



Rangelands Memo

November 2019

Inside:

8

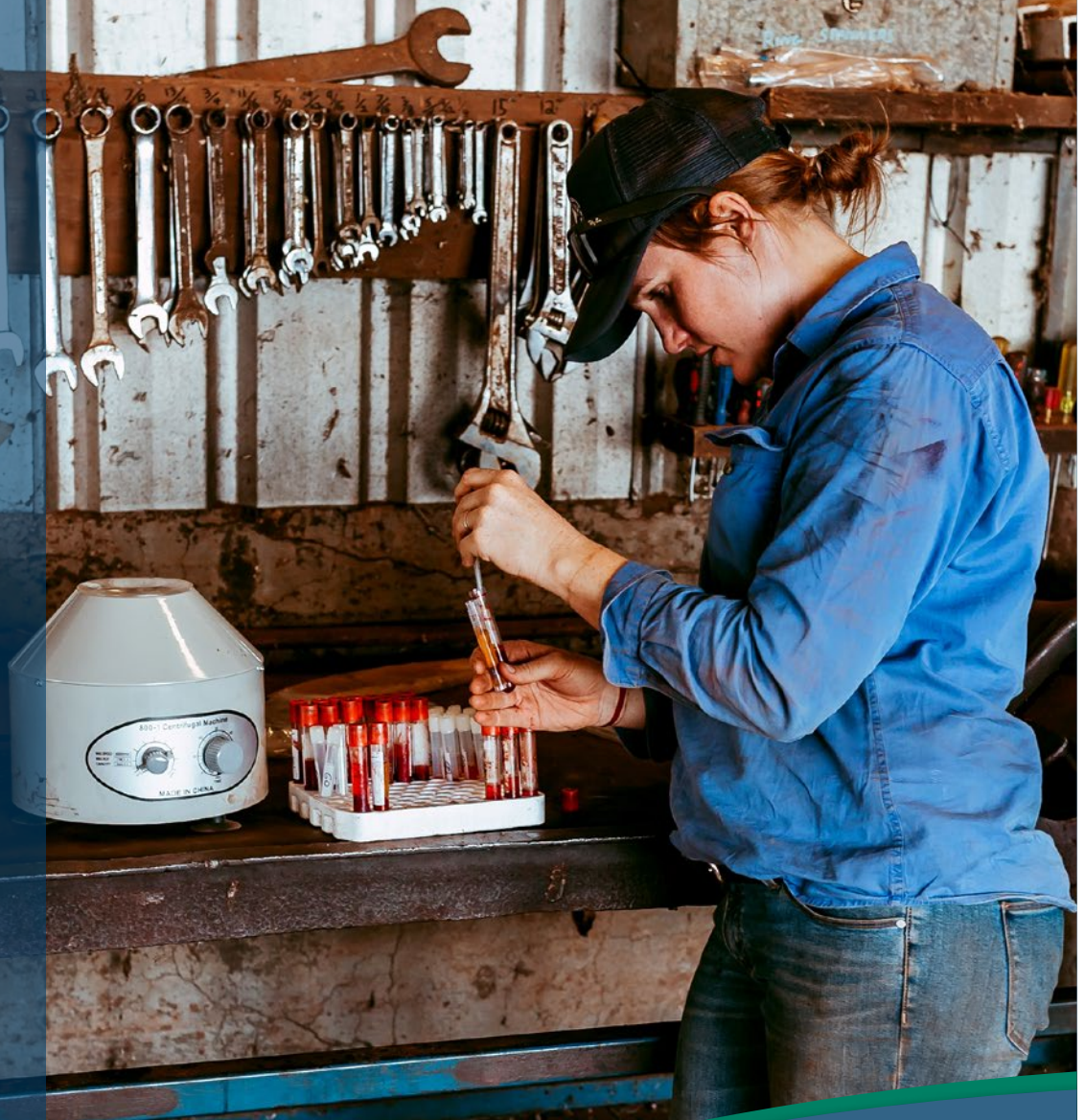
Managing
successive dry
periods

24

The MLA
Phosphorus
Challenge

48

Upgrades to
the Kununurra
Quarantine
Yards



Front cover: DPIRD development officer Clare Atkins processing samples for Meat and Livestock Australia P Challenge. See page 24 for more information.

Important disclaimer

The Chief Executive Officer of the Department of Primary Industries and Regional Development and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

Copyright © State of Western Australia (Department of Primary Industries and Regional Development) 2019

Department of Primary Industries and Regional Development

3 Baron-Hay Court, South Perth WA 6151

+61 1300 374 731 | enquiries@dpird.wa.gov.au | dpird.wa.gov.au

ABN: 18 951 343 745

ISSN 1033-5757

Contents

Foreword	4
Government proposes Pastoral Lands Reform package	5
Successive light seasons: Hope and pray but act to your plan.....	8
A challenging dry season – knowing when to make difficult decisions for acceptable welfare outcomes.....	12
Twilight forums – bringing events back to the bush.....	14
Influence of Madden-Julian Oscillation phase on rainfall and intra-seasonal dry spells: Halls Creek case study.....	19
White grass	22
The MLA P Challenge raising awareness of the adequacy of dietary phosphorus in northern Australia	24
Lake Argyle rubber vine – 2019 update.....	30
Non-indigenous plants – working together to resolve contention!.....	32
The sterile leucaena project	34
Plans underway for the Fitzroy	38
Introducing paddock power.....	44
Kidman Springs study finds substantial benefits from phosphorus supplementation.....	46
Kununurra quarantine livestock yard upgrades.....	52
Reinvigoration of Gascoyne Research Facility.....	54
From drought to flooding rains.....	57
It's only a word	60
Protect your livestock from lead poisoning	61
Remote water monitoring technology in the East Pilbara.....	62
Pain relief management for livestock	65
Help prevent African swine fever entering and establishing in Western Australia	68
The bloke whisperer... (Talking to blokes about health and wellbeing)	70
Regional Men's Health Initiative	72
Have you received your "Is it fit to load?" guide yet?.....	74

Foreword

The State Government has today announced our Pastoral Lands Reform measures to support the long-term prosperity of the pastoral industry and improve the environmental management of WA's pastoral estate.

The pastoral estate covers more than 860,000 square kilometres and is a significant asset to the State of Western Australia.

Pastoral Lands Reform focuses on the condition of the pastoral estate. The reform aims to encourage best-practice land management and more effective administration of the pastoral estate, as well as offering improved security of tenure to pastoralists so they can invest with greater confidence in land management and non-pastoral activities.

Pastoral Lands Reform will:

- provide better performance information for Government and pastoralists;
- provide clear standards for land condition;
- reward good land management with improved security of tenure.

Key elements of our Pastoral Lands Reform package include:

- Statutory right of pastoral lease renewal, subject to compliance with lease and statutory conditions and pastoralists opting in to a voluntary accreditation system to be co-designed by Government and the pastoral industry
- Ability to increase lease term to 50 years, subject to Native Title
- Statutory right to transfer diversification permits upon transfer of the lease, subject to compliance with permit conditions, to encourage capital investment
- Enhanced land management to deliver better knowledge of the pastoral estate and support improved land condition through encouragement of best practices, with an integrated risk-based approach to land condition monitoring and compliance to be developed with industry.

This is a modest and considered package. We want to support pastoralists to develop business models that improve land condition, grow their business and broaden their income streams through diversification into tourism and horticulture, and in turn create jobs for regional WA.

Public consultation on a draft Amendment Bill will begin once the draft amendments to the *Land Administration Act 1997* have been completed.

Many pastoralists have been managing very difficult seasonal conditions across the rangelands.

The Department of Primary Industries and Regional Development is continuing to work with the State's pastoral industry to manage the prolonged dry conditions. Officers have visited more than 100 properties since July, with a focus on animal welfare considerations and management.

While the majority of pastoralists are managing these difficult conditions, the department has been working with a small number of properties around livestock management measures, including steps to improve water provision.

The [2019 pastoral season webpage](#) provides useful material to support producers, including climate information, livestock management information and tools, and links to available support services and assistance.

Industry has responded to the challenging season, increasing water infrastructure; providing for a variety of agistment arrangements and implementing dry season herd management plans.

The agistment process for pastoralists across the rangelands had been streamlined to help ensure stock welfare. The Pastoral Lands Board (PLB) has authorised the Department of Planning, Lands and Heritage to approve applications on its behalf, to allow the early movement of drought-affected stock between properties.

We know that conditions remain challenging and we will continue to work closely with industry and producers.

We are forward planning to build industry resilience to climate variability in the rangelands to give our pastoralists the best chance at thriving across the rangelands.

Hon. Alannah MacTiernan MLC

Minister for Regional Development; Agriculture and Food

Government proposes Pastoral Lands Reform package

Teena Shervington, Manager Strategic Programs, Regional Business Development, DPIRD

The State Government has announced its proposed Pastoral Lands Reform package of legislative, regulatory and administrative measures to support improving the land condition of the pastoral estate, fostering best-practice land management, and encouraging development and diversification on the pastoral estate.

Pastoral Lands Reform will:

- provide better performance information for Government and pastoralists;
- provide clear standards for land condition;
- encourage good land management;
- support pastoralists to demonstrate best-practice land management; and
- reward good practice.

For pastoralists, Pastoral Lands Reform offers improved security of tenure so they can invest with more confidence in the capital improvements required for better land management and non-pastoral activities.

WA's pastoral estate covers more than 860 000 square kilometres and is a significant asset to the State. It supports a pastoral industry, which over many years has contributed significantly to WA's economy. This industry also provides fire management, feral animal control and other environmental services, and job opportunities for regional communities.

Many parts of the pastoral estate have significant cultural values for Aboriginal people, and emotional significance for the general public.

The prosperity of the pastoral industry is directly linked to the long-term productivity of the land, and therefore the sustainable management of its natural resources.

The ecological sustainability of the pastoral estate is not adequately protected by the current system of land monitoring and administration. Some parts of the pastoral estate suffer from historic degradation, limiting its ability to support profitable businesses and jobs.

To ensure that the potential of the pastoral estate to deliver positive environmental, economic and social outcomes is realised, it is essential that it is managed sustainably, for long-term outcomes.

Land management

Enhanced land condition monitoring will deliver increased knowledge of the pastoral estate and support improvement of land condition through encouragement of best practices.

An integrated risk-based approach to land condition monitoring and compliance on the pastoral estate will be developed in partnership between Government, Pastoral Lands Board (PLB), the pastoral industry, Traditional Owners and other key stakeholders.

Over the next three years, Government will:

- develop regional land condition standards and good pastoral land management guidelines and policies;
- design a risk-based pastoral land management program based on on-ground and satellite monitoring to inform the frequency and intensity of monitoring on individual leases;
- work with industry to co-design define best practice for business and land management; and
- identify long-term resourcing requirements.

A voluntary, opt-in land management accreditation system will be co-designed by Government and the pastoral industry to encourage the use of best-practice pastoral land management activities. Pastoralists who opt-in to the accreditation system will be able to formally demonstrate their good land management credentials.

Other measures to improve administration and management of the pastoral estate include:

- enhanced statutory enforcement powers for the PLB
- Minister for Environment to nominate a member with expertise in the field of flora, fauna or land conservation management for the PLB
- improved coordination with environmental and animal welfare legislation.

Security of tenure

Improved security of tenure for pastoralists will minimise the uncertainty and risk associated with the capital investment required to enhance land management.

By opting-in to an accreditation system approved by Government, compliant pastoralists can access a statutory right of lease renewal. In addition, pastoralists can apply to increase lease terms to 50 years, subject to native title.

The current lease renewal system will continue to apply for pastoralists who choose not to opt-in to an accreditation system.



WA's pastoral estate covers more than 860 000 square kilometres and is a significant asset to the State

Development and diversification

Measures aimed at encouraging development and diversification on the pastoral estate will give pastoralists confidence to explore complementary income from sources other than livestock, further reducing the financial risk of investing in improved land management.

A statutory right to transfer diversification permits upon transfer of the lease, subject to compliance with permit conditions, will remove uncertainty in relation to capital investment in non-pastoral activities conducted under a diversification permit.

Streamlining inter-agency approval processes for permits will increase transparency, and introduce options for fast-tracking where applicable.

Consultation

A public consultation process will commence once the draft amendments to the *Land Administration Act 1997* have been completed.

Individuals and organisations will be able to respond to the draft amendments through a variety of methods including the DPIRD website, email, post and in-person at consultation forums to be held across the state in regional and metro areas.

For more information on the Pastoral Lands Reform, please visit drd.wa.gov.au/projects/PLR or contact PLR@dpird.wa.gov.au



The Pastoral Lands Reform package focuses on improving the land condition of the pastoral estate, fostering best-practice land management, and encouraging development and diversification

Successive light seasons: Hope and pray but act to your plan

Raymond Stacey, Advisor, Resource Consulting Services

Rainfall variability is a normal part of agriculture. Across northern Australia, we experience a wet summer and a dry season throughout the rest of the year. The consistent thing about the wet summer is its inconsistency; early start, late start, late finish, early finish, big wet, little wet. Drought is a shortage of feed when we would expect it and we are either going into drought, in drought or coming out of drought.

It is something that confronts us all in grazing from time to time; first dry year - okay; second - this hurts and third dry year - this is really tough. These successive dry years come extra hard in country that is regarded as fairly reliable. We can worry all we like about the shortage of rain, but all we can manage is the feed that has grown in the wet summer just gone.

Unfortunately, we see too many operations where “hope” was the plan. As the dry season progresses on these operations, we often see stock low in condition with poor production, pasture is thin with ground cover diminishing daily, business equity is declining, cash reserves are low and the people are stressed and feeling out of options.

At RCS, we use the analogy of the three-legged pot when discussing management. The pot and the people in it are supported by the three legs - land, production/stock and business/finances. These legs need to be managed in balance. If the legs get out of kilter and the pot tips over, we lose the people and money.

Some common factors emerge with managers of breeding properties in drought crisis situations across northern Australia. In the lead up, there have been years with higher rainfall and herd numbers which increased with higher weaning rates, more females retained and lower mortalities. In some country the numbers of cleanskin stock numbers have built rapidly along with increasing feral species (donkeys, camels etc). All these contribute to total grazing pressure. Stock numbers are uncertain with limited regular planned pasture budgeting and monitoring.

The first low rainfall season arrives and there is enough feed to get through the year doing “as normal” management, though at the break of season, stock are a bit lighter in condition, groundcover is low and plants are eaten down a lot further than previous years. As a result, when the rain is light in the following summer, there is less pasture growth from the weakened plants with high stock numbers competing for the limited grazing. The downward spiral starts here and it becomes a priority to manage this situation.

With managers that reach this state of crisis, we assess the present situation by-

- Estimating carrying capacity (CC): Feed budget how much grazing is available in the paddocks. Using direct estimates of feed available such as stock days per hectare (SDH) or going through the kgs of grazing



pathway, we estimate how many stock days of feed are available. This is the short term carrying capacity. It is critical in these estimates that we be realistic about what stock will productively graze, how far stock can productively walk to grazing and how we want to leave the plants for the next growing season. E.g. 30 SDH of feed x 10 000ha would be a carrying capacity of 300 000 stock days of feed.

- Asking “How long does this feed need to last?”: This is the period of time from the feed budget to when we have a high probability of sustained green growth in the next growing season.
- Estimate stocking rate (SR): How much feed does the current herd need? Model the current herd plan through on a month-by-month basis. Using Adult Unit tables we can work out how many stock days of feed are required. e.g. 2000LSU for 200 days will consume 400 000 stock days of feed. Therefore we will have a shortfall of 100 000 stock days of feed.
- Asking “Does the feed available match the feed required?”: If yes, continue on. If no, then we take immediate steps to match SR:CC. e.g. a shortfall of 100 000 stock days divided by 200 days would mean 500 stock units must be removed immediately.
- Assessing the destocking plan: Any delay in destocking would mean more stock have to be removed. Therefore, early action will lower the destocking pain, leaving more feed for the remainder to perform on. e.g. if it took a month to destock, over 680 LSU will have to go.

There is no one right way to manage in drought. It is a whole package of strategies and the objective is to have the people, stock, land and business as healthy as possible.

Managers have taken many options that have worked for their businesses during the drought.

- Reducing SR (numbers) by marketing planned sales earlier, pregnancy testing and marketing empty cows, early weaning, marketing cows that will calve outside the ideal calving window for their operation, catching and marketing cleanskins, culling feral grazers, moving stock away on agistment, topping and tailing the herd, and retaining the lower risk breeders.
- Retaining the stock that will give best return for the business such as cows that calve in the best calving window and stock that give the best gross margins.
- Adding carrying capacity by getting water to country that has been outside grazing arcs.
- Early weaning to take pressure off cows and optimise cow condition.
- Pregnancy testing cows into calving groups and with targeted feed available and supplementation.
- Combining mobs so that some targeted country gets rested. Water supplies need to be assessed before this strategy is employed.
- Reworking stock flow and cash flow budgets to reflect the new reality and keeping financiers up to date with plans.
- Partitioning cash from forced sales so that it is available for the rebuild and not used for overheads.
- Keeping staff informed of the plans and how they are going.
- Taken breaks off property and maintained an “oasis” to come home to.

In managing the crisis part of drought, people have learnt that preparedness is key and have put in place management plans and options so that decisions are not being made under stressful situations such as when having too many stock, too little feed and too few options late in the year. The following strategies are drawn from the Drought Management section of the Resource Consulting Services Grazing for Profit School.

For the people:

- Understand that drought is normal and have plans to minimise the effect of drought.
- Act on time to plans. Research of southern Australian graziers found that those who best managed in droughts were those who had the discipline to act as planned.
- Plan to not create feed shortages.
- Educate people so that they are prepared, skilled and resilient.

For the land:

- Manage grazing to promote country health. Have planned rest in country. Manage for plant health.
- Maintain a grazing chart and know your carrying capacity benchmark (how much feed you grow per 100mm of rain).
- Develop reliable water supplies.
- Fence to manage pasture.
- Know your critical rain dates; the dates by which if it has not rained, destocking begins. Typically there are two dates - the first is the late start to the season so when this happens, be prepared for an early warning. The second is the understanding of when limited growth will occur so that you can start to act on plans.

- Feed budget at end of growing season and match SR:CC early. In the summer growing country, we know that the feed we have by the end of April is what we have to get us through the year. Matching SR:CC avoids overgrazing and driving country health down. Be the last into drought and first out.

For the stock:

- Identify the keeper herd (typically breeders that will not be sold) and the negotiable herd.
- Know your critical rain dates- the dates by which if it has not rained destocking begins.
- Act on time to plan. By acting early you can be ahead of the main rush to sale or agistment. Reducing numbers early also provides more feed for stock remaining and reduces massive destocks later or stock losses.

For the finances:

- Have an enterprise mix that is compatible with drought risk.
- Plan stock and cash flows.
- Budget for profit.
- Build reserves in the business.
- Understand tax implications of forced sales.
- Plan for opportunities in drought.

From the position of preparedness, having plans for the various what ifs, we are prepared to act early and not struggle with the crisis situation later in the year.

Businesses that implement strategies for drought preparedness have observed improved cow condition, running 25% less females and yet branding the same number of calves, having grass up their sleeve, not having animal welfare issues to cope with late in the year and how this is better for the whole operation, land, stock, business and people.

The plan is to optimise the profits in the good years and minimise risk in the bad.

Raymond Stacey is an advisor, facilitator and coach with Resource Consulting Services. To get in contact with Raymond, please call the RCS office on 1800 356 004.



Raymond Stacey

A challenging dry season – knowing when to make difficult decisions for acceptable welfare outcomes

James Matthews, Senior Livestock Compliance Officer, DPIRD, Broome

With much of the northern rangelands experiencing a below average wet season, and with dry conditions expected to remain until the start of the next wet season in late 2019, many pastoralists will need to take action to manage risks to animal welfare.

Animals should not be allowed to lose condition to the point where they become seriously weak or at risk of death due to starvation or thirst. If livestock are reaching this point, they should be moved and given adequate food, water and shelter, or killed humanely (euthanasia).

‘At-risk’ livestock should not be mustered or transported unless they are fit for the journey. Producers have a responsibility under the Animal Welfare Act 2002 and the Model Code of Practice for the Welfare of Cattle to ensure their animals are fit before transporting them.

The Meat & Livestock Australia Guide ‘Is the animal fit to load?’ is a good tool for determining an animal’s suitability for transport. If stock are going to be walked, you must first consider if they are in condition to deal with the heat and distance, and ensure that they are provided with sufficient water, food and rest. The journey must not cause harm to the livestock.




If livestock cannot be moved and they are seriously weak or at risk of starvation or dehydration, euthanasia may be the most humane course of action. For guidance on humane killing of cattle and sheep, please refer to part 9 of the Model Code of Practice for the Welfare of Cattle or part 11 of the Code of Practice for Sheep in Western Australia.

The department has also produced a useful publication titled Humane destruction of sheep and cattle to ensure animals receive appropriate care. The publication covers methods of destruction, types of firearms required, point of aim and how to confirm death, and is available from the department’s website.

At these times, it’s also important to take account of human wellbeing. Support services that can be used include the WA Regional Men’s Health Initiative (08 9690 2277) and Beyond Blue (1300 224 636).

Don’t hesitate to check in with your family, friends and colleagues, to make sure that everybody gets through this difficult time.

Table 1. Welfare decisions for cattle based on animal condition

	Fat score 1	Poor	Very poor
Cow condition	 <p>Lean but strong and healthy and with no significant muscle wastage. Likely reduced reproductive performance</p>	 <p>Healthy but with significant muscle wastage. Unlikely to conceive. Able to recover if adequately fed</p>	 <p>Weak, with very low body reserves. At risk of death from cold, wet weather or other stress. Slow recovery reliant on high-quality care</p>
Backbone	Easily seen	Spines of backbone identifiable	Spines of backbone individually identifiable
Short ribs	Visible. Fairly sharp to touch	Prominent and very sharp to touch	Very prominent and easy to see individually
Inside pin bones	Slightly sunken	Sunken	Deeply sunken to the bone
Muscle wastage	Rump muscle concave (between hooks and pins)	Rump muscle concave. Muscle wastage in loin and leg muscle evident	Muscle wastage over whole body. Rump and leg muscles deeply concave
Stifle joint	Not identifiable	Not identifiable	Identifiable
Tail bones	Individual bones not identifiable	Individual bones just able to be felt	Individual bones easily felt
Skin	Pliable	Less pliable	Tight
Appearance	Bright, alert	Healthy	Lacking energy or dull
Mobility	Normal gait	Mobile, able to lie down/rise with ease	Unsteady gait, may drag or cross over hind feet. Difficulty lying down/standing up
Ability to calve	Some assistance required	Moderate assistance required	High level of assistance required
Transport, sale	<ul style="list-style-type: none"> • Suitable for transport but with minimum time off feed • Suitable for sale but must not be kept off feed for extended periods 	<ul style="list-style-type: none"> • Unsuitable for transport over long distances • Unsuitable for sale at saleyards • Suitable for sale only direct to farm or abattoir • Suitable for transport direct to agistment 	<ul style="list-style-type: none"> • Not fit for transport
Actions required	<ul style="list-style-type: none"> • Must be fed adequately to prevent further weight loss • Supervise and be ready to assist during calving 	<ul style="list-style-type: none"> • Must be fed adequately to prevent weight loss • Supervise closely and be ready to assist during calving 	<ul style="list-style-type: none"> • Must be given high-quality feed, water and care or carry out humane destruction • Supervise closely and be ready to assist during calving

Twilight forums – bringing events back to the bush

Clare Atkins and Stephanie Coombes, Development Officers, DPIRD, Kununurra and Broome

Ongoing dry conditions across large parts of the northern and southern rangelands have resulted in increased pressure on the rangelands, livestock, infrastructure, management and staff.

DPIRD is undertaking a dry season response program to support pastoralists to manage the challenging conditions and to ensure positive animal welfare outcomes. To date this has included providing information to support business decision-making, extending road train permits, improving the turnaround time for agistment requests, investigating remote satellite imagery resources, providing assistance to individual pastoralists where needed, and access to subject matter experts and support services through on-station events.

In April, the Northern Beef Development (NBD) project hosted a series of on-station workshops titled Twilight Forums (forums) with the theme of “Managing for climate variability”.

Three forums were successfully delivered in the Pilbara and Kimberley regions and were attended by 38 staff from 13 pastoral companies.



DPIRD Development Officers and the guest speakers travelled many kilometres to host the events on-station instead of in towns



A number of resources were made available at the forums, but the laminated pastoral maps were the biggest hit

Regrettably, the impact of Tropical Cyclone Veronica and the potential impact of Tropical Cyclone Wallace postponed two forums in the Pilbara region. These were re-scheduled and delivered across the Pilbara in October, with an additional forum added for the Gascoyne region. The October forums were attended by 52 people from 15 pastoral companies.

Twilight Forums are an extension tool developed by the NBD team to provide timely access to relevant information and reduce producer downtime by being hosted on multiple stations across the northern pastoral region. Neighbouring stations within a three-hour driving radius are invited to attend each event to allow a full morning's work before the event commences at 2pm and conclude at 6pm with a barbecue.

Climate variability and available monitoring and management tools

The Northern Australia Climate Program (NACP) local extension officers, known as Climate Mates, provided an explanation of the four key drivers of seasonal climate in the northwest; the Madden-Julian Oscillation, the Monsoon, the El Niño Southern Oscillation and the Indian Ocean Dipole.

Attendees were taught how to find and interpret measures of climate drivers on the BoM website. Understanding these key drivers and their indexes is important for reading seasonal outlooks as well as informing decision-making processes.

In addition to BoM, some useful apps and websites such as CliMate, Long Paddock and ARM online were introduced, along with discussion of herd management implications of the current dry conditions and median outlook.

The NACP Climate Mates are available across the north to connect producers to the NACP seasonal forecast and assist producers to further their understanding of seasonal climate forecasts.



Grey McKay presenting Climate information at Bidgemia Station in the Gascoyne

Forage budgeting

With over 30 years of experience in research, development and extension in the grazing lands of northern Australia, Col Paton discussed management strategies to improve land condition and increase carrying capacity and profitability.

The session included a field walk to undertake a practical calculation of feed on offer. Participants were tasked with identifying pasture species and estimating the quantity of standing forage by using photo standards, before harvesting samples and calculating dry matter.



Pastoralists using photo standards on Ethel Creek Station



Col Paton demonstrating how to assess available top feed



It was great to see the next generation learning how to do a forage budget

Col's take home messages were:

Regardless of weather forecasts, make sure:

1. your land is always 'rain ready' (good land condition with attached ground cover)
2. you regularly monitor pasture, animal and land condition so that you can anticipate and avoid feed shortages, diminished animal performance and land condition decline
3. there is flexibility in your herd structure and grazing management to allow for timely adjustment of stock numbers.

Applications of satellite imagery in extensive pastoral enterprises

After manually calculating the feed on offer to manage carrying capacity, Phil Tickle from Cibo Labs presented on how satellite technology can be leveraged to answer questions such as: How many grazing days do I have?; How much green or non-green cover do I have?; Is my land condition improving or declining?

While the technology has been available for close to 30 years, Phil said a silent revolution had been taking place in the last 10 years with an increase in the frequency at which satellites capture data and the level of detail captured. Some satellites pass over as often as every five days and are able to capture 10m resolution data—enough to see individual trees.

Satellite imagery can be used not only to assess pasture biomass, but the stage of growth, thus allowing land managers to monitor pasture response to weather events such as rain and heat waves.

Satellite technology is complementary to traditional methods of forage budgeting and assessments by being able to quantify pasture growth and consumption, allowing for a direct



Col Paton explaining how to use photo standards for estimating pasture biomass



Phil Tickle demonstrating how to use a plate meter to assess pasture biomass



Pastoralists assessing pasture biomass in a quadrat

comparison with the predictions made through traditional forage budgeting methods. The accuracy of visual assessments made out in the paddock can be measured against data collected from the satellites. However it was highlighted that the technology cannot be used as a replacement for visual assessments in the paddock.

Satellite imagery can also be used to demonstrate development potential to financial lenders as imagery showing unutilised country can be used to demonstrate a business case for water point development.

The ability to monitor land condition not only for internal business management, but to also demonstrate positive stewardship to the broader community was heralded as a major opportunity of the technology.

While there are a number of opportunities available from the use of satellite technology, pastoralists are encouraged to undertake a benefit-cost ratio analysis to understand the benefits applicable to their specific enterprise.

Regional Men's Health Initiative

The October forums included a fourth presenter, Owen Catto from the Regional Men's Health Initiative. Owen provided an informal presentation during dinner on the topics of wellbeing, managing situational distress, and looking after yourself and your mates.

The NBD team invite Owen to speak after reflecting on the amount of time that is dedicated to learning about how to look after cattle and country, compared to the time spent learning about how to look after ourselves.



Owen Catto from the Regional Men's Health Initiative sharing information on how to maintain wellbeing



Each event had a great turnout, however the Gascoyne forum took home first prize with 26 people attending

Attendance at the Twilight Forums is increasing with repeat as well as new stakeholders attending. These tailored events provide an opportunity for pastoralists to engage with their neighbours, access industry leading key speakers and share knowledge.

The NBD team welcomes suggestions from pastoralists about the topics they would like covered at future forums that are scheduled for early 2020.

For more information contact Mariah Maughan, Development Officer, DPIRD, Broome, on +61 (0)8 9194 1440 or mariah.maughan@dpird.wa.gov.au



The Twilight Forums offer an opportunity for pastoralists to network and discuss what they've learnt by putting on a BBQ at the end of the event



A cow calf pair in the Gascoyne, October 2019, in great condition given the lack of rain. A true credit to the hard work of pastoralists

Influence of Madden-Julian Oscillation phase on rainfall and intra-seasonal dry spells: Halls Creek case study

Kath Ryan, Development Officer, DPIRD, Kununurra

Climatology (historical weather observations) together with the Madden-Julian Oscillation (MJO) index forecast and seasonal outlooks can be useful in northern rangeland management decision making.

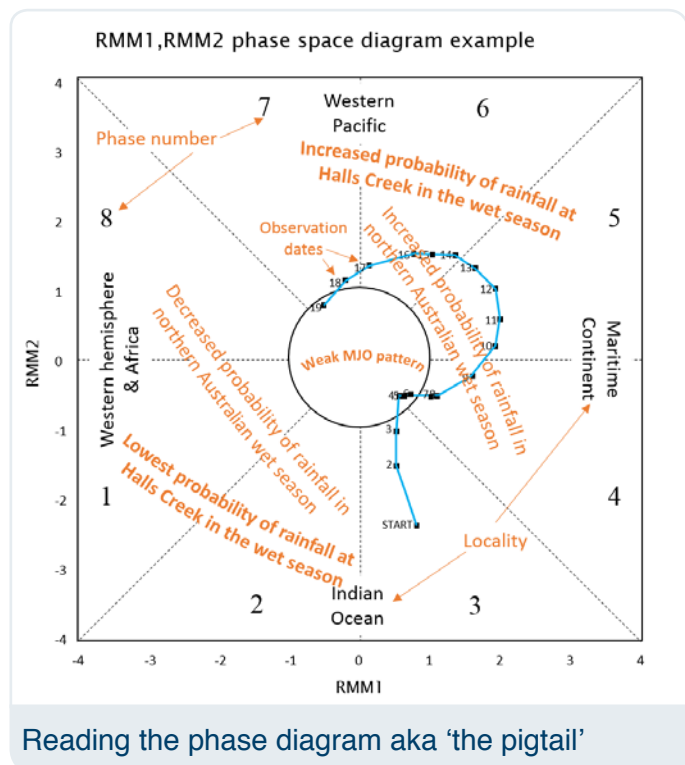
Climatology can provide long term 'best-bet' dates for wet season onset, green date, production point and end of growing season. This information can be used in combination with seasonal outlooks to inform decisions about wet season stock movement, fire management, weed control, joining windows, adjusting stocking rates, planting for restoration or crops and the like.

The MJO is a global-scale feature of the tropical atmosphere associated with weekly to monthly periods of enhanced and suppressed rainfall over northern Australia. It influences the timing, development and strength of the major global monsoon patterns and tropical cyclones, and is associated with variations in wind, cloudiness, and rainfall (Bureau of Meteorology (BoM) website).

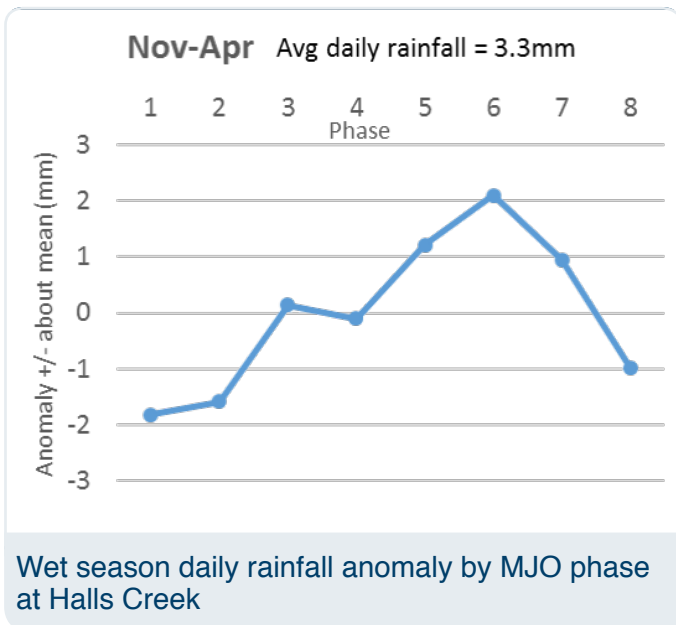
Recent observations and an experimental forecast of the MJO are available from the BoM website. The MJO observations and forecast can be applied to any location and compared with local rainfall events. The MJO phase diagram illustrates the progression of the MJO through different phases, which generally coincide with locations along the equator around the globe. RMM1 and RMM2 are mathematical methods (Real-time Multivariate MJO) that combine cloud amount and winds at upper and lower levels of the atmosphere to provide a measure of the strength and location of the MJO (the index). When the index is within the centre circle of the diagram the MJO is considered weak, meaning it is difficult to discern (NACP climate workshop, Katherine 2019).



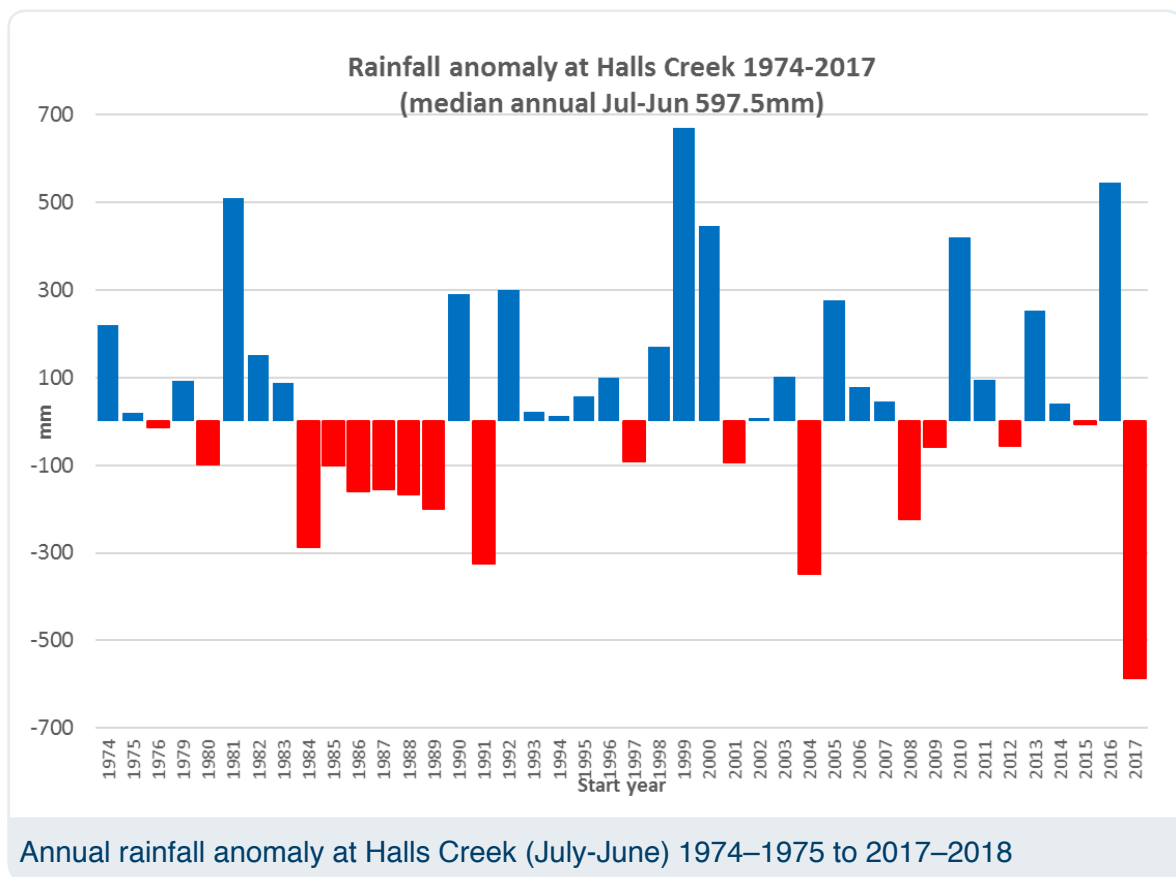
Watching the clouds build up at Ruby Plains station



Historical MJO data and the BoM Halls Creek composite rainfall record were compared by DPIRD to localise existing general information of relevance to the pastoral industry. Summary statistics of rainfall data from 1974–1975 to 2017–2018 at Halls Creek show that phases 5 and 6 are most likely to coincide with rainfall. The MJO also influences ‘dry’ periods during the northern wet season in phases 8, 1 and 2 (Wheeler et al. 2009). Phases 1 and 2 are least likely to coincide with rain at Halls Creek.



The same record set described above was used to investigate the occurrence of ‘rainfall effective for plant growth’, applying the rule-of-thumb threshold commonly used in the Kimberley (50mm or more over three days with follow-up rainfall two weeks later). Rainfall meeting this threshold occurred at least once in 27 of the years in the records 1974–1975 to 2017–2018 and in most MJO phases, but never in phase 2 (note: gap in MJO data 1977–1978 excluded from both datasets).



The 23 years where ‘effective rainfall’ at this threshold was not recorded, coincided with years of near or below median rainfall. Informal observation of seasonal grass growth is at odds with the low incidence of ‘rainfall effective for growth’ in the record (i.e. grass grows even when the threshold is not met), suggesting that the rule of thumb is due for a revision in this locality.

Other major drivers of rainfall at Halls Creek include El Niño and La Niña conditions, the Indian Ocean Dipole and regional soil moisture (Sharmila and Hendon 2019).

Further analyses already underway to improve our understanding of the MJO and other climate drivers include:

- regional drivers of ‘unseasonal’ and variable rainfall- Sharmila Sur (University of Southern Queensland)
- new and improved forecast tools for the MJO- Matt Wheeler (BoM)
- Additional analysis of the MJO and Halls Creek datasets could be used to investigate:
- the correlation with the amount of rainfall received at Halls Creek if the length of time that the MJO remains in phases 4, 5 and 6 (i.e. increased length of time ‘stalled’ may lead to increased rainfall)
- a revision of rule-of-thumb thresholds for ‘rainfall effective for growth’ at Halls Creek.

To find out more about the MJO or the Northern Australia Climate Program in your area, contact your local climate mates, Anne Marie Huey (East Kimberley/VRD) on 08 9191 7069 annemarie.huey@usq.edu.au or Jardine MacDonald (West Kimberley/Pilbara) on 08 9192 5507 jardinem@rangelandswa.com.au

References

Ryan, K. 2019: Madden-Julian Oscillation influence of phase on rainfall and intraseasonal dry spells: Halls Creek case study. Australian Rangeland Society 2019 conf. proceedings (abstract).

<http://www.bom.gov.au/climate/mjo/>

http://poama.bom.gov.au/researcher/agm/project/mjo_prob/mjo_prob.html

Sharmila, S. and H.H. Hendon, 2019: Causes and predictability of multi-year variability of Northern Australia wet-season rainfall. AMOS-ICTMO2019 conf. proceedings (abstract). <http://amos-ictmo-2019.m.amos.currinda.com/schedule/session/61/abstract/84>

Wheeler, M.C., H.H. Hendon, S. Cleland, H. Meinke, and A. Donald, 2009: Impacts of the Madden–Julian Oscillation on Australian Rainfall and Circulation. *J. Climate*, 22, 1482–1498, <https://doi.org/10.1175/2008JCLI2595.1>

For more information contact Kath Ryan, Development Officer, Kununurra, on +61 (0)8 9166 4000 or kath.ryan@dpird.wa.gov.au

White grass

Matthew Fletcher and Kath Ryan, DPIRD, Kununurra and Andrew van Burgel, DPIRD, Albany

White grass (*Sehima nervosum*) is a perennial tussock grass found in the Kimberley and across northern Australia. Figure 1 shows the locations of Western Australian Rangelands Monitoring System (WARMS) sites where white grass has been recorded. The May 2019 Rangelands Memo included an article (pp. 23-25) titled White grass, which discussed some of its key characteristics and evidence from WARMS sites of a general increase in the frequency of this species since monitoring began in 1994.

In this article, we look at changes over the same period in the frequency of several other grasses important to pastoralists that are found at sites where white grass occurs. The species considered are feathertop threeawn (*Aristida inaequiglumis*, Figure 2), limestone grass (*Enneapogon polyphyllus*), black spargrass (*Heteropogon contortus*), ribbon grass (*Chrysopogon fallax*) and bundle-bundle (*Dichanthium fecundum*). The information that follows is based on a poster presented at the Australian Rangelands Society conference held in Canberra in September 2019.

The WARMS data reported was derived from sites in the Derby – West Kimberley and Halls Creek – East Kimberley districts as almost all sites where white grass frequency had shown a clearly increasing overall trend since monitoring began, were from these two areas. Two subsets of sites were selected for comparison purposes:

1. sites showing an increasing trend (at least 15%) in white grass frequency
2. sites where white grass frequency remained relatively stable (trend within $\pm 5\%$)

Frequency changes of the 'other' grasses present at sites belonging to these subsets were then compared.

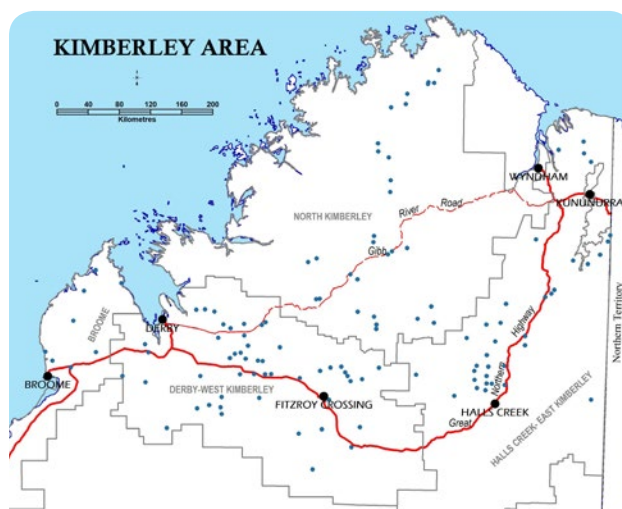


Figure 1 Location of WARMS sites where white grass was recorded



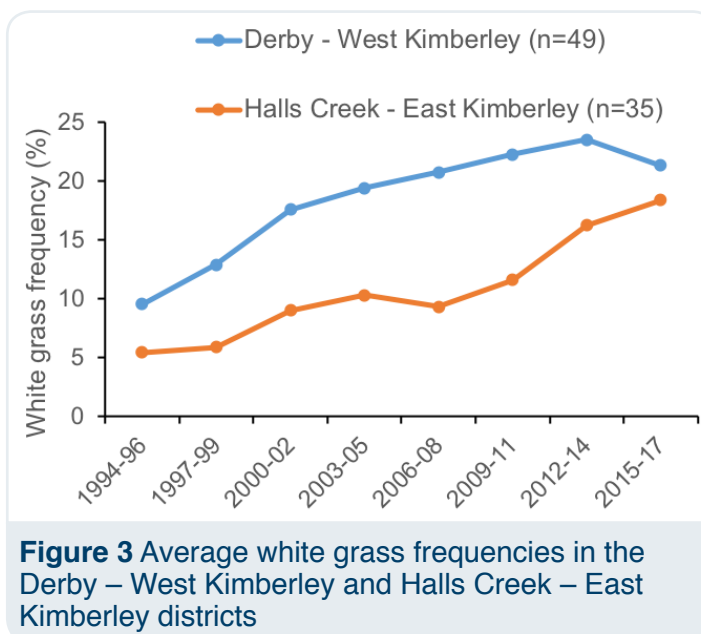
Figure 2 Feathertop threeawn is unpalatable to livestock

Results

Average white grass frequencies for the complete set of study sites in the Derby – West Kimberley and Halls Creek – East Kimberley districts showed generally similar patterns of change (Figure 3).

Feathertop threeawn and limestone grass frequencies generally decreased, regardless of whether white grass frequency increased or was stable. However for both feathertop threeawn and limestone grass, the average decrease was greater at sites where white grass frequency increased.

Black speargrass and ribbon grass frequencies generally increased regardless of whether white grass frequency increased or was stable. Changes in bundle-bundle frequency were not significant.



Discussion

The long-term increase in average frequency of white grass at monitoring sites in the Derby – West Kimberley and Halls Creek – East Kimberley districts has yet to be explained and warrants further investigation. Together, these districts support the majority of Kimberley cattle production. For the region as a whole, reported stock numbers (cattle units) increased steadily from about 387 000 (avg. 1994/95/96) to 727 000 (avg. 2015/16/17). The Kimberley region experienced a very favourable run of wet seasons during the study period.

Although white grass is generally regarded as having limited value for pastoral production, it is a native perennial with good soil-stabilising properties. This exploratory study suggests that the observed increase in white grass frequency is unlikely to be associated with any major change in pastoral productivity. There was some evidence of an accompanying decrease in feathertop threeawn, a species considered undesirable from a pastoral perspective. An increase in white grass was associated with a decrease in the frequency of limestone grass, a palatable though short-lived species that is more abundant after good seasons.

No evidence was found of any influence of increasing white grass on the frequencies of ribbon grass and bundle-bundle, perennials that are highly valued for their contribution to production and soil stability. While the increase in white grass may not be of immediate concern, it is important that we continue to monitor the situation through the WARMS system and pasture assessments more generally.

Acknowledgements

The authors would like to acknowledge the many land managers and departmental colleagues who have contributed to the development and maintenance of the WARMS project.

For more information contact Matthew Fletcher, Development Officer, Kununurra, on +61 (0)8 9166 4019 or matthew.fletcher@agric.wa.gov.au

The MLA P Challenge raising awareness of the adequacy of dietary phosphorus in northern Australia

Clare Atkins and Stephanie Coombes, Development Officers, DPIRD, Kununurra and Broome and Geoff Neithe, Meat and Livestock Australia

While there's no disputing the fact that northern Australia is phosphorus deficient, and that phosphorus deficiency in cattle can have severe impacts on production, the adoption of phosphorus supplementation programs is low.

Beef cattle production can be improved by provision of Phosphorus (P) to animals that are grazing in acutely P deficient regions. A P deficiency will result in restricted feed intake. In these situations, the benefits of providing P can provide significant returns on investment. P supplementation works simply by ensuring maximum intake levels are achieved when animals are on a positive plain of nutrition.

Phosphorus supplementation has been shown to improve growth rates in growing animals by up to 60 kilograms per annum, equating to up to a 50% increase in growth per annum (100-120 kg/hd/year is a typical weight gain for cattle grazed on native pastures), improve milk production and weaning weights by up to 35 kg/hd/year, improve conception rates and significantly decrease breeder cow and calf mortality rates (Quiggley, Poppi and Schatz, 2015).

Unfortunately, the main benefits of supplementation occur over the wet season when most producers feel that their stock do not require supplementation because of the abundance of green pastures. However at this time of the year growing pastures cannot meet the P requirements of cattle.

The other major issue with lack of adoption is that the P levels in paddocks vary depending on the soil types within that paddock. This can result in uncertainty as to when to give P supplementation to ensure a positive cost benefit. For example if a paddock is acutely deficient, marginal or adequate for P, what does this mean for when and how much to supplement?



Samples had to be centrifuged and prepared within hours of collection, which meant the laboratory was swapped for some unusual locations

Recent Meat and Livestock Australia (MLA) funded trials (Quigley et. al. 2015, Dixon et. al. 2018) and an NT project (Schatz et. al. 2019) have validated findings of previous studies regarding the value of phosphorus supplementation during the wet season in areas with deficient soils.

However, the biggest problem for extension officers and advisors is to be able to confidently make a diagnosis and provide advice to pastoralists in circumstances when responses to supplementation are likely to occur, especially in marginal situations.

The current studies have:

- provided a renewed confidence in the Plasma Inorganic Phosphorus (PIP) test as the best indicator of the level of P in the diet of cattle (in supplemented and unsupplemented cattle)
- shown levels respond within a few weeks of changing the amount of P being fed
- showcased that P mobilised from body reserves does not appear to impact significantly on PIP results.

This year MLA ran a Phosphorus Challenge across all of northern Australia. The aim of the P Challenge was to:

- increase industry awareness of the value of PIP testing
- better understand the extent of the P deficiency in northern Australia
- develop a practical 'in field' system of sample collection.

An open call was extended to producers in Queensland, the Northern Territory and Western Australia (WA), with input by local Regional Beef Research Committees and final selection by MLA.



Blood was collected from the coxygeal vein in the tail



A centrifuged sample showing some haemolysis – ideal samples should be a straw yellow colour

The criteria for entry into the project included:

- access to stock with adequate handling equipment
- young breeders, heifers or steers on a good plane of nutrition
- cattle grazing in a known P deficient region or old cropping paddock
- reported growth rates in steers/heifers <120 kg p.a.
- poor reproductive performance.

Blood and faecal samples were collected from 20 animals per property, of the same class and from within the same mob. Blood samples were centrifuged at approximately 4000 RPM for 10 minutes, and serum was extracted and frozen. Faecal samples were pooled into a single specimen jar and frozen. All samples were analysed in Queensland.

Results

Samples from 15 mobs in the Pilbara and West Kimberley regions were collected. In summary, seven herds (paddocks) were classified as adequate (1.95 m.mol/L to 2.68 m.mol/L), four marginal (1.38 to 1.5 m.mol/L) and 4 herds were deemed deficient (0.86 to 1.24 m.mol/L). At time of printing, faecal sample results were not available.



DPIRD Development Officer Stephanie Coombes became known for her unusual stances while collecting bloods

The P Challenge turned out to be appropriately named as many challenges had to be overcome in the process. Much of Kimberley and Pilbara regions had also experienced the poorest wet season in recent years and the plane of available nutrition started to decline earlier than usual, further reducing collection times and resulting in the East Kimberley region not being suitable to participate. There were issues with haemolysis in the collection tubes (red blood cell damage) and samples were required to be centrifuged.

It is hoped that the price of the test may be able to be reduced if after collection of samples on site, equal aliquots of serum can be pooled and tested as one sample, thus reducing laboratory testing charges. The correlation between the test average (20 individual animals) and the pooled samples was 0.99. It is still too early to determine if pooling samples on property will be a technique which will be available in the future.

There was large variation in individual results on some properties and this may be caused by individual animals not consuming enough supplement or because of differing grazing patterns. Supplementation was practised in some herds and these findings need further investigation to ascertain amount and frequency.

All clients involved in the challenge received an individual feedback sheet which included not only their results for that particular paddock but also interpretation of the likely causes and types of economic responses expected.



A heifer with her calf from a mob that was sampled in the Pilbara

While haemolysis occurred to varying degrees, it did not seem to impact greatly on the final outcome. Participants with inconclusive results will be invited to participate again in 2020 when the challenge is run again. Producers in other regions further south such as the Gascoyne have expressed interest in being involved. The P Challenge has generated much discussion and interest among pastoralists in all regions. The preliminary results have been enlightening and will provide opportunities for future engagement.

References

Dixon, R., Fletcher, M., Anderson, S., Kidd, L., Benvenuti, M., Mayer, B., McNeill, D. and Goodwin, K. (2018). Improved management of cattle phosphorus status through applied physiology. Meat and Livestock Australia, North Sydney, Australia.

Quigley, S., Poppi, D., and Schatz, T. (2015). Validation and demonstration of a diagnostic tool for phosphorus status of beef cattle. Meat and Livestock Australia, North Sydney, Australia.

Schatz, T. McCosker, K. and Thomas, S. (2019) Effect of Phosphorus supplementation on female reproductive performance in phosphorus deficient country in the NT. 2019 NBRUC Proceedings.

For more information contact Clare Atkins, Development Officer, DPIRD, Kununurra on +61 (0)8 9166 4044 or clare.atkins@dpird.wa.gov.au or Stephanie Coombes, Development Officer, DPIRD, Broome on +61 (0)8 9194 1430 or stephanie.coombes@dpird.wa.gov.au



A new friend made on one of the station visits



Most people asked a lot of questions about the sample preparation process, but this character didn't have much to say

Get involved: 2020 Phosphorus Challenge



Northern beef producers are invited to sign up for MLA's 2020 Phosphorus Challenge.

The Challenge not only provides participating producers with insights about the P status of their mobs, but it helps MLA build a fuller picture of the P status of northern herds and demonstrate the benefits of testing and P supplementation.

Following the highly successful pilot program in 2019 involving 68 properties, the 2020 Phosphorus Challenge is seeking 100 producers to get involved.

Participating producers will receive the following (valued at \$463):

- blood sampling kit (enough for 20 samples)
- faecal sampling kit
- free postage of kits and samples
- sampling instructions
- analysis of results.

To be eligible, producers must be able to:

- yard stock at a time nominated for sampling OR can organise a technician, extension officer or vet to collect the samples during routine husbandry practices
- have adequate stock handling equipment, such as a vet crush
- have young breeders, heifers OR steers on a good plane of nutrition
- meet criteria to ensure blood sampling is consistent across all mobs
- collect samples at the end of the growing season (depending on seasonal conditions)

Producers should also meet at least two of the following criteria:

- have cattle grazing in a known P deficient region OR an old cropping paddock
- steers/heifers achieving an annual growth of less than 120kg or having a record of poor reproductive performance
- understand they're managing P deficient country and feed P (but want to know if supplementation is sufficient)
- new to the industry and keen to manage P deficiency to improve production.



How to get involved

The 2020 P Challenge will be open to producers in the Gascoyne, Pilbara, Kimberley, Nullarbor and Murchison/Goldfields regions in Western Australia.

Producers interested in participating should contact: Clare Atkins, DPIRD

E: clare.atkins@dpiird.wa.gov.au

Lake Argyle rubber vine – 2019 update

John-Paul Slaven, Biosecurity Officer, DPIRD, Kununurra

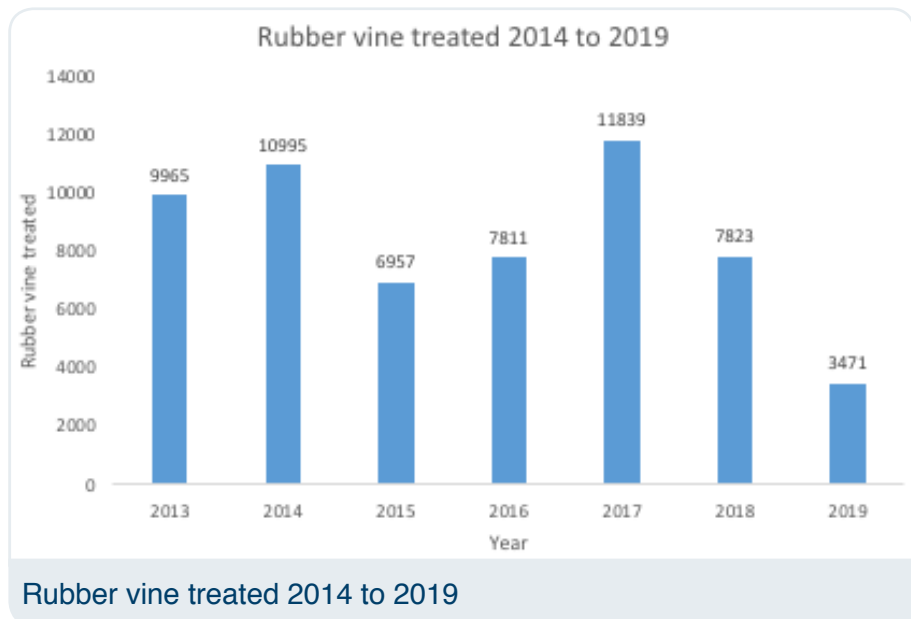
There are few weeds more threatening to Northern Rangelands habitats than rubber vine (*Cryptostegia grandiflora*). It is unequalled in its ability to smother pasture, open woodland, and dense forest. While rubber vine is occasionally found growing in dry rocky soil, it's typically most successful in riparian areas, finer textured soils and habitats with a reduced likelihood of wild fires (Dale, 1978).

Rubber vine first appeared in the Lake Argyle area in the 1990s near the junction of the Ord and Bow Rivers. Since then the Department of Primary Industries and Regional Development (DPIRD) and its partners the Department of Biodiversity Conservation and Attractions (DBCA), Kimberley Rangelands Biosecurity Group (KRBG) and Traditional Owners have staged a yearly campaign to eradicate rubber vine from the region. The Lake Argyle Rubber Vine Advisory Committee (LARVAC) consisting of the above-mentioned agencies, Rio Tinto Argyle Diamonds and contractors now manages the joint effort to eradicate the vine.

The yearly schedule starts with DPIRD conducting an aerial survey over an area of 40 000ha at the conclusion of the wet season rains to identify flowering rubber vine from the air. Weeks of groundwork by staff from all partner agencies and contractors follow aerial survey work to destroy identified populations of vines.

The fruiting biology of the vine is of greatest concern when conducting ground operations. Each mature fully formed fruit is capable of the release of around 340–380 seeds (Tomley, 1995). These spread by wind, running water, grazing cattle and wallabies (Grice, 1997). While the vine fruits and flowers year around maximum fruit production is correlated with peak rainfall periods (Curtis, 1996). With this in mind, LARVAC aims to start ground operations at a time when they will intercept the greatest number of rubber vine seed-pods, typically in the first months after the conclusion of the wet season.

Ground operations involve intensive survey and eradication work. Each reproductive vine is cut down from its host tree and carefully dissected to remove all seed-pods from the vine. Vines are then cut off at ground level and painted with herbicide. Pods removed from the vine are burnt in a hot fire tightly wrapped in layers of bags to prevent fly away of seed during combustion. Pod destruction occurs in the control area so no plant material is moved off site.



Older control areas and outliers identified during aerial work are surveyed on foot with the practice being to visually inspect historical vine locations. Staff survey the previously infested areas by walking transects spaced according to the density of the surrounding vegetation. Typically if the vines are controlled well the previous season the crew will only find immature rubber vine which are cut and painted or hand pulled.

The 2019 control program found 3471 vines in the control area compared to 7823 vines in 2018 and 11839 vines in 2017. Project partners are hopeful that the dry conditions over the 2019 season will further deplete the seed bank and aid control efforts in 2020.

This year's control program concluded with a hot burn conducted by DBCA in the main rubber vine control area. Fifteen staff from DBCA and Emergency Response Team Members from Rio Tinto Argyle Diamonds burnt an area of 2000ha. The primary goal of the burn was to aid accessibility for ground crews operating in the infestation area. Hot burns in high fuel load habitats have previously demonstrated a capacity to achieve high mortality and retard the growth of remaining rubber vine (Collins et. al., 2008). It is expected we will find a significant decrease in vines with the onset of the 2020 season.



From left: DPIRD Biosecurity Officer JP Slaven, Ranger Leroy Carlton, Senior Ranger Imran Paddy, Ranger Dylan Curtin. Photo taken on Limestone creek, Lissadell Station at conclusion of survey work. Photo courtesy Tom Andrews Kidja Rangers

References

- Curtis, J.T., 1946, *Some factors affecting fruit production by cryptostegia*, American journal of Botany, Vol.33, No.10, p699-761.
- Dale, I., 1978, *Factors affecting the distribution of rubber-vine (Cryptostegia grandiflora) in North Queensland*, Proceedings, conference of the Australian Weeds council.
- Collins, E.M., Contarino, A.J., Hasted, J., Williams, P.R., 2008, *The effect of fire and herbicide on rubber-vine (Cryptostegia grandiflora) in Bowling Green Bay National Park, Queensland*, Proceedings, Sixteenth Australian Weeds Conference.
- Grice A.C., 1997 *Post-Fire regrowth and survival of the invasive tropical shrubs Cryptostegia grandiflora and Ziziphus mauritiana*, Australian Journal of Ecology, Vol22, p49-55
- Tomley, A.J., 1995, *The Biology of Australian Weeds 26. Cryptostegia grandiflora R. Br.*, Plant Protection Quarterley, Vol. 10, (4).

For more information contact John-Paul Slaven, Biosecurity Officer, DPIRD, Kununurra on +61 (0)8 9166 4047 or john-paul.slaven@dpiird.wa.gov.au

Non-indigenous plants – working together to resolve contention!

Christopher Ham, Senior Development Officer, Broome

The growing of non-indigenous plants on pastoral leases in northern WA can be contentious. As a result, policy and approvals to use non-indigenous plants tend to apply a precautionary approach.

Contentious situations present an opportunity for government, industry and the community to work together to develop solutions. Examples of this are the Leucaena Network in Queensland developing a Code of Practice for their growers, or voluntary on farm biosecurity plans that can minimise risks to farming systems while simultaneously protecting the environment. These proactive industry-led solutions could be useful concepts for WA pastoralists and regulators to put forward when negotiating this challenging issue.

The area under irrigation on pastoral stations in the Kimberley and Pilbara has increased from 565ha in 2006 to more than 3000ha in 2019 and continues to increase each year. This represents a significant investment into increasing productivity over what is still a relatively small area of land, less than 0.01% of the Pilbara-Kimberley regions. Similar to agriculture across the rest of Australia, economically viable irrigated production relies on growing non-indigenous plants, that is, plants that are exotic to Australia.

Some of the exotic plants introduced to Australia for pasture production have become naturalised and in the worst cases, are acting as serious weeds by altering our ecosystems and adversely affecting biodiversity, resulting in substantial costs to the community. Hence, there is justified concern over their use in northern Australia where the areas of pristine natural environment are of national significance. Exotic pasture plants tend to persist in town sites where there has been hay spread for gardens and where there is extra water and land disturbance. Hence they are very visible and an issue for land managers in urban environments. However, this also highlights that pasture plants tend to colonise highly disturbed environments, especially in the absence of grazing, but in most cases do not spread past areas that are not disturbed.

New research results from field sites in the west Kimberley and Pilbara regions have highlighted that most of the pasture species established under irrigation did not persist in the medium-term after the irrigation ceased. Rather, the trial sites have been re-colonised by the original vegetation. There is of course, contentious species that can become environmental weeds if they enter a favourable environment.

The exotic plants that are likely to be productive are grouped into two; either as tropical grasses that originated from Asia or Africa, or as tropical legumes from South America. Interestingly, Australian flora has not contributed any pasture cultivars to other countries.

Australian native plants are extremely important in pastoral grazing systems. However, they are so well adapted to our wet season that they do not produce suitable quantities of biomass in the dry season, even when irrigated!

There is significant potential to develop native seed industries, though only for dryland (i.e. non-irrigated situations).

Access to irrigation provides the producer with the ability to manage soil moisture and grow crops all year round. Irrigation infrastructure and resource development approvals involve a substantial investment (\$10 000 to \$15 000 per hectare). An economically viable return requires access to a range of plant species, both perennial and annual crops, that will produce high yield of a suitable quality in both the wet and dry seasons.

Temperature and photoperiod responses are strong influences on plant growth. High temperatures can stifle growth of temperate plants in the wet season, while cool nights in the dry season reduces the growth of many tropical plants, particularly legumes. One of the most widely grown grasses under irrigation is Rhodes grass (*Chloris gayana*) because it is highly productive over the wet season and in many areas, still moderately productive over the dry season. Growth does slow down considerably over the cooler months, but overall annual production is the highest of the perennial grass options. The issue with Rhodes grass is not the biomass production, but manipulating the feed quality. With best management practices, metabolisable energy levels of around 9.8MJ/kg are possible, but in practice, Rhodes grass is difficult to manage, understand and graze systems.

This means that whilst it is a very useful crop, it is not adequate as a sole source of fodder when taking into the economic returns required for many irrigators, and the desire to access new markets for northern cattle and meet market specifications.

The evolution of the beef industry from a rangelands system to a more intensive targeted production system requires plant species that can produce high yields and high quality fodder, often coupled with characteristics that pose some level of risk to the environment. At the same time, the physical environment, plant physiology and policies to manage environmental risk limit the options available to pastoralists. In addition, there is some inequity in that many of the desired plants are permitted into Western Australia (WA) and available for use by other agricultural ventures under different tenure.

In WA, the *Lands Administration Act (1997)* requires that pastoralists seeking to grow non-indigenous plants for agricultural purposes require a diversification permit (Section 120 or 121) from the Pastoral Lands Board (PLB). The approval process involves seeking advice from a range of government departments including a weed risk assessment. The PLB has the power to set specific conditions to manage the environmental risk.

The challenge for policy makers is to strike a balance between the legislation, the process of administration, regulation, and the desires of pastoralists to access productive plants, and to mitigate risks to the broader environment. Designing the most effective policy instrument and land management strategies is challenging. Trust, risk and consequence are at the heart of the debate. Contentious situations present an opportunity for government and industry to work together to co-develop solutions.

For more information contact Chris Ham, Senior Development Officer, Broome, on +61 (0)8 9194 1400 or christopher.ham@dpird.wa.gov.au

The sterile leucaena project

Samuel Crouch, Development Officer, DPIRD, Broome

What are we doing?

The Department of Primary Industries and Regional Development (DPIRD) in Western Australia has attracted funding from the MLA Donor Company to examine the feasibility of developing a sterile leucaena that has all the production benefits of leucaena and yet, does not produce viable seed; significantly reducing its weed risk for WA's rangelands.

Why are we doing it?

The tropical forage legume leucaena (*Leucaena leucocephala*) is one of the most profitable forage options available for beef production and is used extensively in central and south-east Queensland. However, *L. leucocephala* is a contentious species as although it is highly regarded for its feed quality and animal production, it can also become a serious environmental weed.

An industry code of practice has been developed by the Leucaena Network in Queensland to reduce the risk of unintended spread. In WA, *L. leucocephala* is currently not approved for use on a pastoral lease in the Kimberley and Pilbara regions (even though there is history of its use) due to its assessment as a very high weed risk. However, there is still considerable interest in the dryland production of leucaena in WA, and this is one of the main drivers for considering a sterile/seedless form. Opportunities for irrigated leucaena production are also increasing, enabling leucaena to be grown in areas considered well outside their ideal dryland environment.

How are we doing it?

Over the next few years, the project will seek to define the most suitable technology for developing a sterile leucaena, including a cost-benefit analysis of preferred strategies. A range of non-GM breeding technologies will be applied, and parent material for the breeding program will be selected from a series of field nurseries established across northern WA and maintained for the life of the project.

Breeding strategies start with the plant's ploidy level, which refers to the number of pairs of chromosomes in the cells of the plants. Five leucaena species have four sets of chromosomes (tetraploid), and 19 species of leucaena have two sets of chromosomes (diploid). The main species of interest is the commercial *Leucaena leucocephala*, known as tetraploid, which is highly regarded for its forage quality, production, and persistence. A potential strategy for this species is a gene-editing technology called CRISPR which can be used to edit out a flowering gene and develop a non-flowering *L. leucocephala* and/or create a male/female sterile lines of *L. leucocephala* (**not** classed as a genetically modified organism). A sterile triploid can be created using conventional plant breeding techniques through crossing a tetraploid species with a diploid species. A species with three sets of chromosomes (triploid) is often observed to be sterile or has much reduced viable seed production. The strategy here is to cross the tetraploid species (*L. leucocephala* and/or *L. diversifolia*) with diploid species that have good forage attributes such as *L. collinsii*, *L. macrophylla*, *L. shannonii*, *L. retusa* and *L. pulverulenta*. The project has successfully created several triploid crosses as a proof of concept.



Example of a successful hand-cross in leucaena

Where are we doing it?

The project has been successful in assembling 225 accessions from 15 different species of leucaena to evaluate their adaptation to varying conditions in northern WA. Field nurseries, by individual seedling transplants in May-June 2018, have been established in Carnarvon, Broome, and Kununurra to reflect the key climate and soil types. The sites range from black cracking clay to red Pindan sands (Table 1).

The diversity of growing environments across the sites provides a great opportunity to see the genetic variability in the leucaena collection, allowing us to identify well-adapted and high performing parent material. All sites were established with irrigation, and this will be continued for the first 18 months. After this time, we plan to cease irrigation on part of each site to evaluate performance under rain-fed conditions.

Carnarvon's 200-300mm rainfall and cooler winter temperatures are sub-optimal for growing dryland leucaena. However, there are fertile loam soils that would support growth and may be suitable for irrigated production. Broome's 600mm rainfall is marginal for dryland leucaena. While the infertility of pindan sand will potentially constrain growth, its depth and free draining qualities make it suitable for irrigation. The lower rainfall in Carnarvon and Broome opens up opportunities to assess drought-tolerant species such as *L. greggii* and *L. confertiflora*, which can grow in rainfall of 350-700mm. Kununurra's rainfall of 800mm, fertile heavy clay soil and high temperatures across most months of the year combine for optimal growing conditions for all species. These conditions are particularly suitable for the main tetraploid species of interest *L. leucocephala* and *L. diversifolia*.

The actual breeding work is being conducted in South Perth with another nursery of plant material representing the full leucaena collection grown under glasshouse conditions. The molecular breeding support has been provided through a collaboration with Murdoch University (Yong Han, Saipriya Vasan) and the New Mexico State University (Donovan Bailey).

Table 1 Location and soil type for leucaena adaptation sites in northern Western Australia (RSU - Research Station Unit)

Site	Location	Soil type	% clay	% sand	% silt	% C
Kununurra	DPIRD RSU	Black (kununurra) clay	43	37	20	0.43
Broome	Water Corp	Red (pindan) sand	7	90	3	0.32
Carnarvon	DPIRD RSU	Red sandy clay loam	30	55	15	0.72



Leucaena trial site Broome several months after seedling transplants (October 2018)



Growth of leucaena trial site Broome several months after first cut (April 2019)

Where to next?

All field nursery sites have established well, though not without some challenges. Damage from cutworms and wallabies were experienced at Kununurra and plants had to be protected with tree guards. Plants were treated for termites at Broome, and the Carnarvon site was baited for rabbits. The leucaena accessions are being evaluated for their ability to recover after cutting to a height of 50cm (to simulate grazing), drought tolerance, feed quality, and growth habit. At this time, the plants are regrowing after being cut for a second time. The growth at the Broome site has been particularly impressive. The field sites are expected to run for up to four years. The elite plant selections will go into the breeding program as parents to create a 100% sterile leucaena that is adapted to the environment, has high feed quality to fatten cattle, and is easier to manage.

The project is planned to continue until March 2022. By the end of the project, we expect to have established the most cost-efficient strategy for developing a sterile or seedless leucaena and have generated some early hybrid material for further field testing. We will also have explored options to reproduce a new variety by vegetative reproduction or hybrid seed production systems. We think there are opportunities for vegetative reproduction, particularly for intensive irrigated production systems.

Further funding will likely be required to fully commercialise a sterile or seedless variety of leucaena.



DPIRD Development Officer Samuel Crouch with an elite *L. diversifolia*.

Acknowledgments

We thank the Meat & Livestock Australia Donor Company and DPIRD for funding the project. We also thank Mengistu Yadete and Geoff Moore (DPIRD, South Perth), Clare Atkins, Helena O'Dwyer and Mark Warmington (DPIRD, Kununurra) and Graeme Sinclair (DPIRD, Carnarvon) for providing field and glasshouse support for the project. Seed of the leucaena accessions has been provided by the Australian Pastures Genetic Resource Centre, the International Centre for Tropical Agriculture (CIAT) Colombia, United States Department of Agriculture (USDA) and The University of Queensland.

For more information contact Sam Crouch, Development Officer, DPIRD, Broome, on +61 (0)8 9194 1475 or samuel.crouch@dpird.wa.gov.au

Plans underway for the Fitzroy

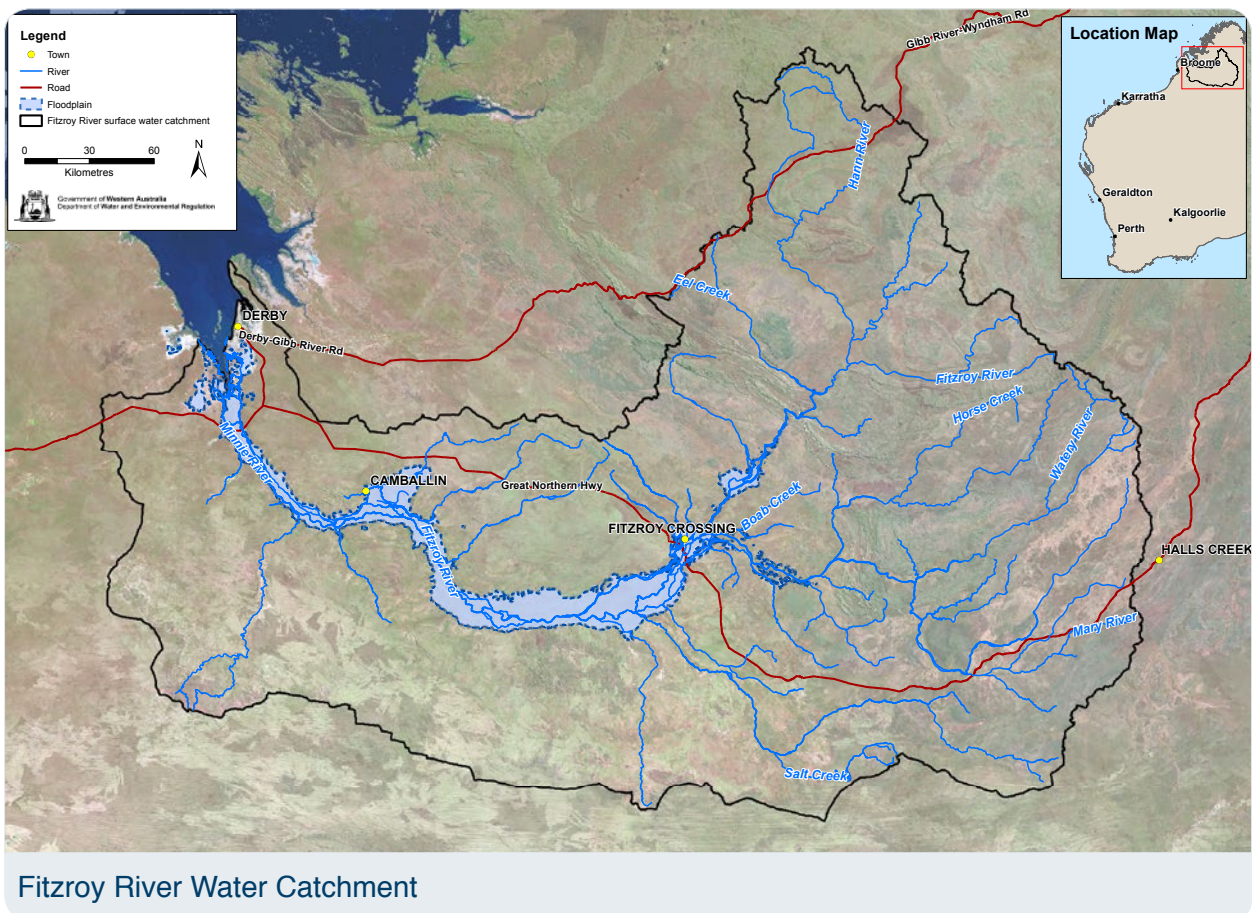
Meghan Barnes, Manager Strategic Projects, DPRID, Broome

The Western Australian Government is committed to further developing and diversifying the economy in the Kimberley region and is currently progressing a series of election commitments in the Fitzroy River catchment to:

- create the Fitzroy National Park, which will extend the Geikie Gorge National Park further along the Fitzroy River to the north, and the Margaret River to the east;
- support the protection and development of a management plan for the Fitzroy River, to ensure the health of the river and provide a basis for sustainable economic development; and
- not allow the Fitzroy River or its tributaries to be dammed.

The Government has also separately committed to prepare a water allocation plan.

The Departments of Primary Industries and Regional Development (DPIRD), Water and Environmental Regulation (DWER), and Biodiversity, Conservation and Attractions (DBCA), are leading the development of the management plan, water allocation plan and creation of the national park respectively.



The Fitzroy River catchment covers 94 000 square kilometres in the Kimberley region of Western Australia – an area larger than Tasmania. The Fitzroy River flows over 700 kilometres from the Durack Range in the east-Kimberley to the Indian Ocean at King Sound, near the town of Derby. The catchment is located largely within the Shire of Derby-West Kimberley.

The Fitzroy River catchment contains significant cultural, environmental and economic values, with parts of the catchment National Heritage Listed. It also includes an extensive pastoral estate; jointly managed conservation reserves; and supports a range of tourism, mining and petroleum, local businesses and rangelands activities.



The Fitzroy River catchment includes an extensive pastoral estate

Fitzroy River Management Plan approach

DPIRD is leading the preparation of the Fitzroy River Management Plan (Management Plan) which will tie the suite of Fitzroy election commitments together and cover the whole of the catchment. The Management Plan will be guided by the location of population centres, natural resources and attractions that can support economic development.

The plan will seek to identify opportunities to boost the economy of the region by taking a sensitive, staged and sustainable approach to development options. The preparation of the plan will address economic development and conservation themes with a view to identifying strategies and actions to develop new, adapted and impactful priorities for the catchment.

The Management Plan will not be a statutory document but will instead provide an overarching framework for the catchment, aligning with existing State and Federal legislation and assessment processes. At its heart, the delivery of the Management Plan is a strategic framework which will direct future economic and conservation actions within the Fitzroy catchment.

How the Management Plan is being delivered

DPIRD is undertaking desktop research and stakeholder consultation to prepare and ground-truth objectives, strategies and priority actions identified under specific themes.

Themes proposed through initial consultation for inclusion in the draft Fitzroy Management Plan include agriculture development, tourism, Aboriginal economic development, environmental and cultural conservation, and new and emerging industries.

Results of the research and consultation will be reflected in a draft Management Plan which will be released for a period of public comment.



Fitzroy River

Traditional Owners and stakeholder consultation

Effective stakeholder engagement is important to the achievement of sustainable economic development outcomes. It is a challenging area for consultation given the size of the catchment, its remoteness and the wide variety of views on matters such as water use and development in and around the culturally and environmentally significant Fitzroy River.

There are strong and differing views about development in the catchment. The stakeholder base for the Fitzroy River catchment includes:

- a strong, resilient pastoral sector
- a Traditional Owner base that is deeply connected to the cultural values and traditions that underpin both their past and present ties to country
- an impassioned and active environmental conservation sector and
- a range of other stakeholders from industry, small to medium businesses, government services and not for profit sectors.

All of these stakeholders hold individual and in some cases, collective views on what, where and how development should occur. It is the State Governments' responsibility to ensure that a broad range of views can be heard and that they are considered in the progression of this planning process.

Mr Barty McFarlane has been appointed as an expert Fitzroy River Stakeholder Convenor to assist with understanding stakeholder sentiment. Mr MacFarlane is assisting to translate the range of interests that people hold in the catchment into meaningful outcomes through the planning process underway by the State Government.

A range of engagement with Traditional Owners and stakeholders has occurred to date across the suite of election commitments, which includes Ministerial Forums, presentations by Government on the approach and process and a range of individual face to face consultations on the specific commitments.

In August this year, a stakeholder-led forum was facilitated and supported by the State Government to allow Traditional Owners and stakeholders to come together to have their views heard and listen to others. This forum was important because it demonstrated the breadth of views across the catchment and saw the coming together of stakeholders to find common ground around a set of principles for future development. A communique was released by Co-Chairs Anne Poelina and Alastair Shields following the Forum and is available on DPIRD's website.

The Government has also been contributing funding to the Martuwarra Fitzroy River Council which provides a forum for some Traditional Owners to discuss river matters.

Delivery timeframe

Consultation is ongoing and will inform a draft Fitzroy River Management Plan which is scheduled to be released for public comment in mid to late-2020.

If you are interested in more information or are an organisation, business or group interested in discussing the commitments further, please contact the DPIRD Fitzroy Project Team based in Broome, on +61 (0)8 9194 1400 or fitzroycommitments@dpird.wa.gov.au

Alternatively, if you would like to discuss the Fitzroy commitments with the Stakeholder Convenor, please send a request to the above address along with your contact details and we will place you in contact with them.

More information on each of the commitments for the Fitzroy can be found at the below web addresses:

[Department of Water and Environment Regulation – Fitzroy water allocation plan](#)

[Department of Biodiversity, Conservation and Attractions – Plan for our Parks](#)

[Department of Primary Industries and Regional Development – Fitzroy River Management Plan](#)

Paddock Power

Unlocking the secrets to sustainable and profitable intensification in northern Australia



Many breeder paddocks in northern Australia are too big and underwatered to achieve optimum productivity.

Impacts on reproduction and profitability include:

- over-and under-utilised feed (depending on distance from water)
- incomplete musters
- limited opportunities to implement herd segregation, controlled mating or tactical pasture management

Walking long distances out to feed erodes live weight gain and body condition. The negative impact of poor body condition on re-conception and calf survival rates further reduces productivity

Some producers speculate that high rates of calf wastage (>20%) in large poorly-watered paddocks may be caused by cows leaving newborn calves to return several kilometres back to water, thus increasing the risk of predation or dehydration.



Dramatic differences in feed availability in relation to distance from water have an impact on productivity and sustainable resource use.



Key questions of the Paddock Power project

How much impact is paddock area and distance to water having on production?

Use existing data and new paddock trials to measure:

- calf wastage
- mortality rates
- steer growth rates
- how many kilograms of beef are produced in a paddock, and how many kilograms of beef could potentially be produced?

Where should we put new infrastructure to get best bang for buck?

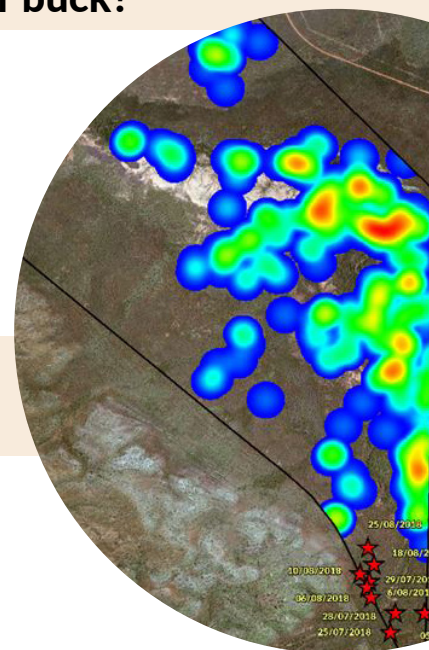
Use GPS tracking to measure:

- how far cattle are walking - with and without calves
- how far from water calves are being born
- how cattle utilise paddocks of different sizes and watered area
- how paddock usage patterns change throughout the year

What infrastructure development option will deliver the best return on investment for me?

Roll out the Paddock Power calculator

- compare development options identified by the producer
- work out return on investment and payback period on the basis of your specific cost base, land types and productivity.



Get involved!

Contact Dionne Walsh, Rangeland Program Manager dionne.walsh@nt.gov.au or Kieren McCosker, Senior Livestock Scientist kieren.mccosker@nt.gov.au or search 'Paddock Power' on Facebook for regular updates!

Introducing paddock power

Dionne Walsh, Rangelands Program Manager, Northern Territory Department of Primary Industry and Resources, Darwin

A new project that will have broad application across northern Australia has commenced in the Northern Territory.

Previous research (e.g. the Pigeon Hole experiment and the Beetaloo project) has demonstrated that developing more water points is a sound investment for achieving better pasture utilisation and increasing carrying capacity. However, the improvements in breeder herd performance and/or live weight gain that can be achieved from infrastructure development are less clear.

Fencing and water development is gathering pace on large properties across northern Australia. However, it is very expensive and producers have told us they are seeking stronger evidence of potential productivity increases in order to better articulate the business case to financiers.

The current situation

Many breeder paddocks in northern Australia are too big and under-watered to achieve optimum productivity. Impacts on reproduction and profitability include:

- over-and under-utilised feed (depending on distance from water)
- incomplete musters
- limited opportunities to implement herd segregation, controlled mating or tactical pasture management.

Cattle having to walk long distances out to feed reduces their live weight gain and body condition. The negative impact of poor body condition on re-conception and calf survival rates further reduces breeder herd productivity.

Some producers speculate that calves born in large, poorly-watered paddocks are at greater risk of separation from their dam, with breeders leaving newborn calves to return several kilometres back to water. This may increase the risk of predation or dehydration and contribute to the high calf loss rates (>20% and up to 35%) often observed for heifers grazing such paddocks.

Paddock Power has thus been designed to answer three key questions:

Question 1: How much impact does paddock area and distance-to-water have on production?

How will we do this? Use existing datasets and new paddock trials to measure:

- rates of calf wastage
- mortality rates
- steer growth rates
- how many kilograms of beef are produced in a paddock, and how many kilograms of beef could potentially be produced.

Question 2: Where should we put new infrastructure to get best bang for buck?

How will we do this? Use GPS tracking to measure:

- how far cattle are walking - with and without calves
- how far from water calves are being born
- how cattle utilise paddocks of different sizes and watered area
- how paddock usage patterns change throughout the year.

Question 3: What infrastructure development option will deliver the best return on investment for my situation?

How will we do this? Roll out the “Paddock Power Calculator” to:

- compare the performance of potential development options identified by the producer
- work out return on investment and payback period on the basis of your cost base, land types and productivity.

Want to know more?

- Join our Paddock Power Facebook Group - www.facebook.com/groups/326686724590667
- Keep up to date with project findings on our FutureBeef webpage - futurebeef.com.au/projects/paddockpower/

The Paddock Power project is funded by Meat and Livestock Australia and the Northern Territory Department of Primary Industry and Resources and will run until April 2021.

For more information contact Dionne Walsh, Rangeland Program Manager, Northern Territory Department of Primary Industry and Resources on +61 (0)8 8999 2178 or dionne.walsh@nt.gov.au



Cattle on the Barkly Tablelands – what kind of paddock will provide the optimum production conditions for them?

Kidman Springs study finds substantial benefits from phosphorus supplementation

Tim Schatz, Principal Livestock Research Officer, Northern Territory Department of Primary Industry and Resources, Darwin

Many readers will be aware of the Phosphorus (P) supplementation study that has been running at the NT Department of Primary Industries and Resource's Victoria River Research Station (Kidman Springs) since 2014. Major benefits from P supplementation have been demonstrated over the last few years, but this year's results have been even more dramatic and indicate that P supplementation is one of the most important activities that cattle stations can adopt to improve profitability in P deficient areas.

At the weaning muster in May this year, the effect of P deficiency on cows that had calved for the second time was quite confronting. The body condition of lactating P- cows (that had no access to P supplement) had deteriorated to the point where the decision was made to stop the study due to animal welfare concerns.

While the study was scheduled to run for another year, the huge differences between the treatments seen so far made it hard to justify subjecting the P- cows to another year without P supplement. It would have been good to get data for another year, however if people are not convinced of the benefits of P supplementation from the results so far then running the study for another year is unlikely to make a difference.

The study began in mid-2014 by randomly allocating 179 Brahman weaner heifers to treatments that either received P supplement (P+) or did not (P-). The allocation process included stratifying for weight, making sure that the average and range of weights were similar for both treatment groups (average weight: +P = 171.7kg, -P = 171.2kg).

Table 1 The recipes for the loose lick supplements used in the Kidman Springs P supplementation study

	Wet season		Dry season	
	P+	P-	P+	P-
Ridley Biofos MCP*	42.5%		25%	
Salt	50.0%	73.5%	40%	65%
Ammonium sulphate (Gran Am)	7.5%	7.5%	10%	10%
Urea			25%	25%
Limestone		17.5%		

* The sponsorship of the supplement by Ridley is gratefully acknowledged.

The treatment groups grazed two similar, acutely P deficient (average Colwell P soil test results: 2.5 and 3.1 mg P/kg) neighbouring paddocks. The paddocks were set stocked and the treatments swapped paddocks at the first round muster (May) each year to minimise any paddock effect.

The loose lick supplement was distributed twice-weekly and fed year-round in troughs that were sheltered from rain using sheds. The wet and dry season recipes of the supplements fed to each treatment group are shown in Table 1. Basically, salt was substituted for Biofos® in the P- supplement. However, limestone was added to the P- wet season supplement to make the ratio of calcium to P the same in both licks.

The heifers were first mated at two years of age for 4 months, from late December 2015, with the first calf crop weaned in May 2017. Two more calf crops were weaned before the study concluded at the weaning muster in May 2019.

Each year, more and heavier calves were weaned from the P+ treatment, so the total weight of calves weaned from the P+ group was substantially more than from the P- group. In 2017, 2018 and 2019, an extra 3072kg, 2804kg and 5932kg of weaner was weaned from the P+ treatment group (Table 2). Over the first 3 calf crops, the extra value of calves weaned from the P+ treatment was worth \$379 per heifer originally allocated to the treatments (the study started with 88 heifers in P- and 91 in P+).

A very basic economic comparison of the profitability of the P+ treatment was conducted by dividing the extra value of the weaners produced from the P+ treatment in each year by the cumulative extra cost of the P+ supplement to that point. Table 3 shows that the cumulative return on investment for the P+ treatment was 280% in 2017, 347% in 2018 and had risen to 513% by 2019.

Table 2 Details of the first three calf crops weaned from the P+ and P- treatments in the Kidman Springs P supplementation study

Year	Treatment	Avg weaner weight (kg)	No. of weaners	Total weight of weaners (kg)	Sale price (\$/kg)	Total value of weaners
2017	+P	173	50	8616	\$3.50	\$30 154
2017	-P	139	40	5544	\$3.50	\$19 402
2017	Diff +P vs -P	34	10	3072	\$3.50	\$10 752
2018	+P	185	43	7951	\$3.00	\$23 852
2018	-P	172	30	5145	\$3.00	\$15 435
2018	Diff +P vs -P	13	13	2806	\$3.00	\$8417
2019	+P	201	64	12 841	\$2.90	\$37 239
2019	-P	157	44	6909	\$2.90	\$20 036
2019	Diff +P vs -P	44	20	5932	\$2.90	\$17 203

Table 3 Assessment of the return on investment in the P+ treatment in the Kidman Springs P supplementation study

Year	Extra value of calves weaned from P+ each year	Cumulative extra value of calves weaned from P+	Cumulative extra cost of the P+ treatment	Cumulative return on investment from P+ treatment
2017	\$10,752	\$10,752	\$3,839	280%
2018	\$8,417	\$19,170	\$5,529	347%
2019	\$17,203	\$36,373	\$7,089	513%

However, this only tells part of the story, as it doesn't account for the greater mortality rate in P- and the heavier weight of cows in P+ (meaning that the P+ cows are likely to be more valuable at the time of culling for age). The cumulative mortality rate from the start of the study to when it was stopped in May 2019 was 13% higher in P- (+P=2%, -P=15%) and the average weight of cows was 96kg heavier in P+.

When the greater salvage value of cows in the P+ treatment (\$26 026 in May 2019) is added to the extra value of weaners produced, the return on investment by May 2019 was 880%. This sort of a return on investment is quite staggering and although it is not a proper economic evaluation, it indicates how great an effect that P supplementation can have on the profitability of properties in P deficient areas (note – a proper economic evaluation will be done in future).

Also note that it is likely that the mortality rate in P- would have been even higher if the study had not been stopped in May 2019 and efforts made to improve the body condition of P- cows that had been lactating and were in very poor condition (some were showing signs of peg leg). 29 P- cows (33% of the total) were segregated in a small holding paddock and provided with hay, molasses, pellets and P supplement until their body condition improved. If this had not been done then it is likely that the mortality rate in P- would have been even higher.

The reason for the dramatic deterioration in P- cows during their second lactation is likely to be because so much P had been drained from their systems during their first and second lactations. If cows don't get enough P from their diet when they are lactating, they mobilise P from their bones and tissues to put into milk. This occurring over 2 lactations without their P stocks being replenished by supplementation seems to have resulted in the P- treatment crashing.

This study has documented the large effects on productivity and profitability that providing P supplements to heifers and cows can have when they are grazing P deficient country. It has shown very large returns on investment from P supplementation and is already resulting in increased adoption of P supplementation. However, it should be noted that the response will vary depending on the level of P deficiency and benefits of this scale may not be seen where P deficiency is not as severe.

For more information contact Tim Schatz, Principal Livestock Research Officer, Northern Territory Department of Primary Industry and Resources, Darwin, +61 (0)8 8999 2332 or tim.schatz@nt.gov.au



P+ wet cows in May 2019



P- wet cows in May 2019

Breeding EDGE Workshop



Karratha, WA: 12 - 14 March 2020

Broome, WA: 17 - 19 March 2020

TIME: 8:00am to 5:00pm all days

Breeding EDGE is a three-day workshop designed to assist producers improve and refine their breeder herd management and genetic improvement plans using genetic and reproductive knowledge and technologies, to achieve desired production targets.

Attending this workshop will help you to:

- identify where the current breeder herd management program can be improved to reduce reproductive loss
- measure reproductive performance more accurately
- identify strategies and management to improve bull selection, retention, management and performance
- develop, or refine, a practical and achievable management plan for the breeding herd that will lead to higher productivity
- gain a thorough understanding of genetic improvement for both breeding cattle and turnoff cattle and develop breeding objectives to take your herd in a more profitable direction.

What you will learn

- current herd performance – what measures matter most
- reproduction and reproduction loss
- managing the breeders - systems
- bull fertility and management
- identifying “not so obvious” bull faults that impact reproduction
- reproductive diseases and diseases impacting reproduction
- breeder herd management plans
- genetic improvement of your herd (including breeding objectives)
- genetic principles and selection tools
- selection and selection criteria for traits important to you
- breeds and breeding systems.

What do other producers think of Breeding EDGE?

General feedback

“Invaluable insight into how the industry should be selecting for genetic gain and how we, as producers, can make more genetic and economic gain by enforcing more data recording.”

“Will be repaid with a more productive breeder herd.”

“Taking the information home will save us money and make money. I can see the changes happening already.”

“It is definitely a course worth doing as you can see where you sit as a business, what you can improve on and are given a range of tools and spreadsheets to make it easier.”

The presenters

“Very knowledgeable and experienced presenters, able to relate to our situation.”

“Very good cross section of presenters, all very helpful and knowledgeable.”

“Great presenters - good knowledge and ability to relate to audience.”

“Knowledge was excellent - extremely wide and deep.”

Value for time & money

“We can justify the cost of workshop by making a couple of better bull selections that increase our herd performance.”

“Really great investment, very relevant.”

“Worthwhile for all commercial cattle breeders in northern Australia.”

“I have no doubt if half or a quarter of what was learned was actually implemented the investment would be paid back ten times in the first year.”

“Everything was relevant to me to improve/enhance our business, so it was all a good use of time and money.”

Price

\$1,750 + GST / 1st person from one business

\$1,450 + GST / 2nd and 3rd person from same business

Corporate rate + GST/ 5 or more participants from the one business

Cost includes comprehensive set of Workshop Notes, Workbook, electronic files, other materials and catering.

Presenters

- Felicity Hamlyn-Hill – Beef Enterprise Advisory Services Pty Ltd
- Tim Emery – Tropical Beef Technology Services
- Anne Marie Huey – Northern Rangelands Services (Broome only)
- ACV & BULLCHECK accredited vet

Register now for Breeding EDGE

Places are limited. Register via

Felicity Hamlyn-Hill – Beef Enterprise Advisory Services Pty Ltd

M: 0428 113 732 or E: felicityhamlyn-hill@bigpond.com

Kununurra quarantine livestock yard upgrades

Charlotte Thomson, Senior Quarantine Inspector (Livestock) Operations and Compliance, DPIRD, Kununurra

At the start of 2019, upgrades to the Department of Primary Industries and Regional Development's (DPIRD) Kununurra quarantine livestock yard were carried out with several improvements taking place. Increasing shipments of stock being imported into Western Australia has meant there is a need to continuously have the facilities to increase efficiency, and also ensure a safe environment for staff and stock.

A new office to replace the old donga has meant a space onsite to process livestock forms and other paperwork, which has reduced the need to travel to the DPIRD Research Station (30km from the yards) to check livestock forms and emails.



The new office building at the Kununurra quarantine yards

A handy addition has been the self-latching gates to the forcing yards. This has seen a great improvement in terms of efficiency. Several smaller man-gates have also been added for the safety of stock-handlers.

Shade sails have been erected in some of the larger yards and all of the smaller yards. A new sprinkler system has been installed to replace the old system. These additions are a welcome relief from the humidity, dust and sun. Stock originating from cooler southern states are



QLD stud bulls staying cool under the shade sails

imported regularly into WA so having permanent shade and dampened yards have helped stock to acclimatise to their new environment and to spell for the next leg of the journey.

New watering troughs have been installed in all of the large yards to replace ageing ones. The water used is pumped from the Ord River which is fresh and cool, perfect for stock needing a spell.

A new pump has been installed at the wash-down bay to increase the efficiency and pressure when hosing off dirty trailers and floats.

Firebreaks around the entire facility (both inside and outside) were cleared at the start of the year, ensuring the yards are compliant for the bushfire season.

The entrance signage has been updated with Quarantine Inspector contact details, including a reminder that importers should always call within the hours of 6.00am to 6.00pm Monday to Friday.

All of these upgrades have made processing stock in the yards more efficient and safe, which plays an important role in helping to keep Western Australia free of interstate pests and diseases.



New signage at the Kununurra quarantine livestock yards

For more information contact Charlotte Thomson, Senior Quarantine Inspector (Livestock), Kununurra, on +61 477 757 185 or charlotte.thomson@dpiird.wa.gov.au



Firebreaks were cleared ready for the bushfire season

Reinvigoration of Gascoyne Research Facility

Valerie Shrubbs, Development Officer, DPIRD, Carnarvon

An injection of \$1.4 million into the DPIRD Gascoyne horticulture program was recently announced by Agriculture and Food Minister Alannah MacTiernan MLC, boosting the program until mid-2020. These funds will be used to launch a coordinated program of activities in the Carnarvon horticultural region and to reinvigorate the Gascoyne Research Facility (GRF).

Several activities are already underway, with the program focussing on how technology and collaborative research can be used improve farm productivity, quality of produce grown in Carnarvon and support the overall long-term profitability of growers in the region.



Carnarvon grower and AUSVEG board member Michael Nixon (left), Gascoyne Food Council chair Kate Allen, Minister Alannah MacTiernan MLC, Joanne Symonds, owner of Bentwaters plantation, the venue for the Gascoyne Food Council Long Table Lunch and VegetablesWA chair and Gascoyne Development Commission board member, Dan Kuzmicich, Carnarvon

Investment in innovative technology

The revitalisation of the Gascoyne Research Facility will involve investment in facility repairs, new equipment, protected cropping facilities and demonstration smart technology.

Work has begun with upgrades to fencing for biosecurity, windbreak replacement, irrigation system upgrades and consultation for installing protected cropping infrastructure for future trial work.

Installation of various new technologies like remote crop, weather and irrigation monitoring sensors will allow DPIRD to trial the impact of ag-tech investments on farm productivity and profitability in an irrigated and protected cropping context. The agronomic recommendations and the economic analysis produced by the project will provide more certainty to growers of

the benefits of adopting new technology. The planned research at GRF will be relevant to the Pilbara, Kimberley and other arid and tropical regions in Australia.

The technology installed will additionally act as a showcase for growers to evaluate and gauge the value of ag-tech investments for their growing systems, which will be made available to growers through activities such as field days and consultant access.

The funds will also allow for training and upskilling of staff at GRF to effectively utilise these new technologies, and for collaboration with local and technical specialists.

Big data for decision making

DPIRD have contracted local consultant Scott Brain to work with a technology company to develop a data capture and interpretation system that will provide a web-based interface to display individual and regional data, with the pilot being based at GRF. The objective is to have growers engage with the collection of 'big data' to analyse multiple crop inputs (chemical, labour, fertiliser etc.) against quality and economic outcome of the crops grown in the region. This project intends to improve business practices and decision making, as well as longer term traceability, providence and supply chain integrity activity in the Gascoyne.

Profitability through pest management

DPIRD will analyse data from current pest management projects to assess the economic outcome of better management of pests and diseases.

The three current area wide management of pests and disease projects occurring in the Carnarvon region are:

- Area-wide trapping program for pest surveillance in the Carnarvon Horticultural area, funded by Royalties for Regions and DPIRD.
- Area-wide management to control Mediterranean fruit fly in the Carnarvon Horticultural area, funded by Industry (RBG), DPIRD and Royalties for Regions.
- Area-wide management of insect-vectored viral and bacterial diseases, occurring across Australia and WA including Geraldton, Carnarvon and Kununurra, funded by Horticulture Innovation.

Data from each of the local activities will be utilised to build a pest monitoring network that will be integrated into the data capture system being developed.

Collaboration for better research

The reinvigoration of GRF and the launch of new projects is expected to attract students, researchers, growers and specialists to the Gascoyne from peer growing regions to work on similar regional issues. This will provide professional development for DPIRD regional staff and Carnarvon industry, and create professional networks that extend globally.



Van Coo, Elio Jovicich and Carnarvon Growers Agronomist Annie Van Blomm discussing growing capsicums under net in Carnarvon

DPIRD's investment into a CRC for Developing Northern Australia protected cropping project, 'Strengthening Northern Australia's horticultural sector through assessing protected cropping value chain linkages and pathways for adoption,' will bring Elio Jovicich, senior researcher in Vegetable Production Systems at the Department of Agriculture and Fisheries Queensland to Carnarvon.

DPIRD also recently hosted Paul Storer, a soil microbiologist and plant physiologist who has spent 30 years investigating and developing methods to improve soil health in order to maximise productivity.

In addition, an experienced researcher Neil Lantzke will be contracted over the next 12 months to spend time in Carnarvon to initiate research on growers' properties, provide guidance and mentoring to the new researchers, develop research funding proposals and assist in the procurement and establishment of the new protected cropping facilities.

Collaborative activities and relationships are being built and strengthened between DPIRD, the Gascoyne Development Commission, other regions and local industry to enhance local DPIRD activities and improve the region's profitability.

This new program of activities will elevate GRF as a leader in utilising cutting edge ag-tech, data best practice and a collaborative focus to produce high-quality, grower-focused research. By increasing the research outputs of GRF, we can expect to see benefits reflected in the profitability of the Carnarvon and broader Northern irrigated agriculture industries of WA.

For more information contact Valerie Shrubbs, Development Officer, Carnarvon, on +61 (0) 459 867 916, +61 (0)8 9956 3322 or valerie.shrubbs@dpird.wa.gov.au



Growers undertaking a field walk on Matt Cosh's (centre) property to discuss soil health practices for growing bananas in Carnarvon with Paul Storer (right)

From drought to flooding rains

Mark Bettini, Owner, Bettini Beef, Pilbara

The challenges that go with living and working in the Pilbara pastoral industry are many and they shape the people that live and work here. They make us resilient and stoic, which is both good and bad.

My name is Mark Bettini and I live on DeGrey Station which is 100kms by road from Port Hedland. I manage the Bettini family business “Bettini Beef”, which runs five pastoral properties in the Pilbara.

2019 didn't get off to that great a wet season start that we had hoped for. We were still doing bore runs at a time of year when we could usually rely on surface water. The cattle on DeGrey were in remarkable condition considering the light season in 2018. We had lick out in all areas and it had helped keep the condition on the cattle, which was a relief.

At around the end of January I completed an assessment of the cattle and pasture on all the five properties. I wanted to make sure I understood what our staff were dealing with if we faced a second dry year. We were not desperate yet, but they were going to be if we did not get rain or if we did not get our management right and muster early. We had a lot of cows that were in light condition due to the weaner they still had on them that was a calf during 2018.

It was obvious it was going to be a tough year for those cows and they would pose a survival risk if I could not get those calves off quickly. Still, mustering in scorching summer temperatures was not what I wanted to do.

A date was picked — March 11. If it did not rain by then, we were going to be mustering. It was still going to be very hot but we would just have to do it for the sake of the cattle. I wrote a plan on a few pages, passed it around so the managers could see what we were in for and worked on the details. We needed hay, hay feeders, and pellets for early weaning. I needed to know that I was approaching the nutritional needs of the cattle with good sense so I consulted with a nutritionist and we decided on what strategy to take. Vaccine, tags, more lick ... this drought was certainly going to rack up a bill!

We also had to plan fencing and open up areas not previously grazed by installing new water points. We were trying to do our best by both the cattle and the country.

During February and March, keeping water up to the cattle was our highest priority. In many wells the water table was low and we moved to pumping 24 hours in some areas to keep water up to the cattle. The water table had dropped too low in some places and pumps would slurp away but not be able to deliver any water, so we had to shut off these pumps and move the cattle to where they could get a drink.

Being a land manager can be a stressful job at the best of times. Every decision you make both leading up to and during a drought can make a big difference to the land, welfare of the stock, staff moral and the business bottom line. They are all linked. If you make a mistake with any of these generally the others suffer with them. In my experience, it is best to plan ahead and be decisive, and to make decisions early.

With our March 11 muster deadline looming, I was surprised to see a Tropical Low forming. “Cyclone Veronica” was forecast to head straight for the Pilbara coast. My planning changed

from drought mitigation to cyclone preparation within hours. With so many new staff members it was important to make sure everyone knew our plan, and were given up-to-date information on the forecast track of the cyclone.

Well cyclone Veronica took her time. She certainly did not want to do anything in a hurry and spent two days buffeting the coast between Port Hedland and Karratha. The Mallina and Sherlock homesteads along with Munda station were copping the brunt of it with torrential rain that did not abate. The Mallina rain gauge overflowed and 575mm was tipped out of the Sherlock gauge for the two days during the cyclone.

I was able to keep contact with the staff at both properties due to phone and internet, so I knew staff members were safe. One particular conversation with Andrew at Sherlock revealed that floodwaters were up to the house fence and that there were a few dead cattle that were washed up along it. At that point my heart sank as the cattle were light weaners we had been feeding. I was really worried for our cattle as two days of torrential rain and wind from TC Veronica was not what our cattle needed considering they were already in poor condition due to the poor season thus far.

The next morning, I awoke to a flood! The weather was fine for a fly so I took to the air to have a look. I flew from DeGrey down to Mallina and Sherlock and Warambie to see for myself. What I did see was depressing. On the way past Munda station I could see how high the floodwater had been and there were dead cattle visible there so I was not looking forward to what was ahead.

I flew over the paddock that was supposed to have all of the yearlings that we had shifted four days ago out of the reach of floodwaters only to find that most of them had died along a fence line. They had been blown by the wind walking with their backs to it until they reached the fence then had died from exposure to the elements.



Moving cattle out of floodwaters.

In one paddock we gave up counting the dead and just had a guess as there were so many in one area. We just flew on to the next place and kept counting.

There was simply nowhere for the cattle to shelter away from such a storm with the high winds and rain. It was simply too cold for the cattle to survive even up against the side of hills where they had tried to get out of the wind and then were found huddled together dead.

When it became wet in the low-lying country, the cattle became bogged and we found a few alive that needed to be put down as they were bogged to their bellies with their legs straight down in the mud.

In all, we counted 1500 cattle that had succumbed to the wind and rain of cyclone Veronica. Since then we have revised that to 2000 and now that mustering numbers have come in, it could go higher as mustering progresses. We will see the impact of the losses stretch into the next few years while we stabilise our breeder numbers in those areas.

The landscape had suffered too, with a lot of scolding and erosion of creek banks. The roads around the place did not look too flash and there was going to be plenty of work for a grader or two to fix them, especially the Sherlock driveway which looked more like a creek than a driveway.

Looking back over the last six months, we have gone from managing drought conditions to flood conditions in very quick time.

Even though we lost a lot of cattle, I feel blessed that we were able to get the rain. We now have plenty of grass for the cattle we still have and the ones that are still left, are in great condition and their immediate future looks good. I really feel for the other areas of the pastoral regions that are still in drought. I hope this coming wet season is kinder to us all.

Drought and flood are not uncommon in the Pilbara region especially in “cyclone alley”. We have all faced the challenges before and we will again. It is what we all do out here. You just have to put one foot in front of the other and stay the course.

I would like to extend my thanks to all the staff that have had to endure picking up the pieces of the last 12 months with Bettini Beef and I hope when the new year comes around, we can see that we have all grown with the challenge and are more than ready for what 2020 can throw at us!

You can follow Bettini Beef on Facebook (facebook.com/bettinibeef) and Instagram ([@bettinibeef](https://instagram.com/bettinibeef)).

It's only a word

Nic Kentish, Advisor, Resource Consulting Services

Bad habits generally creep in slowly. My friend who happens to also be my livestock selling agent has developed a bad habit over his career. He sometimes says to me, "I can get rid of those cows for you," or "I will quit those lambs for you".

I get pretty straight with him nowadays because he instantly knows what my reaction will be. "Mate," I say, "Those cows and I have done too much together to get rid of them. Those lambs have worked hard to make me money. We don't quit or get rid of anything around here!". I have known some of those cows for longer than I have known my agent friend!

It is only a word, I know, but it affects our thinking and ultimately pushes us right down to where we think we belong as food producers – at the bottom of the food chain. Yet we stomp our feet at the general population, asking them to respect us farmers who feed them but then go on to disrespect our animals and the job that they have done for us by just 'Quitting them.'

I can vouch for the effect that a change of language will cause. When my friend, the agent (just to please me) says, "Let's market those cows," or "I'm going to get you the best price for those lambs", subconsciously he is now prepared to do just that. It is now a value proposition rather than just a 'get-out-of-trouble' collapse.

So rewardingly often, as a result of this change, he finds me better deals. He looks a lot harder for me and all of his clients. His purpose changes from a transaction service provider to a networker and marketer with an eye for detail. The same bloke who was yesterday a herd-quitter is today a food and fibre broker who is not only finding us a great deal on these animals but has plenty more where that came from.

Abundance! It is the essence of farming when we are growing things. We are in one of the few trades where we can depend on natural multiplication of plants and animals to grow our inventory and cashflow. We look towards our crops to grow, our breeders to reproduce and our grass to flourish to fatten their offspring. Everyone and everything on the farm is doing its job well. So, why quit them? Who wins when we get rid of anything? It is disrespectful!

If we can change our habits, we are demonstrating to ourselves and others that we are doing good and positive stuff about the things over which we have total control. We can do little about the markets that we sell into. We can do lots about the way we sell into them. Careful planning using the skills of good networkers and advisers as well as our own research is invaluable.

So, next time someone says, "Time we got rid of those sheep", or "Better quit those silos of grain", stop and remind them just how much effort and toil went into creating that product. Ultimately, it is up to us to start a new habit of saying what it is that we really want – to sell produce profitably.

Nic Kentish is an advisor, facilitator and coach with Resource Consulting Services. To get in contact with Nic, please call the RCS office on 1800 356 004.

Protect your livestock from lead poisoning

Dr Bruce Twentyman, Veterinary Officer, DPIRD, Perth

With the dry conditions prevailing over much of Western Australia this year and as we head into summer, there will be less available feed for livestock.

At these times, livestock may seek alternative feed sources, which may expose them to sources of lead.

Lead ingestion can cause poisoning in livestock, typically in young and inquisitive animals. Exposure occurs from licking or chewing the lead components of old or burnt machinery batteries, sump oil spills or flaking paints on machinery, cars, sheds or yards.

Affected livestock may not respond to sound or touch, may appear blind, stagger, have tremors and die. Always call a vet immediately if your animals show these disease signs.

Intake of only small doses of lead in livestock may not cause disease signs – but it can cause residues.

It is an offence under WA biosecurity legislation to supply meat for human consumption containing lead residue levels over 0.1 milligrams per kilogram or edible offal containing lead residue levels over 0.5 milligrams per kilogram.

To ensure that Australian livestock products continue to be safe, the National Residue Survey (NRS), a national testing program, monitors lead levels in livestock supplied to WA abattoirs. The NRS reports any elevated levels to state investigators. This system protects consumers, as well as safeguarding our access to livestock markets.

Protect your business and your markets. Ensure you comply with the accreditation requirements under Meat and Livestock Australia's Livestock Production Assurance (LPA) program.

Remove potential sources of lead from your paddocks and do not allow stock into machinery yards. Fence farm dumps securely so that stock cannot access them.

For more information, visit agric.wa.gov.au and search 'lead poisoning'.

If your livestock have had access to lead sources or are showing signs of poisoning, seek immediate veterinary advice by contacting your local DPIRD field vet or private vet.

For more information contact Dr Bruce Twentyman, Veterinary Officer, DPIRD, Perth, on +61 (0)8 9363 4127 or bruce.twentyman@dpird.wa.gov.au



Unfenced farm machinery yards and farm dumps present a risk of lead poisoning or residues in livestock. Fence your dump and remove or prevent stock access to lead sources on your property, such as old paint, batteries and sump oil.

Remote water monitoring technology in the East Pilbara

Mariah Maughan, Development Officer, DPIRD, Broome

Annabelle Coppin is a fifth generation pastoralist in the Pilbara region of Western Australia. Her station, Yarrie, runs 2500 breeders on approximately 240 000 hectares of mixed country. Annabelle used her DPIRD Business Improvement Grant to implement remote water monitoring technology on Yarrie. This is her story:

I purchased Yarrie station from my family in 2015 and today it continues to run in conjunction with our farm north of Perth. Yarrie is used as an extensive breeding operation, and the farm is used for backgrounding and growing out cattle. We aim for a predominantly Droughtmaster-based herd, which appeals to both the domestic and live trade markets, as well as our own branded product - Outback Beef.

The Business Improvement Grants (BIG) gave us an opportunity to try something new that was made low risk through the use of program funds. We decided to install remote monitoring cameras which is quite a new concept to the region. They work off 3G mobile service, which we are fortunate to have access to on Yarrie.

Twice each day, a photo taken from the camera is sent to my email and an application on my iPad. The image is high resolution which is great; you can zoom right in to the trough to look at the water quality and fill level.

One of our water monitoring cameras is installed at a watering point that is approximately 100km from the homestead, about a one and a half hour drive. We chose to put the camera out there because it's one of the furthest watering points on our property. The savings made through time, labour, fuel and follow-on costs, is noticeable. The flow on effects for efficiency and savings even include grading the road out to the bore less often, due to reduced usage of the road.

We now only have to travel out to that watering point and check it around once every three weeks to a month, instead of every five days.

While we were keen to trial this new technology, I was initially concerned about how long the cameras would last in a harsh environment like the Pilbara. Until you buy a few cameras to make sure they are effective, you don't know if they are necessarily viable. Through trialling new technology thanks to BIG, we have been able to make sure the technology can work effectively in our harsh environment.

If I really wanted to get the bang for my buck out of implementing remote water monitoring cameras on the property, I would also need to implement more than two units. Therefore, the next step for us is to invest a substantial amount to purchase additional units.

We have definitely found benefits in implementing the cameras and they have survived all summer. I now have the confidence to go forward and purchase more, although I do recognise that we still don't know how they will last in the Pilbara conditions long-term.

My advice to pastoralists interested in implementing remote water monitoring units is that, you need to take into account that this type of unit requires at least one to two bars of 3G for the

system to operate accurately. I think it is also important to get hardware from a reputable and reliable source that can provide support in the event of any issues.

I think technology is only going to get better, which is very exciting. It's going to revolutionise our efficiency on rangeland properties, particularly because we cover such a big area of country. Technology is really going to help us to be able to be on top of things and respond a lot quicker in the future.

Small things tacking onto the business to make it more efficient, it's a no brainer.



Annabelle Coppin.



Pilbara Pastoralist Annabelle Coppin inspects a water point using a tablet device.

Learn more about remote water monitoring

Traditional methods

Today, most water monitoring is done by manually checking the water supply. The manual methods create a significant drain on enterprise resources.

Once a water point has been inspected there is no way to know if an error or damage has subsequently occurred, until someone returns to inspect the area.

Leakage or overflow issues risk going unnoticed until they become a major animal welfare risk.

Key features of remote water monitoring units

- Reduced manual inspection of water points resulting in reduced enterprise costs.
- Some products include the capability to track water usage and trends in water consumption.
- Receive timely warning of faults and leaks.
- Access to water monitoring information while you are off the property.

What remote water monitoring products are out there?

When looking at water monitoring products for your business there are a few questions to consider first.

1. Satellite technology or 3G?

Depending on the type and brand of product, some products will require 3G service in order to work correctly. Other systems run on satellite technology and some systems will allow you the choice between satellite and 3G. If your property is not in an area that a 3G service covers, then a product that works off satellite technology is required.

2. Would you prefer camera monitoring system or a tank level sensor system?

The two main water monitoring systems are a tank level sensor system or a camera imaging system. It should be noted that camera imaging systems commonly rely on 3G services to operate.

3. How do you want to receive your water monitoring information?

Depending on the brand and type of product you are looking to purchase, you will receive your information/images to either a mobile, email, or a product specific display unit. This may also be dependent on whether the product uses 3G or satellite technology.

If you prefer to receive your information/images via email or mobile, keep this in mind when looking at different types of hardware.

The economics behind remote water monitoring

The following scenario demonstrates how you can determine how much you can save through implementing a remote water monitoring system. In the scenario below Joe aims for two bore runs per week with each bore run averaging 50km. The bore run usually takes Joe three hours and he is on an hourly rate of \$25.00/hr.

Scenario one ¹		Monthly	Yearly
Water runs per week: 2	Total time	24.0hrs	312.0hrs
Distance per run (km): 50	Total distance driven	400.0km	5200.0km
Time per run (hrs): 3	Labour cost	\$600.00	\$7800.00
Labour rate \$/hr: 25.00	Fuel cost	\$84.00	\$1092.00
Fuel \$/100km: 21.00	Maintenance	\$8.00	\$104.00
Maintenance \$/100km: 2.00	Total cost	\$692.00	\$8996.00

¹Cost savings calculator, farmbot.com.au/cost-savings-calculator/

For more information contact Mariah Maughan, Development Officer, DPIRD, Broome, on +61 (0)8 9194 1440 or mariah.maughan@dpiird.wa.gov.au

Pain relief management for livestock

Mariah Maughan, Development Officer, DPIRD, Broome

The Brockhurst family purchased Larrawa Station in the East Kimberley in the late 1980s. What was once a bare block with a single fence, is now a developed property with a grey Brahman herd. In this article Stephen Brockhurst discusses his experience trialling pain relief products for cattle.

We used the Business Improvement Grant (BIG) to trial the pain relief product Buccalgesic. Our main reasoning behind trialling pain relief was the welfare of our weaners; some of our necessary husbandry procedures do cause pain, and if we can minimise that, we want to.

Our family is also aware that animal welfare is becoming an increasing focus in this industry and we wanted to take that into account.

We wanted to see what impact pain relief would have on our weaners during branding, particularly if there could be further benefits such as a decrease in time off feed.

When processing weaners, we apply Buccalgesic to the side of their gums (orally). It usually takes around about 10 minutes before it kicks in and the cattle start responding to it. We used it when processing both heifers and steers, but our priority was using it on young bulls that were being castrated.

We started trialling Buccalgesic on our weaners in 2017 through the BIG program and then decided to continue with using it in 2018 through our own funds.

The decision to continue using the product was based on the response we saw in our cattle – namely that the weaners returned to normal behaviour (eating, drinking etc) quicker than those not treated.

The only issue we have had to be mindful of with the product is that it can fall out of the cattle's mouth if not applied correctly. We found that applicator guns with a hook shape instead of a straight shape applicator tube are better suited.

I would recommend using Buccalgesic to other stations if they can work it into their program and budget. It works really well for us with our early weaning program where the weaners are kept in the yards. For other stations that turn weaners out into the paddock of good quality pasture immediately after processing, the benefits may be more subtle. It's important for each owner and manager to measure up the pros and cons, and make sure they choose the type of pain relief that is right for their operation.



Kimberley pastoralist Stephen Brockhurst

More information on pain relief medication for processing livestock

The primary objectives of pain management in medical procedures such as castrating steers are to:

1. Alleviate any pain and inflammatory response
2. Improve animal time to recover

Currently, three pain relief products have been registered and approved for use with livestock in Australia.

Buccalgescic:	
Buccalgescic contains a non-steroidal anti-inflammatory drug which decreases the inflammation that causes pain.	
Manufacturer	Troy Pharmaceutical
Function	Analgesic
Purpose	<ul style="list-style-type: none"> • Pain relief • Reduces inflammation
Application	Before procedure- paste applied orally to the gum
Time it takes to work	10-15 minutes
Period of relief	24-72 hours
Withholding period	14 day meat withholding period and a 21 day export slaughter interval
Availability	Required veterinary prescription

Tri-Solfen:	
Tri-Solfen contains anaesthetics that locally block sensory nerves which cause pain. Tri-Solfen also contains adrenaline which allows the product to reduce blood loss.	
Manufacturer	Bayer
Function	Anesthetic
Purpose	<ul style="list-style-type: none"> • Pain relief • Reduces bleeding • Reduces risk of bacterial infection • Assist in healing by sealing and protecting the wound
Application	Post procedure- topical spray
Time it takes to work	Immediate (within 1 minute)
Period of relief	Approx. 24 hour
Withholding period	90 day meat withholding period
Availability	Over the counter

Metacam 20:

Metacam also contains a non-steroidal anti-inflammatory drug, which decreases the inflammation that causes pain.

Manufacturer	Boehringer Ingelheim
Function	Analgesic
Purpose	<ul style="list-style-type: none"> • Pain relief • Reduces inflammation
Application	Before procedure- injection high on the neck behind the ear
Time it takes to work	10-15 minutes
Period of relief	26-72 hours
Withholding period	8 day meat withholding period
Availability	Requires veterinary prescription

Pricing

The pricing of the three products differ and can also vary with quantity purchased.

The following workings were calculated on a **160-200kg weaner** using the recommended dosages. The pricing of products used were an approximate and can be subject to change.

Product	Dosage	\$/ml	\$/head
Buccalgesic	8-10ml	\$0.30	\$2.44-\$3.05
Metacam	4-5ml	\$1.32	\$5.28-\$6.60
Trisolfen	9ml	\$0.14	\$1.26- \$1.94

If you wish to gain further insight into how pain relief can be used in your management system please contact your local veterinarian.

For more information contact Mariah Maughan, Development Officer, DPIRD, Broome, on +61 (0)8 9194 1440 or mariah.maughan@dpiird.wa.gov.au

Help prevent African swine fever entering and establishing in Western Australia

Dr Vanessa Rushworth, Veterinary Officer, DPIRD, Perth

Every pig owner, pig hunter and landowner with feral pigs has a vital role to play in reducing the risk of the serious pig disease, African swine fever, occurring in Australia. With the spread of African swine fever throughout Europe, China, South-East Asia and most recently in Timor Leste, the disease poses a major threat to Australia's pigs.

The disease is an infectious virus that usually causes high death rates in pigs and there is no vaccination available. It does not affect people.

The most likely way that African swine fever and other devastating exotic diseases such as foot-and-mouth disease could be introduced to Australia is through illegally imported meat products being fed to pigs. For this reason, it is illegal across Australia to feed pigs meat, products that contain meat or that have had contact with meat or non-Australian dairy (known as prohibited pig feed or swill feeding).

African swine fever can be spread by direct contact with infected pigs (including feral pigs), contaminated vehicles, equipment or clothing and by feeding swill to pigs. If African swine fever became established in feral pig populations, it would be extremely difficult to eradicate.

If you own pigs, you should immediately review and reinforce your biosecurity measures to prevent African swine fever. In particular:

- Review your pig feed practices to ensure your pigs cannot access swill. Also securely fence farm dumps to exclude feral pigs from accessing food waste.
- Ensure feral pigs cannot access domestic pigs or pig facilities through appropriate segregation and fencing.
- Ensure that farm visitors and staff do not have contact with your pigs if they have been overseas in the previous seven days.
- Know the signs of African swine fever: sudden death, blotching of the skin, especially the ears, loss of appetite, huddling or hiding in corners, diarrhoea which may be bloody.
- Call your vet or the emergency animal disease hotline immediately on 1800 675 888 if you suspect the disease.
- If you suspect swill is being fed to pigs, call your local Department biosecurity officer or vet or the Emergency Animal Disease hotline on 1800 675 888.



Important biosecurity measures to prevent African swine fever in Australia include ensuring feral pigs do not have access food waste in farm dumps or at camping sites

Traceability

If you own pigs, even just one as a pet, you are legally required to register with the Department of Primary Industries and Regional Development as a livestock owner. In the case of an emergency disease outbreak such as African swine fever, we will need to be able to map the location and movements of all domestic pigs quickly. For more information about registering, contact DPIRD on 1300 WA NLIS (1300 926 547) or see agric.wa.gov.au/livestock-ownership

Feral pigs

All landowners have a responsibility under the *Biosecurity and Agriculture Management Act 2007* to manage declared pests such as feral pigs on their land. Control methods such as baiting with 1080 and trapping are preferred. These techniques concentrate feral pigs and provide the best opportunities to significantly reduce feral pig abundance in your area. Hunting and the use of dogs to catch feral pigs should be avoided, as this can cause pigs to disperse or move to other areas, increasing the risk of spreading African swine fever if it occurred in Australia.

For more information about the best options for management on your property, contact your local DPIRD biosecurity officer or see agric.wa.gov.au/pest-mammals/feral-pigs or visit the PestSmart website pestsmart.org.au/pest-animal-species/feral-pig.

Hunters

Hunters can help protect against African swine fever with good hunting practices, including:

- reporting dead pigs or unusual disease signs in feral pigs to 1800 675 888
- cleaning and disinfecting equipment and bagging all carcasses before leaving the hunting site
- removing carcasses so that they cannot be accessed by other feral pigs and taking all food home
- not moving live feral pigs to another location – this is illegal and can spread disease.

If you hunt feral pigs, you should not have contact with domestic pigs.

International travellers

If you have visitors or farm workers from overseas, remind them not to bring meat or animal products into Australia and to declare if they have been visiting farms or hiking.

To report international mail containing meat or animal products, contact the federal hotline on 1800 798 636.

Campers/caravaners

Campers should always take their waste with them and dispose of it so it cannot be accessed by animals such as feral pigs.

For more information and further biosecurity measures, visit the Farm Biosecurity website at farmbiosecurity.com.au or search 'African swine fever resources' on the department website at agric.wa.gov.au

The bloke whisperer...

(Talking to blokes about health and wellbeing)

The Regional Men's Health Initiative

Although we live across a large landscape, we are all a part of the same small community. While DPIRD's primary role is to assist you with your pastoral business, we know that the health of the people in our community comes first and foremost.

While there are challenges inherent within the industry and regions we have chosen to work and live in, this year has been particularly challenging for some. In addition to below average rainfalls, there have been other on-going challenges within our community. It is up to us to look after our landscape, livestock, each other and ourselves – Stephanie Coombes, editor.

Getting blokes to talk openly and frankly about health issues can sometimes be a struggle, especially if they feel like they can not show vulnerability, or they do not want to worry others with their problems. Whilst I am the first to admit that talking about fishing and footy is great, we need to be open to broadening the range of topics that we are happy to cover in general conversation.

The importance of this is bought into sharp focus when you see that blokes are on the wrong side of the ledger in terms of all the preventable cancers, cardiovascular disease, suicide rates, workplace accidents/deaths and motor vehicle trauma. There is some serious stuff we need to talk about that currently many of us are not!

Sometimes when trying to address this, the old adage about getting in touch with our feminine side gets wheeled out. However it is important we realise that men and women are hard-wired differently. We communicate differently and show our emotions differently. It is however important to note that if a bloke feels in a safe place he will talk. The following are some useful tips when chatting to blokes:

- **Shoulder to shoulder talk:** Blokes tend to feel much more comfortable talking side by side. A shared task or sport is often a great starting point. A few explanations have been offered as to why this is our favoured stance: Blokes can find direct eye contact challenging; they place less emphasis on reading someone's face and tend to take others by their word.
- **Steer away from the language of failure:** Blokes can be quite sensitive to turns of phrases like "suffering from" or "needing help". This to them may suggest that in some way they are failing themselves or their family. Therefore rephrasing "seeking help" to "taking control" may help your cause.
- **Do not make it a big conversation:** If you are concerned for a bloke in your life, it can be tempting to prepare yourself for one big chat. This can feel like an ambush and be counterproductive. Instead, mention health and wellbeing in passing, even if initially it is framed around someone else. Once the topic is introduced, let it run its course. It may take a couple of conversations to explore or explain your concerns and get him talking comfortably.
- **Persist:** If it is worrying you, it is probably worrying him. A bloke's initial reluctance to engage may just reflect a nervousness around the subject matter. A second or third

approach will not go astray. After that it is probably time to give him some space with the option to take up the offer when it suits him.

- **Mr Fix It:** Guys tend to be task oriented and prefer that approach when talking about and tackling problems. They want to have a clear purpose, therefore a general discussion around feelings just does not cut it! Conversations that are goal oriented and have a clear direction are the most effective.

Of course, every bloke is different, but if we start to play to our strengths rather than highlighting our weaknesses, inevitably the lines of communication will become stronger. If we can achieve this then the health and wellbeing outcomes for men can only improve.

Glen and the Team

The Regional Men's Health Initiative

For more information contact The Regional Men's Health Initiative, delivered by Wheatbelt Men's Health (Inc.), Northam WA, on +61 (0)8 8 9690 2277 or menshealth@4blokes.com.au. Visit their website at regionalmenshealth.com.au

Regional Men's Health Initiative



Who we are?

The Regional Men's Health Initiative is not a health organisation, rather, we act as a bridge of support and education to regional men, local communities and health services. We are funded through Royalties for Regions to provide health education and awareness on men's health and wellbeing through a community education model across regional, rural and remote WA. Additionally, we receive a small funding package through the Mental Health Commission to focus on mental health and wellbeing education for men in regional and remote farming communities across the State.

We do not organise events but rather, are invited by individuals/community organisations/groups to deliver one of our "Warrior Education Sessions" and/or our "Fast Track Pit Stop Program". There is no cost to individuals/local community groups for our education programs.

What's involved?

From your end you just need to organise the event, pull the crowd and arrange a venue for the gathering. We have previously presented at pastoral locations and station homesteads.

We have a \$300 community grant you can apply for to encourage the crowd to stick around for a bbq. Terms and conditions apply for the use of the grant.

Booking a date

Once you decide on a date, get in touch with us as soon as possible so that we can make the necessary arrangements. We are happy to hold a couple of tentative dates to start with for you.

What we do?

This program's primary role is community education on men's holistic health and wellbeing. This is delivered in three ways:

1. Warrior education sessions
 - where we talk about blokes physical, mental, and social/spiritual wellbeing.

2. Fast Track Pit Stop

- an interactive wellbeing, health awareness and listening tool that is themed around the servicing of a vehicle including:
 - o waist measurement – (chassis)
 - o blood pressure – (oil pressure)
 - o coping skills – (shock absorbers)
 - o (The Fast Track Pit Stop is an interactive wellbeing, health awareness and listening tool that is themed around the servicing of a vehicle. Participants will have their waist line (chassis) and blood pressure (oil pressure) measured and are asked 10 questions that help to identify stress levels and coping skills (shock absorbers). Fast Track Pit Stop is a simple and non-invasive way of helping men become more aware and take charge of their own health and wellbeing.)

3. Advocacy

- Promoting the motto ... before it all gets too much ... Talk to a Mate!
- Providing personal short term resilience support & referral pathways.
- Providing critical links to professional services.
- Continuing to pioneer men's holistic health and wellbeing at every opportunity.

The slogan “before it all gets too much...Talk to a Mate!!” is the basis of all our initiatives. Mate ship, empathy and the appropriate use of humour is the key to connectedness in our programs and presentations.

The Regional Men's Health Initiative
delivered by Wheatbelt Men's Health (Inc.)
PO Box 768, Northam WA 6401
Phone: 08 9690 2277
Email: menshealth@4blokes.com.au
regionalmenshealth.com.au

Have you received your “Is it fit to load?” guide yet?

Stephanie Coombes, Development Officer, DPIRD, Broome

In mid-2019, DPIRD posted two copies of the 2019 revised edition of Meat and Livestock Australia’s “**Is the animal fit to load?**” guide to each pastoral lease in Western Australia.

The 2019 edition of the national guide includes new content to ensure best practice animal welfare when preparing, loading and delivering cattle, sheep and goats, including:

- clear roles and responsibilities for consignors and transporters
- clear checklists to assess whether an animal is fit to load
- managing effluent
- loading densities
- requirements for transporting bobby calves
- using firearms or captive bolt for euthanasia.

This booklet is a great resource, and we encourage you to keep a copy handy in your cattle yards and/or truck.

You can also access this booklet online as a PDF at mla.com.au/isitfittoload

Please note that the previous edition is still a useful resource and should not be discarded.

It should be noted that if the person in charge of the stock prepares to transport, or transports, an animal that is unfit, that person may be liable to prosecution under state animal welfare legislation.

For more information, please visit agric.wa.gov.au/animalwelfare or contact your local Northern Beef Development and/or Livestock Compliance Unit officers.



Is the animal fit to load?

mla
MEAT & LIVESTOCK AUSTRALIA

A national guide to the pre-transport selection and management of livestock

Revised edition 2019

Endorsed by:

ALFA AUSTRALIA, AGRICULTURE VICTORIA, ALMA, animalhealth AUSTRALIA, ALPA, ALRTA, CATTLE COUNCIL OF AUSTRALIA, Dairy Australia, GICA, Queensland Government, RMAC, SHEEP PRODUCERS AUSTRALIA, Truck Safe, WOOLPRODUCERS AUSTRALIA

Have you received your copy yet?

We have had a small number of packages returned in the mail due to incorrect mailing addresses. DPIRD does not have access to the Pastoral Lease Register for the purposes of sending general mail, and is reliant on pastoralists to be able to maintain a contact database (phone, email and postal address).

If you have not received your copies of the guide, or wish to update your contact details please contact Stephanie Coombes at stephanie.coombes@dpird.wa.gov.au

If you would like to receive future editions of the Rangelands Memo by email, or know someone who needs to be added to the postal list, please contact stephanie.coombes@dpird.wa.gov.au