Northern Territory Government

DEPARTMENT OF **PRIMARY INDUSTRY AND FISHERIES**

THE 2010 PASTORAL INDUSTRY SURVEY

Katherine Region

The 2010 Pastoral Industry Survey – Katherine Region

Northern Territory Government

Department of Primary Industry and Fisheries

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Bibliography:

Cowley, T. 2014. The 2010 Pastoral Industry Survey – Katherine Region. Northern Territory Government, Australia.

Contact:

Northern Territory Government
Department of Primary Industry and Fisheries
GPO Box 3000
Darwin NT 0801
http://www.nt.gov.au/d

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To the reader,

The 2010 Pastoral Industry Survey has the full support and backing of the Katherine Pastoral Industry Advisory Committee. It was always the belief and intention that Pastoral Survey Reports would be carried out on a regular basis, providing a snapshot of the industry and capture any new practices or issues as the industry developed.

I am sure that the 2004 survey opened up a lot of discussion, realisation and recognition for where our industry was at that given point in time. This version will no doubt reflect the changes in industry over time along with producer and Government response to those changes.

The Pastoral Industry Survey has been, and will continue to be, a focal point to identify and explore priority areas that require attention, including research and development, education, extension and training. This enables the Northern Territory (NT) Government through its main rural agency, the Department of Primary Industry and Fisheries (DPIF) to carry out future work to provide the best outcomes for producers, our environment, and our communities.

The new survey will also give producers and associated industry and Government representatives a new updated benchmark for industry and an opportunity to compare with previous survey results.

It is a credit to the pastoral industry working in conjunction with the NT Government through DPIF to once again join together to produce this useful and informative document. Thanks go out to all who provided information and to those who gathered this information and collated it.

I believe that the cooperation and commitment shown between producers and DPIF is the envy of most other States in Australia. It is this cooperation and commitment that will overcome the many and varied impediments that are continually placed in our industry's path.

I recommend this publication to you all.

Cheers,

Keith Holzwart
Chairman
Katherine Pastoral Industry Advisory Committee

Table of Contents

List of Figures

List of Tables

Tables in Appendices

List of acronyms

AE	Adult equivalent
AI	Artificial insemination
BBSE	Bull breeding soundness evaluation
CRC	Cooperative Research Centre
DPIF	Department of Primary Industry and Fisheries
EBV	Estimated breeding value
EID	Electronic identification tag
HGP	Hormonal growth promotants
KPIAC	Katherine Pastoral Industry Advisory Committee
MLA	Meat and Livestock Australia
NIRS	Near infrared reflectance spectroscopy
NLIS	National Livestock Identification System
NTCA	Northern Territory Cattlemen's Association

Acknowledgements

Firstly, thank you to all the pastoralists who took the time to sit down with me and answer hundreds of questions! I learnt so much from talking to each and every one of you. Thanks to Trudi Oxley for her guidance and patience throughout the entire project. I would like to acknowledge Trudi Oxley, Casey Collier and Arthur Cameron for assistance in surveying and Arthur for writing the hay and improved pasture sections. Thank you to the editing team - Tim Schatz, Dionne Walsh, Neil Macdonald, Trudi Oxley, Arthur Cameron and Deborah Norwood. Thanks to Deborah Norwood for her excellent eye for detail in proofing the report and in designing the layout. Thanks to Whitney Dollemore, Kieren McCosker and Mark Hearnden who provided much support and assistance during the data analysis. Thanks to the Technical Publications Section of DPIF for editing and publishing the final draft.

The 2010 Katherine Pastoral Industry Survey was based on the 2004 version:

Oxley, T. (2006). The 2004 Katherine Pastoral Industry Survey. Department of Primary Industry and Fisheries, Northern Territory Government. The document can be found online at:
http://www.nt.gov.au/d/Content/File/p/Tech_Bull/PastoralSurvey_Katherine.pdf

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Researched and written by Trisha Cowley

Executive summary

The previous Katherine Pastoral Industry Survey (2004) was the first comprehensive data of the industry's practices and plans that had been collected since the early 1980s. The results attracted great interest and showed a remarkable transformation of the industry over that 20-year period. It was therefore agreed that the survey would be repeated approximately every five years to monitor the progress of the industry as it evolves, and this survey, which reports on the 2010 calendar year, is the result. While the changes from 2004 to 2010 have been less dramatic than those reported in 2004, the data shows steady development in the industry and significant investment in infrastructure and improved management.

The other important reason for publishing this survey data is that the results are a more accurate representation of the industry because this time the data has been weighted by size of property in terms of adult equivalents (AE) or land area, while in 2004 the survey data was based purely on the number of responses. Direct comparisons between 2010 and 2004 should therefore be treated with some caution.

This survey was not easy to carry out or to interpret due to the temporary suspension of the live export trade to Indonesia in June 2011 in the middle of data collection. Although the data presented refers to the year before, this action had a profound effect on industry confidence and attitudes, as most of the interviews were conducted after the suspension.

Out of the estimated 108 pastoral businesses in the Katherine region, 63 were surveyed (58%). This portion of businesses accounted for approximately 676 000 cattle out of the estimated Katherine total of 1.1 m (61%), and 140 000 km^2 of land out of approximately 234 000 km^2 (60%) under pastoral management. All the surveyed businesses had a minimum of 300 adult cattle.

The surveyed properties had an average size of 2232 km^2, a median of 16 paddocks and a median paddock size of 70 km^2. Of the total surveyed area, 75% was used for grazing, 8% was classified as not productive, 8% was not yet developed and 9% was unclassified.

A considerable amount of infrastructure development was undertaken in 2009 and 2010, with 77% of properties investing in water point development and 54% subdividing paddocks. Businesses spent a median of $27/AE on capital development. Water point development and paddock subdivision remained the highest two priorities for future infrastructure development. On average, producers designed infrastructure based on a maximum grazing radius of 5 km.

The most common ownership type was owner-manager and more properties were privately owned than owned by corporate companies. However, as companies generally had larger properties in premium cattle country, they actually owned an equal land mass but more cattle than privately-owned businesses. The median length of ownership was eight years, while the median length of management was 4.5 years.

The average herd size was 10 730 head. Producer estimates indicated a 10% increase in total AEs for the region since the 2004 survey.

Furthermore, producer estimates of future carrying capacity based on development plans suggested a 22% increase in carrying capacity by 2015 and a 31% increase by 2020.

Properties were breeding for the live export market. Eighty three per cent of turnoff was destined for live export, largely feeder steers which were sold at an average of 308 kg at approximately 2 years of age. There were a moderate number of properties (32%), mostly company owned, which transferred young stock to other properties, or utilised floodplain agistment for growing out before turning off to the live export market. The 2010 enforcement of the 350 kg weight restriction to Indonesia had significant ramifications for businesses. Producers reacted by sending cull cows to interstate abattoirs at great expense and changed the management of their steers, such as weighing more frequently, selling at lighter weights before the wet season or ceasing the use of supplements or hormonal growth promotants (HGPs).

Brahman was the predominant breed with 78% of cattle being Brahman and 17% being Brahman based such as Droughtmaster or Charbray. One third of producers were undertaking some crossbreeding.

Continuous mating was the preferred strategy with 54% of producers continuously mating all females. Poor bull control was the major reason for not practising controlled mating. More heifers (45%) were control-mated than mature-age cows (12%) and heifers were commonly segregated from older cows (68% of properties). Individual identification for performance recording purposes was also most common in heifers, followed by breeders. Overall, 48% of producers recorded the performance of 23% of stock in the region and another 11% of producers planned to.

Pregnancy testing was carried out by 84% of producers, mainly on dry cows (49% of properties). Pregnancy testing of all cows was more common on smaller, privately-owned properties.

Producer estimates indicated an average weaning rate of 61% in mature-age breeders, 78% in first-calf heifers and 46% in second-calf heifers across the region. Calf loss in mature breeders was estimated at 10.5%, while mortality in mature breeders was estimated at 4.2%.

Bulls were run at an average of 4% across the region. They were largely sourced from Queensland stud breeders (45% of all bulls). However, a significant percentage of bulls were supplied through the company chain (20%) or bred on-property (19%). Producers considered temperament and structure to be the most important traits for bull selection. Across the region, 17% of bulls were purchased after examining estimated breeding values (EBVs) and 50% of bulls were semen tested prior to purchase. Few bulls were tested later during their working life.

The majority of producers (82%) carried out two rounds of mustering while 19% carried out a third round. The average mustering cost was $13/head.

The average weaning weight was 174 kg in round 1 and 140 kg in round 2. Training of weaners was common, with 84% of producers feeding weaners in the yards after weaning, 81% working through yards and 70% tailing out weaners. Nearly half of the producers (46%) segregated weaners based on weight and fed them accordingly; weaners weighing less than 100 kg were the most commonly segregated weight class.

Supplementation was carried out on 89% of properties, with 59% of cattle fed during the dry and 48% during the wet. Some properties (37%) fed all year round.

While buffalo flies and cattle ticks were the most common animal health problems, botulism and vibriosis were also a cause for concern. While 93% of livestock were vaccinated against botulism, 61% of bulls and 20% of heifers were vaccinated against vibriosis. Only 56% of producers used HGPs due mainly to a perceived lack of benefit from their use.

Producers typically assessed pasture availability frequently throughout the year and used a variety of methods to adjust stock numbers accordingly. While continuous grazing was a common grazing strategy, 70% used a combination of strategies, most commonly continuous grazing and spelling (56%).

In 2010, an estimated 11% of the surveyed area was burnt by wildfire and 75% of producers burnt another 14% for management purposes. Producers largely used fire to control grazing and reduce rank pasture (66%) and to mitigate wildfire risk (63%). While 81% of respondents had noticed an increase in woody vegetation, only 32% burnt to manage it.

Half of the properties (50%) had some areas of improved pastures, largely using low inputs where seed was broadcast into uncultivated soil to improve the diet quality in native pastures. Some producers (29%) planned to increase their improved pastures. Some were growing more intensive crops, such as hay (16%) for their own use.

Weeds were considered the major risk to environmental sustainability. Based on producer estimates, 10% of the surveyed area was affected by weeds. Most producers (85%) were controlling some or all of their weeds, with a median annual expenditure of $6500 per property on weed control. Another $3250 was spent annually to control pest animals, mainly wild dogs, which were considered a growing problem.

The surveyed properties employed 529 staff, based on cattle numbers this indicated approximately 850 people were employed on pastoral properties in the Katherine region in 2010.

The major hurdles to managing pastoral businesses were markets (24%), staff (18%), roads for access (18%) cost of production (15%), nutrition (13%) and cash flow (11%). Producers identified markets (35%), cost of production (33%) and fertility (19%) as the major issues affecting profitability.

Gulf district

The Gulf district was characterised by large properties in the early stages of infrastructure and herd development. This was seen in large paddock sizes (250 km^2), the lowest density of water points in the region and the highest infrastructure development activity. Compared with other districts, a larger percentage of properties in the Gulf were carrying out paddock subdivision (80%), water point development (80%), boundary fencing (30%) and building drafting yards (40%). Furthermore, properties in the Gulf district reported the highest capital expenditure per AE in the region ($112/AE). Producers in the Gulf district had the highest expectations of increased carrying capacity in the region in 10 years' time based on their development plans (93% increase). Interestingly, despite this early stage of development, the Gulf district had the longest median property ownership period of 16 years.

Cattle management data suggested that properties were in a herd build-up phase, and that the low level of development and difficulties with bull control (feral bulls made up an estimated 35% of total bull numbers) meant that more intensive management practices were not practical. For example, compared with other districts, a lower percentage of producers in the Gulf district were control-mating (11%), pregnancy testing (40%), supplementing (60%) or vaccinating against botulism (50%), and they had the highest proportion of Shorthorn cross cattle. Furthermore, properties in the Gulf district had among the highest mustering costs ($24/hd) and the largest area of unproductive country, with 23% of the surveyed land classified as unproductive by respondents.

Katherine/Daly district

The Katherine/Daly district represented a wide range of ownership types and property sizes. While the estimated percentage of land grazed was the highest in the region (97%), properties had a lower density of water points compared with most other districts, suggesting that there may be room for more water point development. Compared with other districts, fewer producers had carried out paddock subdivision (33%), and capital expenditure was lower ($26/AE), while paddock sizes tended to equal those in the Roper and Sturt Plateau districts, suggesting a more mature stage of infrastructure development.

Roper district

While surveyed properties in the Roper district were generally smaller (67% smaller than 1000 km^2), there was still considerable development opportunity. Producer estimates indicated that the properties had the lowest percentage of grazed land in the region (65%) and the highest percentage of land classified as 'yet to be developed' (33%). Producers also reported the second highest capital expenditure per AE, behind the Gulf district at $61/AE.

Sturt Plateau district

Properties on the Sturt Plateau were typically family owned and run, smaller in size and more intensively developed and managed compared with other districts. Of the surveyed area, 83% was grazed, while the rest was largely classified as 'yet to be developed'. The Sturt Plateau arguably had the most intensive infrastructure development, with smaller paddock sizes (50 km^2), the highest density of water points (complemented by the lowest preferred maximum grazing radius for planned infrastructure of 3 km) and the highest proportion of properties with improved pastures (70%).

Producers on the Sturt Plateau employed the lowest number of staff and appeared to be designing infrastructure to reduce labour requirements. This was seen in a higher percentage of producers investing in laneways (45%) and trap yards (20%) compared with other districts, which presumably also contributed to their comparably lower mustering costs ($11/hd).

Coupled with more intensive infrastructure was evidence of more intensive cattle management. Compared with other districts, there was a higher proportion of Sturt Plateau producers utilising EBVs when purchasing bulls (30%), segregating breeders (90%), feeding supplement (100%) breeding their own bulls (38%) and practising controlled mating (55%).

Victoria River district (VRD)

VRD properties were similar in size, but little else, to those in the Gulf. They employed the most staff, managed the largest herds and had the highest company ownership and the highest access to permanent natural waters. The self-estimated carrying capacity on VRD properties was more than double that of similarly sized Gulf properties, which reflects differences in inherent productivity and stages of development between the districts.

While infrastructure development was still occurring in the VRD, it was to a lesser degree compared with other districts. Fewer properties were carrying out paddock subdivision (35%) and the capital expenditure per AE was the lowest in the region ($16/AE), despite being the highest per property ($250 000). Estimates of changes in cattle numbers since the previous survey further reflected a later stage of development, with the VRD having the lowest reported change in cattle numbers and the only decrease (-0.4%).

Producers in the VRD appeared to have the most intensive heifer management, with a higher proportion of producers selecting heifers at pregnancy testing after joining (67%) and segregating heifers from breeders (83%) compared with other districts. They also had the smallest percentage of cattle individually identified for performance recording purposes of all districts (9%).

How the survey was conducted and considerations for using information

This survey follows the 2004 Pastoral Industry Survey. Due to the level of interest in the results of that survey, it was agreed with the industry to repeat it after five years to monitor changes.

Survey forms were sent to producers by email, mail or were hand-delivered. Most of the surveys were conducted by extension officers face to face with producers on their properties.

All of the surveyed properties had at least 300 head of cattle. Where producers managed more than one parcel of land, the survey was completed on the business unit rather than on each individual property. Out of an estimated 108 commercial stations in the Katherine region, 63 were surveyed (58%). They represent approximately 676 000 cattle out of the estimated Katherine total of 1 102 000 (61%), and 140 609 km^2 of land out of approximately 234 227 km^2 under pastoral management (60%).

Data collection began in January 2011 with an initial aim of being completed by late 2011. However, in June 2011, the live export trade to Indonesia was temporarily suspended after footage was aired on national television of cruelty to animals in some Indonesian abattoirs. Although the suspension was lifted a month later, the episode left a legacy of uncertainty and a decline in industry confidence. No survey interviews were conducted while the trade suspension was in place and the majority were carried out towards the end of 2011 and early 2012. Some interviews were conducted prior to, and some after, the trade suspension. It was decided to focus the survey questions on the 2010 calendar year (prior to the trade suspension). Data collection was completed in March 2012.

The context and timing of the survey are therefore important when considering the results, especially for those questions related to development plans and issues facing the long-term sustainability and profitability of the businesses, all of which could be affected by the change in industry confidence.

Since properties vary greatly in land area and cattle numbers, the results have been weighted to provide the most appropriate representation of the industry. Data concerned with cattle production has been weighted by the total AEs per property and data related to land management by land area, while questions about business management or staff were not weighted. Where producers were not able to provide cattle numbers, regional estimates were

used based on herd models used in the regional Beef Cooperative Research Centre templates. Total AEs were calculated for each property and were used to weight questions regarding cattle management where relevant.

Care must therefore be taken when drawing direct comparisons with the 2004 survey as those results were not weighted in any way.

Median figures, rather than averages, have been used in this report. The median of a group is the half-way point at which there are as many values above as below. It provides a better representation of the most common or typical value.

Not all properties responded to each question. The data has been summarised to reflect the number of respondents to each question, rather than to the survey overall.

Throughout this report there are many results where the percentages total more than 100%. This occurs where people have responded to more than one variable; for example, mustering in which they may have used horses, helicopters and motorbikes.

Responses collected during this survey are completely anonymous and remain the property of the producers. The database is maintained by DPIF Pastoral Production staff at Katherine Research Station. Any requests for further inspection of the data must be approved by the Executive of the Northern Territory Cattlemen's Association (NTCA).

Introduction

The pastoral industry in the Katherine region has over a million beef cattle managed by over 110 pastoral operations on over 230 000 km^2. It extends from Pine Creek north of Katherine to the Queensland border in the east, to the Western Australian border in the west and to the Tanami Desert in the south. It is an industry that is expanding, with areas of pastoral land still to be developed. Enterprises are geared towards supplying the live export market in South-East Asia. The region is not without its challenges, such as distance, inherent low productivity of native pastures, sheer size, humidity and heat during the build-up season and, last but not least, market issues.

The 2010 Pastoral Industry Survey of the Katherine region has been prepared by DPIF to assist the industry through its use as a benchmarking and planning tool. The objectives of this survey were to:

- Document the state of the cattle industry in the Katherine region to enable government and industry to better assess the benefits of past and current research projects.
- Collect information on industry needs so DPIF and other groups, such as the Industry Advisory Committees and NTCA can examine them when setting priorities for action.
- Determine the most effective ways for providing relevant information to producers in each region, and to initiate or improve communication between DPIF staff and cattle producers.
- Provide industry with up-to-date information on best management practice and to prioritise and plan for future research activities.

This report focuses on the Katherine region. Three other surveys were carried out in the other major pastoral regions of the NT, namely the Top End, the Barkly and the Alice Springs regions.. Individual reports are available for each of the three regions.

The four regional surveys are summarised in the NT-wide report.

Size

While the Katherine pastoral industry spans 230 000 km^2, the land managed by the survey participants totalled 140 609 km^2 or 61% of the total region. The region is divided into five districts (see Figure 1 below):

- **Katherine/Daly -** 7651 km^2 surveyed, 55% of the district
- **Roper -** 10 197 km^2 surveyed, 43% of the district
- **Victoria River** - 60 781 km^2 surveyed, 68% of the district
- **Sturt Plateau** - 26 151 km^2 surveyed, 68% of the district
- **Gulf -** 35 829 km^2 surveyed, 51% of the district.

Soils and vegetation

Sturt Plateau

Red earths are the most widespread soil type in this district, interspersed with yellow earths and areas of alluvial clay. Vegetation consists mainly of golden beard grass, perennial sorghum, kangaroo grass and white grass, with kerosene grass, Wanderrie grasses, wire grasses and soft spinifex on the more gravelly rises.

Roper and Gulf

These districts are characterised by large areas of soils that are shallow, coarse-textured and stony with abundant rocky outcrops. Vegetation is predominantly open woodland dominated by eucalypts, with limited areas of grasslands on alluvial plains. There are extensive areas of lancewood forests. Grasses typically found on the more productive areas used for pastoral production include golden beard grass, silky browntop, perennial sorghum, white grass, black speargrass, limestone grass and soft spinifex.

Victoria River

In the higher rainfall northern area of the VRD, the country is rugged and hilly with valleys of tropical tall grass and blue grass plains. Tall grasses include kangaroo grass, perennial sorghum, golden beard grass, bluegrass, black speargrass and white grass. In the southern area, there are larger areas of more undulating country with plains dominated by Mitchell grass and Flinders grass. Upland red country supports arid short grasses, such as limestone, kerosene and wire grasses, with soft spinifex on the rockier hills.

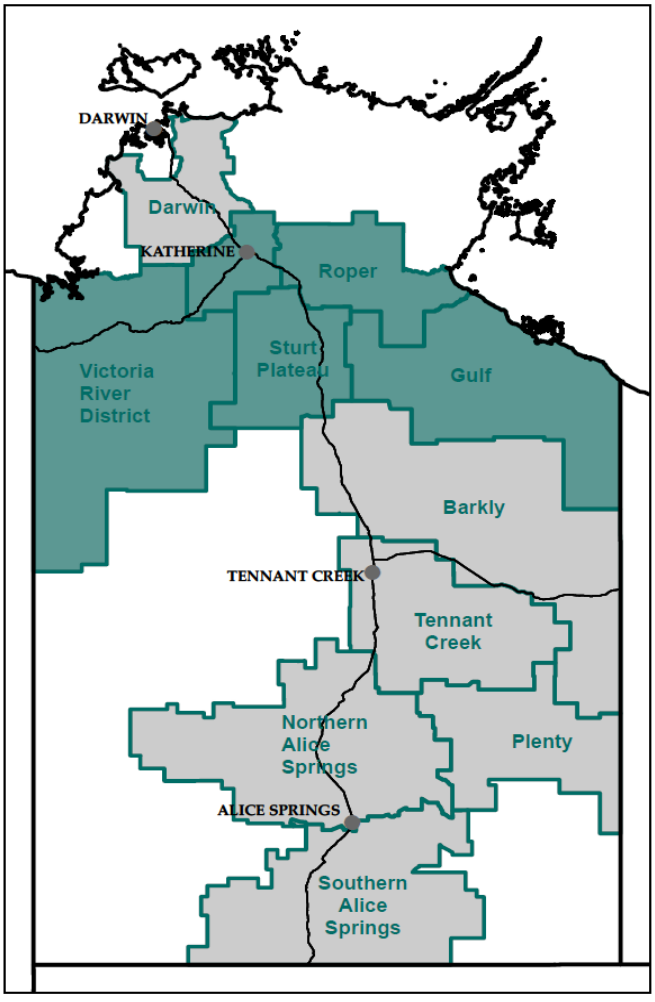


Figure 1. Regions and districts of the NT

Katherine/Daly

This area is characterised by large areas of rugged hills and ridges. The areas of greatest pastoral importance are red and yellow earths with tropical tall grasses, such as black speargrass, kangaroo grass, golden beard grass, white grass and perennial and annual sorghum.

Climate and season

While the Katherine region extends over quite a large geographical area, there are climatic and vegetation similarities which tie it together. Characterised by a semi-arid monsoonal climate and two seasons, rain falls reliably during the 'wet season' from October to April and rarely during the 'dry season' extending from May to September. There is a rainfall gradient from north to south, with an average rainfall of 979 mm at Katherine in the north to 633 mm at Limbunya Station in the southern VRD. Figure 2 shows the long-term average rainfall for the Katherine districts, with Ngukurr representing average rainfall for the Roper and Borroloola areas representing average rainfall for the Gulf. This is compared with rainfall from the 2009-10 wet season.

Figure 3 shows the monthly rainfall for the 2009-10 wet season for each district. While in 2009-10 there was a late start to the wet, it did extend out until May for most areas, with average rainfall in most parts and some out-of-season rainfall in July.

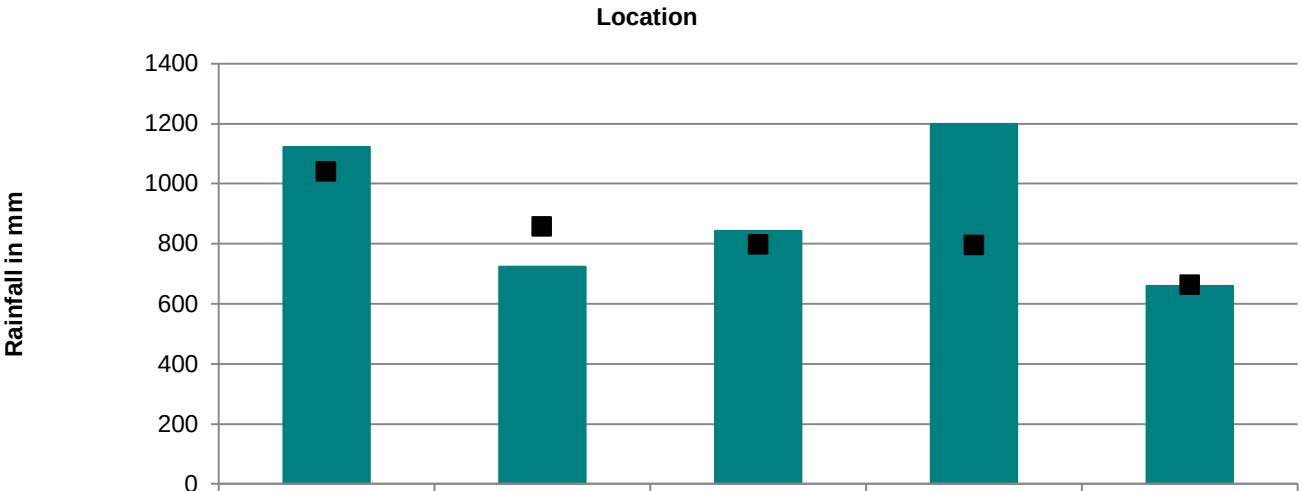
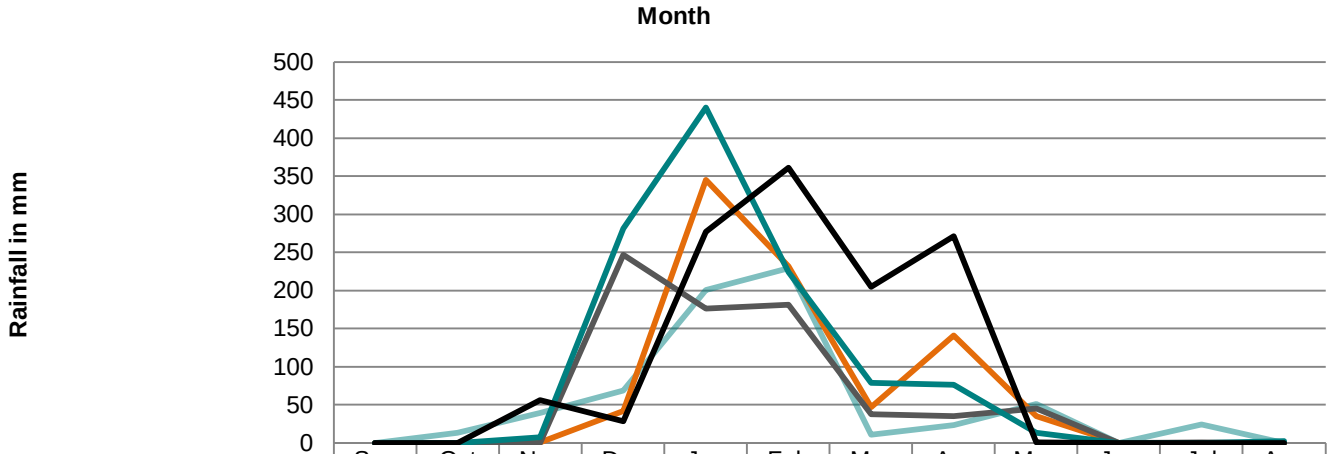


Figure 2. Average long-term annual rainfall versus the 2010 rainfall



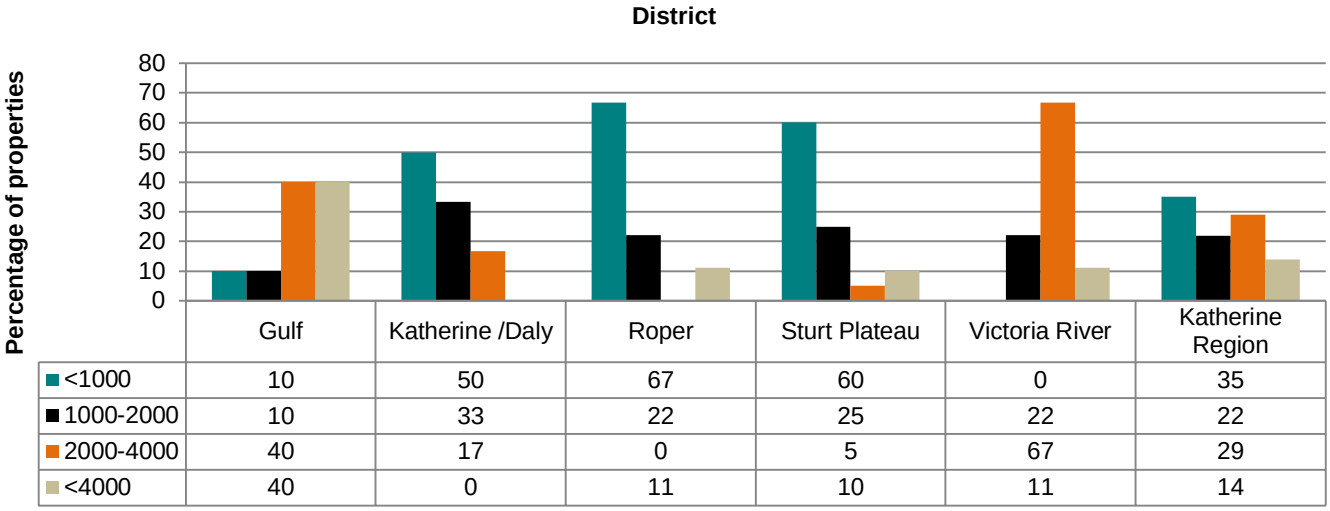
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Victoria River Downs	0	13	39	69	201	229	11	23	51	0	24	0
Ngukurr	0	0	1	42	345	232	47	141	35	0	0	0
Larrimah	0	0	0	247	176	181	38	35	45	0	0	0
Katherine	0	0	7	281	440	224	79	76	13	0	0	2
Borroloola	0	0	56	28	277	361	205	271	1	0	0	0

Figure 3. Monthly rainfall in the 2009-10 wet season

A picture of the Katherine pastoral industry in 2010

Station size

Size varied across the surveyed properties, from a minimum of 20 km^2 in the Roper district, to a maximum of 13 500 km^2 in the VRD. The average property was 2232 km^2. Larger properties were more common in the VRD and Gulf districts (Figure 4).



	Gulf	Katherine /Daly	Roper	Sturt Plateau	Victoria River	Katherine Region
<1000	10	50	67	60	0	35
1000-2000	10	33	22	25	22	22
2000-4000	40	17	0	5	67	29
<4000	40	0	11	10	11	14

Figure 4. Range in property sizes (km²)

Based on the surveyed area, 76% of the pastoral land in the Katherine region was used for grazing. This varied between districts (Table 1), with the highest percentage of grazed area in the Katherine/Daly and the lowest in the Gulf and Roper districts. The area that was not utilised for grazing in the Gulf was largely due to it being considered unproductive (23%). In comparison, unutilised land in the Sturt Plateau (14%) and Roper (33%) districts was classified as 'yet to be developed'.

Table 1. Average property size and grazed area according to district

	Gulf	Katherine/ Daly	Roper	Sturt Plateau	Victoria River	Katherine Region
Average size (km^2)	3583	1275	1133	1308	3377	2232
Average area grazed (km^2)	2196	1244	739	1105	2459	1613
Area grazed (%)	71	97	65	83	80	75
No. producers surveyed	10	6	9	20	18	63

NB: Area grazed (%) is weighted by property size, while average size and area grazed are not.

Current infrastructure

Typically, within each district the number of paddocks and size of paddocks tended to increase as property size increased; however, they varied between districts (Table 2).

Table 2. Median number of paddocks and their size

District	Median no. of paddocks	Median paddock size (km^2)	Median size of smallest paddock (km^2)	Median size of largest paddock (km^2)
Gulf	12	250	29	498
Katherine/Daly	13	53	13	117
Roper	9	44	13	89
Sturt Plateau	16	50	9	160
Victoria River	20	120	20	329
Katherine Region	16	70	15	192

NB: Holding paddocks were not included.

While the VRD and the Gulf districts had similar average property sizes, paddock size and number of paddocks were quite different, reflecting the more advanced development stage in the VRD. This was further reflected in the number of yards. The VRD had the largest number of permanent yards per property (median of five), while the Katherine/Daly had a median of two and the other districts had a median of one. Across the region, as herd size increased, so did the number of permanent yards. Herd sizes between 300 and 5000 head averaged one set of permanent yards, herds between 5000 and 15 000 head averaged three sets of permanent yards, herds between 15 000 and 20 000 head averaged four sets of yards and herds larger than 20 000 head averaged seven sets of permanent yards.

Of the properties in the Katherine region, 67% had a set of portable yards and an average of three portable yard sites. Approximately two thirds of these sites had access to water and holding paddocks and one third had some permanent yard facilities, such as a loading ramp or a crush. Portable yards were most common in the Gulf district, where 90% of the producers were using them.

In the Katherine region, 33% of producers used trap paddocks, with the highest usage being in the Sturt Plateau district where 50% of properties had a median of 14 trap paddocks each.

Producers were asked about the number of permanent natural and man-made water points they had. Generally, the number of water points increased with station size; however, the density of water points varied between districts as reflected by the grazed area per water point in Table 3. The Gulf had the lowest density of water points, once again reflecting an earlier stage of development. The Sturt Plateau had a low number of permanent natural water points and the highest density of man-made water points. A number of producers in the VRD utilised extensive permanent creeks and rivers for stock water. Rather than counting the watercourse as one water point, they assumed a 3 km grazing radius and estimated the number of 'water points' 3 km apart along the watercourse in each paddock. This is why the number of permanent natural water points appears so high in the VRD.

Table 3. Median number of natural and man-made water points

District	Median no. of permanent natural water points	Median no. of man-made water points	Grazed area per water point (km^2)
Gulf	3	10	197
Katherine/Daly	2	12	94
Roper	3	12	44
Sturt Plateau	2	36	28
Victoria River	24	58	41
Katherine Region	3	30	66

Table 4 outlines the different technology used to equip waters in the Katherine region. All producers used diesel/petrol powered pumps to equip some or all water points and many used dams. Windmills were only used on 11 properties in the VRD and Gulf districts, where the highest use of solar-powered pumps was also found. Only one producer in the VRD used an electronic monitoring system associated with their water points.

Table 4. Equipping of permanent waters in the Katherine region

Equipment	Properties (%)	Median per property	Range
Solar	32	2	1 - 5
Windmill	18	3	1 - 12
Diesel/petrol powered pump	100	8	1 - 64
Dams	75	5	1 - 37

Station improvements

The most common infrastructure developments undertaken in the Katherine region during 2009 and 2010 were water points and paddock subdivision (Table 5), with some differences between districts. Compared with other districts, a smaller percentage of properties in the VRD and the Katherine/Daly district carried out paddock subdivision, while a higher percentage of properties in the Sturt Plateau district (45%) and the VRD (29%) put in laneways. Once again reflecting an earlier stage of infrastructure development, 80% of properties in the Gulf district carried out paddock subdivision and water point development, 30% carried out boundary fencing (highest in the region) and 40% put in drafting yards (highest in the region). This was also reflected in capital development expenditure.

Table 5. Percentage of producers who carried out infrastructure development in 2009 and 2010

Infrastructure development	Properties (%)
Water point development	77
Paddock subdivision	54
Drafting yards	33
Laneways	28
Accommodation	26
Roads	25
Boundary fencing	20
Trap paddocks	15
Sheds	15
Other	7
Upgraded yards	5
Erosion control	3
Land clearing	3
Telemetry	2

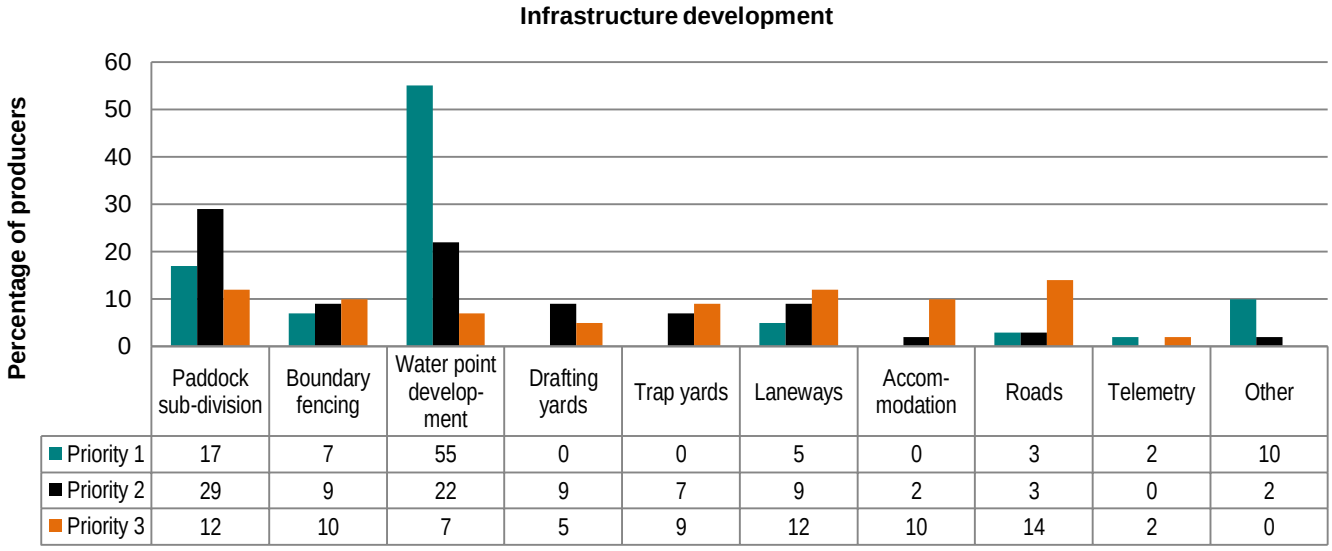
Producers were asked to provide an estimate of the cost of captial development undertaken in 2009 and 2010 (Table 6). The Gulf district had the highest capital expenditure per AE.

Table 6. Median estimates of capital development expenditure during 2009 and 2010

District	No. of responses	Median expenditure ($)	Median expenditure per AE ($/AE)
Gulf	6	205 000	112
Katherine/Daly	2	315 000	26
Roper	5	200 000	61
Sturt Plateau	13	125 200	27
Victoria River	14	250 000	16
Katherine Region	40	200 000	27

Plans for infrastructure development

Producers were asked to rank their highest three priorities for future infrastructure development. As seen in Figure 5, water point development and paddock subdivision came out as the clear priorities across the region. The Gulf and Roper districts had a higher percentage of producers listing paddock subdivision as one of their top two priorities, reflecting their younger stage of development. Other priorities included fencing repairs, erosion control, improved pasture, converting pumps to solar power and rainwater storage tanks.



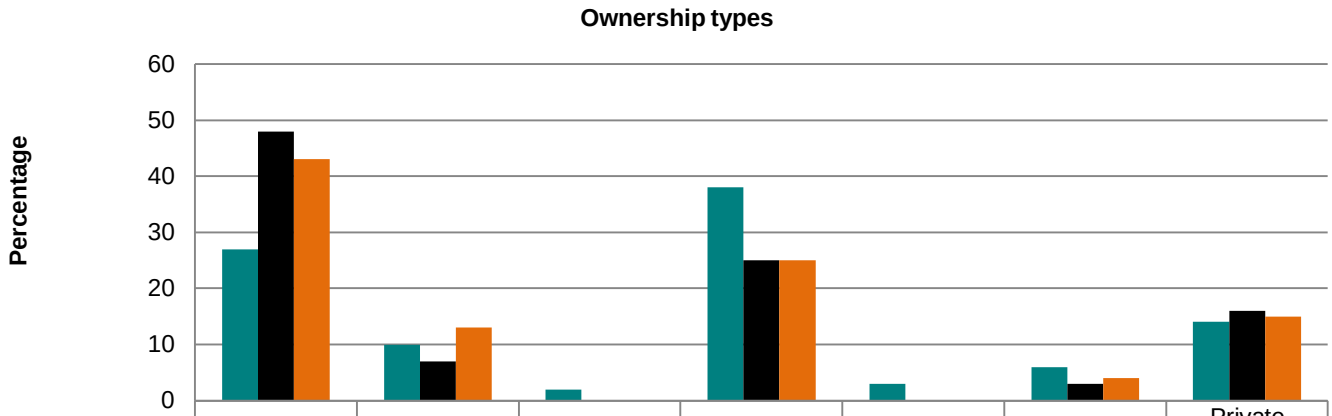
	Paddock sub-division	Boundary fencing	Water point develop-ment	Drafting yards	Trap yards	Laneways	Accom-modation	Roads	Telemetry	Other
Priority 1	17	7	55	0	0	5	0	3	2	10
Priority 2	29	9	22	9	7	9	2	3	0	2
Priority 3	12	10	7	5	9	12	10	14	2	0

Figure 5. Priorities for infrastructure development

Ownership

Management structure

There was a range of ownership types in the Katherine region, with the most common being owner-manager (that is, run by the owner) and company-manager (company-owned, employing a manager). While a greater percentage of the properties surveyed were privately-owned, companies managed an equal proportion of land and a larger proportion of cattle (Figure 6), as smaller properties were mainly privately-owned and larger properties were mainly company-owned (Table 7). The VRD had the highest percentage of company-owned properties (56%), while the Katherine/Daly (50%) and Sturt Plateau (68%) had the highest percentage of owner-managers. The Gulf and Roper districts had the highest percentage of enterprises on Indigenous-owned land.



	Company-Manager	Indigenous	Other	Owner-Manager	Private-Agistee	Private-Lessee	Private owned-Manager
Enterprises	27	10	2	38	3	6	14
Cattle	48	7	0	25	0	3	16
Land	43	13	0	25	0	4	15

Figure 6. The percentage by ownership of enterprises, cattle and land area in the Katherine region

Company-owned enterprises were generally run as an integrated production system involving transfers of cattle between properties and sharing of staff and resources, while owner-managers typically owned one property and hence ran it as a stand-alone enterprise (Table 8).

Table 7. Average property size according to ownership

Ownership	Number of properties	Average size (km^2)
Company-manager	17	3570
Indigenous-owned land	6	3020
Other	1	460
Owner-manager	24	1442
Private-agistee	2	237
Private-lessee	4	1390
Privately- owned with employed manager	9	2299

Table 8. Number of properties run as integrated versus stand-alone enterprise

Ownership	Integrated	Stand-alone
Company-manager	13	4
Indigenous-owned land	2	4
Owner-manager	4	19
Private-agistee	1	1
Private-lessee	2	2
Privately-owned with employed manager	6	5
Percentage in region	44	56

Length of ownership and management

At the time of surveying, several properties had only recently changed ownership and many company-owned properties had recently undergone a change of management. This was particularly evident in the VRD where the median number of years of management was two (Figure 7) reflecting a relatively high turnover rate in managers. The median length of ownership in the Katherine region was eight years and the median length of management was 4.5 years.

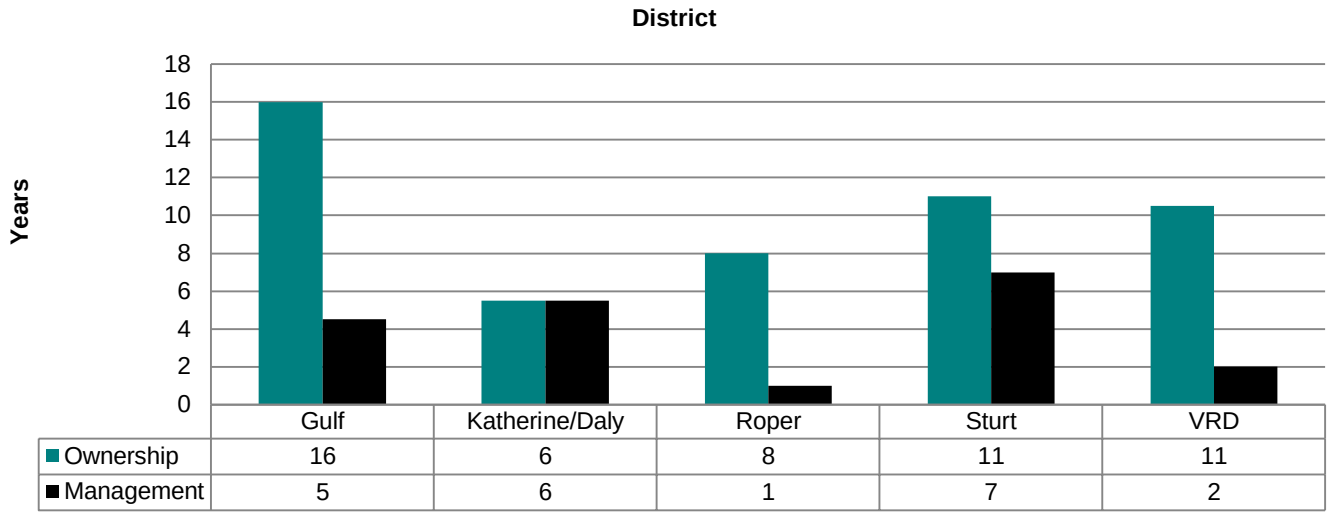


Figure 7. Median years of current ownership and management

Staff

The majority of businesses in the Katherine region employed a mixture of permanent and seasonal staff (Table 9), with 16% of properties employing permanent staff only. Smaller, privately-owned properties were more likely to hire staff for short periods during peak work times, such as mustering and processing, while larger company-owned places were more likely to employ staff for the entire dry season or on a permanent basis.

Table 9. Percentage of properties employing different types of staff and median numbers of staff employed

Staff type	No. of properties employing	Properties (%)	Median number of staff	Median number of weeks employed per year
Permanent staff	54	86	3	N/A
Seasonal contractors	12	19	4	4
Seasonal station hands	39	62	4	6
Seasonal backpackers	3	5	2	4

The number of staff employed was relative to total number of AEs (Figure 8).

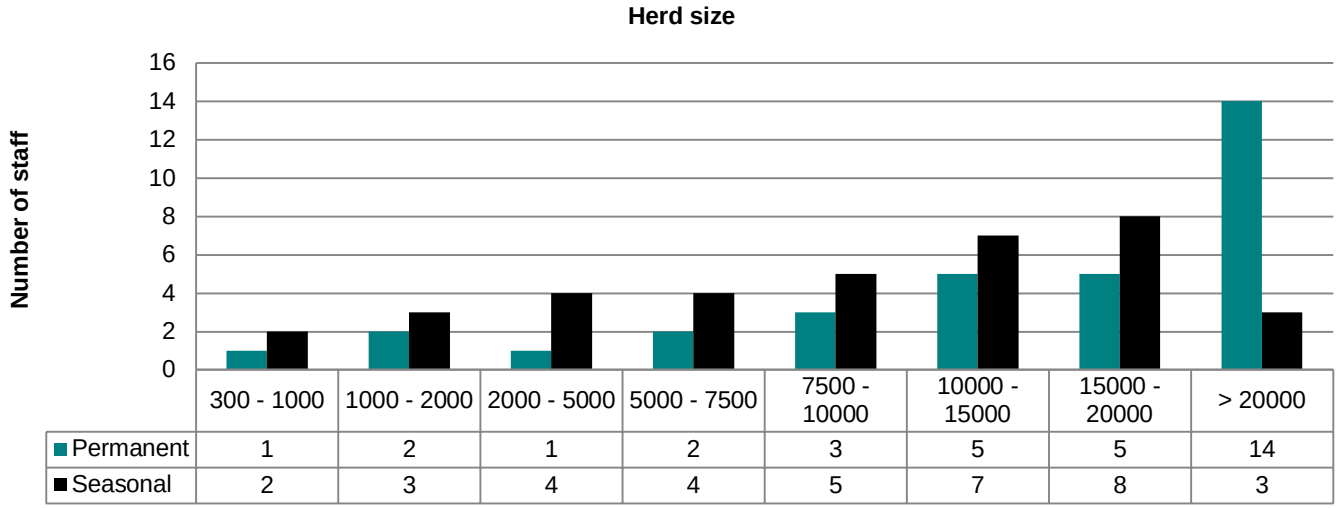


Figure 8. Average number of permanent and seasonal staff according to total animal equivalents

Properties with a manager in place (private and company) tended to employ more staff than owner-manager properties; this was shown in the Sturt Plateau district and the VRD, which are largely owner-manager and company-owned, respectively. Properties in the VRD employed the largest number of staff per property and accounted for 44% of all staff employed on the surveyed properties while the Sturt Plateau district properties employed the smallest number of staff per property (Table 10). A total of 214 permanent and 315 seasonal staff were employed by the 63 surveyed properties in 2010, this suggested that based on cattle numbers approximately 850 staff were employed in the Katherine region (having surveyed 58% of properties).

Table10. The average number of staff employed and total staff employed on surveyed properties in 2010

District	Average number of staff employed	Total permanent staff	Total seasonal staff
Gulf	9	24	69
Katherine/Daly	7	20	22
Roper	7	19	47
Sturt Plateau	5	34	61
Victoria River	13	117	116
Katherine Region	8	214	315

Number of cattle

The surveyed properties encompassed approximately 300 000 breeders and a total of 675 000 head, which represented approximately 61% of cattle in the Katherine region based on ABARE data. There was a wide range of herd sizes throughout the region and districts (Figure 9). The largest herds were found in the VRD and were company-owned. While the most common herd size in the region was between 2000 and 5000 head, 60% of producers managed herds of more than 5000 head.

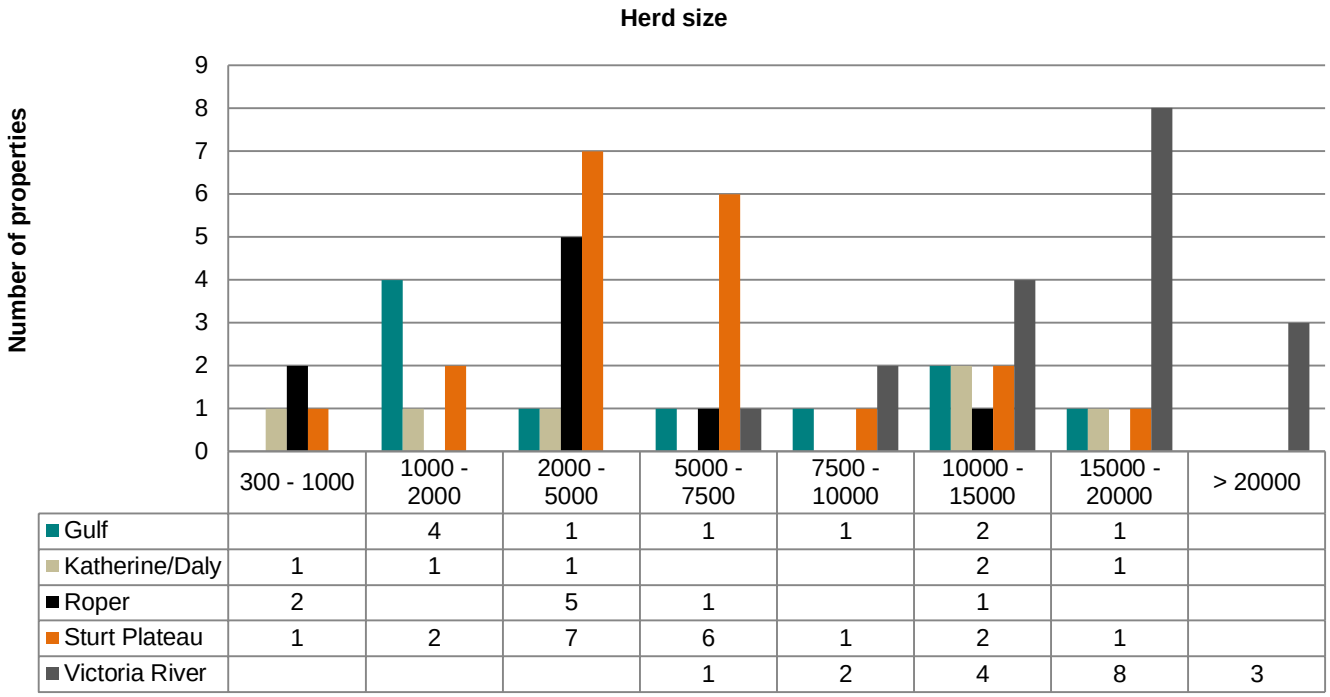


Figure 9. Number of properties with different herd sizes according to district

There was a range of herd sizes under each ownership type. Smaller herds were most commonly managed by agistees, lessees and owner-managers (Table 11).

Table 11. Median number of breeders, range and approximate total cattle numbers represented in the survey according to ownership

Ownership	Number of properties	Median number of breeders	Breeder range	Approximate total number represented in the survey
Company-manager	17	8000	2700 – 24 000	325 500
Indigenous-owned land	6	1800	800 – 10 350	48 500
Owner-manager	24	2250	300 – 10 000	168 000
Private-agistee	2	600	520 – 630	2000
Private-lessee	4	2700	425 – 4400	20 000
Privately-owned employed manager	9	4500	1670 – 12 320	111 000

Producers were asked to estimate the change in cattle numbers since 2004. A number of producers found this difficult to do as they had not been there in 2004. Most producers (80%) indicated a decrease in numbers, 38% indicated an increase in numbers and 54% did not respond as no change had occurred, or as they were unsure. Overall, the producer estimates suggested a 10% increase (approximately) in AEs in the Katherine region since 2004. Table 12 outlines the number of properties that reported changes in cattle numbers and the percentage change in overall cattle numbers for each district. The large increase in the Roper district was due to one large property having taken on a lease since 2004 and was now running 15 000 head.

Table 12. Number of producers reporting changes in cattle numbers and average percentage changes in AEs since 2004

District	Number of properties	Change AE (%)
Gulf	2	+12
Katherine/Daly	0	0
Roper	3	+94
Sturt Plateau	12	+32
Victoria River	5	-0.4
Katherine Region	22	+10

Turnoff and markets

Main types of cattle enterprises

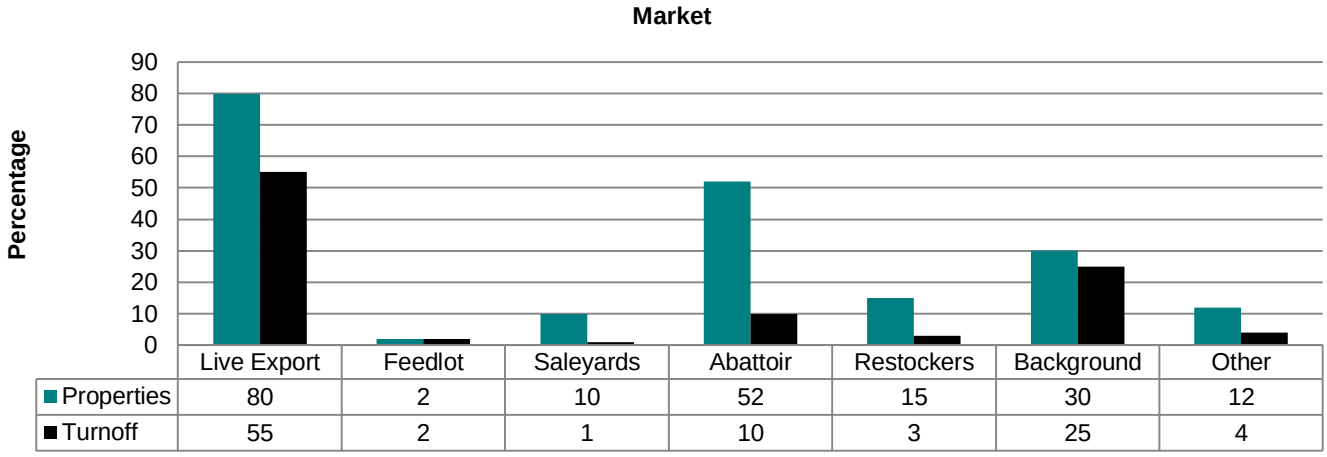
The majority of cattle enterprises in the Katherine region were geared towards breeding feeder cattle for the live export market (Table 13). However, a reasonable number of properties bred cattle and transferred or sold them for growing out elsewhere. These were typically company-owned properties sending weaners and cull cattle to inter-company fattening blocks which predominantly sold to the live export trade. Only two producers identified as predominantly operating as fattening blocks; however, seven properties grew out an average of 4299 purchased or transferred cattle in 2010 (range 34 – 15 000 head). While nine producers bred stud cattle commercially, only two identified solely as stud operations. Another two identified agistment as their major enterprise. However, altogether eight producers mostly located in the Sturt Plateau and Roper districts reported running an average of 1389 agistment cattle (range 200 - 4380).

Table 13. Percentage of cattle represented by different types of enterprises

District	Agistment	Breed for live export	Breed for slaughter	Breed and transfer for growing elsewhere	Growing out	Other
Gulf	0	42	4	49	6	0
Katherine/Daly	0	6	0	94	0	0
Roper	0	61	0	38	0	1
Sturt Plateau	7	56	7	24	0	6
Victoria River	0	68	0	22	10	0
Katherine Region	1	58	2	32	6	1

Markets

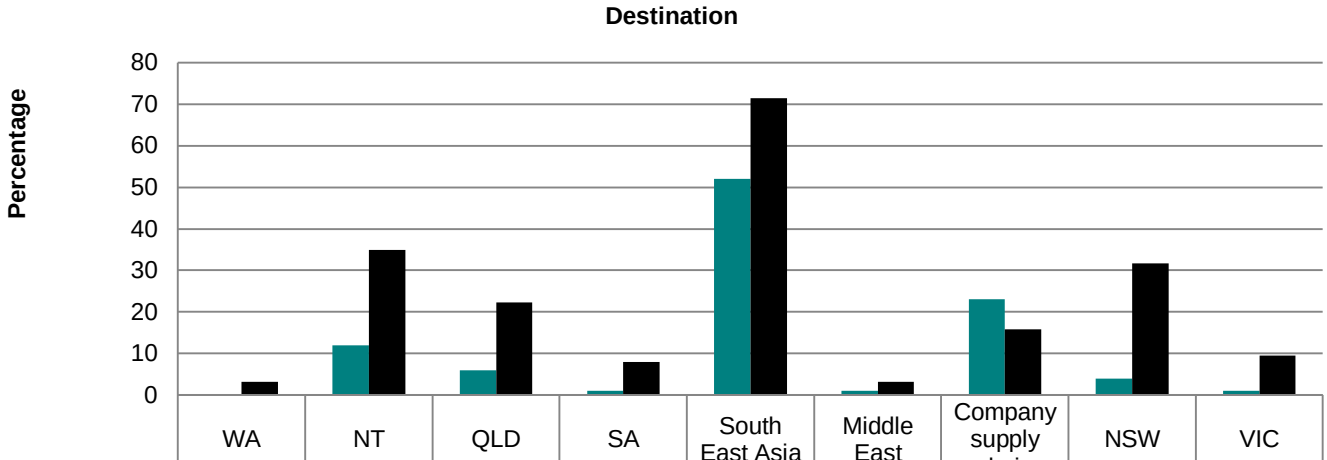
Live export was the dominant direct market, accounting for 55% of turnoff in the Katherine region (Figure 10). While abattoirs were the next most common market, they accounted for a smaller percentage of turnoff compared with backgrounders. Backgrounders commonly included inter-company properties and floodplain agistment, with these cattle typically destined for live export after growing out, bringing the total indirect turnoff to live export to 83%. Other markets included stud sales. Only one property located in the Gulf sent cattle to an interstate feedlot.



	Live Export	Feedlot	Saleyards	Abattoir	Restockers	Background	Other
Properties	80	2	10	52	15	30	12
Turnoff	55	2	1	10	3	25	4

Figure 10. Percentage of producers selling directly to different markets and percentage of sale cattle sent

The most common live export destination was South-East Asia, accounting for 52% of turnoff and 98% of cattle exported. Company supply chains were less commonly used; however, they accounted for 23% of turnoff in the region. Cattle sent to NSW, SA and VIC were destined for abattoirs.



	WA	NT	QLD	SA	South East Asia	Middle East	Company supply chain	NSW	VIC
Turnoff	0	12	6	1	52	1	23	4	1
Properties	3	35	22	8	71	3	16	32	10

Figure 11. Percentage of producers using different market destinations and percentage of cattle sent

Turnoff

While sale cattle were turned off throughout the year, most were sold during the early dry season, coinciding with the start of first round mustering (Figure 12). Interestingly, no producers reported selling cattle during January and very few during February, despite these being the months when the highest prices are typically received. This is likely due to high rainfall during these months, which makes turnoff difficult. January 2010 rainfall was particularly high, which would have prevented sales for many properties.

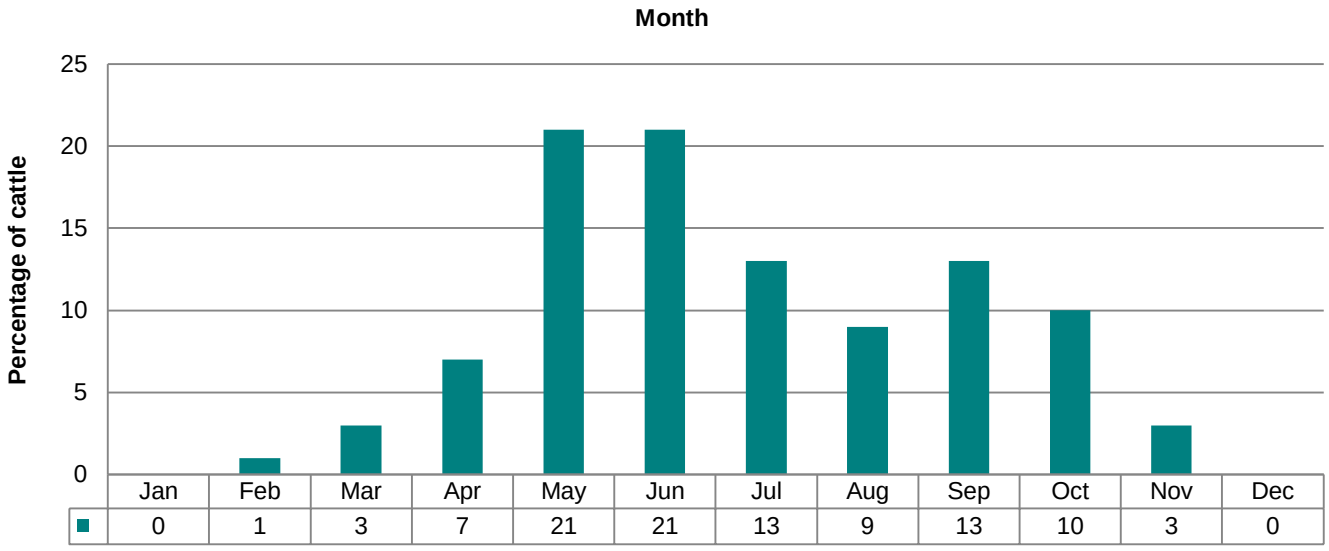


Figure 12. Major turnoff months for sale of stock

Producers were asked about their turnoff in terms of numbers sold, average weight and average age. Out of 63 respondents, 55 provided numbers, but fewer provided average weights and ages. Of the 17 properties (31%) that did not send feeder steers direct to live export, 13 were producing cattle ultimately destined for live export, but did not directly sell them to live export (six properties transferred weaners inter-company, seven sold lighter steers to NT backgrounders), one only sold stud bulls and three sold steers to Queensland. Table 14 details the turn-off figures for the Katherine region. Please note that the average number turned off per property is based only on those properties turning off that stock class.

Table 14. Average turnoff data for the Katherine region

Stock class	Turn-off in the region (%)	Properties turning off (%)	Average turn-off weight (kg)	Average turn-off age (years)	Average number turned-off per property
Between property transfer	18	16	189	1.2	3568
Bulls live export	0	5	502	5.9	24
Bulls NT	0	16	567	8.1	75
Bulls slaughter	1	35	589	8.1	89
Cow and calf	1	5		11.0	377
Cows interstate	13	31	422	8.6	854
Cows live export	2	24	413	9.3	270
Cows NT	3	15	374	8.0	757
Cows slaughter	3	20	415	9.0	463
Feeder steers live export	38	69	308	1.8	1432
Feeder steers NT	6	20	246	1.5	930
Feeder steers Queensland	3	7	243	1.0	1372
Heifers live export	13	56	299	1.8	740
Heifers NT	2	13	223	1.7	530
Heifers slaughter	1	4	403	4.6	625
Mickeys live export	0	9	322	1.7	152
Mickeys NT	0	2	296	2.5	107
Mickeys slaughter	0	2		0.5	840
Slaughter steers	0	18	466	3.8	68
Slaughter steers live export	1	15	405	2.7	326
Other	4	11	241	1.3	1030

Impact of Indonesian import restrictions

Producers were asked what strategies they used when Indonesia enforced the 350-kg weight limit restrictions in 2010 (Table 15). A range of practices was used, with the most common being selling cull cows direct to slaughter and adjusting the management of steers to ensure none went over 350 kg. Adjusting management of steers included weighing more frequently, drafting into weight ranges, agisting where wet season access was available and ceasing the use of supplement and HGPs.

Table 15. Change in management due to Indonesian 350-kg weight restrictions

Strategy	Properties (%)
Sold cull cows direct to slaughter	41
Adjusted management of steers	37
Held cull cows over	25
Held heavy steers over	17
Sold heavy steers directly to slaughter	17
Sold heavy steers to interstate saleyards	8
Sold/sent cattle to another company/property	8

Cattle management

Breed of cattle

Brahman cattle represented 78% of all cattle on the surveyed properties. Another 17% were Brahman-derived, such as Droughtmaster and Charbray. More than a third of properties had some crossbred cattle. The Gulf and Sturt Plateau districts had the lowest proportion of Brahman cattle (22% and 58%, respectively). Properties in the Gulf had a larger proportion of Shorthorn cross cattle compared with other districts. Of the Gulf properties, 40% had some Brahmans, 50% had crossbred cattle (Brahman crosses, such as Brahman X Charbray or Brahman X Droughtmaster) and one property had 100% composite cattle. The Sturt Plateau district had the highest proportion of Droughtmasters.

Breeding aims

Producers were asked to nominate their main breeding goal (Figure 13). The most common breeding goal was to select traits within a breed. Crossbreeding to increase herd performance or to suit markets was also common, which was reflected in the percentage of properties with crossbred cattle across the region. Three producers identified polledness and several producers identified early maturity and fertility as traits they wanted to improve.

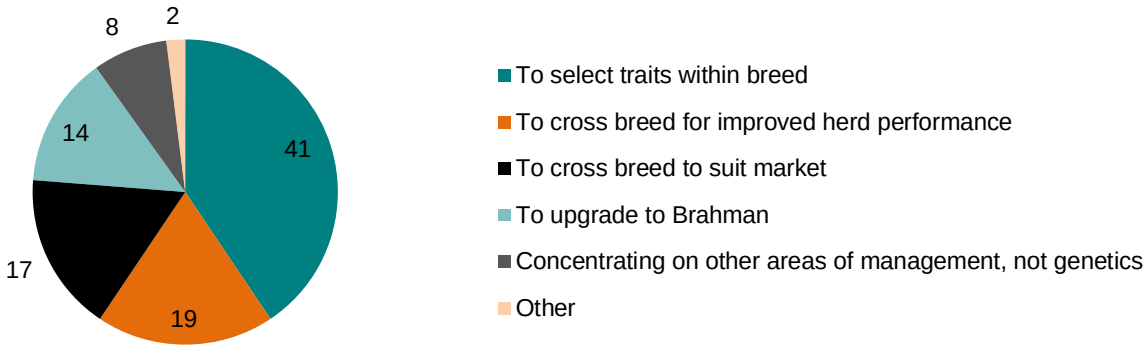
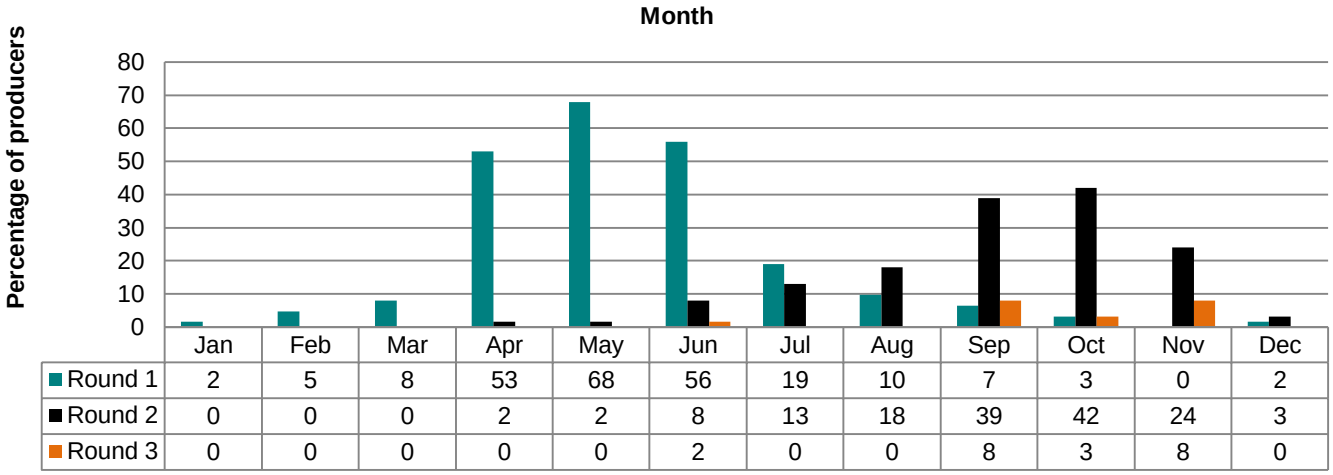


Figure 13. Main breeding aims of Katherine producers (%)

Mustering practices

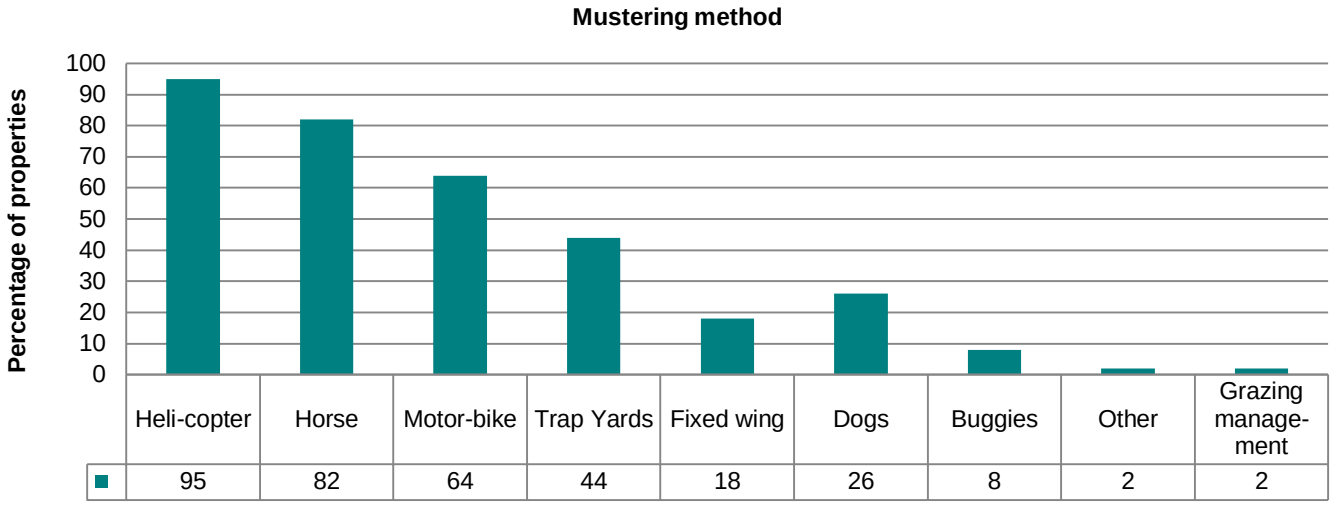
Two rounds of mustering were carried out by 82% of producers in the Katherine region and 19% carried out a third round (Figure 14). A higher proportion of producers in the Katherine/Daly and Roper districts carried out a third round compared with other districts. One round of mustering only was practised by 18% of producers. These were all privately-owned and none were from the VRD. Only one producer did one round due to controlled mating.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Round 1	2	5	8	53	68	56	19	10	7	3	0	2
Round 2	0	0	0	2	2	8	13	18	39	42	24	3
Round 3	0	0	0	0	0	2	0	0	8	3	8	0

Figure 14. Proportion of producers who carried out a first, second and third mustering round during different months of the year

Helicopters, horses and motorbikes were the most widely used mustering methods (Figure 15). The Sturt Plateau district had the highest use of trap yards, reflecting the lack of natural water points. Buggies were more commonly used in the Gulf and Roper districts where clean musters are more difficult to achieve due to plentiful natural water and rougher terrain. Two producers planned rotational grazing so that cattle were in paddocks close to yards when mustering was to be conducted.



	Heli-copter	Horse	Motor-bike	Trap Yards	Fixed wing	Dogs	Buggies	Other	Grazing manage-ment
	95	82	64	44	18	26	8	2	2

Figure 15. Mustering methods used in the Katherine region

Producers were asked to estimate their mustering costs, taking into account labour and associated machinery costs. The Sturt Plateau district had the lowest mustering costs, possibly due to a higher use of trap paddocks, a lower use of helicopters and lower staff numbers (Table 16). Owner-managers, who make up most operators in the Sturt Plateau, also had the lowest mustering costs for the region ($11/head) while private-agistors ($32/head) and company-managers ($20/head) had the highest mustering costs.

Table 16. Average mustering costs per head by district and region

District	Cost/head ($)
Gulf	24
Katherine/Daly	26
Roper	11
Sturt Plateau	10
Victoria River	12
Katherine Region	13

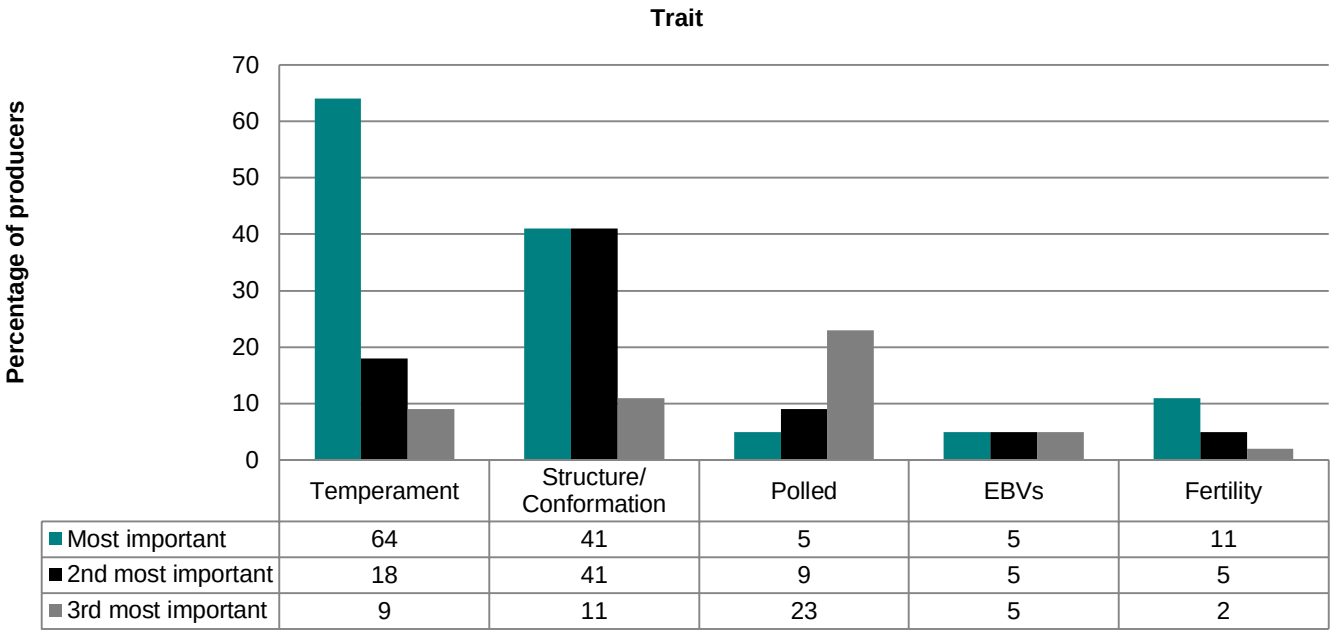
Bulls

The average bull percentage in the Katherine region was 4%. There was little variation between districts, with the lowest being in the Roper district at 3.1% and the highest being in the VRD at 4.1%. The percentage ranged from 2% to 10% across the region. Feral bulls were not generally considered a problem, except in the Gulf and Roper districts where they were estimated to make up 35% and 20% of bull numbers, respectively.

Queensland stud breeders were the most common source of bulls for the Katherine region (Figure 16). The Sturt Plateau and Roper districts, which have the highest number of studs, also had the highest proportion of home-bred bulls.

Figure 16. Percentage of bulls sourced from different locations for the Katherine region

Temperament and structure were considered the two most important traits when selecting bulls (Figure 17). Polledness also featured as a trait of increasing importance, but only after temperament and structure.



	Temperament	Structure/ Conformation	Polled	EBVs	Fertility
Most important	64	41	5	5	11
2nd most important	18	41	9	5	5
3rd most important	9	11	23	5	2

Figure 17. Importance of traits when selecting bulls

Thirteen producers, largely from the Sturt Plateau district and the VRD, reported using EBVs when selecting bulls. This equated to 17% of bulls sourced for the Katherine region being selected using EBVs. Fertility EBVs were considered the most important. Five producers have used the Northern Live Export Index and one property has used the Jap Ox Index.

Bull testing was not widespread and typically occurred prior to purchase. In the Katherine region, 7% of bulls underwent a bull breeding soundness evaluation test and 50% were semen tested in the Katherine region. The majority were tested prior to purchase, with only 8% being tested on average every 2.7 years after purchase.

Breeder management

Weaning percentage

Producers were asked to estimate the weaning rate in their mature cows, first-calf heifers and second-calf heifers. Only 43 out of 63 producers provided estimates for mature cows and only 14 provided estimates for heifers. Based on the responses, the average mature cow weaning rate for the region was 61.5%, with some variation between districts (Table 17). In heifers, the average estimated weaning rate from maiden joining was 78% and 46% from the second joining. Producers were often unable to estimate weaning rates in heifers as they did not segregate heifers from breeders and were not recording individual performance. Therefore, these rates are unlikely to accurately reflect heifer performance across the region, but reflect the performance of producers who have a higher level of heifer management.

Table 17. Average breeder weaning percentage according to district

District	Average weaning (%)	Minimum (%)	Maximum (%)
Gulf	63 (5)	50	68
Katherine/Daly	56 (4)	50	70
Roper	55 (5)	50	64
Sturt Plateau	62 (14)	45	97
Victoria River	62 (15)	46	75
Katherine Region	61 (43)	45	97

NB: Figures in brackets indicate the number of responses.

Calf loss

Producers were asked to provide estimates of calf loss between pregnancy and weaning. Many were unsure, with only 22 producers providing an estimate. The average estimated calf loss for mature breeders for the region was 10.5% and ranged from 0 to 23%.

Cull cattle

Since cull cow rates can vary from year to year based on seasonal and market changes, producers were asked to provide an estimate averaged over the previous three years. Based on 47 responses, the percentage of cows culled for the previous three years was 9%, with little difference between districts. Seven producers stated that they had not culled any breeders in the preceding three years. Cows were culled based on pregnancy diagnosis (77% of properties), temperament (61% of properties), age (60% of properties) and conformation (50% of properties). Bottle teats were also a common culling criterion. Breeders were culled on average at the age of 10.5 years (range 9 – 15 years).

Cull females are often spayed. In the Katherine region, 45% of producers spayed cull females, with some small differences between cull heifers and cull breeders (Table 18).

Table 18. The percentage of producers that spayed cull females and the percentage of cull females spayed

Cull female	Properties spaying (%)	Cull females spayed (%)
Breeders	42	38
Heifers	37	40

Pregnancy testing

Pregnancy testing was carried out on 84% of properties with dry cows being the most commonly tested class overall (Figure 18). There were some differences between districts, with the highest proportion of testing in heifers occurring in the Sturt Plateau district and the VRD. Properties in the Gulf district were least likely to be pregnancy tested and, those that did, only tested dry cows. Smaller, privately-owned properties were the most likely to test all cows.

Typically pregnancy testing was carried out by the producers themselves, particularly those leasing land or on Indigenous-owned land or it was done by a staff member. Producers in the VRD and the Katherine/Daly district, and producers agisting cattle, were most likely to use a vet to carry out pregnancy testing.

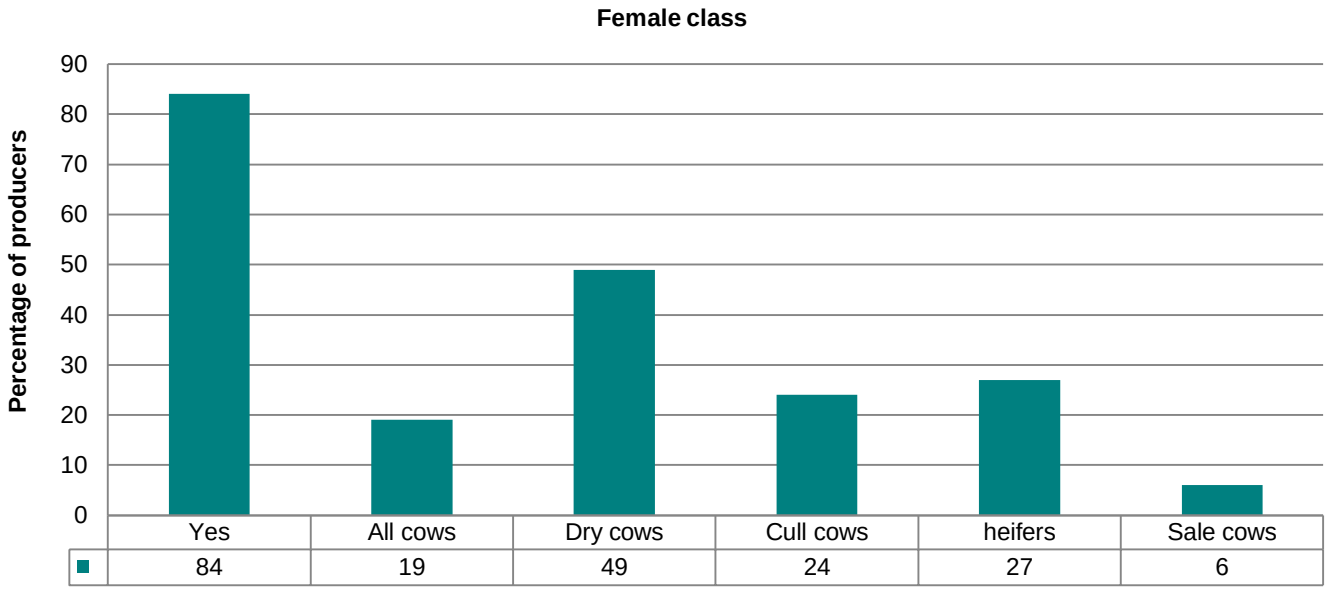


Figure 18. The percentage of producers that pregnancy-tested different classes of cattle

Segregation

In the Katherine region, 60% of producers carried out some segregation in their breeder herd. Age was a common basis for segregation (Table 19). This included segregating heifers from breeders as well as segregating by age in mature cow groups. While a few producers segregated cows into calving periods and a few planned to, segregating by pregnancy diagnosis often referred to simply segregating empty cows from pregnant cows. Segregation was most common in the Sturt Plateau district (70% of properties), as was segregating by age.

Table 19. The number of producers that carried out different types of breeder segregation

Basis of segregation	Number of producers
Age	24
Pregnancy diagnosis	14
Ownership	5
Condition	4
Colour	3
Breed	4
Lactation status	2

Herd performance recording

The National Livestock Identification System requires that all stock have an electronic identification tag for movement off the property unless they were being transported to a live export boat. Only 48% of producers individually identified stock for performance recording purposes, representing 23% of stock in the region. Eleven per-cent of producers were not currently identifying any stock for management purposes, but planned to, and another 10% which were already identifying stock, planned to identify more (Table 20).

Table 20. The percentage of producers at various stages of herd performance recording

Stage of herd performance recording	Producers (%)
None currently, but plan to	11
None currently, none planned	41
Currently recording, plan to do more	10
Currently recording, no more planned	38

There were some differences between districts as demonstrated in Figure 19. A combination of visual tags, electronic identification devices (EIDs) or both were used, with the latter being most common. Private enterprises had the highest proportion of cattle identified, while enterprises on Indigenous- owned land had the lowest.

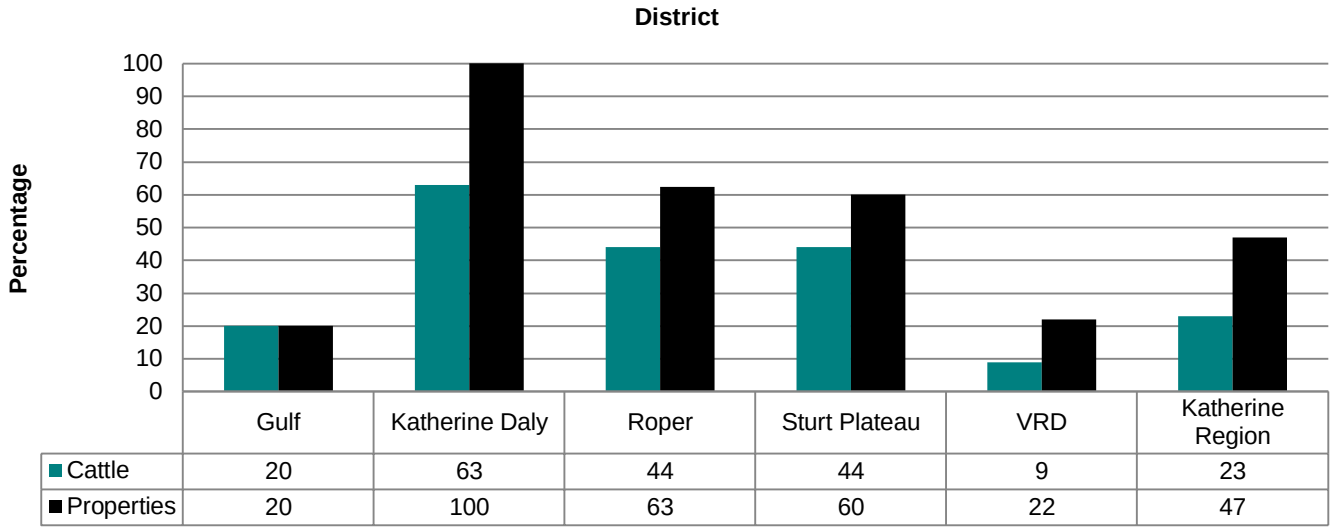
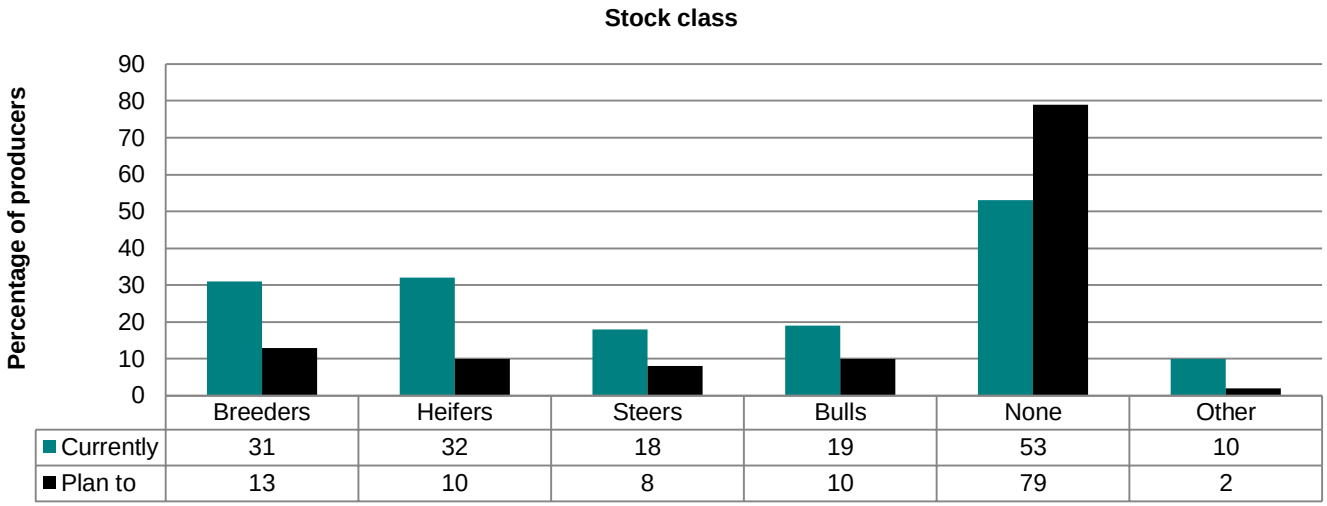


Figure 19. The percentage of producers individually identifying stock and percentage of stock identified

Some producers only identified and recorded a portion of stock, with breeders and heifers being the most commonly recorded class of stock as seen in Figure 20. Sixteen producers out of the 29 that were identifying stock tagged 100% of stock, of which eight were from the Sturt Plateau. The most commonly recorded traits were pregnancy status (36% of properties), age (35%), lactation status (30%) and weight (17%). Other traits recorded in commercial studs and nucleus bull breeding herds included parentage, date of birth, temperament and horns. Three producers recorded an extensive list of traits, including a range of conformation traits, udder scores and semen evaluation.



	Breeders	Heifers	Steers	Bulls	None	Other
Currently	31	32	18	19	53	10
Plan to	13	10	8	10	79	2

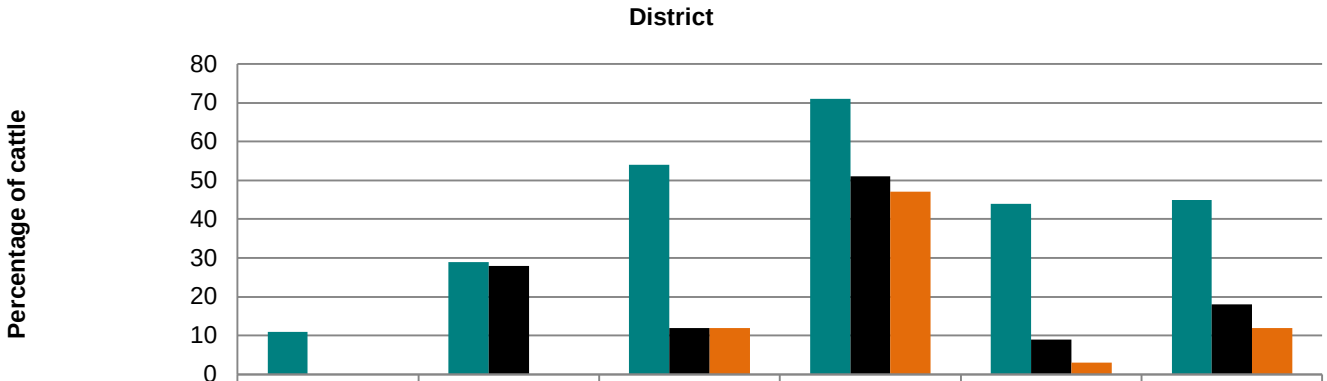
Figure 20. The percentage of producers currently and planning to individually identify different classes of stock for management purposes

Artificial insemination (AI) or embryo transfer

Only three producers carried out AI and one of them also utilised embryo transfer technology. All three producers were breeding stud cattle.

Continuous or controlled mating

Most producers continuously mated the majority of their breeding cattle, with 64% continuously mating all females. Heifers were the most likely class to be control-mated. Based on the survey responses, 45% of maiden heifers, 18% of first-calf heifers and 12% of mature breeders in the Katherine region were control-mated. On the Sturt Plateau, where bull control is easier to achieve due to smaller paddocks, accessible terrain and controlled water points, the largest percentage of producers carried out controlled mating. In comparison, in the Gulf district, which features some inaccessible terrain, large paddocks and abundant surface water, controlled mating was practised the least (Figure 21).



	Gulf	Katherine/ Daly	Roper	Sturt Plateau	VRD	Katherine Region
Maiden heifers	11	29	54	71	44	45
First calf heifers	0	28	12	51	9	18
Breeders	0	0	12	47	3	12

Figure 21. The proportion of maiden heifers, first-calf heifers and breeders under controlled mating

The percentage of producers carrying out some controlled mating is presented in Table 21.

Table 21. The percentage of producers carrying out some controlled mating

District	Producers (%)
Gulf	11
Katherine/Daly	17
Roper	43
Sturt Plateau	56
Victoria River	33
Katherine Region	36

Table 22. The proportion of producers that put bulls in and pulled them out during different months

Month bulls put in	Maiden heifers		First calf heifers	
	In (%)	Out (%)	In (%)	Out (%)
November	3		3	
December	12		7	2
January	10		7	
February	7		7	
March		3		
April	3	3		
May		15		3
June		5		10
July		3		3
August				2
September		3		3
October				
Stay in		22		

Producers who control-mated mature-age breeders did so for an average of 4.8 months (range three to eight months) with differences in timing. Bulls were put out with breeders in December (three properties), January (four properties) and February (four properties) and pulled out in April (one property), May (four properties), June (three properties), July (one property) and August (two properties). Table 22 shows the proportion of producers putting bulls in with heifers and pulling bulls out at different times of the year. Of the producers that stated they control-mated heifers, 22% were only controlling the start of joining as bulls were not removed once they were put in.

The major reason for not using controlled mating in the VRD, Gulf, Katherine/Daly and Roper districts was poor bull control. Sturt Plateau producers also believed that they had insufficient paddocks and that the results did not justify the effort. Other reasons included paddock security, poor wet season access to put bulls out and increased injuries when bulls were run together. One producer commented that he had continuously mated in the past as he did not realise the effect that out of season calving had on breeders. Another producer said that they use pregnancy testing to identify cows that will calve at the desired time of year instead of using controlled mating.

Mortality rates

Producers were asked to estimate mortality rates in different classes of stock, which is often difficult on extensive pastoral enterprises. Table 23 shows the estimated mortality rates and number of producers that provided responses. Mortality in breeders was estimated the highest in the Gulf (5.7%), Roper (5.6%) and Sturt Plateau (4.9%) districts and the lowest in the Katherine/Daly (4.4%) and Victoria River districts (3.3%).

Table 23. Average estimated mortality rates in different stock classes

Stock class	Mortality (%)	No. of responses
Weaner heifers	3.8	34
Weaner steers	4.1	34
Steers	3.3	30
First calf heifers	3.7	34
Second calf heifers	4.2	34
Breeders	4.2	45
Old cows	5.5	33

Heifer management

Averaged over 2009 and 2010, 58% of heifers were kept as replacements in the Katherine region, with some differences between districts as seen in Table 24. Higher percentages were kept on Indigenous-owned land (95%), by agistees (84%) and lessees (75%), reflecting that they were in an earlier herd development stage and were still building up herd numbers.

Table 24. Average percentage of heifers kept during 2009 and 2010 according to district

District	Heifers kept (%)
Gulf	54
Katherine/Daly	59
Roper	66
Sturt Plateau	65
Victoria River	54
Katherine Region	58

Most producers made selection decisions on heifers at multiple stages during their life (Figure 22). Six producers kept all heifers. Sturt Plateau producers were the least likely to select at weaning, while Gulf producers were the most likely. Furthermore, Sturt Plateau producers largely selected heifers prior to joining, while VRD producers mostly selected heifers prior to joining and at pregnancy testing after joining. A higher proportion of VRD producers selected heifers after joining compared with other districts.

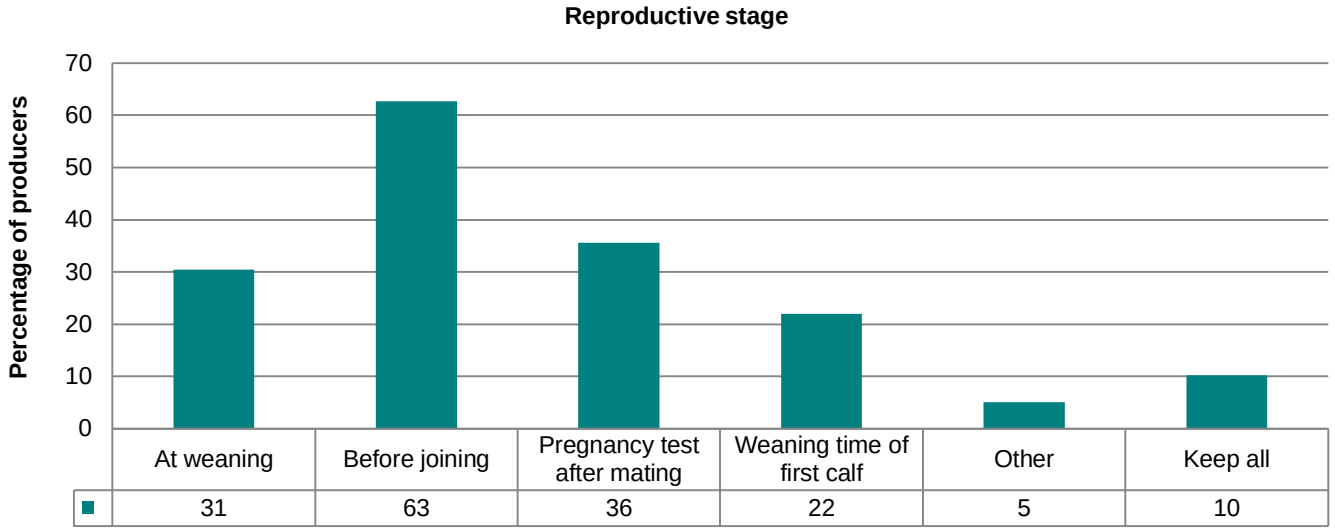


Figure 22. The proportion of producers that selected heifers at different reproductive stages in the Katherine region

Producers were asked to rate the importance of various traits when selecting replacement heifers on a scale of 1-5 (where one is not important and five is very important) (Table 25). Conformation, temperament and type were considered the most important traits.

Table 25. Average rating of importance of traits when selecting heifers

Trait	Average rating
Conformation	4.5
Temperament	4.5
Type	4.4
Weight	4.0
Fertility	3.7
Colour	2.7
Polled	2.5

A large majority of producers aimed to join heifers at two years old. However, due to continuous mating, there is a range of ages and weights within a year group of heifers on any property. This is reflected in Figure 23 which shows the percentage of heifers joined at different ages in the Katherine region based on producer estimates. One producer in the Roper district joined heifers as yearlings and two producers on the Sturt Plateau were considering joining heifers at three years old, for different reasons. One producer believed that their heifers needed to be more physically mature to avoid added nutritional demands on a growing body, while another producer had noticed that his heifers were reaching puberty at later ages and heavier weights, which was leading to decreasing pregnancy rates in his two-year-old joined heifers.

Producers were also asked to estimate the percentage of their heifers that fell into different weight ranges at joining. Figure 24 shows the percentage of heifers joined at different weight ranges in the Katherine region.

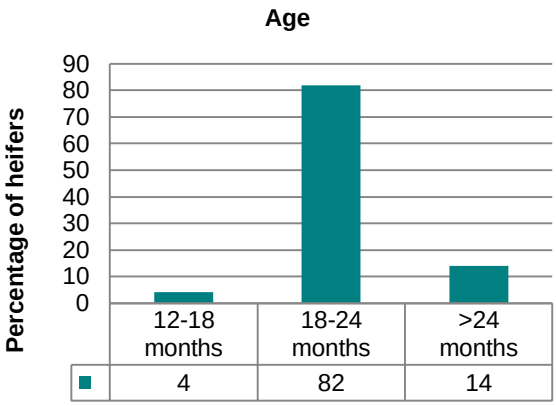


Figure 23. The percentage of heifers joined at different weight ranges

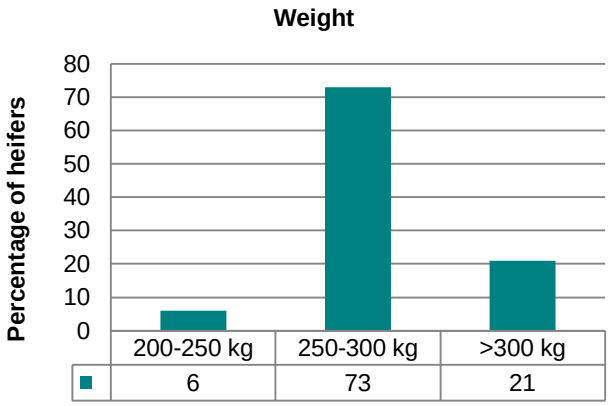


Figure 24. The percentage of heifers joined at different weight ranges

Some producers (44%) weighed their heifers at some stage prior to joining, 34% weighed just before joining, 15% weighed at weaning and 5% weighed at 12 to 18 months of age. Significantly more company-owned properties weighed heifers compared with other ownership types.

In the Katherine region, 68% of producers segregated heifers from breeders, representing 82% of heifers in the region. In general, larger properties were more likely to segregate than smaller properties, with the most common reason for not segregating being not enough paddocks (nine producers). Three producers did not believe that the benefits of segregating heifers outweighed the extra effort to implement it and another two believed that it required too much labour. The highest proportion of properties that segregated was in the VRD, where only three producers did not segregate. The Sturt Plateau had the lowest proportion of segregated heifers (Figure 25) and the major reason given was not having enough paddocks to run heifers separately from breeders.

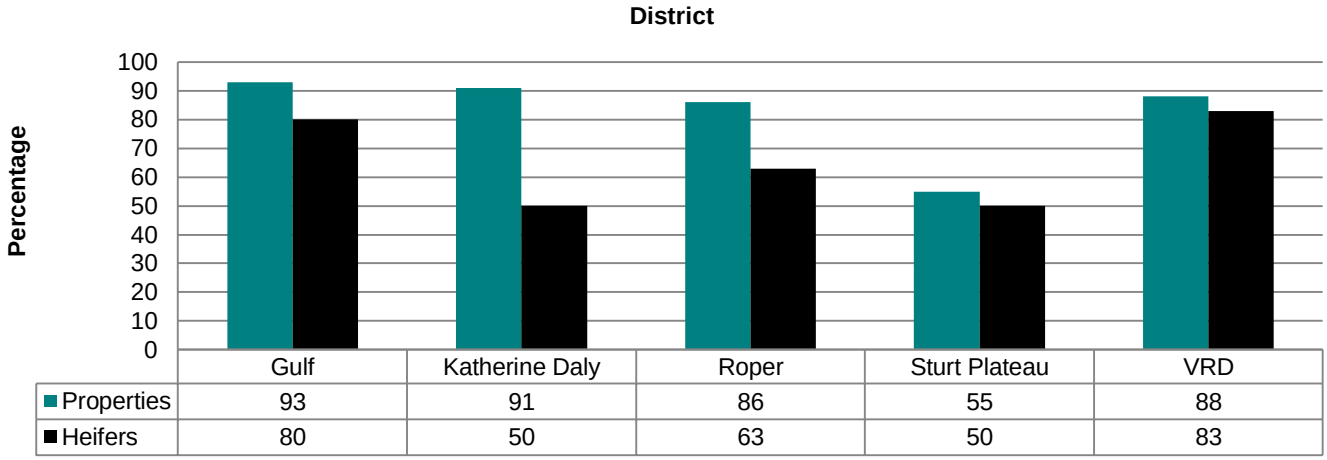


Figure 25. The percentages of heifers segregated and the percentage of properties that segregated heifers

Heifers were most commonly segregated until after weaning of their first calf or until the start of second joining. The percentage of heifers in the Katherine region under different types of segregation is detailed in Table 26.

Table 26. The percentage of heifers in the Katherine region that were segregated until different reproductive stages

Age kept segregated until	Properties (%)	Heifers (%)
Not segregated	32	18
Preg-test after first joining	3	2
Until start of second joining	20	22
After weaning of first calf	25	33
Until weaning of second calf	5	8
For life	7	8
Other	8	9

Producers in the region preferred to mate heifers to young bulls (less than three years old).

In all districts except the Gulf, the condition of the heifers was considered the most important factor influencing when producers decided to wean off calves from them. In the Gulf district, mustering practices and access to heifers were the chief determinants of when weaning occurred.

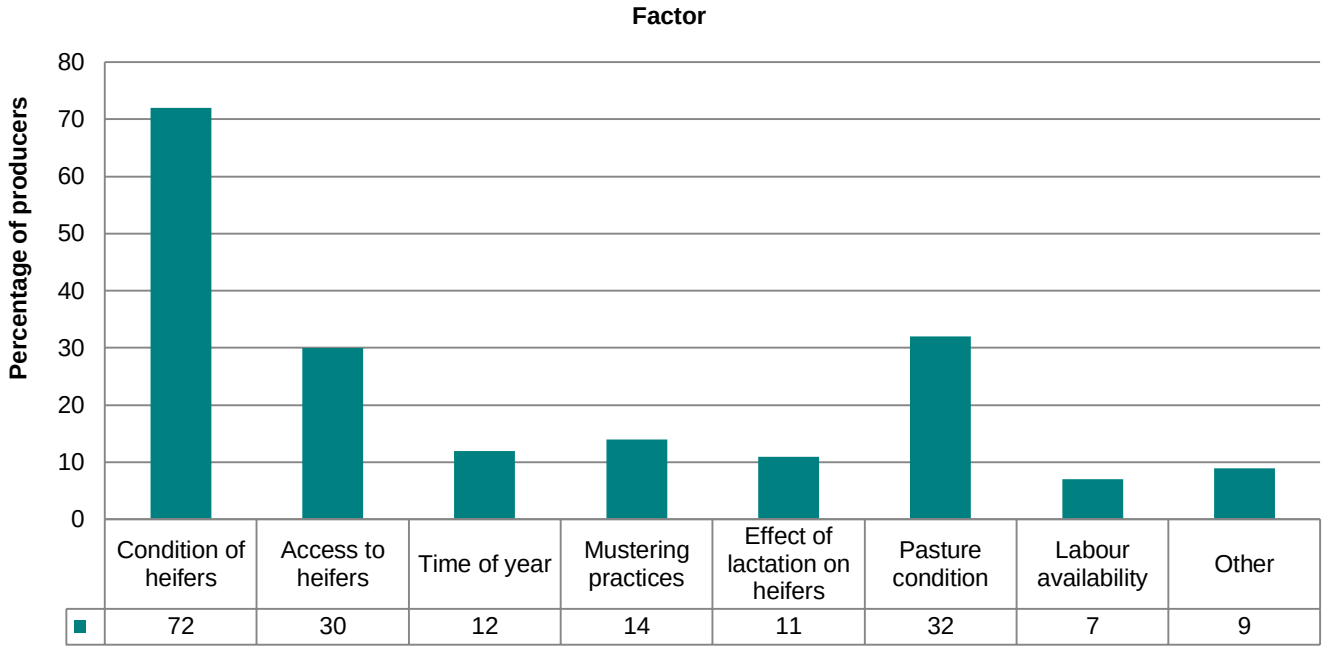


Figure 26. Factors influencing when to wean calves off heifers

Producers were asked what was the most important factor that affected the reproductive performance of heifers. Figure 27 shows the percentage of producers who rated different factors as the most important in maiden and first-calf heifers. Weight was considered the most important in maiden heifers, while plane of nutrition and body condition were considered the most important in first-calf heifers.

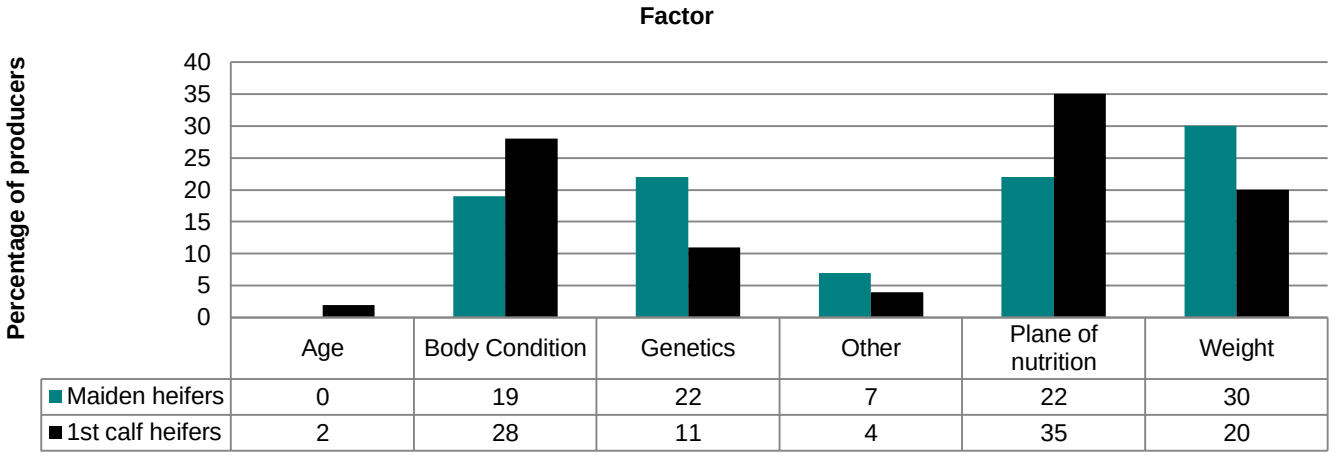


Figure 27. The percentage of producers that chose different factors as most important in affecting fertility in heifers

Management of young stock

Weaning

All properties except one (in the Gulf) indicated that they weaned their calves. A large majority of producers made decisions about when to wean based on the season and breeder condition, although some weaned down to a set weight or age regardless of conditions. The minimum weight that producers weaned down to varied with time of year, seasonal conditions and by district as shown in Table 27.

Table 27. Average minimum weaning weight

District	First round (kg)	Second round (kg)	In a bad year (kg)
Gulf	110	110	83
Katherine/Daly	121	82	63
Roper	107	89	73
Sturt Plateau	121	100	89
Victoria River	137	108	87
Katherine Region	129	103	85

The average estimated weaning weight for first and second rounds was typically higher in the first round (Figure 28); however, not all properties did a second round and therefore did not provide a weaning weight. It is unusual that the Gulf had a heavy second round weaning weight; this was because three out of the seven producers that responded only did one round of mustering and weaned lighter than the producers who did two rounds. The average weaning weight for these three properties was 70 kg, while for those that did two rounds the average weaning weight was 177 kg in round one and 140 kg in round two.

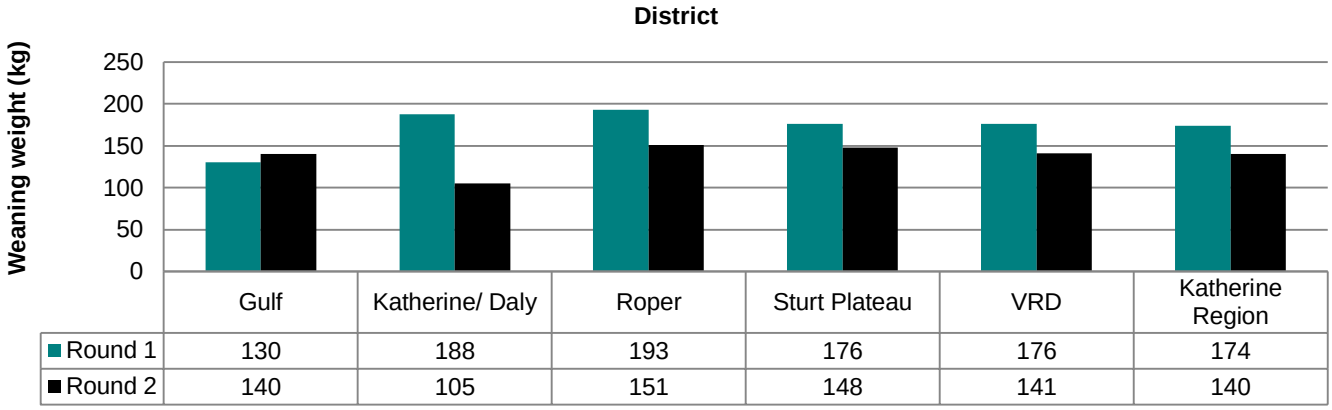


Figure 28. Average weaning weights in the first and second round

The weaning process typically involved a range of training activities and feeding management (Figure 29). Most commonly, weaners were fed in the yards for an average of five days (range one day to three weeks), worked through the yards over three days (range one day to two weeks) and tailed out over four days (range one day to two weeks). Tailing out was least common in the VRD.

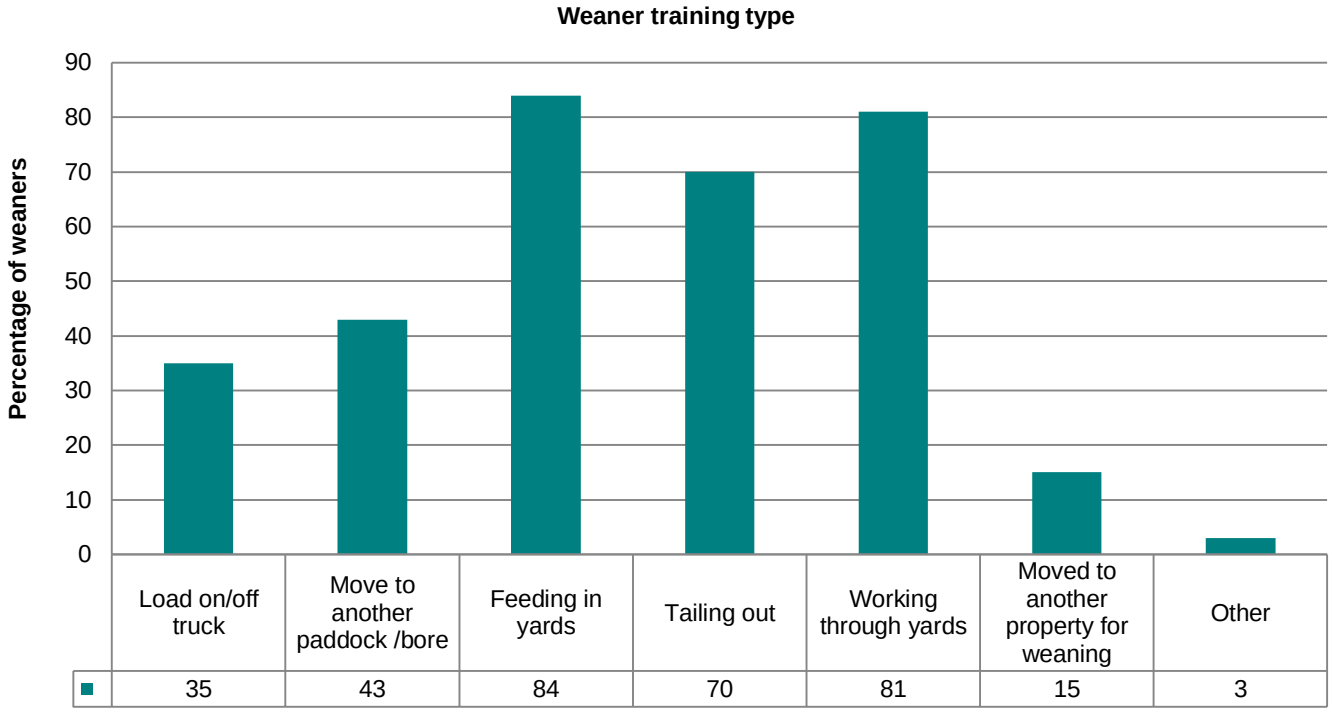


Figure 29. Percentage of weaners undergoing different weaner training

Most producers employed feeding strategies for weaners, which were typically more intensive during the weaning and training process and less so afterwards. Typically, weaners were fed hay in the yards during weaning then put out onto spelled pasture and fed a tailored, urea-based supplement throughout the dry season. Twenty nine producers representing 54% of weaners in the region segregated weaners based on weight and fed them accordingly. The most commonly segregated weaner class was less than 100 kg (43% of producers), while some producers segregated 100 to 150 kg weaners (16%). Table 28 shows the proportion of producers who carry out different feeding strategies for the different classes of weaners, while Table 29 shows the different feedstuffs fed.

Those who segregated usually fed lighter weaners pellets in the yards or in smaller nearby paddocks. Producers who fed all weaners or heavier classes of weaners throughout the dry season, typically fed a urea-based supplement.

Table 28. Percentage of producers using different feeding strategies for different classes of weaners

Feeding strategy	All (%)	< 100 kg (%)	100-150 kg (%)
Feeding throughout the dry season	49	8	2
Feeding to target weight	5	25	11
Put on spelled pasture	49	3	0
Short-term feeding in yards with concentrate	11	16	3
Short-term feeding in yards with hay	90	3	0
Other	7	3	2

Other feeding strategies included putting heifer weaners into better nutrition paddocks and sending lighter weaners to another property for growing out.

Table 29. Percentage of producers feeding various feedstuffs to different weight classes of weaners

Feedstuff	All (%)	< 100 kg (%)	100-150 kg (%)
Copra	8	10	2
Cottonseed meal	5	8	3
Grass hay	28	3	2
Legume hay	25	5	3
Legume/grass hay	10	3	2
Native/rangeland hay	22	2	2
Weaner pellets	8	30	10
Dry season supplement	36	5	5
Other*	7	5	0

*Other feedstuffs included grain mix, mineral supplement, liquid mineral supplement, mash, calf pellets and molasses. One property used a Friesian cow to rear poddy calves.

Year branding

The calendar year was used for year branding 54% of animals and the financial year was used for branding 40% of animals. Another three properties (6% of stock) did not year brand. Financial year branding often meant branding second round weaners with the following year number - that is from August onwards. This was most common on owner-manager properties in the Sturt Plateau and company-owned properties in the VRD.

Nutritional management

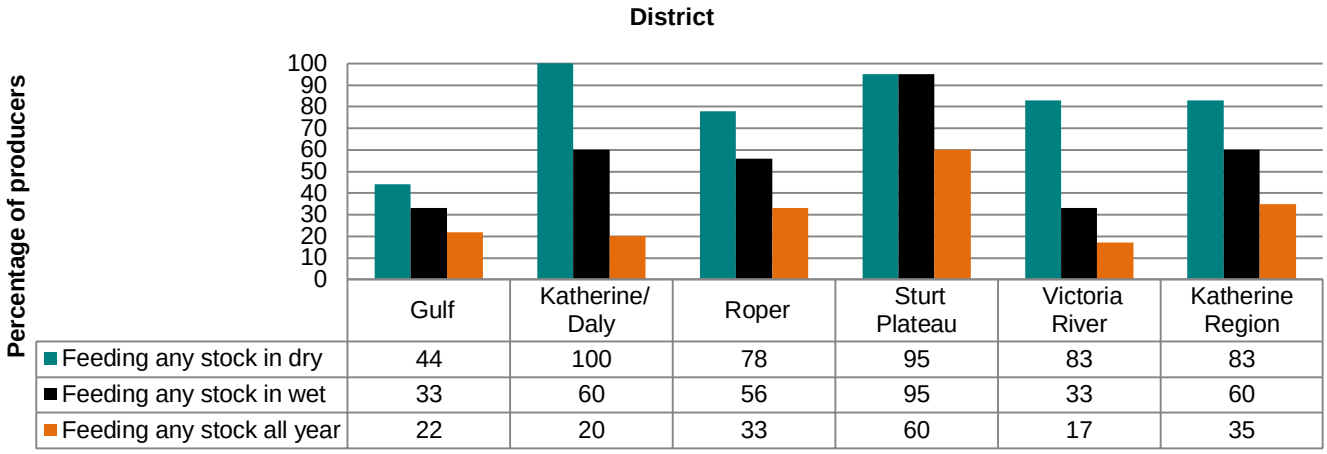
Supplementation

Supplementation was carried out on 89% of properties in the Katherine region (Table 30).

Table 30. Proportion of producers using supplements

District	Producers (%)
Gulf	60
Katherine/Daly	100
Roper	88
Sturt Plateau	100
Victoria River	89
Katherine Region	89

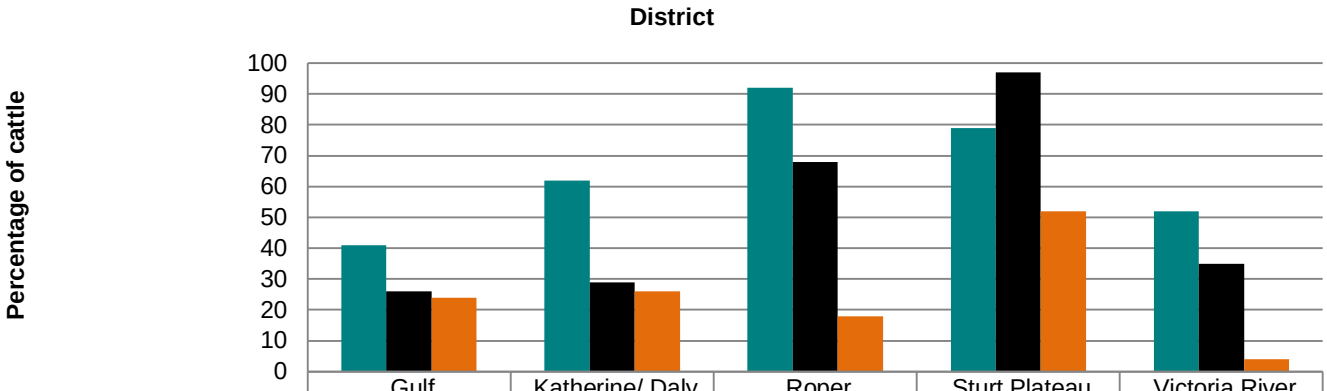
There was a wide range of supplementation strategies, with different producers supplementing different stock classes over different periods of the year. Eighty three per cent of producers supplemented at least one class of stock during the dry and 60% supplemented at least one class of stock during the wet. Twenty eight per cent of producers fed supplement all year to all stock, 3% fed breeders all year and one producer fed their breeding heifers all year. Producers on the Sturt Plateau carried out the highest amount of supplementation in the region (Figure 30).



	Gulf	Katherine/ Daly	Roper	Sturt Plateau	Victoria River	Katherine Region
Feeding any stock in dry	44	100	78	95	83	83
Feeding any stock in wet	33	60	56	95	33	60
Feeding any stock all year	22	20	33	60	17	35

Figure 30. Percentage of producers carrying out various supplementation strategies

The percentage of cattle supplemented differed from the percentage of producers supplementing, as seen in Figure 31. Overall, for the surveyed properties, 18% of cattle were supplemented all year. Including the year round supplemented stock, 59% of stock on the surveyed properties were supplemented during the dry season and 48% during the wet season.



	Gulf	Katherine/ Daly	Roper	Sturt Plateau	Victoria River
Supplemented in dry	41	62	92	79	52
Supplemented in wet	26	29	68	97	35
Supplemented all year	24	26	18	52	4

Figure 31. Percentage of cattle supplemented at different times of the year

Table 31 shows some of the broad supplementation strategies that Katherine producers used and looks at what percentage of producers were only supplementing at certain times of the year. While 83% of producers did some dry season supplementation, 27% actually only supplemented in the dry season.

Table 31. The percentage of producers carrying out various broad supplementation strategies

Broad supplementation strategy	Producers (%)
Only supplementing in dry season	27
Only supplementing in wet season	3
Only supplementing year round	28
Dry and wet season supplementation, but not all year	22
Supplement all year for some stock and part of the year for other stock	7
None	11
Unstated	2

During the dry season, producers were most likely to either supplement all stock or just supplement breeders and/or weaners. Some started supplementing early in the dry season while others did not start until very late in the dry season, but typically all fed supplements until the first storms (Table 32).

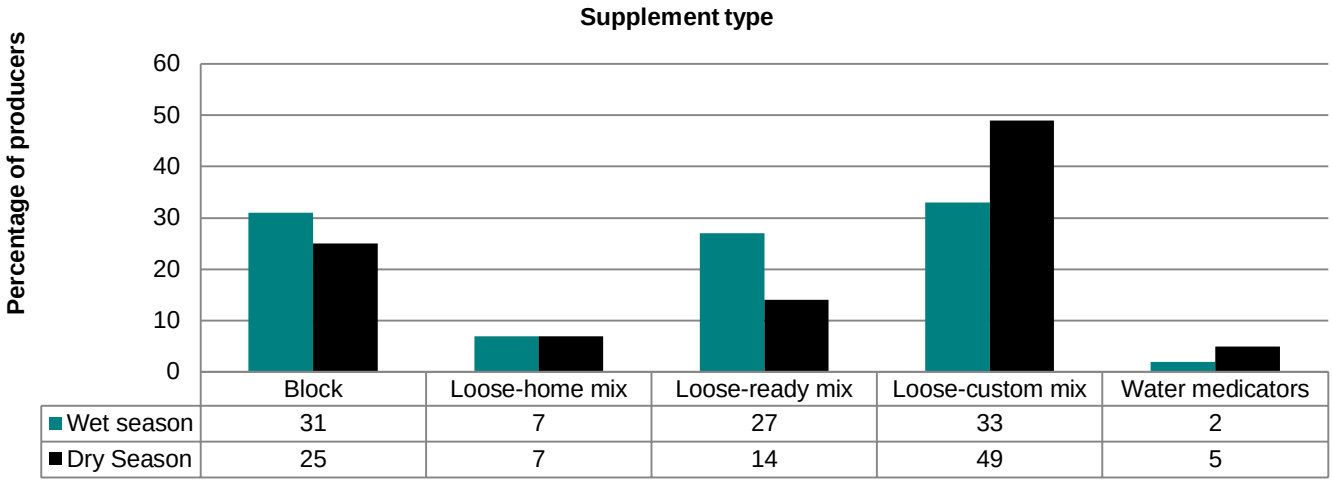
Table 32. Months during which producers started to feed a dry season supplement

Month start	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Number of producers	2	5	10	10	8	8	3	1

While a high percentage of producers fed a wet season supplement to breeders, sale steers were the most supplemented stock class across the region as several larger properties provided wet season licks to steers. Most producers started providing a wet season supplement in November and December; however, others started providing it as early as September and as late as January. Generally, a wet season supplement was put out before it was required, while there was still access to paddocks.

Year-round supplementation was most common in the Sturt Plateau and Roper districts.

Custom-made loose mixes were more commonly fed out during the dry season, while ready-mixed loose mixes and blocks were more commonly fed out during the wet season (Figure 32). Sturt Plateau producers were the main users of a loose mix supplement in the dry and wet season, while 70% of properties fed out a custom mix in the dry. Blocks were most commonly used in the VRD by company-owned and private owned with a manager employed properties, as well as by enterprises on Indigenous-owned land. Five producers (three in the Sturt Plateau) used water medicators to supply a supplement. Three producers used them intensively (i.e. more than 10 per property) while two producers only used them in a few paddocks.



	Block	Loose-home mix	Loose-ready mix	Loose-custom mix	Water medicators
Wet season	31	7	27	33	2
Dry Season	25	7	14	49	5

Figure 32. The percentage of producers using different supplement types in the wet and dry season

Producers were asked what main mineral they supplemented in the dry and wet season. Most producers in the region (93%) thought that phosphorus was the main mineral to supplement in the wet season. Two producers in the Gulf thought that both urea and phosphorus were the most important minerals to supplement during the wet. During the dry season the main mineral supplemented was urea; however, a proportion of producers felt that phosphorus was also a major mineral required (Figure 33). One producer in the Gulf listed calcium as very important and two producers in the Roper believed that urea had a negative impact on reproductive performance and fed an organic mineral mix instead.

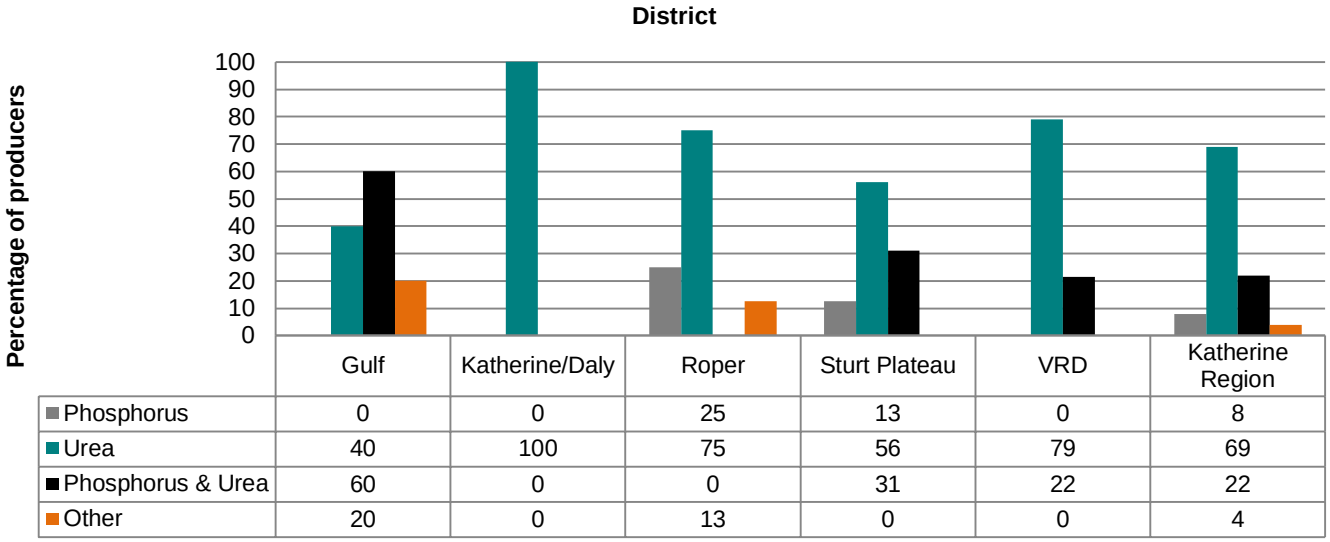


Figure 33. Major mineral supplements used in the dry season (percentage of producers)

Producers were asked to estimate the cost per head for supplement in 2010. While some producers were very aware of this, many were not. The average per district and season is shown in Table 33 along with the number of properties that provided estimates.

Table 33. Average supplement costs per head for 2010

District	Dry season ($/head)	No. responses	Wet season ($/head)	No. responses
Gulf	10.82	4	9.55	3
Katherine/Daly	19.49	4	15.88	3
Roper	13.79	4	14.08	2
Sturt Plateau	17.96	11	16.63	11
Victoria River	14.14	9	10.62	3
Katherine Region	16.36	32	12.67	22

Near infrared reflectance spectroscopy (NIRS) is used to determine the nutritional quality of grazed pastures through analysis of faecal samples. Eleven producers in the Katherine region, mostly from the VRD, were using NIRS to help determine timing of supplementation. Another 17 producers had used NIRS in the past but were not using it any longer. This was mostly due to them feeling they had learnt what they wanted to know; however, others cited expense, time and lack of usefulness as reasons for discontinuing. One producer said he just looked at the neighbour's results.

Production feeding

Production feeding of various types of grain mixes was only carried out by six producers in the Katherine region. Two producers fed bulls for sale, three fed small weaners and one had a rudimentary feedlot where he fed the tail end of his sale steers using purchased and home-grown feedstuffs.

Hay production

Ten of the producers surveyed (16%) made hay. All of them made hay for their own use, while three producers also sold hay to other pastoral properties (Table 34).

Table 34. Number of producers making hay and purposes for making hay

District	Making hay	For own use	For sale
Gulf	0	0	0
Katherine/Daly	1	1	0
Roper	1	1	0
Sturt Plateau	5	5	1
Victoria River	3	3	2
Katherine Region	10	10	3

The 10 hay producers grew an average of 467 tonnes per property (range 10 - 2420, median 270) in 2010 from improved pastures. One producer made 400 tonnes of native grass hay.

The approximate amount spent on fertiliser for hay production was mostly less than $99 per hectare (Figure 34).

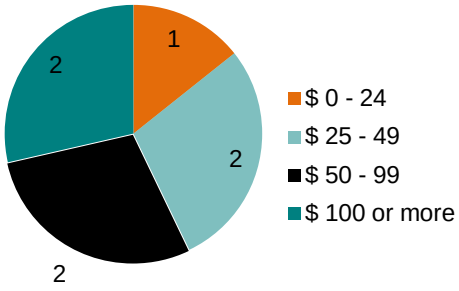


Figure 34. Number of producers spending different amounts on fertiliser for hay production ($/ha)

The main issues that producers thought affected hay production were weeds followed by cost of production and weather variability. There was a range of other issues mentioned, including the availability of machinery and contractors, and land clearing legislation.

Most hay producers (90%) had implemented a weed management plan for hay production. While the majority of them have their weed management plans in their heads (67%), some have it as part of a pastoral management plan and one had a formal document.

A number of factors limited the expansion of hay production (Figure 35).

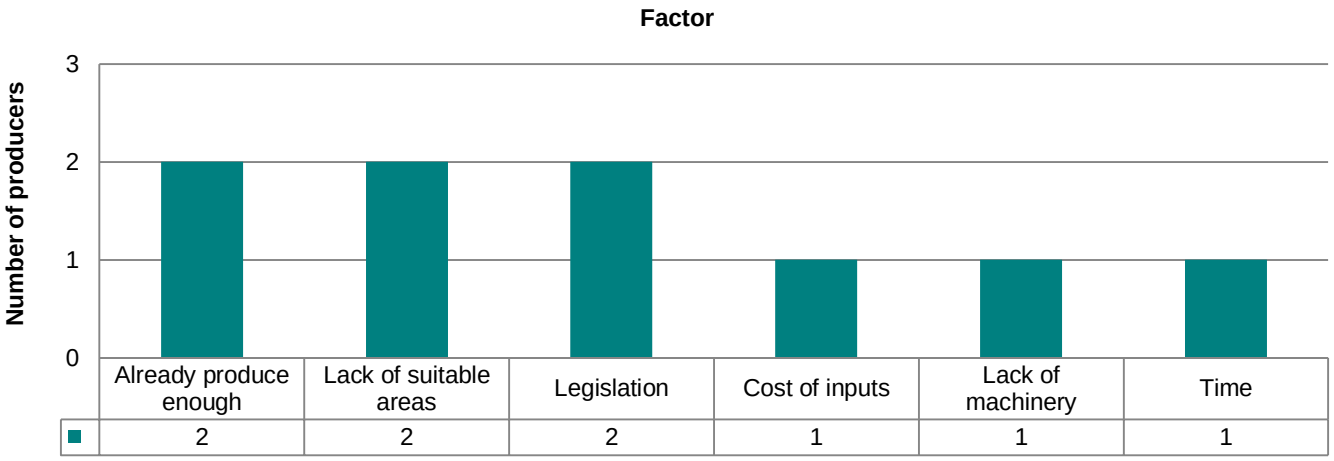


Figure 35. Factors that limited the expansion of hay production

The main ways producers thought hay production practices could be improved were through improved land clearing processes, producing their own seed to reduce weed infestation and better availability of hay contractors. Other ways mentioned included having better machinery and using crop rotations.

Animal health

Common problems

In the Katherine region the two most common animal health problems named by producers were cattle ticks and buffalo flies (Figure 36). Other animal health problems mentioned included a lack of protein and the presence of wild dogs.

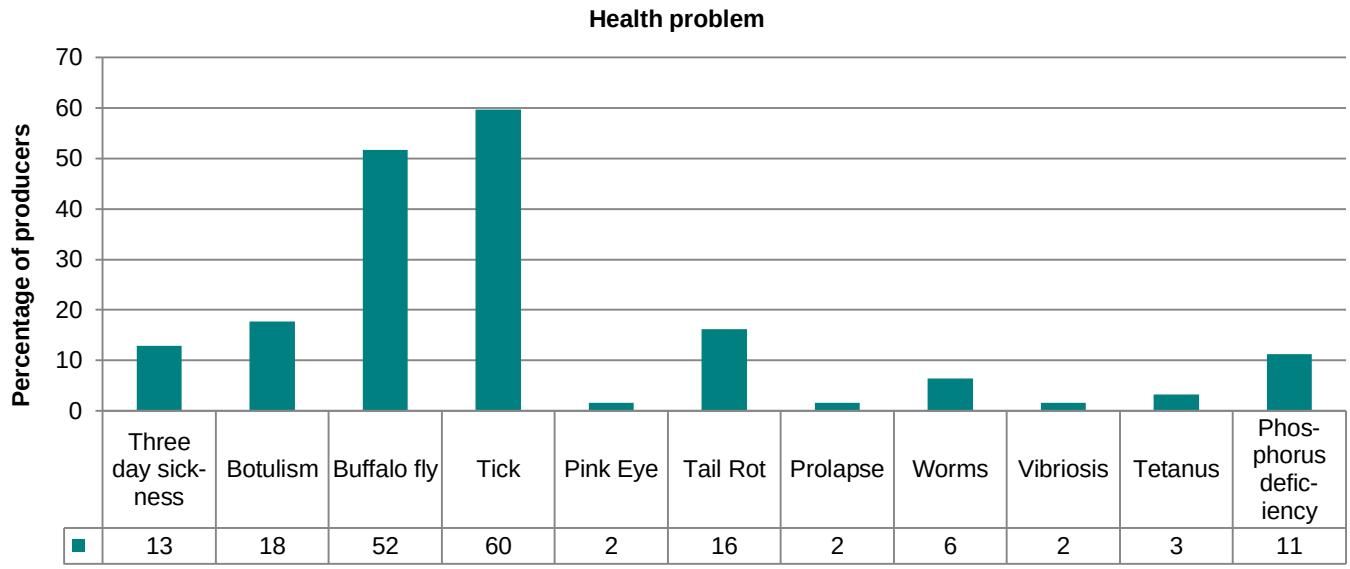


Figure 36. Most commonly seen animal health problems

Health treatments

Botulism

The most common animal health treatment was vaccination against botulism, suggesting that it was a well-recognised animal health problem (Table 35). Ninety per cent of producers vaccinated 93% of cattle in the region against botulism. Of those vaccinating, all except one property vaccinated all stock and they vaccinated just the breeding heifers and weaners. Of the six that did not vaccinate for botulism, five were from the Gulf. Of those that did, 52% used a long-acting vaccine, 27% used an annual vaccine and 21% used a combination of both; however, there were some differences between districts. Sturt Plateau and Katherine/Daly producers mostly used the long-acting vaccine, while the Gulf and Roper producers mostly used the annual vaccine and the VRD producers used either the long-acting or both.

Table 35. Diseases vaccinated against in the Katherine region

Disease vaccinated against	Properties (%)
Botulism	90
Vibriosis	62
Clostridial	29
Leptospirosis	13
Three day sickness	3
Pestivirus	3
Red water (tick fever)	2

Vibriosis

Vibriosis was the second most common disease vaccinated against. Forty four per cent of producers vaccinated only bulls, 5% vaccinated only heifers and 13% vaccinated bulls and heifers. Overall for the region, 20% of maiden heifers and 61% of bulls were vaccinated against vibriosis. Vaccination was most common in the Sturt Plateau and VRD (70% of properties). Of those that vaccinated against vibriosis, 92% did it every year.

Clostridial diseases

Twenty nine per cent of producers vaccinated against clostridial diseases, with five producers vaccinating all stock. Overall, 11% of livestock in the region were vaccinated, including 21% of weaners, 5% of breeders and 14% of breeding heifers. Producers often specified vaccinating male weaners with 5-in-1 and female cattle with 7-in-1 products.

Cattle ticks

In the Katherine region 58% of producers were treating 28% of non-sale cattle against ticks. The highest prevalence of treatment occurred in the Gulf and Roper districts, which treated 84% and 78% of stock, respectively. Typically, producers either treated all stock or treated only weaners. One producer vaccinated against tick fever.

Buffalo flies

Forty five per cent of producers treated 28% of cattle against buffalo flies in the Katherine region. The VRD had the lowest incidence of treatment. Generally, if a property was treating against buffalo flies, all livestock were treated.

Worms

Sixty five per cent of producers were treating against worms and typically either treated all stock or only weaners.

Lice

Lice are not a widely-recognised problem in the Katherine region. However, the treatments used to treat against worms and cattle ticks often also treat against lice; 20 producers in the region recognised that they thus also

treated against lice. In a similar way to treating against worms, generally all livestock were treated or only weaners. The highest treatment for lice occurred in the Roper district where four producers treated all stock.

Wound antisepsis

Thirty nine per cent of producers mentioned using wound antisepsis, which were used on dehorning wounds in weaners, or as needed on all stock. The Roper and the Sturt Plateau districts had the highest number of producers treating weaners.

Pestivirus

Two producers in the Sturt Plateau vaccinated their breeding heifers against pestivirus.

Bovine ephemeral fever

Only two producers mentioned treating for three-day sickness and they vaccinated purchased bulls.

Leptospirosis

Eight producers in the region vaccinated a range of stock classes against leptospirosis. Two producers vaccinated female weaners, two vaccinated breeding heifers, one vaccinated all weaners, one vaccinated bulls, one vaccinated breeders and one vaccinated all stock.

Hormone growth promotants

HGPs were used by 56% of producers in the Katherine region. Male weaners were most commonly implanted, with 55% receiving an implant, compared with 24% of sale steers. Thirteen per cent of producers implanted both weaner males and sale stock, including spayed heifers and cull cows. The major reasons why some producers did not use HGPs included a perceived lack of cost-benefit and concerns about market access (Figure 37). Several properties transferred weaners to another inter-company property where steers were implanted with HGPs at a later stage.

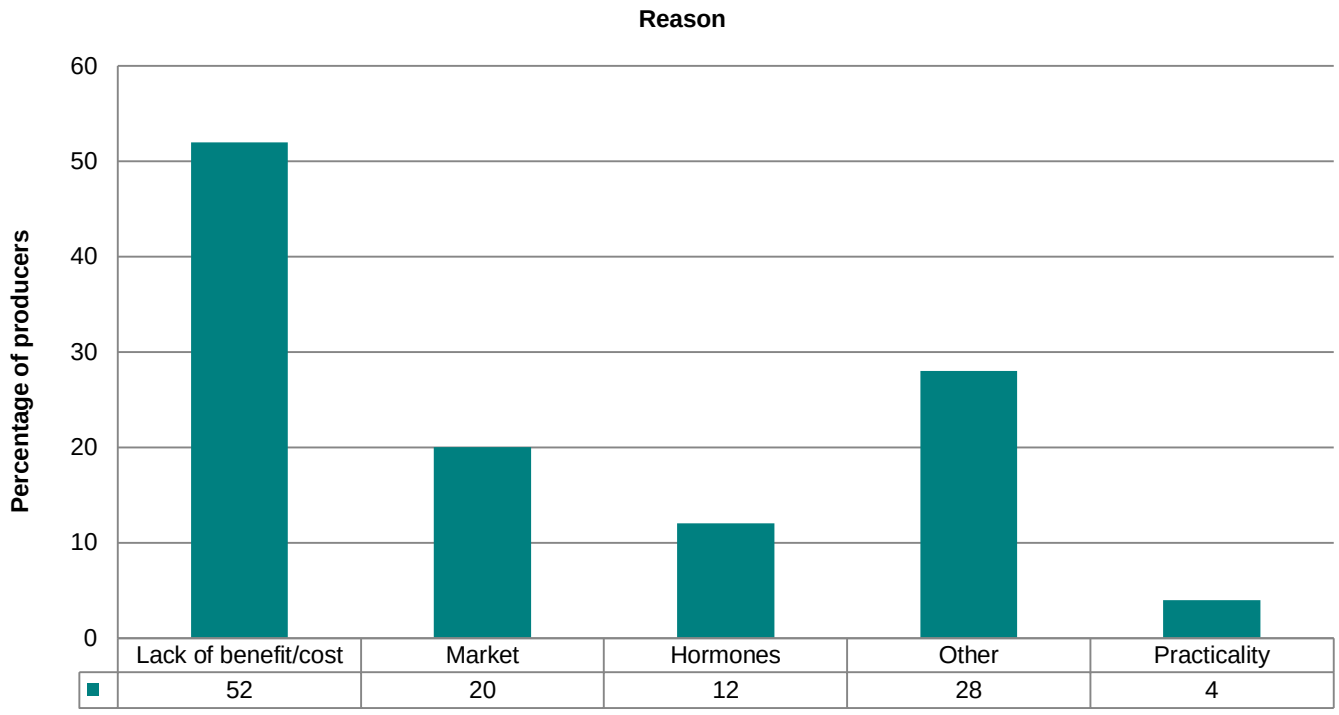


Figure 37. The percentage of producers not using HGPs for different reasons

Grazing management

Carrying capacity

Producers were asked to estimate the current carrying capacity of their property and, based on their plans for infrastructure development, the carrying capacity in five and 10 years' time (Table 36). Current capacity largely reflected the size of properties, except in the case of the Gulf district. While Gulf district properties were similar in size to those in the VRD, their carrying capacities were far lower, reflecting differences in the underlying pastoral productivity and stages of development between the districts. Estimated increases in carrying capacity further highlighted this, with the Gulf district having the highest planned increase for the region.

Based on 48 responses for the region, the estimated carrying capacity for the Katherine region will increase by 22% by 2015 and by 31% by 2020.

Table 36. Estimated current average carrying capacity and increase over time according to district

District	Estimated average carrying capacity in 2010	Estimate in five years' time	Percentage increase on 2010*	Estimate in ten years' time	Percentage increase on 2010*
Gulf	9571	12 500	59	16 333	93
Katherine/Daly	9400	10 040	6	12 040	24
Roper	6607	7929	15	8314	19
Sturt Plateau	7150	8345	32	9873	38
Victoria River	24 531	27 750	16	29 286	20
Katherine Region	13 588	15 948	22	17 177	31

*This is the increase in carrying capacity over all properties that responded and represents expected percentage change in carrying capacity at a district/regional level.

The most common methods of assessing feed availability were the use of historical information and experience, and looking at the condition of the stock (Table 37). Eleven producers stated that they measured feed on offer. Most producers made assessments frequently throughout the year, with many commenting that they did so every time they did a bore run or went for a drive. Some (five producers) assessed feed availability at the end of the growing season.

Table 37. The percentage of producers using various methods to assess feed availability

Method	Producers (%)
Use historical information/experience	86
Look at condition of stock	69
Measure food on offer	14
Monitoring sites	8
Other	7

Producers were asked how they adjusted stocking rates during the dry season, if required. The most common methods were culling cows, early sale of steers and early weaning, as shown in Figure 38. Other methods included rotational grazing and transfer of young cattle to fattening properties.

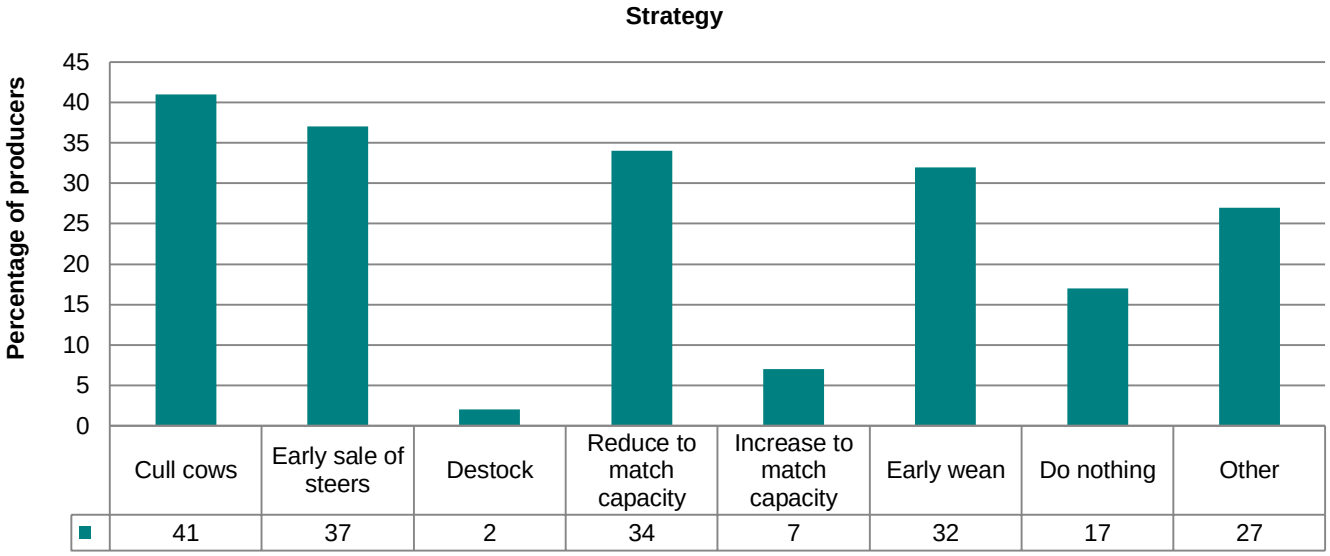


Figure 38. The percentage of producers using different strategies to adjust stocking rates in the dry season

Water point development

On average, producers in the Katherine region planned infrastructure development based on a maximum grazing radius of 5 km. The percentage of producers that preferred different grazing radii is shown in Figure 39. Sturt Plateau and Roper district producers generally preferred smaller distances to water, with a median of 3 and 4 km, respectively. Gulf district producers had the highest average preferred distance to water of 5.5 km.

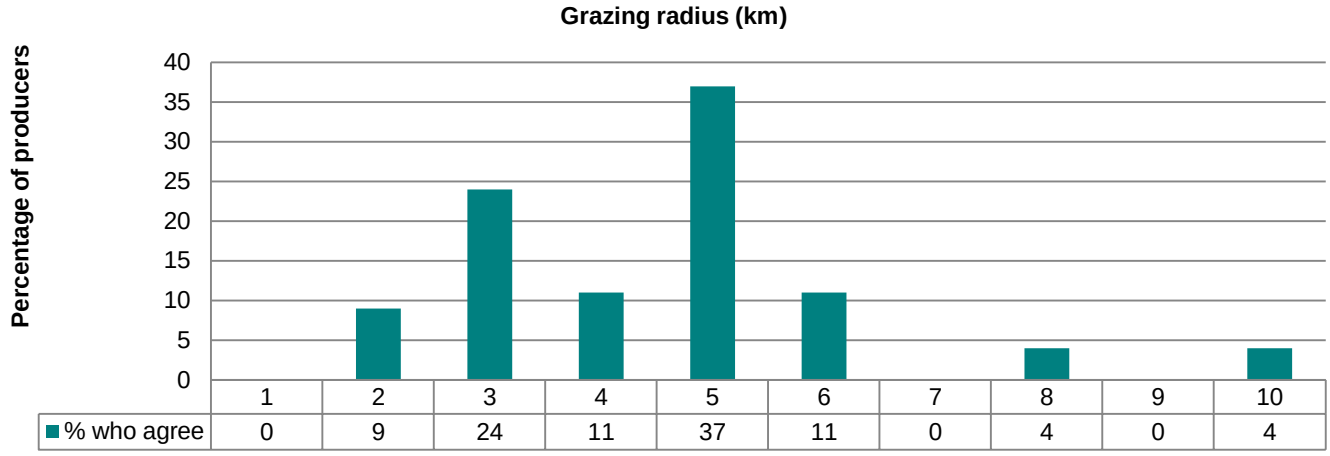


Figure 39. Preferred maximum grazing radius (km) when planning infrastructure (% producers)

While 60% of producers felt that increasing water points was sufficient to disperse cattle more evenly through a paddock, 92% used other strategies, as shown in Table 38.

Table 38. The percentage of producers that used different strategies to distribute grazing pressure more evenly

Method	Producers (%)
Fire	63
Fences	58
Supplement points	57
Rotating water points	23
Roads	13
Other	2

Grazing strategies

A range of grazing strategies was practised by producers, with 70% using a combination of strategies. The most common grazing strategy was a combination of continuous grazing and spelling, which was used by 56% of producers. Eleven producers used continuous grazing only, five used rotational grazing only and six used a combination of rotational grazing and spelling. One producer used cell grazing, and one used a combination of all four strategies. Rotational grazing and cell grazing were more commonly used by smaller landholders.

Producers were asked if they excluded any areas of their property from regular grazing; about half did so for a variety of reasons (Figure 40). Producers in the Roper district were more likely to exclude grazing due to mustering difficulties and rivers compared with other districts. There were several reasons for excluding grazing under the 'other' category. Four producers had country that was not yet developed so they did not use it for grazing. One producer was helping country to recover from overgrazing, while another was protecting their cropping country and another excluded grazing for carbon trading purposes. Another producer fenced off surface water and pumped into tanks to provide clean water for stock and keep the habitat in good condition for wildlife and another producer kept a paddock as a feed reserve, commenting that 'you need to have some spare country up your sleeve'. Of those that did not exclude grazing, 26% would consider it in the future.

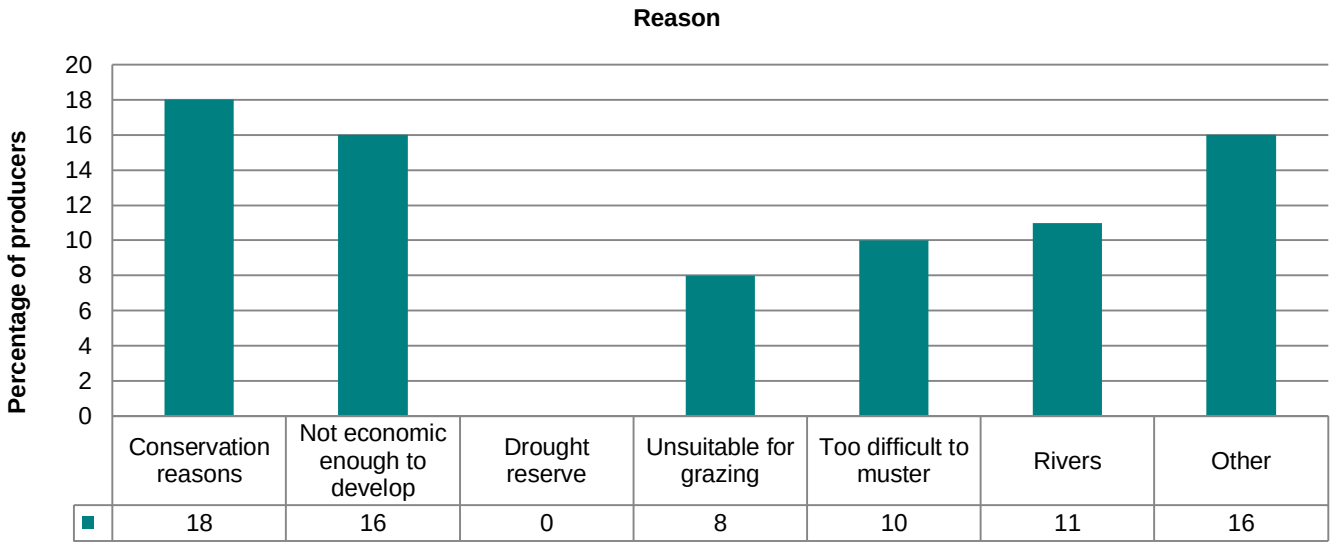


Figure 40. Reasons for excluding country from grazing

Fire

Based on the responses of 57 producers, 11% of the surveyed area was estimated to have been affected by wildfire in 2010. Seventy five per cent of properties carried out prescribed burning for management purposes on an estimated 14% of the surveyed area in 2010. The Katherine/Daly district had the lowest proportion of country burned by wildfire (4%) while the VRD had the lowest proportion of country burnt intentionally (8%). Prescribed burning is carried out for a variety of purposes in the region, as shown in Table 39 and has been used by 97% of surveyed producers in the past.

Table 39. The percentage of producers who used fire for various management purposes

Management purpose of burning	Producers (%)
Control grazing/remove rank pasture	66
Wildfire mitigation	63
Manage tree-grass balance	32
Control exotic weeds	11
Manage pasture composition	3

Producers burning to remove rank pasture and control grazing typically used a cool fire in the early wet season on 30% of their lease. Those burning to protect against wildfires generally used a cool fire in the early dry season on 10% of their lease (on average); however, a number of producers aimed for a moderate fire in the late dry or early wet. Whilst most producers burning to control woody thickening used a hot fire in the late dry, some aimed for a moderate fire after the first storms of the wet season. Only two producers in the Katherine region did not do any intentional burning. One did not as they had only just started leasing some land and fire was not yet a priority, and the other believed that fire had negative effects on soil biological activity.

Improved pasture

Half of the producers surveyed had improved pastures on their properties. The total area of improved pastures in the region comprised only 3% of the area of the surveyed properties (Table 40).

Table 40. Properties in the Katherine region with improved pastures

District	No. properties	Properties (%)	Av. proportion of property (%)
Gulf	4	40	0.4
Katherine/Daly	3	50	0.1
Roper	2	25	0.2
Sturt Plateau	14	70	7.2
Victoria River	8	44	4.4
Katherine Region	31	50	3.0

The improved pastures were predominantly low input, where seed was broadcast into an uncultivated seedbed (Table 41). The average area of low input pastures on the properties was exaggerated by two large sowings in the Sturt Plateau district. There were smaller amounts of high-input improved pasture on some properties except in the Gulf and Roper districts. Two properties in the region established sown pastures by putting seed into loose mixed supplement over an average of 5450 hectares.

Table 41. Areas of high input and low input improved pastures on properties (ha)

Improved pasture type	Average	Range	Median
High input	247	60 – 500	200
Low input	13 882	5 – 130 000	1300

The majority of improved pastures were rain-fed (Table 42). The average area of rain-fed pasture was skewed by large sowings on a small number of properties. Two properties in the region (average 2044 ha, range 88 to 4000 ha) had areas of irrigated pastures. Three properties had on average 203 ha of crops (range 10 to 500 ha, median 100 ha).

Table 42. Rain-fed improved pastures on properties (ha)

District	Average	Range	Median
Gulf	3676	5 – 10 000	2350
Katherine/Daly	138	13 – 300	100
Roper	800	300 – 1300	800
Sturt Plateau	5196	60 – 43 000	900
Victoria River	36 400	100 – 210 000	1550
Katherine Region	11 241	5 – 210 000	700

The largest areas of improved pasture were grass only pastures (buffel grass) (Table 43), or legume only pastures (Seca and Verano stylos) sown into native pastures (Table 44). There were smaller areas of mixed grass/legume pasture in all districts except the Gulf (average 885 ha, range 13 to 4500 ha, median 500 ha).

Table 43. Areas of grass only improved pastures (ha)

District	Average	Range	Median
Gulf	5003	5 – 10 000	5003
Katherine/Daly	40	-	40
Roper	0	-	0
Sturt Plateau	200	-	200
Victoria River	73 000	4000 – 210 000	5000
Katherine Region	32 749	5 – 210 000	4000

Table 44. Areas of legume only improved pastures (ha)

District	Average	Range	Median
Gulf	0	-	0
Katherine/Daly	60	-	60
Roper	0	-	0
Sturt Plateau	18 620	70 – 130 000	1515
Victoria River	2500	-	2500
Katherine Region	15 370	60 – 130 000	4130

The improved pastures were mainly used to improve diet quality in native pasture systems, followed by hay production and rehabilitation (Table 45). Most used improved pasture for a number of purposes.

Table 45. The percentage of producers using improved pastures for various purposes

Improved pasture use	Producers (%)
Improved diet quality in native pasture systems	61
Hay production	32
Rehabilitation	26
Improved diet quality in improved pasture systems	19
Special purpose	6
Other	3

Nine grass cultivars were being used (Table 46). The two most popular grasses were buffel grass and sabi grass.

Table 46. Pasture grasses currently used

Grass cultivar	No. of properties
Buffel grass	10
Nixon sabi grass	8
Indian bluegrass	4
Silk sorghum	4
Tully	3
Para grass	2
Rhodes grass	2
Arnhem finger grass	2
Jarra finger grass	1

Five legume cultivars were being used (Table 47). The most popular legumes were Seca and Verano stylos, followed by Cavalcade.

Table 47. Pasture legumes currently used

Grass cultivar	No. properties
Seca	14
Verano	10
Cavalcade	5
Milgarra blue pea	2
Wynn cassia	1

Eighteen producers (29%) planned to increase their area of improved pastures and crops in the next three years (Table 48). Four producers intended to introduce improved pastures and a further two intended to increase the sowings and introduce new types of improved pastures. The sowings will be predominantly low-input improved pastures (13 producers). High-input improved pastures were proposed for sowing on four properties (average 475 ha, range 200 to 1000, median 350 ha), and sorghum crops were to be sown on two properties (average 250 ha, range 200 to 300 ha). The planned improved pasture grass sowings were mostly buffel grass or sabi grass followed by Jarra. The planned legume sowings were mostly Seca or Verano, followed by Cavalcade. One producer was intending to sow leucaena.

Table 48. Proposed sowings of low input (ha)

District	Average	Range	Median
Gulf	4000	-	4000
Katherine/Daly	1305	10 – 2600	1305
Roper	810	320 – 1300	810
Sturt Plateau	16 867	100 – 50 000	3200
Victoria River	51 000	2000 – 100 000	51 000
Katherine Region	16 264	10 – 100 000	2000

Most producers (61%) did not use fertilisers on their improved pastures. Those who did, used a mixed NPK fertiliser or superphosphate (Table 49). Producers who used fertiliser applied an average of 74 kg/ha (range 5 – 100) annually.

Table 49. Fertiliser types used on improved pastures

Type of fertiliser	Producers (%)
NPK	38
Superphosphate	38
Urea	15
Muriate of potash	8

Natural resource management

Producers were asked if they carried out any form of documented land monitoring. Seven producers had a company program, three were involved in Landcare, two had a holistic management plan, one had a soil erosion plan, one had an environmental management system in place and one producer was monitoring their rotational grazing.

Native tree and shrub build-up

The majority of producers in the region (81%) had noticed a build-up of native shrubs and trees across a range of soil and land types. Woody thickening appeared to be a widespread problem, with a similar number of producers noticing it on black and red soil types. It was more commonly noticed on previously cleared areas in the Sturt Plateau and Katherine/Daly districts where clearing for improved pasture purposes was more common (Table 50). Of those that reported woody thickening, about half only noticed it on one land type, a quarter noticed it on two land types and another quarter noticed it on three or more.

Table 50. Number of producers noticing woody thickening on different soil and land types

District	Black soil	Red soil	River flats	Previously cleared areas	Other
Gulf	1	0	2	1	2
Katherine/Daly	1	1	0	2	1
Roper	2	3	0	2	0
Sturt Plateau	7	10	5	7	2
Victoria River	12	7	9	2	0
Katherine Region	33	21	16	14	5

Weeds

The most common weeds in the region were sida, hyptis, parkinsonia, rubber bush and senna species (Table 51). These weeds, along with mimosa bush and noogoora burr, were also rated as having the highest impact across the region. There were some differences between districts and a district breakdown of weed impact is shown in Appendix 1.

Table 51. Species of weeds present in the Katherine region, their impact rating and the percentage of producers attempting to control them

Weed	Properties with weed (%)	Properties controlling weed (%)	Impact (% producers rating it as)		
			Low	Medium	High
Athel pine	2	0	2	0	0
Barleria	2	100	0	0	2
Bellyache bush	18	73	15	2	2
Caltrop	2	0	2	0	0
Castor-oil plant	2	0	2	0	0
Chinee apple	8	10	6	2	0
Crotalaria	23	36	18	3	2
Devil's claw	16	90	8	3	5
Grader grass	26	75	18	2	6
Hyptis	74	76	42	18	15
Khaki weed	48	50	37	6	5
Lions-tail	2	100	0	0	2
Mesquite	2	100	2	0	0
Mimosa	3	50	3	0	0
Mimosa bush	45	50	19	11	15
Mission grass	24	47	18	0	6
Mossman River grass	6	75	6	0	0
Noogoora burr	42	46	23	8	11
Parkinsonia	68	76	40	6	21
Prickly acacia	6	100	3	2	2
Rubber bush	66	51	32	23	11
Senna	50	81	37	6	6
Sida	87	80	58	16	13
Snakeweed	3	0	2	2	0

Most producers (54%) were controlling some species of weeds; however, 31% were controlling all weeds and 15% were not doing any control at all. Typically, the most prevalent and high-impact weeds were the most commonly controlled, as well as other less common but invasive weeds, such as prickly acacia, devil's claw, bellyache bush, grader grass and Mossman River grass.

About two thirds of producers took steps to prevent the introduction of weeds onto their properties. Most strategies were related to preventing weeds from entering properties through purchased hay (Table 52). Producers often commented about difficulties in buying weed-free hay, with one producer inspecting hay before purchase.

Table 52. The percentage of producers using different strategies to prevent the introduction of weeds

Strategies	Producers (%)
Feed out purchased hay in designated areas	42
Quarantine animals purchased off property	39
Buy certified hay/seed	34
Restrict access to off-property machinery/vehicles	24
Wash down bays	19
Quarantine machinery and equipment	19
Use own hay	18
Other	8

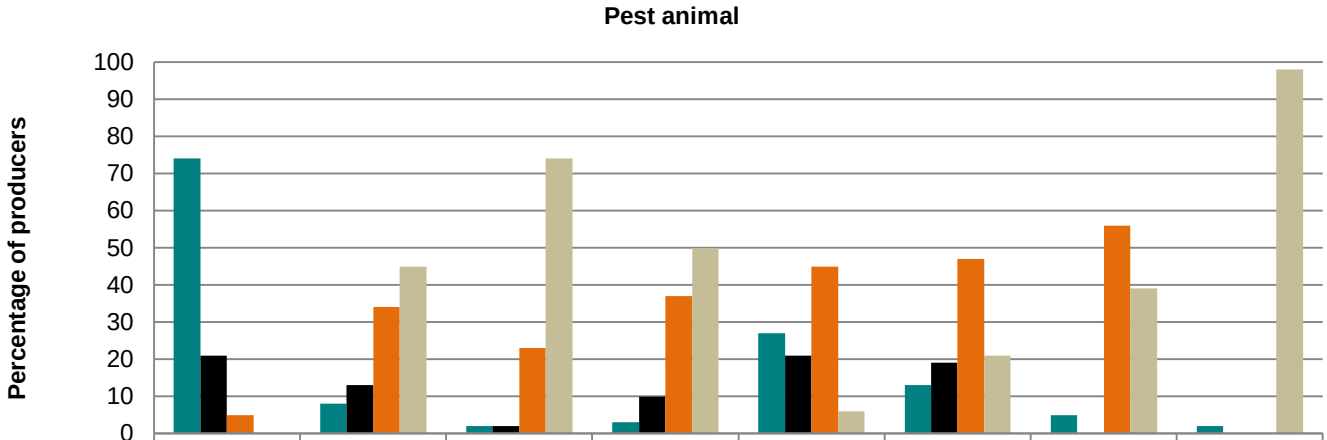
Producers were asked to estimate the percentage of their property that was affected by weeds and what they spent annually on weed control. Based on the responses of 52 producers, 10% of the surveyed area was affected by weeds, with some variation between districts as shown in Table 53. There was quite a large variation between producers on what they spent annually on weed control ($0 – $60 000). To take into account the size of the lease, expenditure on weed control was calculated per square kilometre of the lease.

Table 53. Percentage of property area affected by weeds and annual median control expenditure

District	Area affected (%)	Median cost ($/property)	Median cost ($/km^2)
Gulf	2	2000	0.30
Katherine/Daly	23	15 000	17.50
Roper	11	7500	20.20
Sturt Plateau	4	5000	6.20
Victoria River	15	10 000	4.00
Katherine Region	10	6500	3.90

Pest animals

Producers were asked to rate the impact of pest animals on their properties (Figure 41). Wild dogs were considered to be a big problem by many producers, with frustrations expressed over recently changed baiting regulations. Many producers commented that baiting had not been carried out due to difficulties in obtaining permits, which had led to an increase in the wild dog population. Several commented that they had never seen wild dogs as bad before. Wallabies and pigs were also seen to be having a moderate or high impact on about 40% of properties, while donkeys, camels, horses and buffalo were often not present or, if present, not considered a problem. For district breakdowns, see Appendix 2.



	Wild dog	Donkey	Camel	Horse	Kangaroo/ Wallaby	Pig	Buffalo	Rabbit
High	74	8	2	3	27	13	5	2
Medium	21	13	2	10	21	19	0	0
Low	5	34	23	37	45	47	56	0
N/A	0	45	74	50	6	21	39	98

Figure 41. Percentage of producers rating the impact of pest animals as low, medium or high

Nearly all producers spent some money on pest animal control, which typically included baiting for wild dogs and some aerial culling costs for other pests, such as pigs, horses and donkeys. Table 54 outlines the median annual expenditure on pest control. The pest animals most commonly controlled were wild dogs (97% of properties), donkeys (74%), horses (61%), pigs (53%), buffalo (42%) and camels (25%).

Table 54. Annual median pest control expenditure per property and per square kilometre

District	Median cost ($/property)	Median cost ($/km^2)
Gulf	1000	1.20
Katherine/Daly	600	3.60
Roper	4500	4.00
Sturt Plateau	1000	1.50
Victoria River	5000	2.30
Katherine Region	3250	2.50

Producers were asked to estimate the annual cost of lost production due to natural resource management (NRM) issues such as weeds, erosion, pest animals and wildfires. The only issue of concern which producers could feel confident to quantify was related to wild dogs. Sixteen producers estimated an average of $46 500 per property in lost production through calf losses and lost income due to inability to sell dog-bitten steers. They did acknowledge that the other NRM issues also affected production, but were not able to put a figure on them.

Climate change

Climate change elicited a range of opinions and attitudes. Producers were asked if they thought that climate change would affect their business. A third of producers believed that it would. Of these, 66% believed climate change would increase the cost of production due to the carbon tax and government regulation while equal numbers believed it would have negative impacts on production, positive impacts on production and both positive and negative impacts. However, 30% of producers did not believe in climate change, 25% did not know enough

about climate change to comment on it and 13% believed in climate change but did not think that it would affect their businesses.

Three producers had had the carbon footprint of their cattle enterprise measured.

Business

Staff

Producers recruited staff through a number of channels, but most frequently through word of mouth (Figure 42), with privately-owned operations more likely to rely on this method. Other recruitment methods included using family as staff (six producers), putting flyers up in backpacker hostels (three) and backpacker websites (one). Company-owned properties were more likely to use internal recruitment and recruitment agencies. Newspaper ads were most commonly used by producers from the Sturt Plateau and the VRD.

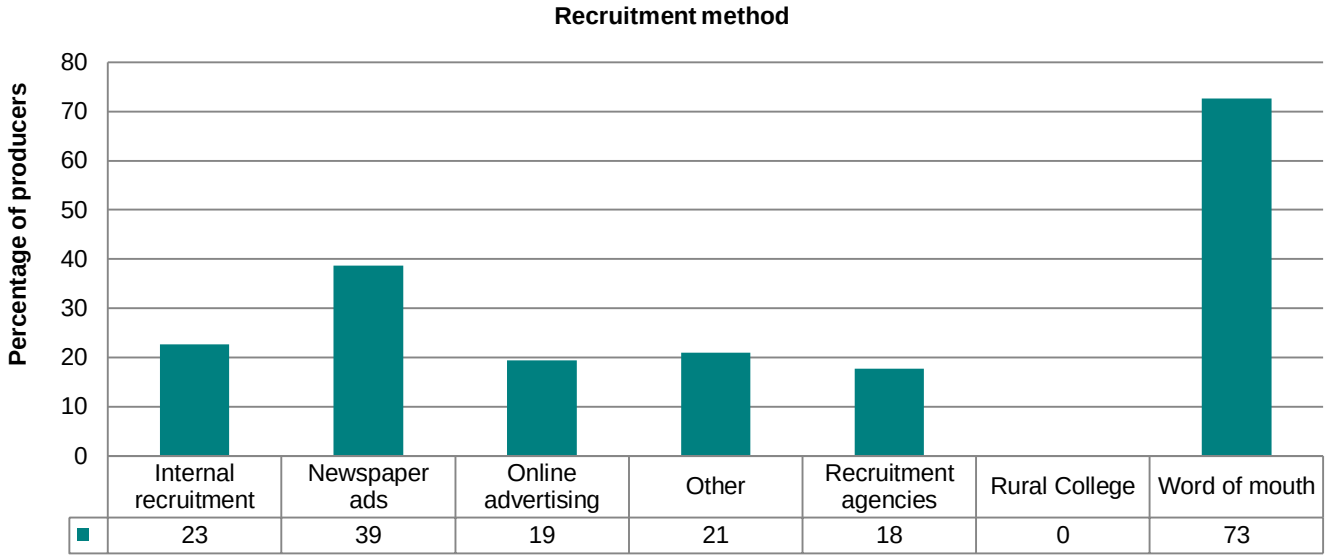


Figure 42. Percentage of producers using different recruitment methods

Eighty nine per cent of enterprises undertook some staff training, most commonly informal, on-the-job training (Table 55). Those that did not carry out any training were privately-owned and employed experienced workers for short periods during mustering. Producers in the VRD and company-owned properties undertook the most training.

Table 55. Percentage of properties and staff undergoing different types of training in the Katherine region

Training type	Properties (%)	Staff (%)	No. of staff
Formal accredited	30	24	129
Formal non-accredited	46	27	142
Informal/on-the-job	86	92	487

A wide range of training topics were undertaken, as shown in Appendix 3. The most common formal training topics were livestock handling (48% properties), horsemanship (40%), ChemCert training (35%) and First Aid (30%).

Succession planning

Succession planning is a critical but often difficult step in family enterprises. Twenty four per cent of family-owned businesses had a succession plan in place, 24% were in the process of putting a plan in place and half had none. Plans were generally not in place due to children being too young or simply as they 'hadn't gotten around to it'. Some felt that it was not necessary, while for another, keeping the property in the family was not possible due to family size.

Benchmarking and planning

Documented plans of some form were used by 79% of businesses, the most common being financial plans (73%), followed by OH&S plans (40%), NRM plans (24%) and human resource management plans (22%). NRM plans included weed management plans, soil erosion plans, grazing plans, property management plans and environmental management systems.

Producers were asked if they used any financial or production benchmarks to guide their management, with 74% of producers stating that they did. Production benchmarks were more commonly used than financial (72% versus 41% of producers). Weaning percentage was the standard benchmark used (Table 56); however, five producers specified calving percentage and two specified branding percentage rather than weaning rate. Other financial benchmarks mentioned included profit, loan reduction, cash surplus and expenditure, while other production benchmarks mentioned included average weaner weight and breeder body condition score. One producer commented that staff turn-over rates were compared between company properties.

Table 56. Percentage of producers using different financial and production benchmarks

Benchmark	Producers (%)
Cost of production per kg	28
Gross margin per AE	11
kg beef turned off per AE	11
kg beef turned off per ha	13
Weaning/branding/calving %	67
Return on assets	16
Average sale weight	3
Sales turnoff	5
Trait scores on stud cattle	5
Other	16

Eighty per cent of producers used benchmarks to assist in managing their natural resources (Table 57). Other benchmarks included bare ground, fire scar mapping, soil tests and holistic land monitoring.

Table 57. Percentage of producers using specific natural resource management benchmarks

Benchmark	Producers (%)
Rainfall records	74
Weed maps	33
Photo monitoring sites	30
Grazing records	28
Tier 2 monitoring	8
Residual yield	5
Veg. machine	2
Other	7

Financial

Producers were asked how the property business was financed (Table 58). The most common response was 'don't know', from property managers who did not have direct dealings with the financial institution. Only one property specifically commented that they did not borrow money and "paid as they went". Another producer used three major banks to spread risk.

Table 58. Percentage of producers using different financial institutions

Financial institution	Producers (%)
Agribusiness	13
Agricultural bank	8
Don't know	28
Major trading bank, interstate branch	16
Major trading bank, NT branch	21
Not applicable	10
Other	5

Thirty per cent of producers had enterprises on their properties other than cattle. These properties were predominantly privately-owned. The types of enterprises were varied and included hay production (six properties), station store (four), tourism (five), helicopter mustering (three), breeding horses (two), mangoes (one), mixed farming (one), crocodile egg collection (one), contract tree clearing (one), livestock transport (one), goats (one) and heavy machinery operation courses (one). Five producers from the Roper and Gulf districts had mining exploration or production occurring on their properties.

Information delivery and management

Producers use a range of computer technology on a day-to-day basis to help make management decisions. Eighty four per cent of producers used email and the Internet, with the Bureau of Meteorology (84%) and Northern Australian Fire Information (75%) websites being widely used. Thirty seven per cent of producers considered electronic identification of animals as aiding management decisions. Herd recording programs, general recording programs (for example, PAM), and herd modelling programs were used to a lesser extent (24%, 10% and 8%, respectively).

Priorities

What are the hurdles faced by the pastoral industry?

At the beginning of the survey, producers were asked what hurdles they faced in managing their enterprises. While a range of responses was given, market issues, staff, roads/access, cost of production and nutrition were the most commonly mentioned (Table 59). Market issues included the 350 kg weight limit to Indonesia and the lack of alternative profitable cull cow markets as well as the insecurity/instability of, and dependence on, the Indonesian live export market.

Table 59. Percentage of producers mentioning hurdles faced by management

Issue	Producers (%)
Market issues	24
Staff	18
Roads/access	18
Cost of production	15
Nutrition	13
Cash flow/money	11
Other	8
Seasons	8
No response	8
Government regulation	8
Wild dogs	6
Freight	5
Infrastructure	5
Water	5
Time	5
Fertility of herd	5
Pest animals	3
Isolation	3
Fire	3
Erosion	3
Cattle control	3
Scale	2
Weeds	2
Distance	2

Towards the end of the survey, producers were also asked to consider the main issues that affected the profitability of their enterprises (Table 60); similar responses were elicited as when asked about the hurdles they faced. This question had one of the highest non-response rates (14%), possibly as it was one of the last questions in the survey, but some producers found it difficult to answer. Market access and instability were most commonly mentioned, followed by cost of production (freight and transport often specifically mentioned) and herd fertility. The 2011 live export suspension was specifically mentioned by 12 producers.

Table 60. Factors most affecting the profitability of enterprises

Issue	Producers (%)
Market access and instability	35
Cost of production	33
Herd fertility	19
No response	14
Government regulation	14
Wild dogs	13
Roads	8
Declining land values	8
Cattle prices	8
Inherent productivity of land	8
Infrastructure	5
Land clearing restrictions	5
Staff	5
Climate/weather/season	3
Interest rates	2
World economy	2
Cash flow	2
Weeds	2
Age of producer	2
Live-weight gain	2
Animal security	2

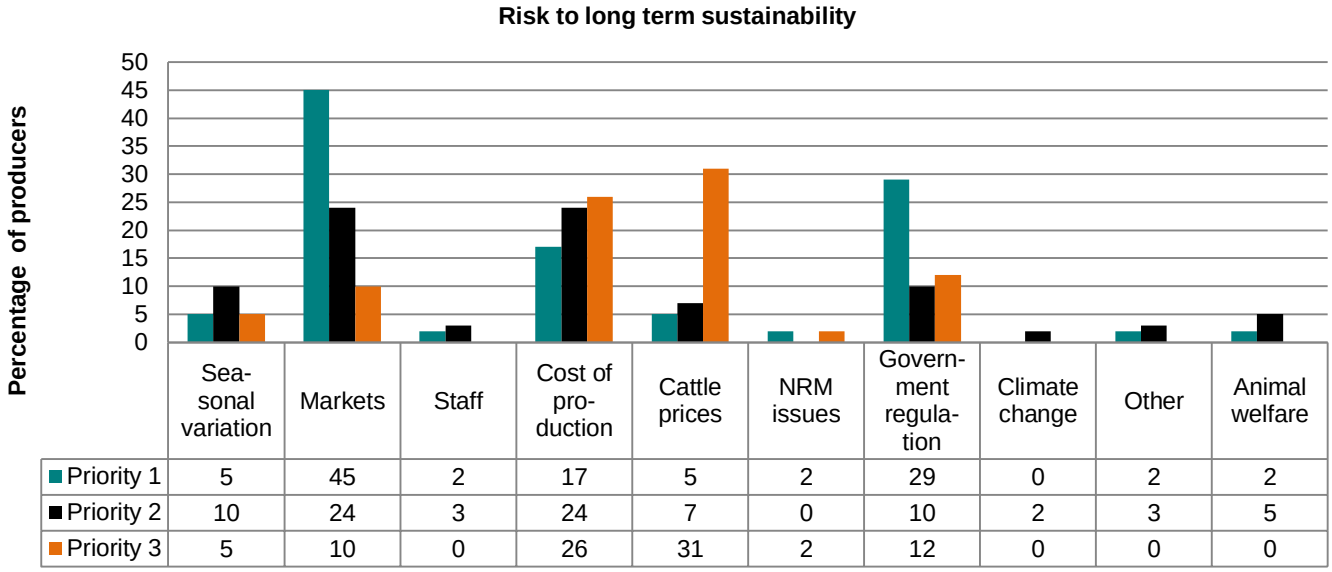
As well as issues affecting profitability, producers were asked about the main issues affecting the environmental sustainability of their enterprises. Once again, many did not answer this question (27% of respondents). The factors most commonly mentioned were weeds and feral animals (Table 61).

Table 61. Factors most affecting the environmental sustainability of enterprises

Issue	Producers (%)
Weeds	35
No response	27
Feral animals	16
Government policy and regulation	10
Erosion	10
Drought/seasonal conditions	8
Wallabies	8
Stocking rates/grazing management	8
Other	5
Land clearing	5
Wild dogs	3
Woody thickening	3
Wildfire	3
Not enough water points	3
Viability/profitability	2
Cost of development	2
Land condition	2
Not an issue	2

What are the risks to long term sustainability?

While the previous questions related to current issues, another question asked producers to consider long-term risks. Respondents were asked to rank a list of issues in order of the risk to their long-term sustainability (Figure 43). Markets, government regulation and cost of production were considered the highest risks. Energy availability was included on the list, but was not considered a risk by any respondents. Risks which were not included in the list but which were nominated by producers included family business structure/succession planning, wild dogs, land condition, debt, media, mining and exotic disease incursion.



	Sea-sonal variation	Markets	Staff	Cost of pro-duction	Cattle prices	NRM issues	Govern-ment regula-tion	Climate change	Other	Animal welfare
Priority 1	5	45	2	17	5	2	29	0	2	2
Priority 2	10	24	3	24	7	0	10	2	3	5
Priority 3	5	10	0	26	31	2	12	0	0	0

Figure 43. Percentage of producers who mentioned different risks in their top three priorities

What motivates people to be part of the pastoral industry?

In the final question of the survey, producers were asked why they chose to be members of the pastoral industry. At the time of interviewing, the industry was still dealing with significant market uncertainty and declining land values. Despite all this, only one producer answered negatively, stating 'don't really know anymore, it used to be the lifestyle'. Most paused to answer, with some stating it was the hardest question in the entire survey! The most common response was lifestyle (54%) and because they enjoyed it (35%). Twenty per cent said they were born into it. Others liked the challenge that it provides (seven producers) and enjoyed contributing to the community and making a difference (seven). Some just enjoyed working with cattle and horses. Below is a sample of responses.

Born and bred into it.

Because I enjoy it. My job is my hobby; therefore, work is easy to go to.

Why would you want to be anywhere else? Done a lot of things, but this is what I always come back to. See a lot of changes.

Enjoy the lifestyle; feel like you are contributing to the community. Enjoy the challenge.

Because I like cows and country.

I often wonder myself. Probably because I am stubborn and like to work for myself. Not for the money. Wanted to bring my kids up in the bush.

Because it is a way of life. Been a farmer of some sorts all my life.

Probably a good question – they assume you have chosen it! Because it is my profession.

Livelihood and lifestyle. Want to improve the land and make a difference. Do the tourism thing to educate other people about what we really do.

It's something I am passionate about, that I am interested in. I am a developer and I enjoy the challenge of seeing the place change.

It's not the money. I like the challenges that we have in the pastoral industry. I think it is a great balance and a healthy life. If I had a chance to live again I wouldn't do anything else.

Because it stimulates my intellect to have to be a mechanic, hydrologist, plumber, vet, stockman, book keeper, animal nutritionist, financier, cleaner, agronomist, pest exterminator, fence repairer etc., all in the one job.

It's all I know.

Help people with employment and improving the lives of others by giving opportunity to be involved in the pastoral industry.

Born into it, had no choice at the time.

The solitude, I love challenges, not repetitive work, something to pass onto the kids, improving property.

I enjoy being my own boss and the freedom of being my own boss.

It's a little bit about the lifestyle, but I'm working so hard that I don't have a lifestyle!

How the Katherine pastoral industry has changed 2004-2010

It is difficult to make some comparisons between the 2004 report and this report due to some changes in methodology of data analysis and also due to changes in the sample size. This section of the report will highlight the key differences, based on knowledge of the sample and methodology. Where comparisons have not been made, it is due to no noteworthy differences or to inability to compare because of changes in methodology of analysis between the 2004 and 2010 reports.

Differences in sample size

In the 2004 report, there was a Gulf district in each of the Katherine and Barkly regions, with the eastern Gulf included in the Katherine region and the western Gulf included in the Barkly region. In the 2010 survey, the Gulf district was surveyed as part of the Katherine region only. This has implications when comparing results for the Gulf between the two surveys.

Table 62 shows the number of businesses surveyed by district for each of the surveys and the percentage of the area that these surveyed properties represented. While a similar percentage of pastoral land was surveyed, there were differences between districts, with a lower representation from the VRD and a higher representation from the Sturt Plateau in the 2010 survey compared with the 2004 survey.

Table 62. Differences in sample size between 2004 and 2010 pastoral industry surveys

District	No. properties surveyed		Area surveyed (km^2)	
	2004	2010	2004	2010
Gulf	6	10	19 455 (66%)	35 829 (51%)
Katherine/Daly	7	6	8527 (62%)	7651 (55%)
Roper	9	9	19 300 (66%)	10 197 (43%)
Sturt Plateau	15	20	15 986 (42%)	26 151 (68%)
Victoria River	24	18	85 702 (97%)	60 781 (68%)
Katherine Region	61	63	136 744 (62%)	140 609 (61%)

NB: Figures in brackets represent percentage of pastoral area surveyed

Property size and infrastructure

The average property size remained the same. However, the sizes of company-owned and Indigenous-owned properties were larger in the 2010 survey, while owner-manager properties were smaller. This is likely a reflection of differences in the sample rather than actual changes as while property sales occurred during this time, there were no major changes in ownership types as a result. While it is difficult to compare due to weighting of the 2010 data, it appears as if the percentage of area grazed has increased across all districts except the Roper, which is likely to have occurred due to ongoing infrastructure development and intensification. The average number of paddocks (the median was reported in this report) and the average number of man-made water points per property have increased across the region. Interestingly, the average number of man-made water points per property in 2010 on the Sturt Plateau was nearly twice that in 2004. This must be due to both differences in sample size and infrastructure intensification.

Priorities for infrastructure development remained the same, with water points the first priority and paddock subdivision the second priority.

Ownership

There were some differences in ownership, with a greater percentage of owner-manager properties and a lower percentage of privately-owned manager properties. This is likely due to differences in the sample or classification rather than changes in ownership. The length of time owning and/or managing properties remained very similar when comparing averages (the median was reported in the 2010 survey and cannot be compared directly with the 2004 report).

Markets and turnoff

As a result of the Indonesian 350 kg weight-limit restrictions, there were changes in market destinations. In 2010, 56% of producers sent cattle to Australian abattoirs, compared with 5% in 2004. This has had major ramifications for the northern beef industry. A large percentage of cull cows and bulls were sent to southern abattoirs with a freight cost of around $150 per head. This significantly affected profitability.

Cattle management

The most common herd size remained the same at 2000 to 5000 head and company-owned properties still managed the largest herds. While Brahman remained the dominant breed, 84% of properties mentioned having Brahman in 2010 compared with 97% in 2004, highlighting an increasing number of properties with crossbred cattle, which typically were typically Droughtmaster or Charbray crosses.

There was a definite change in breeding aims. In 2010, the main breeding aim was to select traits within breeds (41% of producers), while in 2004, it was to upgrade to Brahman (24% of producers). The second most common breeding aim remained the same and that was to crossbreed for improved herd performance.

There was an increase in the number of properties carrying out three mustering rounds and using motorbikes and trap yards. The greater use of trap yards possibly reflects a great proportion of Sturt Plateau producers using them in the 2010 survey, as they used trapping the most. However, it may also be a reflection of cost-cutting measures.

There has been a 17% increase in producers culling on pregnancy diagnosis (77% in 2010 vs 60% in 2004), an 18% increase in producers segregating breeders (60% in 2010 vs 42% in 2004) and a 10% increase in producers pregnancy testing (84% in 2010 vs 74% in 2004).

More producers were weighing heifers prior to joining and making selection decisions on heifers after joining (i.e. selecting heifers based on their reproductive performance). Conformation and temperament were still considered more important than fertility when selecting heifer replacements.

EID tags can be used as management tools to record performance information of individual animals, which can be used later for decision making. In 2004 when the NLIS system was still at a voluntary stage, only three producers were using NLIS devices (EID tags) but 27% of producers said that they would utilise EID tags as a management tool in the future. In 2010, when all transported stock had to have a NLIS device unless they were going to live export, 47% of producers individually identified stock for performance recording purposes, 6% planned to identify more stock and 11% planned to start individually identifying stock.

There was a decrease in the percentage of producers supplementing with 89% providing some supplement in 2010 compared with 98% in 2004. This is possibly due to an increase in the cost of supplement. Dry season supplementation was still more common than wet season supplementation. Only half as many properties were producing hay in 2010 (16%) compared with 2004 (30%).

Weaning and mortality rates

There was a 10% difference between the average reported weaning rate in the 2004 (71%) and 2010 (61.5%) surveys. It is unlikely that this reflects reality. Rather, survey respondents may have been more aware of their weaning rates due to better herd recording practices and due to several large- scale reproductive performance benchmarking projects, which indicated that properties in the NT were achieving lower weaning rates than those reported in the 2004 survey.

Producers estimated a higher weaning rate in first-joined heifers in 2010 (78%) compared with 2004 (67%). Furthermore, there was evidence that more producers were culling empty heifers after joining in 2010 than in 2004. Weaning rates may have been calculated after the empty heifers had been removed and not on the joined heifer mob. Thus, 78% possibly reflects calf loss between pregnancy testing and weaning in 2010 rather than a weaning rate per se.

Weaning rate estimates in second joined heifers were lower in 2010 (46%) compared with in 2004 (59%). It is unlikely that actual decreases occurred, but rather that better recording practices and greater awareness of poor performance were noted as a result of the NT Heifer Fertility project, which identified much lower weaning rates in second-calf heifers than the 2004 survey data suggested.

In 2010, producers estimated slightly higher mortality rates in breeders (4.2%) compared with 2004 (3%). However, these were still much lower than those calculated by the MLA breeder mortality project, suggesting that breeder mortality is still not accurately captured by current herd recording practices in northern herds.

Animal health

There was a change in the perceived major animal health problems between the surveys. In 2010, cattle ticks and buffalo flies stood out as the major problems. In 2004, the most commonly mentioned animal health problems were botulism, cattle ticks and tail rot. A very high percentage of producers vaccinated against botulism in both surveys, suggesting that botulism was a well-recognised and prevented animal health problem. There was a slight increase

in vaccination against vibriosis in 2010 compared with 2004, with more properties vaccinating heifers as well as bulls. Two properties vaccinated against pestivirus in 2010; however, a vaccine was not available in 2004.

There was a marked decrease in HGP usage in 2010 (56%) compared with 83% in 2004.

Grazing land management

Based on unweighted data (not reported) the expected increase in carrying capacity in five and 10 years' time was similar across both surveys. In 2010, the average expected increase in five years was 22% and 48% in 10 years. In 2004, the average expected increase in five years was 22% and 42% in 10 years.

There was no change in preferred distance to water.

In 2004, woody thickening was a topic of concern and was listed as one of the major issues affecting environmental sustainability, but was not so in 2010. While the same percentage of producers had noticed a build-up of woody vegetation in both surveys, fewer producers burnt to manage woody thickening in 2010 (32% vs 52% in 2004).

There were some changes in weed control and weed impact ratings. In 2010, about 15% more producers were controlling senna and sida species compared with in 2004. Furthermore, 20% more producers mentioned Parkinsonia as a weed, suggesting either that it was spreading, or that there was greater awareness of it as a weed. In 2010, about half as many producers mentioned crotalaria and Mission grass. Expenditure on weed and pest animal control increased between the two surveys.

Wild dogs were rated much more highly in 2010 as having a negative impact with 74% of producers rating wild dogs as having a high impact compared with 40% in 2004. Wild dogs were also mentioned as affecting profitability.

Business management

There was a 33% increase in the number of properties with documented plans.

Issues affecting profitability

An increasing number of producers mentioned market access and instability, cost of production and production issues as affecting profitability in 2010 compared with in 2004 (Table 63). Government regulation and wild dogs were not mentioned in 2004 but did feature in 2010.

Table 63. Percentage of producers mentioning issues affecting profitability in 2004 and 2010

Issue	2004 (%)	2010 (%)
Market	15	35
Cost of production	20	33
NRM issues	20	-
Production issues	17	31
Government regulation	-	14
Wild dogs	-	13

In general, issues affecting environmental sustainability did not appear to rate as highly on producers' radars in 2010 compared with in 2004. The only issue which was mentioned more frequently in 2010 was feral animals (Table 64).

Table 64. Percentage of producers mentioning issues affecting environmental sustainability in 2004 and 2010

Issue	2004 (%)	2010 (%)
Weeds	45	35
Erosion	20	10
Woody shrub encroachment	13	3
Ability to plan and monitor rangeland management	10	-
Wildfire	10	3
Feral animals	7	16
Ill-advised community pressure	10	-
Overgrazing	7	3
Government policy and regulation	2	10

Finding and retaining staff was the major hurdle facing producers when managing their businesses in 2004. However, in 2010 market issues, roads and cost of production/cash flow were greater concerns (Table 65).

Table 65. Percentage of producers mentioning hurdles facing management in 2004 and 2010

Issue	2004 (%)	2010 (%)
Staff	26	18
Market	3	24
Roads/access/distance	10	20
Cost of production/cash flow	11	26
Nutrition	7	13

Appendix 1 – Impact of different weeds according to district

Number of producers rating weed species as a high impact according to district

District	Gulf	#	Katherine/Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Weeds having a HIGH impact	Khaki weed	1	Bellyache bush	1	Devils claw	1	Crotalaria	1	Barleria	1
	Mimosa bush	1	Devils claw	1	Mission grass	1	Mission grass	1	Devils claw	1
	Noogoora burr	1	Hyptis	1	Noogoora Burr	1	Rubber Bush	1	Lions tail	1
	Parkinsonia	1	Grader grass	2	Parkinsonia	1	Sida	1	Sida	1
	Rubber bush	1	Mission grass	2	Prickly acacia	1	Hyptis	3	Khaki weed	2
	Sida	1	Sida	2	Rubber bush	1			Hyptis	3
					Senna	1			Senna	3
					Grader grass	2			Rubber bush	4
					Hyptis	2			Noogoora burr	5
					Sida	3			MImosa bush	8
									Parkinsonia	11

Number of producers rating weeds species as a medium impact according to district

District	Gulf	#	Katherine/ Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Weeds having a MEDIUM impact	Mimosa bush	1	Devils claw	1	Parkinsonia	1	Crotalaria	1	Grader grass	1
	Noogoora burr	1	Sida	1	Sida	1	Devils claw	1	Prickly acacia	1
	Sida	1	Chinee apple	1	Mimosa bush	1	Khaki weed	1	Sida	2
	Bellyache bush	1	Crotalaria	1	Rubber bush	2	Snake weed	1	Parkinsonia	2
	Hyptis	2	Parkinsonia	1			Hyptis	2	Khaki weed	3
			Noogoora burr	1			Senna	2	Noogoora burr	3
			Parkinsonia	1			Rubber bush	4	Hyptis	4
			Senna	2			Sida	5	Rubber bush	5
			Hyptis	3					Mimosa bush	5
			Rubber bush	3					Parkinsonia	11

Number of producers rating weeds species as a low impact according to district

District	Gulf	#	Katherine/ Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Weeds having a LOW impact	Bellyache bush	1	Crotalaria	1	Mimosa bush	1	Athel pine	1	Kapok bush	1
	Khaki weed	1	Noogoora burr	1	Devils claw	1	Bellyache bush	1	Mesquite	1
	Chinee apple	1	Parkinsonia	1	Bellyache bush	1	Snake weed	1	Mimosa	1
	Devils Claw	1	Grader grass	1	Castor oil plant	1	Wild sesame	1	Mission grass	1
	Grader grass	1	Khaki weed	1	Chinee apple	1	Noogoora burr	2	Grader grass	2
	Senna	1	Hyptis	2	Crotalaria	1	Mossman River grass	4	Prickly acacia	2
	Noogoora burr	2	Rubber bush	2	Mimosa	1	Crotalaria	5	Chinee aApple	2
	Crotalaria	3	Mission grass	2	Parkinsonia	2	Mission grass	5	Crotalaria	2
	Hyptis	3	Sida	3	Noogoora burr	2	Grader grass	5	Devils claw	3
	Sida	4	Senna	3	Senna	2	Parkinsonia	5	Hyptis	4
	Parkinsonia	7			Grader grass	2	Mimosa bush	7	Rubber bush	4
					Rubber bush	3	Rubber bush	11	Mimosa bush	4
					Mission grass	3	Khaki weed	12	Khaki weed	5
					Sida	4	Hyptis	12	Senna	5
					Khaki weed	4	Senna	12	Bellyache bush	6
					Hyptis	5	Sida	13	Noogoora burr	7
									Parkinsonia	10
									Sida	12

Appendix 2 – Impact of pest animal species according to district

Number of producers rating pest animals as high impact according to district

District	Gulf	3	Katherine/ Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Pest animals having a HIGH impact	Wild dog	8	Wild dog	4	Wild dog	6	Wild dog	11	Wild dog	17
	Pig	3	Pig	2	Kangaroo/ wallaby	3	Kangaroo/wallaby	2	Kangaroo/ wallaby	5
	Donkey	1	Kangaroo/ wallaby	2	Buffalo	3	Pig	2	Donkey	2
					Camel	2			Pig	1
					Donkey	2				
					Pig	1				
					Rabbit	1				

Number of producers rating pest animals as medium impact according to district

District	Gulf	#	Katherine/ Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Pest animals having a MEDIUM impact	Pig	2	Pig	3	Wild dog	2	Wild dog	7	Donkey	5
	Wild dog	1	Wild dog	2	Pig	2	Kangaroo/wallaby	4	Pig	4
	Horse	1	Horse	2	Kangaroo/ wallaby	1	Pig	2	Kangaroo/ wallaby	3
	Kangaroo/ wallaby	1	Kangaroo/ wallaby	2	Horse	1	Donkey	1	Wild dog	1
			Donkey	1	Donkey	1			Camel	1
									Horse	1

Number of producers rating pest animals as low impact according to district

District	Gulf	#	Katherine/ Daly	#	Roper	#	Sturt Plateau	#	Victoria River	#
Pest animals having a LOW impact	Buffalo	6	Buffalo	6	Pig	7	Buffalo	11	Kangaroo/ wallaby	10
	Horse	6	Donkey	4	Donkey	4	Pig	10	Donkey	8
	Kangaroo/ wallaby	5	Kangaroo/ wallaby	2	Kangaroo/ wallaby	4	Kangaroo/wallaby	7	Buffalo	8
	Pig	4	Horse	2	Buffalo	4	Horse	4	Horse	8
	Donkey	2	Pig	1	Horse	3	Donkey	3	Pig	7
	Camel	2	Camel	1	Camel	1	Camel	1	Camel	1
	Wild dog	1			Wild dog	1	Wild dog	1		

Appendix 3 – Number of properties undertaking formal training topics in the Katherine region

Training topic	No. of properties
Livestock handling	19
Horsemanship	16
ChemCert	14
First Aid	12
Pregnancy testing	9
Grazing land management	8
Working dogs	7
Shoeing	5
Business management	4
Bull selection	4
Mechanics	3
Certificate in Agriculture	3
Welding	3
Nutrition EDGE	3
Monitoring	3
Bushfires training	2
Breeding EDGE	1
Spaying	1
Artificial insemination	1
Firearms license	1
Certificate IV – Train the Trainer	1
Holistic management	1
Grazing for Profit	1
Injectables	1
Fencing	1
Rescuing and working at heights	1
Marketing	1

Appendix 4 – Index of plant names

Grass species

Common or Cultivar name	Scientific name
Arnhem finger grass	*Digitaria milanjiana (swynnertonii)*
Bluegrass	*Dichanthium fecundum*
Buffel grass	*Cenchrus ciliaris*
Bunch speargrass/black speargrass	*Heteropogon contortus*
Flinders grass	*Iseilema fragile, I. vaginiflorum*
Jarra finger grass	*Digitaria milanjiana*
Indian bluegrass	*Bothriochloa pertusa*
Kangaroo grass	*Themeda triandra*
Limestone grass	*Enneapogon polyphyllus*
Mitchell grass	*Astrebla lappacea, A. pectinata*
Nixon sabi grass	*Urochloa mosambicensis*
Para grass	*Urochloa (Brachiaria) mutica*
Ribbon grass	*Chrysopogon latifolius*
Rhodes grass	*Chloris gayana*
Silk sorghum	*Sorghum* sp
Silky browntop	*Eulalia aurea*
Soft spinifex	*Triodia intermedia*
Sorghum (annual)	*Sarga (Sorghum) intrans*
Sorghum (grain)	Sorghum bicolor
Sorghum (perennial), plume sorghum	*Sarga (Sorghum) plumosum*
Tully, humidicola	*Urochloa (Brachiara) humidicola*
Wanderrie grasses	*Eriachne ciliata, E. glauca*
White grass	*Sehima nervosum*
Wiregrass	*Aristida holanthera, A. hygrometrica, A. inaequiglumis, A. latifolia*

Legume species

Common or Cultivar name	Scientific name
Cavalcade	*Centrosema pascuorum*
Milgarra blue pea	*Clitoria ternatea*
Leucaena	*Leucaena leucocephala*
Seca stylo	*Stylosanthes scabra*
Verano stylo	*Stylosanthes hamata*
Wynn cassia	*Chamaechrista rotundifolia*

Tree species

Common name	Scientific name
Eucalyptus/Eucalypts	*Corymbia* spp, *Eucalyptus* spp
Lancewood	*Acacia shirleyi*

Weed species

Common name	Scientific name
Athel pine	*Tamarix aphylla*
Barleria	*Barlaria prioritis*
Bellyache bush	*Jatropha gossypifolia*
Caltrop	*Tribulus* spp
Castor-oil plant	*Ricinus communis*
Chinee apple	*Ziziphus mauritiana*
Crotalaria	*Crotalaria goreensis, Crotalaria* spp
Devil's claw	*Martynia annua*
Grader grass	*Themeda quadrivalis*
Hyptis	*Hyptis suaveolens*
Khaki weed	*Alternanthera pungens*
Lions-tail	*Leonotis nepetifolia*
Mesquite	*Prosopsis limensis*
Mimosa	*Mimosa pigra*
Mimosa bush	*Acacia farnesiana*
Mission grass (annual)	*Cenchrus pennisetiformis (Pennisetum pedicelatum)*
Mossman River grass	*Cenchrus echinatus*
Noogoora burr	*Xanthium occidentale*
Parkinsonia	*Parkinsonia aculeata*
Prickly acacia	*Acacia nilotica*
Rubber bush	*Calotropis procera*
Senna (candle bush)	*Senna alata*
Senna (coffee senna)	*Sena occidentalis*
Senna (sicklepod)	*Senna obtusifolia*
Sida (spinyhead sida)	*Sida acuta*
Sida (Flannel weed)	*Sida cordifolia*
Sida (paddy's lucerne)	*Sida rhombifolia*
Snake weed	*Stachytarpheta* spp