HAZARD NOTE

bushfire&natural HAZARDSCRC

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

AUSTRALIAN SEASONAL BUSHFIRE OUTLOOK: APRIL 2020

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OVERVIEW

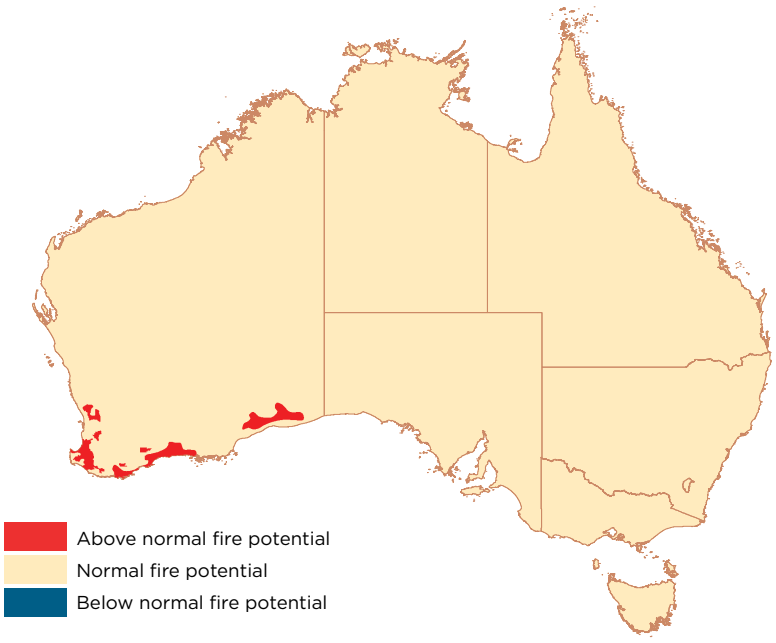
The fire season of 2019/20 was one of the most devastating Australia has experienced. Large and destructive bushfires occurred in most states and territories, beginning in the north and extending to the south. There were prolonged periods of smoke exposure to many cities and regional areas, reducing the air quality. The challenging conditions continued until widespread rain occurred across large parts of the east coast in early February 2020. In total, 17.4 million hectares were burnt, resulting in 33 human fatalities and 3,094 homes destroyed (AFAC National Resource Sharing Centre). There was widespread environmental damage and wildlife death.

2019 was warmest and driest on record for Australia, with many records set. Temperatures were 1.52°C above the 1961–1990 average (see Annual Climate Statement 2019, Bureau of Meteorology). However, the early months of 2020 have seen a shift to more normal rain patterns for a number of areas.

The *Australian Seasonal Bushfire Outlook: April 2020* 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.

OUTLOOK – AUTUMN 2020

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. The *Australian Seasonal Bushfire Outlook: April 2020* covers all states and territories through to July 2020. 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.



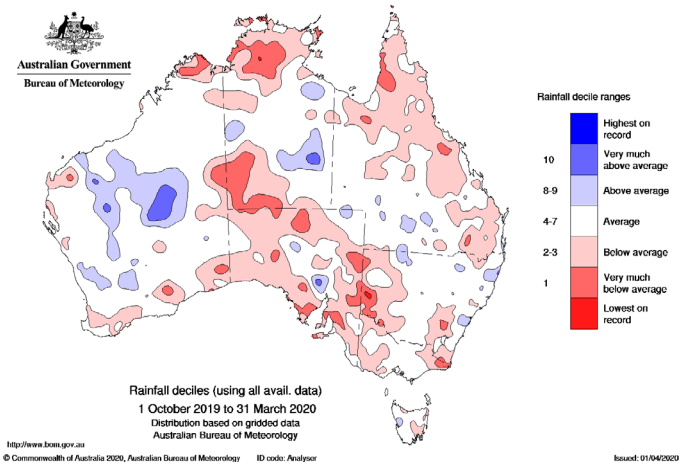
▲ Figure 1: AUSTRALIAN SEASONAL BUSHFIRE OUTLOOK APRIL 2020. AREAS ARE BASED ON THE INTERIM BIOGEOGRAPHIC REGIONALISATION FOR AUSTRALIA AND OTHER GEOGRAPHICAL FEATURES.

Fire management is a year-round process, and this Outlook reflects the priorities in each state and territory over the next three months given the 2019/20 fire season, and the weather conditions expected in coming months. Although the risk of uncontrolled bushfire is lower in most areas, the fire potential remains high in some specific regions due to the long-term low rainfall. It is important to remember that areas designated as normal or below normal fire potential may experience bushfire – normal or below normal risk does not mean there is no risk.

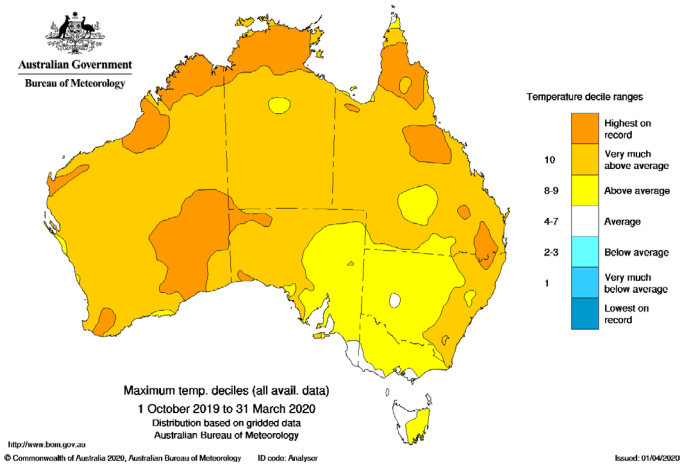
DEFINITION

Bushfire potential: The chance of a bushfire or number of bushfires 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. Bushfire potential depends on many factors including weather and climate, fuel abundance and availability, recent fire history and firefighting resources available in an area.

Prescribed burning during this Outlook period is an important tool to reduce bushfire risk. In many areas, prescribed burning opportunities may arise under appropriate



▲ Figure 2: RAINFALL DECILES FOR OCTOBER 2019 TO MARCH 2020.



▲ Figure 3: MAXIMUM TEMPERATURE DECILES FOR OCTOBER 2019 TO MARCH 2020.

weather conditions and with enough local resources. It is unclear at this point what effect COVID-19 will have on the ability of agencies and land management departments to conduct prescribed burning, but it is anticipated that there will be impacts. Prior to the COVID-19 restrictions, post-fire season burning programs had already begun in many regions.

RECENT CONDITIONS

Seasonal fire conditions are a function of fuel amount and state, and seasonal weather conditions. 2019 was warmest and driest on record for Australia, with many records set. However, the early months of 2020 saw a shift to more normal rain patterns for a number of areas.

For January to December 2019, rainfall was very much below average over most of Australia. It was the driest year in 120 years of records and was especially dry over eastern and southern Australia. For some areas, such as New South Wales extending into south eastern Queensland, 2019 marked the third year of dry conditions.

The early months of 2020 saw a return to more normal rain patterns, with a number of tropical weather systems bringing rainfall to drought-affected parts of the country. This rainfall, while welcome, was still well short of clearing rainfall deficiencies at a longer time scale. Additionally, the northern wet season to date (October 2019 to March 2020, Figure 2, above) has seen low rainfall across parts of northern Australia, and much of the south.

The long-term warming trend means that above average temperatures now tend to occur in most years, and recent months have followed this pattern. Temperatures in Australia for 2019 were the warmest in 110 years of records (1.52°C above the 1961–1990 average, see Annual Climate Statement 2019, Bureau of Meteorology). Early 2020 has continued to see warmer days for much of the north. High temperatures add to the impact of reduced rainfall by increasing evaporation.

The combined very hot (Figure 3, above) and dry conditions contributed to the extreme nature of the 2019/20 southern fire season. The rainfall in early 2020 has eased the fire risk for much of Australia. At extended timescales of greater than six months, many areas across southern Australia remain drier than average. The late and poor northern wet season rainfall-to-date for many areas of northern Australia may mean less vegetation growth over the season.

The tendency for fire seasons to become more intense, and fire danger to occur earlier in the season, is a clear trend in Australia's climate, reflecting reduced and/or less reliable cool season rainfall and rising temperatures (see State of the Climate 2018). Fire season severity is increasing across much of Australia as measured by annual (July to June) indices of the Forest Fire Danger Index, with the increases tending to be greatest in inland eastern Australia and coastal Western Australia.

CLIMATE OUTLOOK

Climate outlooks are influenced by active climate drivers, together with other factors including long-term trends.

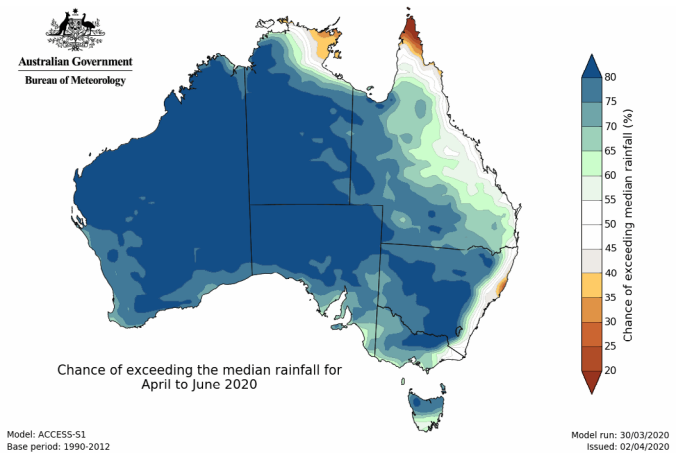
The influences on climate in the second half of 2019 are very different to the current conditions in place now and those forecast for the coming months.

A strong positive Indian Ocean Dipole brought dry conditions to much of Australia in the second half of 2019. Additionally, this was combined with an unusually persistent negative phase of the Southern Annular Mode in the last three months of 2019. A negative Southern Annular Mode means Australia's weather systems are further north than usual, which in late spring to early summer typically means stronger westerly winds for Tasmania and the southern mainland. In areas where those winds are coming off the ocean, it's typically cooler and wetter, but in parts where westerlies blow across long fetches of land, this air becomes dry and hot with reduced rainfall.

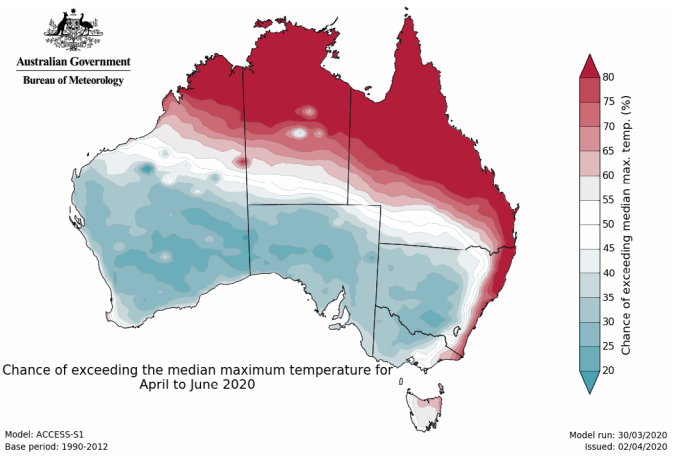
Both of these dry climate drivers had decayed by early January, with the main Australian climate drivers all back at a neutral state. Forecasts suggest both the El Niño-Southern Oscillation and the Indian Ocean Dipole are likely to remain neutral at least until mid-year.

This has allowed more localised influences on the outlook for April to June. The outlook indicates a stronger north to south temperature gradient in the eastern Indian Ocean. This, combined with south westerly winds, increases the likelihood of north west cloudbands and subsequently, wetter than average conditions for much of central and southern Australia.

The outlook for April to June (Figure 4, page 3) suggests that rainfall is likely to be above average across most of Australia. There is an increased likelihood of below average rainfall across small parts of the far north, with the northern and eastern coasts mostly favouring roughly equal chances of



▲ Figure 4: CHANCE OF EXCEEDING THE MEDIAN RAINFALL FOR APRIL TO JUNE 2020.



▲ Figure 5: CHANCE OF EXCEEDING THE MEDIAN MAXIMUM TEMPERATURE FOR APRIL TO JUNE 2020.

wetter or drier conditions. Historical outlook accuracy for April to June is moderate across western and northern Australia, as well as patchy areas of south east Australia. Elsewhere, accuracy is low to very low.

The outlook for April to June maximum temperatures (Figure 5, above right) favours above average daytime temperatures across northern and eastern Australia, while cooler than average days are likely for southern Western Australia, South Australia, western and central New South Wales and western and central Victoria. The outlook for minimum temperatures (not shown) also strongly favours above average temperatures across the country. Historical accuracy for April to June maximum temperatures is moderate to high across Australia, and very high in northern parts. Minimum temperature accuracy is moderate to high for western, central and northern Australia as well as Tasmania. Elsewhere, accuracy is low to very low.

Updates to climate forecasts, including forecasts of monthly, fortnightly and weekly outlooks 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

REGIONAL SUMMARIES

QUEENSLAND

Following a very dry December 2019, a tropical low and a monsoon trough at the end of January 2020 produced moderate to heavy falls from the northern tropics to the Burdekin coasts. Summer rainfall totals were mixed across the state. Areas around the Cape York Peninsula and the north tropical coast, the far south west and the central interior reported below average rainfall. In contrast, parts of the southern interior and south east, and small areas through the central and southern interior and Gulf Country, recorded above average rainfall. Early autumn weather systems have delivered moisture to most of Queensland, significantly reducing the risk of uncontrolled fires. The moisture delivered from these systems is currently promoting regeneration and growth and improving the overall health of vegetation across the state.

Stable conditions with lower than average rainfall are forecast for the coming weeks, however Queensland is within the cyclone season and the chance of weather systems forming cannot be ruled out.

Currently the Bureau of Meteorology's forecast is for Queensland to experience above average rainfall for the coming months in south, west and central areas of the state. As the vegetation responds, opportunities for planned burning activity will commence. These activities will be heavily dependent on any changes in weather systems.

NEW SOUTH WALES

The frequency, size and consequence of bushfires during the 2019/20 fire season was of extraordinary significance in recent NSW fire history. Two successive periods of significant rain during February brought a reprieve to the situation, with the last emergency declaration revoked on 4 March.

Traditionally in NSW the period from April to June sees a shift from the bushfire danger period to a focus on hazard reduction burning. Conditions for the current outlook period appear variable, with soil moisture conditions for large areas in the eastern half of the state area wetter than average. Fuel state reflects this situation, with reports of grass growth and low levels of curing (green grass). However, soil moisture in parts of the Central and Far West and Far South Coast still remain drier than average.

The rainfall outlook appears positive for much of the state. Whilst the bushfire outlook on the balance of the forecast appears normal, there is a need to monitor for unusual weather events (particularly windy conditions) that occasionally present during this period.

Where weather permits, NSW fire and land management agencies will undertake hazard reduction burning.

ACT

Early in 2020 the southern ACT was severely impacted by the Orroral Valley bushfire, while areas to the north, including Canberra, were not affected. The burnt area included 75 per cent of the Namadgi National Park, which equates to 36 per cent of the ACT. Recent rains have mitigated the extended drought effects and have reduced the fire threat to the community to normal levels for this time of year. Grasslands have greened up rapidly with the rain, removing any grassfire risks for the coming months. Some forest fire potential remains, but autumn moisture should keep threats to normal levels. Autumn is traditionally a time for hazard reduction burns. Should the right conditions eventuate this activity will commence. A primary goal for the coming months is to continue to prepare the community for the next fire season as unburnt forest areas remain in the north and west, close to Canberra. That

threat will be closely monitored.

VICTORIA

During autumn, bushfire activity in Victoria generally declines due to seasonal changes and moisture recovery in soils and vegetation. While bushfire potential is normal for this time of year, it is important to note that elevated fire danger under windy conditions in grasslands in the west of the state during April is a possibility. Planned burning activity in Victoria has been ongoing since late summer in the west of the state, under suitable weather conditions. The planned burning program is likely to continue in the west, and as landscape conditions meet operational requirements, this program may contract or expand to the east. There is low confidence and high uncertainty in the success of the planned program in general, based on the potential of high rainfall weather systems during April. In general, planned burn opportunities will depend on rainfall, drying conditions and conducive weather, as well as balancing resource requirements.

TASMANIA

The bushfire season had fires which were exceedingly difficult to suppress due to the underlying drought conditions, especially in the Midlands and eastern Tasmania. Fingal, St Marys, Bicheno and Swansea were all threatened for several weeks by major fires. Widespread rain in March was sufficient enough for the state to be regarded as having normal fire season potential for the time of year. Planned burning has commenced in all areas during suitable burning windows, taking advantage of the different requirements for moorlands and scrubs compared to the dry forests. Given the climate outlook, a normal autumn-early winter planned burning season is expected for all fuel types, with small weather windows becoming available between the passage of frontal systems. Forest fuels in eastern Tasmania may yet be too dry for low intensity burning without further rains.

SOUTH AUSTRALIA

South Australia has not experienced the large rainfall that has fallen across broad areas of the east coast in recent months. As a result, soil dryness is average. However, the rainfall that occurred at the end of January over broad parts of the state was sufficient enough to extinguish the fires that had occurred since November. This rain improved conditions and provided a brief respite, but the effects have been temporary.

Bush and grass fires remain a threat across South Australia. Previous fire seasons have demonstrated that elevated fire weather conditions and major fires have occurred through April and May, and as a result, normal fire potential is expected across South Australia.

WESTERN AUSTRALIA

Rainfall from Tropical Cyclones *Damien* (early February) and *Esther* (mid February) have resulted in significant vegetation growth for the grasslands of the Kimberley and spinifex areas of the Pilbara. With weather conditions becoming cooler and more stable, the northern parts of Western Australia will soon commence their planned burning activities, including the Kimberley's annual aerial and roadside burning programs. These burning programs are a collaboration between the Department of Fire and Emergency Services, the Department of Biodiversity, Conservation and Attractions, Main Roads WA, Traditional Owners, the Kimberley Land Council, the Australian Wildlife Conservancy and the Pastoralists and Graziers Association of WA.

For the southern parts of Western Australia, ongoing hot and dry conditions are reflected in below average root zone soil moisture, particularly in areas with woody vegetation. Above normal fire potential continues for parts of the Swan Coastal Plain, Jarrah Forest, Warren, Mallee, Esperance Plains, Nullarbor and Hampton Biogeographic Regions. In the past two years, the south west has experienced unusually strong and dry pre-frontal winds associated with cold fronts in late autumn, highlighting the need for good burn security and situational awareness in the conduct of prescribed burning operations.

NORTHERN TERRITORY

The northern regions of the Northern Territory are still experiencing significant rain, in part due to ex-Tropical Cyclone *Esther* which occurred in mid February, followed by early March monsoon activity. As a result, grassy fuel growth is strong. Accumulated rainfall totals in most centres of the north are currently below average (by up to 30 per cent) to almost average. Significant curing of these grassy fuels is not evident at present. The current rainfall totals and range suggests normal fire potential for the coming months, leading into the northern Australian fire season. Prescribed burning activity is expected to concentrate during the next three months in the north, and will include broad scale strategic aerial prescribed and roadside fuel hazard reduction burning with landholders, as well as finer scale property planned burning activity.

In central and southern regions of the Northern Territory, recent and quite widespread rainfall has eased the fire danger. In the coming months there will likely be opportunities for fire mitigation programs to be undertaken, including broad and fine scale prescribed burning activity. The recent rainfall, fire season activity, and fire mitigation efforts suggest normal fire potential for these regions through to June.

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.