Department of Primary Industries

NSW Seasonal Conditions Report - October 2014

Highlights

- September rainfall was below average across areas of the tablelands, north west, central west and Riverina.
- Drier than normal conditions are likely from October to December across eastern, central and northern NSW, and warmer conditions generally. Drier and warmer than normal conditions are likely during October.
- ENSO remains neutral, with a late and weak El Niño event likely. A limited effect is likely on summer rainfall.
- Pasture growth declined across the west, north west and areas of the central west, but improved over the coast.
- Moisture stress has reduced crop yield prospects in areas of the central west and north. The south is variable.
- Resources to assist in management for areas suffering poor rainfall and growth are available at www.dpi.nsw.gov.au/agriculture/emergency/drought/managing

1. Summary

Rainfall during September was average or above over 68% of NSW, except over areas of the tablelands, north and central west and Riverina.

Pasture growth declined across much of western and north western NSW over September, and areas of the central west. Growth improved across areas of the coast and the south east, but remained low across the south/south west. Growth across eastern NSW was above average, but slowed across the northern tablelands. Biomass declined in the central and southern areas, but improved along the coast.

Winter crops in the west, areas of the central west and north have suffered from moisture stress during grain fill. Yields have been depressed and grain quality will suffer. The extent of losses due to this and frost is still unclear. Prospects for crops in the south are mixed. The far south and other areas that received good September rainfall have good yield potential, except for some very early sown crops which suffered frost damage. Lack of soil moisture will restrict summer crop sowings in the north. Water costs are reducing the prospects for rice and some other irrigated crops in the south.

Between October and December, drier than normal conditions are likely across most of eastern, northern and north western NSW and some central areas. There is a near-equal chance of above or below median rainfall for areas of the south west and far west. Warmer than normal daytime and overnight temperatures are likely. Over October, drier than normal conditions are likely across NSW, with warmer daytime and overnight temperatures.

ENSO remains neutral, with a late and weak El Niño event likely in the next two months. The Bureau of Meteorology's El Niño status remains at 'watch' level. Warm equatorial sea surface and sub surface temperatures favour an event. However, an event usually has a reduced influence on summer rainfall over NSW. Cooler sea surface temperatures to the north are reducing potential rainfall sources.

Rainfall across most of NSW ranged from 10-50 mm. Much of the coast, tablelands and south received 25-50 mm. Some areas of the coast and the far south received 50-100 mm. Daytime temperatures were above normal and overnight temperatures close to normal. In relative terms, quarterly rainfall was below average over 41% of NSW and average over 35%. Over the quarter, relative rainfall was low across much of southern and central NSW, as well as areas of the north west and northern tablelands. Half yearly relative rainfall was average or above over 75% of NSW.

Modelled topsoil moisture declined over western, southern and central NSW but remained moderate along the coast and eastern fall. Subsoil moisture levels were mostly stable, but low across areas of the north west, northern tablelands, north coast and the Riverina. Levels were high across the south east and coast.

Streamflow analysis indicated below average run off over areas of the tablelands, north west, Riverina, far west and some coastal areas.

Relative pasture growth was low over the northern tablelands, central and southern areas, but improved on the coast. Quarterly relative growth was low over the south, north west and central areas. Relative biomass levels were slightly lower, but improved on the coast.

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 10 October 2014.

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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 collated in late September and early October and were up to date as at 10 October 2014.

2.1 Seasonal outlook summary

Table 1: Seasonal outlook summary (BoM)

	Current Outlook	Previous Outlook
Rainfall (quarter)	Drier (east/central/north west/far north west) Near neutral (far west/south west)	Drier (south/central) Near neutral-neutral (northern, far western, north east & far south east NSW)
Max Temperature (quarter)	Warmer	Warmer Near neutral (north/north east NSW)
Min Temperature (quarter)	Warmer	Warmer Near neutral (north/north east NSW)

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 October to December, drier than normal conditions are likely across most of the northern, north western, eastern and some central areas of the State. The chances of exceeding median rainfall in these areas are between 35-40%. That is, the chances of receiving below median rainfall are 60-65%. There is a near-equal chance (a 40-45% probability) of above or below median rainfall for areas of the central west, south west and far west (Figure 9).
- This means that for every ten years with similar climate patterns to those at present, across much of northern and eastern NSW about three to four October to December periods would be expected to be wetter than normal and six to seven drier than normal.
- The outlook accuracy (confidence or skill) is moderate to high across most of NSW, ranging from 55-75%, with areas that are high (65-75%) in the north west. However, accuracy is low (less than 55%) across areas of the north west, northern tablelands and far north coast (Figure 12).
- About half of the global climate models surveyed also suggest drier than normal conditions during October to November across much of NSW.

2.3 Seasonal temperature outlook

- Over the three month period from October to December, warmer than normal daytime temperatures are likely across NSW (Figure 10).
- The chance of exceeding median maximum temperatures ranges from 60-65% in the far west, increasing to 70-75% to the east and to more than 80% in the south east, with the highest probabilities in far south east of the State.
- This means that for every ten years with similar climate patterns to those at present, across NSW about six to eight October to December periods would be expected to have warmer than normal daytime temperatures, and two to four cooler than normal daytime temperatures.
- The outlook accuracy (confidence or skill) is very high across the south and south west (≥ 75%), moderate (55-65%) across the central to north coast and areas of the central tablelands, and high (65-75%) across the remainder of NSW (Figure 12).
- Warmer than normal overnight temperatures are likely across NSW between October to December. The chance of exceeding median minimum temperatures ranges from 60-65% in the far west to more than 75% in the central areas of the State, increasing towards the east and south east (Figure 11).

- The outlook accuracy (confidence or skill) for the minimum temperature outlook is moderate to high (55-75%) across most of western and central NSW, very high (≥ 75%) in areas of the far north west and low (< 55%) across the northern tablelands, most of the coast and the far south west (Figure 12).
- The majority of global climate models surveyed suggested warmer than normal conditions are likely across NSW between October and December.

2.4 Monthly rainfall and temperature outlook

Monthly outlook information is sourced from the Australian Bureau of Meteorology (BoM).

The multi-week and month 2 experimental climate outlooks from the POAMA model are provided with thanks to, and by special agreement with, the Bureau of Meteorology. However, they are experimental only, do not currently form part of the BoM's standard services and are not yet fully calibrated. They should therefore be used with some caution.

Feedback on the experimental outlooks can be provided to climate.helpdesk@bom.gov.au.

Monthly outlook summary

Table 2: Monthly outlook summary (BoM)

	October	November
Rainfall	Drier	Neutral-near neutral
Max Temperature	Warmer	Warmer (east/central) Neutral-near neutral (west)
Min Temperature	Warmer	Warmer (east/central) Neutral-near neutral (west)

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.

Month 1 - October

- Drier than normal conditions are likely across NSW in October (Figure 13), particularly in areas of the north west and the south. The probability of exceeding the median rainfall is 30-40% over most of the State, decreasing to 25-30% across areas of the north west and south
- The October rainfall outlook has a moderate to high accuracy (skill) over most of the State, but has a low accuracy over areas of the south coast, far north east and far north west.
- Over half of the global climate models surveyed suggested drier than normal conditions are likely across areas of NSW in October.
- Warmer than normal daytime temperatures are likely during October across NSW (a 65% to more than 80% probability), particularly across the north/north east and the south/south east (Figure 14).
- The October daytime temperature outlook has a moderate to high accuracy (skill) across NSW.
- Warmer than normal overnight temperatures are likely (a 60% to more than 80% probability) across NSW during October. The south, south east and areas of northern NSW have the highest probability for warmer than normal overnight temperatures (≥ 80%) (Figure 15).
- However, the October overnight temperature outlook has a low to very low accuracy (skill) across all of NSW, with the exception of areas of the far west.
- Nearly two thirds of the global climate models surveyed suggested warmer than normal conditions are likely across NSW during October.

October multi-week (as at 5 October)

- Weekly experimental outlook information suggests that during the third and fourth week of October (19 October - 1 November) there is an equal chance of drier or wetter than normal conditions across most of NSW, with the exception of the central coast and the far south east, where wetter than normal conditions are likely. The accuracy (skill) for this outlook is moderate across north western areas of western NSW, but low across the remainder of the State.
- Daytime temperatures during the third and fourth week of October are likely to be warmer than normal over the north east, central coast and south east of NSW, and have an equal chance of being warmer or cooler than normal elsewhere. This outlook has a moderate accuracy (skill) over most of NSW, but is low in the far south west.
- Overnight temperatures during the third and fourth week of October are likely to be warmer than normal across most of the State, with the exception of the central and northern areas of the far west, and areas of

the central west and mid-north coast. The accuracy (skill) level for this outlook is low for most of NSW, but moderate across the far north west.

Month 2 - November

- The experimental outlook for November indicates an equal probability (45-50%) for drier or wetter than normal conditions across most of western and central NSW, with a near equal probability (40-45%) of exceeding the median rainfall across coastal NSW and areas of the south east (Figure 17).
- The November rainfall outlook has a moderate accuracy (skill) across most of NSW, a high accuracy in areas of the central west, far south east and far north east, but a low accuracy over the central tablelands and the far west.
- Just under half of the global climate models surveyed indicated a neutral outlook for rainfall across areas of NSW during November, with about a third suggesting drier than normal conditions and about a fifth suggesting wetter than normal conditions.
- There is a near equal to equal probability of warmer or cooler than normal daytime temperatures across western NSW during November (Figure 17). Warmer than normal daytime temperatures (a 60-70% probability) are likely across the central and eastern areas of the State.
- The accuracy (skill) for the November daytime temperature outlook is moderate across most of NSW, but low in areas of the far west and the far north east.
- There is a near equal to equal probability of warmer or cooler than normal overnight temperatures across western NSW during November (Figure 17). Warmer than normal overnight temperatures (a 60-70% probability) are likely across the central and eastern areas of the State, particularly in the far south east.
- The accuracy (skill) for the November overnight temperature outlook is moderate to high across most of western and central NSW and the south east, but low to very low in the north east.
- Over half the global climate models surveyed suggested warmer than normal conditions are likely across areas of NSW during November, with most of the remainder having a neutral outlook.

2.5 Other climatic models

Bureau of Meteorology statistical model (superseded)

The Bureau of Meteorology statistical model outlooks have been superseded by those from the POAMA model.

With the launch of the new Bureau of Meteorology climate outlook webpage in August 2014, they are no longer available.

UK Meteorology Office

The output from this model is provided for the use of international meteorological centres, and not as general seasonal outlooks. It should therefore be used with caution.

- The UK Meteorology Office's global long range probability modelled output indicates wetter than normal conditions are likely across southern NSW between October and December, with a 60-80% probability of above average rainfall. The remainder of the State has a near-equal probability for wetter or drier than normal conditions (a 40-60% probability of above average rainfall). An area in the far north east is likely to have drier than normal conditions (a 20-40% probability of above average rainfall). The skill assessment for this outlook is moderate to high across southern NSW, but low across the remainder of the State.
- The model indicates that there is a 60-80% probability of above average temperatures across most of NSW between October to December, but a near equal probability of above or below average temperatures in the south/south west and areas of central western NSW. The skill assessment for this outlook is high across most of NSW, but moderate to low across the far south west.
- For November to January, the UK Meteorology Office's global long range probability modelled output indicates there is an increased chance of wetter than normal conditions across most of western, central and south eastern NSW (a 60-80% probability of above average precipitation), with a near equal probability of drier or wetter than normal conditions over the far north east, far south and far north west. The skill assessment for this outlook is low over most of NSW, but moderate to high in the south and south east.
- For temperature over November to January, the outlook indicates that warmer than normal conditions are likely across the majority of NSW with a 60-80% probability of

exceeding the average temperature. An area of southern NSW has a near-equal probability of above or below average temperatures. The temperature outlook has a low skill over much of western and southern NSW, although the skill is moderate to high across central and eastern NSW and over much of the north.

APEC Climate Centre

- The APEC Climate Centre's deterministic multi-model ensemble outlook of rainfall anomalies for October to December indicates that near normal rainfall is likely across most of the State. There is a slight rainfall deficit suggested over the majority of NSW, with a slight increase in the south. The temperature anomaly outlook indicates the likelihood of warmer than average temperatures, particularly across coastal and southern-central NSW. No skill assessment is available for these outlooks.
- During October, the APEC Climate Centre's rainfall anomaly outlook indicates that near normal to slightly lower than normal rainfall is likely across NSW. The temperature anomaly outlook indicates warmer than average temperatures, particularly across coastal and southern-central NSW. No skill assessment is available for these outlooks.

2.6 El Niño-Southern Oscillation (ENSO)

ENSO summary

- ENSO remains neutral, although the equatorial Pacific continues to be warm and the SOI was moderately negative during September. Most climate models indicate the likelihood of a late and weak El Niño event occurring in the next one to two months, and extending into 2015. Some models are suggesting a borderline event instead, and a number are indicating neutral conditions.
- El Niño events tend to have a lesser influence on late spring and early summer rainfall across NSW than in winter and early spring (Figure 18), particularly in the north and east. They have little influence on summer rainfall over NSW (Figure 19).
- Sea surface temperatures are warm across most of the equatorial Pacific, although have cooled slightly in the central Pacific. Positive subsurface temperature anomalies cover much of the central equatorial Pacific, which favour the development of an El Niño event. Weak warm subsurface anomalies are occurring at depth in the west, and shallow cool anomalies are occurring in the east.
- The SOI has been at negative levels (-7 to -8 or less) since mid-August, but in early October it started to increase again and is currently around -4.2. The low August-September SOI was a result of high atmospheric pressure over Darwin rather than a fall in pressure over Tahiti.
- Trade winds have been variable, and are currently near average across the equatorial Pacific. Cloudiness near the Date Line was below average over most of September.
- Tropical rainfall was near normal at the junction of the equator and the International Date Line, but declined to the south east, as indicated by positive outgoing long-wave radiation (OLR) anomalies. For an El Niño event to occur, rainfall tends to be reduced in this area. A mix of positive and negative anomalies occurred over Indonesia and Papua New Guinea.
- Other indicators such as the thermocline slope index, and the equatorial Pacific basin upper ocean heat anomalies are currently near zero, and reflect ENSO neutral conditions.
- The cooling of sea surface temperatures to the north of Australia may influence rainfall through reduced convection.

ENSO outlook and comments

Table 3: ENSO/Climatic Outlook

	Current Outlook (early October)	**Previous Outlook** (early September)
ENSO (overall)	Neutral – El Niño possible/likely	Neutral – El Niño possible/likely
BoM ENSO Tracker Status	El Niño Watch	El Niño Watch
SOI	Neutral – slightly negative	Neutral – slightly negative
Pacific Ocean SST (NINO3.4)	Slightly warm/warm (Neutral – some models)	Slightly warm/warm (Neutral – some models)
Indian Ocean (IOD)	Neutral	Neutral
Southern Annular Mode (SAM/AAO)	Neutral – weakly positive	Neutral

Summary Legend: Grey = Neutral, i.e. neither El Niño nor La Niña or no rainfall trend.
Red = El Niño/reduced rainfall trend.
Blue = La Niña/higher rainfall trend.

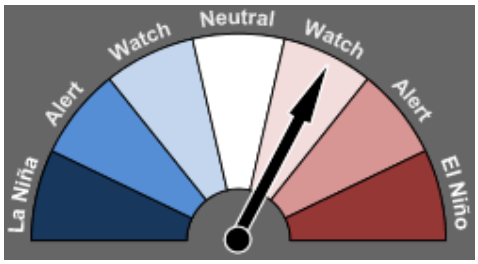
Source: Derived from information provided by the Australian Bureau of Meteorology and the US National Oceanic and Atmospheric Administration.

- A strong west to east gradient in sea surface temperatures, which would indicate El Niño-like oceanic and atmospheric coupling, has

not yet occurred. Under these circumstances, it is possible that the growth of an El Niño event will be slower or reduced. The stronger such a gradient, and the stronger the westerly winds blowing across the equatorial Pacific, the more likely it is that coupling may occur. Alternatively, stronger winds can lead to stronger sea surface temperature gradients developing.

- The Bureau of Meteorology's ENSO tracker (Figure 1) remains at El Niño 'Watch' level. In the past, about 50% of the time that this level has been reached, an El Niño event has occurred (compared to 70% at 'Alert' level).

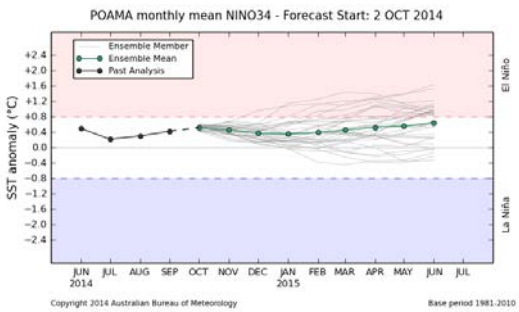
Figure 1: Bureau of Meteorology ENSO tracker status



Source: Australian Bureau of Meteorology

- The Bureau of Meteorology's POAMA model's latest long range outlook indicates that the sea surface temperature anomalies in the NINO3.4 Pacific Ocean region may remain at neutral levels (Figure 2). However, it is important to consider the outlooks from all available global climate models. Two of the eight global climate models surveyed by the Bureau of Meteorology indicate that sea surface temperatures in the NINO3.4 Pacific Ocean region are likely to be at or near El Niño levels during October. Six of the eight indicate that sea surface temperatures will be at or near this level by December.

Figure 2: Current Bureau of Meteorology POAMA NINO3.4 Forecast



Source: Australian Bureau of Meteorology

- The CPC/IRI ENSO Alert System Status remains on 'El Niño watch'. This indicates conditions remain favourable for the development of an El Niño event within the next six months.

The CPC/IRI consensus ENSO forecast of the NINO3.4 index (as at 9 October) indicates the likelihood of a weak El Niño event developing during the next one to two months, peaking during summer and continuing into the autumn of 2015. The majority of forecasts indicate NINO 3.4 sea surface temperature anomalies are expected to be in the range of +0.5°C and +0.9°C. The CPC/IRI model forecast probabilities for an El Niño event occurring are 62-67% during the late spring and summer (Figure 3, Table 4).

Figure 3: CPC/IRI Consensus ENSO Forecast

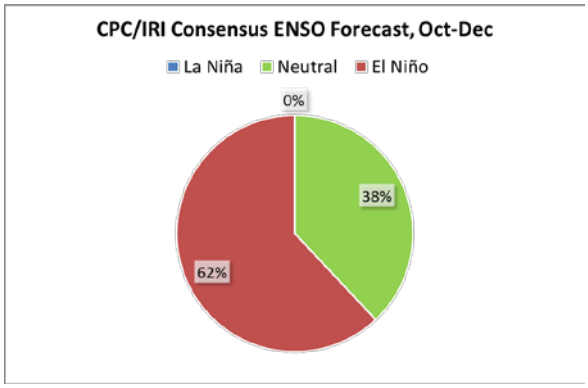


Table 4: Current consensus ENSO forecast probabilities (as at 9 October)

Season	La Niña	Neutral	El Niño
Oct-Dec	0%	38%	62%
Nov-Jan	1%	32%	67%
Dec-Feb	1%	34%	65%
Jan-Mar	1%	36%	63%
Feb-Apr	2%	40%	58%
Mar-May	3%	45%	52%
Apr-Jun	5%	47%	48%
May-Jul	8%	49%	43%

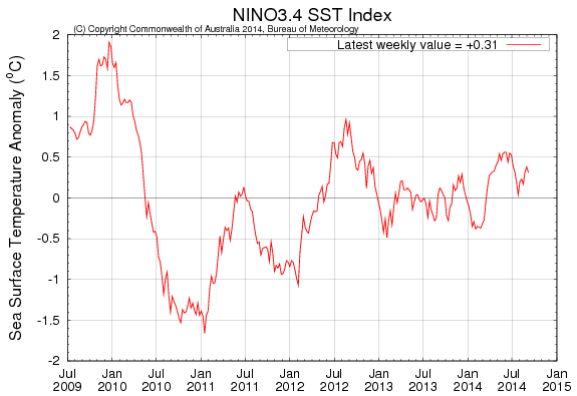
Source: Climate Prediction Centre/International Research Institute for Climate and Society.

- 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.

Sea temperatures

- Monthly sea surface temperatures from the Bureau of Meteorology and the US National Oceanic and Atmospheric Administration (NOAA) indicate that the eastern equatorial Pacific (east of the International Date Line) cooled during the last month, but the central equatorial Pacific warmed. Temperatures were above average across most of the equatorial Pacific.
- Sea surface temperatures were near normal to the north of Australia during the month, but cooled again in the week to 5 October. Cool sea surface temperatures to the north of the continent may influence rainfall through reduced convection.
- The most recent monthly temperature anomaly value in the key NINO3.4 region is +0.45°C for September, similar to the levels in May and June and an increase from +0.20 in August and +0.18°C for July.
- Weekly sea surface temperatures to 5 October remained neutral-slightly warm in the NINO 3.4 region (Figure 4), with the current temperature at +0.44°C. The sea surface temperature anomaly increased to +0.61°C in the NINO 3 region, and +0.63°C in the NINO 4 region. Temperature anomalies in the NINO 1 region are +0.31°C and in the NINO 2 region are +0.41°C as at 5 October.

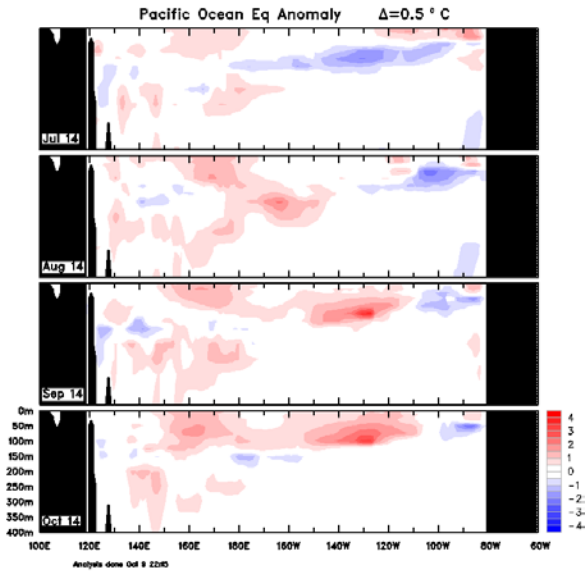
Figure 4: NINO3.4 Sea Surface Temperature Index



Source: Australian Bureau of Meteorology

- The sub surface sea temperatures in the equatorial Pacific show warm anomalies across most of the central equatorial Pacific, extending somewhat west of the Date Line, but to the east to about 120° (Figure 5). Some weak negative anomalies remain in the far east.

Figure 5: Monthly sea sub-surface temperatures



Source: Australian Bureau of Meteorology

Southern oscillation index (SOI)

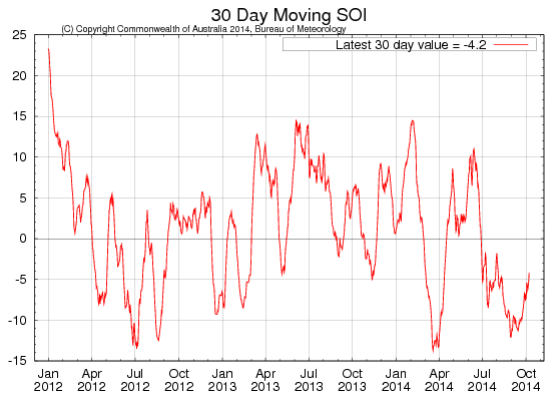
- The monthly value of the Southern Oscillation Index is currently neutral at -4.2 (as at 8 October), after being negative between mid-August and late September (Figure 6, Table 5).
- The low SOI has been a result of high atmospheric pressure over Darwin during much of August and September rather than a decrease in pressure at Tahiti.

Table 5: Values of the Southern Oscillation Index

	Current monthly value (8 October)	Previous monthly value (8 September)
SOI (30 day)	-4.2	-9.7

Source: Australian Bureau of Meteorology.

Figure 6: 30 day moving SOI



Source: Australian Bureau of Meteorology

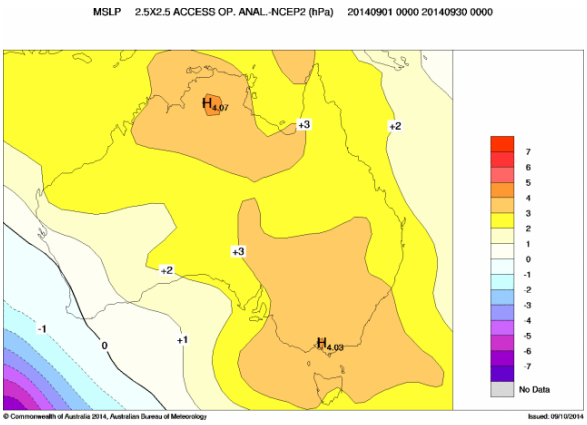
- The Southern Oscillation Index is one factor indicating the development and intensity of El Niño and La Niña events in the Pacific

Ocean. It is calculated from variations in surface atmospheric pressure between Darwin and Tahiti. Values of the SOI between -8 and +8 indicate neutral conditions, sustained values above +8 may indicate a La Niña event, and sustained values below -8 may indicate an El Niño event.

Sub-tropical ridge (STR)/atmospheric pressure

- The sub-tropical ridge was slightly stronger than normal and somewhat further south in latitude during September. There was high atmospheric pressure over most of the continent during September, particularly over the north (affecting the SOI) and over NSW and Victoria (Figure 7), as indicated on NOAA and Bureau of Meteorology mean sea level pressure charts. The increased pressure contributes to the blocking of the passage of fronts through NSW.
- During September, the sub-tropical ridge is normally around a pressure of 1020 hPa and is centred at around a latitude of 29°S to 30°S. During August, the sub-tropical ridge was further south than normal by about 6 degrees, and was one of the strongest on record (+6.2 hPa).

Figure 7: Anomalous mean sea level pressure, September 2014



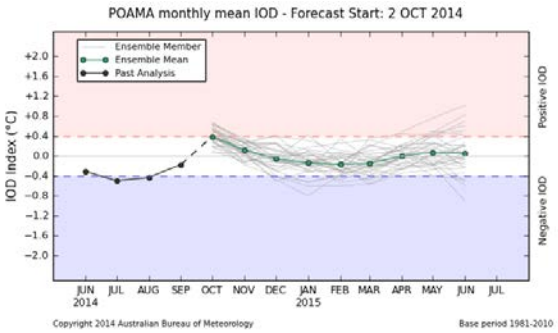
Source: Australian Bureau of Meteorology.

- 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 30°S to 32°S, allowing cold fronts to extend further into southern Australia.

Indian Ocean dipole (IOD)

- The Indian Ocean dipole returned to neutral during September.
- The latest IOD index value for the week ending 5 October is +0.29°C. The outlooks indicate that it will remain neutral.
- The Bureau of Meteorology's POAMA model and all climate models surveyed by the Bureau of Meteorology favour a neutral IOD between October and February (Figure 8). The POAMA sea surface temperature outlook indicates near neutral conditions in the eastern and western Indian Ocean areas used for the calculation of the IOD extending through to February.

Figure 8: Current Bureau of Meteorology POAMA Indian Ocean Dipole Forecast



Source: Australian Bureau of Meteorology.

- 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.
- 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, as shown in this link. 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.

Trade winds and Pacific cloud conditions

- Trade winds are currently weaker than normal in the western tropical Pacific and

near normal along the remainder of the equator (as at 5-7 October). During the last month, they have been near average across most of the equatorial Pacific. Recently, westerly wind anomalies occurred in the western equatorial Pacific. In the eastern equatorial Pacific, there have been weak easterly wind anomalies occurring.

- 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.
- Cloud conditions at the equator near the International Date Line have been slightly above average over the last two weeks, but have now declined again. Cloudiness in this area has been below average during most of August and September. Convection and precipitation were suppressed to the south west of the junction of the International Date Line and equator.
- Cloudiness in this area 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 is currently weakly negative to near neutral, after remaining weakly to moderately negative through most of September and weakly negative in late August.
- The SAM index value from POAMA (as at 5 October) was weakly negative at -0.1 and the AAO index value from NOAA (as at 6 October) was near neutral.
- The outlook from POAMA indicates the SAM index will increase to be weakly positive to neutral through to late October. The NOAA outlook is similar.
- 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.
- 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 across southern Australia and potentially increased rainfall.
- A positive SAM event indicates the contraction of the belt of strong westerly winds towards Antarctica and higher pressures over southern Australia. During autumn and winter, a positive SAM event can potentially mean a decrease in rainfall across southern Australia. 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.

NSW cloud conditions

- Cloud conditions were near normal across most of NSW during September, but slightly lower than normal in the south/south east and areas of the mid-north coast.

2.8 Possible effects of El Niño events

- El Niño conditions are often associated with below normal rainfall and above normal daytime temperatures across much of NSW in the second half of the year, and an increased risk of frost. However, this is not always the case.
- Between October and December, the greatest effect of El Niño events has been across the south west of the State (Figure 18).
- El Niño events (in general) do not strongly affect rainfall in NSW during summer (Figure 19).
- The severity of an El Niño event does not necessarily directly relate to the severity of the impact on rainfall. In some cases, severe El Niño events have had a limited effect on rainfall, while mild-moderate El Niño events have had a major effect.

3. Rainfall

3.1 Relative rainfall

Relative rainfall information is sourced from the AussieGRASS project of the Queensland Department of Science, Information Technology, Innovation and the Arts 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 6: Rainfall relative to historical records – percentage area of NSW in each class

Period	Missing data	Below Average (0-30%)	Average (31-70%)	Above Average (71-100%)
Month	4%	28%	58%	10%
Quarter	0%	41%	35%	24%
Half year	0%	25%	59%	16%
Year	0%	39%	60%	1%

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

September

- Relative to historical records, rainfall for September was above average across just 10% of the State, extending across the northern and some central areas of Western LLS district, areas of Murray and the far south of South East LLS district.
- Below average relative rainfall occurred over 28% of NSW (that is, rainfall in the 3rd decile or below), particularly across the central areas of the State and the tablelands. It extended across most of Northern Tablelands, Central West and Central Tablelands LLS districts. Below average rainfall also occurred across the west and east of Riverina LLS district, and across the eastern half of North West LLS district. Areas of below average rainfall also occurred across the far east of Murray LLS district, and in areas of the North Coast, South East, Greater Sydney LLS districts.
- Average relative rainfall (that is, rainfall of between the 4th and 7th deciles) fell across 28% of NSW (Figure 20, Table 6), extending across most of the far west and far south. Most of Western, Murray, South East and Hunter LLS districts received average relative rainfall.
- Across most of the State the rainfall was generally 40-80% of normal for the month, with some areas receiving 20-40% of normal.

July to September (3 months)

- Over the 3 month period from July to September, relative rainfall was average or above over 59% the State (Figure 21, Table 6).
- Below average relative rainfall occurred across 41% of the State, extending primarily across the much of the central, southern and south western areas. Below average relative rainfall for the period also extended across areas of the north west and northern tablelands.
- Relative quarterly rainfall across much of the Riverina LLS district and the eastern and northern area of the Murray LLS district was extremely low (in the lowest 10% of years), as well as in areas of the Central West and Central Tablelands LLS districts. Most of these areas received 20-60% of their normal rainfall.
- In the Western LLS district, areas of the far north west received above average to well above average relative rainfall for the period, reaching 125-300% of normal. Areas of the North Coast LLS district received above average to extremely high quarterly relative rainfall, mainly falling in late August. Other coastal areas in the Hunter, Greater Sydney and South East LLS districts also received above average relative rainfall for the period. These areas received 125-200% of their normal rainfall for the period.
- The remainder of the State (35%) received average relative rainfall for the quarterly period (that is, rainfall of between the 4th and 7th deciles) and covering much of the western and north western areas, and the south to mid-north coast.

April to September (6 months)

- Over the six months to September, relative rainfall was average across 59% of NSW, below average across 25% and above average across 16% (Figure 22, Table 6).
- Below average relative rainfall for the period occurred across most of the North West (89%), Northern Tablelands (74%) and Central Tablelands (70%) LLS districts. Below average relative rainfall for the period also extended across the eastern third of the Central West LLS district, and the far west of the Riverina LLS district around Hay. The far north and south of the North Coast and areas of Hunter and Greater Sydney LLS districts also experienced below average relative rainfall for the period. These areas generally received between 40-80% of their normal rainfall.
- Above average relative rainfall occurred in the far west around Broken Hill, south of Deniliquin, between Nyngan and Cobar and in the far south east. Relative rainfall around Broken Hill was extremely high. Most of these areas received 100-125% of their

normal half yearly rainfall, with the area near Broken Hill receiving 125-200%.

- Most of the southern and western areas of the State received average relative rainfall for the six month period.

January to September (9 months, BoM)

- Over the 9 month period from January to September relative rainfall across the State was below average across most of the North West, Northern Tablelands, North Coast, Hunter and Greater Sydney LLS districts. Most of these areas received 60-80% of their normal rainfall for the period.
- Areas near Walgett, between Glen Innes and Armidale and near Coffs Harbour, Port Macquarie, Taree and Tweed Heads received very much below average relative rainfall for the period. An area of below average relative rainfall also occurred near Hay in the Riverina LLS district (Figure 23). These areas received 40-60% of their normal rainfall over the period.
- An area of above average relative rainfall occurred in the Central West LLS district between Forbes, Parkes, Condobolin, Nyngan and Cobar. Above average relative rainfall also occurred near Broken Hill in the Western LLS district, and across areas of the Monaro in the South East LLS district. Rainfall in these areas was generally between 100-125% of normal for the period.
- The remainder of the State had generally average relative rainfall over the period.

October to September (12 months)

- Over the twelve months to September, below average relative rainfall extended across almost all of the North West, Northern Tablelands, Central Tablelands and North Coast LLS districts.
- Areas of the Hunter (51%), Riverina (61%), Greater Sydney (52%) and Central West (40%) LLS districts also experienced below average relative rainfall for the period (Figure 24, Table 6).
- Much of the North West and Northern Tablelands LLS districts, and areas of the North Coast, Hunter and Central West LLS districts received well below average to extremely low relative rainfall during the period.
- Most of these areas received between 60-80% of their normal rainfall for the period, with areas in the north west, north coast and around Hay receiving less than 60%.
- For the year, below average relative rainfall occurred across 39% of NSW.
- Above average relative rainfall was restricted to scattered areas around Broken Hill, Wentworth, Deniliquin, Nyngan and in the alpine areas. The majority of the State (60%) received average rainfall for the period.

3.2 Total rainfall

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

September

- Overall, NSW received a State-wide rainfall of about 34% of average for September.
- Most of the State received rainfall of between 40-80% of average for the month, with only areas of the far west-north west and areas of the far south receiving above average rainfall.
- Conditions were dry for most of the month. A cold front generated some rain along the far south early in the month, with another front producing widespread rainfall across south eastern NSW on the 10 September. A surface trough also generated rain and thunderstorms between the 24-26 September.
- Some 57% of the State received average rainfall during the month, that is, rainfall of between the 4th and 7th decile, 28% received below average rainfall and 10% received above average rainfall (Table 6).
- Total rainfall over the State ranged from 5-200 mm, with the majority of the State receiving 10-50 mm.
- The majority of the coast, tablelands and south received 25-50 mm. Heavier falls of 50-100 mm occurred over some areas of the Hunter and Greater Sydney LLS districts, in the far south and in the alpine areas.
- Areas between Hay and Ivanhoe and in the far north west received less than 10 mm for the month (Figure 25).

July to September (3 months)

- Total rainfall over the three months to September ranged from 25-400 mm over NSW, with most of the State receiving between 50-200 mm.
- The west received between 25-100 mm for the period, and the central areas of the State between 50-100 mm (Figure 26). The

tablelands, slopes and Monaro generally received 100-200 mm. Most of the coastal strip received 200-300 mm, with areas near Wollongong, the mid-north coast and near Lismore receiving 300-400 mm.

April to September (6 months)

- Rainfall across the State during the April to September period ranged from 50-800 mm (Figure 27), with most areas receiving between 100-400 mm.
- Some of the lowest rainfall over the period (50-100 mm) fell in the far north west of Western LLS district.
- The far west, western areas of the plains and the north west generally received between 100-200 mm. The central and eastern areas of the plains generally received 200-300 mm. The central areas of the State, including the slopes and much of the tablelands, received 200-400 mm during the period, with some areas receiving 400-600 mm. The northern tablelands generally received 200-300 mm, and the south east 200-400 mm.
- The coastal LLS districts generally received 300-600 mm.

4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

The data used to create the temperature anomaly maps in Figure 29 and Figure 30 are slightly different from that used to create the anomaly maps on the Bureau of Meteorology website. The comments below reflect the website maps, which are more accurate, rather than those included in this report. The maps in Figure 29 and Figure 30 are provided for a general assessment only.

- Daytime temperatures over September were 1.5°C warmer than average across NSW. A belt extending from Inverell and Collarenebri south and west, including the south and east of Western LLS district had daytime temperatures of between 1-2°C above average for the month.
- An area in the south west of the State including the western and much of the central areas of Riverina and Murray LLS district had daytime temperatures of 2-3°C above average for the month. This area extended from Condobolin to Wagga, Deniliquin and Balranald.
- The remainder of the State, including the northern area of Western LLS district and most of the Northern Tablelands and coastal LLS districts had near average daytime temperatures during September.
- Overnight temperatures were close to average (+0.4°C) across NSW during September.
- Across the far south west, most of central NSW and areas of the Northern Tablelands and far north coast, temperatures were between 0 and -1°C below average for the month. An area in the south of Central West LLS district and the north of Riverina LLS district (between Condobolin, Parkes and Wagga) had temperatures of between -1 to -2°C below average.
- Most of western, north western and coastal NSW had near normal overnight temperatures of 0-1°C above average.
- Areas of the mid-north coast and central coast had overnight temperatures of 1-2°C above average for the month.

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 31 and Figure 32 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 33 and Figure 34. 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 7: Average monthly relative soil moisture (fraction) – percentage area of NSW in each class

Layer	Low (0-0.3)	Moderate (0.3-0.7)	High (0.7-1.0)
Topsoil	80%	19%	1%
Subsoil	46%	45%	9%

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

5.2 Topsoil

- Modelled topsoil moisture continued to decline during the month across the central and western areas of the State, due to lower than average rainfall and warm temperatures

(Figure 31). Levels remained moderate across most of the coast and the east of the tablelands, due to the high August rainfall over these areas.

- Overall, only 19% of NSW had moderate topsoil moisture (averaged over the month), 1% high topsoil moisture and 80% had low topsoil moisture (Figure 31, Table 7), a slight decline from August.
- On a percentile rank basis (Figure 33), topsoil moisture levels were below average across most of the south and the southern-central areas of the State. This was particularly the case across the Murray and Riverina LLS districts, as well as the south and east of the Central West LLS district and the south west and north east of the Central Tablelands LLS district.
- Low percentile rank topsoil moisture was also evident across the south east of the Western LLS district and in areas of the North West and Northern Tablelands. Percentile rank topsoil moisture was high in the far north west, in the Nyngan area, in the far south east and across the central to north coast and eastern fall areas. Elsewhere, it was average.
- Total topsoil moisture levels were in the range of 10-20 mm across most of the western and western-central areas of the State. Over the tablelands and upper slopes, levels were generally between 20-60 mm. Over the east of the State, levels were generally between 40-80 mm (except for some areas in the upper Hunter valley and far north coast). Some coastal areas that received heavy August rainfall had levels of 80-150 mm.

5.3 Subsoil

- Modelled subsoil moisture levels remained relatively stable over the State between August and September, with a slight decrease in areas with moderate subsoil moisture and a slight increase in areas with low subsoil moisture (Figure 32, Table 7).
- There was an improvement in modelled subsoil moisture across most of the South East LLS district, with a 15% increase in the area of the district with high subsoil moisture. Areas of increased subsoil moisture also occurred across most of a narrow strip along the central to north coast.
- Levels of modelled topsoil moisture remained low across the north west of the State and in the west of the Murray and Riverina LLS districts. The North West LLS district had the lowest overall relative subsoil moisture during the month, with 80% of its area in the low category. This was followed by 59% of Western, 45% of Northern Tablelands and Central West, 34% of Murray and 38% of Riverina LLS districts. All LLS districts apart from North West and Western had more than 50% of their area in the moderate-high category.
- Total modelled subsoil moisture for the month was generally 50-200 mm across most of the State. A band with 100 mm or less extended from the west of North West LLS district, through the east and to the south of Western LLS district. It also extended into the north west of Central West LLS district, and the west of Murray and Riverina LLS district. The central and northern areas of the Northern Tablelands LLS district also had modelled subsoil moisture levels of less than 100 mm.
- Modelled subsoil moisture was less than 50 mm near Walgett, Hay and Armidale and between Balranald and Wentworth.
- On a percentile rank basis (Figure 34), modelled subsoil moisture was below average across the north west between Brewarrina, Walgett, Collarenebri, Narrabri and Coonabarabran, and north of Moree. It was also below average across most of the Northern Tablelands and North Coast LLS districts and the south of the Central Tablelands and the north-north east of the Hunter LLS districts.
- Percentile rank subsoil moisture was also low across the southern half of the Riverina LLS district, and was extremely low around Hay.
- Above average percent rank subsoil moisture occurred across the central-western areas of Western LLS district, around the Nyngan area of Central West LLS district, and in the south and east of South East LLS district.

6. Pasture growth and biomass

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

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.

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 pasture growth over October to December suggests that well below average to below average growth is likely across much of central and eastern NSW. This outlook was based on a consistently negative SOI phase during September.
- A similar outlook is suggested for the far south, far east and the central/northern areas of the Western LLS district, with near normal growth for the remainder of the Western LLS.
- Skill levels for this outlook are high for the east of the State, and are moderate for most of the central and south western areas of the State. For most of the west, skill levels are low to very low.

6.2 Modelled pasture growth

- Modelled pasture growth declined across much of the west and north west of NSW during September (Figure 35). Growth improved during the month across the Central Tablelands LLS district, and was maintained at relatively high levels along the coast. Growth also improved over the Northern Tablelands LLS distict.
- Lower than normal August/September rainfall and higher than normal daytime temperatures across areas of central NSW contributed to a decline in pasture growth between August and September in these areas. Declines in growth occurred particularly in the west of the North West, Riverina and Murray LLS districts, the western and central areas of Central West LLS district and the south and east of the Western LLS district.
- The output from alternative pasture growth models are more appropriate for the upper slopes, tablelands and coast than AussieGRASS pasture growth model. However, there have been some calibration issues. Output from these models indicates that growth across many areas of the South East LLS district is well above median. Growth over the Central Tablelands LLS district has slowed over the last month, particularly in the north, but is still above median for the month. Growth across the Northern Tablelands LLS district is below median, and has declined in the last month. Growth across the North Coast LLS is above median in the south, but well below median in areas of the north.
- The best (AussieGRASS) modelled pasture growth during the month occurred across areas of the tablelands, upper slopes and coastal areas. Growth in these areas was generally between 200-1,000 kg of dry matter (DM)/ha for the month.
- Modelled pasture growth across most of Western LLS district (particularly the west and north) and the west of the North West LLS district declined from the previous month to about 20-100 kg DM/ha.
- Areas of low modelled growth occurred in the south and east of Western LLS district, the western, central and north east of North West LLS district, the western and central areas of Central West and the west of Riverina and Murray LLS districts.

6.2 Modelled biomass

- Modelled total standing dry matter (biomass) levels declined in the central and southern areas of the State between August and September, but improved along the coast. The modelled biomass levels appear to be inaccurate for the south east.
- Biomass levels were low but stable across the far western and northern areas of the Western LLS district, and the western half of North West LLS district (Figure 36). Biomass levels in these areas were generally less than 500 kg of dry matter (DM)/ha.
- Biomass levels in the Central West, Riverina and Murray LLS districts generally declined from about 1,000-2,000 kg DM/ha to 500-1,500 kg DM/ha. However, certain areas within these districts (such as near Hay and

Griffith) had levels of modelled biomass of less than 500 kg DM/ha.

- The coastal areas generally improved in biomass from about 500 kg DM/ha to 1,000-1,500 kg DM/ha.
- Biomass levels also improved over the Central Tablelands, Northern Tablelands and the tablelands and Monaro areas of the South East LLS districts. However, the AussieGRASS pasture growth model has limited reliability in these areas.

6.4 Relative pasture growth

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 8: Pasture growth and biomass relative to historical records – percentage area of NSW in each class

Period	No Data	Below Average (0-30%)	Average (31-70%)	Above Average (71-100%)	Other
Growth					
Month	11%	27%	36%	25%	1%
Quarter	2%	26%	50%	21%	1%
Half Year	1%	6%	46%	46%	1%
Year	0%	18%	62%	19%	1%
Biomass					
Month	0%	19%	52%	28%	1%

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

September

- Relative to historical records, 60% of NSW had average or above average pasture growth during September (Table 8, Figure 37).
- The area of the State with above average growth decreased from 33% in August to 25% in September.
- The area showing below average growth increased from 17% in August to 27% in September, as a result of poor rainfall across parts of the southern and central areas of the State during August and September.
- The major declines in monthly relative pasture growth occurred across the Central Tablelands and North West LLS districts. In these areas, relative pasture growth generally fell from average to below average, particularly in the west of the North West LLS district and the south and east of the Central West LLS district. A similar decline occurred in the west and north west of the Central Tablelands LLS district.
- There was a general improvement in relative pasture growth along the coast, with a general increase from average to above average growth, or from above average to extremely high growth. However, the pasture growth model is not well calibrated for these areas.
- Relative pasture growth was below average to average over the Northern Tablelands LLS district, and remained low in across most of the south of the State, but improved across the southern area of Murray LLS district.
- Areas of missing data accounted for 11% of the area of NSW, primarily across far west.

July to September (3 months)

- Over the three months to September, relative pasture growth was average or better across 71% of the State.
- Some 21% of the area of NSW had above average relative growth and 50% had average growth, compared to 29% and 58% for the three months to August (Table 8, Figure 38).
- The area of the State with below average relative growth over the three month period included about half of the Central West, North West, Riverina and Murray LLS districts, and the southern and eastern edge of the Western LLS district. These areas declined from generally average relative pasture growth during the previous (June to August) period.
- Areas of the highest relative pasture growth for the period occurred across the coastal LLS districts, including the eastern edge of the tablelands and the Monaro. The far north west of Western LLS district also

experienced above average relative growth for the period. The remainder of the State had near average relative growth.

April to September (6 months)

- Over the six month period from April to September, relative pasture growth declined slightly from the previous period but improved along the coast. Relative growth remained average to above average across most of NSW, although low in areas of the north west.
- Most of the Northern Tablelands, Central Tablelands, Central West, Riverina and Murray LLS districts had above average relative growth during the period. However, this is likely to be an overestimate for the Northern Tablelands.
- Relative pasture growth improved across the coastal areas over the period.
- The northern areas of the State also had generally average relative growth, except for an area between Walgett, Collarenebri, Carinda, Lightning Ridge and Goodooga and to the north of Moree.
- Relative growth over the period was average or above over 92% of the State (Table 8, Figure 39), and above average over 46% of the State.

October to September (12 months)

- Relative pasture growth over the last 12 months remained similar to the period to July, although with a decrease in the area of below average growth and an increase in the area of average growth.
- Relative growth was average or above across 81% of the State (Table 8, Figure 40), with 62% of the State having average relative growth.
- Below average relative growth covered 18% of the area of the State. It extended across 71% of the North West LLS district, and areas of the Northern Tablelands and Central Tablelands LLS districts as well as the tablelands areas of the South East LLS district. The central area of the Riverina LLS district also showed below average relative growth, as did an area between Griffith and Hay.

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.

- The area of below average relative total standing dry matter (biomass) increased slightly between August and September, from 12% to 19% (Table 8, Figure 41). Levels of average relative biomass declined slightly, and levels of above average relative biomass fell from 34% to 28%.
- Relative to historical records, biomass remained high across most of the coastal LLS districts and the east of the tablelands. It was also high across east of the Murray and Riverina LLS districts.
- There was an improvement in relative biomass levels across the coastal LLS districts, but continued low levels across the northern area of the North West LLS district.
- Levels of relative biomass also declined slightly over the north east of the Western LLS district, the Riverina LLS district and the south and east of the Central West LLS district.

7. Crop production

Crop production information is sourced from the NSW DPI grains report. An updated grains report was not available at the time of publication.

8. Water storage and irrigation allocations

8.1 Storage levels

Storage levels are given as at 10 October 2014.

- Levels in water storages are low-moderate, with the average capacity being 53%.
- Changes in storage levels during the last month were generally minor, with the largest increase at Hume Dam (5%). Most storages had minor decreases of between 1-6%, with the largest decrease at Blowering Dam (-6%), Lake Pamamaroo (-6%) and Lake Cargelligo (-17%).

Table 9: Capacity of storages

Storage	Current Volume (GL)	Effective Capacity (%)	Monthly Change (%)
Toonumbar	11	98	-2
Malpas	8	67	-4
Glenbawn	661	88	0
Glennies	241	85	-1
Lostock	20	99	-1
Brogo	9	100	0
Cochrane	1	-	-
Dartmouth	3604	93	-2
Hume	2334	78	5
Blowering	1076	65	-6
Burrinjuck	820	80	-1
Brewster	-	-	-
Carcoar	11	31	0
Cargelligo	22	51	-17
Wyangala	665	55	-2
Glenlyon	90	-	-
Pindari	43	14	-3
Copeton	416	30	-3
Chaffey	25	39	0
Keepit	64	14	-5
Split Rock	81	20	0
Burrendong	308	24	0
Oberon	29	64	-1
Windamere	180	49	0
Lake Cawndilla	100	3	-4
Lake Menindee	-	0	0
Lake Pamamaroo	124	43	-6
Wetherell	67	33	-2
Total	**11010**		
Average		**53**	

8.2 Irrigation allocations

Allocations are given as at 10 October 2014.

- General security allocations remained unchanged from early August, except for a small increase in the allocations for the Bega-Brogo River Valley from 40-45%, for the Murrumbidgee River Valley from 30-37% and for the Murray River Valley from 20-24%.

Table 10: Irrigation allocations

River valley	Allocation	Licence category
NSW Border Rivers*	28.2%	General security A Class
	0%	General security B Class
	100%	High security
Richmond	100%	General security
	100%	High security
Gwydir*	0%	General security
	100%	High security
Hunter	100%	General security
	100%	High security
Paterson	100%	General security
	100%	High security
Lachlan*	0%	General security
	100%	High security
Belubula*	0%	General security
	100%	High security
Lower Darling*	100%	General security
	100%	High security
Macquarie and Cudgegong*	2%	General security
	100%	High security
Murray*	34%	General security
	97%	High security
Murrumbidgee*	37%	General security
	95%	High security
Lower Namoi*	0%	General security
	100%	High security
Upper Namoi*	100%	General security
	100%	High security
Peel	0%	General security
	50%	High security
Bega Brogo	45%	General security
	100%	High security
*Carry over water may be available		

9. Appendix

Maps and data used in the production of this report.

Seasonal rainfall and temperature outlook

Figure 9: Quarterly rainfall outlook

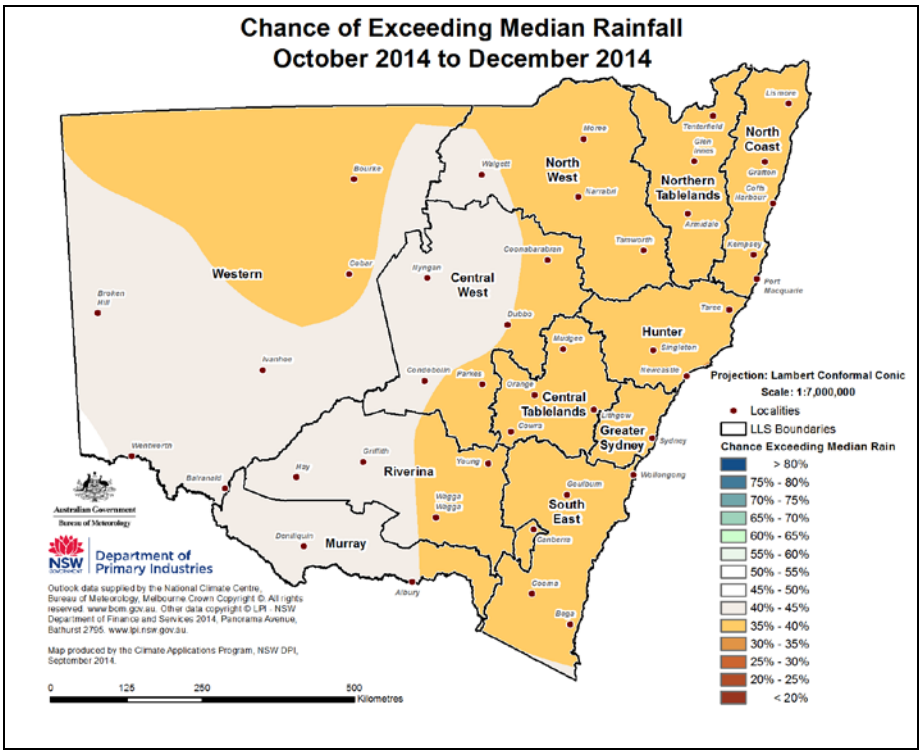


Figure 10: Quarterly maximum temperature outlook

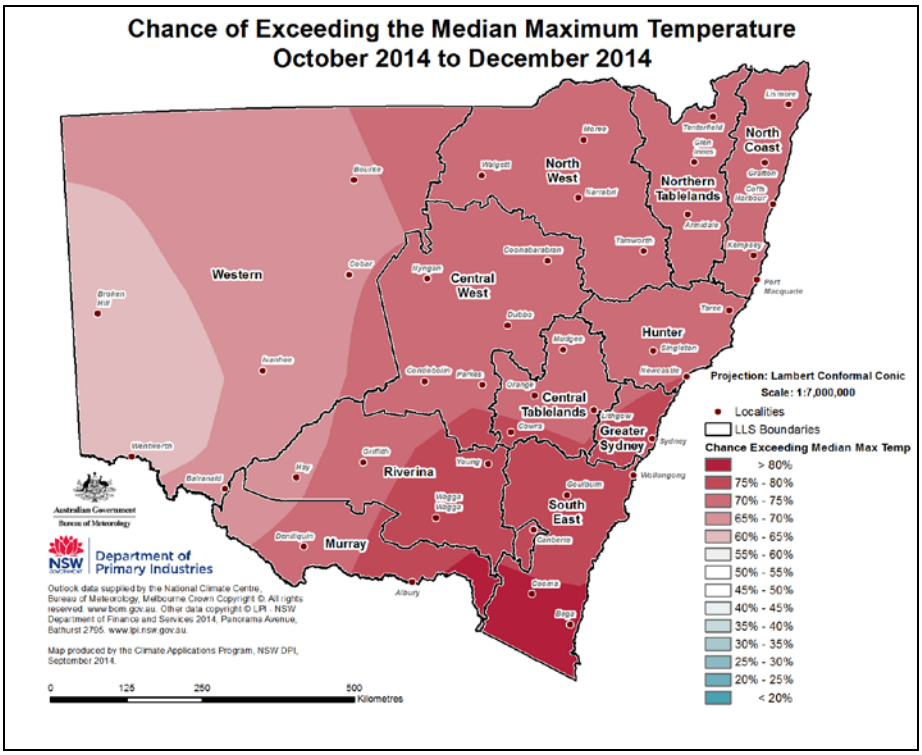


Figure 11: Quarterly minimum temperature outlook

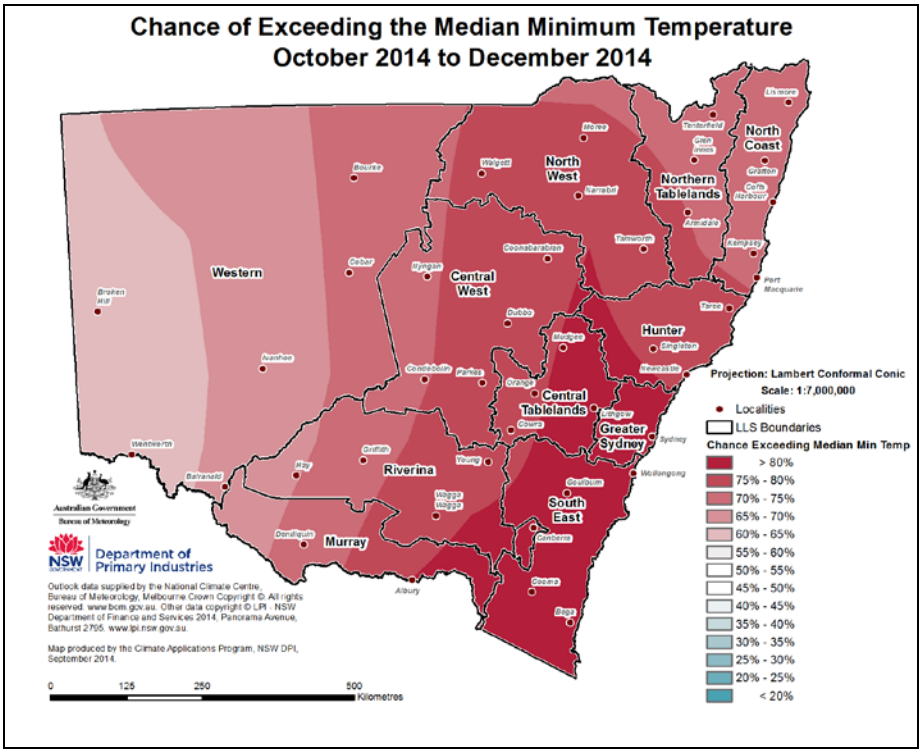
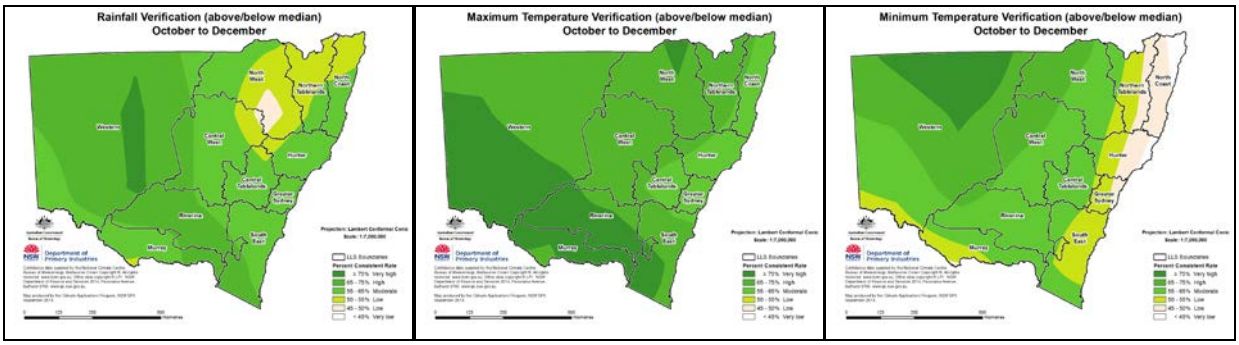


Figure 12: Outlook skill maps



Month 1 rainfall & temperature outlook

Figure 13: Month 1 rainfall outlook

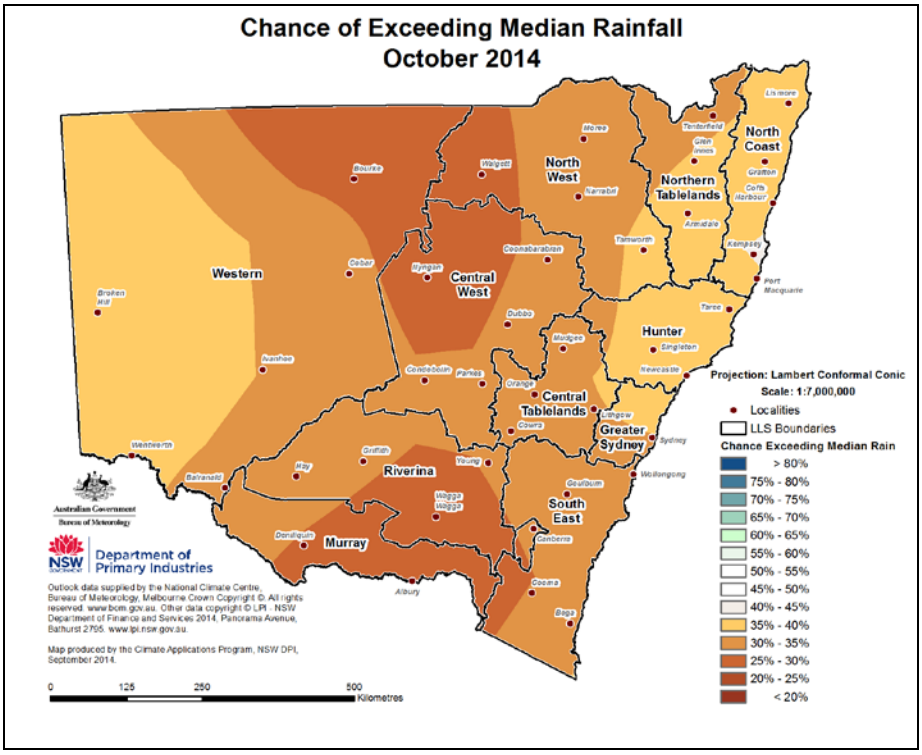


Figure 14: Month 1 maximum temperature outlook

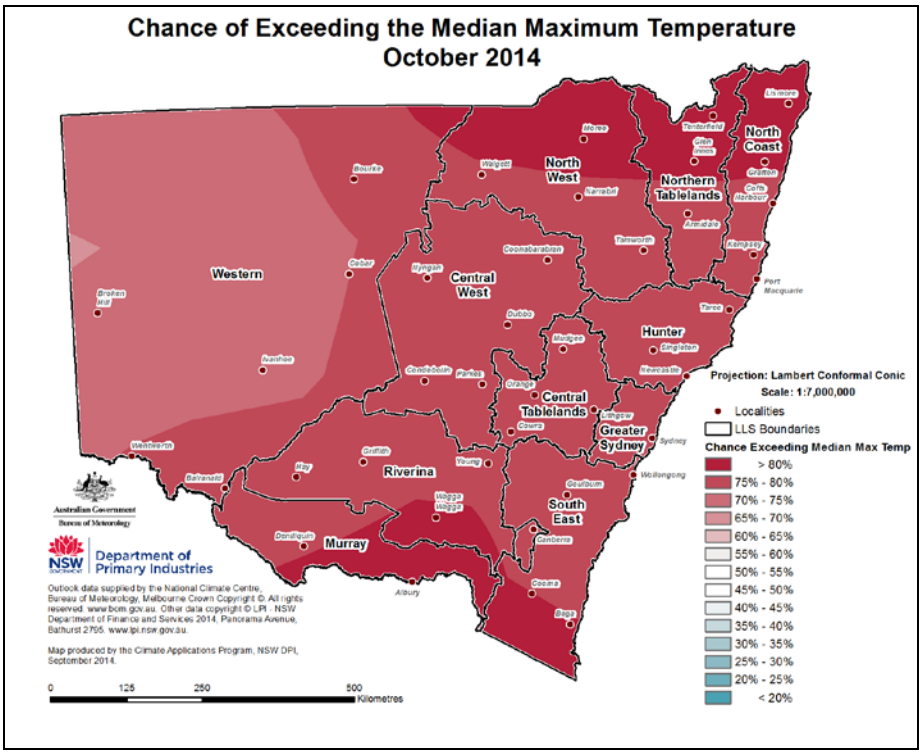


Figure 15: Month 1 minimum temperature outlook

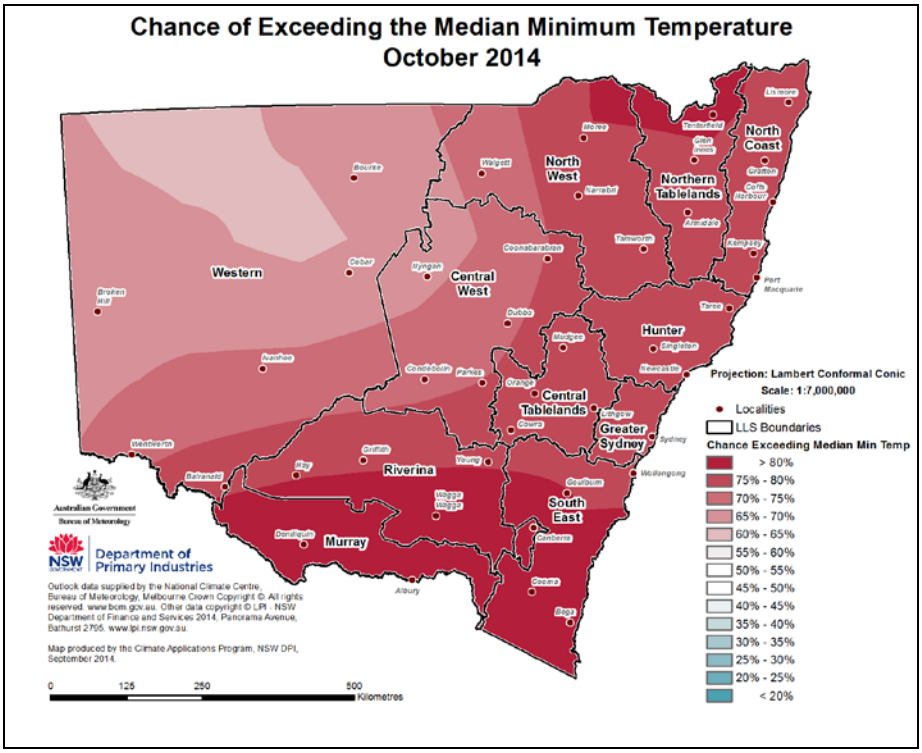
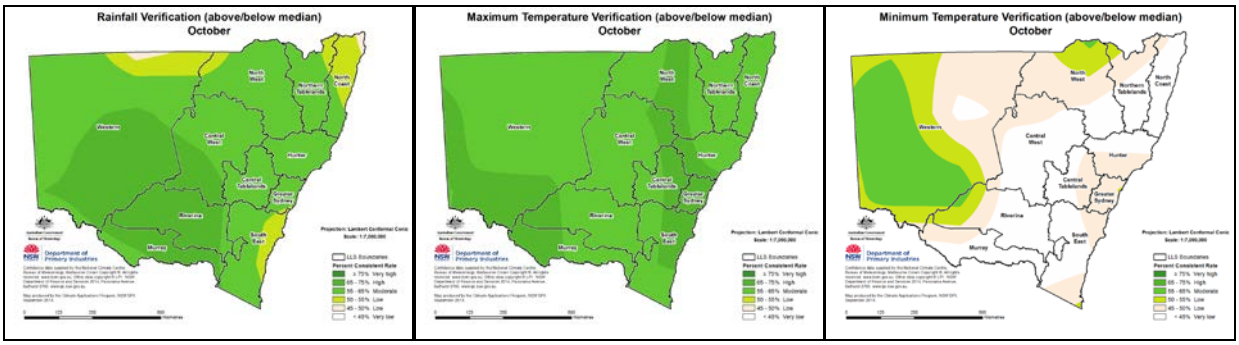


Figure 16: Month 1 outlook skill maps

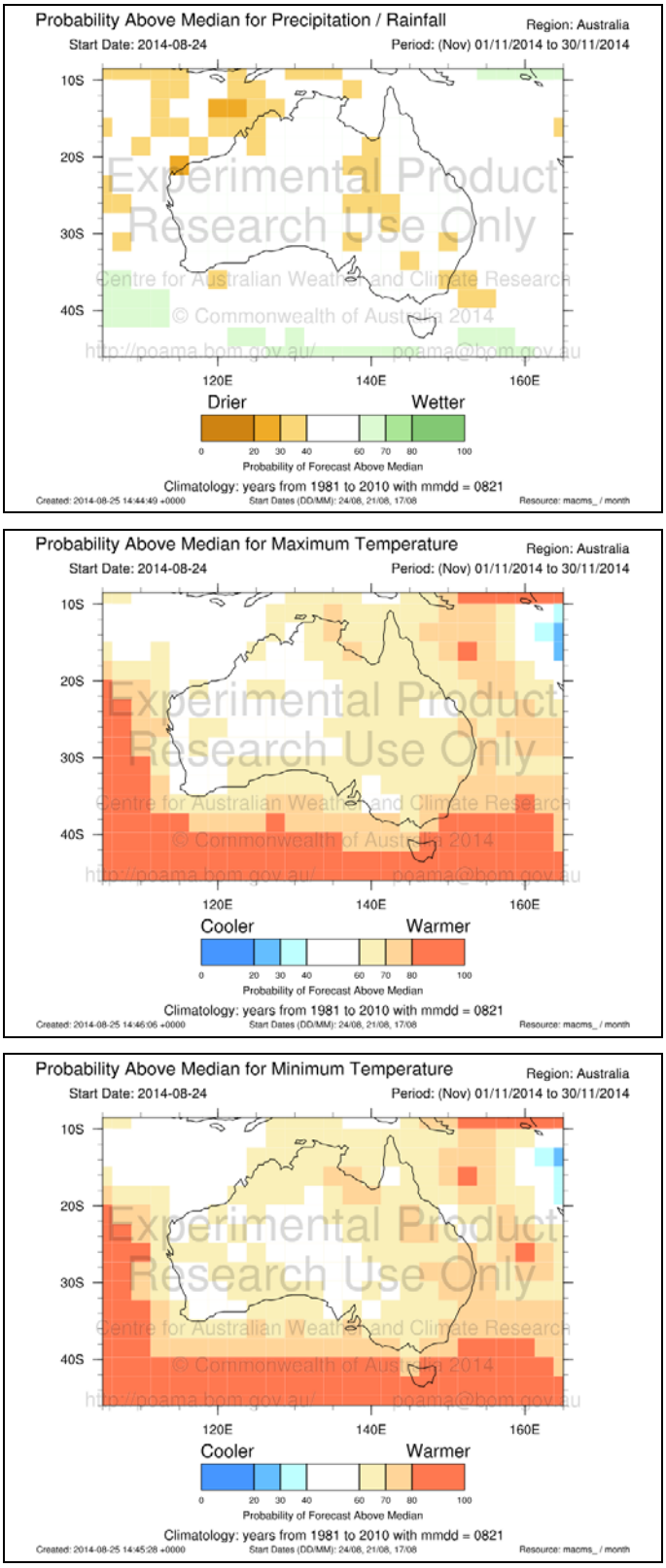


Month 2 rainfall & temperature outlook

(Bureau of Meteorology, POAMA - experimental)

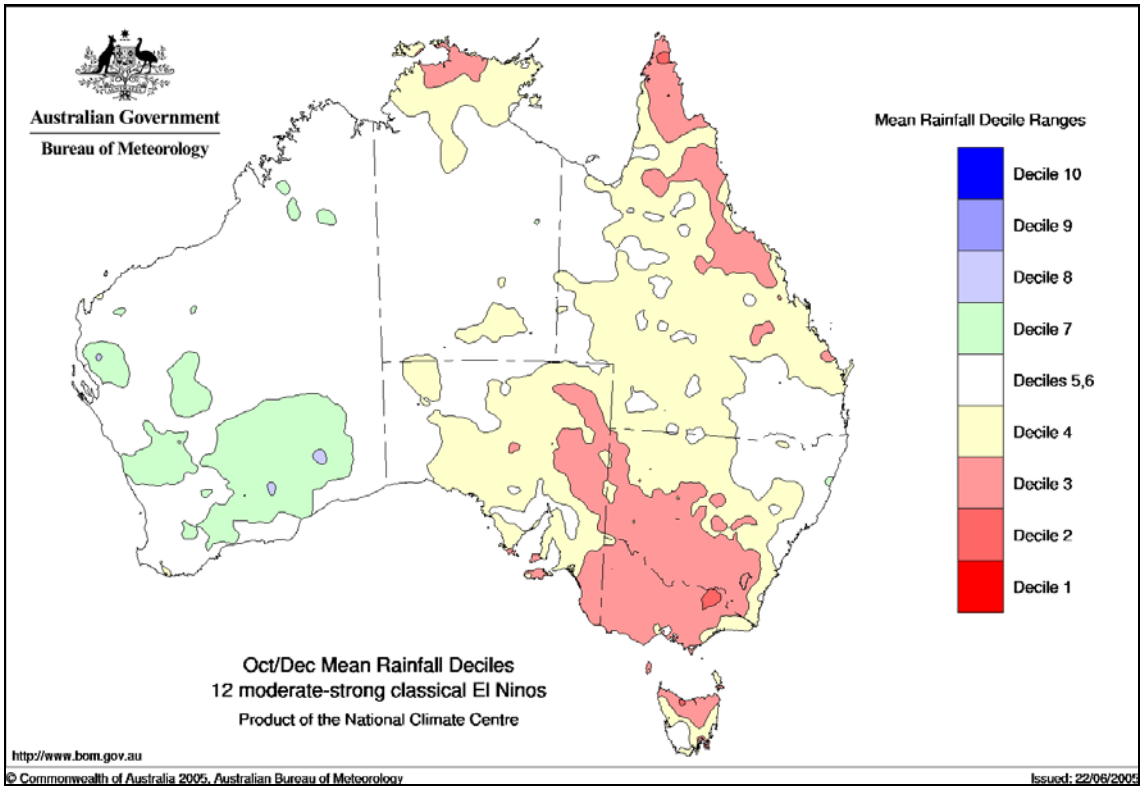
Note – Operational Bureau of Meteorology month 2 outlook maps will be available in the near future.

Figure 17: Experimental November rainfall and temperature outlooks



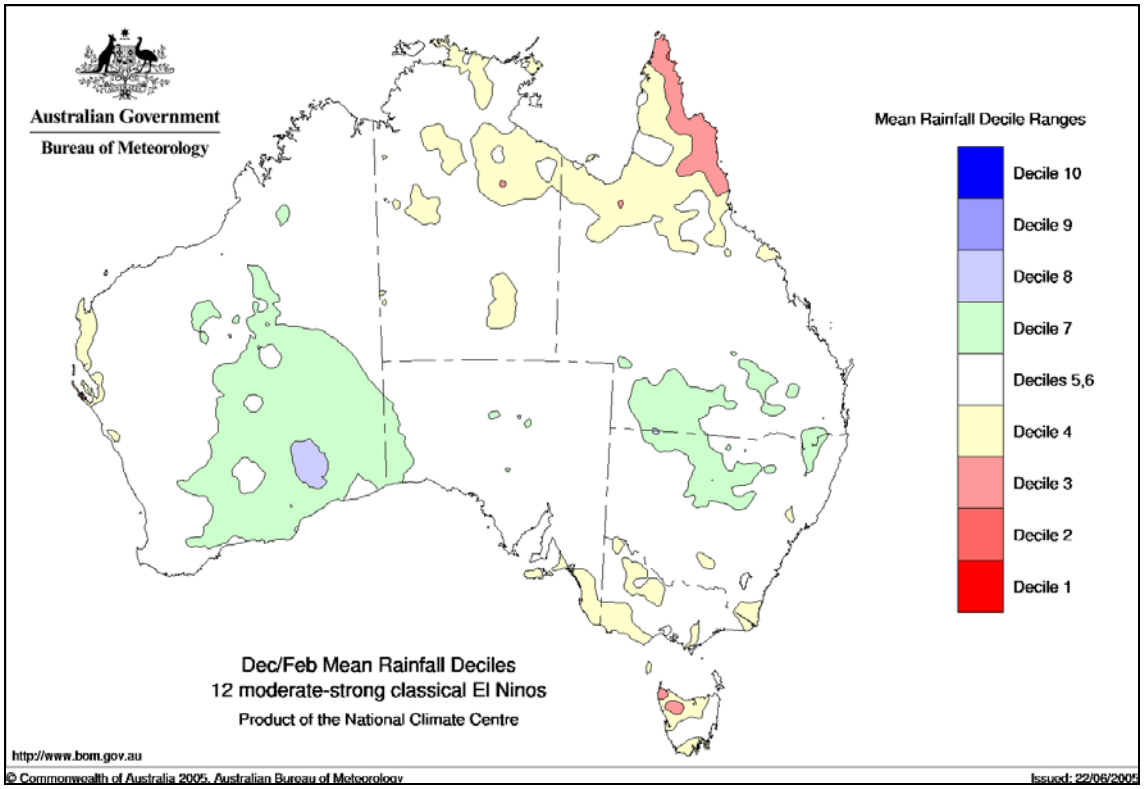
Possible effects of an El Nino event

Figure 18: Australian Oct-Dec mean rainfall deciles for twelve moderate to strong El Nino events



Source: Australian Bureau of Meteorology

Figure 19: Australian Dec-Feb mean rainfall deciles for twelve moderate to strong El Nino events



Source: Australian Bureau of Meteorology

Rainfall

Figure 20: Relative rainfall – monthly

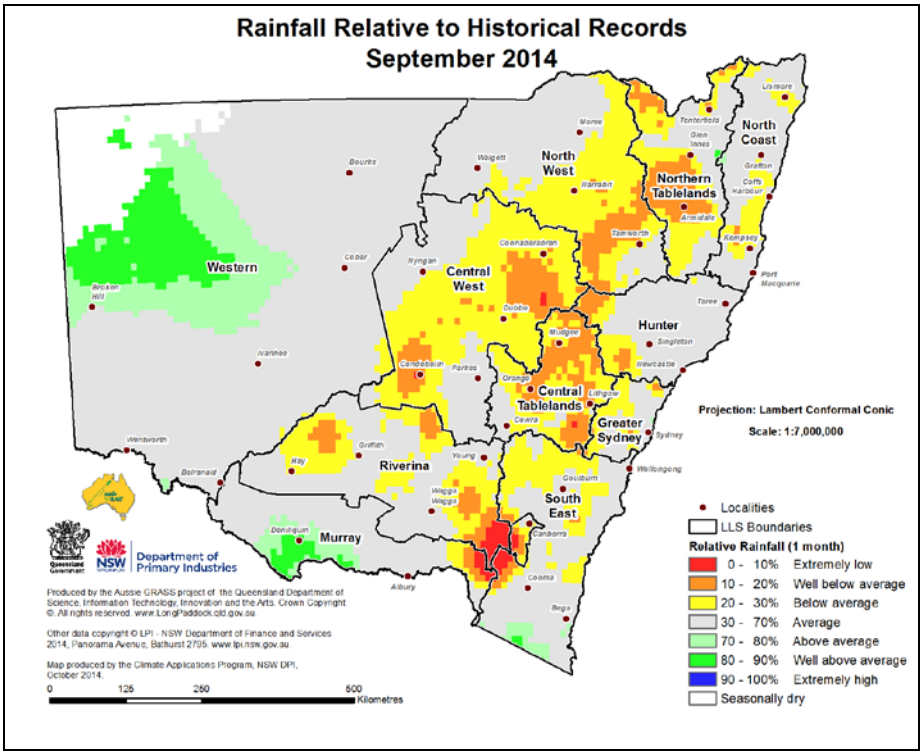


Figure 21: Relative rainfall – quarterly

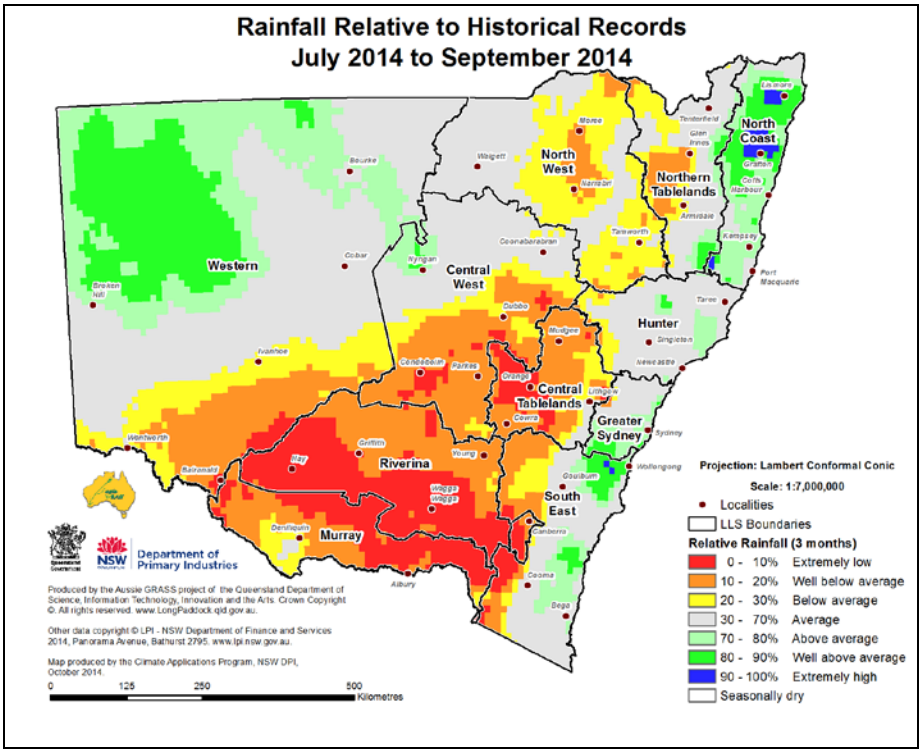


Figure 22: Relative rainfall – half yearly

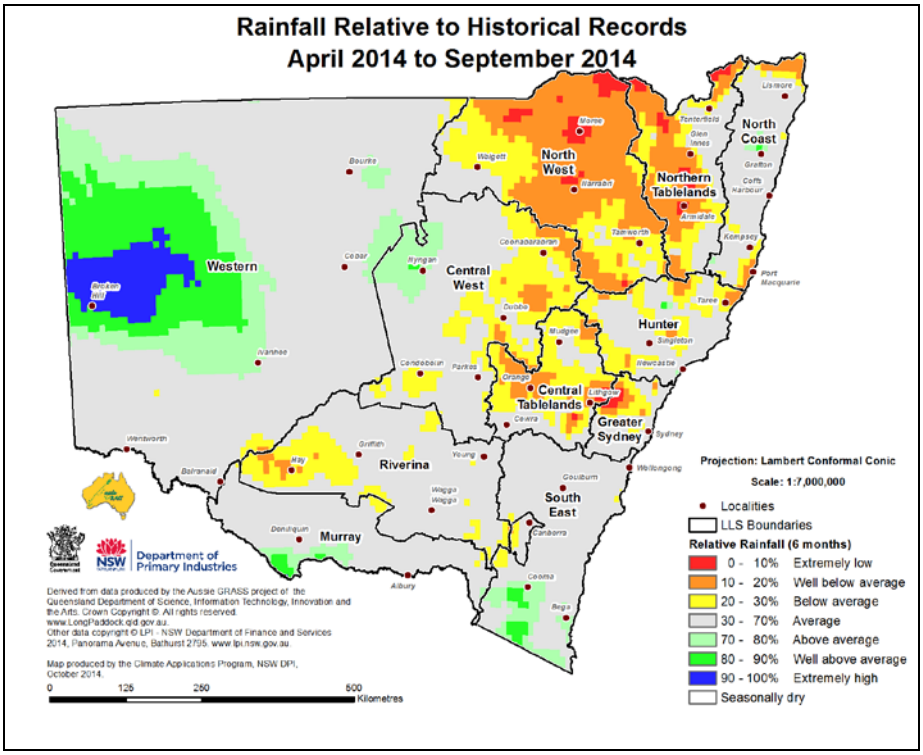


Figure 23: Relative rainfall – nine monthly

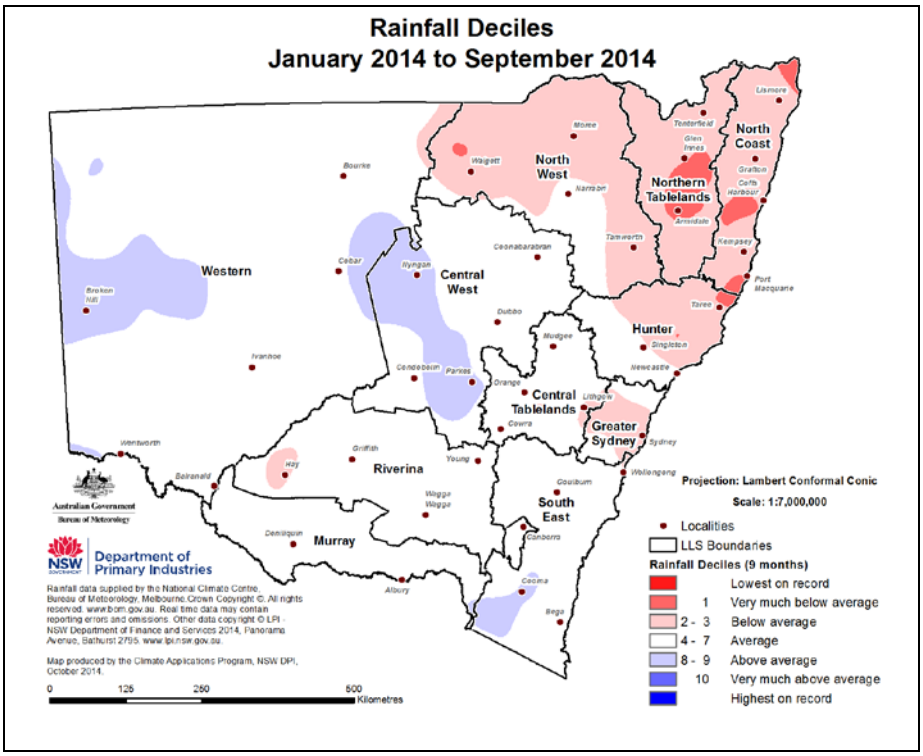


Figure 24: Relative rainfall – yearly

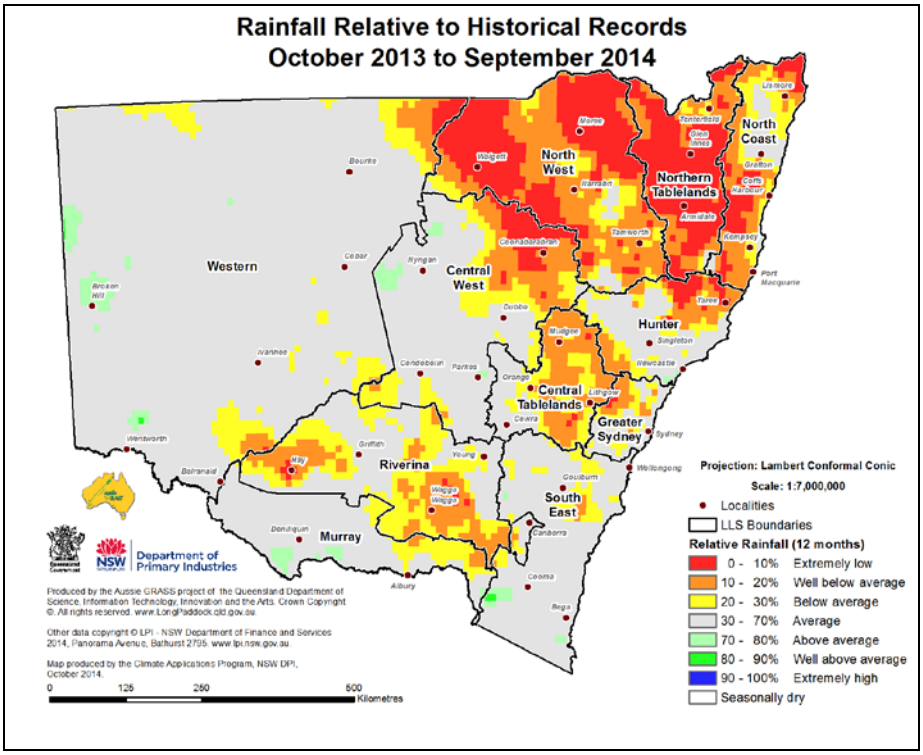


Figure 25: Total rainfall – monthly

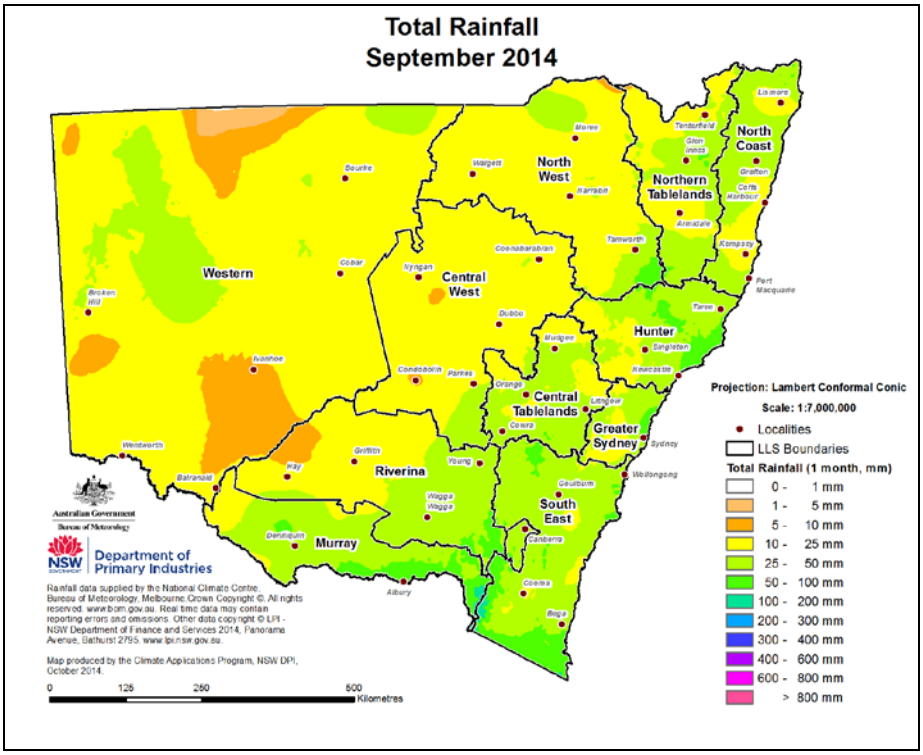


Figure 26: Total rainfall – quarterly

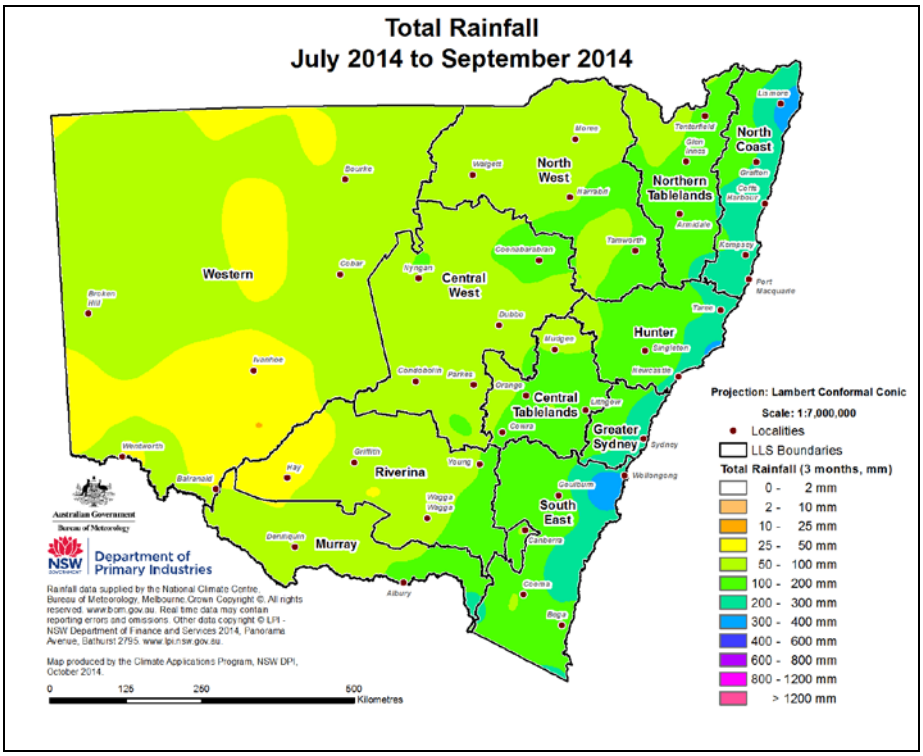


Figure 27: Total rainfall – half yearly

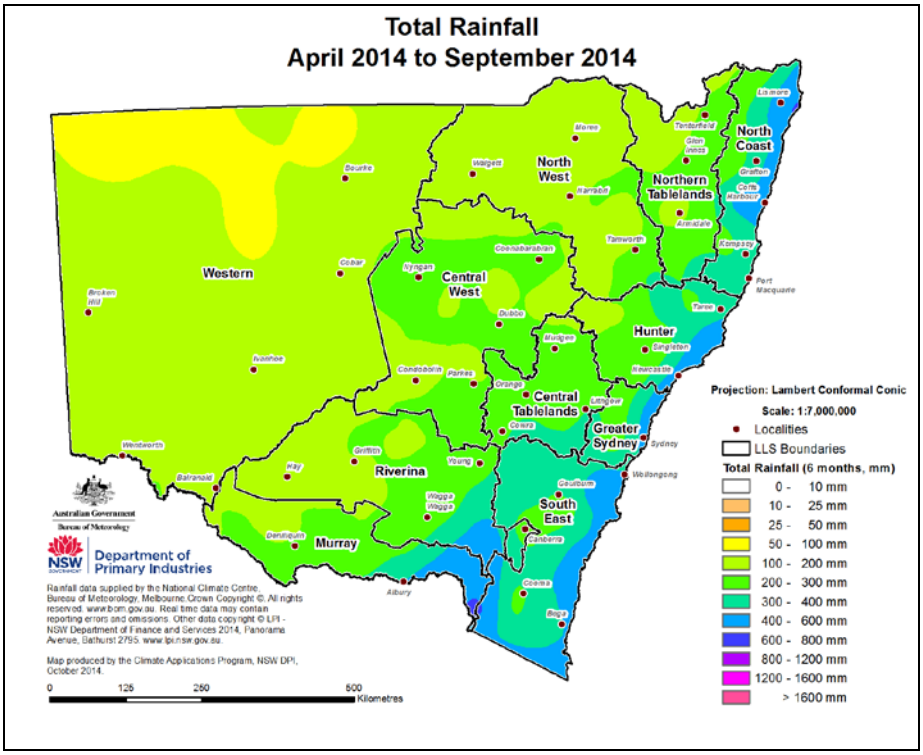
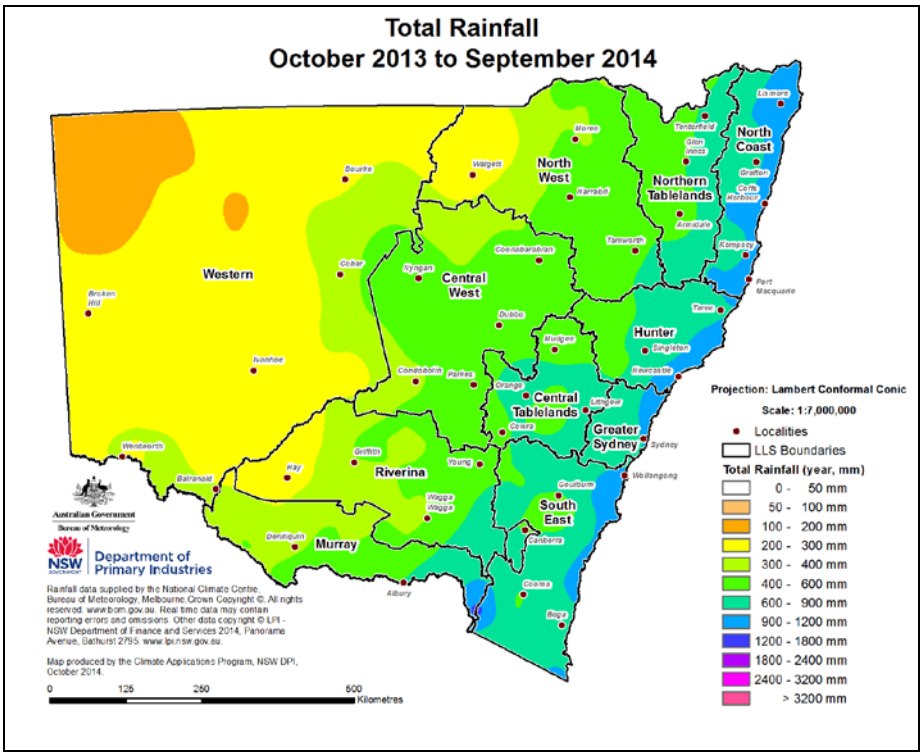


Figure 28: Total rainfall – yearly



Temperature

Note - The data used to create the temperature anomaly maps in Figure 29 and Figure 30 are slightly different from that used to create the anomaly maps on the Bureau of Meteorology website. The website maps are more accurate and should be used in preference.

Figure 29: Maximum monthly temperature anomaly

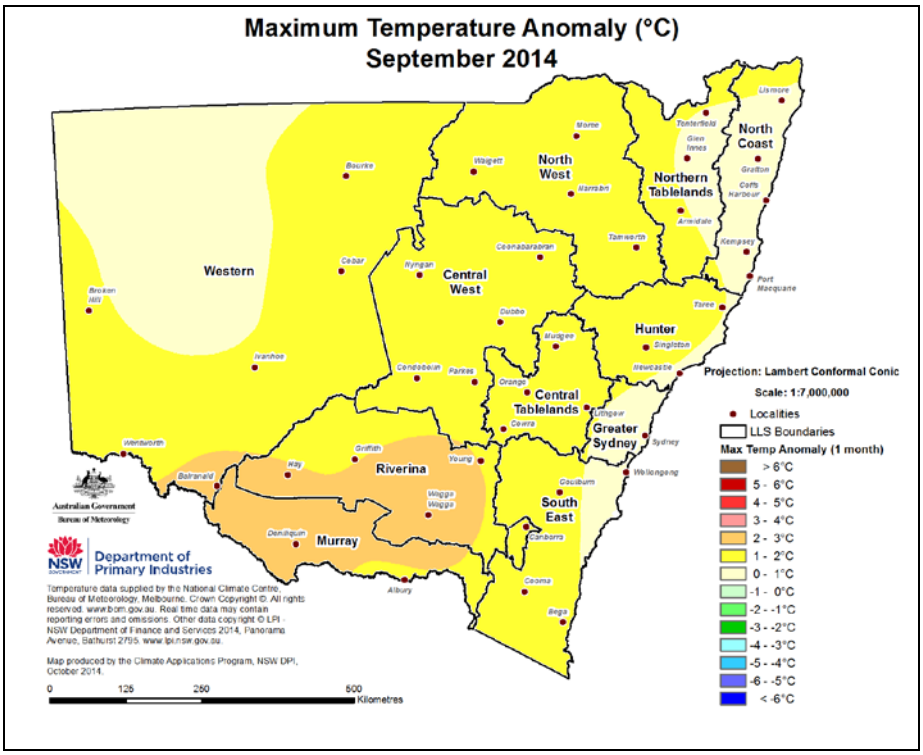
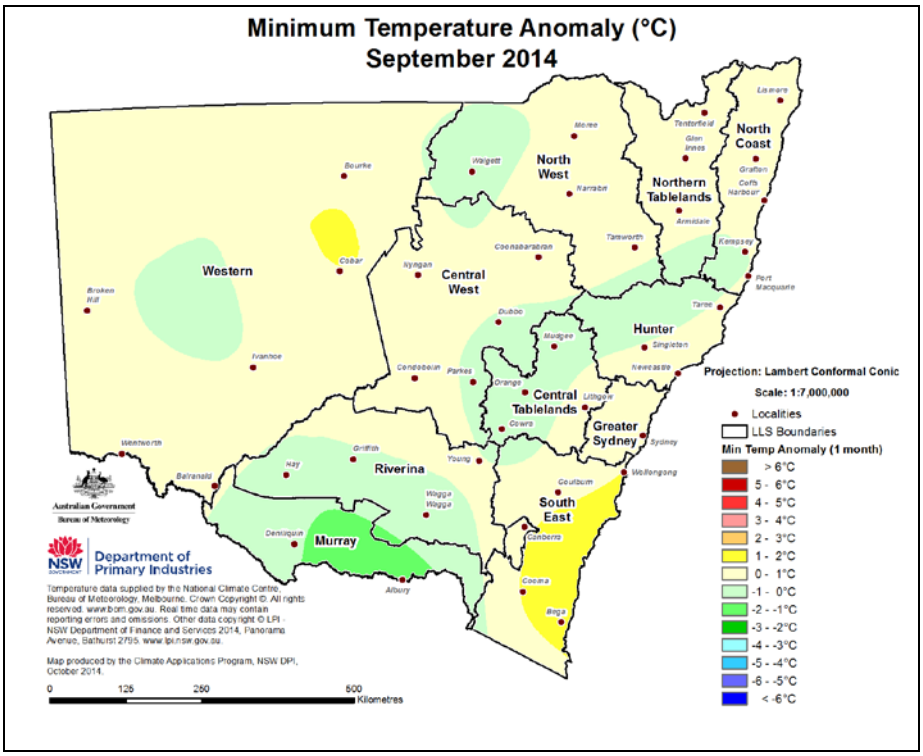


Figure 30: Minimum monthly temperature anomaly



Soil moisture

Figure 31: Relative monthly topsoil moisture (fraction of a saturated profile)

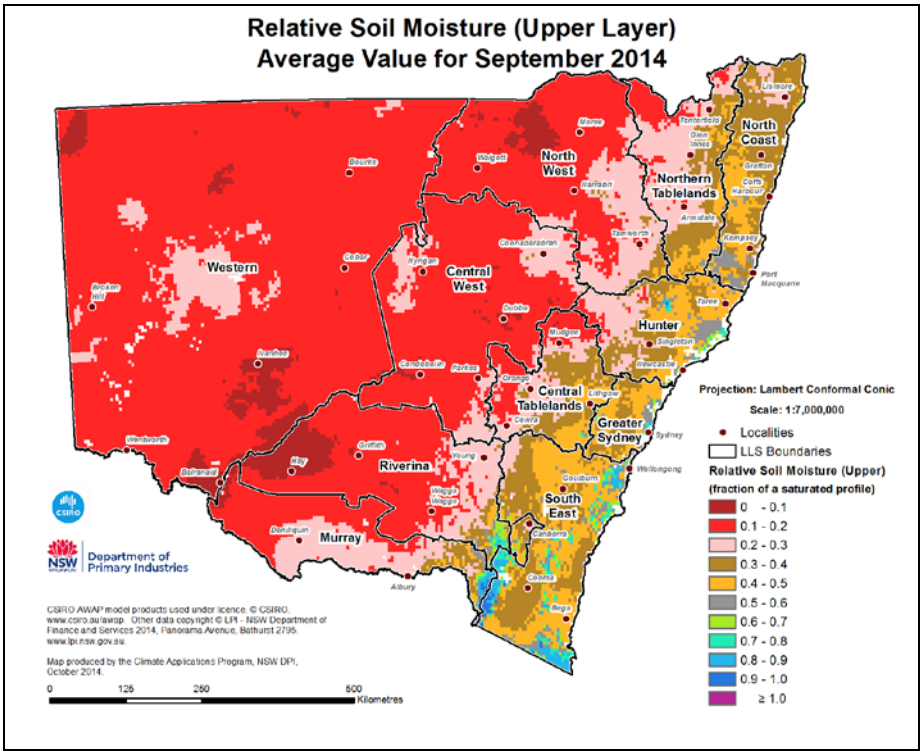


Figure 32: Relative monthly subsoil moisture (fraction of a saturated profile)

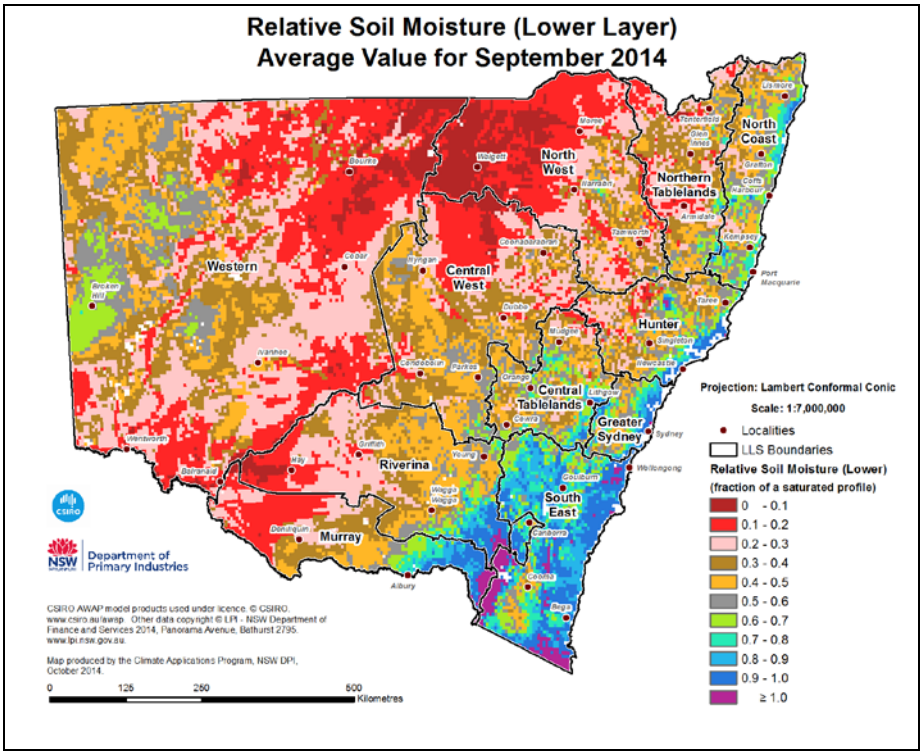


Figure 33: Relative monthly topsoil moisture (percent rank)

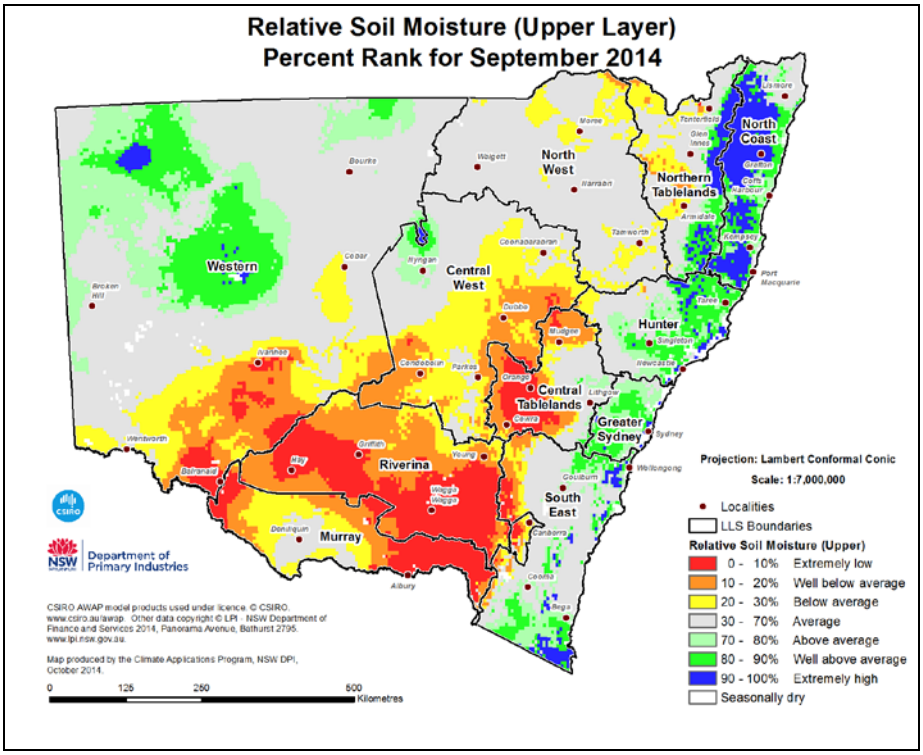
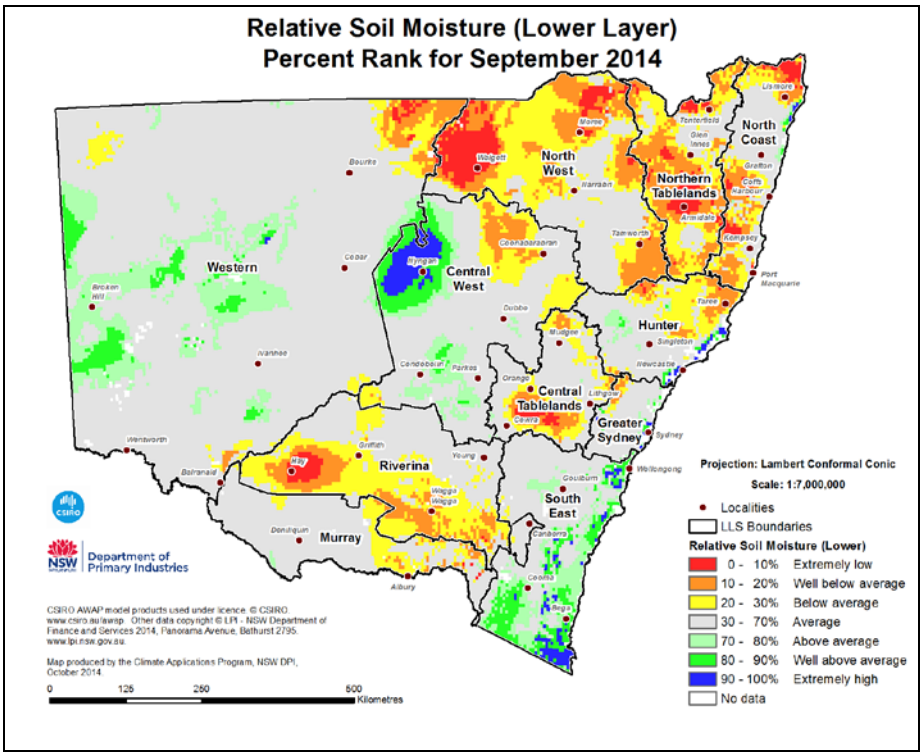


Figure 34: Relative monthly subsoil moisture (percent rank)



Pasture growth and biomass

Figure 35: Modelled pasture growth

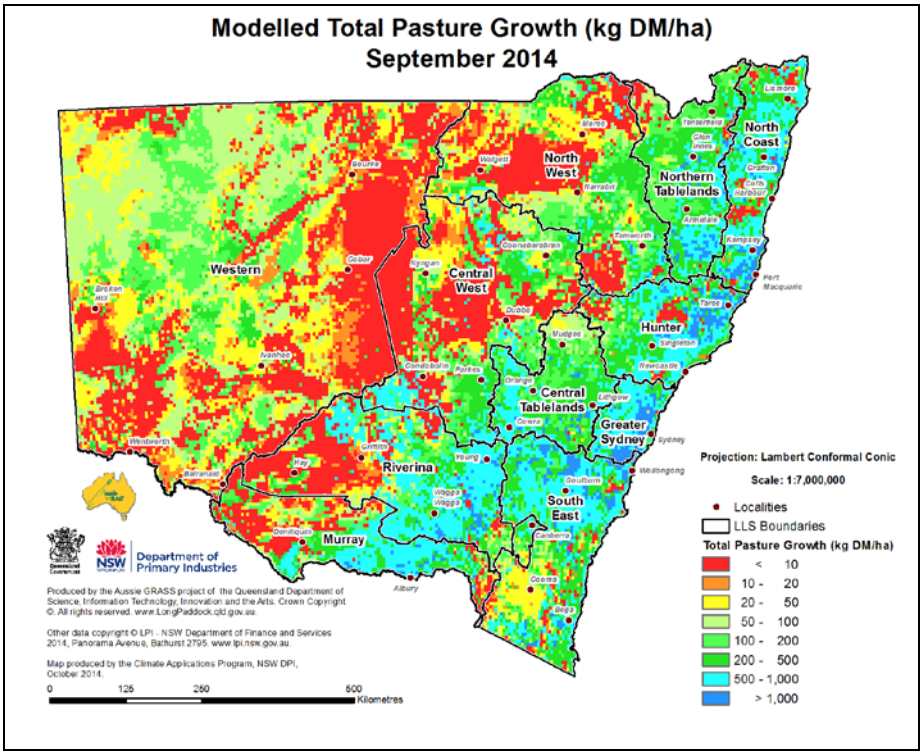


Figure 36: Modelled biomass

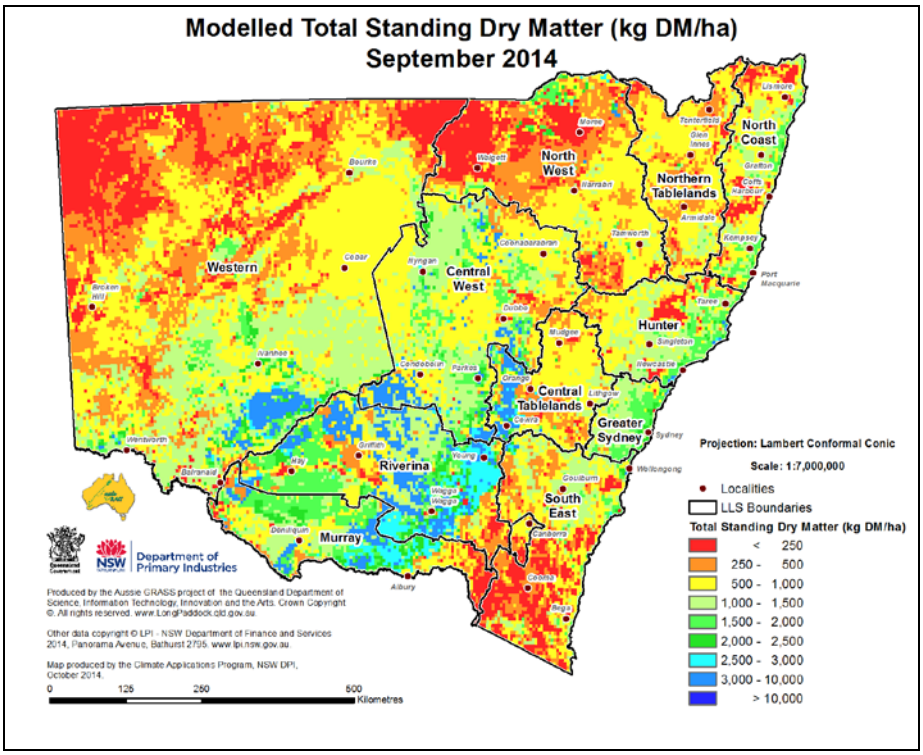


Figure 37: Relative pasture growth – monthly

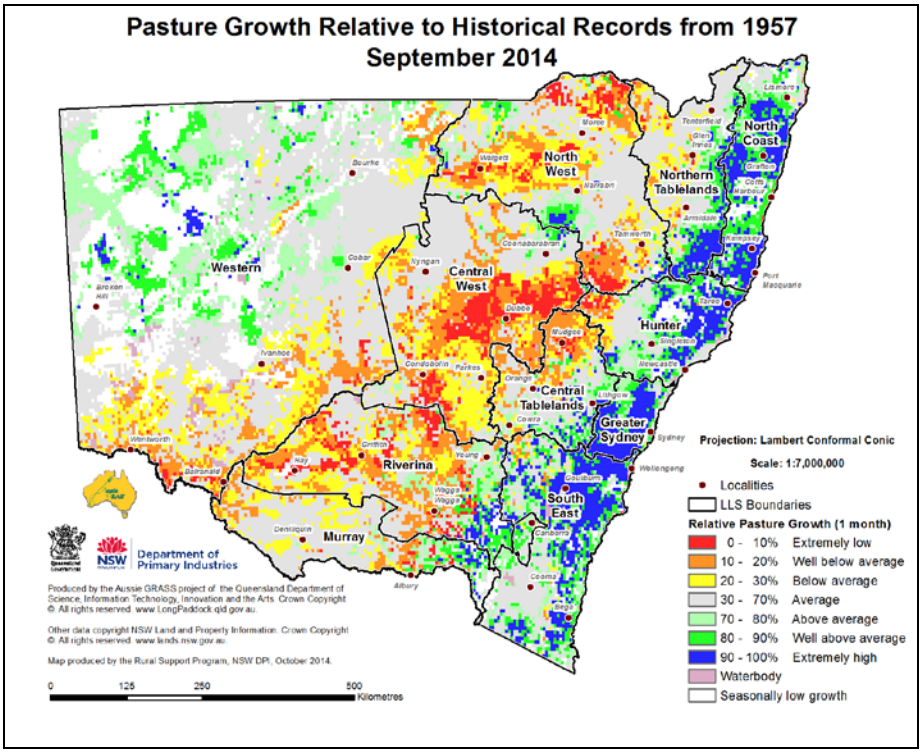


Figure 38: Relative pasture growth – quarterly

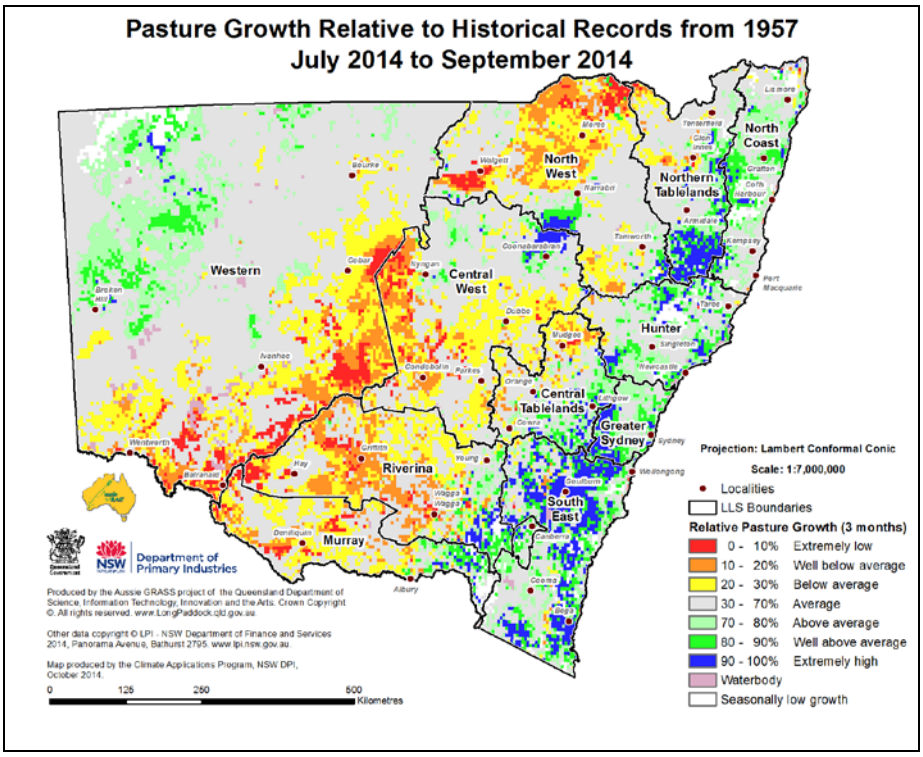


Figure 39: Relative pasture growth – half yearly

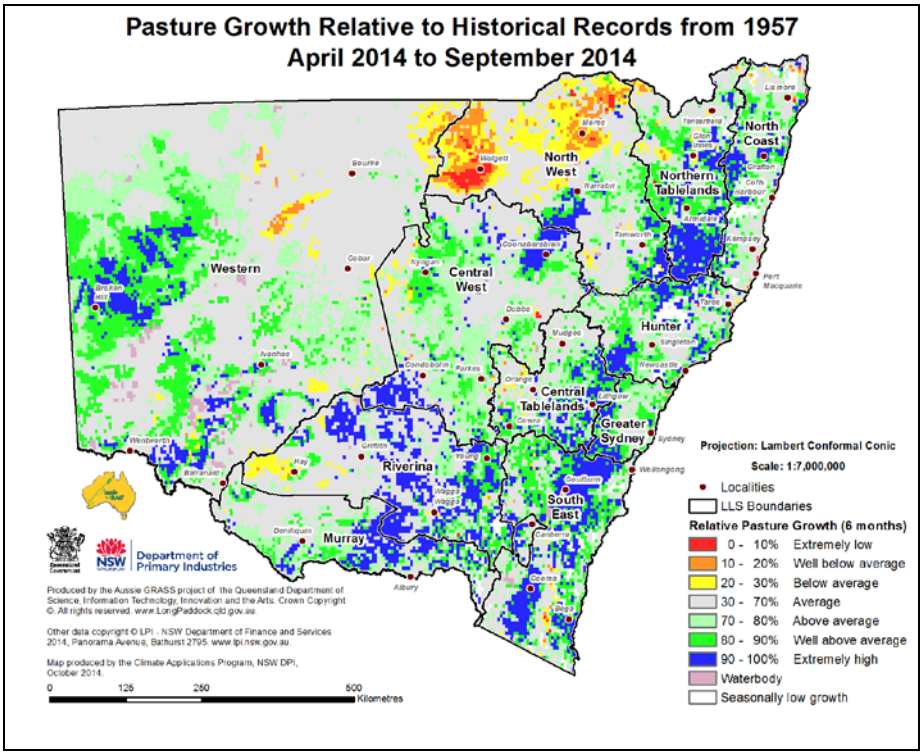


Figure 40: Relative pasture growth – yearly

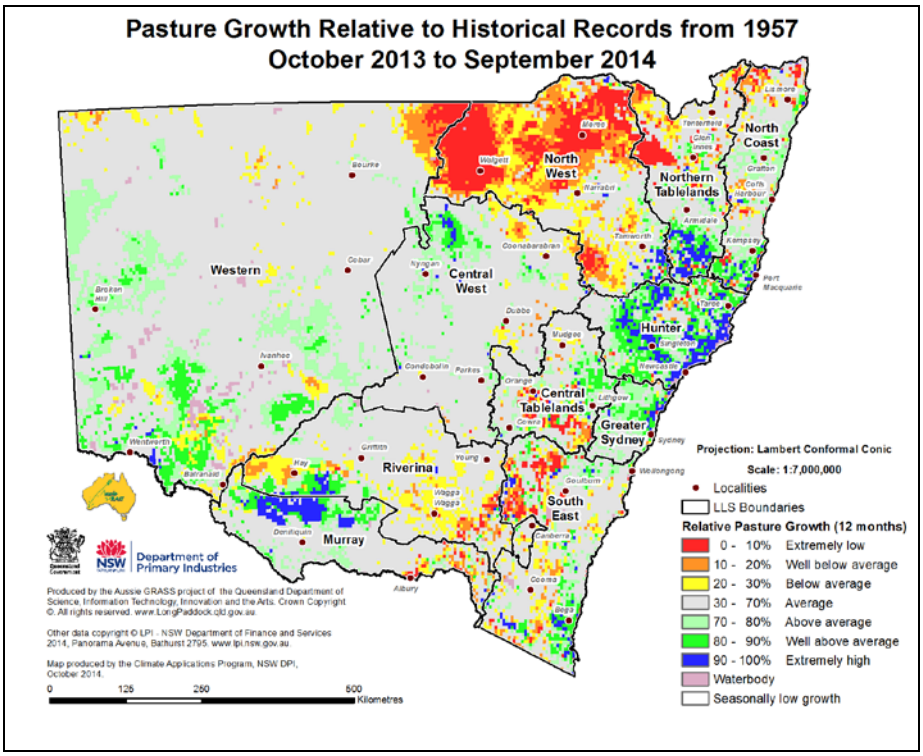


Figure 41: Relative biomass – monthly

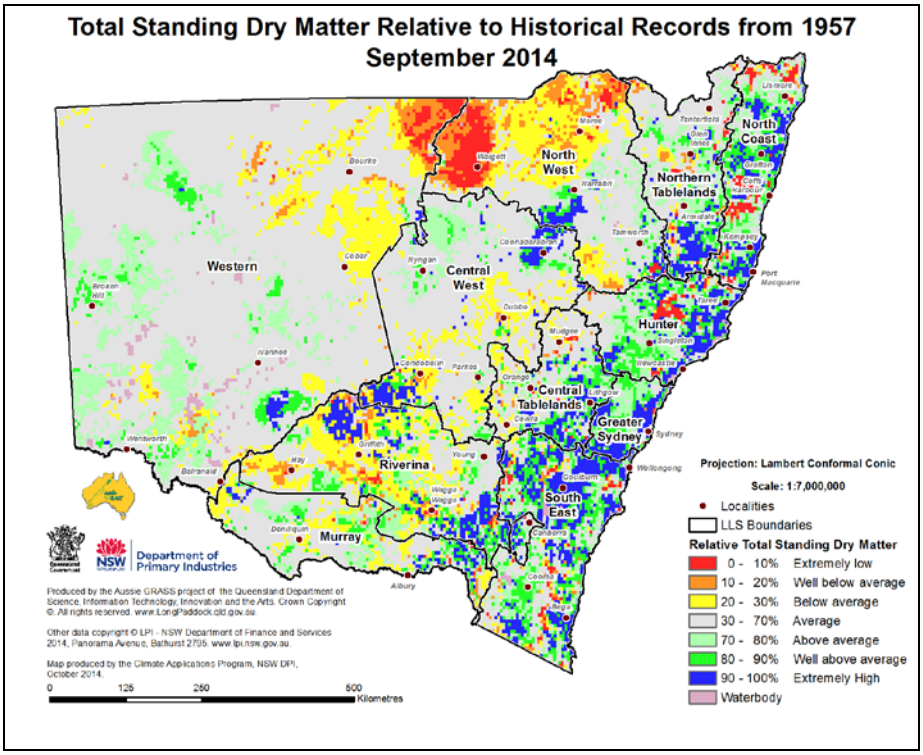
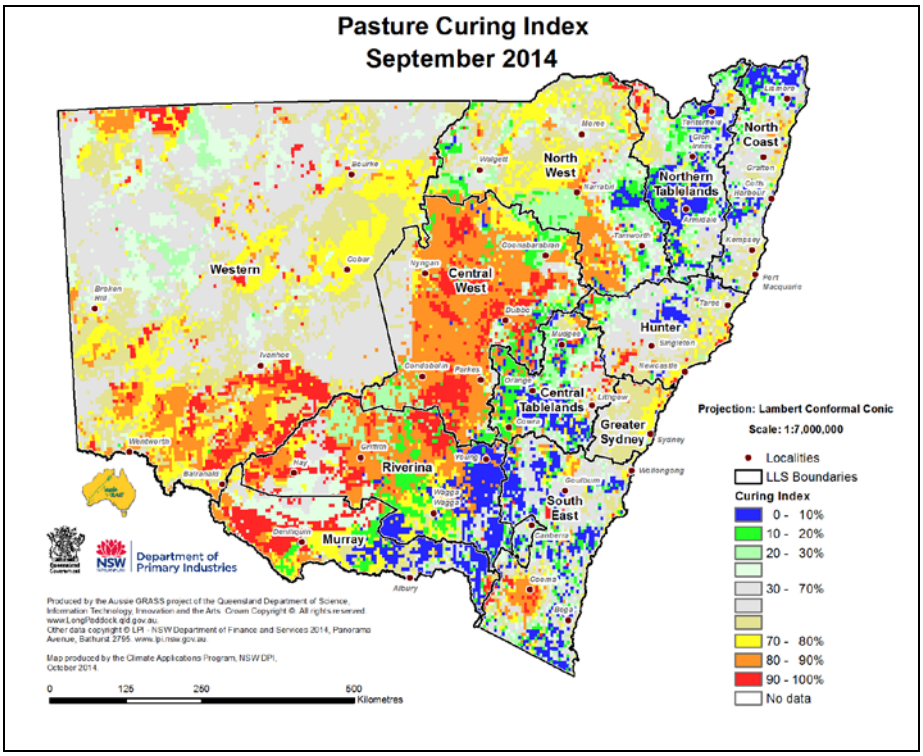


Figure 42: Pasture curing index



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, is available at http://www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/regional-seasonal-conditions-reports. A link to join the Seasonal Conditions mailing list is also available at that site.

A four-page simplified summary of the seasonal outlook and the current conditions is provided in the NSW Climate Summary, available at www.dpi.nsw.gov.au/agriculture/emergency/seasonal-conditions/summary.

Acknowledgments

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