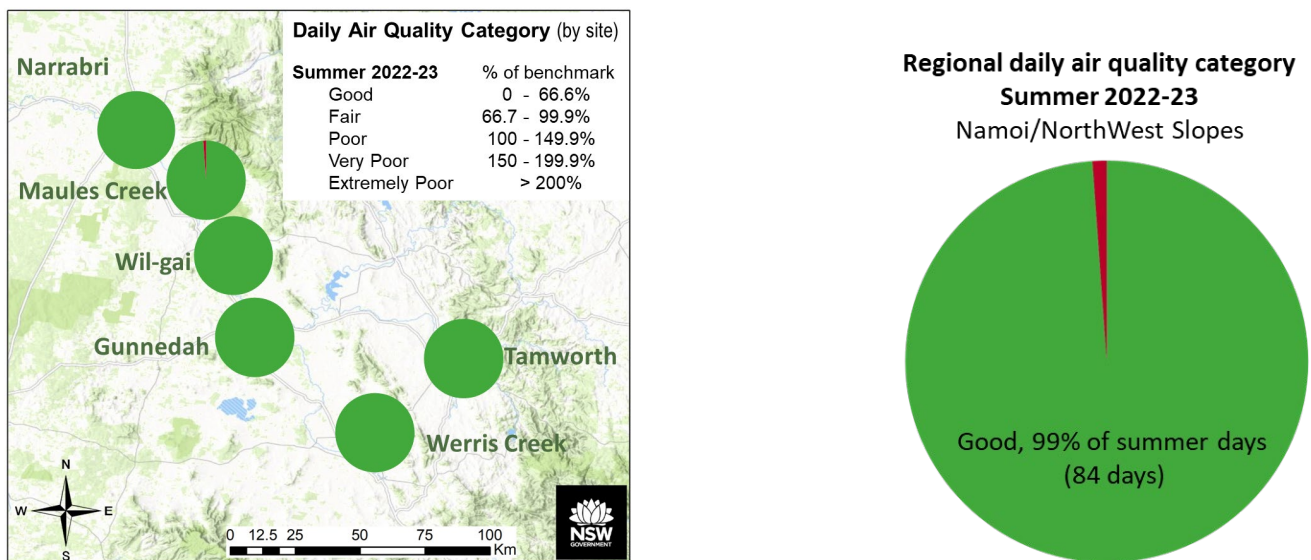


Summer 2022–23

## Air quality in the Namoi/North West Slopes Region

Air quality in the Namoi/North West Slopes region was always good during summer 2022–23, and all stations met national benchmarks<sup>1</sup> on 100% of days (Figure 1). Good air quality across the region was sustained by the prevailing climate conditions. A drier than average with below-average rainfall for all summer months, cooler temperatures, and greater than 95% ground cover reduced dust activity.



**Figure 1** Daily air quality categories at individual monitoring stations (left) and regional air quality in the Namoi/North West Slopes region (right).

## Air quality: summary statistics, summer 2022–23

There was one day above the national benchmarks for PM10 recorded at Maules Creek during summer 2022–23 (Table 1).

**Table 1** Number of days above each benchmark, by station, 1 December 2022 to 28 February 2023

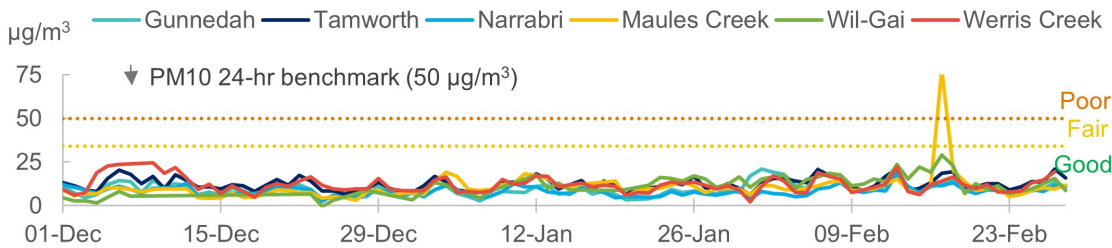
Station	PM10 daily benchmark [50 µg/m <sup>3</sup> ]	PM2.5 daily benchmark [25 µg/m <sup>3</sup> ]	NO <sub>2</sub> hourly benchmark <sup>1a</sup> [8 pphm]	O <sub>3</sub> 8-hourly benchmark <sup>1a</sup> [6.5 pphm]
Gunnedah	0	0	0	0
Narrabri	0	0	-	-
Tamworth	0	0	0	0
Maules Creek	1	0	-	-
Werris Creek	0	0	-	-
Wil-gai	0	0	-	-

- = not monitored; µg/m<sup>3</sup> = micrograms per cubic metre; pphm = parts per hundred million by volume (i.e., parts of pollutant per hundred million parts of air).

<sup>1, 1a</sup> The National Environment Protection (Ambient Air Quality) Measure (Air NEPM) sets national standards for common urban air pollutants, which in this report are referred to as air quality 'benchmarks'. 1a: the 2021 amended NEPM strengthened the 1-hour NO<sub>2</sub> standard (from 12 pphm) and replaced the previous O<sub>3</sub> standards with the 8-hour rolling average standard.

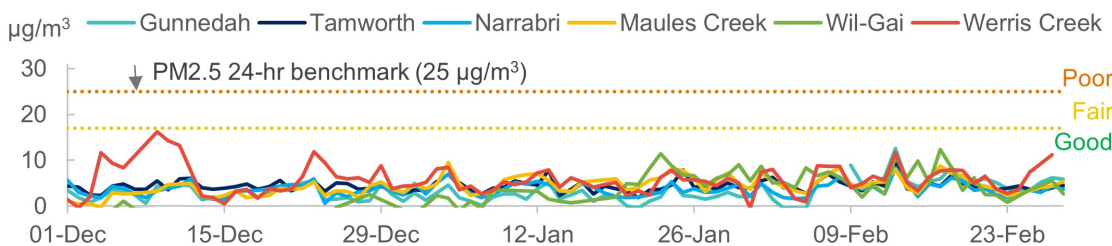
## Air quality: particle pollution summer 2022–23

The time series of daily average particle concentrations shows PM10 levels well below the benchmark at all sites except at Maules Creek, which recorded PM10 concentrations above the benchmark on one day in February 2023 (Figure 2).



**Figure 2** Daily average PM10 in summer 2022–23, showing concentrations below the benchmark.

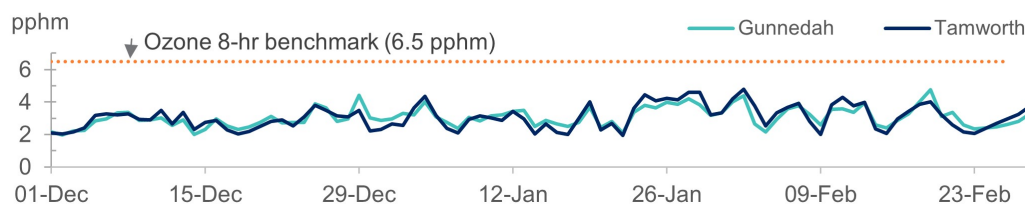
Daily average PM2.5 levels were below the benchmark. No stations recorded PM2.5 concentrations above the benchmark during summer 2022–23 (Figure 3).



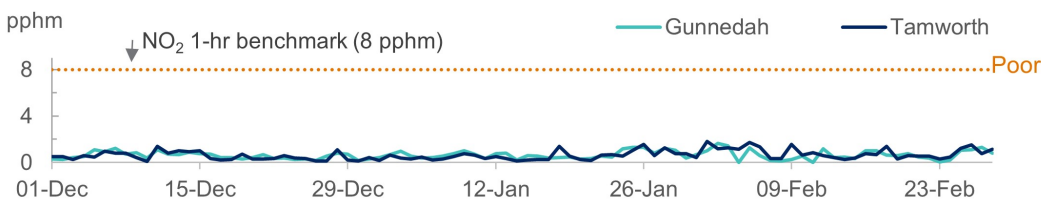
**Figure 3** Daily average PM2.5 in summer 2022–23, showing concentrations below the benchmark.

## Air quality: gaseous pollution summer 2022–23

Figure 4 and Figure 5 show summer 2022–23 trends at Gunnedah and Tamworth stations were characterised by broadly stable ozone and nitrogen dioxide concentrations<sup>2</sup>, trailing well below the O<sub>3</sub> and NO<sub>2</sub> standards<sup>3</sup>.



**Figure 4** Ozone daily maximum 8-hour average concentrations at Gunnedah and Tamworth, during summer 2022–23, showing levels below the benchmark.



**Figure 5** Nitrogen dioxide daily maximum 1-hour average concentrations at Gunnedah and Tamworth, during summer 2022–23, showing levels below the benchmark.

<sup>2</sup> Tamworth station gaseous monitors were recommissioned for spring/summer on 30 September 2022.

<sup>3</sup> Air quality categories based on the updated national gaseous standards (or benchmarks) are not yet established. Hence these plots do not show any other air quality category other than ‘poor’ which are defined by benchmarks.

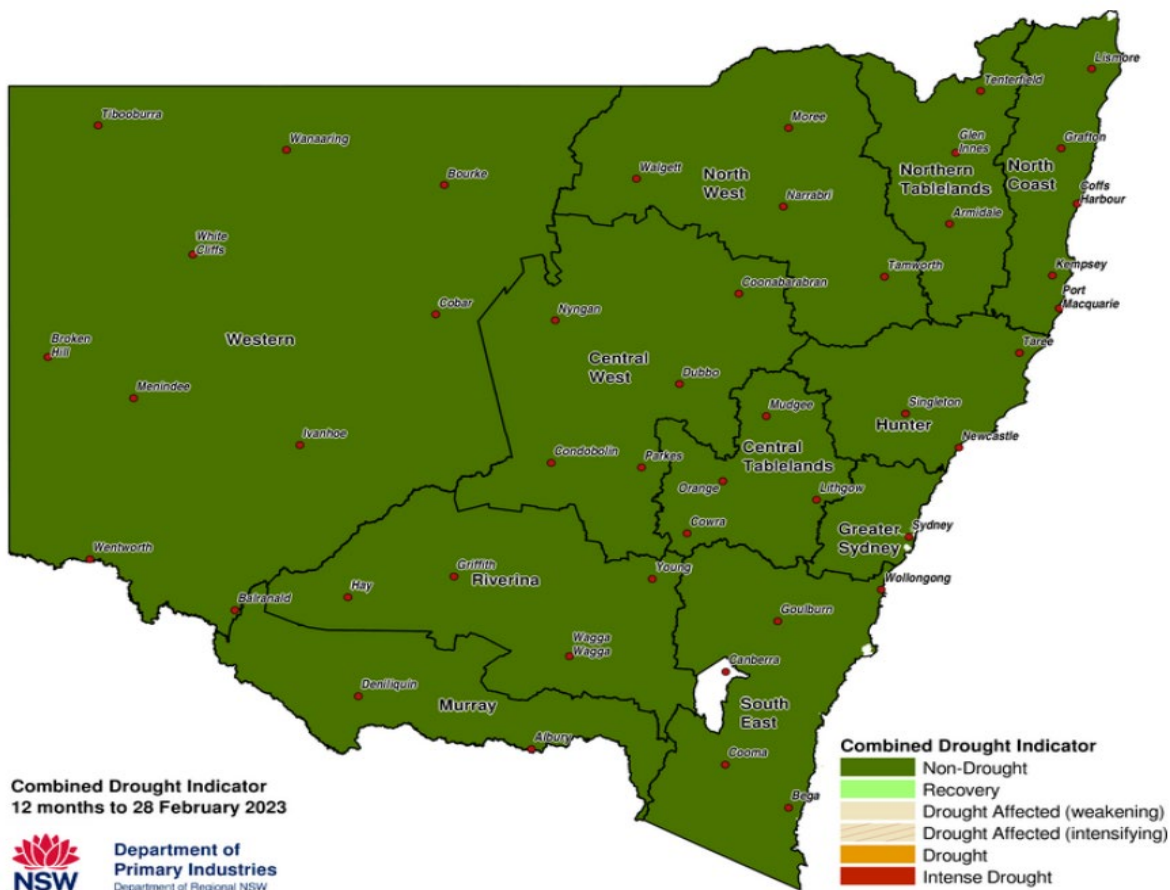
# Seasonal weather and climate

Summer 2022–23 was drier than average, especially for north-east New South Wales. Minimum temperatures were cooler than average, especially during December and for central and north-east parts of the state <sup>4</sup>. Rainfall was below average for the parts of the Riverina along the border with Victoria. Rainfall was very much below average in parts of the Northern Tablelands and Northern Rivers. February was a particularly dry month, with the state-averaged rainfall total 56% below the 1961–1990 average.

## Drought conditions and dust activity

Summer 2022–23 rainfall was below average for most of New South Wales. December was drier than average for north-east, January was wetter than average for western and southern areas and February was drier than average, especially towards the Far West of the state. The NSW Department of Primary Industries Combined Drought Indicator (CDI) shows that 100% of New South Wales was in the non-drought category at the end of February 2023<sup>5</sup> (Figure 6).

DustWatch<sup>6</sup> reported low levels of dust activity in the Northwest New South Wales region during summer 2022–23. In addition to very good ground cover and below average rainfall, wind strength was much below average for December, increased for January but below average for February.



**Figure 6** NSW Combined Drought Indicator – 12 months to 28 February 2023, showing non-drought conditions across the Namoi/Northwest region and across the state.

<sup>4</sup> Seasonal Climate Summary for New South Wales in summer 2023, Bureau of Meteorology, accessed August 2023.

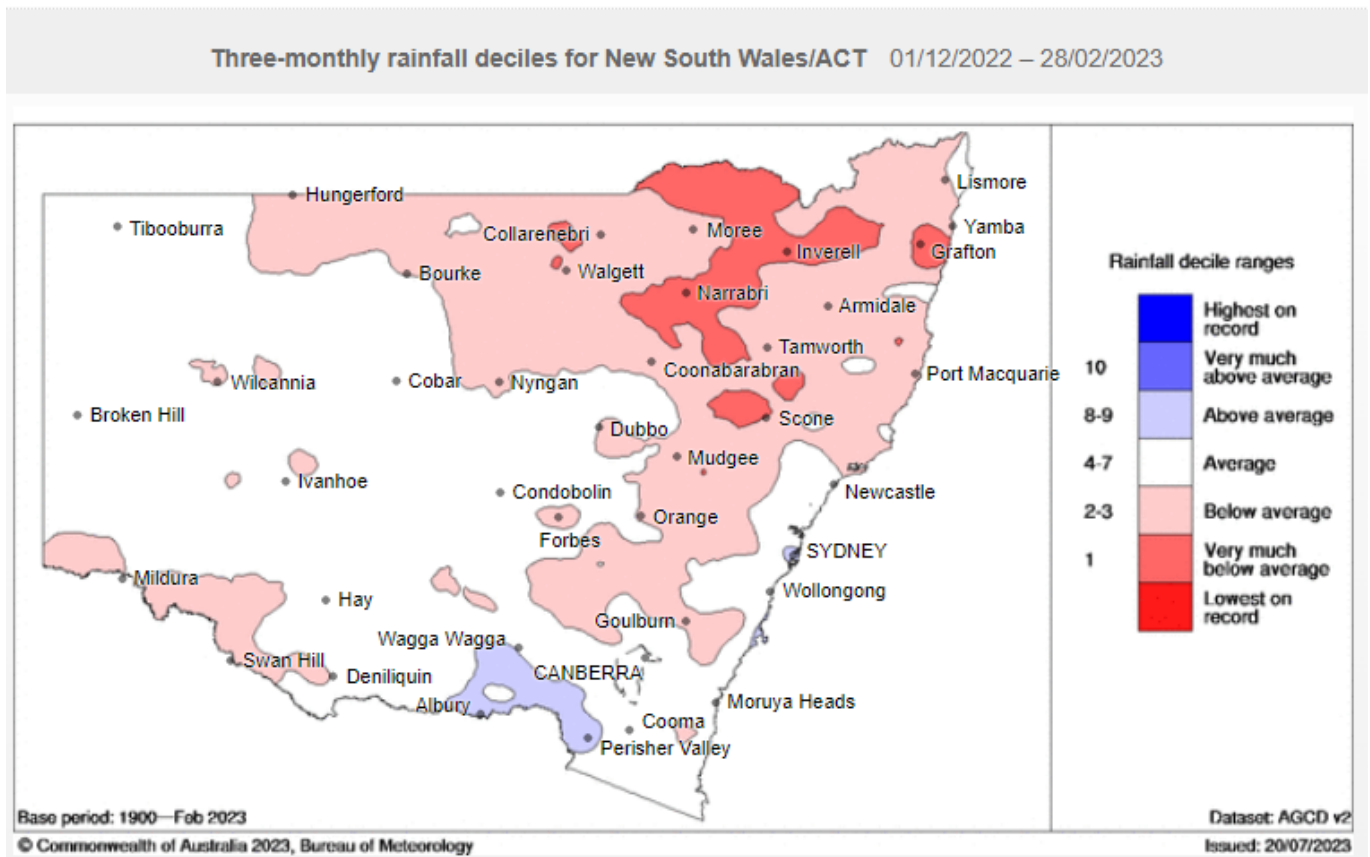
<sup>5</sup> Combined Drought Indicator for 12 months to 28 February 2023, Department of Primary Industries, accessed August 2023.

<sup>6</sup> DustWatch Reports: December 2022, January 2023 and February 2023, Department of Planning and Environment, accessed August 2023.

# Rainfall

The Bureau of Meteorology’s (BoM) seasonal rainfall summary at Figure 7<sup>7</sup> shows that rainfall during summer 2022–23 was below average for most of the Namoi/North West Slopes region. Rainfall totals across the region ranged between 100–200 millimetres (mm)<sup>8</sup>, much lower compared to summer totals for the region in the past 3 years (2020, 2021, 2022).

Seasonal rainfall totals for summer 2022–23 at Tamworth AWS (128mm)<sup>9</sup> and Gunnedah AWS (68 mm)<sup>10</sup> Bureau of Meteorology stations were much lower than their respective long-term summer totals (213mm and 191 mm)<sup>11,12</sup>. The department’s Gunnedah air quality monitoring station (Gunnedah AQM) recorded 88 mm of rainfall (Figure 8)<sup>11</sup>, just over half the Gunnedah AWS long-term total for summer (191 mm).



**Figure 7 NSW rainfall deciles for summer, 1 December to 28 February 2023, showing very much above average rainfall in the Namoi/North West Slopes region.**

<sup>7</sup> Rainfall decile map for 3 months to 28 February 2023 for NSW, Bureau of Meteorology, accessed August 2023.

<sup>8</sup> Summer 2023 rainfall totals and 1-year to 3-year differences, Bureau of Meteorology, accessed August 2023.

<sup>9</sup> Daily Weather Observations – Tamworth Airport Automatic Weather Station (AWS), accessed August 2023.

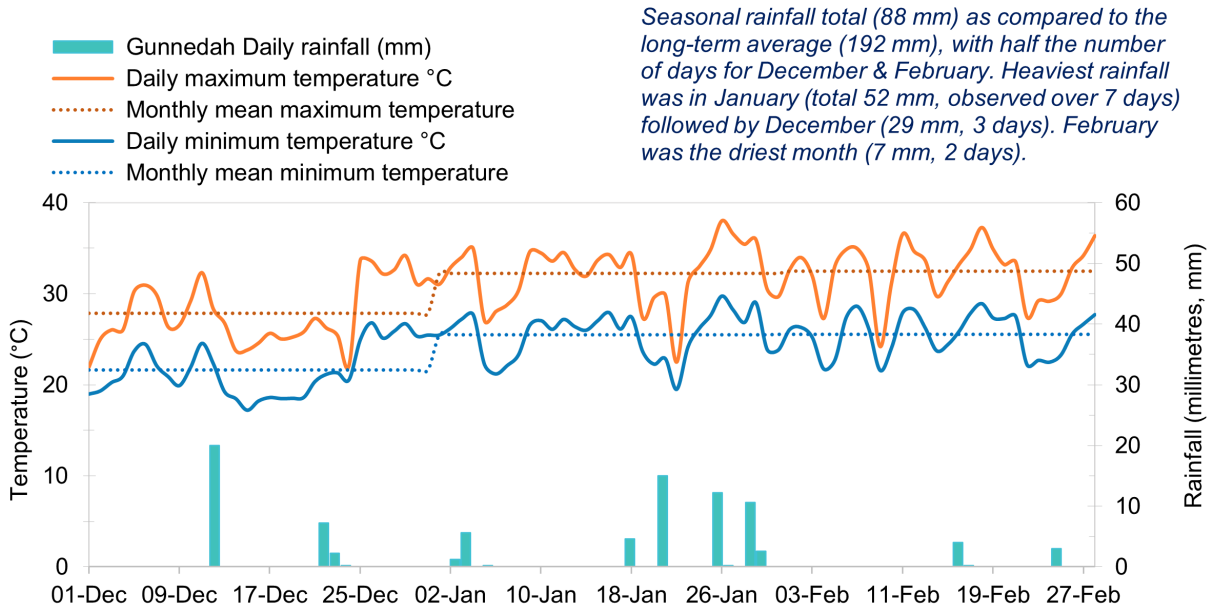
<sup>10</sup> Daily Weather Observations – Gunnedah Airport Automatic Weather Station (AWS), accessed August 2023.

<sup>11</sup> Summary climate statistics – Gunnedah Airport AWS, Bureau of Meteorology, accessed August 2023.

<sup>12</sup> Summary climate statistics – Tamworth Airport AWS, Bureau of Meteorology, accessed August 2023.

<sup>11</sup> DPE observations at Gunnedah air quality monitoring (AQM) station. These data are not NATA accredited.

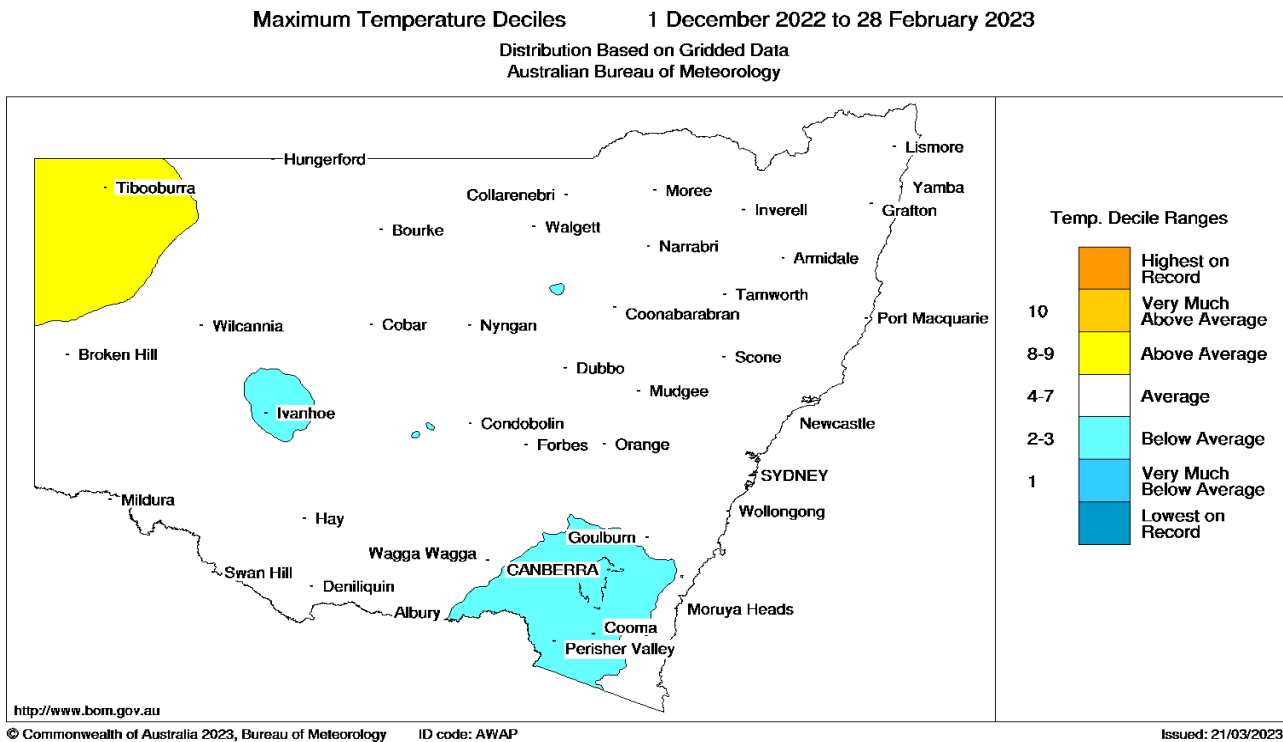




**Figure 8** Gunnedah AQM station meteorology conditions, showing rainfall days and seasonal maximum and minimum temperatures during summer, 1 December to 28 February 2023.

## Temperature

Maximum daytime temperatures across the Namoi/North West Slopes region were average according to the Bureau’s summer 2022-23 seasonal summary (Figure 9)<sup>12</sup>. December had cooler-than-average days, and the far northwest had mean daily maximum temperatures warmer than average.



**Figure 9** NSW maximum temperature deciles, showing average maximum temperatures in the North West Slopes region during summer, 1 December to 28 February 2023

<sup>12</sup> [Temperature \(maximum\) decile map for 3 months to 28 February 2023](#), Bureau of Meteorology, accessed August 2023.

The department's Gunnedah AQM station recorded cooler-than-average days (maximum temperatures) compared to the long-term summer maximum at Gunnedah AWS. Summer maximum temperatures at Gunnedah AQM station ranged from 21.9–38.0°C (orange line at Figure 8), with an average of 30.8°C, about 3°C lower compared to the long-term summer maximum at Gunnedah AWS (33.4°C)<sup>13</sup>.

Overnight (minimum) temperatures Gunnedah AQM station was slightly above average. Minimum temperatures ranged from 17.2–29.7°C (blue line at Figure 8) with an average of 17.2°C, about 0.2°C lower than the Gunnedah AWS<sup>13</sup> long-term average summer minimum (17.6°C). The Bureau's summer 2022–23 seasonal summary<sup>13</sup> shows average minimum temperatures in the region.

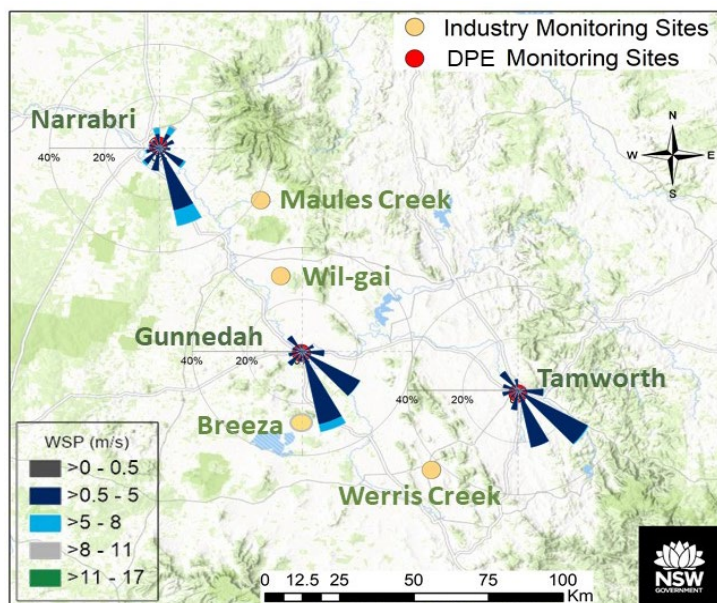
## Wind

The topography of the North West Slopes region is characterised by highlands in the east and south, and to the west lies a broad floodplain, with Namoi River flowing north-west through Gunnedah and Narrabri, and Peel River flowing north-west through Tamworth. Prevailing winds across the region generally align with direction of the Namoi and Peel River valleys, that is, along the south-east to north-west sector.

The wind rose map at Figure 10 shows wind direction and speed in the region, with the length of the bars showing the percentage of time wind blows from each direction, and colours along the bars indicating wind speed categories.

As is typical for the Namoi region during summer months, prevailing winds in summer 2022–23 were generally light to moderate south-easterlies. However, some influence from other sectors was observed from all 3 stations.

Gunnedah AQM station<sup>14</sup> is located within the region's population centre, as is Tamworth AQM station<sup>15</sup> and both stations are surrounded by high population densities. Narrabri AQM station<sup>16</sup> is located at Narrabri Airport, outside of the regional population centre which is located to the west.



**Figure 9** Wind rose map for the Namoi/North West Slopes during summer 2022–23

<sup>13</sup> [Temperature \(minimum\) decile map for three months to 28 February 2023](#), Bureau of Meteorology, accessed August 2023.

<sup>14</sup> [About the DPE Gunnedah Air Quality Monitoring station.](#)

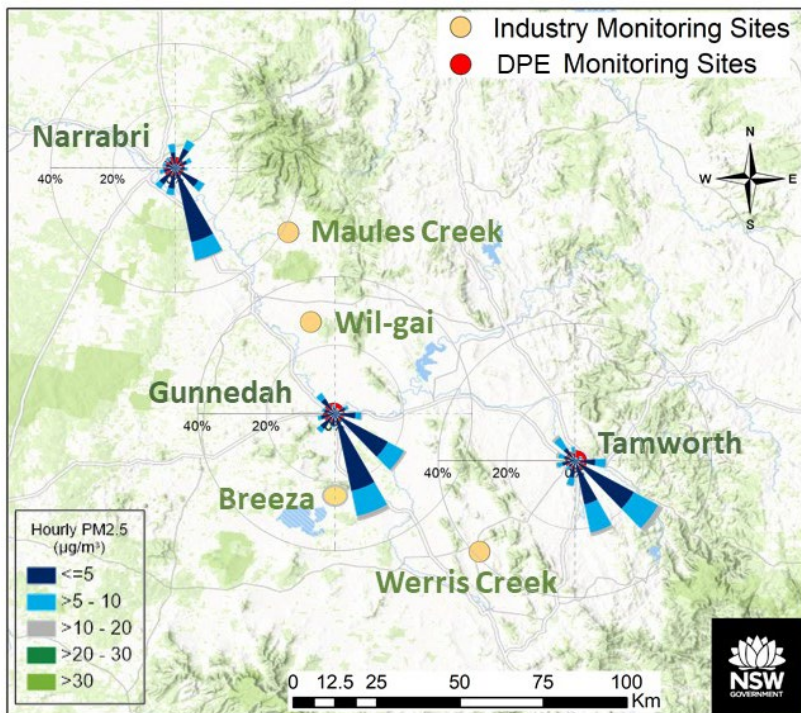
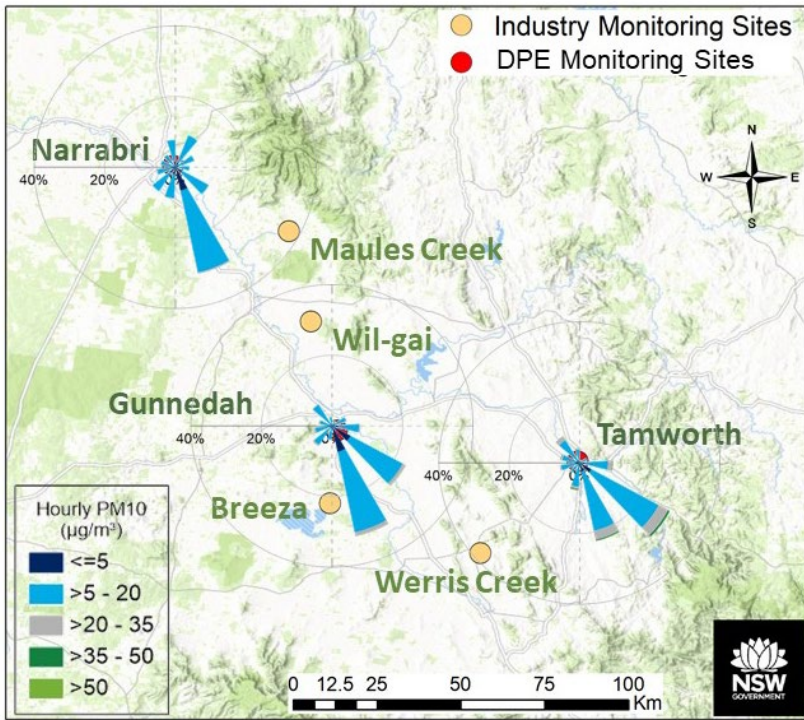
<sup>15</sup> [About the DPE Tamworth Air Quality Monitoring station.](#)

<sup>16</sup> [About the DPE Narrabri Air Quality Monitoring station.](#)

# Pollution roses from hourly particle data

Pollution roses show the wind direction and particle levels at a location, with the length of each bar around the circle showing the percentage of time wind blows from each direction. The colours along the bars indicate the concentration of particle levels. Figure 11 shows summer 2022-23 pollution roses for the 3 regional centres (Narrabri, Gunnedah and Tamworth).

High levels of hourly PM10 and PM2.5 were predominantly associated with south-easterly winds at all stations with some distinctions. Lower particle levels were also associated with north westerlies at Gunnedah and Tamworth. However, at Narrabri lower particle levels were associated with northeasterlies.



**Figure 10** Pollution roses for hourly PM10 (top) and PM2.5 (bottom) in summer 2022-23



## Online performance of monitoring stations

The target performance for air quality monitoring at the Department of Planning and Environment stations is at least 95% data availability for all criteria pollutants and meteorological parameters. The maximum online time attainable for gases, NO<sub>2</sub> and O<sub>3</sub>, is 95% due to daily calibrations.

Table 2 presents online performance of monitoring stations at Gunnedah, Narrabri, and Tamworth during summer 2022–23:

- all stations met online targets for monitoring of meteorology
- Gunnedah, Narrabri and Tamworth met online targets for monitoring of PM10 and PM2.5.

**Table 2 Online performance (%) from 1 December to 28 February 2023**

Station	Particles PM10 daily	Particles PM2.5 daily	Gases NO <sub>2</sub> hourly	Gases O <sub>3</sub> hourly	Meteorology wind hourly
Gunnedah	97.8	97.8	93.5	95.5	98.3
Narrabri	100	100	-	-	99.9
Tamworth	100	98.9	95.6	95.6	99.7

'-' not monitored.

Reduced online times were due to;

- Gunnedah NO<sub>2</sub>: performance was slightly below target due to calibration performance on 4 and 11 February.

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