid. They had an average weight of 305 kg, an average P8 of 14 mm and an average value of $962.

Of the 66% of heifers that did not meet specification, 1,502 (38% of the total) were too light, 491 (13% of the total) were too heavy, and 570 (15% of the total) were the target weight but either too lean or too fat. The average discount for all light heifers was $0.27/kg and the average lost revenue per carcase was $67. These values were higher if the carcases were also out of fat specification (on average up to $0.61/kg and up to $149 per carcase). Similarly, the average discount for all of the heavy heifers was $0.53/kg and the average lost revenue per carcase was $199with these values being higher if the carcases were also out of fat specification (up to $0.64/kg and up to $$204 per carcase). The discount for not meeting the P8 range only was relatively low at an average of $0.09/kg for a carcase loss of just $28.

Putting these calculations together to calculate the total cost of non-compliance, this value is almost $250,000 across all of the 2,563 non-compliant heifers. This is equivalent to $0.30/kg

or close to $100 per carcase. Across all the heifers, the cost of the non-compliance is $63 per carcase. The total value of all of these heifers would have been approximately 7.4% higher if they had all met weight and fat specifications.

There were 9,922 steers in total in this 2012 dataset. 3,768 (38%) met both the weight and fat specification for the 2012 grid. They had an average weight of 314 kg, an average P8 of 14 mm and an average value of $1037. 40% of all steers were too heavy, 8% were too light, and 14% were the right weight but either too fat or too lean.

Going through the same calculations as for the heifers, the total cost of non-compliance for the steers is over $470,000 across all of the 6,154 non-compliant steers. This is equivalent to $0.16/kg or about $50 per carcase. Across all the steers, the cost of the non-compliance is $47 per carcase. The total value of all of these steers would have been 4.6% higher if they had all met weight and fat specifications.

In aggregate for the 13,827 heifer and steer carcases assessed in the 2012 data set, 8717 or 63% were non-compliant to either HSCW, P8 fat, or both. The total cost of this non-compliance is over $716,000 across all of the non-compliant carcases. This is equivalent to $0.23/kg or about $75 per carcase. Across all the carcases, compliant and non-compliant, the cost of the non-compliance is $51 per carcase. The total value of all of these cattle would have been some 5.3% higher if they had all met weight and fat specifications.

Table 1: 2012 Estimated non-compliance costs

Heifers	n	HCWT_avg	P8_avg	Discount_avg	EstValue_avg	EstLoss_avg	EstValue_total	EstLoss_total	%Loss/Value
<280	1502	254.9	15.6	0.27	736	67	1098518	99962	9.1
<280_<5	70	253	2.6	0.61	648	149	45328	10462	23.1
<280_>22	265	258	28.4	0.42	702	108	179687	27702	15.4
280-340	1912	305.7	16.4	0.09	934	28	1769407	53045	3.0
280-340/5-22	1342	305.5	14.1	0	962	0	1292220	0	0.0
>340	491	367.5	17	0.53	956	199	447442	93324	20.9
>340_<5	21	364.5	2.7	0.75	875	273	19248	6015	31.3
>340_>22	110	368	30	0.78	865	288	93392	31137	33.3
Total Heifers	**3905**	**309.4**	**16.3**	**0.30**	**875**	**98**	**3315367**	**246331**	**7.4**
Steers	n	HCWT_avg	P8_avg	Discount_avg	EstValue_avg	EstLoss_avg	EstValue_total	EstLoss_total	%Loss/Value
<280	842	262.8	16.4	0.19	818	49	688864	41389	6.0
<280_<5	23	264.4	3	0.55	727	145	17453	3491	20.0
<280_>22	161	262	28.3	0.37	767	98	123485	15726	12.7
280-340	5117	314.4	15.9	0.05	1021	17	5172789	85474	1.7
280-340/5-22	3768	314.3	14	0	1037	0	3910768	0	0.0
>340	3963	369	15.9	0.23	1129	87	4451187	343617	7.7
>340_<5	230	374.3	2.8	0.55	1017	204	218768	43754	20.0
>340_>22	728	368.8	28.6	0.37	1077	139	778768	100289	12.9
Total Steers	**9922**	**315.4**	**16.1**	**0.16**	**989**	**51**	**10312840**	**470480**	**4.6**
Total All	**13827**	**312.4**	**16.2**	**0.23**	**932**	**75**	**13628207**	**716811**	**5.3**

Table 2: 2013 Estimated non-compliance costs

Heifers	n	HCWT_avg	P8_avg	Discount_avg	EstValue_avg	EstLoss_avg	EstValue_total	EstLoss_total	%Loss/Value
<280	9650	245.7	12.6	0.45	770	102	7427640	988501	13.3
<280_<5	1570	229.8	2.1	0.94	609	209	952512	328402	34.5
<280_>22	1024	261.1	28	0.39	826	101	845520	103689	12.3
280-340	7435	305.3	20.9	0.17	1031	53	7637994	390031	0.5
280-340/5-22	4135	302.4	15.7	0	1013	0	4438519	0	0.0
>340	2014	367.4	29.1	0.77	1013	290	2072404	593187	28.6
>340_<5	9	353.8	2.8	0.17	1194	62	10746	559	5.2
>340_>22	1513	369.8	33.5	0.91	969	344	1466247	519814	35.5
Total Heifers	**19099**	**306.1**	**20.9**	**0.46**	**938**	**148**	**17138038**	**1971998**	**11.5**
Steers	**n**	**HCWT_avg**	**P8_avg**	**Discount_avg**	**EstValue_avg**	**EstLoss_avg**	**EstValue_total**	**EstLoss_total**	**%Loss/Value**
<280	3947	261.3	8.9	0.35	866	89	3403216	352472	10.4
<280_<5	623	253.9	2.9	0.78	729	198	453854	123392	27.2
<280_>22	23	269.7	24.1	0.16	942	42	21673	968	4.5
280-340	14509	311.1	12.4	0.11	1102	33.3	15986081	482675	3.0
280-340/5-22	12061	311.1	12.9	0	1136	0	13698131	0	0.0
>340	11558	375.1	16.4	0.39	1215	154	14041392	1781362	12.7
>340_<5	495	384.1	2.8	0.85	1076	327	532399	161621	30.4
>340_>22	2218	388.6	27.4	0.49	1221	198	2708071	438127	16.2
Total Steers	**30014**	**315.8**	**12.6**	**0.28**	**1061**	**92**	**33430689**	**2616509**	**7.8**
Total All	**49113**	**311.0**	**16.7**	**0.37**	**999**	**120**	**50568727**	**4488507**	**9.1**

4.2.2 2013 Cost of non-compliance

In Table 2, the number of carcases is much higher than in Table 1, even though only a six month period is covered. The company made a concerted effort to increase pasture-fed throughput, and this resulted in a much more variable group of carcases passing through the plant.

There were 19,099 heifers in the 2013 dataset, but only 4135 of them (22%) met both the weight and fat specification for the 2013 grid: 9,650 (more than 50% of the total) were too light, 2014 (11% of the total) were too heavy, and 3,300 (17% of the total) were the right weight but either too lean or too fat. The total cost of non-compliance was over $1.6 million across all of the 14,965 non-compliant heifers. This is equivalent to $0.46/kg or close to $150 per carcase. Across all the heifers, the cost of the non-compliance is $84 per carcase. The total value of all of these heifers would have been 9.5% higher if they had all met weight and fat specifications.

There were 30,014 steers in this dataset, but only 12,061 of them (40%) met both the weight and fat specification for the 2013 grid. 39% of all steers were too heavy, 13% were too light, and 8% were the right weight but either too fat or too lean. The total cost of non-compliance for the steers is over $2.6 million across all of the 17953 non-compliant steers. This is equivalent to $0.28/kg or about $92 per carcase. Across all the steers, the cost of the non-compliance is $87 per carcase. The total value of all of these steers would have been 7.8% higher if they had all met weight and fat specifications.

In aggregate for the 49,113 heifer and steer carcases assessed in the 2013 data set, 32,917 of them (67%) were non-compliant. The total cost of this non-compliance was almost $4.6 million across all of the non-compliant carcases. This is equivalent to $0.37/kg or about $120 per carcase. Across all the 49,113 carcases, the cost of the non-compliance is $86 per carcase. The total value of all of these cattle would have been 9.1% higher if they had all met weight and fat specifications.

4.3 Processor views on compliance

Interviews were held with representatives of both the livestock supply and beef marketing divisions of the company. The discussions revealed that the grid prices offered to producers for any two-week period were based on the following criteria:

(a) The overall level of beef prices in the market.
The processor has a range of market outlets for the beef they supply, both domestically and in export markets. Some of these markets are based on relatively long term contracts, others on medium and short term contracts, and some are opportunistic depending on circumstances at a particular time. The returns from these spot market sales can be quite variable. The grid prices offered do not reflect this short term variability, so the relationship between grid prices and prices in the spot markets is not close over a short time frame. However the company expects that over a longer time frame the grid prices would generally reflect movements in the beef market.

(b) The premiums that consumers are willing to pay for quality.
Prices for MSA-graded carcases are higher than for non-graded carcases. For example, in the 2012 grid shown in Appendix 1, the processor offered $3.15/kg for a heifer carcase of 300-320kg, 5-22mm fat, 0-2 teeth and conformation A-C that graded MSA. For the same carcase that did not grade MSA, the price offered was $3.00/kg. This premium reflects the premiums available in the market for retail cuts from MSA graded carcases (Griffith and Thompson 2012).

(c) The combination of carcase characteristics that lead to higher retail beef yield.
The processor indicated that from experience and from the available research they offered higher prices for some types of carcases because they had an expectation that these carcases would provide a higher saleable beef yield.

(d) Processing cost.
Light weight carcases cost the same to process as heavier carcases, so the cost/kg of light weight carcases coming off the chain was considerably higher and this cost could not be recouped in the market. A lower price had to be offered on the grid. Heavy carcases on the other hand slowed down the chain and as well there were serious OH&S issues with slaughtering and processing staff. The processor indicated that they had done a lot of study of plant efficiency as it related to carcase size.

(e) Portion size. This was a major parameter.
The processor indicated that the food service sector had very precise portion requirements for the high value primals (eg tenderloin less than 0.9kg, striploin less than 2.7kg, cube roll less than 1.4kg). If the portion size was too large, they would not be bought and would have to be discarded into trimmings and mince. Thus a $7/kg striploin could end as $4.50/kg mince. Discounts also had to be offered for large rumps.

5. Cost of non-compliance discussion

In these pasture-fed data sets, the proportion of carcases that are non-compliant with the processor specifications, and the cost of this non-compliance (company and meat quality specifications) in terms of forgone revenue, is substantial and much higher than that found for grain-fed carcases. For example, Slack-Smith et al. (2009) estimated that out-of-specification costs for weight and P8 fat in the short-fed market averaged $5.50 and $17.50/carcase respectively, but could be as high as $60 and $80/carcase, respectively. Here, in the pasture grass-fed market, average out-of-specification costs for weight and P8 fat ranged between $47 and $148/carcase across all carcases, but could be as high as $344/carcase.

The values calculated for average discount and average loss per carcase indicate the potential economic benefits from improved compliance, and the amount of money that could be invested to improve compliance. For example, using the 2013 data set, more than half of the heifers offered to the processor were too light. This resulted in an average penalty of $0.45/kg or about $100 per carcase. The producer could spend up to $0.45/kg or up to $100 per head, on changing on farm practices, to ensure these heifers made the minimum weight thresh-hold. Such changes could range from improved animal assessment and drafting skills, purchasing supplementary feed or using different genetics all the way to investing in new pasture species. Applying decision support tools such as BeefSpecs that provide a better prediction of the outcomes from current practices could also be used. This project identified losses incurred during 2012, where compliance rates were driven by supply requirements at the expense of meeting target market specifications.

Conversely, in the same data set, almost 40% of the steers were too heavy. This resulted in an average penalty of $0.39/kg or about $150 per carcase. Using the same argument as for the heifers, the producer could spend up to this amount to ensure these steers did not exceed 340kg. However closer examination of Table 2 shows that these average heavier animals are worth more than $100 above the average weight compliant animals. The discount for being too heavy is almost outweighed by the value of the extra kilos.

However, just growing heavier steers is not a costless exercise. Larger, heavier animals require more feed. This suggests that a formal analysis of the benefits to producers from attempting to reduce the costs of non-compliance must be done in the context of the whole farm system, where the producer is bound by the constraint of total feed supply and has to make trade-offs between stocking rate and growth rate. That is the type of analysis reported in Graham et al. (2009) and related papers, where the software package Beef-N-Omics was used to match feed demand and feed supply in a Victorian pasture-fed production system. Carcase weight and faster growth were the main determinants of profitability in that analysis.

5.1 An Improved Compliance Scenario

Improving skills in live animal assessment and understanding target markets would be the first step in addressing non-compliance. Another option to support decision making is to use decision support tools such as Beef Specs. The BeefSpecs decision support tool allows producers to better estimate final weight and fat measures given starting weight and estimated growth rates. McKiernan (2011) undertook a number of simulation experiments with the package and concluded that it was not unreasonable to expect a 50% improvement in compliance rates from using the tool once the producer was experienced in defining the input data.

In the Exit Report for the Beef CRC, Griffith and Burrow (2014) estimated savings in the cost of non-compliance from using BeefSpecs as a net $10/head for pasture fed cattle (based on the short fed grain fed results of Slack-Smith et al (2009) and assuming they might be similar for pasture fed), and $35/head for feedlot cattle (based on McKiernan 2011). However, given the non-compliance costs estimated above, between $47 and $148/carcase across all carcases, a $10/head saving for pasture fed would seem to be a significant under-estimate.

In the following scenario, it was assumed that the producers supplying this processor during 2013 had access to and were trained in the use of the BeefSpecs decision support tool. Rather than assume a specific saving per carcase, it was assumed following McKiernan (2011) that the proportions of carcases assessed as non-compliant were reduced by half. That is, half of the heifers and steers that were too light moved up into the acceptable weight range, and half of the heifers and steers that were too heavy moved down into the acceptable weight range. Thus in terms of the distributions of weight and fat illustrated above for the 2013 data, the assumed distribution becomes more concentrated around the mean, with smaller tails on both sides. Almost 6800 carcases move from under-weight to acceptable weight, and about the same number move from over-weight to acceptable weight.

The proportions falling outside the acceptable fat range were kept the same as in the actual 2013 data. The same average discounts per kg and per carcase were also retained.

The results of this exercise are shown in Table 3. Losses from being under- or over-weight are essentially halved, but losses from being in the acceptable weight range are increased because there are almost 13,700 extra carcases in this group and over 16% of them are discounted because they are out of specification for fat depth. However the net result is a substantial reduction in the aggregate losses due to being out of specification, a saving of $484,667 for the heifers and a saving of $809,577 for the steers, summing to $1,294,244. This is a saving of 28% of the actual 2013 loss of $4,588,507 calculated in Table 2, or on a per carcase basis, a reduction in losses from $93/head to $67/head, or by $26/head.

Table 3: Improved Compliance Scenario, 2013 data

Heifers	**n**	**Discount_avg**	**EstLoss_avg**	**EstLoss_total**
<280	4825	0.45	102	492150
<280_<5	785	0.94	209	164065
<280_>22	512	0.39	101	51712
280-340	13267	0.17	53	703151
280-340/5-22	9967	0	0	0
>340	1007	0.77	290	292030
>340_<5	5	0.17	62	279
>340_>22	757	0.91	344	260236
Total Heifers	19099			1487331
Steers	**n**	**Discount_avg**	**EstLoss_avg**	**EstLoss_total**
<280	1974	0.35	89	175642
<280_<5	312	0.78	198	61677
<280_>22	12	0.16	42	483
280-340	22262	0.11	33	741325
280-340/5-22	19814	0	0	0
>340	5779	0.39	154	889966
>340_<5	248	0.85	327	80933
>340_>22	1109	0.49	198	219582
Total Steers	30015			1806932
Total All	49114			3294263

6. Analysis of non-compliance by local government area

Data sets from 2012 and 2013 were examined in relation to Property Identification Code (PIC) which identified the local government area which was the likely location of livestock supply in a pasture fed supply chain. Assumption being that stock for pasture fed supply will most likely be finished on farm of origin or, traded 'locally' for finishing.

Data were examined by extracting MSA eligible heifers and steers which were non-compliant for preferred carcase weight (280-340kg), fat depth (5-22mm) or both. Areas that did not supply significant numbers of non-compliant stock have not been noted in the tables below.

6.1 2012 Non-compliance by local government area

Table 4: Heifers - Out of specification for weight (n=960)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	87	271	14	67
Baw Baw	61	290	14	72
East Gippsland	41	263	14	36
Hepburn	35	275	13	91
Moorabool	30	279	16	41
South Gippsland	372	275	14	81
Towong	38	282	12	94

Table 5: Heifers - Out of specification for fat (n=280)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	10	307	25	88
Colac Otway	10	316	29	120
Glenelg	15	302	17	107
Greater Geelong	19	304	23	71
La Troe	10	293	27	29
Moorabool	16	308	31	168
South Gippsland	85	306	24	96
Wellington	24	307	29	125

Table 6: Heifers – Out of specification for weight and fat (n= 307)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Glenelg	14	289	18	161
Greater Geelong	25	275	27	121
Moorabool	22	289	30	175
South Gippsland	105	275	23	151

Table 7: Steers - Out of specification for weight (n=2442)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	200	354	14	60
Baw Baw	262	345	14	58
Colac Otway	140	366	15	66
East Gippsland	167	344	15	58
Hepburn	56	347	13	56
Moorabool	44	345	14	51
South Gippsland	691	344	14	56
Southern Grampians	91	374	13	79
Towong	58	382	14	86
Wellington	24	352	15	61
Yarra Ranges	44	345	14	54

Table 8: Steers - Out of specification for fat (n=797)

Local government area	n	Average HSCWT (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	62	315	23	56
Baw Baw	60	315	22	81
Colac Otway	32	316	27	104
East Gippsland	35	313	21	95
Greater Geelong	21	313	21	115
Hepburn	40	318	24	81
Murrindindi	20	316	22	109
South Gippsland	263	317	24	84
Wellington	78	315	27	63
Yarra Ranges	22	312	29	97

Table 9: Steers - Out of specification for weight and fat (n=205)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Baw Baw	70	339	23	135
Colac-Otway	68	367	24	151
East Gippsland	49	348	22	126
South Gippsland	206	356	24	132
Wellington	58	352	27	142

6.2 2013 Non-compliance by local government area

Table 10: Heifers - Out of specification for weight (n=1838)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Baw Baw	120	243	14	98
Benalla	78	260	14	69
Colac Otway	110	261	15	53
Corangamite	115	256	14	71
East Gippsland	51	258	12	80
Greater Hume	363	266	14	59
Hepburn	45	261	13	56
Mansfield	43	258	15	51
Mitchell	49	263	14	54
Moyne	48	263	13	59
Murrindindi	101	259	14	58
South Gippsland	173	258	14	74
Surf Coast	60	288	115	74
Towong	79	279	14	62
Wangaratta	63	253	13	57

Table 11: Heifers - Out of specification for fat (n=701)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Benalla	30	308	28	141
Colac Otway	34	302	27	29
Corangamite	80	309	28	135
Greater Hume	139	309	29	94
Mitchell	20	316	28	110
Murrindindi	45	306	28	100
South Gippsland	89	309	28	97
Surf Coast	43	307	27	112
Towong	42	314	27	58

Table 12: Heifers - Out of specification for weight and fat (n=741)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Corangamite	66	282	20	186
Greater Hume	127	303	23	180
South Gippsland	134	270	19	157
Towong	53	345	30	255

Table 13: Steers - Out of specification for weight (n=4241)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	474	364	15	100
Baw Baw	499	367	15	120
Colac Otway	137	339	13	80
East Gippsland	108	349	14	115
Greater Geelong	103	307	14	60
Greater Hume	174	290	13	46
Hepburn	115	324	13	60
La Trobe	57	339	14	63
Mansfield	76	284	11	41
Moorabool	68	314	13	57
Murrindindi	92	356	13	120
South Gippsland	1520	357	14	103
Towong	152	360	15	112
Wellington	213	345	13	89
Yarra Ranges	93	309	12	49

Table 14: Steers - Out of specification for fat (n=380)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass Coast	42	322	22	71
Baw Baw	16	316	15	165
Hepburn	15	320	22	47
Murrindindi	14	323	22	53
South Gippsland	1250	317	19	82
Towong	13	319	25	61
Wellington	34	315	12	172

Table 15: Steers - Out of specification for weight and fat (n=826)

Local government area	n	Average HSCW (kg)	Average fat depth (mm)	Out of specification Foregone value ($)
Bass	66	379	27	144
Baw Baw	127	393	25	169
South Gippsland	134	377	20	209

Particular areas could be identified for having a greater likelihood of supplying out of specification stock. For example, Bass Coast and South Gippsland tended to supply overweight and over fat steers though supplied lighter weight over fat heifers.

Extension programs managing stock to meet market requirements could be tailored and have greater promotion in these areas.

7. Analysis of non-compliance by producer

Data sets from 2012 and 2013 were examined in relation to Property Identification Code (PIC) which identified the breeder location as the likely source of supply within this particular pasture fed supply chain. The assumption being that stock for pasture fed supply will most likely be finished on farm of origin or, traded 'locally' for finishing. Data were examined by extracting eligible heifers and steers which were non-compliant for preferred carcase weight (280-340kg) or fat depth (5-22mm). Producers that did not supply significant numbers of non-compliant stock have not been noted in the tables below.

7.1 2012 Non-compliance by producer

Table 16: Heifers – out of specification for weight (n=960 from 79 suppliers)

Producer	Locality	No. consigned	No. out of spec	% out of spec	Average HSCW (kg)	Average fat depth (mm)	Average Foregone value ($)
3BSDW	Glen Forbes	17	12	70.6	323	12	178
3BSER	Almurta	25	20	80.0	252	14	50
3BSJF	Kongwak	44	18	40.9	257	13	33
3BSJW	Outtrim	29	14	48.3	278	14	74
3BWRB	Trafalgar	58	19	32.8	290	13	58
3BWTE	Yarragon South	74	30	40.5	306	13	81
3DTJR	Swanpool	30	11	36.7	293	16	80
3EGNG	Gelantipy	37	26	70.3	257	13	41
3GGEM	Anakie	59	12	20.3	285	14	73
3GLVH	Heywood	55	15	27.3	272	14	87
3HPWJ	Mollongghip	15	13	86.7	238	12	93
3MBAN	Claretown	53	10	18.9	294	16	35
3SBSY	Gooram	44	18	40.9	346	12	198
3SGBW	Poowong	38	16	42.1	254	14	57
3SGGA	Leongatha	41	11	26.8	281	14	85
3SGJC	Jumbunna	22	14	63.6	248	15	65
3SGKK	Outtrim	43	16	37.2	264	14	75
3SGLI	Ruby	15	11	73.3	240	12	91
3SGLT	Leongatha	72	27	37.5	258	15	66
3SGLW	Leongatha South	39	25	64.1	259	14	41
3SGQN	Middle Tarwin	39	18	46.2	285	11	110
3SGSH	Buffalo	78	31	39.7	265	14	68
3SGSJ	Tarwin	51	35	68.6	264	12	31
3SGUG	Yanakie	70	27	38.6	298	15	121
3SGUS	Port Franklin	47	16	34.0	247	16	79
3SGXP	Tarwin Lower	74	18	24.3	351	15	185
3TWMA	Towong	53	24	45.3	295	11	113
3WALI	Oxley	16	12	75.0	262	17	82
3WLOH	Woodside	28	12	42.9	265	16	31
NH300	Tabbita	90	40	44.4	304	14	108

Table 17: Heifers – Out of specification for fat (n=280 from 79 suppliers)

Property	Locality	No consigned	No out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3GGEM	Anakie	59	12	20.3	306	24	86
3GLVH	Heywood	55	12	21.8	302	15	128
3MBAN	Claretown	53	11	20.8	310	33	231
3SGGS	Leongatha	41	10	24.4	308	24	89
3SGLA	Leongatha South	63	10	15.9	313	23	43
3SGUG	Yanakie	70	13	18.6	310	20	182
NH300	Tabbita	90	11	12.2	313	22	100

Table 18: Steers – out of specification for weight (n=2442 from 137 suppliers)

Property	Locality	No. consigned	No. out of spec	% out of spec	Average HSCW	Average fat depth	Average Foregone value
3BSDL	Kernot	62	13	21.0	308	14	62
3BSHL	West Creek	156	45	28.8	357	15	156
3BSJA	Outtrim	24	10	41.7	359	13	24
3BSJF	Kongwak	144	38	26.4	377	13	144
3BSJW	Outtrim	52	27	51.9	360	14	52
3BSLH	Inverloch	58	19	32.8	328	16	58
3BSLK	Wattle Bank	23	19	82.6	365	14	23
3BWES	Neerim South	79	36	45.6	332	13	79
3BWFA	Hill End	100	29	29.0	359	14	100
3BWRB	Trafalgar East	139	67	48.2	371	15	139
3BWRB	Trafalgar	121	43	35.5	344	13	121
3 CEMP	Bookaar	56	30	53.6	374	13	56
3CLLH	Marroon	76	22	28.9	348	15	76
3CLPW	Merangamete	53	21	39.6	369	16	53
3CLXR	Apollo Bay	65	31	47.7	369	14	65
3CPYL	Muskerry	51	18	35.3	284	10	51
3EGJM	Woodglen	46	19	41.3	359	13	46
3EGNG	Gelantipy	68	45	66.2	354	12	68
3EGVW	Lucknow	128	56	43.8	350	16	128
3GGNP	Marras Hill	36	18	50.0	354	14	36
3GMMG	Brit Brit	86	45	52.3	368	15	86
3GMTR	Wannon	82	46	56.1	379	12	82
3HPYU	Bullarto South	140	33	23.6	366	14	140
3LAKS	Yinnar South	48	19	39.6	353	14	48
3MYMN	Woolsthorpe	80	18	22.5	297	15	80
3SGBW	Poowong	76	24	31.6	346	11	76
3SGEK	Bena	64	35	54.7	365	13	64

Property	Locality	No. consigned	No. out of spec	% out of spec	Average HSCW	Average fat depth	Average Foregone value
3SGJW	Bena	123	28	22.8	332	15	123
3SGLT	Leongatha South	102	38	37.3	316	14	102
3SGRU	Outtrim	130	59	45.4	313	13	130
3SGSG	Meeniyan	84	42	50.0	346	13	84
3SGSH	Buffalo	96	43	44.8	367	14	73
3SGSJ	Tarwin	192	39	20.3	348	16	38
3SGUG	Yanakie	104	34	32.7	369	14	63
3SGXP	Tarwin Lower	95	39	41.1	347	13	54
3TWMA	Cudgewa	52	29	55.8	395	13	108
3WLLF	Denison	74	21	28.4	355	16	48
3WLMG	Munro	56	36	64.3	371	14	71
3WLOE	Dutson Downs	56	29	51.8	313	15	64
3WLXF	Rosedale	144	47	32.6	365	15	68
3YRHJ	Healesville	92	23	25.0	334	13	42
NC30069	Hay	52	22	42.3	373	15	74
NH30062	Tabitta	152	51	33.6	320	14	49

Table 19: Steers – Out of specification for fat (n=797 from 137 suppliers)

Property	Locality	No. consigned	No. out of spec	% out of spec	Average HSCW	Average fat depth	Average Foregone value
3BSJF	Kongwak	144	18	12.5	312	22	67
3BSLH	Inverloch	58	12	20.7	312	24	42
3BWES	Neerim South	79	10	12.7	309	24	95
3BWFA	Hill End	100	12	12.0	318	28	73
3BWME	Trafalgar East	139	12	8.6	322	25	70
3BWTE	Yarragon South	194	16	8.2	311	20	64
3CLLH	Murroon	76	10	13.2	306	21	57
3EGVW	Lucknow	128	12	9.4	309	29	73
3HPUG	Newlyn	39	12	30.8	323	28	83
3HPYU	Bullarto South	140	13	9.3	320	20	66
3LAPU	Budgeree	73	11	15.1	318	21	59
3MYMN	Woolsthorpe	80	12	15.0	301	31	84
3SFKF	Freshwater Creek	98	13	13.3	313	22	83
3SGJW	Bena	123	20	16.3	310	23	118
3SGLC	Koorooman	45	13	28.9	326	23	145
3SGRJ	Buffalo	122	32	26.2	309	26	31
3SGRU	Outtrim	130	14	10.8	313	27	55
3SGSJ	Tarwin	192	39	20.3	312	24	77
3SGUG	Yanakie	104	16	15.4	314	21	82

Property	Locality	No. consigned	No. out of spec	% out of spec	Average HSCW	Average fat depth	Average Foregone value
3SGXT	Walkerville	38	13	34.2	318	16	120
3WLLF	Denison	74	11	14.9	321	25	32
3WLOH	Woodside	96	30	31.3	309	26	60
3WLXF	Rosedale	144	18	12.5	323	29	75
3YRHJ	Healesville	92	11	12.0	303	27	54
3YRPA	Gruyere	72	11	15.3	322	31	141
NH30062	Tabbita	152	23	15.1	310	16	104

7.2 2013 Non-compliance by producer

Table 20: Heifers – out of specification for weight (n=1838 from 111 suppliers)

Property	Locality	No. consigned	No. out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3BWES	Neerim South	87	57	65.5	237	15	90
3BWHT	Labertouche	31	10	32.3	263	18	91
3BWMG	Trafalgar	24	13	54.2	241	13	77
3BWMU	Yarragon	19	11	57.9	247	12	139
3BWTE	Yarragon South	18	14	77.8	243	11	147
3CENR	Kariah	322	103	32.0	255	14	74
3CLEH	Cororooke	63	22	34.9	281	14	59
3CLLM	Barwon Downs	22	17	77.3	243	13	69
3CLPW	Gerangamete	71	24	33.8	262	17	40
3CLTR	Murroon	45	25	55.6	248	14	63
3CPAA	Patho	22	16	72.7	241	10	94
3DTFW	Swanpool	146	64	43.8	255	13	73
3DTKM	Merton	38	26	68.4	249	14	66
3EGAT	Omeo	54	18	33.3	276	12	76
3GGEM	Anakie	48	39	81.3	253	13	59
3GMMG	Brit Brit	53	37	69.8	252	15	65
3HPWJ	Mollonghip	94	41	43.6	263	13	34
3MHPH	Beveridge	85	36	42.4	262	14	57
3MROS	Romsey	27	16	59.3	265	15	38
3MUBF	Ghin Ghin	62	21	33.9	277	15	50
3MUGN	Limestone	44	22	50.0	260	14	40
3MYMN	Woolsthorpe	112	48	42.9	263	13	59
3SFSR	Bambra	72	18	25.0	283	13	30
3SGQN	Middle Tarwin	87	36	41.4	257	13	60
3SGRJ	Buffalo	214	64	29.9	247	16	73
3SGRW	Tarwin Lower	62	22	35.5	258	16	41
3SPTM	Arcadia	58	22	37.9	244	12	78

Property	Locality	No. consigned	No. out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3TWDP	Mount Alfred	142	29	20.4	299	13	69
3WART	Meadow Creek	111	58	52.3	250	14	59
3WLXF	Rosedale	49	20	40.8	271	15	69
3YRHJ	Healesville	34	25	73.5	259	12	39
NC320	Holbrook	111	63	56.8	262	14	61
ND320	Jingellic	495	170	34.3	275	15	61
NH320	Tooma	163	73	44.8	257	15	46
NK320	Talmalmo	39	21	53.8	250	14	64
SA121	Mount Schank	105	33	31.4	274	13	73

Table 21: Heifers – Out of specification for fat (n=701 from 111 suppliers)

Property	Locality	No consigned	No out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3CEMP	Bookar	55	17	30.9	309	31	180
3CENR	Kariah	322	64	19.9	309	27	123
3DTFW	Swanpool	146	22	15.1	310	30	180
3MHPH	Beveridge	85	33	38.8	317	28	126
3MUBF	Ghin Ghin	62	10	16.1	303	28	59
3MUDA	Koriella	40	10	25.0	308	35	236
3MYMN	Woolsthorpe	112	18	16.1	314	30	120
3SFME	Winchelsea South	29	14	48.3	305	29	80
3SFSR	Benambra	72	16	22.2	310	27	73
3SGLP	Buffalo	64	13	20.3	316	26	27
3SGQN	Middle Tarwin	87	10	11.5	309	20	105
3SGRJ	Buffalo	214	44	20.6	310	30	118
3SGRW	Tarwin Lower	62	12	19.4	304	26	15
3TWDP	Mount Alfred	142	25	17.6	315	26	33
3TWFT	Towong	38	10	26.3	310	30	150
3WART	Meadow Creek	111	19	17.1	310	26	15
ND320	Jingellic	495	84	17.0	311	28	71
NE320	Rosewood	64	10	15.6	306	35	235
NH320	Tooma	163	28	17.2	306	30	112
SA121	Mount Schank	105	24	22.9	306	29	88

Table 22: Steers – Out of specification for weight (n=4241 from 164 suppliers)

Property	Locality	No consigned	No out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3BSEM	Kernot	52	26	50.0	374	15	113
3BSHL	West Creek	52	20	38.5	351	13	75
3BSJF	Kongwak	270	114	42.2	371	15	104
3BSJW	Outtrim	154	92	59.7	377	17	135
3BSMT	Inverloch	179	102	57.0	359	13	88
3BWRB	Trafalgar	68	30	44.1	369	11	103
3BWTE	Yarragon South	586	368	62.8	377	15	133
3CLLH	Murroon	150	40	26.7	355	11	81
3DTKH	Ancona	61	51	83.6	261	11	30
3EGNG	Gelantipy	177	81	45.8	366	15	134
3GGEM	Anakie	170	63	37.1	306	14	60
3HPYU	Bullarto South	167	41	24.6	349	14	65
3LAPU	Budgeree	146	33	22.6	356	14	76
3MUGN	Limestone	110	39	35.5	354	12	94
3MUGU	Murrindindi	61	33	54.1	278	9	28
3SGFI	Arawata	765	201	26.3	348	13	75
3SGJC	Jumbunna	52	35	67.3	365	13	123
3SGJL	Moyarra	82	45	54.9	376	13	142
3SGJW	Bena	188	143	76.1	376	13	133
3SGKN	Leongatha South	180	129	71.7	371	15	119
3SGLA	Leongatha South	419	190	45.3	378	14	141
3SGLC	Koorooman	120	79	65.8	373	15	122
3SGLT	Leongatha South	193	110	57.0	362	14	96
3SGRU	Outtrim	145	53	36.6	355	13	91
3SGSH	Buffalo	117	59	50.4	360	15	108
3SGSJ	Tarwin	384	99	25.8	287	13	51
3SGUG	Yanakie	253	116	45.8	357	13	81
3TWNS	Nariel Valley	187	76	40.6	360	17	79
3WLMG	Munro	259	96	37.1	329	14	64
3WLXF	Rosedale	233	71	30.5	366	10	127
3YRHJ	Healesville	175	39	22.3	270	10	31
3YRPA	Gruyere	173	35	20.2	346	15	57
NA320	Khancoban	312	105	33.7	270	12	29

Table 23: Steers – Out of specification for fat (n=380 from 99 suppliers)

Property	Locality	No consigned	No out of spec	% out of spec	Average CWT	Average fat depth	Average Foregone value
3BSJF	Kongwak	270	14	5.2	325	25	16
3DTJR	Swanpool	70	10	14.3	319	27	16
3LAPU	Budgeree	146	12	8.2	322	16	126
3MUCB	Kanumbra	41	12	29.3	323	25	16
3SGFI	Arawata	765	27	3.5	317	25	16
3SGLA	Leongatha South	419	31	7.4	318	10	188
3WLMG	Munro	259	10	3.9	312	21	63
3WLXF	Rosedale	233	21	9.0	319	6	246

Individual producers in the supply chain could be identified for having a greater likelihood of supplying out of specification stock. The location of producers supplying out of specification stock was consistent with the local government areas identified previously for having a higher likelihood of supplying those out of specification stock.

If real time data capture and analysis through technologies such as Livestock Data Link (LDL) was available, follow-up with producers in relation to poor levels of compliance could be made soon after processing. This would allow production or management issues to be identified allowing improved performance and conformance to processor grids to be achieved in future deliveries.

8. Summary, discussion and recommendations

The analysis of carcase data from 19 months of supply to this pasture-fed value chain has shown substantial foregone value through carcases not meeting processor weight and fat specifications. The 2012 data set comprised 3,905 heifers and 9,922 steers. Some 66% of the heifers and 62% of the steers did not meet the company specifications for carcase weight and fat depth. For heifers the cost of non-compliance was estimated to be $63 per carcase and for steers it was $47 per carcase. Across all of the 13,827 animals in this data set, the cost of non-compliance summed to almost $717,000 or 5.3% of the total carcase value.

The 2013 data set comprised 19,099 heifers and 30,014 steers. Only 22% of the heifers met the highest value specification on the 2013 grid, with more than 50% of heifer carcases being too light. Just on 40% of steer carcases met the 2013 weight and fat specifications while 39% of all the steers were overweight. The foregone value in non-compliance for heifers was estimated to be $84 per carcase and for steers, $87 per carcase. Across all of the 49,113 animals in this data set, the cost of non-compliance summed to almost $4.5 million or over 9% of the total carcase value.

Improved financial benefits could be gained by beef producers being better able to hit the highest value area on the processor grid. The use of the *BeefSpecs* decision support tool to simulate reduced losses across the 2013 data set demonstrated that more accurate attention to weight specification can improve carcase value and reduce foregone value. Across both years heifer carcases that did not meet minimum weight specifications made up the majority of the non-compliance. This could be attributed to a number of factors such as

poor seasonal conditions resulting in producers turning off stock early. In contrast, non-compliant steer carcases were heavier than the 340kg HSCW specification.

The results show that a number of producers supply livestock that do not meet the processor's preferred target weight and fat ranges, especially where low weight and low fat stock are supplied. This could reflect poor management (nutrition and animal health) of stock through the production cycle or poor performing genetics. Where stock are supplied that are too heavy or too fat it is likely the producer and possibly the buyer are not using equipment such as scales to monitor stock weights through the production cycle or leading up to supply.

The current parcel of work has demonstrated exploration of processor's carcase data to determine the level of non-compliance at a supplier (breeder) level. If data could be analysed in a more timely manner to assess levels of non-compliance, improved feed-back and follow-up with suppliers could be made earlier to assess reasons for non-compliance that may have occurred at the farm level. Appropriate follow up could include skills based training to improve capacity as managers to meet market specifications leading to overall improved performance through the supply chain.

Further investigation is required to understand why, on the one hand, producers market their livestock to meet processor specifications while on the other, carcases don't meet specification. A number of reasons could be possible. Issues such as variation in seasonal conditions over the data collection period, livestock systems, producer attitude to meeting the sweet spot on the grid or price incentive and live cattle assessment skills all present potential reasons. Producers need to scrutinise their whole farm system including livestock genetics, pastures, calving time and markets so they can maximise their ability to meet target market specifications and reduce their level of non-compliance to ensure their losses are minimised.

For the processor, the benefits of higher compliance levels would potentially lie in efficiency of throughput at plant level and ease of marketing a known quality and quantity of beef product and the opportunity cost of moving non-compliant product. The company grids used at the time of this project however did not reflect a significant premium for hitting the highest paying point in the grid, this may reflect the ability of the processor to access a number of different wholesale markets with different requirements cost effectively; as a result the company procurement model may reflect this in its buying behaviour. Over the course of the project the processor has continued to modify the MSA grid to reflect Southern Australian beef supply and market demand.

Another component in the supply chain is that of the buyer for the processor and the demand made on him/her in meeting supply requests. There may be a 'bullwhip effect' where unforeseen spikes in demand or overestimations of demand result in the buyers having to fill orders in a relatively short time frame and increasing the likelihood of buying non-complying livestock. The consequences of this exacerbate difficulties in the producer receiving clear market signals.

Profitable pasture-fed production systems require well attuned management in matching feed supply with demand to consistently produce cattle suited to the target market. There is significant further work to be completed right through the supply chain from whole farm systems and livestock purchases, through to the processor in marketing and delivering clear market signals. It is anticipated that an analysis of the type reported by Graham et al. (2009) will be undertaken as the options for on-farm changes in production and management practices become better defined.

Recommendations:

1: Explore options for providing a training program for producers that combines developing skills in BeefSpecs with linkages to improved understanding of processor feed-back information. This could be provided as a pilot prior to, or as Livestock Data Link is further developed.

2. Through timely recognition of high levels of non-compliance, identify poor supplier performance and trace back to understand why poor compliance occurs. For example, is it driven by seasonal conditions, buyer 'pressure' or low standards of stock management on farm.

9. Appendices

Appendix 1: Non-compliance summary tables

Table 1.

Heifers (F) & steers (M) outside weight specification <280kg & >340kg weight										
Year	**F**	**F <280**	**%**	**F >340**	**%**	**M**	**M <280**	**%**	**M >340**	**%**
2012	6317	2526	40.0	1389	22.0	14680	1137	7.8	5849	39.8
2013	19266	9650	50.1	2044	10.6	29416	3847	13.3	11064	36.8

Table 2.

Heifers (F) & steers (M) outside fat specification <5mm & >22mm fat										
Year	**F total**	**M total**	**F <5mm**	**%**	**F >22mm**	**%**	**M <5mm**	**%**	**M >22mm**	**%**
2012	6317	14680	287	4.5	1195	19.0	638	4.3	2724	18.6
2013	19266	29416	1740	9.0	5522	28.7	1422	4.8	2867	9.7

Table 3.

Heifers outside weight and fat <280 & >340 kg and <5mm and >22mm fat									
Year	**Total**	**<5<280**	**%**	**<5>340**	**%**	**>22<280**	**%**	**>22>340**	**%**
2012	6317	116	1.84	33	0.52	451	7.14	156	2.47
2013	19266	1570	8.15	9	0.05	1024	5.32	1513	7.85

Table.4

Steers outside weight and fat <280 & >340 kg and <5mm and >22mm fat									
Year	**Total**	**<5<280**	**%**	**<5>340**	**%**	**>22<280**	**%**	**>22>340**	**%**
2012	14680	31	0.21	315	2.15	239	1.63	1083	7.38
2013	29416	539	1.83	316	1.07	23	0.08	0	0.00

Appendix 2: 2012 grid

Grade	Fat	Teeth	Shape	Price														
MSA Grass Trade Yearling Steer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYO	5-22	0-2	A-C				3.20	3.30	3.30	3.30	3.20	3.15							
MY1	23-32	0-2	A-C				3.10	3.20	3.20	3.20	3.10	3.05							
MY2	5-22	0-2	A-D				3.05	3.15	3.15	3.15	3.05	3.00							
MY3	23-32	0-2	A-D				2.95	3.05	3.05	3.05	2.95	2.90							
MSA Grass Trade Yearling Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYH	5-22	0-2	A-C				3.05	3.15	3.15	3.15	3.05	3.00							
MY6	23-32	0-2	A-C				2.95	3.05	3.05	3.05	2.95	2.90							
MY7	5-22	0-2	A-D				2.90	3.00	3.00	3.00	2.90	2.85							
MY8	23-32	0-2	A-D				2.85	2.95	2.95	2.95	2.85	2.80							
MSA Ox				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI	7-22	0-4	A-C				3.10	3.15	3.15	3.15	3.10	3.05							
MI9	23-32	0-4	A-C				3.05	3.10	3.10	3.10	3.05	3.00							
MSA Grass Fed Jap Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI1	7-22	0-4	A-C				2.90	2.95	2.95	2.95	2.90	2.85							
MI8	23-32	0-4	A-C				2.85	2.90	2.90	2.90	2.85	2.80							

Grade	Fat	Teeth	Shape	Price															
MSA Grass Trade Yearling Steer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYO	5-22	0-2	A-C				3.20	3.30	3.30	3.30	3.20	3.15							
MY1	23-32	0-2	A-C				3.10	3.20	3.20	3.20	3.10	3.05							
MY2	5-22	0-2	A-D				3.05	3.15	3.15	3.15	3.05	3.00							
MY3	23-32	0-2	A-D				2.95	3.05	3.05	3.05	2.95	2.90							
MSA Grass Trade Yearling Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYH	5-22	0-2	A-C				3.05	3.15	3.15	3.15	3.05	3.00							
MY6	23-32	0-2	A-C				2.95	3.05	3.05	3.05	2.95	2.90							
MY7	5-22	0-2	A-D				2.90	3.00	3.00	3.00	2.90	2.85							
MY8	23-32	0-2	A-D				2.85	2.95	2.95	2.95	2.85	2.80							
MSA Ox				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI	7-22	0-4	A-C				3.10	3.15	3.15	3.15	3.10	3.05							
MI9	23-32	0-4	A-C				3.05	3.10	3.10	3.10	3.05	3.00							
MSA Grass Fed Jap Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI1	7-22	0-4	A-C				2.90	2.95	2.95	2.95	2.90	2.85							
MI8	23-32	0-4	A-C				2.85	2.90	2.90	2.90	2.85	2.80							

Grade	Fat	Teeth	Shape	Price														
Grass Trade Yearling Steer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
YO	5-22	0-2	A-C				3.15	3.15	3.15	3.10	3.05	3.00	2.95	2.85	2.70				
Y1	23-32	0-2	A-C				3.10	3.10	3.10	3.05	3.00	2.95	2.90	2.80	2.65				
Y2	5-22	0-2	A-D				3.05	3.05	3.05	3.00	2.95	2.90	2.85	2.75	2.60				
Y3	23-32	0-2	A-D				3.00	3.00	3.00	2.95	2.90	2.85	2.80	2.70	2.55				
Ox				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
I	7-22	0-4	A-C	2.40	2.65	3.10	3.10	3.10	3.10	3.05	3.00	2.95	2.85	2.75	2.65				
I9	23-32	0-4	A-C	2.30	2.65	3.10	3.10	3.10	3.10	3.05	3.00	2.95	2.85	2.75	2.65				
J	7-22	0-6	A-C	2.30	2.65	3.10	3.10	3.10	3.10	3.05	3.00	2.95							
J9	23-32	0-6	A-C	2.30	2.65	3.10	3.10	3.10	3.10	3.05	3.00	2.95							
A	7-22	7-8	A-C	2.15	2.45	2.90	2.90	2.90	2.90										
A9	23-32	7-8	A-C	2.15	2.40	2.85	2.85	2.85	2.85										
D	3-22	0-7	A-D	2.05	2.35	2.80	2.80	2.80	2.80	2.75	2.70	2.65	2.60	2.50	2.45	1.60	0.40	0.30	0.20
D9	23-32	0-7	A-D	2.05	2.30	2.75	2.75	2.75	2.75	2.70	2.65	2.60	2.55	2.45	2.40	1.55	0.40	0.30	0.20
E	3-22	8	A-D	1.90	2.20	2.65	2.65	2.65	2.65	2.60	2.55	2.45	2.40	2.35	2.25	1.45	0.30	0.20	0.10
E9	23-32	8	A-D	1.85	2.15	2.60	2.60	2.60	2.60	2.55	2.50	2.40	2.35	2.30	2.20	1.40	0.30	0.20	0.10
F	0-32	0-8	A-E	1.75	2.05	2.50	2.50	2.50	2.50	2.45	2.40	2.30	2.25	2.10	2.00	1.25	0.30	0.20	0.10
ZS	33-42	0-8	A-E	1.60	1.90	2.35	2.35	2.35	2.35	2.30	2.25	2.15	2.10	2.00	1.90	1.10	0.30	0.20	0.10
ZT	43+	0-8	A-E	1.45	1.75	2.20	2.20	2.20	2.20	2.15	2.10	2.00	1.95	1.80	1.70	0.90	0.30	0.20	0.10
Bull				**700+**	**650+**	**600+**	**500+**	**440+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**-160**
Q	0-32	0-8	A-D	1.25	1.85	2.05	2.20	2.50	2.50	2.50	2.40	2.35	2.30	2.25	2.05	1.95	1.80	1.50	0.35
R	0-32	0-8	A-E	1.15	1.75	1.95	2.10	2.40	2.40	2.40	2.30	2.25	2.20	2.15	1.95	1.85	1.70	1.40	0.25

Appendix 3: 2013 grid

Grade	Fat	Teeth	Shape	Price															
MSA Grass Trade Yearling Steer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYO	5-22	0-2	A-C				3.55	3.65	3.65	3.65	3.55	3.50							
MY1	23-32	0-2	A-C				3.50	3.60	3.60	3.60	3.50	3.45							
MY2	5-22	0-2	A-D				3.45	3.55	3.55	3.55	3.45	3.40							
MY3	23-32	0-2	A-D				3.35	3.45	3.45	3.45	3.35	3.30							
MSA Grass Trade Yearling Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MYH	5-22	0-2	A-C				3.45	3.55	3.55	3.55	3.45	3.40							
MY6	23-32	0-2	A-C				3.40	3.50	3.50	3.50	3.40	3.35							
MY7	5-22	0-2	A-D				3.35	3.45	3.45	3.45	3.35	3.30							
MY8	23-32	0-2	A-D				3.30	3.40	3.40	3.40	3.30	3.25							
MSA Ox				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI	7-22	0-4	A-C				3.50	3.50	3.50	3.50	3.45	3.40							
MI9	23-32	0-4	A-C				3.45	3.45	3.45	3.45	3.40	3.35							
MSA Grass Fed Jap Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
MI1	7-22	0-4	A-C				3.35	3.40	3.40	3.40	3.35	3.30							
MI8	23-32	0-4	A-C				3.30	3.35	3.35	3.35	3.30	3.25							

Grade	Fat	Teeth	Shape	Price														
Grass Trade Yearling Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
YH	5-22	0-2	A-C				3.15	3.15	3.15	3.10	3.05	3.00	2.95	2.85	2.70				
Y6	23-32	0-2	A-C				3.10	3.10	3.10	3.05	3.00	2.95	2.90	2.80	2.65				
Y7	5-22	0-2	A-D				3.05	3.05	3.05	3.00	2.95	2.90	2.85	2.75	2.60				
Y8	23-32	0-2	A-D				3.00	3.00	3.00	2.95	2.90	2.85	2.80	2.70	2.55				
Grass Fed Jap Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
I1	7-22	0-4	A-C	2.10	2.40	2.80	2.90	2.90	2.90	2.85	2.80	2.75	2.70	2.60	2.50				
I8	23-32	0-4	A-C	2.00	2.35	2.75	2.85	2.85	2.85	2.80	2.75	2.70	2.65	2.55	2.45				
J1	7-22	0-6	A-C	2.00	2.35	2.75	2.75	2.75	2.75	2.70	2.65	2.60							
J8	23-32	0-6	A-C	1.95	2.30	2.70	2.70	2.70	2.70	2.65	2.60	2.55							
A1	7-22	0-7	A-C	1.90	2.30	2.70	2.70	2.70	2.70										
A8	23-32	0-7	A-C	1.90	2.25	2.65	2.65	2.65	2.65										
Cow				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
L/M/M9	3-12	8	A-D	1.95	2.35	2.65	2.70	2.70	2.70	2.65	2.60	2.45	2.30	2.25	2.10	1.45	0.05		
N	13-22	8	A-D	1.85	2.30	2.65	2.70	2.70	2.70	2.65	2.60	2.40	2.25	2.20	2.05	1.35			
O	23-32	8	A-D	1.80	2.25	2.60	2.65	2.65	2.65	2.60	2.55	2.35	2.20	2.15	2.00	1.20			
P	0-32	8	A-E	1.60	2.05	2.30	2.35	2.35	2.35	2.30	2.30	2.15	2.10	1.95	1.80	1.20	0.05		
ZC	33-42	0-8	A-E	1.35	1.65	2.15	2.25	2.25	2.25	2.20	2.10	2.00	1.95	1.80	1.65	1.05			
ZE	43+	0-8	A-E	1.20	1.50	2.00	2.05	2.05	2.05	2.00	1.95	1.85	1.80	1.65	1.50	0.85			
Heifer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
D1	3-22	0-7	A-D	2.00	2.40	2.65	2.70	2.70	2.70	2.65	2.60	2.50	2.45	2.40	2.25	1.55	0.15		
D8	23-32	0-7	A-D	1.95	2.35	2.60	2.65	2.65	2.65	2.60	2.55	2.45	2.40	2.35	2.20	1.50	0.15		
F1	0-32	0-7	A-E	1.75	2.25	2.45	2.50	2.50	2.50	2.45	2.40	2.35	2.30	2.25	2.10	1.40	0.15		
Bull				**700+**	**650+**	**600+**	**500+**	**440+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**-160**
Q	0-32	0-8	A-D	1.15	1.75	1.95	2.10	2.40	2.40	2.40	2.30	2.25	2.20	2.15	1.95	1.85	1.70	1.40	0.25
R	0-32	0-8	A-E	1.05	1.65	1.85	2.00	2.30	2.30	2.30	2.20	2.15	2.10	2.05	1.85	1.75	1.70	1.40	0.25
Grade	Fat	Teeth	Shape	Price															

Grass Trade Yearling Steer				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
YO	5-22	0-2	A-C				3.30	3.30	3.30	3.25	3.20	3.15	3.10	3.00	2.85				
Y1	23-32	0-2	A-C				3.25	3.25	3.25	3.20	3.15	3.10	3.05	2.95	2.80				
Y2	5-22	0-2	A-D				3.20	3.20	3.20	3.15	3.10	3.05	3.00	2.90	2.75				
Y3	23-32	0-2	A-D				3.15	3.15	3.15	3.10	3.05	3.00	2.95	2.85	2.70				
Ox				**440+**	**420+**	**360+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**140+**	**120+**	**-120**
I	7-22	0-4	A-C	2.55	2.80	3.25	3.25	3.25	3.25	3.20	3.15	3.10	3.00	2.90	2.80				
I9	23-32	0-4	A-C	2.45	2.80	3.25	3.25	3.25	3.25	3.20	3.15	3.10	3.00	2.90	2.80				
J	7-22	0-6	A-C	2.40	2.75	3.20	3.20	3.20	3.20	3.15	3.10	3.05							
J9	23-32	0-6	A-C	2.40	2.75	3.20	3.20	3.20	3.20	3.15	3.10	3.05							
A	7-22	7-8	A-C	2.25	2.55	3.00	3.00	3.00	3.00										
A9	23-32	7-8	A-C	2.25	2.50	2.95	2.95	2.95	2.95										
D	3-22	0-7	A-D	2.05	2.35	2.80	2.80	2.80	2.80	2.75	2.70	2.65	2.60	2.50	2.45	1.60	0.45	0.35	0.25
D9	23-32	0-7	A-D	2.05	2.30	2.75	2.75	2.75	2.75	2.70	2.65	2.60	2.55	2.45	2.40	1.55	0.45	0.35	0.25
E	3-22	8	A-D	1.90	2.20	2.65	2.65	2.65	2.65	2.60	2.55	2.45	2.40	2.35	2.25	1.45	0.35	0.25	
E9	23-32	8	A-D	1.85	2.15	2.60	2.60	2.60	2.60	2.55	2.50	2.40	2.35	2.30	2.20	1.40	0.35	0.25	
F	0-32	0-8	A-E	1.75	2.05	2.50	2.50	2.50	2.50	2.45	2.40	2.30	2.25	2.10	2.00	1.25	0.35	0.25	
ZS	33-42	0-8	A-E	1.60	1.90	2.35	2.35	2.35	2.35	2.30	2.25	2.15	2.10	2.00	1.90	1.10	0.35	0.25	
ZT	43+	0-8	A-E	1.45	1.75	2.20	2.20	2.20	2.20	2.15	2.10	2.00	1.95	1.80	1.70	0.90	0.35	0.25	
Bull				**700+**	**650+**	**600+**	**500+**	**440+**	**340+**	**320+**	**300+**	**280+**	**260+**	**240+**	**220+**	**200+**	**180+**	**160+**	**-160**
Q	0-32	0-8	A-D	1.15	1.75	1.95	2.10	2.40	2.40	2.40	2.30	2.25	2.20	2.15	1.95	1.85	1.70	1.40	0.25
R	0-32	0-8	A-E	1.05	1.65	1.85	2.00	2.30	2.30	2.30	2.20	2.15	2.10	2.05	1.85	1.75	1.70	1.40	0.25

10. References

BeefSpecs Decision Support Tool
http://beefspecs.agriculture.nsw.gov.au/

Graham, J.G., Quinn, H., Davies, L. and Griffith, G. (2009), "Economic effects of alternate growth path, time of calving and breed type combinations across southern Australian beef cattle environments: grass finishing at the Victorian experimental site", *Australian Farm and Business Management Journal* 6(1), 17-26. Available at: http://www.csu.edu.au/faculty/science/saws/afbmnetwork/afbmjournal/volume6

Griffith, G.R. and Burrow, H.M. (2014), "The Cooperative Research Centre for Beef Genetic Technologies: using the Impact Tool to evaluate realized and anticipated benefits, 2005/06-2020/21", *Animal Production Science* 54 (accepted May 27, in press).

McKiernan, B. (2011), *Solutions to feedback: Livestock Data Link*. Final Report to Meat and Livestock Australia, Project V.LDL.1004, NSW Department of Primary Industry, Armidale.

McPhee, M. and Walmsley B. (2014), *Assessment of compliance in grass-fed cattle and evaluation of increasing accuracy of BeefSpecs inputs.* Final Report to Meat and Livestock Australia, Project B.SBP.0108, NSW Department of Primary Industries – Agriculture NSW.

Slack-Smith A, Griffith G and Thompson J (2009) The cost of non-compliance to beef market specifications. *Australasian Agribusiness Review* 17 (9): 178-190. Available at: http://www.agrifood.info/review/2009/Slack-Smith_Griffith_Thompson.pdf