

Queensland's fire weather

Part 1 Fire Seasons

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Much of the literature and media warnings relate to the summer fire season experienced “down south”. In Queensland, wildfires can occur at any time of the year, however the fire season usually coincides with progressive drying following the autumn rain season, peaking during the spring months of more severe fire weather, and concluding with the arrival of more regular storm events and rain in late spring and summer. On the east coast, this peak fire season is characterised by frequent dry westerly winds and lower humidity. In inland areas, wind direction is less significant and the fire season can extend much longer into the summer months if rainfall is delayed.

The accepted understanding of fire seasons in Queensland is the widely circulated description developed by Luke and McArthur in the 60s and 70s. Luke described the “march of fire seasons”, commencing in winter in northern Australia and progressing to summer in southern Australia.

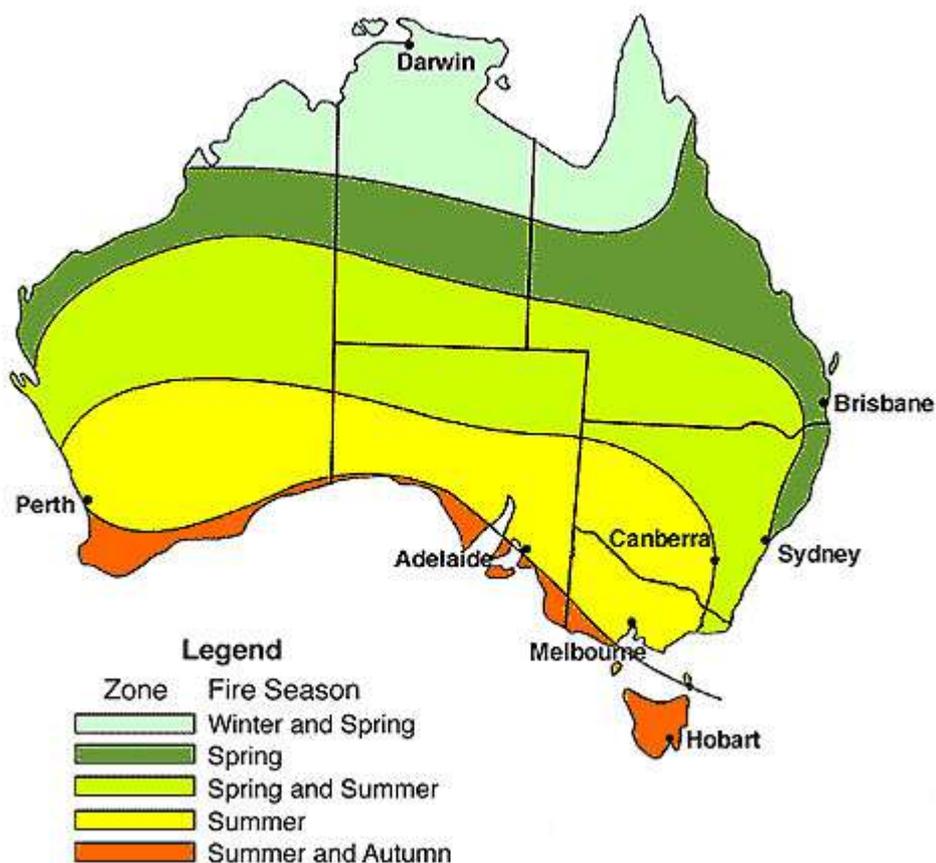


Figure 1. Pattern of seasonal fire occurrence in Australia (Luke and McArthur, 1978) (Source: CSIRO – Months of a Fire Season <http://www.csiro.au/Outcomes/Environment/Australian-Landscapes/Fire-Season-Months.aspx> accessed 10.10.13, last updated October 2011.)

With reference to Luke's (1978) map (figure 1), the fire season is defined as the months that more severe wildfires normally occur. This season has been determined by the proportional number and area of fires reported per month. Tom Just, Fire Protection Officer for the Department of Forestry, did a similar analysis of fire seasons based on the Department of Forestry fire data (1975 Fire School notes), and identified a rapid increase in fire activity in September in both Northern and Eastern Queensland, to a peak in November, then declining with the onset of the storm and wet season. For western areas, fire seasons tended to start in October but extended into the summer months of January and February.

This is similar to Queensland Parks and Wildlife (QPWS) wildfire experience. From statistics on wildfires affecting the QPWS estate over the last 10 years, the average number of fires and burnt area tends to peak in October. However this is skewed by a single large October fire in the Simpson Desert in 2011 of about 1 million hectares. Excluding this one event, the average monthly area burnt clearly peaks in November at about 250,000 hectares (see Figure 2). Intuitively, the number and size of wildfires is likely to be greater late in the dry season, when there is a higher likelihood of lightning strikes from dry storm events, and more burning activity. Graziers who burn tend to protect winter feed, and burn after the first storm rains to encourage the green pick.

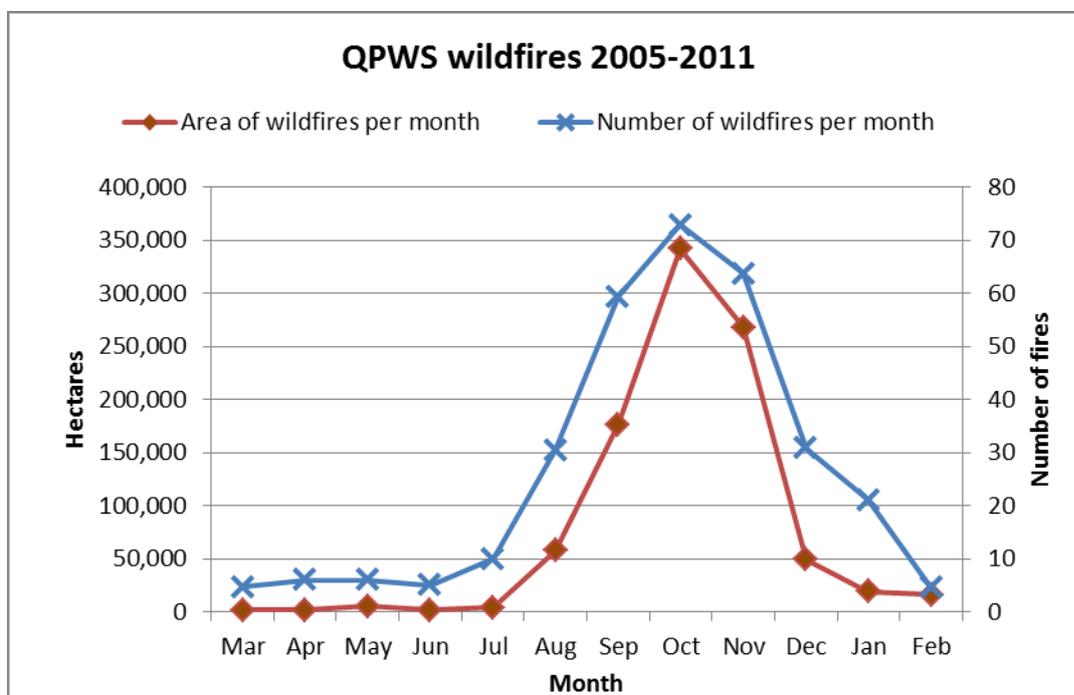


Figure 2. Average QPWS wildfire numbers and burnt area per month. (Data source: QPWS FAWeb)

This determination of fire seasons based on fire activity is in effect using a combination of both the weather severity and the likelihood of ignitions. Often the wildfires earlier in the year (autumn and winter) are mild, resulting in desirable outcomes, and when safe to do so are sometimes allowed to spread within a broader containment boundary, resulting in artificially high burnt areas. Also, if early planned burning or more effective wildfire suppression and prevention is successful in reducing wildfire areas at the worst times, there could again be a tendency for the fire season to be displaced. In an extreme case, the fire season could then be defined as the time we most want fire activity.

Excluding fire activity and considering fire weather conditions only, it is possible to determine the fire seasons based on the likelihood of severe fire weather. Recent work by Chris Lucas has allowed the examination of 38 years of daily weather and fire danger data for 19 sites around Queensland. Using the number of days per month when forest fire danger index (FFDI) or grassland fire danger index (GFDI) exceeds an appropriate threshold, such as 25+ (V High) for coastal areas or 50+ (Severe) for inland areas, periods of higher fire risk are identified. Seasons can also be compared across Queensland. For South East Queensland, based on this method and definition of the fire season, a greater number of bad fire weather days occur earlier in the season, peaking in September. Of note is that August also has a significant frequency of bad fire weather days, bringing with it a greater

likelihood of reignitions and escapes associated with August burning. An example of this is the chart for Amberley (Figure 3).

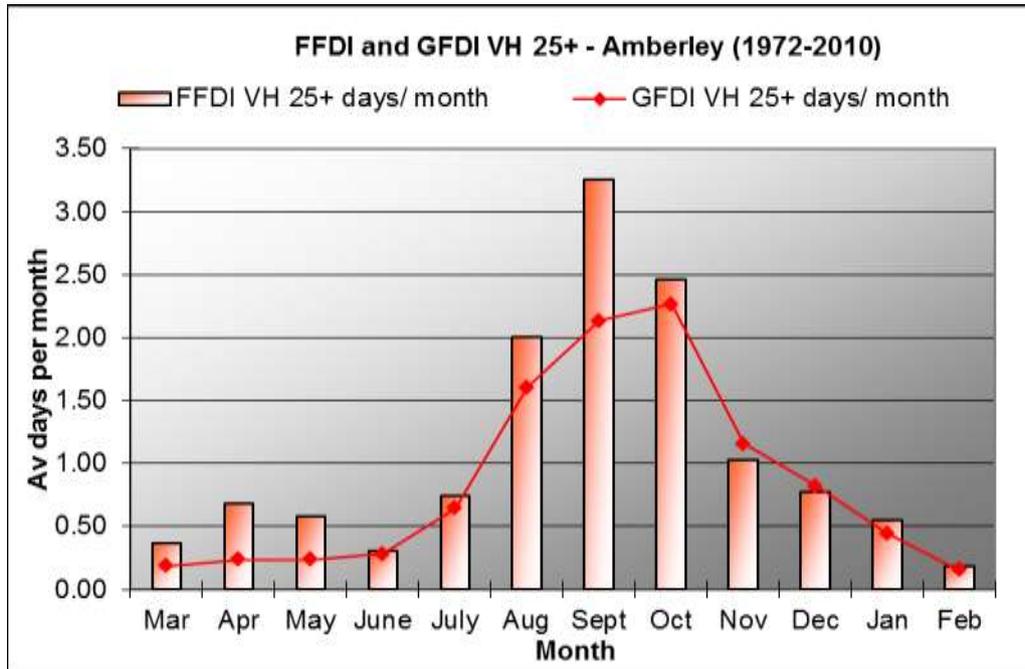


Figure 3. Amberley Forest Fire Danger Index (FFDI) and Grassland Fire Danger Index (FFDI) average days per month exceeding 25 Very High. (Data source: Lucas 2009)

Within this data, while November has a fewer number of very high to severe fire weather days, the greater proportion of the higher severity days fall within November. Similarly, the worst of the fire events in SE Queensland have historically occurred in November.

Applying this method across Queensland, it is apparent that there is no clear difference in the fire season for the east coast and the Cape and Gulf centres. All these coastal centres tend to have an August to November fire season. Moving inland, the months with more bad days tend to be later in the year and extend into December. In the south west of the State, the season starts in September, reaches a peak in December, and extends through into January and February.

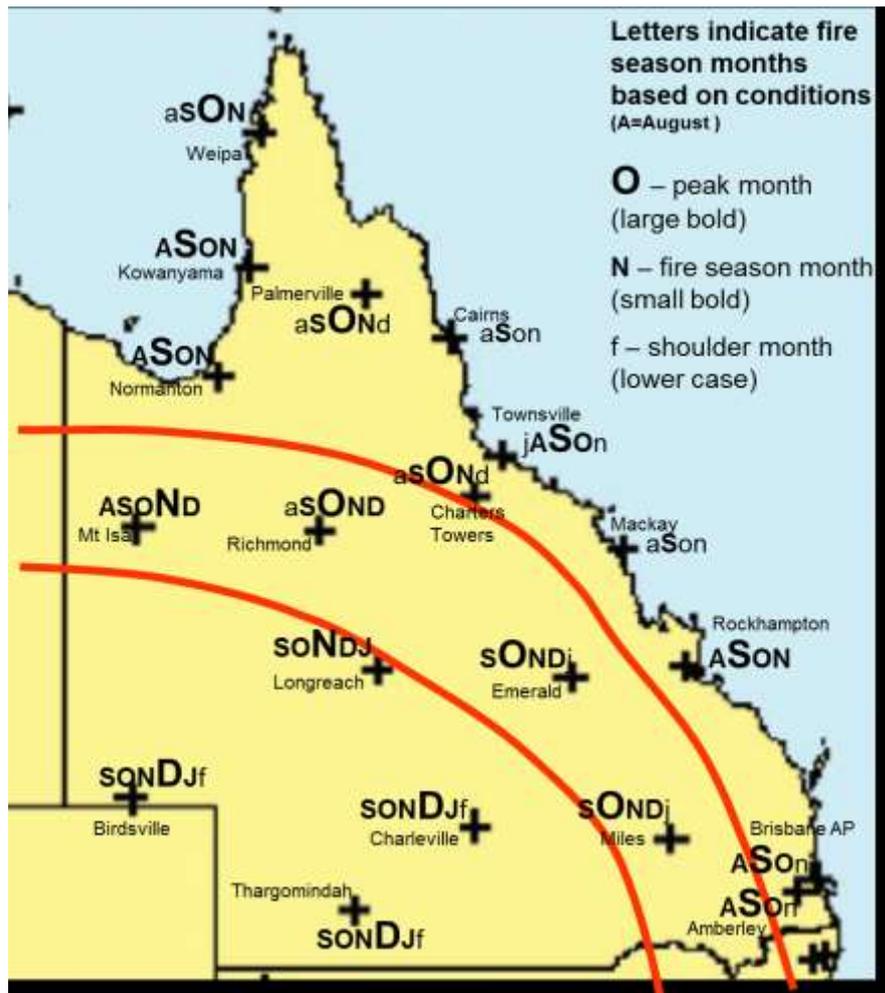


Figure 4. Fire season months based on likelihood of severe fire weather (data source: Lucas 2009)

The fire seasons as described are based on average conditions and do not have a fixed start and finish date. However linked to this increasing fire risk are specific declared periods which may have particular operational implications. Queensland Fire and Rescue Service sometimes declare a Fire Danger Period, which changes the requirements for permits to light fires. QPWS also annually declares a fire risk period based on the current seasonal conditions, which guides the internal reporting, preparedness, and burn approval arrangements for the Agency. Other agencies adopt similar permanent or variable internal arrangements such as termination of burning at the end of August. These are sometimes considered *de facto* fire seasons and can confuse the understanding of what or when is the fire season.

In conclusion, the fire seasons for Queensland can be defined by either the likelihood of fires, or the likelihood of bad fire weather. There is an increasing risk of severe fire weather commencing in August, and an increasing frequency and extent of fires in October - November. Fire seasons tend to vary between coastal (shorter and peaking earlier) and inland regions (longer and peaking later). A better understanding of seasonal patterns will improve the risk management of late winter burning, or early commencement of summer burning.

Further reading:

Bureau of Meteorology web page, Bushfire Weather

<http://www.bom.gov.au/weather-services/bushfire/about-bushfire-weather.shtml>

CSIRO web page, The Months of a Fire Season

<http://www.csiro.au/Outcomes/Environment/Australian-Landscapes/Fire-Season-Months.aspx>

Lucas C, 2009, On developing a historical fire weather data-set for Australia, Australian Meteorological and Oceanographic Journal 60 (2010) 1-14.

Luke R H and McArthur A G, Bushfires in Australia 1978, DPI Forestry and Timber Bureau, CSIRO Division of Forest Research.