HAZARD **NOTE**

bushfire&natural HAZARDSCRC

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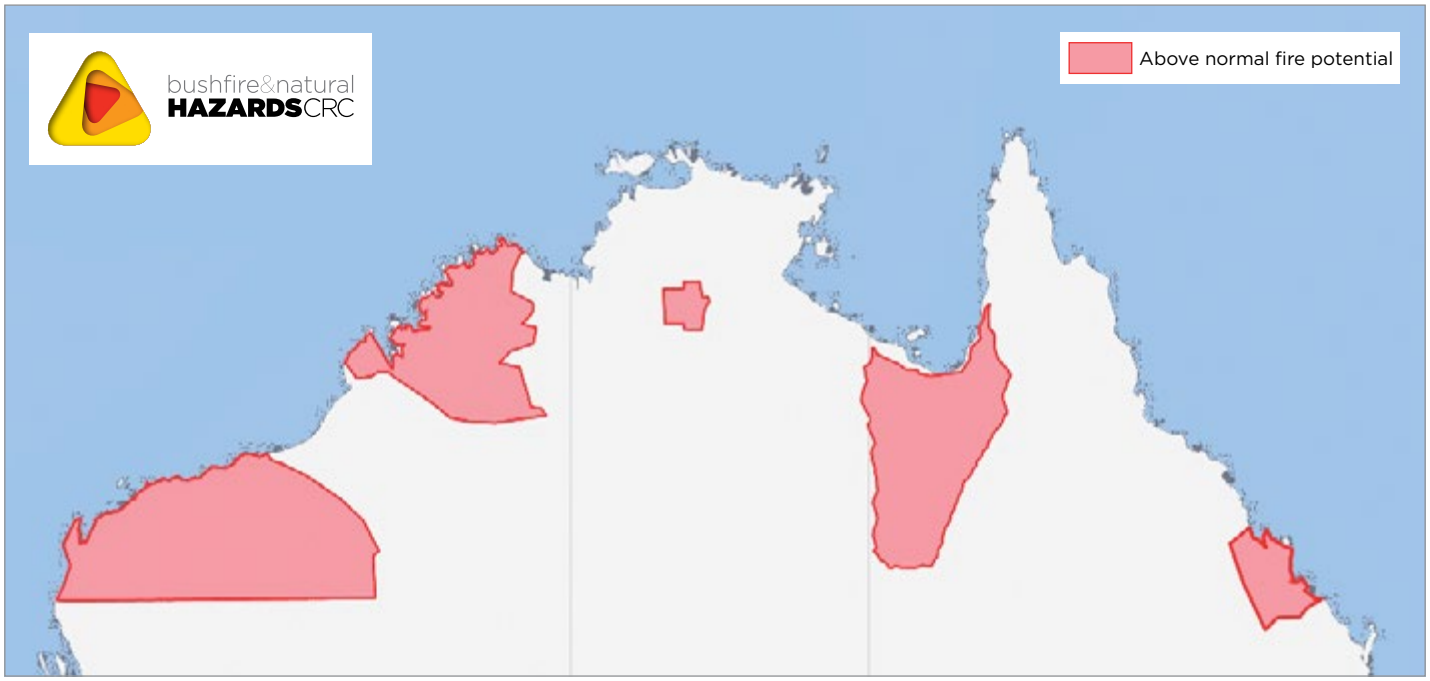
TOPICS IN THIS EDITION | FIRE WEATHER | FUEL MANAGEMENT

NORTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2015



BUSHFIRE 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, and 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 for 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 the Pacific and Indian Ocean sea surface temperatures associated with the El Niño-Southern Oscillation and the Indian Ocean Dipole, which are major climate drivers 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 Bushfire and Natural Hazards CRC CEO Dr Richard Thornton, met in Cairns 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 available at www.bnhcrc.com.au

Forum attendees included representatives of the Bureau of Meteorology, Queensland Fire and Emergency Services, Queensland Parks and Wildlife Service, Bushfires NT, the NT Fire and Rescue Service, the WA Department of Fire and Emergency Services, the WA Department of Parks and Wildlife, Charles Darwin University, AFAC, Rural Fire Brigades Association Queensland, Cape York Sustainable Futures, Carpentaria Land Council Aboriginal Corporation, Landgate, the Aboriginal Carbon Fund and the federal Department of Defence.

ANTECEDENT CONDITIONS

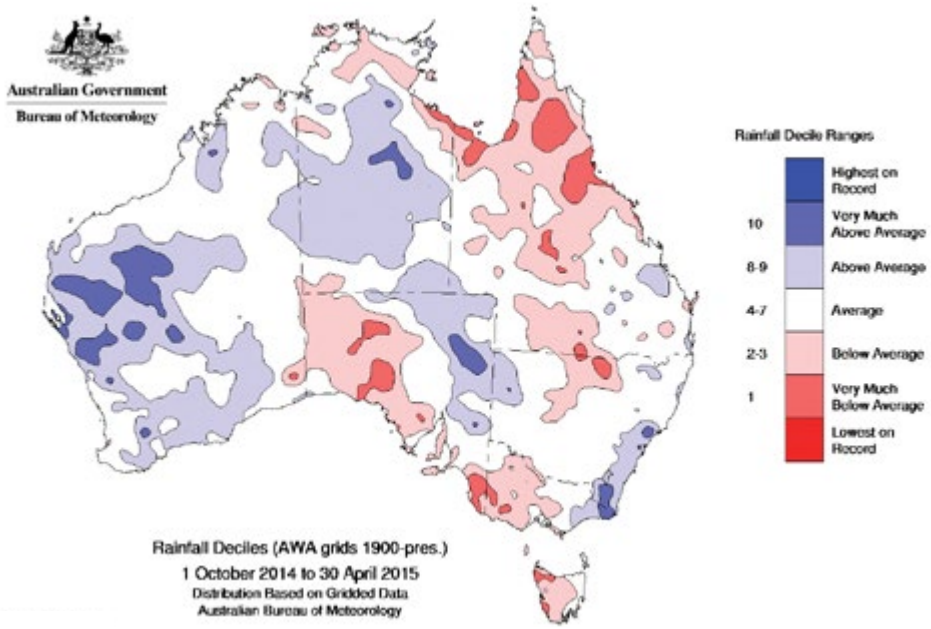
The 2014–2015 northern wet season saw borderline El Niño conditions in the Pacific Ocean, which reached peak intensity towards the end of the calendar year. After a brief weakening over summer, warming recommenced in the Pacific in autumn and an El Niño was declared in May 2015. The El Niño is expected to persist through the remainder of 2015, with some further strengthening likely during spring. The Pacific warmth coincides with warm ocean conditions across the Indian Ocean, which has been linked to increased rainfall across the subtropics in recent months.

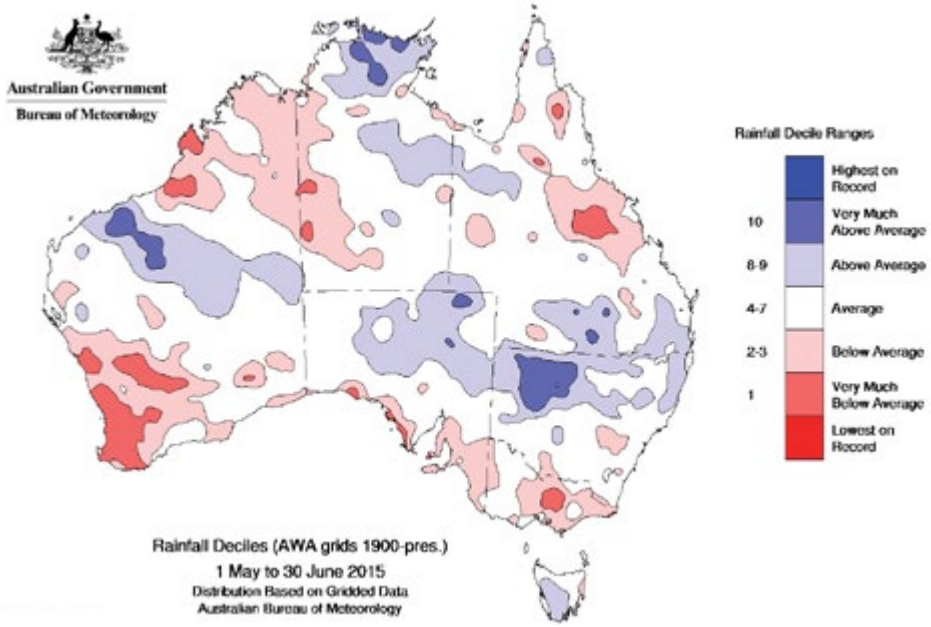
DEFINITIONS

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. The Bushfire Outlook map is based on the IBRA regions for northern Australia.





Consistent with the near El Niño conditions, the build-up months of October and November 2014 saw very much below average rainfall for many northern areas, with unusually warm daytime temperatures. The monsoon onset at Darwin occurred later than usual (officially observed on 31 December 2014). The arrival of the monsoon saw widespread heavy rainfall into January, with particularly good falls occurring in a north west-south east belt from the north of Western Australia and the Top End of the Northern Territory, down into south east Australia. Unfortunately the outbreak of heavy rainfall was short-lived; dry and locally record-warm temperatures affected most of northern Australia for the remainder of the wet season.

The bulk of Queensland experienced a relatively poor wet season, the third in as many years, with rainfall widely below to very much below average. Severe Tropical Cyclone *Marcia* brought locally heavy rainfall to the central coast of Queensland and adjacent inland areas in February, was associated with cyclone-strength winds over a large area of vegetation and caused significant damage to several towns. At the same time, Severe Tropical Cyclone *Lam* brought locally heavy falls to the eastern Top End of the Northern Territory and parts of the Cape York Peninsula in Queensland. While both cyclones were locally significant, they left only a modest signal on seasonal rainfall totals.

Currently, about 80% of Queensland is drought declared, with vegetation and soil moisture affected by the protracted rainfall deficiencies. Southern drought-affected areas have seen poor vegetation growth for a number of years, which translates into low fuel loads.

Rainfall during February, March and April was generally below average over Queensland, meaning that the wet season effectively ended early. The combination of a poor finish to the wet season and above average temperatures has led to an early curing (drying) of vegetation, with vegetation greenness values very low for March. In May 2015, only the immediate tropical coast of Queensland and a small area of the Northern Territory corresponding to heavy rainfall during January remained green for the time of year.

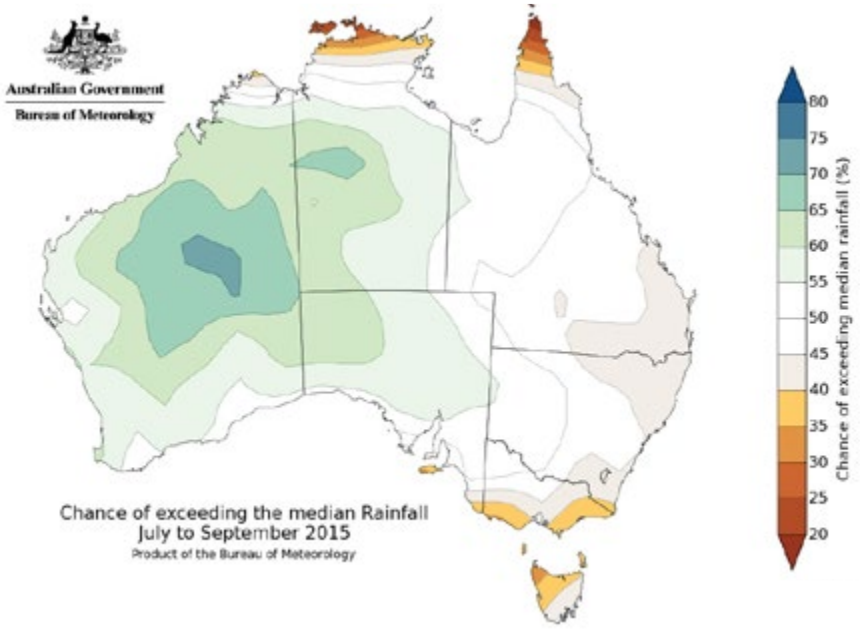
CLIMATE OUTLOOK

The 2015 El Niño continues to strengthen and will be an important driver of climate for the remainder of the year. Central and eastern tropical Pacific Ocean sea surface temperature indices are more than one degree above average, levels not seen since 1997 (the last strong El Niño). El Niño is typically associated with above average daytime temperatures and a delay in the start of the northern wet season, suggesting that an early end to the fire danger season is unlikely. The Bureau's new Northern Rainfall Onset outlook, which takes into account influences from the Pacific and Indian oceans, suggests that the onset of the rainy season is likely to be delayed, and particularly so about the most northerly parts of the tropics.

The July to September period is dry for northern Australia (see right), with very low rainfall except near the tropical Queensland coast. The climate outlook shows that there is an increased chance of a wetter than usual July to September over central and northern Western Australia, as well as adjacent areas of the Northern Territory. Rainfall is likely to be below average across the far north. The current outlook reflects abnormally warm sea surface temperatures in the Indian Ocean and El Niño in the Pacific. The Bureau's historical climate 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 lower.

July to September days are likely to be warmer than average across large parts of northern Australia (see page 4), continuing the pattern of recent months. Overnight temperatures are likely to be warmer than average for most of northern Australia. Significantly warmer-than-average sea surface temperatures in the Indian Ocean, and in waters around Australia, are likely influencing the warmer overnight temperatures expected for much of the country. The Bureau's maximum temperature accuracy is moderate to high over most of Australia for this time of year, while minimum temperature accuracy is moderate over the northern half of Australia for this time of year.

The combination of above average temperatures, dry fuel and low rainfall suggests that fire weather is likely to be elevated during the northern fire season.



REGIONAL SUMMARIES

NORTH 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. During the 2015 wet season, Queensland experienced two severe weather events. While Severe Tropical Cyclone *Marcia* provided much needed rainfall to the coastal areas of the central region, and likewise Tropical Cyclone *Nathan* north of Cooktown, the remainder of north and central Queensland experienced well below average rainfall for the wet season. A neutral El Niño-Southern Oscillation was replaced by an official El Niño declaration, with El Niño conditions expected to strengthen.

As of 1 July 2015, over 80% of Queensland had been drought declared. Over the past 12 months, rainfall has generally been average to below average across most of northern and central Queensland. Although record rainfall along the north tropical coast in June has lessened deficiencies in some coastal areas, the remainder of the region around Townsville, central and western Cape York Peninsula, the southern coast of the Gulf of Carpentaria and inland from central Queensland near Longreach continue to have severe rainfall deficiencies. With average to below average rainfall forecast, and temperatures expected to be above average over much of Queensland into early spring, conditions are unlikely to improve.

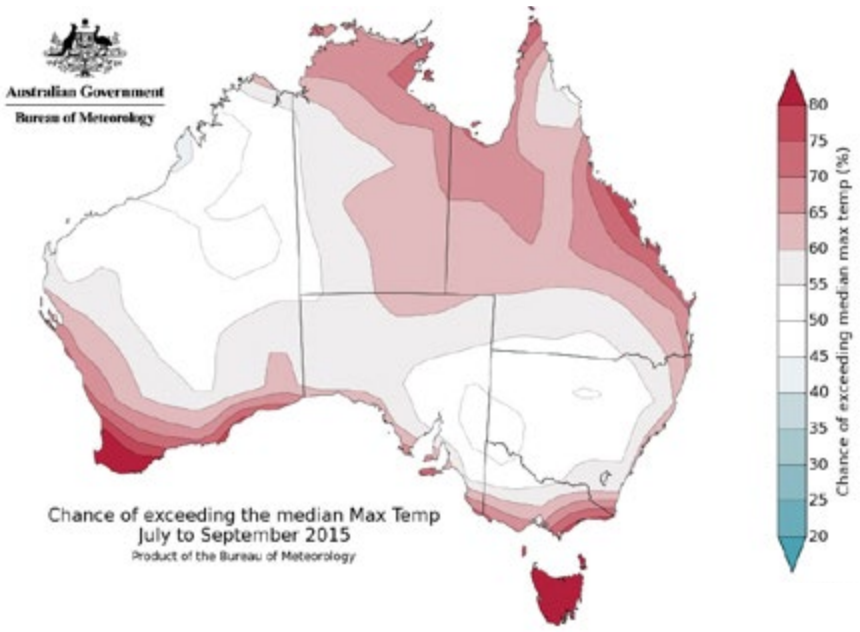
Pasture conditions and grass fuel loads vary considerably, and with the onset of the dry season the condition of the vegetation is generally declining, especially across inland and northern inland areas. Winter frosts over inland areas have added to the denigration of grassland conditions and due to the increasing drought conditions many landowners are now focused on protecting existing pasture, which in turn increases the risk of fire in some regions.

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:

- In the northern and north western part of the state, above normal fire potential is expected across the Gulf Country from the Northern Territory border, east to around Normanton and north towards Kowanyama; south towards Prospect and south west to south of Boulia and west to the Northern Territory border, encompassing the Barkly Tableland and greater Mount Isa area.
- In the central region, above normal fire potential is expected in the impact areas of Severe Tropical Cyclone *Marcia*, from the coastal fringe west into the Callide Valley.
- Normal bushfire potential is expected from north west of Theodore, north towards Collinsville and into

western Cape York near Kowanyama, south towards Julia Creek and south east to the northern Central Highlands, the Desert Uplands and south east to Alpha and north towards Charters Towers.

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 Season workshop in August 2015.



NORTHERN TERRITORY

Overview

The Northern Territory has experienced inconsistent rain over the past six to eight months, where regular rain (every three-five days) ceased at the end of January, with limited monsoonal activity apart from cyclone activity across a large portion of the Territory. This has led to a variety of curing development with some IBRA regions (Victoria Bonaparte and Gulf Falls Uplands) being far more advanced than others. The three-month forecast looks to support this, with limited rain predicted for the remainder of the dry season after higher than average rainfall occurring from mid-May until the end of June.

Western Top End

The Darwin coastal and Darwin IBRA regions have experienced average rainfall, which has resulted in usual growth patterns of vegetation. As in previous years, the presence and density of Gamba Grass continues to have a high impact on this region, greatly increasing the complexity and potential risk associated with managing bushfires. The reduced length of the wet season has allowed for more mitigation work to take place, resulting in a normal assessment of the fire season throughout the western Top End in 2015.

Southern Top End

An above normal fire season was experienced in 2014 due to several large bushfires, followed by a wet season that saw good initial rain in December but limited rainfall after January, leading to average pasture growth. Early curing has allowed for mitigation works to occur, which has complemented 2014 fire scars and grazing programs by pastoralists, leading to an estimated normal assessment of the 2015 fire season across the majority of the southern Top End.

The exception to this is the central area of the Sturt Plateau IBRA region. This area has been subjected to above average rainfall, with 1600mm falling in some places, resulting in significant pasture growth and delayed curing. There has been limited mitigation due to properties utilising the increased vegetation as pasture. This indicates an above normal fire potential in comparison to the neighbouring IBRA regions.

Central Regions

Rain has been present across the Tanami, MacDonnell Ranges and Burt IBRA regions, which put an end to the 2014 summer fire season in February. This rainfall has led to increased pasture levels. With planned mitigation works and landholder grazing plans, the fire potential is anticipated as being normal. This may change with consistent winter rains and relevant curing in the coming months.

WESTERN AUSTRALIA

The Kimberley and Pilbara are fire-prone landscapes and it is normal for bushfires to occur each year.

Kimberley

Overall, there is a normal bushfire potential in the central region of the Kimberley and the area adjacent to the Northern Territory border. The exception to this is the areas to the west and parts of the north east of the central zone, which are of above normal potential. This assessment is taking into account the prescribed burning that has been undertaken, as well as what is planned, across the region.

Pilbara/Northern Goldfields

Rainfall across the Pilbara has been average or above average. Due to the rainfall patterns there is an above normal bushfire potential in the western region. The central and eastern regions have a normal bushfire potential.

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.

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