Department of Primary Industries

NSW Seasonal Conditions Report - February 2014

Highlights

- Dry conditions continue to expand across NSW. 90% of NSW had below average rainfall over the 6 months to January, & 57% had rainfall in the lowest 10% of years.
- The outlook indicates that the chances of a drier or wetter February to April period are nearly equal & that warmer daytime temperatures are likely in the south east, & overnight in the south & on the mid north coast.
- Three distinct heatwaves occurred during January & rainfall was below average over nearly half of NSW.
- January pasture growth was low across most of the north west, tablelands, slopes & coast. Over the last 6 months it was low across western & central NSW.
- Modelled topsoil moisture was low across 99% of NSW. Subsoil levels were stable, but remain low over 55% of NSW.
- Stock water was low over areas of the west, north west & tablelands.
- Stock condition & pasture production will depend upon follow up rainfall over the coming months. Considerable resources are available to assist in management at http://www.dpi.nsw.gov.au/agriculture/emergency/drought/managing

1. Summary

Dry conditions continue to expand across NSW. Over the six months to January, 90% of NSW had below average rainfall and 57% of NSW had rainfall in the lowest 10% of years.

The outlook for February to April indicates the chances of a drier or wetter season are nearly equal across NSW, with a slightly reduced chance of exceeding median rainfall in the central and southern areas. February is likely to be drier than normal, and the chances for drier or wetter March are near equal.

Warmer than normal daytime temperatures are likely in the south east of NSW over the February to April period, and overnight across the south and mid north coast. For the remainder of NSW, the chance of warmer or cooler than normal daytime and overnight temperatures is roughly equal. February is likely to be warmer than normal, and in March, the chances are roughly equal for warmer or cooler conditions.

The ENSO climatic indicators are currently neutral, and the outlooks suggest a high probability for neutral conditions to continue over summer and autumn. However, most models indicate a warming trend over autumn/winter.

Over January, 49% of NSW received below average rainfall, with much of NSW receiving less than 40% of normal. The worst affected areas included the coast, tablelands and the north west. The majority of NSW received falls of only 1-25 mm. Daytime and overnight temperatures were above average with three distinct heatwaves occurring.

Stock water supplies were low in January across areas of the north west, tablelands, Monaro, south west slopes and areas of the Riverina and western NSW. In these areas streamflow analysis has shown well below average to extremely low run off over the last 1-2 years.

In relative terms, quarterly rainfall was below average across 72% of NSW, particularly across most of the western, central and tablelands areas. Relative rainfall for the last six months was below average across the majority of NSW, except for areas in the south, south east and on the coast, and showed a similar pattern over the last 18 months.

Modelled topsoil moisture was low over 99% of NSW, with levels of total soil moisture of 10-20 mm or less. Modelled subsoil moisture levels were stable from December, but remain low over 55% of NSW. Higher than normal rainfall is needed to replenish depleted profiles.

Modelled pasture growth for January was low over most of NSW. Relative to historical records, it was below average across 42% of NSW over the north west, tablelands, slopes and coast. Biomass levels declined over a similar area of the State. Relative to historical records, biomass was low across the north west, tablelands and central NSW. Quarterly and half yearly relative pasture growth was low over 60% or more of NSW. Only the far south east, south and areas of western NSW had near average relative growth over the last 6 months.

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 6th - 10th February 2014.

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 Climate 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 early February and were up to date as at 6th - 10th February 2014.

2.1 Seasonal rainfall outlook

- For the three month period from February to April, the chances of a wetter or drier than normal season are roughly equal across the State. This represents an improvement in the outlook since last month in the north west. There is a slightly reduced (40-45%) chance of exceeding median rainfall across the central and southern areas of the State. This includes the Central West, Riverina, Murray, Central Tablelands, Greater Sydney and most of the Hunter LLS districts, as well as the south eastern area of Western LLS district and the northern and western areas of South East LLS district. Small areas between Hay and Ivanhoe, and between Albury and Holbrook have a 35-40% chance of exceeding median rainfall (Figure 1).
- This means that for every ten years with similar climate patterns to those at present, across most of NSW four to five February to April periods would be expected to be wetter than normal and five to six drier than normal.

  The confidence (skill) for this outlook is moderate across most of north eastern NSW, (ranging from 55-75%). The skill is low (45-55%) for the far north east and most of the remainder of the State (Figure 4).

2.2 Seasonal temperature outlook

- Over the three month period from February to April, the chances of exceeding the long term median maximum temperature are 60-65% across far south eastern NSW including the Central Tablelands, Greater Sydney and South East LLS districts. For the remainder of the State, the probability of warmer or cooler than normal daytime temperatures is roughly equal (Figure 2).
- The confidence (skill) for this outlook is moderate (55-65%) across most of NSW, except for the south west, far north west and far north east where it is low (50-55%) (Figure 4).
- This means that for every ten years with similar climate patterns to those at present, in south eastern NSW about six February to April periods would be expected to have warmer than normal daytime temperatures and four cooler than normal temperatures. For the rest of NSW, about five February to April periods would be expected to be warmer than normal and five cooler than normal in daytime temperatures.
- Warmer than normal overnight temperatures between February to April are likely across the mid north coast and far south of NSW, with the probability of exceeding the long term median maximum temperature being more than 60-65%. For the remainder of the State, the probability of warmer or cooler than normal overnight temperatures is roughly equal (Figure 3).
- The confidence (skill) for the minimum temperature outlook is low for all but the south east and north west corners of NSW, and an area in the central west (Figure 4).

2.3 Monthly rainfall and temperature outlook (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.

February

- The experimental rainfall outlook for February (Figure 5) suggests that drier than

normal conditions are likely across most of NSW, with a 30-40% probability of above median rainfall occurring over most of the State, decreasing to 20-30% along the coast and in the south east. For the north and far west of the State, the probability of drier or wetter conditions in February is roughly equal. The outlook has a moderate confidence (skill) over most of the State.

- The experimental maximum temperature outlook for February (Figure 5) suggests that warmer than normal daytime conditions are likely, with a 60-80% probability of above median maximum temperatures across most of NSW, increasing to above 80% in the south. The confidence (skill) for this outlook is moderate.
- The experimental outlook for minimum temperature is similar, indicating warmer than normal conditions are likely during February, with a more than 70-80% probability of above median temperatures across most of NSW, increasing to over 80% in the south. The confidence (skill) for this outlook is low for the coastal areas and the north and north west of NSW, and moderate for the south and west.

February multi-week

- Weekly experimental outlook information suggests that drier than normal conditions are likely across the central areas of the State during the third and fourth week of February, with a 60-70% probability of wetter than normal conditions in the north east. However, the skill for these outlooks is low.
- Warmer than normal daytime temperatures are likely across the north of State during the third and fourth weeks of February, particularly in the north east. The skill level for this outlook is low-moderate.
- Overnight temperatures in mid-late February are likely to be warmer than normal across the north, north-central areas and north coast of NSW. The skill level for this outlook is low.

March

- The experimental outlook for March indicates a roughly equal probability for wetter or drier conditions across NSW, with a 40-60% probability of above median rainfall (Figure 6). The skill for this outlook is low.
- The experimental March outlook indicates a roughly equal probability for warmer or cooler daytime temperatures across NSW, with a 40-60% probability of above median maximum temperatures (Figure 6). The skill for this outlook is moderate for the north of NSW, but low in the south.
- There is also a roughly equal probability for warmer or cooler overnight temperatures in March, with a probability of 40-60% for above median minimum temperatures across most of the State (Figure 6). Limited areas in the north, north west and south west have a 60-70% probability of receiving above median minimum temperatures. However, the skill for this outlook is low.

2.4 Other climatic models

- The Bureau of Meteorology's old statistical model indicates an equal probability for wetter or drier rainfall conditions over most of NSW over the next three months, with a slightly decreased probability for above median rainfall in the north west. It indicates that overnight temperatures have an equal probability to be warmer or cooler, as do daytime temperatures over most of the State, with an increased probability of higher temperatures in the south and south west. The statistical outlook is based on past trends in sea surface temperatures. 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 UK Meteorology Office's global long range probability modelled output indicates an equal probability for wetter or drier conditions across NSW in February to April. The skill assessment for this outlook is low for most of NSW, moderate for the central west and high for the north west and south west. The model indicates above average temperatures for the period in the south and west of NSW and an equal probability for warmer or cooler conditions across the north and north east. The skill for the temperature outlook is high for northern NSW, moderate for coastal NSW and low for the remainder of the State.
- For March to May, the UK Meteorology Office's global long range probability modelled output indicates an equal probability for wetter and drier conditions across NSW. The skill assessment for this outlook is moderate to high, except for the south of the State. For temperature, the outlook indicates that above normal conditions are likely with a 60-80% probability of above average temperatures. The temperature outlook has a moderate to high skill for most of NSW. Note that the

output from this model is provided for the use of international meteorological centres and not as general seasonal outlooks.

- The APEC Climate Centre's multi-model ensemble outlook of rainfall anomalies for February to April indicates a somewhat lower than normal rainfall is likely across the north east, that higher than normal rainfall is likely across north east, far west and south west, and that near normal rainfall is likely across the remainder of the State. The temperature anomaly outlook indicates a likelihood of increased temperatures across the State during February to April, particularly in the far north west. No skill assessment is available for these outlooks.
- During February, the APEC Climate Centre's rainfall anomaly outlook indicates a likelihood of lower than normal rainfall across the State, except over the north west and south east. The temperature anomaly outlook indicates higher than normal temperatures are likely during February. No skill assessment is available for these outlooks.

2.5 El Niño-Southern Oscillation (ENSO)

- The Pacific Ocean remains in a neutral ENSO state (neither El Niño nor La Niña). The international climate models surveyed by the Bureau of Meteorology indicate this state is likely to continue through to at least autumn, although warming is likely in the tropical Pacific in the coming months through autumn and winter.
- ENSO neutral conditions do not guarantee normal seasonal conditions, as more localised weather extremes can and do occur due to the influence of secondary or local factors, such as the warmer than normal sea surface temperatures occurring around parts of the Australian coastline.
- The CPC/IRI consensus ENSO forecast of the NINO3.4 index (as at 6th February) states that of the 24 climate prediction models surveyed, most indicate ENSO neutral conditions will continue over February to April and through autumn (Table 1).
- 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.
- However, during late autumn and winter 2014 many of the models in the CPC/IRI consensus ENSO forecast are indicating a warming tendency, with 31% indicating El Niño conditions are probable between April-June next year, increasing to 45% over July-August (Table 1). It should be noted that the Bureau of Meteorology's POAMA model currently indicates ENSO neutral conditions during autumn and early winter; although the some of the climate models surveyed by the Bureau of Meteorology indicate temperatures may approach El Niño levels by early winter. It should also be noted that ENSO forecasts generally have a lower skill at this time of year.

Table 1: Current ENSO consensus forecast probabilities

Season	La Niña	Neutral	El Niño
Jan-Mar	2%	96%	2%
Feb-Apr	3%	91%	6%
Mar-May	3%	79%	18%
Apr-June	3%	66%	31%
May-Jul	4%	56%	40%
Jun-Aug	6%	49%	45%
Jul-Sep	6%	47%	47%
Aug-Oct	6%	45%	49%
Sep-Nov	6%	45%	49%

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

- Monthly sea surface temperatures from the Bureau of Meteorology and the US National Oceanic and Atmospheric Administration (NOAA) indicate close to average conditions over most of the central and eastern tropical Pacific. Weak cool anomalies are present in the far eastern Pacific south of the equator. Weak warm anomalies are present in the west, and along areas of the south eastern and north western coastline of Australia. Conditions are near average in the central Pacific. The most recent monthly temperature index value in the NINO3.4 region is -0.3°C, a -0.4°C change since December, and -0.38°C for the week ending 6th February. Most models suggest the NINO3.4 region will remain in the neutral range through to autumn 2014, as shown in Table 1 above.
- The sub surface sea temperatures in the Pacific (to January) remain cooler than average to the east of the Date Line and warmer in the west. The areas of cool anomalies in the east and warm anomalies in the west have strengthened over the last few months.

- The Southern Oscillation Index (SOI) has dropped slightly after rising over the last few weeks, though this is likely to be due to short term local weather variations. It is expected to decrease over the next fortnight. The latest 30-day value to 10th February is +12.5 and the average for the last 90 days to 10th February (supplied by QDSITIA) is +6.9. Values of 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.
- The Sub-Tropical Ridge (STR) remained south of the continent, as indicated on NOAA and Bureau of Meteorology mean sea level pressure charts. 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 allowing cold fronts to extend further into southern Australia.
- The Indian Ocean Dipole (IOD) remains neutral. The latest IOD index value for the week ending the 9th February is -0.07°C. The Bureau of Meteorology's POAMA model and most climate models surveyed by the Bureau of Meteorology favour a neutral IOD over the coming months. This is because IOD patterns are generally inhibited by the development and position of the monsoonal trough. The IOD has little effect on Australian climate until autumn or winter. A negative IOD 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.
- Trade wind patterns over the tropical Pacific are near average across most of the equator. Trade winds strengthen across the tropical Pacific during La Niña events and weaken during El Niño events.
- Cloud conditions at the equator near the International Date Line are currently slightly below average, and have been so since early January. Cloudiness in this area decreases during La Niña and increases during El Niño events.

2.5 Other climatic indicators

- The experimental Southern Annular Mode (SAM) index has been weakly negative since mid-late December, was currently weakly positive at about +0.75 as at 6th February from POAMA and as at 9th February from NOAA. Predictions from POAMA and the US National Oceanic and Atmospheric Administration (NOAA) indicate the SAM index is likely to be weakly positive in early-mid February and then decline to be near neutral or weakly negative later in the month.
- 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 during January was above normal across the State, particularly along the central coast. High atmospheric pressure is linked to drier than normal conditions.

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 1900.

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.

January

- Relative to historical records, rainfall for January was below average to well below average across most of the north west, tablelands and coastal areas. Most of these areas were in the lowest 10% of years for January rainfall.

- Below average rainfall extended across the North West, Northern Tablelands, North Coast, Hunter, Central Tablelands, Greater Sydney and South East LLS districts, as well as areas of the other LLS districts and occurred across 49% of the State (Figure 7).
- The remainder of the State (47%) received generally average relative rainfall during January.
- Limited above average to well above average rainfall resulted from localised falls due to thunderstorms in areas around Parkes and Lake Cargelligo.

November to January (3 months)

- Over the period from November to January, relative rainfall was below average across 72% of the State (Figure 8). These area extended across much of Western, North West, Northern Tablelands, Central West, Central Tablelands, Riverina and South East LLS districts.
- Above average or better relative rainfall was confined to isolated areas along the coast and in Hunter LLS district.
- Average relative rainfall was restricted to most of the coastal areas and the far south of NSW.
- Over the period, 70-96% of Riverina, Western, Central Tablelands, Central West, Northern Tablelands, and North West LLS districts had below average rainfall.

August to January (6 months)

- Over the six months to November, relative rainfall was below average or worse across 90% of NSW (Figure 9). A large proportion of this area (57% of the area of NSW) received rainfall in the lowest 10% of years.
- Only limited areas of the South East, Murray, Hunter and North Coast LLS district received average relative rainfall over the period, amounting to just under 10% of the State.
- Isolated areas in the alpine region and near Bega received above average rainfall.

March to November (9 months, BoM)

- Over the 9 month period from May to January, relative rainfall across the State was below average across most of the west, north west, north and mid north coast, Hunter valley and the tablelands (Figure 10). Most of these areas received 40-80% of their normal rainfall.
- Areas of particular deficiency occurred in the far north west between Walgett, Goodooga and Collarenebri which received between 20-40% of the long term average rainfall.
- Limited parts of the alpine areas received above average rainfall. The remainder of the State was near average (mainly the south and south east), receiving 80-100% of normal rainfall.

February to January (12 months)

- Over the twelve months to January, below average relative rainfall extended across the north west and tablelands, including the North West, Northern Tablelands, Central Tablelands and areas of the Central West and Western LLS districts (Figure 11), and covered 53% of NSW.
- Areas of the Hunter, Riverina, South East and Murray LLS districts also experienced below average rainfall for the period.
- The remainder of the State (46%), including most of the coastal and central areas and much of Western LLS district, had average relative rainfall. Only isolated areas received above average relative rainfall over 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.

January

- NSW received an average of 21 mm for the month in comparison to the historical average of 66 mm. January was the driest since 2003.
- Rainfall during January was between 0-40% of average across most of NSW. Much of the south east, north west, mid-north coast and tablelands received less than 20% of their normal rainfall.
- Most rainfall across the State was as a result of a surface trough on the 24th and 25th which resulted in widespread light falls, with heavier rainfall over the alpine areas and north coast.
- Isolated thunderstorms on the 9th and 10th caused localised heavy falls in parts of central NSW at Parkes and west of Condobolin.
- Total rainfall over the State ranged from 0-300 mm. However, the higher recordings were only received in limited areas, and the

majority of the State received between 1-25 mm.

- Most of the western areas received 0-25 mm, the central areas 0-50 mm and the eastern areas 5-50 mm, and higher falls of up to 100 mm (or more) in areas of north coast, alpine areas and around Parkes (Figure 12).
- Rainfall across much of the southern and central areas of Western LLS district, the west of Riverina and Murray LLS districts, and areas of the North West, Hunter and South East LLS districts was restricted to less than 10 mm.
- Parts of the north west received some relief, with falls of 25-50 mm to the north of Bourke.

November to January (3 months)

- Total rainfall over the three months to January ranged from 10-300 mm over most of the State, with some areas receiving as little as 10-25 mm and others over 300 mm.
- The far north west and much of the far west received 2-50 mm. An area between far north western corner of the State and Ivanhoe to Oxley received 10-25 mm.
- Most of the central areas of the State received 50-200 mm, with the amount received increasing to the east. The tablelands generally received 100-200 mm, with eastern fall areas of the Northern Tablelands LLS district receiving 200-300 mm.
- The coastal areas received 200-300 mm, with areas in the Hunter and North Coast LLS districts receiving 300-400 mm (Figure 13).

August to January (6 months)

- Rainfall across the State during the August to January period ranged from 10-800 mm (Figure 14), with most areas receiving between 50-300 mm.
- The lowest rainfall over the period (10-50 mm) fell in the far north west and extended south east to Ivanhoe, with another area to the north and north west of Bourke.
- Most of the far west and north west of the State received 50-100 mm over the period.
- The central areas of the State, including the slopes and much of the tablelands received 100-300 mm during the period. The eastern areas of Riverina and Murray LLS districts also received similar rainfall with the far east of these districts receiving 300-600 mm.
- The coastal LLS districts generally received 300-400 mm. Isolated areas near Wollongong and Moruya received 400-600 mm. The alpine areas received 400-800 mm.

4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

- Maximum temperatures across the State in January averaged 2.7°C above normal, and it was the 10th warmest January on record. High temperatures were associated with dry sunny conditions, three heatwaves and warm north westerly airflow. The heatwaves occurred between the 1st and the 3rd, the 12th to the 21st and from the 28th onwards.
- Maximum temperature anomalies ranged from 1-3°C across most of the State, with the highest temperatures in the south west and in a belt through the central areas and slopes. In these areas, temperatures were generally 3-4°C above normal.
- Along the coast and eastern fall areas, maximum temperatures were 0-2°C above normal (Figure 16).
- Minimum temperatures during the month averaged 1.3°C above normal across the State. Warmest temperatures occurred in the far south west, where minimum temperatures were 2-3°C above normal.
- Generally, the western areas of the State had minimum temperatures of 1-2°C above normal and the east between 0-1°C above normal. Minimum temperatures along areas of the coast and part of the tablelands were -1-0°C above normal (Figure 17).

5. Relative soil moisture

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

5.1 Topsoil

- Modelled topsoil moisture was low across over 99% of NSW in January (Figure 18), declining 3% from last month.
- Some small improvements in topsoil moisture occurred in the central west and far north west, but these were minimal. Declines in topsoil moisture occurred along the coast.
- On a percent rank basis, about half the State ranked as having below average to extremely low relative soil moisture.

- Levels remained particularly low across most of the Western, North West, Riverina and Hunter LLS districts. Across most of these areas, modelled topsoil moisture averaged 10-20 mm or less.
- Average topsoil moisture levels of 20-40 mm occurred across the North Coast LLS district, eastern areas of the Northern Tablelands, Greater Sydney, parts of the Central Tablelands and the alpine and north eastern areas of the South East LLS district.

5.2 Subsoil

- Modelled subsoil moisture levels were relatively stable between December and January. The areas of lowest subsoil moisture were in the north west and south west of the State (Figure 19).
- On a percent rank basis, the majority of the North West, Northern Tablelands and Central Tablelands LLS districts had below average to extremely low subsoil moisture, as did the north of Central West, the north west of South East and the east of Riverina LLS districts.
- Some 55% of NSW had low subsoil moisture in January, a slight improvement from 57% in December. The North West LLS district showed the greatest decline in subsoil moisture level between December and January, and the Riverina LLS district the greatest improvement.
- Subsoil moisture levels remained moderate along a narrow coastal strip from Bega to Tweed Heads.
- Only 1% of the State remained in the high subsoil moisture category during January.
- The North West LLS district had the lowest overall relative subsoil moisture during the month, with 86% of its area in the low category. This was followed by 78% of Central West, 67% of Murray and 57% of Western LLS districts.
- Total modelled subsoil moisture for the month was less than 200 mm across most of the State, and less than 50 mm near Walgett in the North West LLS district. The coastal areas generally had 200-400 mm of subsoil moisture.

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.

6.1 Modelled pasture growth

- During January, modelled pasture growth remained very low across most of the State, with large areas showing growth of less than 10 kg/ha dry matter (DM) (Figure 20).
- Of the remainder, the majority of pasture growth was in the range of 10-50 kg/ha dry matter (DM).
- The areas of best growth were in the north and south of the North Coast LLS district, and in the west of the Central Tablelands LLS district.

6.2 Modelled biomass

- Modelled total standing dry matter (biomass) levels during January declined across much of the State, particularly in the central and coastal areas (Figure 21).
- Modelled biomass levels declined across the coastal LLS districts from 500-1,500 kg/ha dry matter (DM) in December to 250-1,000 kg/ha DM in January (Figure 21). Similar declines occurred in the Northern Tablelands LLS district, with the area of low biomass increasing across the west of the district.
- The areas of reasonable biomass also declined in the Riverina and Murray LLS districts, and the across the west of the Central Tablelands LLS district.

6.3 Relative pasture growth

Relative pasture growth and biomass area calculated by comparing and ranking the current modelled growth and biomass against that for the same period over every year since 1957. 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.

January

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.

- Relative pasture growth during January was poor across most of the north west, northern, and coastal areas and the tablelands (Figure 22).
- Some 42% of the State was below average in relative growth for the month, 28% average and only 3% above average. Areas of missing data accounted for the remaining 27%, primarily across the west of the State.

- The worst areas of relative pasture growth extended across the North West, Northern Tablelands, North Coast, Hunter, Central Tablelands and South East LLS districts. Other areas of poor growth occurred in the north of the Central West and the east of the Riverina LLS districts, and in isolated areas of the Western LLS district (although there was a large amount of missing data for Western LLS district).
- Missing data covered large areas of the Murray, Riverina and Western LLS districts (57%, 33% and 50% of their areas, respectively).

November to January (3 months)

- Over the three months to January, relative pasture growth was below average or worse across much of the Western, North West, Riverina and Central Tablelands LLS districts, as well as the east of the Murray and north west of the Northern Tablelands LLS districts (Figure 23). Some 60% of the State had below average relative growth for the period.
- Approximately 70% of the Western LLS district had below average relative growth for the period, along with 78% of North West, 87% of Central West, 64% of Central Tablelands and 57% of Riverina LLS districts.
- The eastern areas of the South East, Greater Sydney and Hunter LLS districts had average or better relative growth over the three months to January. A small proportion State (7%) had above average relative growth, mainly in Greater Sydney and Hunter LLS districts, as a result of the heavy November rainfall.

August to January (6 months)

- Over the six month period from August to January, relative pasture growth was below average over 67% of the State. Only the far south east and the south of the State as well as the south easterly area of Western LLS district had average relative growth, amounting to about 30% of the State (Figure 23).
- Areas of well below average to extremely low growth extended from the far west, through the North West and Northern Tablelands LLS districts and into the Central Tablelands, North Coast and Hunter LLS districts.

February to January (12 months)

- Relative pasture growth across the State over the last 12 months was below average to extremely low across the north west and areas of the far west, extending from Wanaaring and Bourke to Moree and Coonamble (Figure 25).
- Other areas of below average growth extended across the Northern Tablelands and into the south of North Coast and the north of Hunter LLS district.
- The area of below average yearly growth made up 26% of NSW.
- The Western LLS district had generally average relative growth over the period, with the exception of the far north east and areas of the far north west and south west.
- Relative growth across most of the central and southern tablelands, the remainder of central, coastal and southern NSW was generally average (57% of the State), with pockets of above and below average growth.
- Relative growth across the majority of South East and Greater Sydney LLS districts was generally above average.

6.4 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 declined across north west and central NSW and the tablelands between December and January (Figure 26). Below average relative biomass made up 54% of NSW in January.
- Better areas of relative biomass (above average or higher) occurred in the coastal areas of the Hunter LLS district. Most of the coastal strip had average relative biomass, along with the central and eastern areas of Western and the Murray LLS district.

6.5 Pasture curing

- The curing index indicated a high degree of pasture curing across most of the western and central areas of the State, as well as the southern areas of the Hunter LLS district and most of the South East LLS district (Figure 27).
- Curing was variable across the Hunter, North Coast and Northern Tablelands LLS districts.

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 6th February 2014.

- Levels in water storages are low-moderate, with the average capacity being 55%.
- Changes in storage levels were generally small, with the exception of the Blowering (-15%), Hume (-13%), Pindari (-13%), Brogo (-11%) and Lostock (-10%) Dams and Lake Pamamaroo (-26%). Minor decreases occurred across most other storages, with the exception of Lake Cargelligo.

Table 2: Capacity of storages

Storage	Current Volume (GL)	Effective Capacity (%)	Monthly Change (%)
Toonumbar	10	93	-2
Glenbawn	698	93	-2
Glennies	257	91	-3
Lostock	17	83	-10
Brogo	8	88	-11
Cochrane	-	-	-
Dartmouth	3559	92	-3
Hume	1686	56	-13
Blowering	1079	66	-15
Burrinjuck	473	46	-7
Brewster	-	-	-
Carcoar	14	37	-9
Cargelligo	34	93	11
Wyangala	579	48	-6
Glenlyon	110	-	-
Pindari	62	20	-13
Copeton	523	38	-
Chaffey	-	-	-
Keepit	112	25	-9
Split Rock	89	22	-
Burrendong	267	20	-6
Oberon	32	70	-4
Windamere	186	50	-2
Lake Cawndilla	197	20	-6
Lake Menindee	56	0	-3
Lake Pamamaroo	202	71	-26
Wetherell	71	35	-3
Total	**10321**		
Average		**55**	

8.2 Irrigation allocations

Allocations are given as at 6th February 2014.

- High security and general security allocations remained the same as last month, with the exception of the general security licences for the Murrumbidgee river valley, which increased from 52-59%, and the Bega-Brogo, which increased from 48-52%.
- Irrigators in the Murrumbidgee river valley will be able to access an additional 5% of their entitlement after February 2014.

Table 3: Irrigation allocations

River valley	Allocation	Licence category
NSW Border Rivers	100%	General security A Class
	1.7%	General security B Class
	100%	High security
Richmond	90%	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*	6%	General security
	100%	High security
Murray*	100%	General security
	100%	High security
Murrumbidgee*	59%	General security
	95%	High security
Lower Namoi*	6%	General security
	100%	High security
Upper Namoi*	100%	General security
	100%	High security
Peel	45%	General security
	100%	High security
Bega Brogo	52%	General security
	100%	High security

* Carry over water may be available

Appendix

Maps and data used in the production of this report.

Seasonal outlook

Figure 1: Quarterly rainfall outlook

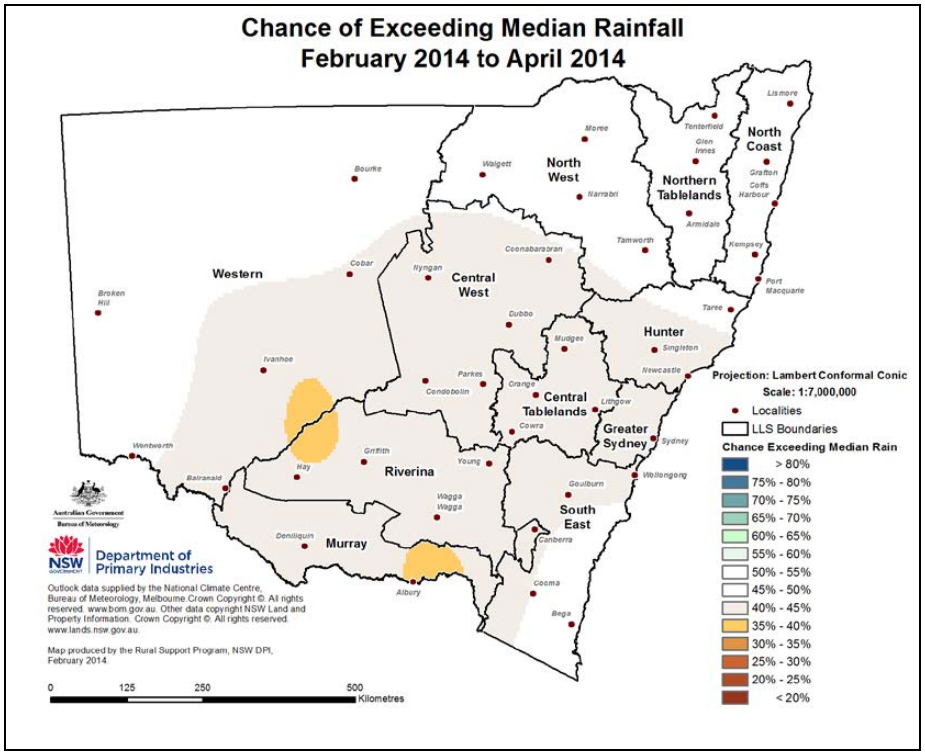


Figure 2: Quarterly maximum temperature outlook

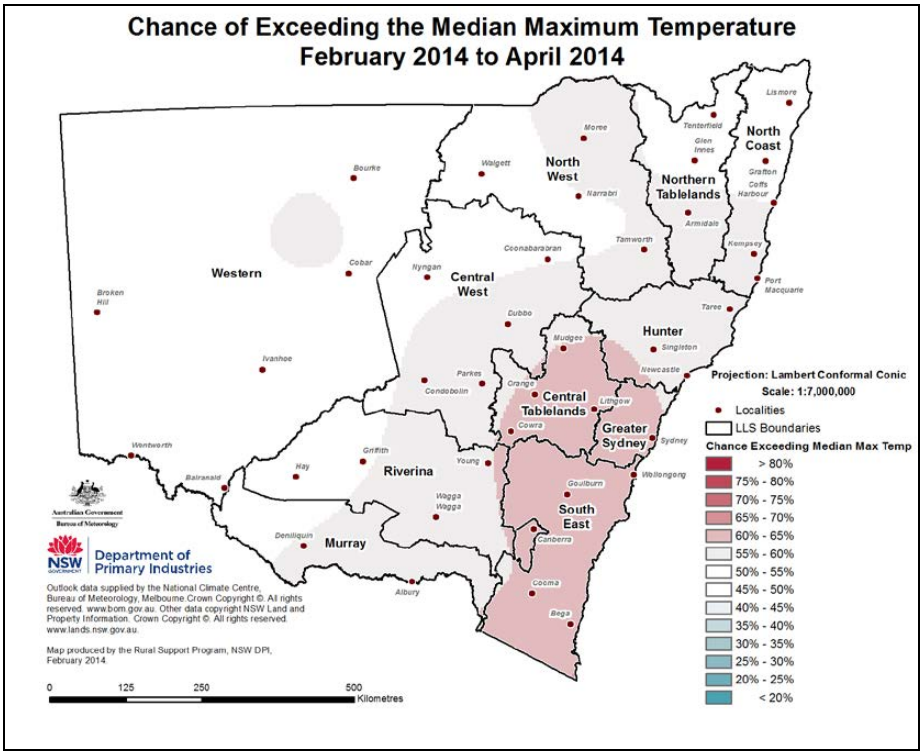


Figure 3: Quarterly minimum temperature outlook

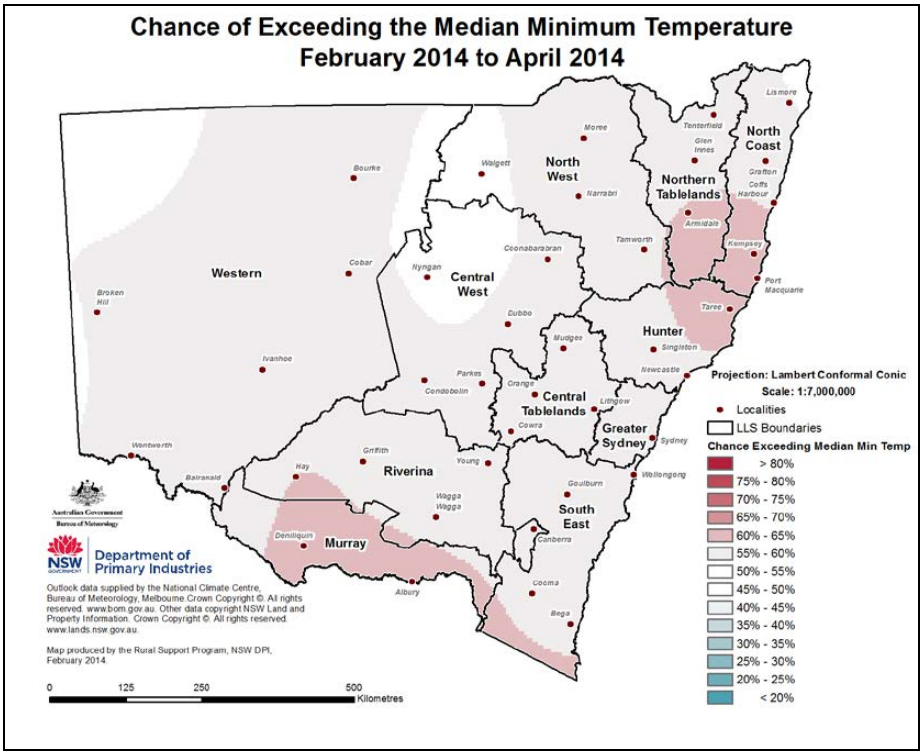
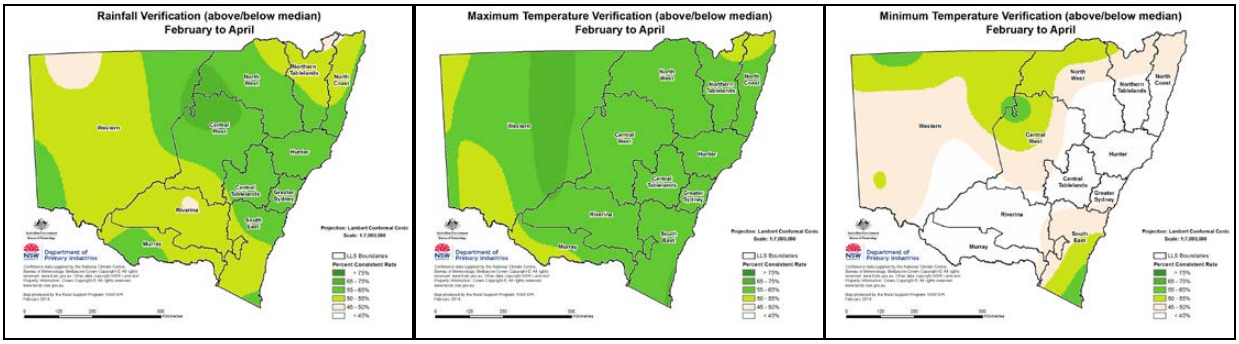


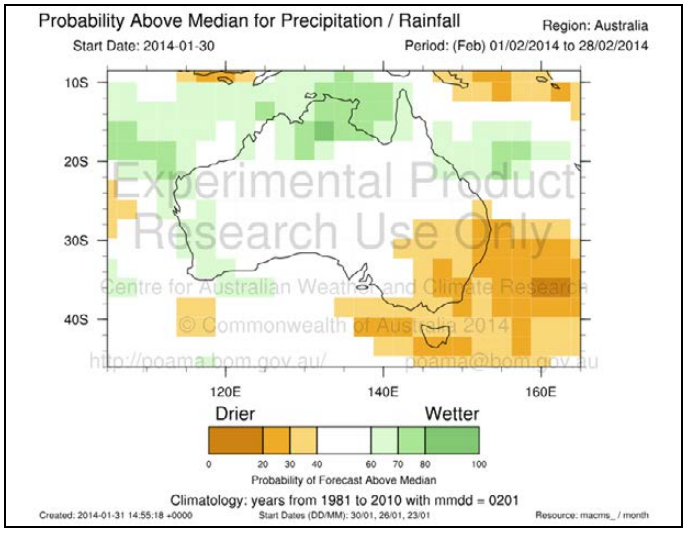
Figure 4: Outlook skill maps

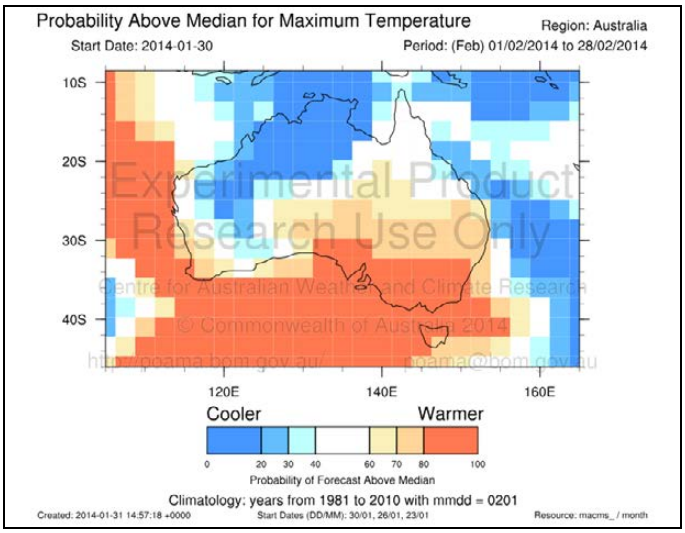


Monthly rainfall & temperature outlook

(Bureau of Meteorology, POAMA - experimental)

Figure 5: Experimental February rainfall and temperature outlooks





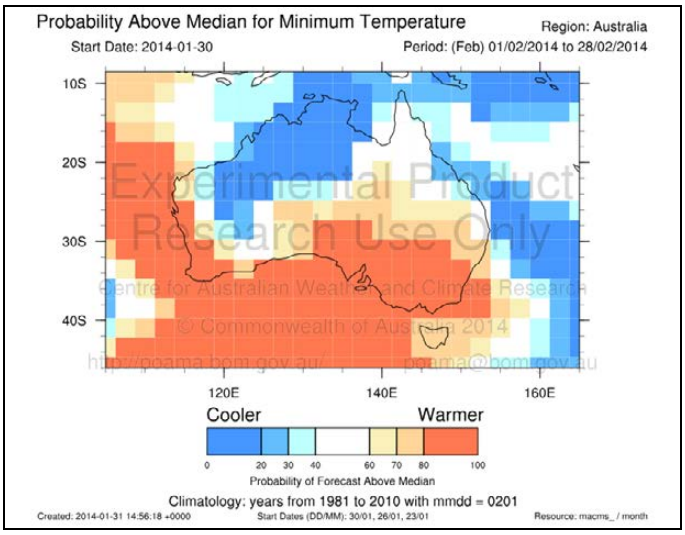
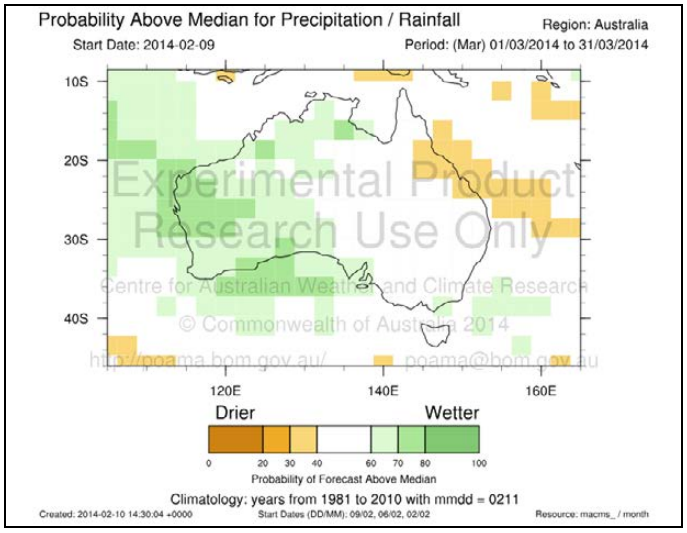
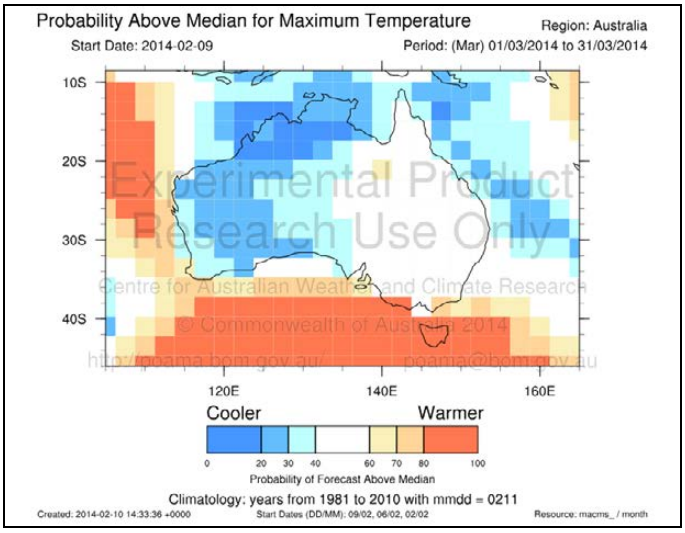
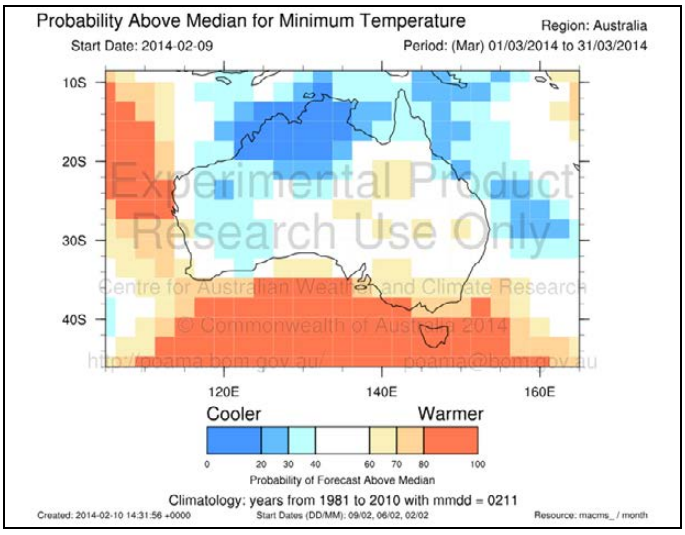


Figure 6: Experimental March rainfall and temperature outlooks







Rainfall

Figure 7: Relative rainfall – monthly

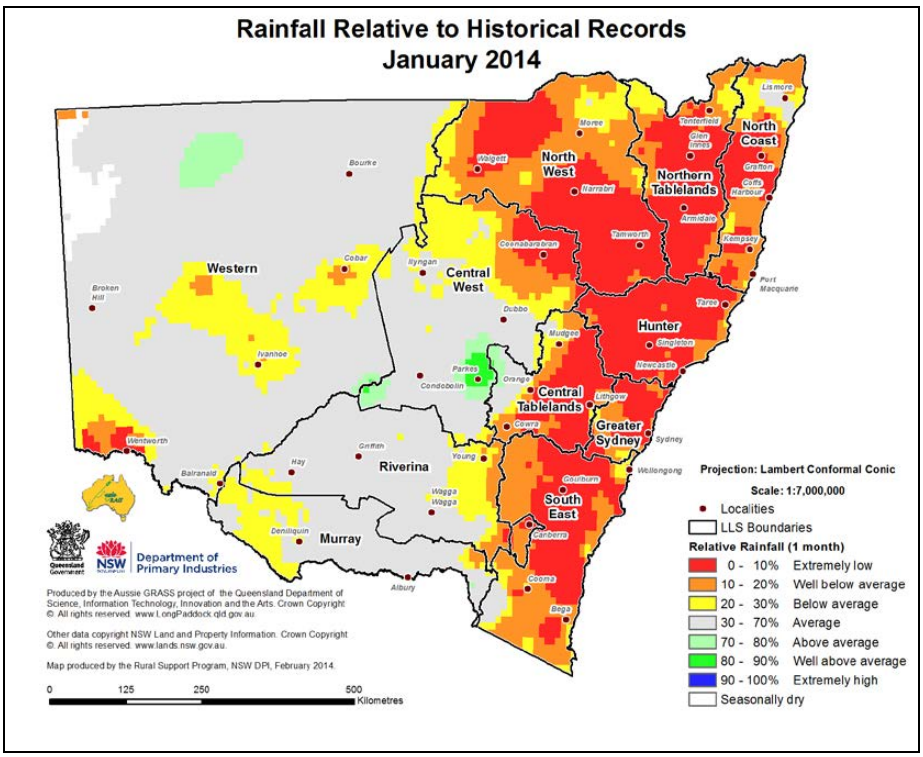


Figure 8: Relative rainfall – quarterly

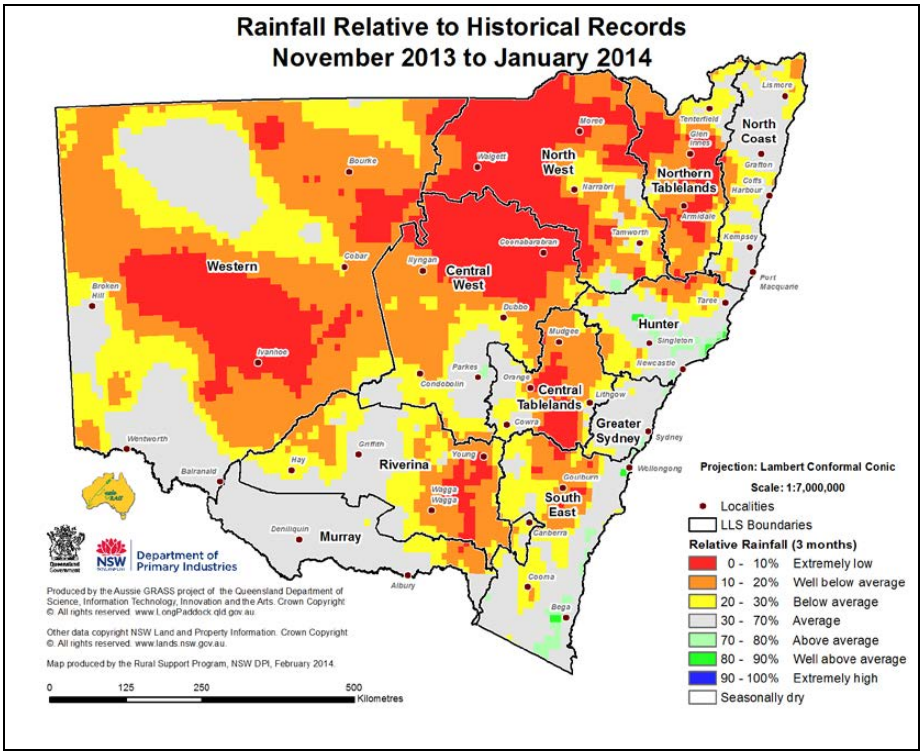


Figure 9: Relative rainfall – half yearly

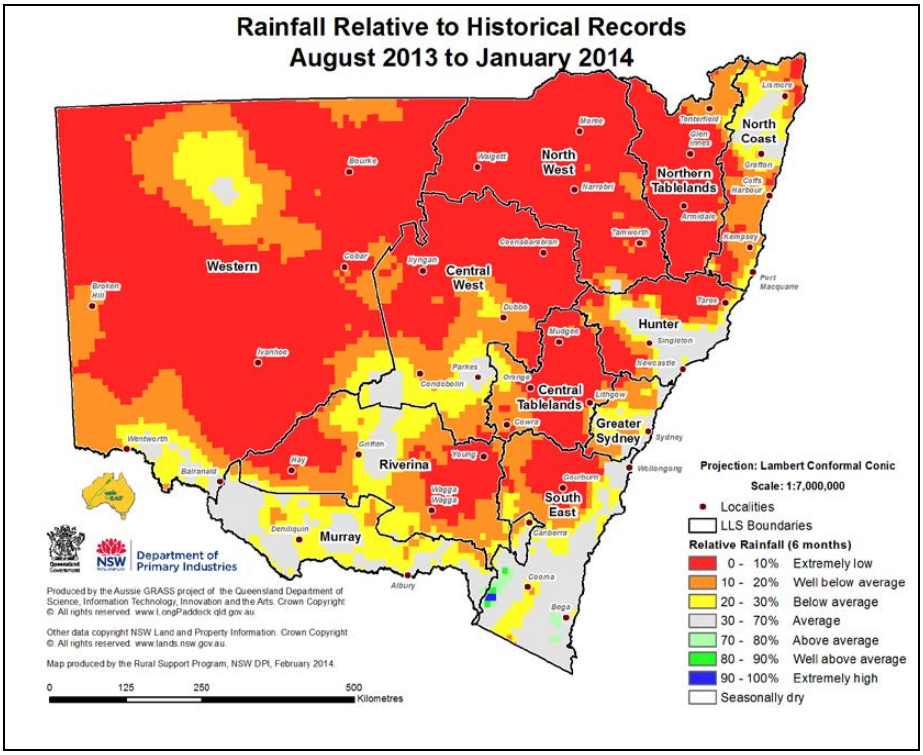


Figure 10: Relative rainfall – nine monthly

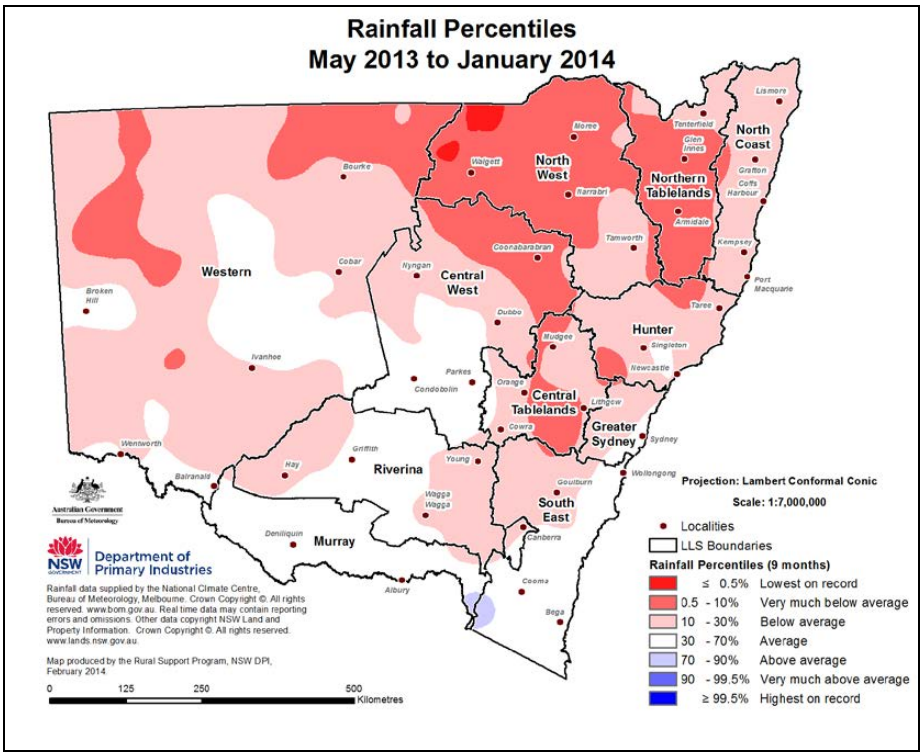


Figure 11: Relative rainfall – yearly

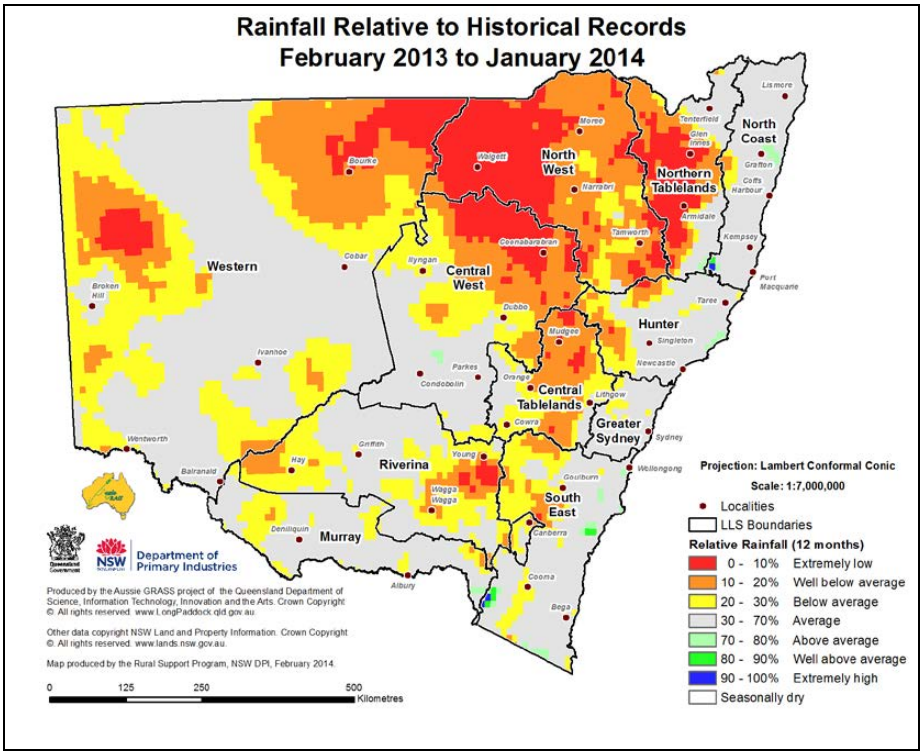


Figure 12: Total rainfall – monthly

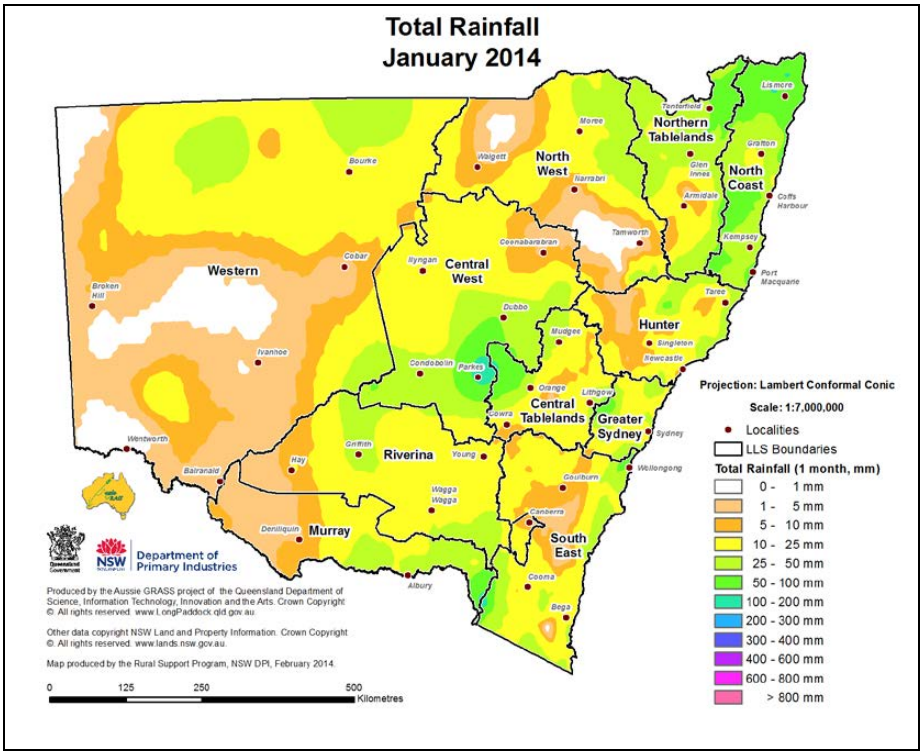


Figure 13: Total rainfall – quarterly

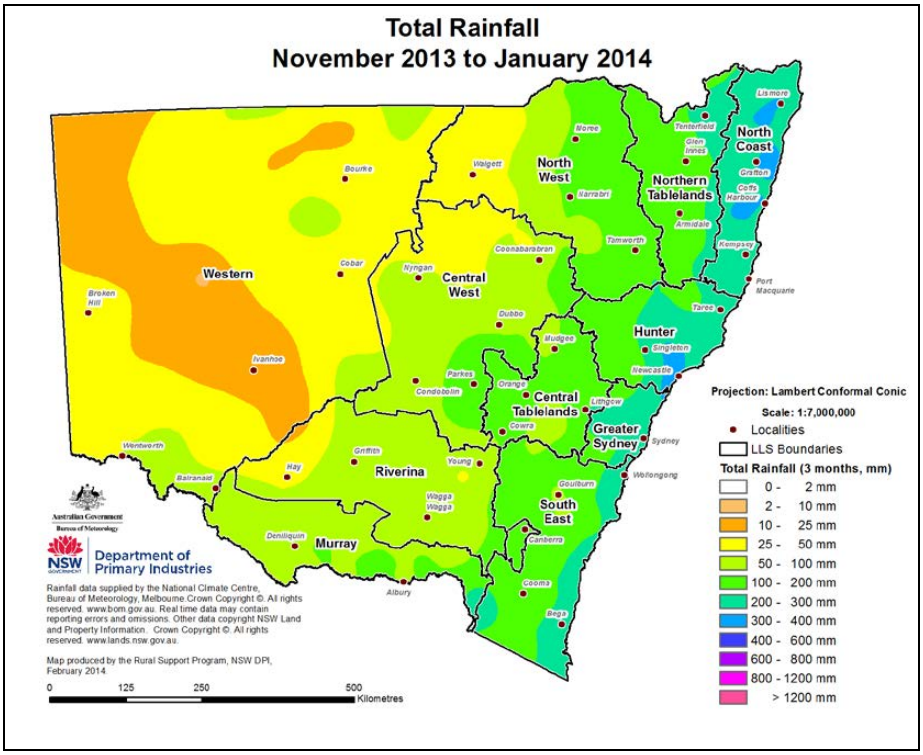


Figure 14: Total rainfall – half yearly

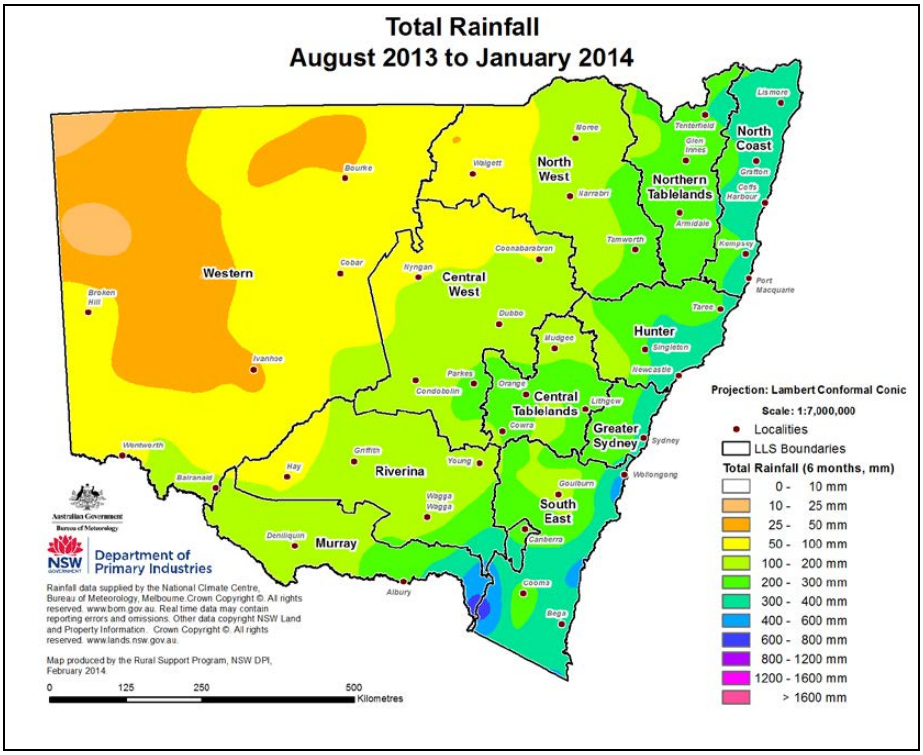
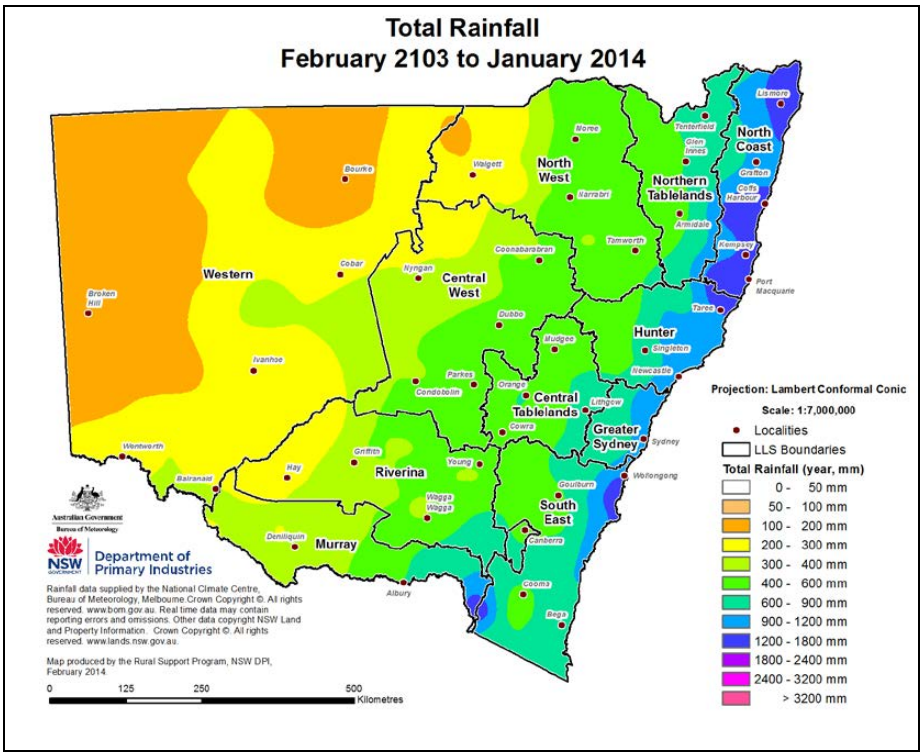


Figure 15: Total rainfall – yearly



Temperature

Figure 16: Maximum monthly temperature anomaly

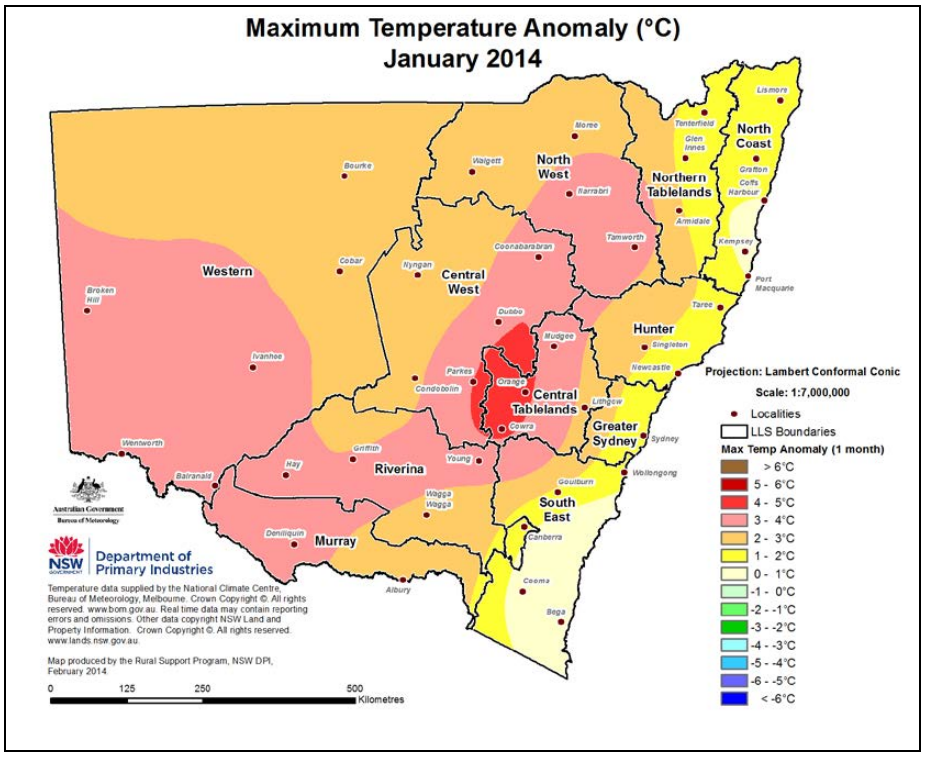
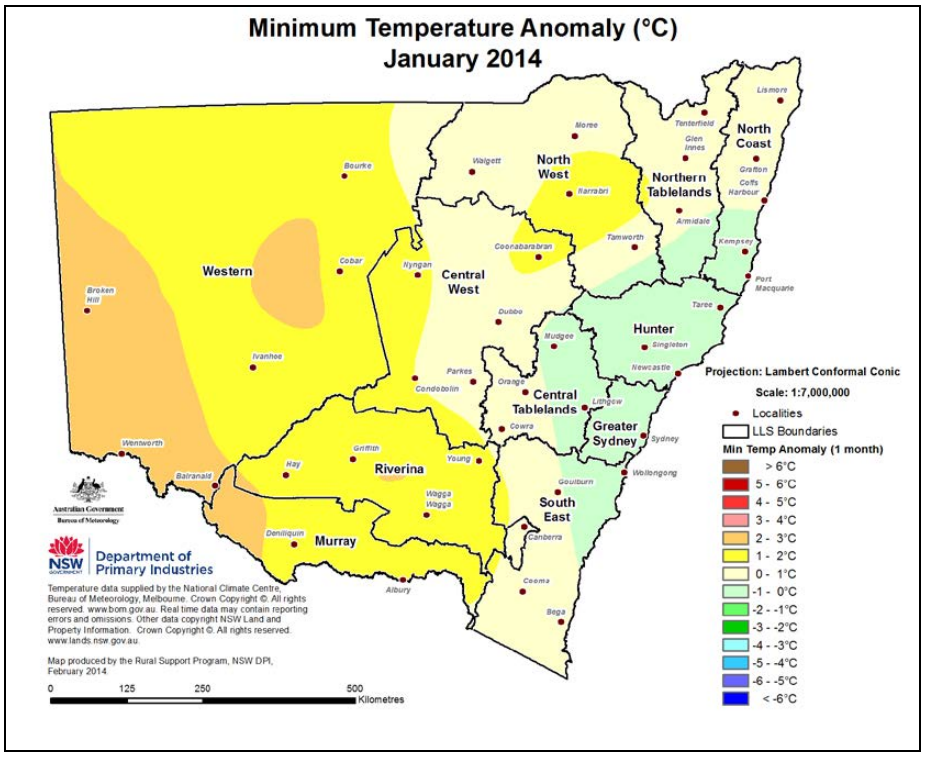


Figure 17: Minimum monthly temperature anomaly



Soil moisture

Figure 18: Relative topsoil moisture

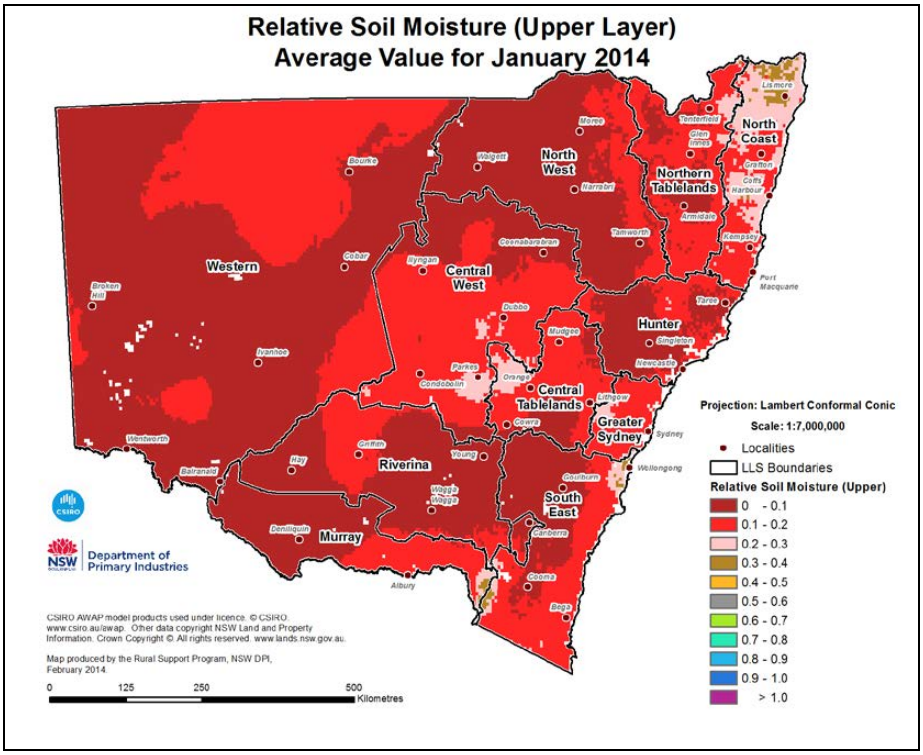
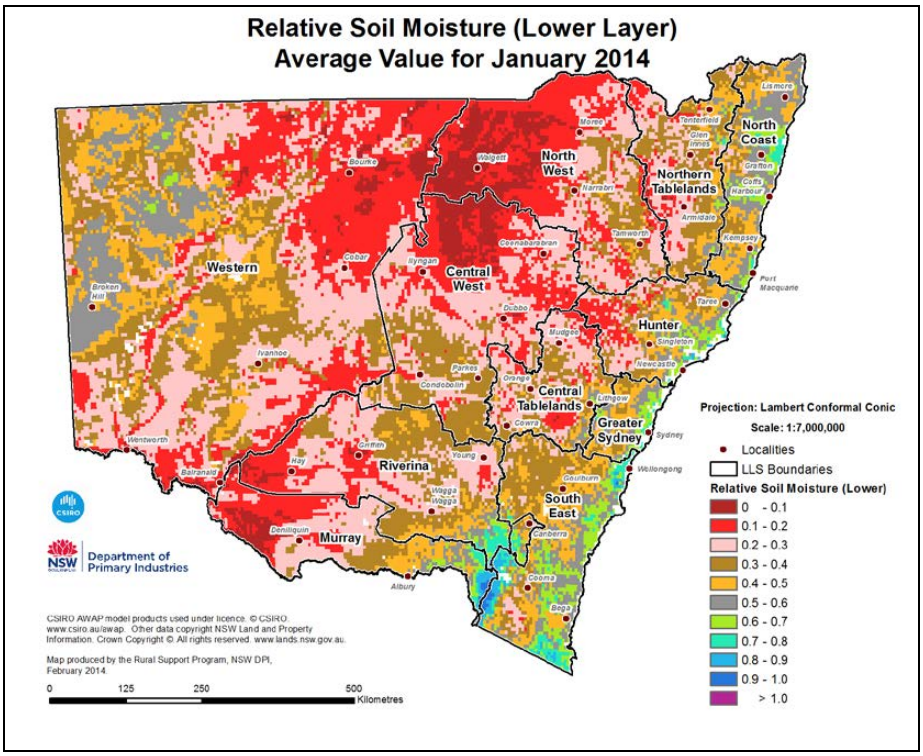


Figure 19: Relative subsoil moisture



Pasture growth and biomass

Figure 20: Modelled pasture growth

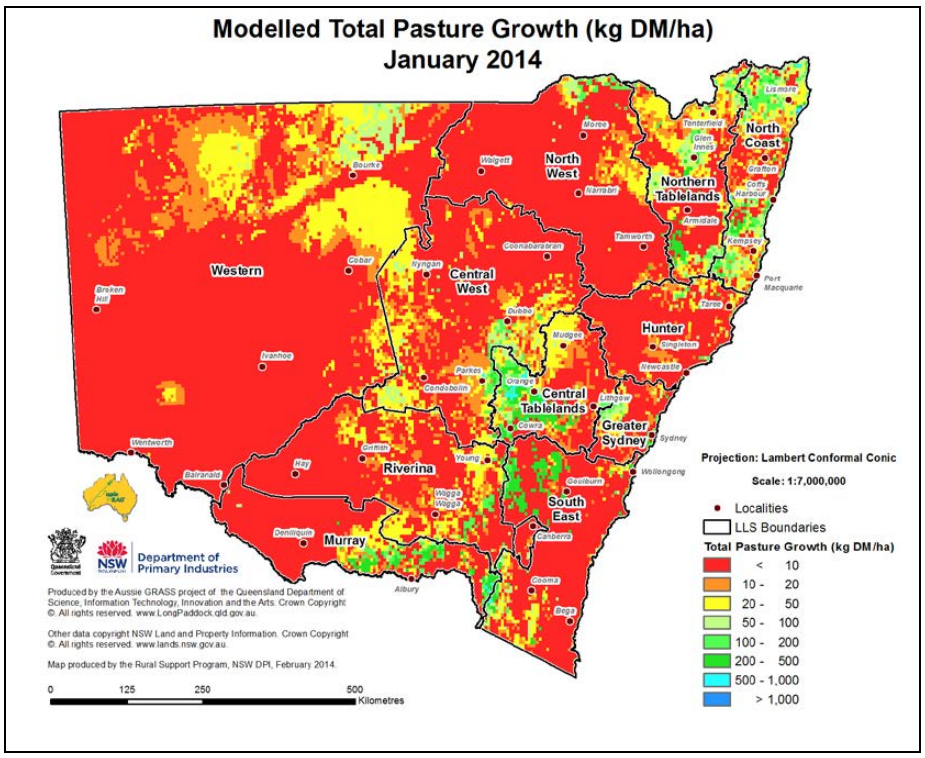


Figure 21: Modelled biomass

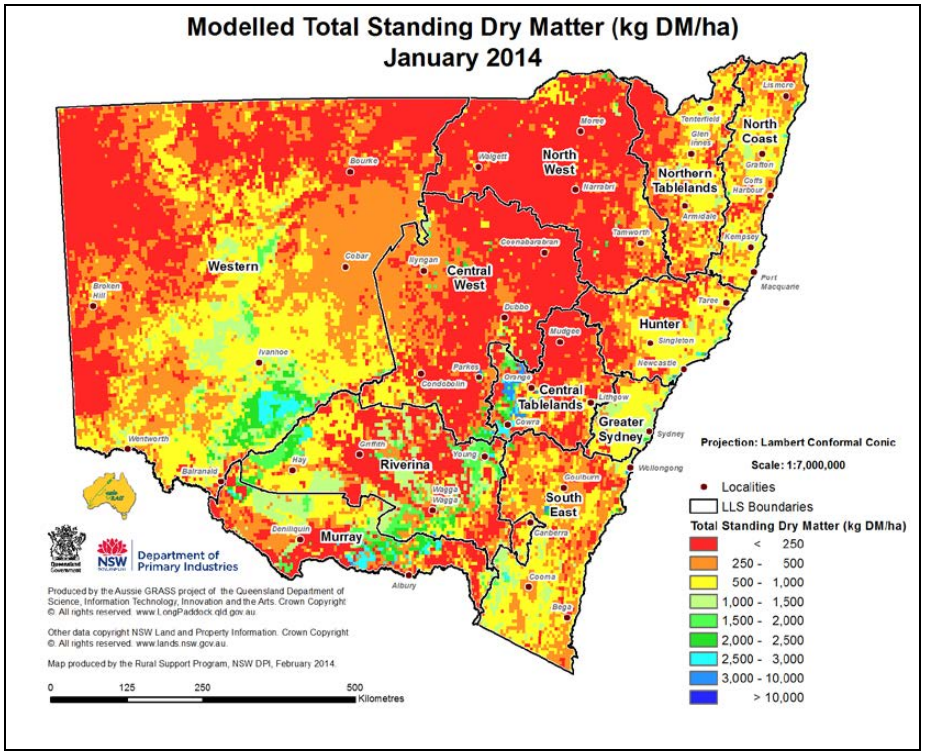


Figure 22: Relative pasture growth – monthly

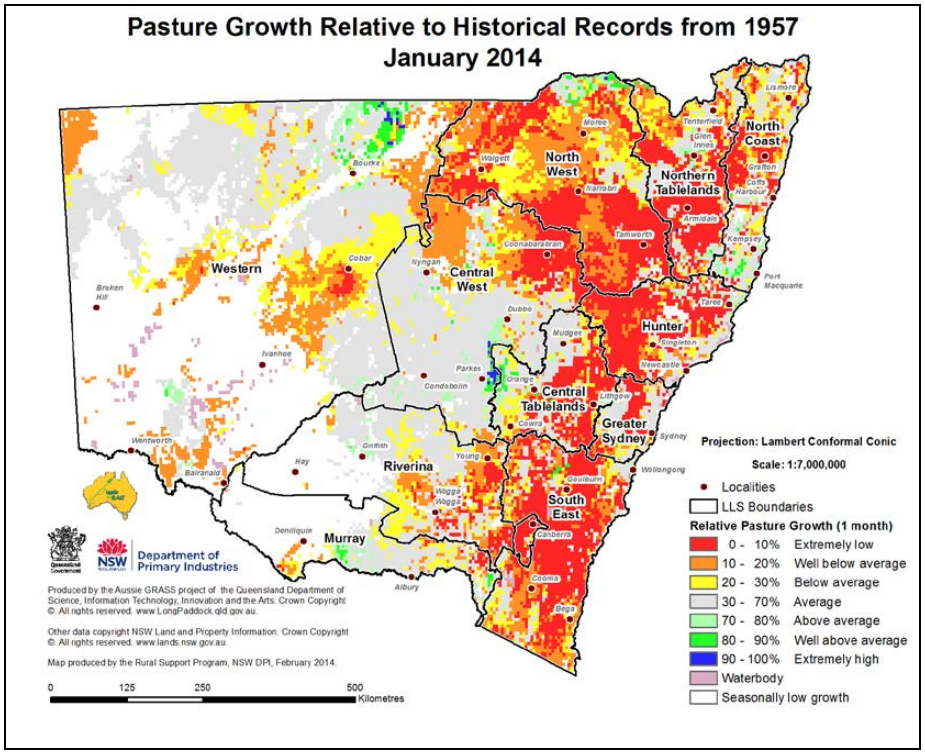


Figure 23: Relative pasture growth – quarterly

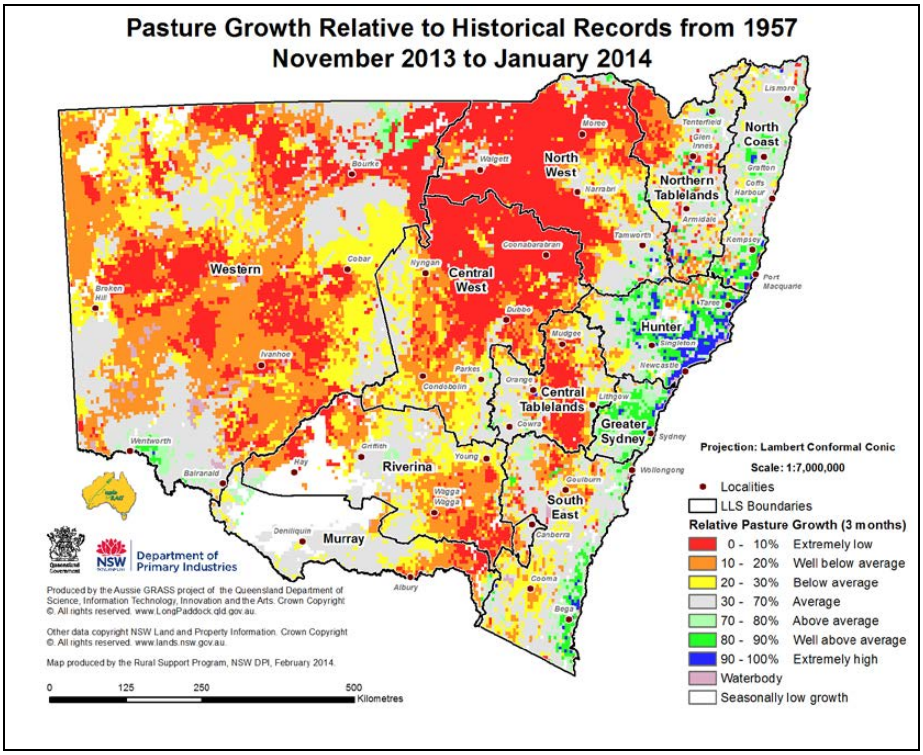


Figure 24: Relative pasture growth – half yearly

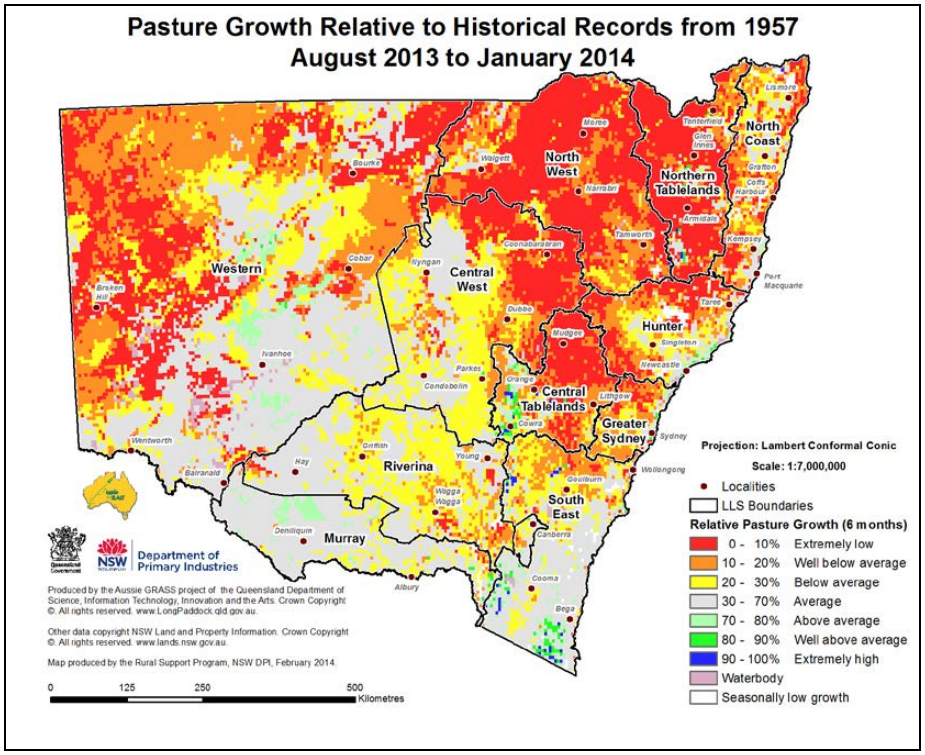


Figure 25: Relative pasture growth – yearly

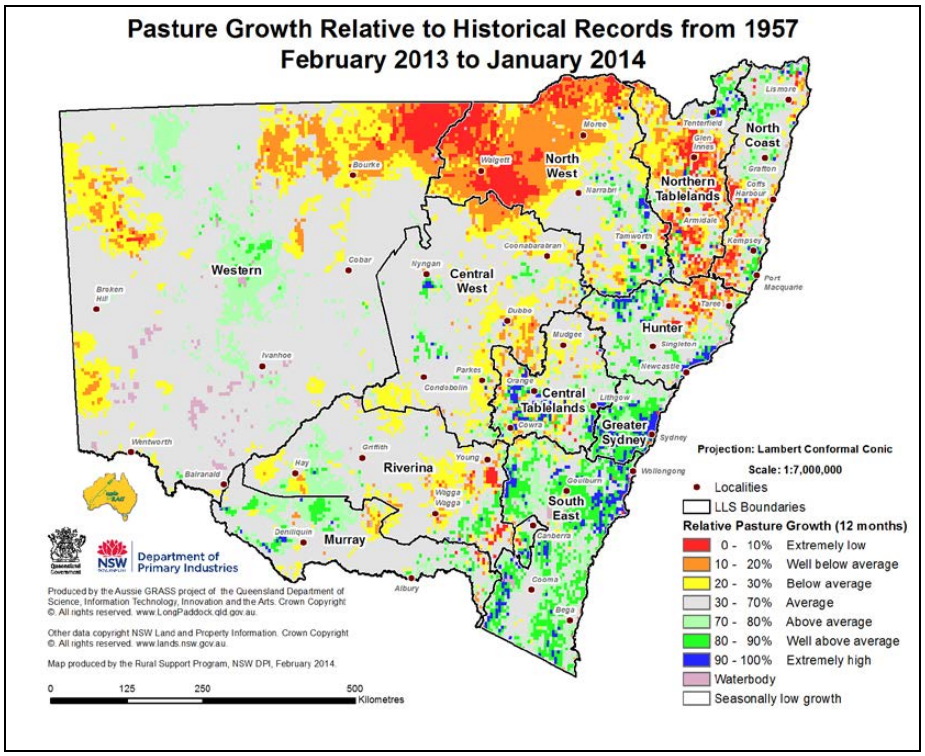


Figure 26: Relative biomass – monthly

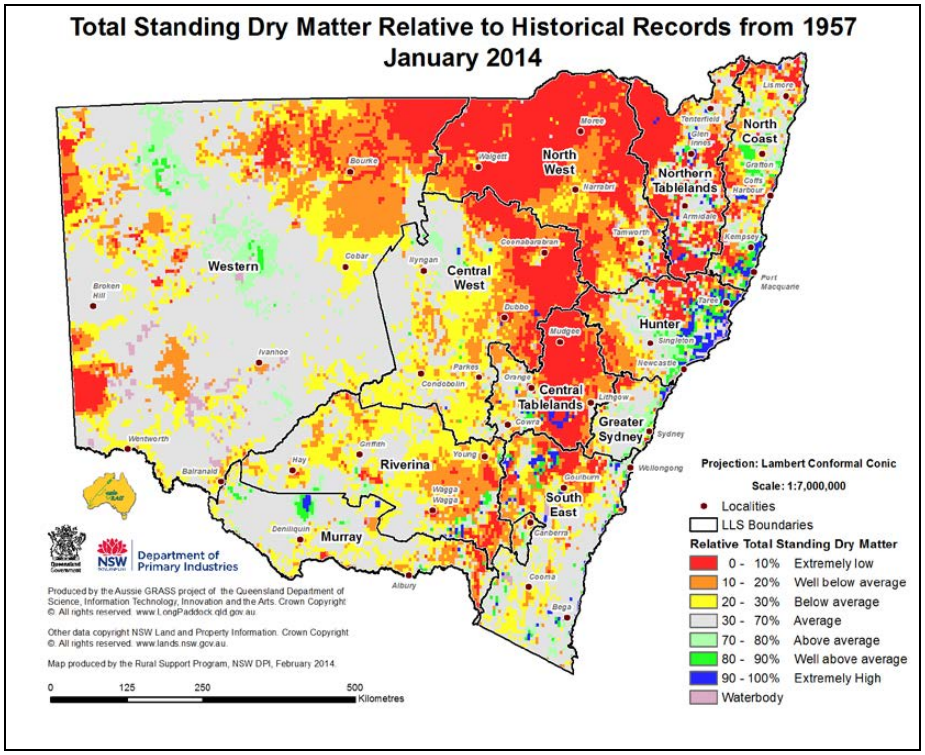
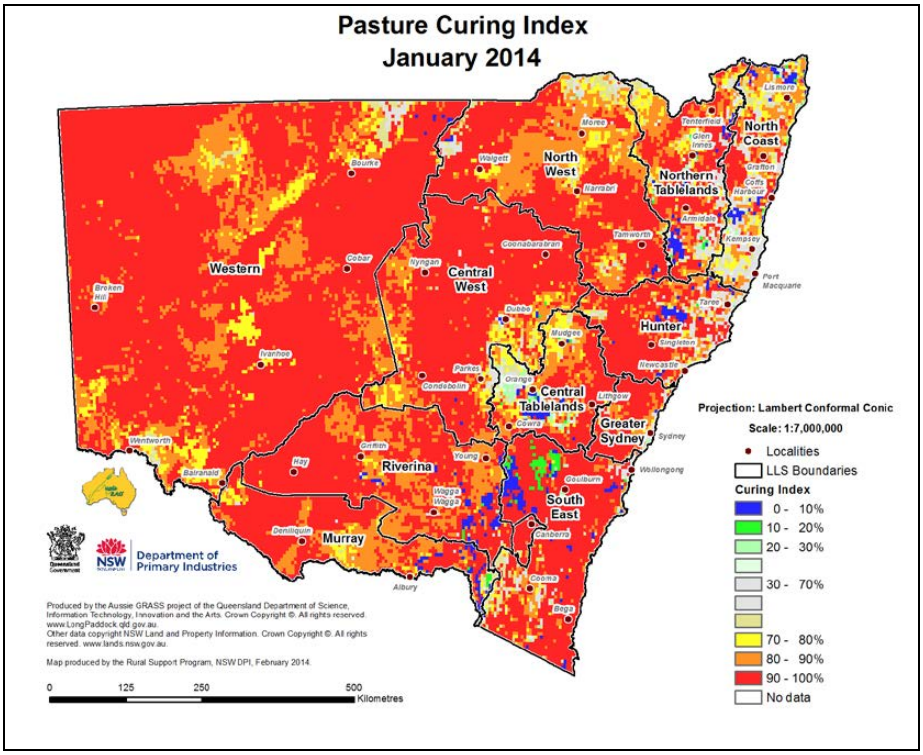


Figure 27: Pasture curing index



More information

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

Acknowledgments

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Warning

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