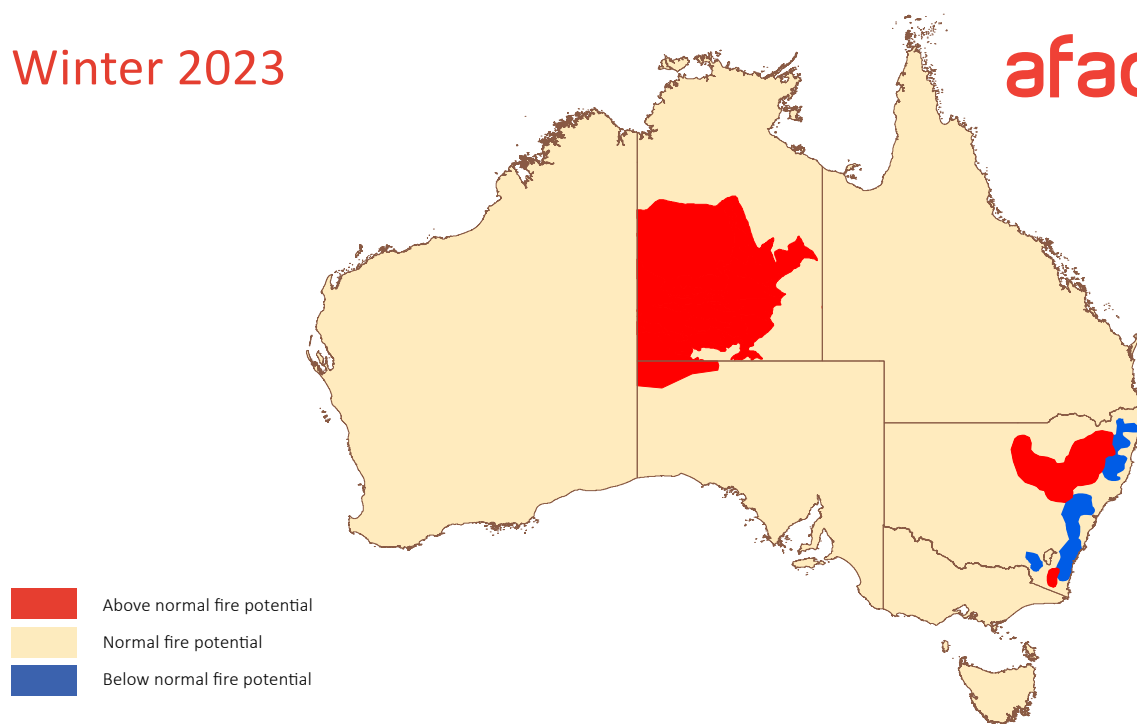


# SEASONAL BUSHFIRE OUTLOOK

Winter 2023



**Figure 1** Seasonal Bushfire Outlook Winter 2023. Areas are based on the interim biogeographic regionalisation for Australia and other geographical features.

**Fire potential definition:** The chance of a bushfire or number of fires occurring of such size, complexity or other impact that requires resources (from both a preemptive 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.

## Overview

Australia has returned to a more normal period of rainfall following a very wet 12 months due to La Niña and negative Indian Ocean Dipole events influencing the Australian climate.

February to April saw above average temperatures for much of the southern and central parts of the country and this trend is expected to continue. Climate models anticipate development of El Niño conditions during winter, and the El Niño-Southern Oscillation is currently at El Niño Watch status.

Most of Australia is likely to experience below median rainfall for the winter period and maximum temperatures are likely or very likely to be above median for most of the country. The combination of reduced rainfall and above average temperatures and evaporation results in outlooks for drier than average root zone soil moisture by late winter for much of the country.

Much of Central Australia is showing **above normal fire potential** for this outlook due to reduced rainfall, higher temperatures, and higher fuel loads, including of the invasive Buffel Grass. Parts of NSW also have above normal fire potential driven by the risk of frost curing of high grass fuel loads.

In parts of the Great Dividing Range fuels remain reduced from the 2019-20 fire season and these areas are predicted to continue to provide **below normal fire potential**.

While most of Australia shows **normal fire potential** during this outlook period, anyone living and working in these areas needs to be vigilant. Destructive and deadly fires can still occur during normal bushfire seasons across Australia.

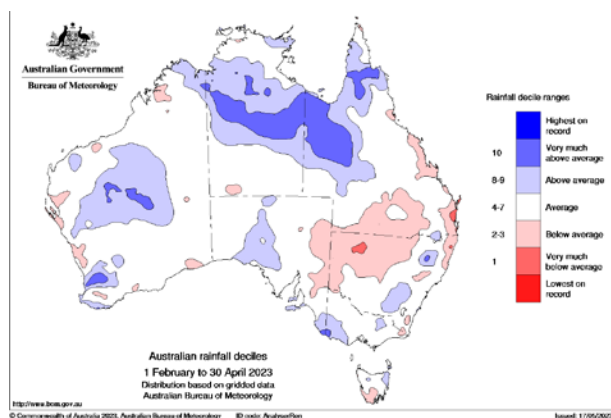
## About the Outlook

Fire management is a year-round process. The Seasonal Outlook reflects the priorities in each state and territory for the coming months given the expected climate conditions. 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.

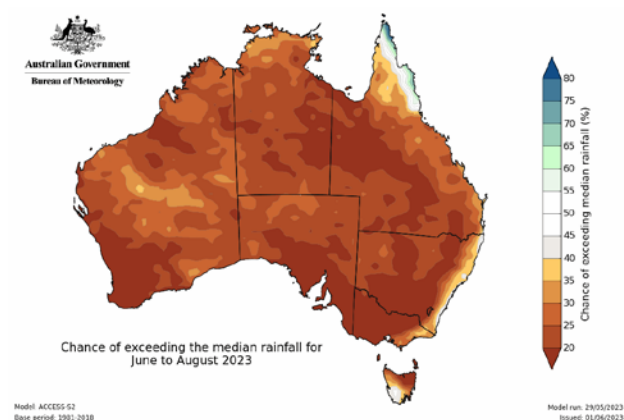
Fire potential can vary greatly, even at the smaller scale, between bordering states and territories. Each state and territory's assessment considers different land use types and vegetation types. This is influenced by different forecasts for temperature and rainfall over these regions.

This Seasonal Outlook was developed by AFAC, the Bureau of Meteorology, Queensland Fire and Emergency Services, the NSW Rural Fire Service, ACT Emergency Services Agency, ACT Parks and Conservation Service, Country Fire Authority, Department of Energy, Environment and Climate Action Victoria, Tasmania Fire Service, SA Country Fire Service, Department of Fire and Emergency Services and Department of Biodiversity, Conservation and Attractions WA, and Bushfires NT.

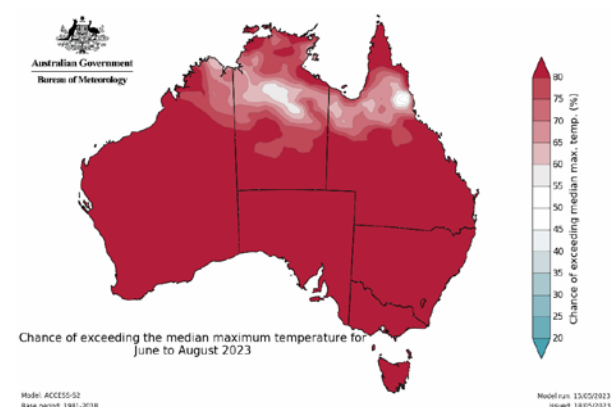
*AFAC is the National Council for fire and emergency services, supporting the sector to create safer, more resilient communities. AFAC drives national consistency through collaboration, innovation and partnerships. It delivers enhanced capability by developing doctrine and supporting operations.*



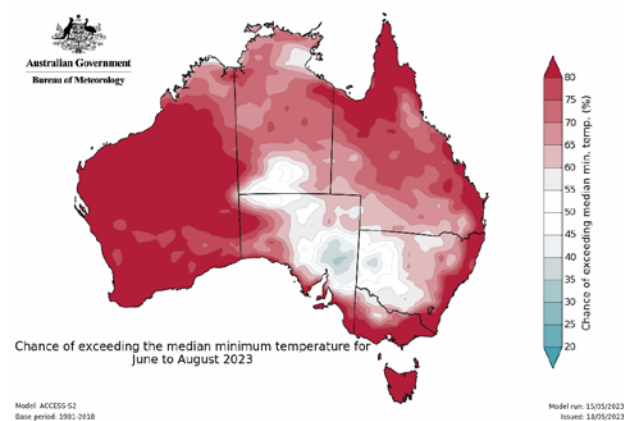
**Figure 2** 1 February 2023 – 30 April 2023 rainfall deciles



**Figure 3** June – August 2023 chance of above normal rainfall



**Figure 4** June – August 2023 chance of above normal maximum temperature



**Figure 5** June – August 2023 chance of above normal minimum temperature

## Recent conditions

Seasonal fire conditions depend on many factors, including the amount and type of fuel (vegetation) and how dry that fuel is. Fuel conditions are influenced by recent rainfall, temperatures, and soil moisture.

For Australia as a whole, February to April 2023 rainfall was 7% above the 1961-1990 average. Above average rainfall for the three months (Figure 2) occurred mostly over central parts of WA, and parts of the northern tropics, as well as some smaller areas scattered across southern Australia. Rainfall for the three months was below average along pockets of the eastern coastline of Australia, southern parts of Queensland, much of western and northern NSW, eastern SA, and southern Tasmania. No states or territories were in the top or bottom 10 of their respective records for the three months. May has seen broadly drier conditions nation-wide and is likely to be one of the driest Mays on record for Australia.

This more normal period of rainfall follows a very wet 12 months, which saw both La Niña and negative Indian Ocean Dipole events influencing the Australian climate. The latter part of 2022 saw an extended positive Southern Annular Mode, which also likely contributed towards the extended wet period. The 12 months ending February 2023 were the ninth wettest such period in 123 years of records for Australia, with the top ten years dominated by La Niña years. Much of northern and eastern Australia saw rainfall in the top 10% of records during this period.

February to April 2023 has seen warmer than average maximum temperatures for much of the southern and central parts of the country as well as along the Queensland coastline. This follows a cooler second half of 2022 for the southern two-thirds of the Australian mainland. However, as is typical of La Niña periods, the north remained warmer than average during this six-month period.

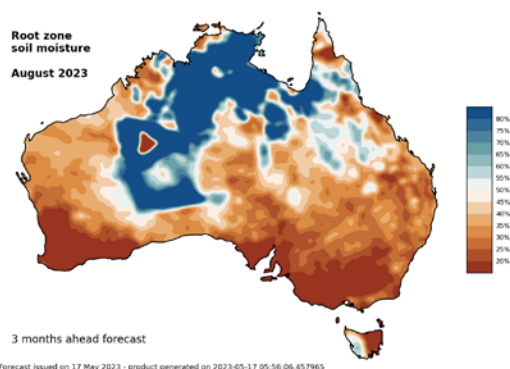
Climate change means that for every degree of global warming, around 7% more moisture can be contained in the atmosphere, resulting in around 5-15% more rainfall during extreme rain events. However, for Australia, there is likely to be longer periods of dry between periods of enhanced wet, particularly in regions where mean rainfall is likely to decrease such as parts of southern Australia.

## Long-range forecasts

The Bureau of Meteorology's long-range forecasts are based on global models of the oceans, atmosphere, land, and ice. These models implicitly include physics that capture the influence of all climate drivers, including long-term trends.

June to August rainfall (Figure 3) is likely (greater than 60% chance) to be below median across virtually all of the country. Much of the South West Land Division, southern SA, eastern NT, western Queensland, central NSW, Victoria and north-east Tasmania are very likely to experience below median rainfall (greater than 80% chance).

June to August maximum temperatures (Figure 4) are likely (greater than 60% chance) to be above median for much of the far north of the country, and very likely (greater than 80% chance) to be above median elsewhere.



**Figure 6** August 2023 chance of above normal soil moisture

June to August minimum temperatures (Figure 5) are likely (greater than 60% chance) to be above median for many areas, with cooler winter nights for far southern parts of the NT and Queensland, as well as western NSW and eastern SA.

The combination of reduced rainfall and above average temperatures and evaporation results in outlooks for drier than average root zone (top metre) soil moisture (Figure 6) by late winter for much of the country. Only areas in eastern WA, the northern half of the NT and scattered parts of far north Queensland may continue to have wetter than average soils. For eastern Australia, this is a significant change from the wet soils of 2022, suggesting the abundant growth associated with high moisture availability in spring 2022 may be drying out in the first half of 2023; the high fuel loads are likely to become more flammable in some places.

Updates to climate forecasts, including forecasts of monthly, fortnightly and weekly outlooks and the outlook for the Indian Ocean Dipole and El Niño–Southern Oscillation will continue to be published at [www.bom.gov.au/climate/ahead](http://www.bom.gov.au/climate/ahead) and [awo.bom.gov.au](http://awo.bom.gov.au)

## Climate drivers

The El Niño–Southern Oscillation (ENSO) returned to neutral (neither La Niña nor El Niño) in early March following the end of the La Niña. Since then, tropical Pacific ocean waters have been steadily warming. Globally, the April sea surface temperatures were the warmest on record for that month. Climate models anticipate development of El Niño conditions during winter. However, there has been little shift towards El Niño in atmospheric ENSO indicators. With these factors in mind, the ENSO Outlook remains at El Niño Watch, though this is being closely monitored for any change in status. This means there is approximately a 50% chance of El Niño developing in 2023. El Niño typically reduces winter-spring rainfall across much of eastern Australia.

The Indian Ocean Dipole (IOD) has been inactive during the December to April months but may influence Australian climate during winter. Climate models suggest the possibility of positive IOD development in the coming months. A positive IOD typically reduces winter-spring rainfall across much of southern and central Australia.

Warmer than average sea surface temperatures persist around parts of southern Australia, and for much of the Coral Sea, which overall had its second-warmest April on record.

Australia's temperature and rainfall variability are also influenced by global warming caused anthropogenic influences (human activities). Australia's climate has warmed by around 1.47 °C in the period between 1910 and 2021. There has also been a trend towards a greater proportion of rainfall from high intensity short duration rainfall events, especially across northern Australia. Southern Australia has seen a reduction of 10 to 20% in cool season (April–October) rainfall in recent decades.

Historically, forest fire activity in eastern Australia is lower during a La Niña or negative IOD years. However, regions that see above average winter, spring and summer rainfall typically experience increased grass and vegetation growth which increase subsequent fuel loads in the year following.

The tendency for fire seasons to have elevated fire dangers more frequently, and for elevated fire danger to appear earlier and later in the season, is an observed trend in Australia's climate. This reflects reduced and/or less reliable cool season (April–October) rainfall in southern parts of the country and rising temperatures. Year-to-year variability can reduce the impact of the long-term trends in increased severity and length of fire seasons, as was the case during the recent La Niña events. A change in ENSO state would expect to see a return to the general trend.

The frequency of dangerous fire weather days has increased significantly in recent decades across many regions of Australia, especially in the south and east. These increases are particularly evident during spring and summer and are associated with an earlier start to the southern fire weather season. (State of the Climate 2022).

## Jurisdictional summaries

### New South Wales

Throughout Autumn parts of NSW saw significant grass fuel loads and below average rainfall provide above normal fire activity with significant fires occurring in central NSW's forests and grasslands.

Due to high grass fuel loads and the potential for frost to cure grasses, some areas of NSW are expected to see above normal fire potential this winter. Even when it is cold, windy weather can support intense and fast spreading grass fires. If significant frost curing occurs in parts of the state other than those depicted, these areas could also pose an above normal risk during this period.

In parts of the Great Dividing Range, fuels remain reduced from the 2019-20 fire season whilst regrowth in these areas is quicker than normal due to ideal growing conditions, these areas are predicted to continue to provide below normal fire potential at this time. The RFS is monitoring the regrowth of fuel loads in these areas closely. Close monitoring of these areas will continue into next fire season.

Elsewhere in NSW the more benign conditions and cold temperatures associated with winter are expected to provide relatively normal fire potential.

Where weather and resource opportunities permit, NSW fire and land management agencies will undertake hazard reduction burning to reduce the potential for future fires to impact on communities.

## ACT

Maximum (daytime) and minimum (overnight) temperatures are forecast to be above average throughout winter with an unlikely chance of exceeding median rainfall. However, above average rainfall was received for much of the ACT over Autumn. Despite these warmer and drier conditions predicted for winter, the current root zone soil moisture for the ACT being average or slightly above average and considerable water across the landscape of the ACT, means normal fire potential is expected for winter.

Fire agencies and land managers will continue to undertake prescribed burning when conditions allow throughout winter. ACT residents can monitor prescribed burns that are being planned and undertaken through either the ACT Emergency Services Agency and ACT Parks and Conservation Service websites or Fires Near Me App.

## Victoria

During Autumn, wetter than normal conditions were experienced in the southwest of Victoria while the remainder of the state received closer to average rainfall. Three consecutive years of La Niña has resulted in wetter soils across the state for this time of year as the winter period commences.

Winter will see Victoria transitioning into a low-risk period for bushfire activity, resulting in an assessment of normal bushfire potential across the state. The climate outlook suggests a high chance that drier and warmer conditions will eventuate across Victoria in the lead up to spring. As a result, there will likely be increased planned burning opportunities during winter. The forecast drying patterns across the state will be closely monitored over the winter period to identify emerging risks and any potential for an earlier start to Victoria's bushfire season.

## Tasmania

Autumn rainfall has been close to normal, with some recovery to forest fuel moisture and underlying landscape dryness.

The winter period is forecast to see drier than average conditions across areas of the east and north of Tasmania, and warmer than average temperatures statewide. These conditions however are unlikely to result in above normal bushfire potential during the period. Rather, good opportunities may present for fuel reduction burning. The winter period is therefore assessed as normal fire potential statewide.

The effect of below average rainfall during the winter period may result in an earlier start to the fire season in spring. Abundant fuel growth from successive wet (La Niña) years, coupled with forecast below average rainfall, may result in above normal fire potential in some areas in the spring period. Tasmania Fire Service continues to monitor conditions throughout the period.

## South Australia

Despite above average rainfalls across much of the state from spring 2022 through to autumn 2023, SA has seen a rapid drying out of above average fuel loads. This is leading to above average Forest Fire Danger Index ratings starting to be seen in the lower western Eyre Peninsula and far southwest of the state. Evaporative stress indicators are reflecting the rapid drying of soil across the mid to northeast of the state as well as the far southwestern corner, which increases the likelihood of high rates of curing in the high fuel loads in those areas.

From June to August, most of the lower south of the state is predicted to be in the lowest 20% of historical averages of rainfall, combined with most of the state being in the top 20% likelihood of well above average temperatures. SA's mallee heath landscapes are forecast to have a high chance of exceeding the median Fire Danger Index range from June to August and grassland in SA is noted amongst national fire danger risk areas.

## Queensland

Queensland is likely to see normal fire potential across the state through the winter season. With frost and drying conditions, grasses will continue to cure and become available to carry fire. Northern Queensland is likely to see an opportunity for late autumn through to spring mitigation activity. This is due to the significant amount of rainfall across the region during summer and autumn, leading to higher-than-average soil moisture levels and prolonged low curing rates.

High rainfall across northern and central Queensland over the previous months have seen increased fuel growth. While it is unlikely that there will be a significant increase in the current fuel loadings in these regions, it is likely for grasslands to carry fire throughout the later winter months. There is also potential for isolated pockets of intense soil moisture evaporation to occur around the coastal areas of the Wide-Bay and Fraser Coast districts that may lead to above-normal fire behaviour around these areas.

Grasses are ranging from medium to high fuel loads across parts of central and eastern Queensland with drying conditions trending to continue across southern parts of Queensland into the late winter months. Some areas of central Queensland are showing pockets of elevated fuel loads along the exposed plains. Conditions are favourable in southeast Queensland for early winter season mitigation burning, with warmer than average daytime temperatures forecast for these areas, and soil and fuel moisture levels are supportive of effective hazard mitigation and ecological burning. This window of effective and safe mitigation burning is likely to remain until mid to late July. Winter months are likely to provide an opportunity to undertake mitigation in large parts of Queensland, and many eco-systems are forecast to be favourable for seasonal burning to achieve both an ecological and risk reduction benefit for communities. Moving into the cooler months, we are not likely to see a notable change in the fuel accumulation through winter, leading into the spring fire season.

## Western Australia

Analysis shows normal fire potential for Western Australia (WA). For northern parts of WA, above average root zone soil moisture because of the Ex-Tropical Cyclone Ellie and Tropical Cyclone Ilsa events is slowing the grass curing. However, the weather is transitioning to dry season conditions, as evident from declining root zone soil moisture in the central parts of the Kimberley. Extensive grass and spinifex fuel mitigation activities undertaken by land and fire managers and delayed grass curing have resulted in normal fire potential predicted for the outlook period. For the southern parts of WA, there has been a late break to the season and areas are experiencing below-average root zone soil moisture, such as the northern parts of the Swan Coastal Plain and Jarrah Forest in the southwest, and parts of Murchison, Coolgardie, and the Nullarbor bioregions. The remaining areas are associated with average to above-average root zone soil moisture. Rainfalls in parts of the Southwest Land Division are forecast to be below the median but cool winter conditions should alleviate impacts from these moisture deficiencies on bushfire risk over the forecast period.

## Northern Territory

The 2022-23 monsoon season has come to an end, yielding average rainfall totals for the northern savanna region (Top End, Arnhem and Katherine regions). Currently, root zone soil moisture remains above average within the northwestern, northeastern Top End and Katherine regions. Some grass fuels are still curing as a result of the late end to the monsoon.

Grass fuel loads are at average levels throughout the northern savanna, except for some areas where invasive Gamba Grass (*Andropogon gayanus*) is located within peri-urban areas south of Darwin and just north of Katherine.

Annual early season mitigation programs have commenced throughout the northern savanna region. Due to monsoon rainfall persisting into April, a shorter window for mitigation programs to be completed before the onset of the late dry season has been identified.

Should fire mitigation programs fall short of required targets, the probability of wildfire potential could increase for the northern savanna region before the conclusion of the winter reporting period. The ENSO is currently at El Niño Watch status, with fire potential predicted to increase later in winter, during August, as drying El Niño conditions are predicted to dominate.

An above normal fire potential has been indicated for the winter period throughout much of Central Australia, including Tanami and the arid southern area of the Barkly region. This is due to a combination of climatic factors pertaining to reduced rainfall and higher minimum and maximum temperatures from the development of El Niño, high fuel loads across the landscape, fuel continuity and increased distribution of the invasive Buffel Grass (*Cenchrus ciliaris*). The previous two years of rainfall has caused spinifex and shorter-lived grass fuels to develop to a continuous stage where fire could travel over a larger distance, as was observed in March 2023 with wildfires burning out a large area of Tjoritja (West MacDonnell) National Park.

Despite the above normal fire potential, cooler day time and night time temperatures during the winter season in Central Australia and southern Barkly (Including Tennant Creek) regions will enable fire managers to control wildfire more effectively.

An extensive planning and preparedness approach has been undertaken by Bushfires NT and Northern Territory Fire and Rescue Service, with additional resourcing committed across government and private sectors to increase the effectiveness of mitigation programs. Public messaging and stakeholder engagement has increased to ensure sufficient preparedness throughout the Central Australia and Barkly regions. Strategic mitigation programs have now commenced, aiming to reduce high mass, continuous grass fuel loads and to ensure a wide coverage of fire scars and increased protection of townships, remote communities and park tenure across the wider landscape. This approach will best prepare Central Australia and southern Barkly for the anticipated increased risk in wildfire activity for the 2023 spring and summer seasons.