

## AUSTRALIAN SEASONAL BUSHFIRE OUTLOOK: AUGUST 2019

### OVERVIEW

The 2019/20 fire season has the potential to be an active season across Australia, following on from a very warm and dry start to the year. Due to these conditions, the east coast of Queensland, New South Wales, Victoria and Tasmania, as well as parts of southern Western Australia and South Australia, face above normal fire potential.



This August 2019 *Australian Seasonal Bushfire Outlook* covers all states and territories. It 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.

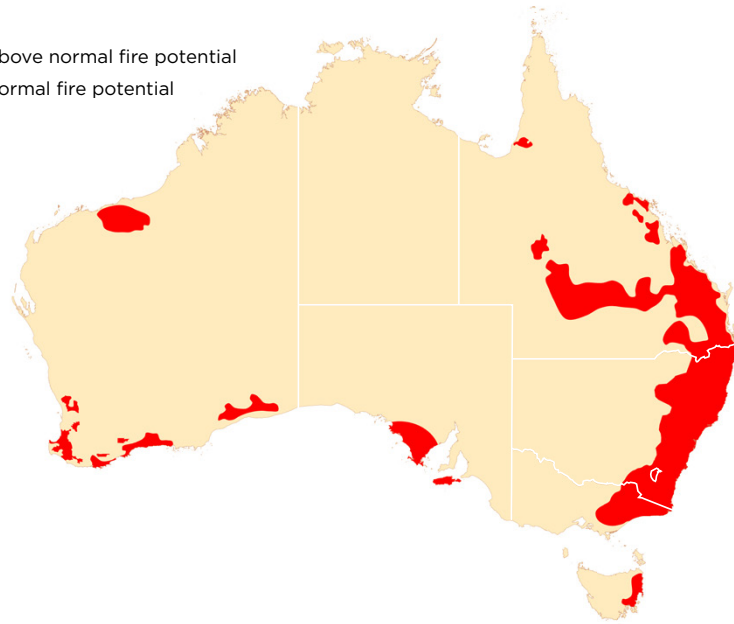
Bushfire potential depends on many factors. The volume, location and timing of rainfall are critically important when estimating vegetation (fuel) volumes and growth. The climate outlook for the next few months is also a crucial factor. Of particular interest are the future tendencies of Pacific sea surface temperature associated with the El Niño-Southern Oscillation, as well as the Indian Ocean Dipole, major climate drivers over Australia. Other less quantifiable factors, such as the distribution and readiness of firefighting resources, are also considered.

The *Australian Seasonal Bushfire Outlook: August 2019* is developed by the Bushfire and Natural Hazards CRC, AFAC, the Bureau of Meteorology, Queensland Fire and Emergency Services, the New South Wales Rural Fire Service, ACT Emergency Services Agency, ACT Parks and Conservation Service, Country Fire Authority, Department of Environment, Land, Water and Planning Victoria, Tasmania Fire Service, Country Fire Service, Department of Fire and Emergency Services and Department of Biodiversity, Conservation and Attractions Western Australia, and Bushfires NT.

### RECENT CONDITIONS

Seasonal fire conditions are a function of fuel amount and state, and seasonal

 Above normal fire potential  
 Normal fire potential



▲ Figure 1: AUSTRALIAN SEASONAL BUSHFIRE OUTLOOK AUGUST 2019. AREAS ARE BASED ON THE INTERIM BIOGEOGRAPHIC REGIONALISATION FOR AUSTRALIA AND OTHER GEOGRAPHICAL FEATURES.

weather conditions. The year to date has been unusually warm and dry for large parts Australia. For January to July, rainfall has been below to very much below average over much of Australia (Figure 2, page 2). It has been the fifth-driest start to the year on record, and the driest since 1970. This is especially the case over the southern half of the country, which has experienced the driest January to July on record (January to July 1902 is the second driest). Areas of above average rainfall are largely confined to central Queensland, extending to the coast.

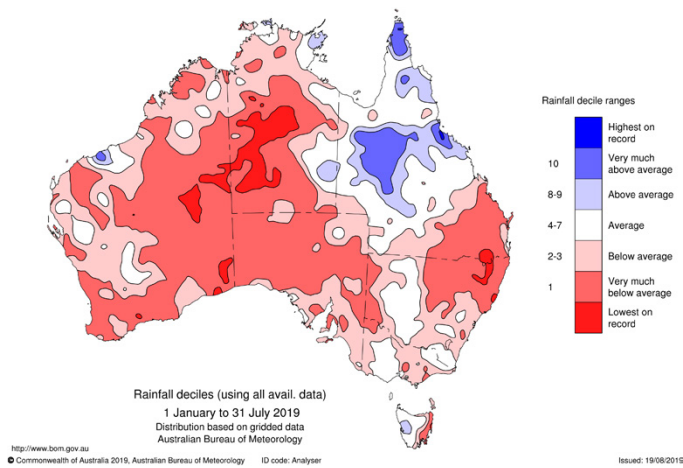
Some areas, such as New South Wales into south eastern Queensland, are into their third year of dry conditions. It will take a number of months of above average rainfall to remove the deficiencies which are in place, meaning that general landscape dryness is likely to persist for many areas.

The warming trend means that above average temperatures now tend to occur in most years, and 2019 has followed this pattern. Across Australia, temperatures for

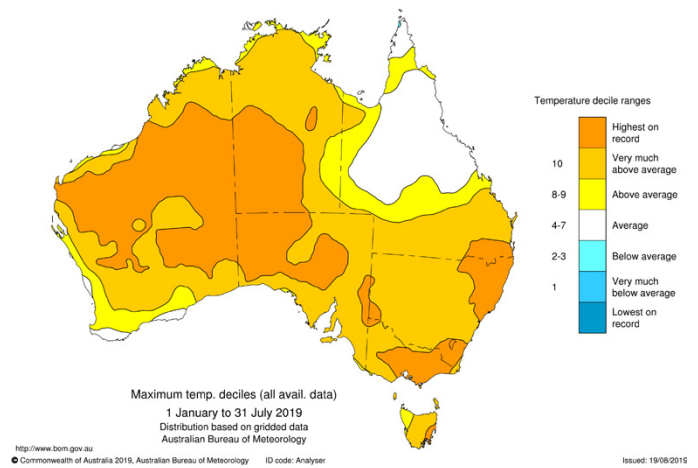
January to July have been very much warmer than average (2nd warmest for this period on record, 1.46°C above the 1961-1990 average), with daytime temperatures the warmest on record (1.85°C above the 1961-1990 average, see Figure 3, page 2). Summer 2018/19 was exceptionally warm (2.14°C above average, over 0.8°C greater than the previous warmest summer on record). These high temperatures add to the impact of reduced rainfall, and increase evaporation, further drying the landscape and vegetation.

As might be expected given the broad climatic factors, an early start to the fire season has been declared in many areas across eastern Australia. The dry landscape means that any warm and windy conditions are likely to see elevated fire risk. Countering the climate signal, poor growth of grass and annual plants means that vegetation loads are reduced in drought affected areas.

Fire season severity is increasing across southern Australia as measured by annual (July to June) indices of the Forest Fire



▲ Figure 2: RAINFALL DECILES FOR JANUARY TO JULY 2019 SHOWING DRY CONDITIONS OVER MUCH OF AUSTRALIA.



▲ Figure 3: MAXIMUM TEMPERATURE DECILES FOR JANUARY TO JULY 2019 SHOWING WARM CONDITIONS ACROSS AUSTRALIA.

## 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.

**Decile:** A decile is a statistical technique that ranks observations into 10 equal groups. A decile map will show whether the rainfall or temperature is above average, average or below average.

Danger Index (FFDI). The increases are tending to be greatest in inland eastern Australia and coastal Western Australia. For example, the Victorian annual FFDI has increased by about 50 per cent since 1950, with 2018/19 the fourth highest on record, behind the severe fire seasons of 2002/03, 1982/83 and 2006/07. The increases reflect rising temperatures and below average rainfall during the cool season (April to October).

## CLIMATE OUTLOOK

The climate outlook for spring is mainly influenced by the Indian Ocean, together with other factors including long-term trends. Ocean temperatures in the tropical

Pacific remain close to average, with no El Niño or La Niña expected to develop in the coming months. A positive Indian Ocean Dipole during spring typically increases the chance of below average rainfall for southern and central Australia and has been linked to elevated summer fire danger. Other influences include Tasman Sea pressure patterns, which are favouring a reduction in onshore flow for parts of the east coast of Australia, and are likely contributing to the warmer and drier conditions forecast across NSW and southern Queensland.

The outlook for spring rainfall (Figure 4, page 3) shows a drier than average spring is likely for much of mainland Australia, especially for inland parts of southern Australia, and for large areas of northern Australia. Large areas of northern Australia are also likely to see a late northern rainfall onset, which may extend the fire season in the north. The likelihood of drier conditions is stronger in October compared with September. September is likely to be drier across northern Australia and small scattered areas of southern Australia, while October is likely to be drier across most of the mainland. Historical outlook accuracy for spring is moderate to high for most of the country, but low along the Northern Territory/Western Australia border, and the west coast of Western Australia.

The outlook for spring maximum temperatures favours above average daytime temperatures for nearly all of Australia. Probabilities are particularly high across much of northern Australia, where they widely exceed 80 per cent. Probabilities in the south are typically in the range of 50 to 80 per cent (Figure 5, page 3), implying that above average daytime temperatures

are favoured. The outlook for minimum temperatures (not shown) suggests above average temperatures are favoured across northern and western parts of Australia, with probabilities above 80 per cent in western parts of the Northern Territory and northern Western Australia. Historical accuracy for spring maximum temperatures is moderate to high for most of Australia, except parts of northern South Australia. Minimum temperature accuracy is patchy, but generally moderate across much of eastern Australia including Tasmania, and the tropical north. Moderate to low accuracy is seen across western Western Australia and South Australia, with low accuracy in central Western Australia, the central Northern Territory and parts of western Queensland.

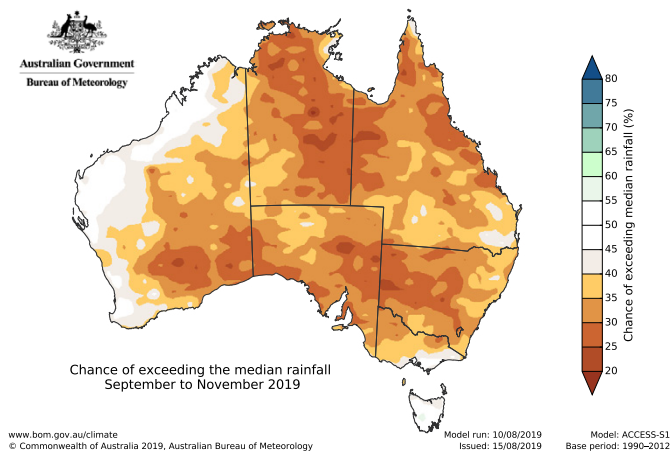
Updates to climate forecasts and the outlook for the Indian Ocean Dipole and the El Niño-Southern Oscillation will continue to be published at [www.bom.gov.au/climate/ahead](http://www.bom.gov.au/climate/ahead).

## REGIONAL SUMMARIES

### QUEENSLAND

2018/19 was a record fire season in Queensland, with November/December 2018 seeing unprecedented bushfires along the central to north coast. Following on from this, December 2018 saw record rainfall on the North Tropical Coast, as well as the Herbert and Lower Burdekin forecast districts. February and March 2019 also saw record and very much above average rainfall over northern parts of the state. Conversely for the 12 months to 31 July 2019, rainfall has been very much below average in south eastern parts of the state.

The lack of rain has resulted in the root zone soil moisture being below average - in



▲ Figure 4: CHANCE OF EXCEEDING THE MEDIAN RAINFALL FOR SEPTEMBER TO NOVEMBER 2019.

the lowest one per cent on record for areas around Rockhampton and south to the New South Wales border. The rainfall and temperature outlooks make it very likely that this current soil moisture deficit will persist for the coming months, significantly increasing the available fuel in forested areas in south eastern Queensland.

Inland Queensland has been drought effected since 2013, and as a result there has been very little grass fuel available. However, the rainfall received this year will very likely see a return to average fuel loads in inland parts.

Since 1990, there has been a trend for Queensland fire seasons to start earlier and persist longer. This was the case last fire season, which saw record forest fire danger indices in August 2018 and February and March 2019. August 2019 has seen this trend continue, with Severe Fire Danger and successive days of Very High Fire Danger.

Above normal fire potential is expected in forested areas along the coast south of Rockhampton down to the NSW border, for woodland and grass fuels, inland areas in the south, and a small area west of Mackay. Although this was previously identified in the *Northern Australia Seasonal Bushfire Outlook 2019 (Hazard Note 62, June 2019)*, the hot and dry conditions experienced since June have dried the landscape even further. The Darling Downs and Granite Belt districts are facing severe water shortages as a result of the ongoing drought. This has the potential to impact the availability of water for fire suppression. QFES has been working closely with relevant local councils and their partners to manage this risk. Normal fire potential is expected for all other parts of Queensland.

### NEW SOUTH WALES

Weather conditions have been exceptionally dry across NSW leading into the 2019/20 fire season. Much of central and northern NSW has experienced very much below average rainfall during the last three months, with a small percentage of areas experiencing driest on record conditions.

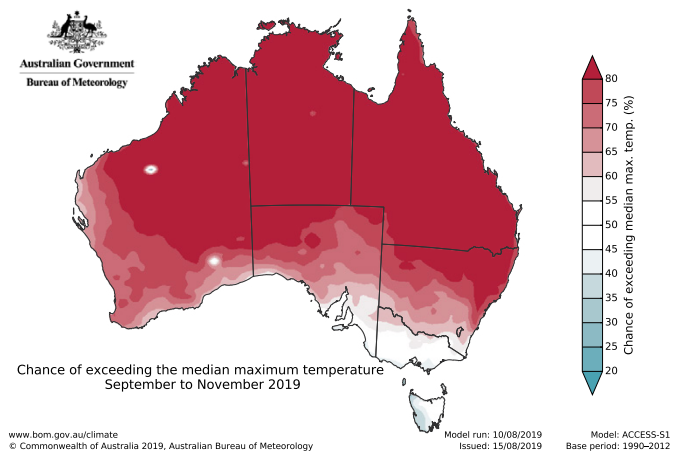
Long-term rainfall deficiencies, record-low for some areas in the north of the state, have severely impacted on water resources. With limited water availability, fire agencies in NSW are having to plan for firefighting tactics that minimise the use of water.

At the beginning of August, the NSW Department of Primary Industries mapped nearly all of NSW into one of three drought categories, with approximately 55 per cent of the state drought affected, 23 per cent experiencing drought, and 17 per cent experiencing intense drought.

Widespread significant soil moisture deficit has resulted in an early start to the fire danger period for many local government areas in NSW. Windy conditions in August have again resulted in many significant bushfires in forested areas north of the Hunter Valley.

With the short to medium-range climate outlooks favouring warmer and drier than average conditions across much of the state, there is significant concern for the potential of an above normal fire season in forested areas on and east of the Great Dividing Range.

Reports of grassland fuel conditions west of the Divide indicate that whilst grassy vegetation is cured, it is below average in quantity or load. With the chances of above median rainfall west of the Divide below 50 per cent to well below 50 per cent in the next three months, the balance of this situation



▲ Figure 5: CHANCE OF EXCEEDING THE MEDIAN MAXIMUM TEMPERATURE FOR SEPTEMBER TO NOVEMBER 2019.

has resulted in an assessment of normal fire potential for these areas. It should be noted that while grass load is reduced and therefore the potential intensity of grass fires may be reduced, highly cured grass creates the potential for grass fire to spread rapidly.

### ACT

The ACT has received less than average rainfall over the last two years, leading to a persistent and high level of drought. The lowland forests are dry, while highland forests are relatively moist. This indicates that fuel flammability in the lowland forests could remain high, creating risks early in the fire season. The dry conditions and grazing by farm stock and wildlife have led to lower levels of grass growth, resulting in reduced grass fire risk. The outlook indicates a potential for the highland forests to dry out, however this could be delayed by the occurrence of summer rain. Heatwaves and dust storms may make bushfire detection and suppression more challenging at times during the season.

The overall bushfire risk for the ACT is above normal. Community members should continue to prepare for the fire season by taking actions to reduce the bushfire risks around and within their property, and to review their bushfire survival plans.

### VICTORIA

Potential for above normal bushfire activity continues across the coastal and foothill forests of East Gippsland, extending into West Gippsland and the Great Dividing Range. These areas are now experiencing their third consecutive year of significant rainfall deficit, with severe levels of underlying dryness persisting in soils

and heavy forest fuels, along with higher abundance of dead fuel components and higher flammability of live vegetation.

Across the rest of Victoria, mostly normal bushfire activity is expected, however there is likely to be increased growth rates in pasture and croplands in the west due to winter rain. There is uncertainty around the effect of the Indian Ocean Dipole and warm/dry outlook, with some risk that ash forests in the central highlands and Otways may dry out at faster rates and become more flammable than normal during summer.

### TASMANIA

For the early part of Tasmania's fire season, most of the state has normal fire potential. The western half of the state is wet, but the east is drier than normal, especially between the Forestier Peninsula and Scamander. This eastern dry area has above normal fire potential. Without significant rain in the coming months, this area will expand. As in recent years, increased fire activity is likely in this dry strip before December and will require considerable response efforts. Eastern peat soils will be susceptible to fire and will burn to depth, with traditionally wet or damp gullies already dry.

The fire season in the remainder of the state will commence more normally, in late spring or early summer, and provide good conditions for planned burning.

### SOUTH AUSTRALIA

Average to below average rainfall has occurred across South Australia, with some areas experiencing persistent dry conditions since the start of 2018. In areas of ongoing dry conditions, grass fuel growth is either average, to well below average, which creates the likelihood of normal fire potential in these areas. This level of fire potential also continues in central and southern parts of South Australia, where average rainfall has occurred.

The Bureau of Meteorology's El Niño watch is currently neutral and the Indian Ocean Dipole is forecast to be positive.

Similar forecasts have resulted in drier and warmer than average conditions in the lead up to, and throughout, South Australia's fire season. The dry spring forecast may result in an earlier start to the fire season in parts of South Australia.

The Mount Lofty Ranges have recorded almost average rainfall, which has reset the Soil Dryness Index to zero. However, late winter rainfall may promote increased vegetation growth before summer, and could increase the available bushfire fuels during the fire season. Forecast conditions maintain the potential for bushfire across the populated areas of the Mount Lofty Ranges.

Parts of the Lower Eyre Peninsula have received good rainfall, resulting in a bumper cropping season and higher than normal grass fuel growth. Due to the increased fuel load, these areas have above normal fire potential. Kangaroo Island also has above normal fire potential, with a combination of drier than average, and wetter than average conditions (depending on the vegetation type) across the island. These conditions may result in above average fuel loads in parts, and drier than average vegetation in others, especially in areas of forested and scrub vegetation.

The prolonged dry conditions across much of South Australia is also likely to create increased occurrences of raised dust during the windy conditions that often accompany high fire risk days. The dust may affect the operational capabilities of aerial firefighting assets and limit their effectiveness. Fire managers will carefully monitor this issue during the fire season, noting that without rainfall, dust suppression is impossible on the scale required.

There are currently no forecasts indicating any potential for above average rainfall during spring and summer, which may prolong the fire season across parts of South Australia. Significant bushfires have occurred in similar conditions, and even areas of normal fire potential can expect to experience dangerous bushfires as per a normal South Australian fire season.

### WESTERN AUSTRALIA

Rainfall deficiencies have persisted across most of the south west of Western Australia, with this area experiencing its driest start to the year, followed by the seventh-driest autumn on record. In addition, drier and warmer than average conditions are forecast through to October, which will increase soil moisture deficits and stress in woody vegetation. These conditions have resulted in above normal fire potential for parts of the Swan Coastal Plain, Avon Wheatbelt, Jarrah Forest, Warren, Esperance Plains and Mallee regions. In parts of the Nullarbor, higher than normal fuel loads will contribute to above normal potential.

Above normal fire potential is also expected for coastal areas of the Pilbara which experienced heavy rainfall in association with Severe Tropical Cyclone *Veronica* in March 2019. This rainfall promoted good growth of soft grass and spinifex, as well as delaying curing compared to the rest of the region. As conditions dry out, greater continuity and loading of grassy fuels will increase the fire potential in parts of the Pilbara affected by *Veronica*.

### NORTHERN TERRITORY

The late and weak monsoon activity for the 2018/19 wet season has led to dry conditions, with the Top End experiencing the driest wet season since 1992. Similarly, large areas of central Australia have received below average rainfall over the last 12 months.

This has led to reduced growth of vegetation, but despite this, the Northern Territory is expecting normal bushfire potential to continue for the remainder of the fire season, due to a shift in the timing of fire management activities. In the Top End, both mitigation activities and bushfires occurred two months earlier than normal, with large, long duration, early season fires that would normally be pulled up by temporary watercourses taking place. With a late onset to the 2019/20 wet season expected, dry conditions are likely to be extended.

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, practises or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire and Natural Hazards CRC.

All material in this document, except as identified below, is licensed under the Creative Commons Attribution-Non-Commercial 4.0 International Licence.

Material not licensed under the Creative Commons licence:

- Bushfire and Natural Hazards CRC logo
- All photographs.

All rights are reserved in content not licenced under the Creative Commons licence. Permission must be sought from the copyright owner to use this material.