



Protection of agricultural land against erosion in the Eyre Peninsula Region

Seasonal Report April 2011

Issued by:

Department of Environment and Natural Resources (DENR)

1st May 2011

DENR conducts observational field surveys to monitor trends in the protection of soil from the risk of erosion in the state's agricultural cropping regions. The surveys are undertaken in October, March, May and June each year. Seasonal erosion protection reports are produced twice yearly, following the October and March surveys.

The reports provide a summary of ground cover and soil protection levels in relation to seasonal conditions and land management activities undertaken in recent months, including comparison with the same period in previous years that monitoring was undertaken. They also indicate likely trends in ground cover levels over coming months based on previous years' data.

Summary

- Rainfall recordings across the region for the 6 months from October 2010 to March 2011 were in the highest 10% of all recordings (Decile 10) for that period.
- Good growing conditions which persisted into late spring in 2010 resulted in a large amount of annual crop and pasture biomass production.
- A number of rainfall events over late spring, summer and early autumn boosted growth of summer weeds, perennial plants and volunteer crop plants.
- While some cultivation was undertaken to control weeds, herbicides were more widely used which provided better protection against erosion.
- The proportion of land protected from wind erosion in March is greater than average for this period, due to the greater amounts of surface cover. The proportion of land protected from water erosion remains close to 100%.

Seasonal Conditions

Although October was generally dry, two rainfall events resulted in above average falls for the month with Streaky Bay and Cleve both recording 84mm for the month. Several locations, including Cleve, Elliston, Minnipa, Wharminda and Streaky Bay recorded monthly totals that were in the Decile 10 range. Whyalla Aerodrome recorded its highest ever October rainfall.

More scattered showers fell across the region in November with falls of over 25 mm recorded over a few days towards the end of the month. Rainfall was highly variable with central and western Eyre Peninsula receiving below average falls for the month (Decile 2 & 3) while lower and eastern parts had above average falls. Arno Bay, Mount Cooper and Wharminda recorded Decile 10 observations for the month.

Above average rainfall was observed in December, beginning with scattered showers at the start of the month and some storms later. Arno Bay and Mount Cooper again recorded Decile 10 falls, along with Mt Hope.

January was comparatively dry with few places recording more than 7 mm for the month. However, February saw significant rainfall events around the middle of the month with several locations recording more than 50 mm of rain. Nearly all Bureau of Meteorology sites recorded Decile 10 monthly totals. The highest falls tended to be in the eastern areas with Tumby Bay receiving 115 mm, Kimba 90 mm and Whyalla Aerodrome 92 mm. Water erosion was noted on small areas in the Cleve Hills and near Ungarra.

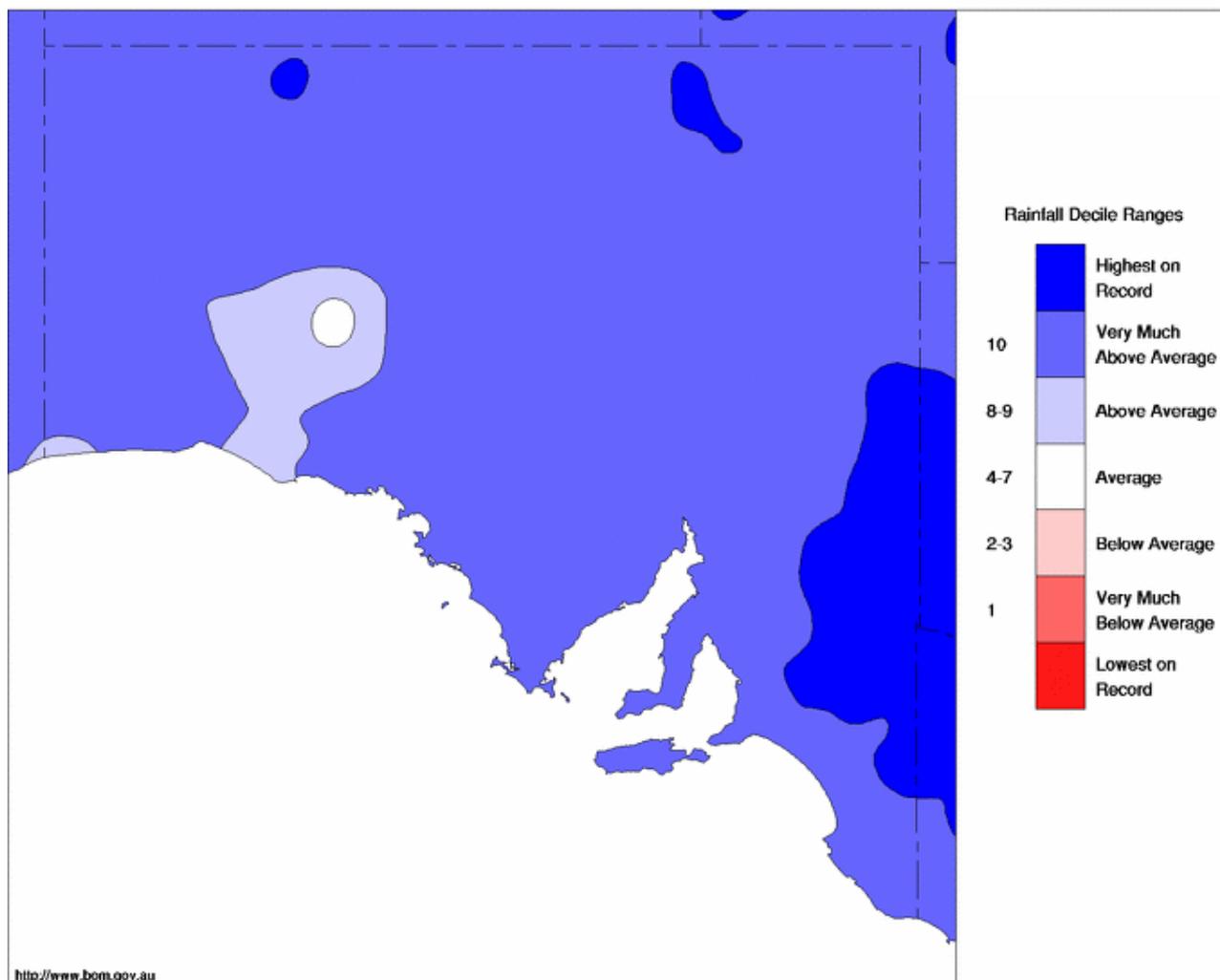
The above average rain continued in March with several centres across the region recording Decile 10 falls. Mount Cooper continued its run of wet conditions with a 5th month of Decile 10 rain in the 6 month period from October to March, recording 94 mm for the month. Smoky Bay (82 mm) and Poochera (81 mm) also received falls well above average.

The extraordinary rainfall over the October to March period is depicted in the figure from the Australian Bureau of Meteorology showing rainfall deciles (Figure 1).

Figure 1

South Australian Rainfall Deciles 1 October 2010 to 31 March 2011

Distribution Based on Gridded Data
Product of the National Climate Centre



<http://www.bom.gov.au>

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Issued: 01/04/2011

Soil surface cover levels

Very good growing conditions produced an abundance of crop and pasture growth resulting in high levels of surface cover. Less growth was cut for hay this year compared to previous years, resulting in more biomass being left in paddocks. Some paddocks were spray-topped in spring to reduce seed set and their rapid senescence reduced soil cover levels to some extent. The season was prolonged by wet conditions and moist subsoils in October and November and feed for livestock outstripped demand.

The rain in late spring and early summer generated a significant growth of summer weeds and volunteer crop plants but this dried off late in January. Herbicides had also been used to kill off the summer growth in order to conserve soil moisture. The surface cover in grain legume stubbles diminished quickly but high amounts of biomass were still present in cereal stubbles.

The February and March rains germinated or maintained the growth of weeds and volunteer crops, and with crop and pasture residues, helped to maintain or slow down the

loss of surface cover. Spraying of herbicides to control the new growth continued and there was some cultivation of land in the Cleve Hills and Franklin Harbour areas following rainfall events.

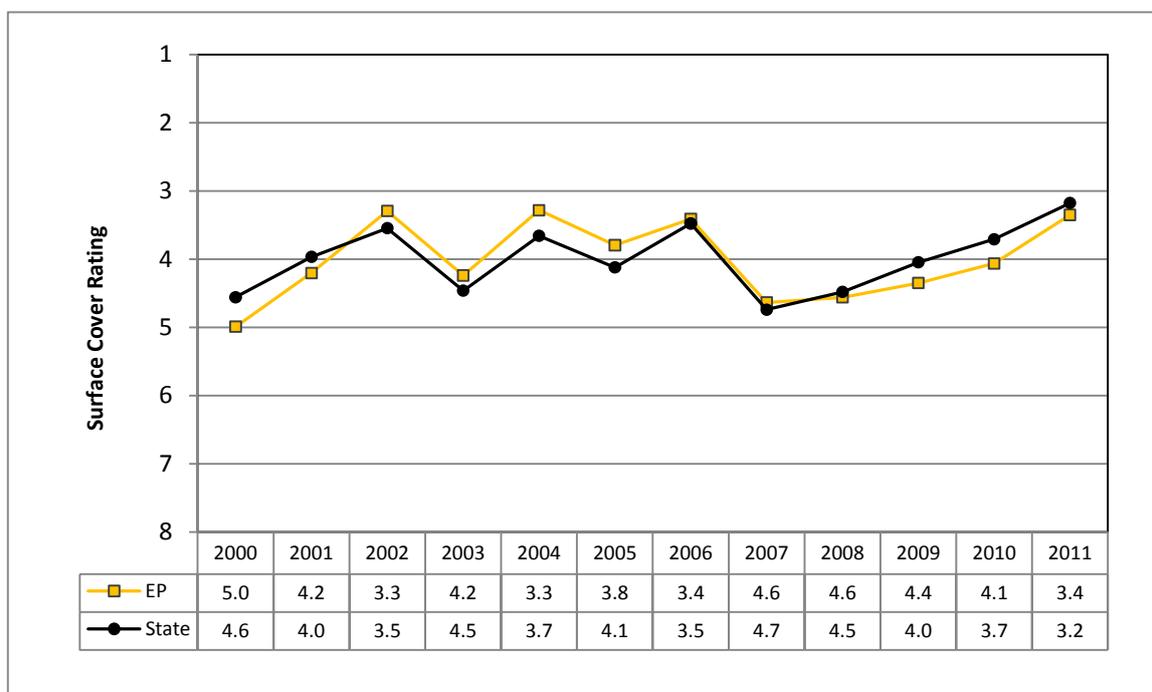
In the DENR erosion protection field surveys, surface cover levels and soil disturbance are visually rated. The surface cover rating system used is based on a scale of 1-8 where 1 = full cover and 8 = bare ground.

Assessments in October 2010 showed that surface cover levels then were better than the average October level observed over the monitoring period of 12 years.

Crop and pasture residues break down naturally over summer, particularly if there is rain that stimulates micro-organisms. Natural breakdown, combined with management practices, reduce surface cover levels. Based on the average change in cover ratings between October and March in previous seasons, it was anticipated that surface cover ratings in March 2011 would not be in the range considered to be at risk of erosion.

Data from the land condition field survey show that the mean surface cover rating in March 2011 was 3.4 (Figure 2). This is outside of the critical rating range for erosion risk (greater than 5) and better than the rating of 4.1 in March 2010 and the March average from 2000 to 2010 of 4.0. The change in the surface cover rating of 1.4 units from 2.0 in October 2010 to 3.1 in March 2011 was equal to the average change in cover ratings from October to March for the period 2000 to 2011.

Figure 2: Mean Surface Cover Rating on cleared land in March in the Eyre Peninsula Region and South Australia for the period 2000 – 2011

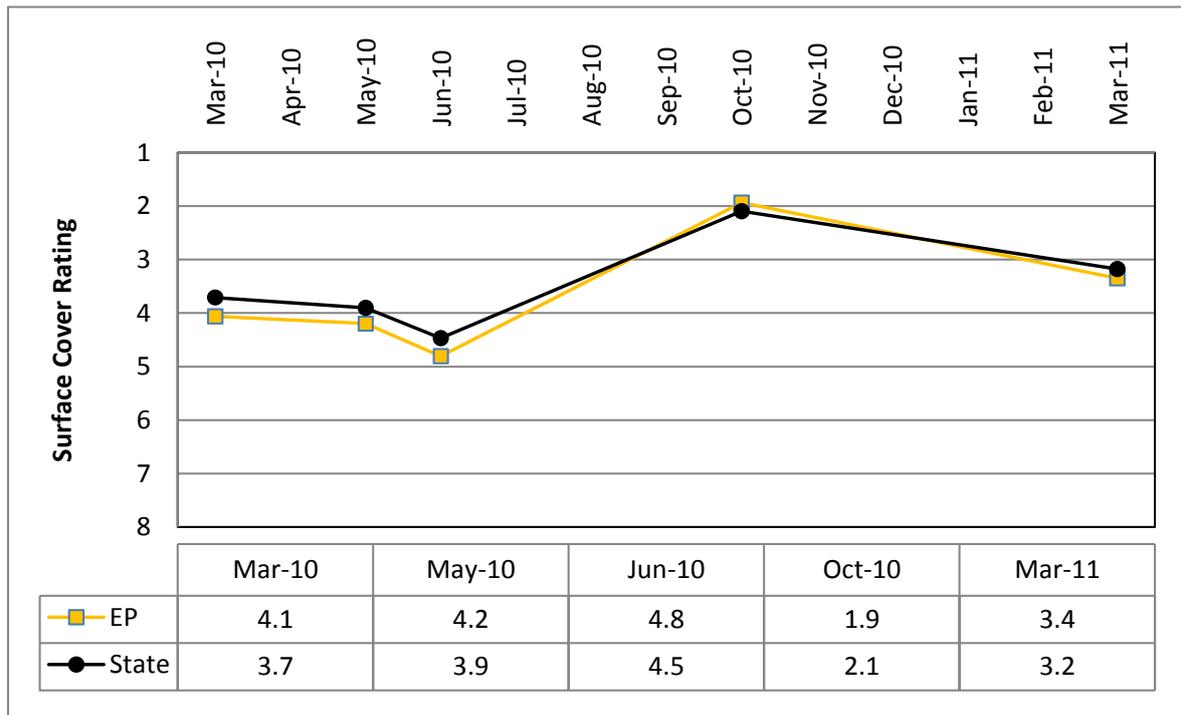


Note: Cover rating of 1 = full cover; 8 = bare

Figure 3 shows the change in surface cover in the 13 month period from March 2010 to March 2011.

It is estimated from the land condition field survey that about 3.0% of the region’s land was cultivated at the time of the March observations. This is less than the mean for March of 3.8% for the period 2000 to 2011 but higher than the proportion of 0.2% in March 2010.

Figure 3: Mean Surface Cover Rating on cleared land in the Eyre Peninsula Region and South Australia from March 2010 to March 2011



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

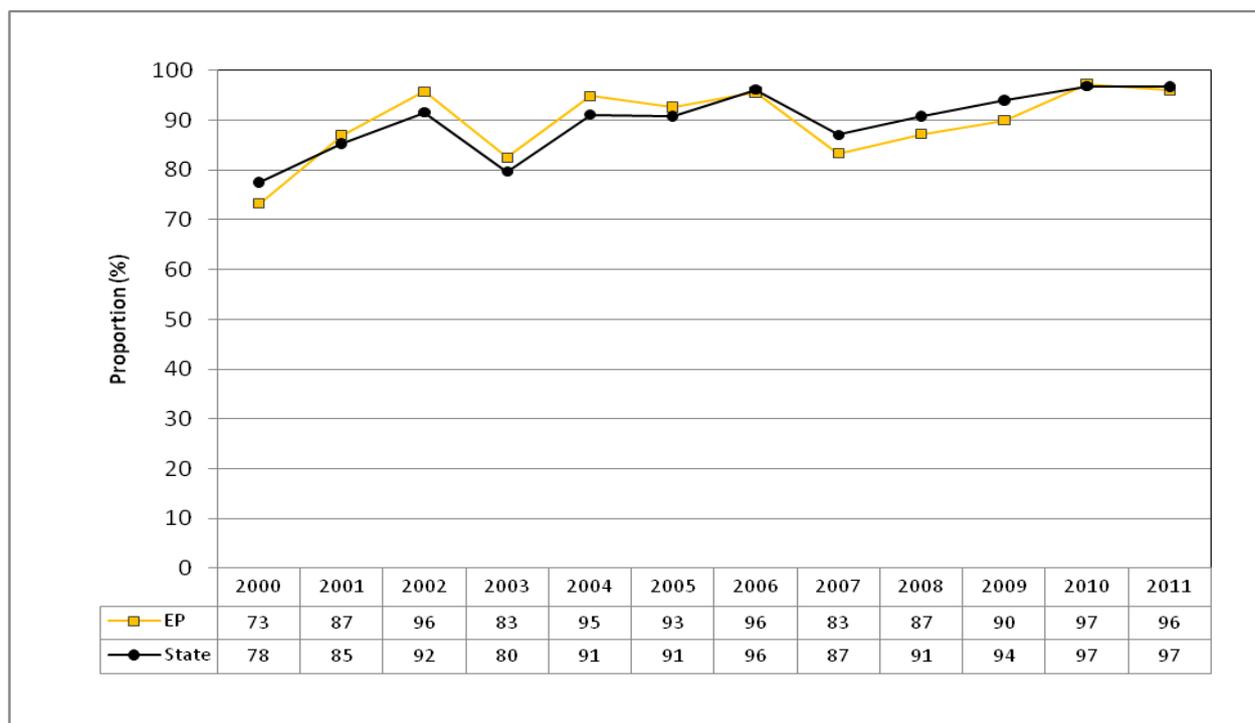
Given the good levels of surface cover in March this year and the slow rate of breakdown of residues, adequate levels should remain until they are disturbed or removed by burning and/or tillage.

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 784,000 ha or 28% of cleared land on Eyre Peninsula. This is mainly found on the sandier soil types of Western, Central and Eastern Eyre Peninsula.

The proportion of land protected from wind erosion in March is 96%, which is above the March average of 90% for the monitoring period (Figure 4).

Figure 4: Proportion of cleared land (%) adequately protected from wind erosion in March in the Eyre Peninsula Region and South Australia for the period 2000 - 2011



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 226,000 ha or 8% of cleared land on Eyre Peninsula. It mainly occurs on the hilly land of Lower Eyre Peninsula.

The proportion of area of land protected from water erosion in March 2011 is at 99% which is at the average for the period 2000 to 2011 (Table 1).

Table 1: Proportion of cleared land (%) protected from water erosion in March in the Eyre Peninsula Region and South Australia for the period 2000 – 2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Ave
EP	93	95	99	99	100	98	99	98	99	99	100	99	98
State	95	96	99	98	99	98	99	95	97	99	99	99	98

Practices that will reduce soil cover levels or disturb soil before seeding are burning, over-grazing or tillage. If these practices are to be undertaken, delaying them as long as possible will reduce the period of erosion risk.

Conclusions

A prolonged winter growing season and well above average rainfall from October through to March grew a large amount of crop and pasture biomass, and weeds and volunteer plants after harvest. This resulted in good surface cover levels in March.

While some land was cultivated following rainfall events, herbicide was more widely used to control weeds, conserve soil moisture and reduce the risk of disease carryover. The proportion of land cultivated in the region in March was estimated to be 3%, higher than last year's March observation of less than 1% but less than the March 2000 to 2011 average of 3.8%.

The proportion of land protected from wind erosion in March was 96%, higher than the March average of 90% over the monitoring period from 2000 to 2011. The proportion of land protected from water erosion remained at the average of 98%.

It is expected that a higher number of paddocks than usual will be burned this year due to concerns that crop stubbles will be too dense to work through when sowing crops or to control pests such as snails and herbicide-resistant weeds. Mice also pose a threat due to the higher amount of seed present in the environment so burning or more tillage might be used to disturb their habitat.

It is expected that farmers will not need significant rains to start sowing this year's crop given the amount of stored moisture in the soil profile. It is quite likely that some will sow at optimum sowing times for their crop types and local climates, rather than wait for opening rains. In this event, the length of time land will be exposed to erosion is expected to be quite short provided that adequate rains fall within a few weeks of sowing.

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