



Protection of agricultural land against erosion in the South East Region

Seasonal Report April 2011

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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. A small area in the north-east part of the region observed highest-ever falls on record for the period.
- A large amount of biomass was grown and maintained over summer and into autumn by the wet conditions.
- Surface cover levels in March this year were equivalent to the best level observed over the monitoring period from 2000 to 2011.
- The proportion of land protected from wind erosion in March was nearly 99% and the highest since monitoring began.
- The large amount of biomass could prove difficult to manage for farmers preparing land for cropping. It is expected that more burning and tillage to reduce the bulk of material, and discourage snails and slugs, will be used in the region this autumn.

Seasonal Conditions

While temperatures were mild to warm for the month, rainfall was below average over the region in October. Rainfall was variable in November with Bureau of Meteorology sites observing a range from below average to above average falls for the month. Temperatures were warm with a few hot days, but generally around average.

December was very wet with all sites recording highest-ever or Decile 10 falls for the month. Sites that reported highest-ever December falls on record included Keith (138 mm), Wolseley (130), Coonawarra (114) and Naracoorte (145). Seventy millimetres fell in one day at Naracoorte. Temperatures ranged from cool to warm.

The wet conditions continued into January, February and March. Wolseley again recorded highest-ever rainfall for the month with 116 mm and Frances (125) and Kalangadoo (107) also observed highest-ever monthly totals on record for January. Several centres had falls in the highest 10% of all January recordings, including Bordertown (95), Keith (57), Coonawarra (97), Lucindale (57), Millicent (69) and Penola (94). Runoff caused erosion of creeks and drainage lines but there was no damage to paddocks.

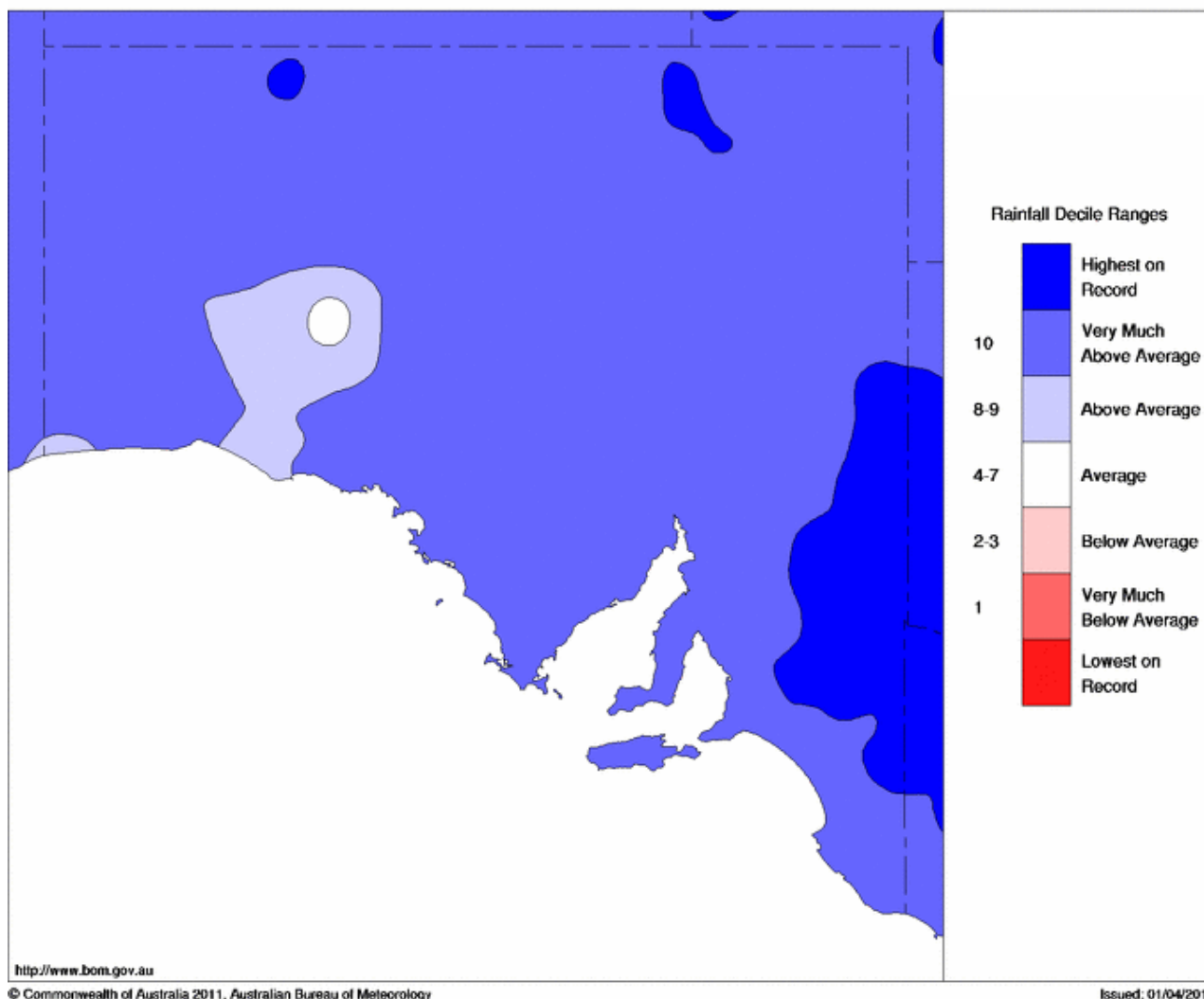
Keith reported its highest-ever rainfall total on record of 63 mm in February while Coonalpyn (53 mm), Coonawarra (47), Kingston SE (62), Lucindale (87) and Naracoorte (46) mm recorded falls in the Decile 10 range for the month.

Coonawarra and Keith received Decile 10 rainfall or higher for the fourth month in succession with 47 and 66 mm respectively in March. Other sites in the Decile 10 range of falls for the month were Tintinara (50), Frances (51), Lucindale (77), Naracoorte (85) and Penola (85).

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



Soil surface cover levels

Crops and pastures grew well in October, responding to relatively drier conditions and warmer temperatures. Graziers were looking to increase stock numbers to take advantage of the abundance of feed.

Surface cover levels were excellent heading into summer, and wet and mild conditions prolonged the growing season.

Paddocks became waterlogged following the heavy rains in December but the abundant surface cover protected soils from erosion by overland flows. Pastures continued to grow vigorously, outstripping grazing by livestock.

This growth of pasture and summer weeds continued through to March. Farmers used herbicides to control weed growth but in some situations the growth was beyond the ability of herbicides to control it.

The abundance of biomass was a concern for farmers and no-till practitioners were reported to be considering using cultivation to try and bury summer weeds. Burning of stubbles started in the mid and upper South East during March to reduce the amount of plant residues and to control snails and slugs. There was also concern that heavy residue loads would contribute to waterlogging of soils in autumn and winter.

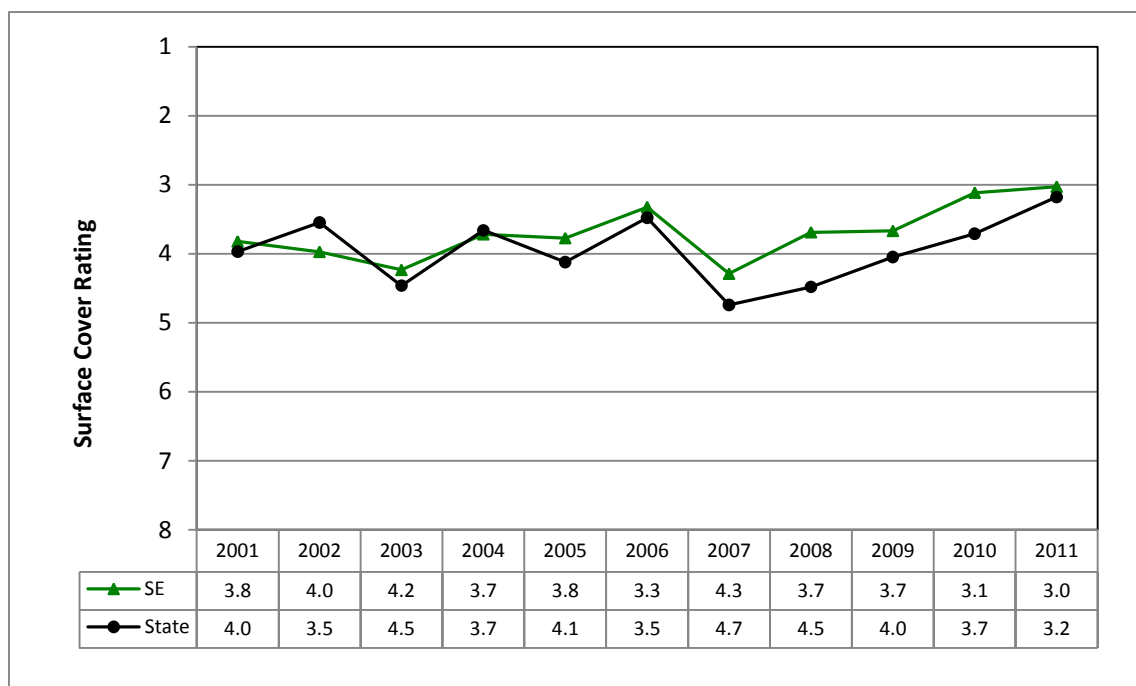
In the DENR erosion protection field surveys, surface cover levels and soil disturbance are visually rated. The surface cover rating system used is based on a scale of 1-8 where 1 = full cover and 8 = bare ground.

Assessments in October 2010 showed that surface cover levels then were better than average for October 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 3.0 (Figure 2) which is the equal-best level of cover in March recorded since monitoring began. It is outside of the critical rating range for erosion risk (greater than 5) and better than the March average from 2000 to 2010 of 3.7. The change in the surface cover rating of 0.7 units from October 2010 to March 2011 was less than the average change in cover ratings from October to March of 0.7 for the period 2000 to 2011.

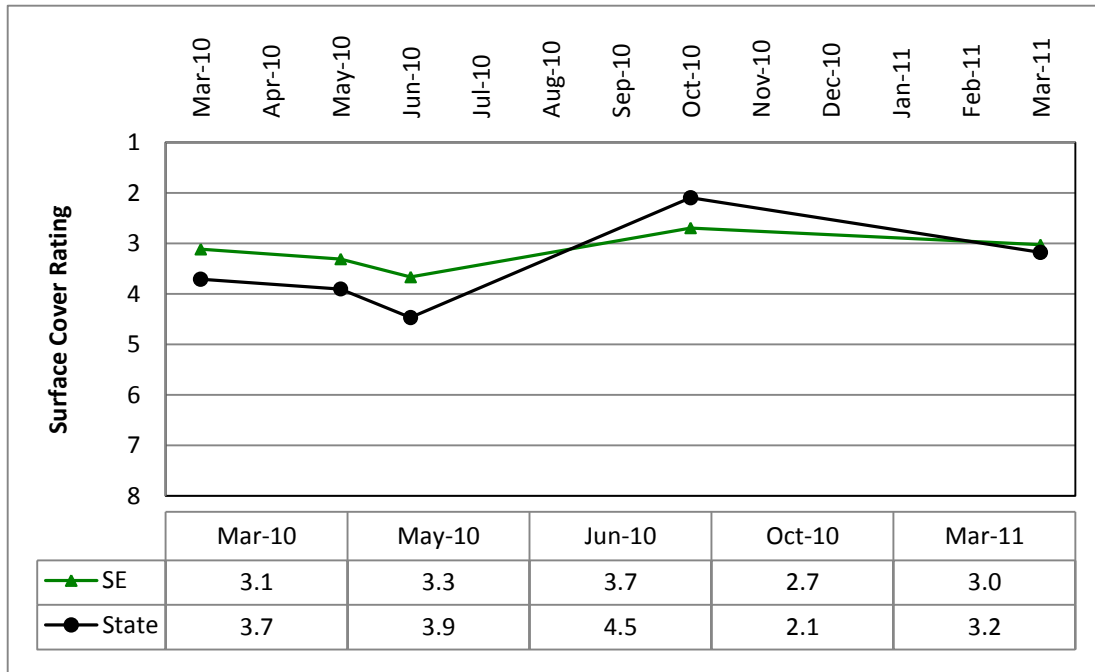
Figure 2: Mean Surface Cover Rating on cleared land in March in the South East Region and South Australia for the period 2000 – 2011



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.

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



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

It is estimated from the land condition field survey that less than 0.5% of the region's land was cultivated at the time of the March observations. This is less than the mean for March of 1.2% for the period 2000 to 2011.

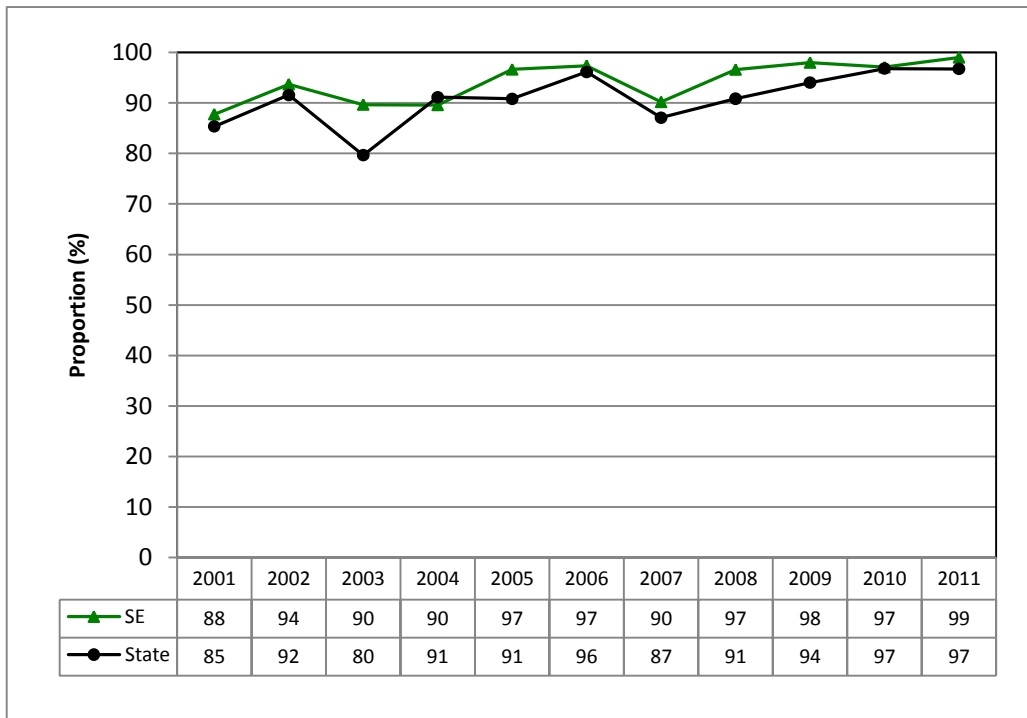
Given the good levels of surface cover in March this year, adequate levels should remain until they are disturbed or removed by burning and/or tillage.

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 540,000 ha or 25% of cleared land in the South East NRM Region. This is found on the sandier soil types throughout the region but cropped areas of the upper South East are at greater risk because their soils are loosened by tillage.

In March 2011, 99% of the land was protected from wind erosion, which is greater than March last year (97%) and the highest proportion observed over the monitoring period (Figure 4). The average proportion of land protected from wind erosion in March for 2000 to 2011 is 94%.

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



Conclusions

An excellent growing season in 2010 provided for very good growth of crops and pastures, and soil surface cover, at the end of spring. Pastures outgrew grazing by livestock.

Very wet conditions from December through to March maintained this vigorous growth of pastures as well as stimulating growth of summer weeds. While runoff was generated by the heavy rain and waterlogged soils, erosion damage was confined to watercourse erosion with most land being well protected by surface cover.

Surface cover levels in March were equal to last year's March levels which were the best observed in March since monitoring began. The proportion of land adequately protected from wind erosion in March was nearly 100%.

The large amount of biomass grown over the summer and early autumn has caused worries for farmers. The growth has proved difficult to control with herbicides because their efficacy is reduced by the high volume of plant material; it will be difficult to work through with tillage machinery on cropping paddocks, and it is harbouring pests such as slugs and snails. There are also concerns that the residues will prevent wet and waterlogged soils from drying out. Burning of stubbles commenced in March and it is expected that the area of land burnt this year will be much higher compared to previous years because of these concerns. It is also possible that more cultivation will be practised to break down residues before sowing.

It is expected that the store of soil moisture gained from the summer rains will enable farmers to start sowing around the optimum sowing time without having to wait for significant opening rains.

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