



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

## Seasonal Report April 2010

Issued by:

Department of Water, Land and Biodiversity Conservation

### Summary

- Spring rain and thunderstorms over summer boosted plant growth leading to adequate soil surface cover over summer and early autumn.
- Surface cover levels in March 2010 were better than the mean March surface cover levels for the period 2000 to 2010.
- The proportion of land protected from water erosion in March 2010 was 98% and above the mean of 94% for March from 2000 to 2010. The proportion of land protected from wind erosion (98%) was also above the average for the monitoring period (96%)
- Due to higher stubble loads this season, there might be more stubble burning than during the last few years in higher rainfall areas of the region, which will expose more erosion-susceptible land to the risk of erosion.

### Seasonal Conditions

The wet spring of 2009 continued in November with several locations in the northern part of the region recording rainfalls for the month in their top 10 percent (Decile 10) of all recordings. Burra (72 mm) and Mount Bryan (119 mm) recorded their highest ever falls for November. Other places that recorded Decile 10 rainfalls for the month included Appila (94 mm), Melrose (107 mm), Mambray Creek (80 mm), Jamestown (93 mm) and Hoyleton (61 mm).

Unseasonably hot weather also occurred in November with more than a week of daily maximum temperatures above 35<sup>0</sup> C.

Electrical storms on the 19<sup>th</sup> of November resulted in many fires being started by lightning. The worst of these burnt approximately 1,250 ha around Curramulka on Yorke Peninsula.

Scattered thunderstorms, many associated with monsoonal in-feeds from the north and west of the country, generated some heavy rainfalls during January, February and March. Falls of up to 50 mm within a few hours were noted on properties but these did not extend very far in area. Kadina (110 mm), Moonta (79 mm), Wallaroo (70 mm), Manoora (95 mm) and Mambray Creek (40 mm) observed Decile 10 rainfall recordings in March due to very intense storms around the 7<sup>th</sup> of March. No water erosion was reported or observed despite runoff being generated however it is possible grain legume paddocks suffered some erosion due to their lack of surface cover and the intensity of rain.

Some days of very windy weather were experienced, particularly around the end of February. These did cause raised dust from some paddocks, mainly legume stubbles and overgrazed paddocks.

## Soil surface cover levels

The significant spring rainfalls generated good plant growth and scattered thunderstorms over summer stimulated growth of weeds and other summer-active plants such as some of the native grasses and lucerne.

Hot weather in August and November, frosts and late rain tended to reduce grain quantity and quality rather than growth, so while crop yields were adversely affected by unseasonable weather, biomass production was not. This resulted in a good bulk of vegetative matter on land at the start of summer.

Rainfall over summer led some farmers to cultivate land, particularly the northern and eastern most cropping areas (Wilmington to Peterborough). In other areas, herbicides have been used to kill weed growth and conserve moisture, which has maintained surface cover and left the soil undisturbed.

A few farmers expecting difficulties working through heavy crop stubbles at seeding time, or problems with pests such as snails and mice, started burning paddocks in March, mainly in the higher rainfall areas of the region. Some pasture paddocks were burnt to remove residues before stone picking.

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 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.

Assessments in October 2009 showed that surface cover levels then were around the average October level observed over the monitoring period of 11 years.

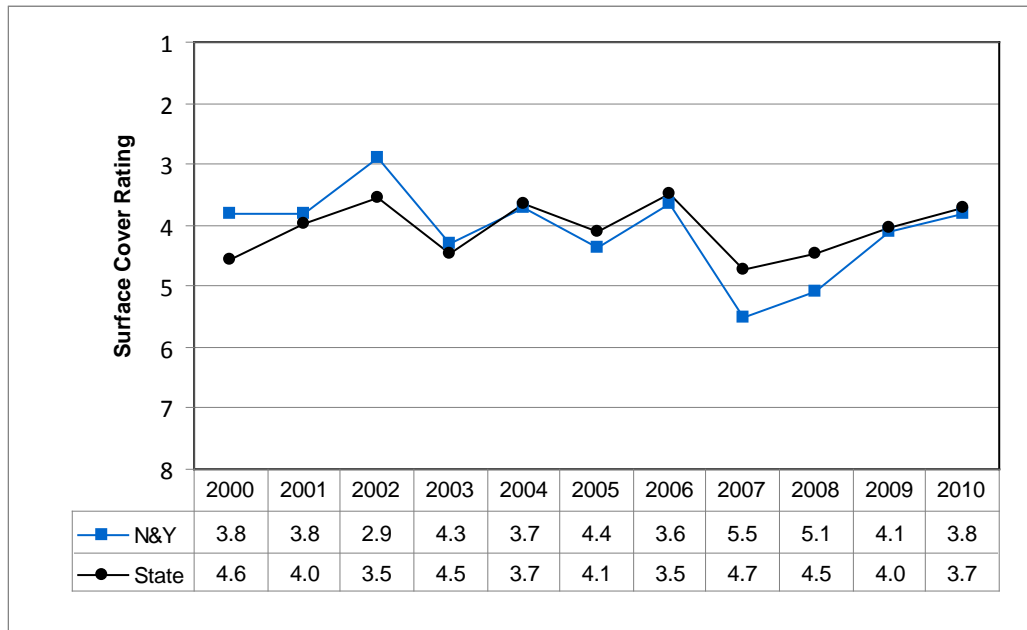
Crop and pasture residues break down naturally over summer, particularly if there is rain that stimulates micro-organisms. Natural breakdown, combined with management practices, reduce surface cover levels. Based on the average change in cover ratings between October and March in previous seasons, it was anticipated that surface cover ratings in March 2010 would not be in the range considered to be at risk of erosion.

Data from the Land Condition Monitoring survey show that the mean surface cover rating in March 2010 was 3.8 (Figure 1). This is outside of the critical rating range for erosion risk (greater than 5) and better than the rating of 4.1 in March 2009 and the March average from 2000 to 2010 of 4.1. The change in the surface cover rating of 2.2 units from 1.6 in October 2009 to 3.8 in March 2010 equals the average change in cover ratings from October to March for the period 2000 to 2010.

Figure 2 shows the change in surface cover in the 13 month period from March 2009 to March 2010.

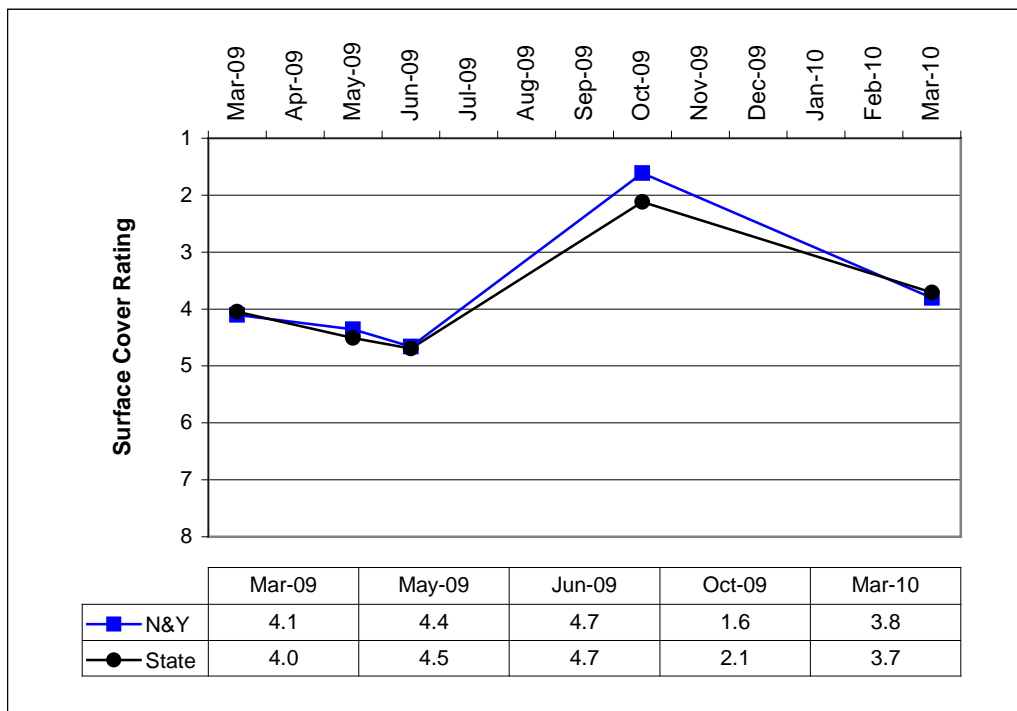
It is estimated from the Land Condition Monitoring survey that about 1% of the region's land was cultivated at the time of the March observations (first week of March). This is lower than the mean for March of 3% for the period 2000 to 2010.

**Figure 1: Mean Surface Cover Rating on cleared land in March in the Northern and Yorke Region and South Australia for the period 2000 - 2010**



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

**Figure 2: Mean Surface Cover Rating on cleared land in Northern and Yorke region and South Australia from March 2009 to March 2010**



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

Surface cover will deteriorate more in the next few weeks, increasing the risk of erosion. The length of the risk period will depend to some extent on the timing of break of the season rains that will produce enough plant growth to protect the soil from erosion. Later opening rains will prolong the period of time that the soil is at risk of erosion as cover levels continue to decline.

## 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. 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 March 2010 was 98%, which is the same as in March 2009, and is above the March average of 96% for the monitoring period (Table 1).

**Table 1: Proportion of cleared land (%) protected from wind erosion in March in the Northern and Yorke Region and South Australia for the period 2000 – 2010**

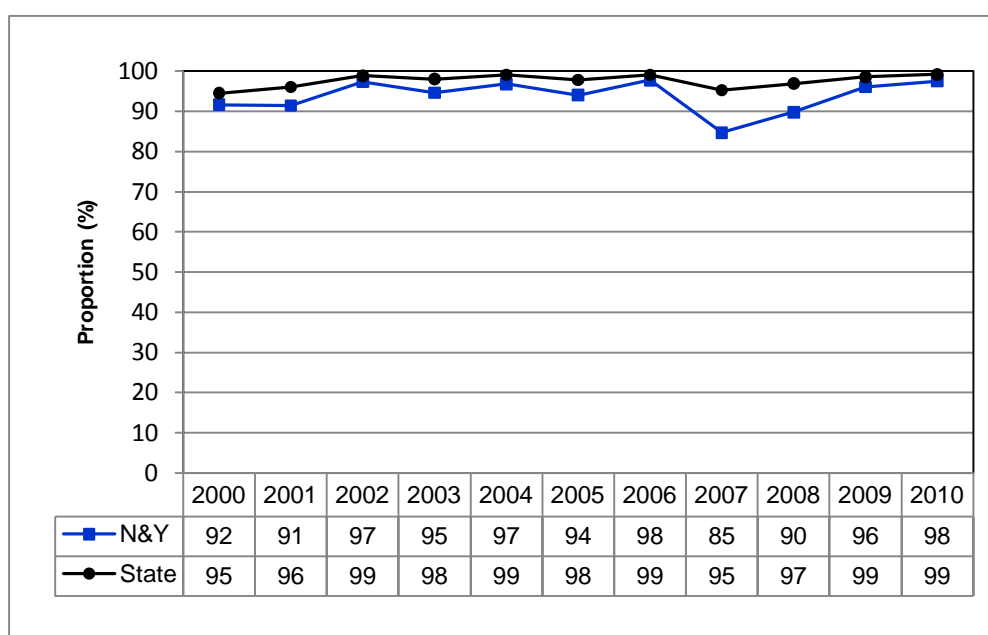
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Ave
<b>N&amp;Y</b>	94	94	99	92	96	95	98	95	92	98	98	96
<b>State</b>	78	85	92	80	91	91	96	87	91	94	97	89

## 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. It mainly occurs on the slopes of the Southern Flinders, North Mount Lofty, Barunga and Hummock Ranges.

The proportion of land protected from water erosion in March 2010 was 98%, which is above the March average of 94% over the monitoring period (Figure 3).

**Figure 3: Proportion of cleared land adequately protected from water erosion in March in the Northern and Yorke Region and South Australia for the period 2000 - 2010**



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**

Good rains in spring and thunderstorms over summer boosted plant growth that has provided protection of the soil surface from erosion.

Surface cover levels in March this year were better than in March 2009 and better than the average March level from 2000 to 2010.

Intense rainfall events associated with thunderstorms have been scattered across the region over summer causing flooding in some locations but no erosion of paddocks has been observed.

Windy weather associated with the passage of weather fronts has raised dust on some days, mainly from grain legume stubbles and over-grazed paddocks.

The quantity of stubble residues carried over from last year could cause some farmers problems at seeding time if it is too thick to work through. Farmers in higher rainfall areas with significant residue levels have started burning some paddocks to reduce cover levels.

A few farmers, particularly in the lower rainfall areas, have cultivated land after receiving thunderstorm rainfalls. This has removed protective surface cover and loosened the soil, increasing the risk of erosion on these paddocks. However, only about 1% of the region was estimated to be cultivated at the time of the survey so the area at risk is very low.

The proportions of cleared land adequately protected from both wind and water erosion in March 2010 were above the March averages for the period 2000 to 2010.

The later the break of the season, the greater the risk of erosion as surface cover levels decline because of burning, cultivation, grazing and / or natural breakdown. Stubble burning has already started in the lower North and Yorke Peninsula and it is expected that more will occur in preparation for this year's crops. Grain legume stubbles in particular will continue to pose an erosion risk until new plant growth occurs. Continued grazing of paddocks could reduce soil surface cover to levels that are inadequate for providing protection against erosion.

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[http://www.dwlbc.sa.gov.au/land/monitoring/current\\_reports.html](http://www.dwlbc.sa.gov.au/land/monitoring/current_reports.html)