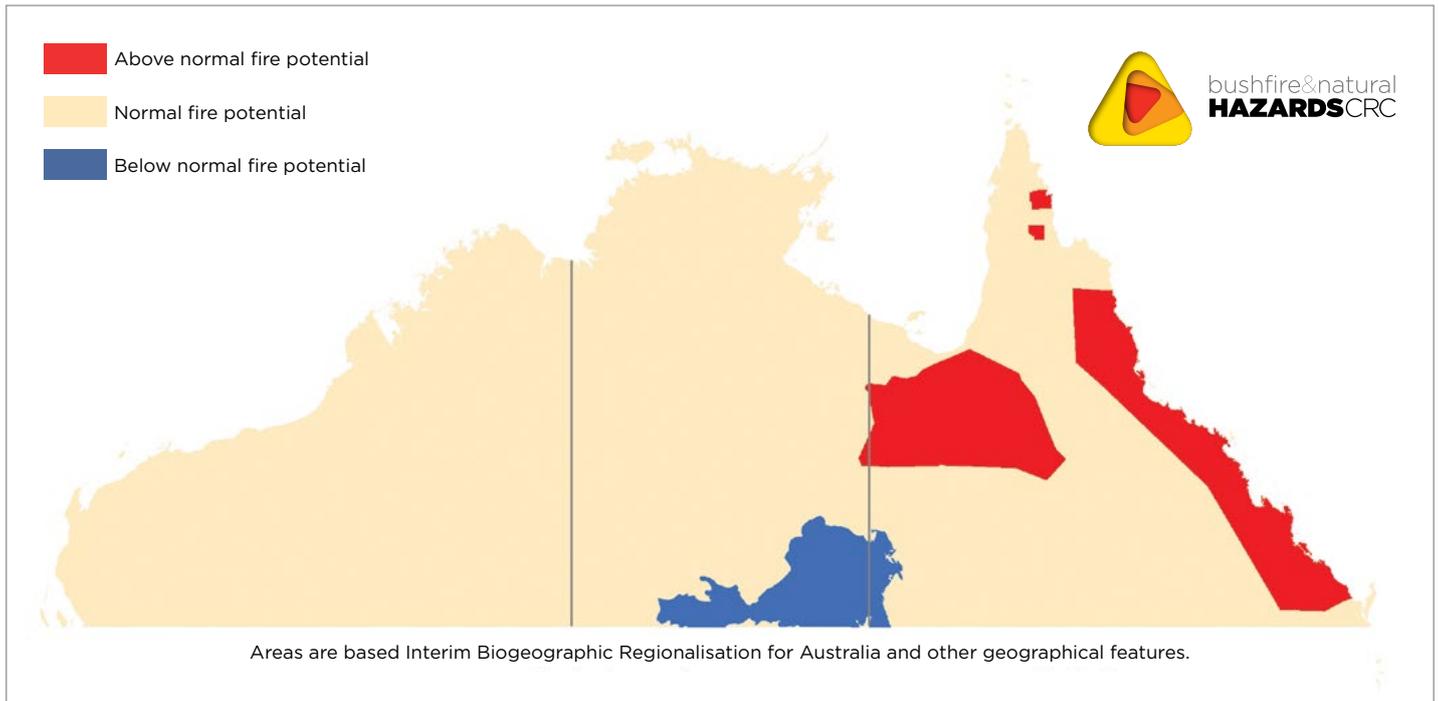


ISSUE 18 JULY 2016

TOPICS IN THIS EDITION | FIRE WEATHER | FUEL MANAGEMENT

NORTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2016



BUSHFIRE POTENTIAL

This *Northern Australia Seasonal Bushfire Outlook* provides information to assist fire and land management agencies 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 distributed 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 fuel volumes and growth. They also affect the timing of the drying of the fuel.

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' Group Forum, chaired by Bushfire and Natural Hazards CRC CEO Richard Thornton, met in Alice Springs in June. During the two-day proceedings 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.

Forum attendees included representatives of Bushfires NT, NT Fire and Rescue Service, Parks and Wildlife Commission of the NT, Queensland Fire and Emergency Services, Queensland Parks and Wildlife Service, WA Department of Fire and Emergency Services, WA Department of Parks and Wildlife, the Bureau of Meteorology, AFAC, Charles Darwin University and the Central Land Council.

ANTECEDENT CONDITIONS

The 2015-2016 northern wet season was affected by one of the strongest El Niño events on record. The El Niño remained strong throughout the summer, before weakening in autumn. Neutral conditions have recently become established, and there remains a significant chance that a La Niña will develop in the coming months. The Pacific warmth (El Niño) has coincided with near-record warm ocean conditions across almost the entire Indian Ocean.

As a result of the strong El Niño, wet season rainfall was patchy, tropical cyclone activity suppressed and temperatures at record warmth. Most coastal areas had below average rainfall for October to April. In contrast, an area of above average rainfall occurred in a belt from near Katherine to the Alice Springs region. The bulk of this rainfall fell in a couple of weeks around Christmas Day and early January, associated with a slow-moving

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 decile: 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.

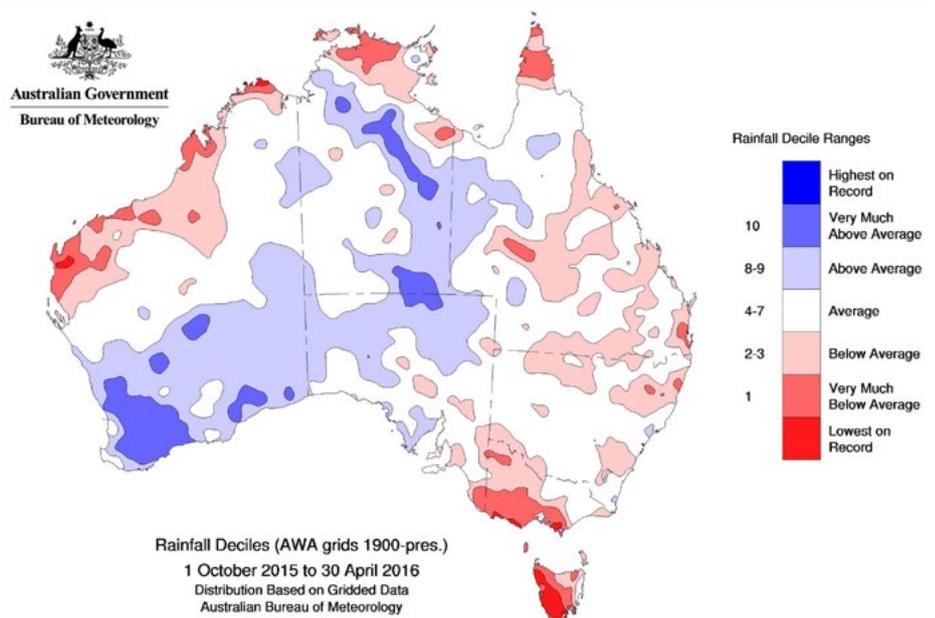
IBRA: Interim Biogeographic Regionalisation for Australia. Australia's landscapes are divided into 89 large geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information.

monsoon depression. In Queensland, March saw some heavy rainfall, particularly near the Northern Territory border and southern Cape York Peninsula, with patchy areas of above average rainfall along the coast.

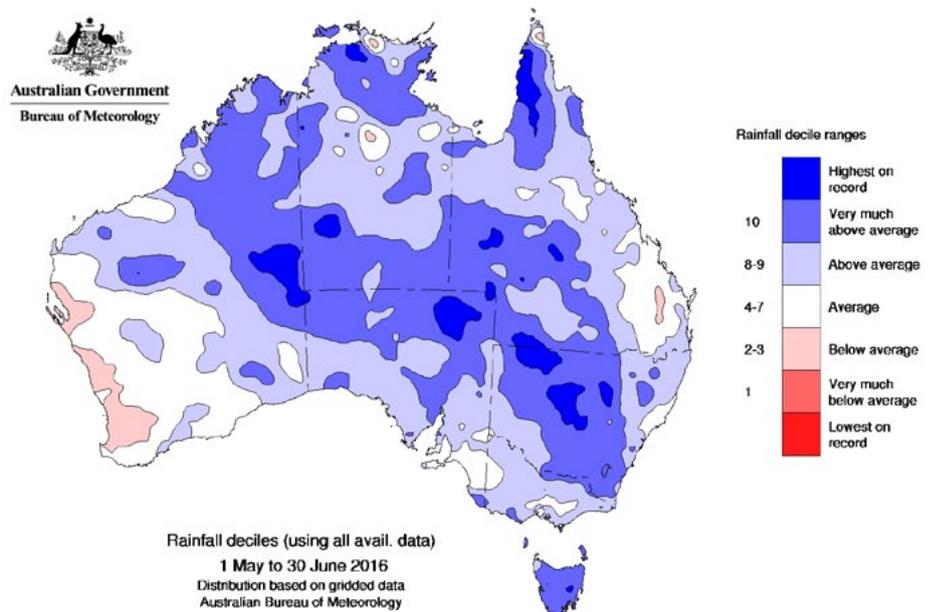
Weaker than normal monsoonal activity in the north meant that much of Queensland continues to suffer substantial rainfall deficits over periods of three to four years (dating back to late 2012). These deficiencies are reflected in agricultural drought declarations that currently affect more than 80% of Queensland. In the Northern Territory and Western Australia long-term deficiencies are patchier and less severe in intensity.

A notable feature of the past 12 months has been record heat. Mean temperatures for the 12 months ending June 30 were some +1.3°C above the 1961-1990 average across northern Australia, beating the previous record of +0.9°C set in 2013/2014. Records were also set for both maximum and minimum temperatures over the same period.

The return to neutral El Niño-Southern Oscillation (ENSO) conditions in April and warming in the eastern Indian Ocean (a precursor to a likely negative Indian Ocean Dipole) has triggered a shift in



▲ **Figure 1:** RAINFALL DECILES FOR 1 OCTOBER 2015 TO 30 APRIL 2016.



▲ **Figure 2:** RAINFALL DECILES FOR 1 MAY TO 30 JUNE 2016.

Australia's climate toward favouring wetter conditions. Above average to locally record high May-June rainfall has fallen across almost all of northern Australia (see Figure 2, above), with some areas such as the central west of Queensland having more rainfall during this period than in the whole of 2015. The combination of a relatively poor wet season (and very poor second half), followed by unseasonal dry season rainfall is highly unusual.

Vegetation across northern Australia has dried rapidly in response to the record warm and dry second half to the northern wet season, despite the unusual rainfall in May and June.

CLIMATE OUTLOOK

The Pacific Ocean is currently experiencing neutral ENSO conditions, with the Indian Ocean remaining at near-record warmth. While there remains some uncertainty around future developments, it is likely that a negative Indian Ocean Dipole will develop in the coming weeks, while neutral to weak La Niña conditions are expected in the Pacific. There remains the possibility that a more significant La Niña could develop later in 2016, but this is assessed as being less likely. The combination of these climate drivers means that an early start to the wet season is now likely for northern Australia, which might bring an early end to the fire season.

The July to September period is normally dry for northern Australia, with low rainfall except near the tropical Queensland coast. This means that the impact of rainfall in the coming months, even if it is above average, will tend to be quite modest. For Australia as a whole (Figure 3, right), rainfall moderately to strongly favours above median rainfall. The probability of above median rainfall is greater than 70% in central Australia and typically 55 to 65% in tropical Australia. These probabilities suggest that the higher rainfall seen in May and June may be expected to continue through until September, although rainfall over northern Australia is typically low during this period. Historical outlook accuracy for July to September is moderate over most of northern Australia, except around the border of Western Australia and the Northern Territory, and areas surrounding the Gulf of Carpentaria, where accuracy is low.

July to September is likely to bring above average maximum temperatures to tropical parts, with conditions likely to be cooler than average further south. The overall pattern is similar for minimum temperatures, with the probability of above median typically in the range of 70% or higher in tropical parts, and somewhat less than 50% in parts of central Australia. Maximum temperature accuracy is moderate to high over most of Australia for this time of year. Minimum temperature accuracy is moderate over the northern half of Australia for this time of year.

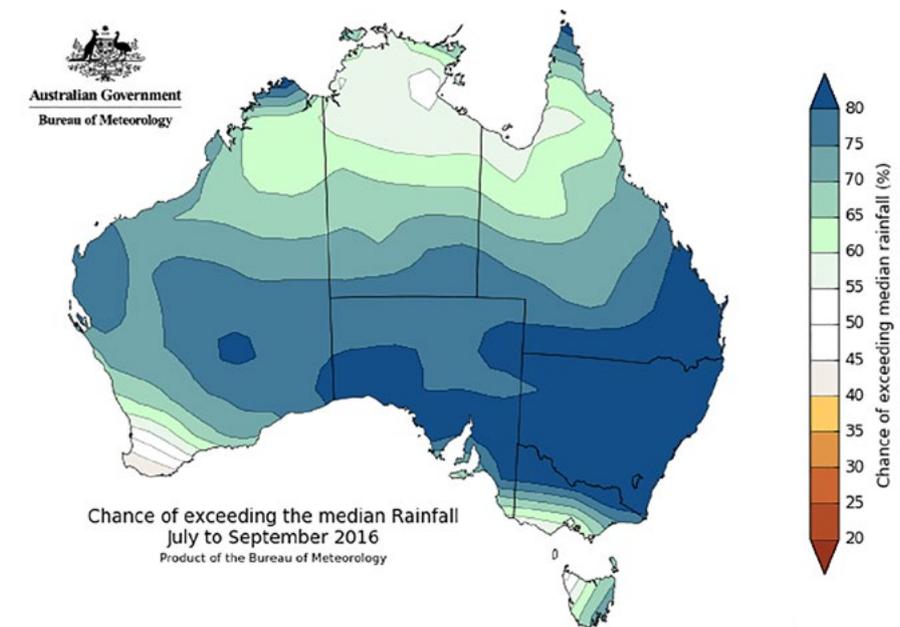
The climatic conditions and the climate outlook overall presents quite mixed signals for the fire season. For this reason, the state and amount of available fuels, and the predicted earlier onset of northern rainfall, is probably the best guide to the fire season ahead in many parts.

REGIONAL SUMMARIES

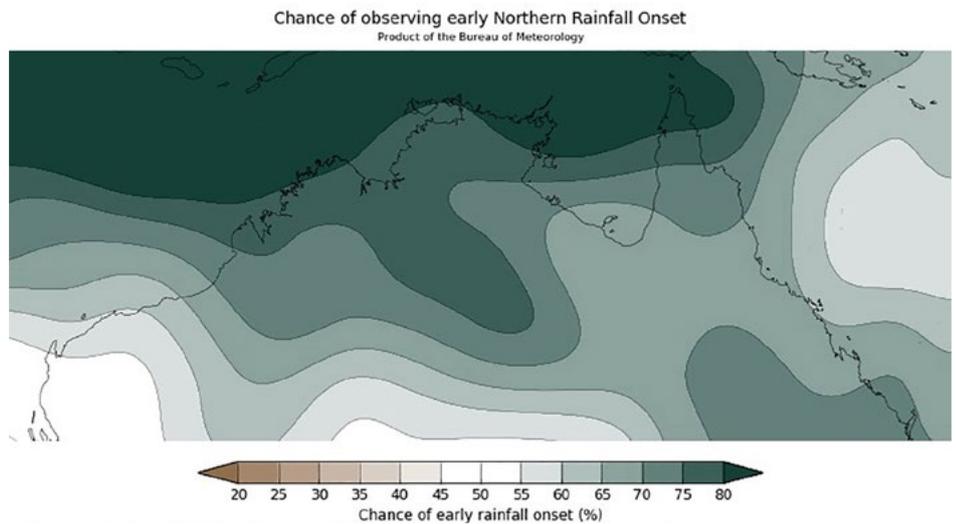
NORTHERN QUEENSLAND

The bushfire season across northern Queensland is primarily influenced by geographic location, the relationship between climate and vegetation, and long-term, seasonal and short-term climatic conditions. The 2015/2016 wet season did not produce much rain, with the main falls coming in May and June, outside the normal period. The impact of this more recent rain is unclear at this time.

Following three years of drought, much of western and central Queensland has been destocked. This year's rain has led



▲ **Figure 3:** THE PROBABILITY OF ABOVE MEDIAN RAINFALL FOR JULY TO SEPTEMBER.



▲ **Figure 4:** THE PROBABILITY OF EARLY NORTHERN RAINFALL ONSET (ACCUMULATION OF 50+MM FROM 1 SEPTEMBER 2016).

to increased fuel loads in some of these areas. However due to both the high price and shortage of store cattle they remain either destocked or lightly stocked. This has created higher than normal fuel loads that will carry into this northern Queensland fire season.

In February 2015 Severe Tropical Cyclone *Marcia* (see *Hazard Note 8 July 2015* for information on the impact of *Marcia* on fuel levels) caused significant damage to the vegetation around Rockhampton. Very strong winds stripped leaves from the canopies and this increased the fine fuel loads and changed the structure of the vegetation.

These changes to the fuel persist and there remains an increased fire risk along the Capricorn Coast. Task Force Marcia

was created to manage this increased risk and this work proved valuable to decision makers last fire season. As a result of this success, further work is being undertaken in preparation for this fire season.

Drought declarations are still in force in 36 local government areas, with a further six under partial drought declaration. These areas have limited fuel loads.

In collaboration with other fire and land management agencies, the Carpentaria Land Council Aboriginal Corporation and landowners, the bushfire potential for the fire season has been assessed as follows:

- Above normal fire potential is expected in the coastal ranges from Bundaberg north to around Cooktown.

- Woodlands and grasslands around the Mount Isa region, east to Richmond, north to Normanton and west to near the Northern Territory border have been assessed as having above normal fire potential.
- Isolated patches in Cape York can expect above normal fire potential.
- Below normal fire potential is expected north of Cameron Corner adjacent to the Northern Territory border.

Normal fire potential is predicted for all other areas north of latitude S25°. Regions of south east and western Queensland south of latitude S25° will be assessed during the Southern Australia Bushfire Seasonal workshop in August 2016.

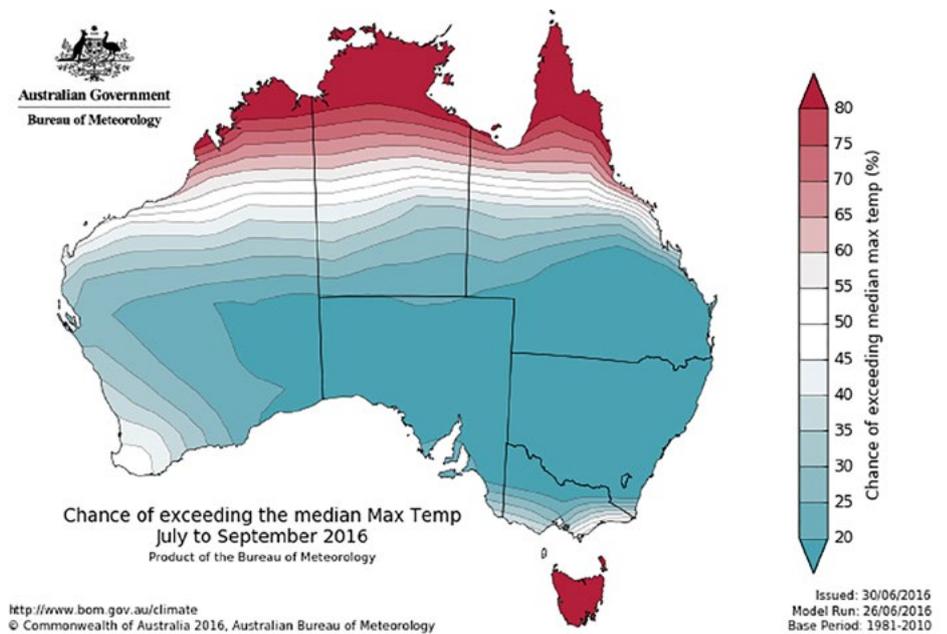
NORTHERN TERRITORY

Overview

Weather events have been quite diverse over the previous six to eight months and inconsistent with previous years. Areas across the pastoral estate have received record rainfall, whilst other areas on the Arnhem Coast have received the lowest rainfall on record. Conditions in Central Australia continue to advance towards another fire season of significant intensity. Pasture conditions and growth also fluctuate across the Territory, with fire potential classified as normal in all areas except the south east, with a level of confidence that it will not exceed into above normal.

Western Top End

The Darwin coastal and Darwin IBRA regions have experienced average to well below average rainfall since October 2015. This rainfall, including late rains in May, was still sufficient, and coupled with sunny days, has been enough to produce average growth of vegetation. The concerning factor was that the unseasonal May rain hampered, and in some cases put a halt on, mitigation burning. This rain also led to regrowth of already burnt areas, impacting on the effectiveness of the completed burns, and delayed planned mitigation work, affecting fire management outcomes.



▲ Figure 5: THE PROBABILITY OF ABOVE MEDIAN MAXIMUM TEMPERATURE FOR JULY TO SEPTEMBER.

Southern Top End

Inconsistent rain during the 2015/2016 wet season has resulted in average fuel growth across these regions. Areas of the Daly basin received the highest rainfall totals on record, whilst other areas have seen the lowest rainfall on record.

Late 2015 saw a large number of bushfires across this area which reduced a large quantity of fuel for the 2016 fire season. Normal fire potential is expected for the 2016 fire season in these areas.

Central Regions

Conditions have been normal over north and north western areas of central Australia, with carbon farming initiatives and other mitigation activities taking place. These regions maintain normal fire potential.

Parts of the Mitchell Grass Downs IBRA region in the Territory received the highest rainfall on record during the wet season. Continuing rainfall over more recent months has reduced curing, and this combined with the intensiveness of the grazing in this region, should restrict the likelihood of the fire season exceeding normal conditions.

Below normal fire potential has been identified as occurring in the south and south eastern area of the Territory. Rain in recent months, along with delayed curing, provides a level of confidence with this assessment. These areas are likely to return to normal fire potential by the end of the year.

WESTERN AUSTRALIA

A drier than average wet season in the East Kimberley and Pilbara has resulted in the lowest autumn rainfall on record, with normal to reduced grass fuel loads in these regions. With expansive areas of reduced fuel loads as a result of a mosaic of dry season fire scars and late wet season burning across 2015/2016 in the Central and West Kimberley, the risk of above normal grass fuel loads from an above average wet season for this region has been mitigated. The result of the combination of weather and mitigation influences across the north of Western Australia has resulted in normal to reduced grass fuel loads across the region, with the expectation of a normal fire season.

Note: no above normal areas indicated in Western Australia.

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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