



# Protection of agricultural land against erosion in the Northern and Yorke Region

## Seasonal Report November 2009

Issued by:

Department of Water, Land and Biodiversity Conservation

### Summary

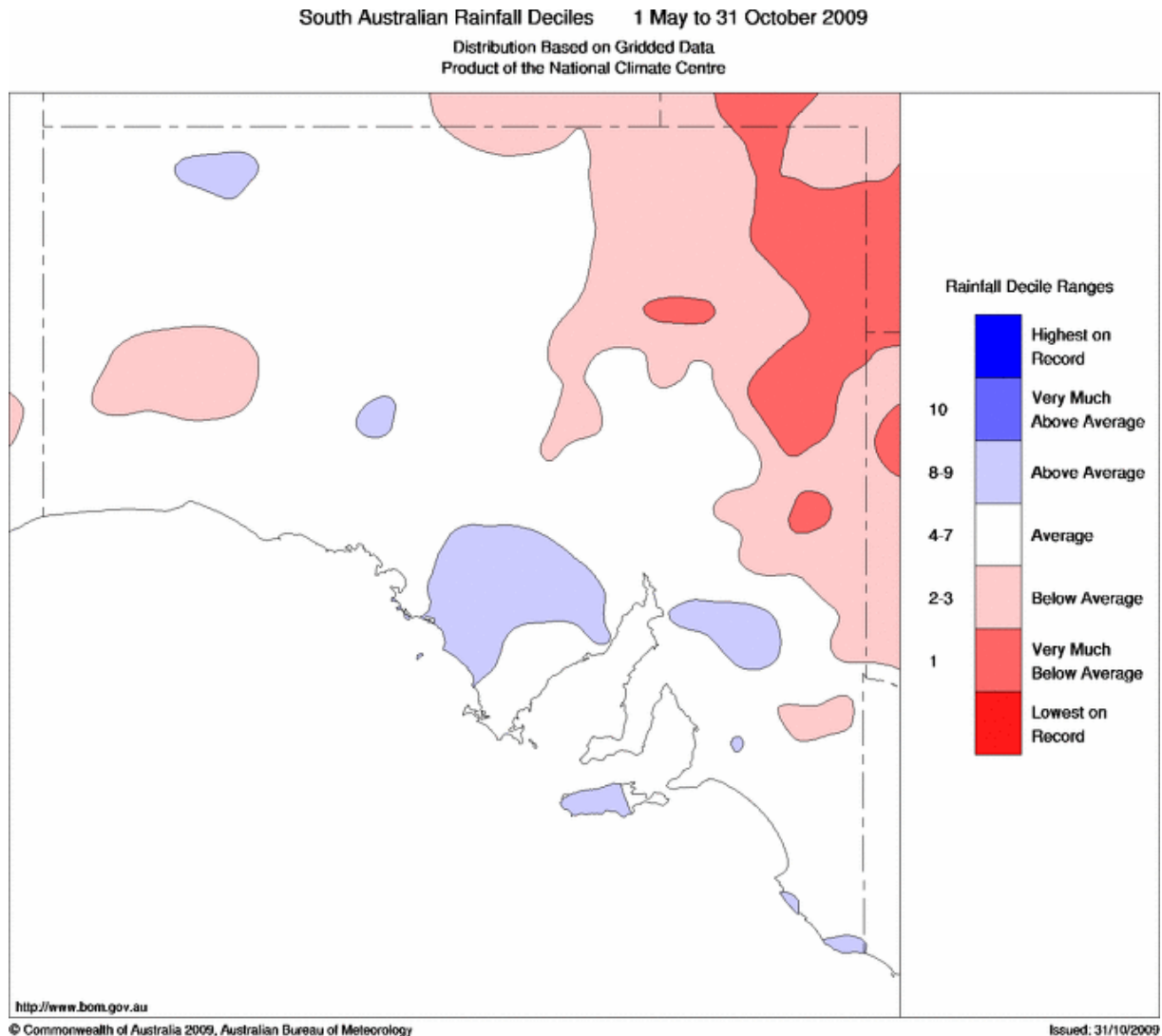
- Conditions for the growth of crops and pastures varied through the season but spring rains revived or boosted most crops and pastures providing sufficient soil surface cover leading into summer.
- Surface cover levels in October were equal to the mean for October for 2000 to 2009.
- Given the average rate of surface cover breakdown and losses over summer in the region, cover levels are not expected to fall below the level regarded as adequate for erosion protection by March 2010.
- The proportions of land protected from wind erosion and water erosion are at 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 Northern and Yorke Region had average rainfall during the growing season this year with an area bounded approximately by Port Pirie, Terowie, Burra and Gulnare receiving above average rainfall (Figure 1).

Rain at the end of April triggered the start of the growing season with falls of over 25 mm across most of the cropping land. Slightly below to below average falls were recorded in the Upper North, Lower North and Northern Yorke Peninsula during May, with the rest of Yorke Peninsula receiving around average rainfalls. Most of the region recorded rain in the decile 7 to 10 range in June. Rainfall in July tended to be lighter over a higher than average number of days with most locations reporting average to well above average recordings for the month. Soils in some of the Lower North became saturated and run-off was generated in a number of catchments.

Figure 1:



Temperatures warmed significantly in August with warm to hot windy weather occurring mid month. The dry, warm conditions continued into early to mid September before widespread rain fell from mid September into October. The warm windy weather raised dust on several days although no erosion was evident on agricultural land. Many locations recorded decile 10 rainfalls in September, particularly around Crystal Brook, Gladstone, Jamestown and Hallett.

Cumulative growing season rainfall data for selected sites across the Northern and Yorke Region are shown in Appendix 1. These demonstrate the significance of the rain in September, lifting many sites from average to well above average rainfall for the growing season.

### Soil surface cover levels

The Department of Water, Land and Biodiversity Conservation conducts a Land Condition Monitoring Program that 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.

Prior to rainfall at the end of April, many farmers had commenced sowing crops into dry soil. Burning of crop and pasture residues was noted in the Lower North and Yorke Peninsula areas. These practices loosened the soil surface and removed protective soil surface cover, increasing the risk of erosion.

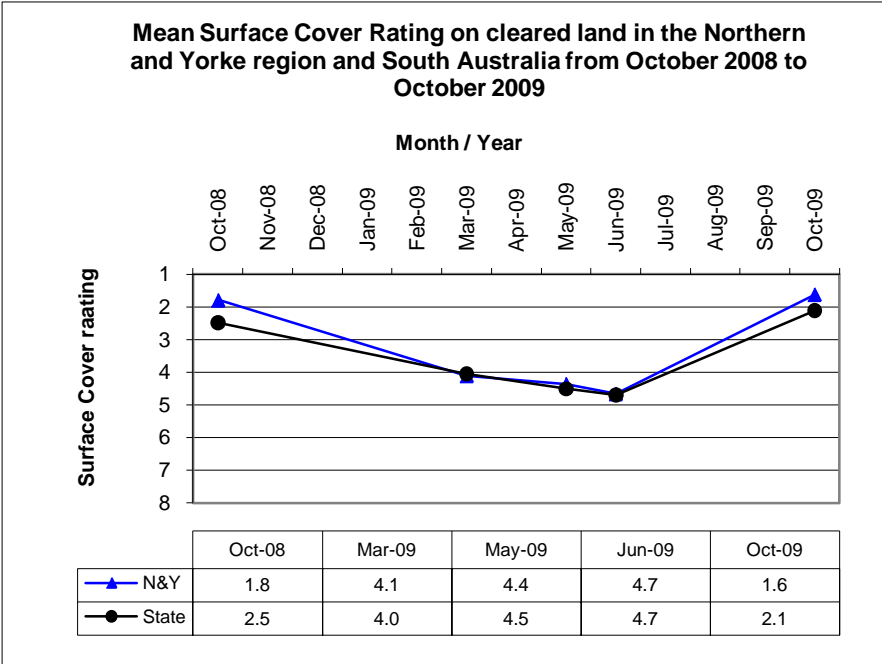
After the opening rains, there was reasonable plant germination and establishment but growth was slowed in later sown areas during June.

Drier conditions combined with warm, windy weather adversely affected crop and pasture growth in August and the early half of September, particularly in the northern parts of the region. Crops were observed to be dying off south of Port Pirie, along the coastal plains from Port Germein to Mambray Creek, and in the northern most cropping land from Wilmington across to Peterborough. Crops that had not senesced were revived by the rain in September and October.

Appendix 2 shows estimated pasture growth in kilograms per hectare per day for district councils within the Northern and Yorke 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 is evident in graphs from several district councils, particularly the northern and coastal ones.

Figure 2 shows how surface cover ratings changed over the 13 months to October 2009. Surface cover levels approached the critical rating of 5 in June (a rating higher than 5 is regarded as being inadequate for erosion protection) however after crops and pastures germinated and grew, cover was re-established.

Figure 2:

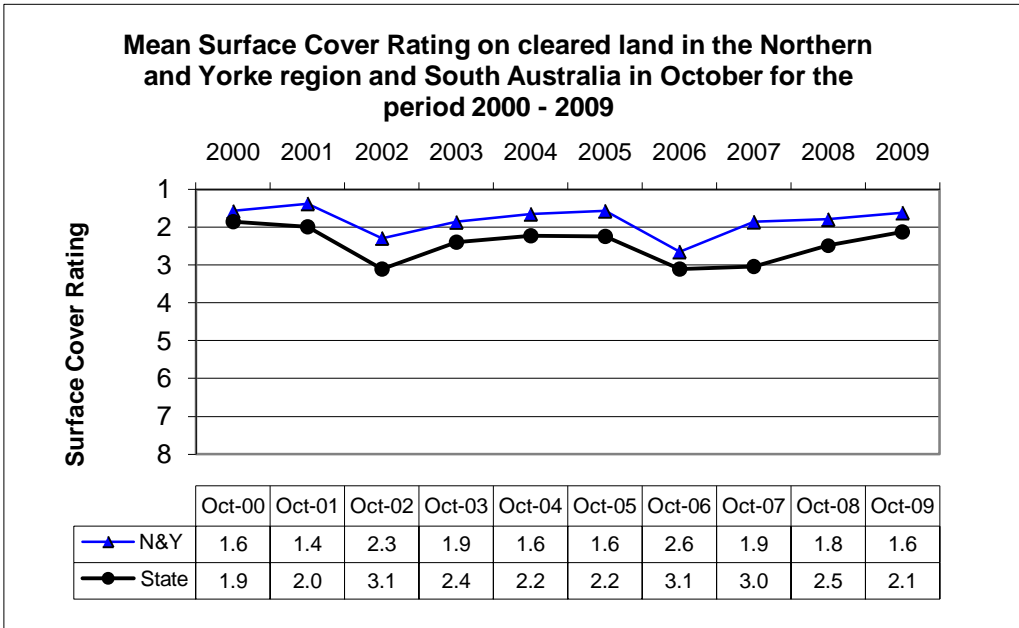


Note: Cover rating of 1 = full cover; 8 = bare

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 Surface Cover Rating between October and March in the Northern and Yorke Region since monitoring began is 2.3. If this change occurs over this summer, the average cover rating in the region in March 2010 is likely to be around 3.9, 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 the Northern and Yorke Region in October since 2000 is shown in Figure 3. Surface cover in October this year was the same as in October 2008 and around the average rating of 1.8 since monitoring began.

Figure 3:



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<sub>a</sub>, IV<sub>a</sub> and V<sub>a</sub>) is approximately 221,000 ha or 11% of cleared land in the Northern and Yorke NRM Region (new regional boundaries as at July 2009). This is mainly found on the sandier soil types on the plains west of the Barunga and Southern Flinders Ranges, Yorke Peninsula and the dune-swale systems in the Balaklava–Avon–Port Wakefield area.

The proportion of land protected from wind erosion in October 2009 was 100% (Table 1).

**Table 1: Proportion of cleared land (%) protected from wind erosion in October in the Northern and Yorke Region and South Australia for the period 2000 – 2009**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
N&Y	99	100	99	100	100	100	99	100	100	100
State	99	99	91	98	99	99	98	98	99	99

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At this time of the year, the main erosion risk is associated with lack of surface cover as there is little soil disturbance due to tillage.

## Protection of land from water erosion

The area of cleared land inherently susceptible to water erosion due to soil type and topography (Class III<sub>e</sub>, IV<sub>e</sub> and V<sub>e</sub>), is approximately 603,000 ha or 29% of cleared land in the Northern and Yorke NRM Region (new regional boundaries as at July 2009). It mainly occurs on the slopes of the Southern Flinders, Northern Mount Lofty, Barunga and Hummock Ranges.

The proportion of land protected from water erosion in October was 100%, which was equal to the average of 99% for the period 2000 to 2009 (Table 2).

**Table 2: Proportion of cleared land (%) protected from water erosion in October in the Northern and Yorke Region and South Australia for the period 2000 – 2009**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
N&Y	99	100	97	99	100	99	98	99	100	100
State	100	100	99	100	100	100	99	100	100	100

## Conclusions

A favourable start to the season was checked by dry, warm conditions from mid August to mid September. Good rains later in September and into October revived or boosted most crops and pastures providing sufficient soil surface cover heading into summer.

Surface cover levels in October 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 proportions of land protected from wind erosion and water erosion are at 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 associated with lack of surface cover as there is little soil disturbance due to tillage.

Soil surface cover levels will decline as the plant residues break down naturally and are grazed. Tillage can also reduce cover levels as most tillage implements tend to break up and / or bury plant residues. In the Northern and Yorke region, the change in cover levels between October and March, on average, is greater than for other regions in the State.

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.

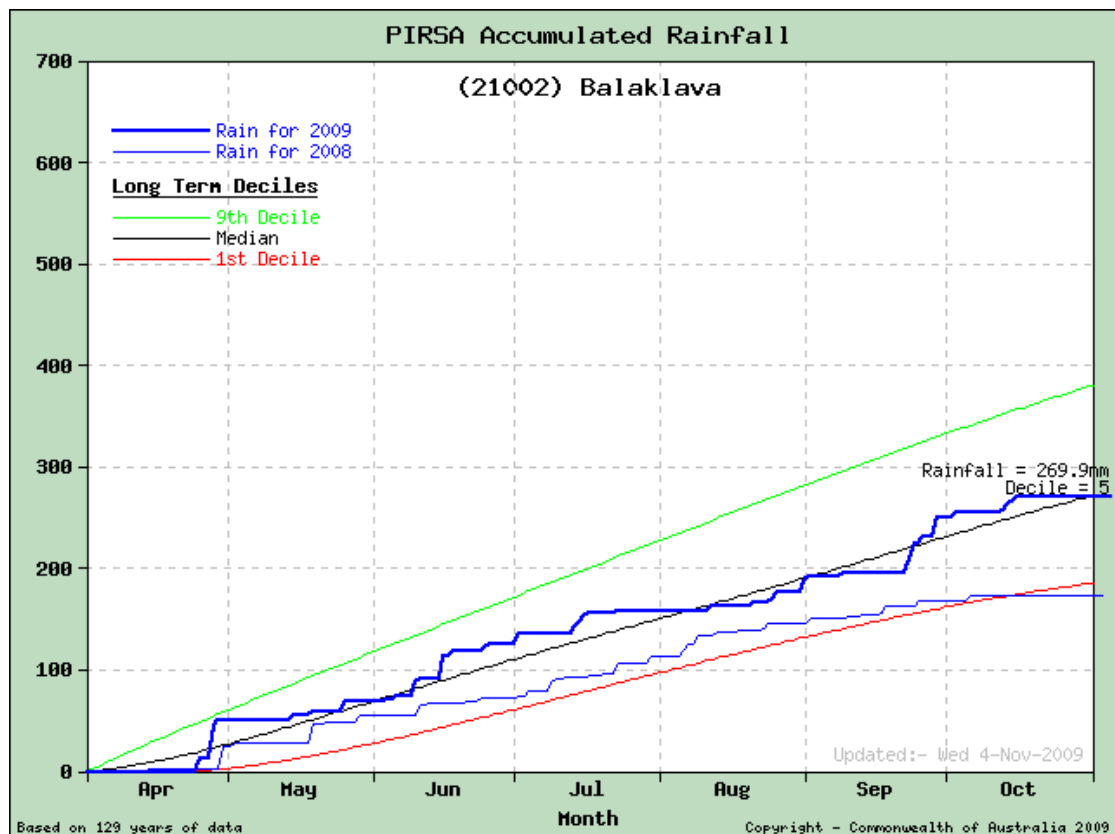
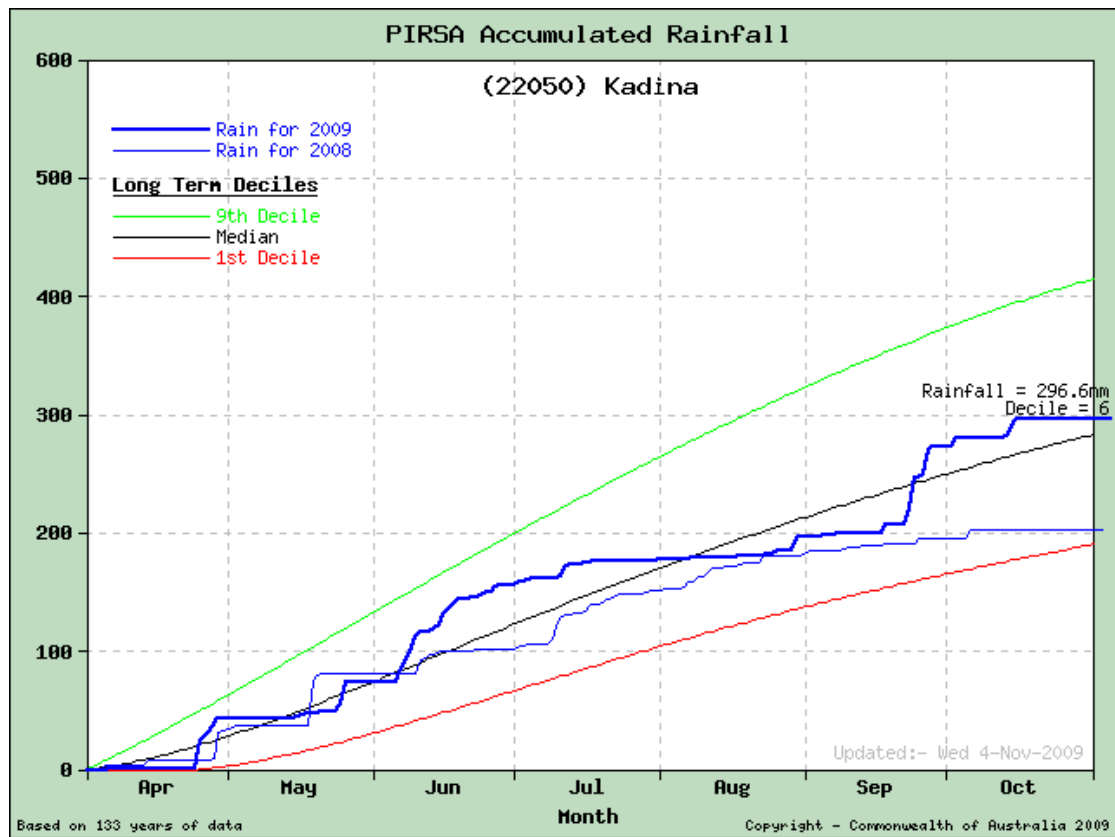
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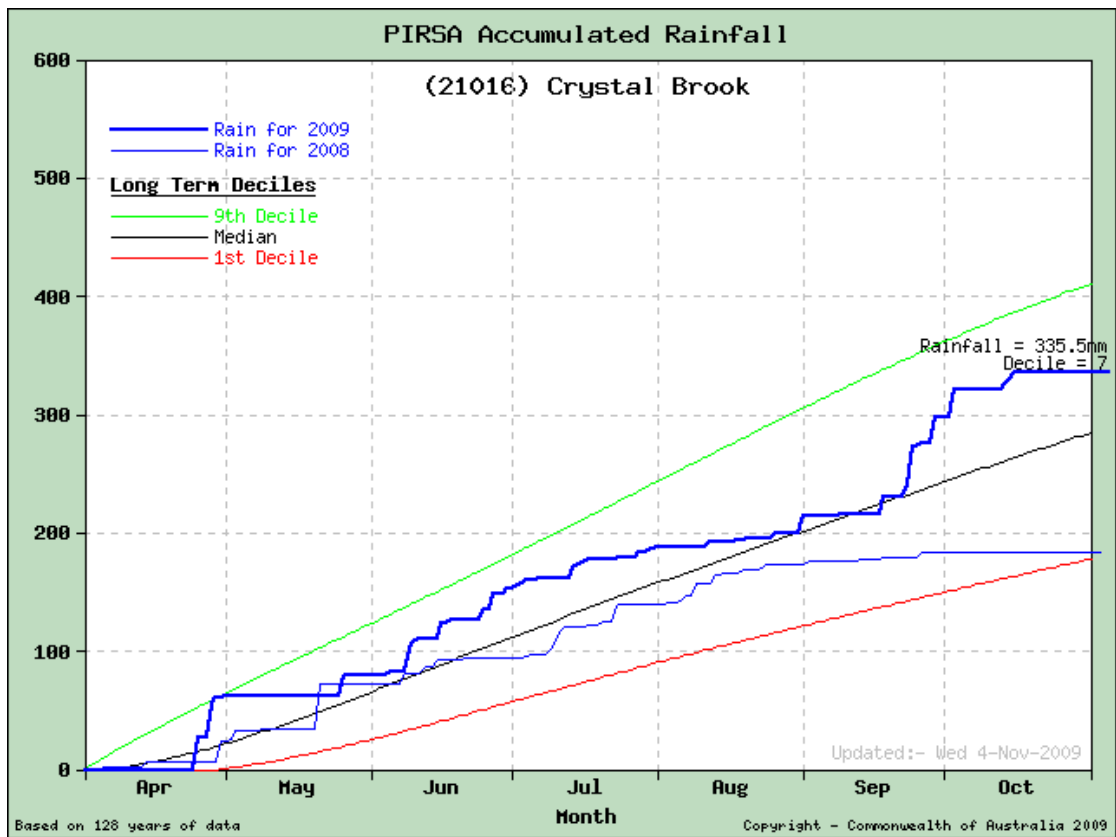
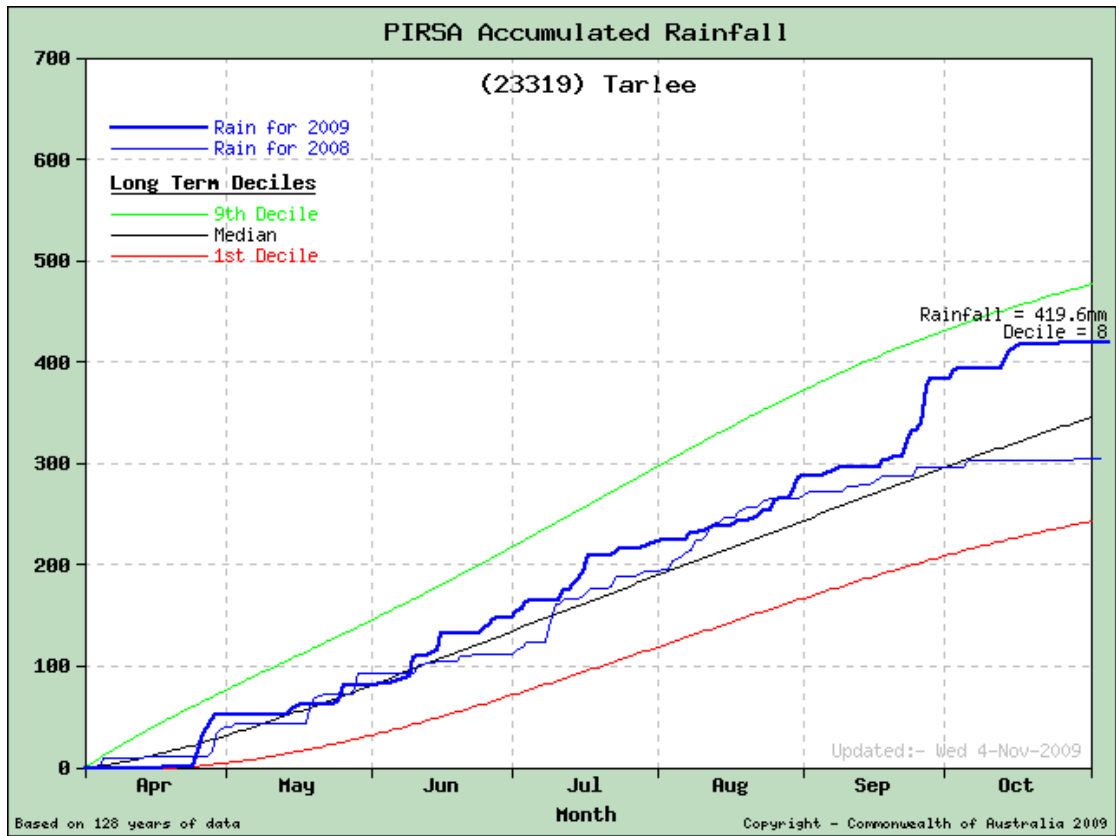
Where summer plant growth is grazed, attention will still have to be paid to maintaining adequate surface cover.

Appendix 1

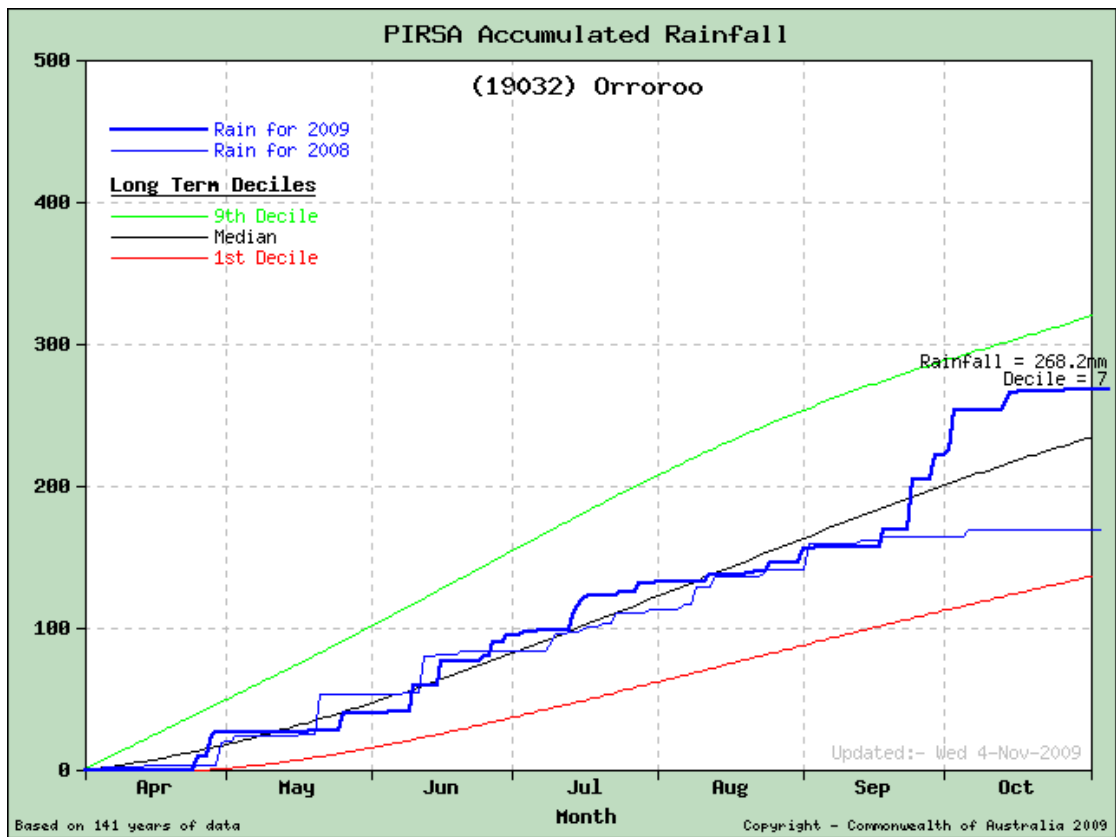
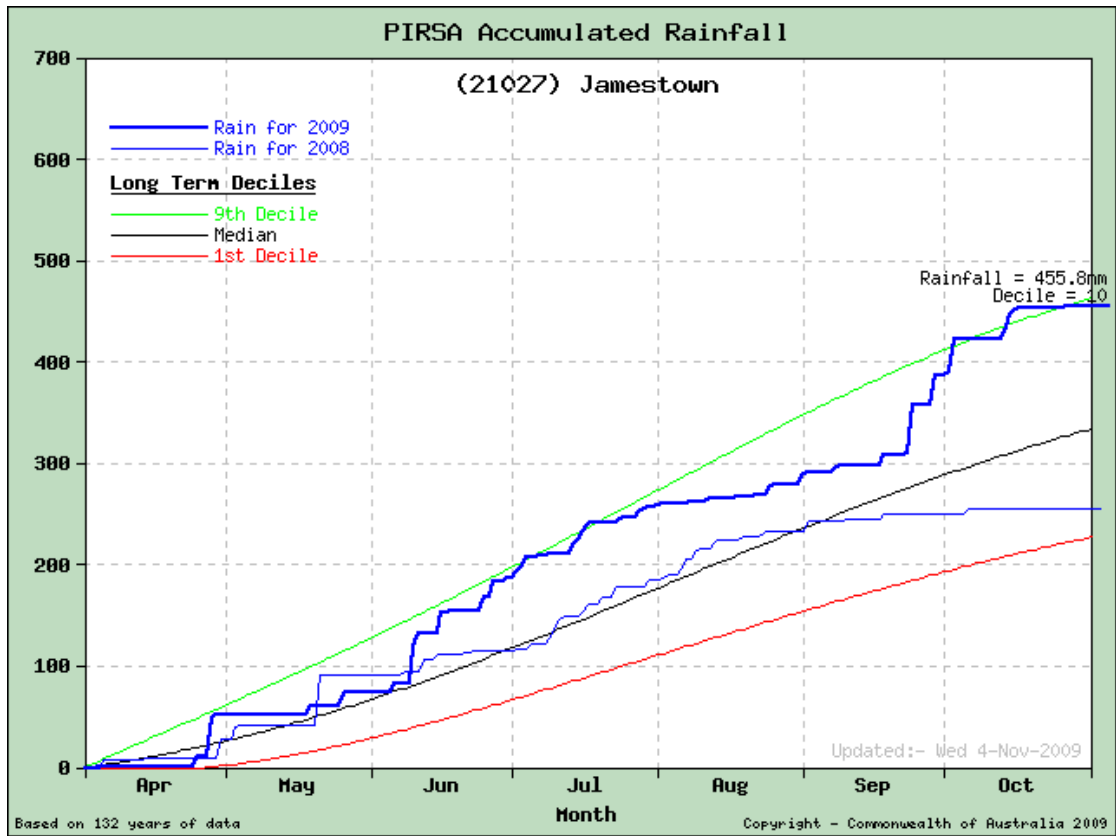
Cumulative rainfall data for selected sites across the Northern and Yorke Region

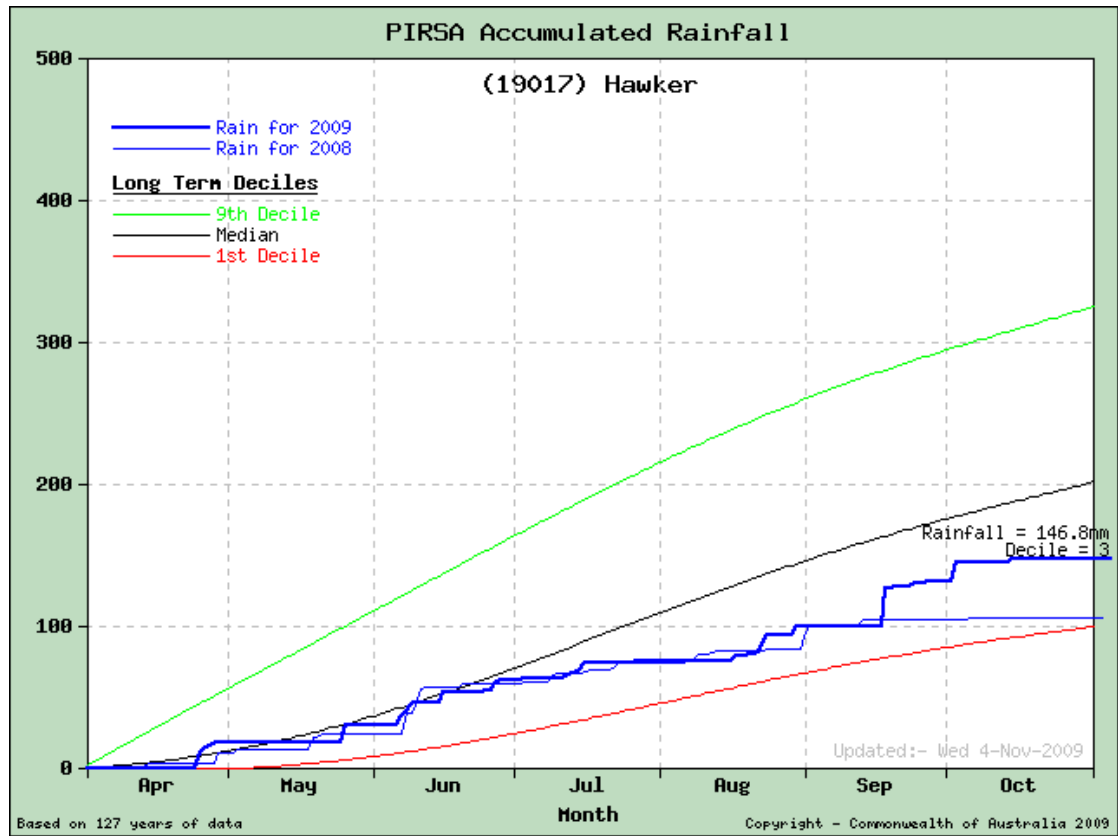
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## Appendix 2

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

