

Dust activity	Tripled from October 2022; average for November
Wind strength	Increased from October; below average for November
Groundcover	High across all NRM; slightly decreasing in the west
Rainfall	Much above average; dry in the north-west of NSW

Dust activity

The hours of dust with visibility below 10 kilometres measured across the network (3 h) has tripled from October 2022 (1 h) but is well below the long-term average for November (15 h). Increased hours of strong winds (Figure 1) and reduced groundcover in the Local Land Services North West Region and Mallee Catchment Management Authority Region (Figure 4) are the main factors for the increase.

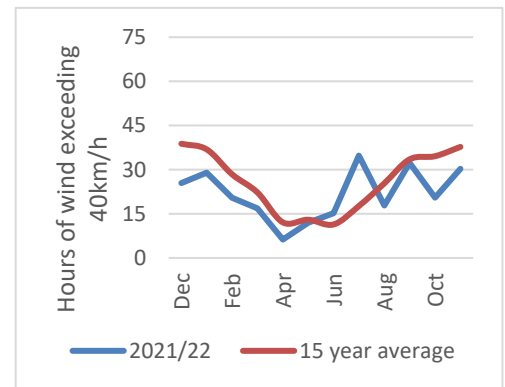


Figure 1 Hours of wind exceeding 40km/h – average across all sites

Note: Real time dust measurements from all our monitoring sites are at: Rural air quality network – live data

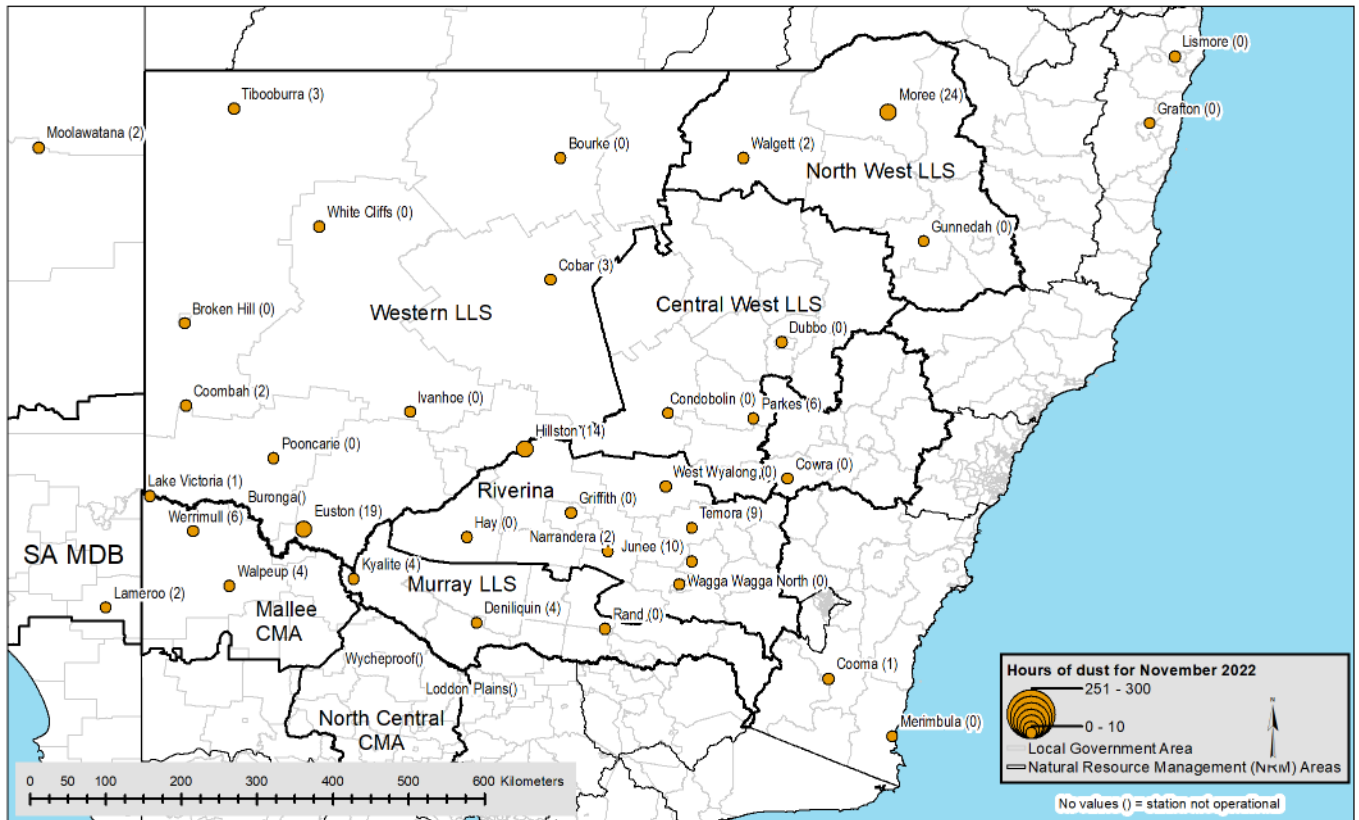


Figure 2 Hours of dust activity (number in brackets) at each DustWatch site in November 2022

Groundcover

The area with greater than 50% groundcover (green and yellow colours in Figure 3) has decreased across the board, most noticeable in the Local Land Services Western Region, where the value dropped from 83% in October 2022 to 78% in November 2022 (Table 1).

These groundcover values are high for this time of the year and are due to exceptionally high rainfall in the spring of 2022 (Figure 7b).

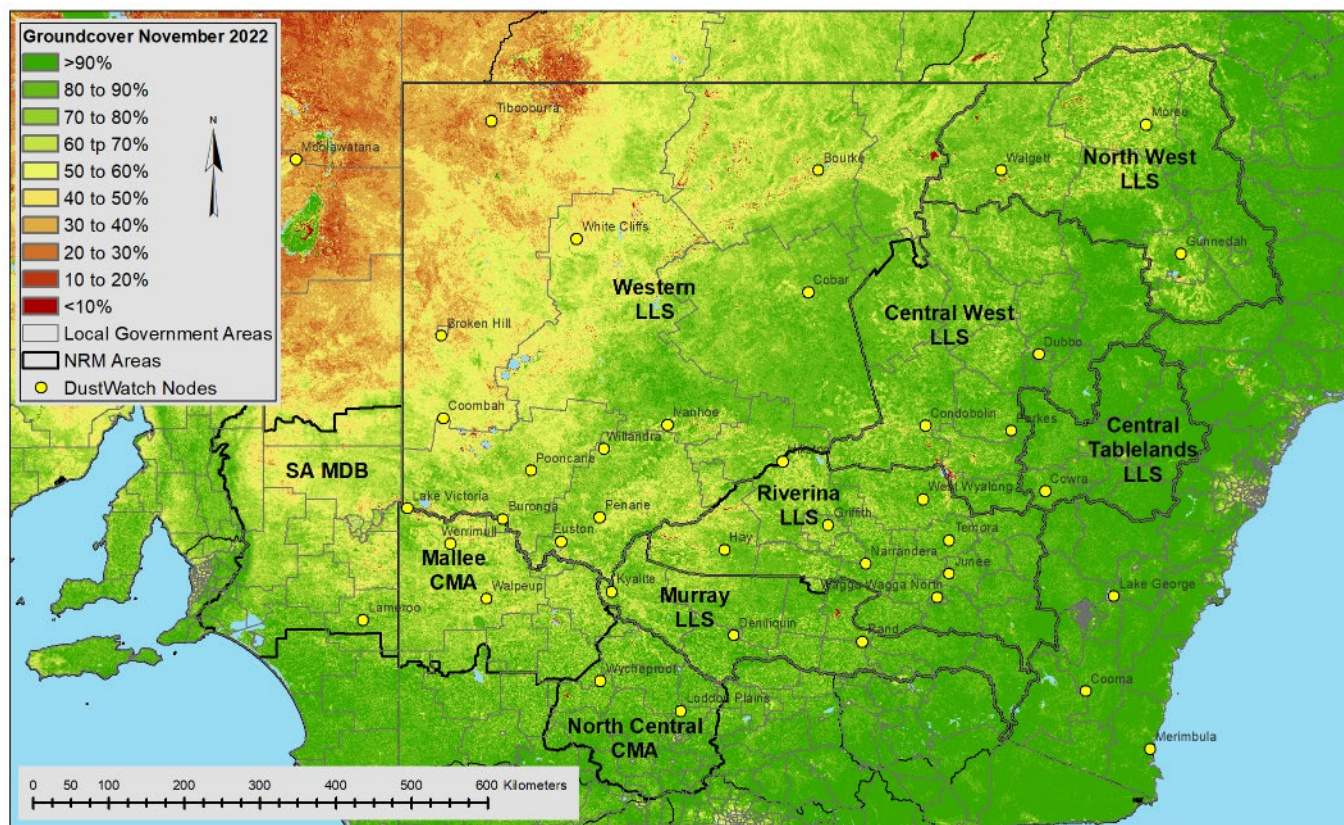


Figure 3 Groundcover for November 2022 as determined from MODIS by CSIRO

Table 1 Percentage of each NRM with cover >50% for November 2021 to November 2022

Date	Central West	Mallee	Murray	North Central	North West	Riverina	SA MDB	Western	Central Tablelands
Nov 2021	99	85	98	99	98	98	73	49	100
Dec 2021	99	74	96	98	97	96	65	49	100
Jan 2022	99	76	97	98	99	98	68	54	100
Feb 2022	99	71	95	97	99	97	67	57	100
Mar 2022	98	75	96	98	99	98	71	60	100
Apr 2022	99	89	99	99	98	99	81	70	100
May 2022	100	95	100	100	99	100	88	82	100
Jun 2022	100	99	100	100	99	100	95	92	100
Jul 2022	100	99	100	100	99	100	94	91	100
Aug 2022	100	100	100	100	99	100	92	89	100
Sep 2022	100	99	100	100	98	100	89	82	100
Oct 2022	100	98	100	100	99	100	91	83	100
Nov 2022	99	97	99	100	98	99	93	78	100

Groundcover change

Groundcover is reducing visibly (red and orange colours in Figure 4) in the Local Land Services North West and Riverina Regions and the Mallee Catchment Management Authority Region (Figure 4) despite good rainfall recorded in November 2022 (Figure 6) and the wetter than average conditions in spring 2022 (Figure 6b).

Groundcover is generally lowest from November to December (Figure 5). Given the above average rainfall groundcover should start to increase in early 2023.

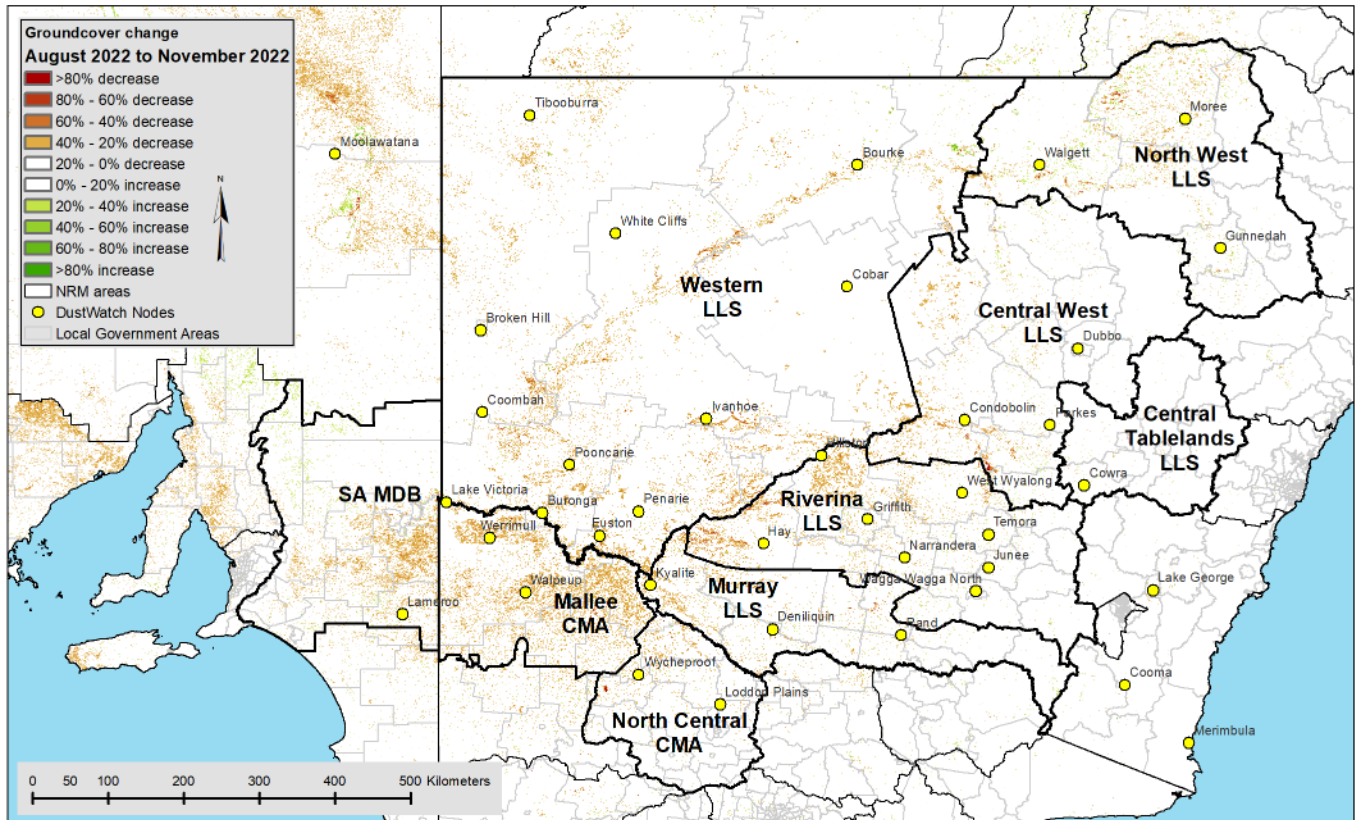


Figure 4 Groundcover difference between August 2022 and November 2022

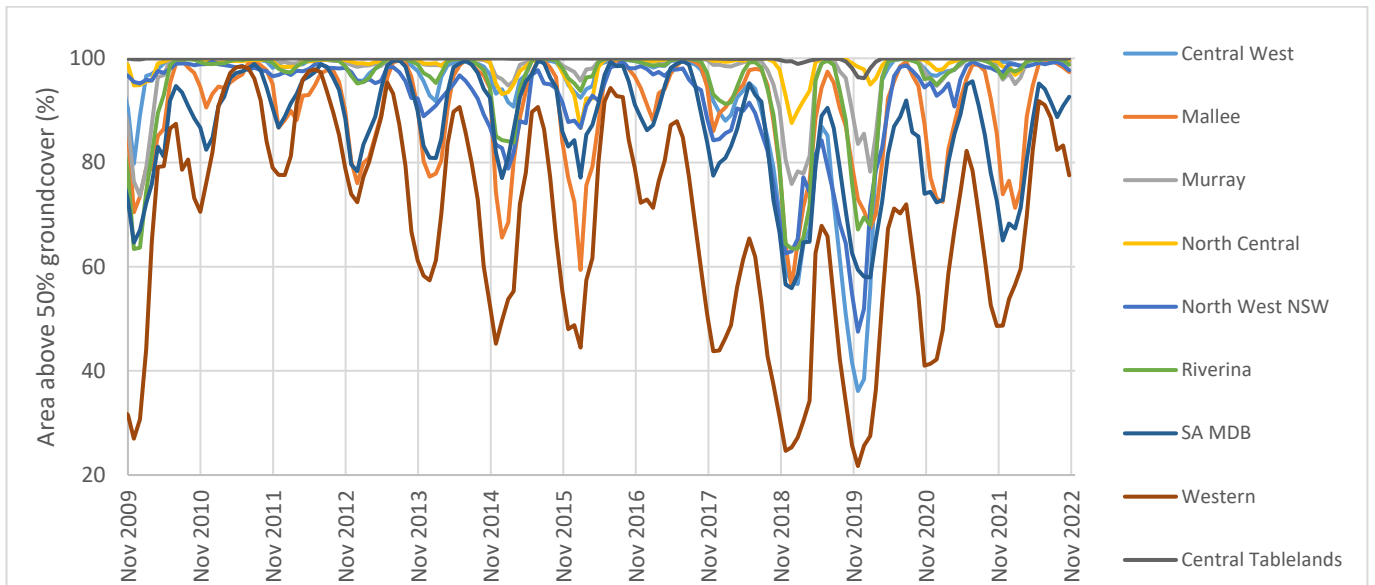


Figure 5 Area (%) of NRM with more than 50% cover since November 2009

Rainfall

Significant rainfall above 50 mm was recorded across most of New South Wales in November 2022, with areas in the centre and south of the state receiving in excess of 100 mm (Figure 6).

The heavy rain in the south was very unusual for this time of the year, and large parts of the state were in the wettest 10% of Bureau of Meteorology records for November (Figure 7a).

The wetter-than-average conditions in November 2022 have pushed large parts of New South Wales into the **highest on record** rainfall category in the last 3 months (Figure 7b).

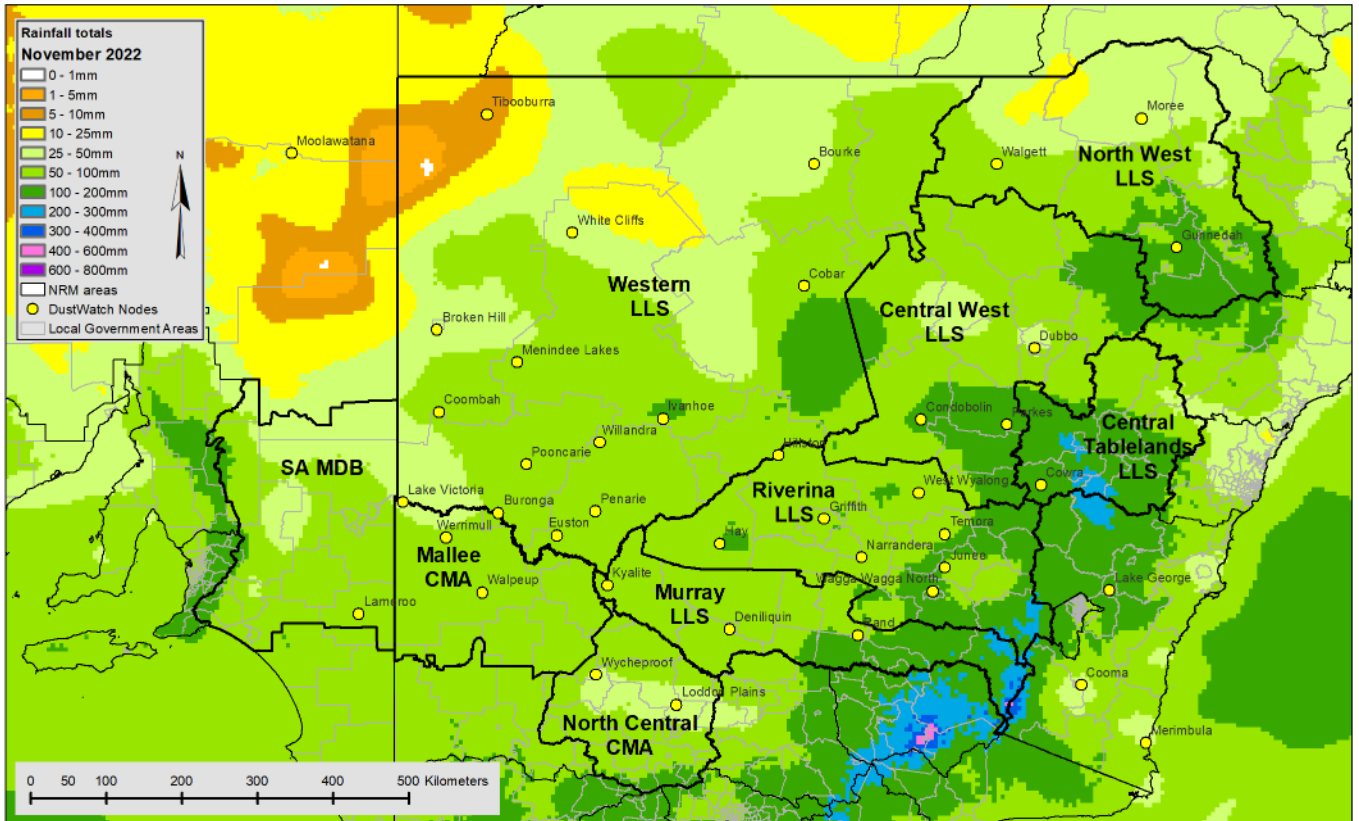


Figure 6 Rainfall totals for November 2022 (source: Bureau of Meteorology)

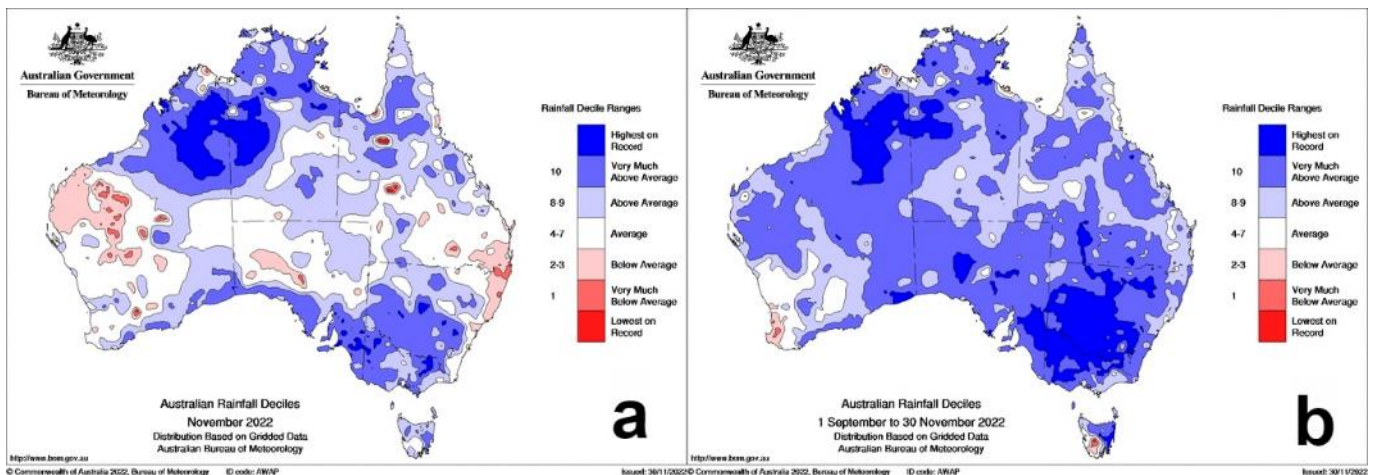


Figure 7 Rainfall deciles for November 2022 (a) and 1 September 2022 to 30 November 2022 (b)

VIIRS fires and satellite image

Haze from smoke and dust is difficult to separate. We use satellite imagery to manually classify every measurement into dust or smoke. The satellite detected 579 hot spots (375 m pixel with temperature anomalies) in November 2022 (Figures 8 and 9), a small decrease from the 675 hot spots detected in October 2022. Fires occurred mostly in north-eastern NSW and the Riverina.

Note: The number of hot spots is not equal to the number of fires. Large fires have multiple hot spots, thereby increasing the number of detections. Cloud or fog can obscure hot spots, thereby reducing the number of detections.

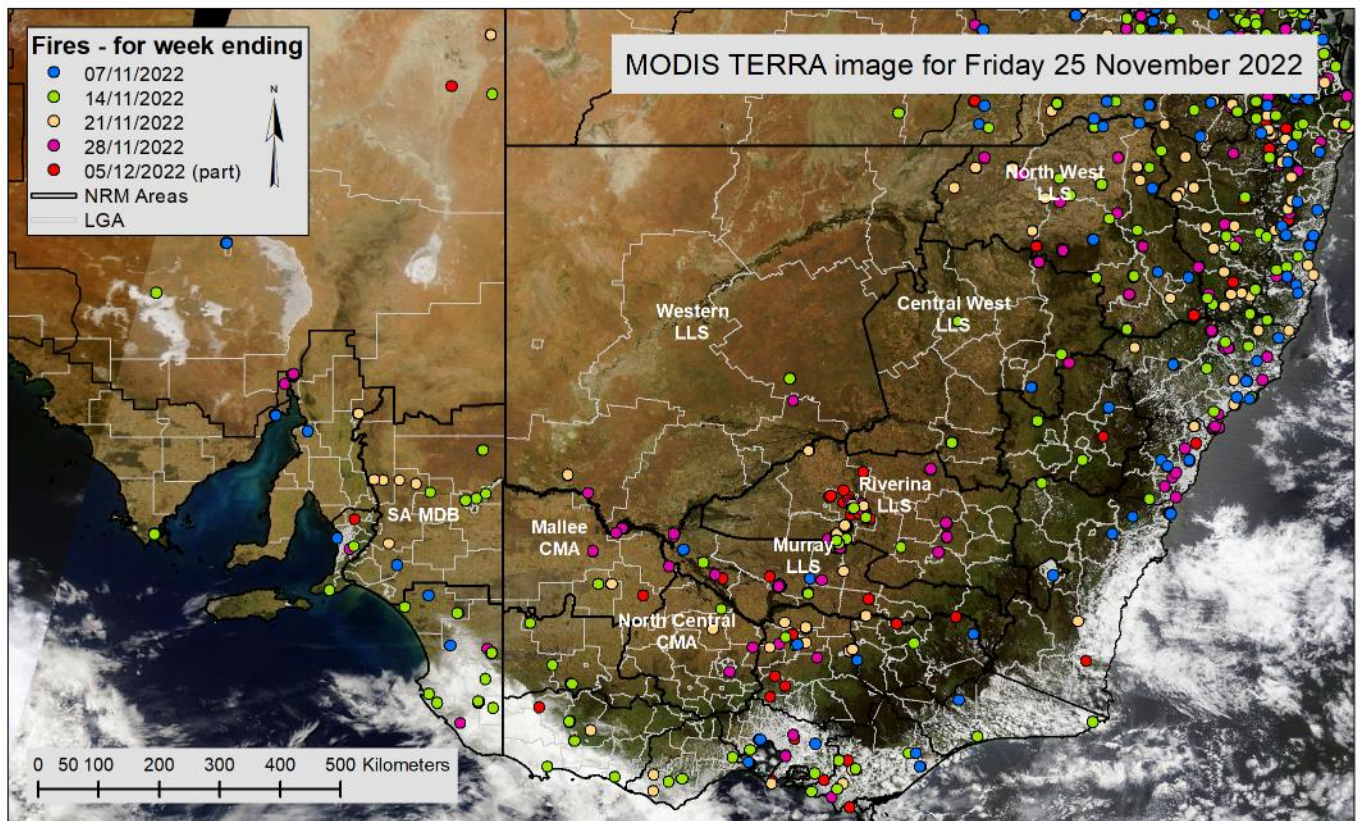


Figure 8 Pixels (375m) with active burning fires in November 2022 as determined from VIIRS satellite

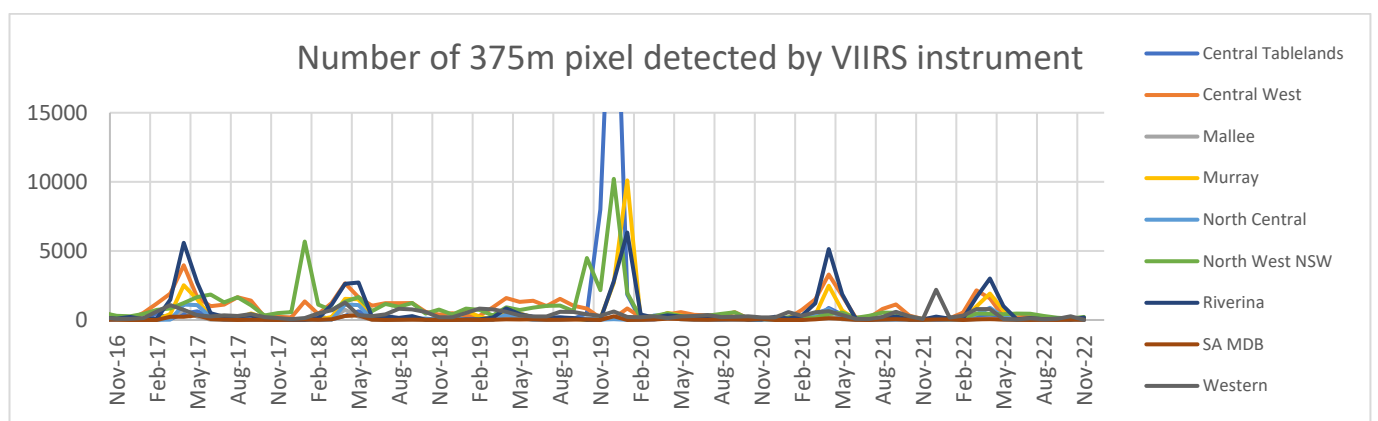


Figure 9 Number of 375m pixels with active burning fires between November 2016 and November 2022

The DustWatch team

Dust data supplied by the Department of Planning and Environment Rural Air Quality network. The MODIS image is courtesy of MODIS Rapid Response Project at NASA/GSFC; the VIIRS fire data is courtesy of the Fire Information for Resource Management System (FIRMS) and the rainfall maps are from the Australian Bureau of Meteorology. This project would not be possible without funding from: The National Landcare Program, Western and Murray Local Land Services (LLS) in NSW; the NSW EPA; the Mallee and North Central CMAs in Victoria and Murray Darling Basin NRM in South Australia; CSIRO, TERN and the Australian National University. We particularly thank our many DustWatch volunteers who provide observations and help maintain the instruments.

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Community-based wind erosion monitoring across Australia

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