DustWatch Report

January 2023

Dust activity	Less than December 2022; below average for the month
Wind strength	Increased from December; below average for the month
Groundcover	Unchanged from December; much above average
Rainfall	Substantial falls in the south; dry in the north-east

Dust activity

The average hours of dust across our long-term sites dropped from 10.2 h in December 2022 to 8.4 h in January 2023 (Figure 2). This is mainly caused by the widespread rainfall received across large parts of New South Wales in January 2023 (Figure 6) and the associated increase in groundcover (Figure 3 and Table 1). Lower than average hours of strong winds (Figure 1) contributed to the low dust numbers. In fact, the dust numbers for the fourth quarter of 2022 were the fourth lowest since records began in 2005.

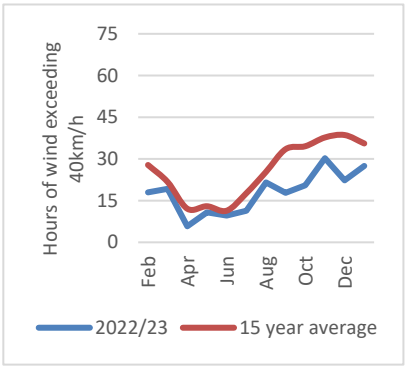

Figure 1 **Hours of wind exceeding 40km/h – average across all sites**

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

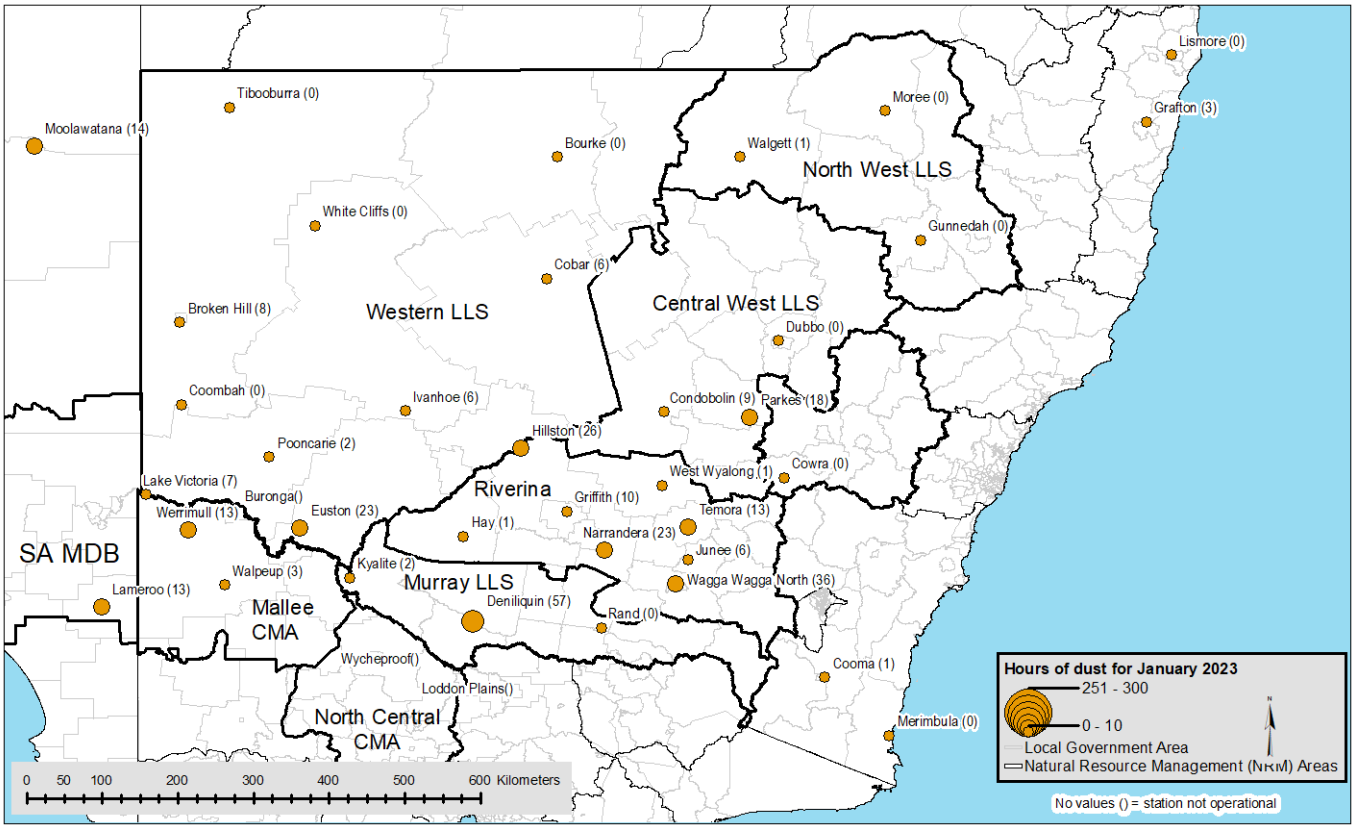

Figure 2 **Hours of dust activity (number in brackets) at each DustWatch site in January 2023**

Groundcover

The area with greater than 50% groundcover (green and yellow colours in Figure 3) has remained almost unchanged from December 2022, with minor increases in the area above 50% groundcover recorded in the Local Land Services Western Region and the South Australian Murray Darling Basin (Table 1). For example, the January 2023 groundcover values in the Local Land Services Western Region are better than anything recorded in January since 2013.

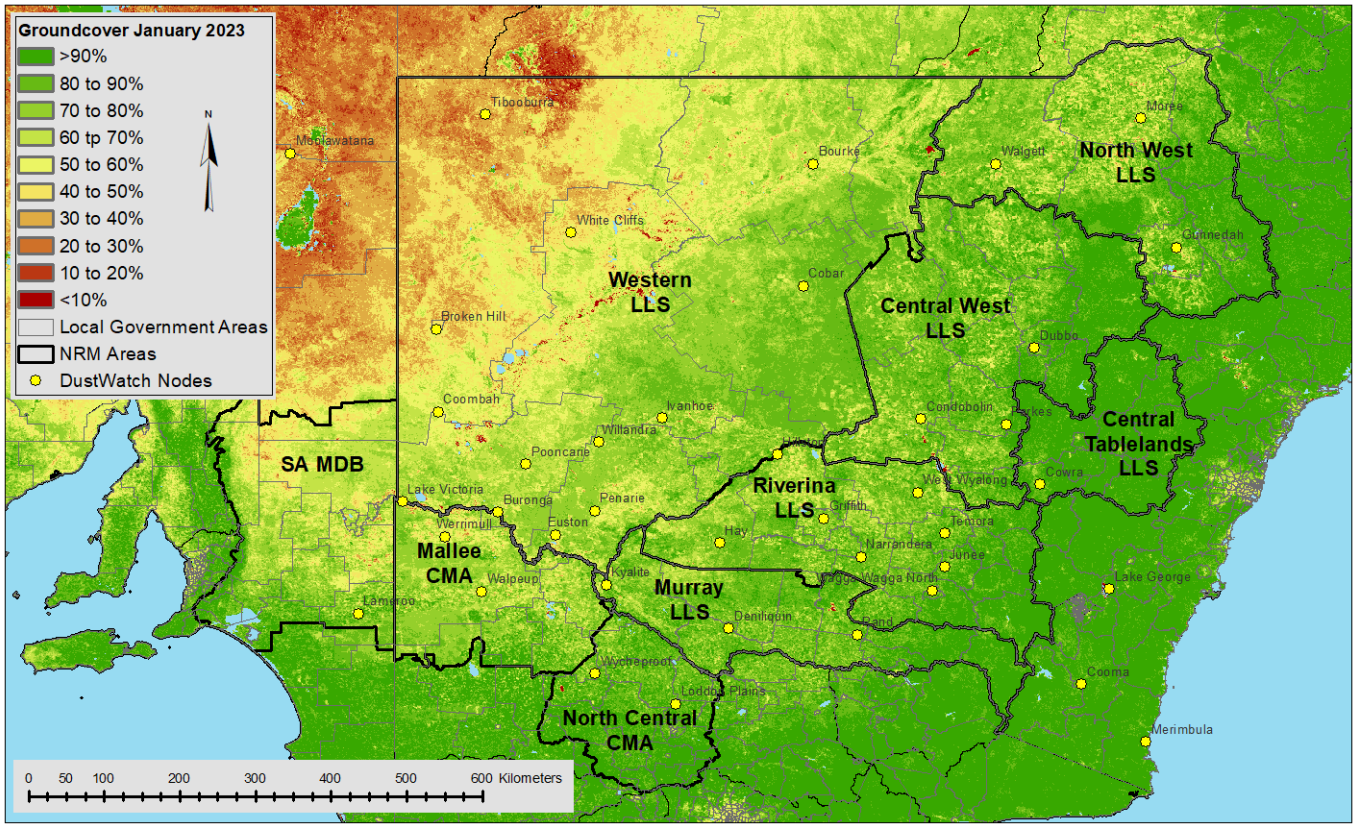

Figure 3 **Groundcover for January 2023 as determined from MODIS by CSIRO**

Table 1 **Percentage of each NRM with cover >50% for January 2021 to January 2023**

Date	Central West	Mallee	Murray	North Central	North West	Riverina	SA MDB	Western	Central Tablelands
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
Dec 2022	100	97	99	100	98	99	91	73	100
Jan 2023	100	97	100	100	98	100	92	74	100

Groundcover change

Groundcover reductions occurred across all regions between October 2022 and January 2023 (orange and red colours in Figure 4). They are counterbalanced by groundcover increases (green colours in Figure 4) within each region, or they are smaller reductions from a very high groundcover value (e.g. from 90% to 75%) since there are no major changes to the area below 50% groundcover (Table 1).

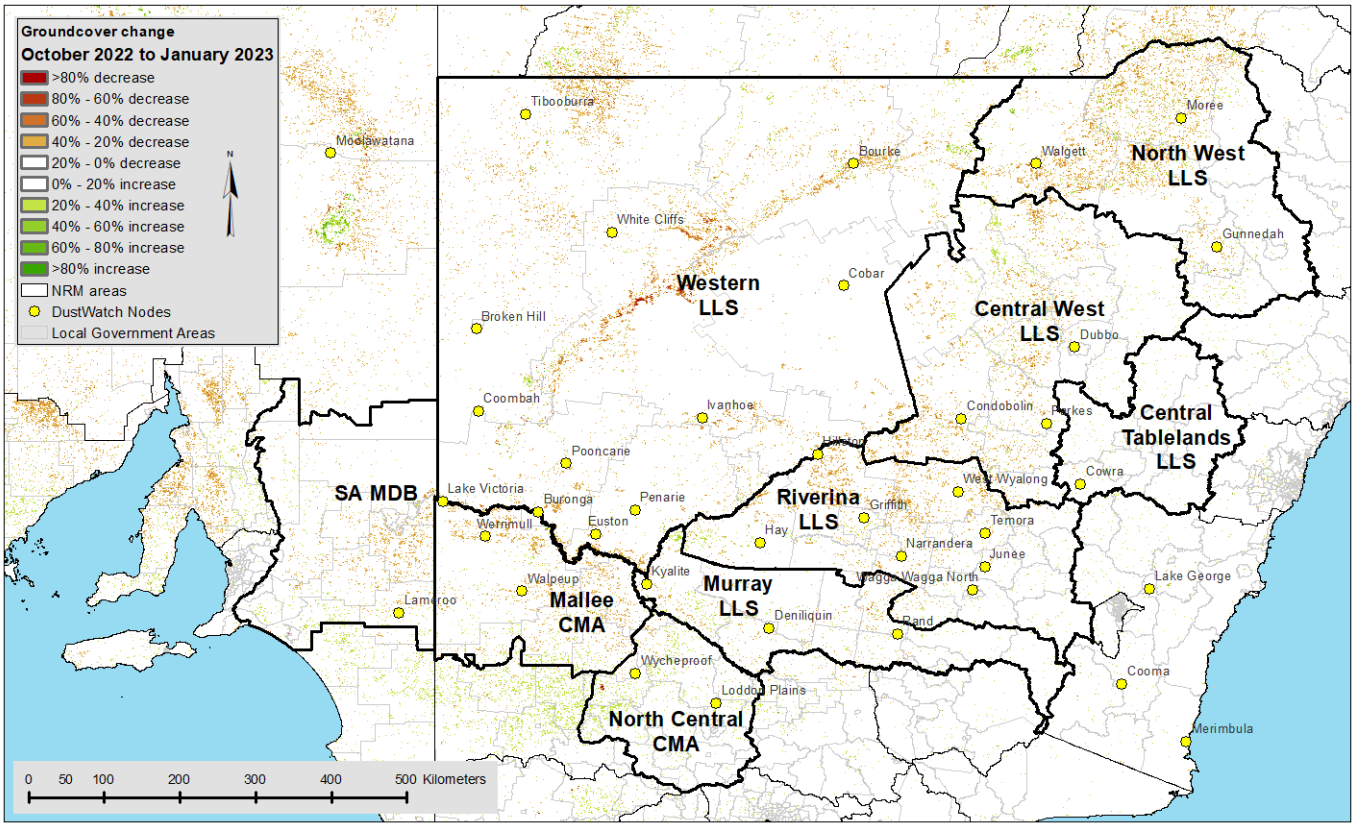

Figure 4 Groundcover difference between October 2022 and January 2023

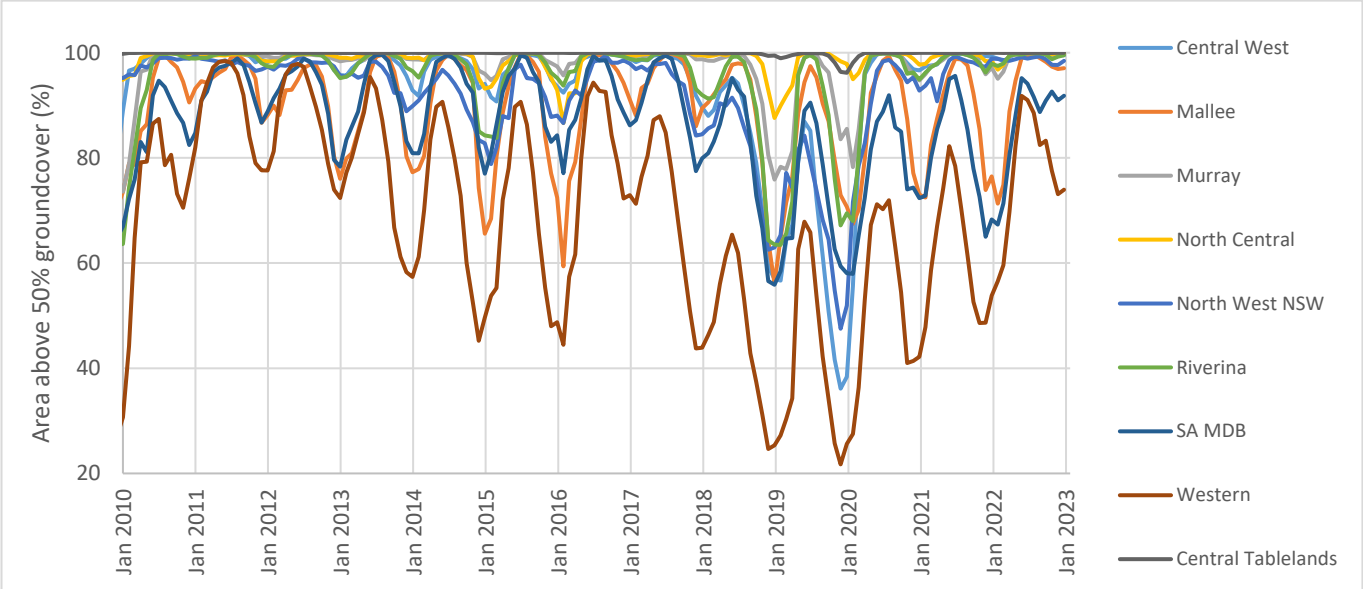

Figure 5 Area (%) of NRM with more than 50% cover since January 2010

Rainfall

Significant rainfall exceeding 100 mm was recorded in eastern NSW in January 2023 with the state's centre receiving falls between 25 mm and 100 mm. The areas west of White Cliffs and between Mildura and Coombah missed out on the rain in January 2023 (Figure 6).

The good falls in the southwest were above average for February (Figure 7a) and added to the already wetter than average conditions when looking at the last 3 months (Figure 7b).

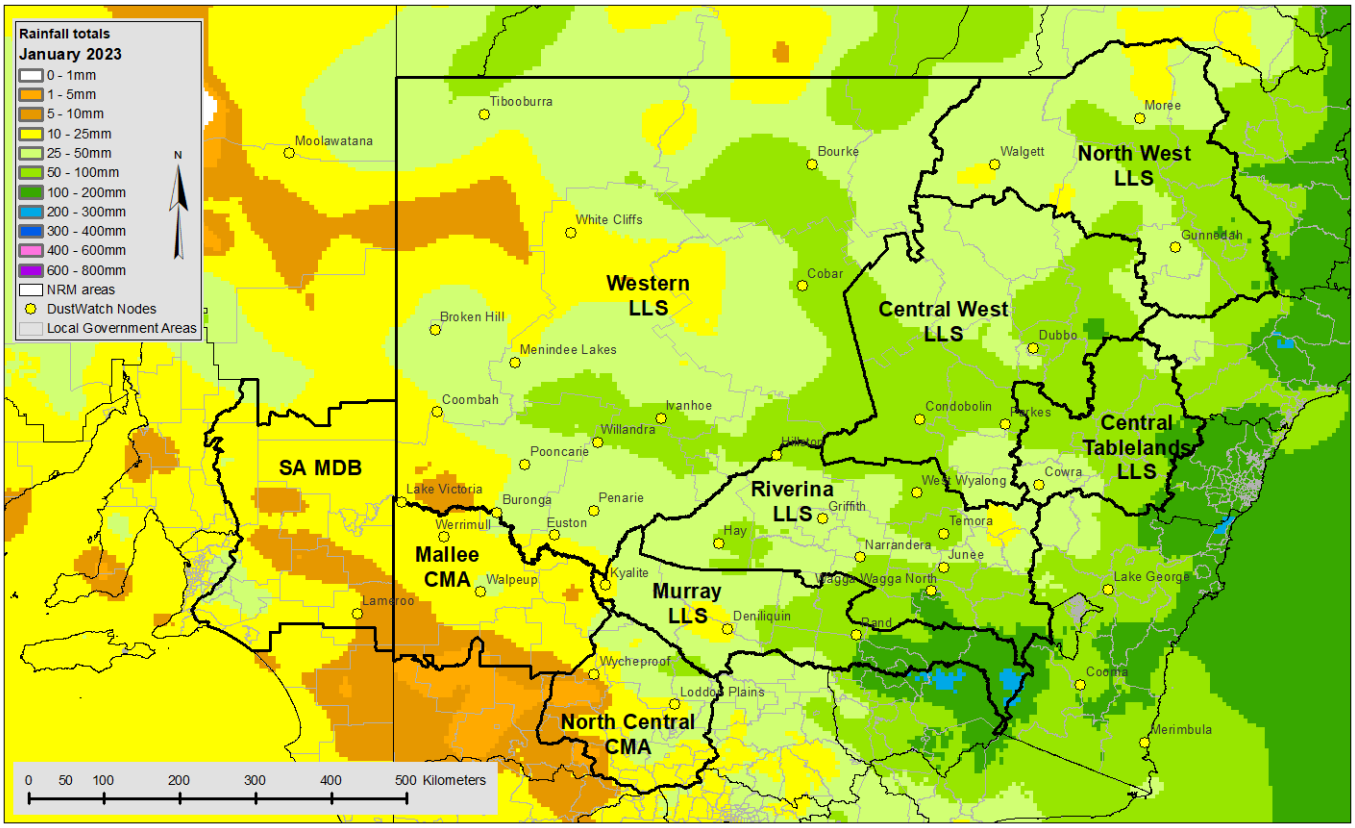

Figure 6 **Rainfall totals for January 2023 (source: Bureau of Meteorology)**

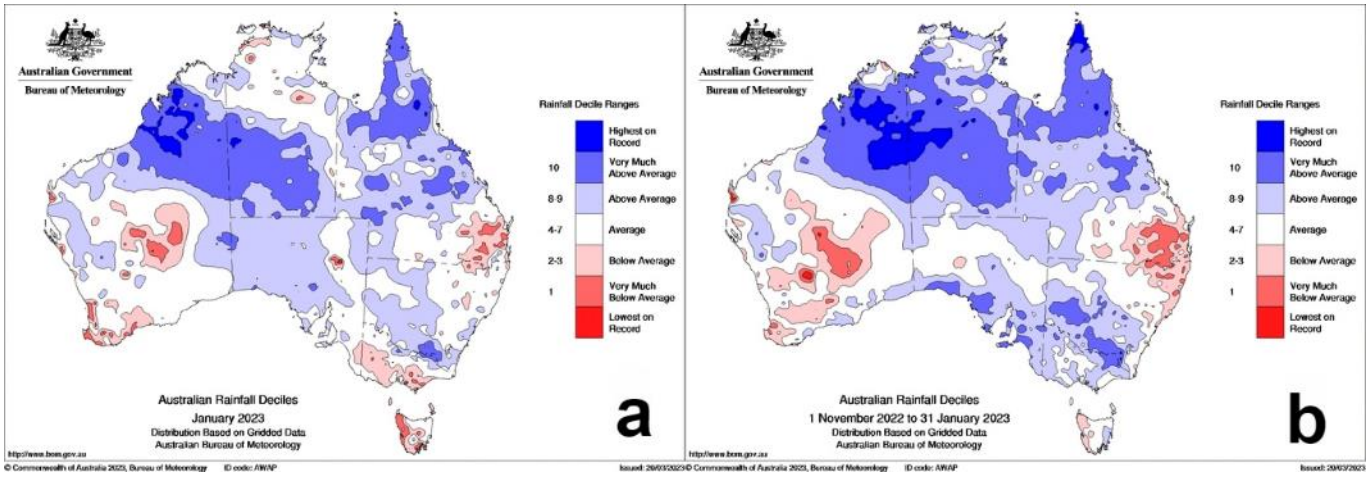

Figure 7 **Rainfall deciles for January 2023 (a) and 1 November 2022 to 31 January 2023 (b)**

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 1,444 hot spots (375 m pixel with temperature anomalies) in January 2023 (Figures 8 and 9), a 32% increase from the 978 hot spots detected in December 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.

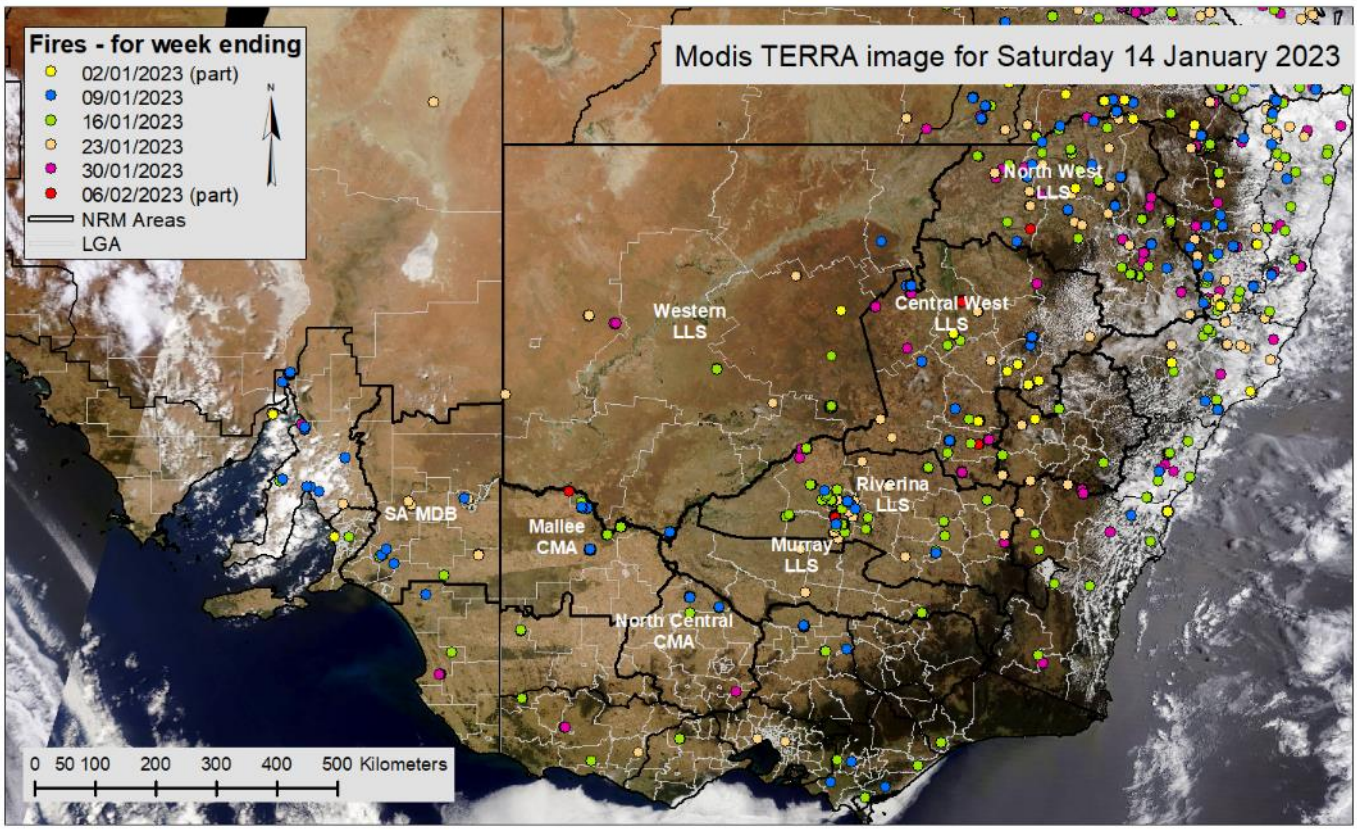

Figure 8 **Pixels (375m) with active burning fires in January 2023 as determined from VIIRS satellite**

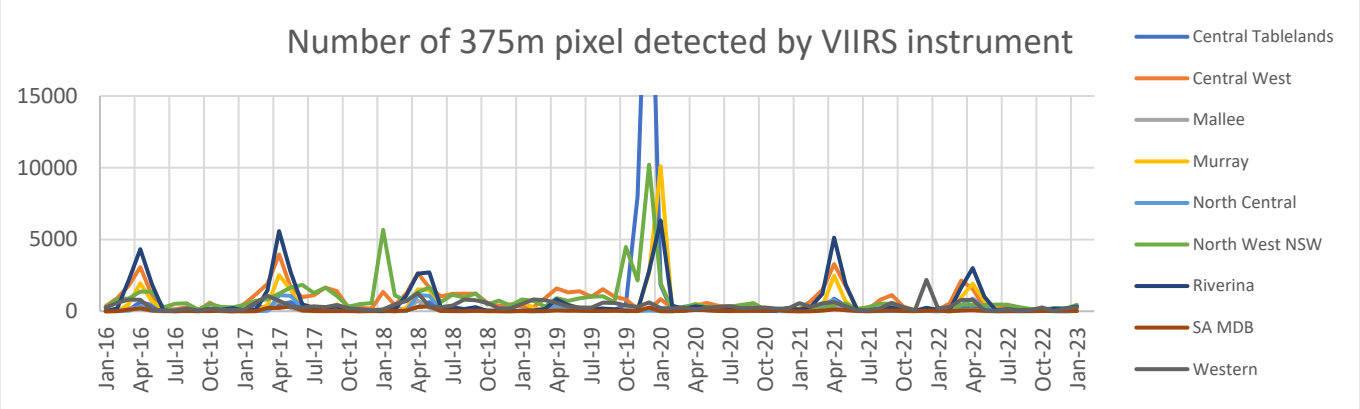

Figure 9 **Number of 375m pixels with active burning fires between January 2016 and January 2023**

The DustWatch team Contact us at dustwatch@environment.nsw.gov.au

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 Australian, 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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