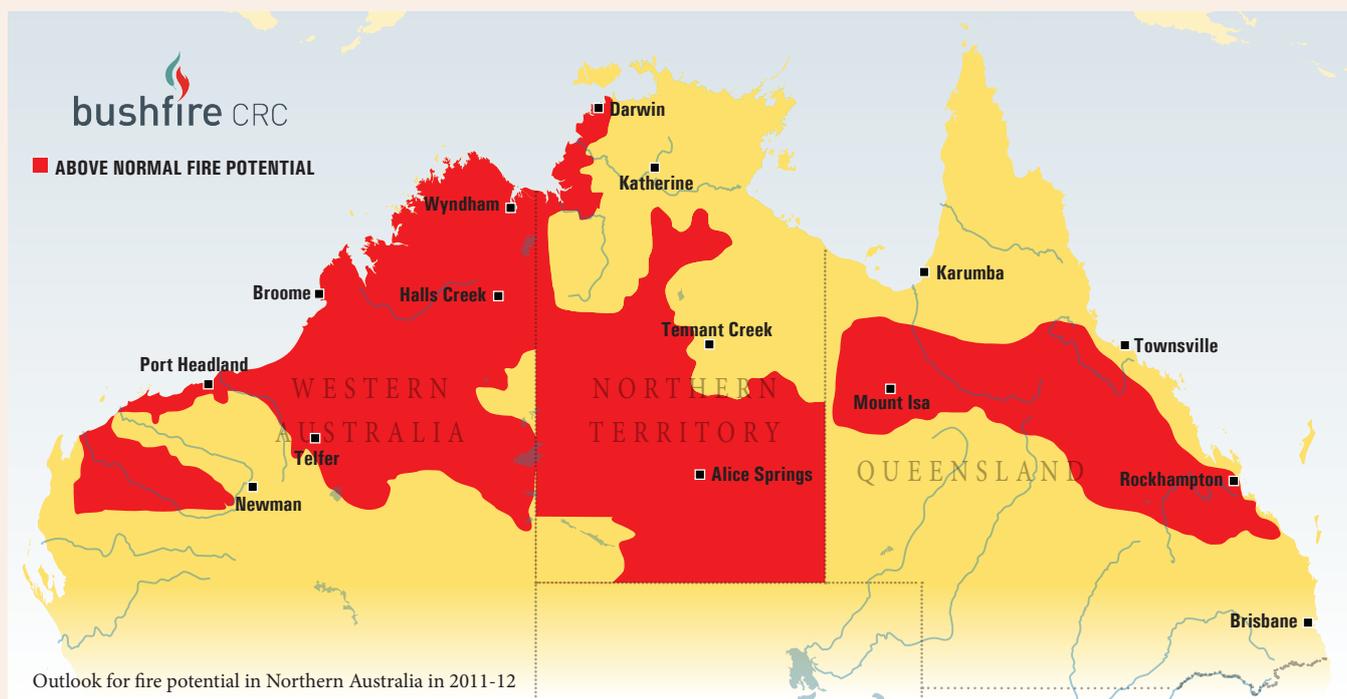


FIRE NOTE

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NORTHERN AUSTRALIA SEASONAL BUSHFIRE OUTLOOK 2011



SUMMARY

Large areas of Northern Australia face above-normal fire potential for the remainder of the 2011 fire season. This is largely because of strong vegetation growth in many areas fuelled by the wet weather that accompanied the very strong La Niña event of 2010-11

In Western Australia, the Kimberley has an above-normal bushfire potential, with the fuel loads remaining significant despite increased prescribed burning across the region.

Vast areas of Central Australia as well as the north-west coast of the Northern Territory can expect above average bushfire potential thanks to two years of above-average rainfall that have increased fuel loads and fuel continuity.

Queensland is facing above-normal fire potential over a vast area of coastal and inland areas of Central and Northern Queensland, thanks to abundant and continuous highly cured grassland. With the map above, each jurisdiction has made its own determination.

BUSHFIRE POTENTIAL

Bushfire potential depends on many factors. The stage is set by the previous wet season. The volume, location and timing of rainfall are critically important when estimating fuel volumes and growth. They also affect the timing of the curing (that is, 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 Pacific sea surface temperature associated with the El Niño-

Southern Oscillation, a major climate driver over Australia. Other less quantifiable factors, such as the distribution and readiness of fire-fighting resources, are also considered.

Members of the Northern Australian Fire Managers' Group Forum, chaired by Bushfire CRC Deputy CEO Richard Thornton, met at Kununurra in the far north of Western Australia in mid-June. During the proceedings they discussed the seasonal outlook for the imminent fire season, enabling the production of this Fire Note.

Attendees included representatives of the Bureau of Meteorology, Bushfires NT, the WA Fire and Emergency Services Authority, the WA Department of Environment and Conservation, Queensland Fire and Rescue Service and Queensland Parks and Wildlife Service.

The *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.

ANTECEDENT CONDITIONS

Thanks to a strong La Niña event in the Pacific Ocean, northern Australia experienced an extreme 2010-11 Wet Season, preceded by an exceptionally wet 2010 Dry Season in northern and central Australia.

The May to October period of 2010 will go down as the wettest on record for northern Australia (north of 26 deg South). Several stations in the Kimberley, Alice Springs and Channel Country districts measured their highest Dry Season rainfall totals on record. A relative absence of dry, southeast trade winds and the prevalence of northwest cloudbands contributed to the unusual Dry Season.

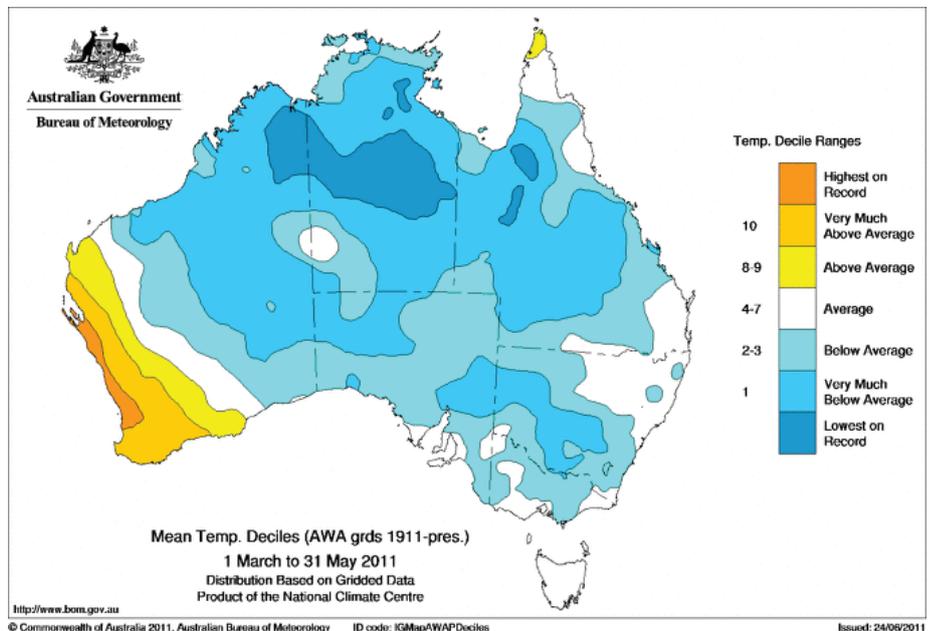
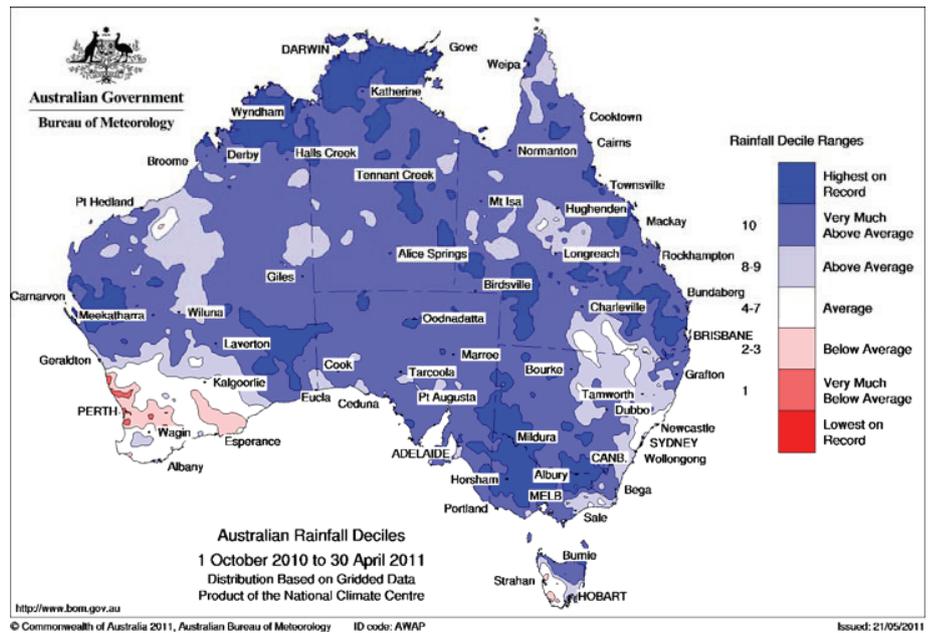
With the strong La Niña enhancing rainfall across most of northern and eastern Australia, and the added precipitation from several tropical cyclones, the 2010-11 Wet Season became one for the record books. Many rainfall records were broken across the Northern Territory, Western Australia's Kimberley region and eastern Queensland. The three main extreme events that contributed to the rainfall were Tropical Cyclone Carlos over the western Top End, Severe Tropical Cyclone Yasi affecting Queensland during February and extreme rainfall over the Kimberley in March.

March to May 2011 was marked by consistent below-normal temperatures, with a few areas recording their coldest autumn on record. These areas were in northern and central Australia including the east Kimberley, the central Northern Territory and parts of northern Queensland. Averaged across states and territories, it was also the coldest autumn since at least 1950 for Queensland and the Northern Territory.

The cool conditions experienced in autumn 2011 are also largely a result of the La Niña event, which brought heavy rainfall and cool daytime temperatures to Australia before decaying in late autumn.

The Bureau of Meteorology announced the end of the 2010-11 La Niña on 25 May 2011. This event will go down in the record books as one of the strongest in living memory. The last La Niña of this intensity was in 1975-76. Even though the oceanic component of the La Niña peaked late in 2010, and began to return to normal early in 2011, the atmospheric component remained in La Niña territory until May when the Southern Oscillation Index (SOI) plummeted to neutral levels in a matter of weeks.

Relative upper soil (0.2 m) moisture peaked in March across most of northern Australia. Since then, the upper soil moisture levels have rapidly decreased. Lower soil (0.2-



1.5m) humidity has remained stable over the past few months, showing the results of the extreme wet season. The variability over the past two months among the upper level is due to the onset of the dry season (less rainfall) and increase in soil evaporation and deep drainage.

EXPECTED CLIMATE SCENARIO

The outlook for July to September shows a moderate shift in the odds favouring a wetter season in northern Queensland, with neutral conditions elsewhere across northern Australia.

Cool temperatures have predominated early in the season over most of northern Australia. This has been partly due to the cool and wet summer experienced over the continent, preconditioning the early dry season to cooler conditions.

The outlook for maximum and minimum

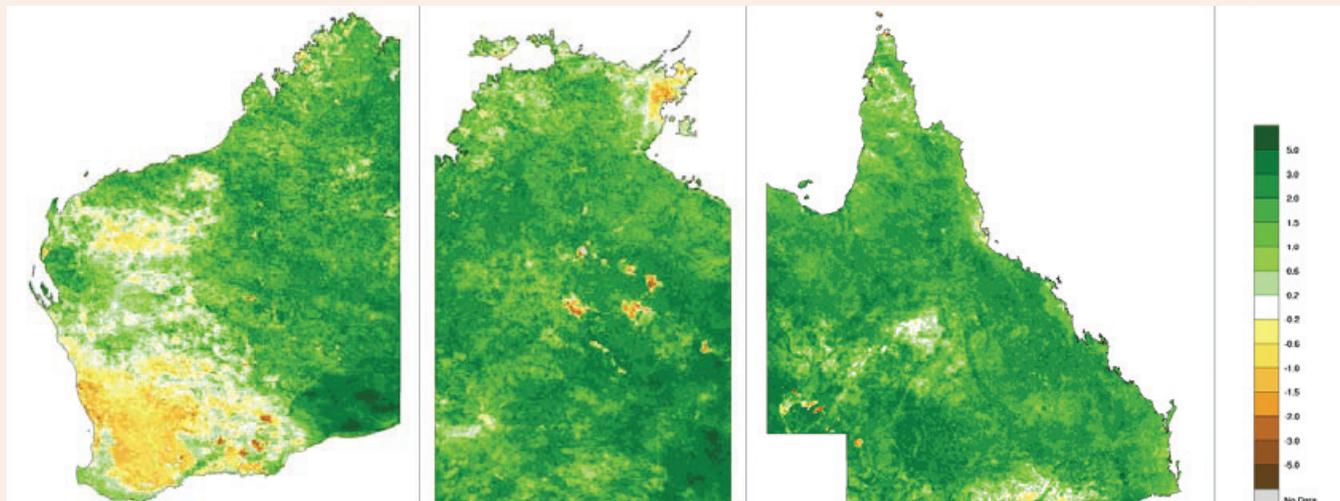
temperatures for the July to September period favours warmer days over most of northern Western Australia and south-western Northern Territory. Cooler nights are favoured over large parts of Queensland.

The majority of leading international climate models surveyed by the Bureau predicts neutral El Niño-Southern Oscillation conditions will persist through the southern hemisphere winter. A number of models indicate that oceanic conditions may become weakly warm (that is, weak El Niño) during the southern hemisphere spring.

The Indian Ocean Dipole (IOD) has remained neutral over the past few months, which is typical for this time of year. Recent forecasts from the Bureau's POAMA (Predictive Ocean Atmosphere Model for Australia) forecast system predict that a weak positive IOD event will develop during the southern hemisphere winter,

NORMALISED DIFFERENCE VEGETATION INDEX

The NDVI anomaly for the month of May reflects the effects of the exceptional wet season over northern Australia vegetation. Extensive positive anomalies are observed over most of northern Australia, indicative of greater density and greenness of the vegetation canopy. A few patches of below average anomalies (lower density and greenness of the vegetation canopy) are evident over most of the Western Australia's Pilbara and northern Gascoyne, Northern Territory's Barkly and eastern Arnhem, as well as around Queensland's Hinchinbrook shire and far northern Cape York.



with values of the index remaining weakly positive throughout spring. Positive IOD events have been associated with drier conditions over large parts of northern Australia.

If a positive IOD and El Niño turn out as predicted, an extended dry season for northern Australia and a drier build-up from October to December can be expected. However, at this stage confidence levels are low due to the length of the forecast period. The Northern Territory Climate Services Centre will be monitoring these climate drivers closely over the forthcoming weeks.

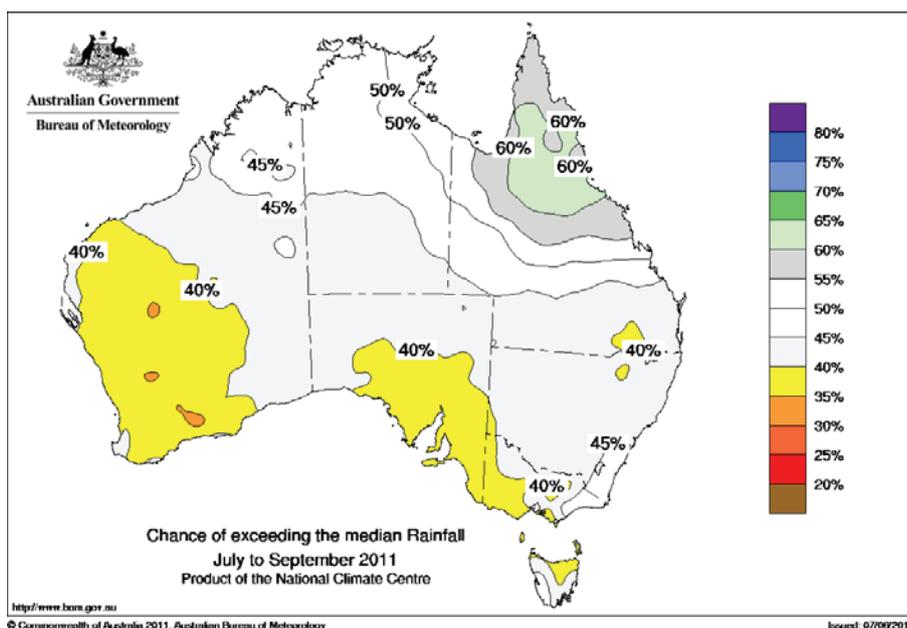
REGIONAL SUMMARIES

Western Australia

The Kimberley and Pilbara are fire-prone landscapes and it is normal for bushfires to occur each year. Above-normal bushfire potential is the chance of fires occurring that may be complex, protracted or could require resources beyond the local capacity.

Kimberley: Overall there is an above average bushfire potential. The area has been subject to record-breaking rainfall and this has resulted in significant and widespread grass growth across the region. This assessment is cognisant of the increased prescribed burning being undertaken across the region, but the rainfall and consequent fuel loads are significant.

Pilbara: In general rainfall across the Pilbara has been average or above average. In the areas of average rainfall and a grass type fuel the outlook is for an average season. This is in the general area from the coast to the area west of Telfer and east of Newman. Rainfall across the rest of the Pilbara has been above



DEFINITIONS

Fire potential: The chance of a fire or number of fires occurring of such size, complexity or other impact (such as biodiversity or global emissions) which 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 fire-fighting 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 (as seen in the top map on page 2) will show whether the rainfall is above average, average or below average for the chosen time period and area.

average and it is therefore when considering the bush fire fuel type, load and structure it is expected to be an above average bushfire potential.

Northern Territory

Extensive areas of normal fire potential conditions dominate the northern savanna and Barkly regions where early Dry Season

prescribed fire management is in place and has been effectively undertaken in 2011. These regions also have the capacity to deal with fires that will occur later in the year.

An extensive area of above-normal fire potential dominates Central Australia. The area has received two years of above-average rainfall that have increased fuel loads and fuel continuity. The effectiveness of prescribed fire management has been limited and capacity to deal with the anticipated bushfires later in 2011 will be limited.

The extension of the above-normal conditions into the Stuart Plateau region and along the northwest coast of the Northern Territory into the Darwin region reflects both a lower effectiveness of prescribed burning programs this year and the increased fuel load and fire risks associated with Gamba grass in the peri-urban regions.

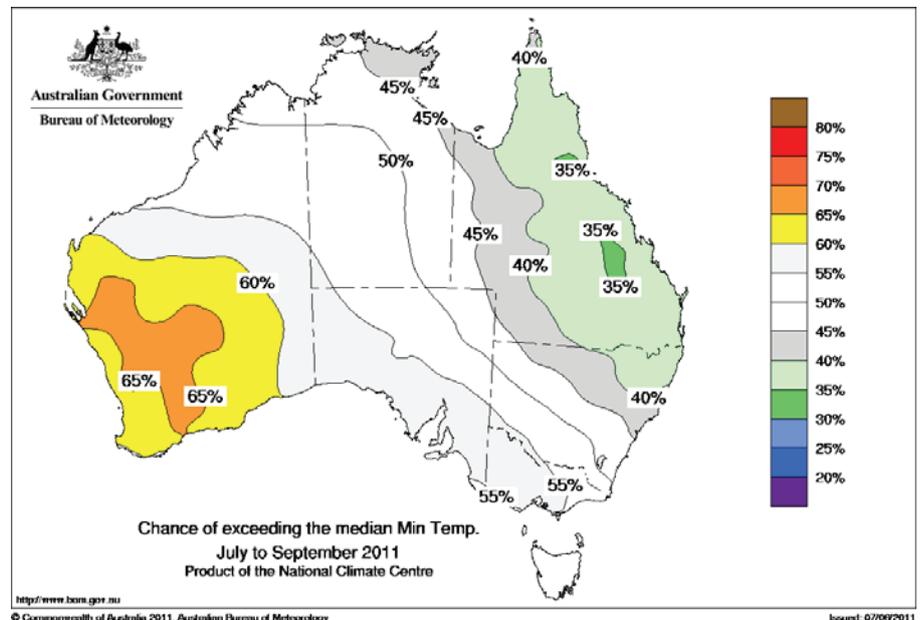
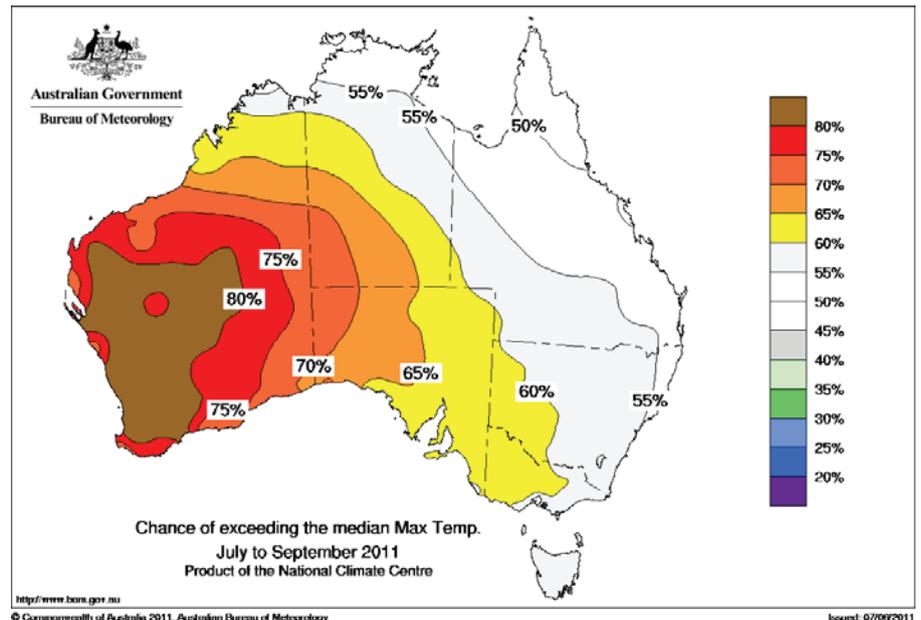
The small area of normal fire potential in the southwest Northern Territory reflects slightly lower rainfall and fuel loads in that region of central Australia. The record-breaking run of hot weather in January 2011 also contributed to lower fuel load accumulations. However, a considerable number of fires are expected in 2011, especially in localised areas dominated by buffel grass.

Queensland

Influenced by a strong La Niña event, the combination of a strong monsoon wet and three tropical cyclones increased the October 2010 to April 2011 rainfall deciles to above to well-above average for the majority of coastal and inland Queensland. Significant flooding was experienced over southern and central parts of the state causing inundation and disruptions to many areas.

The wet conditions together with warm temperatures promoted productive growth over the majority of grassland across regional areas of northern, central and western Queensland.

Above-normal fire potential over a vast area of coastal and inland areas of Central and Northern Queensland has been assessed for 2011 contributed by an abundant and



continuous highly cured grassland sward throughout. Widespread frosts have occurred over this vast area.

Cape York Peninsula, the Wet Tropics, and Tablelands to the Lower Gulf areas are expecting a normal fire potential for 2011 due to a delayed curing response and continuing wet conditions

leading into the dry winter period. Tropical Cyclone Yasi caused considerable wind damage to native forests, hardwood and softwood timber plantations, increasing ground fuels. However, with moist tropical climate and soil conditions, quick decomposition is expected to assist in reducing fire potential.

Fire Note is published jointly by the Bushfire Cooperative Research Centre (Bushfire CRC) and the Australasian Fire and Emergency Service Authorities Council (AFAC). This Fire Note is prepared from available research at the time of publication to encourage discussion and debate. The contents of the Fire Note do not necessarily represent the views, policies, practices or positions of any of the individual agencies or organisations who are stakeholders of the Bushfire CRC.

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AFAC is the peak representative body for fire, emergency services and land management agencies in the Australasia region. It was established in 1993 and has 35 full and 10 affiliate member organisations.