Department of Primary Industries

NSW Seasonal Conditions Report - October 2013

Highlights

- Near normal to slightly drier conditions are expected, with lower rainfall probabilities over northern & north western NSW & in the south east.
- Warmer daytime & overnight temperatures are likely, particularly in the east & south east.
- September was warmer than normal. The far west, north west & mid north coast received less than 25mm rainfall.
- Pasture growth declined across the far west, north west & mid north coast. Stock water supplies are low in some areas.
- Crop yields affected by poor rainfall in the north west & some frosts in the central west. Crop & pastures are reasonable to good in the central & southern areas.
- Modelled topsoil moisture levels declined due to high temperatures & lack of rainfall. Levels are low across most of NSW. Subsoil moisture levels declined slightly.
- 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

Over October to December near normal to slightly drier conditions are likely across NSW, with lower than normal rainfall across the north and north west, and on the far south coast. October is likely to be dry, but November is likely to have near normal rainfall. Warmer than normal daytime and overnight temperatures are likely over the October to December period, particularly in the south east.

Over September, NSW received about 80% of average rainfall, with most falls received on the 17th. Daytime temperatures were the warmest on record.

Areas of the far west, the northern, central and southern tablelands and the central and mid north coast received below average rainfall, while the central wheat belt and the far south coast received above average rainfall. Rainfall was near average over the rest of NSW.

Most of the far west received less than 10 mm, as did the Bourke area. The remainder of the far west, the north west and the mid north coast received 10-25 mm. Most of the southern cropping areas, central tablelands, north west slopes, northern tablelands and far north coast received 25-50 mm, with some areas receiving up to 100 mm. The far south east, including the upper south west slopes and parts of the southern tablelands and Monaro received 50-100mm and up to 200 mm in some areas.

The quarterly relative rainfall was below average across 61% of the State, and was well below average or worse across the far west, north west, northern tablelands, mid north coast and Hunter, central coast and southern tablelands. Quarterly relative rainfall was average over the southern and central areas of the State.

Relative rainfall for the last six months was similar, being below average for the north west, Hunter and parts of the northern and central tablelands and far north west.

Modelled topsoil moisture continued to decline due to low rainfall and high temperatures, and is now low over 95% of NSW. Topsoil moisture is greatest in the south east. Modelled subsoil moisture also declined slightly, particularly in the north east and coastal areas. Higher than normal rainfall is required to replenish depleted profiles.

Modelled pasture growth and biomass for September were low across western and north eastern NSW, with relative levels low over the north west and Hunter. Growth and biomass were average to good over the southern areas, particularly in the south east. Biomass levels have reduced runoff in some areas, and stock water supplies are low in the west, north west and parts of the central west and tablelands.

Quarterly relative growth was low over the north west, far north west and Hunter. Rainfall is required in most areas to maintain spring pasture growth.

Areas of light frost in late September have caused some crop damage in the central west. Crops in areas of the north west and the northern areas of the central west have failed due to insufficient rainfall.

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 October 2013.

2. Seasonal outlook

Seasonal outlook and ENSO information are sourced from the Australian Bureau of Meteorology (BoM) and international sources. The BoM's official forecasts 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 forecasts 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.

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 from late September to early October and were up to date as at 6th October 2013.

2.1 Seasonal rainfall outlook

- For the three month period from October to December, near normal rainfall conditions are likely over most of the State, with a slightly reduced (40-45%) chance of exceeding median rainfall. Lower than normal rainfall is possible across the north to north west and the south east, with the probability of exceeding median rainfall at 35-40% in these areas. Near normal rainfall is likely for the mid north coast (Figure 1).
- This means that for every ten years with similar climate patterns to those at present, three to four October to December periods would be expected to be wetter than average, and six to seven years drier than average.
- The outlook confidence (skill) for this forecast is moderate for north eastern NSW, (ranging from 55-65%), and moderate to high for southern, western and north western NSW (ranging from 65-75% in most areas, to more than 75% in some areas).

2.2 Seasonal temperature outlook

- Over the three month period from October to December, the probability of exceeding the long term median maximum temperature across NSW is more than 60%. There is a 60-65% probability across most of western and north western NSW, and a 70-75% probability for most of eastern, southern and central NSW. There is a 70-75% probability of exceeding median maximum temperatures along the central, south and mid north coast (Figure 2).
- The outlook confidence (skill) for this forecast is moderate for the central to north coast, moderate to high for central and southern NSW, and high for northern and north western NSW.
- This means that for every ten years with similar climate patterns to those at present, about six to seven October to December periods would be expected to have warmer than average daytime temperatures and three to four cooler than average.
- Warmer than normal overnight temperatures over October to December are likely across NSW, particularly in the south east. The probability of October to December minimum temperatures being higher than the long term median is 60-65% in far western NSW, 65-70% for most of central and northern NSW, and from 70-80% for the south east (Figure 3).
- The confidence (skill) for the minimum temperature outlook is moderate to high for most of central and north western NSW, moderate for the south west and the tablelands, and low for the north east and far south coast.

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.

- The experimental rainfall outlook for October (Figure 4) suggests drier than normal conditions, with a 0-30% probability of above median rainfall across most of the State. The outlook has a moderate confidence (skill).
- The experimental maximum temperature outlook for October (Figure 4) suggest warmer than normal daytime conditions, with an 80-100% probability of above median maximum temperatures for the month. The outlook confidence (skill) for this forecast is moderate.

- Overnight temperatures are also likely to be high during October, with a 60-70% probability of above median temperatures in the west, 70-80% in central NSW and 80-100% probability for coastal and north eastern NSW. The outlook confidence (skill) for this forecast is moderate for northern NSW, and low for southern NSW and the coast.
- Weekly experimental outlook information suggests that the drier and warmer than normal daytime temperatures will persist throughout October. The warmer than normal daytime temperatures are most likely in the coastal and eastern-central areas of the State throughout the month, but have a lower probability late in the month in the far west. Overnight temperatures later in the month are likely to be higher than normal in the east and north, near normal in the west and cooler than normal in the south and south west. However, skill levels are variable, and are low for weekly minimum temperature and rainfall forecasts later in October across some areas of the State.
- The experimental rainfall outlook for November (Figure 5) suggests near normal rainfall conditions are likely across the State. However, the outlook confidence (skill) for this forecast is low for the east and north the State, and moderate for the south east and west.
- The experimental maximum temperature outlook for November suggests above average daytime temperatures (60-70% probability of above median temperature) over most of the State, with warmer than normal temperatures most likely in the south east and far south west (a 70-80% probability of above median temperatures). The outlook confidence (skill) is for this forecast is moderate.
- For overnight temperatures during November, the experimental outlook indicates the probability higher than normal minimum temperatures across the State (a 60-70% probability of above median temperatures in the west, 70-80% in the east and north, and 80-100% over the south east and central coast). However, the outlook confidence (skill) is low for the eastern third of the State and some central areas, and moderate for the rest.

Other climatic models

- The Bureau of Meteorology's old statistical model indicates a likelihood of near neutral rainfall conditions across most of the State over the next three months, with a slightly increased probability of rainfall in the north east. It indicates warmer than normal overnight temperatures in the south and far west, and near normal daytime temperatures. However, the statistical forecast does not take the IOD into account and is based on past trends in sea surface temperatures. Skill assessments for the statistical model are available via this link.
- The UK Meteorology Office's long range model indicates a 60-80% probability of above average rainfall for most of NSW over the October to December period with the exception of the north east, and above average temperatures (a 60-80% probability) along the south to mid north coast and in the south west. No skill assessment is available for this model output, and its output is not provided for the use of international meteorological centres and not as seasonal forecasts.
- The International Research Institute (IRI) for Climate and Society's seasonal climate forecast indicates that temperatures are likely to be higher than normal across the State over the October to December period. The IRI forecast over most of NSW indicates a 45% likelihood of being in the warmest third of years, 35% the middle third and 25% of falling into the coolest third. The north and north east have slightly lower probabilities at 40, 35 and 25% respectively, and the south east slightly higher. A similar range of likelihoods is given for the November to January period, with the south and south east having higher probabilities. No skill assessment is available for this model output.
- The International Research Institute (IRI) for Climate and Society's seasonal climate forecast rainfall probabilities are not available for much of the State, but indicate a likelihood of near normal conditions (30% above normal, 40% normal and 30% below normal) over the north east, south and south west for October to December and for the north east and far south west in November to January. The model indicates a slightly elevated likelihood of above normal rainfall for the north west between October and December. No skill assessment is available for this model output.

2.4 El Niño-Southern Oscillation (ENSO)

- The Pacific Ocean remains in a neutral ENSO state (neither El Niño nor La Niña). Most international climate models indicate

this state is likely to continue through to early 2014. Currently, 70% of these models suggest ENSO neutral conditions over October to November, 24% La Niña and 6% El Niño conditions. Over November to January, 64% of these models suggest ENSO neutral conditions, 26% La Niña and 10% El Niño.

- Monthly sea surface temperatures from the Bureau of Meteorology indicate close to average conditions eastern tropical Pacific. The weak cool anomalies along the coast of South America have mostly decayed. Warm anomalies are persisting in the west, and have strengthened somewhat along the southern coastline of Australia and the NSW coastline. The most recent monthly temperature index value in the NINO3.4 region is 0.0°C. Most models suggest the NINO3.4 region will warm over the next six months, but its temperature will remain in the neutral range. The sub surface sea temperatures in the eastern Pacific (to the end of September) remain slightly cooler than average in the east and slightly warmer in the west. Overall, they are close to the long term average. Small areas of cool anomalies near the surface remain in the east, and have strengthened slightly. Recent information from the US National Oceanic and Atmospheric Administration (NOAA) is not available due to the Federal Government shutdown in the USA.
- The Southern Oscillation Index (SOI) rose over the two weeks to 22nd September, but has shown little change since. The latest 30-day value to 6th October is +6.2. 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 Indian Ocean Dipole (IOD) returned to the neutral range after a negative event between May and August. The latest IOD index value is -0.2°C for the week ending 6th October, and most climate models favour a neutral IOD over spring. 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 western Pacific strengthened over the two weeks to 22nd September, and have varied little since. They are slightly stronger than average across the western tropical Pacific and slightly weaker than average in the eastern tropical Pacific. 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 were above average briefly in the last two weeks, but are now below average. 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 was negative during September, but has now increased to be slightly positive. Predictions from POAMA are for it to move to being weakly negative through the rest of October. Recent information from the US National Oceanic and Atmospheric Administration (NOAA) is not available due to the Federal Government shutdown in the USA.
- 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 September was near normal across the State. It was slightly higher than normal across the north east and mid north to far north coast and slightly lower over the central and southern areas, particularly in the far south west. 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.

September

- Relative to historical records, rainfall for September was within the "average" range (the middle 40% of historical records) across most of the State (Figure 6).
- Relative rainfall was below average or lower in a band running from the central coast to the mid north coast, and including the eastern half of the Hunter LLS district, and the southern half of the North Coast and Northern Tablelands LLS districts.
- Other areas of below average relative rainfall occurred in the far north of Northern Tablelands LLS, west of Narrabri, in an area between Temora, Cootamundra, Cowra, Crookwell and Yass, and in the Western LLS district an area between White Cliffs, Wilcannia, Broken Hill, Wentworth and Balranald.
- An area of above average to extremely high relative rainfall occurred in South East LLS district, extending from Sydney to Canberra, Cooma and Eden.
- Another area of above average to well above average relative rainfall was received between Cobar, Nymagee, Lake Cargelligo, West Wyalong, Nyngan, Mudgee, Parkes and Leeton.

July to September (3 months)

- Over the period from July to August, relative rainfall was below average across 61% of the State (Figure 7).
- Above average or better rainfall was confined to limited areas (1%) of the State including part of the alpine areas, the east of Murray LLS district and near the ACT.
- Below average to extremely low relative rainfall occurred over large areas of the Western LLS district, and in a belt extending from the north west through to most of the central and northern tablelands, central to mid north coast and areas of the central west. Large areas of extremely low relative rainfall extended from Tibooburra to Wilcannia and Menindee, and from Armidale to the coast and south to Goulburn.
- Over the period, 93-100% of the Greater Sydney, Hunter, Northern Tablelands, North West and Central Tablelands LLS districts had below average rainfall.
- Only 8-10% of the Murray and South East LLS districts received above average or better rainfall over the period.

April to September (6 months)

- Over the six months to September, relative rainfall was average or better across most of southern, central and the far north east of NSW (Figure 8), and still showed the effects of the heavy rainfall in June.
- Areas of above average to well above average relative rainfall occurred in the central-eastern area of the Western LLS district and the south west of Central West LLS district.
- Below average to extremely low relative rainfall occurred in a belt running from Bourke to Boggabilla, and extending to the south east to Coonabarabran, Armidale and Singleton.
- Some 95% of North West and 84% of Hunter LLS districts had below average relative rainfall for the period, as well as 57% of Northern Tablelands and 59% of Central Tablelands LLS districts.

January to September (9 months, BoM)

- Over the 9 month period from January to September, relative rainfall across the State was below average across parts of far western and north western NSW (Figure 9), as well as areas of the southern tablelands and south west slopes, and the northern tablelands. Most of these areas received 60-80% of their normal rainfall.
- Areas of particular deficiency occurred in the far north west between Bourke and Walgett (in Western and North West LLS districts) and in the far west north of Broken Hill, with these areas receiving between 40-60% of the long term average rainfall.
- The North Coast and areas of Northern Tablelands, Hunter and Greater Sydney and the South East LLS districts received above average rainfall for the period, as did an area of Western LLS district between Wilcannia, Ivanhoe and Cobar. The remainder of the State was near average.

October to September (12 months)

- Relative rainfall for the last 12 months remained generally below average to well below average across much of the north west, central areas of the State and parts of the far west and south west (Figure 10).
- Areas of the Western, North West, Central West, Central Tablelands, Riverina and Murray LLS districts had below average relative rainfall, along with the western edges of the Northern Tablelands and South East LLS districts.
- Over the last year, areas of extremely low relative rainfall extended in a belt from Wanaaring to Bourke, Brewarrina, Quambone, Coonamble, Pilliga and included Goodooga, Lightning Ridge and Walgett. Other areas occurred around Wentworth, north of Broken Hill, between Young and Harden, and between Armidale and Murrurundi.
- The eastern side of Northern Tablelands LLS district and much of the North Coast LLS district had above average to well above average relative rainfall for the period. The remainder of the State was generally within the average range.

3.2 Total rainfall

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

September

- Rainfall during September was about 80% of average across NSW. Most of the rainfall occurred on the 17th September as a result of a complex trough system passing through the State.
- Rainfall across much of the west, north west and mid north coast and parts of the northern tablelands was restricted to falls of less than 25 mm. However, rainfall in the far west (west of Wilcannia and north west of Pooncarie) and in the vicinity of Bourke was restricted to less than 10 mm.
- The far south east and parts of the central west were the only part of the State to record above average rainfall. With the exception of the far south east and the alpine areas, rainfall across the State ranged from 0-100 mm, with most of the State receiving 10-50 mm (Figure 11).
- Most of the central and southern cropping areas, the central tablelands, north west slopes, northern tablelands and far north coast received 25-50mm, with some areas receiving up to 100 mm.
- Areas of the South East and Murray LLS districts received 100-200 mm, with the majority of the south eastern corner of the State receiving 50-100 mm.

July to September (3 months)

- Total rainfall over the three months to September ranged from 50-200 mm across most of the State. The north west and most of the far west received 10-50 mm. The far north western corner of the State received 2-10 mm.
- Limited areas of the State received 200 mm or more, including an area between Albury and the ACT and extending into the alpine areas, and east of Lismore.
- Areas along the coast between Gloucester and Kempsey, between Singleton, Cessnock and Putty and in the western suburbs of Sydney received 25-50 mm (Figure 12).

April to September (6 months)

- Rainfall across the State during the April to September period ranged from 25-800 mm (Figure 13).
- The lowest rainfall over the period (25-50 mm) fell in the far north west around Tibooburra.
- The north west of NSW west of Walgett and extending to Wilcannia received 50-100 mm. The central areas of the State and the far south west generally received 100-300 mm.
- The eastern edge of the coastal LLS districts generally received 300-600 mm with more falling between Ballina and Tweed Heads, and between Ulladulla and Wollongong. An area of the south west slopes, southern tablelands and alpine areas received 400-800 mm, with the highest falls between Khancoban and Jindabyne.

4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

- Maximum temperatures across the State in September averaged 4.5°C above normal. The average maximum for September was the highest on record and 1.1°C above the previous record (1928).

- Maximum temperatures were 3-6°C above normal across most of the State, with the highest temperatures across the far west and north west.
- Maximum temperatures were lowest across the south east, from Deniliquin, Wagga, Moruya and to the south, but were still 2-3°C above normal (Figure 15).
- Minimum temperatures during the month averaged 2.2°C above normal. The average minimum for September was the third warmest on record.
- Overnight temperatures in the far west were generally warmer than normal by 2-4°C, and 0-2°C across the eastern and central areas of the State (Figure 16).

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 continued to decline across most of the State in September, as a result of the lower than normal rainfall and much higher than average temperatures (Figure 17). Approximately 95% of the State has low modelled topsoil moisture, up from 87% last month. On a percentile rank basis, about 70% of the State has below average to extremely low relative soil moisture.
- Levels are particularly low across the north west, far north west and far west, and over the mid north coast and the south of the northern tablelands.
- The only improvements in modelled topsoil moisture levels were in the far south east, far southern tablelands and the alpine areas. Some 18% of the Murray (in the east) and 45% of the South East LLS districts have moderate levels of topsoil moisture.
- A decline from moderate to low levels of modelled topsoil moisture occurred across much of the south west slopes and southern and central tablelands. The area of this decline extended from Tocumwal and Corowa north east towards Parkes, Wagga, Goulburn, Orange and Lithgow. However, apart from the upper south west slopes, southern and central tablelands and the far south east, modelled topsoil moisture across the State is generally 10-20 mm or less.
- Improvements in modelled topsoil moisture were limited to the far southern tablelands, the far south east and the alpine areas.

5.2 Subsoil

- Modelled subsoil moisture levels declined slightly during the month. Levels across most of the cropping areas were generally moderate, apart from the western half of North West, the north west of Central West and the west of the Riverina and Murray LLS districts (Figure 18). Modelled subsoil moisture also declined in the west of the Hunter LLS district.
- Average modelled subsoil moisture for the month is less than 200 mm across most of the State, with some areas having less than 100 mm. The exceptions are the alpine and coastal areas.
- Another 7% of the State moved into the low from the moderate category and 5% from high to moderate.
- The greatest declines in modelled subsoil moisture occurred over the North Coast, Greater Sydney, Northern Tablelands, South East and Hunter LLS districts, although most of the declines were from the high to the moderate category. These declines ranged from 14% in the Hunter to 39% in the North Coast LLS districts.
- Smaller declines in subsoil moisture occurred in the Central West, North West, Riverina, Western and Murray LLS districts. These declines were limited to 7-10% of the area of the LLS districts.
- Subsoil moisture levels remain high along a narrow coastal strip from Ulladulla to Port Macquarie and from Ballina to Tweed Heads.
- The North West LLS district has the lowest relative subsoil moisture, with 67% of its area in the low category. This is followed by 50 % of the Central West, 49% of Murray (in the west), 32% of the Riverina and 42% of the Western LLS districts.

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

- Declines in modelled pasture growth occurred in the Western LLS district and in

the south of the North Coast LLS district (Figure 19).

- In these areas, modelled pasture growth decreased from up to 500 kg/ha of dry matter (DM) in August to less than 50 kg/ha DM in September. In many cases, modelled growth declined to less than 10 kg/ha DM in these areas.
- There was some improvement in the North West LLS district, with some areas in the west increasing from less than 10 kg/ha DM to 20-100 kg/ha DM.
- The most favoured areas for modelled pasture growth remained the Murray and Riverina LLS districts, as well as the southern half of Central West and the south east of the Western LLS districts. The Northern Tablelands, Central West and South East LLS districts also improved, the latter particularly across the Monaro. Modelled growth in these areas ranged from 200-1,000 kg/ha DM, with some areas achieving more than 1,000 kg/ha DM.
- Modelled growth over the rest of the State was variable, ranging generally from 50-500 kg/ha DM.

6.2 Modelled biomass

- Modelled total standing dry matter (biomass) levels for September declined slightly in the far west of the Western LLS district, the west of North West LLS district and across the North Coast LLS district.
- Levels remained similar to August in the Hunter LLS district and improved somewhat across the Central Tablelands LLS district (Figure 20).
- Limited improvements in modelled biomass levels occurred in the west and north of the South East LLS district, and across the Central West LLS district.
- Generally, modelled biomass levels were low over the far west, north west, north east, mid north coast and far south east of the State, being generally 1,000 kg/ha DM or less, with 500 kg/ha DM or less in the worst areas.
- Modelled biomass levels were moderate to high across the much of the Central West, Riverina and Murray LLS districts, and the south east and central areas of the Western LLS district. In these areas, modelled biomass generally ranged from 1,000-2,500 kg/ha DM, with some areas exceeding 3,000 kg/ha DM.

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.

September

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 was variable across the State in September (Figure 21).
- The worst areas of relative pasture growth occurred in the far west of the State (Western LLS district) and along the central to mid north coast (Hunter LLS district and the south of the North Coast LLS district).
- Other areas of poor growth also occurred across the North West LLS district, in the west and south of the New England LLS and in the north east of the Central West LLS district.
- Modelled growth across the remainder of NSW was generally average, with the exception of the south east.
- Areas of high relative growth occurred in the, the eastern ears of Riverina and Murray LLS districts, but particularly in the south of the Central Tablelands and west of the South East LLS districts.
- Patches of missing data occurred across the Western LLS district, and parts of the alpine and coastal areas.

July to September (3 months)

- Over the three months to September, relative pasture growth across the State was variable (Figure 22).
- The far north, north west and mid north coast of the State had below average to extremely low relative growth.
- These areas extended from Broken Hill and White Cliffs to Cameron’s Corner in the Western LLS district, from Wanaaring and Bourke in Western LLS district to Wee Waa and Boggabilla in the North West LLS district and covered the whole Hunter LLS district

and the southern end of North Coast LLS district (south of Kempsey).

- In contrast, much of the central area of Western LLS district south and east of Louth, Cobar, Wilcannia and Menindee had above average to well above average relative growth, as did the western areas of Central West, Riverina and Murray LLS districts.
- A large area of extremely high relative growth occurred in the south east of the State, extending from the eastern edge of the Riverina and Murray LLS districts on the south west slopes into the South East LLS district.

April to September (6 months)

- In the period from April to September, much of the western, southern and south eastern areas of the State had above average relative growth (Figure 22). This was particularly in the south east, where the eastern areas of the Riverina and Murray LLS districts, the south of the Central Tablelands and most of the South East LLS districts had well above average to extremely high relative growth.
- Areas of Western LLS district between Broken Hill, Wilcannia, Tilpa, Ivanhoe and Booligal had above average relative growth over the period, as did an area between Pooncarie and Balranald. Areas in the west of the Central West, Riverina and Murray LLS districts west of Nyngan, Condobolin, Griffith, Hay and Wakool also had above average relative growth.
- Areas of below average or worse relative growth occurred between Enngonia, Bourke, Brewarrina, Goodooga in Western LLS district, and extended to Lightning Ridge, Walgett, Wee Waa, Pilliga, Moree and Boggabilla in North West LLS district.
- Areas of below average or worse growth also occurred across the Hunter LLS district and into the southern end of North Coast LLS district south of Kempsey.

October to December (12 months)

- Relative pasture growth across the State over the last 12 months was below average to extremely low across the north west, the mid north coast, and areas of the central west and south west slopes (Figure 24).
- The Western LLS district had generally average relative growth, with the exception of the far north east and areas of the far west.
- An area of below average to extremely low relative growth in the north west extended from Wanaaring, Louth, Bourke and Brewarrina in Western LLS district to Walgett, Pilliga, Wee Waa, Warialda and Boggabilla in the North West LLS district, and south to Coonamble and Coonabarabran in the Central West LLS district.
- Another major area of below average relative growth extended along the central and mid north coast from Gosford to Kempsey and west to Singleton and Gloucester in the Hunter LLS district.
- Relative growth across most of the tablelands, the remainder of central NSW and the remainder of the coast was generally average, with pockets of above and below average growth.
- Relative growth across the eastern edge of the south west slopes and in the South East LLS district was generally above average or better, but was also variable.

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.

- For the time of year, modelled relative total standing dry matter (biomass) levels across the central, western and north eastern areas of NSW were generally average (Figure 25).
- Better areas of relative biomass (above average or higher) occurred in areas of the far west. Much of the southern tablelands, the south of the central tablelands and the eastern edge of the south west slopes had well above average or better relative biomass, as did the western and alpine areas of the South East LLS district.
- Areas of below average or worse relative biomass occurred between Wanaaring, Louth, Bourke, Brewarrina, Goodooga, Lightning Ridge, Walgett, Wee Waa, Moree, Boggabilla and south to Coonamble and Coonabarabran. Other areas occurred along the central and mid north coasts and Hunter region, particularly in the Hunter LLS district, and south of Coffs Harbour in the North Coast LLS district.

6.5 Pasture curing

- The curing index indicated a high degree of pasture curing in the far north west and north of Western LLS district, across the western and central areas of North West LLS district and across most of the Central West LLS district (Figure 26).
- Other areas of high curing were in the south of the Murray LLS district. A high degree of curing also developed across the North Coast LLS district and in the south and east of the Hunter LLS district, as well as parts of the Greater Sydney LLS district.
- Curing was variable across the south and east of the Central West LLS district and the western and central areas of the Riverina LLS district.
- Curing over most of the Northern Tablelands, Central Tablelands and the south of the South East LLS districts was low, as was curing in the east of the Murray and Riverina 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 of this report.

8. Water storage and irrigation allocations

8.1 Storage levels

Storage levels are given as at 1st October 2013.

- Levels in water storages remain generally moderate, with the average effective capacity being 81%.
- Changes in storage levels over the month were generally small, with the exception of the Burrinuck Dam (16%).
- Minor decreases occurred across a number of storages, and minor increases at Dartmouth and Blowering Dams, and at Lakes Cargelligo and Pamamaroo.

Table 1: Capacity of storages

Storage	Current Volume (GL)	Effective Capacity (%)	Monthly Change (%)
Toonumbar	-	-	-
Glenbawn	740	99	0
Glennies	-	-	-
Lostock	-	-	-
Brogo	-	-	-
Cochrane	-	-	-
Dartmouth	3812	99	1
Hume	2958	98	-1
Blowering	1481	91	1
Burrinjuck	688	67	16
Brewster	-	-	-
Carcoar	-	-	-
Cargelligo	33	88	5
Wyangala	868	71	-2
Glenlyon	234	-	-
Pindari	197	63	0
Copeton	989	72	-2
Chaffey	49	78	-2
Keepit	172	39	-6
Split Rock	-	-	-
Burrendong	-	-	-
Oberon	38	84	0
Windamere	-	-	-
Lake Cawndilla	351	49	-3
Lake Menindee	239	31	-5
Lake Pamamaroo	351	128	1
Menindee	-	-	-
Total Menindee	-	-	-
Wetherell	234	122	-5
Total	**13434**		
Average		**80**	

8.2 Irrigation allocations

Allocations are given as at 1st October 2013.

- High security allocations remain similar to earlier in the year, except for the Murray River Valley increasing in October from 97% to 100% and for the Murrumbidgee River Valleys (95%).
- Since last month, general security allocations increased for the Murray (79% to 100%), Murrumbidgee (28% to 43%) and Lower Namoi (5% to 6%) River Valleys.
- Irrigators in the Murrumbidgee River Valley will be able to access an additional 5% of their entitlement after February 2014.

Table 2: 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*	43%	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	40%	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

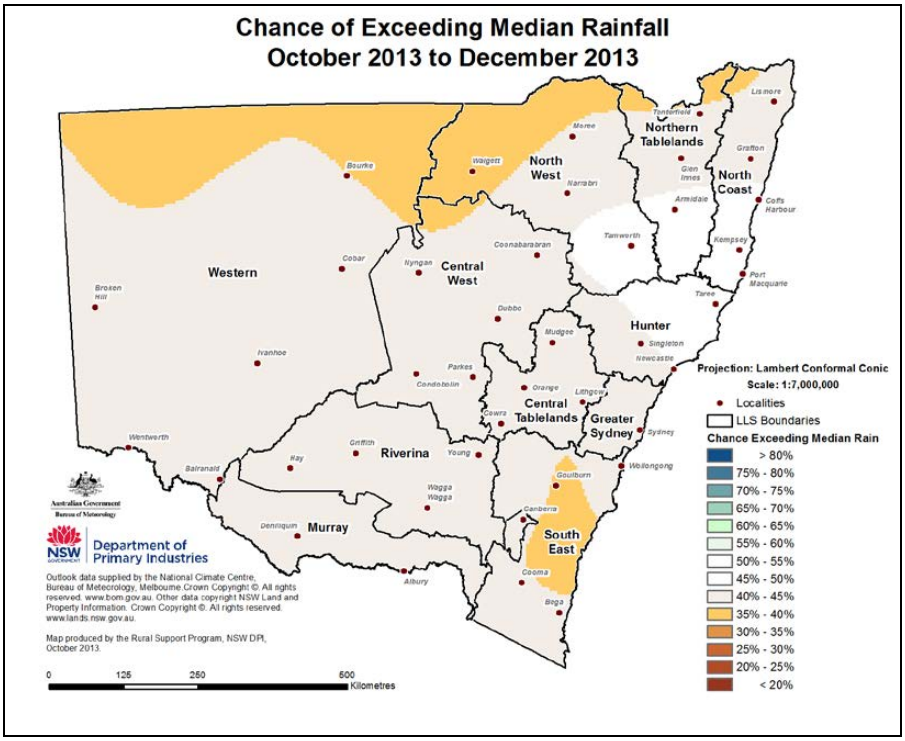


Figure 2: Quarterly maximum temperature outlook

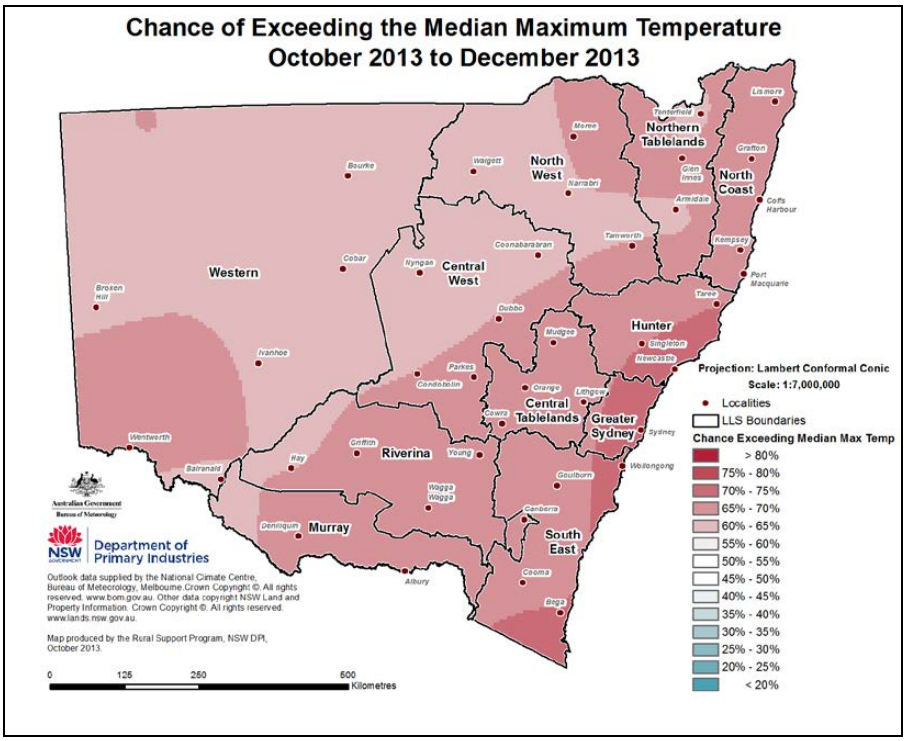
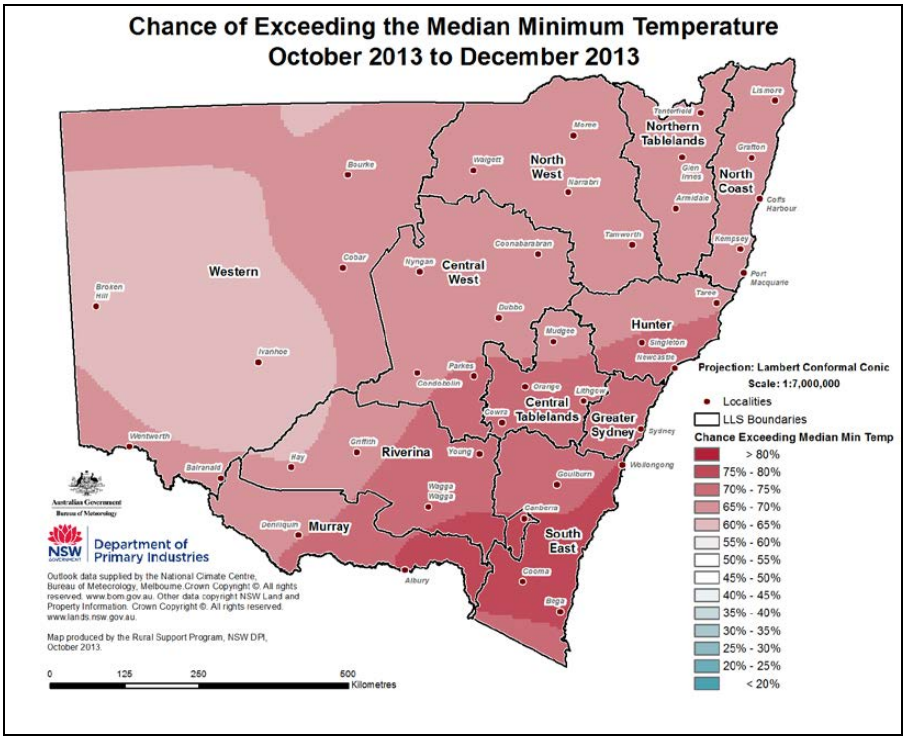


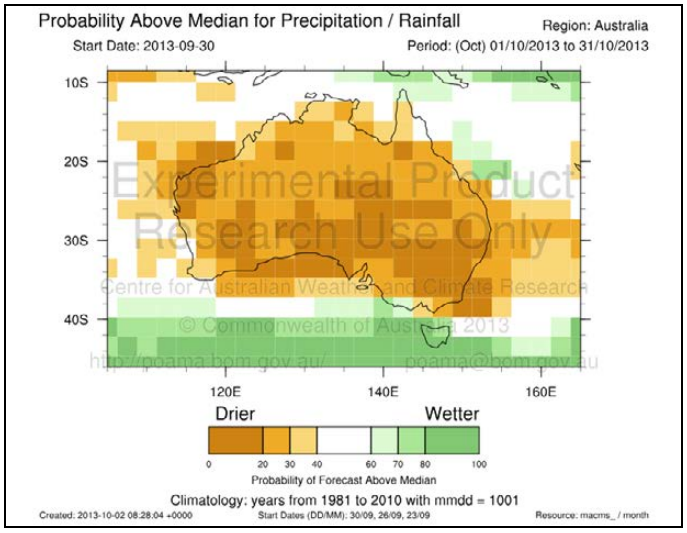
Figure 3: Quarterly minimum temperature outlook

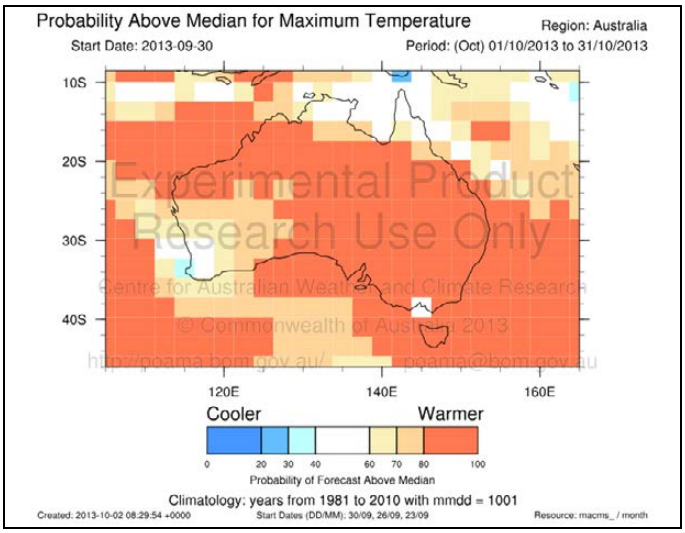


Monthly rainfall & temperature outlook

(Bureau of Meteorology, POAMA - experimental)

Figure 4: Experimental October rainfall and temperature outlooks





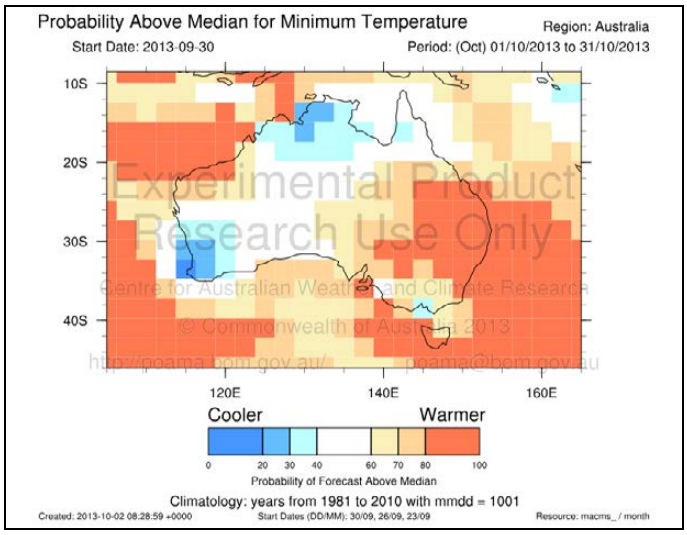
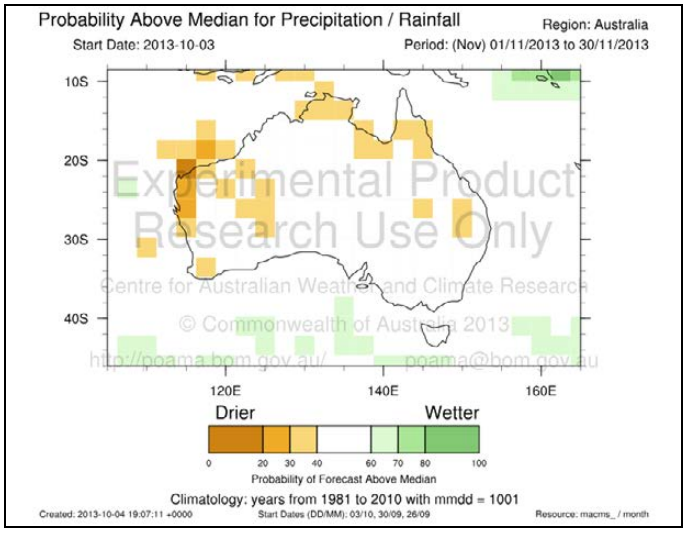
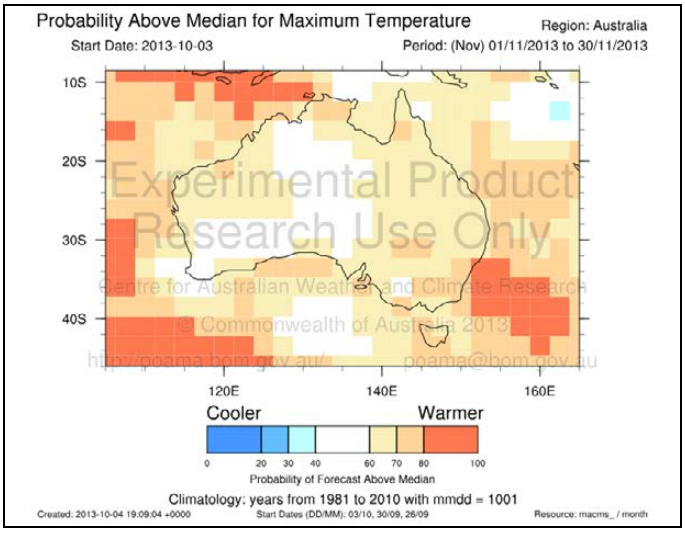
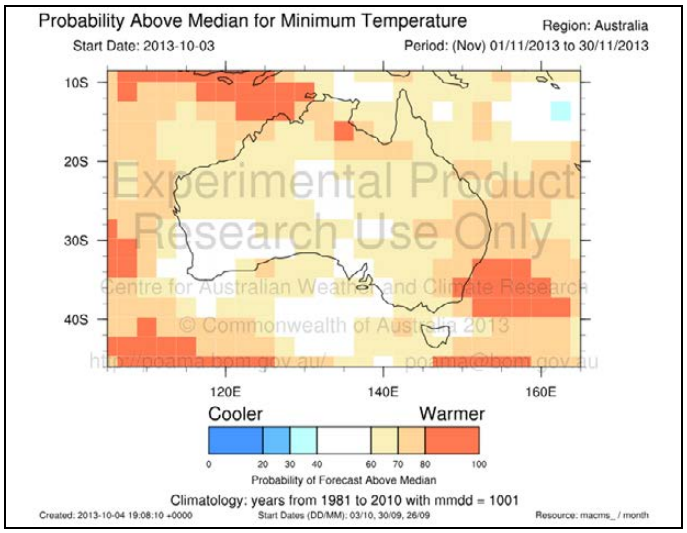


Figure 5: Experimental November rainfall and temperature outlooks







Rainfall

Figure 6: Relative rainfall – monthly

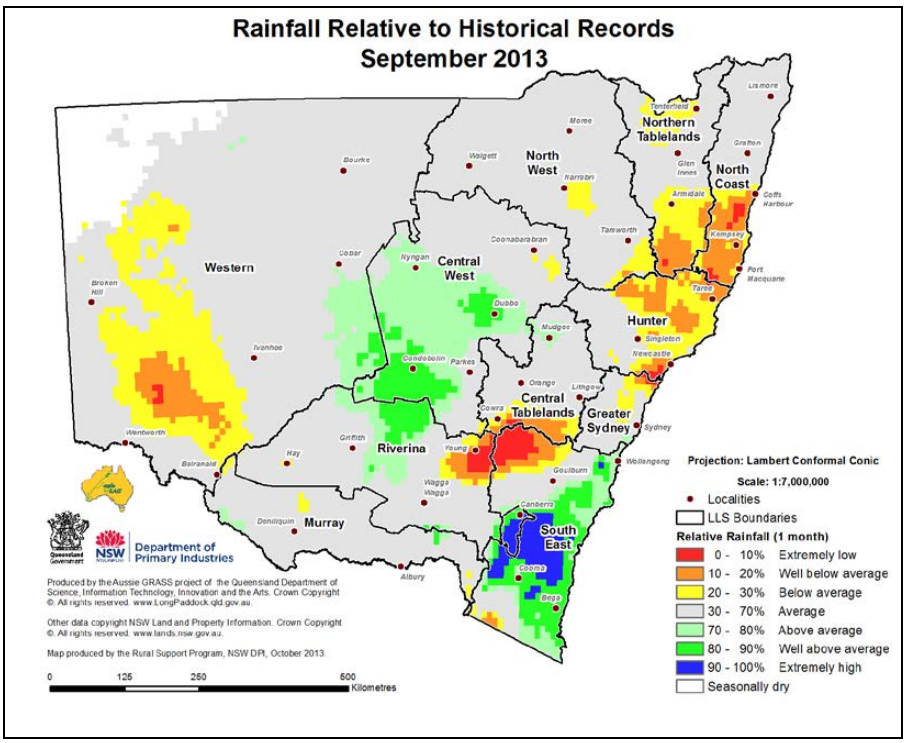


Figure 7: Relative rainfall – quarterly

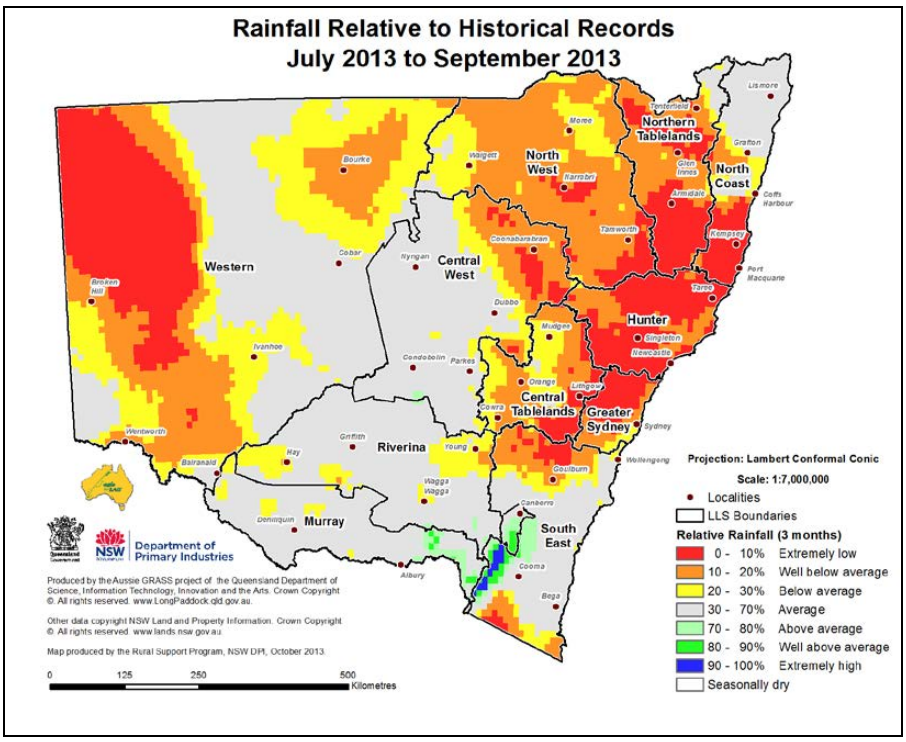


Figure 8: Relative rainfall – half yearly

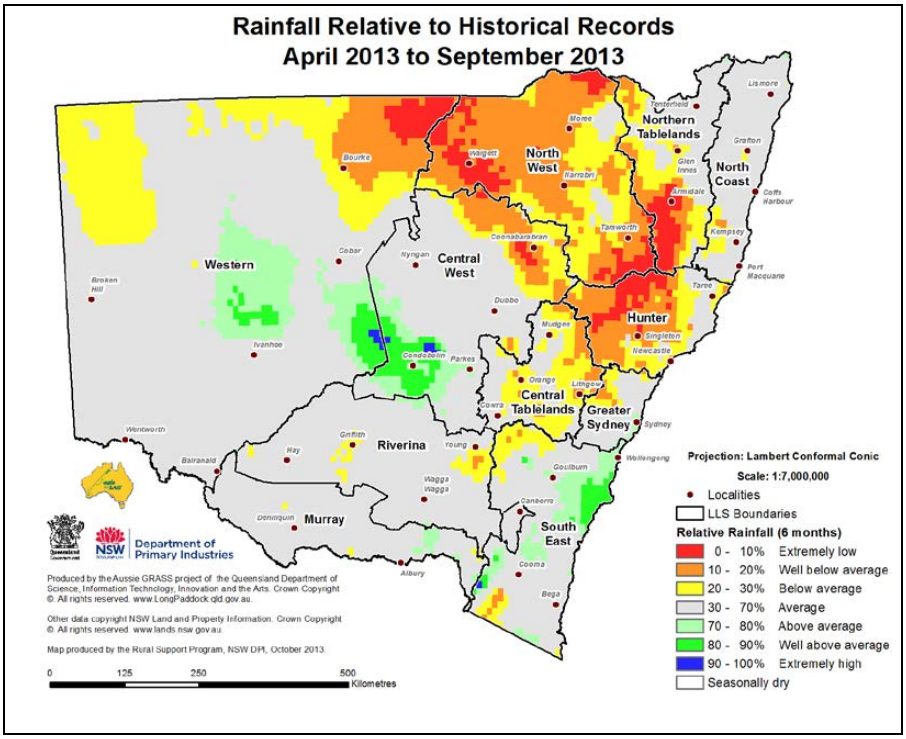


Figure 9: Relative rainfall – nine monthly

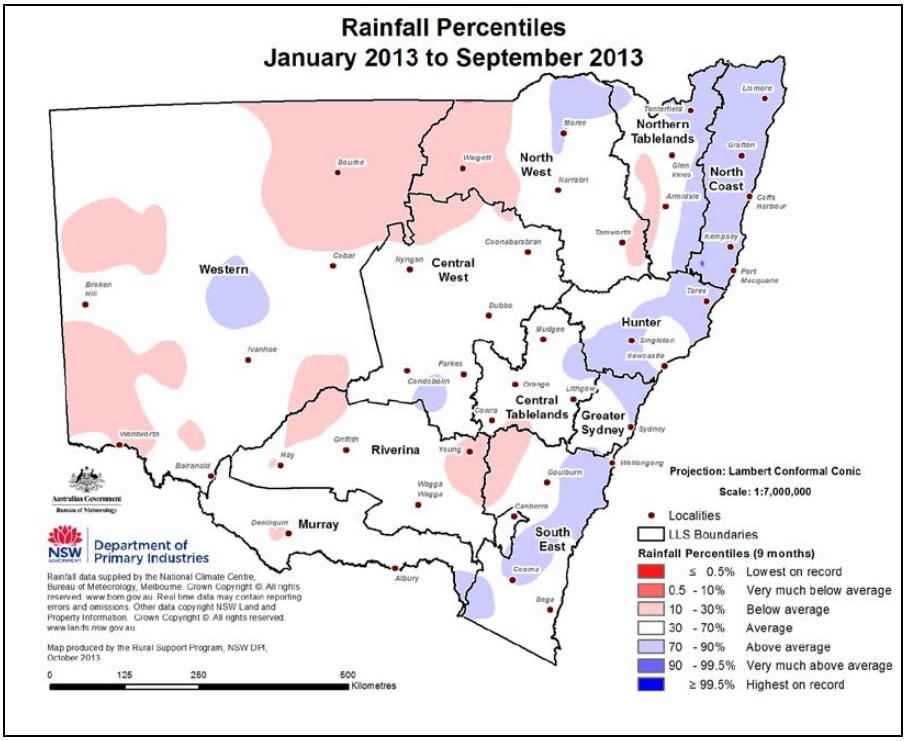


Figure 10: Relative rainfall – yearly

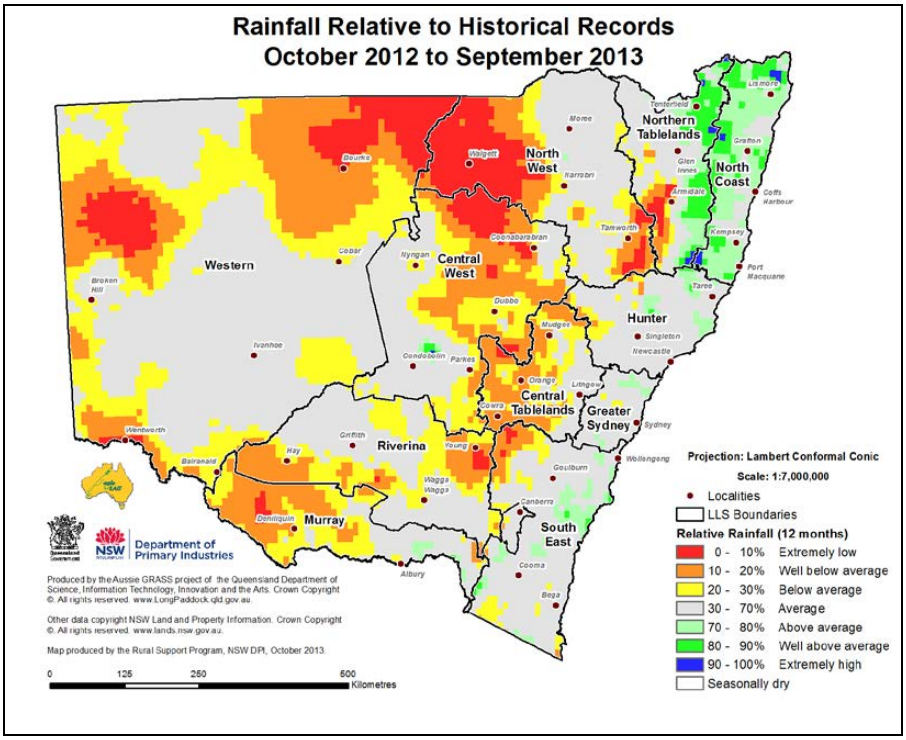


Figure 11: Total rainfall – monthly

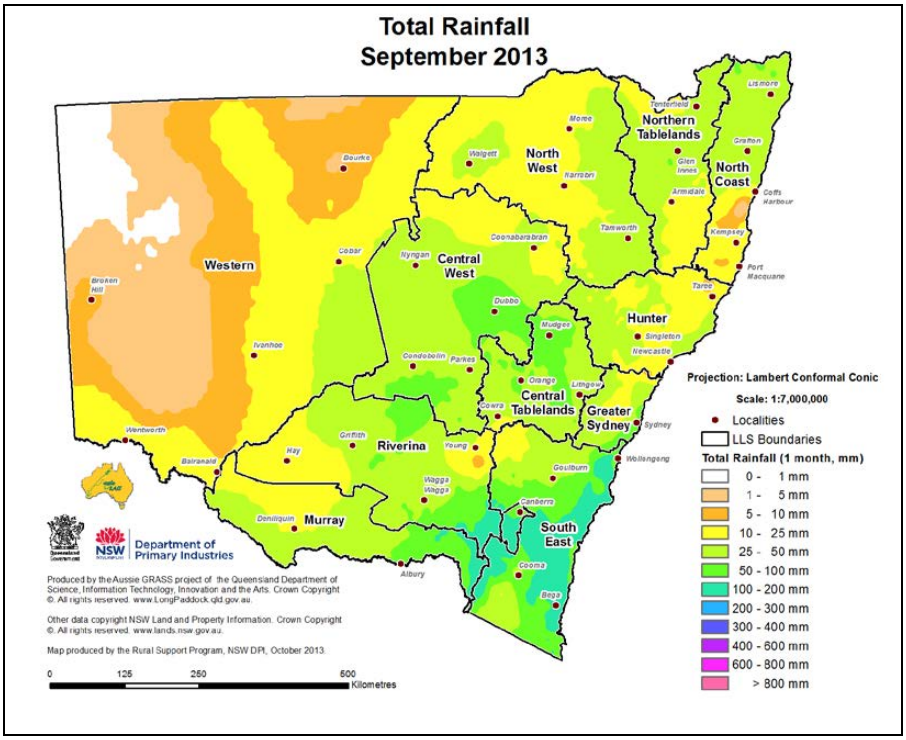


Figure 12: Total rainfall – quarterly

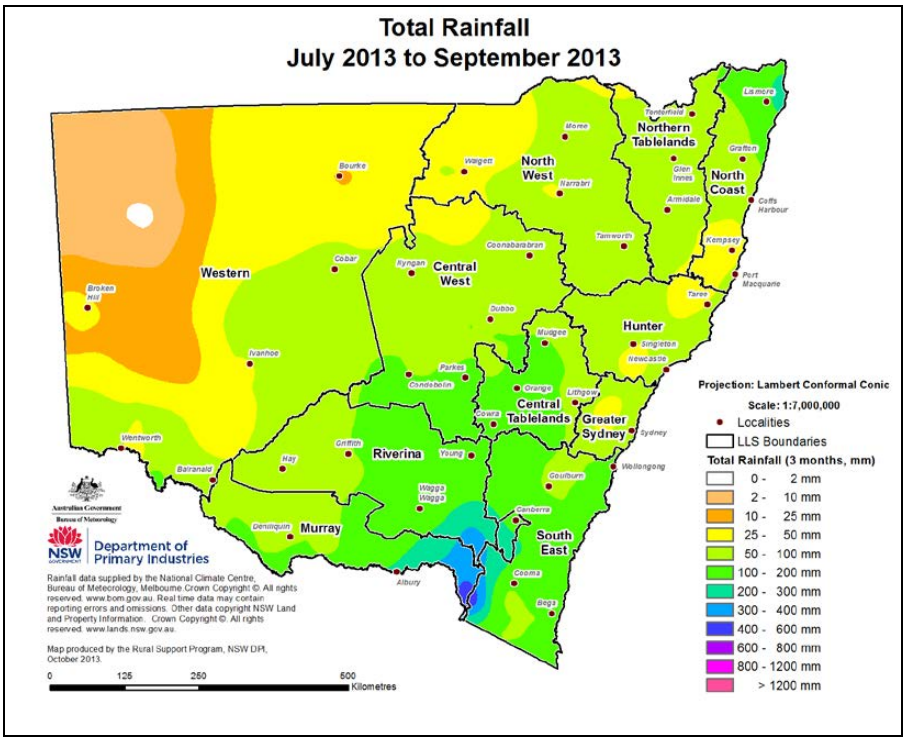


Figure 13: Total rainfall – half yearly

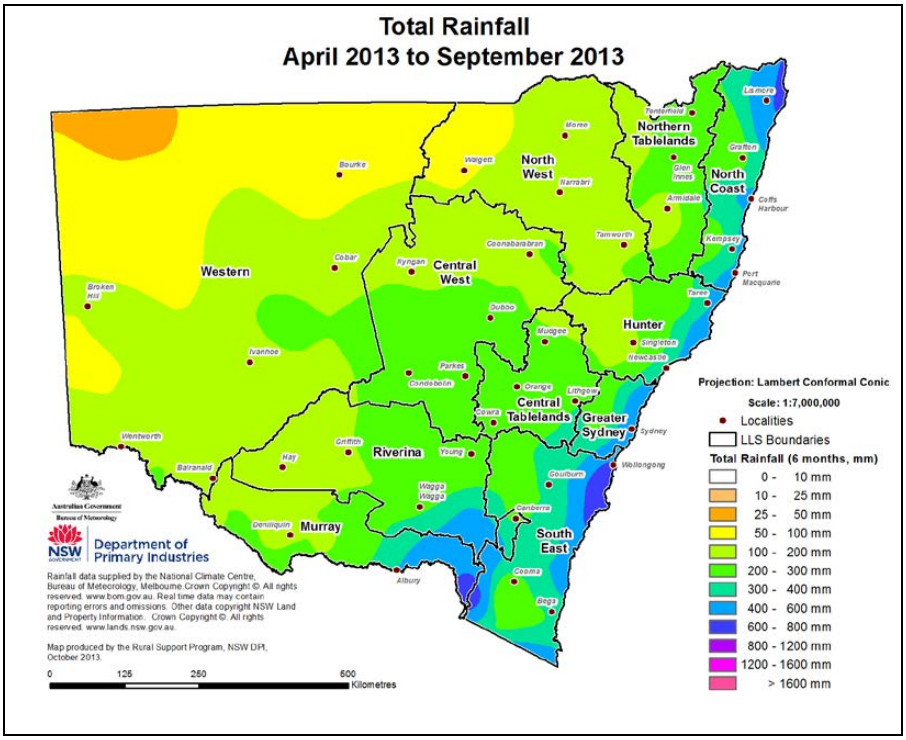
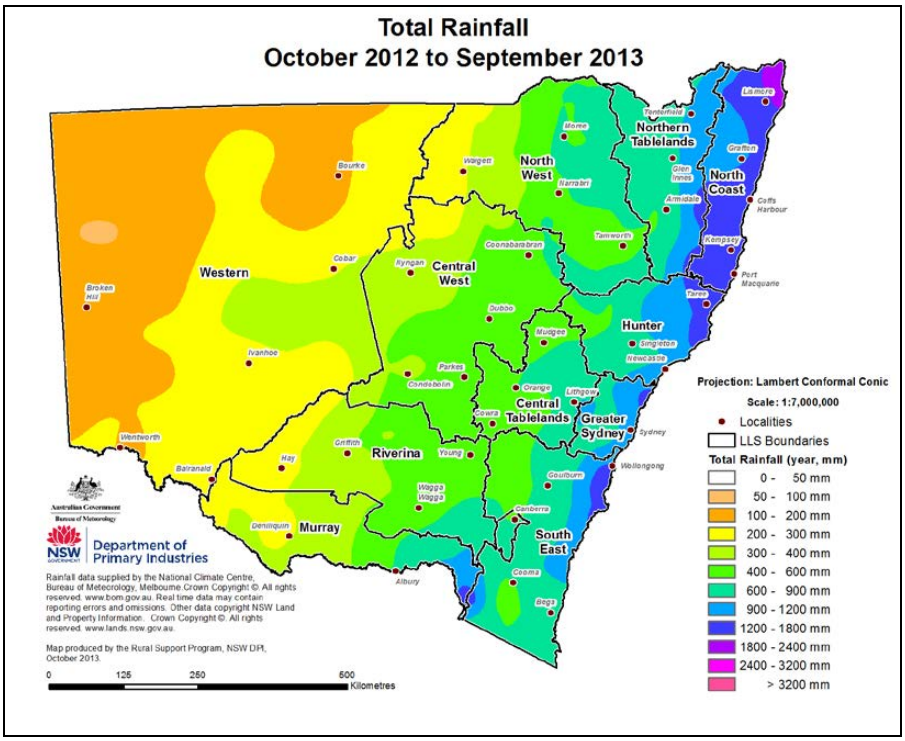


Figure 14: Total rainfall – yearly



Temperature

Figure 15: Maximum monthly temperature anomaly

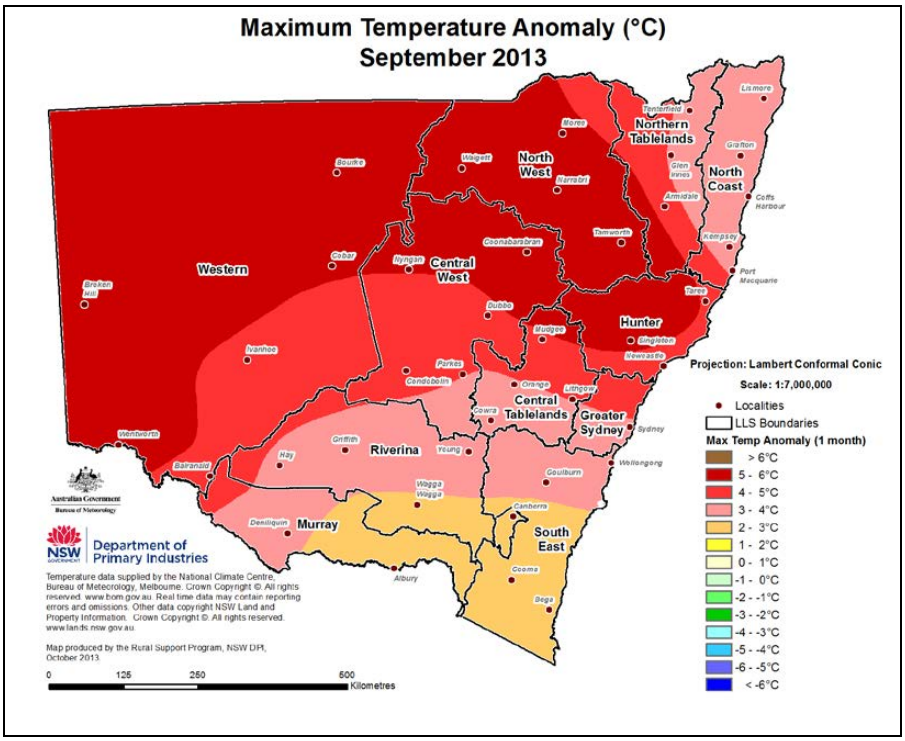
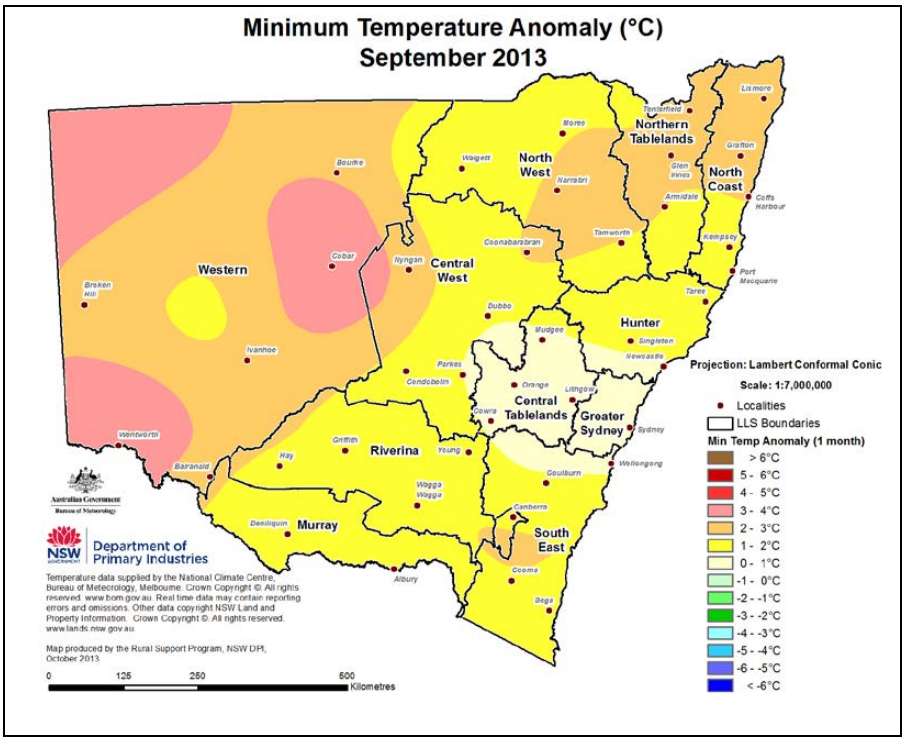


Figure 16: Minimum monthly temperature anomaly



Soil moisture

Figure 17: Relative topsoil moisture

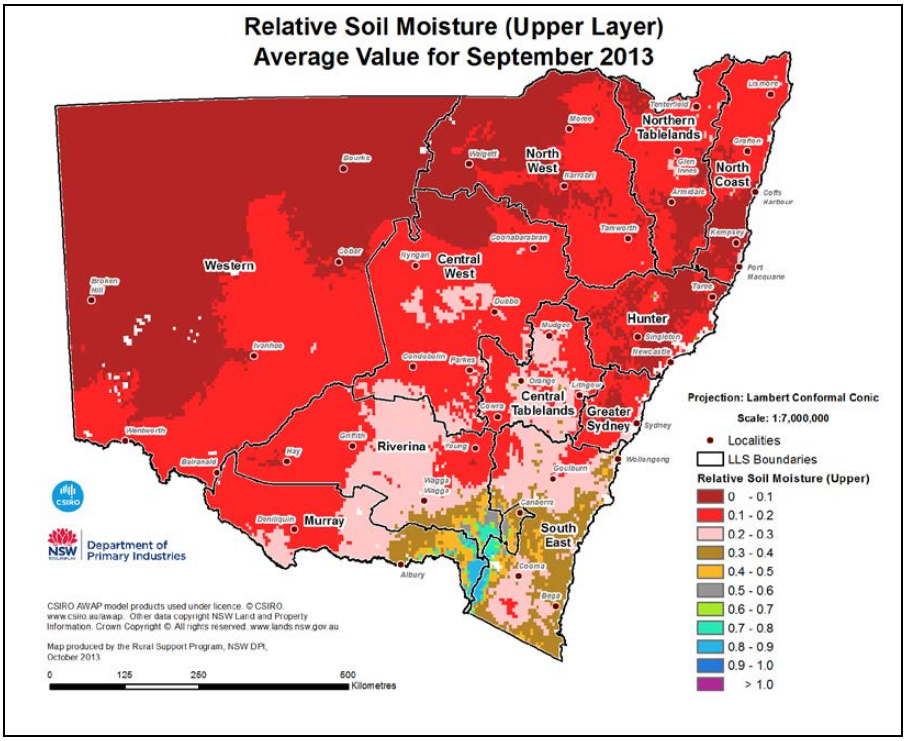
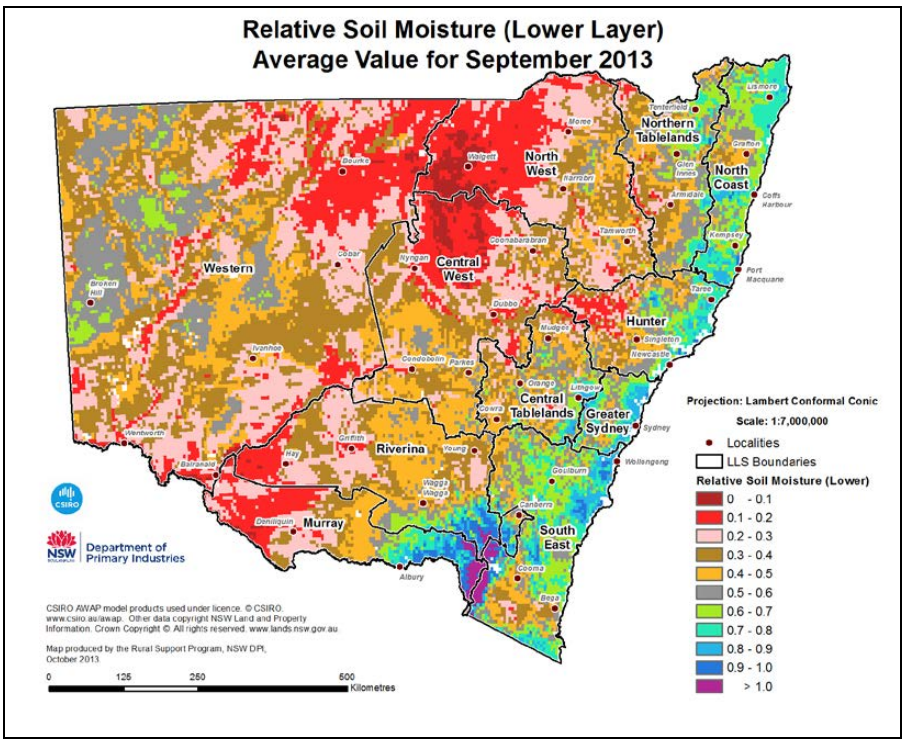


Figure 18: Relative subsoil moisture



Pasture growth and biomass

Figure 19: Modelled pasture growth

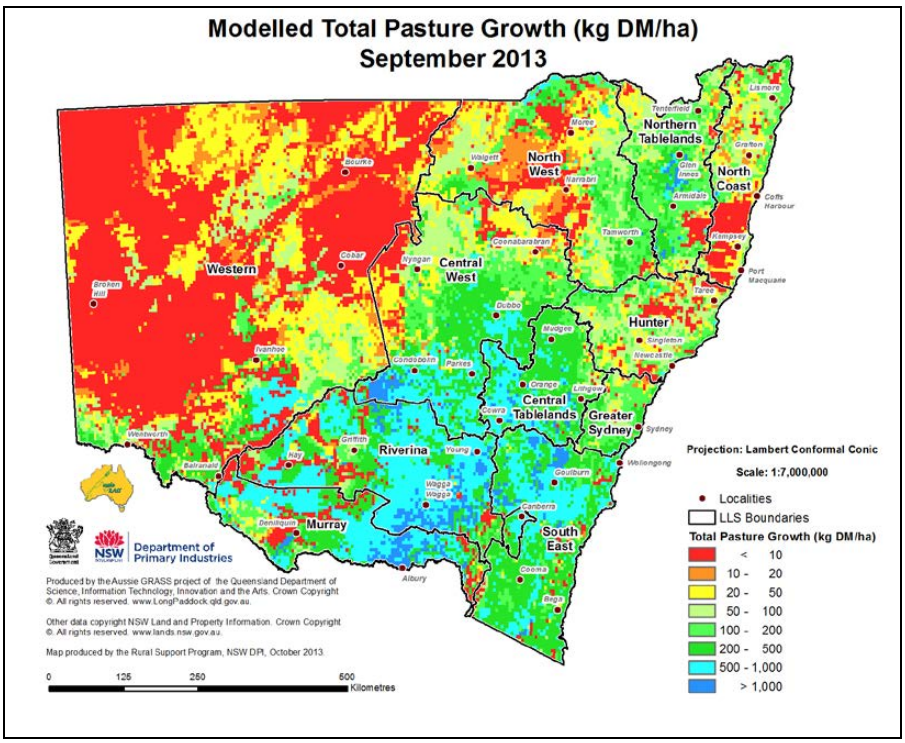


Figure 20: Modelled biomass

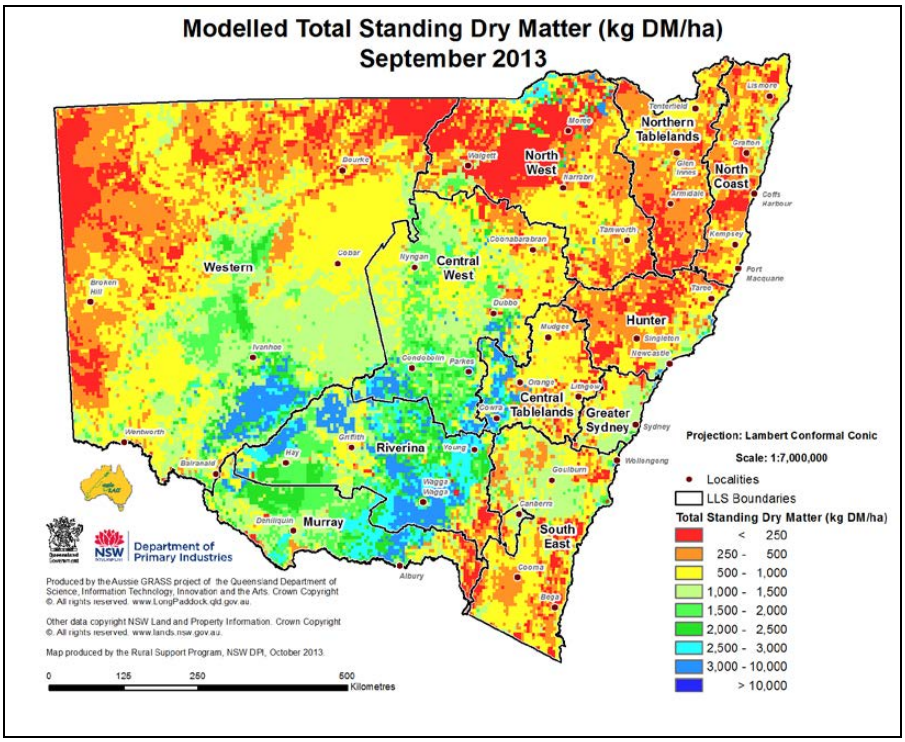


Figure 21: Relative pasture growth – monthly

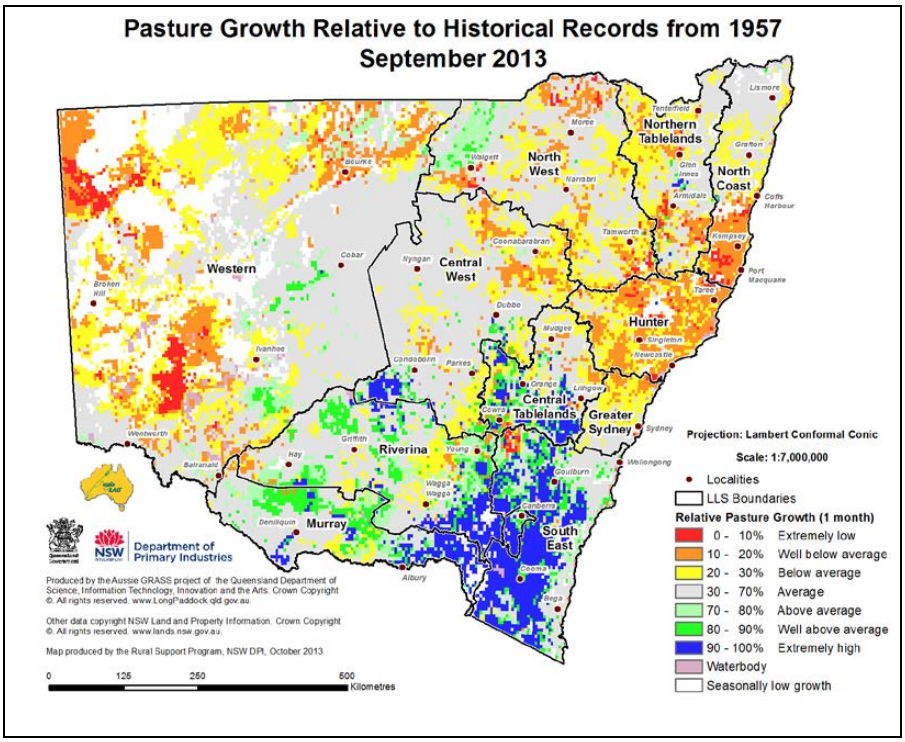


Figure 22: Relative pasture growth – quarterly

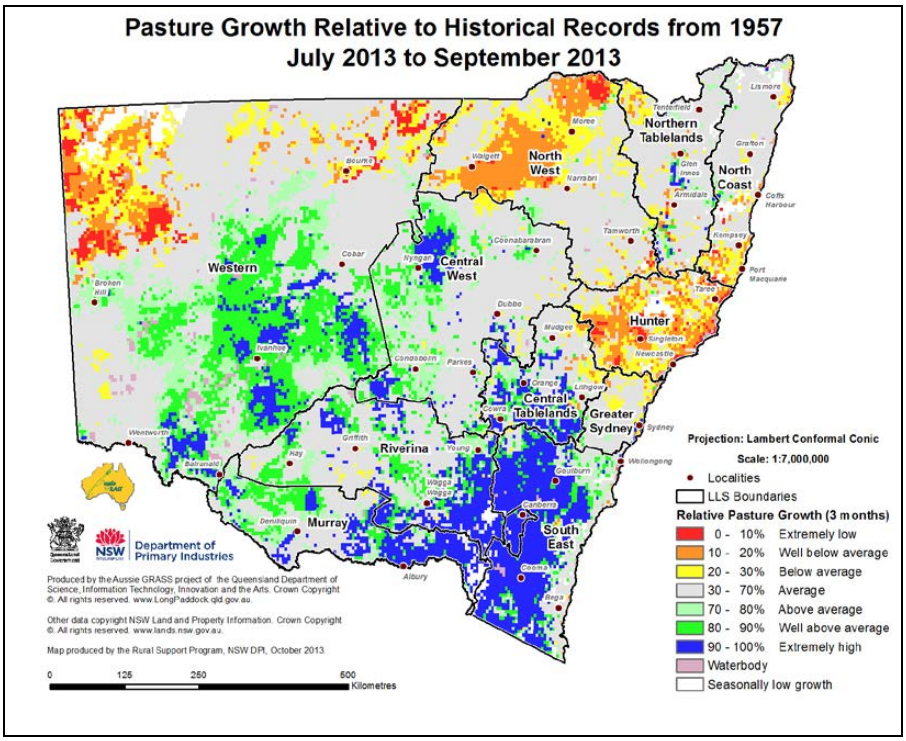


Figure 23: Relative pasture growth – half yearly

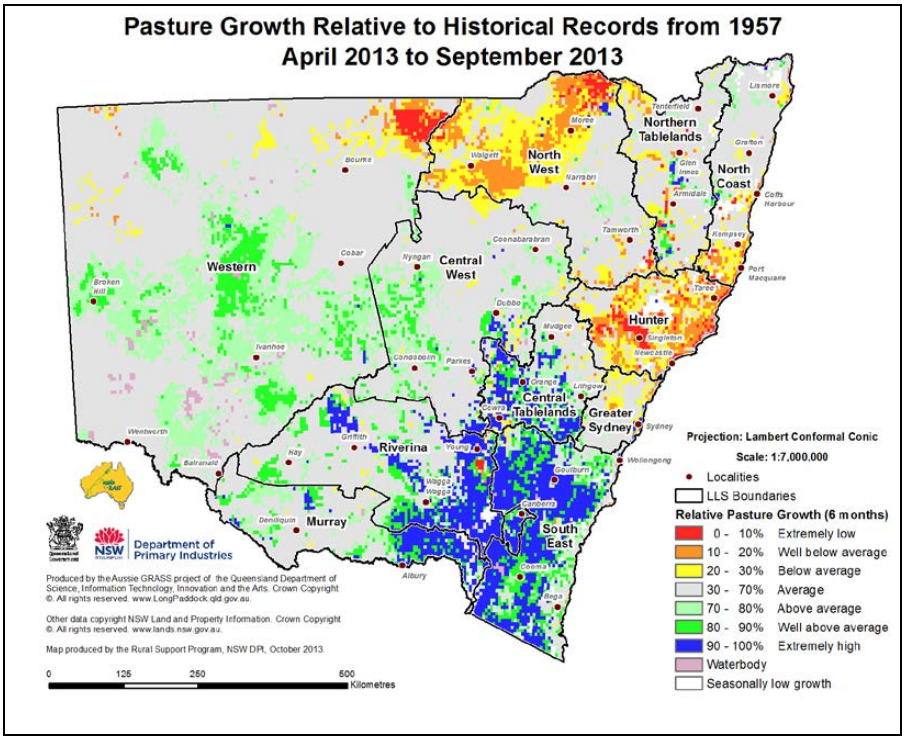


Figure 24: Relative pasture growth – yearly

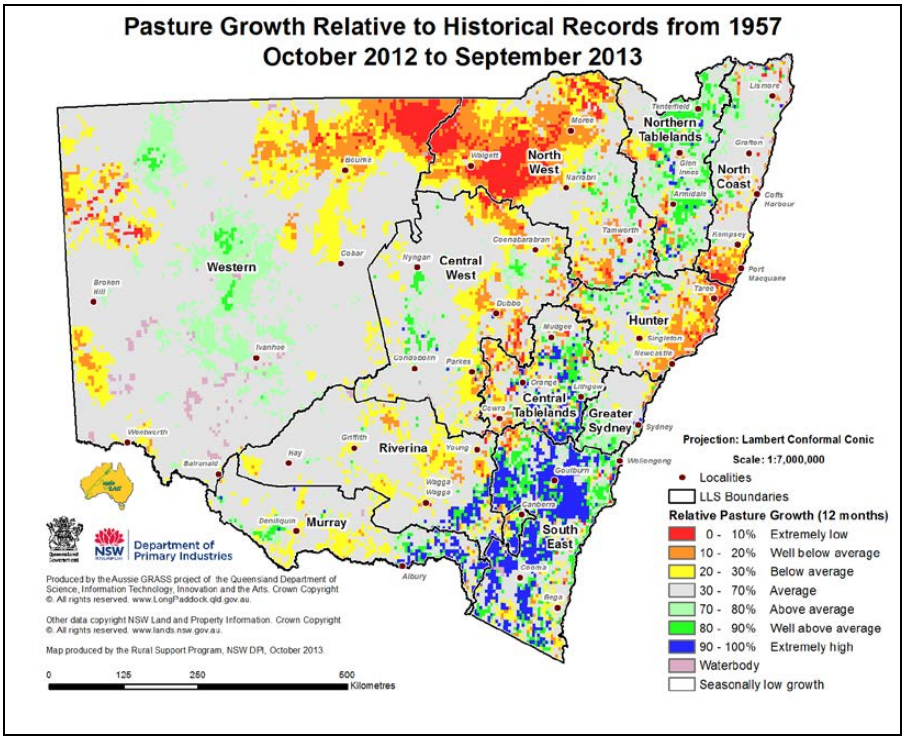


Figure 25: Relative biomass – monthly

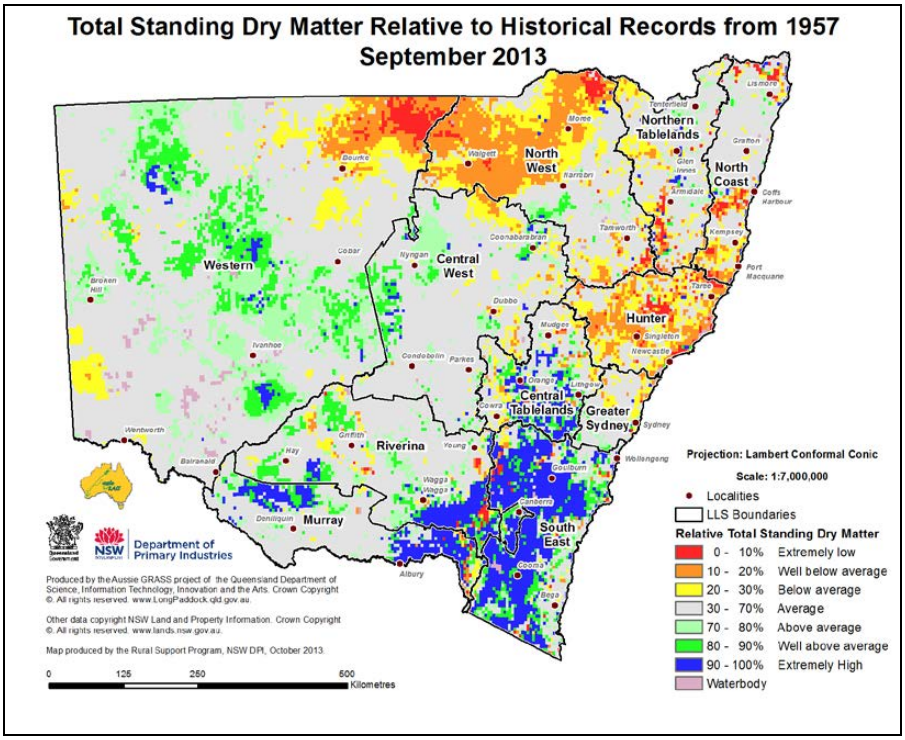
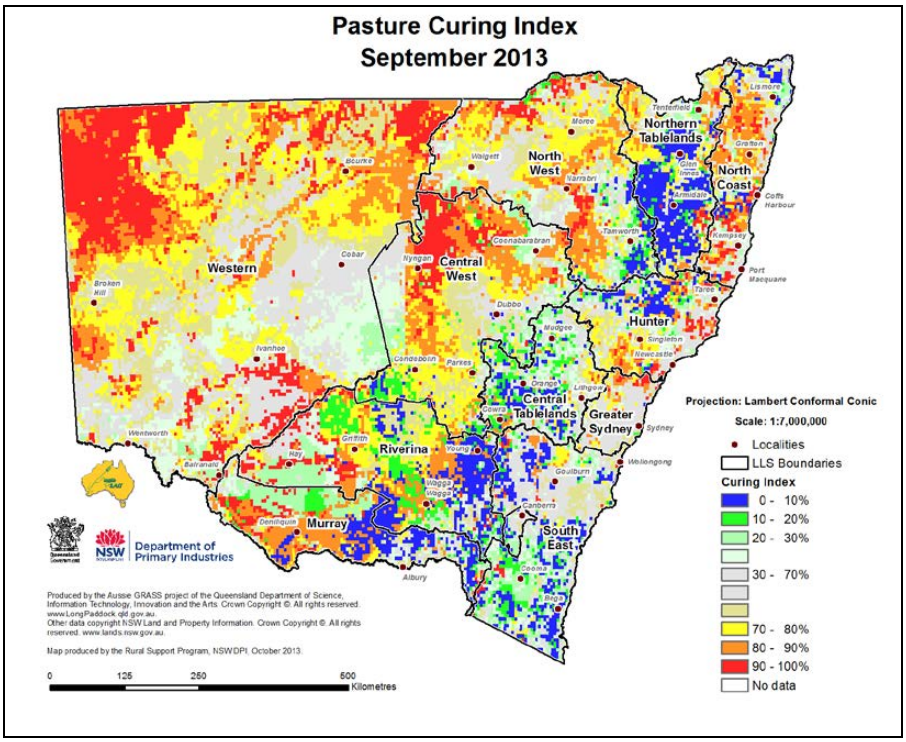


Figure 26: Pasture curing index



More information

For more information, contact the NSW Department of Primary Industries on 02 6391 3100.

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Warning

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