Department of Primary Industries

NSW Seasonal Conditions Report - August 2013

Highlights

- Wetter conditions are expected across the State, with higher probabilities over southern NSW.
- Cooler daytime & overnight temperatures are likely.
- July conditions were warmer than normal, with below average rainfall over much of the central & northern tablelands, the north west & coastal areas. Average falls across most of western, central & southern NSW.
- Monthly relative pasture growth & biomass levels were average or above average across most of NSW due to milder temperatures & the June-July rainfall.
- Modelled topsoil moisture levels fell slightly. Levels are low in the far west & north west of NSW & in areas of the central west and Riverina. Subsoil moisture was generally static in the western and central areas & improved in the east.
- Whilst general conditions have improved, stock condition & crop and 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

The outlook for NSW from August to October indicates that wetter conditions are likely across the State, with the highest probabilities of above median rainfall across the southern half of NSW. Cooler than normal daytime and night time temperatures are likely over this period.

The majority of the State received average rainfall during the month, with the highest rainfall of 100 mm or more falling to the south and south west of Canberra and in the far north east. The central areas of the State generally received 25-50 mm. Some areas in the north west received below average rainfall, including an area of the North West LLS district near Collarenebri, Walgett, Mungindi and Lightning Ridge. This area, an area near Bourke, the far north west of the State from Broken Hill north, much of the Sydney metropolitan area, and the far south east received 10 mm or less. Other areas to receive below average rainfall include parts of the Central Tablelands, Hunter and Northern Tablelands LLS districts.

An area of Western LLS district between Ivanhoe Cobar and Nymagee, and the far north east of the North Coast LLS district received above average rainfall for the month.

Both daytime temperatures and overnight temperatures were higher than average over the month. This benefitted pasture and crop growth.

Reports from LHPA Rangers indicate that pasture and crop growth is improving, although pasture growth is still slow in many areas. There has been a reduction in supplementary feeding of stock in central and western areas as pasture growth improves and dual purpose winter cereals become available for grazing. Pasture and crop growth is slow over the tablelands upper slopes, and north west. Supplementary feeding is continuing, although primarily for breeding stock except where little rainfall occurred. Stock condition ranges from stable to improving. Stock water supplies have generally improved, but are still low in some areas.

The three month relative rainfall assessment is still under the influence of the June rainfall, with most of the State showing average to above average conditions, with the exception of parts of the north west. Relative rainfall for the last six months is also rated as average across most of western and central NSW.

Modelled topsoil moisture declined slightly in the western and some central areas, particularly in the west of Murray and Riverina LLS districts, and in the Western LLS district. It declined to a lesser extent across Central West. Levels are low across more than half of the Western and North West LLS districts. Higher than normal rainfall is necessary here to replenish depleted soil moisture profiles. Levels across central and eastern NSW are generally moderate. Modelled subsoil moisture remained relatively static, with small increases in parts of central NSW and a marked increase in the south east.

Modelled pasture growth improved greatly during July, and relative growth was generally well above average. However, for the last 12 months, relative growth remains poor, particularly in central, north western and southern NSW. Modelled biomass levels improved over July, particularly in central and southern NSW. Relative biomass over most of the State was average or better, except in the north west.

2. Seasonal outlook

Seasonal outlook and ENSO information are sourced from Australian Bureau of Meteorology. The BoM seasonal forecasts are based on modelled output from dynamic models such as POAMA, which are physics-based. Full details on POAMA can be obtained at http://poama.bom.gov.au/.

2.1 Seasonal rainfall outlook

- For the 3 month period August – October there is at least a 65% chance of exceeding median rainfall across the State, with higher probabilities (ranging from 75% to more than 80%) in all but the far north west.
- This means that for every ten years with similar climate patterns to those at present, six to eight August to October periods would be expected to be wetter than average, and two to four years drier than average.
- The outlook confidence (skill) for this forecast is moderate across most of NSW, with low to very low skill in the far west and south west. The outlook confidence is also low in the far south east of the State.

2.2 Monthly rainfall outlook (experimental)

The monthly rainfall outlooks from the POAMA model are experimental only, are not yet fully calibrated, and may differ from the operational rainfall outlook. They should therefore be used with some caution.

- The experimental rainfall outlook for August (Figure 4) suggests near normal rainfall conditions across NSW, with a 40-60% chance of above median rainfall. The outlook has a moderate to high confidence (skill).
- The experimental rainfall outlook for September (Figure 5) suggests a 60-70% probability of above median rainfall for south western NSW, and a 70-80% probability for the northern, central and eastern areas of NSW. The outlook confidence (skill) for this forecast is moderate for central NSW, low for south western NSW and low to moderate for the north east.

2.3 Seasonal temperature outlook

- The probability of exceeding the long term median maximum temperatures across NSW is low, being 20-35% for most of NSW, with southern and south eastern NSW having the greatest probability of below average daytime temperatures (Figure 2). The outlook confidence (skill) is moderate for this forecast for most of NSW, and moderate to high in the north east of the State.
- This means that for every ten years with similar climate patterns to those at present, two to three years would be expected to be warmer than average and seven to eight years cooler than average.
- Cooler than normal overnight temperatures are likely across central and eastern NSW, with the exception of the far south east. The probability of August to October minimum temperatures being higher than the long term median is from 45-50% in far north west to 25-30% in the far north east NSW (Figure 3).
- Normal minimum temperatures are likely in the far north west and normal to slightly elevated temperatures for the far south east.
- The confidence (skill) for the minimum temperature outlook is low for most of NSW, particularly in the south and south east, but moderate in the far north west.

Other climatic models

- The Bureau of Meteorology's old statistical model indicates a likelihood near neutral rainfall conditions and warmer than normal maximum and minimum temperatures over the August to October period, unlike the POAMA model. However, the statistical forecast does not take the IOD into account and is based on past trends.
- The UK Meteorology Office's long range model indicates above average rainfall is likely for NSW over the August to October period, and near neutral temperatures for most of the State, except for the far north west and the south to mid north coast (60-80% of above average temperatures).
- The International Research Institute (IRI) for Climate and Society's climate forecast indicates that temperatures are likely to be higher than normal across the State over the August to October period. The IRI forecast indicates a 50% likelihood of above normal, 35% of normal and 15% of below normal temperatures. No skill assessment is available for these forecasts.

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. Currently, 66% of models suggest ENSO neutral conditions in August to October, 22% La Niña and 12% El Niño conditions. The Bureau of Meteorology's POAMA model and that of the

UK Meteorology Office are indicating that weak La Niña conditions may develop over winter and into spring.

- Monthly sea surface temperatures from the Bureau of Meteorology and the US National Oceanic and Atmospheric Administration (NOAA) indicate cool anomalies in the eastern tropical pacific and along the coast of South America. However, these anomalies have weakened in the last few weeks. Warm anomalies are persisting in the west. The sub surface sea temperatures in the eastern Pacific have cooled, although also remain close to average.
- Trade wind patterns over the western Pacific strengthened slightly over the last two weeks, but are near average across most of the tropical Pacific (these strengthen during La Niña and weaken during El Niño events).
- Cloud conditions at the equator near the International Date Line have fluctuated over the last fortnight, but are near normal (cloudiness in this area decreases during La Niña and increases during El Niño events).
- The latest Southern Oscillation Index (SOI) 30-day value has slowly declined to +7.5 (at 28th July). 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) continues to show a negative pattern, following cooling of the western Indian Ocean in recent weeks; the eastern tropical Indian Ocean has remained consistently warm. The warm waters around north-western Australia act as a source of moisture feeding into north-west cloud bands, as seen in the rainfall in June.
- The latest IOD index value is -0.6°C for the week ending 28th July, and this year has been officially classified as a negative IOD event. The model outlooks suggest it will remain negative into October and decay in December. This increases the chances of above normal rainfall across southern NSW and much of western and central NSW, and snow in the alpine areas in August and September. However, the chances of rainfall across northern and coastal NSW are near neutral, and are slightly lower in far north western NSW in negative IOD and neutral ENSO years, as shown in this link.

2.5 Other climatic indicators

- The experimental Southern Annular Mode (SAM) index was near neutral to weakly positive in early to mid-July and weakly positive in late July. It has dropped sharply, and is now negative. Predictions from POAMA and the US National Oceanic and Atmospheric Administration (NOAA) are for it to move to neutral or weakly positive in early August, move to being weakly negative in mid-August and possibly move to being near neutral or weakly positive in late August.
- A negative SAM indicates an expansion of strong westerly winds towards the equator, resulting in more or stronger low pressure systems across southern Australia and increased rainfall. A positive SAM indicates the contraction of westerly winds towards Antarctica and higher pressure over southern Australia and a decrease in rainfall. However, a strongly positive SAM in spring and summer can lead to a slightly higher likelihood of increased rainfall over south eastern and central NSW.
- Atmospheric pressure during July was much higher than average over the State, particularly in the east. 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.

July

- Relative to historical records, rainfall for July was average over most of the central, southern and western areas of the State (Figure 6).
- Relative rainfall was below average in the far north west, parts of the north west, Greater Sydney LLS district, much of the Northern

and Central Tablelands LLS districts, and the eastern edge of the South East LLS district.

- The Monaro and far south coast of the South East LLS district received extremely low relative rainfall for the month.
- Above average to well above average relative rainfall occurred in the far north east of the North Coast LLS district, north of Yamba. Relative rainfall was also above average between Nymagee, Cobar and Ivanhoe.

May to July (3 months)

- The relative rainfall assessment for May to July was greatly influenced by the above average falls that occurred across much of the State in June.
- Over the period from May to July, relative rainfall was average or better across most of the State (Figure 7).
- Above average to well above average rainfall occurred across the centre and south east of Western LLS district, the south and west of Central West and the north eastern area of South East LLS district, around Nowra and Mittagong, and extending into Greater Sydney. The north of the Riverina and east of the Murray LLS districts also received above average rainfall.
- Below average to well below average relative rainfall occurred in the west of the North West LLS district, and the far north east of the Western LLS district. This area extended from Goodooga to Walgett, Lightning Ridge and Collarenebri.
- Some 22% of the North West LLS district, 11% of Northern Tablelands and 7% of Western LLS districts received below average or worse rainfall during the period.
- Some 88% of the North Coast, 38% of Central West, 46% of Greater Sydney, 35% of Northern Tablelands and 28% of South East LLS districts received above average or better rainfall over the period.

February to July (6 months)

- Over the six months to June, relative rainfall was average or better across most of NSW (Figure 8).
- Areas of above average to well above average relative rainfall occurred across the North Coast LLS district. Other areas of above average relative rainfall occurred in the central area of the Western LLS district, the south of Central West, the north of South East and Hunter LLS districts, the east of Northern Tablelands and areas of Greater Sydney LLS districts.
- Below average to extremely low rainfall occurred in the west and north of North West LLS district, and the far north east of Western LLS district.

November to July (9 months, BoM)

- Over the 9 month period from November to July, relative rainfall across the State was below average across parts of central, north western and south western NSW (Figure 9). Below average areas extended from Tocumwal to Balranald and Wentworth; from Adaminaby to Temora, Boorowa, Cowra, Orange and Wellington; and from Louth and Wanaaring to Coonabarabran and Dubbo. These areas received 60-80% or less of their normal rainfall.
- Areas of particular deficiency occurred in the far north west between Walgett, Collarenebri, Lightning Ridge and Goodooga, and also around Harden. Rainfall percentages indicate that these areas received between 40-60% of their long term average rainfall.
- The North Coast and areas of Northern Tablelands, Hunter and Greater Sydney and the north of South East LLS districts received above average rainfall for the period. The remainder of the State was average.

August to July (12 months)

- Relative rainfall for the last 12 months remained generally below average to well below average across much of central and southern NSW, and in the north west (Figure 10).
- Areas of the Western, North West, Central West, Riverina and Murray LLS districts were affected, along with the western edge of Central Tablelands LLS districts.
- Areas of well below average relative rainfall over the last year extended in a belt from Enngonia to Brewarrina, Quambone, Coonamble, Pilliga and Mungindi and included Goodooga, Lightning Ridge and Walgett.
- The eastern side of Northern Tablelands and much of the North Coast LLS districts had above average to well above average relative rainfall for the period.

3.2 Total rainfall

Total rainfall information is sourced from the AussieGRASS project of the Queensland Department of Science, Information Technology,

Innovation and the Arts and from the Bureau of Meteorology.

July

- Unfortunately, the good rainfall of June did not continue into July, with falls across NSW overall being less than 70% of average. Most of the rainfall west of the divide occurred between the 15th and 20th July due the progression of surface troughs.
- Much of the north, far north west and east of the State received below average falls for the month.
- The west, south and south west of the State received generally average rainfall of up to about 50 mm, with above average rainfall in the alpine areas, between Wilcannia and Cobar, near Forbes and on the far north coast.
- Rainfall across most of the State ranged from 10-50 mm (Figure 11). More favoured areas received 50-100 mm or more, such as areas between Parkes, Forbes, and Grenfell, between Corowa, Tarcutta, Yass and Jindabyne and north east of Kyogle and Lismore.
- The lightest falls (0-10mm) occurred across the far north west and west, extending in a belt from Tibooburra to White Cliffs, Broken Hill and Menindee. Other areas of rainfall between 1-10 mm occurred between Collarenebri and Walgett, in the far south east between Batemans Bay, Bega, Eden, Delegate Nimmitabel and across the west of Greater Sydney LLS district.
- Limited areas north east of Lismore and between Tumbarumba, Tumut and Jindabyne received 100-200 mm or more.

May to July (3 months)

- Total rainfall over the three months to July ranged from 50-200 mm across most of the State. The far north west received 25-50 mm, as did an area near Lightning Ridge. The coastal strip received 200-400 mm, as did an area between Albury and the ACT.
- Falls of 400-600 mm were recorded near Tweed Heads, Coffs Harbour, between Sydney and Ulladulla and in the alpine areas (Figure 12).

February to July (6 months)

- Rainfall across the State during the February to July period ranged from 50 mm to more than 1,200 mm (Figure 13).
- The lowest rainfall over the period (50-100 mm) fell in patches in the far west of the State, near Broken Hill and in the north west near Bourke.
- The west of the State generally received 100-200 mm, with some areas receiving 200-300 mm. The central areas of the State generally received 200-300 mm, with some areas receiving up to 400 mm.
- The eastern edge of the Northern Tablelands and Hunter LLS districts, the east of the Central Tablelands LLS district, and the North Coast, Greater Sydney and the coastal areas of South East LLS districts generally received 400 mm or more, with heavier recordings of 600-1200 mm close to the coast from Moruya to the north. The far southern tablelands and alpine areas also received 400 mm or more.

4. Temperature anomalies

Temperature information is sourced from the Bureau of Meteorology.

- Maximum temperatures across the State in July averaged 2.1°C above normal, being the third warmest on record for July. Some 87% of the State recorded temperatures in the warmest 10% of years.
- Across much of western and central NSW and the Hunter valley, maximum temperatures ranged from 2-3°C above normal. Maximum temperatures across the remainder of the State were generally 1-2°C above normal (Figure 15).
- Minimum temperatures during the month averaged 1.7°C above normal across most of NSW, and providing fewer frosts than normal in most areas (Figure 16).
- Overnight temperatures were highest in the north east of the State, parts of the north west and central west. Overnight temperatures were also high in the south of the State across the south east of the Riverina and Murray LLS districts and in the west of the South East LLS district.

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 declined somewhat during the month, particularly in the far north west and the north west. Levels in these areas are once again low (Figure 17). Levels are low across more than half of

the Western and North West LLS districts. Greater Higher than average rainfall will be required to restore soil moisture in these areas.

- Declines from moderate to low levels of modelled topsoil moisture also occurred in the north of Central West and the south of Western LLS districts, and the west of Riverina and Murray LLS districts, possibly due to the warmer than average temperatures.
- Over the month, modelled topsoil moisture declined from moderate to low across 43% of Western, 23% of Riverina, 21% of Murray, 13% of Central West and 8% of North West LLS districts.
- In total 68% of Western, 56% of North West, 23% of Riverina, 21% of Murray and 16% of Central West LLS districts have low modelled topsoil moisture.
- Levels across the remainder of central and eastern NSW remained generally moderate.
- Improvements in modelled topsoil moisture occurred along a narrow coastal strip from Ulladulla to Port Macquarie and from Yamba to Tweed Heads. Slight improvements also occurred in the Monaro.
- The major improvement was in the Greater Sydney LLS district, where 15% of the LLS district shifted from moderate to high relative topsoil moisture.
- Most of the coastal strip and alpine areas have moderate-high relative topsoil moisture.

5.2 Subsoil

- Modelled subsoil moisture levels remained relatively static during the month, with the levels across much of the cropping areas being generally moderate (Figure 18).
- Levels in the coastal districts and the eastern edge of the Central and Northern Tablelands LLS districts improved somewhat, and a marked increase occurred in the South East LLS district.
- Subsoil moisture levels are very high along a narrow coastal strip from Ulladulla to Tweed Heads.
- There were improvements in the Greater Sydney and South East LLS districts, where between 18-32% of the districts shifted from moderate to high relative subsoil moisture.
- The most serious deficiencies were in the west of the North West LLS district, the north of Central West, the north east of Western and the far west of Riverina and Murray LLS districts.
- The North West LLS district has the lowest relative subsoil moisture, with 52% of its area in the low category.

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

- As a result of the June rainfall and somewhat mild temperatures, modelled pasture growth improved over much of the State during July (Figure 19).
- Modelled growth of between 100-500 kg/ha of dry matter (DM) was estimated for most of Western LLS district, with some areas of between 500-1,000 kg/ha. The central and southern areas of the State ranged from 200 to more than 1,000 kg DM/ha, with the best growth in the Central West LLS district and the central area of the Riverina LLS district.
- Modelled growth across much of the coast and the Northern Tablelands LLS area improved to moderate-high levels.
- The worst areas of modelled growth were in the far north west, the Walgett-Lightning Ridge area and in the far south east in the alpine areas and on the far south coast. Here, growth was restricted to less than 50 kg DM /ha.

6.2 Modelled biomass

- In July, modelled total standing dry matter (biomass) levels improved across the central and southern areas of NSW. Modelled biomass increased in these areas from around 500 kg DM/ha to the 1500-2,000 kg DM/ha range (Figure 20).
- The greatest improvements in biomass were in the Central West and Murray LLS districts. Levels also improved across the North Coast, Hunter and Greater Sydney LLS districts.
- Generally, the tablelands and far south coast had low modelled biomass, ranging from <250 to 250-500 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.

July

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 for July was well above average to extremely high over most of the State (Figure 21).
- The worst pasture growth occurred in North West LLS district between Walgett, Pilliga, Collarenebri and Lightning Ridge, in the far north west of Western LLS district, and in areas between Enngonia, Bourke and Goodooga. Another area of poor growth occurred around Harden in the Riverina LLS district.
- Modelled growth across the remainder of NSW was average to above average for the month.
- Patches of missing data occurred across the north west of Western LLS district, most of the South East LLS district and over scattered areas of the rest of the coast and tablelands.

May to July (3 months)

- Over the three months to July, most of the State experienced above average to extremely high relative pasture growth (Figure 22).
- The far north and north west of the State had generally average growth, with areas of lower growth between Goodooga, Lightning Ridge and Walgett, and also around Boggabilla.
- Much of the North Coast and Hunter LLS districts, and the western half of the Murray LLS district had generally average growth.

February to July (6 months)

- In the period from February to July, the eastern third of the State had generally well above average to extremely high relative growth (Figure 23).
- The central and western areas of the State generally ranged from average to above average in relative growth.
- Areas of below average or worse relative growth occurred in the Harden area, between Enngonia, Bourke, Brewarrina, Goodooga, Lightning Ridge, Walgett and Pilliga.

August to July (12 months)

- Relative pasture growth across the State over the last 12 months was below average to extremely low across much of the central and north western areas of the State (Figure 24).
- The Western LLS district had generally average relative growth, with the exception of the far north east and the far south west.
- Relative growth across the tablelands and coast was generally average, with pockets of above and below average growth.

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 and western areas of NSW were generally average to above average (Figure 25).
- Better areas of relative biomass (above average or higher) occurred along in the eastern third of the State.
- Areas of below average or worse relative biomass occurred in the Harden area, near Conargo and Jerilderie, and between Enngonia, Bourke, Brewarrina, Goodooga, Lightning Ridge, Walgett and Pilliga.

7. Crop production

Crop production information is sourced from the NSW DPI grains report.

The last grains report was released in April, and a new report had not been released at the time of publication of this report.

8. Water storage and irrigation allocations

8.1 Storage levels

Storage levels are given as at 29th July 2013.

- Levels in water storages remain generally moderate, with the average effective capacity being 79%.
- Increases over the month (to 29th July) were generally small, with the exception of the Hume (13%) and Blowering (8%) Dams.

Table 1: Capacity of storages

Storage	Current Volume (GL)	Effective Capacity (%)	Monthly Change (%)
Toonumbar	-	-	-
Glenbawn	-	-	-
Glennies	-	-	-
Lostock	-	-	-
Brogo	9	100	-
Cochrane	0	-	-
Dartmouth	3721	96	1
Hume	2351	78	13
Blowering	1301	79	8
Burrinjuck	472	46	4
Brewster	-	-	-
Carcoar	-	-	-
Cargelligo	-	-	-
Wyangala	856	70	2
Glenlyon	235	-	-
Pindari	205	66	1
Copeton	-	-	-
Chaffey	52	83	2
Keepit	197	46	1
Split Rock	-	-	-
Burrendong	566	46	-
Oberon	38	84	1
Windamere	-	-	-
Lake Cawndilla	387	55	0
Lake Menindee	-	-	-
Lake Pamamaroo	338	123	-2
Menindee	-	-	-
Total Menindee	-	-	-
Wetherell	245	128	4
Total	**10973**		
Average		**79**	

8.2 Irrigation allocations

Allocations are given as at 29th July 2013.

- High security allocations are unchanged from early July. High security allocations remain at 100%, except for the Murray (97%) and Murrumbidgee (95%) River Valleys.
- General security allocations are unchanged from early July, with the exception of that of the Macquarie and Cudgegong River Valleys, where the allocation increased very slightly from 0 to 2%.

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*	2%	General security
	100%	High security
Murray*	38%	General security
	97%	High security
Murrumbidgee*	18%	General security
	95%	High security
Lower Namoi*	0%	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

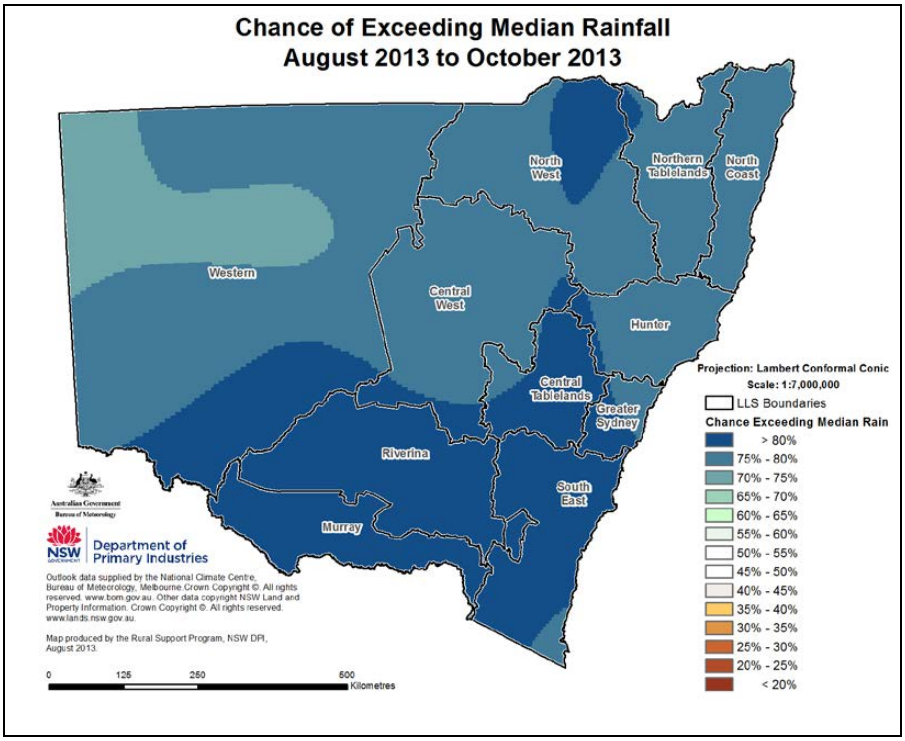


Figure 2: Quarterly maximum temperature outlook

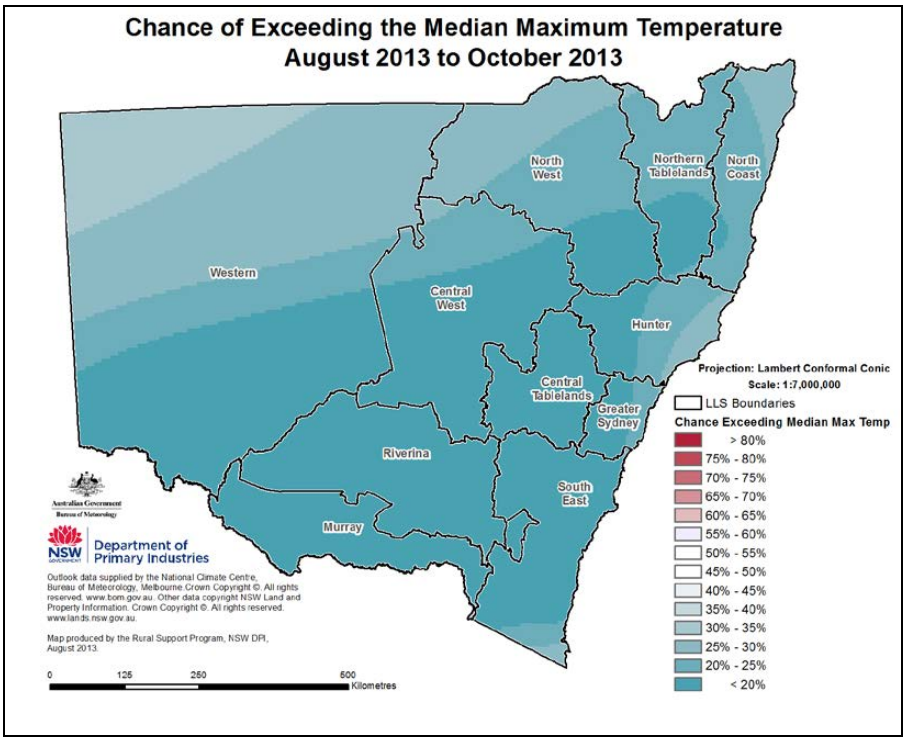
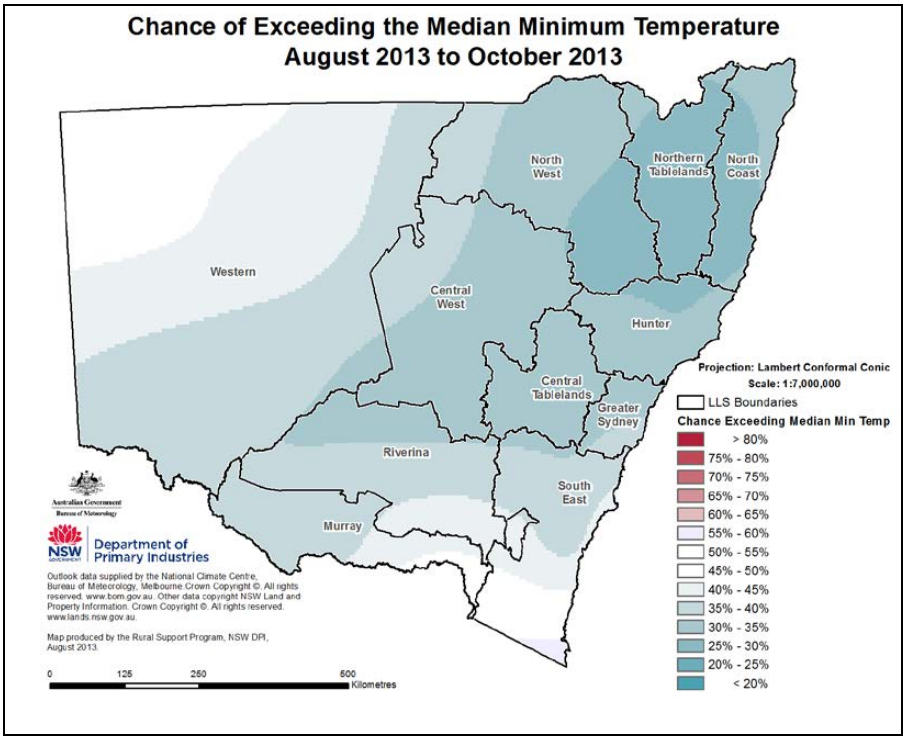


Figure 3: Quarterly minimum temperature outlook



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

Figure 4: Experimental August rainfall outlook

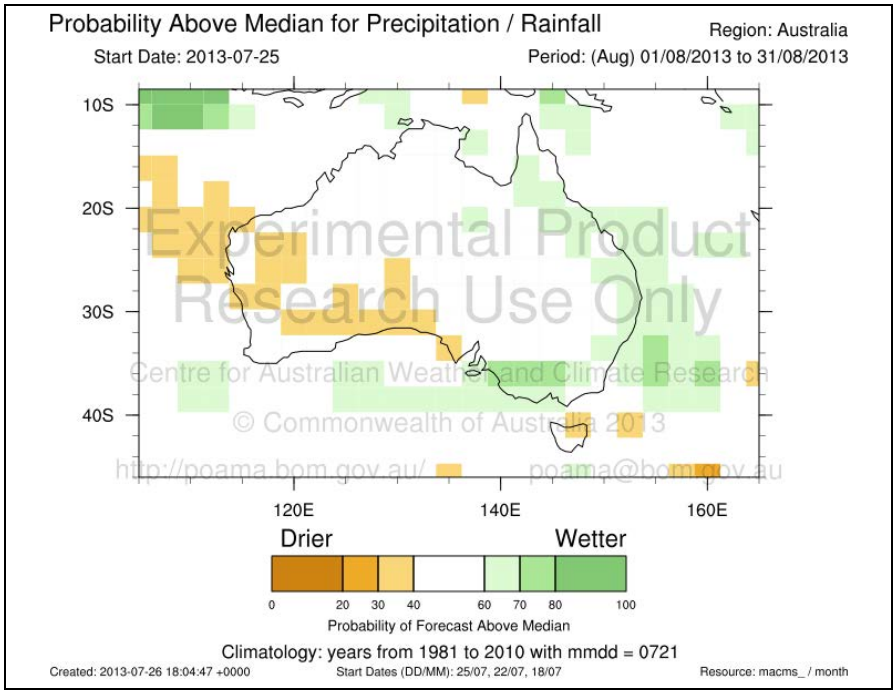
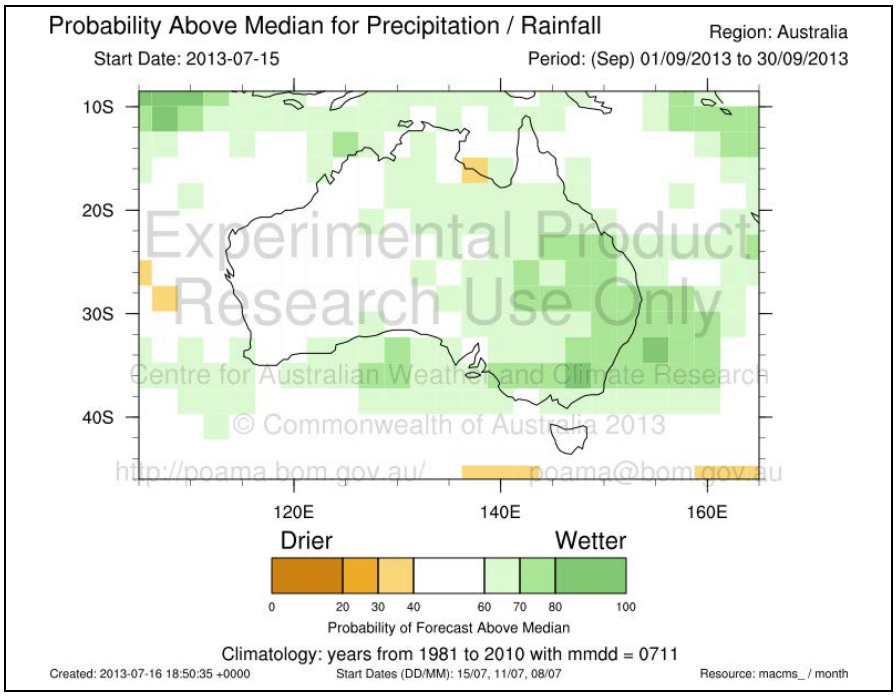


Figure 5: Experimental September rainfall outlook



Rainfall

Figure 6: Relative rainfall – monthly

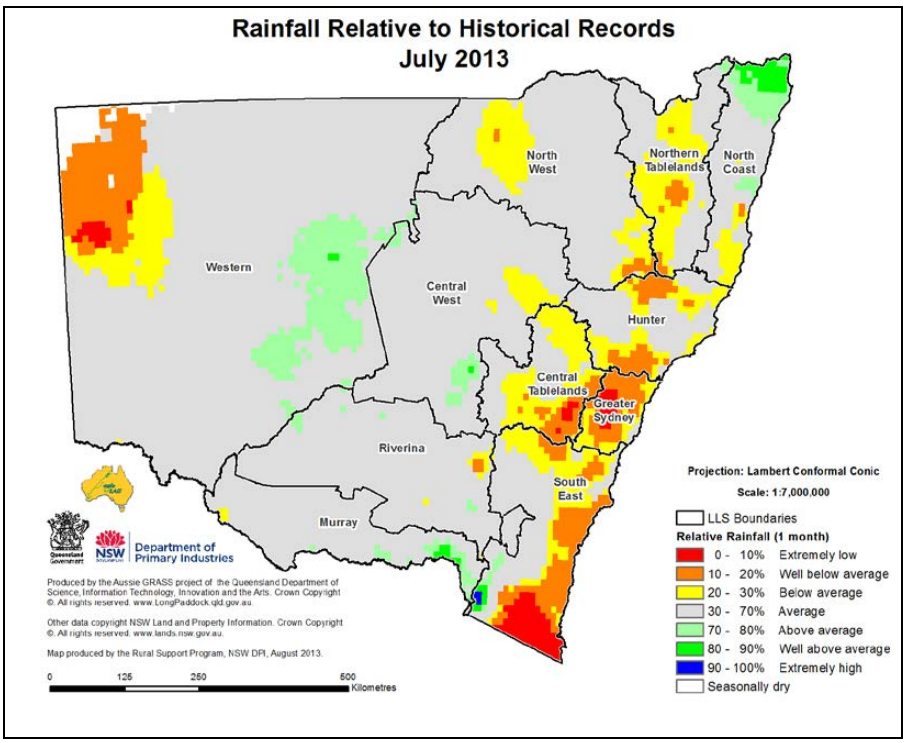


Figure 7: Relative rainfall – quarterly

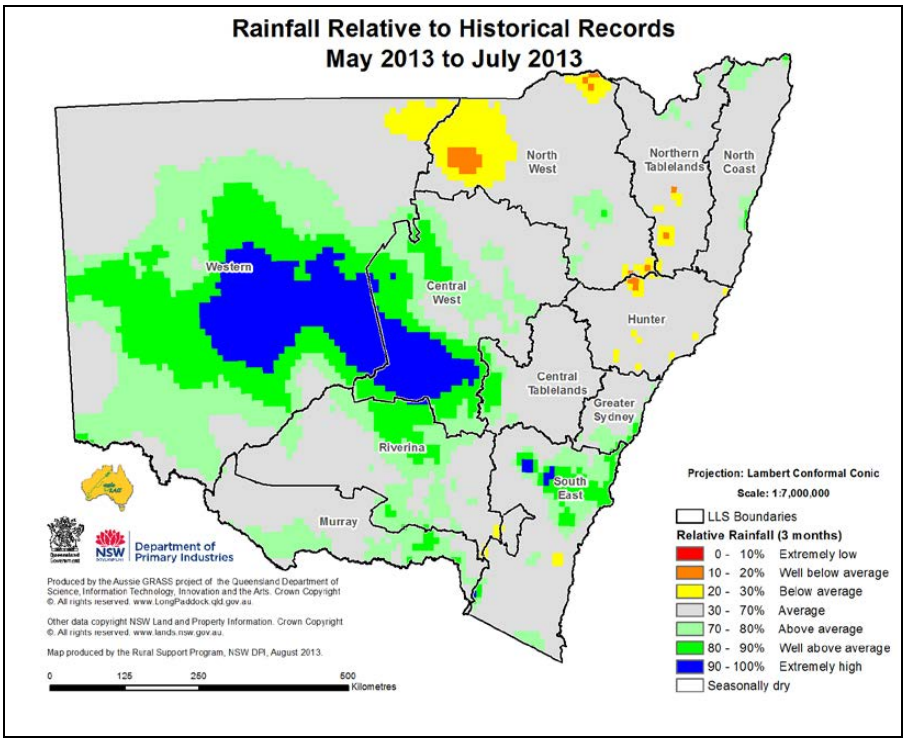


Figure 8: Relative rainfall – half yearly

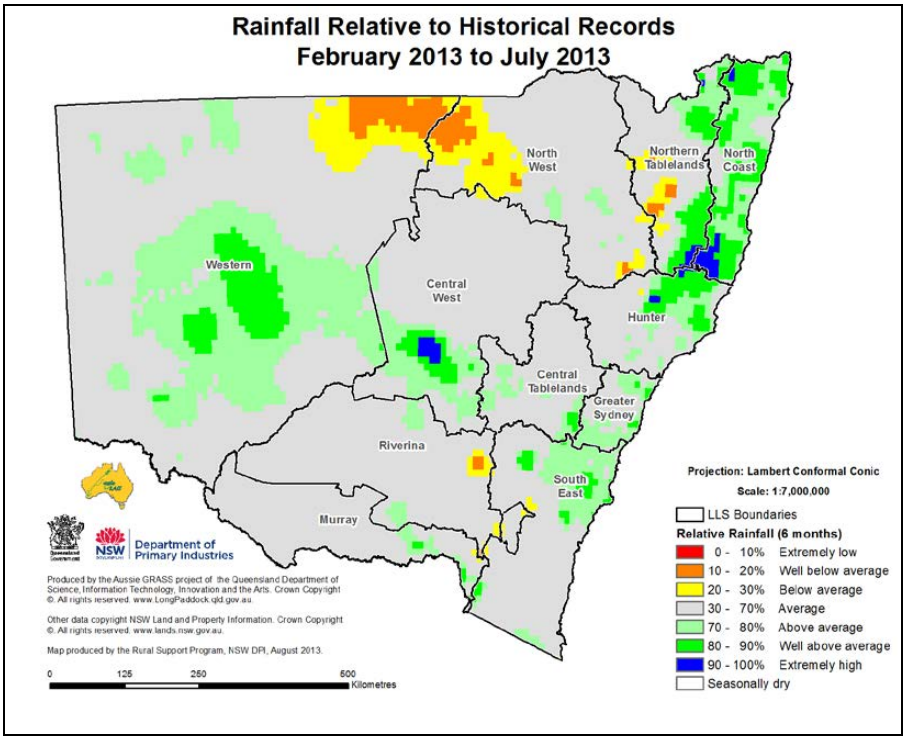


Figure 9: Relative rainfall – nine monthly

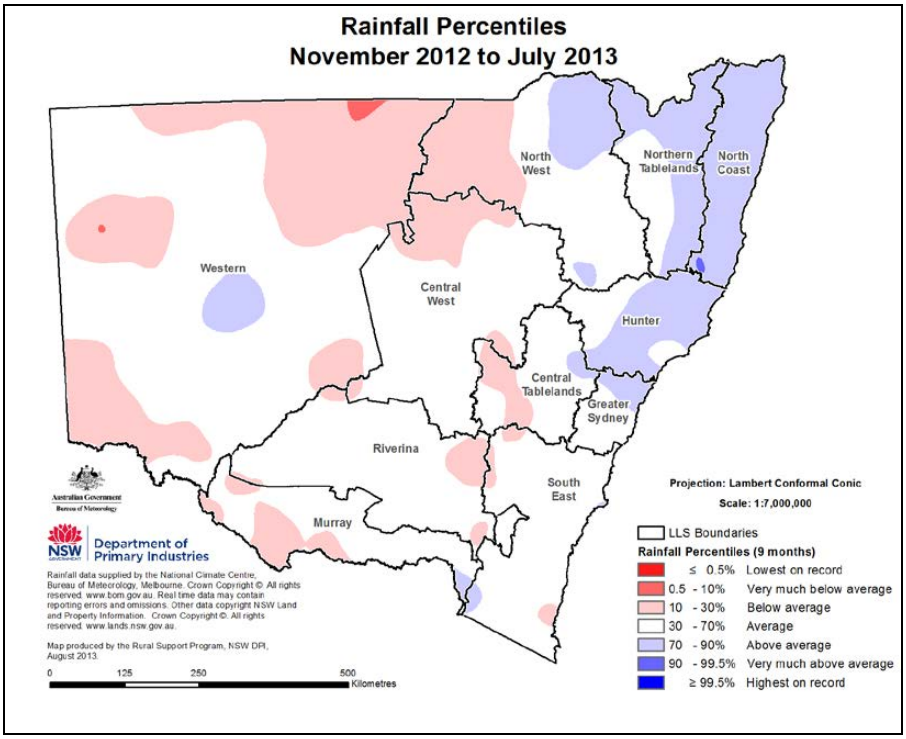


Figure 10: Relative rainfall – yearly

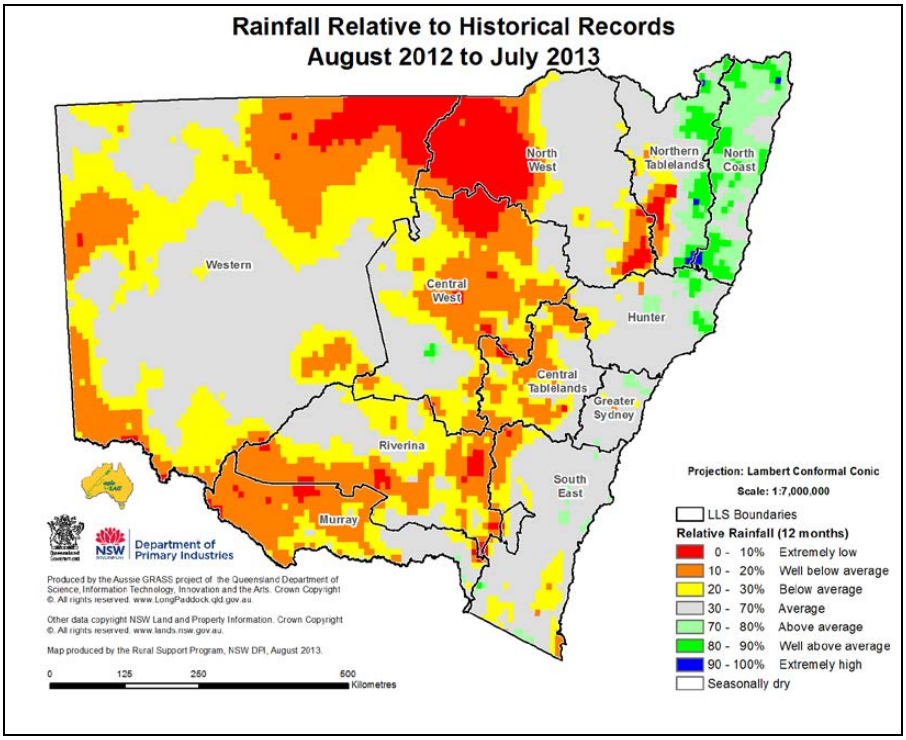


Figure 11: Total rainfall – monthly

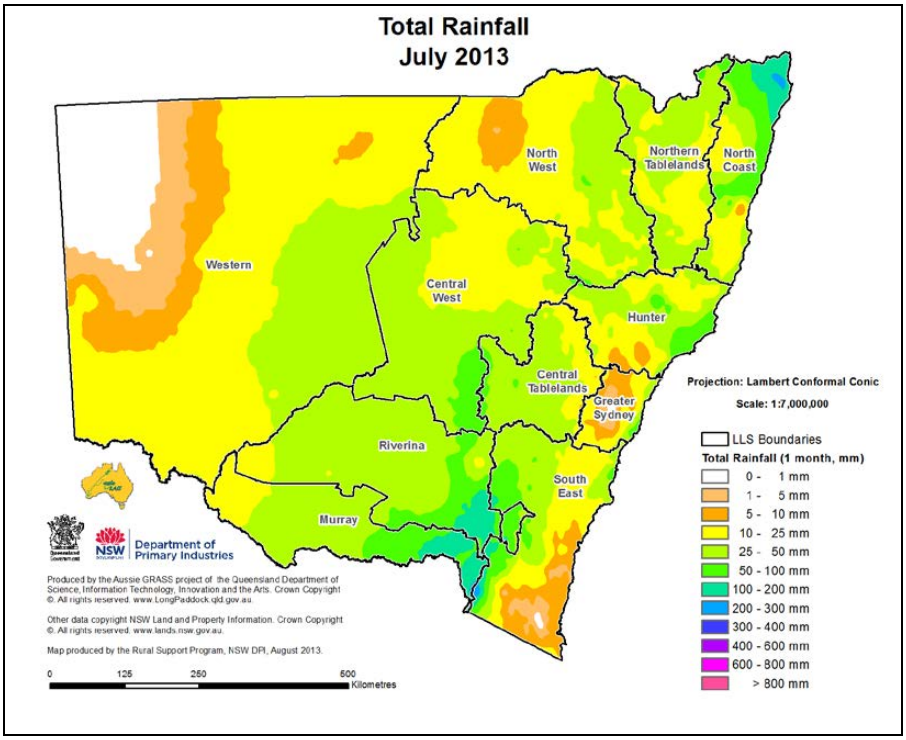


Figure 12: Total rainfall – quarterly

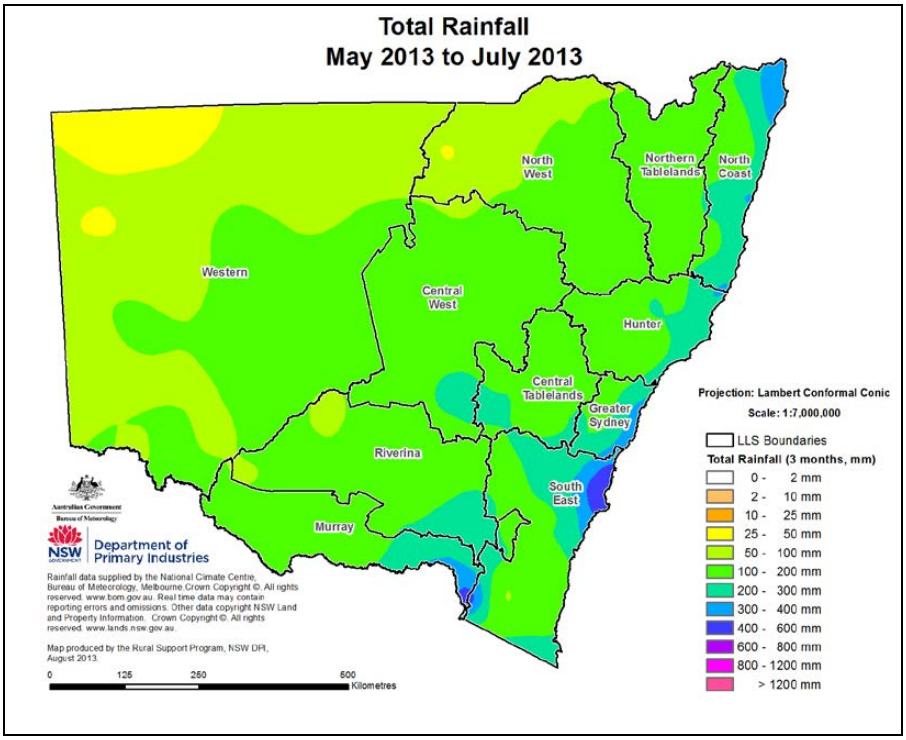


Figure 13: Total rainfall – half yearly

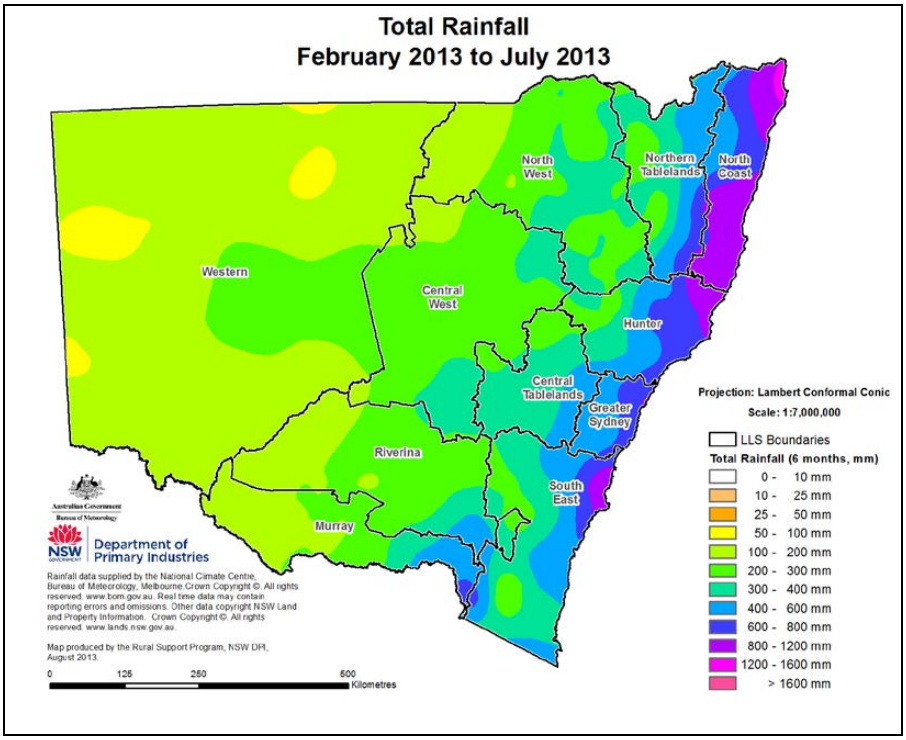
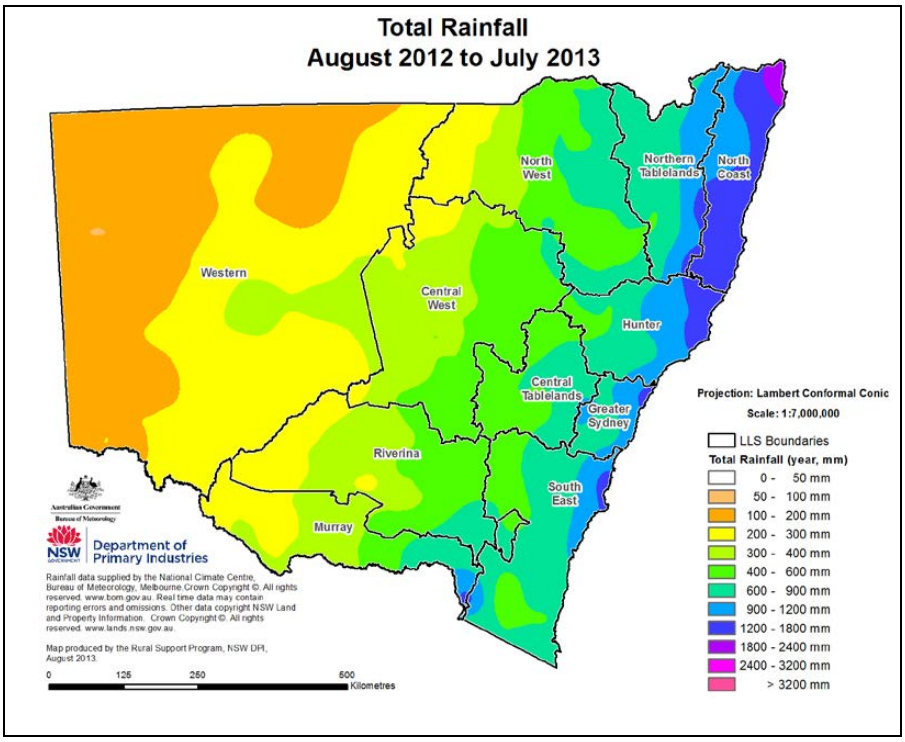


Figure 14: Total rainfall – yearly



Temperature

Figure 15: Maximum monthly temperature anomaly

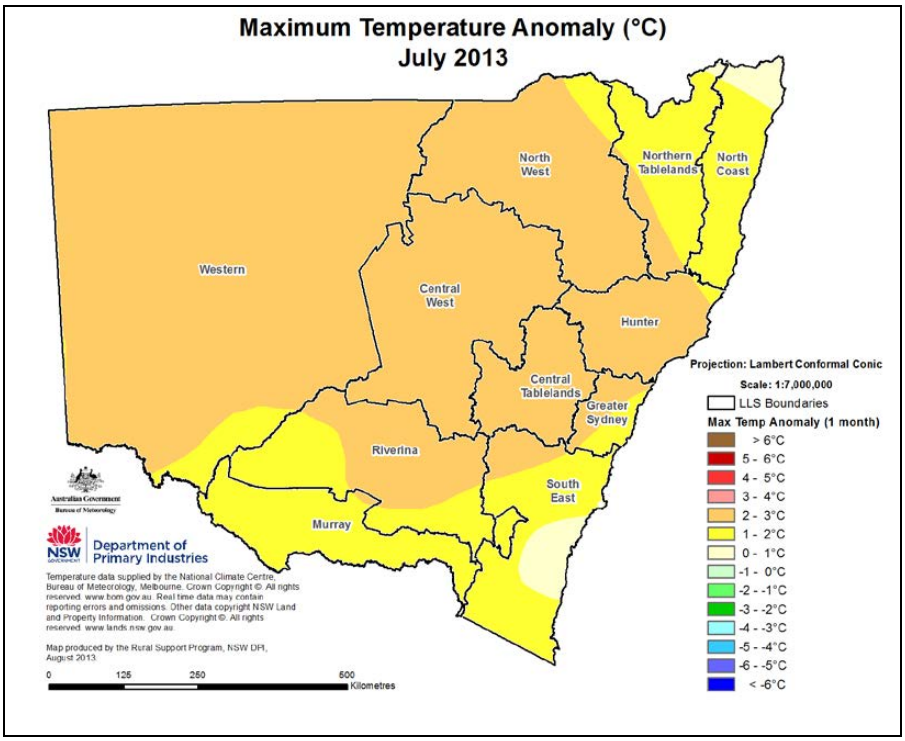
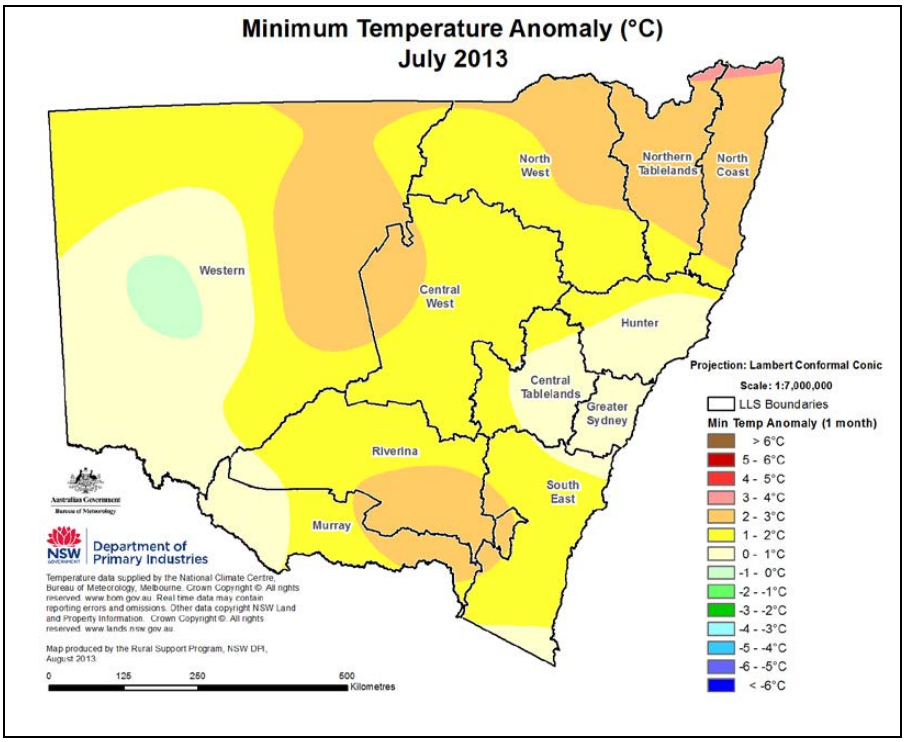


Figure 16: Minimum monthly temperature anomaly



Soil moisture

Figure 17: Relative topsoil moisture

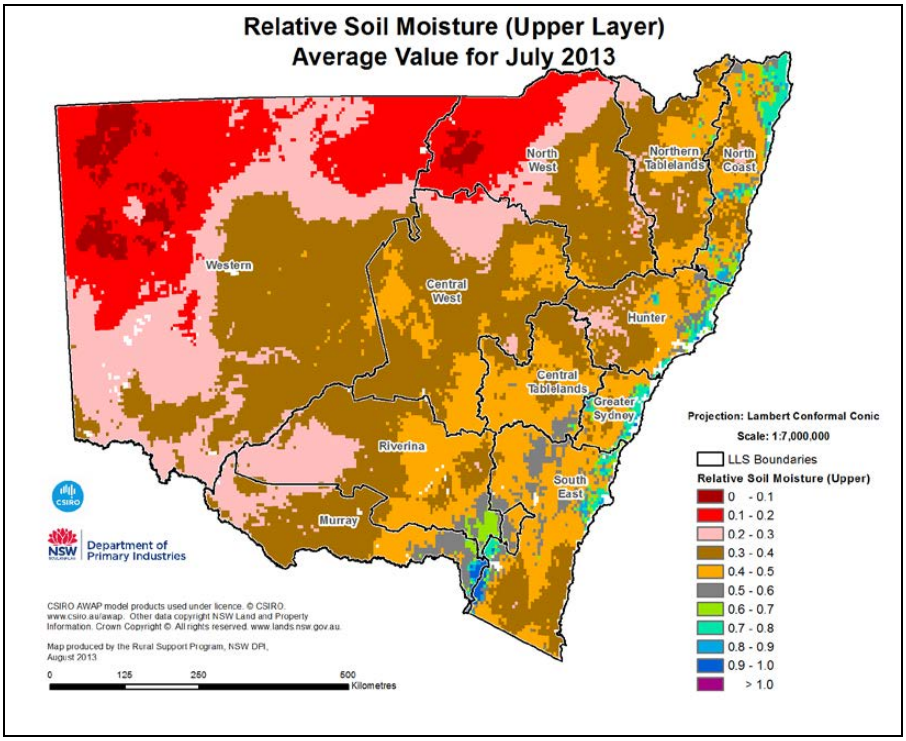
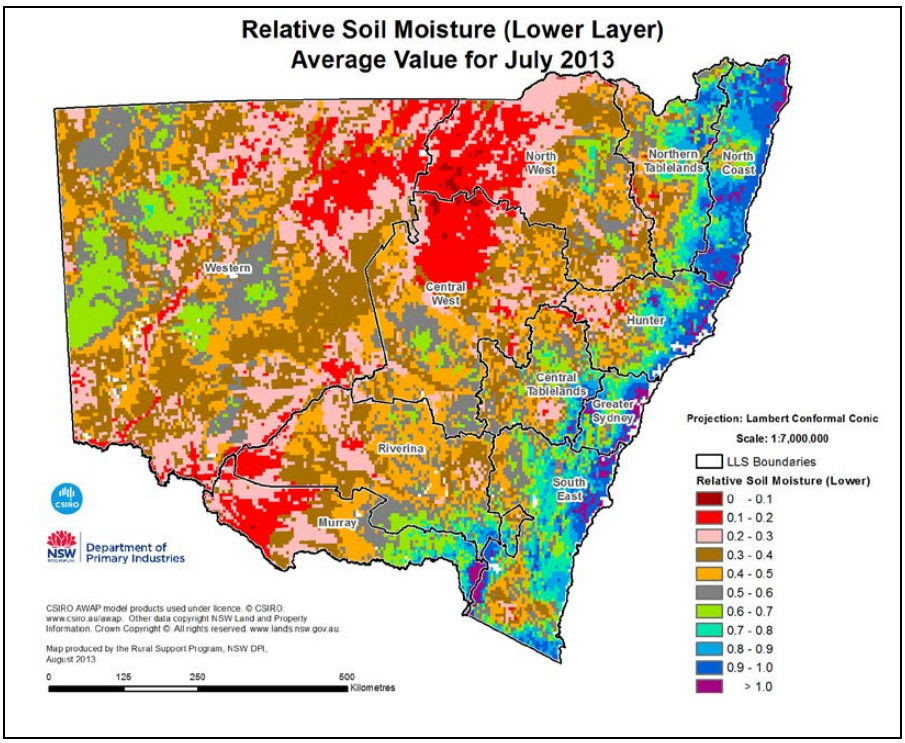


Figure 18: Relative subsoil moisture



Pasture growth and biomass

Figure 19: Modelled pasture growth

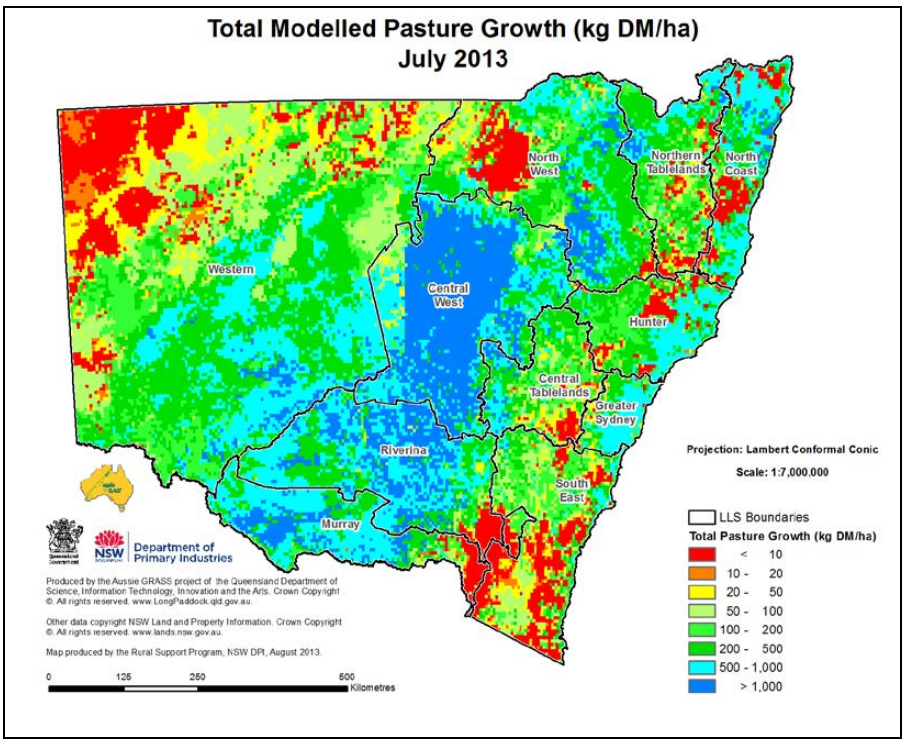


Figure 20: Modelled biomass

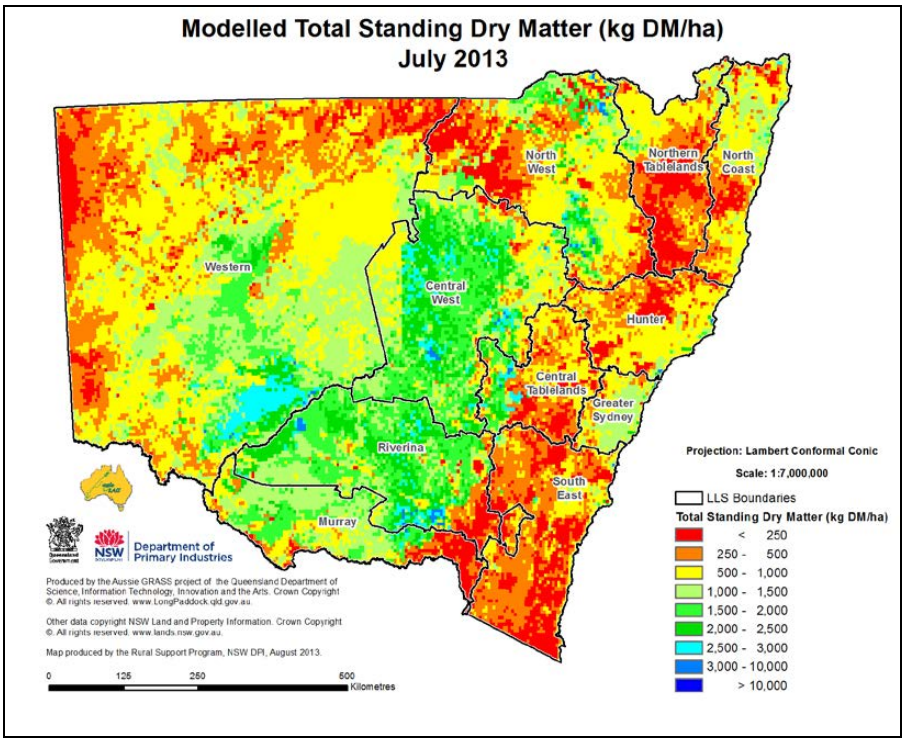


Figure 21: Relative pasture growth – monthly

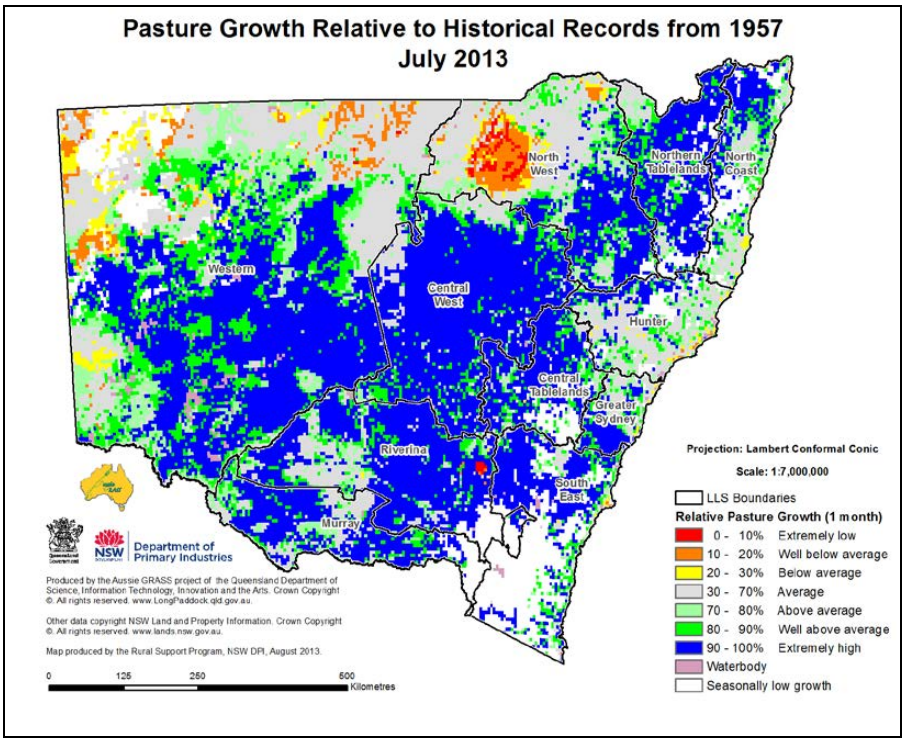


Figure 22: Relative pasture growth – quarterly

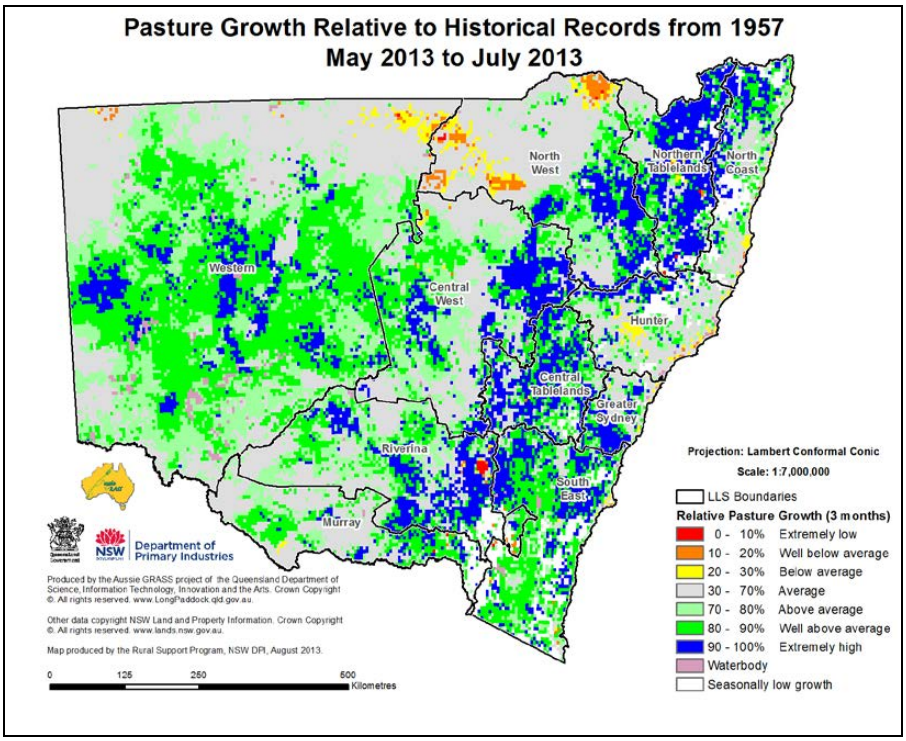


Figure 23: Relative pasture growth – half yearly

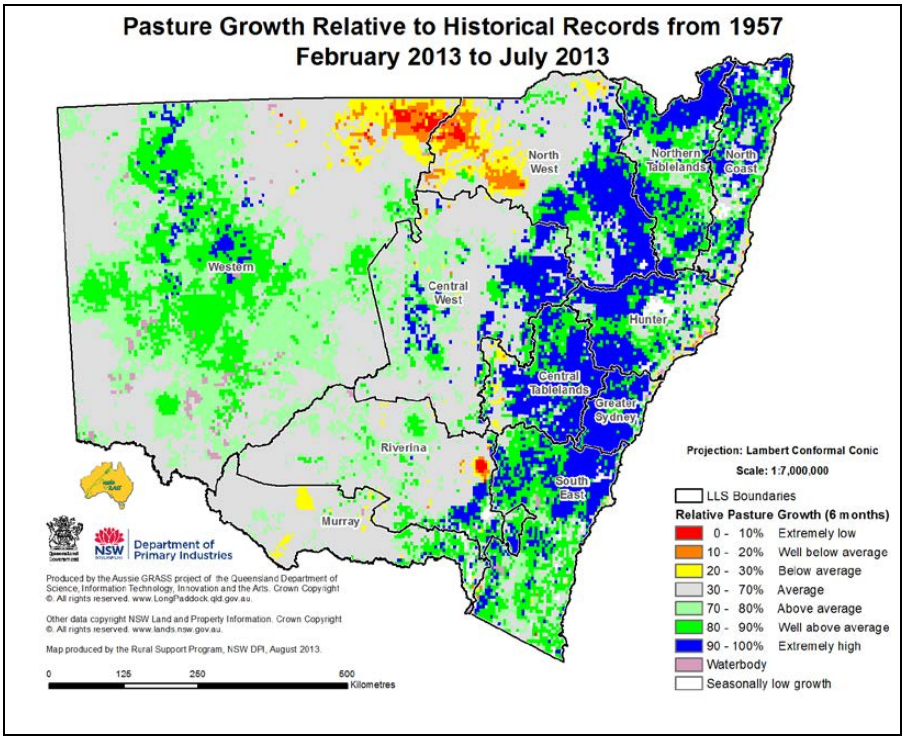


Figure 24: Relative pasture growth – yearly

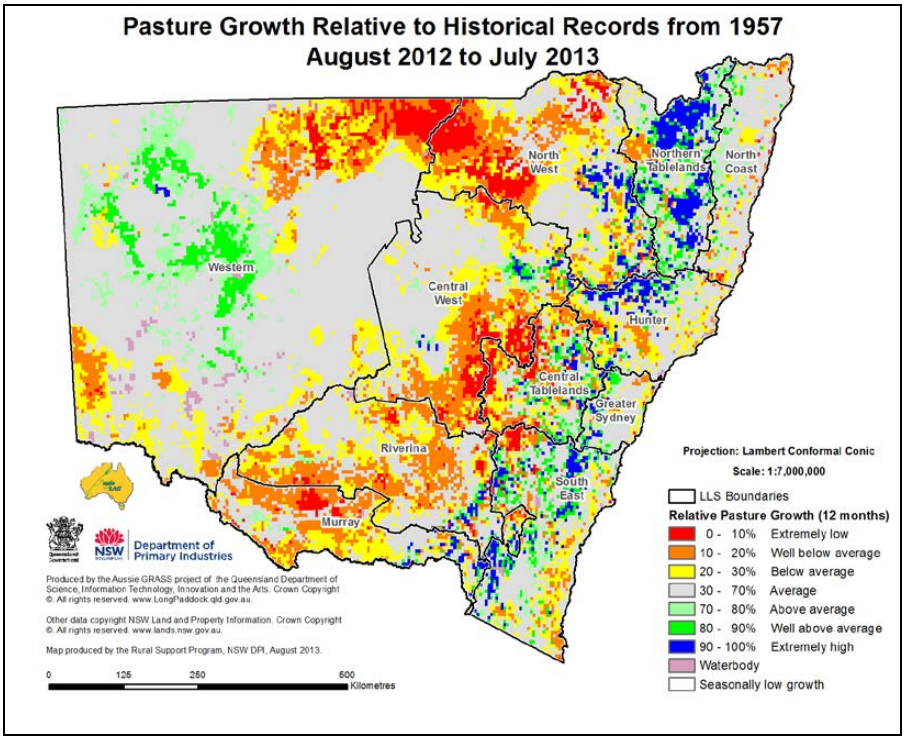
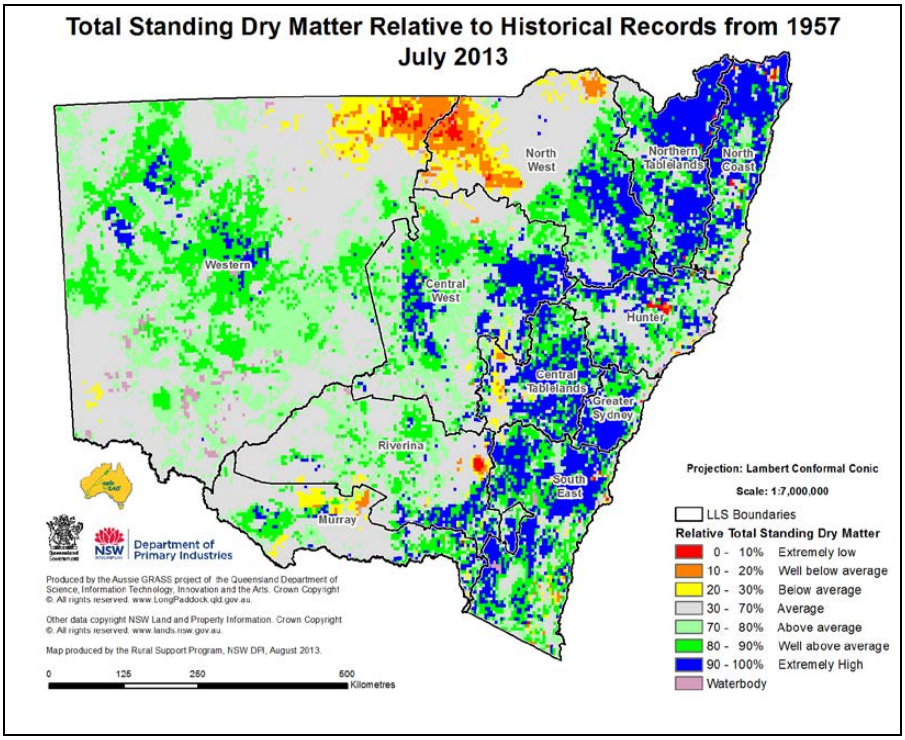


Figure 25: Relative biomass – monthly



More information

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

Acknowledgments

Information used in this report was sourced from the Bureau of Meteorology, CSIRO, Queensland Department of Science, Information Technology, Innovation and the Arts, NSW Livestock Health and Pest Authorities and NSW Department of Primary Industries.

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