Winter is over and again we enter the spring and summer without any rain. We, of course, are not alone as large areas of the eastern states are gripped by crippling drought. This has led to an Australian wide increase in slaughter rates as pastoralists de-stock with the subsequent decrease in the national herd. The extra supply to abattoirs has not led to price drops, as any surplus has been absorbed by strong overseas markets buoyed by a weak Australian dollar.

Our pastoral production team can assist in making objective decisions on stocking rates in these difficult times to maximise long term production and to drought proof your property. Recovery of rangelands when rain finally does come is probably just as important as making the most of the feed that is now present, and our professionals can offer excellent advice in this area.

Budburst is currently underway in the table grape farms at Ti Tree and Alice Springs, the hope is for a frost free time between now and November as this is what all the growers require. Like cattle, the table grape industry has been held up by strong export markets that balances out supply ensuring our growers can make a fair return on all the hard work they do and risks that they endure.

Our department recently commissioned Ernst and Young to assess the commercial potential and market for bush foods in Central Australia. Although not a huge market at present, it does provide supplementary income for hundreds of Aboriginal people, mostly women, living in remote communities in our region. The report found that unlike the beef and grape industries, demand outstrips supply. It is my firm belief that this industry is ripe for entrepreneurial investment in the next decade to the point where consumption of native, Australian flora and its products will be commonplace.

For our department, we are reaching the end of our tenure in the middle of “town”, and will be moving back to AZRI this month. We will be having a re-opening and celebration of AZRI’s 50th anniversary on the Friday 16 November at the AZRI social club from 3pm. You are all invited and I hope you can make it. Please contact Michelle Lord on 89518111 or michelle.lord@nt.gov.au.
Beef cattle research overview

By Jocelyn Coventry, Pastoral Production Officer, Alice Springs

Updates on beef cattle research help cattle managers review ongoing management strategies, as well as assess new strategies so they can adapt to change or adopt improved practices. This article provides an overview, to help the busy beef cattle producer scan the relevance of Australian beef cattle research on productive breeder cows, i.e. maternal productivity, as reported early 2018 in Animal Production Science, and cited in the reference list at the end of this article. Two department examples are given to help illustrate some points.

The research question

A Beef Co-operative Research Centre (Beef CRC) was tasked with looking at whether recent pursuit of “genetic improvement in feedlot and abattoir performance of cattle” could lead to “a decline in maternal productivity (of breeding herds), especially under variable nutritional conditions”¹. Therefore a Beef CRC Maternal Productivity Project (Beef CRC ‘project’) with Angus (Bos taurus) cattle was undertaken over five years in southern Australia.

Driving factors for maternal productivity

In the Beef CRC ‘project’, maternal productivity was defined as output (calf plus cow) versus input (feed intake), as measured by:

- weight of calf-weaned,
- cow weight change,
- energy intake, and
- progeny post-weaning production².

Finding the balance for maternal productivity

The Beef CRC ‘project’ noted that the balancing of cattle requirements for maternal productivity and feedlot or abattoir performance “is not straight forward, (but) is of critical importance”³. The researchers believe that producers should target management of “heifer pregnancy rates and interactions between the cow herd and (a variable) nutritional environment”³.

Suggestions for how to do this focused on heifer and cow genetics, in particular, estimated breeding values (EBVs) for rib fat and residual feed intake. The latter is an indicator of efficiency in feed conversion, and is defined as the difference between actual post-weaning feed consumption and the expected feed requirement for growth and maintenance.

Heifers with a higher EBV for rib fat had "significant (higher) pregnancy rates". Cows with higher EBVs for rib fat and intramuscular fat were more likely to be "earlier calving cows". This highlighted the importance of a heritable (genotypic) capacity to store feed energy as body fat. Similar to observations for physically (phenotypically) small-framed cows with lower feed maintenance requirements that allow them to store more feed energy as body fat, increased genotypic capacity to store body fat is perceived to provide a resilience for maternal productivity under variable seasonal conditions.

Cows with a lower EBV for residual feed intake had a lower weaning rate and delayed calving, but produced "heavier calves at weaning" and were "more efficient at producing weaner calves" under the range of 'normal' seasonal conditions in the Beef CRC 'project'. This may sound counter-intuitive, but if the weaning rate is only slightly lower while the weaning weight of each calf is much higher, the average calf-weight weaned per breeder cow can still be higher. This latter finding illustrates the challenge in design of a breeding program that provides a regional balance between EBVs for improved reproduction (to increase the number of progeny), versus high growth (to increase the weight of individual progeny).

**NT DPIR case study for heifer fertility and productivity**

With regards to heifer fertility, the Beef CRC 'project' showed that "weight and fat depth were the largest contributing factors to variation in (heifer) pregnancy rates". The following example from the department's Droughtmaster cattle at the Arid Zone Research Institute (AZRI) sentinel heifers illustrates the importance of managing nutrition for heifer fertility, i.e. to reach a target weight for mating, with moderate body condition to promote re-conception after calving.

Between 2013 and 2016, supplementary feeding of pellets with coccidiostat at weaning, enabled the AZRI sentinel heifers to sustain steady post-weaning growth, averaging 0.5 kg per head per day in the first 12 months and meeting a target average critical mating weight of 300 kg at 12 to 14 months of age. For these moderate frame-sized breeders, this target is within the recommendations reviewed for the Beef CRC 'project' (56 to 66% of mature cow weight). Controlled mating commenced in early December and after three months, resulted in pregnancy percentages ranging from 87 to 100% (see Table 1).

**Table 1. Summary of annual outcomes for management of AZRI sentinel heifer fertility**

<table>
<thead>
<tr>
<th>Year Brand</th>
<th>... to 12 months old</th>
<th>... to 18 months old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Growth (kg/day)</td>
<td>Average weight (kg)</td>
</tr>
<tr>
<td>2013</td>
<td>0.62</td>
<td>327</td>
</tr>
<tr>
<td>2014</td>
<td>0.51</td>
<td>325</td>
</tr>
<tr>
<td>2015</td>
<td>0.44</td>
<td>304</td>
</tr>
<tr>
<td>2016</td>
<td>0.36</td>
<td>343</td>
</tr>
<tr>
<td>2017</td>
<td>0.26</td>
<td>274</td>
</tr>
</tbody>
</table>

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4 Animal Production Science, Volume 58, Issue 1: Divergent breeding values for fatness or residual feed intake in Angus cattle.  
1. Pregnancy rates of heifers differed between fat lines and were affected by weight and fat  

5 Animal Production Science, Volume 58, Issue 1: Divergent genotypes for fatness or residual feed intake in Angus cattle.  

6 Animal Production Science, Volume 58, Issue 1: Divergent breeding values for fatness or residual feed intake in Angus cattle.  
In 2017, supplementary feeding of pellets with coccidiostat was withheld at weaning and the heifers only grew at an average of 0.29 kg per head per day for four months post-weaning. They failed to meet the target average critical mating weight in time for controlled mating over summer 2017-18. At assessment in May 2018, these heifers were within the expected hip height range-for-age (medium frame), but the sub-optimal median body condition (fat) score of 2.5 (on scale of 1 to 5) and the absence of prospective calf production in 2018, is a legacy of their previous slow post-weaning growth.

Department research in the Top End\(^7\) has previously modelled the relationship between pre-mating weight and pregnancy percentage in yearling and two year old Brahman heifers, where pre-mating weight was recorded in either October or December (see Figure 2). In each case, pregnancy rates were higher with higher pre-mating weights. The average weight at conception for the yearling heifer groups that were used for the modelling, ranged from 300 to 333 kg. This weight range represented reproductive success (conception) in up to 36% of the control-mated heifers. In comparison, the slightly wider average weight range (304 to 343 kg) that was reported pre-mating for the control-mated AZRI Sentinel heifers, resulted in reproductive success in over 80% of heifers. So although those two weight ranges provide slightly different retrospective views of the interaction between management, nutrition and heifer fertility in the NT, they both emphasize the importance of weight targets over 300 kg for reproductive efficiency in moderate framed *Bos indicus* or *Bos indicus*-infused heifers.

Research findings from the described Beef CRC ‘project’ provide new insights into ‘feeding vs. breeding’. Together with examples from department research cattle, this highlights the importance of balancing a breeding program to manage nutrition and to consider EBVs in cattle selection.

Because selection and introduction of beef cattle sires with *Bos taurus* genetics forms an important base for many cattle herds in central Australia, this adds relevance to the Beef CRC ‘project’ findings for Centralian cattle producers.

For more information, please contact:
Jocelyn Coventry, (b/h) ph. 08 89518142.

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**Footnote**

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VET students learn horticultural skills at AZRI

The Department of Education shares facilities with the Department of Primary Industry and Resources (DPIR) at AZRI to deliver a number of courses – Certificate III in Agriculture; Certificate II in Rural Operations; Certificate II in Conservation and Land Management and Certificate I in AgriFood Operations courses under the Pastoral Futures Program. This is a joint partnership between the Central Land Council, Indigenous Land Corporation, Northern Territory (NT) Cattleman’s Association and DPIR. The program skill sets are developed in consultation with industry, and students often assist AZRI staff at the farm.

Glen Oliver, Horticultural Technical Officer, has been showing students how to capture pollen from male date flowers.

Pollen release in dates occurs from June to August depending on the variety. At AZRI we have Jarvis, Fard and Boyer (male palm trees). Mature flowers are collected, left in the hothouse to dry then the flowers are cut and crumpled by hand before separating the pollen from the flower using a sifter and a paint brush.

Sarah Tsai presents Horticulture in Central Australia

By Sarah Tsai, Research Horticulturalist, Alice Springs

“I have always enjoyed talking to people that do not know that we have a horticultural industry in Central Australia. People just don’t believe it! Sometimes even people who live in Alice Springs find it a surprise!” – Sarah Tsai

I recently presented a poster at the Developing Northern Australia conference in Alice Springs (18-19 June) and the Food Futures Conference in Darwin (2-4 July). This poster puts horticulture in Central Australia in the spotlight. It summarises the horticultural potential of Central Australia: the areas of interest, existing commercial production with room to expand, and crops with great potential in the centre that are still waiting to be developed.

This poster is an extension of the prospectus published by DPIR: Investing in the Horticultural Growth of Central Australia. This prospectus was created with input from several departments of the NT Government as a 'one stop shop' booklet to showcase horticultural investment opportunities in the centre from Tennant Creek down to the SA/NT border.

Recently a news article from ABC asked the question: “Why doesn't the tropical north produce more agriculturally?” Greg Owens, CEO of the NT Farmers Association was quoted “The annual value of production of the horticultural industry was almost nothing in 1981
and has grown to almost a quarter of a billion dollars over the past 37 years”. This shows the time scales necessary for an industry like this to establish and grow.

Both conferences emphasised the development of the mango, melon and Asian vegetables industries in the northern part of the NT. Central Australia, however, has an arid climate suitable for other crops such as table grapes, dates, and bushfoods. These crops have been established and supported through ongoing work of entrepreneurs and the department since the 1980s. As new crop genetics become available, on-ground testing is still needed to evaluate the risks of commercial plantings in the Centre. The demands from consumers are changing, market opportunities are shifting and markets are dynamic and competitive. The challenge will be to exploit the Centre’s unique climatic zone.

**Exploring for the Future**

As part of a wider Government Australian initiative to boost exploration for and management of mineral, energy, and groundwater resources in northern Australia, Geoscience Australia (GA) is leading the *Exploring for the Future* program in collaboration with State and Territory partners such as the NT Geological Survey.

Through 2018 until 2020 several geoscience research projects will be working across northern Australia including:

- Airborne electromagnetic surveys
- Bore water testing
- Borehole logging and hydraulic testing
- Soil geochemistry
- Magnetotelluric surveys
- Deep seismic surveys
- Stratigraphic drilling

The information collected from these surveys will be publicly available via the GA website. Further information about Exploring for the Future can be found at [www.ga.gov.au/eftf](http://www.ga.gov.au/eftf) and enquiries can be made to [eftf@ga.gov.au](mailto:eftf@ga.gov.au) or 1800 870 833 (Mon-Fri, 9am to 5pm AEST).
Exploring for the Future: Survey areas

VegMachine – Looking at the ground from the sky

Wouldn’t it be nice to see how your ground cover has changed on your place over the last 30 years without having to leave your desk? Satellites (Landsat) have been taking pictures of your back yard for thirty years. The good news is that now you can access these images too, on an easy to use website called VegMachine at https://vegmachine.net/.

Veg Machine lets you look at ground cover of selected areas through time. To select the areas to observe cover changes you can either import files such as kml files, or you can draw your own area on the website map. At its most basic, you can look at maps of cover across your place for a selected date. Options include total ground cover, woody cover (persistent green), as well as decile cover which indicates whether the cover is above or below average compared to the historical record (Figure 1).

But the real strength of VegMachine is the summary of cover through time for different areas using the polygon comparison tool. To demonstrate I have compared the ground cover changes on Old Man Plains, the DPIR research station, to similar pastoral land around it (Figure 2). Everyone wants to know how they are doing compared to their neighbours!
The first thing you notice is that the ground cover varies a lot between the rarer very wet seasons and the usual desert climate. Ground cover usually tracked between 40 to 50%, but increased to 70% in the wet early 2000s and 2011-2012, and was lowest in the very dry year of 2008.

The next thing you notice is that at the beginning of the 1990s Old Man Plains had similar ground cover to the surrounding pastoral land. However, over time the ground cover on Old Man Plains and Pastoral land 1 increased twice as much through time as on Pastoral land 2 (Table 1). Old Man Plains has been stocked according to recommended carrying capacity by DPIR since 2004. We hoped that applying safe carrying capacity would lead to improved land condition, and the increased ground cover suggests it may have, but it took above average seasons in 2010 to 2012 to improve. The spread of buffel on Old Man Plains might also have contributed to increased ground cover.

Fires can cause sudden large reductions in average ground cover, as can be seen on Old Man Plains and on Pastoral land area 2 in 2002, and again on Pastoral land area 2 in 2011. The lower average ground cover following the 2002 fire carried through for 7 years until 200mm rainfall in November and December 2008 led to higher cover in 2009. The larger ground cover response on Old Man Plains in the beginning of 2009 followed partial destocking of Old Man Plains in 2008, which combined with the rotational grazing and spelling, may have maximised recovery.

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Figure 2: Change in ground cover through time downloaded from VegMachine on Old Man Plains and surrounding pastoral land.

Table 1: Average ground cover and change through time for the research station and surrounding areas.

<table>
<thead>
<tr>
<th></th>
<th>Old Man Plains</th>
<th>Pastoral land area 1</th>
<th>Pastoral land area 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>First ten years 1990 to 1999</td>
<td>40%</td>
<td>43%</td>
<td>40%</td>
</tr>
<tr>
<td>Last ten years 2008 to 2017</td>
<td>52%</td>
<td>55%</td>
<td>44.5%</td>
</tr>
<tr>
<td>Change in cover</td>
<td>+12%</td>
<td>+12%</td>
<td>+4.5%</td>
</tr>
</tbody>
</table>

You might want to compare individual paddocks, or similar land types to see how they are tracking through time on your place. Because seasons cause large changes in ground cover, comparing cover trends through time on different areas (e.g. near vs. far from water, grazed vs. ungrazed) can help to distinguish seasonal from management related trends. Knowing
what has happened with seasons, fire and grazing management will help you to interpret the possible causes of ground cover changes in different areas. Is ground cover decreasing more through time on some areas? That could mean that stocking rates are too high, or fire frequency was higher. Is ground cover increasing more in some areas? That could suggest that management is allowing recovery of pastures.

To see some short example videos of how to use VegMachine click the following links.

- [https://www.facebook.com/vegmachine/videos/2063416797269064/](https://www.facebook.com/vegmachine/videos/2063416797269064/)

Also, click on the help button on the VegMachine site to get an excellent easy to follow manual about how to use it.

To get a file of your station boundary to use in VegMachine email [dale.jenner@nt.gov.au](mailto:dale.jenner@nt.gov.au).

Have fun!

**What's the big deal about ground cover?**

Ground cover protects the soil from erosion. It also reduces soil evaporation, which leaves more water in the soil for growing grass. Good cover gives your land the best chance to capture and keep the rain that falls, so you maximise the growth of your pastures.
Hazard Note – Northern Australia

NORTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2018

BUDDHIS POTENTIAL
This Northern Australia Seasonal Bushfire Outlook provides information to assist fire authorities in making strategic decisions such as resource planning and prescribed fire management to reduce the negative impacts of bushfire.

A Seasonal Bushfire Outlook for southern Australia will be published in early September, and will include an update on the northern fire season.

Bushfire potential depends on many factors. In northern Australia, conditions are determined by the nature of the previous wet season. The volume, location and timing of rainfall are critically important when estimating vegetation (fuel) volumes and growth. They also affect the timing of the growing of the vegetation.

The climate outlook for the next few months is also a crucial factor. Of particular interest are the future tendencies of Pacific sea surface temperature associated with the El Niño-Southern Oscillation, a major climate driver over Australia. Other less quantifiable factors, such as the distribution and readiness of firefighting resources, are also considered.

The annual Northern Australian Fire Managers’ Forum, chaired by the Bushfire and Natural Hazards CRC, met in Townsville, Queensland, in June. This year marked the 20th anniversary of the forum, which gathers fire managers over three days from a range of public and private organisations from across northern Australia. The forum discussed the seasonal outlook for the imminent fire season, enabling the production of this Hazard Note. All other presentations from the Forum are online at www.bnhcrc.com.au/events/2018-ntgf.

Forum attendees included representatives of the Queensland Fire and Emergency Services, Queensland Parks and Wildlife Service, Bushfires NT, WA Department of Fire and Emergency Services, WA Department of Biodiversity, Conservation and Attractions, NSW Rural Fire Service, the Department of Defence, the Bureau of Meteorology, the Australian Institute for Disaster Resilience, Charles Darwin University and the Australian Wildlife Conservatory.

ANTECEDENT CONDITIONS
The past 12 months has seen Australia dominated by record warm daytime (maximum) temperatures, with highly variable rainfall. The months of October, November, January and March delivered widespread above average rainfall to tropical Australia, while September, December, April and May saw most areas experience average to below average rainfall.

The second half of 2017 saw the development of a weak La Niña in the Pacific Ocean, which persisted early in 2018 before rapidly declining. The overall impact of the La Niña on Australia’s climate was modest, with inter-seasonal (month-to-month) variability tending to dominate rainfall patterns. This inter-seasonal variability led to near average northern wet season rainfall overall (October 2017 to April 2018), tending towards above average in the far north west, Top End and Gulf of Carpentaria, and below average in parts of inland Queensland (Figure 1, page 2).

The anomalies of the past wet season, with wetter conditions in the west, tending to drier in parts of Queensland, has been repeated in recent years. As a result, there are now large multi-year rainfall deficiencies across most of Queensland, extending south

SHARE ON | All Hazard Notes are available at www.bnhcrc.com.au/hazard_notes
DEFINITIONS
Bushfire potential: The chance of a fire or number of fires occurring of such size, complexity or other impact (such as biodiversity or global emissions) that requires resources (from both a pre-emptive management and suppression capability) beyond the area in which it or they originate. Fire potential depends on many factors including weather and climate, fuel abundance and availability, recent fire history and firefighting resources available in an area.

Rainfall deciles: A decile is a statistical technique that ranks sorted observations into 10 equal groups. A decile rainfall map will show whether the rainfall is above average, average or below average for the chosen time period and area.

IBRA: Interim Biogeographic Regionalisation for Australia. Australia’s landscapes are divided into 69 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information.

into New South Wales. In contrast, nearly all of north west Australia has seen above average rainfall conditions over the past four to five years. These very long-term rainfall patterns influence vegetation growth in the region, which tends to be heavier where rainfall is above average and lighter where rainfall is below normal.

Australian temperatures continue to warm in line with global trends, rising by 1.1°C since 1910. The past 12 months (July 2017 to June 2018) was the second warmest on record for Australian mean temperatures, with an anomaly of +1.06°C, compared to the 1981-90 average, while maximum temperatures were the warmest on record with an anomaly of +1.40°C. One consequence of the rising temperatures is an increase in fire season severity, particularly during the dry season in northern Australia and the warm season in southern Australia. As measured by fire weather indices, northern Australia saw unusually severe fire weather conditions in 2017, with indices showing the second most severe fire weather season since 1950, behind the severely drought-affected 2002.

The dry season in tropical Australia officially commences in May and ends in September. Significant rainfall is uncommon, with the climate dominated by warm to hot temperatures, low humidity and east to south east winds which may become gusty and elevate fire risk. Northern Australia’s climate turned sharply drier in April 2016, with low rainfall conditions becoming established in the north a month earlier than is normal (Figure 2, above). Temperatures during this period have also been warmer than average across nearly all of Australia. As a result, vegetation has rapidly dried, with little greenness left in the tropical region. The combination of weather and climate factors means the fire season is now well underway, as is expected for the time of year.

CLIMATE OUTLOOK
The El Niño–Southern Oscillation remains neutral. However, climate model outlooks and recent warming in the tropical Pacific Ocean mean there is a greater than usual chance of an El Niño forming later this year. The Bureau’s El Niño–Southern Oscillation Outlook is currently at El Niño WATCH, which means the likelihood of an El Niño forming in 2018 is approximately 50%, or about double the normal chance.

Most international climate models surveyed by the Bureau suggest more warming is likely in sea surface temperatures, with a majority indicating...
this warming will reach El Niño levels in the southern hemisphere spring. Historically, El Niño is associated with reduced rainfall in northern and eastern Australia during winter and spring. With dry conditions in place, this combination means that fire weather conditions are likely to be challenging and elevated compared to normal.

Overall, the Bureau’s forecast suggests that the start to the 2018/19 wet season is likely to be near average, though some parts of Queensland slightly favour a late start. The outlook for the coming wet season will be updated monthly as data and model forecasts become available.

The probability of above median rainfall is generally in the range of 30-50% in tropical and subtropical areas, with below average conditions tending to be favoured (Figure 3, above right). The tendency for below average rainfall to be favoured is consistent with the Pacific Ocean showing conditions that may lead to the development of El Niño. Historical outlook accuracy for August to October is moderate over most of northern Australia, except for the interior of Western Australia, where accuracy is low. The August to October period is normally dry during the first two months for northern Australia, with typically low rainfall except near the tropical Queensland coast. Rain may begin to become more widespread during October. This means that the impact of rainfall in the coming months, even if it is above average, will tend to be quite modest.

August to October is likely to bring above average maximum temperatures to tropical parts of the country, with probabilities generally in the range of 60-80% (Figure 4, page 4). This suggests that recent warmer than average conditions are likely to continue through the remainder of the dry season. The pattern is similar for minimum temperatures, with the probability of above median typically in the range of 60-75%, except near Cape York where probabilities are closer to 50%. Maximum temperature accuracy is moderate to high over most of northern Australia for this time of year, except the southern Northern Territory and parts of northern Western Australia, where accuracy is low. Minimum temperature accuracy is moderate to high over the northern half of Australia. The climatic conditions and outlooks generally present a consistent picture, with

NORTHERN QUEENSLAND
The early part of the northern Queensland wet season saw average rainfall. This changed in March, with well above average rainfall across the Gulf Country, Northern Goldfields, North Tropical Coast, and the Herbert and Lower Burdekin. As a result, grass fuel loads as compared to the long-term average are variable across the north. Cape York and areas east of Georgetown have below average grass fuel loads, while west of Georgetown grass fuel loads are around average. Around Normanton and to the north along the western part of Cape York, grass fuel loads are very much above average. Areas that received above average rainfall in March have grass fuel loads that are greater than average for this time of year. Drought declarations are still in force in 23 local government areas, with a further four under partial drought declaration.

Soil moisture is generally close to the long-term average, except for areas inland from Proserpine, Collinsville, Mackay and south to Rockhampton, where soil moisture is below average.

As noted in both the 2016 and 2017 Northern Australia Seasonal Bushfire Outlooks (Hazard Notes 18 and 36), Severe Tropical Cyclone Marcia in February 2017 followed by Severe Tropical Cyclone Debbie in March 2017, caused significant damage to coastal vegetation south of Bowen. Very strong winds stripped leaves from the canopy, increasing the fine fuel load and changing the structure of the vegetation. The increased fire potential in the areas impacted by Marcia led to the creation of a strategic mitigation plan. This plan has been implemented and the risk has largely been mitigated. A similar program was undertaken in the central region following Debbie, and to date these activities have mitigated the risk in parts. Ongoing hazard mitigation activities will continue to reduce the risk in cyclone-damaged vegetation, but there remains an increased fire risk in these areas.

Above normal fire potential is expected for those forested areas along the Central Coast, Whitsundays and the Capricornia Woodland areas, the savanna country around Normanton and to the north are expected to have normal fire potential, with the exception of a small area in the south west of Cape York above average. Areas that received above normal fire potential is predicted.

Normal fire potential is expected for all other areas north of latitude 52°S. Regions of south east and western Queensland south of latitude 52°S will be assessed for the Northern Australia Seasonal Bushfire Outlook 2018, to be published in September.

NORTHERN TERRITORY
The Top End wet season commenced in November 2017, generally easing the threat to lineholders of late season bushfires. Rainfall has since varied in quantity, extent, and timing, resulting in inconsistent rainfall. Some areas around the Victoria River district recorded totals below the season average, with the rain finishing relatively early in the wet season.
The effectiveness of mitigation burns across the Northern Territory have varied due to the differing conditions experienced during the wet season. Where planned burns have been undertaken by agencies and landholders, including carbon farming projects, good results have been achieved to minimise the risk of bushfires occurring later in the year. Finer scale burning has been restricted close to populated areas in locations where above average rainfall occurred. This was due to high soil moisture retention that prevented access to undertake broader planned burning. In addition, the delayed burning of gamba grass meant that mitigation burns in areas infected were delayed. These mitigation burns will continue to be completed when conditions allow.

Central Regions
Large areas of central Australia have received high amounts of rain over the past two years, which has increased the fuel loads. In particular, the Lasseter region has observed above average rainfall that has led to good grass growth. Large areas with a high distribution of buffel grass have an increasing bushfire risk due to this strong growth, particularly within road reserves, drainage areas and water courses. Although fuel loads are increasing, grazing and planned burning efforts suggest that normal bushfire conditions can be expected. The effectiveness of mitigation efforts has varied depending on land tenure. Landscape scale burning is occurring throughout most Aboriginal Land Trusts. Mitigation efforts within the Tanami region have been widely successful and this has reduced the overall bushfire risk to that region.

Top End Region
Inconsistent rainfall across the wet season has led to average levels of fuel loads across the region. The dry end to the wet season allowed for earlier access to country in some locations for mitigation purposes. Burning has been mostly consistent across the Top End except for areas that received below average rainfall, including the Victoria River district, which resulted in earlier than normal burning. As a result of the dry conditions, these regions fuel reduced mitigation works. Grass fuels have been retained for primary production by landowners.

Gamba Grass Prevailing Area
Gamba grass continues to spread to new areas across the north-west Top End, increasing fuel loads and changing fire management practices on properties. Mitigation efforts have varied depending on tenure, land value or the management objectives of landholders. Soil moisture has been above average since April, which has restricted on-ground mitigation programs in some areas. The onset of strong winds has impacted aerial mitigation works. Where burning has taken place, good results have been achieved, with mitigation works in the Darwin Coastal and Daly Basin regions continuing as weather permits.

Northern Western Australia
Northern Western Australia has experienced its third wettest wet season on record. This above average rainfall has resulted in higher than average soil moisture for most of the Dampierland, parts of the Great Sandy Desert and the northern Kimberley. Above average June rain over the north-west of Western Australia has alleviated soil moisture deficiencies in the coastal south-east of the Pilbara and north-eastern Gascoyne. However, June rainfall was below average in the Kimberley.

Cooler and wetter wet season conditions have resulted in the accumulation of higher than average grass fuel loads. This has contributed to above normal fire potential for the Dampierland and parts of the Pilbara and Carnarvon regions. The central Kimberley and Ord Victoria Plains received less rainfall and have cured earlier, with the areas not subjected to prescribed burning classified as above normal fire potential. For other areas of northern Western Australia, normal and reduced fuel loads through wet season fires, grazing and prescribed burning efforts suggest that normal bushfire conditions can be expected.

The Bushfire and Natural Hazards CRC is a national research centre funded by the Australian Government Cooperative Research Centre Program. It was formed in 2013 for an eight-year program to undertake end-user focused research for Australia and New Zealand.

Hazard Notes are prepared from available research at the time of publication to encourage discussion and debate. The contents of Hazard Notes do not necessarily represent the views, policies, practices or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.

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(El Niño + Positive IOD) during spring = **Drier Conditions!**

The El Niño-Southern Oscillation is currently neutral, but there is a 50% chance of El Niño forming in the coming months. El Niño during Spring typically means below-average rainfall in eastern and northern Australia, including a later than average start to the northern wet season. Similarly the Indian Ocean Dipole (IOD) is also neutral. However, outlooks suggest a brief positive IOD event may form during Spring, and typically reduces rainfall in central and southern Australia. A positive IOD can also exacerbate any El Niño-driven rainfall deficiencies.

The national outlook for October to December indicates that:

- **DRIER** than average conditions are more likely across much of the NT, especially across the central and southern districts.
- **WARMER** than average days and nights are more likely across the entire NT.


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**Northern Territory Pastoral Districts**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Southern Alice Springs</th>
<th>Plenty</th>
<th>Northern Alice Springs</th>
<th>Tennant Creek</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past 12 Months Total pasture growth</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
<td>↔</td>
<td>Arrows indicate trend compared to the long-term median.</td>
</tr>
<tr>
<td>Current estimated standing biomass</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
<td>↓</td>
<td>Arrows indicated trend since previous quarter.</td>
</tr>
<tr>
<td>Current fire risk</td>
<td>↓</td>
<td>↓</td>
<td>←</td>
<td>←</td>
<td>Arrows indicate the trend since the previous quarter.</td>
</tr>
<tr>
<td>Current seasonal outlook</td>
<td>↓</td>
<td>↓</td>
<td>↑</td>
<td>←</td>
<td>Arrows indicate the trend since previous quarter and consider forecasted model predictions.</td>
</tr>
</tbody>
</table>

**Legend:**

- Increasing Trend = ↑
- Decreasing Trend = ↓
- Steady = ↔
- Green = low risk
- Orange = watch
- Red = high risk
Median district pasture growth (kg/ha) — running total

**Tennant Creek District**

- **Past 12 Months** 
- **Past 24 Months**

**Northern Alice Springs District**

- **Past 12 Months** 
- **Past 24 Months**

**Plenty District**

- **Past 12 Months** 
- **Past 24 Months**

**Southern Alice Springs District**

- **Past 12 Months** 
- **Past 24 Months**

*If you would like further information, please contact Chris on 895 18111*