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Quality Graze Producer Steer Challenge

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Abstract

The Central Australian Quality Graze Producer Steer Challenge (Challenge) was an extension activity designed to directly involve local producers in the Quality Graze project of the Northern Territory Department of Primary Industry and Resources (DPIR). The Quality Graze project which is investigating the consistent production of premium beef from central Australia on the Old Man Plans Research Station (OMP) hosted the Challenge. This neutral venue provided an opportunity for the Central Australian cattle industry to experience the production benefits of applying the latest grazing land management research recommendations.

Forty seven steers from seven properties participated in the Challenge together with twenty steers from the OMP. All steers were finished on OMP under the latest grazing land management research recommendations. Steer performance monitoring was through eight quarterly static data collection events and via the Remote Livestock Management System. On the 30th March 2016, 54 steers in the challenge (45 producer steers and nine OMP steers) averaging 600kg at approximately 30 months of age, were loaded onto a single B-double road train and processed at Teys Naracoorte meat processing facility on the 31st March 2016. Ninety one percent of the steers graded under the Meat Standards Australia grading system (MSA).

The Challenge participants experienced how their steers met requirements to access premium markets through applying improved management practices, which include a grazing strategy and carrying capacity appropriate for the environmental conditions. The Challenge has successfully engaged seven producers with approximately 25 percent of the Alice Springs region actively following the progress of the Challenge. This is a positive engagement outcome with the potential to increase research uptake significantly into the future. Participant's improved knowledge and appreciation of how to manage their central Australian feed base to enable access to premium beef markets has laid the foundations for research adoption through providing a production need for change.

Executive summary

Research is a journey of discovery and producer engagement in research activities is critical to ensure projects meet a timely need and that the subsequent recommendations are adopted by industry.

In 2011, the Quality Graze trial was implemented on Old Man Plains Research Station (OMP), Alice Springs, Northern Territory to investigate the feasibility of consistently supplying grass-fed beef to premium markets. In 2014, with the aim to directly involve producers in cattle and grazing research, Meat and Livestock Australia funded a producer demonstration site (PDS) at OMP. This project tapped into the producers' competitive nature to compare their steer performance with other producers and research animals under the latest industry grazing land management recommendations at a neutral venue.

Between five and eight 200 kilogram steers from seven properties, encompassing ten breeds and cross-breeds joined twenty Quality Graze trial research steers and were grown out to 30 months of age. The steers were prepared and sent directly to slaughter where they were graded against Meat Standards Australia (MSA) criteria. Ninety one percent of the steers graded MSA. Their performance while at OMP was monitored both manually and with a Remote Livestock Management System (RLMS). Their journey was analysed by researchers and producers alike who identified the following impacts:

- Environmental conditions have greater influence on cattle performance than genetics.
- Pasture *quality* in central Australia enables liveweight gain regardless of season.
- It is possible to achieve consistent liveweight gain regardless of season by managing for pasture *quantity*.
- Production systems based on a 24 month cycle provide a high probability of a pasture growth event in central Australia. These growth events are essential for steers to lay down sufficient fat required to meet MSA requirements. Fat cover can be maintained between growth events on cured pastures.
- Steers produced under recommended grazing land management principles can be finished at 30 months of age, and are able to meet MSA standards in terms of weight for age and fat requirements.
- The Remote Livestock Management System (RLMS) has the potential to assist producers' management decisions to help them achieve MSA grading.

Approximately 25 percent of the Alice Springs region actively followed the progress of the Challenge via a variety of extension activities and media outlets. Participants and partners of the Challenge were engaged through three on-site mini field days to view the steer's performance and to discuss issues impacting their businesses; a study tour to Teys Naracoorte abattoirs and a MSA grading system workshop; and a final review workshop that was followed by a celebratory dinner and awards night. The Challenge steers have been featured in numerous media outlets including ABC radio and newspapers both local, NT and national. In addition the Challenge has been showcased at numerous events held in Alice Springs and at both national and international conferences.

Producers involved in the challenge have gained significant knowledge from qualitative and quantitative data collected during the trial. Relationships of trust were developed between industry and DPIR. The challenge provided an ideal mechanism to include producers on the journey of discovery, which is generally the realm of researchers and extension officers. Participation in the Challenge has encouraged participants to take the next step towards the adoption of grazing land management recommendations for their businesses. As a direct result of the Challenge; two participants are revisiting the option of sending cattle for MSA grading; five participants have requested the DPIR's assistance to determine their safe long-term carrying capacity; two participants are actively planning to implement a similar grazing strategy with the department; and one participant has installed a RLMS with another intending to purchase a unit. All members of the industry that were involved in the Challenge felt that additional Challenges are needed to continue the industry's journey to premium beef production in central Australia.

The support for this project from the participants and the interest from the greater grazing industry across central Australia and nationally, generated unexpected momentum, and has translated into a greater appreciation of the grass base, changed perceptions towards sustainable premium beef production in central Australia, and sown the seed for research adoption by the participating producers. The project has paved the way for future collaborative research with producers.

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1 Background

1.1 Justification for establishing the producer demonstration site

In 2011 a 'strengths, weaknesses, opportunity and threats' (SWOT) analysis was conducted with the Alice Springs Pastoral Industry Advisory Committee (ASPIAC). Several strengths were identified, including the Central Australian cattle industry's ability to run predominantly *Bos taurus* cattle and access quality beef markets.

This raises the question as to how the Central Australian pastoral industry can take advantage of these strengths. Production of finished steers for slaughter and premium prices through the Meat Standards Australia (MSA) meat quality grading system is one option. The creation of the MSA grading system has provided positive outcomes for both grazing business and consumers across Australia. However one of the issues facing Central Australian grazing businesses is being able to consistently supply acceptable animals into this premium market. Meat quality results from OMP cattle over time have demonstrated that attempting to have a high proportion of consigned animals meeting MSA requirements is possible. However, consistently achieving this over time can indeed be challenging predominantly due to meat colour, even when following the recommended guidelines (Materne unpublished). This challenge has been heightened by anecdotal evidence from the small number of Central Australian cattle producers' attempting to access this premium beef market.

Improving growth rates is an important path to increased profits because it decreases age at turnoff and or increases weight at turnoff (McLean *et.al.* 2014). Producers in central Australia generally believe it is only possible to finish steers during 'good' seasons, which are generally infrequent (no more than three out of every ten years). Sentinel herd weight data from the Northern Territory Department of Primary Industry and Resources (Saville unpublished) shows that consistent weight gains in heifers are possible regardless of season. A similar result can therefore be predicted for steers. Consistently fattening steers regardless of season in central Australia is therefore theoretically possible.

However, the industry wanted the following questions answered which formed the basis for the long term Quality Graze trial that is being conducted on Old Man Plains Research Station (OMP) near Alice Springs (Materne 2013):

1. Is it possible for Central Australian grass fed cattle to consistently achieve weight gains, regardless of season, in commercial businesses?
2. Can grass fed steers from central Australia, trucked direct to slaughter, grade under the MSA grading system for guaranteed meat quality regardless of season?
3. What management changes would be required to achieve it?
4. How much will it cost to implement the recommended grazing strategy?
5. Will the production strategy be profitable?
6. How can the Remote Livestock Management System (RLMS) be used to assist businesses targeting the MSA market?

The Central Australian Quality Graze Producer Steer Challenge (Challenge) was developed after the success achieved by the steer challenges in Queensland (Hegarty *et al.* 2015).

The Queensland-based steer challenges were focused primarily on how technology could improve business performance through reducing costs. The aim of the NTDPIR Steer Challenge was to involve producers as active participants in the journey of discovery, with DPIR research into consistent production of premium beef in central Australia. Therefore, this Challenge was primarily designed as an extension exercise and not aimed at providing statistical data on breed-based performance.

1.2 Producer group details

Eight pastoral businesses across the central Australian region came together as participants in the inaugural Challenge with seven businesses entering steers. Generally group activities are hard to coordinate in the Alice Springs region due to distances people have to travel to attend events. There are three properties outside the 250 kilometre radius of OMP, three properties between the 100 kilometre and the 250 kilometre radius line and one property within the 100 kilometre radius (see Figure 1). In addition this demographic of people (operating business in remote areas of central Australia) historically tend not to readily participate in departmental group activities.

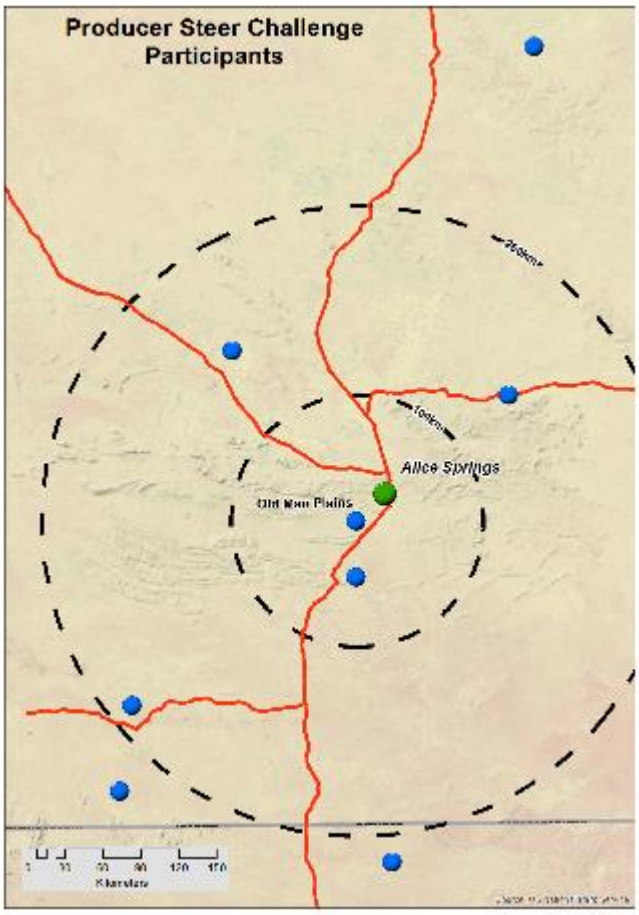

Figure 1. Location of properties who nominated steers to participate in the Challenge. The black dashed circles indicate the 100 kilometre and 250 kilometre radius from the Old Man Plains Research Station. The red lines are the major roads and the green dot represents the location of Alice Springs.

This producer group came together as a result of an invitation to participate in the Challenge which was announced at an industry field day at OMP. The invitation encouraged grazing

businesses to nominate a group of steers to fit the criteria outlined in Table 3. By the end of the field day these eight businesses had expressed an interest to participate which meant that no further advertising for nominations was required as the project site capacity could be filled with these nominations.

In total these businesses manage in excess of 40,000 head of cattle (Conradie 2014) over 2,500,000 hectares of land. Table 1 provides a snap shot of each of the businesses who nominated steers to participate in the Challenge.

Table 1. Overview of Steer Challenge participating businesses.

Business	**Area of land managed (Ha)**	**Predominant cattle breed**
Mob 1	415,200	Murray Grey
Mob 2	385,700	Poll Hereford Cross
Mob 3	263,300	Poll Hereford
Mob 4	264,700	Shorthorn
Mob 5	227,900	Santa Gertrudis Cross
Mob 6 Old Man Plains Research Station	55,000	Droughtmaster
Mob 7	232,100	Multiple Breeds
Mob 8	656,200	Angus
Total	**2,500,100**	

Initially, each of the grazing businesses became involved with the Challenge to see how their cattle would perform under the proposed grazing strategy, and the feasibility of supplying grass-fed beef to premium markets. There was a very clear, but friendly rivalry between two businesses, to see whose cattle performed the best under similar conditions.

2 Project objectives

1. To investigate and demonstrate growth rate potential and consistency of grass fed cattle in central Australia.
2. To investigate and demonstrate the ability of central Australian cattle to be grown and finished on native pastures for Meat Standard Australia grading.
3. To provide a neutral venue for producers to compare their steer performance under the latest industry grazing land management recommendations.
4. To involve producers in the Department of Primary Industry and Resources Central Australian Quality Graze trial.
5. To demonstrate the effectiveness of the Remote Livestock Management System to help producers pinpoint timing of sale to their selected market.
6. To increase producer understanding of changes in pasture quality and subsequent impacts on animal liveweight performance.

3 Methodology

3.1 Challenge activity

The project ran from March 2014 to December 2016. Seven central Australian producers (each with different cattle breeds) committed to participating in the trial, and were approached to supply five weaner steers (180-220kg) for the Challenge to be managed alongside steers bred on OMP. One additional property expressed an interest in being involved in the Challenge, but was unable to supply steers within the desired criteria.

3.1.1 Grazing strategy

The grazing strategy utilised for the Challenge was a two-paddock rotation plus capped variable stocking strategy set up under the Central Australian Quality Graze Project. The aim of this larger project is to test and demonstrate the latest grazing land management research recommendations. Each of the components from the research recommendations are outlined below.

3.1.1.1 Carrying Capacity Management

This strategy is based around the estimated Long Term Carrying Capacity (LTCC) of the watered areas within the paddocks (within 5km of waters). It follows the principles from the Central Australian Grazing Land Management (Chilcott *et al.* 2005) and grass production modelling with GRASP using locally developed land type parameter sets and climate files (Cowley and Materne, unpublished). The average LTCC for the watered area of the paddocks was 2.2 adult equivalents per square kilometre of land (2.2 AE/km^2). The LTCC for Paddock 1 (12 Mile Paddock) is estimated to be 2.4AE/km^2, and for Paddock 2 (Mulga Dam Paddock) it is estimated to be 2.0AE/km^2.

3.1.1.2 Spelling

The research suggests incorporating spelling during pasture growth can aid in land condition maintenance and improvement (Walsh *et. al.* 2014, Chilcott *et al*. 2005). Hence a two paddock, 12 month rotation strategy was chosen to demonstrate the benefits of spelling in its simplest form. Under this rotational grazing system the stocking rate for each paddock for the 12 month grazing period increased. The stocking rate for Paddock 1 (12 Mile Paddock) increased to 5.2AE/km^2, and for Paddock 2 (Mulga Dam Paddock) it increased to 3.8AE/km^2 between spells.

3.1.1.3 Annual Stocking Rate Management

As per recommendations from the Northern Grazing Systems project (Walsh *et. al.* 2014) a restricted flexible stocking rate strategy should be utilised in central Australia to optimise beef production in a remote location under extreme climate variability. The stocking rate adjustment criteria for this strategy can be seen in Table 2. This stocking rate aims to allow for land condition improvement without compromising economic returns. Annual stocking rates were based on forage budgeting estimates undertaken in late April and adjusted during the May muster. If the available forage was greater than the long term average, then stocking rates could be increased above the LTCC, but if the available forage was less than the long term average then stocking rates were decreased. The maximum increases and decreases were capped at +30% and -50% respectively. Breeders and indicator steers from

the Quality Graze trial were used to adjust the stocking rates in the grazing strategy to required stocking rates. Over the challenge period the stocking rate averaged at approximately 2.6 adult equivalents per square kilometre of land (2.6 AE/km^2) due to good seasonal pasture growth or approximately 20% higher than the LTCC. This seasonal adjustment resulted in the stocking rate of Paddock 1 (12 Mile Paddock) to increase to 6.3AE/km^2, and for Paddock 2 (Mulga Dam Paddock) to increase to 4.5AE/ km^2 between spells.

Table 2. Stock number adjustment criteria for the flexible stocking strategy as per Northern Grazing System project (Walsh *et. al.* 2014)

	Annual % changes permitted to stocking rates		**Maximum long term changes permitted to stocking rates**
Feed Supply (kg/ha)	**Present Stocking Rate**		**Cap stocking rate at**
	Above LTCC	**Below LTCC**	
Higher this year, stock numbers can be ***increase*** by up to	+10%	+20%	+30% of LTCC
Lower this year, stock numbers to ***decrease*** by up to	-25%	-30%	-50% of LTCC

3.1.2 Animal activities

Ten different breeds and cross-breeds made up the Challenge. However, this Challenge was an extension activity and due to the small sample size no conclusive results were expected to be obtained with respect to genetic/genotypic influence. During the phase of bringing steers onto OMP, DPIR staff travelled in excess of 7,000 kilometres selecting, testing and transporting steers.

3.1.2.1 On-Station Selection

Initially each producer presented up to sixteen weaner steers (180-220kg) for selection (Table 3). All steers presented were tested for disease risk to ensure the disease free status of the OMP herd was maintained. The final selection of 5 to 8 steers was based on; test results; weight to ensure consistency within each property group, comparability between different producers' steer groups; and breed to ensure the mob was a representation of that property's breed. Steers selected for the trial had neither HGP implants nor did they receive one during the trial.

With the assistance of DPIR staff, all selected steers were tagged with a unique management tag, RFID scanned and treated for parasites. In addition, the following were collected from each: blood samples using ethylenediaminetetraacetic acid (EDTA) vacutainers for Bovine virus diarrhoea virus or pestivirus (BVDV) testing; and faecal samples to determine intestinal worm and coccida burden. The BVDV tests included enzyme-linked immunosorbent assay (ELISA) for the identification of persistently infected animals (PI) and agar Gel Immunodiffusion (AGID) to identify any recently infected animals or animals with an antibody response that may indicate they are still contagious. All selected steers remained isolated on the property of origin for approximately two weeks pending test results. Any steers that were PI for pestivirus or had high intestinal parasite burdens and were not selected for the Challenge.

Table 3. Specific animal requirements to enter the Challenge.

Criteria	Requirement
Age	6 – 8 months
Weaned Weight	180 – 220 kilograms
Biosecurity protocol applied	Free from pestivirus, worms and coccidiosis

3.1.2.2 On-Research Station Activities

Five to eight steers from each property that met the selection and testing requirements were transported to the Arid Zone Research Institute (AZRI) by DPIR staff where they were isolated for a minimum of 10 days prior to the final BVDV: AGID blood test results. Any recently infected steers with a titre of 3 or 4, or a rising titre were held in quarantine for a further four weeks and retested to reduce the risk of infectious spread by animals with a transient infection.

Following quarantine all steers entered the first paddock of the two-paddock rotation on OMP along with 20 Quality Graze project indicator steers that were bred on OMP. Once steers were included in the trial, responsibility of care was with DPIR as per the current OMP cattle herd.

Web based real-time performance updates of data (including weight from walk-over-weighing) was collected by the Remote Livestock Management System on the out spear-trap and was available to producers via the telemetry system on OMP and through a dedicated website www.qualitygraze.nt.gov.au. In addition steer performance data (including growth rate, condition score, p8 fat depth and skeletal growth from hip height) was collected quarterly and results presented to the producers as written update reports (Appendix 10.5). Static performance data recording methodology followed the protocol outlined for the Quality Graze trial on OMP (Materne unpublished), and required animals to be mustered onto feed and water via spear-traps over a 24 hour period prior to data collection.

At approximately two and one-half years of age, and weighing approximately 500 to 600kg, the 54 Challenge steers were removed from the herd and the original rotational grazing strategy paddock (Mulga Dam Paddock) that had experienced a significant growth event during its nine months spell, and its location was closer to the point of trucking. Included in the 54 Challenge steer mob were nine randomly selected steers from the 20 OMP bred Quality Graze trial indicator steers that were in this strategy. Due to the steers coming from the same paddock, time was not needed to reduce social stress prior to trucking as per the latest research and MSA recommendation. However the steers remained isolated in this paddock for approximately six weeks to recover from the final data collection muster. Over a 24 hour period prior to trucking the 54 Challenge steers were mustered using spear-traps and held in a small 'holding' paddock with access to fresh hay and water. On the morning of the 30th March 2016 a single B-double road train transported the steers direct to the abattoirs in Naracoorte, South Australia, where they were processed mid- morning on the 31st March 2016 and graded for MSA compliance. Although the Challenge steers were trucked within the 36 hour limit for MSA compliance through strict logistical adhesion, the extension of the trucking limit to 48 hours has been warmly welcomed in central Australia. It has enabled more producers from central Australia to enter this premium beef market, while reducing the risk of MSA non-compliance from unexpected trucking delays by producers already targeting the MSA market.

Revenue from the stock was returned to the producer. Analysed performance information was sent to producers as a part of the final update report. The net price received from abattoirs helped determine challenge outcome.

3.1.3 Pasture activities

The Challenge steers entered a two-paddock rotation system under a restricted variable annual stocking strategy based on GLM principles in June 2014. Annual forage budgeting was completed prior to the steers entering the first of the two paddock rotation system to ensure the paddocks were stocked according to the grazing strategy criteria (Table 3) for the Quality Graze trial (Materne unpublished). This ensured adequate feed was available in that paddock for the first 12 month period of the Challenge. Before the herd containing the Challenge steers was rotated to the second paddock in May 2015 another annual forage budget was completed to ensure the stocking rate matched feed availability for a further 12 month period.

Each year pasture data including species composition, yield and ground cover was recorded as a part of the greater Quality Graze project; this includes photo points being recorded. As a part of the Near-Infrared Spectroscopy (NIRS) testing, pasture photos were also taken to provide an indication of the pasture the animals were consuming.

NIRS samples were taken monthly and submitted to Symbio Alliance for analysis to determine the diet quality of the steers. Each sample was drawn from fifteen to twenty fresh dung pats that had been mixed together and dried prior to sending to Symbio Alliance.

3.2 Producer assessment / evaluation of demonstrated technology and implementation into their own environment

No formal evaluation of the demonstrated grazing strategy or Remote Livestock Management System was requested from participants. The true success of this Challenge was demonstrated by changes in perceptions surrounding best practice rangeland and cattle management. The pre-project survey forms a baseline for determining initial perceptions.

During the on-property animal disease testing and initial data collection, representatives from each of the participating grazing businesses were requested to complete a pre-project knowledge, skills and practice survey to quantify skills and knowledge levels at the onset of the Challenge. At the conclusion of the project another survey was conducted. This allowed any shifts in knowledge and skills to be captured at the end of the Challenge.

3.3 Communication / extension activities

3.3.1 Challenge participants

In the experience of the DPIR staff, producers in the Alice Springs region are for the most part reluctant to attend group activities due to the remote demographic location of their businesses, or if in attendance are relatively reserved when it comes to active participation when in large groups. For this reason it was decided that any targeted events specifically associated with the Challenge would include the participating producers, members of ASPIAC and invited guests only. Invitation to other members of the industry, such as stock

agents, depended on the extension activity, topics covered or needs. This provided a great opportunity to create a safe environment for people to share experiences and also to feel like they were privy to "special attention" from Department staff. However, this Challenge was an extension activity looking at an entire production system from paddock to plate, and therefore it was essential that all sections of the industry, including stock agents, financial body representatives and abattoir managers, be involved at some stage. This ensured the entire supply chain had a common appreciation into the challenges producers face in meeting this premium beef market from central Australia.

Due to the requirement to maintain the current herd health status of the animals being managed at OMP all the steers selected to be part of the Challenge underwent disease testing and quarantining for intestinal worms, coccidia and bovine pestivirus. This disease testing activity resulted in more interest than expected and provided the DPIR a valuable extension opportunity to provide advice on production limiting animal health issues. Each of the participating grazing businesses willingly assisted during this period even though it meant that they were requirements to keep animals quarantined while on their property.

Once the Challenge began each of the businesses remained in contact with DPIR staff either during mini-field days or via phone/email to discuss performance or contribute ideas for additional data that could be recorded. A number of producers took up the offer to inspect their steers if they were in Alice Springs when a muster was happening.

Three mini field days were conducted during the Challenge. Each of the mini fields days were focused on group discussion as opposed to presentations with question and answer segments. These mini field days were focused on specific topics with presenters giving short presentations which generated discussion within the group. There was a facilitator to guide discussions to ensure all participants had the opportunity to contribute. At each of these events the steers were yarded so participants could view their animals and review their liveweight performance.

The first mini field day incorporated a data collection day so participants could see first-hand what measurements were being taken on their steers. Some producers tried their hand at fat scoring and also guessed the weight of animals before they went over the scale. Time was spent to reiterate the purpose of the Challenge and also provide feedback on some of the disease data already collected from the animals tested. A very informative presentation by DPIF staff was given on pestivirus with some practical advice on how to manage the disease which is prevalent on many properties in the region (Schatz *et. al.* 2008).

The second mini field day focused on the decision making regarding marketing of cattle. Representatives from each of the stock agencies in Alice Springs attended and provided a brief update on each of the available markets to initiate the group discussion on this topic. An economist from DPIR was also on hand to lead some of the discussion and provide answers to the more complex questions about the financial benefit of different marketing strategies and achieving MSA grading.

The third mini field day was held during the steer settling period prior to trucking. It concentrated on the steer performance (growth rate compared to diet quality), highlighting the link between consistent steer growth and good land management, and the greater influence the environment had on growth rate than genetics or breed. Discussion also focused on fat development for MSA, particularly the need for a pasture growth event to

deposit fat and then continued good nutrition until trucking to maintain growth. Hence the importance of two year cycles to ensure a pasture growth event is experienced to lay fat down on steers. A meat scientist from Murdoch University provided feedback on the meat quality study previously conducted which also involved steers from OMP, while a DPIR staff member presented results from a MSA Trucking trial using similar steers from OMP the previous year. Steer management to meet MSA, particularly in terms of dark cutting and trucking stress management, wrapped up the steer and pasture discussions. Other topics which were discussed included:

- Visiting the meat works at Naracoorte to inspect the challenge steers carcasses
- Awards dinner and final workshop
- Awards methodology

There was interesting discussion on stocking rate and a perception that OMP is conservatively stocked. A producer lead reply was “no, stocking rate is all about performance vs. maintenance and a certain piece of country has only got so many kilograms of beef production in it regardless of stock numbers, and it’s about weighing this up to maximise/optimise kilograms of saleable beef.”

Another unique and well supported event that took place as a direct result of the Challenge was that a group of participants, including the producers and other industry representatives involved in the Challenge, travelled to Naracoorte to view the abattoir facilities and the challenge steer carcasses. In addition participants had a short session with representatives from Teys Australia to provide an update of what is happening with the MSA grading system. Over the next two days informal open discussions on all aspects of premium beef production continued and led to a strengthening of the relationship between the DPIR staff and participating producers. Questions about how to determine carrying capacity and implementation of a similar grazing system began to flow as participants fully absorbed the preliminary results of the Challenge.

The final group event for participants in the Challenge was the Awards Dinner to celebrate the success of the Challenge, which enabled the presentation of results in an entertaining manner. An evaluation workshop was conducted before the dinner which included a SWOT analysis of the Challenge. All participants plus other industry representatives and government staff involved in the trial at the workshop were split into two groups, one with participating producers who had steers in the challenge and the other with DPIR staff, sponsors and members of ASPIAC. The purpose of this workshop was not only to evaluate the first Challenge, but also to discuss future research and extension needs that would assist producers in the adoption of the research demonstrated during the Challenge. In total 23 people were involved, 12 in group 1 and 11 in group 2. A full list of SWOT analysis results can be found in Appendix 10.1.

Along with group activities each participating business received a report on how their steers were performing individually and in comparison to the other steers. These reports provided a valuable tool for maintaining contact with participants whilst also continuing to extend information about best practice rangeland and cattle management.

3.3.2 Greater industry

Opportunities to share results from the Challenge with the greater pastoral industry proved to be more than anticipated. A wide range of online and print media combined with group presentations and radio interviews were used to showcase the project to audiences across Australia and at Australian and international conferences in South Africa and Canada. Many participants along the supply chain such as livestock agents, meat processors and even a restaurateur became involved during the course of the project. Table 12 provides a summarised list of extension activities. Examples of the communication material developed as a part of the project can be seen in the Appendices.

The 2016 DPIR Alice Springs show display evolved around the steer challenge to target producers and the general public. Focusing on the three components to premium beef production:

1. Quality native pasture
2. Consistent good steer performance
3. Active grazing and steer management

Together these components will lead to consistent premium beef production, profitable sustainable businesses and viable integrated communities. Show attendants were taken on a journey to discover how each of the components interact to create premium beef as displayed in Figure 2.

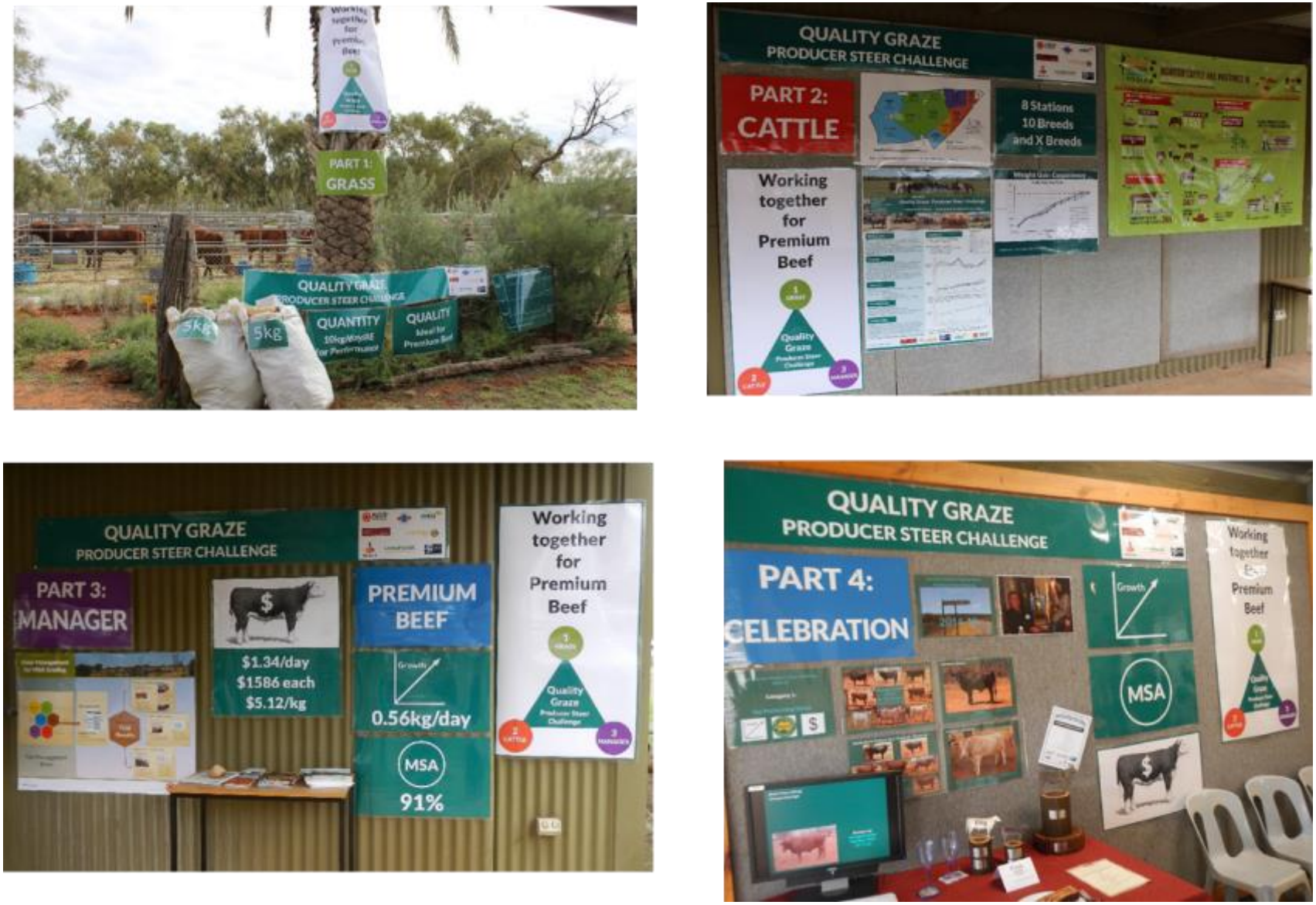

Figure 2. Each of the four components of the display at the 2016 Alice Springs Show demonstrating how to achieve premium beef.

4 Results and what it meant for the Challenge

4.1 Rainfall

Rainfall data from the closest Bureau of Meteorology station at the Alice Springs Airport (located approximately 20 kilometres east of the Challenge site) were used to gain a better understanding of, and to provide context to, the seasonal conditions both prior to and during the Challenge. Historical rainfall records for Alice Springs are shown in Figure3.

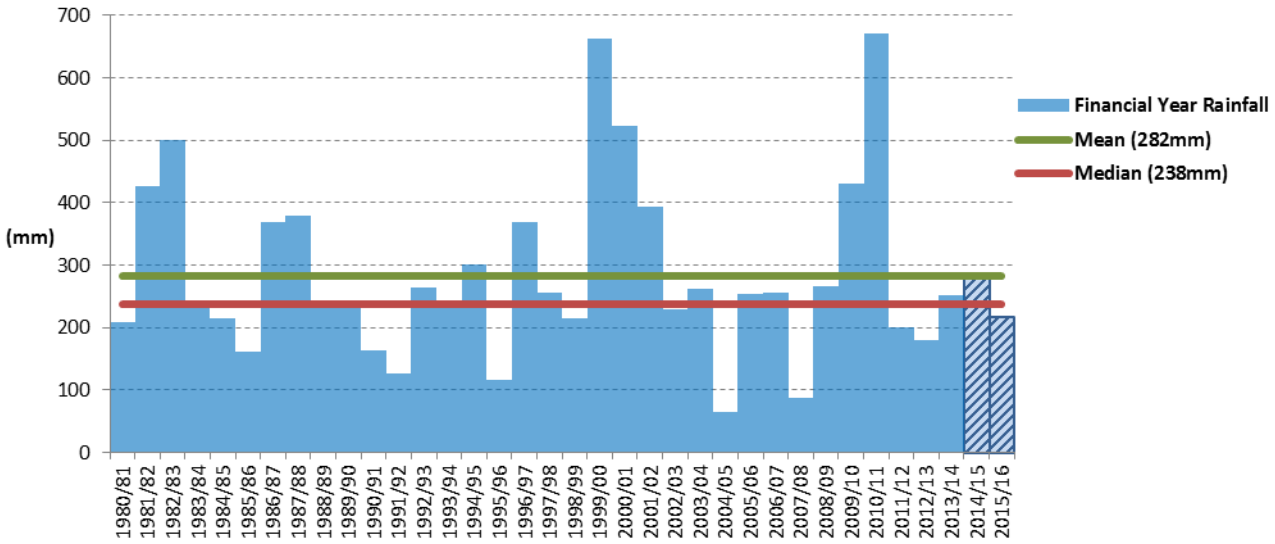

Figure 3. Alice Springs Airport financial year historic rainfall summary (1980-2016). Bars shaded green represent rainfall over the challenge period (Data source: Bureau of Meteorology)**.**

Rainfall leading up to the Challenge, commencing in March 2014, had been below average (Table 4) compared to the Alice Springs Airport historic rainfall figures (Figure 3). Rainfall recorded at the Mulga Dam paddock during the first year of the Challenge (2014/15), of 277mm is considered an average rainfall year. In the second year of the Challenge (2015/16) the steers were in the 12 Mile paddock where 237mm of rainfall was recorded. Although this financial year total is considered slightly below the Alice Springs average, it is comparable to a median rainfall year.

Table 4: Financial year rainfall recorded on site during the Challenge (shading identifies rainfall during the Challenge).

	Mulga Dam	12 Mile
2011/12	231	169
2012/13	108	103
2013/14	222	256
2014/15	**277**	**223**
2015/16	**221**	**237**

4.2 Pasture performance

Due to utilising best practice rangeland management techniques OMP had sufficient feed reserves to be able to carry the animals nominated for the Challenge. The Challenge demonstrated to participants what it means to match stocking rate to carrying capacity and also the impact that land condition can have on rainfall efficiency. The high ground cover on OMP, especially in riparian areas meant that even small rainfall events resulted in growth in the runon areas, due to less loss of rainfall through runoff of water out of the paddock and reduced evaporation.

Faecal NIRS samples were taken each month to determine the diet quality of the pasture the steers were selecting. This data proved useful in confirming the assumption that “hayed-off” or fully cured paddock feed in central Australia is a valuable and nutritious feed reserve capable of putting kilograms on animals, not merely maintaining them. Unlike in the tropical north of Australia, native pasture growth in central Australia is usually water limited rather than nutrient limited. Reduced dilution of nutrients in a pasture generally leads to higher feed quality. This coupled with minimal feed spoilage between growth events, due to low humidity and precipitation, tends to result in high feed quality being retained much longer. In more northern parts of Australia higher precipitation leads to higher pasture growth which leads to nutrient dilution and consequent decline in pasture quality.

The effect of pasture quality on steer performance is demonstated in Figure 4. While the Challenge was conducted the pasture exceeded maintenance requirements, which contributed to the high perfomance of the steers.

Non grass contributed more than 50% of the total diet between August and December 2014 after 20mm of rain in July 2014. Initially this increase was probably due to a flush of winter forbs in August. However top-feed was more likely to be the main non-grass component between October and December once the pasture had cured, consistent with observations in November of steers consuming top-feed.

One observation from the pasture performance is the positive impact highly productive niche areas within the paddock provide for sustained diet quality. Although the majority of the paddock feed was relatively dry between September and December 2015, niche areas areas along the drainage lines or in run-on areas, that were protected by mulga from frost and soil evaporation provided higher quality green feed (Figure 5), and suggests the stocking rate strategy applied to the Challenge paddocks enables additional production benefits to be gained from the extended growth in these small but highly productive areas.

A time series of photos were taken at the same time the faecal NIRS samples were being collected at the designated photo point sites. Taking the time to capture what the pasture looks like at a given time and compiling it as demonstrated in Figure 6 proved to be a valuable tool in understanding pasture quality changes over time.

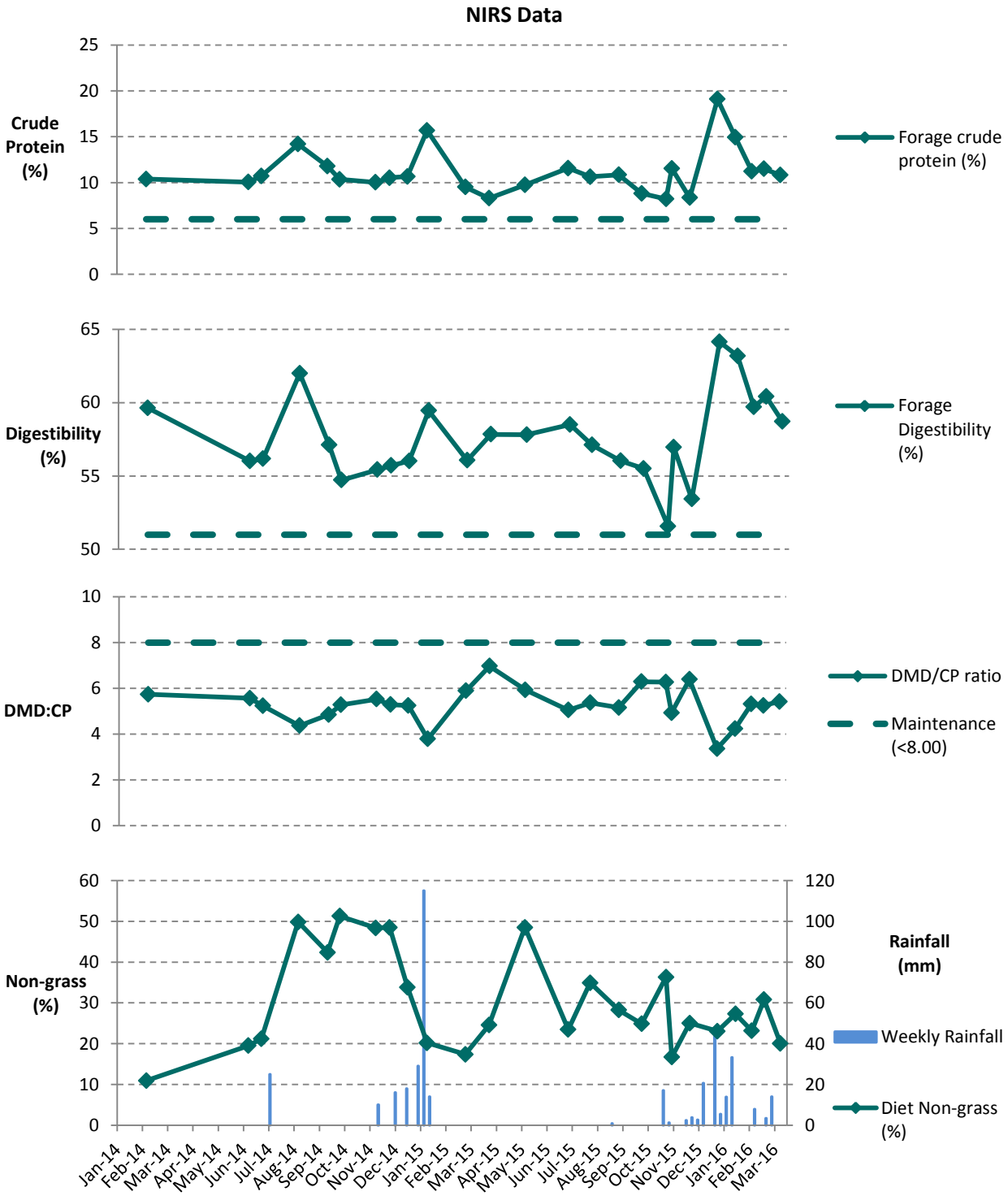

Figure 4. Comparison of pasture quality characteristics in relation to the maintenance requirements of the steers as a result of faecal NIRS testing.

8 September 2015 **6 October 2015** **5 November 2015** **4 December 2015**

Figure 5. Photos of a highly productive niche area along a Mulga protected drainage line that was preferred by the grazing cattle due to the availability of green feed.

This Challenge demonstrated improving land condition on grazing land allows pasture to capitalise on rainfall events (even small amounts) to provide a high quality diet for cattle (Chilcott, 2005). Producing and maintaining a high quality diet allowed animals to consistently put on weight over the desired time period.

Impact for producers

- Steer diet remained above maintenance over the duration of the Challenge enabling the required growth rate to be maintained (Figure 4).
- Diet influenced by extended growth in protected niche areas enables production benefits to be gained from the extended growth in these small but highly productive areas (Figure 5). This may also prove essential to finish off steers.

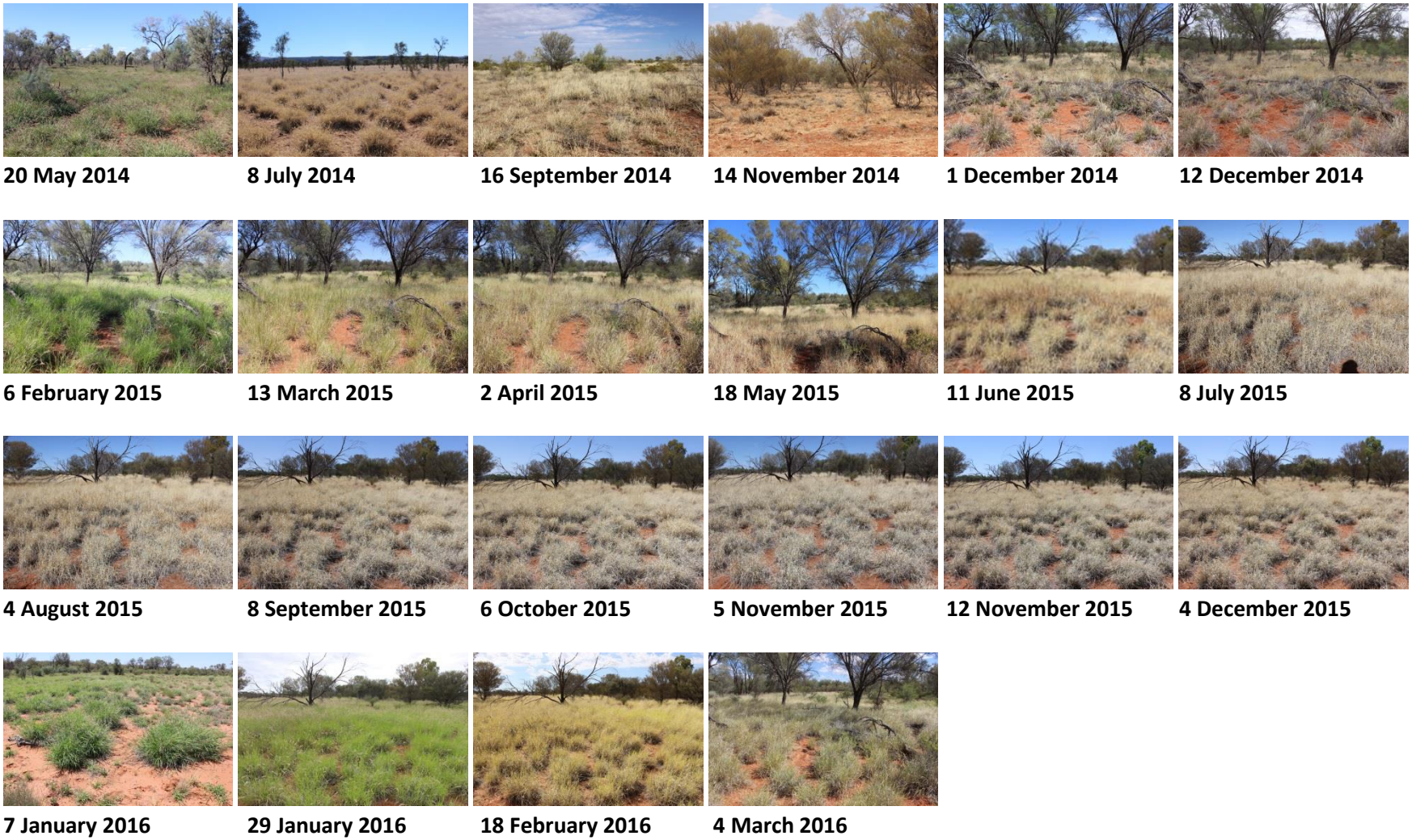

Figure 6. In December 2014 photo-points were set up 5 kilometres from the watering point in both paddocks involved in the Challenge to monitor pasture quality and the identification of significant growth events and their duration. Steers moved into the second paddock during in May 2015 and returned to the original paddock at the end of February 2016.

4.3 Animal performance

4.3.1 Static performance data

The quarterly static data collected during the Challenge shows the steers average liveweight finished at 603kg (Figure 9, 10), 28kg above the target of 575kg set under the Quality Graze trial (Materne, 2013). Of the mob only 68 percent of the individual steers met the finished liveweight target of 575kg (Figure 11). However, the mean liveweight gain was ≥0.5kg/day/hd for all except nine animals (Figure 13), which suggests entry weight, which varied by more than 100kg between different mobs (Figure 10), was the greatest influence on this.

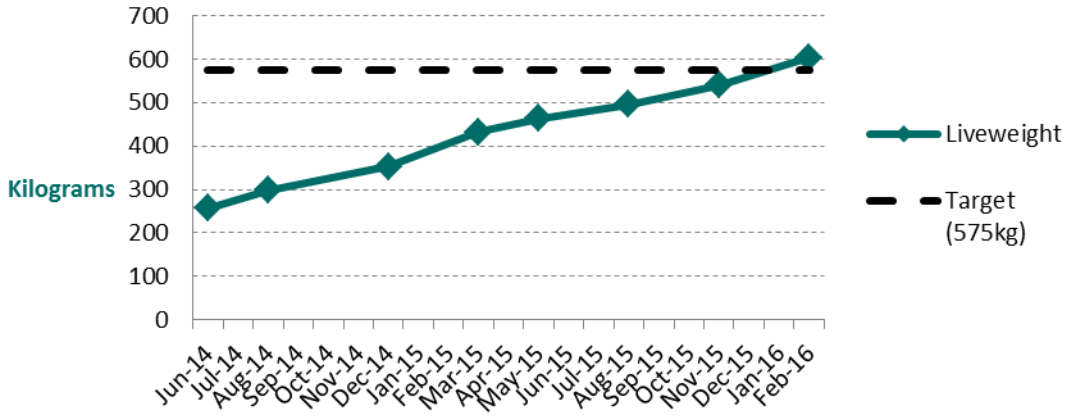

Figure 9. Quarterly mean daily liveweight for all steers in the Challenge.

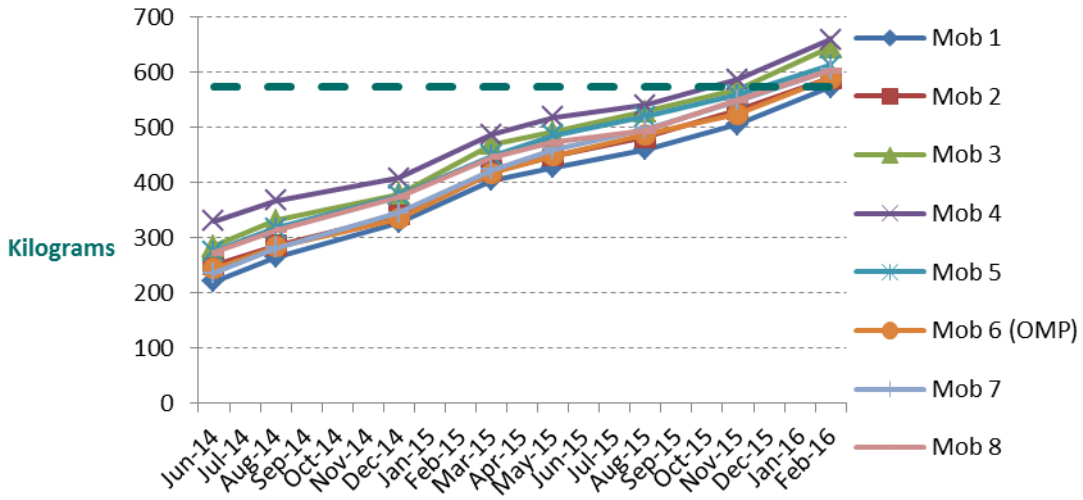

Figure 10. Quarterly mean daily liveweight for all steers in the Challenge stratified by station mob.

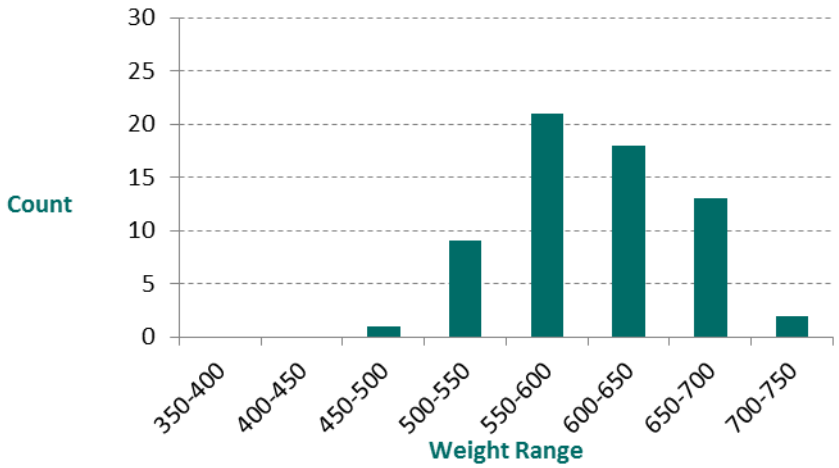

Figure 11. Histogram of final liveweight distribution for all steers in the Challenge as at 23 February 2016.

The mobs' average liveweight gain per quarter varied between 0.39 kg/day during a drier period in mid-2015 to as high as 0.86 kg/day for a period that had experienced a significant growth event (Figure 12). Average daily liveweight gain over the 22 month Challenge period was 0.56kg/day (Table 5), 85 percent of which met the 0.5kg/day target (Figure 13).

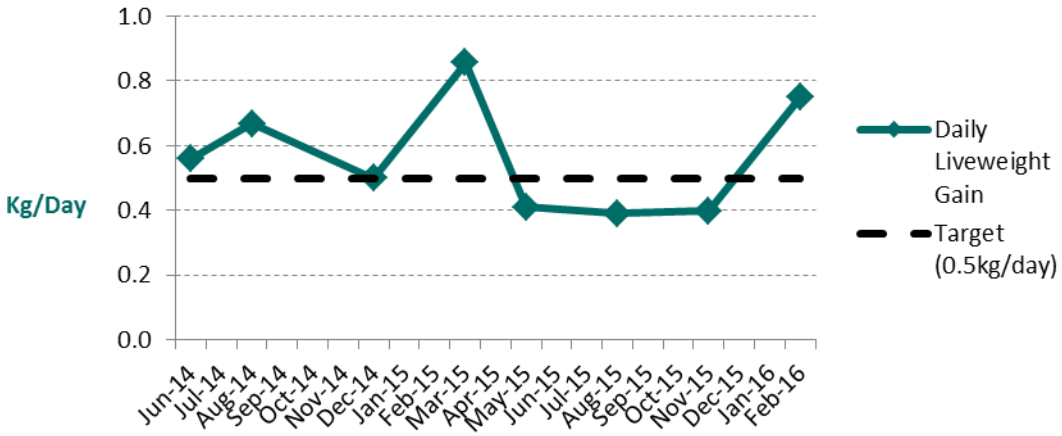

Figure 12. Quarterly mean daily liveweight gain for all steers in the Challenge.

Table 5. Growth rate over the 22 month Challenge period per station mob.

Station Mob	*n*	Min.	Mean	Max
Mob1	*8*	0.41	0.57	0.68
Mob2	*7*	0.48	0.55	0.63
Mob3	*5*	0.56	0.58	0.60
Mob4	*5*	0.46	0.53	0.59
Mob5	*7*	0.44	0.54	0.64
Mob6 (OMP)	*19*	0.42	0.55	0.66
Mob7	*8*	0.51	0.59	0.68
Mob8	*5*	0.45	0.53	0.62
Total	***64***	**0.41**	**0.56**	**0.68**

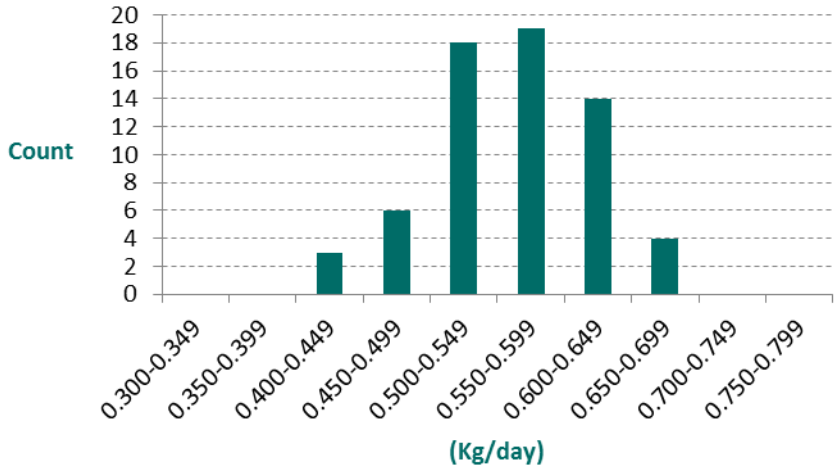

Figure 13. Histogram of mean daily liveweight gain for all Challenge steers over the trial period.

Fat development for a 3-month period over the Challenge period was greatest following a growth event (Figure 14). From the carcase feedback data (Table 6) 96 percent of the steers met the MSA targets in terms of rib fat depth (>3mm), and 93 percent met the MSA requirements for p8 fat depth (>5mm) and for fat distribution (Figure 15).

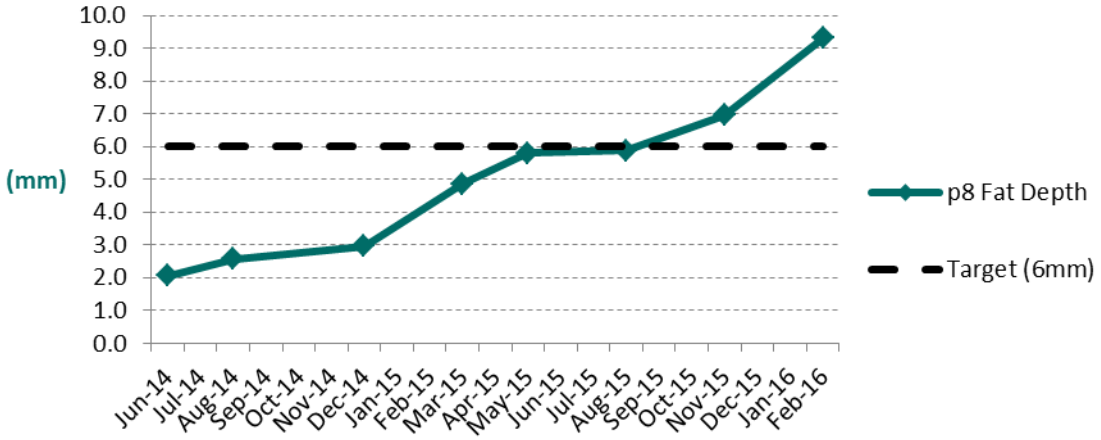

Figure 14. Quarterly mean p8 depth for all steers in the Challenge.

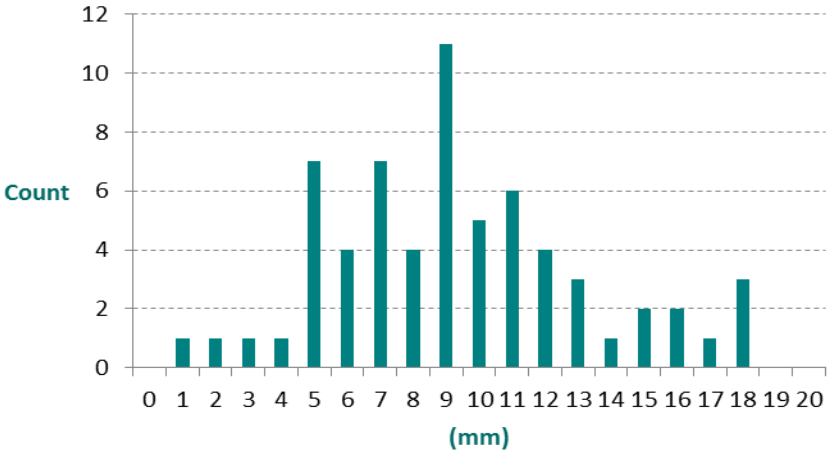

Figure 15. Histogram of p8 Fat Depth for all in the Challenge from static data collection as at 23 February 2016 (Target >5mm)

Although liveweight gain is exceptional during a pasture growth event in central Australia, the pasture's high quality generally enabled continuous consistent liveweight gain even when fully cured. In addition, low humidity between growth events maintained the pasture quality as standing hay. However, in terms of fat deposition, pasture growth events appear to be an important period for the laying down of fat. With the variable climate experienced in central Australia there is a high probability of not experiencing a pasture growth event in a one year cycle. This demonstrates the importance of a two year production cycle to ensure a pasture growth event is experienced to allow for fat deposition.

Most steers had a body condition score of within the target range of 5 to 6 at the end of the project (Figure 16).

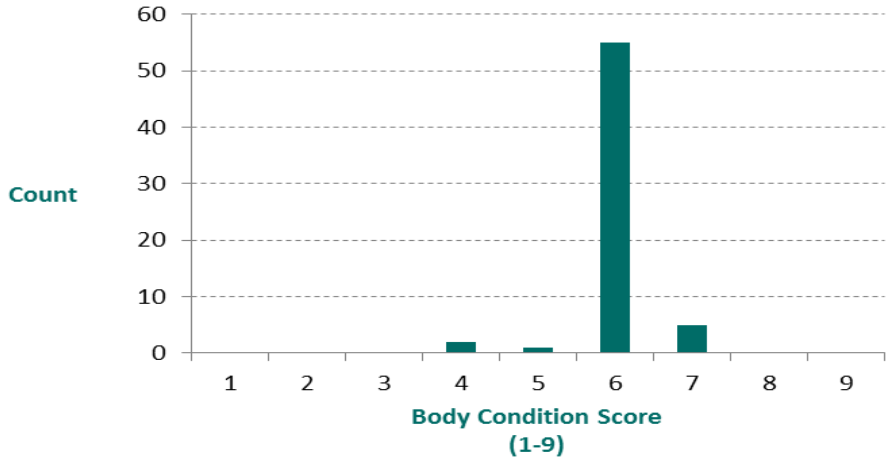

Figure 16. Final body condition score (1-9 scale) distribution for all steers in the Challenge as at 23 February 2016 (Target 5-6).

The Challenge was an extension activity and due to the small sample size data analysis based on genotype was not possible. However when looking at the animal performance characteristics that were measured (liveweight, daily weight gain and p8 fat depth) throughout the project it appears that environmental conditions exerted a greater influence on steer performance than either station of origin (Figure 10) or genetics (Figure 17). In terms of fat formation, it was interesting to see that near the completion of the Challenge the fat depth measured on the steers started to diverge as each of the different breeds began to lay down fat differently (Figure 17). This suggests genetics does have an influence in the rate of fat development during a growth event consistent with previous research that found genetics influenced fat deposition (Costa *et al.* 2013). Table 10 summarises the kill sheet data by breed.

This Challenge clearly demonstrated that environment, as opposed to breed, is exerting greater influence on steer performance. This is a powerful message to industry regarding the importance of grazing land management to achieve premium beef production.

Although the purpose of this Challenge was not to demonstrate impact of breed on liveweight or carcass performance, some participants were interested to see how the different breeds performed throughout the challenge and it created a level of involvement not seen before.

"*I decided to join the steer challenge to measure our product with the industry. It helps to gauge what breed suits the area we live in and whether our crossbreeding or genetics*

chosen over years is putting (beef on the hoof) compared to others. It is great to see a challenge like the Steer Challenge benchmark different breeds in the one environment."

Another participant was surprised that there was very little difference in the way all the steers performed. This participant had requested steers from their two herds ("bush" and "purebred" herds) be included in the challenge as they were expecting that the two different herds would performed differently. Below is a comment this participant shared during the second survey.

" … the interesting result that regardless of the starting weights and the breed, they all ended up coming to a reasonably consistent weight … I certainly didn't expect that, but it does make sense."

A number of participants commented that it was worthwhile being able to do a bit of comparison between the steers that were involved in the challenge and their peers at home. The opportunity for participants to objectively assess their animals' performance has been a positive outcome from the Challenge.

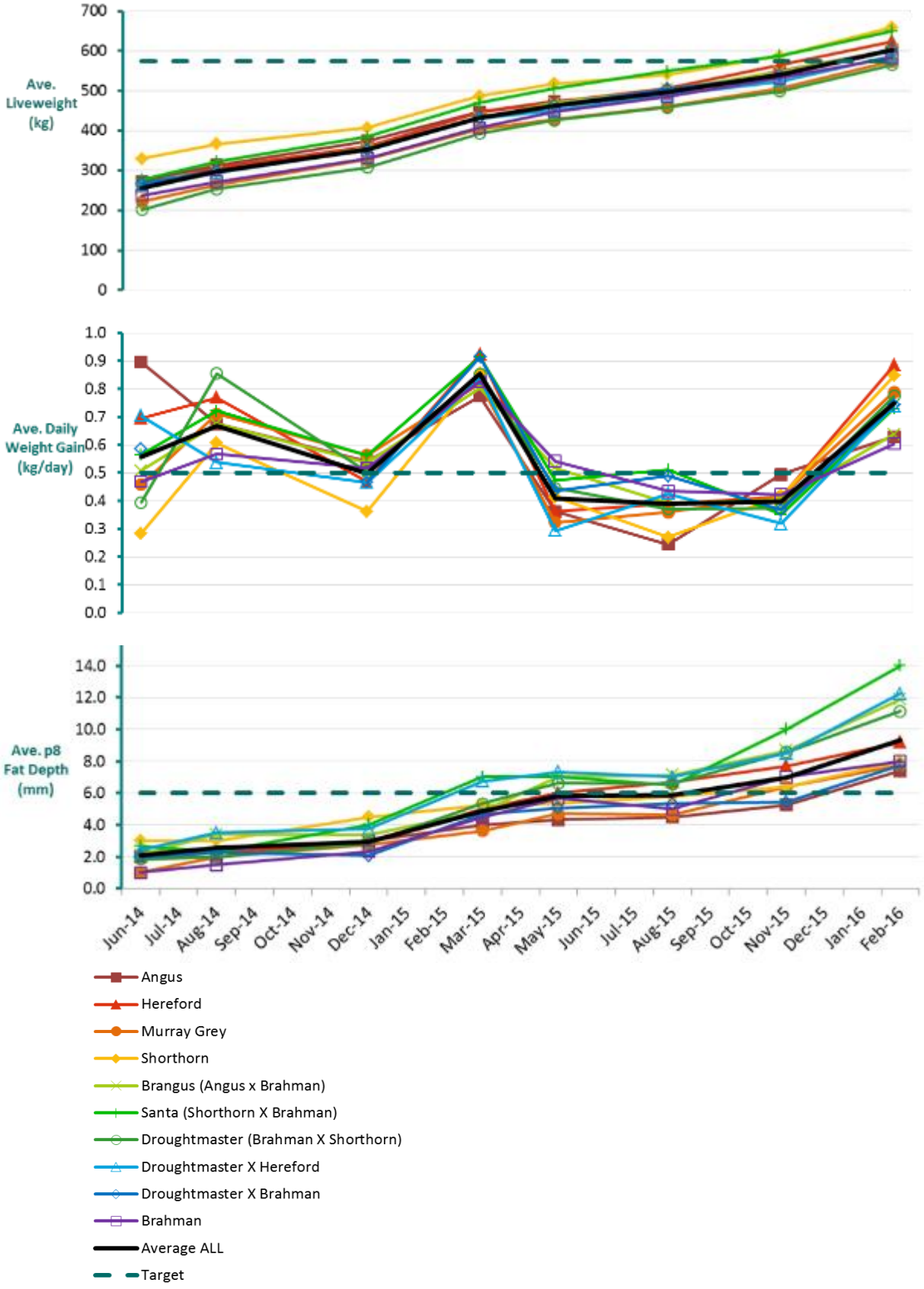

Figure 17. Steers were mustered quarterly to record performance data such as static liveweight and p8 fat depth. On-station weights were used to calculate the mean liveweight gain in June 2014, and reflect the differences in pre Challenge weaner and steer management prior to their entry into the Challenge. Note: Variation in weight gain between breeds in August and December 2015 was a result of issues with equipment and the small sample size and not due to breed.

Impact for producers

- Pasture *quality* in central Australia enables liveweight gain regardless of season.
- Pasture *quantity* needs to be managed to achieve consistent liveweight gain regardless of season.
- Production systems based on 24 month cycle provide a high probability of experiencing a pasture growth event in central Australia sufficient for steers to lay down even fat to meet MSA requirements. Fat cover can be maintained between growth events on cured pastures.
- Steers produced under recommended grazing land management principles can finish at 30 months of age, and are able to meet MSA standards in terms of weight for age and fat requirements.
- By achieving MSA grading producers are able to access the premium beef market and get a better price for their product.

4.3.2 Remote Livestock Management System performance data

This Challenge provided an opportunity to introduce the participants to the RLMS. The general alignment of the RLMS data with the quarterly static weight data gave the participants confidence in the technology output, and in decision making such as determining steer turn-off date.

Figure 18 demonstrates the impact each static weighing had on steer liveweight. This negative trend after each weighing supports the common practice for steers to be placed in a paddock until sale with minimal disturbance to decrease the impact of handling on liveweight gain.

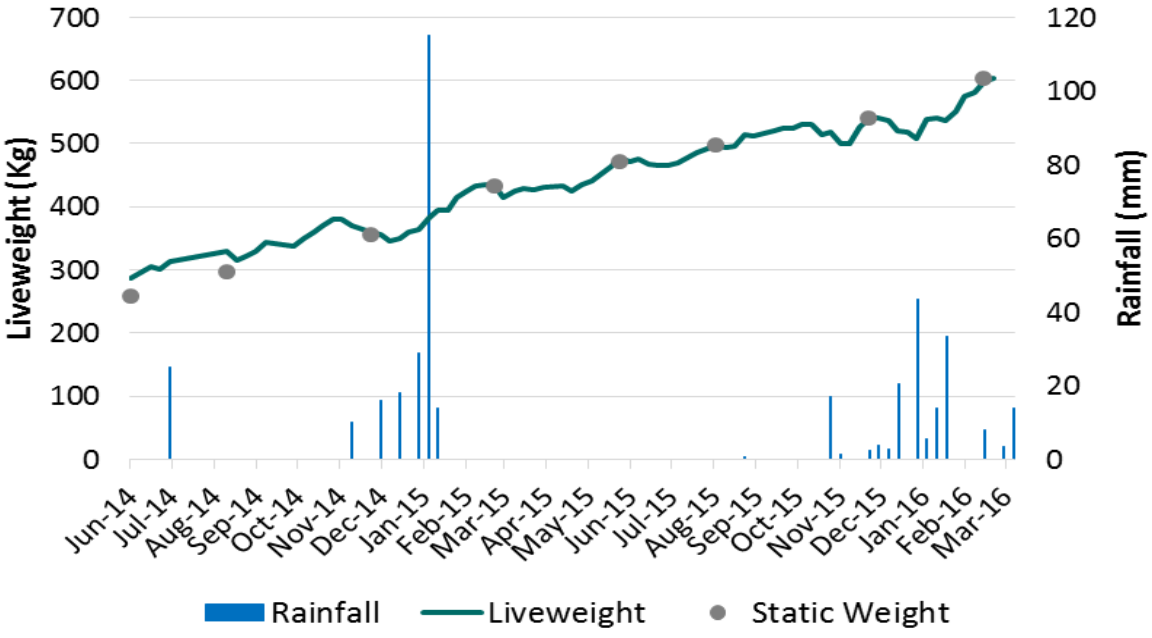

Figure 18. Average Challenge steer liveweight collected via the RLMS compared to the quarterly static weight and rainfall over the Challenge period.

The influence of rainfall (and subsequent pasture quality) on steer performance is an interesting story which could warrant further investigation. The data in Figure 19 confirms that genetics had minimal influence on liveweight gain during this trial. Average liveweight gain was generally very consistent at around 0.52kg per day over challenge period. Average steer liveweight gain during

pasture growth events was as high as 1.29 kg/day during the wet summer period of December 2015 to January 2015, but remained above 0.22 kg/day during the settling in stage (Figure 19), although there was considerable variation between mob liveweight gain at this time.

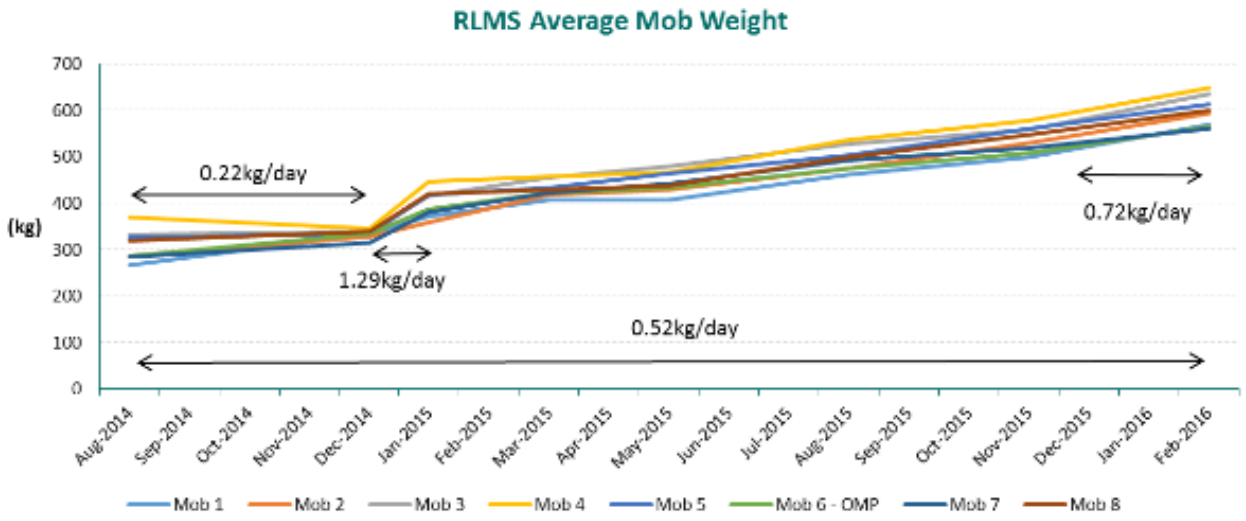

Figure 19. Smoothed RLMS data identifying mean liveweight gain during and in between pasture growth periods.

Impact for producers

- Environmental conditions have greater influence on cattle performance than genetics.
- The RLMS has the potential to assist producers with management decisions.

4.3.3 Carcass performance

Of the 54 steers 91% met MSA requirements and only 5 steers (9%), independent of breed, failed to meet MSA criteria as seen in Table 6.

Table 6. Summary of why five steers failed to grade MSA

Ungraded Reasoning (#5 Steers)					
	#1	**#2**	**#3**	**#4**	**#5**
Fat Distribution Out of Spec	**1**	**1**	**1**		
Subcutaneous Fat Depth Inadequate			**1**		
Meat Colour 1A or > 3				**1**	**1**
Ultimate pH > 5.70					**1**

- Three steers failed on ‘Fat Distribution Out of Spec’ (p8 Fat <6mm), of which only one also failed on ‘Subcutaneous Fat out of Spec’ (Rib Fat <3mm)
- Two steers failed on meat colour, of which only one failed due to the meat pH being out of specification.

The estimated average value added to each steer over the 22 month Challenge period was $878.91 (total carcass value minus entry weight value). The difference between the highest average and the lowest was $173.78, or approximately 18 percent, however the variability within each mob was higher, and as much as $473.12 (Table 7).

Table 7. Mean estimated added value to each steer while in the Challenge stratified by station mob

Station Mob	*n*	Mean Total Dressed Weight (kg)	Mean price received ($/kg)	Mean value added to each steer during Challenge	Min. value	Max. value
Mob 1	*8*	284.88	5.04	$862.43	$601.32	$1,074.45
Mob 2	*7*	300.31	5.08	$861.73	$745.63	$1,020.63
Mob 3	*5*	323.28	5.14	$906.99	$872.40	$967.80
Mob 4	*5*	332.16	5.09	$799.43	$680.41	$899.85
Mob 5	*7*	322.00	5.20	$903.09	$745.78	$1,047.49
Mob 6 (OMP)	*9*	309.13	5.16	$868.31	$581.67	$979.77
Mob 7	*8*	311.88	5.14	$973.21	$812.74	$1,138.01
Mob 8	*5*	308.72	5.03	$815.03	$704.93	$960.58
Total	***54***	**309.87**	**5.11**	**$878.91**	**$581.67**	**$1,138.01**

The impact of MSA grading on the price received is illustrated in Table 8. The premium gained for grading MSA equates to a $69.63 per head difference based on the 310 kilogram dressed weight average of all the Challenge steers, or an extra $133.46 on average while in the 22 month Challenge.

Table 8. MSA effect on price per kg dressed weight from kill sheets

MSA graded	Mean price per dressed weight ($/kg)	Mean dressed weight (kg)	Mean carcase value ($)	Mean value added to each steer during Challenge ($)
No (n=5)	$4.91	283.8	$1393.16	$757.80
Yes (n=49)	$5.13	312.5	$1605.67	$891.26
All Steers	**$5.11**	**309.9**	**$1586.00**	**$878.91**

To gain a better understanding of the Challenge steers' carcass performance a summary of results is displayed in Table 9. Although the focus of this Challenge was on achieving MSA grading it is important to note that the abattoir also has a number of 'company specifications' which must be achieved.

Impact for producers

- MSA graded premium beef production is possible from central Australia with 91% of the challenge steers meeting MSA requirements for meat quality
- MSA premiums delivered on average an extra $0.22 per kilogram dressed weight
- Environmental conditions exert a greater influence on steer performance than genetics
- It appears genetics may begin to influence fat formation as the steers reached 30 months of age, but this did not influence MSA grading success (Table 10).

Table 9. Kill sheet summary for all steers in the Challenge.

	Steers (*n*)	Growth Rate (>0.5kg /day)	MSA compliant	MSA Index	MSA Boning Group	Oss Cold	Dentition		MSA Mb	AUS Mb	Meat ph	Meat Colour	Fat Colour	Rib Fat	p8 Fat	Fat Distribution	Bruising	EMA	Ave. HDCW (Carcase Wt)	Ave. $/kg
					[<9]	[<175]	[<4]	[<6]			[<5.70]	[<4]	[<4]	[>3mm]	[>5mm]	[<10cm	[Nil]		[<340kg]	
			(%)	(Av.)	(Av.)	(%)	(%)	(%)	(Av.)	(Av.)	(Index)	(Index)	(index)	(mm)	(mm)	(%)	(%)	(Av. cm^2)	(Av. kg)	($)
2014 Challenge Steers	54	0.56 (85%)	90.7	53.30	8.5	172.0 (57.4%)	20.4	59.3	369.81	1.3	5.50 (98.1%)	2.5 (96.3%)	2.3 (100%)	6.7 (96.3%)	10.6 (92.6)	92.6	0	72.72	307 (87.0%)	5.11
Company Specs																				
MSA Parameters																				

Table 10. Kill sheet summary for all steers in the Challenge stratified by breed.

Breed	Steers (*n*)	MSA Index	MSA Boning Group	Oss Cold	Dentition	MSA Mb	AUS Mb	Meat pH	Meat Colour	Fat Colour	Rib Fat	p8 Fat	Fat Distribution	Bruising	EMA	Hump Ht.	HDCW (Carcase Wt)	Ave. $/kg	Ave. Total Value
			[<9]	[<175]	[<4]			[<5.70]	[<4]	[<4]	[>3mm]	[>5mm]	[<10cm^2]	[Nil]			[<340kg]		
		(Av.)	(Av.)	(%)	(Av.)	(Av.)	(Av.)	(Index)	(Index)	(index)	(mm)	(mm)	(%)	(%)	(Av. cm^2)	(Index)	(kg)	($/kg)	($)
Angus	5	52.6	8.8	208.0	6.8	382.0	1.6	5.5	2.6	2.6	5.8	8.8		0	75.0	65.0	308.7	5.0	1552.4
Angus x Brahman	8	54.5	7.9	171.3	3.5	420.0	1.8	5.5	2.5	2.3	9.0	12.3		0	69.8	90.6	319.7	5.2	1663.5
Brahman	3	51.6	9.7	170.0	2.7	313.3	0.7	5.5	2.3	1.7	3.7	8.7		0	68.3	146.7	300.5	5.2	1552.9
Droughtmaster	4	53.9	8.3	147.5	2.0	340.0	1.0	5.5	2.0	2.0	7.5	9.0		0	72.0	96.3	298.4	5.1	1532.0
Hereford	10	53.4	8.6	166.0	5.6	360.0	1.2	5.6	2.5	2.3	4.9	12.0		0	73.9	65.0	311.7	5.1	1583.0
Hereford x Droughtmaster	4	53.4	8.5	170.0	4.5	380.0	1.5	5.5	2.8	2.5	7.5	11.8		0	71.8	82.5	303.7	5.2	1564.1
Murray Grey	8	52.8	8.8	186.3	5.8	372.5	1.3	5.6	2.9	2.5	7.3	11.4		0	71.0	63.1	284.9	5.0	1440.0
Santa	2	54.8	7.5	170.0	4.0	420.0	2.0	5.6	3.0	3.0	10.0	13.5		0	74.0	90.0	338.7	5.2	1744.8
Shorthorn	5	54.3	8.0	154.0	4.8	364.0	1.2	5.6	2.6	2.4	7.2	8.2		0	77.4	66.0	332.2	5.1	1691.6
Droughtmaster x Brahman	5	52.4	9.0	168.0	3.2	328.0	0.8	5.5	1.8	1.8	5.8	8.4		0	74.4	113.0	317.8	5.2	1646.5
Grand Total	***54***	**53.4**	**8.5**	**172.0**	**4.6**	**369.8**	**1.3**	**5.5**	**2.5**	**2.3**	**6.7**	**10.6**		0	**72.7**	**82.1**	**309.9**	**5.1**	**1586.0**

4.4 Challenge awards and results presented at the Awards Dinner

The aim of the awards dinner night was;

1. To celebrate the success of the Challenge with all participating producers and sponsors
2. To taste MSA graded beef produced during the Challenge, and
3. To extend the data generated in this Challenge in an entertaining manner.

The winning station's mob of steers performed the best over the 22 month Challenge period in terms of growth rate and price received (Category 1a). The criteria to decide the Challenge winner included;

- Liveweight gained during the 22 month Challenge from static weight and RLMS
- Kilograms of saleable meat and price received per kilogram from the kill sheets
- RLMS final liveweight prior to trucking to calculate approximate wastage
- Average mob performance (minus the lowest performing steer in the mob)

A full list of awards and results can be found in Table 11.

Each steer from the winning mob increased its estimated value by an average of $1,008, or by $46 per month or $1.53 per day (Table 11).

Table 11. Awards and results summary

Category		Winner		Runnerup	
1.0	**Top Performance Steers (kg gained in trial x price received per kg)**				
1a	**Mob Average**	**Bangus & Herefords & Brahmans**	**$1,008 in 22 months ($46/month or $1.53/day)**	**Santas & Santa X & Angus X**	**$929 in 22 months ($42/month or $1.41/day)**
1b	Individual	Brangus	$1,138 in 22 months ($52/month or $1.73/day)	Murray Grey	$1,074 in 22 months ($49/month or $1.63/day)
2.0	**Highest MSA Index**				
2a	**Mob Average**	**Santas & Santa X & Angus X**	**MSA Score 55.06**	**Herefords**	**MSA Score 54.35**
2b	Individual	Santa X	MSA Score 57.26	Murray Grey	MSA Score 56.72
3.0	**Best Prise per Kilogram**				
3a	**Mob Average**	**Santas & Santa X & Angus X**	**$5.22/kg**	**Droughtmasters**	**$5.21/kg**
3b	Individual	Santa X Droughtmaster	$5.30/kg		
4.0	**Best Growth Rate in trial**				
4a	**Mob Average**	**Bangus & Herefords & Brahmans**	**0.606kg/day**	**Murray Greys**	**0.604kg/day**
4b	Individual	Brangus	0.685kg/day	Murray Grey	0.683kg/day
5.0	**Highest % of Group - Meeting MSA and Company Specs.**				
	Mob Average	**Droughtmasters**	**78%**		
6.0	**Highest % of Group - Meeting MSA**				
	Mob Average	**Herrefords**	**100%**		
		Angus	**100%**		
		Santas & Santa X & Angus X	**100%**		
		Bangus & Herefords & Brahmans	**100%**		
7.0	**Best Boning Group**				
7a	**Mob Average**	**Santas & Santa X & Angus X**	**BG = 7.33**	**Shorthorns**	**BG = 8.00**
				Herefords	**BG = 8.00**
7b	Individual	Murray Grey	BG = 6		
		Angus	BG = 6		
		Hereford X Droughtmaster	BG = 6		
8.0	**Highest Total Prise Received**				
8a	**Mob Average**	**Shorthorns**	**$1,845.76**		
8b	Individual	Shorthorn	$1,724.46		
9.0	**Best Meat Colour**				
9a	**Mob Average**	**Droughtmasters**	**1.71**		
9b	Individual	Droughtmaster x2	C1		
		Hereford X Droughtmaster	C1		
10.0	**Greatest p8 Fat Score**				
10a	**Mob Average**	**Santas & Santa X & Angus X**	**p8 Fat = 14.5mm**	**Droughtmaster X & Herefords**	**p8 Fat = 14.2mm**
10b	Individual	Santa	p8 Fat = 20mm		
		Droughtmaster X	p8 Fat = 20mm		
		Hereford	p8 Fat = 20mm		
11.0	**Best Marbling**				
11a	**Mob Average**	**Santas & Santa X & Angus X**	**AUS Mb = 2.3 MSA Mb = 463**	**Angus**	**AUS Mb = 1.8 MSA Mb = 398**
11b	Individual	Santa X	AUS Mb = 4.0 MSA Mb = 620		
		Angus	AUS Mb = 4.0 MSA Mb = 620		
12.0	**Best Ossification Index**				
12a	**Mob Average**	**Herefords**	**Oss. Score = 147.5**	**Shorthorns**	**Oss. Score = 150**
12b	Individual	Hereford	Oss. Score = 140		
		Droughtmaster	Oss. Score = 140		
13.0	**Best Eye Muscle Area (EMA)**				
13a	**Mob Average**	**Shorthorns**	**EMA = 78.25cm^2**	**Angus**	**EMA = 76.50cm^2**
13b	Individual	Angus	EMA = 85.0cm^2	Shorthorn	EMA = 81.0cm^2
				Hereford	EMA = 81.0cm^2
14.0	**Best Fat Colour**				
14a	**Mob Average**	**Bangus & Herefords & Brahmans**	**Fat Colour = 1.83**	**Droughtmasters**	**Fat Colour = 1.86**
14b	Individual	Droughtmaster	Fat Colour = 1		
		Brahman	Fat Colour = 1		
15.0	**Largest Hump and MEAT MSA (highest score)**				
	Individual	Brahman	Hump = 150 MSA Score = 52.31		
16.0	**Animal most consistently in front of the camera**				
	Individual	Murray Grey			

4.5 Monitoring, evaluation and reporting (MER)

Although participants filled in surveys pre and post their involvement in the Challenge, it was through personal communication with producers that it became obvious that producer perception has changed from doubtfulness or even disbelief that grass fed cattle from their properties can get MSA grading consistently, to a belief that it is possible every year.

Only 4 of the original 7 project participants who filled out the pre-Challenge survey also filled out the post project survey. Prior to the Challenge the participating producers were reasonably confident of being able to supply cattle into the MSA system (Figure 20a) and they indicated that they understand the MSA feedback system (Figure 20b). One participant provided the below comment instead of providing a rank for the question regarding supplying cattle into the MSA system.

> *"Cattle that don't meet MSA can still be good eating cattle, but the penalties can be extreme. In this part of the world, we don't have the luxury of picking a date a year in advance as to when we will have something ready for sale. Ossification/denture are all impacted by season not just age."*

Participants were less confident in understanding the cost of non-compliance to processor specifications (Figure 20c). One participant stated that they believe non-compliance has a major influence on the price received. After the challenge participants felt they had a better understanding of the cost of noncompliance to processor specifications.

Prior to the Challenge producers displayed strong confidence in determining long term carrying capacity (Figure 21a) and assessing land condition (Figure 21c). However confidence was mixed when looking at forage budgeting (Figure 21b). There was an expectation that producers might get a different perspective on the actual long term carrying capacity of their property during the course of the challenge on OMP. At the conclusion of the Challenge five of the seven participating producers have requested the assistance from DPIR to complete a LTCC assessment of their property (Table 13), and four have requested assistance with fodder planning, a significant outcome of the Challenge.

There was strong motivation and commitment from the participating grazing businesses to be a part of the inaugural Challenge. As anticipated, perception change initially came from participants while other segments of the greater industry became interested as to what was happening at OMP.

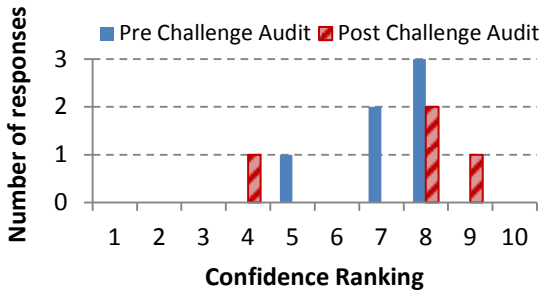

Figure 20a. Producer confidence to supply cattle into the MSA system
(1-low confidence & 10-high confidence)

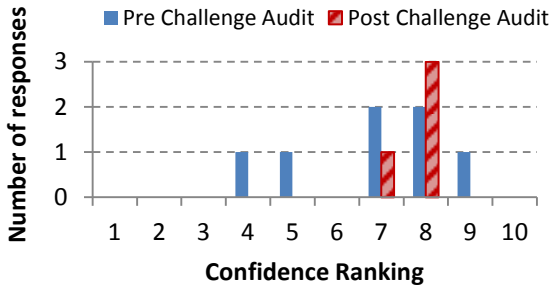

Figure 20b. Producer confident in understanding the MSA feedback system
(1-low confidence & 10-high confidence)

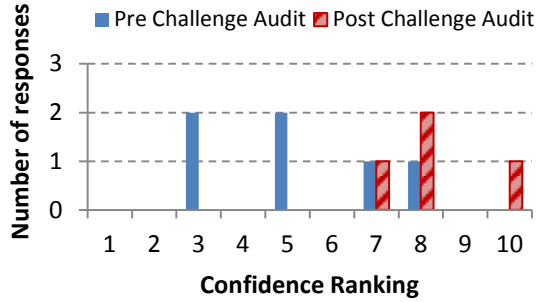

Figure 20c. Producer confident in understanding the cost of non-compliance to processor specifications
(1-low confidence & 10-high confidence)

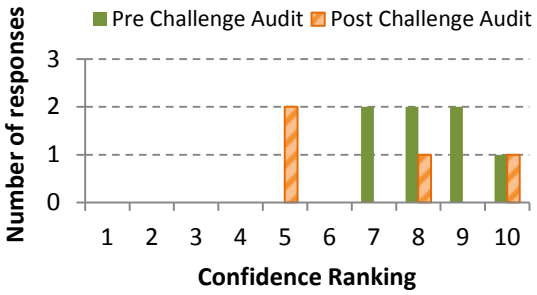

Figure 21a. Producer confident to determine long term carrying capacity
(1-low confidence & 10-high confidence)

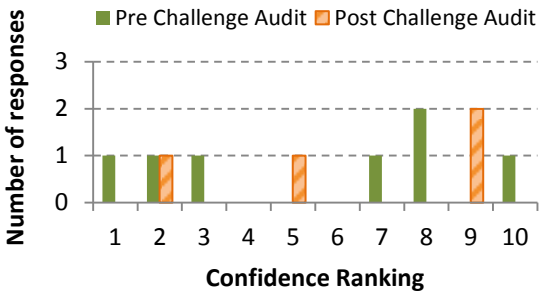

Figure 21b. Producer confident to forage budget
(1-low confidence & 10-high confidence)

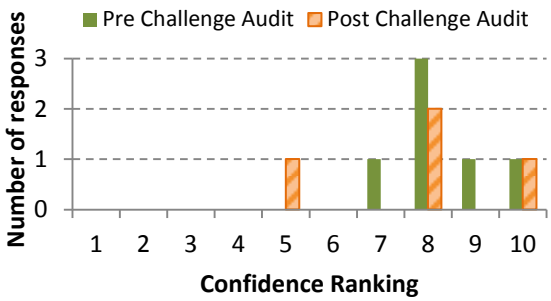

Figure 21c. Producer confident to assess land condition
(1-low confidence & 10-high confidence)

The support for this project from the participants and the interest from the greater grazing industry across central Australia and afar generated unexpected momentum as can be seen in the project achievements column of Table 12.

Table 12. Summary of project targets and achievements against focus areas for industry.

Areas of focus	Project targets	Project achievements
Inputs	• 8 grazing businesses involved • 5 head/business total 40 head	• 8 grazing businesses involved plus steers from OMP • 47 steers entered (2 deceased during the challenge).

Outputs	• 4 weigh days
	• 1 website
	• 2 Rural Review articles
	• 1 Radio Interview
	• 2 Presentations at Alice Springs Show
		Participants
		• 3 mini field days
		• 1 study tour to abattoir
		• 1 SWOT workshop and celebration dinner
		• 6 performance reports per station (42 total)
		• 3 informal visits to steers
		
		Greater Industry
		• 1 website
		• 6 Rural Review articles
		• 4 radio interviews
		• 3 displays at Alice Springs Show (2014, 2015, 2016 core display)
		• 2 articles in Alice Springs Advocate
		• 1 article in Courier Mail and NT News
		• 1 presentation at an Alice Regional biannual field day on Alcoota station
		• 1 presentation and poster at International Grassland Conference, South Africa, 2014
		• 1 poster presentation at Australian Rangeland Society Conference, 2014
		• 1 poster presentation at NT NRM conference, Darwin, 2016
		• 1 poster presentation at International Rangeland Conference, Canada, 2016
		• 4 showcase events for delegates attending
		  ○ Women in Agriculture Conference
		  ○ Australian Rangeland Society Conference
		  ○ Northern Territory Cattleman's Association Conference
		  ○ North Australia Beef Research Conference
		• 2 updates at Northern Territory Cattleman's Association branch meetings
		• 1 update at the Southern Beef Producers forum

		• 240 local and international visitors in total visited the project at OMP
Changes in knowledge, attitudes and skills	• All participants to have completed a pre-project survey.	• All participants have completed a pre project survey • The majority of participants completed a post-project survey. • 1 participant has realised the value of working with DPIR to help answer business questions. • 3 participants feel confident to discuss grazing strategies on OMP with DPIR staff.
Practice changes		• 1 participant installed a RLMS unit and another is intending to purchase. • 5 participants are looking to determine their safe long-term carrying capacity. • 2 participants are actively planning to begin implementing a similar grazing strategy. • 3 participants have renewed confidence that their grazing strategy is correct • 1 participant is utilising the services of DPIR to help improve business decision making. • 2 producers are revisiting the option of sending cattle for MSA grading

5 Discussion

5.1 Project objects and outcomes

At first glance of Table 13 this Challenge has been successful in achieving the project objectives and answering the research questions the group were curious about.

Table 13. Comparison of objectives and outcomes for the project.

Objectives	Outcomes
To investigate and demonstrate growth rate potential and consistency of grass fed cattle in central Australia.	The majority of steers reached liveweight, daily weight gain and fat depth requirements for MSA grading. 91% of carcasses graded MSA
To investigate and demonstrate the ability of central Australian cattle to be grown and finished on native pastures for Meat Standard Australia grading.	Fat cattle consigned to abattoirs in South Australia can meet MSA grading requirements if managed well in accordance with the latest GLM research recommendations, and if satisfactory transport requirements are met
To provide a neutral venue for producers to compare their steer performance under the latest industry grazing land management recommendations.	ALL participants appreciated the use of OMP as venue for conducting the steer challenge. ALL participants appreciated the work carried out by DPIR staff in collecting the necessary animal and pasture performance data to test grazing land management recommendations.
To involve producers in the Department of Primary Industry and Resources Central Australian Quality Graze trial.	8 grazing business from central Australia were directly involved in the Steer Challenge.
Demonstrate the effectiveness of the Remote Livestock Management System (RLMS) to help producers pinpoint timing of sale to their selected market.	The RLMS was demonstrated as a tool to capture liveweight changes in the steers. As a tool to pinpoint timing of sale to selected markets there was not adequate scope in this project due to small data set.
Increase producer understanding of changes in pasture quality and subsequent impacts on animal live weight performance	5 producers have requested pasture assessments by DPIF staff to assist in more effective fodder planning. 1 producer has started taking dung samples to assess pasture quality and nutrition over seasons.

In reflection of project feedback from the SWOT analysis and post-project surveys, an inherit problem of projects like this is that generally more questions are raised as a result of answering the initial questions. Below is one participant's observation:

"One challenge proposes more questions than answers, the second and third will go a lot further in providing answers."

5.2 Key benefits from this Challenge for producers

- Relationship with DPIR

As a result of this Challenge participants feel greater confidence in engaging with DPIR. Four producers have requested pasture assessments by DPIR staff to assist in more effective fodder planning. One producer has started taking dung samples to assess pasture quality and nutrition over seasons. Another producer who had previously had only limited engagement with DPIR has spent time with a number of officers working through business issues which had previously "kept him awake at night".

- Understanding paddock dynamics

The strategy to involve a small group in this Challenge provided a forum that encouraged the producers to share ideas, opinions and experiences amongst themselves and DPIR staff. This environment allowed all involved to gain a better insight into all the factors influencing premium beef production. Producers were able to see first-hand how managing stocking rate to carrying capacity and the interaction of land condition with rainfall utilisation was able to achieve premium beef production.

- Realising environment is more important than breed

As an industry there is a lot of focus placed upon which breed of cattle performs best under certain environments. Steers presented for this Challenge were of diverse genotype, and from stations under a variety of management styles and levels of genetic improvement programs. This project was able to demonstrate that environment exerts a greater influence on animal performance rather than breed. As one participant commented in the SWOT analysis

"It is feed, not breed that will put money in your pocket".

5.3 What was learnt from the project design

5.3.1 What worked well

✓ Venue – hosting the Challenge at OMP ensured that the paddocks were available for the entire challenge. The facilities were also safe and in sound working order to ensure accurate measurements. As OMP was a neutral venue it allowed participants to be open to the results and performance of their cattle. It can be a risk when hosting demonstration trials on private properties that feed may run out or the business may need to utilise that paddock due to unforeseen circumstances.

✓ Closed group - having "invitation only" for Challenge events created a close knit group amongst participants which allowed open dialogue to occur. It also helped to generate more interest in producers not involved in the Challenge as they heard about activities via other sources which created intrigue.

✓ All in this together – answers to questions came from the whole group not just DPIR staff or guest speakers. This culture helped to create meaningful relationships between DPIR staff and participants as well as between participants. Below is one participant's thought

"I guess things have improved with DPIF [now DPIR] *since the Challenge as I am asking for advice and reading study papers more. … For one thing I have learnt, the questions I lose sleep over in managing a large cattle station, DPIF can help answer."*

✓ Unplanned events – the study tour to Naracoorte and the SWOT analysis workshop added value to the Challenge and were very successful. Participants found these events to be informative and useful for sharing opinions and experiences.

✓ Station performance reports – these reports provided a useful mechanism to stay in touch with participants and reinforce the key messages coming from the project.

✓Concluding the event with a Gala Dinner where awards could be handed out and participants, industry representatives and researchers involved could celebrate the success of the project elevated this Challenge to a higher level and enticed producers to commit to further involvement with DPIR

✓Having an experienced extension officer dedicated to facilitate the entire process was invaluable. Without her and the capable support team this project would not have been possible.

5.3.2 What can be improved

😐 - Economic analysis to determine possible points throughout the Challenge when the steers could have been sold and the possible profit margins.

😐 - RLMS data sharing was a challenge throughout the project. Managing the expectations of participants/project staff and what the technology is designed to deliver could have been handled better with improved communication between project staff and Precision Pastoral.

😐 - Would have been beneficial (in hindsight) if a number of "what if" scenarios were explored as the challenge went along. For example if the steers had to be sold today which would have been the most lucrative market, what supplementation could have been provided to the steers?

😐 - Bigger critical mass of numbers and careful selection to reduce bias is recommended to help make the animal performance data more relevant.

5.4 Communication/extension activities and their success

Project success (recognition)

- Northern Territory Government, Department of Primary Industry and Resources – Star Awards 2015-16 – CE Commendation Award (16 September 2016)
- Northern Territory Natural Resource Management Awards - Highly commended – Research in NRM award (23 November 2016)

The combination of specific events for participants and a wide range of communication tools to connect with the greater industry helped to generate significant interest in the Challenge. The team at DPIR were able to provide many small opportunities to engage with participants throughout the Challenge by emailing performance reports, utilising phone calls and emails in seeking opinions or answering participant questions. This activity helped to strengthen the relationship between DPIR and participants which could then leverage the face to face opportunities to share further information. It became a two way communication stream with researchers getting insight into local knowledge and pastoral production information that has been lacking.

As previously mentioned making the events for participants invite only helped to create a constructive group environment where participants and DPIR staff could communicate freely. When guest speakers were invited to events they were given clear instructions on how the group functions and what their role was on the day specific to the group needs. Below is one participant's reflection.

> *"Historically most stations will have had a chequered relationship with government – and often have a high level of distrust. Our relationship with DPIF* [now DPIR] *was ok, and I would say that the relationship now is significantly better"*

Many of the participants are extremely interested in working with the Alice Springs team of DPIR on developing ways on their own properties to implement the grazing strategy utilised during the challenge. This is an ideal opportunity towards adoption and a follow up project "Quality Graze Paddock Challenge" has been written where five producers will make a paddock on their property available to implement this strategy.

With regard to the greater industry there are already four grazing business who have expressed an interest to participate in a possible follow up Steer Challenge; two of which have never been involved with DPIR in the past. This is a fabulous result and provides a clear message to DPIR and MLA that grazing businesses in the Alice Springs region are ready to engage and adopt new technology and can see value in this type of extension activity.

6 Conclusion

6.1 Relevancy of Challenge findings to group

It is possible to supply premium beef markets with steers finished on native pastures in the Alice Springs district. It had been a long held belief that this was only possible to achieve during good seasons. The caveat is that pastures and in particularly stocking rates need to be managed to ensure land condition is able to utilise rainfall events.

Every producer involved in the project has gained further insight into areas in which they can positively influence their businesses. The strong response to have DPIR staff conduct pasture assessments on property is incredibly encouraging. The discussions that have been instigated by producers with DPIR staff is also heartening. In the past producers have tended to shy away from engaging with support agency staff preferring to go at it alone in solving problems.

6.2 Key messages

Steer challenges provide an avenue for grazing businesses to engage with DPIR and in particular research and extension teams. By capitalising on having their own cattle in the challenge, the Challenge was able to break down one of the barriers typically encountered when engaging with producers.

Environmental conditions (forage availability, which can be managed through stocking rates and improving land condition) exert a greater influence on steer performance than genetics.

Fully cured paddock feed in central Australia can generate consistent animal production that meets MSA requirements which can improve business returns due to higher price received per kg.

6.3 Recommendations

- Run another Challenge to capitalise on the interest generated from this Challenge and involve a new group of producers.

Much intellectual property has been developed from this Challenge. Subsequent ‘Challenges’ will leverage of this knowledge and help to answer many of the questions that were raised and not answered during this initial Challenge.

- Create a second program for participants who have been a part of the steer challenge to work with DPIR staff to implement the grazing strategy in one paddock on their station, ‘Paddock Challenge’.

Participants can see the benefits of utilising best practice rangeland management yet find the scale of their properties daunting when looking to implement such a strategy. By assisting producers to implement the strategy on a paddock on their property they will be able to take the first step towards full adoption.

- Clarify the possible outputs of the RLMS and ensure that accurate and timely data is provided to DPIR and participants via an established website.

It was disappointing for participants and DPIR staff that there were issues in downloading data from the RLMS affecting the real time monitoring of the steers.

7 Acknowledgements

Without the support of ASPIAC and the producers who were brave enough to be a part of the inaugural Quality Graze Producer Steer Challenge this project would not have had the cattle or gained the recognition across the region it did.

This project would not have been possible without the contribution of land and resources from Northern Territory Government. OMP provided a neutral venue that was easily accessible. The dedication of the OMP management team of Bryan Gill and Sally Sims to ensure the management and welfare of the steers was invaluable. Other DPIR staff members which contributed much to the success of the project include Dr Jocelyn Coventry, Coral Allan and the AZRI farm team who provided support services.

The use of the RLMS from Precision Pastoral and Tim Driver's expertise with the technology was invaluable.

Thanks to Jane Wightman, Geoff Niethe, Robyn Cowley, Bid Rose and Coral Allan for providing comments and feedback on earlier versions of the report which greatly improved it.

Additional in kind support from Coopers Animal Health as well as Rabobank and Landmark towards the end of the project greatly assisted project communication activities.

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9 Acronyms

AGID – Agar Gel Immunodiffusion

ASPIAC – Alice Springs Pastoral Advisory Committee

AZRI – Arid Zone Research Institute

BVDV – Bovine virus diarrhoea virus (commonly known as bovine pestivirus)

EDTA – Ethylenediaminetetraacetic acid

ELISA – Enzyme-linked immunosorbent assay

GLM – Grazing Land Management

GRASP – Grass Production Model

LTCC – Long Term Carrying Capacity

MLA – Meat and Livestock Australia

MSA – Meat Standards Australia

NIRS – Near-infrared Spectroscopy

DPIR – Northern Territory Department of Primary Industry and Resources

OMP – Old Man Plains Research Station

PDS – Producer Demonstration Site

RFID – Radio Frequency Identification

RLMS – Remote Livestock Management System

SWOT – Strengths, Weakness, Opportunities and Threats

10 Appendix

10.1 SWOT Analysis from final event

Steer Challenge Workshop/Dinner SWOT Analysis
Producer Group
3rd June 2016

Strengths:

- Information – dark cutting
- Where cattle can go with MSA
- Relationships between properties & DPI&F
- Trip South was excellent
- Gave ideas for direction to take with herd – bull selection
- Know weight gains & opens opportunities eg: leasing a paddock down here (Alice Springs)
- 90% of breeding is in the feeding of cattle
- Amount of knowledge here in the numbers to focus for outcomes for everyone
- Integrity of results
- Great starting point
- Comparing amongst & within breeds & MSA compliance
- Willingness of people to be involved

Weaknesses:

- Staff continuity & project – disorganised towards the end
- Bigger critical mass of cattle numbers to make results more relevant
- What if scenarios as project went along – decision if turned off now
- Technology – didn't work on OMP so how will it go with industry – lost a couple of years getting used to it

Opportunities:

- Go again – get more people involved - up the competition with east vs west
- Could hold a field day now as there is a lot of interest in the results from Industry
- By going again we can skip the hiccups & gain from the lessons learnt
- Dedicated officer to communicate to industry
- Benchmarking (what can be achieved) – rainfall, live weight gain, land condition eg: if there is a rainfall event what is the outcome for into the future – budgeting & forecasting – kg/ha not numbers
- Share results/open book for regional comparisons

Threats:

- Need to get funding

- Market availability eg: MSA was favourable at the start of the challenge, now organic is preferable

Other Observations:

- Gross margin for different market options
- Trip south – great to meet people who you talk to on the phone
- Good to see how the meatworks operate
- Good to hear what Teys are up to
- Land condition is critical to success of businesses
- Need an abattoir here in central Australia
- Would have been good to test why the shorthorns were not looking good eg: worm test before going into new paddock
- Should consider tagging calves at branding for the Challenge so we know the age of steers

Steer Challenge Workshop/Dinner SWOT Analysis
Greater Industry Group
3rd June 2016

Strengths:

- Data sets - types (lots)
- DPIR liaison with producers
- Different breeds
- Competition (& interest)
- Comparison of $
- Different producers involved
- Extension tools for sponsors and DPIR
- Following growing of steers
- Marketing for industry in central Australia
- Differentiates central Australia
- Drawcard for visitors to OMP (seeing the different breeds)
- Relationship with Teys
- Contracted extension officer
- Field days

Weaknesses:

- Age of challenge steers (range)
- Different processors have different specifications for MSA graded beef
- Boning Group < 8 gives no extra benefit
- Lack of laneways on OMP
- Lack of resources (staff) at trucking
- Extension officer not able to stay full time
- Not having software sorted at start of project
- Updating of website

- Problems with server and interface with Northern Territory Government

Opportunities:

- Processors see results of central Australian cattle
- Datasets to explore creates “research jobs”
- Data to provide baseline information
- Extension of information gained
- Commence looking at breed of cattle
- 5 year production trial (using the Challenge as pilot) for transition to research
- Involve more producers/different producers
- Repeat demonstration on a producers property
- Examine production system outside of OMP
- Compare 2 similar steer groups on 2 sites

Threats:

- Biosecurity (disease)
- Weather
- Funding
- Fall short of expectations
- Numbers of cattle
- Cattle loss/wastage

10.2 Conference presentations

10.2.1 Posters and Presentations

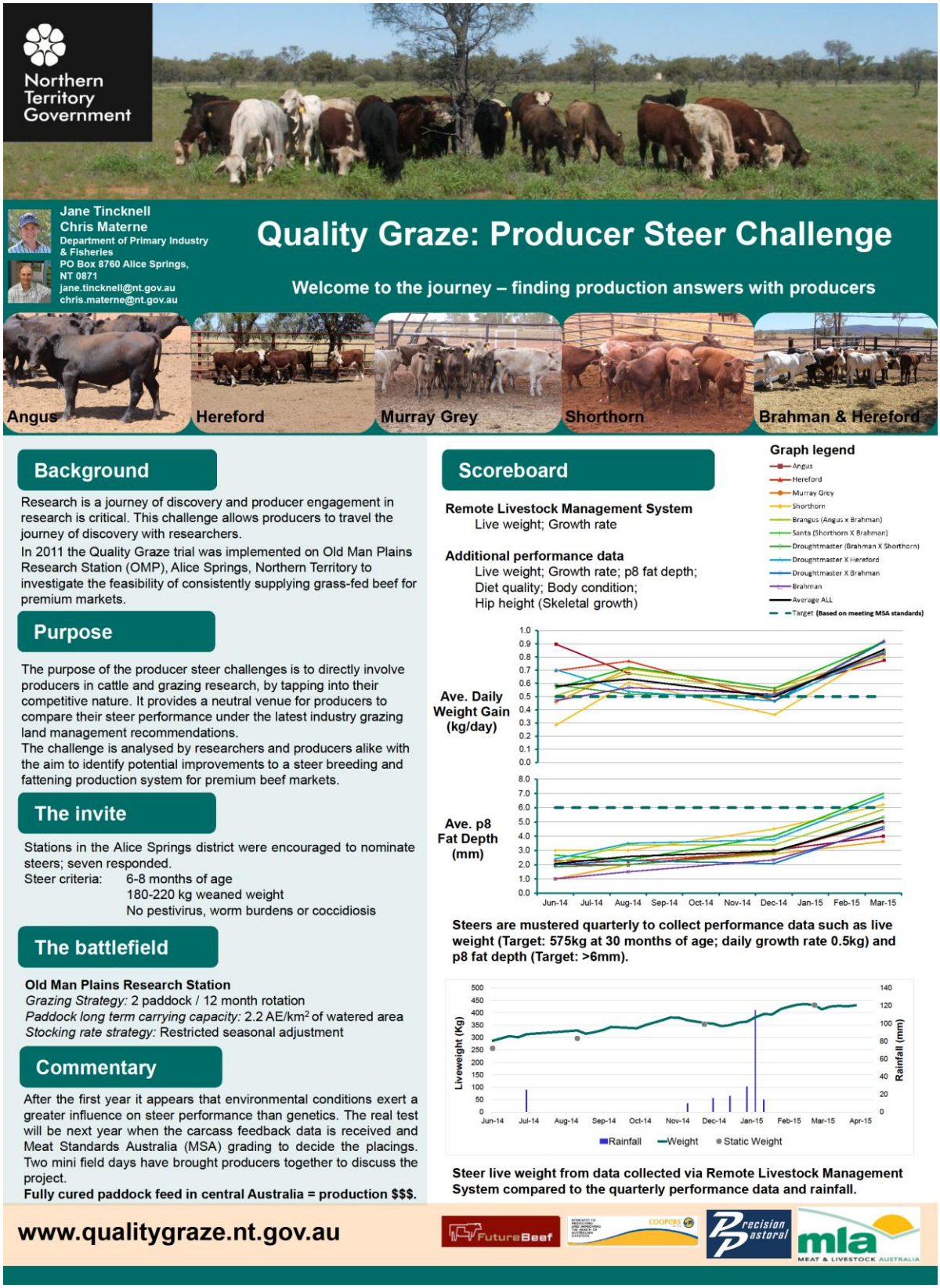
- Australian Rangeland Society Conference, Alice Springs (13-16 April 2015)

http://www.austrangesoc.com.au/biennial-conference-pages/Abstracts%2018th%20Australian%20Rangeland%20Society%20Conference%20Pastoral%20management.pdf
(page 38)

- Grassland Society of Southern Africa Conference, South Africa (21 – 25 July 2014)

- Northern Territory NRM Conference, Darwin (22-23 November 2016)

- International Rangeland Conference, Saskatoon, Canada (16-22 July 2016)



Example of a poster used at conferences.

10.2.2 Abstracts

- International Rangeland Conference, Saskatoon, Canada (16-22 July 2016) http://2016canada.rangelandcongress.org/pdf/papers/X_IRC_Proceedings_Aug2016.pdf page 612

10.3 Print and associated online media

10.3.1 Mainstream media


The Courier Mail

Chris Materne, of Old Man Plains Research Station, with some of the steers at the 2016 NTCA annual meeting in Alice Springs. PICTURE: Justin Kennedy

Northern Territory

Research project in Central Australia pays off for graziers

http://www.ntnews.com.au/news/centralian-advocate/research-project-in-central-australia-pays-off-for-graziers/news-story/b1133bf118037dfd6ed9f45b0cdece7c

http://www.couriermail.com.au/news/national/research-project-in-central-australia-pays-off-for-graziers/news-story/b1133bf118037dfd6ed9f45b0cdece7c


farmonline
NATIONAL

NEWS AGRIBUSINESS POLITICS NATIONAL ISSUES BEEF SHEEP MACHINERY

Steer trial puts grazing theory to the test

Shan Goodwin

http://www.theland.com.au/story/3821875/steer-trial-puts-grazing-theory-to-the-test/?cs=4963

10.3.2 Alice Springs Rural Review

https://dpif.nt.gov.au/__data/assets/pdf_file/0003/293025/ASRR-2016-06.pdf

10.4 Radio and associated online media

10.4.1 ABC

http://www.abc.net.au/news/2013-10-18/cattle-grazing-trial-steer-challenge/5028748

http://www.abc.net.au/news/2016-04-04/nt-steer-challenge-reveals-key-information-pasture-management/7296142

http://www.abc.net.au/news/2015-04-14/steer-challenge-points-to-interesting-results/6391026

10.5 Quarterly Station Performance reports

See next page.

Northern Territory Government

DEPARTMENT OF PRIMARY INDUSTRY AND FISHERIES

Central Australian Quality Graze: Producer Steer Challenge

12313

Station Update
March 2016

STATION "X"

Prepared by Chris Materne

(NOT FOR PUBLIC DISTRIBUTION)

13104

13106

13109

1.0 Average Steer Weight

Below are graphs displaying the live weight gain (Figure 1) and average daily gain (Figure 2) of the different mobs (collected at performance recording musters) compared to Old Man Plains steers.

Weight gain is an important production indicator. Within the Meat Standards Australia (MSA) system it has been noted that a faster growth rate will produce a heavier carcase without increasing ossification levels. By recording these measurements over the 'Challenge' and comparing it with carcase feedback further insights may be gained into this relationship.

It is anticipated that the steers will be yarded every 3 months for performance recording. Data from Old Man Plains steers has been included as a point of reference. A rule of thumb for achieving Meat Standards Australia (MSA) grading requirements is to have animals gain half a kilogram per day (0.5kg/day).

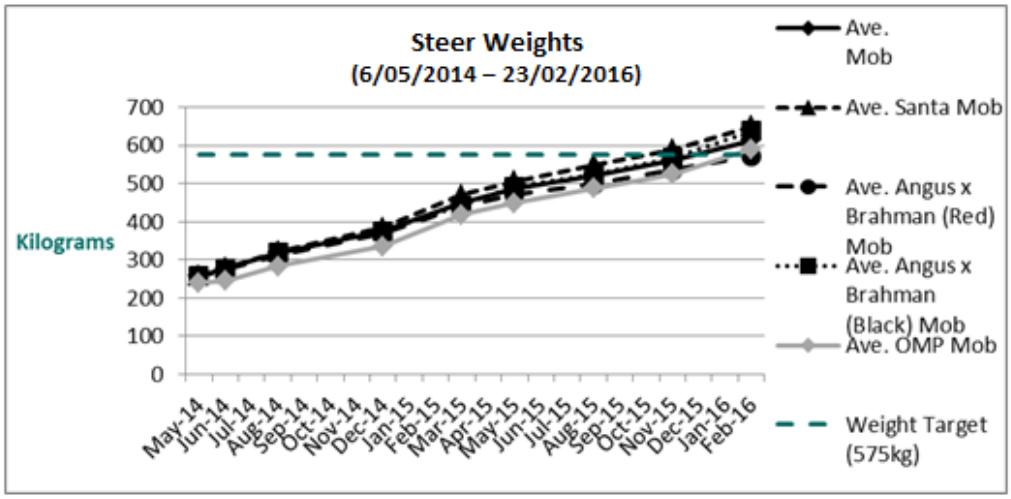


Figure 1. Live weight gain change over time recorded at performance monitoring musters for the different Napperby mobs in the 'Challenge' compared to the target.

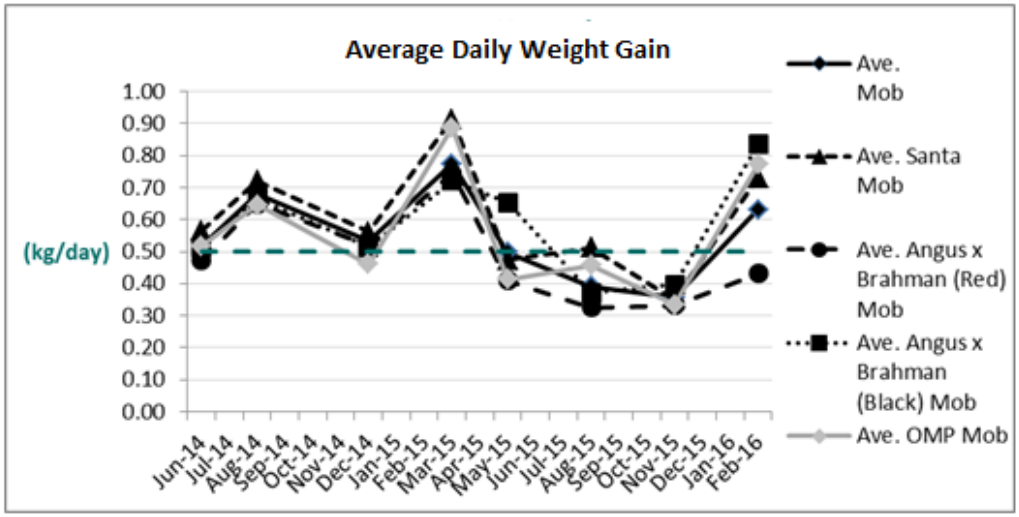


Figure 2. Average daily weight gain change over time recorded at performance monitoring musters for the different mobs in the 'Challenge' compared to the target.

2.0 Average p8 Fat Depth

Below is the p8 fat depth results (Figure 3) for the specific station groups, along with results from cattle bred on Old Man Plains for additional comparison. Fat depth is an important carcase indicator and essential for meeting MSA standards. Measuring fat depth at the p8 site has been correlated to fat depth over the ribs. This measurement will provide an interesting insight as to how fat is laid down as the steers grow and will be crucial in comparing live and carcase fat depth results.

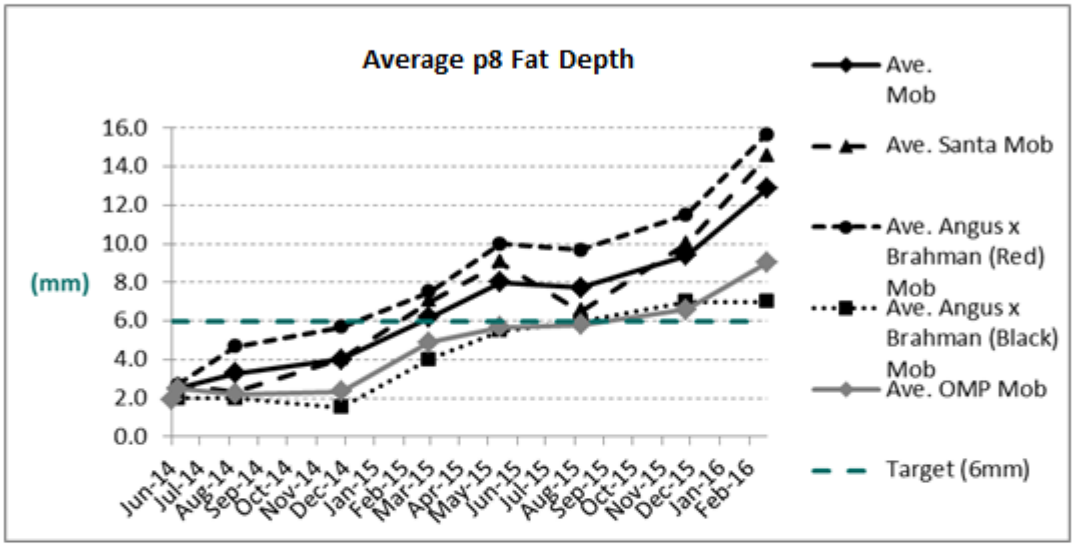


Figure 3. Average p8 fat depth change over time recorded at performance monitoring musters for the different mobs in the 'Challenge' compared to the target. Dentition

3.0 Quality Graze Web Site

The website for the Producer Steer Challenge is now live (website address below) and any feedback and particular suggestions on what you would like to see on the website would be welcomed.

www.qualitygraze.nt.gov.au

For confidentiality, your cattle are listed as Mob 5 on the website results.

4.0 Individual Steer Performance

		2014/15										Dentition (as at 18th May 2015)	2015/16						Trial Period
		Pre-trial			Period 1		Period 2		Period 3		Period 4		Period 1		Period 2		Period 3		
		Autumn 2014			Winter 2014		Spring 2014		Summer 2014/15		Autumn 2015		Winter 2015		Spring 2015		Summer 2015/16		
Steer No.	Mob	6/05/2014	11/06/2014	Growth rate (kg/day)	11/08/2014	Growth rate (kg/day)	1/12/2014	Growth rate (kg/day)	4/03/2015	Growth rate (kg/day)	18/05/2015	Growth rate (kg/day)	Incisor Teeth Present	11/08/2015	Growth rate (kg/day)	30/11/2015	Growth rate (kg/day)	23/02/2016	Growth rate (kg/day)	Growth rate (kg/day)
12313	Angus x Brahman (Red)	257	272	0.42	305	0.54	369	0.57	434	0.70	469	0.47	2	512	0.51	550	0.34	582	0.38	0.50
13101	Santa	270	285	0.42	337	**0.85**	385	0.43		Deceased										Deceased
13102	Santa	239	263	**0.67**	299	0.59	366	0.60	457	0.98	493	0.48	0	532	0.46	560	0.25	626	0.78	0.58
13104	Santa	264	286	0.61	330	0.72	404	**0.66**	483	0.85	518	0.47	1	566	**0.56**	616	**0.45**	674	0.68	0.62
13106	Angus x Brahman (Black)	261	274	0.36	314	0.66	376	0.55	409	0.35	475	**0.88**	0	514	0.46	550	0.32	596	0.54	0.52
13109	Angus x Brahman (Black)	257	281	**0.67**	322	0.67	375	0.47	476	**1.09**	508	0.43	0	532	0.28	584	0.47	**680**	**1.13**	**0.64**
13110	Angus x Brahman (Red)	270	288	0.50	329	0.67	380	0.46	447	0.72	466	0.25	0	486	0.24	522	0.32	564	0.49	0.44
[illegible]	Angus x Brahman (Red)	241	259	0.50	304	0.74	363	0.53	439	0.82	477	0.51	0	497	0.24	534	0.33	570	0.42	0.50
Ave. Santa Mob		258	278	**0.56**	322	**0.72**	385	**0.56**	470	**0.91**	506	0.47		549	**0.51**	588	0.35	650	0.73	**0.60**
Ave. Angus x Brahman (Red) Mob		256	273	0.47	313	0.65	371	0.52	440	0.75	471	0.41		498	0.33	535	0.33	572	0.43	0.48
Ave. Angus x Brahman (Black) Mob		259	278	0.51	318	0.66	376	0.51	443	0.72	492	**0.65**		523	0.37	567	**0.40**	638	**0.84**	0.58
AVERAGE WINNING MOB		**257**	**276**	**0.52**	**318**	**0.68**	**377**	**0.53**	**449**	**0.77**	**487**	**0.50**		**520**	**0.39**	**559**	**0.36**	**613**	**0.63**	**0.54**
Average OMP Mob		*238*	*251*	*0.59*	*283*	*0.53*	*335*	*0.46*	*417*	*0.89*	*448*	*0.41*		*487*	*0.46*	*524*	*0.33*	590	*0.77*	0.58