### Highlights
- Good rainfall occurred across inland NSW during May, but was limited along the coast until early June.
- During June to August wetter than normal conditions are likely across NSW. Cooler daytime temperatures are likely over most of NSW, with a near-neutral outlook in the east. Warmer overnight temperatures are likely, except in the far west.
- The El Niño event has ended, with a return to neutral conditions. La Niña and negative Indian Ocean Dipole events are possible in winter-spring.
- Topsoil moisture levels improved over inland NSW.
- Pasture growth improved greatly over inland NSW during May, but was low on the coast. Growth slowed as temperatures fell.
- Most winter crop sowings have been completed, with good establishment. Growth of dual purpose crops has been good and many are being grazed. Trafficability problems and wet conditions have delayed weed control and topdressing.

### 1. Summary
Good rainfall occurred across most of inland NSW during early and late May, particularly across the western, southern and central areas. Rainfall along the coast was limited, but an east coast low caused heavy rainfall and flooding in early June. Damage was caused to banana farms on the mid-north to north coast. Lodging of sugar cane crops also occurred. Good follow up rainfall occurred during early June across most of inland NSW, except across areas of the far west.

A dramatic improvement in pasture growth occurred across most of inland NSW during May, due to the rainfall and warm temperatures till late in the month. Annual and perennial pastures across western, southern and central NSW responded well. Establishment of newly sown pastures in these areas has also been good. Growth remained low across areas of the coast, Hunter valley and Monaro. The onset of cold, wet conditions and frosts in late May and early June slowed growth, particularly across the tablelands and slopes.

Most winter crop sowing has been completed, with late planting of cereals and chickpeas continuing in north western NSW. Heavy rainfall in the southern and central areas of the state during May resulted in trafficability problems and delayed the completion of sowing. Wet conditions have also restricted early weed control and topdressing. Weed control remains a priority due to the lack of control opportunities prior to sowing. Winter crop establishment and growth has been good in most areas. Grazing of dual purpose cereals and canola has commenced, although growth has slowed with onset of frosts and cooler wet weather.

The Bureau of Meteorology’s rainfall outlook for June to August indicates wetter than normal conditions are likely across NSW. Cooler daytime temperatures are likely across most of the state, with a near-neutral outlook for the east. Overnight temperatures are likely to be warmer, except in the far west.

The El Niño event has ended, with a return to normal conditions. Many global climate models suggest a borderline or weak La Niña event is possible during winter and spring. A negative Indian Ocean Dipole event is also likely.

Topsoil moisture levels improved over inland NSW during May, particularly across western, southern and central NSW. Early June rainfall further increased topsoil moisture over NSW to between well above average to extremely high levels. Subsoil moisture levels were relatively stable, but improved slightly across western, central and southern NSW. Despite the rainfall, run off during May was limited. Follow up rainfall in June increased run off.

During May, relative pasture was above average across much of the west, central west, eastern Riverina, far south and areas of the central and southern tablelands. It was average across much of the north west and northern tablelands, but below average to average across the coast and Hunter valley. Pasture biomass levels ranged from low to average across the state during May, with improvements in the far west, Riverina and south.
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2. Seasonal outlook

Seasonal outlook and ENSO information are sourced from the Australian Bureau of Meteorology (BoM) and international sources. The BoM’s official outlooks are based on modelled output from the Predictive Ocean Atmosphere Model for Australia (POAMA), which is a dynamical (physics-based) climate model developed by the BoM and CSIRO Marine and Atmospheric Research. Further information on POAMA outlooks can be obtained here and at http://poama.bom.gov.au/. Outlooks should be treated with caution when skill is low and strong climate drivers are lacking. In these situations, secondary influences (such as sea surface temperatures around the continent) may have a greater impact.

Changes in seasonal outlooks may have occurred since this report was released, and can be determined by clicking on the links provided.

Seasonal outlook and ENSO information were up to date as at 10 June 2016.

2.1 Seasonal outlook summary

Table 1: Seasonal outlook summary (BoM)

<table>
<thead>
<tr>
<th>Rainfall (quarter)</th>
<th>Current Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetter</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max Temperature (quarter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooler (western, central and southern NSW, areas of north west, central and southern tablelands)</td>
</tr>
<tr>
<td>Near neutral (eastern NSW, northern slopes, northern tablelands, Hunter valley)</td>
</tr>
<tr>
<td>Warmer (far south east, coastal strip of Illawarra, central and far north coast)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min Temperature (quarter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warmer (most of NSW)</td>
</tr>
<tr>
<td>Near neutral (far west)</td>
</tr>
</tbody>
</table>

Outlook Legend: Grey = Neutral, i.e. equal chance of drier/wetter or warmer/cooler. Red = Drier or warmer. Blue = Wetter or cooler.

Source: Derived from information provided by the Australian Bureau of Meteorology.

2.2 Seasonal rainfall outlook

- For the three month period from June to August, the Bureau of Meteorology’s rainfall outlook indicates wetter than normal conditions are likely across NSW (Figure 10).
- The chances of exceeding median rainfall across most of NSW are between 70 to more than 80%. This means that for every ten years with similar climate patterns to those at present, across western NSW seven to more than eight June to August periods would be expected to be wetter than normal, and less than two to three periods drier than normal.

- The past accuracy (skill) for the rainfall outlook is low across areas of far western, central and south eastern NSW and the south eastern corner of NSW. It is moderate for the north east and an area of the south and west (Figure 13).
- Of the global climate models surveyed during May, for NSW as a whole 79% of models indicated a wetter than normal outlook for the June to August period, 0% drier than normal and 21% a near-neutral outlook (Table 4).

2.3 Seasonal temperature outlook

- Over the three month period from June to August, the daytime temperature outlook indicates cooler than normal daytime temperatures are likely across most of western, central and southern NSW, as well as much of the north west and the western half of the central and southern tablelands. There a near-neutral outlook for daytime temperatures across most of eastern NSW. This means that in these areas, there is a near-equal chance of cooler or warmer than normal conditions. Warmer than normal daytime temperatures are likely for the far south east. Warmer than normal temperatures are also likely in a narrow band along the coastal strip from the Illawarra to the central coast, and an area of the far north coast (Figure 11).

- The chances of exceeding median maximum temperatures range from less than 20 to 35% across western, southern and central NSW. This means that for every ten years with similar climate patterns to those at present, across these areas of NSW two to four June to August periods would be expected to have warmer than normal daytime temperatures, and six to more than eight cooler than normal daytime temperatures.

- The past accuracy (that is, confidence or skill) for the maximum temperature outlook is moderate to high across most of NSW (Figure 13).
- Over the three month period from June to August, the overnight temperature outlook is for warmer than normal overnight temperatures across most of NSW. There is a near-neutral outlook for the far west. This
means that there is a near-equal chance of cooler or warmer than normal conditions in this area (Figure 12). The past accuracy for the minimum temperature outlook is moderate to high across most of NSW, but low in the far west (Figure 13).

- Of the global climate models surveyed during May, for NSW as a whole 85% suggested warmer than normal conditions are likely for the June to August period and 15% indicated a near-neutral outlook (Table 4).

### 2.4 Monthly rainfall and temperature outlook

Monthly outlook information is sourced from the Australian Bureau of Meteorology (BoM). Changes in outlooks may have occurred since this report was released, and can be determined by clicking on the links provided.

### Monthly outlook summary

#### Table 2: Monthly outlook summary (BoM)

<table>
<thead>
<tr>
<th>Rainfall</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wetter (western &amp; southern NSW,</td>
<td>Wetter</td>
</tr>
<tr>
<td></td>
<td>far north east, far south east,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>western areas of central west)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Near neutral (north west,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tablelands, eastern NSW)</td>
<td></td>
</tr>
<tr>
<td>Max Temperature</td>
<td>Warm (eastern NSW, northern slopes,</td>
<td>Warm (eastern &amp; south eastern NSW)</td>
</tr>
<tr>
<td></td>
<td>east of central and southern</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tablelands)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooler (western &amp; areas of</td>
<td>Near neutral (most of</td>
</tr>
<tr>
<td></td>
<td>southern NSW)</td>
<td>tablelands, slopes &amp; east of</td>
</tr>
<tr>
<td></td>
<td>Near neutral (areas of north</td>
<td></td>
</tr>
<tr>
<td></td>
<td>west, central west &amp; south)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Min Temperature</td>
<td>Warm (most of NSW)</td>
</tr>
<tr>
<td></td>
<td>Warmer (eastern, north western &amp;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>southern NSW)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Near neutral (western &amp; areas of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>central western NSW)</td>
<td></td>
</tr>
</tbody>
</table>

**Outlook Legend:**
- Grey = Neutral, i.e. equal chance of drier/wetter or warmer/cool.
- Red = Drier or warmer.
- Blue = Wetter or cooler.

**Source:** Derived from information provided by the Australian Bureau of Meteorology.

#### Month 1 - June

- During June wetter than normal conditions are likely across most of western, southern and areas of central NSW, as well as the far north east. There is a near-equal chance of wetter or drier conditions for the remainder of NSW (Figure 14).
- The June rainfall outlook has a low past accuracy (skill) across most of the state, except for an area of moderate skill on the coastal strip between the Illawarra and mid-north coast (Figure 17).
- Warmer than normal daytime temperatures are likely across eastern NSW, including areas of the tablelands and northern slopes. Cooler than normal conditions are likely across the west and far south. There is a near-equal chance of cooler or warmer than normal conditions for the other areas of NSW. This includes an area extending from the north west through the central west, the west of the central and southern tablelands and the eastern Riverina to the eastern areas of southern NSW (Figure 15).
- The May daytime temperature outlook has a moderate to high past accuracy (skill) across NSW (Figure 17).
- Warmer than normal overnight temperatures are likely in the east, south and north west of NSW as well as areas of the Riverina and central NSW. There is a near-equal chance of cooler or warmer than normal overnight temperatures in the far west (Figure 16).
- The May overnight temperature outlook has a moderate past accuracy (skill) across most of NSW, but a low past accuracy for areas of the north west, mid-north coast and south coast (Figure 17).

#### Month 2 - July

- During June, wetter than normal conditions are likely across NSW (Figure 18).
- The July rainfall outlook has a moderate to high past accuracy (skill) across most NSW, but is low across areas of the north east and the far south east.
- Warmer than normal daytime temperatures are likely across areas of eastern and south eastern NSW during July. Cooler than normal conditions are likely for most of western NSW, the western areas of the north west, central west, Riverina and areas of the far south. There is a near-equal chance of cooler or warmer than normal daytime temperatures across most of the north west.
and tablelands and eastern areas of the central west and Riverina (Figure 18).

- The past accuracy (skill) for the July daytime temperature outlook is moderate to high across NSW.
- Warmer than normal overnight temperatures are likely across most of NSW during July. There is a near-equal chance of cooler or warmer than normal overnight temperatures in areas of the far west and south west (Figure 18).
- The past accuracy (skill) for the June overnight temperature outlook is moderate for north eastern and areas of eastern NSW, but low across most of the state.

2.5 Other climatic models

Seasonal outlook summary

Information is provided for the UK Meteorology Office’s global long range probability modelled output, the NOAA Climate Prediction Centre’s coupled forecast system model and the APEC Climate Centre’s deterministic multi-model ensemble outlook.

Outlook information was updated in late May–early June.

Table 3: Seasonal outlook summary – UKMO, NOAA CPC and APCC

<table>
<thead>
<tr>
<th>Rainfall (quarter)</th>
<th>UKMO (Jun-Aug)</th>
<th>NOAA CPC (Jun-Aug)</th>
<th>APCC (Jun-Aug)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Temperature (quarter)</td>
<td>Warmer</td>
<td>Warmer (east &amp; north)</td>
<td>Warmer</td>
</tr>
<tr>
<td></td>
<td>Near neutral (south &amp; west)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature (quarter)</th>
<th>UKMO (Jul-Sep)</th>
<th>NOAA CPC (Jul-Sep)</th>
<th>APCC (Sep-Nov)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near neutral (central NSW)</td>
<td>Warmer (north &amp; east)</td>
<td>Warmer (north east)</td>
<td>Cooler (areas of the coast)</td>
</tr>
<tr>
<td>Warmer (far south west)</td>
<td>Cool (south west)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Outlook Legend: 
- Grey = Neutral, i.e. equal chance of drier/wetter or warmer/cooler. 
- Red = Drier or warmer. 
- Blue = Wetter or cooler.

Source: Derived from information provided by the UK Met Office, the NOAA Climate Prediction Centre and the APEC Climate Centre.

Climate model summary

The climate model summary is a guide to the general outlook for NSW from a survey of selected global climate models and multi-model ensembles. These include the models detailed above in Table 1 and Table 3.

The models are surveyed late in the month before the publication of the Seasonal Conditions Report. Only the general (majority) outlook for the state is considered.

Table 4: Overall NSW outlook - number of major climate models in each general category

<table>
<thead>
<tr>
<th>Rainfall</th>
<th>Generally wetter</th>
<th>Generally near-neutral</th>
<th>Generally Drier</th>
</tr>
</thead>
<tbody>
<tr>
<td>June-August</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>July-September</td>
<td>8</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Generally warmer</th>
<th>Generally near-neutral</th>
<th>Generally cooler</th>
</tr>
</thead>
<tbody>
<tr>
<td>June-August</td>
<td>11</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>July-September</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

- For June to August, most of the models surveyed are suggesting wetter than normal outlook, with about 20% suggesting a near-neutral outlook (Table 4).
- Most of the models surveyed are also suggesting warmer than normal temperatures are likely during the period, with about 15% suggesting a near-neutral outlook.

2.6 El Niño-Southern Oscillation (ENSO)

ENSO summary

- The Pacific Ocean is now in an ENSO-neutral state. Sea surface temperatures in the central and eastern-central equatorial Pacific are now at near-normal levels.
- Sea surface temperatures remain warm to the north, north east and north west of Australia. This will increase evaporation in these areas, and may contribute moisture for south eastern Australia. Areas of average to cooler than normal sea surface temperatures are present in the Indian Ocean along the central coast of Western Australia and near the horn of Africa.
- A number of the global climate models are suggesting a weak or borderline La Niña event may occur during winter and spring. The cool subsurface temperature anomalies are expected to shift the NINO 3.4 region
Sea surface temperatures towards the cooler end of neutral during the next month, and possibly to La Niña levels in spring. The Bureau of Meteorology’s POAMA model is currently suggesting the possibility of weak La Niña event during winter, grading to a borderline event in spring. Due to this, both the Bureau of Meteorology’s and CPC/IRI’s ENSO outlook statuses are at La Niña watch. Climate models are also indicating the possibility of a negative Indian Ocean Dipole event during winter and spring.

- Sea surface temperatures returned to near normal across most of the equatorial Pacific during May. Temperatures are now neutral all the NINO regions. The western equatorial Pacific sea surface temperatures are now warmer than average to the north of Papua-New Guinea, and warm around Indonesia and northern and eastern Australia.

- The cool sub-surface anomaly currently extends across the equatorial Pacific at between 0-200 metres depth. It has reached the surface in the eastern and eastern-central Pacific. The strength of the anomaly indicates the possibility of a La Niña event developing.

- The SOI is currently neutral as at 5 June.

- Trade winds were near-normal across the equatorial Pacific during May, with a slight reversal in early June. Upper level wind anomalies became westerly in early June, indicative of a La Niña event, but only in the western Pacific.

- Cloud conditions at the junction of the equator and the International Date Line were near normal to slightly less than normal during May. Cloud levels increased over western Indonesia and Australia.

- Of the eight climate models surveyed by the Bureau (as at 16 May), two indicated NINO3.4 sea surface temperatures were likely be at La Niña levels in June, and five to six during August and October. Three of four climate models indicated the likelihood of a negative IOD event occurring in June and four by August. All suggest such this event is likely to continue into October.

- A combination of La Niña and negative Indian Ocean Dipole events increase the likelihood of wetter than normal conditions across much of NSW during winter and spring. However, during such events, winter-spring rainfall across areas of the central to north coast and the north east of NSW has historically been near-normal (Figure 38).

### ENSO outlook and detailed comments

<table>
<thead>
<tr>
<th>Table 5: ENSO/Climatic Outlook</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Outlook</strong> (early April)</td>
</tr>
<tr>
<td><strong>ENSO Status (overall)</strong></td>
</tr>
<tr>
<td><strong>BoM ENSO Outlook Status</strong></td>
</tr>
<tr>
<td><strong>SOI</strong></td>
</tr>
<tr>
<td><strong>Pacific Ocean SST (NINO3.4)</strong></td>
</tr>
<tr>
<td><strong>Indian Ocean (IOD)</strong></td>
</tr>
<tr>
<td><strong>Southern Annular Mode (SAM/AAO)</strong></td>
</tr>
<tr>
<td><strong>Summary Legend:</strong></td>
</tr>
</tbody>
</table>

**Source:** Derived from information provided by the Australian Bureau of Meteorology and the US National Oceanic and Atmospheric Administration.

- The Bureau of Meteorology’s ENSO outlook (Figure 1) moved from ‘El Niño’ to ‘La Niña watch’ on 12 April 2016. A ‘La Niña watch’ indicates a 50% probability of a La Niña event occurring.

**Figure 1: Bureau of Meteorology ENSO outlook**

**Source:** Australian Bureau of Meteorology

- The Bureau of Meteorology’s POAMA model’s long range outlook (as at 5 June) indicated that the sea surface temperatures in the NINO3.4 region were likely to reach La Niña levels in June and then return to borderline neutral levels in October (Figure 2).
Of the eight climate models surveyed by the Bureau (as at 5 June), two indicated NINO3.4 sea surface temperatures were likely to reach La Niña levels in June. Five to six models indicated temperatures were likely to be at La Niña levels during August and October.

The CPC/IRI ENSO Alert System Status is at ‘La Niña watch’. This indicates a La Niña event is likely to develop.

The CPC/IRI ENSO forecast (as at 9 June) indicated that the El Niño event has dissipated and ENSO-neutral conditions returned during May. Their analysis suggested that there is about a 75% chance (based on their thresholds) of La Niña conditions developing during winter-spring and extending into summer (Figure 3, Table 6). However, there is uncertainty over the timing and intensity of a potential La Niña event, with a weak or borderline-moderate event suggested. Their threshold for such an event is for 3-month average Niño-3.4 sea surface temperature anomalies to be less than or equal to -0.5°C.

Table 6: Current CPC/IRI consensus ENSO forecast probabilities (as at 12 May)

<table>
<thead>
<tr>
<th>Season</th>
<th>La Niña (%)</th>
<th>Neutral (%)</th>
<th>El Niño (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun-Aug</td>
<td>49</td>
<td>47</td>
<td>4</td>
</tr>
<tr>
<td>Jul-Sep</td>
<td>64</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td>Aug-Oct</td>
<td>70</td>
<td>28</td>
<td>2</td>
</tr>
<tr>
<td>Sep-Nov</td>
<td>72</td>
<td>26</td>
<td>2</td>
</tr>
<tr>
<td>Oct-Dec</td>
<td>74</td>
<td>24</td>
<td>2</td>
</tr>
<tr>
<td>Nov-Jan</td>
<td>76</td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td>Dec-Feb</td>
<td>75</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>Jan-Mar</td>
<td>73</td>
<td>25</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Climate Prediction Centre/International Research Institute for Climate and Society.

Note that the CPC/IRI classifies values of the NINO3.4 index between -0.5°C and +0.5°C as indicating neutral conditions, rather than the -0.8°C to +0.8°C range used by the Bureau of Meteorology. This will result in differences when various meteorological organisations report that El Niño or La Niña conditions are developing or exist.

Sea temperatures

Monthly sea surface temperature information from the Bureau of Meteorology and the US National Oceanic and Atmospheric Administration (NOAA) indicated that temperatures returned to near normal across most of the equatorial Pacific during May. Temperatures were neutral in all the NINO regions in early June. A line of cooler than normal water is snaking across the equator from Ecuador towards the International Date Line. Temperatures remain warmer than normal north of Papua-New Guinea and warmer than normal around Indonesia and eastern and northern Australia.

The most recent monthly temperature anomaly value in the key NINO3.4 region is +0.4°C for May, down from +1.0°C for April.

The weekly sea surface temperature anomaly to 5 June in the NINO 3.4 region was +0.09°C (Figure 4).

The weekly sea surface temperature anomalies to 5 June were +0.11°C in the NINO 3 region, and +0.61°C in the NINO 4 region. The temperature anomaly in the NINO 1 region was +0.46°C, and the anomaly in the NINO 2 region was -0.09°C.
The sub-surface sea temperatures show the El Niño warm anomaly in the central and eastern equatorial has now disappeared.

A cool anomaly extends across the whole equatorial Pacific to a depth of 0-200m and has reached the surface in the eastern and eastern-central areas. The strength of the anomaly indicates the possibility of a La Niña event developing (Figure 5).

The Southern Oscillation Index is one factor indicating the development and intensity of El Niño and La Niña events in the Pacific Ocean. It is calculated from variations in surface atmospheric pressure between Darwin and Tahiti. Values of the SOI 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.

Sub-tropical ridge (STR)/atmospheric pressure

The sub-tropical ridge over the 30 days to 6 June is close to its normal winter position, although at a slightly lower pressure than normal. This is a positive factor for allowing movement of frontal systems across NSW.

Atmospheric pressure over NSW during May was lower than normal, particularly in the southern areas of the state. Atmospheric pressure was very low to the south of Australia (Figure 7).
The sub-tropical ridge is a zone of high pressure which between January and March is normally located south of Australia at about 38°S to 39°S, and tends to suppress cold front activity. During June to September, it generally moves northwards to around 29°S to 32°S, allowing cold fronts to extend further into southern Australia.

Indian Ocean dipole (IOD)

- The Indian Ocean dipole remains neutral. The latest Dipole Mode Index value for the week ending 5 June is -0.65°C. Levels below -0.4 need to be sustained for a few months for a negative IOD event to be declared.

- The Bureau of Meteorology’s POAMA model outlook suggests index values are likely to decrease to negative levels during June, remaining at these levels through winter and spring (Figure 8).

- Three of four climate models surveyed by the Bureau of Meteorology on 16 May indicate the likelihood of a negative IOD event occurring in June and four by August. All suggest such this event is likely to continue into October.

The IOD has little effect on Australian climate until late autumn or winter. An IOD event usually starts between May and June, peaks in August to October and rapidly decays afterwards with the onset of the monsoon. It tends to have little influence from December to April, during the monsoon season.

- A negative IOD period (a sustained IOD index value of -0.4°C or less) is caused by warmer than normal water in the tropical eastern Indian Ocean and cooler than normal water in the tropical western Indian Ocean. A negative IOD period increases the chances of above normal rainfall during winter and spring across southern and much of western and central NSW. A negative IOD can also contribute to below-average mean sea level pressure over Darwin, which may cause an increase in the SOI.

- A positive IOD period (a sustained IOD index value of +0.4°C or more) is the result of cooler than normal water in the tropical eastern Indian Ocean and warmer than normal water in the tropical western Indian Ocean. Positive IOD periods have been associated with a decrease in rainfall during winter and spring across southern, western and central NSW and may exacerbate the effects of an El Niño event on rainfall.

Trade winds and Pacific cloud conditions

- Trade winds were near normal across most of the equatorial Pacific during May, with a slight reversal in early June. Upper level wind anomalies became westerly in early June, indicative of a La Niña event, but only in the western Pacific.

- Easterly trade winds strengthen across the tropical Pacific during La Niña events and weaken or reverse during El Niño events. Weakening of the trade winds allows warmer than normal water to move into the central and eastern tropical Pacific Ocean.
• Levels of cloud at the equator at the junction of the International Date Line were near normal to slightly less than normal during May. Cloud levels (and therefore potential convection and rainfall) increased over western Indonesia and Australia.

• Cloudiness at the equator near and to the east of the International Date Line decreases during La Niña events and increases during El Niño events.

2.7 Other climatic indicators

Southern annular mode (SAM)

• The experimental Southern Annular Mode or Antarctic Oscillation (AAO) index was weakly positive (as at 6 June) after being weakly to moderately negative in late April and most of May.

• The outlook from NOAA indicates the SAM index is likely to be weakly to moderately positive during mid-June.

• A negative SAM event indicates an expansion of the belt of strong westerly winds towards the equator, resulting in more or stronger low pressure systems, stronger winds and potentially increased rainfall across southern Australia.

• A positive SAM event indicates the contraction of the belt of strong westerly winds towards Antarctica, resulting in weaker than normal westerly winds and higher pressures over southern Australia. During autumn and winter, a positive SAM event can potentially lead to a decrease in rainfall across southern Australia.

• In winter, a positive SAM event can be associated with moist easterly winds occurring on the New South Wales coast and is sometimes associated with the development of East Coast Lows.

• However, a strongly positive SAM in spring and 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.

SAM outlooks tend to be extremely variable, particularly at lead times of two weeks or more, and the skill level for outlooks of 10-21 days tends to be low.

3. Rainfall

3.1 Relative rainfall

Relative rainfall information is sourced from the AussieGRASS project of the Queensland Department of Science, Information Technology and Innovation (QDSITI) and from the Bureau of Meteorology.

Relative rainfall is calculated by comparing and ranking the rainfall for the current period against that for the same period over every year since 1889 (percentile ranks).

This means that if the current period has a rank of between 30 and 70 against all other years, it is regarded as being “average” and the conditions experienced will occur over about 4 out of every 10 years.

Summary

Table 8: AussieGRASS rainfall relative to historical records – percentage area of NSW in each class

<table>
<thead>
<tr>
<th>Period</th>
<th>Missing data</th>
<th>Below Average (0-30%)</th>
<th>Average (31-70%)</th>
<th>Above Average (71-100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month</td>
<td>0%</td>
<td>12%</td>
<td>20%</td>
<td>68%</td>
</tr>
<tr>
<td>Quarter</td>
<td>0%</td>
<td>25%</td>
<td>41%</td>
<td>34%</td>
</tr>
<tr>
<td>Half year</td>
<td>0%</td>
<td>22%</td>
<td>67%</td>
<td>11%</td>
</tr>
<tr>
<td>Year</td>
<td>0%</td>
<td>21%</td>
<td>61%</td>
<td>18%</td>
</tr>
</tbody>
</table>

Source: Derived from information supplied by the Queensland Department of Science, Information Technology, and Innovation.

May

• Relative to historical records, rainfall during May was above average across 68 per cent of the state, covering most of western, southern and central NSW.

• Near average rainfall occurred across the north west and northern tablelands.

• Rainfall was below average across most of the coast, Sydney basin, lower Hunter valley and areas of the adjacent ranges (Figure 19, Table 8). This dramatically changed in early June with the onset of a severe East Coast Low causing widespread heavy rainfall and flooding in these areas.

March to May (3 months)

• Over the three month period from March to May, rainfall relative to historical records was near-average across 41% of NSW (Figure 20, Table 8)

• Relative rainfall was below average across 25 per cent of NSW. Below average relative
rainfall extended across the coast, Hunter valley, Sydney basin and areas of the northern tablelands and north west.

- Above average relative rainfall was restricted to areas of the far west, Riverina and far south.

**December to May (6 months)**
- Over the six months to May, 67% of NSW had average relative rainfall (Figure 21, Table 8).
- Above average relative rainfall for the period occurred across scattered areas of the far west, central west, Riverina, south, south east and Hunter valley.
- Areas of below average relative rainfall occurred across the north west, northern tablelands and north coast. Areas of the central west, Hunter valley, Sydney basin, south coast and the central and southern tablelands also had below average relative rainfall for the period.

**June to May (12 months)**
- Over the twelve months to May, relative rainfall was near average across 61% of NSW (Figure 22, Table 7).
- Areas of below average relative rainfall extended across 21% of the state and occurred primarily across the eastern areas of the north west, the north coast and the northern tablelands. Other areas occurred in the north of the Hunter valley, the central tablelands, Sydney basin, southern tablelands and the far south west and far south.
- Areas of above average rainfall occurred generally across the Riverina, far south and areas of the far west. Some scattered areas occurred in the central west and along the south coast.

### 3.2 Total rainfall

Total rainfall information is sourced from the AussieGRASS project of the Queensland Department of Science, Information Technology and Innovation and from the Bureau of Meteorology.

**May**
- During May, rainfall ranged from 3-325 mm across the state with most of the state receiving 25-100 mm.
- The north west, northern tablelands and areas of the far west and central west received 25-50 mm or less, with most of the remainder of inland NSW receiving 50-100 mm.
- The best falls of more than 100 mm occurred across areas of the far north west, the eastern Riverina and areas of the south and south west slopes.
- The coast and adjacent ranges were relatively dry, with falls of less than 25 mm being received. However, an east coast low in early June caused heavy rainfall and flooding across these areas (Figure 23).

**March to May (3 months)**
- Total rainfall over the three months to May ranged from 25-600 mm over NSW, with most of the state receiving between 50-200 mm (Figure 24).
- Areas of the far west, central NSW and most of the south received 100-200 mm, as did areas of the mid-north to north coast, Hunter valley and northern tablelands. The coastal strip from the south to the central coast also received 100-200 mm, as did the far south east.
- An area of the south west slopes and southern tablelands received more than 200 mm. An area of the far north coast received from 200-600 mm for the period.

**December to May (6 months)**
- Rainfall across the state during the December to May period ranged from 50-1,200 mm (Figure 25), with most of NSW receiving between 100-400 mm.
- The western areas of the state generally received 100-200 mm over the period, with some exceptions. Across the central areas of NSW, rainfall generally ranged from 200-400 mm.
- Most of the tablelands received 300-400 mm, with the eastern areas receiving 400-600 mm. Areas of the south west slopes, southern tablelands and alpine areas received 300-600 mm, with some areas receiving more. Some areas of the southern tablelands, southern highlands and the Monaro received 200-300 mm.
- The coastal and alpine areas generally received 400-600 mm, with some areas of the central, mid-north and far north coast receiving more than 600 mm.
4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

- During May, statewide mean temperatures were the sixth-warmest on record. Both daytime and overnight temperatures were above average across NSW, with the statewide mean temperature being 1.51°C above average.
- Daytime temperatures ranged from 0-4°C above average across the state, with most of the state having temperatures of generally 0-2°C above average. An area of the far north east and the lower Hunter valley had temperatures of 3-4°C above average, with most of the coast and the north having temperatures of 2-3°C above average.
- Overnight temperature anomalies ranged from -1-4°C across the state and were generally 1-2°C above average. Areas of the west, central west, south and south east had overnight temperatures of 1-3°C above average. Areas of the south, central and mid-north coast had temperatures of 0-1°C above average. Some areas of the mid-north to north coast and northern tablelands had overnight temperatures ranging from -1-0°C.

5. Relative soil moisture

Soil moisture information is sourced from the joint CSIRO and Bureau of Meteorology Australian Water Availability Project (AWAP).

The soil moisture maps presented in Figure 29 and Figure 30 show the average monthly soil moisture content for the topsoil and subsoil, as a proportion of its saturated capacity.

Monthly soil moisture levels relative to historical records (percentile ranks) are shown in Figure 31 and Figure 32. These percentile rank products use a relatively short comparative period of 1961-1990, which may result in large fluctuations in values from month to month.

5.1 Summary

Table 9: AWAP average monthly relative soil moisture (fraction) – percentage area of NSW in each class

<table>
<thead>
<tr>
<th>Layer</th>
<th>Low  (0-0.3)</th>
<th>Moderate (0.3-0.7)</th>
<th>High  (0.7-1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topsoil</td>
<td>42%</td>
<td>58%</td>
<td>0%</td>
</tr>
<tr>
<td>Subsoil</td>
<td>53%</td>
<td>44%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Source: Derived from information supplied by CSIRO and the Australian Bureau of Meteorology.

5.2 Topsoil

- Average modelled topsoil moisture improved across most of western, central and southern NSW during May. Levels across north western NSW and areas of the northern tablelands remained low to moderate, but levels were low across much of the coast (Figure 27, Table 9).
- On a percentile rank basis (Figure 29), topsoil moisture levels were above average to extremely high across much of the far west, central west, Riverina and southern NSW. Levels across the north west, upper Hunter valley and the central and southern tablelands were near average. Much of the coast and northern tablelands had below average topsoil moisture.
- By early June, topsoil moisture levels had increased to well above average to extremely high across most of NSW.

5.3 Subsoil

- Modelled subsoil moisture levels improved during May over areas of western, southern and central NSW, but declined across areas of the east, northern tablelands and north west (Figure 28, Table 9).
- On a percentile rank basis (Figure 30), subsoil moisture was near average across most of NSW but below average across areas of the far south, north west, tablelands and north coast. Levels improved further in early June.

6. Pasture growth and biomass

Pasture growth and biomass information is primarily sourced from the AussieGRASS project of the Queensland Department of Science, Information Technology and Innovation and is used under licence.

The modelled total pasture growth and biomass levels should be used with some caution in the higher rainfall areas of NSW such as across the
upper slopes, tablelands and coast. The pasture growth model is not as well calibrated for these areas as for the rangelands, plains and lower slopes.

Alternative pasture growth information is generated using the Growest model of the Fenner School of the Australian National University, with input data from the Australian Water Availability Project. Growth is generated for temperate grasses and legumes (C3 mesotherms) and tropical grasses (C4 megatherms). Growest is a simpler model than GRASP, which is used to generate the AussieGRASS products. Initial assessments indicate it has some advantages over the AussieGRASS products for the upper slopes, tablelands and coast. However, there have been some calibration issues.

Output is provided as an index from 0-1, rather than amounts of dry matter per hectare and is also converted to percentile ranks. Only monthly products are being generated at this stage. Maps of the products have not currently been included as the products are still undergoing development.

6.1 Pasture growth outlook

Growth outlooks are based on modelled pasture and soil moisture conditions, modelled soil nitrogen levels and the phase of the Southern Oscillation Index (SOI) over the last one to two months.

The SOI phase is used to determine the likelihood of rainfall over the next three months, and is often different to the outlook from the Bureau of Meteorology POAMA model.

Growth outlooks are based on the probability of pasture growth over the next three months exceeding the long term (post 1957) median value.

The growth outlooks have varying levels of skill across NSW. As a result, they should be used with some caution. Skill levels are particularly low in autumn.

- The outlook for June to August indicates that well above average growth is likely for most of western, southern and central NSW.
- Average to above average growth is indicated for much of the north west and the northern areas of the northern tablelands.
- Generally below average growth is indicated for the coast, Monaro, Hunter valley and areas of the central and northern tablelands.
- The seasonal rainfall prediction that the growth outlook is based upon is for generally above average rainfall for most of NSW, but average to below average rainfall for the coast, Monaro, Hunter valley and the east of the tablelands.
- The rainfall prediction was based on a rapidly rising SOI during April and May. The rainfall outlook is similar to that of the Bureau of Meteorology for all but eastern NSW.
- The pasture growth outlook has moderate to high accuracy for most of the state.
- Due to the differences between the rainfall outlooks for the east of the state, the growth outlook for this area may be an underestimate.

6.2 Modelled pasture growth

AussieGRASS modelled growth

- There was a dramatic improvement in pasture growth across much of inland NSW during May due to the rainfall and warm temperatures till late in the month.
- Particular improvements in growth occurred across areas of the Riverina, far south, areas of the far west and central west.
- Growth across most of eastern NSW remained low, including the northern tablelands, north coast, Hunter valley, Sydney basin, south coast, Monaro and areas of the north west and southern and central tablelands.
- Growth levels improved from less than 10-20 kg/ha of dry matter (DM) in April in most areas of northern, central, western and southern NSW to between 100-500 kg DM/ha during May. Some areas of the far west and north west increased to 20-50 kg DM/ha, and some areas in the south and Riverina reached more than 500 kg DM/ha. Growth in the east remained similar to that of April (Figure 31).
- The onset of cold, wet conditions and frosts in late May and early June slowed growth across the tablelands and slopes.
- Note that the AussieGRASS modelled pasture growth output is best calibrated for the rangelands, plains and lower slopes. It is not as well calibrated for upper slopes, tablelands and coastal areas.
- Note that the modelled growth does not take waterlogging of low lying areas into account.

Growest modelled growth

- The temperate pasture growth index for May indicated improvements in growth across the far west, central west, Riverina, south west and the central and southern tablelands.
Improvements also occurred across some areas of the north west and northern tablelands.

- The growth index declined across coastal NSW, particularly across the mid-north to north coast. Growth was low to very low in these areas.
- Relative to historical records, temperate pasture growth was generally well above average to extremely high across most of western, southern and central NSW and the west of the central and southern tablelands. Above average growth also occurred on the northern slopes, some western areas of the northern tablelands and some areas of the far south east.
- Well below average to extremely low relative growth occurred across most of the coast, the lower Hunter valley and areas of the Monaro.
- Most of the north west, northern tablelands, the upper Hunter valley, the east of the central and southern tablelands, the southern highlands and areas of the far south east had near average relative growth.
- Note that the modelled growth does not take waterlogging of low lying areas into account.

6.2 Modelled biomass

- Modelled total standing dry matter (biomass) levels improved slightly over those of April, but remained at low to moderately low levels across most of NSW (Figure 32).
- The greatest improvements occurred across areas of the far west, Riverina and far south, as well as areas of the central west. Here levels improved from less than 500 kg DM/ha in April to 500-1500 kg DM/ha during May. In most areas, levels improved from less than 250 kg DM/ha to 500 kg DM/ha.
- Note that the AussieGRASS modelled biomass output is best calibrated for the rangelands, plains and lower slopes. It is not as well calibrated for upper slopes, tablelands and coastal areas.

6.4 Relative pasture growth

AussieGRASS relative pasture growth and biomass are calculated by comparing and ranking the current modelled growth and biomass against that for the same period over every year since 1957 (percentile ranks).

This means that if the current period has a rank of between 30 to 70 against all other years, it is regarded as being “average” and the conditions experienced will occur over about 4 out of every 10 years.

Relative monthly pasture growth should be compared to modelled pasture growth for interpretation. ‘Average’ levels of relative growth may correlate with modelled levels (in kg/ha) that are quite low or high at certain times of year.

Summary

Table 10: AussieGRASS pasture growth and biomass relative to historical records – percentage area of NSW in each class

<table>
<thead>
<tr>
<th>Period</th>
<th>No Data</th>
<th>Below Average (0-30%)</th>
<th>Average (31-70%)</th>
<th>Above Average (71-100%)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month</td>
<td>13%</td>
<td>9%</td>
<td>34%</td>
<td>43%</td>
<td>1%</td>
</tr>
<tr>
<td>Quarter</td>
<td>3%</td>
<td>24%</td>
<td>59%</td>
<td>13%</td>
<td>1%</td>
</tr>
<tr>
<td>Half Year</td>
<td>1%</td>
<td>23%</td>
<td>70%</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>Year</td>
<td>0%</td>
<td>14%</td>
<td>68%</td>
<td>17%</td>
<td>1%</td>
</tr>
<tr>
<td>Biomass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Month</td>
<td>0%</td>
<td>29%</td>
<td>60%</td>
<td>10%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: Derived from information supplied by the Queensland Department of Science, Information Technology and Innovation.

May

- Relative to historical records, May pasture growth was above average across 43% of the state.
- Relative pasture growth was above average across areas of the far west, central west, Riverina, far south and the central and southern tablelands. It was near average across most of the north west and northern tablelands, but below average to average across the coast, Hunter valley and areas of the north west slopes (Table 9, Figure 33).

March to May (3 months)

- Over the three months to May, AussieGRASS relative pasture growth was near average across 59% of the state.
- Areas of below average relative growth occurred across much of the north west, the south to mid-north coast, Hunter valley and areas of the northern tablelands.
- Above average relative growth was generally restricted to areas of the far west, southern tablelands and south west slopes (Table 9, Figure 34).
December to May (6 months)
- Over the six month period to May, relative growth was average across 70% of NSW, and below average across 23%.
- Areas of the far west, north west, central west, north coast, lower Hunter valley, south east and eastern Riverina had below average growth.
- Scattered areas of below average growth also occurred across the northern and central tablelands, central west and far south.
- Above average relative growth was generally restricted to areas of the tablelands, upper Hunter valley, far west, far south and south west slopes (Table 9, Figure 35).

June to May (12 months)
- Yearly relative growth was near average across 68% of NSW, with below average growth across 18% and above average growth across 14% of the state.
- Areas of below average growth occurred across the southern tablelands and areas of the north west (near Pilliga), the south west slopes, the central north coast (near Grafton) and in areas of the far south, central and northern tablelands and areas of the far west.
- Above average growth occurred across areas of the far west, central tablelands, north coast and the central west. Other scattered areas of above average growth occurred in the north west, northern tablelands and south east (Table 9, Figure 36).

6.5 Relative biomass
Relative monthly biomass should be compared to modelled biomass for interpretation. “Average” levels of relative biomass may correlate with modelled levels (in kg/ha) that are quite low or high at certain times of year.
- During May, relative biomass levels were generally near average across the state with improvements across the tablelands, Hunter valley and southern and south eastern NSW.
- Relative biomass remained low across north western NSW and areas of the coast and far south west (Table 9, Figure 37).

7. Streamflow, water storage and irrigation allocations
Streamflow information is sourced from experimental products of the AussieGRASS project and from the Bureau of Meteorology. Irrigation allocations and storage levels are sourced from the NSW Office of Water. Comments on farm water supplies are sourced from Local Land Services.

7.1 Streamflow
- Yearly run off to May was low across areas of the mid-north to north coast, central and northern tablelands, the northern slopes, the north west, the west and north east of the central west, the upper Hunter valley and areas of the far south and far west.
- With the replenishment of soil moisture profiles from the May rainfall, the follow up rainfall in June increased run off into dams, waterways and storages.
- The Bureau of Meteorology’s streamflow forecast indicates low to near-median streamflows are likely across most NSW monitoring stations during June to August. Near-median and high streamflows are likely at some southern locations during the period, and low streamflows in some northern locations.

7.2 Storage levels
Storage levels are shown as at 1 June and are compared to those at 3 May in Figure 9.
- Levels in water storages were generally low-moderate, but high in coastal areas.
- The average storage capacity across the state was 41%.
- The largest decreases were at Chaffey (-16%) and Glenbawn (-3%) Dams.
- The largest increases were at Lake Cargelligo and Lake Wetherell (+4%) and Hum (6%) and Blowering (+9%) Dams (Figure 9).
7.3 Irrigation allocations

Allocations are given as at 1 June 2016.

- There were no changes in allocations from the previous period (Table 11).

Table 11: Irrigation allocations

<table>
<thead>
<tr>
<th>River valley</th>
<th>Allocation</th>
<th>Licence category</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW Border Rivers*</td>
<td>100%</td>
<td>General security A Class</td>
</tr>
<tr>
<td></td>
<td>26.56%</td>
<td>General security B Class</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Richmond</td>
<td>100%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Gwydir*</td>
<td>5.28%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Hunter</td>
<td>100%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Paterson</td>
<td>100%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Lachlan*</td>
<td>25%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Belubula*</td>
<td>0%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Lower Darling*</td>
<td>0%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>80%</td>
<td>High security</td>
</tr>
<tr>
<td>Macquarie and Cudgegong*</td>
<td>7%</td>
<td>General security</td>
</tr>
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<td></td>
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<td>High security</td>
</tr>
<tr>
<td>Murray*</td>
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<td>General security</td>
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<tr>
<td></td>
<td>97%</td>
<td>High security</td>
</tr>
<tr>
<td>Murrumbidgee*</td>
<td>37%</td>
<td>General security</td>
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<td>95%</td>
<td>High security</td>
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<td>Lower Namoi*</td>
<td>0%</td>
<td>General security</td>
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<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
<tr>
<td>Upper Namoi*</td>
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<td>General security</td>
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<td>100%</td>
<td>High security</td>
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<td>Peel</td>
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<td>High security</td>
</tr>
<tr>
<td>Bega Brogo</td>
<td>46%</td>
<td>General security</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>High security</td>
</tr>
</tbody>
</table>

*Carry over water may be available
Figure 9: Capacity of storages

Storage Levels - 1 June 2016


Legend:
- Total storage
- Storage level last year
- Storage level last month
- Less than 20% full
- Between 20 and 50% full
- More than 50% full
8. Appendix
Maps and data used in the production of this report.

Seasonal rainfall and temperature outlook

Figure 10: Quarterly rainfall outlook

Figure 11: Quarterly maximum temperature outlook
Figure 12: Quarterly minimum temperature outlook

Figure 13: Outlook skill maps
Month 1 rainfall & temperature outlook

Figure 14: Month 1 rainfall outlook

Figure 15: Month 1 maximum temperature outlook
Figure 16: Month 1 minimum temperature outlook

![Map showing the chance of exceeding the median minimum temperature for June 2016 in NSW.](image)

**Legend:**
- **Red:** > 90%
- **Dark Red:** 70% - 90%
- **Orange:** 60% - 70%
- **Pink:** 50% - 60%
- **Light Pink:** 40% - 50%
- **Yellow:** 30% - 40%
- **Green:** 20% - 30%
- **Blue:** < 20%

Figure 17: Month 1 outlook skill maps

![Skill maps for rainfall and temperature for NSW in June 2016.](image)
Month 2 rainfall & temperature outlook
(Bureau of Meteorology, POAMA)

Figure 18: Month 2 rainfall and temperature outlooks
Rainfall

Figure 19: Relative rainfall – monthly

![Rainfall Relative to Historical Records May 2016](image)

Figure 20: Relative rainfall – quarterly

![Rainfall Relative to Historical Records March 2016 to May 2016](image)
Figure 21: Relative rainfall – half yearly

Figure 22: Relative rainfall – yearly
Figure 23: Total rainfall – monthly

![Total Rainfall May 2016](image)

Figure 24: Total rainfall – quarterly

Not available
Figure 25: Total rainfall – half yearly
Not available

Figure 26: Total rainfall – yearly
Not available
Soil moisture

Figure 27: Relative monthly topsoil moisture (fraction of a saturated profile)

Figure 28: Relative monthly subsoil moisture (fraction of a saturated profile)
Figure 29: Relative monthly topsoil moisture (percent rank)

Figure 30: Relative monthly subsoil moisture (percent rank)
Pasture growth and biomass

Figure 31: Modelled pasture growth

![Modelled Total Pasture Growth (kg DM/ha) May 2016](image)

Figure 32: Modelled pasture biomass

![Modelled Total Standing Dry Matter (kg DM/ha) May 2016](image)
Figure 33: Relative pasture growth – monthly

![Pasture Growth Relative to Historical Records from 1957: May 2016](image)

Figure 34: Relative pasture growth – quarterly

![Pasture Growth Relative to Historical Records from 1957: March 2016 to May 2016](image)
Figure 35: Relative pasture growth – half yearly

![Pasture Growth Relative to Historical Records from 1957 December 2015 to May 2016](image)

Figure 36: Relative pasture growth – yearly

![Pasture Growth Relative to Historical Records from 1957 June 2015 to May 2016](image)
Figure 37: Relative biomass – monthly

![Total Standing Dry Matter Relative to Historical Records from 1957 May 2016](image)

**Figure 37**: Relative biomass – monthly

Other

Figure 38: Winter and spring mean rainfall deciles – negative IOD years

![Mean Rainfall Deciles Ranges](image)

**Figure 38**: Winter and spring mean rainfall deciles – negative IOD years
More information

For more information, contact the NSW Department of Primary Industries on 02 6391 3100 or Local Land Services on 1300 795 299.

The Seasonal Conditions Summary, a shortened version of this document with some additional information, is available at [http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regionalseasonal-conditions-reports](http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regionalseasonal-conditions-reports). A link to join the Seasonal Conditions mailing list is also available at the site.


The On-ground Seasonal Conditions Reports, collated each month by Local Land Services pasture, cropping, livestock and biosecurity specialists from information provided by more than 350 land managers are available at [http://www.lls.nsw.gov.au/agriculture/seasonal-conditions](http://www.lls.nsw.gov.au/agriculture/seasonal-conditions).

Acknowledgments

Information used in this report was sourced from the Australian Bureau of Meteorology, CSIRO, the Queensland Department of Science, Information Technology and Innovation, the Australian Export Grains Innovation Centre, the Queensland Alliance for Agriculture and Food Innovation, the U.S. Department of Agriculture, U.S. Department of Commerce, the U.S. National Oceanic and Atmospheric Administration, the International Research Institute for Climate and Society (Columbia University), the UK Meteorological Office, the APEC Climate Centre, NSW Local Land Services and NSW Department of Primary Industries.

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Published by the Department of Primary Industries.

ISSN 2202-1795 (Online)
PUB16/291
Volume 4/Number 5
Jobtrack 12948