Department of Primary Industries

NSW Seasonal Conditions Report - July 2014

Highlights

- Rainfall over June was near average over most of NSW, lower over the mid-north to north coast and far south west and higher over central and south eastern areas.
- Drier and warmer than normal conditions are likely between July and September.
- ENSO remains neutral, with a continued 70% chance of an El Niño event occurring during spring. An atmospheric response to the ocean conditions has not yet occurred.
- Pasture growth was good over central, southern and western areas, but remained slow on the tablelands and coast. Relative quarterly growth was average or better over 93% of NSW. Biomass was low over the north west and coast. Areas are experiencing a 'green drought'.
- Crop development is good across southern/central areas, but poor in the north. Early sown canola is flowering.
- Stock water supplies remain variable in some areas.
- 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 June was average over most of NSW, with below average areas across the north to mid north coast and over the far south west. A large area of central and southern/south eastern NSW received above average rainfall. Areas in the north west received near average rainfall.

Good pasture growth occurred over central and western NSW. Growth improved in areas of the north west, deteriorated in the far north west and remained slow over the tablelands and coast. Biomass was low over the north, tablelands, coast and south east. Some areas experienced a 'green drought'.

Early and mid-season winter crops progressed well, but development of late sown crops remained slow. Early sown canola commenced flowering, and is at risk from frosting. Crop condition remains good in the south and reasonable to good in central areas, but is poor in areas of the north. Good rainfall is essential in July-August, particularly for crops in the north.

Drier than normal conditions are likely between July and September across most of the State, with warmer than normal daytime and overnight temperatures. Over July, drier than normal conditions are likely, with warmer daytime temperatures and cooler overnight temperatures.

ENSO remains neutral, but there is about a 70% chance of an El Niño event developing in spring. A weak to moderate event is considered likely. The Bureau of Meteorology's El Niño alert remains active. The Pacific Ocean remains primed for an event, although recently the NINO3.4 region cooled slightly. An atmospheric response has still not occurred, despite a recent fall in the SOI.

Most of NSW had average rainfall during June. In relative terms, it was low across much of the mid-north to north coast and far south west. Rainfall over most areas ranged from 25-100 mm, but was lower in the far west, mid north to north coast and areas of the north west. Daytime temperatures were slightly above average, particularly over the coast and north east. Overnight temperatures were above average, except over the west and north east.

In relative terms, quarterly rainfall was average over 47% of NSW and above average over 34%. Half yearly relative rainfall was average or above over 82% of NSW. Over both periods, relative rainfall was low across the north west, north east and areas of the coast.

Modelled topsoil moisture improved during June across central, southern and south eastern NSW. Subsoil moisture improved in the south and central west, but fell on the north coast.

Stock water supplies remained variable. Yearly streamflow analysis showed below average run off over the tablelands, coast, north-central west and Riverina.

Relative pasture growth improved over the north west and was average or better over 82% of NSW. Quarterly relative growth was average or above over 93% of NSW. Half yearly relative growth was similarly high with only the north west and south east being low. Relative biomass levels were generally good, but were low over the north west and areas of 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 9 July 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 higher 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 June and early July and were up to date as at 9 July 2014.

2.1 Seasonal outlook summary

Table 1: Seasonal (quarterly) outlook summary

	Current Outlook	Previous Outlook
Rainfall (quarter)	Drier	Drier
Max Temperature (quarter)	Warmer	Warmer
Min Temperature (quarter)	Warmer	Warmer

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 (BoM)

- For the three month period from July to September, drier than normal conditions are likely across most of the State, with the chances of exceeding median rainfall at between 25-40%. That is, the chances of receiving below median rainfall are 60-75%.
- In the far west, south and along most of the south coast the chances are marginally better, with a 40-45% probability of exceeding median rainfall.
- In the far south eastern corner of the State (south of Cooma), the chances of drier or wetter than normal conditions are near equal (Figure 7).
- This means that for every ten years with similar climate patterns to those at present, across most of NSW about three to four July to September periods would be expected to be wetter than normal and six to seven drier than normal.
- The outlook accuracy (confidence or skill) is moderate across most of NSW, ranging from 55-65%. However, accuracy is low (less than 55%) in the far west, across areas of the central west, the Hunter valley and the south east (Figure 10).

2.3 Seasonal temperature outlook

- Over the three month period from July to September, warmer than normal daytime temperatures are likely across most of NSW (Figure 8).
- The chance of exceeding median maximum temperatures ranges from 65% to more than 80% across most of NSW, with the highest probabilities in the north east of the State.
- However, an area in south eastern NSW extending from the south coast to Corowa, and running from Cooma to the south of Canberra has a near equal chance of warmer or cooler than normal daytime temperatures.
- This means that for every ten years with similar climate patterns to those at present, across most of NSW about seven to eight June to August periods would be expected to have warmer than normal daytime temperatures, and two to three cooler than normal daytime temperatures.
- The outlook accuracy (confidence or skill) is moderate to high (55-75% or more) across most of NSW, but low in an area of western NSW between Broken Hill, White Cliffs and Tilpa. Outlook accuracy is also low along the mid-north to north coast, but very high in an area of the south east (Figure 10).
- Warmer than normal overnight temperatures are likely across NSW between July and September.
- The probability for warmer than normal overnight temperatures is highest across the east of the State, being greater than 75%. Over most of the State, probabilities of exceeding the median minimum temperature range between 60-75% (Figure 9).
- The outlook accuracy (confidence or skill) for the minimum temperature outlook is low (less than 55%) across the western, central and south eastern areas of NSW, but moderate (55-65%) across an area in the

east-north east, running from Wollongong to the north, and from Bathurst to Moree (Figure 10).

2.4 Monthly rainfall and temperature outlook (BoM, experimental)

The monthly 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 also may differ from the operational seasonal outlooks as they may be based on a different number of scenarios (ensembles). 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

	July	August
Rainfall	Drier	Drier Neutral (north & mid-north coast & far north west)
Max Temperature	Warmer Neutral (south east)	Warmer
Min Temperature	Cooler Neutral (coast)	Warmer Neutral (south-central)

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.

July

- Drier than normal conditions are likely across NSW on the experimental July outlook (Figure 11). For most of the State, the chances of exceeding median rainfall are less than 20%. The outlook has a moderate accuracy (skill) over most of the State, but has low skill in the far south west.
- Warmer than normal daytime temperatures are likely (a more than 80% chance) across NSW during July, except for the far south east (Figure 11). This outlook has a moderate accuracy (skill).
- Cooler than normal overnight temperatures are likely across most of NSW during July, particularly across the central and southern tablelands and areas of the central west (Figure 11). For areas of the south and mid-north coast, the chances of warmer or cooler than normal overnight temperatures are near equal. However, this outlook has a low accuracy (skill) over northern and western NSW and the coastal areas.

July multi-week (as at 6 July)

- Weekly experimental outlook information suggests that in the third and fourth week of July (13-26 July) drier than normal conditions are likely across most of NSW, particularly in the south and far south west. The accuracy (skill) for this outlook is moderate for most of NSW, but low for the north east and far south west.
- Daytime temperatures over the third and fourth week of July are likely to be warmer than normal across NSW, particularly in the eastern, central and southern areas. This outlook has moderate accuracy (skill).
- Overnight temperatures over the third and fourth week of July are likely to be cooler than normal across most of NSW, with near equal chances for cooler or warmer than normal conditions over the north west. Warmer than normal overnight temperatures are likely in the far south east. The accuracy (skill) level for this outlook is moderate over most of NSW.

August

- The experimental outlook for August indicates drier than normal conditions are likely across the central and southern areas of the State, and the north west, where there is a 30-40% probability of exceeding the median rainfall (Figure 12). Over areas of the far north west and far west, there is a near equal chance of wetter or drier than normal conditions. The accuracy (skill) for this outlook is moderate over most of NSW, but low for the coast.
- Warmer than normal daytime temperatures are likely over August, particularly in the eastern and central areas (Figure 12). There is a 60% or higher chance of exceeding median maximum temperatures across NSW, increasing to more than 80% in the east. The skill for this outlook is moderate.
- Warmer than normal overnight temperatures are likely across most of NSW in August, particularly along the coast. Across the south of the State, there is a near equal chance for cooler or warmer than normal conditions (Figure 12). However, the accuracy (skill) for this outlook is low.

2.5 Other climatic models

Bureau of Meteorology statistical model (superseded)

The Bureau of Meteorology statistical outlook is based on past trends in sea surface temperatures and their relationship to rainfall and temperatures across Australia. These historical relationships and current observations are used to produce the outlook. The statistical model outlooks have been superseded by the outlooks from the POAMA model, and the information is provided for comparative purposes only.

In comparison, the output of the POAMA model takes account of more data and has better skill. Skill assessments for the statistical model are available via this link.

- The Bureau of Meteorology's statistical model indicates drier than normal conditions are likely across northern and eastern NSW over next three months (a 30-40% probability of exceeding median rainfall). A nearly equal probability for wetter or drier conditions exists over the south and south west of NSW (a 45-50% chance of exceeding median rainfall).
- The statistical model indicates that there is a likelihood of warmer than normal daytime temperatures across most of NSW, with a elevated chance of warmer than normal temperatures in the north (a 65-75% probability of exceeding the median maximum temperature) and a somewhat lower probability in the south (55-65%).
- The statistical model indicates a near-equal probability of warmer or cooler than normal overnight temperatures across the State (a 50-60% probability), with a slightly lower probability exceeding median overnight temperatures over the north and north east (45-50%).

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 a roughly equal probability (40-60%) for wetter or drier conditions across most of NSW between July and September. Some areas in the far south west and the central to mid-north coast have a reduced probability of exceeding average rainfall (20-40%). The skill assessment for this outlook is high across most of NSW, but low for the far north west. The model indicates that above average temperatures (a 60-80% probability) are likely for the period across most of NSW, particularly along the coast and in south western NSW (more than 80% probability). The skill assessment for this outlook is low for south western and western NSW, and low-moderate for the remainder of NSW.
- For August to October, the UK Meteorology Office's global long range probability modelled output indicates a near-equal probability for wetter or drier conditions across NSW. There is an increased chance of wetter than normal conditions in the south west (a 60-80% probability of above average precipitation). The skill assessment for this outlook is moderate over most of NSW. For temperature, the outlook indicates that warmer than normal conditions are likely with a 60-80% probability of exceeding the average temperature over most of NSW, increasing to more than 80% probability in the far south west. The temperature outlook has a moderate skill over most of NSW, although skill is low in areas of the north of the State.

APEC Climate Centre

- The APEC Climate Centre's deterministic multi-model ensemble outlook of rainfall anomalies for July to September indicates that near normal rainfall is likely across most of the State, with potentially drier conditions in the north east. The temperature anomaly outlook indicates the likelihood of warmer than normal temperatures, particularly in the far north west, but near normal temperatures in the south east along the tablelands and slopes. No skill assessment is available for these outlooks.
- During July, the APEC Climate Centre's rainfall anomaly outlook indicates a likelihood of near normal rainfall across western, central and south eastern NSW. Drier than normal conditions are likely in the north east and on the mid north coast. The temperature anomaly outlook indicates warmer than normal temperatures are likely in the south and south west, and cooler than normal to normal temperatures are likely in the north east. No skill assessment is available for these outlooks.

2.6 El Niño-Southern Oscillation (ENSO)

ENSO summary

- ENSO is currently neutral, but there is still about a 70% chance that El Niño conditions will develop by spring.
- The Pacific Ocean remains primed for an El Niño event to occur, with warmer than normal sea surface temperatures across the equator, but a consistent atmospheric response is necessary. The recent fall in the SOI and reappearance of weak westerly trade winds may indicate this is commencing.
- Most climate models are indicating a weak to moderate El Niño event, and forecasters consider a moderate event is likely.
- The severity of an El Niño event does not necessarily directly relate to the severity of the impact on rainfall. If warm sea surface temperatures remain around Australia, Indonesia and in the eastern Indian Ocean this assist in mitigating the effects of El Niño conditions.

ENSO outlook and comments

Table 3: ENSO/Climatic Outlook

	Current Outlook (early July)	**Previous Outlook** (early June)
ENSO (overall)	Neutral – El Niño likely	Neutral – El Niño likely
BoM ENSO Tracker Status	El Niño Alert	El Niño Alert
SOI	Neutral	Neutral (positive trend)
Pacific Ocean SST (NINO3.4)	Slightly warm/warm (Neutral – some models)	Neutral – slightly warm (warming trend)
Indian Ocean (IOD)	Neutral (currently slightly negative)	Neutral
Southern Annular Mode (SAM/AAO)	Weakly – moderately positive	Weakly - moderately positive

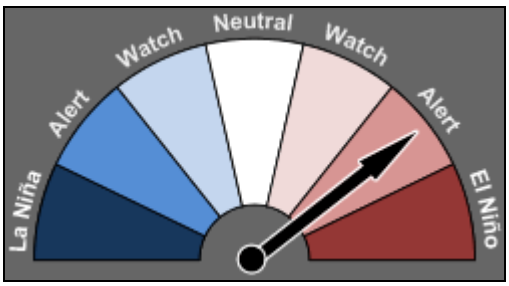
Summary Legend: Grey = Neutral, i.e. neither El Niño nor La Niña.
Red = El Niño/reduced rainfall trend.
Blue = La Niña/higher rainfall trend.

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

- Sea surface temperatures remain warm across the Pacific Ocean along the equator, particularly in the eastern Pacific.
- The warm anomalies have persisted in the eastern equatorial Pacific, while weakening near the International Date Line.
- In the key NINO3.4 region, the weekly sea surface temperature anomaly has declined slightly from slightly warm/borderline El Niño (+0.53°C) to the warm end of neutral (+0.39°C) (note that the Bureau of Meteorology uses an anomaly level of +0.8°C as an indicator of an El Niño event). However, above average sea surface temperatures are persisting in the eastern Pacific.
- Tropical rainfall has remained slightly enhanced over Indonesia and the western tropical Pacific, as indicated by weak negative outgoing long-wave radiation (OLR) anomalies. For an El Niño event to occur, rainfall tends to be reduced in this area.
- Some other indicators (such as the thermocline slope index and equatorial Pacific basin upper ocean heat anomalies) remain consistent with the development of an El Niño event.
- Sea sub-surface temperatures remain warm in the eastern and eastern-central Pacific. Cooler anomalies are now occurring at depth in the central Pacific.
- A continued decrease in the intensity of the sea sub-surface anomalies indicates a somewhat reduced risk of a strong El Niño event developing. At present, the Climate Prediction Centre (CPC) considers that a moderate event is slightly more likely. Most climatic models are indicating the likelihood of a weak-moderate El Niño event. Sea surface temperatures tend to lag the sub-surface temperatures, generally by a few months and with lesser intensity.
- A strong west to east gradient in temperatures, which would indicate El Niño-like oceanic and atmospheric coupling, has not yet occurred.
- However, the Madden-Julian Oscillation (MJO) recently moved into the western Pacific. Though weak, it is thought that this may provide a sufficient westerly wind burst to start an El Niño occurring. The fall in the SOI over recent weeks and reappearance of weak westerly winds may indicate this is commencing, but will need to continue if an El Niño is to occur.
- The Bureau of Meteorology's ENSO tracker (Figure 1) remains at El Niño 'Alert' level. In the past, about 70% of the time that this level

has been reached, an El Niño event has occurred.

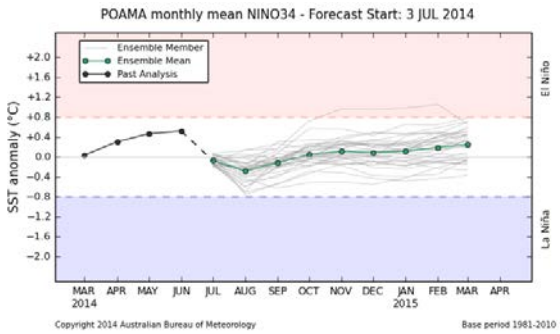
Figure 1: Bureau of Meteorology ENSO tracker status



Source: Australian Bureau of Meteorology

- Five to six of the eight global climate models surveyed by the Bureau of Meteorology indicate sea surface temperatures are likely to be at El Niño levels by September to November.
- 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 decline to neutral levels (Figure 2). There has been a recent slight decline in the NINO3.4 temperature anomaly back to neutral levels, although short term fluctuations have occurred previously.

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 are 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 July) still indicates the likelihood of a weak to moderate El Niño event developing during the remainder of the year. There has been no significant change in model forecasts since last month, and CPC/IRI rate the chances of an El Niño event occurring as 68% during July to September, reaching 76-78% in the spring and summer (Table 4).

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

Season	La Niña	Neutral	El Niño
Jun-Aug	1%	35%	64%
Jul-Sep	1%	31%	68%
Aug-Oct	1%	27%	72%
Sep-Nov	1%	23%	76%
Oct-Dec	1%	21%	78%
Nov-Jan	2%	20%	78%
Dec-Feb	3%	22%	78%
Jan-Mar	3%	25%	72%
Feb-Apr	3%	28%	69%

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

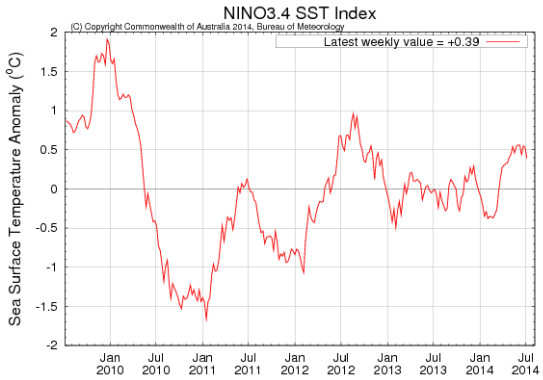
- If an El Niño event does occur, it is still too early to reliably determine its strength. Most forecasters consider that a moderate event is likely. If an event does occur, it is likely to continue throughout the remainder of 2014.
- Note that the CPC/IRI classifies values of the NINO3.4 index between -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 in 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 majority of the equatorial Pacific remains warmer than normal, although there has been a recent weakening of temperature anomalies in the central equatorial Pacific near the International Date Line.
- Most warming occurred in the eastern tropical Pacific near the coast of South America.
- The most recent monthly temperature index value in the key NINO3.4 region is 0.46°C for June, unchanged since May. Weekly sea surface temperatures have declined slightly in the NINO 3.4 and 4 regions, with levels now at +0.39°C (Figure 3) and +0.3°C respectively. Temperatures in the NINO 3 and NINO 1+2 regions remain high.
- Warm anomalies continue to be present around much of the Australian coastline, and

extend into areas of the Indian Ocean and East China Sea. These conditions are not typical of an El Niño event, and may help to minimise its effects on rainfall.

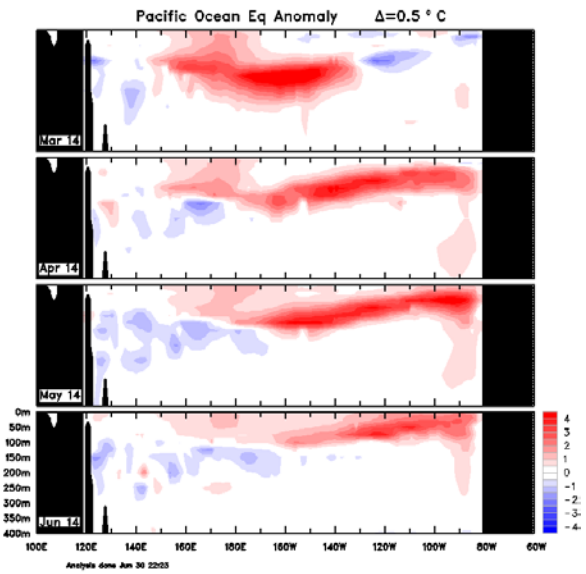
Figure 3: NINO3.4 Sea Surface Temperature Index



Source: Australian Bureau of Meteorology

- The sub surface sea temperatures in the equatorial Pacific show the eastwards movement of a strong warm anomaly, typical of a developing El Niño event (Figure 4).
- Sub surface temperatures in the eastern equatorial Pacific are currently more than 3°C warmer than normal, but have cooled in the eastern and central equatorial Pacific, particularly at depth.
- This weakening in temperature anomalies represents the upwelling phase of the Kelvin wave that caused the warming to occur. Downwelling and warming occurs in the leading edge of a Kelvin wave, and upwelling and cooling in the trailing edge.

Figure 4: Monthly sea sub-surface temperatures



Source: Australian Bureau of Meteorology

Southern oscillation index (SOI)

- The monthly value of the Southern Oscillation Index is currently in the neutral range.
- From a level of +11.0 in mid June, the SOI undergone a rapid decline to -5.3 in early July. It has since increased slightly to a level of -3.2 (Figure 5, Table 5).

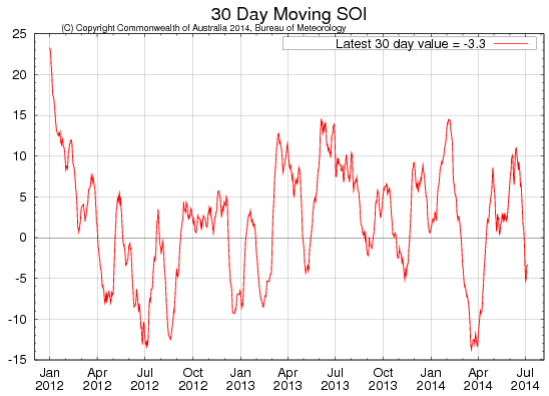
Table 5: Values of the Southern Oscillation Index

	Current monthly value (9 July)	Previous monthly value (9 June)
SOI (30 day)	-3.2	+7.2

Source: Australian Bureau of Meteorology.

- The rapid decline in late June/early July was an indication that atmospheric-oceanic El Niño coupling might be commencing, but the SOI has currently ceased falling and remains in the neutral range.

Figure 5: 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)

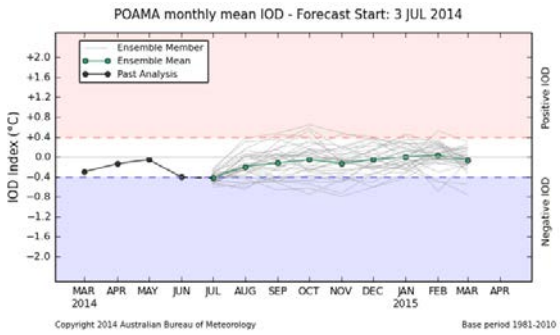
- The sub-tropical ridge remained near its normal winter position during the month, as indicated on NOAA and Bureau of Meteorology mean sea level pressure charts.
- The current position near 30°S has allowed cold fronts through into southern Australia over the last month.

- The sub-tropical ridge is a zone of high pressure which between November and April is normally located south of Australia at about 40°S, and tends to suppress cold front activity. During winter, it generally moves northwards to around 30°S, allowing cold fronts to extend further into southern Australia.

Indian Ocean dipole (IOD)

- The Indian Ocean dipole has been at negative levels for the last four weeks. The latest IOD index value for the week ending 6 July is -0.60°C.
- This is due to a cooling in the tropical western Indian Ocean to near normal levels, and continued warm temperatures in the eastern Indian Ocean to the north west of Australia. However, this is not considered a negative IOD event.
- The Bureau of Meteorology's POAMA model and all but one climate model surveyed by the Bureau of Meteorology favour a neutral IOD over the coming months (Figure 6). Variability in the ensemble members (grey lines) of the outlook is quite high.
- The chances for a positive IOD event will increase if an El Niño event occurs. The IOD is consistent with El Niño or La Niña conditions in the Pacific about 70% of the time. A positive IOD in conjunction with an El Niño event can cause further reductions in rainfall.

Figure 6: 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 near normal along the equator near the central to eastern tropical Pacific. Westerly anomalies have occurred in the western tropical Pacific, possibly as a result of the Madden-Julian Oscillation.
- Over the last 30 days, low-level westerly wind anomalies occurred in the eastern equatorial Pacific. Weak low level easterly wind anomalies occurred in the western equatorial 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.
- Weakening of the trade winds over January and February allowed a strong warm anomaly in the sea sub surface of the western tropical Pacific to move eastwards into the central Pacific (an equatorial Kelvin wave - Figure 4).
- Cloud conditions at the equator near the International Date Line are fluctuating around the long term average. Currently (early July) they are slightly below average. Convection was enhanced near and just west of the International Date Line and over portions of Indonesia.
- Cloud conditions were generally above average between late February and late April, decreased between late April and early May, and were generally slightly above average from mid May to late June.

  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 to moderately positive, and ranged between weakly to moderately positive in June.
- The SAM index value from POAMA (as at 6 July) and the AAO index value from NOAA (as at 7 July) were weakly-moderately positive at about +1.5.
- The outlook from POAMA indicates the SAM index to remain weakly-moderately positive until mid-July, before falling to be neutral to weakly negative. The NOAA outlook suggests the index will increase to be moderately positive (+2 to +2.25) by mid July, then decline to be near neutral.
- 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.

Atmospheric pressure and NSW cloud conditions

- Atmospheric pressure during June was near normal across much of the State, slightly above normal in the north and slightly below normal in the south. High atmospheric pressure can be linked to drier than normal conditions.

  Cloud conditions over NSW during June were generally below normal in the north of the State, and near normal in the south.

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 (Figure 13). However, this is not always the case.
- Lower than normal rainfall is more likely if a positive IOD event occurs in conjunction with an El Niño event (Figure 14).
- 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 current rainfall against that for the same period over every year since 1890 (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.

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	0%	7%	64%	29%
Quarter	0%	19%	47%	34%
Half year	0%	18%	51%	31%
Year	0%	43%	54%	3%

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

June

- Relative to historical records, rainfall for June was close to average over 64% of NSW, that is, rainfall of between the 4th and the 7th deciles.

- Above average rainfall occurred across nearly 30% of NSW (Figure 15, Table 6), extending across the central and south to south-eastern areas of the State. These areas generally received between 125-200% of their average rainfall, with some more favoured areas receiving 200-300% of their normal rainfall.
- The belt of above average rainfall extended from around Bourke, Cobar and Coonamble south east to Condobolin, Dubbo, Orange, Wagga, Cooma and Bega. It also extended to Deniliquin and Coonabarabran, and to areas of the north west near Collarenebri and Narrabri.
- The majority of Central West, Murray, Riverina LLS districts received above average rainfall, as did about half of the South East LLS district.
- Below average rainfall (rainfall in the 3rd decile or below) occurred over 7% of NSW during June, and was generally restricted to areas of the mid-north and north coast and the far south west. Some areas of the northern tablelands also received below average rainfall. These areas generally received between 20-80% of their average rainfall. For the affected coastal and eastern fall areas, this amounted to a deficit of between 25-100 mm.
- The remainder of the State, including most of the east, west and north west received average rainfall for the month.

April to June (3 months)

- Over the 3 month period from April to June, relative rainfall was average or above over more than 80% the State (Figure 16, Table 6).
- Below average rainfall was restricted to 19% of the State, extending across nearly 60% of the North West, 74% of Northern Tablelands, 84% of North Coast, 52% of Hunter, 87% of Greater Sydney and the northern 16% of South East LLS districts. Most of these areas had below to well below average rainfall, and received 20-60% of normal levels.
- Apart from an area between Pooncarie and Hay, the south and west of the State received above average rainfall for the period. This extended in a band from the far north western to the far south eastern corner of NSW. Some 85% of Murray LLS district received above average rainfall, as did 69% of Riverina, 46% of Western and 42% of South East.
- Areas along the Murray River, the alpine areas and near Broken Hill received extremely high relative rainfall over the period, receiving up to 200% of normal rainfall.

January to June (6 months)

- Over the six months to June, relative rainfall was average across 51% of NSW, and above average across 31% (Figure 17, Table 6).
- Much of the Northern Tablelands, North Coast and Greater Sydney LLS districts received below average rainfall over the period, as did areas of the North West, Hunter and South East LLS districts received below average.
- The majority of the North Coast and the north east of Hunter LLS districts received extremely low relative rainfall during the period, that is, rainfall in the lowest 10% of years. In particular, the north coast had a more than 200-400mm rainfall deficit for the last six months.
- Most of the central and southern areas of the State received above average rainfall, as did areas of the far west. These areas received up to 125-150% of normal rainfall.

October to June (9 months, BoM)

- Over the 9 month period from October to June, relative rainfall across the State was below average across the North West, Northern Tablelands, North Coast and Greater Sydney LLS district. Rainfall was also below average across the north and south of the Hunter LLS district, across the north of the South East LLS district and areas of the Central Tablelands LLS district.
- Scattered areas of below average rainfall also occurred across areas of the Western, Riverina and South East LLS districts (Figure 18).
- Most of these areas received between 60-80% of their normal rainfall, with an area between Walgett, Collarenebri and Lightning Ridge receiving 20-40% of normal rainfall. The north and mid-north coast received between 40-80% of normal rainfall.
- Areas of very much below average relative rainfall occurred in the far north west between Coonabarabran, Pilliga, Walgett, Collarenebri and Goodooga. Other areas extended from Moree to the east across most of the Northern Tablelands LLS district, across the north of the Hunter and much of the North Coast LLS districts.

- The remainder of the State has generally average relative rainfall over the period, with isolated areas receiving above average rainfall.

July to June (12 months)

- Over the twelve months to June, below average relative rainfall extended across most of the North West, Northern Tablelands North Coast and Greater Sydney LLS districts, as well as over areas of the Western, Central West, Hunter, South East and Central Tablelands LLS districts (Figure 19, Table 6), and covering 43% of NSW.
- Most of North West, Northern Tablelands, North Coast and Greater Sydney LLS districts received extremely low rainfall over the period, as did areas of Western, Central West, Hunter and South East LLS districts.
- Some 55% of the State, including most of the south east, southern, central and western areas had average relative rainfall for the period. Only isolated areas (including the alpine areas) received above average relative rainfall during 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.

June

- Overall, NSW received a State-wide average rainfall that was slightly above normal for June.
- Most of the rainfall over inland NSW fell as a result of surface troughs on the 1 and 14 June, and other falls occurred as a result of significant cold fronts on 24 and 29 June.
- Rainfall during June was between 20-200% of average (based on historical records between 1961 and 1990) across most of NSW. In the central areas of the State, rainfall was between 100-300% of average. Along the central to north coast and adjacent ranges and over most of the far west, it was generally between 20-80% of average.
- Some 64% of the State received average rainfall during the month, that is, rainfall of between the 4th and 7th decile, and 29% received above average rainfall (Table 6).
- Total rainfall over the State ranged from 1-300 mm, with the majority of the State receiving 25-100 mm. The far north west and far south west of NSW received between 1-10 mm. Most of the west and areas of the north west received 10-25 mm, as did areas of the central and northern tablelands and mid-north coast. Areas of the southern tablelands and south coast received 100-200 mm and the alpine areas received up to 300 mm (Figure 20).
- Rainfall of between 25-50 mm provided some relief to some drought-affected areas in the north west of NSW, although other areas received less.

April to June (3 months)

- Total rainfall over the three months to June ranged from 50-200 mm over most of the State, with areas of the coast and the far south east receiving 200-400 mm. The alpine areas received 300-600 mm during the period (Figure 21).
- Areas around Tibooburra in the Western LLS district, and between Goodooga and Mungindi in North West LLS district received less than 50 mm. Much of the rainfall in this area was less than 60% of normal.
- Most of the central areas of the State (from about Coonabarabran to the south), the south east and the coast received 100-200 mm. The north and the far west generally received 50-100 mm.
- The south and south west of the State had generally above normal rainfall, with the exception of an area between Hay and Pooncarie (about 80% of normal). Most of the north west and coast had less than 60-80% of normal rainfall.

January to June (6 months)

- Rainfall across the State during the January to June period generally ranged from 50-1,200 mm (Figure 22), 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 around Tibooburra, and in the North West LLS district near Lightning Ridge.
- The plains and north west generally received between 200-300 mm and the central areas of the State, including the slopes and much of the tablelands, received 200-400 mm during the period.
- The coastal LLS districts generally received 300-600 mm. Some areas of the coast received up to 800 mm. The alpine areas received 600-1,200 mm.

4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

The data used to create the temperature anomaly maps in Figure 24 and Figure 25 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 24 and Figure 25 are provided for a general assessment only.

- Daytime temperatures across the State during the month averaged 0.8°C above normal.
- Average monthly daytime temperatures were 1-2 °C warmer along most of the coast, the Hunter and the Northern Tablelands LLS districts. There were also areas of above average temperatures in the north west and far south west of the State, and in the far south east. These areas also had maximum temperature anomalies of 1-2°C above normal.
- The majority of the State had near normal temperatures (0-1°C above normal).
- Average monthly minimum temperatures were 1.4°C above normal for the State during June.
- The central and southern areas of NSW, together with coastal areas from the far south to mid-north coast recorded monthly average overnight temperatures of between 1-2°C above normal. Most of the far west and the north east of NSW had near normal temperatures. Some areas in the south reached 2-3°C above normal.

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 26 and Figure 27) show the average monthly soil moisture content for the topsoil and subsoil, as a proportion of its saturated capacity. They do not show monthly soil moisture relative to historical records (percentile ranking).

5.1 Summary

Table 7: Average monthly relative soil moisture – percentage area of NSW in each class

Layer	Low (0-0.3)	Moderate (0.3-0.7)	High (0.7-1.0)
Topsoil	43%	56%	1%
Subsoil	41%	53%	6%

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

5.2 Topsoil

- Modelled topsoil moisture improved between May and June over the southern, central and south eastern areas of NSW, particularly in areas that received 50 mm of rainfall or more.
- There was a slight improvement across the north as a whole, with most improvement occurring in the east of the North West LLS district and across the north west of the Northern Tablelands LLS district.
- Declines in modelled topsoil moisture occurred across the North Coast LLS district.
- In May, 29% of NSW had moderate topsoil moisture levels, which improved to 56% in June (Figure 26, Table 7).
- On a percentile rank basis, most of State ranked as having average relative topsoil moisture over the month, with most of the central and southern areas having above average relative topsoil moisture. The eastern half of the Northern Tablelands, most of the North Coast, Greater Sydney and the north of the Hunter LLS districts had below average soil moisture, as did an area between Goodooga and Lightning Ridge.
- Across most of the Central Tablelands and the South East LLS districts and the eastern side of the Murray and Riverina LLS districts, total modelled topsoil moisture levels were generally between 40-80 mm.
- Over most of the west and north, total topsoil moisture levels were 20-40 mm, and less than 20 mm in the far north west and far west.

5.3 Subsoil

- Modelled subsoil moisture levels improved slightly in June, with 58% of the State having moderate to high levels (Figure 27, Table 7), up from 55% in May.
- There was a slight improvement in modelled subsoil moisture over some areas in the south of the State, particularly in Murray LLS

district, and in areas of Central West LLS district. There was a slight decrease in modelled subsoil moisture over areas of the North Coast LLS district.

- The North West LLS district had the lowest overall relative subsoil moisture during the month, with 77% of its area in the low category. This was followed by 53% of Western, 40% of Central West and Northern Tablelands, 34% of Murray and 30% 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 100-200 mm across most of the State, less than 50 mm near Walgett and Armidale, and ranged from 200-400 mm in the east. Levels were higher in the alpine areas.
- On a percentile rank basis, the southern half of Western and Central West LLS districts had above average modelled subsoil moisture for the month. Similarly, the western areas of Hunter LLS district, the eastern and southern areas of Murray and the western and southern areas of South East LLS districts had above average subsoil moisture.
- On a percentile rank basis, the west of the North West LLS district, as well as areas of the Northern Tablelands, Hunter, Greater Sydney and North Coast and the south of Central Tablelands LLS districts had below average subsoil moisture, as did an area around Hay. Areas near Hay, Walgett, Armidale, Kempsey and Lismore had extremely low subsoil moisture levels.

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 tablelands and coast. The pasture growth model is not as well calibrated for these areas as for the rangelands, plains and 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 chances 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 July to September suggests somewhat below average to below average growth across much of NSW. Areas of better growth outlook extend across the south east of the Central Tablelands LLS district, the west of the South East LLS district, and the eastern areas of Murray and Riverina LLS districts.
- Very limited growth is suggested for the eastern areas of the Western LLS district, and the western areas of the Central West, Riverina and Murray LLS districts.

6.2 Modelled pasture growth

- During June, modelled pasture growth was generally moderate to good across the central and western areas of the State. However, it continued to decline across the tablelands and upper slopes as temperatures fell, and also remained low along the coast (Figure 28).
- Rainfall in June across areas of the north west and over the north of the central west resulted in an improvement in pasture growth in these areas from May.
- Alternative pasture growth models show low to very low growth for temperate pasture species over the tablelands, Monaro and upper slopes, low growth across central NSW and the Hunter valley and low to moderate growth along the coast.
- The best pasture growth during the month continued to occur across most of the Murray and Riverina LLS districts (apart from the upper slopes in the east) and the Central West LLS district.
- Modelled growth in the Murray, Riverina LLS districts and the southern end of the Central West LLS district maintained similar levels to April and May. Improvements in growth occurred in the northern and central areas of

the Central West LLS district. Over most of these districts, modelled growth ranged between 200 kg/ha of dry matter (DM) to more than 1,000 kg/ha DM. Generally, growth was between 500-1,000 kg/ha DM.

- Across the southern and central areas of Western LLS district, modelled growth over June was similar to April and May at 50-500 kg/ha DM, with most areas achieving 100-500 kg/ha DM.
- Modelled pasture growth across the north east of the Western LLS district improved, but remained at low levels in the far north west.
- Growth continued to decline across much of the tablelands and Monaro from levels of 20-200 kg/ha DM during May to 50 kg/ha DM or less in many areas. These areas may experience a 'green drought' until spring.
- Slightly better growth occurred in the west of the Northern Tablelands LLS district and the west and north of Central Tablelands LLS districts.

6.3 Modelled biomass

- Modelled total standing dry matter (biomass) levels during June were similar to those in May (Figure 29).
- Low levels of modelled biomass (generally less than 500 kg/ha DM) were maintained across the north west and north of the Western LLS district and across most of North West LLS district. Low modelled biomass levels were also maintained across most of the North Coast, Northern Tablelands, Hunter, Greater Sydney and South East LLS districts. Low modelled biomass levels also occurred over the north of the Central West LLS district and the far east of the Murray and Riverina LLS districts.
- Over the south east of Western LLS district, the southern half of Central West LLS district and most of the Murray and Riverina LLS districts, modelled biomass levels were generally 1,000-1,500 kg/ha DM.

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	13%	4%	25%	57%	1%
Quarter	2%	4%	18%	75%	1%
Half Year	1%	8%	33%	57%	1%
Year	0%	22%	40%	37%	1%
Biomass					
Month	0%	9%	33%	57%	1%

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

June

- Relative to historical records, 82% of NSW had average or above average pasture growth during June, an increase of 7% over May (Table 8, Figure 30).
- The area of the State with above average growth increased from 49% in May to 57% in June, although the area with average growth remained similar.
- Rainfall in June across areas of north western NSW resulted in an improvement in relative pasture growth in these areas, from well below average to near average. This reduced the area of below average growth across the State from 12% in May to 4% in June.
- Across the remainder of the State, areas of below average growth occurred around Walgett, between Cobar and Nyngan and in the far north eastern corner of the State.
- Over central, southern and western NSW, relative growth was generally above average to well above average during the month. Relative growth was average to above average along the coast and average over north western NSW.
- For the time of year, relative growth was also above average to well above average across

the tablelands, but average across the eastern half of the northern tablelands and across the far southern tablelands and Monaro.

- Areas of missing data accounted for 13% of the area of NSW, primarily across far north west, the south east and the north east.

April to June (3 months)

- Over the three months to June, relative pasture growth across the State remained high.
- Some 75% of the area of NSW had above average relative growth and 18% had average growth, the same as for the previous quarterly period (Table 8, Figure 31). The majority of the State showed well above average to extremely high relative pasture growth.
- The area of the State with below average relative growth was just 4%, and included 11% of the North West LLS district. This area extended between Walgett, Lightning Ridge and Carinda and also included an area to the north of Moree. An area around Tibooburra in Western LLS district also showed below average relative growth for the period.
- A belt of extremely high relative pasture growth for the quarter extended across the tablelands and into the western areas of the Hunter LLS district, and also into the Central West, Riverina and Murray LLS districts. Relative growth over the period was also extremely high in areas of the Western LLS district, and over the Monaro in the South East LLS district.

January to June (6 months)

- Over the six month period from January to June pasture growth was above average across much of southern, central and western NSW, and areas of north eastern NSW.
- Most of the Northern Tablelands, Central Tablelands, Central West, Riverina and Murray LLS districts had well above average to extremely high relative growth.
- The coastal areas had generally average growth over the period, except for the far south coast and far north coast.
- The northern areas of the State also had generally average relative growth, except for an area between Walgett, Carinda, Lightning Ridge and Goodooga, to the north of Moree and near Tibooburra.
- Some 25% of North Coast and South East LLS districts had below average relative growth for the period, as did 22% of North West LLS district.
- Most LLS districts showed a 10-15% increase in the area of the district with above average growth, and a decrease in the area of below average growth.
- Relative growth over the period was average or above over 90% of the State (Table 8, Figure 32), and above average over 57% of the State.

July to June (12 months)

- Relative pasture growth over the last 12 months was similar to the June 2013 to May 2014 period.
- Relative growth was average or above across 77% of the State (Table 8, Figure 33).
- The best relative growth extended across the central and southern tablelands, and over areas of south western and western NSW, covering 37% of the State.
- Below average relative growth covered 22% of the area of the State. It extended across the north west and the north eastern corner of NSW, covering the majority of the North West, Northern Tablelands and North Coast LLS districts. Areas of the Hunter and Greater Sydney LLS districts also showed below average growth.
- Relative growth across the far west and much of central and south east NSW was average (40% of the State), with pockets of above average growth.

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.

- Modelled relative total standing dry matter (biomass) levels remained similar to May (Table 8, Figure 34), with a slight increase in above average relative biomass.
- Relative to historical records, biomass remained high across the Northern Tablelands, Central Tablelands, Central West, Riverina and Murray LLS districts. It was also high across the west of the Hunter and South East LLS districts, and the east and south of the Western LLS district.
- Above average relative biomass made up 57% of the State in June (Table 8).

- However, relative biomass remained low across the far west of the North West LLS district and the far north east of the Western LLS district. It also remained low over the coastal areas of the South East LLS district, and areas of the North Coast.
- The eastern half of Greater Sydney LLS district, the central areas of North West and the northern half of Western LLS districts had average relative biomass.

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 8 July 2014.

- Levels in water storages are low-moderate, with the average capacity being 51%.
- Changes in storage levels during the last month occurred mainly in the south, with increases in the capacity of the Hume (11%), Burrinjuck (9%) and Blowering Dams (8%). Minor increases occurred in Dartmouth, Wyangala and Burrendong Dams.
- Most other dams were either stable or had minor decreases in storage level.

Table 9: Capacity of storages

Storage	Current Volume (GL)	Effective Capacity (%)	Monthly Change (%)
Toonumbar	11	98	-
Glenbawn	653	87	-2
Glennies	246	87	0
Lostock	20	97	-
Brogo	9	100	-1
Cochrane	-	-	-
Dartmouth	3529	91	2
Hume	1688	56	11
Blowering	1042	63	8
Burrinjuck	683	66	9
Brewster	-	-	-
Carcoar	11	29	1
Cargelligo	20	46	-3
Wyangala	583	48	3
Glenlyon	96	-	-
Pindari	52	17	-
Copeton	460	33	0
Chaffey	24	37	0
Keepit	82	18	0
Split Rock	83	20	-
Burrendong	268	20	1
Oberon	29	64	-1
Windamere	182	49	-1
Lake Cawndilla	136	9	-1
Lake Menindee	-	0	0
Lake Pamamaroo	156	54	-2
Wetherell	72	36	1
Total	**10135**		
Average		**51**	

8.2 Irrigation allocations

Allocations are given as at 8 July 2014.

- General security allocations were reduced for many river valleys in July.
- The Border Rivers were reduced from 100 to 28% for general security A class and from 1.7% to zero for B class.
- The Macquarie-Cudgegong river valley was reduced from 6% to zero for general security. The Murray was reduced from 100% to 6% for general security, and also had a 3% reduction in its high security allocation. The Murrumbidgee was reduced from 63% to 10% in general security.
- The Lower Namoi was reduced from 6% to zero in general security, and the Peel from 45% to zero, and from 100% to 50% in high security. Bega-Brogo was reduced from 67% to 40% for general security licences.

Table 10: Irrigation allocations

River valley	Allocation	Licence category
NSW Border Rivers*	28%	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*	0%	General security
	100%	High security
Murray*	6%	General security
	97%	High security
Murrumbidgee*	10%	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	40%	General security
	100%	High security
*Carry over water may be available		

9. Appendix

Maps and data used in the production of this report.

Seasonal outlook

Figure 7: Quarterly rainfall outlook

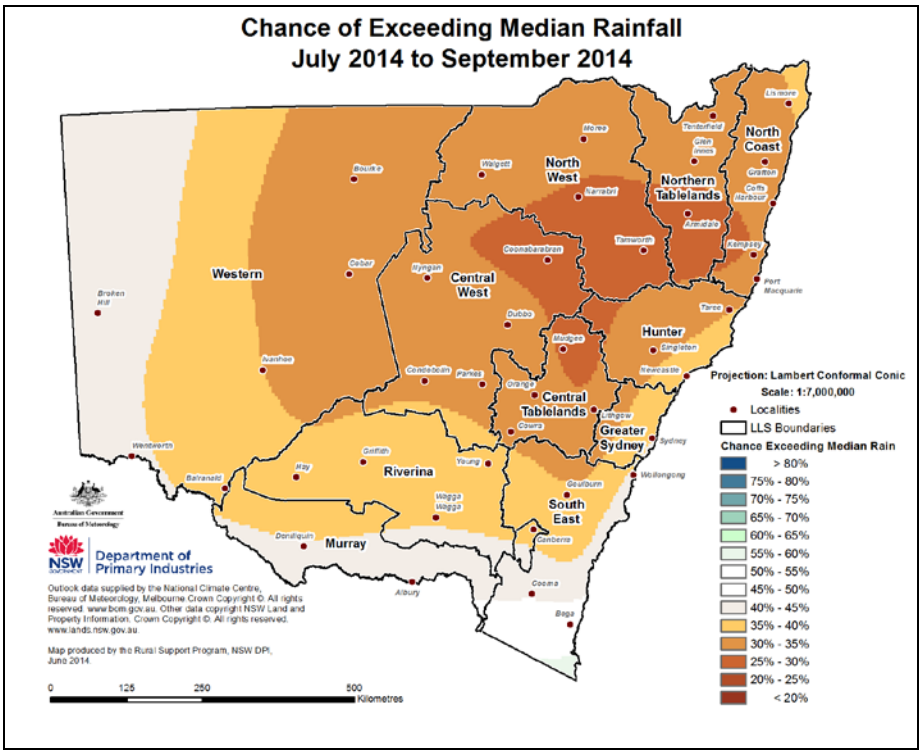


Figure 8: Quarterly maximum temperature outlook

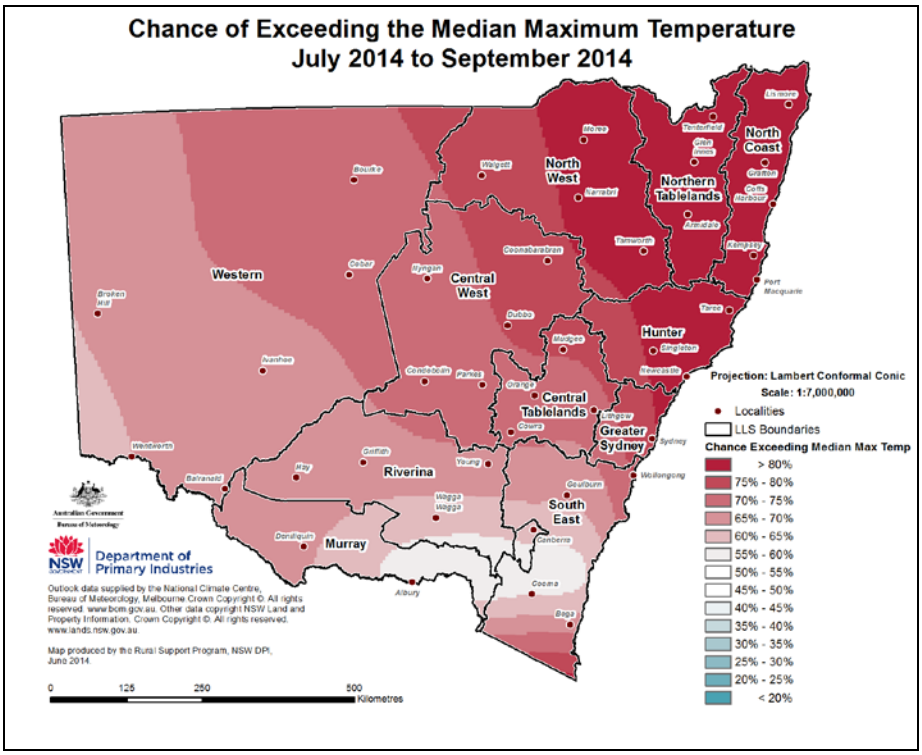


Figure 9: Quarterly minimum temperature outlook

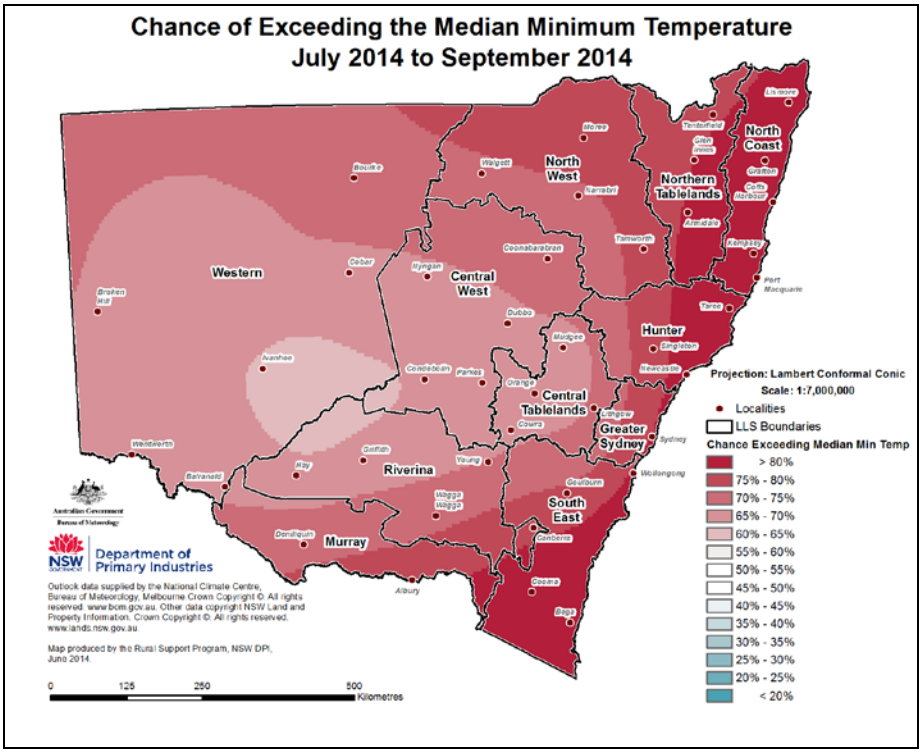
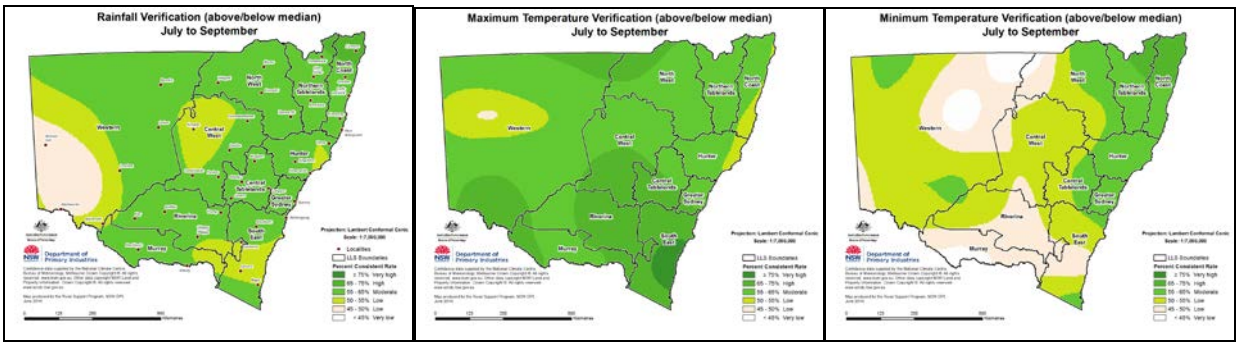
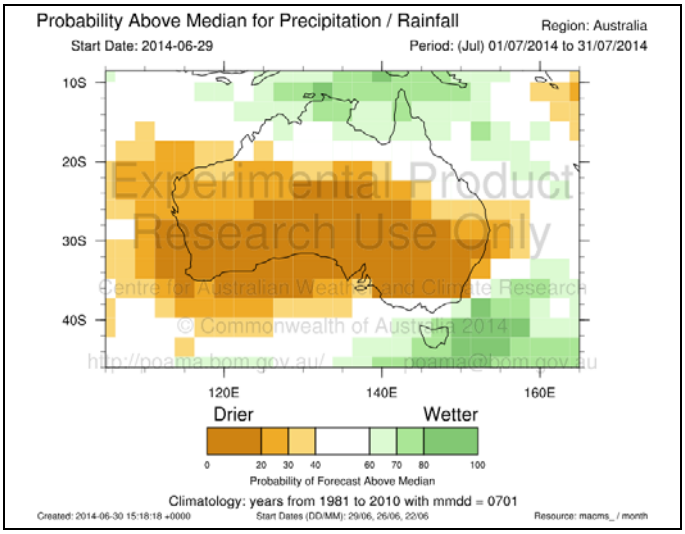


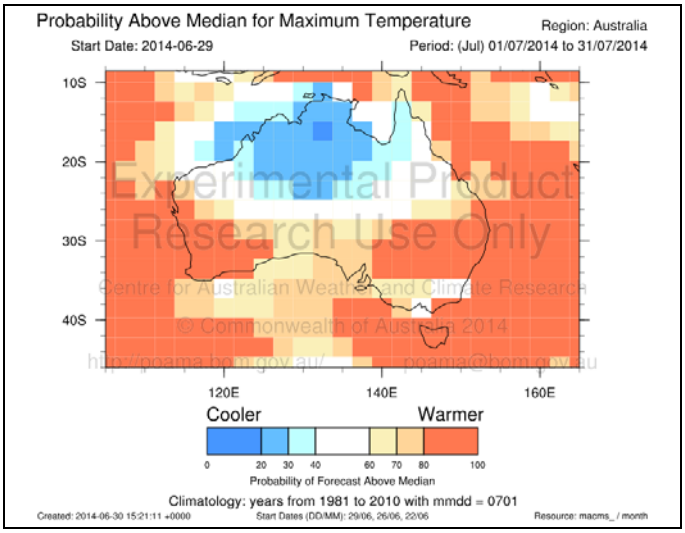
Figure 10: Outlook skill maps



Monthly rainfall & temperature outlook
(Bureau of Meteorology, POAMA - experimental)

Figure 11: Experimental July rainfall and temperature outlooks





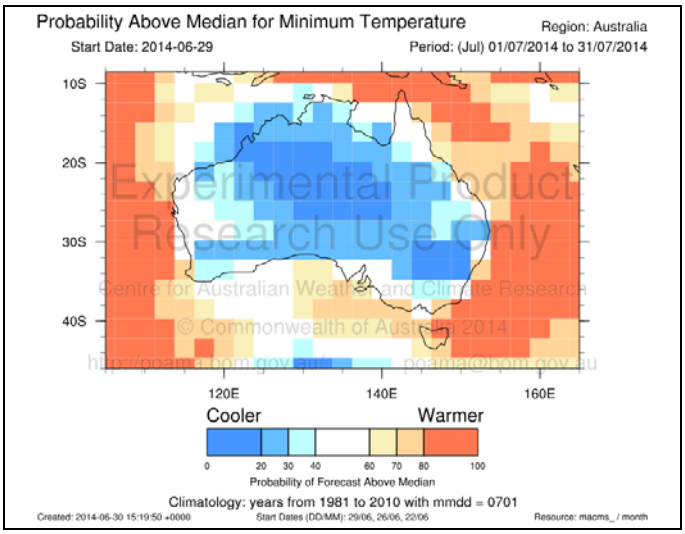
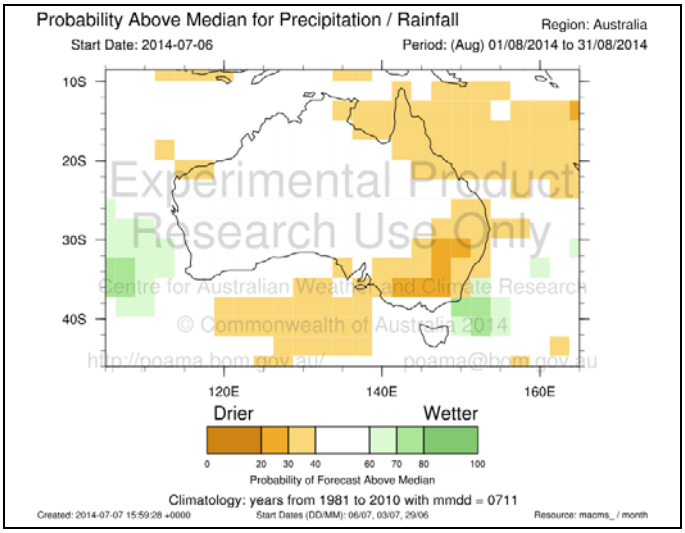
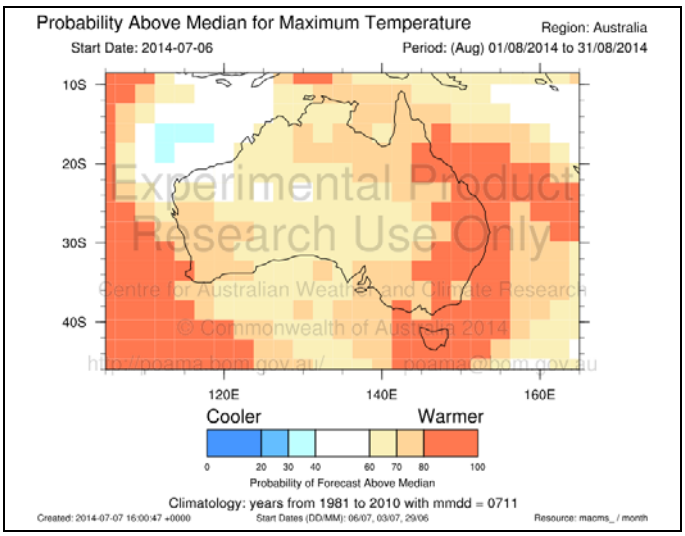
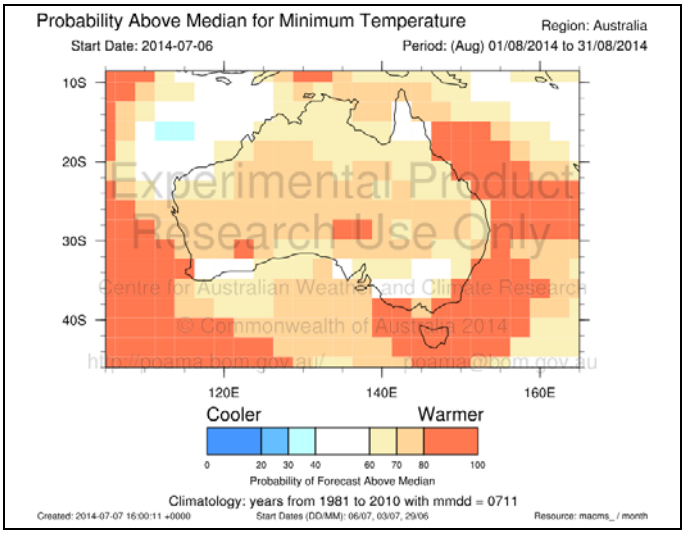


Figure 12: Experimental August rainfall and temperature outlooks

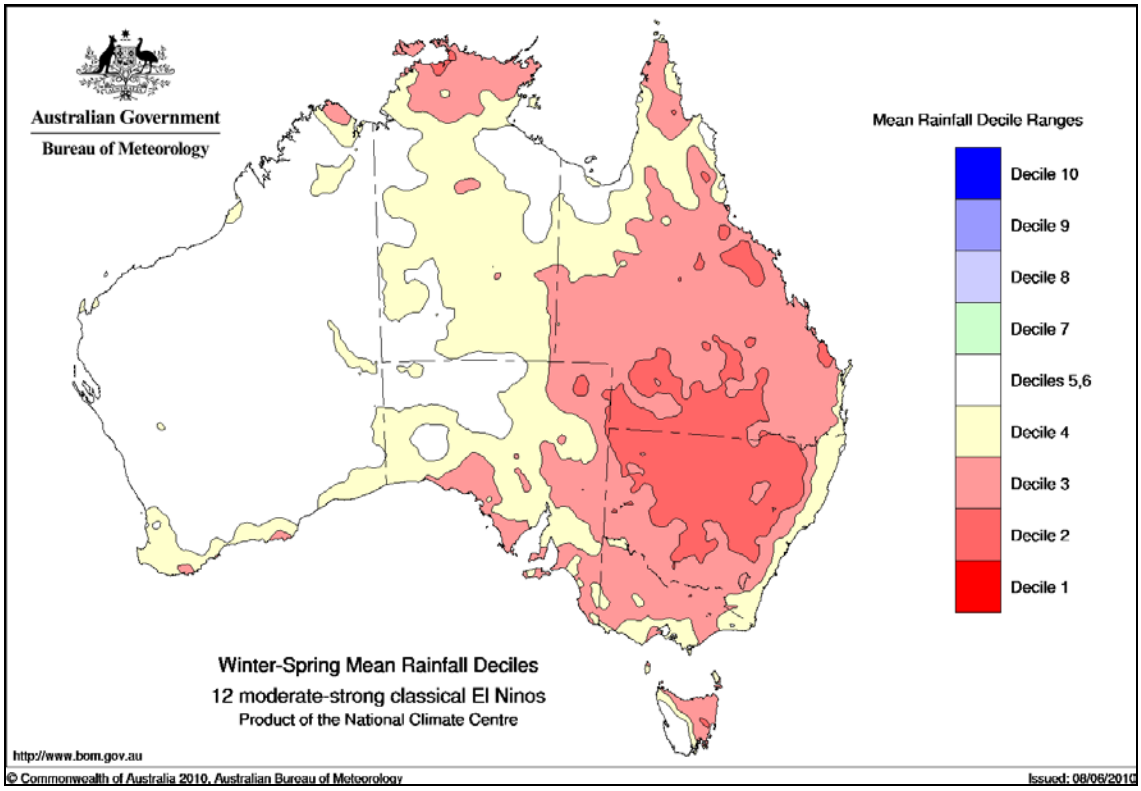






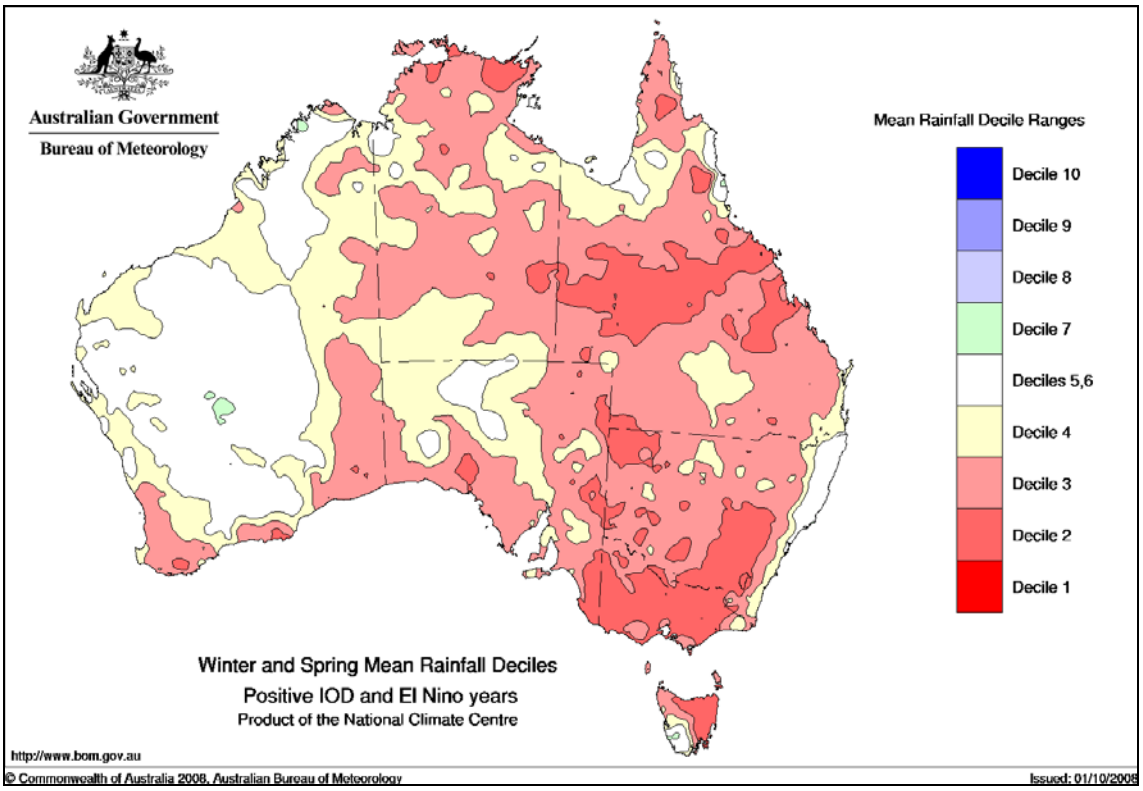
Possible effects of an El Nino event

Figure 13: Australian winter-spring mean rainfall deciles for twelve El Nino events



Source: Australian Bureau of Meteorology

Figure 14: Australian winter-spring mean rainfall deciles for seven positive IOD events coinciding with El Nino events



Source: Australian Bureau of Meteorology

Rainfall

Figure 15: Relative rainfall – monthly

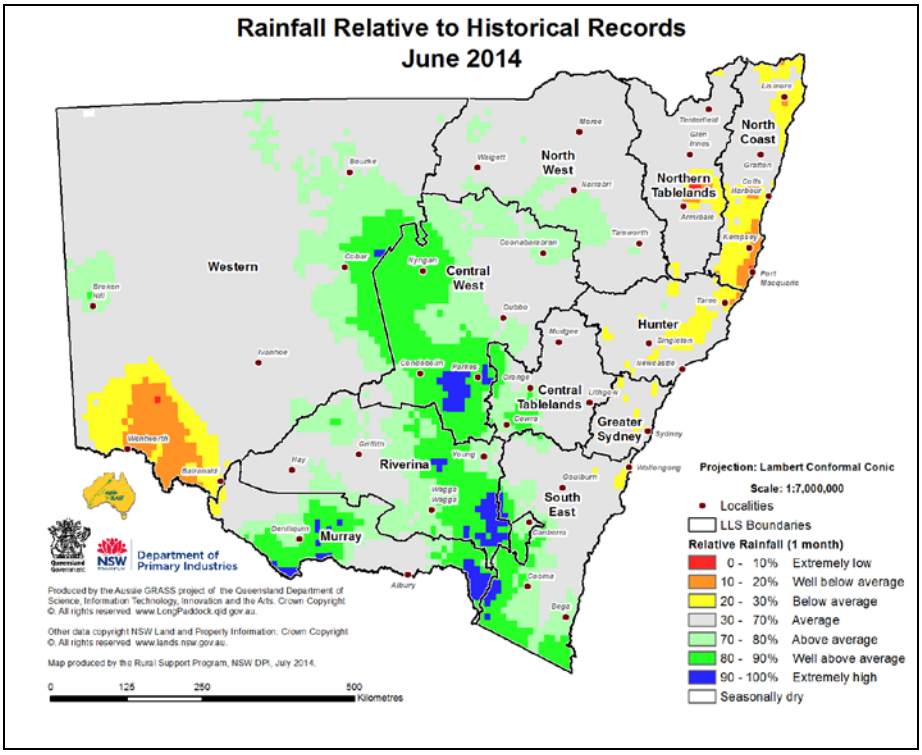


Figure 16: Relative rainfall – quarterly

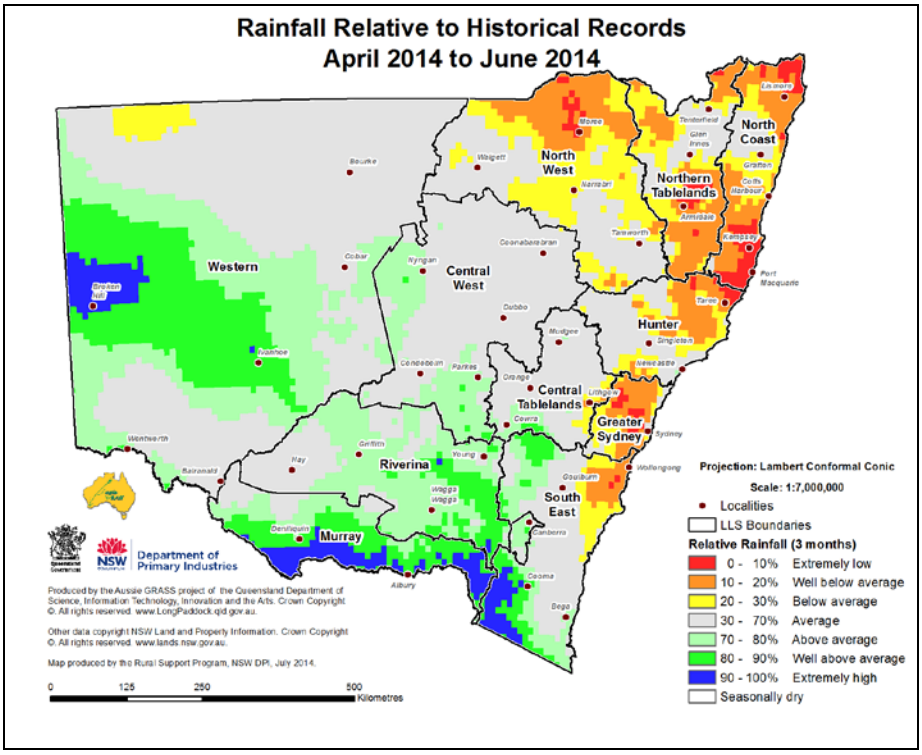


Figure 17: Relative rainfall – half yearly

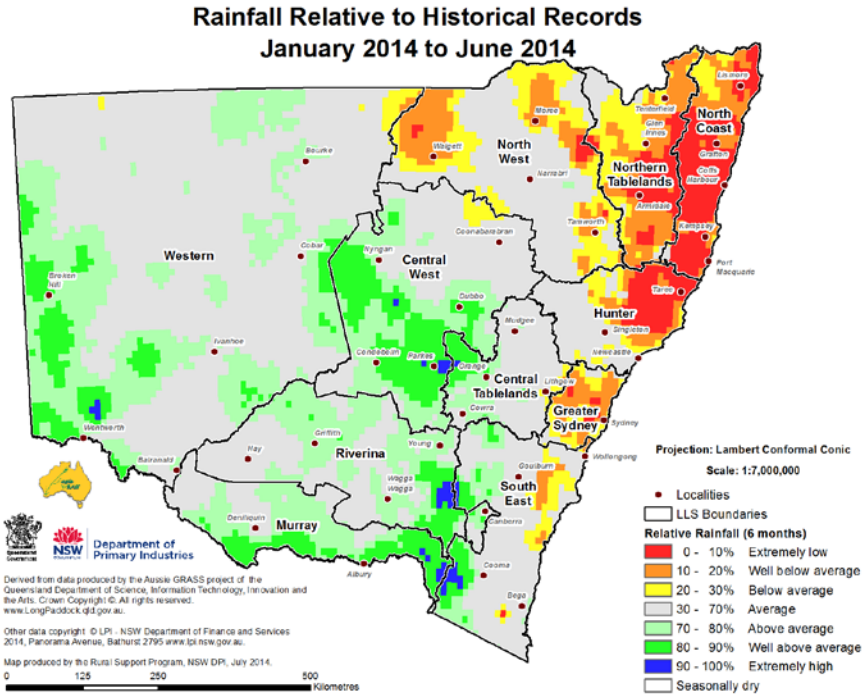


Figure 18: Relative rainfall – nine monthly

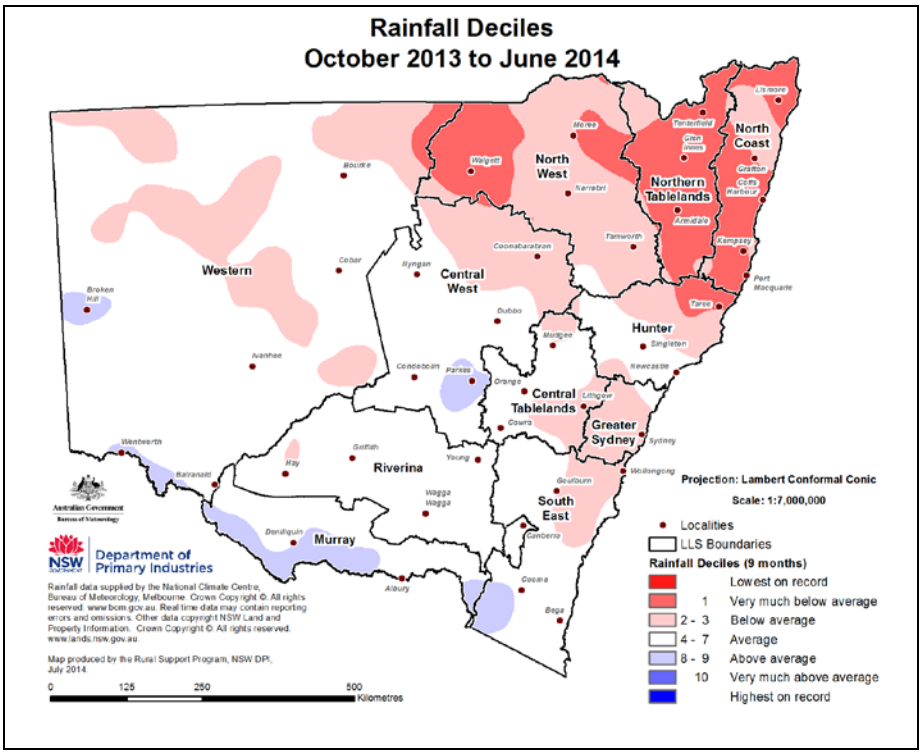


Figure 19: Relative rainfall – yearly

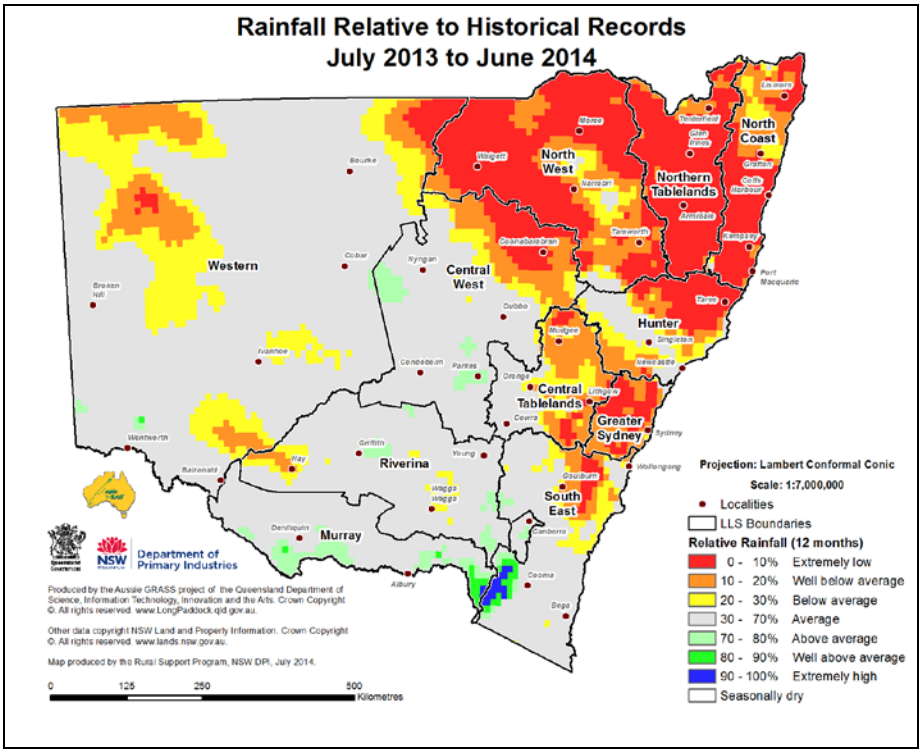


Figure 20: Total rainfall – monthly

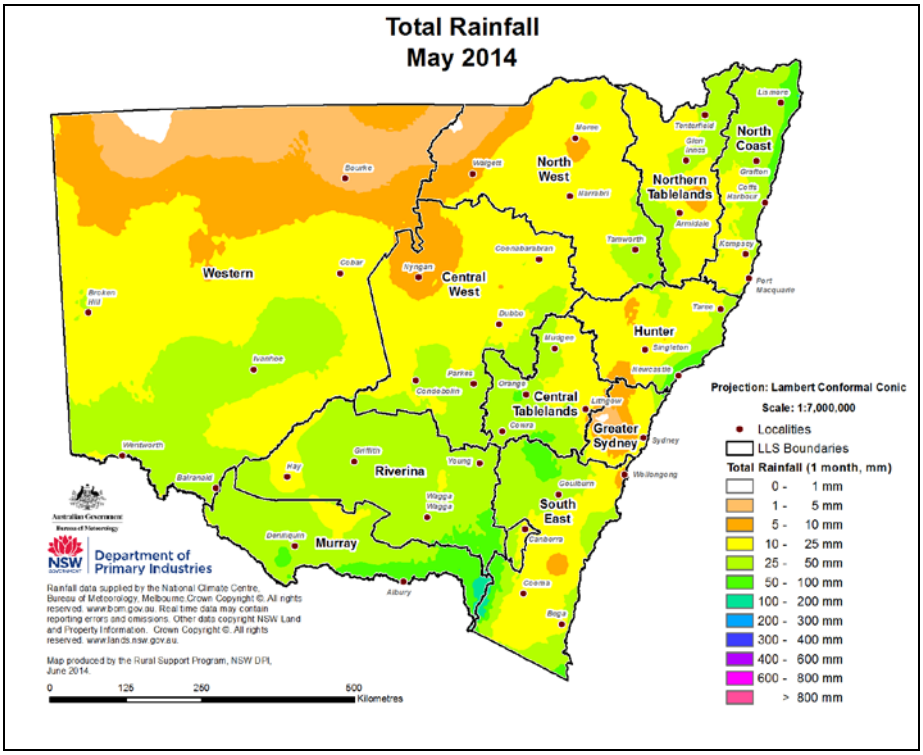


Figure 21: Total rainfall – quarterly

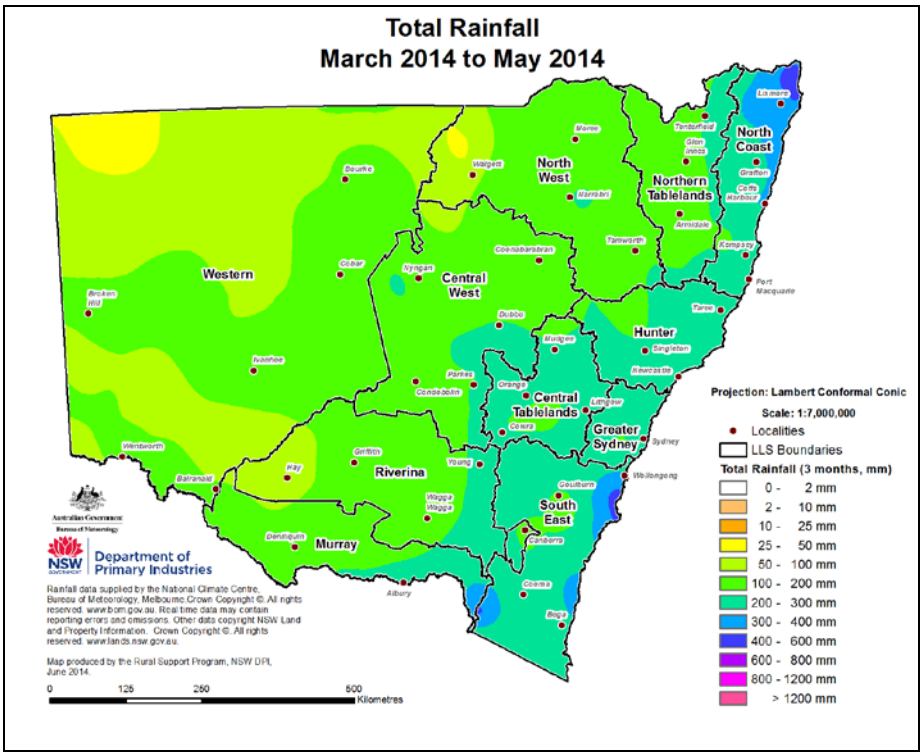


Figure 22: Total rainfall – half yearly

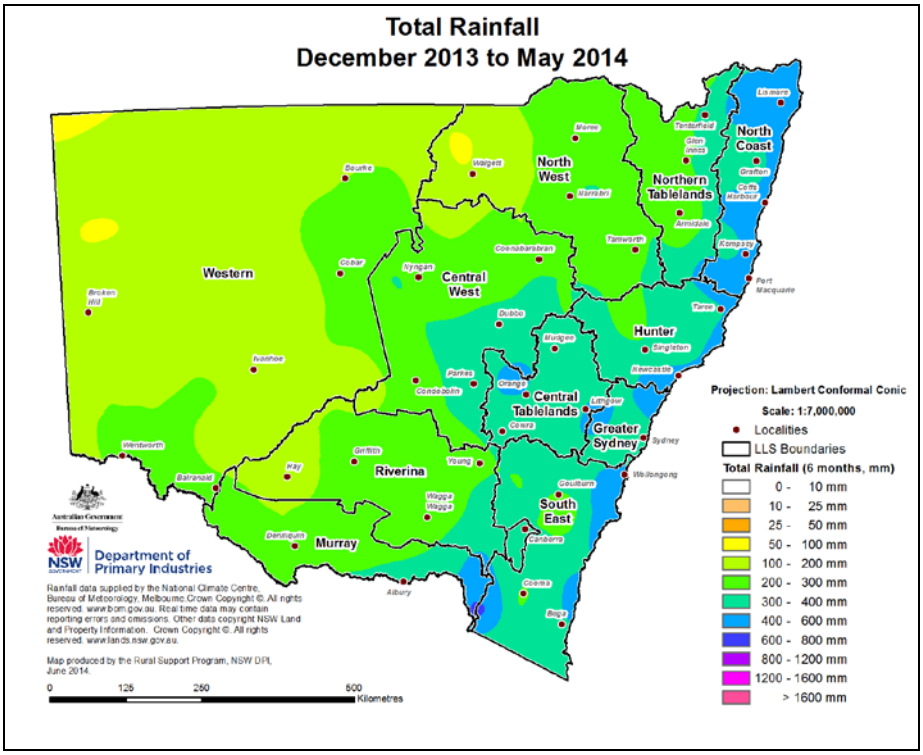
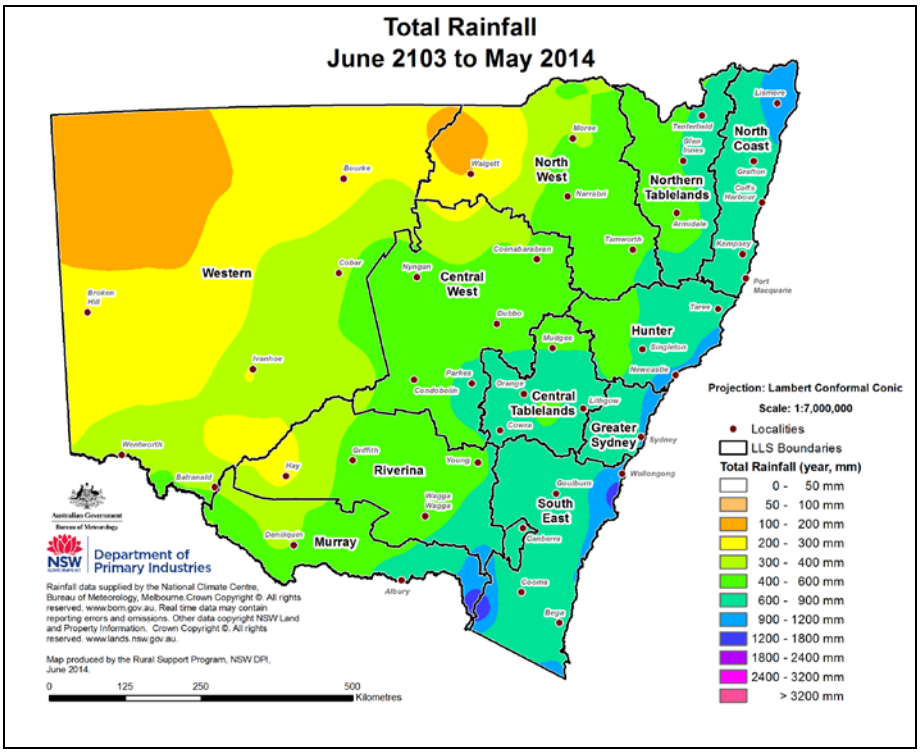


Figure 23: Total rainfall – yearly



Temperature

Figure 24: Maximum monthly temperature anomaly

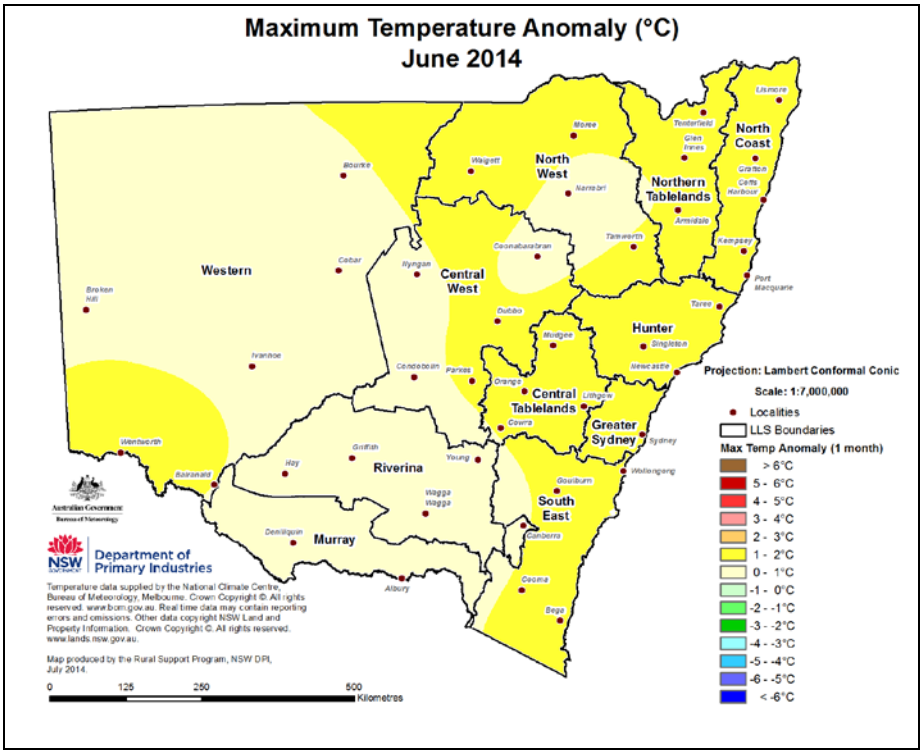
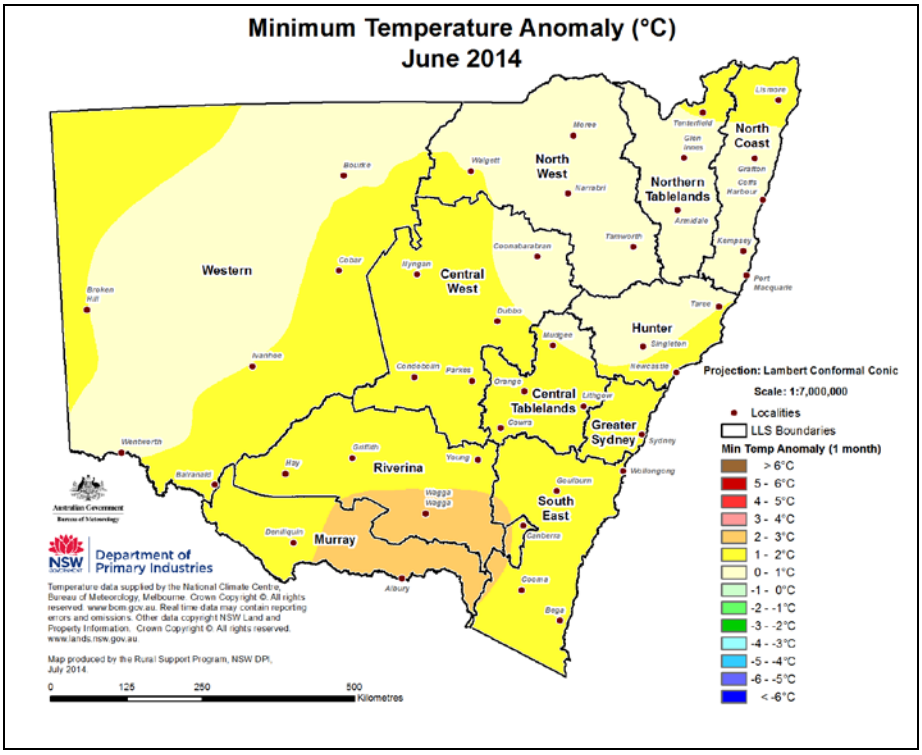


Figure 25: Minimum monthly temperature anomaly



Soil moisture

Figure 26: Relative monthly topsoil moisture

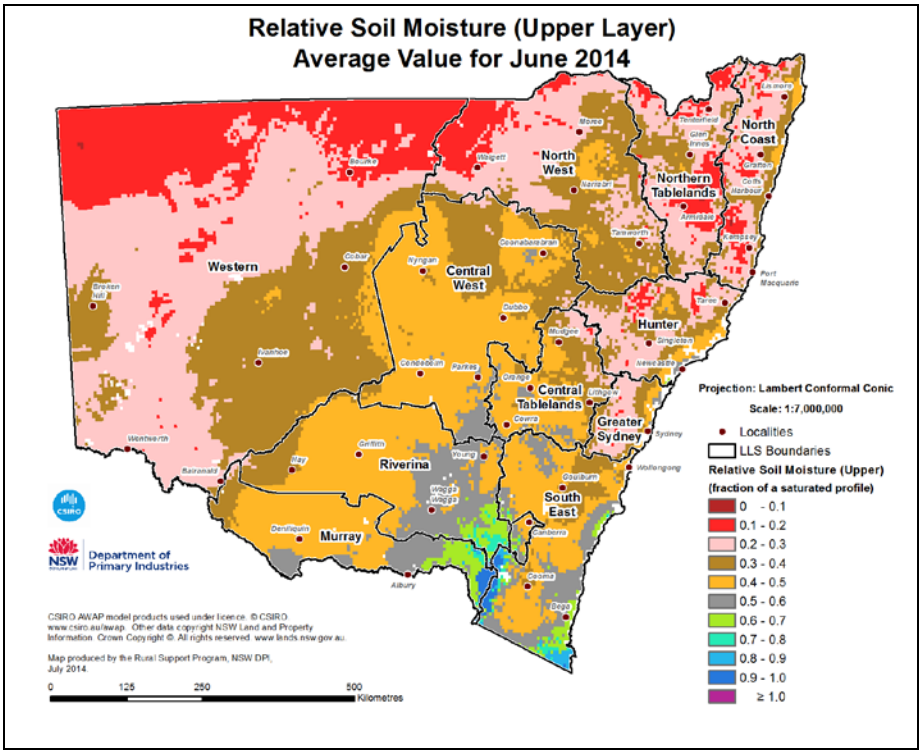
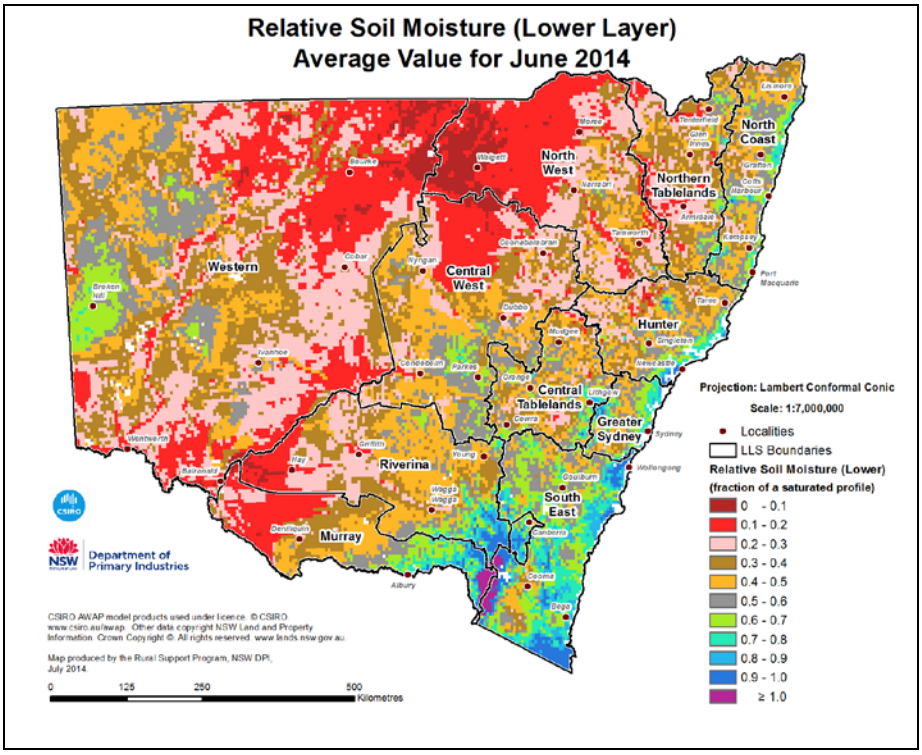


Figure 27: Relative monthly subsoil moisture



Pasture growth and biomass

Figure 28: Modelled pasture growth

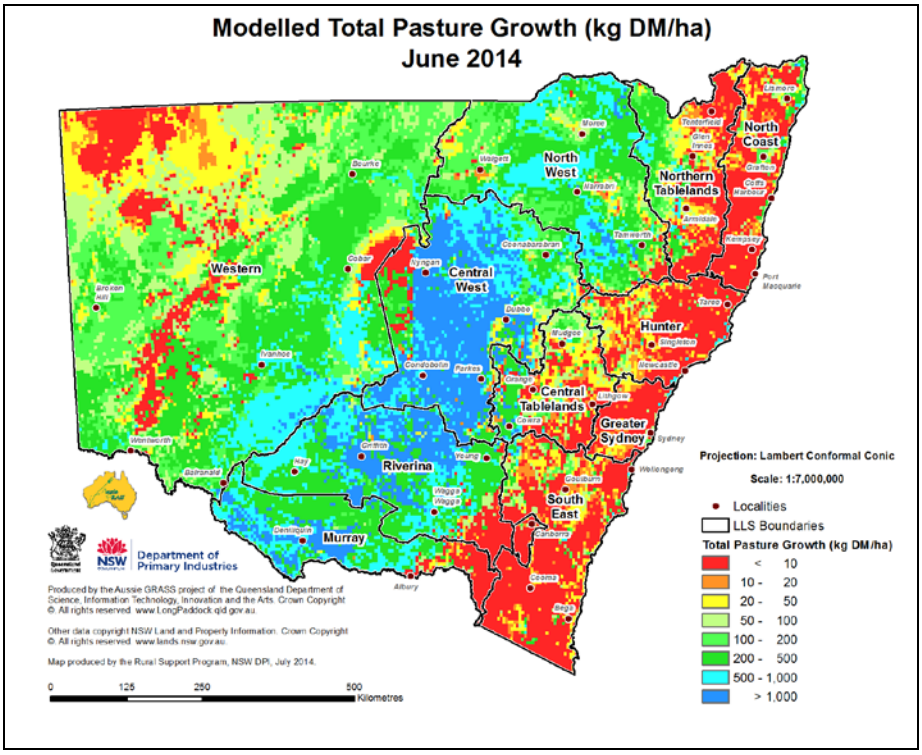


Figure 29: Modelled biomass

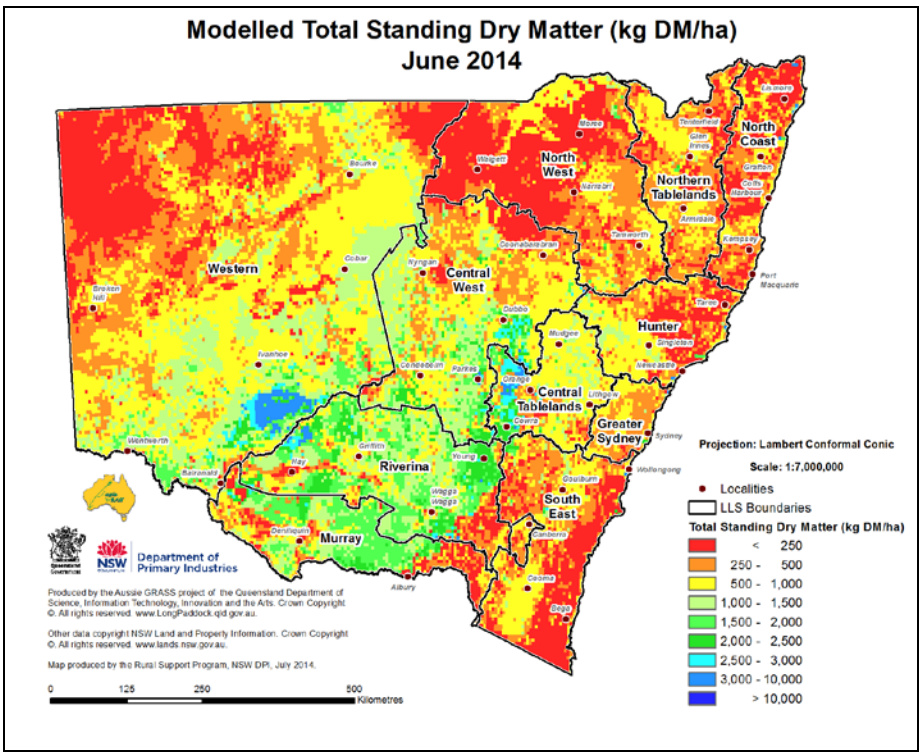


Figure 30: Relative pasture growth – monthly

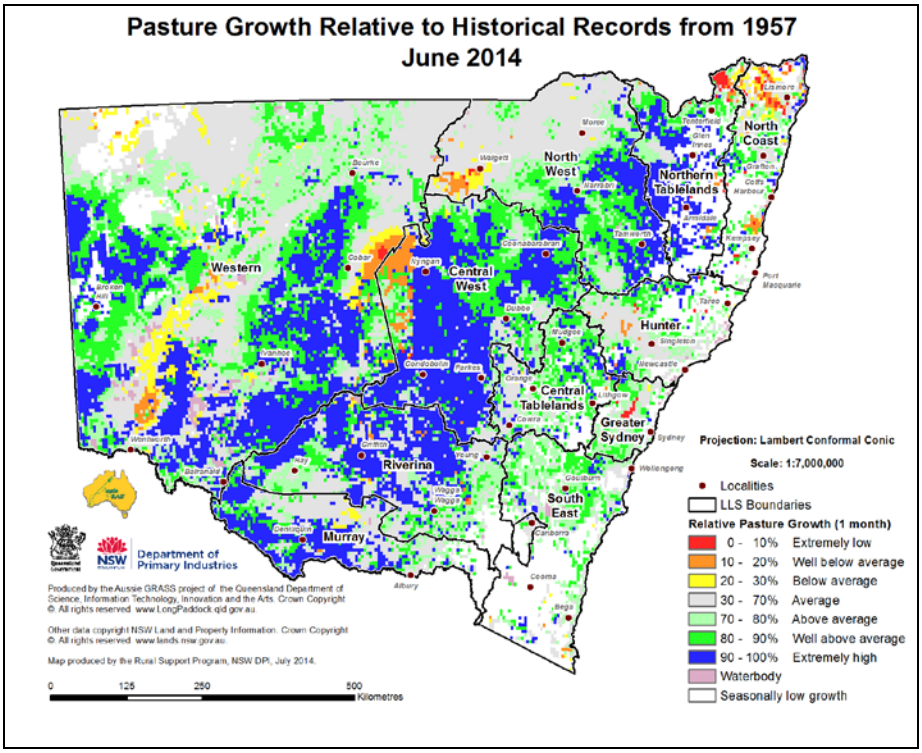


Figure 31: Relative pasture growth – quarterly

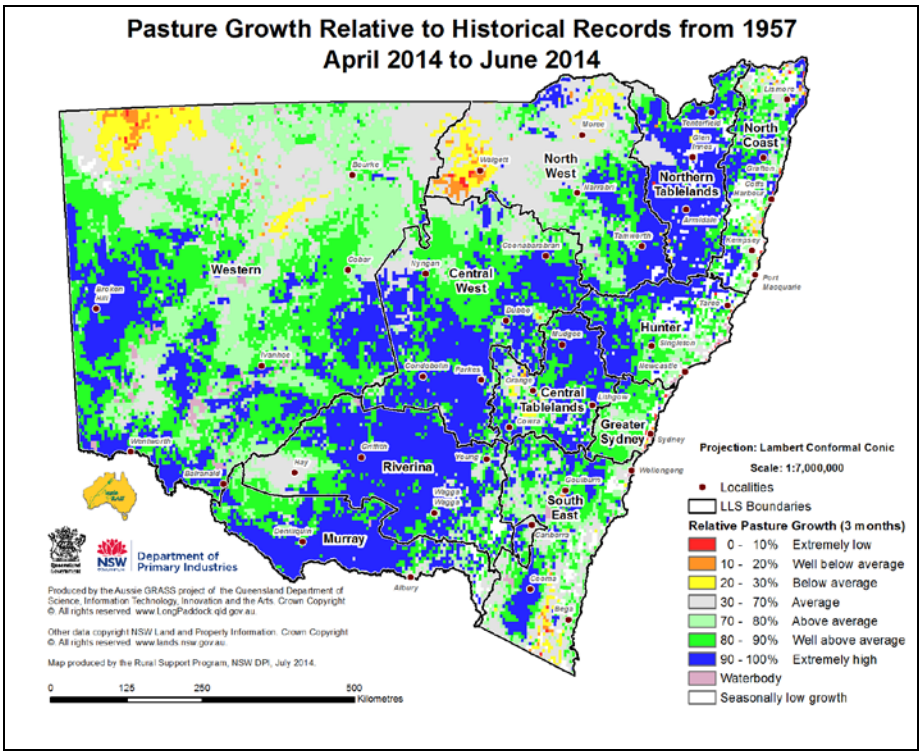


Figure 32: Relative pasture growth – half yearly

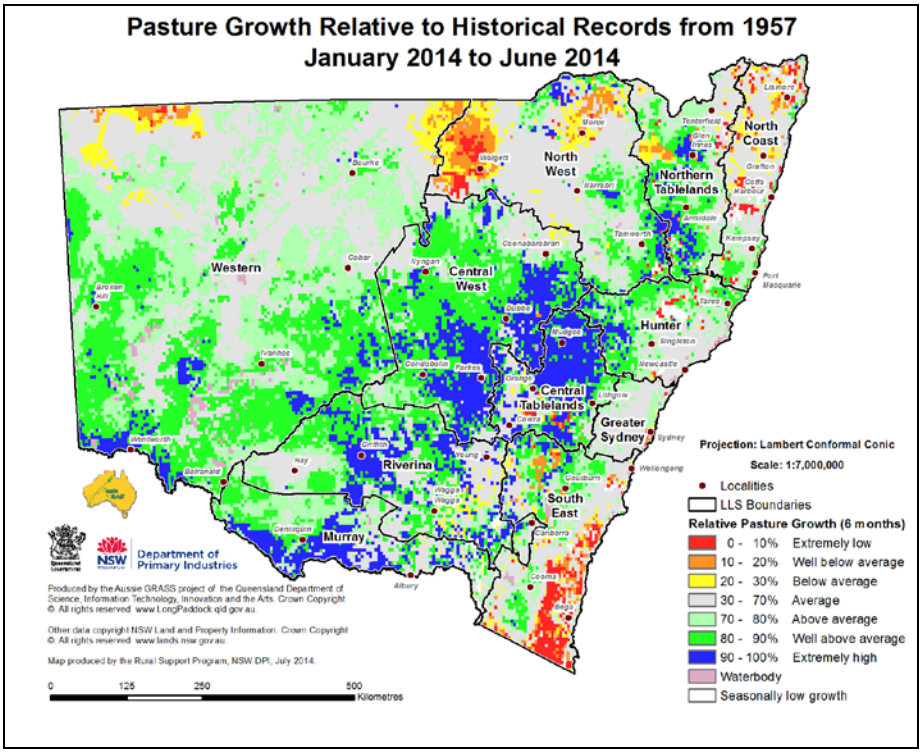


Figure 33: Relative pasture growth – yearly

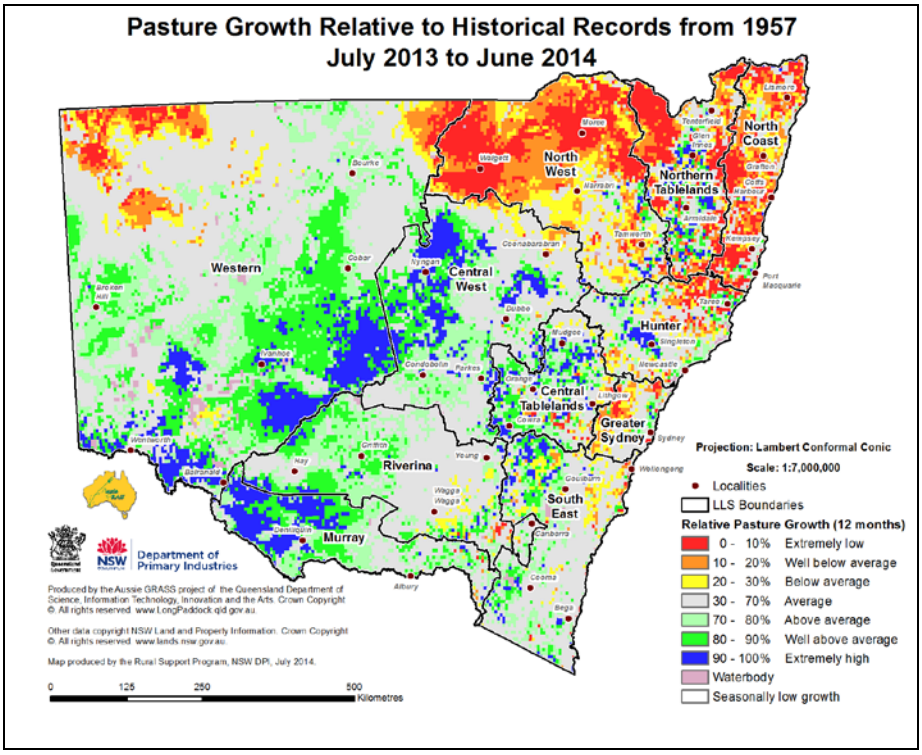


Figure 34: Relative biomass – monthly

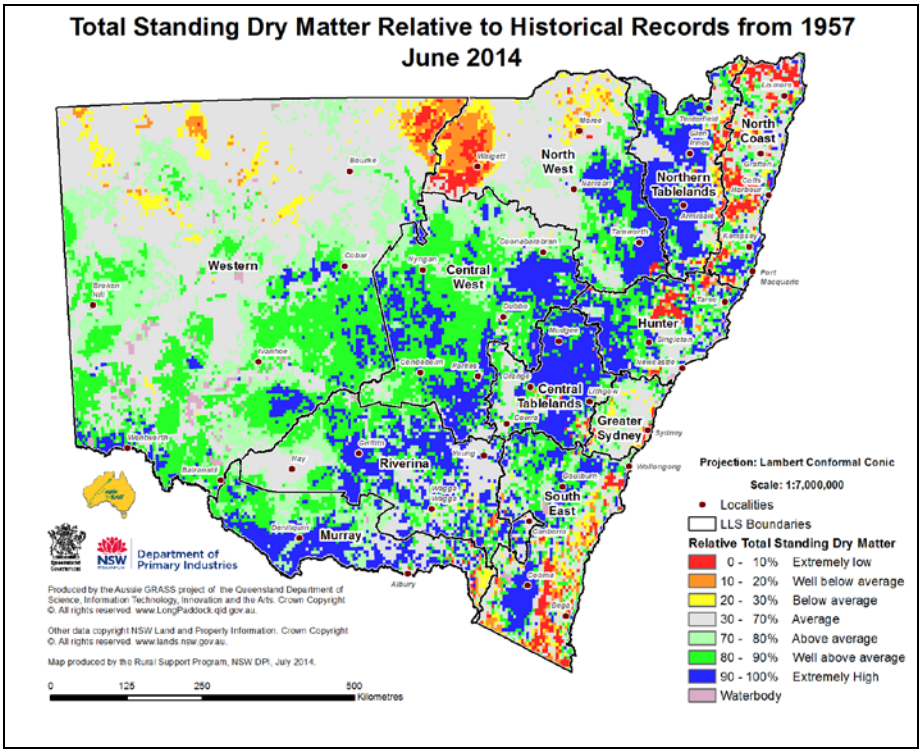
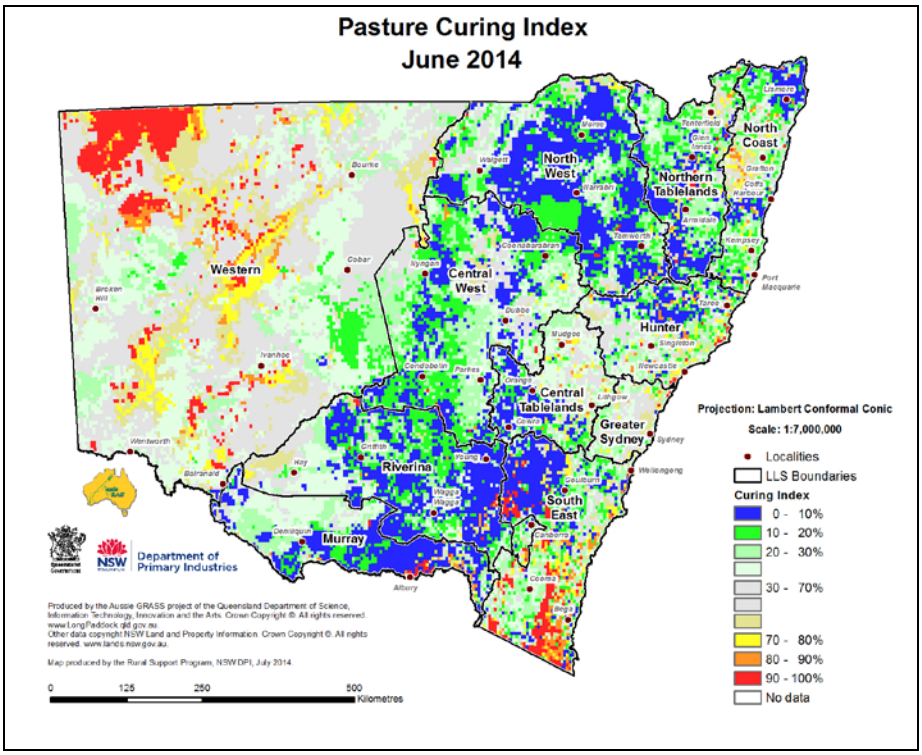


Figure 35: Pasture curing index



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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Warning

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