

# NSW Climate Summary - December 2016

## Summary

Seasonal Outlook	Current outlook
Rainfall (quarter)	Drier (most of NSW)  Near neutral (areas of western and south western NSW)
Max Temperature (quarter)	Warmer (most of NSW)  Near neutral (areas of far western NSW)
Min Temperature (quarter)	Warmer (most of NSW)  Near neutral (areas of western and south western NSW)
<b>ENSO</b>	<b>Current outlook</b>
ENSO (overall)	Neutral  La Niña unlikely
ENSO Outlook Status	Neutral
SOI	Neutral
Pacific Ocean (NINO3.4)	Neutral (slightly cool)
Indian Ocean (IOD)	Neutral (slightly warm)
Southern Annular Mode (SAM/AO)	Weakly to moderately negative

Source: Derived from information provided by the [Australian Bureau of Meteorology](#) and the [US National Oceanic & Atmospheric Administration](#).

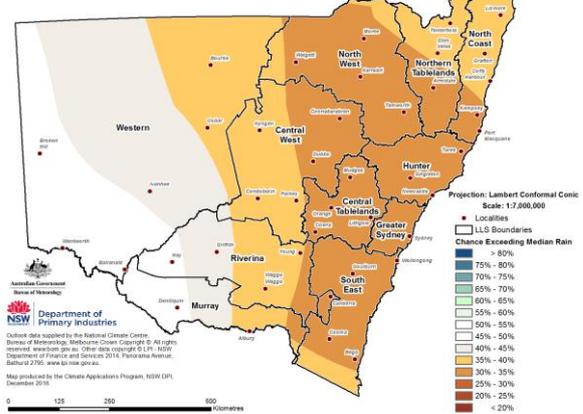
## Seasonal outlook

(Source: [Bureau of Meteorology](#))

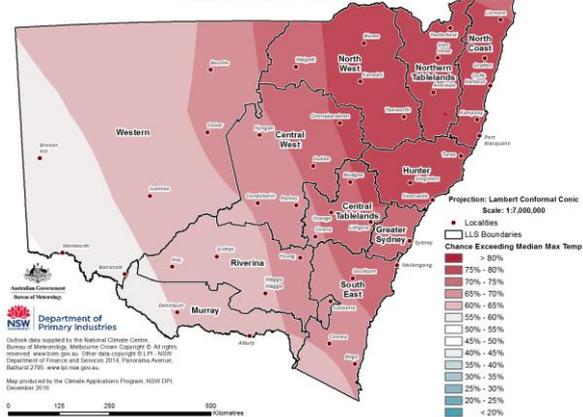
Between January and March drier than normal conditions are likely across most of NSW, with a near-equal chance of drier or wetter than normal conditions across areas of the south and west.

Daytime and overnight temperatures are likely to be warmer than normal across most of NSW. There is a near-equal chance of cooler or warmer than normal daytime and overnight temperatures across areas of the far west and areas of the south. There is also a near-equal chance of cooler or warmer than normal overnight temperatures in areas of the far south east.

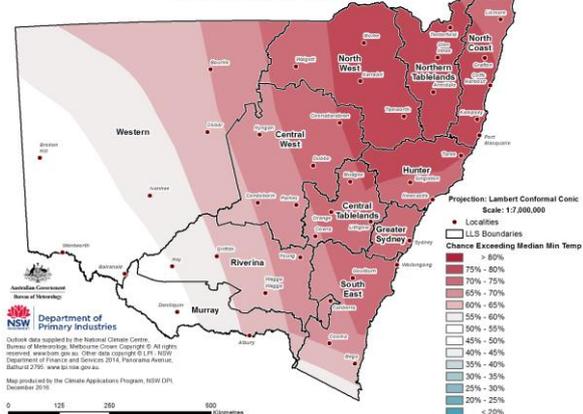
Chance of Exceeding Median Rainfall January 2017 to March 2017



Chance of Exceeding the Median Maximum Temperature January 2017 to March 2017



Chance of Exceeding the Median Minimum Temperature January 2017 to March 2017

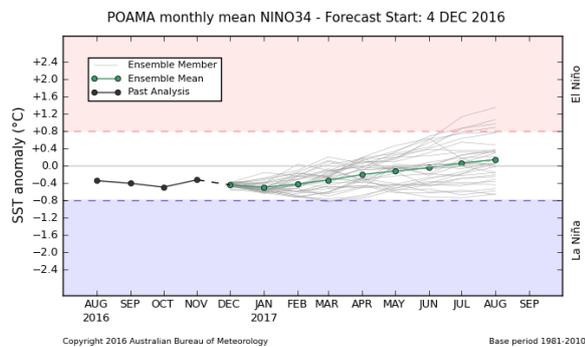


The seasonal outlooks presented in this report are obtained from the Australian Bureau of Meteorology & other sources. These outlooks are general statements about the likelihood (chance) of (for example) exceeding the median rainfall or minimum or maximum temperatures. Such probability outlooks should not be used as categorical or definitive forecasts, but should be regarded as tools to assist in risk management & decision making. Changes in seasonal outlooks may have occurred since this report was released. Outlook information was up to date as at 15 December 2016.

## ENSO

(Source: Bureau of Meteorology & International Research Institute for Climate and Society)

The Pacific Ocean remains in an ENSO-neutral state. Most models suggest a neutral outlook for the remainder summer and a La Niña event is now unlikely. La Niña-like above average sea surface temperatures are still present in the western equatorial Pacific. The negative Indian Ocean Dipole event has ended, but above average sea surface temperatures are persisting in the eastern Indian Ocean near Sumatra. These areas may provide sources of moisture for NSW if the right conditions occur. Cool surface and sub-surface sea temperatures persist in the central and eastern-central equatorial Pacific, but are above La Niña thresholds. Trade winds were near-average. Cloud conditions are at La Niña-like levels, but the SOI is neutral. The major influence on the climate is the negative Southern Annular Mode, which in summer tends to result in reduced rainfall and warmer temperatures. The Bureau of Meteorology's ENSO outlook status is 'inactive'.



The Bureau of Meteorology's POAMA outlook (as at 4 December) suggests that the sea surface temperatures in the NINO3.4 region will be cool but remain in the neutral range throughout summer and into early autumn. The CPC/IRI ENSO forecast suggests La Niña conditions are currently present but the outlook is for ENSO neutral conditions in summer to early autumn. Note that CPC/IRI uses different thresholds for El Niño and La Niña events than does the Bureau of Meteorology.

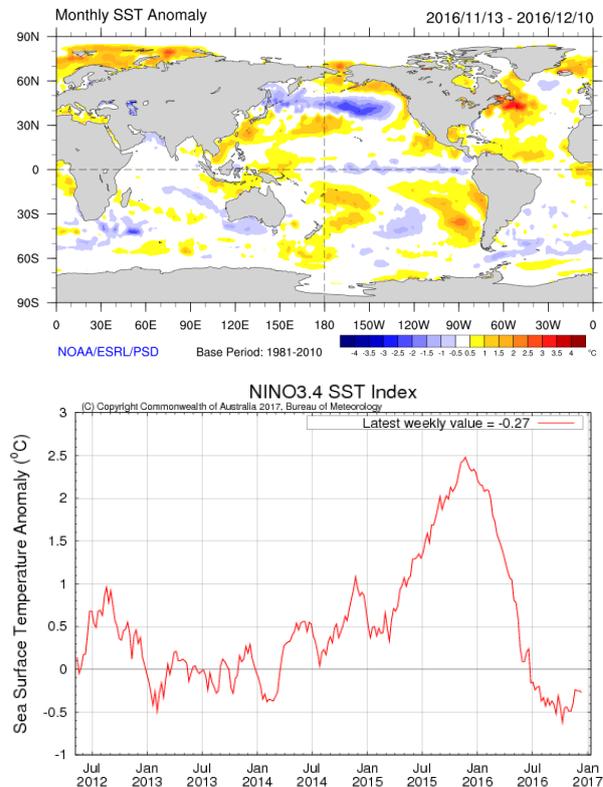
Of the eight climate models surveyed by the Bureau (as at 16 December), two indicate NINO3.4 sea surface temperatures are likely to reach borderline La Niña levels during January but to be neutral by March. All other models suggest a neutral outlook through to March, and seven of the eight indicating this will continue through to May. One model suggests El Niño temperatures occurring by May.

### Sea Surface Temperatures

(Source: NOAA & Bureau of Meteorology)

Sea surface temperatures are below average in the central and eastern equatorial Pacific. La Niña-like above-average sea surface temperatures are present across much of the west. A line of cooler than normal

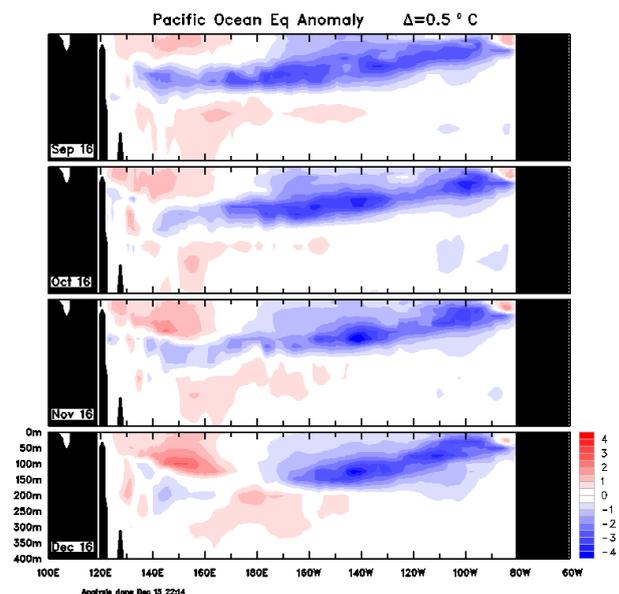
water continues to snake across the eastern to central equatorial Pacific, extending just west of the International Date Line. The most recent weekly temperature anomaly value in the key NINO3.4 region was  $-0.27^{\circ}\text{C}$  in the week to 11 December. A warm anomaly is persisting to the south of Sumatra.



### Monthly Sub-surface Temperatures

(Source: Bureau of Meteorology)

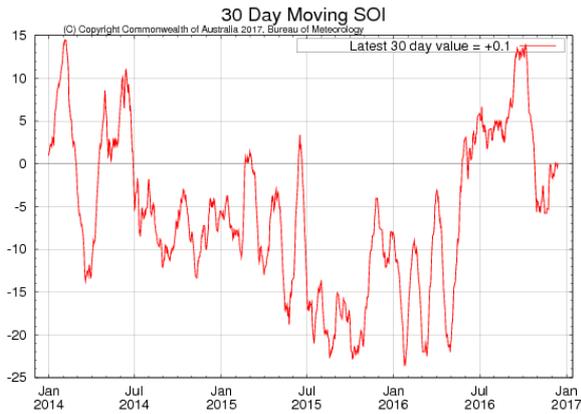
The sub-surface sea temperatures show warming from the surface down to 100 m in the western equatorial Pacific. A cool anomaly extends from 150-200 m in depth to the surface in the central and eastern Pacific.



### Southern Oscillation Index (SOI)

(Source: Bureau of Meteorology & Queensland DSITI)

The Southern Oscillation Index (SOI) is currently neutral. On 14 December, the 30-day SOI value was +0.1 (Bureau of Meteorology) and the 90-day SOI was +1.15 (QDSITI). The neutral SOI is due to atmospheric pressure at Darwin being near-average, with slightly above-average pressure at Tahiti.



Values between -7 and +7 indicate neutral conditions, sustained values above +7 may indicate a La Niña event, and sustained values below -7 may indicate an El Niño event.

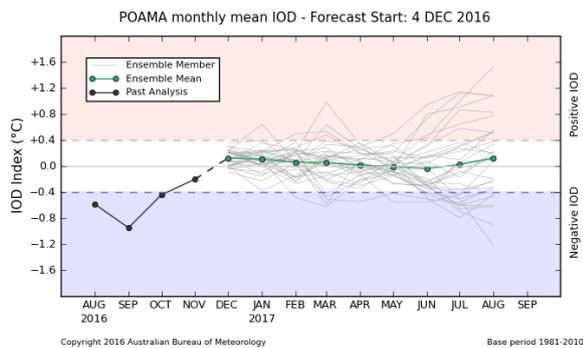
### Indian Ocean Dipole (IOD)

(Source: Bureau of Meteorology)

The Indian Ocean Dipole (IOD) is neutral, which is normal for this time of year. IOD events typically do not form between December and April. The Dipole Mode Index (DMI) value was at -0.03 for the week to 11 December.

Four of the five climate models surveyed by the Bureau of Meteorology on 16 December suggest the likelihood of neutral conditions continuing through to March. All models suggest neutral conditions in May.

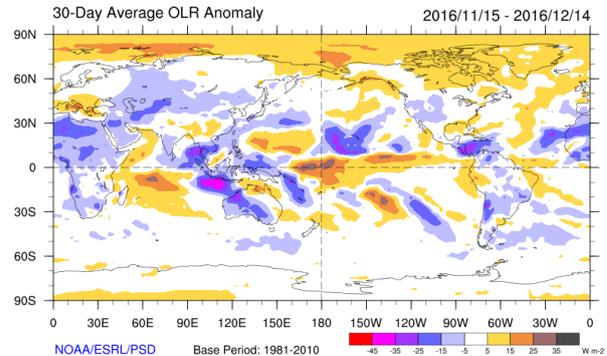
A positive IOD increases the chances of below normal rainfall and may exacerbate the effect of an El Niño event over south eastern Australia. A negative IOD increases the chances of above normal winter and spring rainfall across southern and much of western and central NSW.



### Cloudiness and trade winds

(Source: Bureau of Meteorology & NOAA)

Levels of cloud at the junction of the International Date Line (IDL) remained below normal during November. Cloud levels remained high over Indonesia and areas of South and Western Australia. Cloud levels were particularly high to the south west of Sumatra.



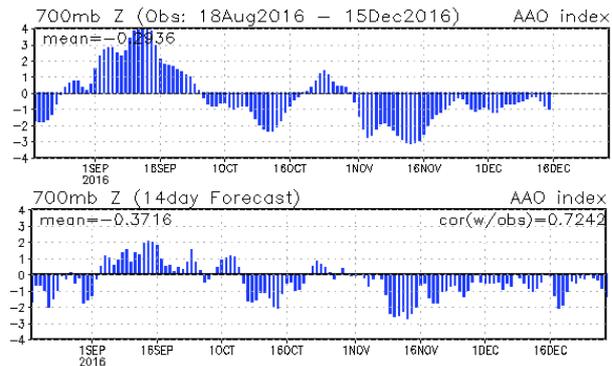
Trade winds were near-normal across the equatorial Pacific during most of November, with some strengthening in the west.

### Southern Annular Mode (SAM)

(Source: NOAA)

The experimental Southern Annular Mode or Antarctic Oscillation (AAO) index is weakly to moderately negative. The outlook is for the SAM to remain at these levels throughout December and into early January. During summer, a negative SAM contributes to a greater likelihood of drier and warmer than normal conditions.

AAO: Observed & GFS forecasts



A negative SAM indicates expansion of the belt of strong westerly winds towards the equator, resulting in more or stronger low pressure systems across southern Australia and potentially increased rainfall during autumn and winter. During spring and summer, the opposite occurs.

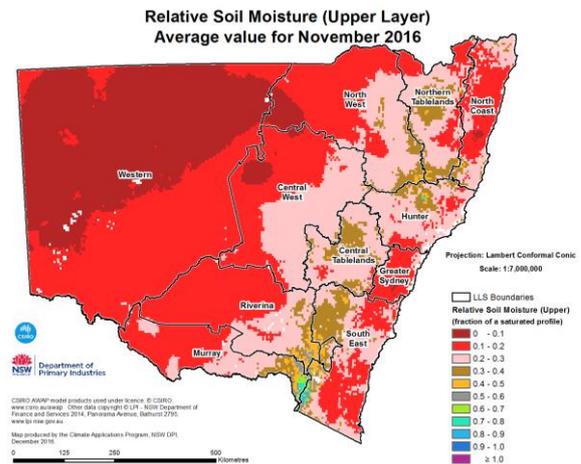
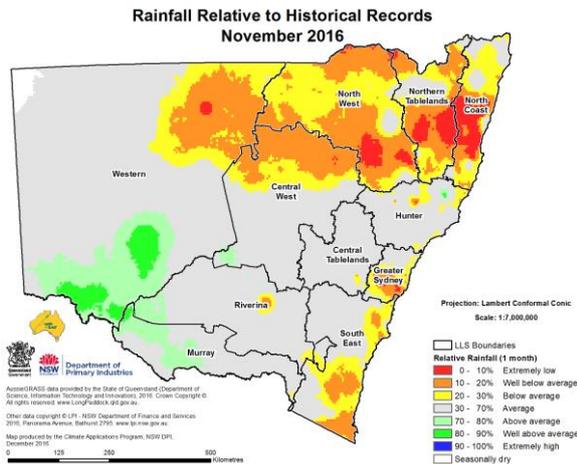
A positive SAM indicates the contraction of the westerly winds towards Antarctica and higher pressures over southern Australia, and can result in stable, drier conditions. A strongly positive SAM in spring-summer can mean southern Australia is influenced by the northern half of high pressure systems, leading to a slightly higher likelihood of increased rainfall over south eastern and central NSW.

## Conditions during November

### Rainfall

(Source: Queensland DSITI)

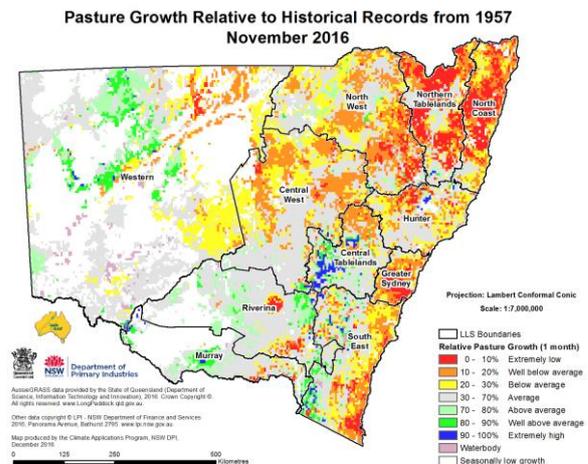
Rainfall across NSW ranged from 1-159 mm during November. Relative to historical records, rainfall was near average across most of southern and central NSW, but below average across the north west, northern central west, northern tablelands, much of the coast and areas of the Monaro. Above average relative rainfall was mostly restricted to areas of the far south west and the far south.



### Pasture growth

(Source: Queensland DSITI)

During November relative pasture growth was average across most of western and southern NSW but below average across most of the coast, Hunter valley, north west, northern tablelands and the central west. Limited areas of above average growth occurred across the western, southern and central areas of the state. Other pasture growth models indicated near-average growth across most of the state but below average growth across areas of the north, the Monaro and the coast.



### Soil moisture

(Source: CSIRO)

Topsoil moisture declined across NSW during November. Relative to historical records, topsoil moisture levels were near average across most of NSW, but were below average across most the north, north west and east. Levels remained above average in the south west.

Subsoil moisture levels remained relatively stable, declining slightly in most areas. Relative to historical records, levels remained extremely high across most of inland NSW, but average in the east.

### More information

For more information, contact the NSW Department of Primary Industries on 02 6391 3100 or Local Land Services on 1300 795 299. Additional and more detailed information on seasonal conditions can be found in the NSW Seasonal Conditions Summary and Report, available at <http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports>, and the LLS On-ground Seasonal Conditions Reports available at <http://www.lls.nsw.gov.au/agriculture/seasonal-conditions>.

### Acknowledgements

Information used in this report was sourced from the Australian Bureau of Meteorology, CSIRO, Queensland Department of Science, Information Technology and Innovation, the US National Oceanic and Atmospheric Administration, the International Research Institute for Climate and Society (Columbia University) and NSW Department of Primary Industries.

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