

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

Air quality in regional population centres in the Namoi/North West Slopes was generally good<sup>1</sup> in summer 2020–21, meeting national benchmarks<sup>2</sup> on all 91 days (100%), compared to 58 days (63%) in summer 2019–20 and 82 days (90%) in summer 2018–19. Air quality improved at all seven air quality monitoring stations<sup>3</sup> across the region, compared with spring–summer 2019–20, following above average rainfall in December 2020 and throughout 2020.

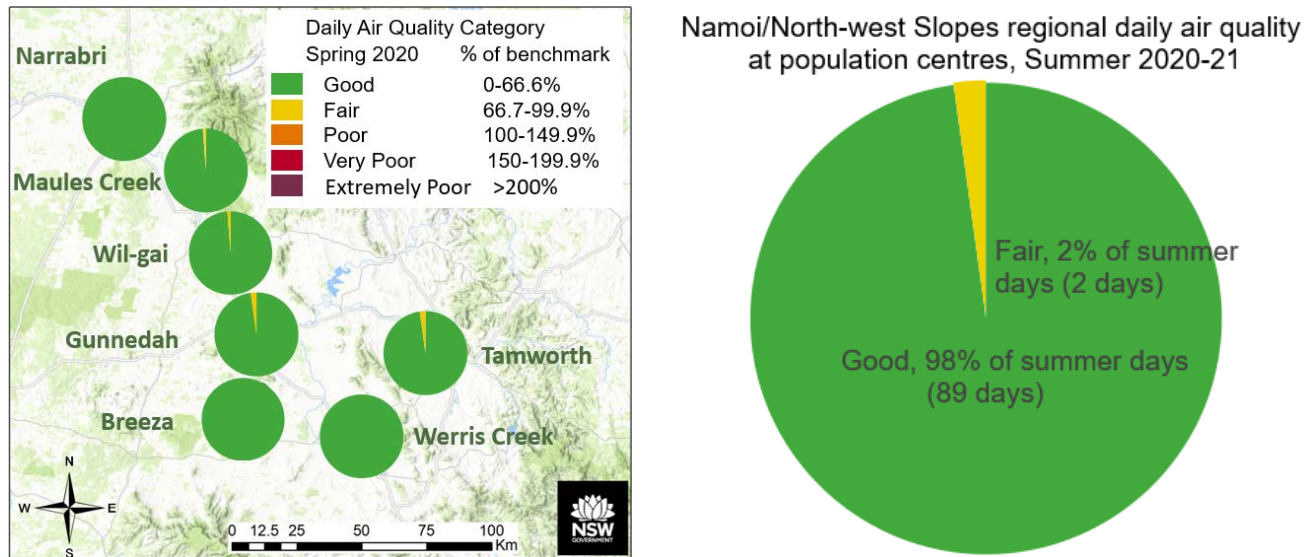


Figure 1 Daily air quality categories at monitoring stations (left) and regional air quality (right)

### Air quality summary statistics, summer 2020–21

Table 1 Air quality summary statistics, by station, 1 December 2020 to 28 February 2021

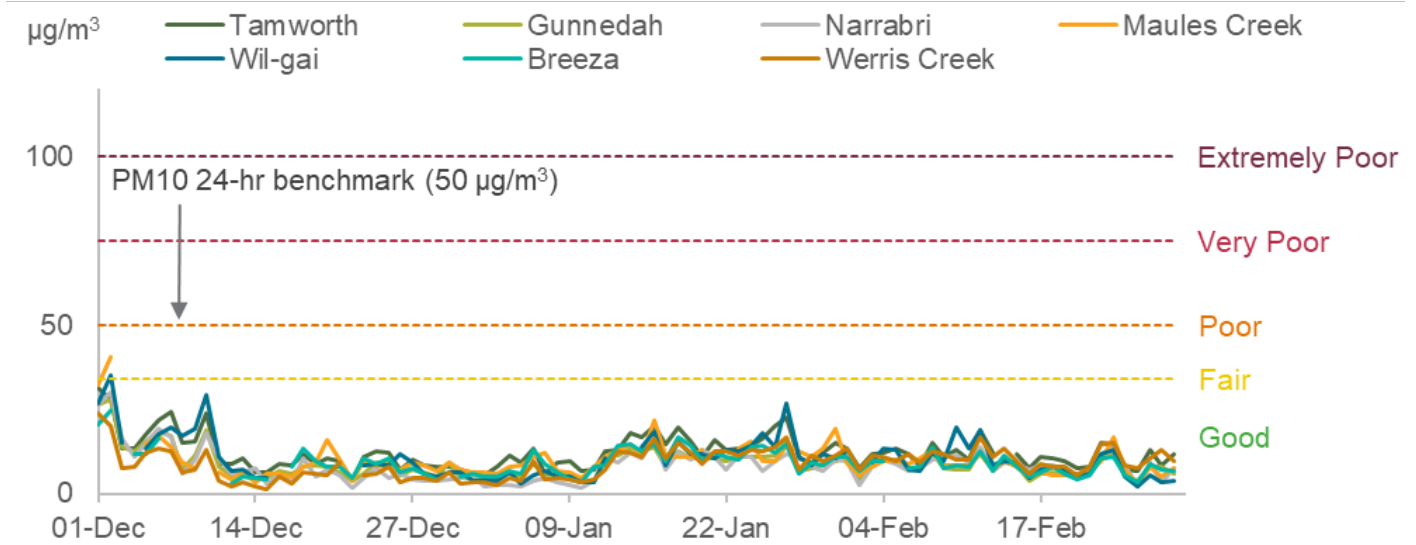
Station	PM10 daily benchmark [50 µg/m <sup>3</sup> ]	PM2.5 daily benchmark [25 µg/m <sup>3</sup> ]	NO <sub>2</sub> hourly benchmark [12 pphm]	O <sub>3</sub> hourly benchmark [10 pphm]	O <sub>3</sub> 4-hourly benchmark [8 pphm]
Narrabri	0	0	-	-	-
Gunnedah	0	0	0	0	0
Tamworth	0	0	-	0	0
Maules Creek	0	0	-	-	-
Wil-gai	0	0	-	-	-
Breeza	0	0	-	-	-
Werris Creek	0	0	-	-	-

- = not monitored, hr=hour, 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</sup> This newsletter uses revised NSW [air quality categories](#) to compare air pollutants to national benchmarks. The 'Good' category combines the 'Very Good' and 'Good' categories used previously. 'Extremely Poor' replaces the 'hazardous' category.  
<sup>2</sup> The [National Environment Protection \(Ambient Air Quality\) Measure \(Air NEPM\)](#) sets national standards for common urban air pollutants. This report refers to the national standards as 'benchmarks' for reporting air quality.  
<sup>3</sup> Seven air quality monitoring stations operate in the region. The NSW Government operates the monitoring stations at Tamworth (from October 2000), Gunnedah and Narrabri (from December 2017). Data are updated hourly on the [NSW air quality website](#). Industries operate the monitoring stations at Maules Creek, Wil-gai, Breeza and Werris Creek. Industry data are reported weekly on the [NSW Environment Protection Authority Namoi air quality monitoring project website](#). All stations continuously monitor airborne particles with diameters less than 10 and 2.5 micrometres, referred to as PM10 and PM2.5 respectively. The Gunnedah monitoring station also monitors gaseous air pollutants, nitrogen dioxide (NO<sub>2</sub>) and ozone (O<sub>3</sub>). Temporary ozone monitoring began at Tamworth in November 2020 as part of the NSW regional ozone monitoring campaign.

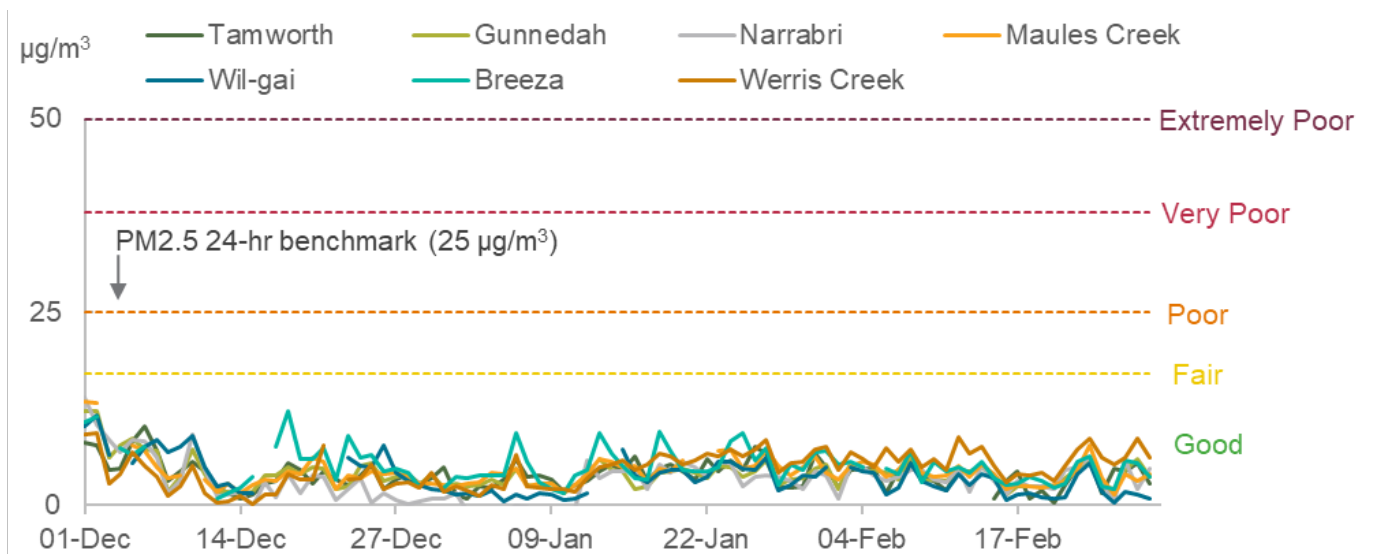
## Air quality: particle pollution summer 2020–21

The time series of daily average particle concentrations shows PM10 levels well below the benchmark. No site recorded PM10 concentrations above the benchmark during summer 2020–21 (Figure 2).



**Figure 2** Daily average PM10 in summer 2020-21, showing concentrations below the benchmark

Daily average PM2.5 levels were below the benchmark. No site recorded PM2.5 concentrations above the benchmark during summer 2020–21 (Figure 3). For comparison, Tamworth, Narrabri and Gunnedah recorded 18, 10 and 18 PM2.5 exceedances respectively during summer 2019–20 due to bushfires and dust storms.

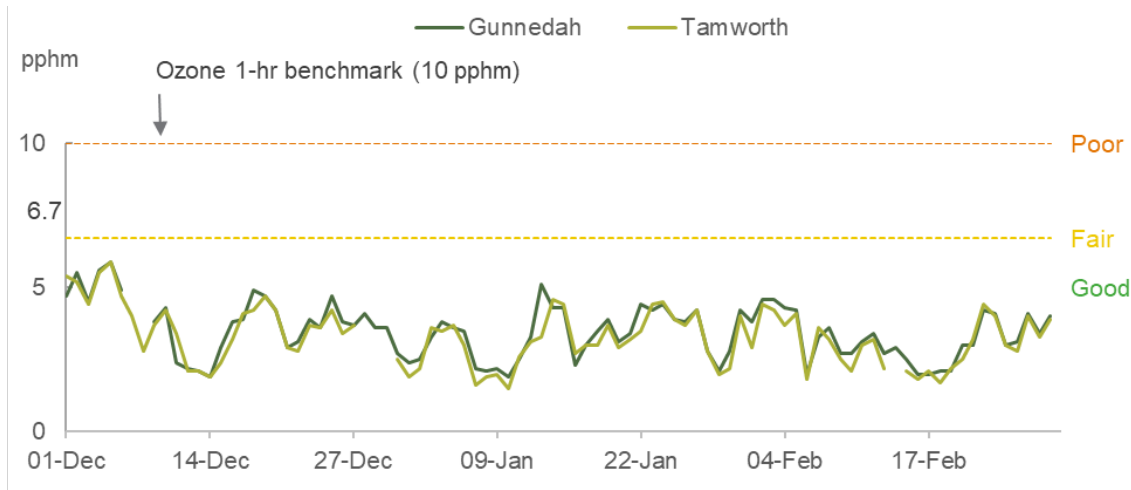


**Figure 3** Daily average PM2.5 in summer 2020-21, showing concentrations below the benchmark

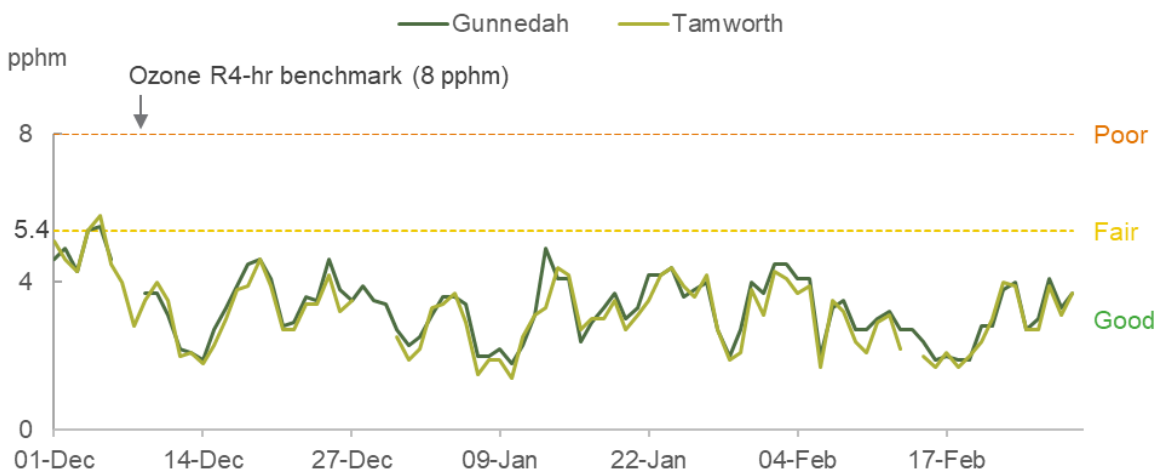
## Air quality: gaseous pollution, summer 2020–21

Figure 4 to Figure 6 show gaseous pollution concentrations were below relevant standards for O<sub>3</sub> and NO<sub>2</sub>, respectively, throughout summer 2020–21. Temporary ozone monitoring began at Tamworth in November 2020 as part of the NSW regional ozone monitoring campaign and continued throughout the summer.

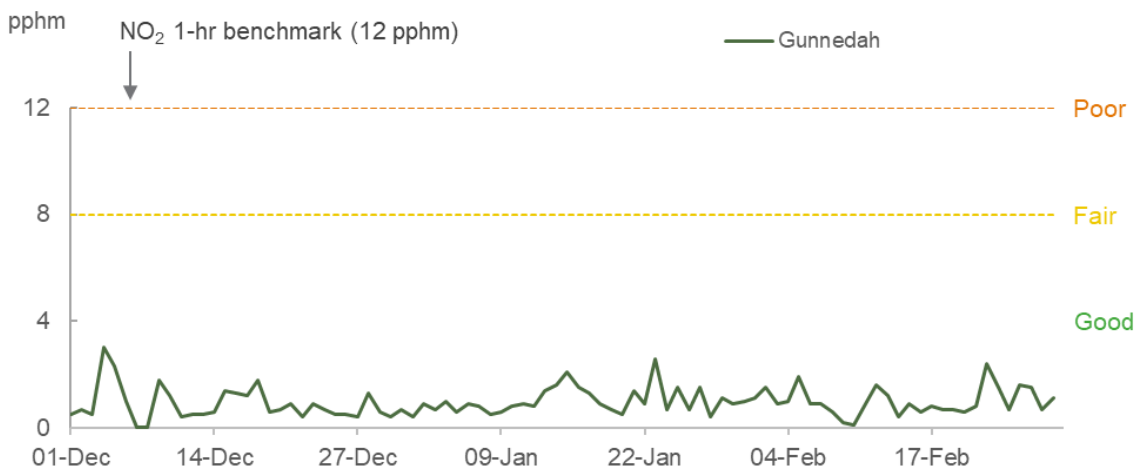
The similar maximum daily concentrations observed at Gunnedah and Tamworth demonstrate that observed ozone concentrations are likely to represent levels expected for the region overall.



**Figure 4** Ozone daily maximum 1-hour average concentrations at Gunnedah and Tamworth, during summer 2020–21, showing levels below the benchmark



**Figure 5** Ozone daily maximum rolling 4-hour average concentrations at Gunnedah and Tamworth, during summer 2020–21, showing levels below the benchmark



**Figure 6** Nitrogen dioxide daily maximum 1-hour average concentrations at Gunnedah, during summer 2020–21, showing levels well below the benchmark

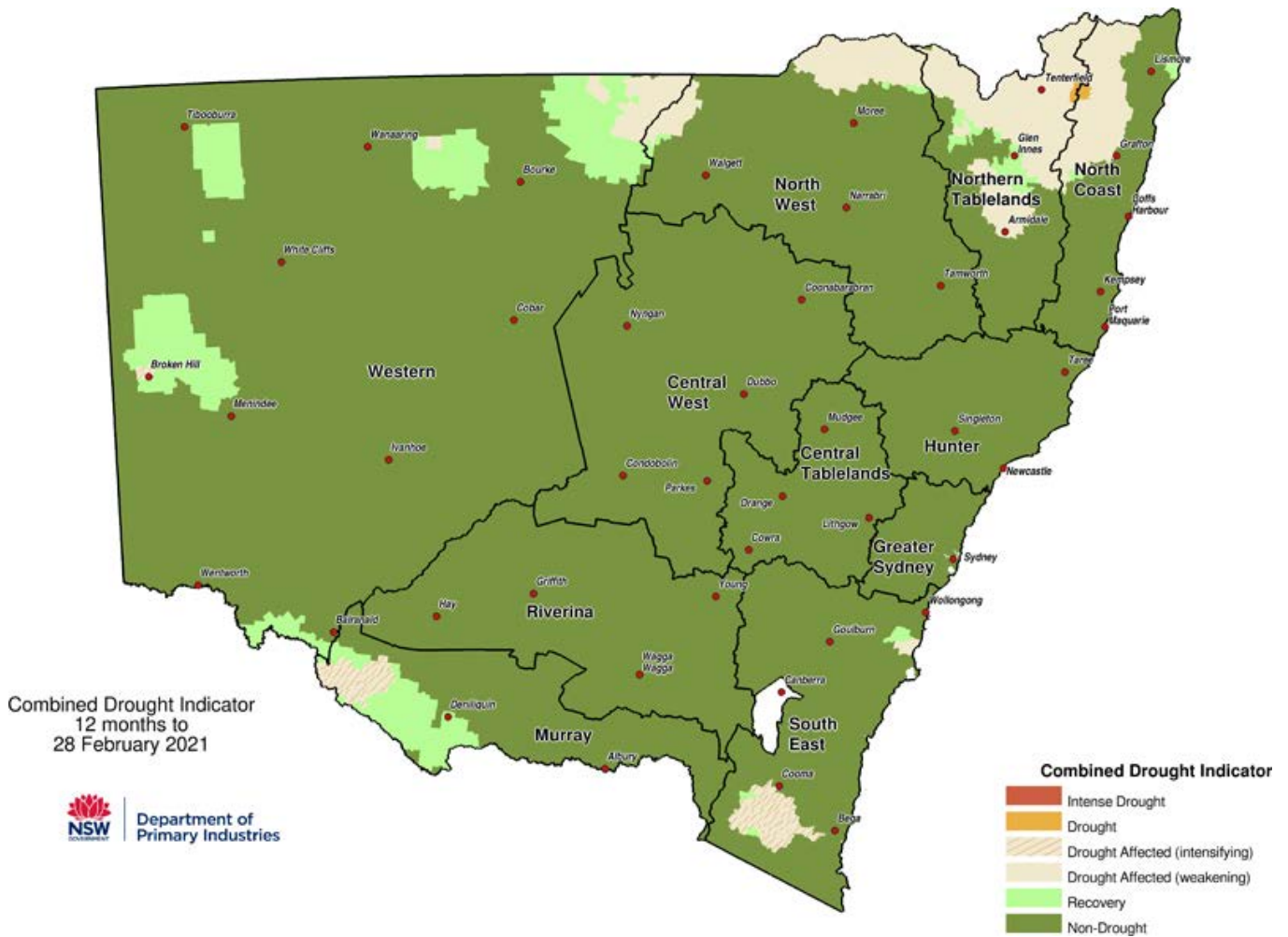
## Seasonal weather and climate<sup>4</sup>

Summer 2020–21 in New South Wales was the coolest since 2011–12, with a mean temperature 0.03°C above average. Summer rainfall was generally above average across the region, as a series of low-pressure systems and troughs brought heavy rainfall across the region from mid to late December 2020. In contrast, a short heatwave at the start of the month saw Gunnedah record its hottest December day on record<sup>4</sup>.

## Drought conditions and dust activity

Drought recovery remained weak, carrying the risk of a ‘false recovery’<sup>5</sup>. The NSW Department of Primary Industry reported 6% of the State was drought declared by the end of November 2020, compared to 99.9% of the State drought declared at the end of November 2019 (Figure 7).

DustWatch<sup>6</sup> reported a persistence of dust in the south of New South Wales, with overall dust levels below average.



**Figure 7** NSW Combined Drought Indicator – 12 months to 28 February 2021<sup>5</sup>, showing non-drought conditions across the Namoi/North West region

<sup>4</sup> Seasonal Climate Summary for New South Wales in Summer 2020-21, Monthly Climate Summary for New South Wales in December 2020, January 2021 and February 2021, accessed May 2021.

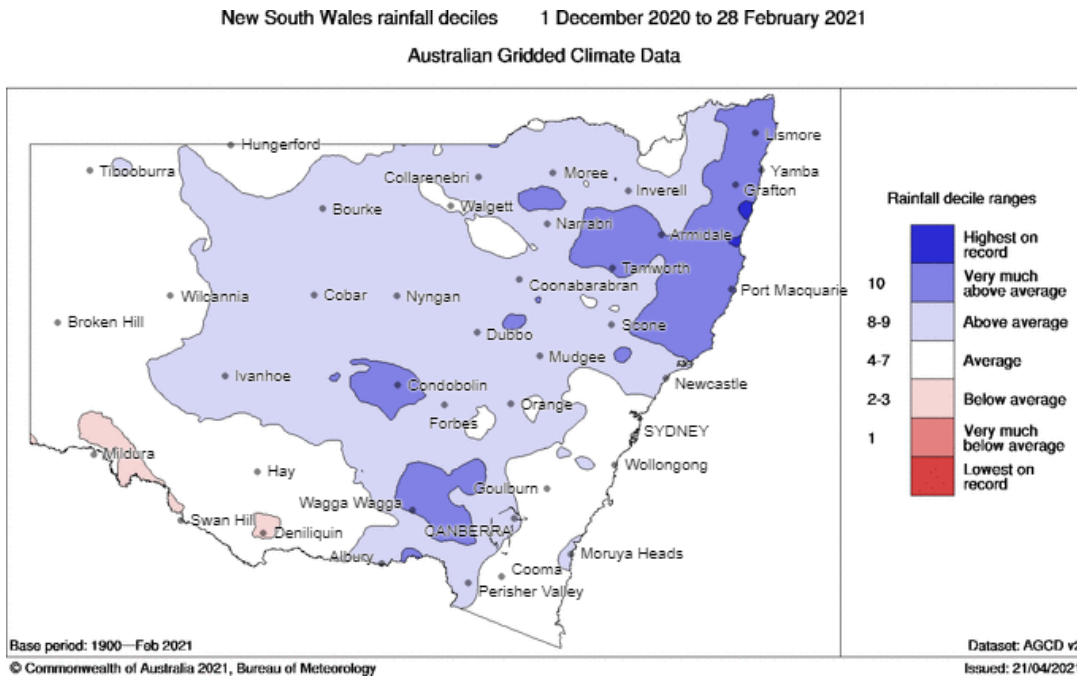
<sup>5</sup> Department of Primary Industries State Seasonal Update – February 2021, accessed May 2021.

<sup>6</sup> DustWatch Reports, December 2020, January 2021 and February 2021, accessed May 2021.

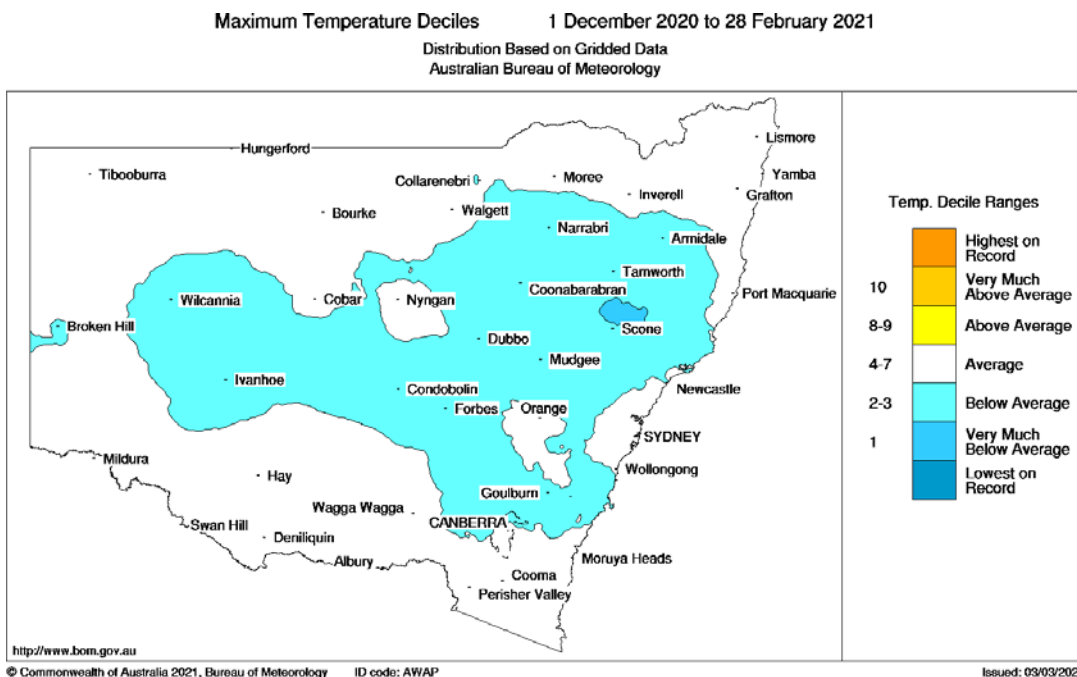
## Rainfall and temperature

Summer 2020–21 rainfall was above or very much above average across the region (Figure 8)<sup>7</sup>. Regional rainfall ranged between 200–400 millimetres (mm)<sup>8</sup>. Compared with previous summer seasons, rainfall totals were 100–200 mm higher than summer 2019–20 and 200–375 mm higher than summer 2018–19.

Maximum temperatures were below average during summer 2020–21 (Figure 9). Minimum temperatures were average across the region.



**Figure 8** NSW rainfall deciles for summer, 1 December 2020 to 28 February 2021<sup>7</sup>, showing above average to very much above average rainfall in the Namoi/North West Slopes

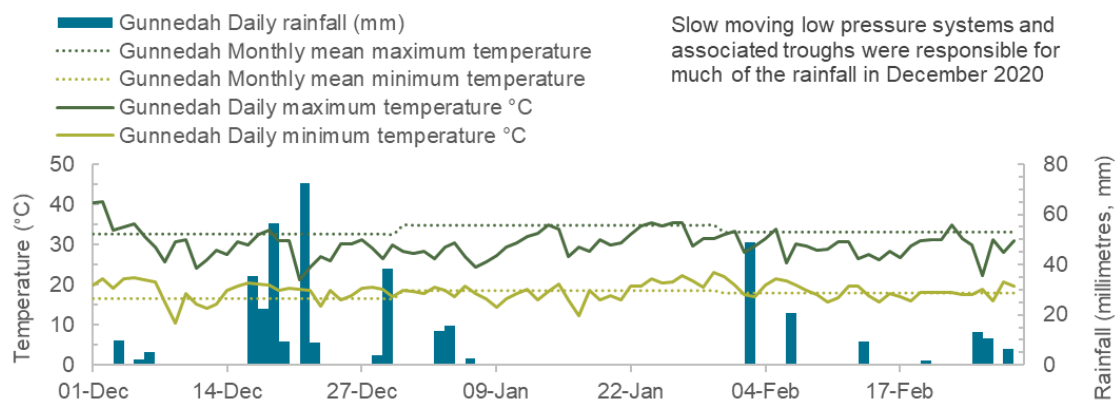


**Figure 9** NSW maximum temperature deciles for summer, 1 December 2020 to 28 February 2021<sup>7</sup>, showing below average temperatures the Namoi/North West Slopes

<sup>7</sup> [NSW rainfall and temperature deciles for three months 1 December 2020 to 28 February 2021](#), Bureau of Meteorology, accessed May 2021.

<sup>8</sup> [Regional summer rainfall totals 2020-21 and 1-year to 3-year differences](#), Bureau of Meteorology, accessed May 2021.

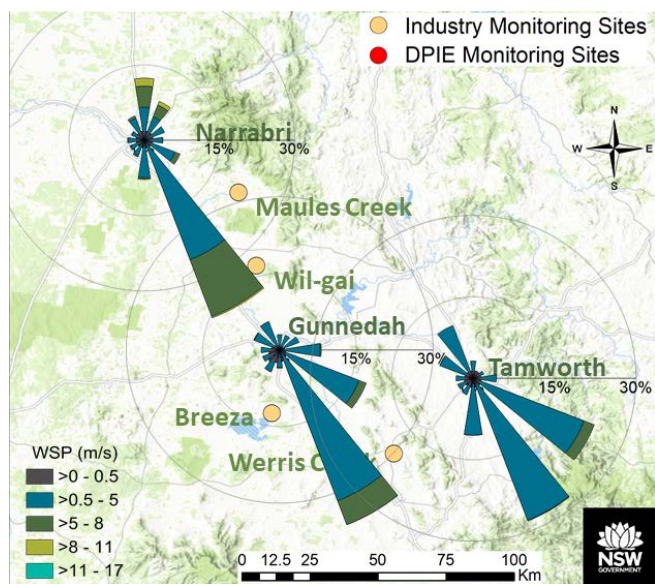
Figure 10 shows rainfall and maximum and minimum temperatures<sup>9</sup>, compared to long-term averages<sup>10</sup> at Gunnedah in summer 2020–21. Maximum temperatures ranged from 21.1 to 40.7 °C, with an average maximum temperature of 31.2 °C compared to the long-term summer mean maximum of 33.4 °C. Minimum temperatures ranged from 10.4 to 23 °C, with an average minimum temperature of 16.9 °C compared to the long-term summer mean minimum of 17.7 °C. Rain was recorded on 34% of summer days (31 days). Heaviest rainfall was associated with the passage of low-pressure systems and associated troughs in December 2020<sup>11</sup>.



**Figure 10** Gunnedah temperatures and rainfall in summer 2020–21, showing heavy rain in December

## Wind

Wind directions across the North West Slopes generally align with the south-east to north-west direction of the Namoi and Peel River valleys<sup>12</sup>. Prevailing winds were generally light to moderate south-easterlies in summer 2020–21. Narrabri recorded light and moderate to strong north to north-easterly winds (to 10.6 metres per second, m/s). Gunnedah recorded moderate winds predominately from the south-east (to 8.5 m/s) (Figure 11).



**Figure 11** Wind rose map<sup>13</sup> for the Namoi/North West Slopes during summer 2020–21, showing generally light south-easterly winds. Narrabri recorded stronger winds, from the north to north-east

<sup>9</sup> DPIE observations at Gunnedah air quality monitoring station. This data is not NATA accredited.

<sup>10</sup> [Gunnedah summary climate statistics](#) accessed May 2021.

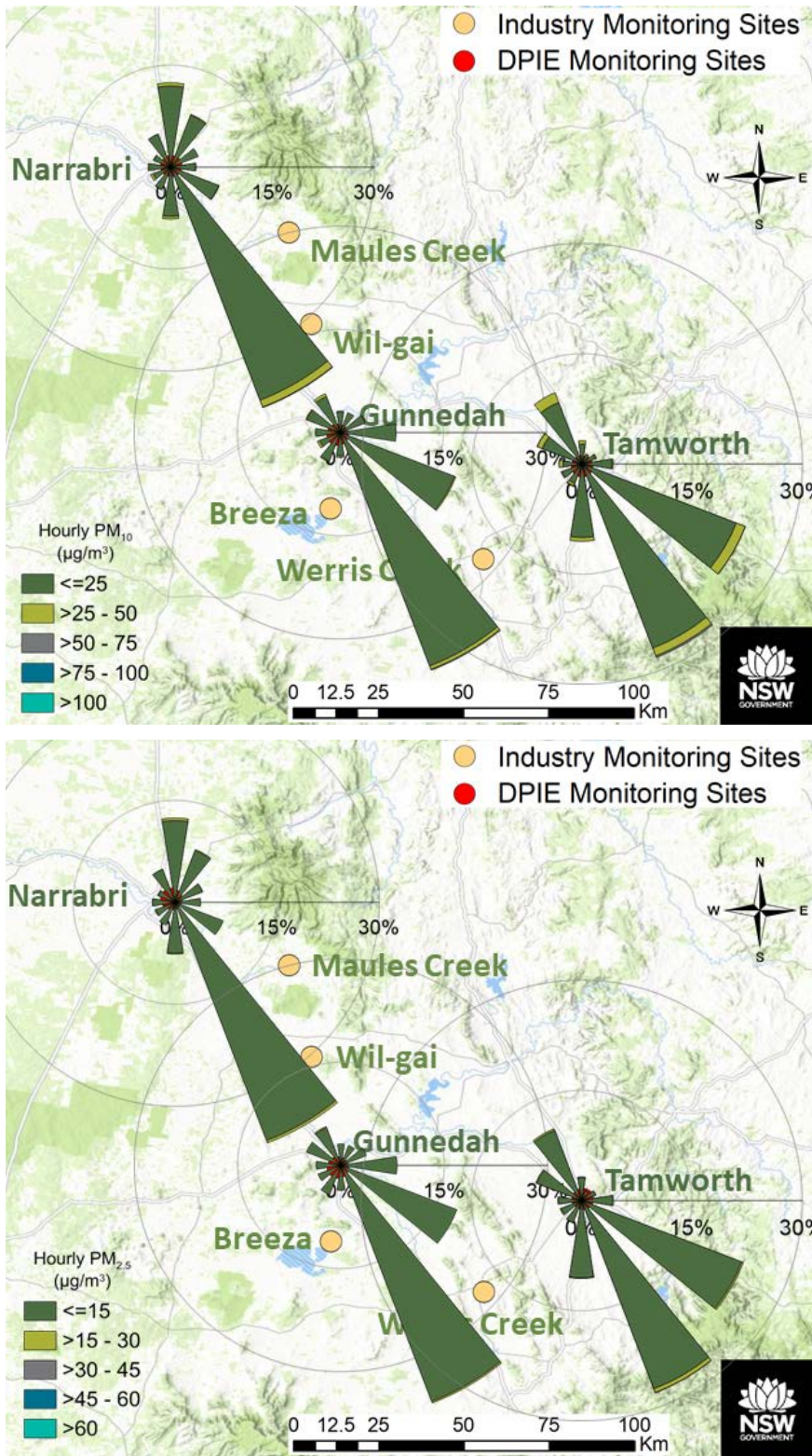
<sup>11</sup> [Synoptic weather charts archive](#), Bureau of Meteorology, accessed May 2021.

<sup>12</sup> The Namoi River flows north-west, through Gunnedah and Narrabri. The Peel River flows north-west through Tamworth, joining the Namoi River near Gunnedah.

<sup>13</sup> Wind roses show wind direction and speed at a location. The length of each bar around the circle shows the percentage of time that the wind blows from each direction. The colours along the bars indicate the wind speed categories.

## Pollution roses

The pollution roses<sup>14</sup> for regional centres during summer 2020–21 show higher hourly PM10 levels generally associated with south-easterly winds at all sites, as well as with north-westerly winds at Tamworth. Higher hourly PM2.5 levels were associated generally with south-easterly winds at all three sites (Figure 12).



**Figure 12** Pollution roses for hourly PM10 (top) and PM2.5 (bottom) in summer 2020–21

<sup>14</sup> Pollution roses show the wind direction and particle levels at a location. The length of each bar around the circle shows the percentage of time the wind blows from each direction. The colours along the bars indicate the concentration of particle levels. Air quality in the Namoi/North-west Slopes Region: Summer 2020-21

## Online performance of monitoring stations, summer 2020-21

The target performance for air quality monitoring at the Department of Planning, Industry and Environment sites 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 96%, due to daily calibrations.

Table 2 presents online performance of monitoring stations at Gunnedah, Narrabri and Tamworth, from 1 December 2020 to 28 February 2021:

- All stations met online targets for monitoring of meteorology.
- All stations met online targets for PM10 and PM2.5 monitoring.

**Table 2** Online performance (%) from 1 December 2020 to 28 February 2021

Station	Particles PM10 daily	Particles PM2.5 daily	Gases NO <sub>2</sub> hourly	Gases O <sub>3</sub> hourly	Meteorology wind hourly
Gunnedah	99	99	94	94	100
Narrabri	100	100	-	-	100
Tamworth	99	98	-	92	100

'-' = not monitored.

Reduced online times were due to:

- Gunnedah Ozone and NO<sub>2</sub> – maintenance and calibration (December 2020).
- Tamworth Ozone – instrument maintenance and calibration (December 2020).

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