HAZARD NOTE

bushfire&natural HAZARDSCRC

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TOPICS IN THIS EDITION | FIRE IMPACTS | FIRE SEVERITY | FIRE WEATHER

SOUTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2017-18: NOVEMBER UPDATE

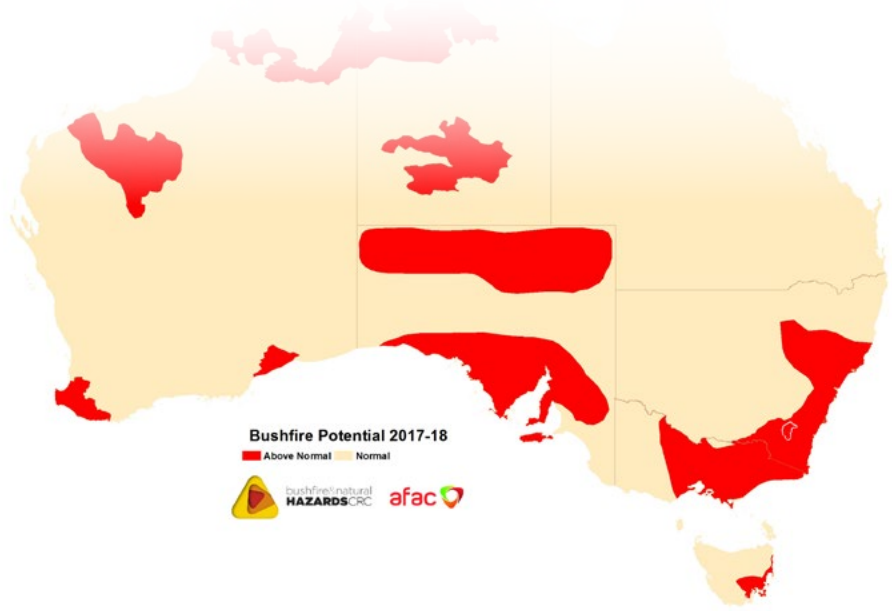
OVERVIEW

The bushfire seasonal outlook for 2017-18 has been re-examined for southern Australia, due to drier and warmer than average conditions since autumn 2017. Queensland experienced an early start to the fire season, with significant fires occurring in August. Early season fires of significance were also experienced in New South Wales, Victoria and Tasmania.

Most states are warning of an above normal fire season. The exception to this is coastal and south east Queensland, and north eastern New South Wales; these areas have received above average rainfall since October and have been reassessed as having normal bushfire potential. Previously these areas were classified as above normal fire potential.

There is potential of a late-forming, weak, La Niña, but if it does occur, this event, brings little prospect of high rainfall due to competing climate drivers from the Indian Ocean. Weak and late-developing La Niña events have had a variable impact on Australian rainfall in the past. Above average temperatures are expected for much of the eastern two thirds of the country. These conditions have resulted in an update to the *Southern Australia Seasonal Bushfire Outlook*. This new edition, released as *Hazard Note* 43, replaces the previous Outlook, published as *Hazard Note* 37 in September 2017.

The map on this page reveals the updated bushfire outlook for 2017-18 for southern Australia. It is important to remember that normal fire conditions can still produce fast running and large fires.



▲ **Above:** BUSHFIRE POTENTIAL AREAS BASED ON INTERIM BIOGEOGRAPHIC REGIONALISATION AND OTHER GEOGRAPHICAL FEATURES.

ANTECEDENT CONDITIONS

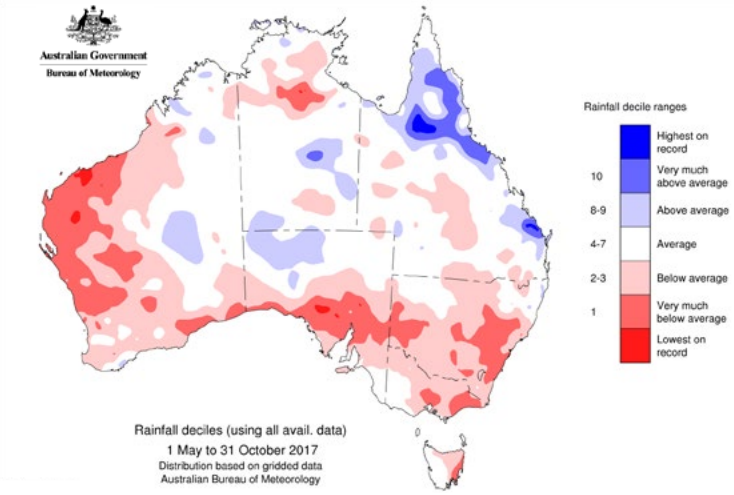
Most of southern and western Australia has experienced drier and warmer than average conditions since autumn 2017. Winter was the eighth driest on record for southern Australia and the driest since 2002. This was followed by a dry and warm September for most of eastern Australia. State record temperatures were set in Queensland, New South Wales and Victoria. In NSW, September was the driest September on record, which coincided with severe heatwaves and fire weather conditions experienced in the latter half of the month.

In contrast, October saw fewer temperature extremes and above average rainfall across coastal areas of Queensland and in north eastern NSW. This helped to relieve long-term dry conditions in those areas, but large parts of southern Australia including inland New South Wales, eastern Victoria, Western Australia, eastern Tasmania and northern agricultural and southern pastoral districts of South Australia are still experiencing serious rainfall deficiencies (Figure 1, page 2).

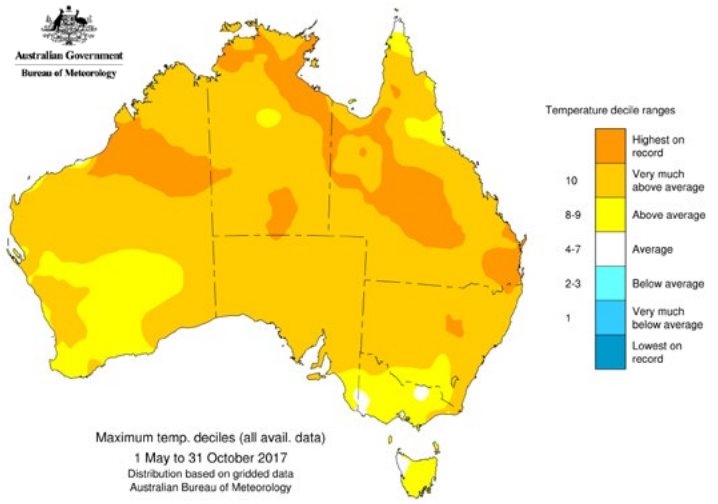
Below average rainfall in 2017 adds to much longer-term drying trends which are affecting the more populated parts of southern Australia during the cool season (April-October). For example, the south west of Western Australia has now experienced 12 consecutive cool seasons with below average rainfall, while Victoria has experienced below average cool season rainfall in 17 of the past 20 seasons. Very long-term deficiencies like these are not seen in the earlier historical record, and have been associated with a marked increase in fire weather severity. The combination of short and long-term rainfall deficits serves to increase the fire risk in the coming months.

Recent dry conditions and hence less evaporative cooling, combined with the long term warming trend, means Australia has observed its equal warmest May to October period on record for daytime temperatures (Figure 2, page 2). In contrast, night time temperatures have been cooler than average in parts of inland southern Australia. This has been due to the clear skies and dry soils allowing much of the daytime heat to escape.

Below average rainfall has also meant poor vegetation growth for most of southern



▲ **Figure 1:** RAINFALL DECILES FOR 1 MAY TO 31 OCTOBER 2017.



▲ **Figure 2:** MEAN MAXIMUM TEMPERATURE DECILES FOR 1 MAY TO 31 OCTOBER 2017.

Australia. Further north, the dry conditions mean that very low greenness is evident in satellite data. The dry state of vegetation means that warm windy conditions are likely to see more elevated fire risk than is normal for the time of year.

Climate conditions over Australia have been unusual in recent months because they have occurred without a strong climate driver. The El Niño—Southern Oscillation (ENSO) is currently neutral, though models and observations suggest that a late forming La Niña may develop. The Bureau's ENSO Outlook is currently at La Niña ALERT, with international climate models surveyed by the Bureau suggesting La Niña thresholds may be reached in late-2017. Weak and late-developing La Niña events have had a variable impact on Australian rainfall in the past.

The Indian Ocean Dipole (IOD) is neutral, with consensus amongst climate models suggesting neutral conditions will continue. The IOD typically has little impact upon Australian climate from December onwards.

CLIMATE OUTLOOK

The climate outlook for the summer months is influenced by the potential La Niña in the Pacific Ocean, and cooler than normal waters in the eastern Indian Ocean, as well as other factors including long-term climate change.

There is an estimated 70% likelihood that a short-lived and weak La Niña may develop over the coming summer. This is around triple the normal chance. While this would typically mean a wetter than average summer, cooler than average waters in parts of the eastern Indian Ocean – as well as near average sea surface temperatures around northern Australia – are reducing the amount of moisture available for rain systems, and increasing the chance of warmer days.

These competing climate drivers are resulting in a mixed rainfall forecast for the coming summer. Rainfall probabilities are close to 50% for most parts, indicating no strong shift towards widespread wetter or drier than average conditions (Figure 3, page 3). Historical outlook accuracy for summer rainfall is moderate to high over most of Western Australia and moderate over the eastern mainland. Elsewhere, accuracy is low.

The preliminary outlook for summer maximum temperatures favours above average conditions for much of the eastern two thirds of Australia (Figure 4, page 4). The probability that temperatures will be above average is typically in the range of 60 to 70%. The outlook for minimum temperatures (not shown) is similar to that for maximum temperatures. Maximum temperature accuracy is moderate over western and eastern parts of Australia and low across central regions and western Tasmania. Minimum temperature accuracy is moderate over most of Australia.

DEFINITION

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.

In summary, the southern fire season is likely to continue against a background of warmer than usual climatic conditions, and despite the increased chance of a late-forming La Niña, no strong indication of widespread wet or dry.

Updates to forecasts and the outlook for ENSO and IOD will continue to be published at www.bom.gov.au/climate/ahead.

REGIONAL SUMMARIES

QUEENSLAND

After a very hot and dry winter, Queensland experienced an earlier start than usual to the fire season. Homes were threatened on the Sunshine Coast at Caloundra by a bushfire on 18 August. This was a significant fire for so early in the fire season.

September continued the hot, dry and windy trend, with the state experiencing record Forest Fire Danger across the month. This increased fire danger across south east Queensland saw fire prevention activities, communication and media engagement a primary focus for Queensland Fire and Emergency Services.

October was a stark contrast to the preceding months, with the third wettest October on record across Queensland, including the wettest since 1975. The areas highlighted as above normal bushfire potential in September's *Southern Australia Seasonal Bushfire Outlook* received very much above average or record rainfall. Consequently, these areas are now considered to have normal bushfire potential.

NEW SOUTH WALES

Rainfall for much of NSW over winter and early spring was below to very much below average. This resulted in the prediction for

above normal fire potential being realised for many areas. September saw an early escalation in fire danger and the amount of bush and grass fires, particularly over the coast and ranges north of Sydney. Incident reports for September include 2,481 bush and grass fires resulting in the destruction of six houses and 11 sheds or outbuildings. A further two houses and two sheds were damaged.

October saw a slight reprieve to the unusually dry conditions, particularly in the north east of NSW, with above average rainfall reducing the drought deficit. Despite the reprieve, the coast and ranges from Port Macquarie south still have areas with long term soil moisture deficit.

The rainfall outlook through to January is indicating a likelihood of even odds of drier or wetter conditions for southern and western NSW, with a reduced chance of receiving average rainfall in central and northern NSW.

Temperature outlooks are for above average maximum temperatures across the state for the December to February period.

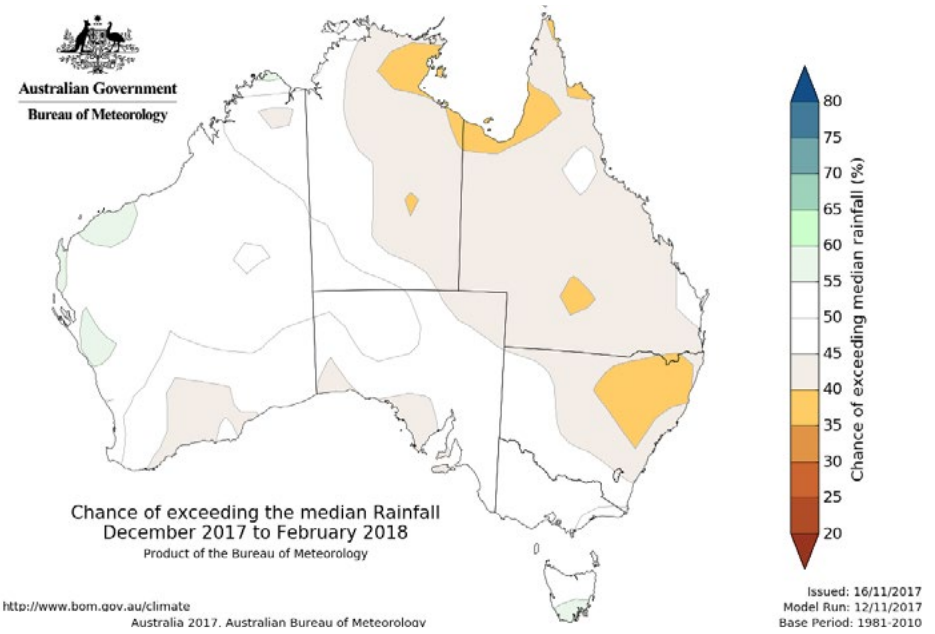
The potential La Niña, if it does occur, is not expected to have the usual widespread heavy rainfall that is typically associated with La Niña due to late development of the event. While El Niño events are traditionally associated with bad fire seasons, some of the most significant bushfires in NSW in recent history have occurred during neutral El Niño conditions. With the potential for warmer conditions, it is expected that significant fires could occur this fire season.

Current soil moisture deficits, particularly coastal areas south of Port Macquarie, and the likelihood of higher than average temperatures through to February, continue to mean that eastern forested areas have above normal fire potential. Due to the above average rainfall received in the north east, this area has now been assessed as having normal fire potential.

Spring rains have facilitated growth in grassland areas west of the divide. In response to this rain, grass fuel loads are likely to increase, but still within normal fire potential expectations.

ACT

After having limited rain since the beginning of the year, the upper soils in the ACT are drier than average for this time of year, with reduced river flows. With the potential for a weak La Niña and a neutral IOD, average rainfall is the most likely outcome over the coming months. It is unlikely that the ACT will receive enough rain during this period to recover from the existing soil moisture deficit. This could cause an early onset of forest fuel flammability as warmer, drier weather arrives with summer. Grasslands have greened-up for the spring flowering season, however growth has been below average and a rapid change to flammability might be possible. The bushfire potential for this outlook period is assessed as above normal, as with surrounding NSW areas. Conditions will be closely monitored to ensure a suitable level of preparedness across the community.



▲ **Figure 3:** THE PROBABILITY OF EXCEEDING THE MEDIAN RAINFALL FOR DECEMBER 2017 TO FEBRUARY 2018.

VICTORIA

Since the initial *Southern Australia Seasonal Bushfire Outlook* in September, Victoria has experienced some resumption of moisture-bearing cold fronts, though this influence has been largely confined to coastal areas. September brought a strong drying influence across Victoria's north and the continuation of dry conditions in the east; while October saw a resumption of drier than average conditions through central parts, including Melbourne's water catchments and foothill forests of West and South Gippsland, and on coastal areas between Warrnambool and Seaspray.

The lateness of a transition to La Niña conditions, if it does occur, brings mixed signals for rain. La Niña conditions can also increase the potential for extended warm spells across Victoria over the summer months. Some historically damaging fires across Victoria have occurred during La Niña events. Any rainfall in the coming months will be much less effective at soaking soil profiles due to longer days and higher average daily maximum temperatures.

Late September saw extreme heat over eastern Australia and significant fire activity in East Gippsland, where a fire near Buchan burnt through approximately 8,000 hectares with fire intensities normally experienced in January. This fire is still being monitored and will continue to consume significant resources as conditions warm over summer. As East Gippsland continues to experience high levels of bushfire activity, the change in bushfire activity with warmer weather indicates this area has had an early start to fire season and is experiencing above normal conditions.

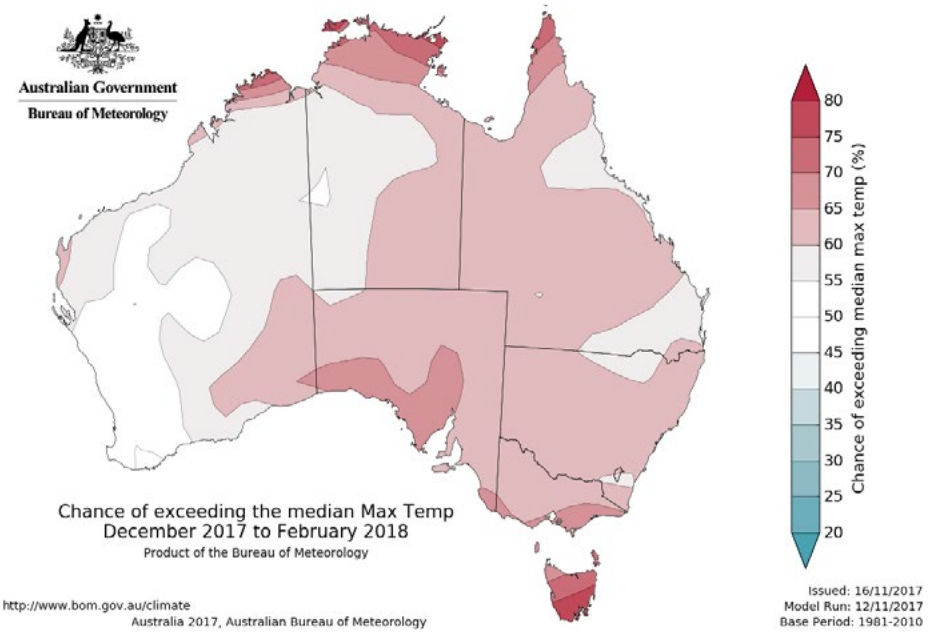
Longer term severe rainfall deficiencies in southern forests along the Great Divide between Swifts Creek and Melbourne's water catchments mean that these forested areas are now dry enough for widespread fire. The rainfall outlook for even chances of either wetter or drier conditions in the coming three months reflects a tension between wetter Pacific (La Niña) and drier Indian Ocean climate drivers. The overriding consideration is the absence of any signal in the Bureau's outlook that can reverse the long term drying trend that has settled over eastern Victoria, and the absence of a clear signal that heatwaves are not likely.

Good prospects for spring growth in the northern and central western grain growing areas have been realised, yet the timing of the beginning of the fire season in these areas looks set to occur as it would in a normal year. Much of these areas have a good base of deep soil moisture.

In the north east and northern side of alpine areas, the rate of pasture curing has slowed, with average rainfall occurring from mid-September to early October. Rain has also extended into the central highlands, though not of sufficient duration or taking in a large enough area to reduce fire potential.

Severe rainfall deficits persist on and south of the Great Dividing Range. There is a good chance forests in these areas will experience sudden changes in fire activity with the onset of warmer or windier weather. Melbourne's water catchment areas and higher value forests along the southern slopes of the Great Dividing Range have a long-term history of dryness, with expected weather patterns looking set to continue this trend.

The background conditions of dryness and the likelihood of above average maximum temperatures this summer places Victoria in a vulnerable position. Rainfall since May has been below average in many areas. A longer-term history of dryness in critical areas and a backdrop of warming temperatures and more frequent weather extremes continues to create above normal fire potential, especially where there is existing dryness. However, there are some factors that have the potential to moderate the risk of fire in some areas, including a good base of soil moisture in western Victoria, soaked gullies along the southern side of the Great Dividing Range and mixed signals for rain over summer. These areas will be closely monitored for emerging trends in the coming months.



▲ **Figure 4:** THE PROBABILITY OF EXCEEDING THE MEDIAN MAXIMUM TEMPERATURE, DECEMBER 2017 TO FEBRUARY 2018.

TASMANIA

The expected early start to the fire season did not eventuate, however there was a period of significant activity during late October on the east coast. Soil moisture levels and vegetation are still drier than normal, with dry areas expanding along the east coast from about St Helens down to Marion Bay, and across the south east to the lower Derwent Valley. These areas continue to have above normal bushfire potential, while the rest of Tasmania has normal bushfire potential.

SOUTH AUSTRALIA

The fire danger season has commenced in South Australia and many of the conditions forecast in September's *Southern Australia Seasonal Bushfire Outlook* have been realised. Fires have occurred across parts of the state, with the past three months remaining drier than average.

This period of continued reduced moisture, combined with the abundant growth of fine fuel caused by 2016's rain, has resulted in areas of above normal fire potential. As previously identified this area of increased risk includes the APY Lands and Northern Pastoral areas, as well as parts of the Riverland, the Clare Valley, the York Peninsula, the Eyre Peninsula, and the West Coast. Additionally, despite receiving some rainfall, the drier than average conditions on Kangaroo Island remain conducive to above normal fire potential.

The remainder of South Australia can expect normal fire potential. In addition, the reduced rainfall in some agricultural areas has resulted in less cropping activity, with South Australia forecast to record a decrease in areas planted and in yields from sown crops. This may reduce the risk of fires from agricultural activity.

Despite the recent La Niña ALERT, the climate forecast for South Australia does not indicate an increased likelihood of wetter than average conditions. La Niña is typically a weather pattern that has the greatest influence on Australia's east coast, and as such any impacts on South Australia are likely to be minimal if a La Niña were to occur.

Significant bushfires have occurred under similar conditions. It should be noted that there are no areas of below normal fire potential predicted across South Australia, and that even areas of normal fire potential can expect to experience dangerous bushfires as per a normal South Australian fire season.

WESTERN AUSTRALIA

Fire potential remains as described in *Southern Australia Seasonal Bushfire Outlook*, released in September as *Hazard Note* 38.

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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