Government of South Australia
Department of Water, Land and Biodiversity Conservation

Protection of agricultural land against erosion in the South Australian Murray-Darling Basin Region

Seasonal Report November 2009

Issued by:
Department of Water, Land and Biodiversity Conservation

Summary

- Most of the region experienced reasonable growing conditions enabling crops and pastures to grow well, except an area from Karoonda to Loxton and Renmark where below average rainfall through most of the growing season resulted in poor growth.

- Average surface cover levels in October in the region were equal to the mean for October for 2000 to 2009, and given the average rate of breakdown and losses over summer, are not expected to fall below the level regarded as adequate for erosion protection by March 2010. Cover levels are lower in the Karoonda–Loxton–Renmark area, and will need to be closely managed to maintain adequate cover for erosion protection in coming months.

- The proportion of land protected from wind erosion in the region in October was at near maximum levels, which is to be expected in October when crops and pastures reach maturity.

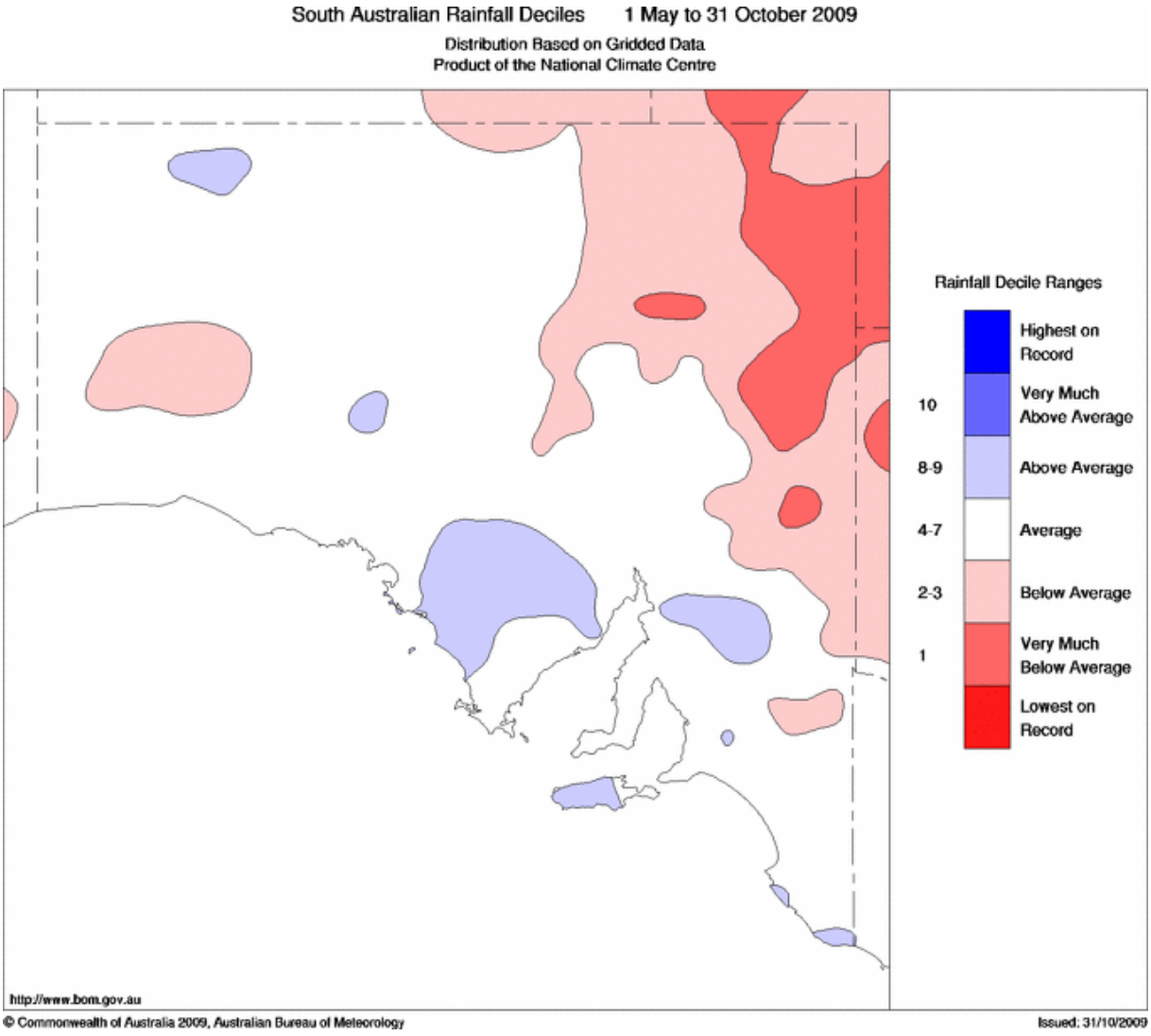
Seasonal Conditions

Rainfall deciles for the period May to October 2009 show that most of the South Australian Murray-Darling Basin Region had average rainfall during the growing season apart for an area of below average rainfall around Loxton to Karoonda in the Northern Mallee (Figure 1).

Good rains towards the end of April gave way to lighter showers through to late May. More rain fell in the areas closer to the Mount Lofty Ranges with lighter falls in the Riverland and eastern parts of the region.

Rainfall was variable over the region in June with some areas recording above average falls and other areas below average. The Northern Mallee continued to experience below average rain during July, while the rest of the region received above average falls.

Figure 1:



Dry conditions were experienced during August until late in the month when rain fell over most of the region except for the Karoonda – Loxton – Renmark area which again received below average falls. September rainfall was above average due to good falls in the second half of the month but only light falls occurred in the Mallee areas in October.

Cumulative growing season rainfall data for selected sites across the SA Murray-Darling Basin Region are shown in Appendix 1. These demonstrate the drier conditions in the Loxton area compared to the rest of the region.

Soil surface cover levels

The Department of Water, Land and Biodiversity Conservation conducts a Land Condition Monitoring Program which assesses the risk of wind and water erosion on susceptible land in the cropping areas four times a year. Surface cover levels and soil disturbance are visually rated during these surveys.

The surface cover rating system used is based on a scale of 1-8 where 1 = full cover and 8 = bare ground.

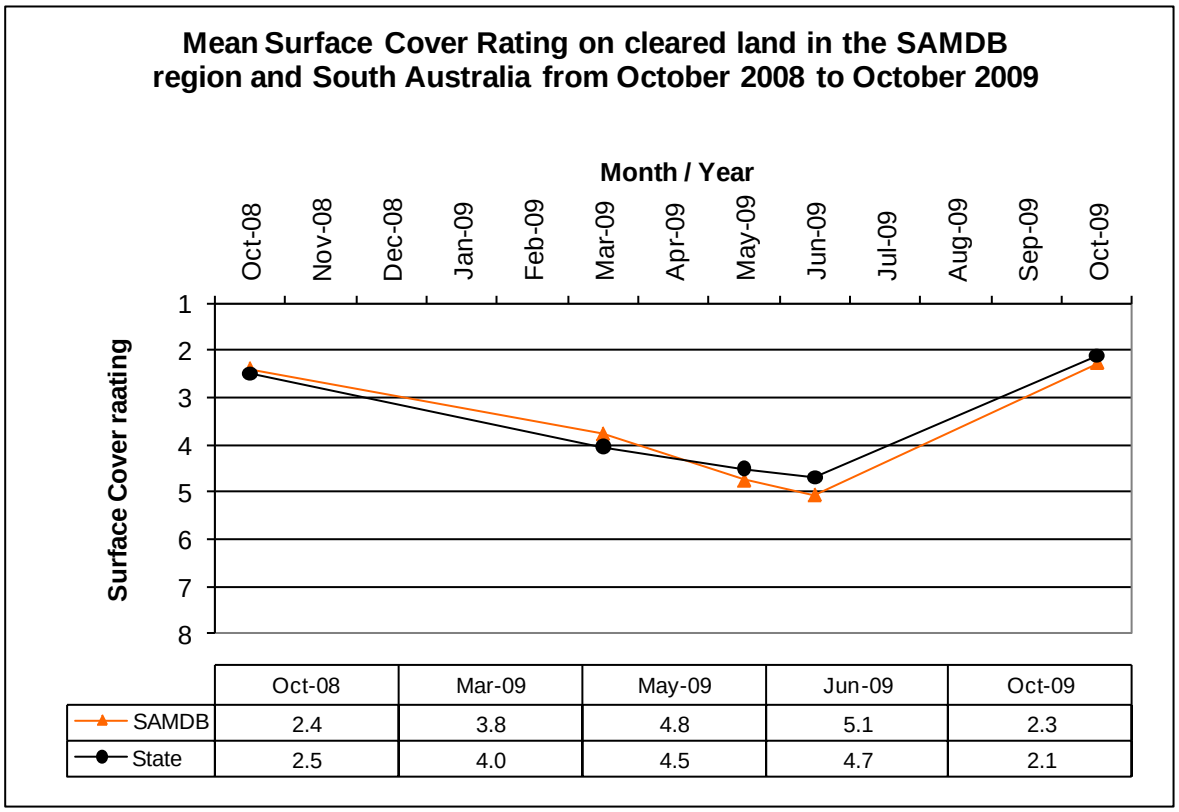
In the Renmark area, some land was cultivated in the summer months and these bare paddocks were at increased risk of wind erosion. Burning to control weeds and snails, and reduce stubble loads, was observed near the Mount Lofty Ranges in May. Sowing of crops before or soon after the opening rains in late April enabled crops to establish quickly while soil temperatures were still warm.

Relatively warmer temperatures in June encouraged good growth of crops and pastures, although some areas such as north of Cambrai between the Mount Lofty Ranges and the Murray River struggled because of low rainfall, resulting in poor emergence, moisture-stressed crops and low cover. Good growing conditions continued into July, although the low rainfall in the Northern Mallee led to late sown crops starting to fail in August with land becoming bare of cover.

Long dry spells in September affected crop growth before widespread rain fell later in the month. Crops died around Loxton and Renmark where the rain was too late to save them. In other parts of the region the good falls boosted crop and pasture growth.

Appendix 2 shows estimated pasture growth in kilograms per hectare per day for district councils within the SA Murray-Darling Basin region during the growing season. These estimates are derived using remote sensing of plant biomass combined with climate and soil data, and are available from the CSIRO's "Pastures From Space" program. The effect of the dry, warm conditions on plant growth in spring is evident in graphs from several district councils.

Figure 2:



	Oct-08	Mar-09	May-09	Jun-09	Oct-09
SAMDB	2.4	3.8	4.8	5.1	2.3
State	2.5	4.0	4.5	4.7	2.1

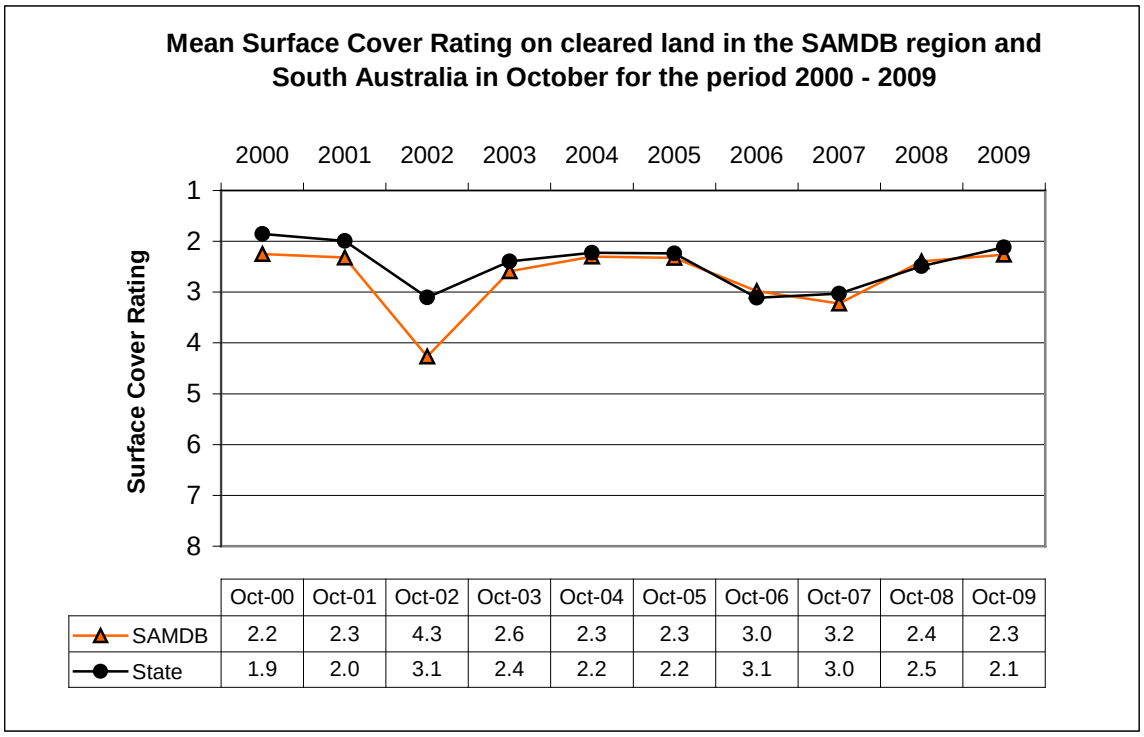
Note: Cover rating of 1 = full cover; 8 = bare

Figure 2 shows how surface cover ratings changed over the 13 months to October 2009. While surface cover levels did become quite low in June, crops and pastures germinated and grew quickly, and re-established cover.

Surface cover is usually at its maximum in October. Cover levels in spring decline over summer and into autumn as plant residues break down. Grazing reduces cover levels further. The average change in cover rating between October and March in the SA Murray-Darling Basin Region is 1.5 since monitoring began. If this change occurs this summer, the average cover rating in the region in March 2010 is likely to be around 3.8, less than the critical rating of 5.0, above which land is considered to be at risk of erosion.

The trend in soil surface cover levels in October since 2000 is shown in Figure 3. Surface cover in the SA Murray-Darling Basin Region in October this year is the same as in October 2008 and around the average rating for October of 2.7 since monitoring began. However, it is likely that cover levels are lower than this in parts of the region affected by poor growing season rainfall.

Figure 3:



	Oct-00	Oct-01	Oct-02	Oct-03	Oct-04	Oct-05	Oct-06	Oct-07	Oct-08	Oct-09
SAMDB	2.2	2.3	4.3	2.6	2.3	2.3	3.0	3.2	2.4	2.3
State	1.9	2.0	3.1	2.4	2.2	2.2	3.1	3.0	2.5	2.1

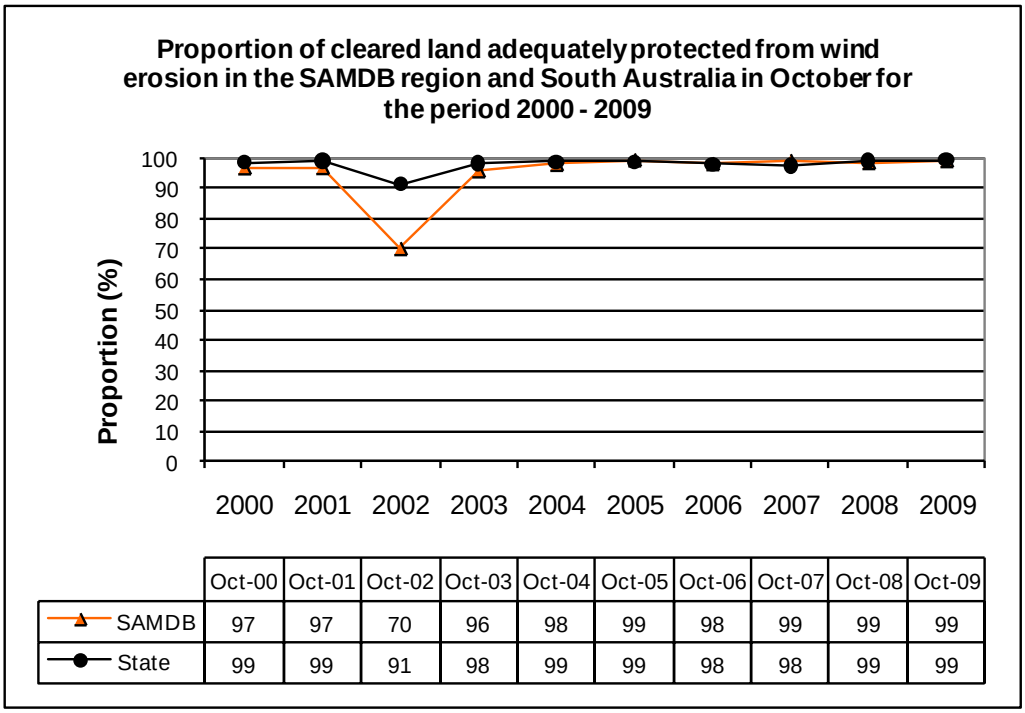
Note: Cover rating of 1 = full cover; 8 = bare

Protection of land from wind erosion

The area of cleared land inherently susceptible to wind erosion due to soil type, rainfall and topographic features (Class III_a, IV_a and V_a) is approximately 770,000 ha or 31% of cleared land in the SA Murray-Darling Basin Region (new regional boundaries as at July 2009). This is mainly found on the sandier soil types of the Murraylands.

In October 2009, 99% of the land was protected from wind erosion, which is the same as for October last year. The average proportion of land protected from wind erosion in October since monitoring began is 95%. The lowest proportion recorded was 70% in October 2002 (Figure 4).

Figure 4:



	Oct-00	Oct-01	Oct-02	Oct-03	Oct-04	Oct-05	Oct-06	Oct-07	Oct-08	Oct-09
SAMDB	97	97	70	96	98	99	98	99	99	99
State	99	99	91	98	99	99	98	98	99	99

Protection of land from water erosion

The area of cleared land inherently susceptible to water erosion due to soil type and topography (Class III_e, IV_e and V_e), is approximately 295,000 ha or 11% of cleared land in the SA Murray-Darling Basin Region. It mainly occurs on the eastern slopes of the Mount Lofty Ranges.

This land is mainly used for grazing and no land condition monitoring is undertaken in these areas.

Conclusions

Most of the region experienced reasonable growing conditions enabling crops and pastures to grow well. A dry spell in August checked growth, and where rainfall had been poor, some crops started to die off. An area of land from Karoonda to Loxton and Renmark received below average rainfall through most of the growing season and poor growth was evident in this part of the region.

Average surface cover levels in October in the region were equal to the mean for October for 2000 to 2009, and given the average rate of breakdown and losses over summer, are not expected to fall below the level regarded as adequate for erosion protection by March. The exception to this is land in the Karoonda–Loxton–Renmark area with low cover due to dry conditions this season.

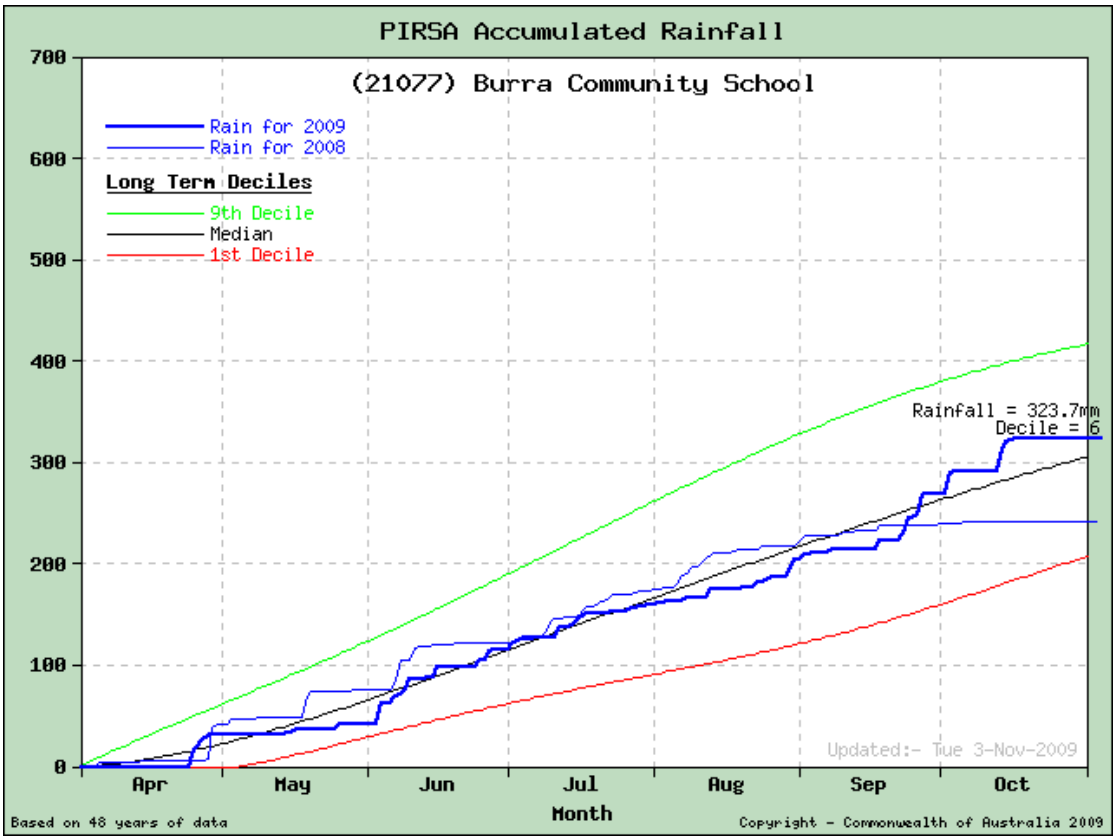
The proportion of land protected from wind erosion in October was at near maximum levels, which is to be expected in October when crops and pastures reach maturity.

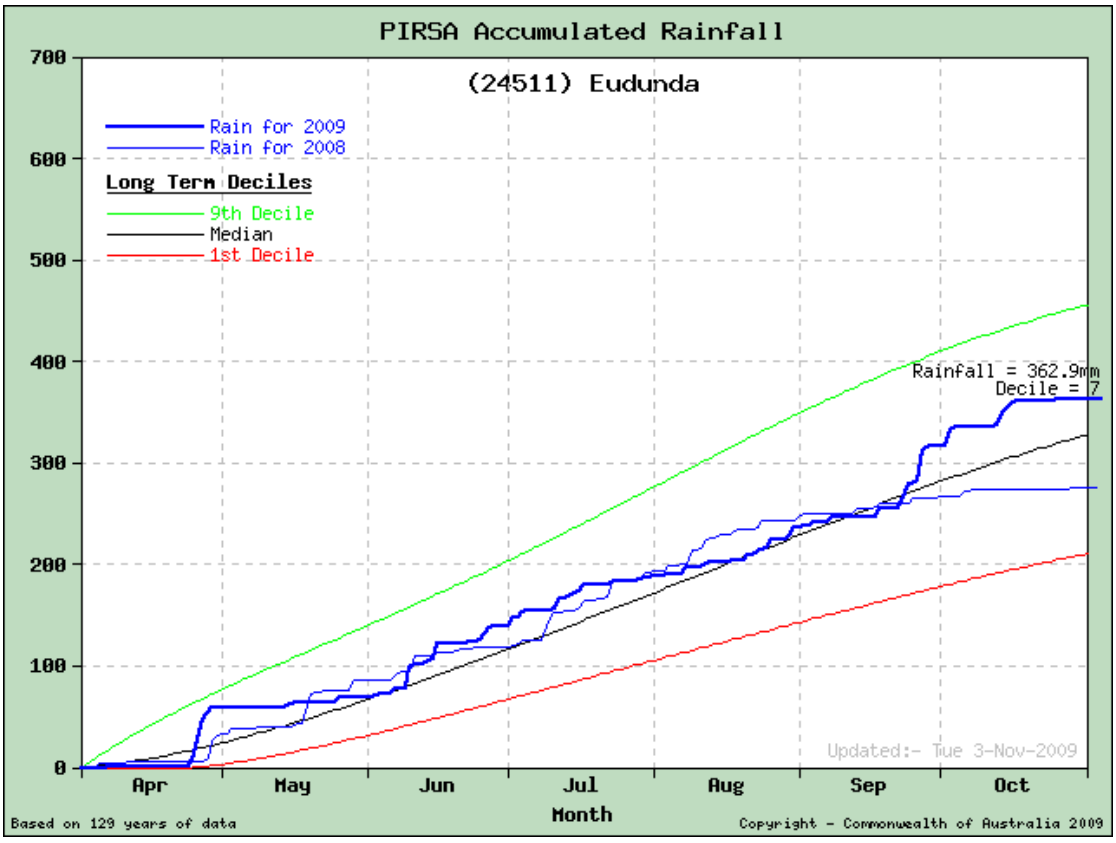
At this time of the year, the main erosion risk is usually associated with lack of surface cover as there is little soil disturbance due to tillage. However, tillage used for weed control over summer can significantly increase the risk of wind erosion for several months, as occurred on some paddocks in the Northern Mallee early in 2009.

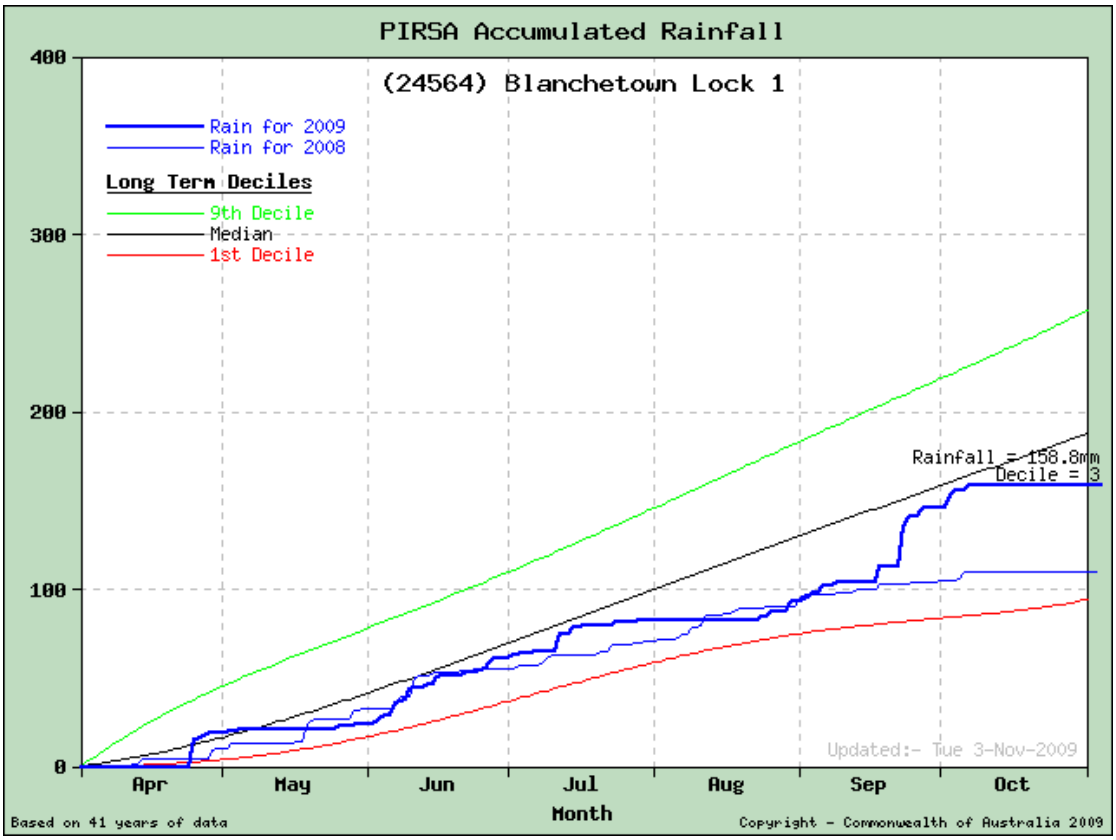
Producers' management of livestock grazing is critical in maintaining adequate levels of surface cover over summer and into autumn. Cultivating land as close as practical to, or at seeding time, will leave cover on the soil surface for a longer period of time. Summer rains can stimulate plant growth leading to better cover of the soil however soil moisture retention and weed control is achieved by killing off this growth. Using herbicides rather than tillage to do this will be better for retaining surface cover. Where summer plant growth is grazed, attention will still have to be paid to maintaining adequate surface cover.

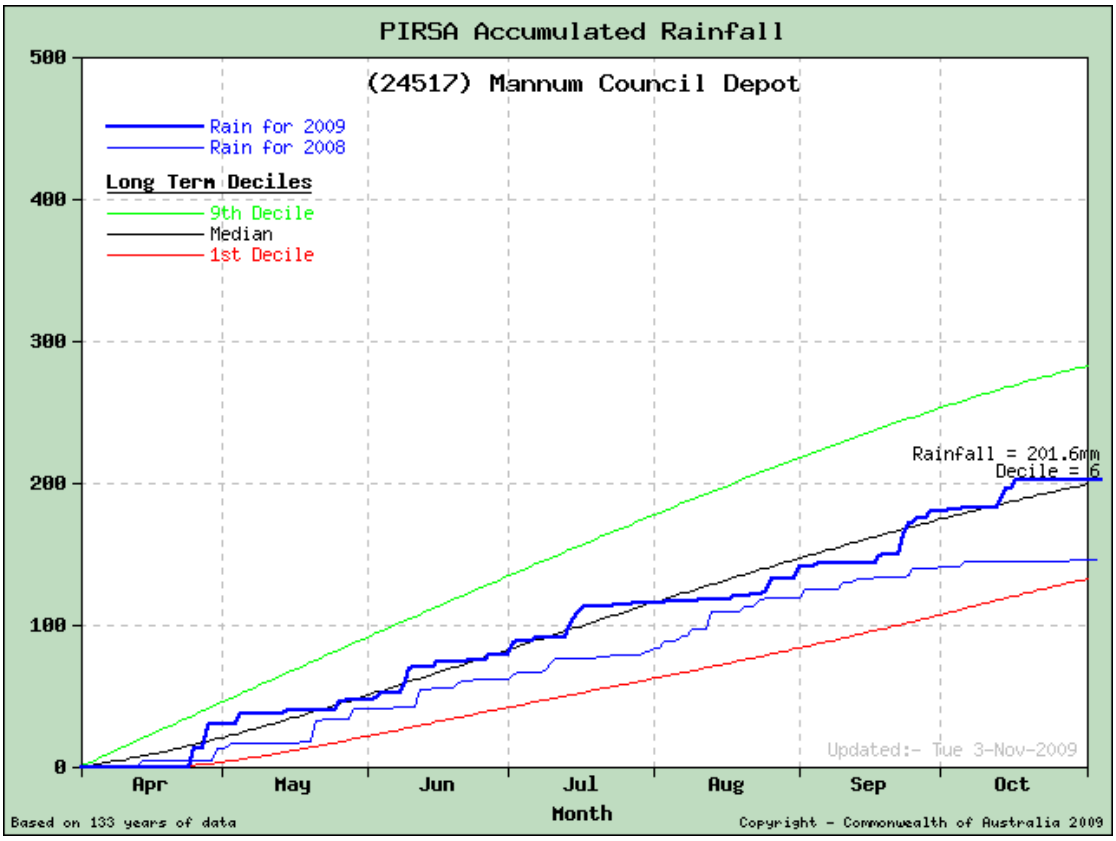
Appendix 1

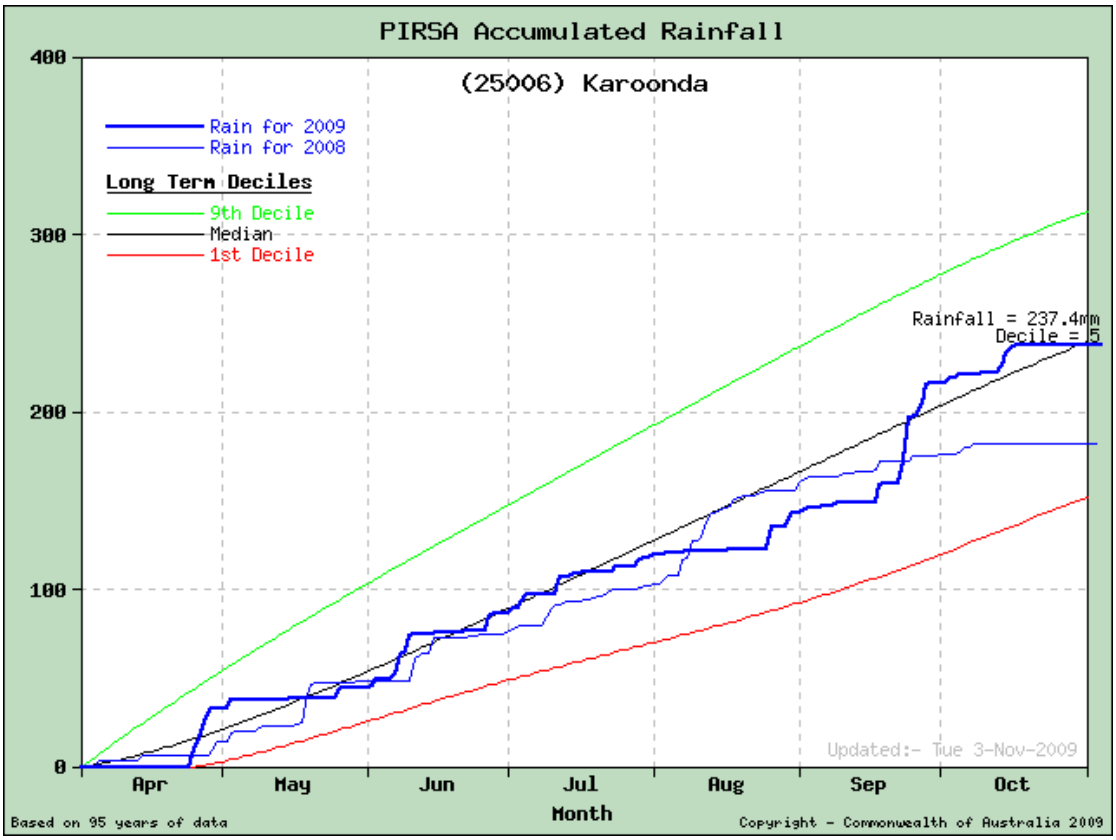
Cumulative rainfall data for selected sites across the South Australian Murray-Darling Basin Region

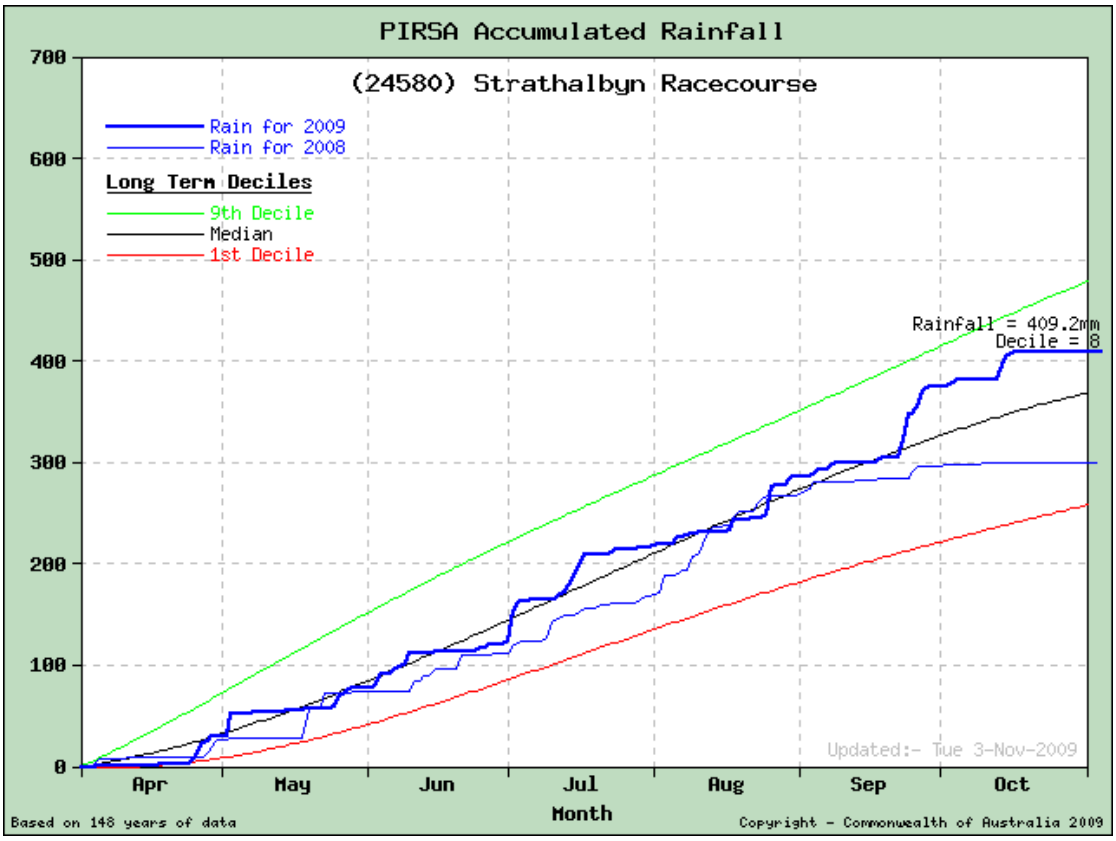


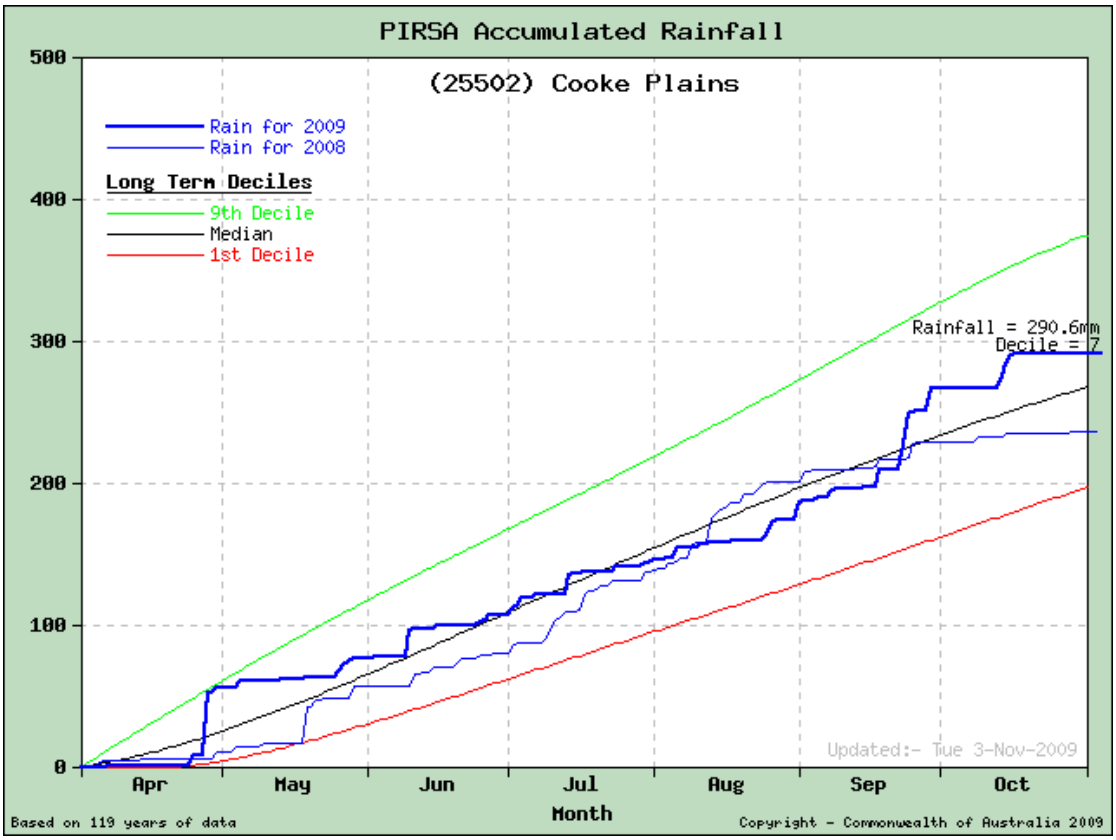


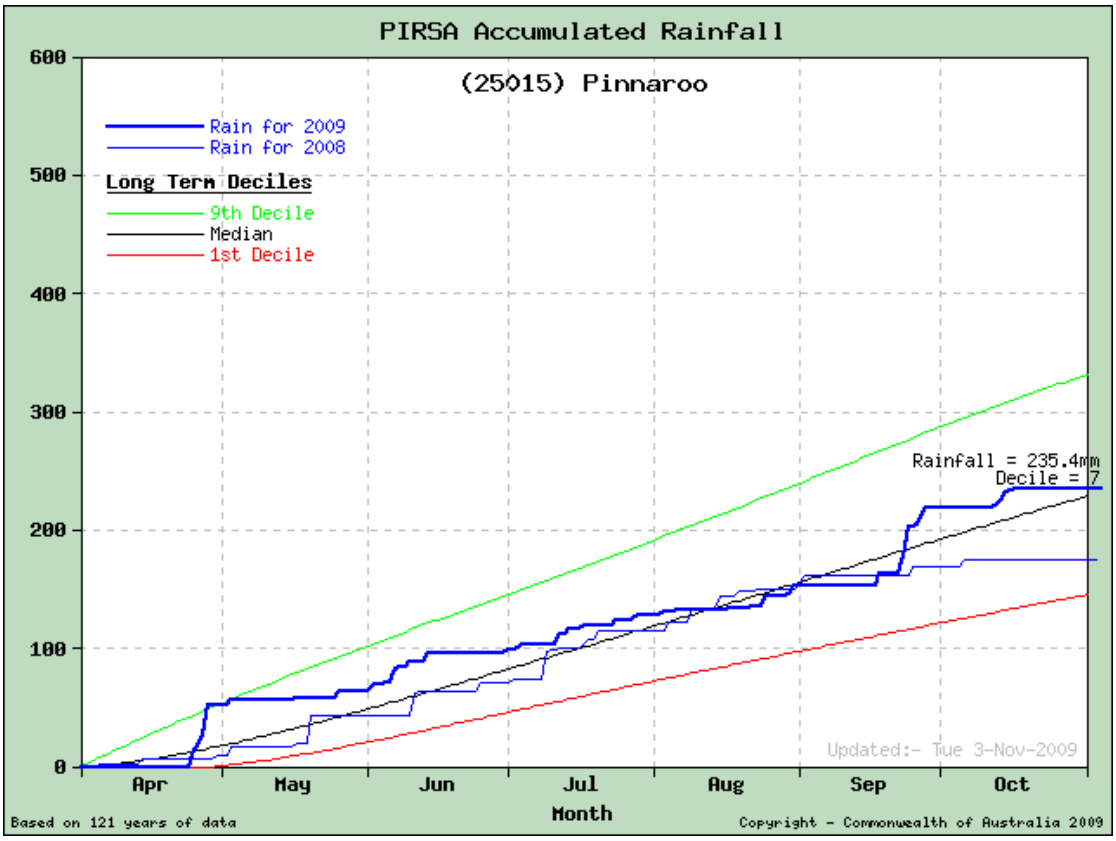

PIRSA Accumulated Rainfall
(24564) Blanchetown Lock 1
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 158.8mm
Decile = 3
Updated:- Tue 3-Nov-2009
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 41 years of data
Copyright - Commonwealth of Australia 2009

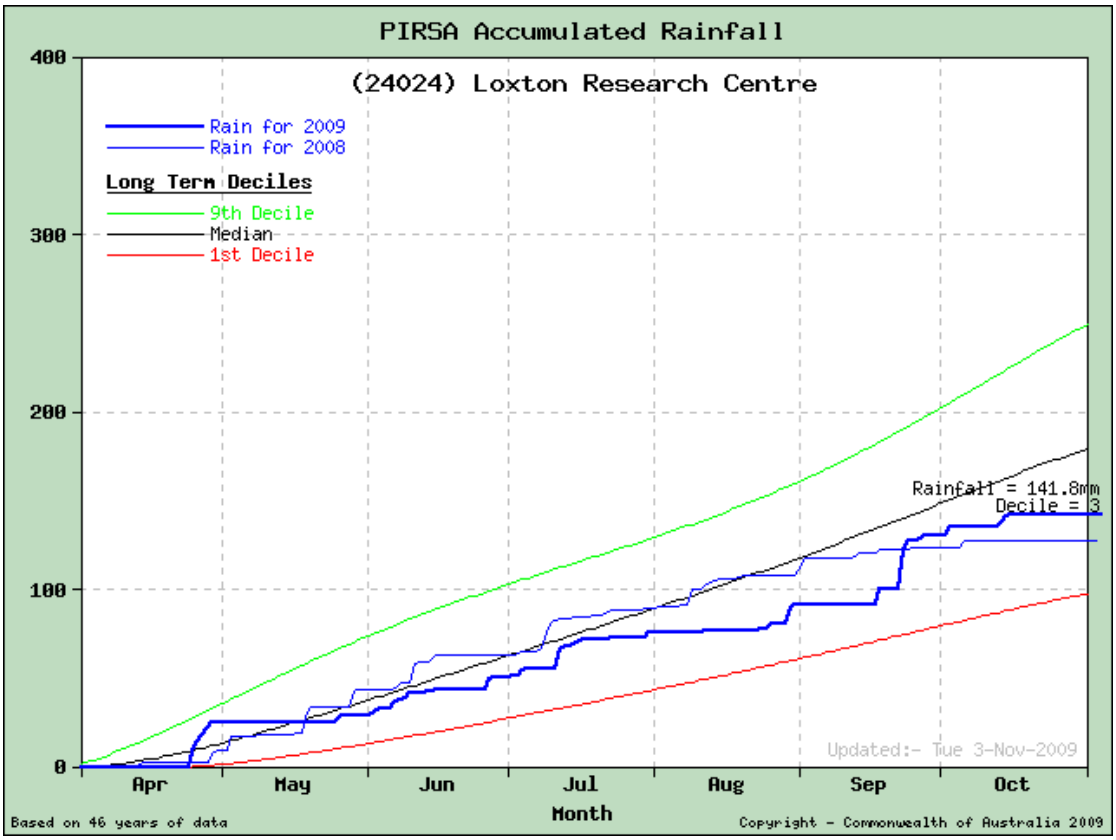

PIRSA Accumulated Rainfall
(24517) Mannum Council Depot
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 201.6mm
Decile = 6
Updated:- Tue 3-Nov-2009
500
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 133 years of data
Copyright - Commonwealth of Australia 2009


PIRSA Accumulated Rainfall
(25006) Karoonda
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 237.4mm
Decile = 5
Updated:- Tue 3-Nov-2009
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 95 years of data
Copyright - Commonwealth of Australia 2009


PIRSA Accumulated Rainfall
(24580) Strathalbyn Racecourse
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 409.2mm
Decile = 8
Updated:- Tue 3-Nov-2009
700
600
500
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 148 years of data
Copyright - Commonwealth of Australia 2009

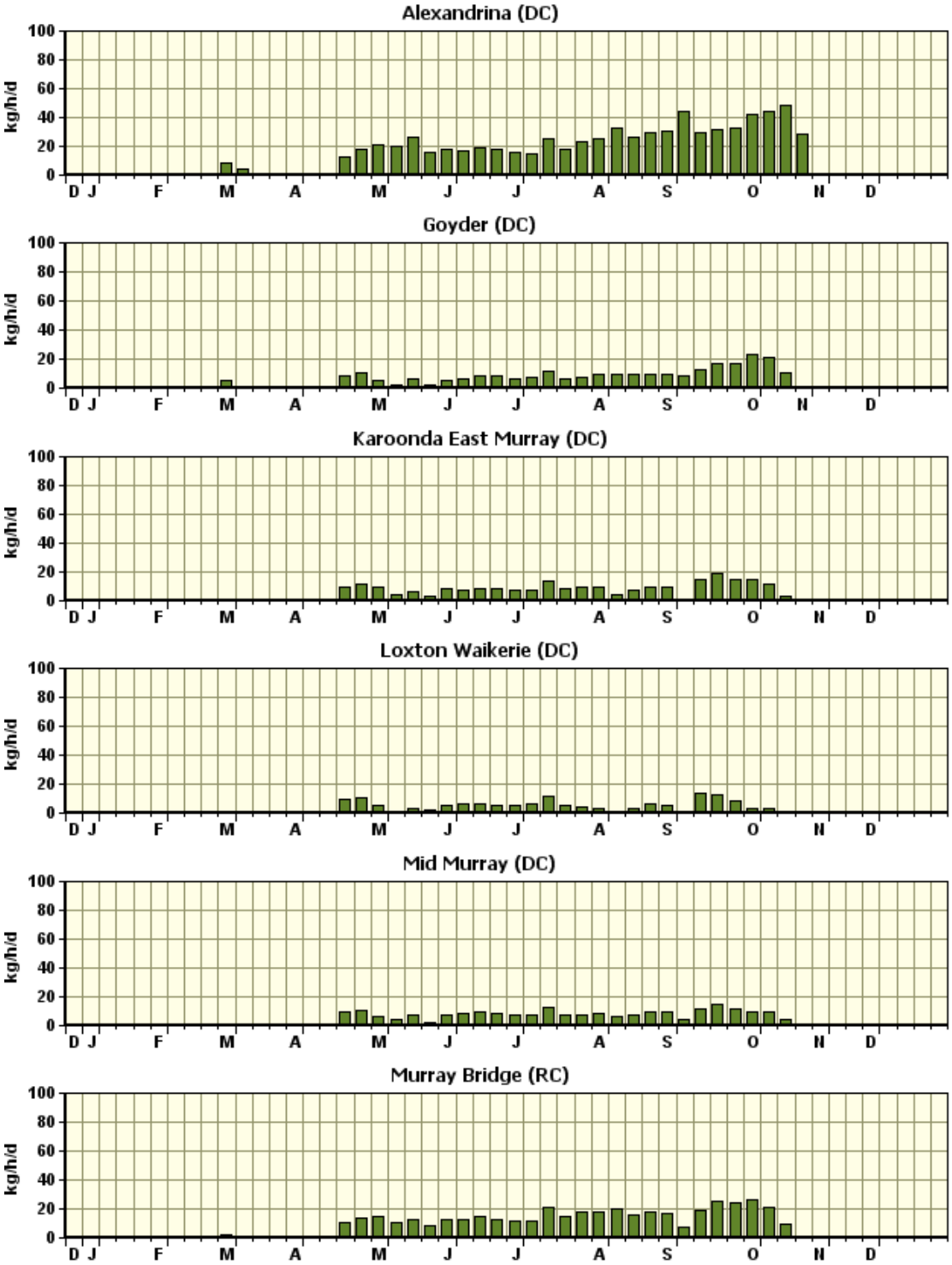

PIRSA Accumulated Rainfall
(25502) Cooke Plains
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 290.6mm
Decile = 7
Updated:- Tue 3-Nov-2009
500
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 119 years of data
Copyright - Commonwealth of Australia 2009

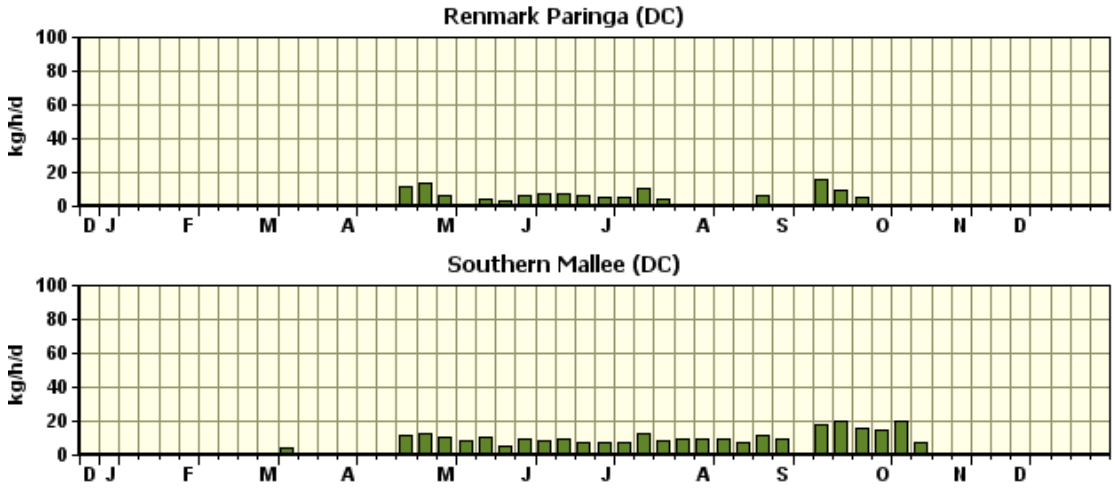

PIRSA Accumulated Rainfall
(25015) Pinnaroo
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
Rainfall = 235.4mm
Decile = 7
Updated:- Tue 3-Nov-2009
600
500
400
300
200
100
0
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 121 years of data
Copyright - Commonwealth of Australia 2009


PIRSA Accumulated Rainfall
(24024) Loxton Research Centre
Rain for 2009
Rain for 2008
Long Term Deciles
9th Decile
Median
1st Decile
400
300
200
100
0
Rainfall = 141.8mm
Decile = 3
Updated:- Tue 3-Nov-2009
Apr
May
Jun
Jul
Aug
Sep
Oct
Month
Based on 46 years of data
Copyright - Commonwealth of Australia 2009

Appendix 2

Estimated Pasture Growth Rates (kg/ha/day) during growing season for district council areas within the SAMDB Region, 2009.
CSIRO Pastures from Space Program (www.pasturesfromspace.csiro.au)




Renmark Paringa (DC)
kg/h/d
100
80
60
40
20
0
D J F M A M J J A S O N D
Southern Mallee (DC)
kg/h/d
100
80
60
40
20
0
D J F M A M J J A S O N D