



## **SPECIAL CLIMATE STATEMENT 14**

### **Six years of widespread drought in southern and eastern Australia November 2001–October 2007**

*Issued 1<sup>st</sup> November 2007  
National Climate Centre*

#### **Summary**

For large parts of southern and eastern Australia, dry conditions have now persisted since October 1996, a total of eleven years. For some areas, the accumulated total rainfall deficit over this period now exceeds a full year's normal rain.

For the agriculturally important Murray-Darling Basin, however, October 2007 marks the sixth anniversary of lower than average rainfall totals, with the November 2001 to October 2007 period being its equal driest such six-year period on record.

This extreme dry period for the Murray-Darling Basin has also been accompanied by high temperatures, exacerbating the low rainfall. Both daytime maximum and daily mean temperatures for the six years from November 2001 to October 2007 have surpassed the previous records by a considerable margin.

#### **Rainfall and temperature anomalies over the Murray-Darling Basin, November 2001 – October 2007**

**Figure 1** shows rainfall for the six years ending in October 2007, in comparison with the historical record from 1900 to the present.

When averaged over Australia as a whole, rainfall totals for the most recent six-year period were slightly above average (60<sup>th</sup> driest), largely the result of very wet conditions in the northwest.

However, for the Murray-Darling Basin this was the equal-driest six-year period on record, with an average of only 389 mm/year over the six years (2336 mm in total). This is approximately 20% below the long-term average of 480 mm/year, and the same as the 389 mm/year which fell during the previous record dry period of 1939-45.

As **Figure 1** clearly shows, the majority of those areas across Australia currently experiencing their lowest rainfall totals so far recorded lie within the Basin where only small areas near Moree, Broken Hill and the Mt. Lofty Ranges have received near-average rainfall. When considered in area terms, just over 75% of the land area of the Murray-Darling Basin experienced rainfall that ranked in the lowest 10% of recorded totals (decile 1). This area of decile 1 rainfall was only surpassed

during the drought of 1939-1945, when 78% of the Murray-Darling Basin was similarly dry, even though that event had a larger area that experienced above-average rainfall.

For the 2001-2007 event, only 0.5% of the Basin received rainfall that was in the highest 50% of historical totals (*i.e.* above median) for such a six-year period. There were no areas that recorded a six-year rainfall total in the top 20% of historically recorded values.

**Table 1** highlights a number of towns and cities in southern and eastern Australia, both within and outside of the Basin, that have now set rainfall records for any six-year period. Arguably the most notable is Melbourne, which for the first time since its records commenced in 1856 received less than 3000 mm for a six-year period (an average of 500 mm per year). There have also been records set locally along parts of the Western Australian coast (not included in table).

Maximum temperatures for the Murray-Darling Basin (and indeed for the whole of Australia) over the past six years were also at record levels, averaging 1.3°C above the long-term (1961-1990) average. The next five warmest six-year periods are 2000-2006, 1999-2005, 1998-2004, 1997-2003 and 1996-2002, revealing a very prolonged period of exceptionally warm conditions. Excluding these periods which overlap with the current dry, the next warmest six-year period is November 1977 to October 1983 which was only 0.4°C above the long term mean, nearly a full degree cooler than the recent period.

Mean daily temperatures were also highest on record (**Figure 2**), some 0.8°C above the long-term average. Minimum temperatures were 7<sup>th</sup> warmest, or 4<sup>th</sup> warmest if overlapping periods are not considered. High-quality monthly temperature records for the Murray-Darling Basin do not currently extend prior to 1950, but annual mean temperature values for the Basin go back to 1910. As four out of the ten hottest years in the Basin have occurred since 2001, but none of the top ten years are from the 1930s or 40s, it is clear that temperatures during the current drought have far exceeded those experienced during previous droughts for which we have rainfall records.

It is also worth noting that for Australia's cropping zones (as defined by the Grains Research and Development Council, which include cropping areas in both eastern and western Australia), this six-year period was more than 80 mm drier than the record 1939-45 drought, and clearly the driest on record. In terms of just the April to October crop and pasture growing season, 2007 was the 21<sup>st</sup> driest on record, with only 220 mm in the cropping zones compared with the long-term average of 273 mm, and the 2002 and 2006 cropping seasons both ranked in the six driest on record. Mean temperatures were also the highest on record for the crop zones for the past six-year period, some 0.6°C above average.

## **Rainfall deficits over Australia; November 1996 –October 2007**

Sections of the Murray-Darling Basin are experiencing a much longer drought dating back to (at least) the mid 1990s. **Figure 3** shows rainfall for the 11 years ending in October 2007, in comparison with the historical record from 1900 to the present.

A feature of the past 11 years for many of the notably dry areas has been a lack of any sustained intervening wet periods. Whilst there have only been a few individual years with severe drought (most notably 2002 and 2006, but also 1997 in Victoria and 2001 in the southwest), the lack of wet periods in the intervening years has had a significant impact upon long term rainfall totals, and hence inflows to and levels of water storages.

Whilst the Murray-Darling Basin is generally closer to average over this longer period thanks to well above average rains in its northern reaches from 1996 to 2001, south-eastern Australia, south-west Western Australia and south-east Queensland continue to display substantial rainfall deficits for the 11-year period.

For south-east Queensland, rainfall has been exceptionally low since October 1999. However, the deficits have been so large as to show up on longer term rainfall deficiency maps, including areas which continue to show lowest on record.

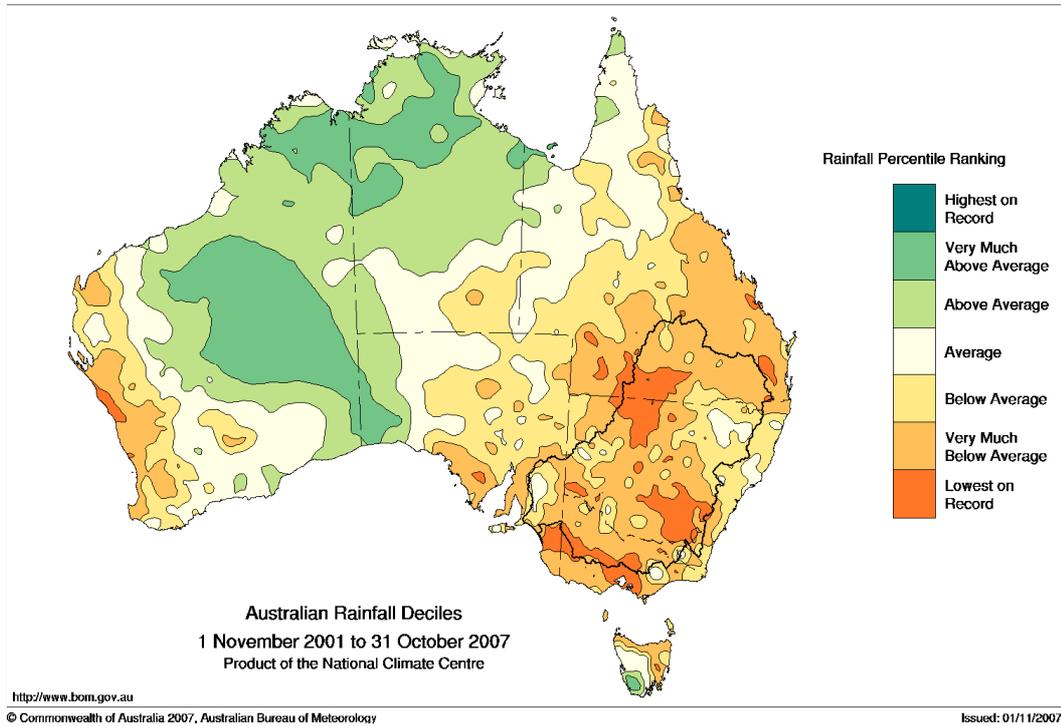
For the south-west of Western Australia, deficits are the continuation of the far longer-term dry conditions that have been observed since the early 1970s. The period 1996 to 2007 has been the driest on record on the coastal strip both north and south of Perth.

The major regions of rainfall deficit are southern Victoria, south-eastern South Australia and northern and eastern Tasmania. For Victoria, the 11-year drought is its driest such 11-year period since at least 1900, eclipsing the previous record set in 1935-46. For south-eastern Australia (including Tasmania) as a whole, the 11-year period ending October 2007 has brought just 6011 mm (546 mm/year), set against the long-term average of 6650 mm (605 mm/year). In other words, south-eastern Australia has now missed out on more than one year of normal rainfall when summed over the duration of this continuing drought event.

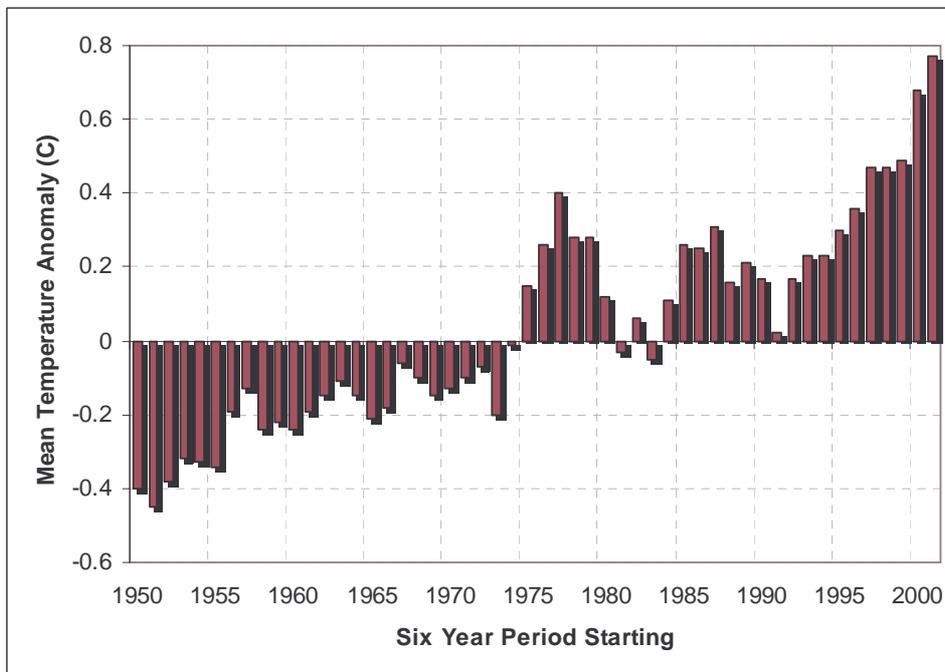
### **Further Information:**

The following climate meteorologists in the National Climate Centre – Dr Blair Trewin (03 9669 4623), Dr David Jones (03 9669 4085), Dr Michael Coughlan (03 9669 4086) – can be contacted about this statement.

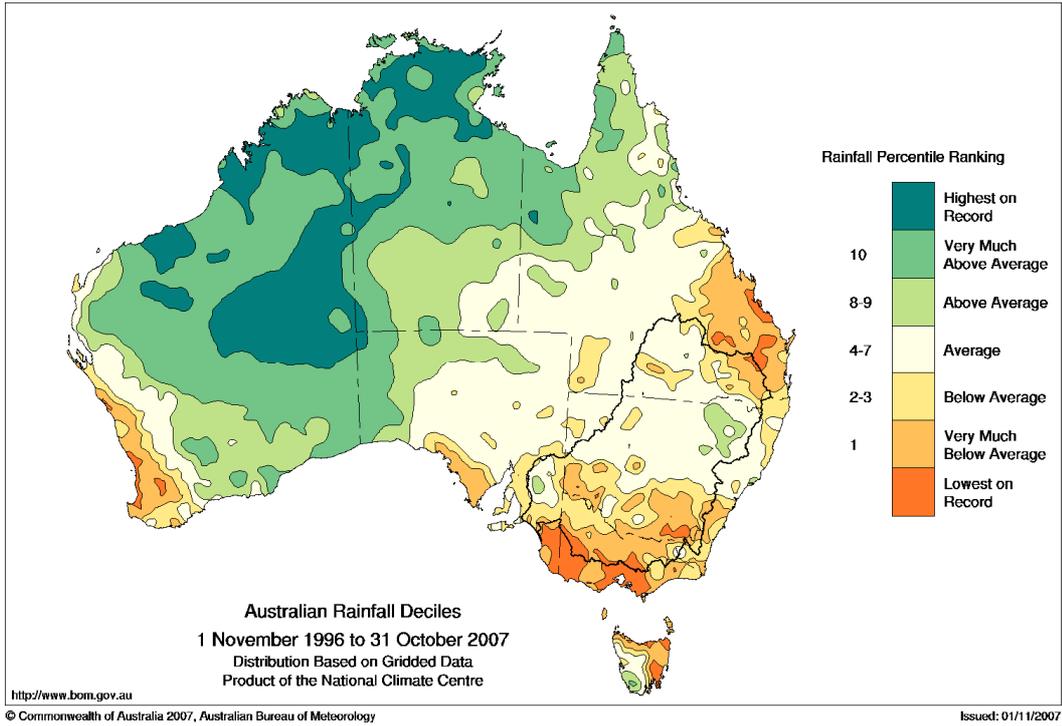
## Figures



**Figure 1.** Australian rainfall deciles for the six-year period November 2001 to October 2007. The Murray-Darling Basin is outlined in bold.



**Figure 2** Murray-Darling Basin mean temperature difference-from-normal for 6-year periods starting November of the year shown. Mean temperature = (maximum temperature + minimum temperature)/2. Data commence 1950. Differences are relative to the average for the 1961-90 period.



**Figure 3.** Australian rainfall deciles for the 11-year period November 1996 to October 2007.

## Tables

Station number	Location	Rainfall Nov 01 – Sep 07 (mm)	% below 1961- 90 normal	Previous record for 6-year period starting Nov	Previous record for any 6-year period
<b>Stations where November 2001-October 2007 sets a new record for any 6-year period</b>					
86071	Melbourne	2974.8	22	3349.2 (1979)	3330.7 (Sep 1904)
89002	Ballarat	3184.4	22	3563.6 (1979)	3524.5 (Jun 1979)
83012	Harrietteville	6519.4	23	7343.9 (1939)	7290.6 (Sep 1909)
85023	Drouin	4826.3	19	5403.6 (1924)	5397.4 (Dec 1921)
72150*	Wagga Wagga	2436.2	30	2526.8 (1896)	2446.5 (Mar 1897)
73054	Wyalong	1966.6	37	2244.3 (1895)	2202.7 (Aug 1895)
70025	Crookwell	3801.0	28	4123.3 (1896)	4031.6 (Sep 1896)
25507	Keith	2329.2	19	2521.0 (1923)	2404.2 (Jul 1924)
39083	Rockhampton	3311.4	34	3654.6 (1991)	3455.1 (Mar 1991)
<b>Stations where November 2001-October 2007 sets a new rainfall record for a 6-year period commencing November (in addition to above)</b>					
79023	Horsham	2136.1	20	2162.7 (1964)	2136.0 (Dec 1964)
70014	Canberra	2951.4	21	3032.8 (1939)	2948.2 (May 1977)
40075	Esk	4230.8	21	4341.6 (1992)	4151.4 (Apr 1992)
40083	Gatton	3404.8	34	3575.4 (1989)	3364.9 (Feb 1918)

**Table 1.** Selected locations with record low 6-year rainfall for the period November 2001-October 2007. For previous records, the starting date of the 6-year period is shown. Periods which overlap with the current 6-year period (i.e. those ending in November 2001 or later) are not considered under 'previous records'. Only selected stations are shown. (\*) indicates that an earlier station in the area is also included in the assessment of previous records.