final report

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Using Walk Over Weighing and remote camera monitoring to identify key management triggers and reduce costs

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Abstract

This project demonstrated to producers the use and implementation of Walk Over Weighing (WOW) equipment in pinpointing the timing of key management practices, such as feeding of dry season supplements and identifying cattle numbers suitable for marketing.
When compared to crush-side weights, the WOW weights were consistently heavier due to curfew differences between the two measurements. Real time monitoring photos were provided through remote camera technology, with one camera installed at a trough to view the water and cattle, and the other two kilometres from water to monitor the pasture yield. Diet quality, using faecal Near Infrared Spectroscopy (NIRS) analysis, matched WOW weight performance, however the slow turnaround time to receive NIRS results back from the lab made timely supplementary feeding decision-making very difficult. Using WOW technology to identify management triggers for supplementation and time of sale was effective. In one instance, delaying feeding by six weeks resulted in a saving of $5.04 per head, and in another instance an additional $115 per head was added by delaying sales.
Reliability issues of the electronic equipment hampered some of the results; however, these technical issues were successfully overcome in the project. Several producers have expressed an interest in adopting the technologies demonstrated from this Producer Demonstration Site.

Executive summary

In response to producer interest in using remote technologies to pinpoint timing of sales and key management practices such as dry season supplementation, a Producer Demonstration Site (PDS) was established to evaluate and demonstrate commercially available automated Walk Over Weighing (WOW) equipment and remote monitoring technology.

The demonstration aimed to achieve a number of objectives, including:

- Demonstrating the effectiveness of WOW equipment to help producers pinpoint timing of sale.
- Identifying trigger points for key management decisions on timing of supplementation.
- Demonstrating the effectiveness of a range of supplementary regimes using an auto draft system.
- Demonstrating the effectiveness of remote camera equipment to monitor water trough levels and pasture condition remotely.
- Correlating faecal Near Infrared Spectroscopy (F.NIRS) results with management triggers.

It was anticipated that this technology could be implemented by PDS group members and the wider cattle industry to reduce mustering costs and assist producers to make key management decisions. Similarly, wider adoption of remote cameras has the potential to reduce labour and vehicle costs by conducting 'water runs' remotely as demonstrated in previous work (Zellor (2011), N.NBP.0505 Remote Water Management – Roma region http://www.mla.com.au/Research-and-development/Search-RD-reports/RD-report-details/Capability-Building/PDS-Remote-Water-Management/395) showing the application of remote water monitoring. This technology has broad industry application, especially in situations where properties are owned and managed across different regions. Several producers have expressed an interest in adopting the technologies.

In the project, two cohorts, (total 134 steers) tested the WOW technology over a two year period. Adequate training was vital to ensure that steers would effectively enter and exit the yards, walk over the weighing platform and adjust to the auto draft equipment. Following initial setup and animal training, daily weight data (summarised weekly), was collated and distributed to the group via the uSee website (www.usee.com.au/sites). This allowed producers and other trial participants to monitor weekly steer performance throughout the demonstration. This weight data was also cross-checked during crush-side weigh days held at regular intervals throughout the trial.

WOW weight consistency and use in management

Analysis of this data shows WOW weights were consistently heavier than crush-side weights (5.2 to 7.3% Cohort 1 and 3.1 to 4.4% Cohort 2), mainly due to the overnight wet curfew prior to crush-side weighing and nil curfew for WOW. The WOW data provide insight into the trend in liveweights, which also correlated well with changes in pasture quality. Using the average weekly liveweight data posted on the website, it was then possible to appropriately time the introduction of dry season supplementation to when cattle weight gains began to plateau. This together with NIRS results and observation enabled the group to delay feeding lick by six weeks, resulting in savings of $5.04 per head associated with their supplementary feeding program.

Using WOW to optimise the sale cattle strategies proved profitable for Cohort 1 by delaying the 'routine sale' time (March) by three months to take advantage of further live weight gain. The advantage of the WOW was that it enabled the producers to see an average weekly weight gain figure (kg/head/day) of the herd rather than assuming the cattle are still gaining

weight, which can be difficult to judge by eye. Under this scenario, the cattle were sold at the beginning of July and weighed on average 635kg, gaining an additional 75kg. Despite a lower price per kilogram, these animals gained an extra $115 per beast without any additional cost.

Pasture growth in the demonstration paddock was limited by the failed 2012/13 wet season, however, feed quality remained high until mid-April 2013 for Cohort 2 cattle. The WOW data showed the cattle average daily weight gain (kg/head/day) plateaued in May, which indicated the animals should have been sold at this time. The producer group made the decision that the animals were too light to process and decided to move them on to a feedlot. However, the feedlot could not take the animals until July. In hindsight, this decision may have been made earlier when the WOW average daily gain weights began to slow down, to enable the cattle to be booked in to a feedlot earlier and avoid weight loss.

Remote cameras

In addition to liveweight data, group members had access to real time monitoring photos through remote camera technology, with one camera installed at the trough and the other two kilometres from water to monitor the pasture yield. Daily photos were taken at set times, or on demand and displayed on the uSee website. This enabled producers to observe trough water levels and animals in the yard ensuring they were not caught in the water yard, off feed. A preliminary assessment for the cost benefit of the remote cameras indicated a one-year payback on investment was achievable. However, further detailed assessments are needed to substantiate this finding. This camera was also useful in monitoring cattle movements through the race during the 'training' process. The technology was used extensively by the demonstration property's livestock manager to quickly assess the status of water and cattle. The pasture monitoring camera provided a reasonable comparison with manually recorded photo monitoring sites and is a useful pasture monitoring tool.

Auto drafter

The auto drafting feature was added to the WOW equipment in 2012, and this allowed testing of different feed supplements to steers grazing the same paddock. This feature drafted cattle three ways to different feeding regimes effectively until there was a degenerative failure of the panel reader where tags were being only read intermittently. The default draft for a non-reading tag was the same as the previous animal and this lead to a mixing of drafting groups. This issue was not identified quickly and the drafting grouping for the final six weeks was compromised. Once a new panel reader was installed, the problem was resolved; however, the weight data was unable to be used to compare feeding regimes due to this inefficiency.

NIRS

Faecal NIRS samples were taken each month to determine the quality of the diet being selected. Dry Matter Digestibility to Crude Protein (DMD to CP) ratio was used to compare the commencement timing of urea feeding with the weekly WOW weight gains. There was a good relationship between DMD:CP ratio ≥ 8 and the plateauing of WOW weight gains. Due to the four to six week time lag between submitting NIRS samples and receiving results, it was difficult to use the NIRS results for timely supplementary feeding decisions, therefore the WOW equipment proved a more suitable option.

Producer learning

Throughout the trial, crush-side weigh days, field days and debrief meetings have provided a platform for participants to engage in further learning and discussion on the WOW technology and related topics. These discussions, coupled with physical observations of the animals and analysis of the data, have increased participants' knowledge of the growth path of animals and the impact of environmental conditions. As a result of being involved with the PDS, group members have indicated they have gained a better understanding of changes in pasture

quality and subsequent impacts on animal liveweight performance, enabling them to make more informed decisions in their own business. Forty percent of the producer group had no understanding of these remote technologies. This improved to 100 percent of the group having some or a good understanding of the technology and how it can be applied. Ninety-four percent indicated interest in using WOW technology on their property.

The demonstration of the WOW, auto-drafter, remote cameras and NIRS technologies has generated significant local and statewide interest. Although remote technology reliability remains an issue, the PDS activities have successfully highlighted the many applications of these technologies on extensive beef enterprises. The WOW and remote monitoring equipment is a viable alternative for supplementation trials as it removes any paddock effect that may be seen.

At the final meeting of this PDS project, the producer group decided to continue to work with Precision Pastoral and to lease the equipment to monitor liveweights in real time in an attempt to answer questions on the performance of different commercial feed products. While this PDS project has finished, this producer group is continuing to test the equipment and its use as a management tool, demonstrating the importance of this extension approach.

Contents

1 Background

As a result of producer interest expressed to FutureBeef staff to trial automated WOW technology, plans began in 2010 to establish a PDS in the Richmond area of western Queensland. The focus was to demonstrate if the equipment could better pinpoint timing of key management practices, such as the commencement of dry season supplementation. This can be identified by the average daily gain of the cattle plateauing; at which point supplementation could be provided depending on the class of stock and marketing goals to be achieved with them. In this case, the producer group made the conscious decision to feed supplement to the demonstration cattle in a similar manner to what they use on their properties.

In early 2011, further producer meetings were held to gauge interest in expanding the concept of the successful Flinders Shire Beef Challenge (essentially a steer grow-out contest used as a platform for producers to learn and discuss a range of issues) into the neighbouring Richmond Shire. Strong producer interest in forming a similar Richmond Beef Challenge provided an opportunity to establish this PDS.

The project team was aware of a number of automated WOW prototypes and units developed and used in other trials, yet commercial equipment has had limited availability. It was considered necessary to demonstrate equipment that would be commercially available to industry, rather than continue developing prototypes. Precision Pastoral from Alice Springs has been working in this field and were close to releasing a commercial product. This company was contracted to supply, setup and maintain the WOW equipment, as well as manage the liveweight data. The daily individual liveweight information was collected via Observant technology and managed by Precision Pastoral. Relevant weight summaries were made available weekly to the group via email and website access. Twelve months into the PDS, an adjustment was made to include an auto draft unit from Precision Pastoral to compare supplementation strategies using the second cohort of steers.

Remote water monitoring systems were another technology identified by the PDS group as a demonstration priority. Harrington Systems Electronics, a Richmond-based business, was contracted to supply and maintain two ‘uSee Remote Cameras’. One camera at the water yard monitored water trough levels and observed animal behaviour around the scales. The second camera was positioned two kilometres from water to monitor pasture quantity. Harrington Systems Electronics also provided and maintained a website to display camera photos and weight data to the group.

Over the life of the project, two cohorts of steers were paddocked and monitored on a Mitchell grass Downs property near Richmond. The first cohort involved 45 head from nine properties, followed by 89 head from 11 properties. These cattle, also part of the Richmond Steer Challenge group, were used to demonstrate the use and gauge effectiveness of this potential labour saving equipment throughout the duration of the PDS.

The demonstrated equipment has the potential to assist producers to make key management decisions. Similarly, wider adoption of remote cameras will reduce labour needs and vehicle costs by being able to conduct ‘water runs’ remotely.
A previous study (Zellor, 2011. http://www.mla.com.au/Research-and-development/Search-RD-reports/RD-report-details/Capability-Building/PDS-Remote-Water-Management/395) clearly showed an economic benefit for two properties with financial gains of $6,700 and $14,400 per year resulting in an annual return on investment (ROI) of 58 percent and 96 percent. This technology has broad industry application, especially where home base is often at a different location to the ‘grow out or finishing block’.

2 Project objectives

By December 2014:

- Demonstrate the effectiveness of WOW equipment to help producers pinpoint timing of sale.
- Identify trigger points for key management decisions on timing of supplementation and gauging the effectiveness of supplementation.
- Demonstrate the effectiveness of a range of supplementary regimes using an auto draft system.
- Demonstrate the effectiveness of remote camera equipment to monitor water trough levels and pasture condition remotely.
- Correlate faecal NIRS results with management triggers.
- Increase producer understanding of changes in pasture quality and subsequent impacts on animal liveweight performance.
- Shared knowledge and experience with the wider industry.

3 Methodology

3.1 Rainfall

Rainfall measurements from the nearby Bureau of Meteorology station at the Richmond Post Office (located 15 km from the PDS site) were used. Rainfall received over the project for the annual seasonal period July – June is shown in Figure 1. (Source: Rainman Streamflow software [*https://www.daf.qld.gov.au/plants/field-crops-and-pastures/broadacre-field-crops/cropping-efficiency/rainman]).*

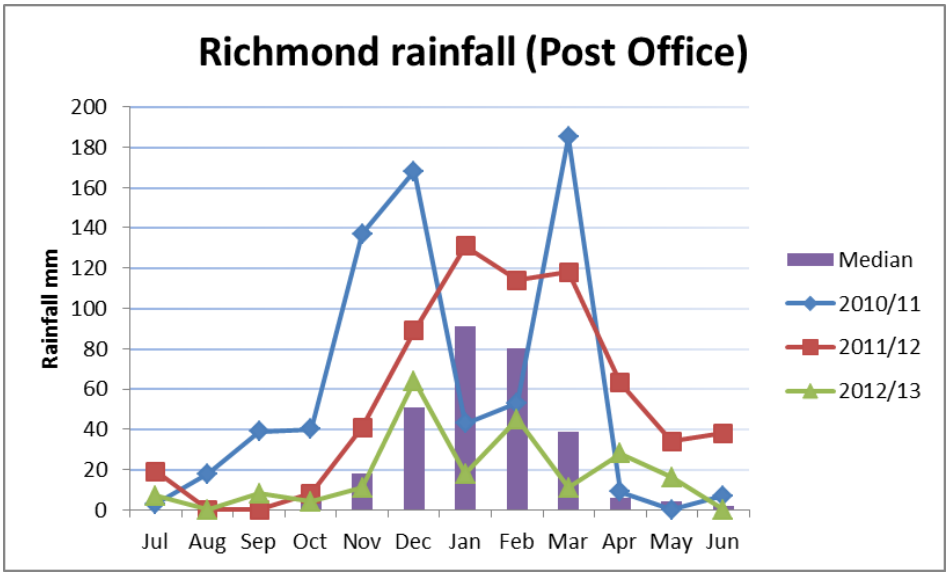


Figure 1. Richmond Post Office rainfall (July - June). Source: Rainman. Historical rainfall information was also accessed from The Long Paddock website (https://www.longpaddock.qld.gov.au/).

Figure 2 highlights that the rainfall, relative to historical records, was extremely low in 2012/13.

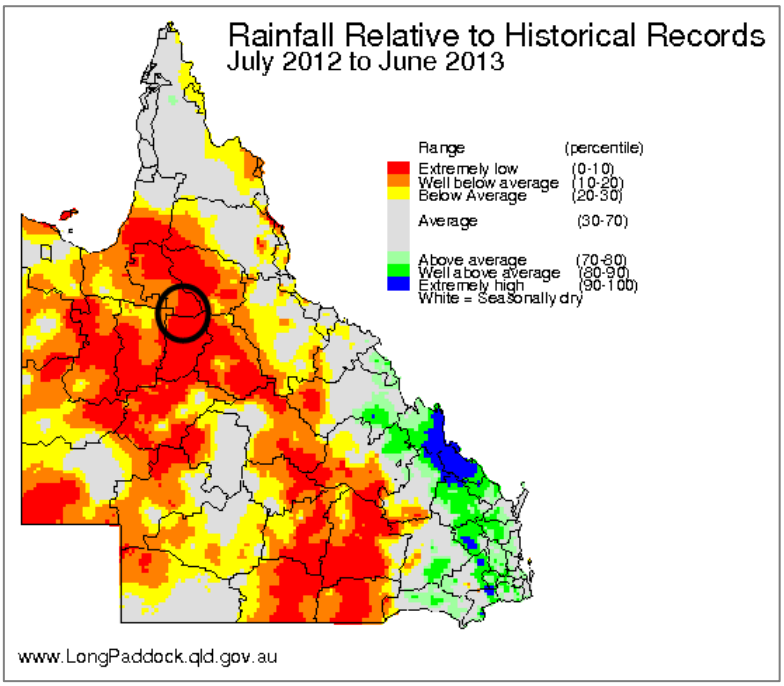


Figure 2. Rainfall relative to historical records. Richmond district circled. Source: The Long Paddock.

3.2 Site establishment

Combining the Richmond Beef Challenge Group (see Appendix 7) with the PDS eliminated the need for participant selection. A producer from the Richmond Beef Challenge group provided the use of a 590 hectare (1,454 acre) paddock on his property, Wilburra Downs, 15 kilometres east of Richmond.

In June 2011, a spear trap yard and basic weighing and loading facilities were built (see Figure 3). Portable panels were sourced from Biosecurity Queensland in Townsville on loan over the duration of the PDS. Spear traps, crush, portable loading ramp, extra pins, water troughs and fittings were loaned from producer group members, donated by local businesses or purchased through the PDS or Richmond Beef Challenge funds. Department of Agriculture and Fisheries (DAF) owned portable scales were used to collect crush-side weights. A sponsored panel reader was used to connect to the WOW equipment to read the electronic identification tags.

The uSee remote monitoring cameras were set up in late June 2011 by Harrington Systems Electronics and the installation of the automated WOW was completed by Precision Pastoral on 25 July 2011 (see Figure 4). The addition of the automatic drafter was added to the WOW unit in September 2012.

Adjustments and alterations had to be made to the yard structure and design (addition of pens and troughs for auto drafter) over the duration of the PDS. These were coordinated and carried out within the group, with the support of FutureBeef staff where necessary. Excellent cooperation and working relationship with the host property manager made the on-ground work and general running of the PDS site a smooth experience (See Appendix 1 for design layout).

Figure 3. PDS group members setting up the portable panel yards and spear traps around the single watering point at the paddock on Wilburra Downs, Richmond, in late June 2011.

3.3 Animals and training

3.3.1 Cohort 1

Forty-five steers (300–400kg, milk or two tooth) from nine properties (five head per property) representing eight businesses were inducted into the paddock on 23 June 2011. All animals received a management tag and were vaccinated for botulism, back lined for internal and

external parasites, Hormone Growth Promotant (HGP) inserted at owner discretion and weighed. Depending on season, they would stay in the paddock for approximately 12 months with the exact selling date decided in 2012. The paddock was stocked at approximately 1AE:13 ha (1AE:32 acres, AE = Adult Equivalent). The steers were left in the paddock for one month to become accustomed to their new environment, after which weight data began to be collated.

Figure 4. Tim Driver, Precision Pastoral, and local producers installing the WOW unit on 25 July 2011.

3.3.2 Cohort 2

Eighty-nine steers (250–300kg, milk or two tooth) from 11 properties (eight per property) representing nine businesses were inducted into the paddock on 8 June 2012. All animals were given a management tag and vaccinated for botulism, back lined for internal and external parasites, HGP inserted at owner discretion and weighed. As with cohort 1, the steers were left in the paddock for one month to become accustomed to their new environment, after which weight data began to be collated. Both cohorts of steers ran in the paddock together for six weeks to assist training the second cohort to use the spear traps and WOW equipment. Over this period the stocking rate was 1AE:5ha (1AE:12 acres) and reduced to 1AE:7 ha (1AE:18 acres) once the first cohort was sold on 5 July 2012. This stocking rate was more in line with the group's perception of the local industry average. The three-way auto draft unit was installed at the site on 24 September 2012, and training of the animals began. A DAF statistician randomly allocated the steers across three supplementation groups to provide an even distribution of weights within each group. The auto drafter began drafting the steers into their individual groups on 31 October 2012 with the aim of demonstrating if the WOW and auto drafter equipment could be used to feed varying supplements to the groups. It was not a scientific trial, rather a demonstration of what the equipment could potentially be used for.

3.3.3 Cohort 3

The proposed third cohort of animals did not eventuate due to drought conditions.

3.4 Measurements/data collected

3.4.1 Liveweight—WOW and manual weigh days

Each animal walked across the WOW platform upon leaving the receiving yard (see Appendix 1), where their liveweight, National Livestock Identification System (NLIS) tag number, date and time were recorded. The number of records per day depended on how often each animal accessed the water trough, which in turn was affected by environmental conditions such as temperature. Liveweight data was sent via 3G Observant technology to a server managed by Precision Pastoral. Performance reports were sent out weekly to Harrington Systems Electronics to be distributed to the group through the Richmond Beef Challenge webpage (http://www.usee.com/sites).

Animals were weighed in a crush with commercial scale equipment at intervals throughout the PDS. These crush-side weigh days varied but the aim was to weigh the steers at the following times:

- June - at induction to the paddock
- July - one month after induction (this was the first measurement used to monitor weight gain)
- November - break of season
- March - end of wet season
- June - prior to selling.

Crush-side weights were carried out using the following protocol. The out spear gate would be closed on the afternoon of the day before weighing. Cattle would be trapped into the 'receiving' water yard that afternoon (see Appendix 1). Weighing would commence at approximately 9.00am the following morning (i.e. overnight curfew on water) with the producer group assisting.

3.4.2 Remote Monitoring Cameras

A uSee remote monitoring camera (Next G) was set up at the water yard to monitor water trough levels, as well as cattle movement and behaviour around equipment (see Figure 5a). The camera was programmed to capture four images a day with an option to take a photo on demand via the uSee website Richmond Beef Challenge webpage.

A second camera was installed two kilometres from water to monitor pasture quantity (see Figure 5b). This camera was programmed to capture one image a day at 1:00pm.

Photos were readily accessible to the producer group and other people involved via the uSee website Richmond Beef Challenge webpage.

Figure 5. uSee remote monitoring cameras used to monitor *[at left]* (a) tank and trough levels as well as

cattle movement at the water yard and *[at right]* (b) two kilometres from water to monitor pasture quantity.

3.4.3 Near Infrared Spectroscopy (NIRS)

Faecal NIRS samples were collected and submitted to Symbio Alliance at monthly intervals throughout the duration of the PDS. These samples were used to analyse diet quality by providing crude protein and digestibility figures, as well as a non-grass content in the diet. Samples from 15 fresh dung pats were collected, mixed together and dried prior to sending off to Symbio Alliance.

A ratio DMD:CP was used as an indicator for timing of supplement feeding to compare with the WOW live weight gain indicator. When the DMD:CP ratio is less than 8, no response to urea supplementation is expected; between 8 and 10 there is likely to be a response (at least in northern speargrass pastures) and when the ratio is greater than 10, it is very likely to be a response to urea supplement. For this study, we have used DMD:CP ratio of greater than 8 as an indicator that urea supplements are likely to benefit growth (Dixon *et al.* 2005).

3.4.4 Pasture monitoring sites

Five pasture photo monitoring sites were established in the paddock in April 2012, at one kilometre intervals from the water yard. As the only water in the paddock is supplied at the east end of the paddock, these sites began one kilometre from water heading west. Photos, pasture species and approximate dry matter yield were recorded for each site every two to three months while there were cattle in the paddock (see Appendix 2). These measures were used to establish a stocking rate at the beginning of each cohort of steers.

3.4.5 Communication activities

Communication activities included a wide range of online and print media combined with face-to-face activities as well as producer days at each crush-side weighing event, debrief days following the sale of each cohort and field days. These were used to provide updates on the progress of the trial, showcase the equipment used and present the data collected, as well as provide an avenue for information delivery on the demonstrated equipment or a related topic. Communication material for the project is presented in the Appendices.

4 Results and discussion

4.1 WOW and auto draft equipment

4.1.1 Animal training and behaviour

To use the WOW equipment, the cattle had to be trained in using spear traps to enter and exit the water yards during their first month in the paddock. Through this demonstration it was found that the most efficient method of training cattle, which had not used this equipment previously, included several steps:

- Week 1 – Remove a panel from beside the entry and exit spear traps. Over the week the panel was closed up to the width of the spear trap frame to allow cattle to get used to walking through this area.
- Week 2 – Spear trap frame was installed between the panels making cattle walk through the frame.
- Week 3 – The top pair of spear trap arms were inserted into the frame. This ensured cattle fitted under the top pair of arms and did not try to jump over them, while getting cattle used to the sensation of the arms running down their back and sides.

- Week 4 – Spear trap arms inserted a pair at a time downwards from the top pair over the week allowing the cattle, to get used to having to push through the arms.

By Week 5 the cattle were trained to use the entire spear traps to enter and exit the water yard. It was vital that these steps were followed and that no short cuts were taken to ensure an efficient training regime had occurred.

Precision Pastoral installed the automated WOW equipment on 25 July 2011, in front of the exit spear from the receiving yard. The animals had already been trained to use the spear traps, as outlined above, and the majority were comfortable using them after the WOW platform was added. Approximately 10 percent of the cohort took up to three months to become adjusted to the equipment and needed to be walked through the equipment regularly until they became comfortable with crossing it themselves. Animal behaviour was monitored with the uSee camera positioned at the water trough, as well as on-site inspections, to ensure all were exiting the yard. The NLIS reader on the weighing equipment was also used to check all animals were crossing the weigh bridge and exiting the water yard.

A different approach to training was used with the second cohort of steers; these animals were introduced to the paddock one month prior to the first cohort being sold. This allowed the first cohort to train the new cattle to use spear traps and the WOW equipment. Daily checks ensured the cattle were adjusting to the equipment and, occasionally, some needed to be walked through the WOW equipment until adjusted.

The new auto draft unit was installed on 24 September 2012, which required further training for the second cohort of cattle. Initially, the animals experienced some anxiety with the auto draft unit and the first training attempt failed as the drafting gates were switched on too soon (within one week). This did not allow the cattle enough time to adjust to the extended race. From observation and discussion with Tim Driver, this anxiety was possibly caused by the large white control box at the top of the unit (see Figure 6) and loud noises made by the equipment when building up air pressure to move the gates.

The following revamped training regime was found to work best for the cattle in this demonstration:

- Week 1 – Drafting gates remained in one position allowing all cattle to walk straight ahead and avoiding any noise coming from the drafting unit. For example, the hydraulic arms in motion.
- Week 2 – The gates were locked one way (through to the left yard) for three days, which again avoided the air pressure noise. This was then repeated with the gates pushing the cattle into the right yard.
- Weeks 3 and 4 – The unit was turned on in a random draft to accustom the animals to the gate moving in front of them. This training went on for as long as required until the animals were adjusted to the moving equipment and associated air pressure noise.

Figure 6. The white control box on top of the auto draft unit caused some issues when training cattle.

Eventually, the arms were removed from the spear trap leading into the WOW and auto drafting equipment as it was found that while the cattle were training they were getting a fright when the auto drafter moved and would step backwards into the spear trap. On two occasions this jammed the arms, preventing any further cattle exiting the water yard.

Daily paddock visits (for up to three months) were required by either the property manager and/or DAF staff during the training process to ensure all animals were adjusting and able to exit the water yard. These visits were reduced by the use of the uSee camera but it did not eliminate visits completely. Animal training was time consuming, with the majority of PDS animals having not used spear traps or weighing and auto drafting equipment before. Without prior exposure it would be a concern to set up this type of equipment any great distance from the homestead on a commercial property, due to the risk of stock perishing before the animals had become adjusted to the equipment.

The majority of the cattle trained well using the spear traps and WOW equipment within five weeks. However, approximately 10 percent of each cohort took up to three months to become adjusted. Out of the two cohorts of cattle, three head (one in Cohort 1 and two in Cohort 2) were removed and returned to their original owners as they were unable to adjust to the equipment.

Each cohort of steers in the PDS had come from a number of different properties and, hence, had been through different management and animal handling/education procedures. If animals were exposed to this training and equipment as suckling calves, or during the weaning process, animal training would likely be shorter and less of a concern for the property manager, but could still take up to five weeks.

4.1.2 Identify trigger points for key management decisions – Timing of sale

The first cohort of steers experienced an excellent season with the mob gaining an average of 194kg liveweight (0.63kg/head/day) over the 310 days in the paddock (WOW weight data from 03/08/2011 to 08/06/2012, see Appendix 3). Given the good wet season and the steers continued growth, the producer group decided at the March 2012 crush-side weigh day to hold off selling the steers, monitor their growth using the WOW equipment to monitor weight

gains and possibly increase their value by selling them later as heavier animals, once their weights began to plateau.

The paddock received 72mm of rain in late May 2012 over two falls (23mm on 25 May and 49mm on 31 May), which was accompanied by cold weather with daily minimums consistently below 10°C for a week. These conditions contributed to the mob averaging a weight loss of 0.2kg/head/day over the two weeks from 25 May to 8 June 2012 (see Figure 7). A decrease in weight gain was also seen in March (see Figure 7), which coincided with the overnight curfew and crush-side weighing. This check in weight gain was common on days when the animals were handled for crush-side weighing. Following winter rains, some cattle were watering in small gilgais in the paddock, and not enough animals passed through the equipment to post a weight for the week beginning 1 June 2012.

For each manual weigh day, the spear gates exiting the receiving yard (leading on to the WOW platform) were closed the morning prior to the time/date of the manual crush side weigh day. This meant that the cattle were locked in the receiving yard only and could not walk across the WOW platform. The spears were closed for this amount of time to ensure that the cattle would all come in for water and be locked in the receiving yard. There was a trough in this yard so the cattle had access to water at all times, but no feed. These cattle would then be manually weighed in the crush using separate weighing equipment to the WOW platform allowing crush side and WOW weight data to be compared.

Following the winter rain, and the 5 July 2012 weigh day, a sale date was set with animals processed at Teys Australia Lakes Creek abattoir on 24 July. This decision was made after the weight gain of the animals had plateaued at the end of May as indicated by the WOW data (see Figure 7).

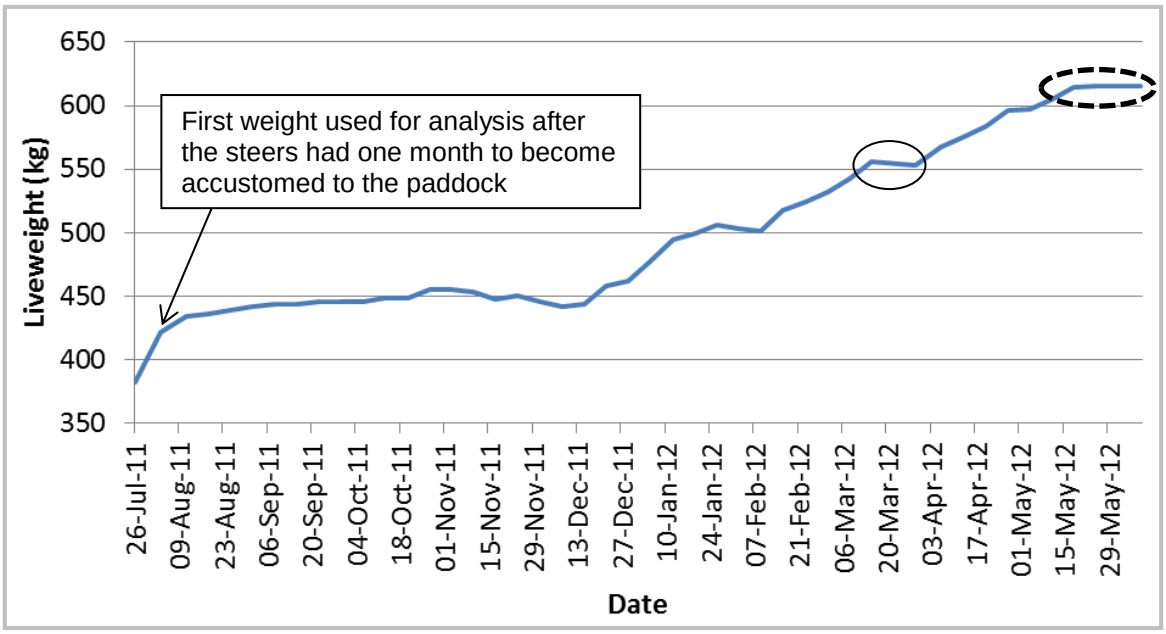


Figure 7. Growth path of first cohort of steers. Growth slowed or stopped around late May, as indicated by the dashed circle in the graph, due to 72 mm of rain followed by cold weather. The solid circle indicates a halt in weight gain, which coincided with the overnight curfew and crush-side weighing.

Some producers in the group would have preferred to sell earlier. Under normal selling conditions for the local area, the identified time of sale for the cattle would have been at the end of March 2012. At that point, the cattle weighed on average 560kg and the price received would have been 390¢/kg Hot Standard Carcase Weight (HSCW). This would have resulted in a total value of $1,136/head (using the average dressing percentage of the mob of

52% when killed in July). However, the WOW data showed that the cattle were still gaining weight. To take advantage of this, and using the WOW data to guide decision making, a second option was to retain the cattle until weights started to plateau and then sell, while also ensuring enough pasture was still available in the paddock. Under this scenario the cattle were sold approximately 12 weeks later, at the beginning of July. At this time the cattle weighed on average 635kg, and the price was 379¢/kg HSCW, which resulted in a total price received of $1,251. Despite the lower price per kilogram, the animals were actually worth more and this was achieved with no extra money spent on inputs over the 12 weeks, resulting in a total of $115 extra per beast obtained (see Figure 8).

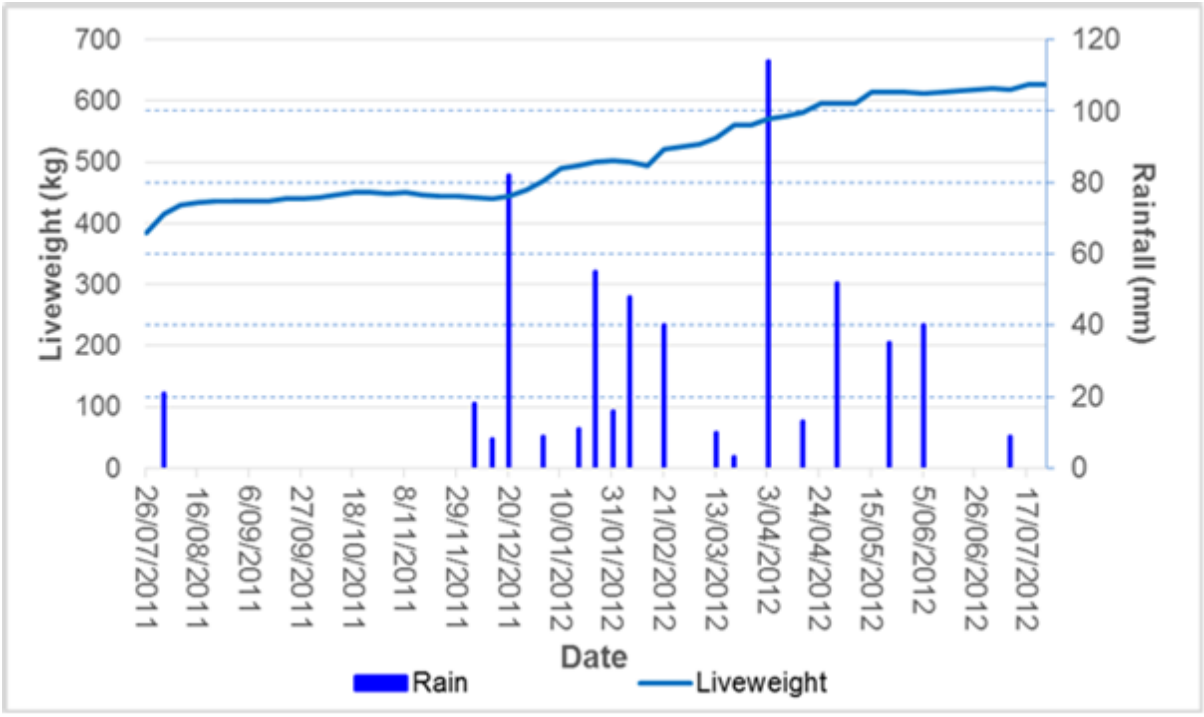


Figure 8. Average WOW liveweight data and rainfall were matched with the price received when the producer would normally sell their cattle (390 cents in March 2012, against when the WOW data showed a plateau in weight gain (379 cents in July 2013). With the extra weight gained during this period a higher profit would have been made by using the WOW weights and holding on to the cattle for longer.

The second cohort of steers (June 2012 to July 2013) gained 117kg liveweight (0.32kg/head/day) over the 371 days in the paddock (WOW weight data from 02/07/2012 to 08/07/2013). The WOW data (see Appendix 3 and Appendix 4) showed liveweight gains beginning to plateau in May 2013 and weight loss began soon after (see Figure 9). Attempts were made to move the cattle once it was identified that the animal weights had plateaued however, an allocation into a feedlot was not available until the end of July. The cattle were not an appropriate weight to send to an abattoir so a feedlot was the best option as pasture was limited in the paddock from the exceptionally dry conditions that year. In July the steers were trucked to a feedlot in Proston. In hindsight, once the WOW data showed the liveweight gains slowing, and given the seasonal conditions, the group should have decided to book the cattle into a feedlot earlier. This decision making process may have occurred sooner if it were not confined to achieving a majority vote by the group.

Pinpointing timing of sale with the second cohort of steers became less of a priority for the group due to a poor wet season, drought conditions and impending installation of the auto draft unit. Animals began to display consistent weight loss from May onwards indicating sale as soon as possible would be ideal. However, the group were keen to utilise auto-drafting

equipment to demonstrate its capability to compare supplement options and indicate potential response in drought conditions.

Although in the paddock for a similar time period, there were an increased number of crush-side weigh days for the second cohort of steers. With the poor wet season, producers wanted to keep a visual appraisal on the animals to match with the manual and WOW weight data, to help management decisions throughout the season until they left the paddock in July 2013. While the WOW equipment was used to aid the group's decision of when to sell the cattle, the producers also relied on visual analysis of the paddock and manual weigh day data.

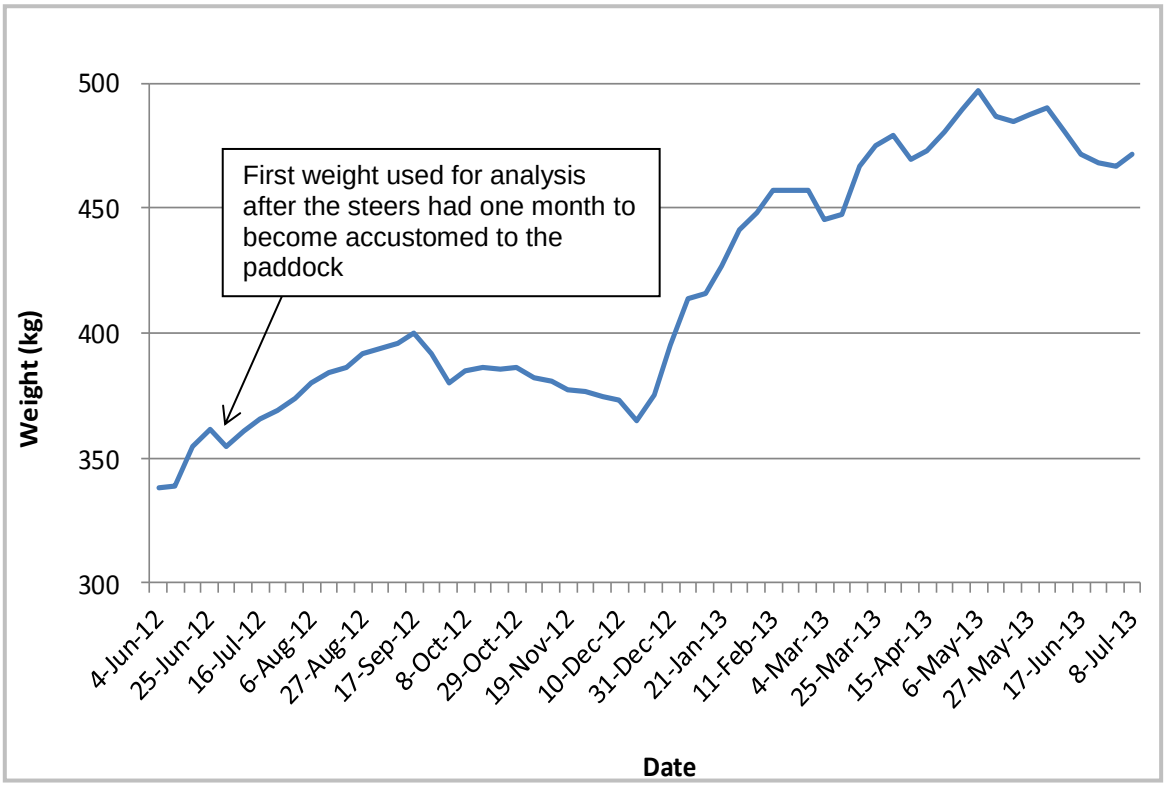


Figure 9: Weekly average weight of the second cohort of steers from June 2012 through to July 2013. After a tough dry season steers gained weight from December 2012 through to May 2013.

Crush-side versus WOW weights

A comparison of the crush-side weights and WOW equipment weights is provided in Table 1. Gut fill created an obvious difference between the crush-side and WOW weights. The animals were trapped into the yards (on water) the day prior to the crush-side weigh, meaning they had lost a significant amount of gut fill prior to being manually weighed. Generally, the average daily gains between the two weigh systems were similar. For the week of the 26/07/2011 the crush-side and WOW weights were similar (383kg and 382kg), which may have been due to the cattle being brought into the paddock that week being empty when first walking over the equipment, and most likely spending the week getting used to the paddock limiting feed intakes. For the next two crush-side weigh recordings the WOW weights were 7.8 and 5.5 percent higher, respectively, than the crush-side weights. Similarly, in the second cohort, the weight differences ranged from 3.2 to 4.6 percent heavier for the WOW compared to the crush-side weights (likely due to gut fill).

Measuring live weight in extensively managed cattle can be inaccurate due to the variation in gut fill at the point of weighing. However, while WOW weights may not provide a completely accurate reflection of the actual liveweights of the cattle at a specific time, it does show the trend in weights which closely followed the crush-side weights. This provides confidence in the use of WOW weight trends as a tool to base management decisions. If producers are

using this equipment to pinpoint timing of sales they should account for gut fill in their decision making process.

The advantage of the WOW weight data in this PDS group was the increased knowledge and understanding of the growth path of their animals and the impact of environmental conditions. This information allows the producers to make more informed strategic decisions.

Table 1: Comparison of crush side weights and WOW equipment weights for both cohort 1 and cohort 2 steers. Average daily gains are provided in the brackets beside each liveweight.

Type of weighing	26/07/ 2011 (kg)	10/11/ 2011 (kg)	29/03/ 2012 (kg)	5/07/ 2012 (kg)	8/11/ 2012 (kg)	21/03/ 2013 (kg)	16/05/ 2013 (kg)	14/06/ 2013 (kg)	30/07/ 2013 (kg)
Crush-side weight cohort 1	383	420 (0.35)	524 (0.74)	601 (0.79)					
Crush-side weight cohort 2				341	366 (0.20)	437 (0.53)	468 (0.55)	466 (-0.07)	456 (-0.22)
WOW equipment weight	382	453 (0.66)	553 (0.71)	-	382 (0.21)	457 (0.56)	487 (0.54)	481 (-0.21)	-
Difference between WOW and crush-side weights	-1	33	29		16	20	19	15	-
Percentage difference between WOW and crush-side weights		7.9%	5.5%		4.4%	4.6%	4.1%	3.2%	

4.1.3 Identify trigger points for key management decisions – Timing of supplementation

Demonstrating that WOW weights could be used to dictate the time when supplementation should begin was a key objective for the producer group. Weighing equipment showed a plateauing in weight performance of the first cohort of steers in early September 2011 (see Figure 10). This was confirmed by the faecal NIRS sample analysis for DMD:CP (August 8.70, September 7.98 and November 9.17), see Appendix 5. Consequently, dry lick feeding began on 24 September 2011 (see Figure 11).

In comparison, the neighbouring Flinders Shire Beef Challenge, who had inducted cattle of the same weight range at the same time in July 2011 to a comparable Mitchell grass paddock and comparable seasonal conditions, introduced lick six weeks earlier. The group had based their decision to feed lick on group experience and visual appraisal of stock and pasture.

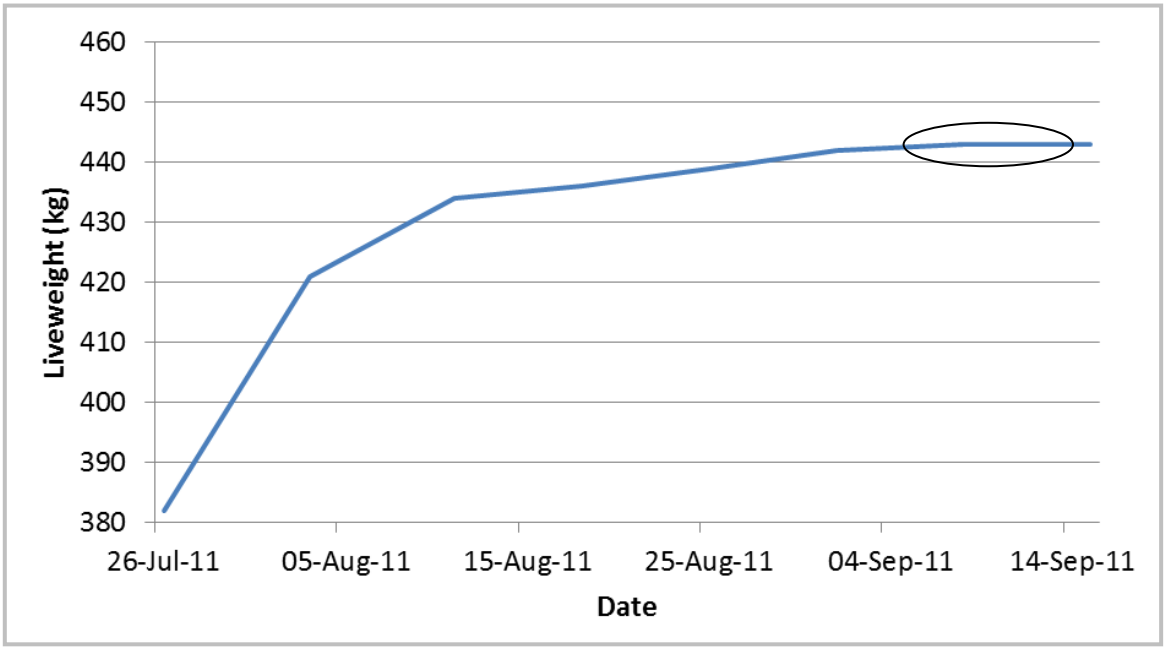


Figure 10. Walk over weighing liveweight data for the cohort 1 steers used by the PDS group to determine when to start feeding lick. The circle indicates when the liveweights began to plateau.

Figure 11. Dry lick supplement was introduced to the Richmond Beef Challenge cattle on 24 September 2011 after identifying liveweights plateauing using the WOW equipment.

At the time, lick was $800 per tonne, and with an average intake of 150 grams per head per day over the six week period, this cost the Flinders Beef Challenge Group $5.04 per head. If the Richmond PDS had followed this supplementation strategy, and not used the WOW data, it would have cost $226 to supply the 45 head for the six week period, when supplement was not required. In commercial terms, multiplied out across 1000 head, the cost of supplementation would have been $5,000 over the six week period. This is an example only and further consideration would need to be taken in to account when making supplementary feeding decisions for steers, taking in to consideration compensatory gain and whether or not it is economical to supplement through the drier months.

The second cohort of steers experienced a poor wet season and drought conditions, and saw more modest weight gains in comparison to the first cohort. Again, the WOW equipment indicated liveweights peaked in September 2012 (see Figure 12), suggesting introduction of lick may have been necessary. However, lick was not introduced for a further eight weeks due to the installation of the auto drafting equipment and animal training. Following the introduction of lick at the beginning of November, the cattle showed a continual decrease in liveweight. If supplement had been fed from when the weights plateaued this loss in weight may have been reduced. The steers did not gain weight again until after storms in December (see Figure 12). The producer group made the decision to feed what the majority of them use as general practice (dry lick and/or molasses) to demonstrate the use of the technology. Further consideration would need to be made for these decisions on-farm as to whether feeding dry lick to steers is economical.

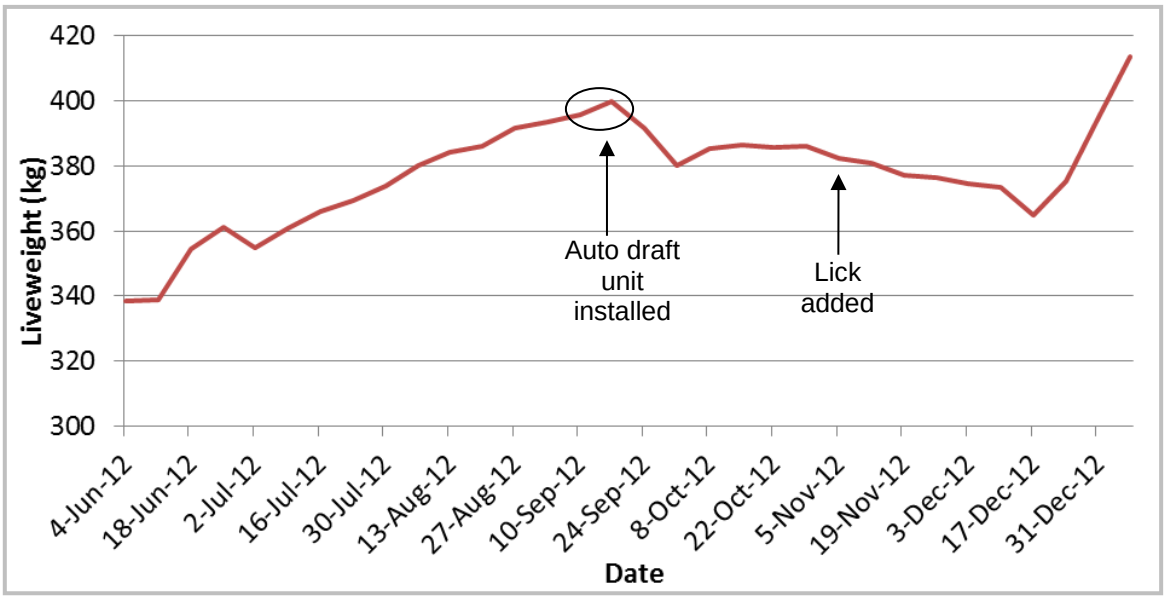


Figure 12. WOW weight data for the cohort 2 steers used by the PDS group to determine when to start feeding lick. The circle indicates slowing in weight performance but due to the installation of the auto drafting equipment, lick was not fed for another eight weeks.

4.1.4 Demonstrate the effectiveness of supplementary feeding using the auto drafter

The WOW equipment enabled the Richmond PDS group to delay the introduction of lick with the first cohort of steers. This further stimulated the producer group's thoughts towards testing the benefit of either feeding or not feeding supplements. The auto drafting equipment was incorporated to demonstrate if the equipment could be used to test different feeding regimes. Further scientific trials would need to be conducted to analyse the benefits of feeding different supplements to steers and whether or not they are economical. The unit was fully functional and was drafting animals three ways by 31 October 2012 (see Figure 13a and b).

The auto drafting options included:

- Group 1 – No supplementation
- Group 2 – Production lick (high protein meal with 10% urea)
- Group 3 – 30% urea supplement/M8U+R.

Figure 13. Cattle using the Richmond auto draft unit. *[at left]* (a) Cattle are being drafted to the production lick and *[at right]* (b) cattle accessing the 30% urea supplement.

Due to the failed 2012/13 wet season, the producer group decided to have dry lick available constantly from when the draft unit was operational (October 2012) through to animals leaving the paddock in July 2013 to demonstrate if the technology could be used to feed different supplement regimes.

The auto draft unit was successful in separating animals onto the different lick treatments. However, demonstrating the effectiveness of the different supplements could not be achieved due to the low number of animals able to be run in the paddock, inadequate yard design, water location that was not corrected until June 2013 and a failing NLIS panel reader over the final six weeks of the demonstration feeding.

From November 2012 to March 2013 the WOW and auto drafter equipment was able to be used to demonstrate that there was little difference in liveweight performance between the treatment groups (see Appendix 4). At the March 2013 crush side weigh day recordings indicated an average daily gain of 0.52kg/head/day for Groups 1 and 3 while Group 2 gained 0.56kg/head/day over the same period. WOW data indicated an average daily gain of 0.67kg/head/day for Group 1; 0.64kg/head/day for Group 2 and 0.59kg/head/day for Group 3 (see Tables 2 and 3).

An anomaly with the Group 1 (nil supplements) growth rates (WOW) being higher than the others treatments led to an investigation by group members and a problem was identified with the location of the water troughs. Group 2 and 3 animals had additional water troughs in their feeding yards. They therefore had the option of two water troughs, one in the main receiving yard prior to crossing the WOW equipment and the second in their feed yards. It seems they mostly drank in their respective feed yards *after* crossing the WOW scales empty of water. Group 1 cattle however, could only water at the main water trough in the receiving yard *before* crossing the WOW scale and exiting the yard. This biased the Group 1

growth rates, with 'full' weights recorded compared to the water fasted weights of the other groups, falsely indicating the average daily gain was greater in Group 1 when compared to Groups 2 and 3 (Tables 2, 3 and 4).

A third water yard and trough was installed in early June 2013 for the Group 1 cattle. The original water trough was emptied and turned off to ensure all animals were crossing the weighing equipment prior to drinking. The WOW weights of Group 1 corrected immediately and dropped below Groups 2 and 3 (see Figures 14 and 15). This trough issue needs to be considered if the equipment is going to be used for supplement feeding trials.

Table 2: Treatment group average weights (kg) measured as static weights at crush side weigh days after the introduction of auto draft unit. Bracketed figures indicate average daily gain/loss.

Static Wt.	8/11/2012	21/03/2013	16/05/2013	14/06/2013	30/07/2013
Group 1	368	438 (0.52)	468 (0.55)	466 (-0.12)	444 (-0.48)
Group 2	365	441 (0.56)	471 (0.54)	468 (-0.08)	452 (-0.33)
Group 3	363	432 (0.52)	466 (0.61)	463 (-0.12)	470 (0.17)

Table 3: Treatment group average weights (kg) as measured by WOW unit after introduction of auto draft unit. Bracketed figures indicate average daily gain/loss.

WOW Wt.	8/11/2012	21/03/2013	16/05/2013	14/06/2013
Group 1	384	473 (0.67)	491 (0.32)	487 (-0.14)
Group 2	384	469 (0.64)	487 (0.32)	481 (-0.21)
Group 3	379	458 (0.59)	482 (0.43)	475 (-0.24)

The liveweight data recorded by the WOW unit is consistently higher than the crush-side weight data collected due to gut fill. Excluding the weights prior to May (i.e. the issue with Group 1 water trough placement), WOW weights were consistently heavier (21-23kg Group 1, 13-16kg Group 2 and 12-16kg Group 3, see Table 4).

Table 4: Treatment group average weight differences (kg) when comparing crush side and WOW data. Bracketed figures indicate average daily gain/loss differences when comparing crush side and WOW data.

Average Wt. Differences	8/11/2012	21/03/2013	16/05/2013	14/06/2013
Group 1	16	35 (0.15)	23 (-0.23)	21 (0.02)
Group 2	19	28 (0.08)	16 (-0.22)	13 (0.13)
Group 3	16	26 (0.07)	16 (-0.18)	12(0.12)

Figure 14. The lick treatment yards and individual troughs were set up in front of the auto draft unit with Group 2 and 3 animals having access after being weighed. The Group 1 animals had to drink prior to walking over the weigh bridge providing skewed results.

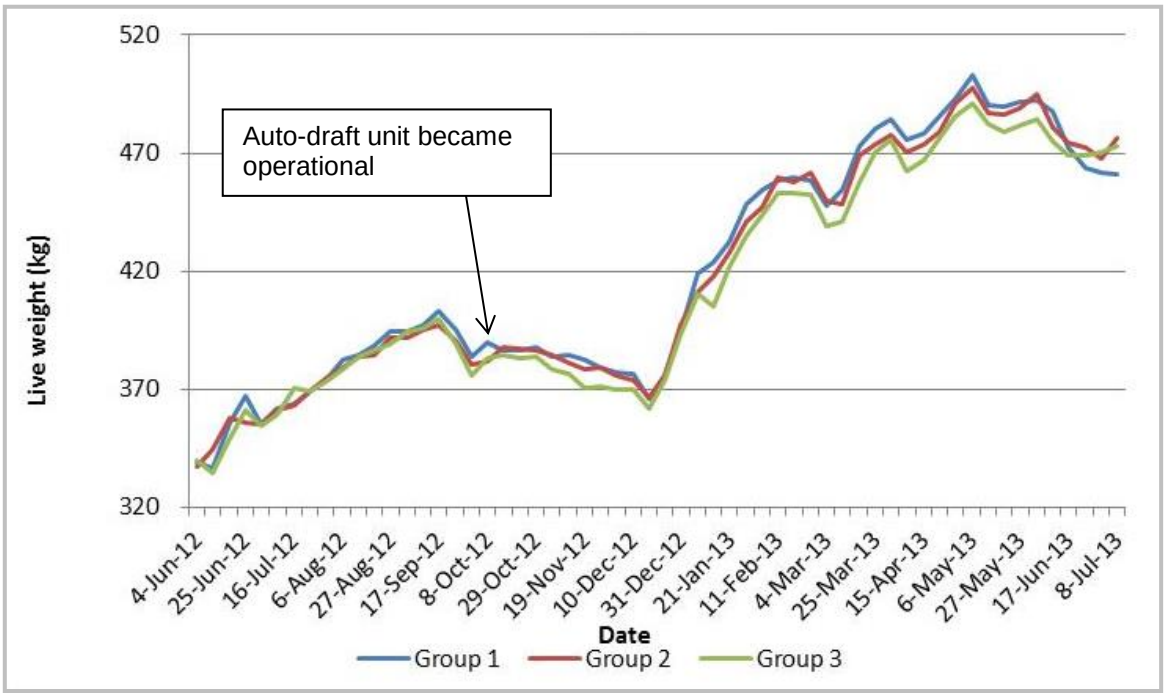


Figure 15. Interpretation of this graph suggests that the control animals (Group 1 – No supplement) were recorded by weighing equipment as consistently performing better than lick treatment animals due to gut fill related to the positioning of the water trough. The reverse occurred with the control group performing more poorly when a third trough was installed after the WOW platform in early June 2013.

Based on feed quality and animal performance, the PDS producers decided to switch the Group 3 cattle from the urea based supplement to M8U+R on 14 June 2013. This coincided with a malfunction of the panel reader and, therefore, the July 2013 WOW data is not included in Tables 3 and 4. Unfortunately, this issue was not identified until 30 July 2014, when animals were being weighed crush-side in their treatment groups prior to being trucked to the feedlot. It was noted that six animals had come through in their incorrect treatment groups throughout weighing and that a number of animals from outside Group 3 had M8U on their dewlap from where it had rubbed on the trough that they should not have had access to.

In follow up discussions with Precision Pastoral, it was revealed that for the final four to six weeks the animals were in the paddock the panel reader was not reading every NLIS tag. When it could not read a tag, the auto drafter would default to allowing the animal to proceed in the same direction as the last tag that was read. This is a default setting to allow for cows with newborn calves to follow their mothers. There was no issue with the functionality of the NLIS tags as all tags were successfully read during the crush side weighing. Therefore, the cattle could have been in all pens allowing them access to the production lick and M8U+R.

There is no way of knowing accurately, which animals went into which yard or how often. Unfortunately, the timing of the panel reader beginning to fail coincided with the introduction of the M8U molasses mix. This issue needs to be avoided if future trials are going to use the WOW and auto-drafter equipment to run supplementary feeding trials.

The number of head in each treatment group (29 head) and differences recorded are too small to draw statistically significant conclusions about the effectiveness of the different supplement strategies. Furthermore, economic analysis would be required to see if the supplements are economical to feed rather than just analysing weight gain data.

4.1.5 Economic analysis of the WOW equipment

This analysis has been completed for the WOW unit only, not including the auto drafter and remote monitoring camera. The scenario is based on an average sized paddock that may utilise the WOW equipment.

The results presented below should only be interpreted as a forward looking projection based on the PDS data, seasonal situations that occurred and the assumptions used. Producers should seek to perform their own cost-benefit analysis when deciding on any capital expenditure, including WOW equipment. DAF can offer services that can assist producers weigh up the cost benefit for the WOW equipment.

Paddock size: 10,000 acres
Number of waters: 2 (one WOW unit per water)
Number of cattle: 400 head (200 head per water and WOW unit)
Initial outlay costs include: the WOW platform, solar panel and NLIS reader
Assumptions made: there was a trough and spear gates already located at each water and were not purchased.

Parameters	
Discount Rate	10%
Paddock Size (Acres)	10,000
Stocking Rate (1hd / X Acre)	25
Head Carrying	400
WOW Scales per Paddock	2
Head per WOW Scale	200

Calculations have been completed for one WOW unit. If you want to calculate the cost for the paddock then you just need to multiply the figures by two.

Initial Outlay	$
Walk Over Weighing Scales*	$20,000.00
Freight, Installation & Training	$2,500
Total	$22,500.00

*Includes NLIS Reader and Solar

A cost of training the cattle on to the equipment was calculated using the amount of training that was required for this Producer Demonstration Site. The first cohort of steers required daily visits to the paddock for three months. With the assumption that this will be needed at the initial set up of the equipment on any property, a cost of this time was calculated.

Cattle Training Cost	Value	Unit
Round trip to WOW Scales	20	km
Time taken for return trip	2	hours
Wage / hour	$30	hour
Trips per week.	7	
Weeks required	12	
Diesel	$1	km
Total Wage Cost /annum	$5,040	
Total Diesel Cost	$1,680	
Total Training Costs	**$6,720**	

A partial budget can be calculated using the example that was provided on page 17 of the report of hanging on to the steers for an extra three months rather than selling them in March.

This data is summarised in the table below to show that the net benefit of holding on to these steers for the extra three months is $87.15 per head. *The year that this particular data/scenario is calculated from was an exceptionally good season and higher than normal weight gains were seen in the steers.*

From this scenario, a discounted cashflow analysis can be calculated to estimate the payback curve for the WOW equipment. There are several assumptions made here:

1. The steers are entering the paddock each year at the same weight and gaining the same kilograms
2. Seasonal conditions have remained the same each year
3. The steers are only remaining in the paddock for one year and then sold, meaning that the training cost is included annually for the new steers entering the paddock each year.

From this it can be seen that after three years, the payback curve turns positive which means that the equipment has covered its cost (indicated by the red circle).

Discounted Cashflow Analysis per Walk Over Weighing						
Year	0	1	2	3	4	5
Benefits						
Increase in Herd Gross Margin		$17,429.75	$17,429.75	$17,429.75	$17,429.75	$17,429.75
Costs						
Training Cost		$6,720.00	$6,720.00	$6,720.00	$6,720.00	$6,720.00
Telemetry Fee		$660.00	$660.00	$660.00	$660.00	$660.00
Initial Outlay	$22,500.00					
Net Nominal Cashflow	-$22,500.00	$10,049.75	$10,049.75	$10,049.75	$10,049.75	$10,049.75
Present Value of Cashflows	-$22,500.00	$9,136.14	$8,305.58	$7,550.52	$6,864.11	$6,240.10
Payback Curve	-$22,500.00	-$ 13,363.86	-$5,058.29	$2,492.24	$9,356.35	$15,596.45

Key Results	
NPV	$15,596.45
IRR	15.59%

The Net Present Value (NPV) is an economic decision criterion, which, if positive, as in this case, means the investment is economically sensible at the discount level chosen (10%).
The internal rate of return (IRR) shows the rate of return the investment achieves. With caution it can be, in this case, interrupted as the percentage return for each dollar invested, at present value. The results show that the IRR was 15.59 percent.

The results have not been risk tested nor had sensitivity analysis performed on key variables. There are a number of factors which will cause large variability of the results. The first is seasonality and length of growing seasons. The shorter the growing season, the less likely benefits are to be achieved. The greater negative difference there is in price between selling now and selling later will also heavily impact the results. Results will also vary where cattle are kept longer than one year and compensatory growth may occur. Likewise, large variance in profitability would likely occur when breeder herds are analysed.

4.2 uSee remote cameras

4.2.1 Monitoring water trough levels and pasture

The remote camera at the PDS yards reliably monitored trough and tank water levels as well as cattle movements through the receiving yard and WOW equipment. The camera was set to capture four images daily, and there was an option to take photos on demand via the website. The photos were readily accessible via the uSee website. The only maintenance required was cleaning the solar panels monthly as bird droppings interfere with the battery charging. As well as monitoring tank and trough water levels these images are useful in ensuring animals are not caught in the water yard off feed (see Figure 16). Given the anxiety experienced by some animals during the training, the cameras were critical in monitoring animal welfare.

The remote camera located in the paddock reliably captured one image daily (at 1:00pm) which could be used to monitor pasture quantity over time. Throughout the duration of the demonstration, uSee has improved the image resolution. There have been no major malfunctions with this unit and photos are readily accessible via the uSee website. The direction of the camera should face north–south ensuring compliance with the Stocktake

method for taking pasture photo standards (see http://futurebeef.com.au/topics/pastures-and-forage-crops/pasture-photo-standards/) (see Figure 17). The remotely captured photos compare reasonably well with the manually recorded monitoring sites (see Figure 18) although the resolution could be improved on the remote camera.

Figure 16. uSee remote camera used to monitor tank and trough level at the PDS yard complex.

Figure 17. uSee remote camera pasture monitoring site two kilometres from the water trough on 21 June 2013. Pasture yield is 1000 kg/ha.

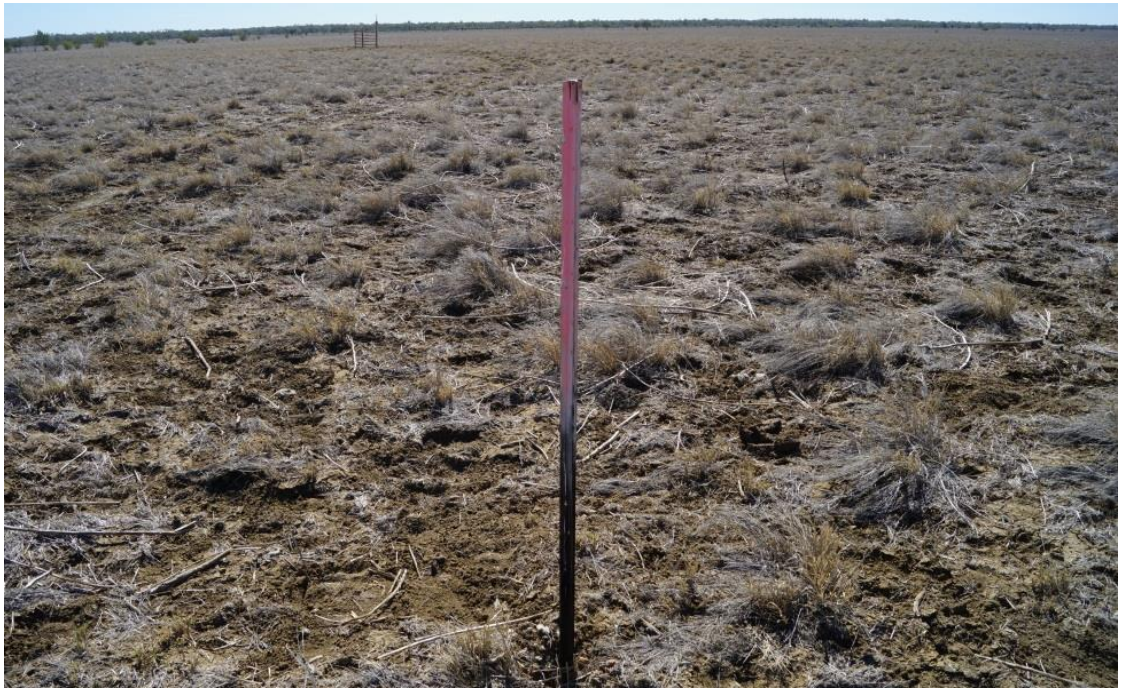


Figure 18. Manual pasture monitoring site on 28 June 2013. This is also located two kilometres from the water trough. Pasture yield is 1000 kg/ha. The uSee camera unit is visible in the background.

A time series of photos demonstrating how pasture quantity is reducing throughout the year from both the uSee camera and the manual digital camera (DSLR) is available in Appendix 2.

4.2.2 Economic analysis of remote monitoring cameras

This analysis has been completed for a remote monitoring camera (next G) used at a watering point to monitor water availability to livestock. The scenario provides an example only of a paddock that may utilise the technology.

The results presented below should only be interpreted as a forward looking projection. Producers should seek to perform their own cost-benefit analysis when deciding on any capital expenditure, including the remote monitoring equipment. DAF offer services that can assist producers to weigh up the cost benefit for the WOW equipment.

Paddock size: 10,000 acres
Number of waters: 2 (one remote monitoring camera unit per water)
Initial outlay costs include: The remote monitoring camera, solar panel, bracket and access to an online account to view the camera images. It does not include the cost to install the camera on a robust steel mounting which the producer will need to do.
Assumptions made: The prices used here are for Next G cameras and they must be used within Next G range. Satellite cameras are available for an extra cost. The producer will need to build a robust steel mount to install the camera on to which places it high enough out of reach of the livestock.

Parameters	Value
Size of Property (ac)	40,000
Size of Paddocks (ac)	10,000
Number of Paddocks	4
Waters per paddock	2

Number of Waters	8
Number of Cameras required	8
Cost per Camera	$ 1,500.00
Total Camera Cost	$ 12,000.00

While the cameras are used to monitor the availability of water to livestock (i.e. over a turkey nest or tank level) they do not remove the need to go to the paddock. They can be used though to greatly reduce the number of paddock inspections. In this example the camera has reduced the number of water runs to once per week, rather than three times a week. These figures and the costs of the wages and diesel are outlined below. There is a large reduction in diesel and wage costs.

	Without the camera		**With the camera**	
	Value	**Unit**	**Value**	**Unit**
# of Runs / annum	156		52	
Distance per run	60	km	60	km
Time	4	hours	4	hours
Wage	$ 30.00	hours	$ 30.00	hours
Diesel	$ 1.00	km	$ 1.00	km
Vehicle running Cost	$ 9,360.00		$ 3,120.00	
Wage Cost	$ 18,720.00		$ 6,240.00	

From this scenario, a discounted cashflow analysis can be calculated to estimate the payback curve for the remote monitoring cameras installed across the four paddocks. There are several assumptions made here:

1. The number of water runs required per week to check the availability of water to livestock is reduced from three times a week to once per week

2. There may be times when more water runs are required

3. There is an ongoing telemetry cost of $275 per camera per year = $2,200 per year for the eight cameras.

From this it can be seen that after one year, the payback curve turns positive which means that the equipment has covered its cost (indicated by the red circle).

Year	0	1	2	3	4	5
Benefits						
Fuel Savings		$ 6,240.00	$ 6,240.00	$ 6,240.00	$ 6,240.00	$ 6,240.00
Wage Savings		$ 12,480.00	$ 12,480.00	$ 12,480.00	$ 12,480.00	$ 12,480.00
Costs						
Telemetry		2200	2200	2200	2200	2200
Initial Outlay						
Cost of Camera	$ 12,000.00					
Net Benefits	-$ 12,000.00	$ 16,520.00	$ 16,520.00	$ 16,520.00	$ 16,520.00	$ 16,520.00
Discounted Benefits	-$ 12,000.00	$ 15,018.18	$ 13,652.89	$ 12,411.72	$ 11,283.38	$ 10,257.62
Payback Period	-$ 12,000.00	$ 3,018.18	$ 16,671.07	$ 29,082.79	$ 40,366.18	$ 50,623.80

The results have not been risk tested nor had sensitivity analysis performed on key variables. There are a number of factors which will cause large variability of the results. The first is distance of the water run and how many times a week these runs need to be completed.

4.3 Faecal Near Infrared Spectroscopy (NIRS)

4.3.1 Correlate faecal NIRS results with management triggers

Faecal NIRS samples were taken each month to determine the quality of the diet being selected (see Appendix 5). Due to the four to six week time lag between sending samples and receiving results back from the lab it was difficult to use the NIRS results for timely management decisions, therefore the WOW weight data proved a more suitable option. However, the NIRS results correlated to management triggers and animal performance, retrospectively.

The first cohort of steers experienced an excellent season with the mob gaining an average of 194kg liveweight over the 310 days of analysis in the paddock. NIRS results over the dry season showed a steady decline in pasture quality from September 2011 to November 2011 (see Figure 19). For the same period, the WOW equipment showed weights plateauing from early September and then beginning to decline from late October, which matches the decrease in diet quality seen with the NIRS results. When coupled with the WOW weight data a good relationship is seen between diet quality and resulting animal performance. During the project, the producer group decided to provide lick to the Cohort 1 animals from when the WOW data showed the liveweights plateauing (24 September 2011) through to the break of season (lick removed at the end of November 2011). This timing of supplementation was supported by the NIRS data (see Figure 20). The supplement used was the same as that used by the producer group on their own properties and was only for demonstration purposes. In depth economic analysis would need to be completed to analyse if feeding this supplement to steers would be economical.

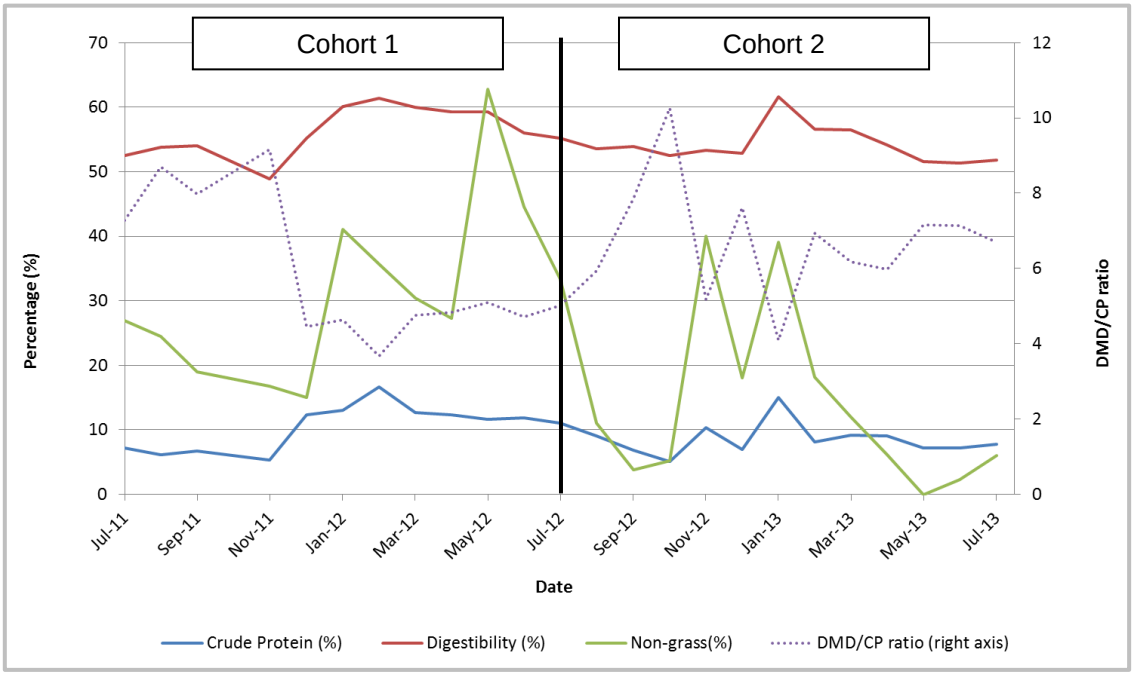


Figure 19. Faecal NIRS data from the PDS paddock from July 2011 through to July 2013. Results took four to six weeks to come back making it difficult to use them for supplement feeding decisions; however, it was useful to keep track of how diet quality changed over the period.

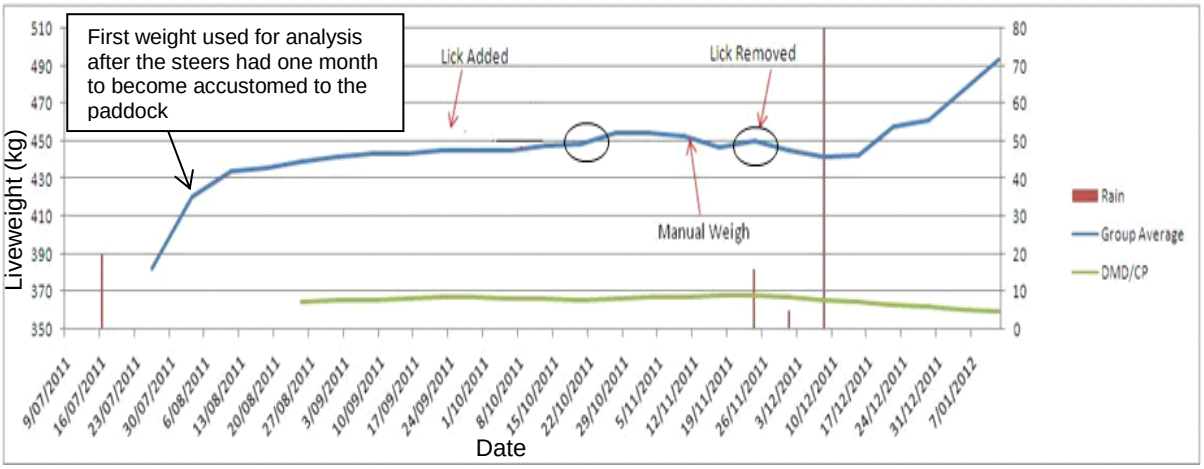


Figure 20. Group average weight versus rainfall and diet quality for first half of cohort 1. Circles indicate the small spike in weight gain three weeks after introduction of lick and period of weight loss following first rains.

Despite the below average 2012/13 wet season, the second cohort of steers gained 117kg over 371 days in the paddock, with their weight steadily increasing up until May 2013. The NIRS analysis in late May shows a decrease in pasture quality, with digestibility dropping from 54 percent in mid-April to 51 percent in late May (Figure 19 and 21). Similarly, crude protein dropped from nine to seven percent over the same period. On only three occasions throughout the duration of the PDS (August 2011, November 2011 and October 2012) was the DMD/CP ratio greater than eight, indicating there could have been an economical response to feeding urea. The non-grass component of the diet appears to be influenced by the availability of forbs in the wet season and prickly acacia seed around May.

WOW recordings identified the point (June 2013) when steers began losing weight, although the DMD:CP ratio (7.13) did not exactly support this (urea response expected at >8). Even though the steers were on dry lick the group used this information to switch one-third of the second cohort of steers to a molasses based feed (M8U+R) and used the WOW equipment to monitor liveweight gain.

When the WOW weight data, crush-side weights and diet quality (digestibility and crude protein) are plotted together, the effects of diet quality on liveweight performance is evident (Figure 21). In November 2011, a large jump in diet quality and average liveweight can be seen after 20 millimetres of rain was received. A gradual increase in diet quality and liveweight is then seen through to May 2012. A similar trend is seen after some rain was received between November 2012 and January 2013. While the NIRS data is useful and is shown to match the trends in the WOW data, the delays in receiving the results back from the lab make this data difficult to use for making timely management decisions. The WOW data however, if received weekly, can identify the drop in diet quality (represented by a plateau in weight gain) much quicker than NIRS testing.

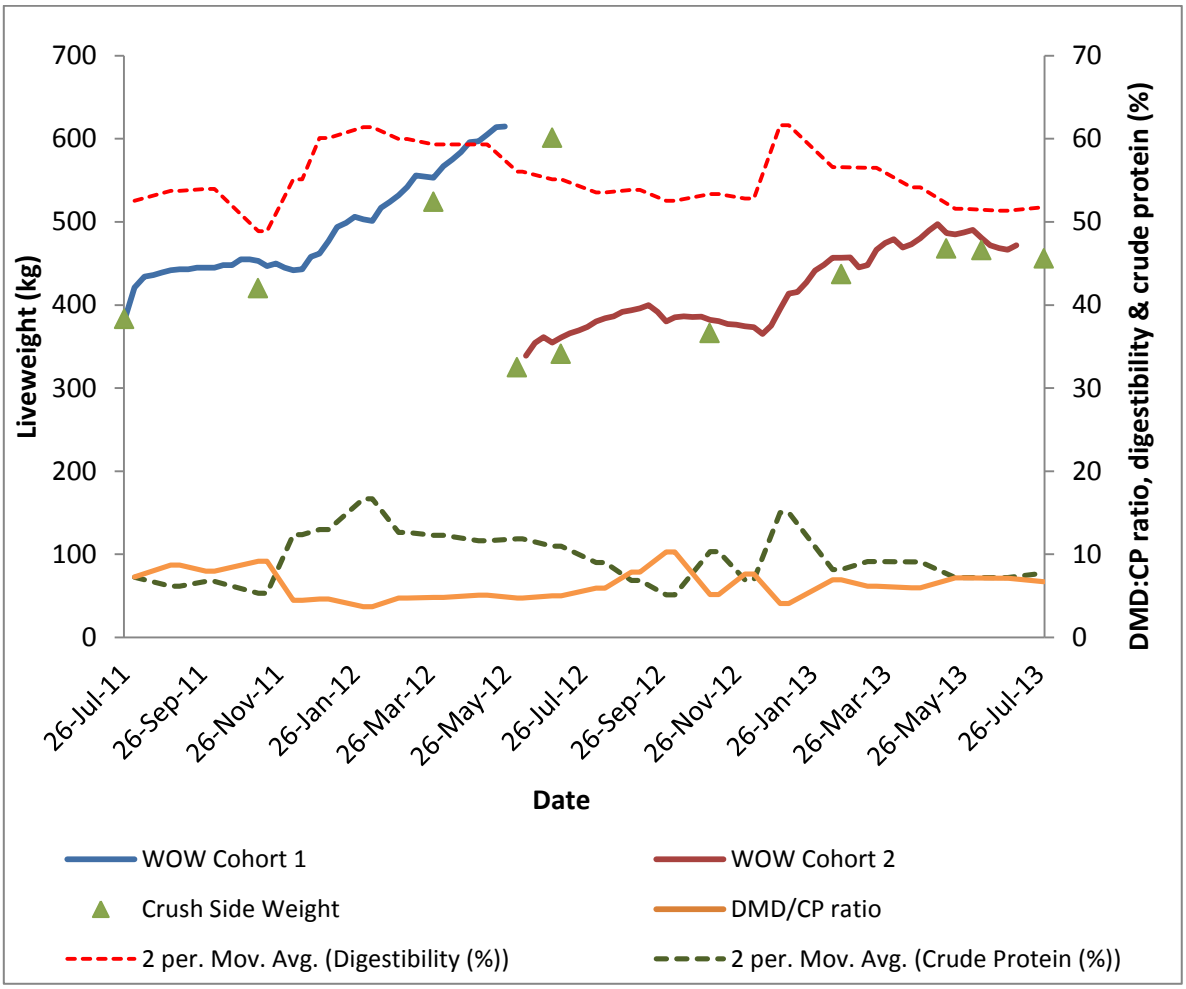


Figure 21. DMD:CP ratio, digestibility and crude protein percentages displayed against the WOW weight data and crush side weigh day data. A clear trend can be seen between increased diet quality (decreased DMD/CP ratio and increased digestibility and CP) and increased liveweight.

4.3.2 Increase producer understanding of changes in pasture quality and subsequent impacts on animal liveweight performance

NIRS and liveweight data was sent out to the PDS group members each month with an explanation of what the data was indicating. The results were also discussed at each of the crush-side weigh day meetings, where the producers were invited to walk through the paddock and look at the pasture, while knowing what the NIRS and weight gain data was showing.

A presentation held at the November 2011 crush-side weigh day, given by Mr Joe Miller, a private consultant based in Mareeba, and experienced in interpreting NIRS results, reviewed the data collected and the dry season lick strategy to meet animal nutritional requirements. Mr Miller provided the producers with further insight on interpreting the NIRS data and how to use the information to make management (supplementation) decisions.
Discussions were also held for correlating the NIRS results to management action, WOW weight data and changes in diet quality at the producer debrief days (September 2012 and February 2014).

The discussions centred on the following points:

- Feeding of the supplements in this trial was a demonstration only and larger scale trials and economic analysis would be required to test the different feeding regimes.

- A plateau in weight gain over a number of weeks in response to diet quality, before weight gain and diet quality both declined rapidly.
- The beginning of the plateau being an appropriate time to feed lick, as the group had implemented in the trial.
- Lag time following lick being made available and cattle beginning to gain weight, due to the cattle becoming accustomed to the change in diet.
- Weight loss following the first break of season rainfall event, before animals began to gain weight rapidly.

After observing the physical changes in the steers in the paddock, the discussion of the data further reinforced with producers the effects of changes in pasture quality on animal liveweight performance.

5 Increase producer understanding of changes in pasture quality and subsequent impacts on animal liveweight performance

5.1 Communication—Shared knowledge and experience with the wider industry

Throughout the project there have been extensive communications activities undertaken to promote the PDS and the use of remote technologies and to demonstrate the effectiveness of the technology.

In March 2012, a sign indicating the trial site and acknowledging the contribution of all sponsors was erected in the paddock alongside the Flinders Highway (see Figure 22). The sign also lists contact details and the uSee website so that local producers are able to gain further information on the PDS.

Figure 22. The Richmond Beef Challenge Group erected a sign on the Flinders highway displaying all of the sponsors and contributors involved with the PDS site.

Media articles produced throughout the project included (see Appendix 6):

Industry Newspapers:

- *North Queensland Register*
  - 30 June 2012: update on Richmond Beef Group induction day
  - 12 July 2012: update following crush side weigh day
  - 4 October 2012: article on debrief day outcomes
  - 15 November 2012: update following crush side weigh day
  - 28 March 2013: update following crush side weigh day
  - 10 June 2013: editorial advertising field day on 14 June 2013

- *Queensland Country Life*
  - 2 August 2012: article detailing the remote technology and opinions from several producers involved in the PDS

Industry Newsletters:

- *Northern Muster* articles distributed by DAF to more than 2500 readers
  - Issue 29 December 2011
  - Issue 30 December 2012

- *Northern Muster* articles printed as a lift out section of the *North Queensland Register* with a printed distribution of 5500, plus online PDF and e-reader versions
  - Issue 31 April 2013
  - Issue 32 September 2013
  - Issue 33 December 2013
  - Issue 34 April 2014

- *Beeftalk* article printed as a lift out section of the *Queensland Country Life* with a printed distribution of over 20000 readers, plus online and e-reader versions
  - Issue 39 July 2014

- MLA Feedback Magazine features
  - July 2012
  - April 2013

- Beef Central online article
  - 22 May 2012

Radio:

- Radio interview aired on NW Rural and Resources Report on Friday 11 November 2011 to publicise results thus far with both Richmond PDS and Flinders Beef Challenge.
- Radio interview aired on NW Rural and Resources Report and the Country Hour on Friday 30 May 2012 to update on results of March 2012 crush-side weigh day.

Email:

- Update on PDS activities sent to all FutureBeef and relevant MLA staff
  - 15 March 2012

In addition to online and print media articles, information on the PDS, associated activities and remote technologies was provided at a number of industry field days, workshops and crush side weigh days held as a part of the trial. These activities included:

Field Days and Workshops:

- Tara Beef2U field day: presentation of technology in use at the PDS site
  - 13 June 2012
  - 50 attendees, 20 local producers

- Richmond Field Days
  - 15–16 June 2012: display of available data and photos of cattle in trial
  - 14 June 2013: morning information session held in conjunction with the field day, to showcase technology being utilised

Crush-side Weigh Days:

- Nine crush-side weigh days were held from June 2011 to July 2013. This also included the 14 June 2013 Richmond Field Day. Each weigh day was attended by 10–12 producers as well as representatives from agribusiness, Precision Pastoral, uSee Remote Camera and rural lender representatives. Weigh day presentations focused on faecal analysis results, weight gain data and the reliability of the remote weighing, drafting and camera equipment. Crush-side liveweight recordings were compared to the WOW data.

5.2 Changes in knowledge and understanding of remote technologies

In order to gauge the effectiveness of the PDS in demonstrating remote technologies to a wider audience, surveys were distributed to the Richmond Beef Challenge group and external PDS participants to complete. Fifteen responses were received and analysed. Questions focussed on the changes in knowledge and understanding of remote technology, the usefulness and effectiveness of the equipment, the likelihood of uptake of the technology and ideas for its future use.

Sixty percent of respondents (n=9) to the surveys were producers, with the other forty percent (n=6) being agribusiness representatives.

The results show:

- Understanding and knowledge of remote technology has increased from 40% of producers knowing nothing prior to the PDS, to 100% having some or good understanding at the conclusion of the PDS (see Figures 23 and 24).
- 100% of respondents agreed that the WOW equipment was an efficient and accurate way to record weekly weight gains of cattle.
- 80% of respondents thought that WOW was an effective way to identify trigger points for key management decisions, such as timing supplements and gauging effectiveness of supplementation. The remaining 20% of respondents thought it would be effective with some modifications. No respondents indicated it wasn't effective.
- 87% of respondents thought that WOW equipment would be useful to help producers target feeding cattle. The remaining 13% indicated they thought it would be helpful with some modifications. No respondents indicated it wouldn't be helpful.
- 100% of respondents thought the remote monitoring camera in the water yard was an effective way to monitor water trough levels.
- 67% of respondents believed the remote monitoring camera in the paddock was an effective way to monitor available pasture in the paddock. The remaining 23% indicated they didn't believe it was effective.
- 94% of respondents would be interested in using WOW and/or auto draft technology on their own property as a result of being involved in the demonstration of this technology.
- 93% of respondents would be interested in using remote monitoring cameras on their property as a result of being involved in the demonstration of this technology. Of this 93%, 57% would be interested for water monitoring only, 43% would be interested in pasture and water monitoring and none would be interested for pasture monitoring only.

- 100% of respondents believe that the monthly faecal Near Infrared Spectroscopy (NIRS) data was useful for making supplementary feeding decisions.
- 100% of respondents indicated they have gained a better understanding of changes in pasture quality and subsequent impacts on animal liveweight performance.
- Ideas from the group on what else the technology could be used for include:
  - General weaning and weaning by weight.
  - Drafting cattle to weight range specifications for sale.
  - Drafting out sick or poorly performing animals for treatment or extra care.
  - Identify superior animals to retain for breeding programs.
  - Monitoring breeder reproductive performance (how many calves she has had?).
  - Segregating bulls in control mated herds.

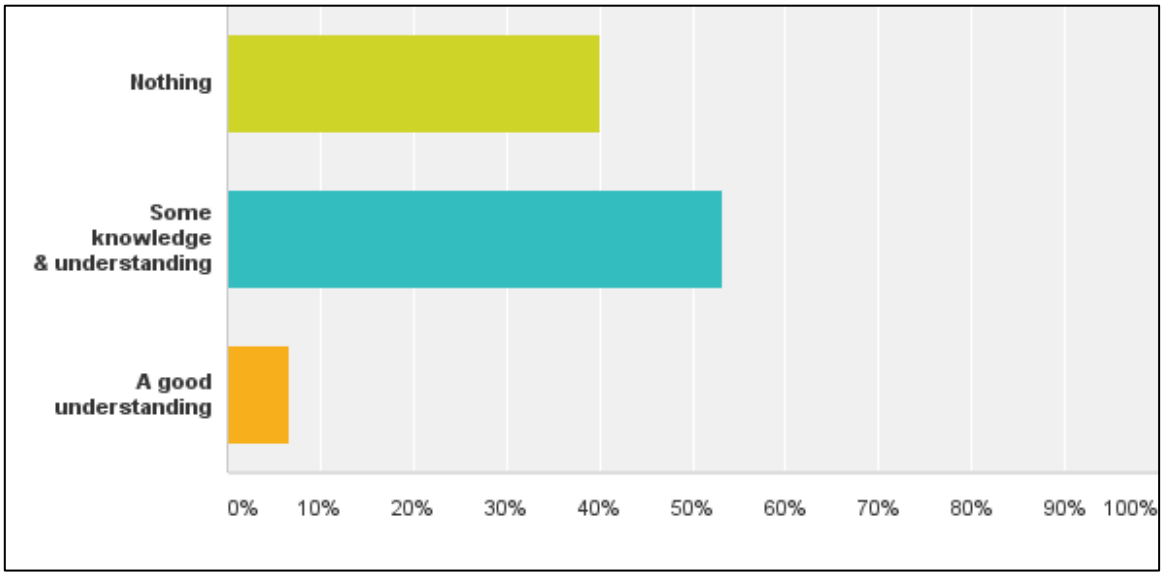


Figure 23. Understanding and knowledge prior to PDS.

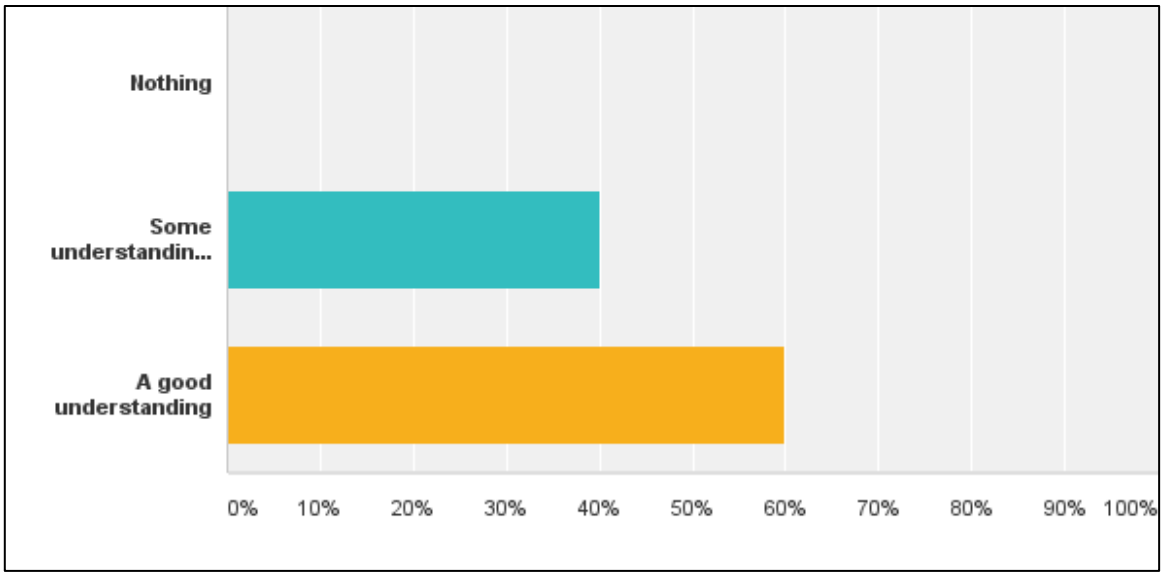


Figure 24. Understanding and knowledge as a result of involvement in PDS.

6 Conclusion and recommendations

The demonstration of the WOW, auto drafter, remote camera and NIRS technologies has generated significant local and statewide interest. Although reliability remains an issue, the PDS activities have successfully highlighted the many applications of these technologies on an extensive beef enterprise. The WOW/auto drafting and remote monitoring equipment has shown to be a good option for supplementation trials by removing the paddock effect; however, access to the data needs to be clarified and improved. Several recommendations which need addressing prior to further use of the equipment are outlined below.

The Richmond Beef Challenge group is continuing to work independently with the equipment suppliers to run 60 weaners in the paddock over the 2014/15 wet season, again testing supplementation strategies. DAF FutureBeef officers are supporting this ongoing trial of remote equipment, but overall coordination of site activities will be the responsibility of the group.

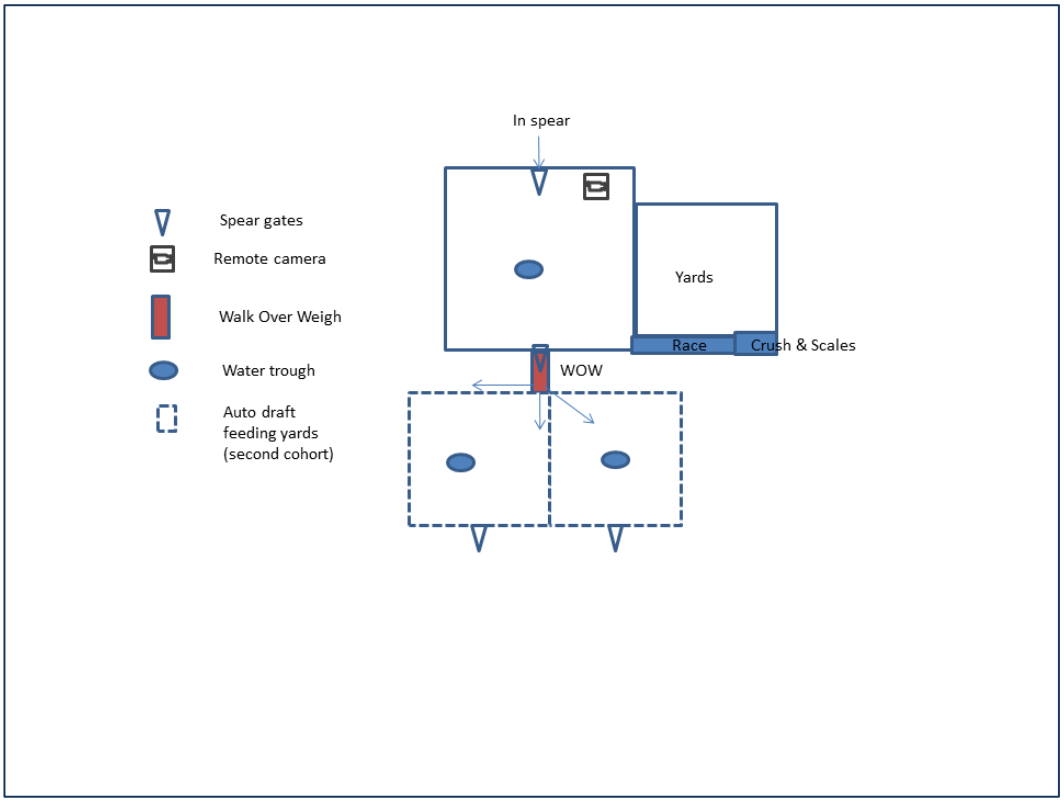
Key recommendations from this PDS include:

- Use ‘trained’ cattle when breaking in new animals to use WOW equipment.
- Disable the auto drafter when training new cattle allowing animals to get accustomed to using the race. After one week set the auto drafter on random for two weeks. The auto drafter can then be set to draft on particular NLIS tags.
- Reduce cattle baulking by moving the auto drafter box away from the race.
- Reduce the hydraulic noise of the auto drafter unit.
- Check capacity setting on the panel reader. Regularly download data to ensure unit continues to function.
- Ensure panel reader has a wide read range to ensure ear tags are read when animals proceed through the race with their head down.
- Seal the aerial box with silicon to waterproof the unit.
- Fully automate equipment alerts as a technician is often difficult to contact in remote areas.
- Clarify the ownership of remotely collected data as the access to WOW data is an impediment to demonstrating ‘real time’ technologies. Accessing the full suite of data for further analysis and reporting purposes would be an advantage.

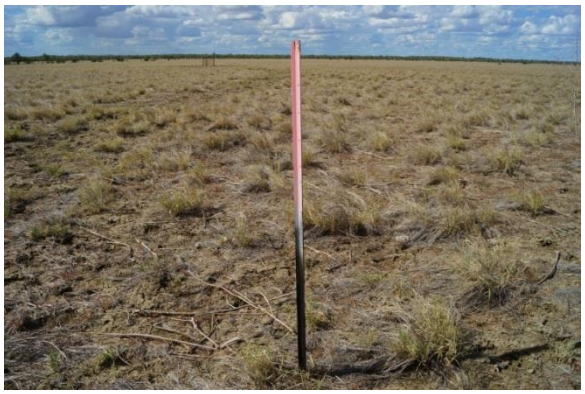
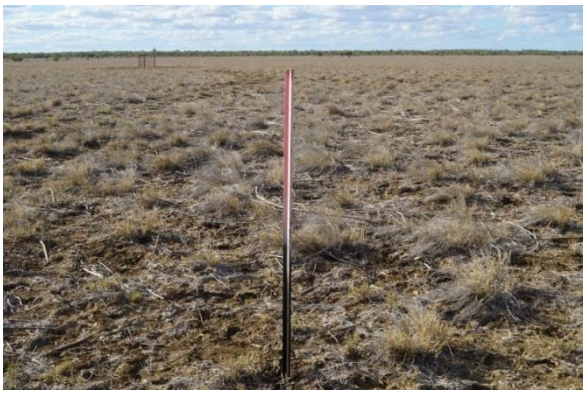
7 Appendices

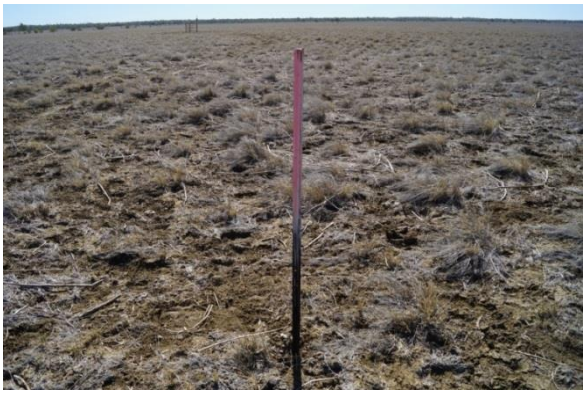
7.1 Appendix 1: Schematic diagram of the yard and WOW design (not to scale)

Cattle flowed from top of screen to bottom i.e. enter the receiving yard through the 'in spear' – across the WOW platform and drafting gates through to their feeding yards and exit through spear gates.
The auto draft feed yards were added in October 2012, and a third yard was later added after a design fault was found March 2013 (not shown).



7.2 Appendix 2: Pasture monitoring photos at two kilometres from water from the manual monitoring site and the remote monitoring camera

Manual monitoring site photos	Remote monitoring camera photos
07.12.2012 Yield = 1400kg/ha 	
12.02.2013 Yield = 1300kg/ha 	
30.05.2013 Yield =1100kg/ha 	

Manual monitoring site photos	Remote monitoring camera photos
28.06.2013 Yield = 1000kg/ha 	

7.3 Appendix 3: WOW liveweight data

Cohort 1		Cohort 2	
Week commencing	**Liveweight (kg)**	**Week commencing**	**Liveweight (kg)**
03-Aug-11	421	2-Jul-12	355
11-Aug-11	434	9-Jul-12	361
18-Aug-11	436	16-Jul-12	366
25-Aug-11	439	23-Jul-12	369
01-Sep-11	442	30-Jul-12	374
08-Sep-11	443	6-Aug-12	380
15-Sep-11	443	13-Aug-12	384
22-Sep-11	445	20-Aug-12	386
29-Sep-11	445	27-Aug-12	392
06-Oct-11	445	3-Sep-12	394
13-Oct-11	448	10-Sep-12	396
20-Oct-11	448	17-Sep-12	400
27-Oct-11	455	24-Sep-12	392
03-Nov-11	455	1-Oct-12	380
10-Nov-11	453	8-Oct-12	385
17-Nov-11	447	15-Oct-12	386
24-Nov-11	450	22-Oct-12	386
01-Dec-11	445	29-Oct-12	386
08-Dec-11	442	5-Nov-12	382
15-Dec-11	443	12-Nov-12	381
22-Dec-11	458	19-Nov-12	377
29-Dec-11	462	26-Nov-12	376
05-Jan-12	477	3-Dec-12	374
12-Jan-12	494	10-Dec-12	373
19-Jan-12	499	17-Dec-12	365
26-Jan-12	506	24-Dec-12	375

Cohort 1		Cohort 2	
Week commencing	**Liveweight (kg)**	**Week commencing**	**Liveweight (kg)**
02-Feb-12	503	31-Dec-12	395
09-Feb-12	501	7-Jan-13	414
16-Feb-12	517	14-Jan-13	416
23-Feb-12	524	21-Jan-13	427
01-Mar-12	532	28-Jan-13	441
08-Mar-12	542	4-Feb-13	448
15-Mar-12	556	11-Feb-13	457
29-Mar-12	553	18-Feb-13	457
06-Apr-12	567	25-Feb-13	457
13-Apr-12	575	4-Mar-13	445
20-Apr-12	584	11-Mar-13	448
27-Apr-12	596	18-Mar-13	467
04-May-12	597	25-Mar-13	475
11-May-12	605	1-Apr-13	479
18-May-12	614	8-Apr-13	469
25-May-12	615	15-Apr-13	473
08-Jun-12	615	22-Apr-13	480
		29-Apr-13	490
		6-May-13	497
		13-May-13	487
		20-May-13	485
		27-May-13	487
		3-Jun-13	490
		10-Jun-13	481
		17-Jun-13	472
		24-Jun-13	468
		1-Jul-13	466

Cohort 1		Cohort 2	
Week commencing	**Liveweight (kg)**	**Week commencing**	**Liveweight (kg)**
		8-Jul-13	472

7.4 Appendix 4: Treatment group liveweight data from WOW equipment for cohort 2

Week commencing	Group 1	Group 2	Group 3
29-Oct-12	388	386	384
5-Nov-12	384	384	379
12-Nov-12	385	381	377
19-Nov-12	382	378	371
26-Nov-12	379	379	371
3-Dec-12	378	376	370
10-Dec-12	376	374	370
17-Dec-12	366	367	362
24-Dec-12	376	376	374
31-Dec-12	395	397	393
7-Jan-13	419	411	411
14-Jan-13	424	418	405
21-Jan-13	432	428	422
28-Jan-13	448	441	435
4-Feb-13	454	447	443
11-Feb-13	458	460	453
18-Feb-13	460	457	453
25-Feb-13	458	462	452
4-Mar-13	448	450	439
11-Mar-13	454	448	441
18-Mar-13	473	469	458
25-Mar-13	480	474	470
1-Apr-13	485	478	475
8-Apr-13	476	470	462
15-Apr-13	478	474	467
22-Apr-13	486	479	476

Week commencing	Group 1	Group 2	Group 3
29-Apr-13	493	491	486
6-May-13	503	497	491
13-May-13	491	487	482
20-May-13	490	486	479
27-May-13	492	489	482
3-Jun-13	492	495	484
10-Jun-13	487	481	475
17-Jun-13	472	475	469
24-Jun-13	464	473	469
1-Jul-13	462	468	470
8-Jul-13	461	476	473

7.5 Appendix 5: Diet quality faecal NIRS data for the cohort 1 and cohort 2 steers (July 2011 to July 2013)

Date	Crude Protein (%)	Digestibility (%)	Non-grass (%)	DMD/CP ratio
Jul-11	7.23	52.55	26.92	7.27
Aug-11	6.18	53.74	24.48	8.70
Sep-11	6.76	53.97	18.93	7.98
Nov-11	5.33	48.89	16.73	9.17
Dec-11	12.36	55.14	14.98	4.46
Jan-12	12.97	60.08	41.03	4.63
Feb-12	16.68	61.41	35.63	3.68
Mar-12	12.62	59.98	30.41	4.75
Apr-12	12.29	59.33	27.30	4.83
May-12	11.62	59.31	62.81	5.10
Jun-12	11.88	56.05	44.54	4.72
Jul-12	10.99	55.14	33.32	5.02
Aug-12	9.01	53.56	11.01	5.94
Sep-12	6.86	53.86	3.74	7.85
Oct-12	5.12	52.56	5.21	10.27
Nov-12	10.32	53.37	40.02	5.17
Dec-12	6.93	52.80	18.05	7.62
Jan-13	15.01	61.62	39.12	4.10
Feb-13	8.16	56.58	18.21	6.94
Mar-13	9.14	56.52	11.92	6.18
Apr-13	9.08	54.15	6.08	5.97
May-13	7.20	51.59	0.00	7.16
Jun-13	7.20	51.34	2.27	7.13
Jul-13	7.76	51.79	6.01	6.70

7.6 Appendix 6: Communication & media articles

7.6.1 North Queensland Register

NEWS

Graziers inspired by Flinders Beef Challenge

THE Rabobank Flinders Beef Challenge is on once again, but this year the idea has attracted graziers in the Richmond Shire who have begun their own challenge.

The idea behind the Rabobank Beef Challenge is to collect information on growth rates of the various breeds of cattle in the district.

Now in its third year, the Flinders Challenge has attracted 29 graziers from throughout the shire, and Richmond in its inaugural year has nine graziers entered.

Each grazier enters five cattle up to 480kg that are run together in one paddock, fed the same feed supplement supplied by Coleman's Stockfeed, and have their performance recorded quarterly over a year before they are slaughtered and the results compared.

The feed supplement will be made available to the cattle after dung samples show they need it.

Cattle are scored on an individual, group and breed basis, and information gained is expected to yield valuable knowledge for graziers wishing to tailor their herds to specific markets.

The challenge also presents a great opportunity to trial new technology, and in the Richmond challenge, Harrington Systems Electronics has set up two cameras for the trial.

One camera will be watching the trough and walk through weighing trap yard set-up, while the other will be positioned further away for pasture monitoring.

The walk through weighing trap yard system was set up by Tim Driver and involves a weigh bridge with a NLIS reader incorporated.

The cattle can be weighed and NLIS tag read each time they come to water. Information from both the cameras will be available to graziers via a website where information is uploaded daily.

At the Richmond induction cattle were tagged, inoculated and weighed at the Richmond Saleyards then transported to host property Wilburra Station, owned by Alistair McClymont.

The Flinders Beef Challenge cattle are being hosted at John Lethbridge's Killarney Station.

With the cameras already in operation, William Harrington, Harrington Systems Electronics, was able to show arriving graziers at the Richmond yards real-time photographs of the cattle on his iPad and mobile telephone. – *Story and pictures:* REG BURTON

7.6.2 North Queensland Register, 12 July 2012

Aysha McCoy, Rainscourt Station, Michaela McClymont, Burleigh Station, Jimmy Bellingham, Clareborough Station, and Campbell McClymont, Burleigh Station.

Results beef up as temperatures drop to zero

ON the morning of July 4, when the mercury had dropped to zero and climbed to just 4deg C by 8am, with an Arctic-like wind that made you rue forgetting your thermal underwear, graziers involved in the Rabobank Flinders Beef Challenge conducted their final weigh-in.

The following morning on Wilburra Station, with the temperature not far above zero but still with a Downs winter wind with which to contend, the Richmond group held their final weigh-in day.

Graziers from both groups decided on a kill date of Tuesday, July 24, with MSA grading to be conducted on July 25.

The cattle will be trucked to Teys Australia meatworks in Rockhampton, and graziers were extended an invitation from Mike Harbin, Teys Australia, to be present at the grading. It is expected that more than half the graziers involved in the challenge will attend.

The Richmond group has had another induction of cattle to begin the 2012/13 Rabobank Beef Challenge, and in this intake it has increased the number to more genuinely represent the normal stocking rates in the district.

It is also in the process of obtaining a three-way draft which – according to the NLIS number – will draft some cattle from each grazier into: 1) a paddock with no supplementary feed; 2) a paddock with a custom-made supplementary; 3) a paddock with a supplementary feed yet to be decided – possibly through the water supply.

Figures obtained from Landmark Richmond show that within the Richmond group, maximum weight of 718kg went to a Rainscourt Senepol-cross bullock. Cattle had maximum weight gain of 0.94kg/day and a minimum of 0.41kg/day.

Specific weight gains for individual breeds were not available at time of printing.

Andrew McGregor, Cannum Downs, and Mick McCoy, Rainscourt Station. Mick provided two lots of cattle for the challenge.

Jay Hughes, Cannum Downs, and Ash Naclerio, TopX Richmond, yarding up at the Richmond Beef Challenge.

Richmond Beef Challenge entrant Peter Harrington, Olga Downs, with Brent Peacock, Elders, Atherton.

THE FIGURES

THE Flinders group figures are property specific and read as follows:
Janaville Station, top weight 577kg at 0.78kg/day
Katandra, top weight 630kg at 0.78kg/day
Koon Kool, top weight 562kg at 0.7kg/day
Malakoff, top weight 586kg at 0.79kg/day
Monavale, top weight 608kg at 0.97kg/day
Ellimoak, top weight 577kg at 0.77kg/day
Ormonde, top weight 570kg at 0.77kg/day
Railvaw, top weight 587kg at 0.99kg/day
Radcliffe, top weight 584kg at 0.93kg/day
Rosevale, top weight 638kg at 0.78kg/day
The Plains, top weight 566kg at 0.78kg/day
Torver Valley, top weight 567kg at 0.85kg/day
Uanda, top weight 586kg at 0.75kg/day
Vuna, top weight 509kg at 0.68kg/day
Woodbine, top weight 582kg at 1.01kg/day
Abbortsford, top weight 563.6kg at 0.95kg/day
Barragunda, top weight 575kg at 0.84kg/day
Bundella, top weight 565kg at 0.74kg/day.

nqr.farmonline.com.au

7.6.3 North Queensland Register, 4 October 2012

NORTHERN BEEF MONTHLY — SPECIAL FEATURE

Reckoning day for beef challenges

IT was reckoning day for the Richmond and Flinders Rabobank Beef Challenges last week, as the respective groups held their debriefing day to ascertain which breeds performed best under what conditions.

The information was obtained from throughout the 12-month challenge period, during which time the Flinders herd was paddocked on Killarney Station and the Richmond herd on Willburra Station.

Both the Flinders and Richmond cattle were killed at Teys Australia, Lakes Creek abattoir, near Rockhampton, on Tuesday, July 24, and their carcases inspected and judged.

The cattle had all gone into the paddock in July last year between 300kg and 400kg liveweight.

The Harringtons, Olga Downs, had a very consistently performing group of steers, which helped them to come out on top for Richmond Challenge.

However, the producers in the group were happy with the variation across the group and within groups. They believe this better represented the commercial properties of the cattle where you don't always have a consistent line of animals.

Both Mick and Noeleen McCoy, Woolfield, and Reay and Lindy Cowan, Woodbine, with groups of four steers collectively, gained more than 1000kg over the 12 months (>0.7kg/hd/d ADG).

While Woodbine cleaned up the liveweight category awards, Peter and Marie Atkinson from Barragunda took out the carcase awards, with all of their steers grading MSA boning group 10 and under.

Murray Patrick, field operations manager for Meat Standards Australia, generously took the time to attend both Richmond and Flinders debrief days.

This was to help the producers to better interpret their MSA feedback data and talk about the long-distance transport trial work that they are currently undertaking.

Tim Driver from Precision Pastoral in Alice Springs also spoke to both groups about the WOW and auto-draft technology and preliminary results from the Richmond site. Tim supplied the walk-over weigh bridge and now the three-way draft for the Richmond Challenge.

The auto-drafter will draft steers into three groups, with one group receiving a 30 percent urea-based lick, one group a production-focused lick and the third group no supplement at all.

Supplements are supplied by sponsor Stocklick Trading.

The animals receiving lick will be drafted into separate water yards where they will have access to the licks.

The group had to purchase extra portable panels for these yards and is thankful for the support of Steel Supplies, Charters Towers, who gave the group a generous deal.

Both the Flinders and the Richmond groups will now attend the Rabobank Western Beef Challenge dinner at the Diggers Entertainment Centre, Hughenden, Saturday, October 13, for award presentations. Anyone interested in attending should contact Teressa Ford on (07) 4741 1546 or email greg.teressa.ford@bigpond.com.au

The next lot of Richmond Challenge cattle are in the paddock already, with McKinlay Shire to join the Rabobank Beef Challenge in October, and will be inducting their inaugural herd of challenge cattle at Eddington Station on Friday, October 5.

The next Flinders Beef Challenge will be hosted by the Murray family, Uanda Station, south of Prairie, and it will be interesting to see the results on country other than Mitchell grass Downs. There will also be heifers involved in the next challenge.

● Results next page.

The challenge information was obtained from throughout the 12-month challenge period, during which time the Flinders herd was paddocked on Killarney Station and the Richmond herd on Willburra Station.

ABOVE: Champion exhibitors Reay and Lindy Cowan, Woodbine, with Peter Stevens, Rabobank.

ABOVE RIGHT: Greg McNamara, Tim Driver (Precision Pastoral, Alice Springs) and Alan Paine at the Flinders debrief day.

RIGHT: About 50 people turned up for the Flinders debrief day. Tim Driver, Precision Pastoral, Alice Springs, spoke to both groups about the results so far with the walk-over weighing equipment at the Richmond challenge site.

7.6.4 North Queensland Register, 15 November 2012

Richmond takes progressive challenge path

RICHMOND Shire cattle producers gathered at Wilburra Station for the first official weigh-in of the 2011/12 Rabobank North West Beef Challenge on Thursday, November 8.

This year, this very progressive group of graziers had a three-way draft set up to be able to feed one-third of the challenge cattle Custom, copra- based lick, one-third of the cattle a 30 percent urea lick, and one- third of the cattle no lick at all.

Information will be obtained on which cattle do better during any particular season.

To add more information to the database, the Richmond Challenge producers have entered different age groups of cattle into the paddock.

Some problems were experienced with some cattle getting used to using the draft, and several head which refused to use it at all were replaced.

Rebecca Gunther, DAFF, said it was possible the reason for this was these cattle had not ever been through a race-draft.

Richmond cattle had been in the Wilburra paddock since July 7, but this was the first official weigh-in and the beginning of the 2013 challenge.

An interesting figure to come out of the day was from DAFF's Emma Hegarty, who had been doing monthly faecal testing since July, who told graziers that during September-October, faecal sample tests showed a 1.5 percent drop in protein level.

The next Rabobank North West Beef Challenge weigh-in will be in April 2013.

Peter Thivakon, Elders, Rebecca Gunther, DAFF, Todd Donaldson, Elanco, and Darren Crouch, Elanco.

NW BEEF CHALLENGE STATISTICS

McKinlay Beef Challenge

Group 1 (200-230kg induction weight): Group liveweight – Avg 265.71kg, min 209kg, max 344kg.

Group 2 (380-420kg induction weight): Group liveweight – Avg 435.38kg, min 351kg, max 560kg.

Richmond Beef Challenge

Group liveweight: Avg 365.6kg, min 259kg, max 475kg.

Group average daily gain (ADG) from July 5 to Nov 8: Avg 0.19kg/hd/day, min -0.08kg/hd/day, max 0.88kg/hd/day.

Ash Naclerio, TopX, Ross Ievers, Tarbray Station, Peter Ievers, Rosedale Station, and Dave Carter, Wyangarie Station.

The seed pods of progardes legume. Seeds can lie dormant in the ground for several seasons.

Legume developed for NW conditions

AFTER the weigh-in, JCU's tropical legume specialist Chris Gardiner gave producers a talk on his development of a native legume of the desmanthus species called the progardes legume.

Mr Gardiner has been developing the progardes on experimental sites up to 2000ha in several climes around North Queensland.

He told producers that this legume was ideally suited to the north-western soil and climate.

It contains 20 percent protein in the leaf and 10pc in the stem, and provides a green pick during the driest time of the year.

He said the legume may need a couple of wet seasons to establish itself, and ideally a sown paddock should be locked up for the first wet season.

Seeds can lie dormant in the soil for several years, and the plant has a growing point just below ground level, which allows it to re-shoot after fire, frost or intensive grazing.

The root system can extend a metre below ground level and irrigated trials have produced plants up to 1.5m high. Progardes can be aerial seeded.

Weight gain trials involving cattle on buffel grass and cattle on progardes showed a 40kg liveweight advantage to those on progardes.

Mr Gardiner is now in the process of developing commercial quantities with the assistance of seed company Agrimix.

RIGHT: Graziers being told of the benefit to cattle of the legume progardes by Chris Gardiner.

LEFT: The progardes legume being developed by JCU's Chris Gardiner and Agrimix.

RIGHT: Todd Donaldson, Elanco, and Keeley Edwards, TopX, being shown a progardes plant by Chris Gardiner.

7.6.5 Queensland Country Life, August 2012

The Richmond Beef Challenge host site uses a walk-over weigh bridge (WOW), and associated telemetry.

Christmas, they would be too light. They would only be 260kg-270 kg on the bottom end of the feeder job, so that is why we are looking for cattle 220kg-250kg so they come back at 320kg-330 kg."

SEALS co-principal **Sid Parker** was also of the opinion that there may not be a lot of feeders about. "A lot of people sold their cattle as weaners to go on to the floodplain, so now they are back in the calf pen."

But he said, "This is no different to many years when we carted all our cattle out of Queensland up to Darwin to be loaded."

Mr Parker said he loaded one ship out of Karumba last week and three more shipments should see it pretty well cleaned up for them this year.

As to the alternatives to Indonesia, he said the Philippines was starting to move a bit but there's no oil or gas there and their economy never really recovered from the 1990s.

"Malaysia, Philippines and Vietnam are all price-sensitive markets which will grow over time, but it's hard to see these markets taking up the slack in the immediate term,' he said.

Not one to miss an opportunity, **John McLoughlin**, Aroona, Katherine, has some cattle booked to go at the end of August at 200c/kg but said that most of his Territory-bred cattle were coming back into Queensland at the moment.

He confirmed that the overall picture seemed to point to a shortage of feeder cattle.

From what he has heard, a lot of cattle have gone south but not many have come back to Queensland.

His observation of the season just experienced also provides some insight into the decision by those producers who have elected to take their heavier steers through to bullock weights. Mr McLoughlin said this was probably the best season he has ever had up there from the point of view of how well the cattle have done. As opposed to the usual torrential downpours they normally experience, this season was quite different. It just kept raining. Bit of wet followed by a bit of dry followed by a bit more wet and so on. "The grass hardened up and the cattle did really well up there this year," he said.

Remote technology stars

THE Richmond Beef Challenge cattle were killed last week at Lakes Creek and the presentation dinner is scheduled for October 13 in Hughenden. An interesting enough event for those close to it and nothing particularly special you might think given the number of similar events around the country. But you would be wrong, for this event is special in that it has developed into an MLA Producer Demonstration Site (PDS) for remote technology and the findings so far are very interesting indeed. The Richmond Challenge host site has an automated walk-over weigh bridge (WOW) that weighs the cattle every time the animal uses the spear trap to exit the water yard. This weight data is correlated to their NLIS tag with an Allflex panel reader and is sent to a website via mobile phone coverage using Observant software. The weight data is downloaded weekly by equipment supplier Precision Pastoral's **Tim Driver** and uploaded to the group's website for all to access (www.usee.com). The website is managed by local Richmond producers **Will and Hollie Harrington** who sponsor the site through their business Harrington Systems Electronics and also have cattle in the Challenge. The Harringtons have provided two remote cameras. One is set above the "in" spear to monitor the water trough and tank levels at the water yard, and a second camera is located 2km from water to monitor pasture condition.

Both cameras are programmed to take photos each day which are automatically uploaded to the website. Dung samples are collected on a monthly basis to correlate diet quality to liveweight response.

Rebecca Gunther (nee Matthews) and **Emma Hegarty** are DAFF Future Beef extension officers in Cloncurry and are responsible for the operation of the PDS. In her capacity as PDS coordinator, Rebecca has recorded what has been learnt so far.

She said one of the earliest indications of the value of WOW came from basing a decision last year on when to introduce dry lick to the cattle from the weight data rather than from visual assessment. Compared with a visual assessment-based decision by the Flinders group, whose cattle were on similar country and experiencing similar conditions, the Richmond group delayed introduction by six weeks until the data indicated a plateau in liveweight gain. "The economic implications of this across a large herd are obvious," she said. Following on from this, the group decided they would like to add autodrafting to the WOW unit so that different lick recipes versus none at all could be trialled. The application has been submitted to MLA so hopefully final approval on the equipment is not far away but Rebecca commented that there may be no call for lick this year due to the terrific season being experienced.

Another significant finding is the high correlation between the WOW recordings and weights collected manually in the crush. She said that, in July-November, the correlation was 0.35kg/hd/day calculated from WOW against 0.36kg/hd/day from manual weighing.

She added that the full-gut nature of the WOW readings (taken as the cattle exit the trap yard) has been shown to be of no significance. The important issue is consistency in the recordings and this allows for the correct inference to be drawn with regard to gain.

Animal behaviour is another area where the remote technology is showing up some interesting observations. From the data it was found that some animals were only watering every second or third day in the cooler months while others were watering several times each day. "This type of intermittent watering behaviour is commonly associated with much larger pastoral situations but the paddock size in this instance is only 590ha," she said.

The telemetry associated with WOW has also proved its value in early detection of missing stock. If an animal's NLIS tag has not been read for several days in a row, the system sends out an alert message.

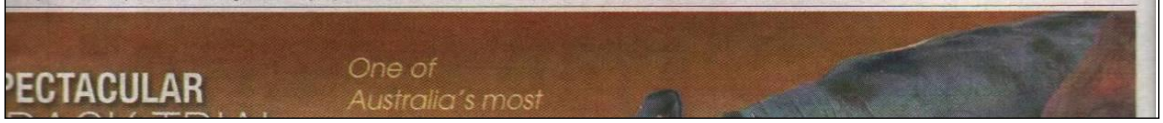
Rebecca said: "With the NLIS tags correlated to management tags, it was possible to discover that one missing animal was really just a persistent fence jumper with a tendency to take a holiday for up to a week or two at a time in a neighbouring paddock, before returning home. This behaviour seemed to diminish as the animal got heavier and the weather hotter." Use of remote cameras has also shown to be an excellent tool in decreasing the amount of water runs required in day-to-day management.

Darren Gillatt, manager of host property Wilburra Downs and the adjoining property Riverdale, owned by group participant **Alister McClymont**, uses the website daily to check the level in the water trough which saves him a one-hour drive round trip to the trial paddock to check in person. He still checks it at least once a week but the cameras reduce the number of water runs required. Through savings in wages and fuel, it can be demonstrated that the cameras can pay for themselves in as little as three months.

Richmond group chairman **Phil Corlis** was upbeat about the benefits the technology has to offer. With the PDS due to continue for another two years, he saw it as a wider benefit than just to the immediate group involved. He thought other producers could utilise the findings and apply it to their own situations as and where appropriate.

On the WOW technology, he could see market-based applications as well as the cost/benefit type of advantages demonstrated in the timing of feed supplements last year.

"If you want to draft cattle out of a certain weight you can do that without bringing them to the yards," he said.



7.6.6 Northern Muster, Issue 31, April 2013

FutureBeef **Northern muster**

Queensland Government

Rabobank western beef challenges

McKinlay Shire Challenge cattle at Eddington, prior to being trucked to Mort & Co's Grassdale Feedlot near Dalby.

Poor wet season provides extra element

Changes to format enforced by dry conditions

A LESS than impressive wet season experienced by most of inland Queensland has certainly added an extra challenge to the three shire beef challenges in the North West. Thanks to the passion and dedication of all three groups, however, the challenges are continuing, albeit with some slight improvisation.

FLINDERS SHIRE BEEF CHALLENGE

The Murray family at Uanda, south of Torrens Creek, were due to induct the 2013/14 lot of challenge cattle in March. The group were keen to compare liveweight gain on pulled gidyea/buffel country with the performances recorded on Mitchell Grass Downs over the previous three challenges.

The group met in February at the Prairie Hotel and decided that, due to dry conditions, no cattle would be put in a paddock for the challenge this year. However, the group will put the time to good use by continuing to meet every two to three months and inviting guest speakers on topics of their choice to use the time productively.

The social aspect of the days will help the community see through the dry season ahead with the next gathering planned for Glendower on April 21. The gatherings will continue throughout the year, with everyone welcome, including neighbouring shires and those who have never been involved in the challenges before. Come enjoy the experience.

Terressa Ford, Flinders Beef Challenges secretary, Hughenden Station, (07) 4741 1546, email greg.terressa.ford@bigpond.com.au

RICHMOND SHIRE CHALLENGE

Since the installation of Precision Pastoral's Remote Livestock Management Systems (RLMS) drafting function in October 2012, the Richmond Shire Challenge and walk-over weighing (WOW) and remote camera technology, PDS cattle have been drafted three ways:

Group 1 – bush with no lick.
Group 2 – high-protein meal-production lick.
Group 3 – 30 percent urea-based lick.

Additional yards were set up adjacent to the main water yard so that as the animals exit the main yard, they cross the RLMS weigh bridge and then are drafted into their lick yards by the RLMS drafting function. Additional water troughs were installed in the lick yards to ensure animals could have access to both lick and water in the same place. Those animals not receiving lick could only access the water trough in the main water yard. The RLMS drafting function has been working well.

Treatment Group 2 animals enjoy their production lick while others look on at the Richmond Beef Challenge.

Recently, it was discovered that the animals receiving lick were bypassing the first water trough, crossing the weighbridge and only drinking from the trough in their yard. Hence, as the animals receiving lick crossed the weigh bridge, they were 20kg-30kg of water lighter than those animals receiving no lick that had to drink before crossing the weighbridge.

The group discussed this issue at the weigh day and decided the only option was to shut off the main water trough and install a third water yard to collect accurate data on the different lick treatment groups. This is now under way.

The host paddock at Wilburra Downs has managed to get under a little more rain than most in the area but lacks bulk to carry the cattle through to the end of the year. The group decided to continue feeding the dry lick recipes and begin feeding the Group 1 (no lick) animals M8U plus rumensin in their new water yard.

The group aims to hold the animals with this feeding regime to try and avoid the current low prices due to the flooded market. It was agreed to weigh the animals again in May to reassess the situation and make a decision on how to market them.

It is hoped that this drought strategy will emulate what producers in the area are already doing and the equipment will give some indication to the effects.

Due to the small number (29 head) of animals in each treatment group, the data will not be statistically significant and any results can be used only 'with a grain of salt'.

March 21 Weigh day results

	Overall	Group 1 – no lick	Group 2 – production lick	Group 3 – 30% urea
Liveweight (kg)	436 (302 – 540)	437	440	432
ADG (kg/hd/d) since Nov 6 2012	0.54 (0.13 – 0.80)	0.52	0.56	0.52

Figures in brackets are the minimum and maximum values

The figures in the table are based on the static manual weigh day weights collected in November and March and should be used as an indication only. The results are not statistically significant.

MCKINLAY SHIRE CHALLENGE

Due to the dry season at host property, Eddington Station, the McKinlay Shire Challenge cattle had to be moved. Members of the group investigated various options that were discussed at the weigh day and made the decision to send the cattle to a feedlot to custom-feed them until slaughter.

Within the week, all challenge cattle were trucked to Mort & Co's Grassdale Feedlot near Dalby, landing by March 27. Given the long trip, the cattle were given a few days rest in a well-grassed paddock and April 2 was their first day on feed in their pen.

The McKinlay Shire Challenge group is now planning a bus tour to visit Grassdale to view the feedlot, cropping and grazing enterprises. Challenge participants will also be able to watch the cattle being processed at the chosen abattoir and chiller assessment when the animals are ready to be sold.

The inaugural Flinders Beef Challenge steers in 2007/08 were also lot-fed prior to slaughter. It will be interesting to compare the liveweight, carcase and economic data at the end of the year.

At the weigh day, the opportunity was taken to inspect the HGP implant site on all animals which received Compudose 400 at induction to look for infection, lost pellets or those pellets that had been inserted too high in the ear. Out of the 81 animals implanted, Todd Donaldson from Elanco found:

- one infection.
- two missing pellets.
- 48 implants placed too high in the ear.

Todd gave the group an overview of these results and reminded them of the importance of hygiene with the applicators and the correct placement of HGP pellets in the middle third of the back of the ear between the two lines of cartilage. Placing the implant too high can contribute to infection and, due to increased blood flow high in the ear close to the head, the implant can be absorbed more quickly, leaving the animal without growth promotion for the fully intended period.

Todd also discussed with the group the modes of action of different implants and how this affects what implant to use in which situation. Implants containing oestradiol-17B stimulate the pituitary gland to release the animal's own natural growth hormones, resulting in increased muscle cell production.

However, 'combination' implants contain oestradiol and trenbolone acetate (TBA). TBA operates by increasing protein accumulation inside the muscle cells, thus producing bigger muscle cells.

Liveweight gain benefits from combination implants containing TBA can be lost if cattle are not turned off or reimplanted. Todd recommended that combination implants should ideally be used as terminal implants to avoid production losses.

The McKinlay group were also treated to a presentation from international guest Don Close. Don is currently the VP Food & Agribusiness Research and Advisory for Animal Protein with RaboAgrifinance, where he specialises in the cattle and beef complex.

With a total of 36 years of livestock marketing experience in his home country, Don gave an interesting overview of the US and international beef industries that was well received by all in attendance.

To show their appreciation, the McKinlay group presented Don with an Akubra hat to wear while he is on his travels in Australia.

Emma Hagarty and Rebecca Gunther, FutureBeef Team, Clonourry, (07) 4742 1311.

March 28 Weigh day results

	Overall	Group 1*	Group 2**
Liveweight (kg)	438 (268 – 610)	383 (268 – 432)	490 (398 – 610)
ADG (kg/hd/d) since Nov 7 2012	0.47 (0.06 – 0.85)	0.56 (0.31 – 0.77)	0.42 (0.06-0.85)

*Group 1 had an induction weight of 200-230kg
**Group 2 had an induction weight of 300-420kg
Figures in brackets are the minimum and maximum values

LEFT: Don Close was presented with an Akubra hat by the McKinlay Shire Beef Challenge.

The yard set up at Wilburra Downs – main water yard in background, RLMS equipment and separate lick yards with own water troughs.

*7.6.7 Northern Muste*r, Issue 32, September 2013

FutureBeef **Northern muster** BEEF CHALLENGES Queensland Government

Taking up challenge

Valuable carcase data collected

McKinlay Shire Beef Challenge

THE McKinlay Shire Beef Challenge cattle were fed for 100 days at the Mort and Co Grassdale Feedlot, outside Dalby. All bar 17 head were processed at the Kilcoy Pastoral Company's abattoir on July 16, 2013.

The remaining animals were too light to meet Kilcoy's weight specifications and were processed through Teys Australia's Dinmore plant on July 18.

Beef challenge secretary Rachael French, from Eddington Station, made the trip south with Department of Agriculture, Fisheries and Forestry FutureBeef officers, Emma Hegarty and Rebecca Gunther, to be on the kill floor at Kilcoy.

Information was collected to enable the carcase feedback data to be analysed to provide producers with some detailed feedback on how their animals graded and performed.

Craig Price, manager of livestock procurement at Kilcoy Pastoral Company, gave the three visitors a comprehensive tour of the plant and was more than happy to answer questions asked.

Early the following morning, Craig was again on hand to show Rachael, Emma and Rebecca through the chillers to inspect the challenge carcases and observe the collection of the carcase data.

The trio then travelled west to Dalby for a guided tour of Mort and Co Grassdale Feedlot. Ben Maher, private client manager, showed the group through the 34,000-head facility, feed mill, automated induction shed and impressive staff horse stable facilities.

The group were able to see the 17 lightest animals that were still awaiting dispatch to Dinmore. They were all in excellent condition and had certainly gained well during their time at Grassdale.

Cameras, pen and paper were at the ready throughout the short trip, which Rachael described as "an absolutely fabulous experience for me and I am so glad I could make it on behalf of the group".

Many of the photos, videos and notes taken over the trip will be reported back to the McKinlay Shire Beef Challenge Group at the September 25 debrief day.

All liveweight, carcase and financial data will be presented to the group at the debrief day as well. A full summary of the debrief day results will be published in the December issue of the *Northern muster*.

● **Richmond Shire Beef Challenge:** It was reported in the previous challenge update that the group had decided at the March 21 weigh day to continue feeding the dry lick recipes to group two (production lick) and group three (30 percent urea) animals, and begin feeding group one (no lick) animals M8U plus rumensin in their new water yard, once constructed. Due to group members' commitments to their own beef businesses, the new water yard and trough were not able to be installed until June. Despite the dry season, the pasture quality remained sufficient for animal production, with positive weight gain across the mob of 0.56kg/head/day recorded at the May 16 weigh day (see table). This result was a pleasant surprise to all.

Keeping the limited forage supply in mind, the group agreed to weigh the animals in another month and make a decision about their future.

At the June 14 weigh day, the mob averaged 465kg and was losing weight at an average of -0.11kg/hd/day. The producers decided to send the animals to Smithfield Feedlot near Proston where the steers will spend 100 days on feed, as they were not yet finished enough for sale straight from the paddock. For the remaining time in the paddock, the group one (no lick) and group two (production lick) animals continued as normal, while the group three (30pc urea) animals received M8U molasses mix plus rumensin immediately.

The producer group also decided to supply group three steers with a seaweed solution in their water trough for one week prior to trucking to try to establish if there were any advantages.

Prior to trucking out the steers on July 30, all animals were manually weighed for the final time to get an exit weight that can be compared with feedlot induction weight. The Richmond steers will be processed in November, and full liveweight and carcase results will be published in the Northern muster in due course.

Rebecca Gunther, Emma Hegarty, FutureBeef team, Cloncurry (07) 4742 1311.

ABOVE: Emma Hegarty, Rachael French and Rebecca Gunther in the Kilcoy chiller.

Marbling in a rib eye of one of the McKinlay Challenge carcases.

Date	Average weight (kg)	Average Daily Gain (kg/hd/d)
5/07/2012	341.13	0.60
8/11/2012	365.56	0.19
21/03/2013	436.63	0.53
16/05/2013	468.15	0.56
14/06/2013	465.80	-0.11
30/07/2013	455.55	-0.21

RIGHT: Some of the lighter animals at Grassdale feedlot before dispatch to Dinmore.

7.6.8 Northern Muster, Issue 33, December 2013

FutureBeef **Northern Muster** BEEF CHALLENGES Queensland Government

High performing cattle

McKinlay Beef Challenge

THE inaugural McKinlay Shire Beef Challenge has concluded with a celebratory dinner on Saturday, October 19, where high-achieving pens of cattle were recognised across grassfed, grainfed and carcase categories. Peter Lewis from ABC television's *Landline* travelled to Julia Creek, sharing with guests entertaining stories and a slideshow of fascinating photos from a recent trip to South America.

The cattle entered the paddock in October 2012 with two different induction weight ranges – 200kg to 230kg and 380kg to 420kg. The official challenge start weight for each animal was recorded in early November with the mob average at 375kg.

As the mob headed to Mort and Co's Grassdale feedlot in March, they had gained an average of 63kg per head, or 0.47kg/hd/day, an impressive effort given the lacklustre wet season.

The highest weight gain performing pen of steers on grass gained 92kg (0.69kg/d), entered by Calvin and Karen Price from Mimong Station.

The first half of the 100 days on feed (DOF), the cattle gained quickly, putting on 2kg/hd/d before slowing to 1.6kg/hd/d. Over the grain-feeding phase, the cattle put on 163kg. Since November 2012, the cattle gained a total of 227kg or average gain of 0.93kg/hd/d.

In comparison, the Richmond Beef Challenge cattle in the previous 2011/12 challenge on grass alone, gained 219kg, or an average gain of 0.66kg/hd/d.

The highest weight gain performing pen of steers gained 298kg (1.21kg/hd/d) from November to July, entered by John and Margo Stevens of Cremorna.

The same pen of steers gained the most weight during the feedlot phase – 2.49kg/d.

The top five individual animals gained between 323kg (1.31kg/hd/d) and 347kg (1.40kg/hd/d) over the nine-month challenge.

On grain feeding only, the top 10 individual animals gained more than 260kg at a rate at or above 2.52kg/d

At induction into the challenge, producers were given the option to use HGP implants or not.

Calvin Price of Mimong, Elanco's Todd Donaldson and Colin Malone from Mount Grant discussing the finer points of the compiled data at the dinner.

LEFT: Cloncurry Rabobank manager Declan Keogh congratulates John Stevens of Cremorna, on achieving the highest overall weight gain in the feedlot with his pen of steers.

	Average weight (kg)	Average gain (kg/hd)	Daily gain (kg/hd/d)
November	375		
March	438	63	0.47
May (53 DOF)	526	88	2
July (103 DOF)	601	75	1.8

	HGP	no HGP	diff	HGP	no HGP	diff	HGP	no HGP
SUMMARY	Overall Gain (kg)			ADG (kg/d)			No. of head	
overall	65.47	57.29	8.18	0.49	0.43	0.06	81	56
Group 1	80.58	68.63	11.96	0.61	0.52	0.09	24	24
Group 2	59.11	48.78	10.32	0.44	0.37	0.08	57	32

In both weight groups, weight advantages were still seen in the animals that had been implanted.

The McKinlay Beef Challenge was made possible through the generous support of sponsors Rabobank, Zoetis, Elanco, Allflex, Ray and Judy Heslin, Q DAFF FutureBeef staff, and the hard work of committee members Lindsay Allen (president), Rachael French (secretary) and Gayle Batt (treasurer).

The group is looking forward to holding its next challenge in the new year.

RIGHT: A few of the McKinlay Challenge animals at the feedlot prior to processing.

Peter Lewis of the ABC sharing a laugh with Lindsay Allen, Longford.

Richmond Beef Challenge

SMITHFIELD Feedlot at Proston hosted the Richmond Challenge cattle for 100 days on feed.

The mob averaged 456kg when loaded at Richmond and had a 4.86 percent shrink to average 434kg at induction.

During their time at the feedlot, they gained at 2.05kg/hd/d, leaving the feedlot with an average weight of 637kg.

The cattle were processed at Kilcoy abattoir in mid-November with FutureBeef officer, Emma Hegarty, travelling down to be on the kill floor at Kilcoy.

Information was collected to enable the carcase feedback data to be analysed to provide producers with some detailed feedback on how their animals graded and performed.

Emma also travelled to Proston where Ryan Brown kindly gave his time to give Emma a comprehensive tour of the facilities.

Information collected at the feedlot and fill liveweight and carcase data will be reported to the group at a debrief day in February.

A full summary of the debrief day results will be published in the autumn issue of *Northern muster*.

Rebecca Gunther, FutureBeef Team, Cloncurry, 0417 726 703, Rebecca.Gunther@daff.qld.gov.au

7.6.9 Northern Muster, Issue 34, April 2014

FutureBeef **Northern Muster** MEAT MATTERS Queensland Government

Students take on the States

National Western Contest, Denver, Colorado. Pictured are Demi Lollback (coach), Tammy Heir, Frederick Broughton, Nick van den Berg, Hamish Irvine, Laura Kemmis and Emma Hegarty (coach).

RIGHT: Training at Wyoming University. Pictured are Emma Hegarty (coach), Frederick Broughton, Hamish Irvine, Tammy Heir, Laura Kemmis and Nick van den Berg.

Meat-judging team impresses

THE Australian national meat-judging team arrived home from the United States with an impressive line-up of awards from three meat-judging contests, and some experiences that would make any university student envious.

The enthusiastic students making up the team included Hamish Irvine from University of Sydney, Frederick Broughton from University of New England, Nick van den Berg from University of Adelaide, and Tamara Heir and Laura Kemmis, both from Charles Sturt University, Wagga Wagga.

The month-long meat and livestock industry tour of the US included participating in three meat-judging contests against US colleges. As a team, the Australians placed nothing less than fifth place in all categories of all of their contests. They were placed third overall, and won the category for judging placings at the National Western in Denver, Colorado.

Individual award highlights included Nick van den Berg placed as the fourth and seventh highest overall individual at the National Western (Denver) and South Western competition (Fort Worth) respectively. Laura Kemmis achieved fourth and fifth highest individual in beef judging at both of these contests. Tammy, Fred and Hamish were also successful in securing a great display of ribbons over a number of categories.

The team at the US Meat Animal Research Centre in Nebraska: Hamish Irvine, Nick van den Berg, Laura Kemmis, Emma Hegarty (coach), Frederick Broughton, Tammy Heir and Demi Lollback (coach).

"The students this year were a great group who worked very hard," Australian coach Emma Hegarty said.

"They put a lot of effort into everything we did – whether it was long training sessions in the abattoir or representing their country at the many industry visits and tours we did."

Demi Lollback of Meat & Livestock Australia, who assisted in the coaching role, was overwhelmed by the extent of the tour itinerary.

"As my first year in this role, this was a trip of a lifetime. The students have just had a very exclusive insight into the US industry that not many people ever get to do," she said.

Aside from the contests, the team spent a month covering nearly 10,000km across 10 states visiting industry organisations.

The trip gave the students a complete paddock-to-plate insight from ranch and feedlot visits, to processor tours of beef, pork and lamb facilities, including the three major US packers – JBS, Tyson and Cargill.

Other tour visits included the National Cattlemen's Beef Association, meat science faculties of seven major universities, as well as meeting with Global Animal Products in Amarillo, who provided the team with a personal flight over their feedlots.

Nick van den Berg was very impressed with the visit to the USDA Meat Animal Research Centre (MARC) in Nebraska.

"The research centre runs 7000 breeding cows, 3000 ewes and produces 700 litters of pigs a year. The variety and integration of their research projects had myself and the whole team astounded at the work being undertaken," he said.

The Australian team will be guests at the 2014 Australian Intercollegiate Meat Judging program to be held in Wagga Wagga on July 8 to 13, inspiring the next intake of meat-judging enthusiasts.

This year will be the 25th anniversary of the meat-judging contest in Australia. Meat & Livestock Australia and Australian Meat Processors Corporation were the major sponsors of the Australian team.

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Richmond Beef Challenge yields top results

Liveweight results

AT the July 2012 weigh day, the official start weight for each Richmond Beef Challenge animal was recorded, with the mob of 89 head averaging 341kg.

The cattle gained at 0.19 kilograms per day (kg/d) through to November, and 0.53kg/d over the lacklustre wet season through to end of March 2013.

In the previous challenge, the cattle gained 0.85kg/d over the similar November 2011 to March 2012 wet-season period.

The cattle continued to gain weight through to May 2013, but began to lose weight thereafter. When leaving the paddock for the feedlot in late July, the mob averaged 455kg, or had put on an average of 0.29kg/d over the 390-day grassfed period.

In the feedlot, the mob performed at an average of 2.05kg/d with an individual animal gaining 3.56kg/d.

When the cattle left for the abattoir, the mob had put on an average 290kg/head over the 488-day combined grass and grainfed phases of the challenge, at an average rate of 0.59kg/d. In comparison, the previous challenge cattle put on 219kg at an average rate of 0.66kg/d over only 345 days.

It has been very interesting to compare the performance of similar animals in the same paddock over two very different seasons.

Carcase results

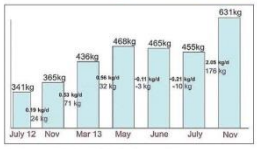
The Shire Beef Challenge cattle were sent to abattoirs in Kilcoy in mid-November last year, where MSA data was collected and used to assess the carcase attributes for each individual steer. This was following on from the steers being fed in Smithfield feedlot, Proston, for 100 days.

All of the cattle met Meat Standards Australia (MSA) specifications, which are pH < 5.7; meat colour – 1B to 3; rib fat minimum of 3mm.

LEFT: Finished Richmond Beef Challenge cattle.

BELOW, LEFT: When leaving the paddock for the feedlot in late July, the mob averaged 455kg, or had put on an average of 0.29kg/day over the 390-day grassfed period.

BELOW: A summary of the average carcase data collected for the beef challenge steers.



Carcase attribute	Average data
Average hot standard carcase weight	338kg
Average dressing percentage	53.5%
Average P8 fat	15mm (8-31mm range)
Average pH	5.47 (5.3 to 5.6)
Average ossification score	151 (120-200 range)
Average marbling score	213 (110-370 range)
Rib fat	13mm (5-23mm range)

This was a fantastic result, given that the steers went through a drier than normal wet season and a very dry start to 2013.

While the cattle had MSA data collected on them, it was for a learning exercise only, and none of the steers was marketed as MSA product.

The P8 fat ranged from 8 to 31mm, with an average of 15mm across the mob. Only two head received a discount for having greater than 26mm.

There were no dark cutters in the mob and fat colour was white across all bodies.

Ossification was good, with the highest score being a 200, which equals an approximate physiological age of 30 months. Marbling scores were quite low for the mob, with the average carcase only showing slight marbling in the rib eye.

An interesting fact to note from the data collected was the average hump height of 122mm, but ranging up to 230mm. Hump height is used to measure the tropical breed content of the animal.

The steers were placed into boning groups (BG) ranging from 4 to 14 on a 1 to 18 scale (BG 1 being the best).

The data showed that as the boning group increased (and eating quality decreased), the rib fat decreased, hump height increased and the MSA eating quality score decreased significantly.

MSA data was collected to use as a learning tool to better understand the carcase attributes for each individual steer.

The average price received was $3.73/kg dressed, ranging from $3.55 to $3.80. These prices were for 100-day grainfed product, non-MSA.

To learn more about the MSA grading system and for assistance with interpreting MSA feedback data, visit www.mla.com.au/Marketingbeef-and-lamb/Meat-Standards-Australia/MSAbeef.

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7.6.10 Beeftalk, Issue 39, July 2014

FutureBeef Beeftalk

Queensland Government

Drought strategies, preparing for El Niño

WELCOME to Beeftalk 39. In this issue, there is a warning for impending El Niño conditions which often, but not always, bring drier than normal conditions.

The impact of El Niño is more relevant to some areas than others, such as far northern Queensland. A list of drought strategies and considerations is given, including the all important adjustment of stock numbers to match paddock feed and water supplies.

Supplementation of stock on pastures is still important, especially to help breeders hold condition. Several articles discuss assessing pasture quality (dung samples), animal requirements, supplementation needs and options.

While management of the business is important, Lifeline reminds us that "YOU and your family" are the most important part of the business also needing attention.

New landholders in particular are not always clear on their responsibilities for managing land and livestock. Several articles provide an overview and refresher of responsibilities for landholders big and small. Observing these responsibilities is so important to maintain clean landscapes and food to keep our export and domestic customers buying Queensland beef.

The update on the 2013 Northern Beef Situation Analysis reminds us that things are difficult, it also highlights that some businesses are managing for consistently better profits.

Please provide your feedback and suggestions for future issues using a short survey at www.surveymonkey.com/s/beeftalk39. Online versions of Beeftalk are also available for download or email. To receive the online version, please subscribe on the FutureBeef website www.futurebeef.com.au/sign-up

Happy reading!

– The Beeftalk team

Beeftalk edition 39

Editorial committee

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Trialling two remote technologies at MLA Producer Demonstration Site, Richmond

IN 2011, a producer group at Richmond in North West Queensland started trialing two remote technologies as part of a MLA Producer Demonstration Site (PDS).

The project, coordinated by Cloncurry-based FutureBeef extension officers Rebecca Gunther and Emma Hegarty, demonstrates using remote equipment to automatically collect animal weights, draft animals, and photographically monitor waters, livestock in the yards, and pastures.

The automated weighing and drafting unit, supplied by Precision Pastoral, allows livestock to be monitored remotely in the paddock. Cattle are weighed every time they walk over the weighbridge to exit the main water yard. Each animal's NLIS tag is scanned with an Allflex panel reader and matched to their live weight, date and time by a Tru Test XR3000. This information is then sent to Precision Pastoral's online weight reporting software via mobile phone coverage using Observant telemetry. Satellite and UHF frequency equipment is also available to use with the system if mobile coverage is not sufficient.

A drafting unit adjoins the weighing unit and can be used to automatically draft stock on live weight or NLIS tag number into different yards. This enables drafting on sale weight specifications or weaning weights or even to compare stock with or without a treatment or supplement in the yards.

The remote weighing and drafting technology has allowed pin point timing of key management practices with the equipment through monitoring whether live weights are gaining, levelling or dropping. The group has been able to specifically target the introduction of dry lick supplementation when live weights began to plateau. The live weight data can then be used to see if there is a response to the supplement. Significant cost saving can be achieved by not supplementing too early and minimising weight loss over the dry season.

LEFT: uSee remote monitoring camera supplied by Harrington Systems Electronics keeps an eye on water trough and tank levels in main water yard.

Analysing the data has shown some interesting animal behaviour with some animals only watering every second or third day in cooler months of the year, despite the relatively small 1500ac paddock. The system also sends an alert when an animal's tag has'nt been read for several days. It also discovered that one animal in particular would go missing periodically, jumping the fence to return later.

The project has been very beneficial in demonstrating the practical application of the system, its potential, and its limitations. Importantly livestock need to be trained to use the spear traps which are an integral part of the system, as well as being trained to become accustomed to walking over the weigh bridge and waiting for their gate to open in front of them.

Since large paddocks in extensive grazing operations have multiple waters, it may be necessary to set the system up in a large holding paddock with controlled water, or accept monitoring of just a percentage of livestock in the paddock.

uSee Remote monitoring cameras, supplied by Harrington Systems Electronics, were the second remote technology demonstrated. One camera was set above the 'in' spear to monitor the water trough and tank levels in the main water yard, while a second camera was located two kilometres from water to monitor pasture condition.

Both cameras are programmed to take a set number of photos a day that are uploaded via mobile phone coverage to the uSee website at www.usee.com. The cameras can also be instructed to take a photo on demand, via a button on the website. Satellite cameras are available for areas outside of mobile coverage.

The remote camera was found to be an excellent tool in decreasing the amount of water runs required in day-to-day management.

The ability to check the water trough levels daily on the web site reduced the number of times required to check the trial paddock in person, saving a one hour drive round trip to the trial paddock each time. It was estimated that such savings in labour and fuel could pay for the system in as little as three months. A satellite camera would take slightly longer, but payback time still measured in months, not years.

With labour costs at a premium, the project has been successful in demonstrating the potential of remote technologies to improve management efficiencies in beef enterprises. The technologies and applications will only improve in time.

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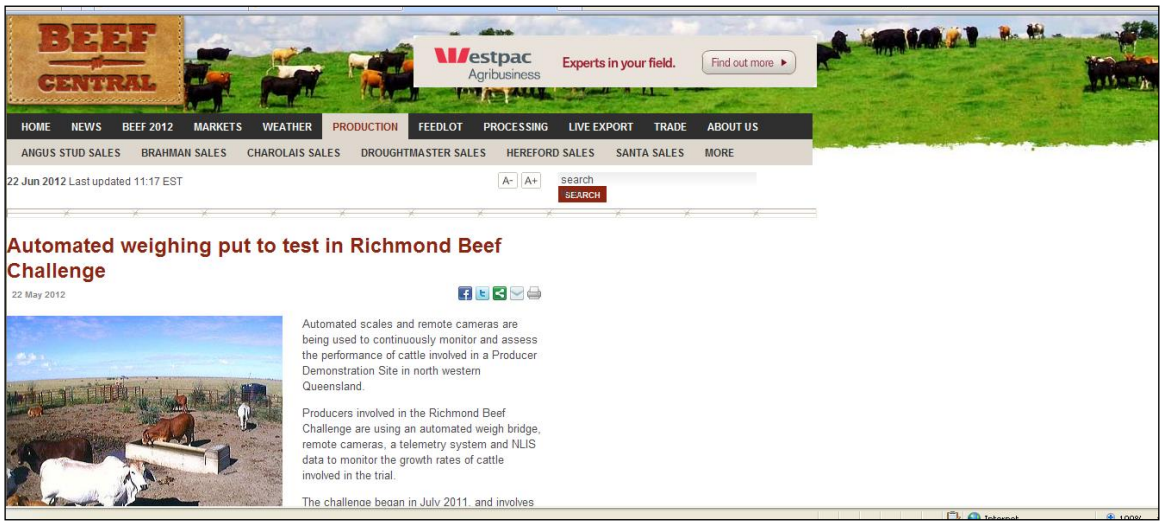
7.6.11 Beef Central article, 22 May 2012



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Automated weighing put to test in Richmond Beef Challenge

22 May 2012

Automated scales and remote cameras are being used to continuously monitor and assess the performance of cattle involved in a Producer Demonstration Site in north western Queensland.

Producers involved in the Richmond Beef Challenge are using an automated weigh bridge, remote cameras, a telemetry system and NLIS data to monitor the growth rates of cattle involved in the trial.

The challenge began in July 2011, and involves

7.6.12 Field day flyer, 14 June 2013

W O W !

No cattle sale at Richmond Field Days this year ☹ so...

What have these guys been up to?

FIND OUT FRI 14TH JUNE 8AM, WILBURRA DOWNS

Bus available from Field Days (race track)

Bus departs – 7:30am

Arrives back – 9:30am

COME ALONG TO SEE HOW TO SAVE $ MONEY $ ON LICK AND LABOUR

- **Walk over weighing (WOW)**
- **Remote cameras**
- **Auto drafting**
- **Tank level indicators**
- **Weather stations**
- **Herd recording**

For seats on bus contact *Rebecca Gunther* *0417 726 703* *Emma Hegarty* *0467 808 340*

7.7 Appendix 7: Richmond Beef Challenge Group

As a result of producer interest expressed to DAF FutureBeef staff to trial automated WOW technology, plans began in 2010 to establish a PDS in the Richmond area of western Queensland. Following this interest, the Richmond Beef Challenge Group was formed in 2011 with the aim of getting enthusiastic, like-minded cattle producers together to learn and gain a better understanding of cattle production in their local area. A similar concept had been developed in the Flinders Shire in 2007 and has been highly successful with the group still together today. The steer grow-out contest was used as a platform for producers to learn and discuss a range of issues. Hence the strong producer interest provided an opportunity to establish this PDS with the Richmond Beef Challenge Group.

Members of the Richmond Beef Challenge Group supplied the cattle, paddock, panels and troughs required for the PDS project. Steers from 11 properties were used across the two cohorts in the PDS. These cattle were also part of the Richmond Steer Challenge, while demonstrating the effectiveness of the potential labour-saving WOW equipment.

Running the PDS project in conjunction with the Richmond Beef Challenge Group worked well. In addition to the core PDS project activity, most weigh days were used to up skill the producers. We often hosted guest speakers on topics the group were interested to learn more about; topics included new technologies, legume or pasture varieties and animal nutrition. It was not a closed group and any local producers were invited along and able to take part in the weigh days. The environment provided was an open one, with producers happy to share their data, knowledge and skills with each other providing a fantastic opportunity to learn, particularly for young producers. Group facilitation was used to make decisions about what supplements to feed and when the cattle should be sold or fed based on local best practice. This allowed the demonstration to represent what actually happens in the area. The PDS project would not have taken place without the time and effort put into it by the producer group.

To ensure the producer's involved were learning and gaining a good understanding of the data presented, debrief days were held after each cohort of steers was slaughtered. These days allowed detailed discussion and learning on carcase, liveweight, NIRS and nutritional data.

8 Acknowledgements

This project would not be possible without the contribution of land and people resources from the producer group, and in particular Alister McClymont and Wilburra Downs livestock manager Darren Gillatt. Tim Driver of Precision Pastoral and Will Harrington of Harrington Systems Electronics for their experience with these technology systems was invaluable.

Support for the project from local Richmond businesses has been much appreciated as well as panels supplied by Biosecurity Queendland. Additional support in the form of sponsorship from Allflex Australia, Zoetis Animal Health, Elanco, Stocklick Trading and Rabobank was gratefully received.

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