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Broken Hill air quality (lead) monitoring report

March 2020 to June 2025

Department of Climate Change,
Energy, the Environment and Water

Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

Artist and designer Nikita Ridgeway from Aboriginal design agency Boss Lady Creative Designs created the People and Community symbol.

Cover photo: Western Ridge walking track, Mutawintji National Park. John Spencer/DCCEEW

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ISBN 978-1-76186-080-5
EH 2025/0419 November 2025

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Summary

This report summarises the results of air monitoring data collected at Broken Hill between March 2020 and June 2025.

Monitoring is conducted with varying technologies at 7 locations throughout Broken Hill. Four high-volume monitors sample the air for 24 hours every 6 days. This monitoring allows for direct comparison with the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) standard for lead of 0.5 $\mu g/m^3$ based on an annual average. The annual average lead levels in air at these sites ranged from 0.029 $\mu g/m^3$ to 0.128 $\mu g/m^3$ for the data collection period. These are below the AAQ NEPM standard.

Seven dust deposition gauges are used to measure the monthly mass of deposited dust and the mass of lead in that dust. Lead in dust levels for the period ranged from 0.00034 g/m^2/month to 0.0059 g/m^2/month across the sites. There is no NEPM standard for dust deposition rate.

One-directional high-volume monitor is used to measure lead in the air during the period when wind is blowing from northwest to northeast directions (that is, wind passed over the line of lode areas). The directional high-volume monitor data is included in the report for completeness and cannot be validly compared to any NEPM standard due to the monitoring technique used.

1. Monitoring network

The Broken Hill Air Quality Monitoring Network (BHAQMN) consists of 7 monitoring sites around Broken Hill (Figure 1). These are identified as National Parks (NPWS), Wetlands, Water Tank (Waterboards), Sewerage Works (Sewerage Pumping Station), South Morish St (Old South Pool), North Memorial Oval (North Mem Oval) and Wentworth Rd (Silver City Highway). The network site establishment was completed progressively from March 2020 to February 2022, varying slightly across sites and methods, as shown in Table 1.

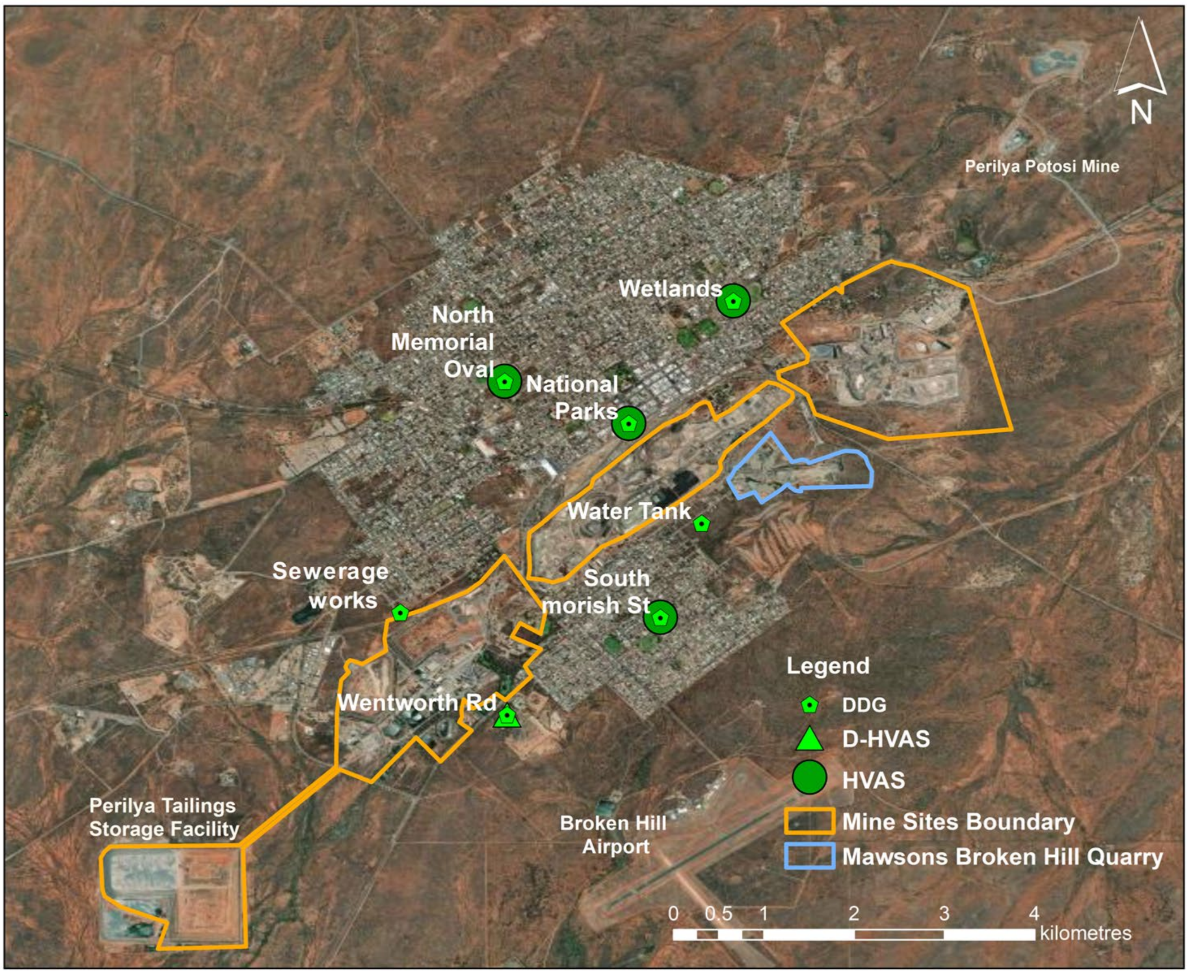

Figure 1 **Broken Hill air quality monitoring site locations (green symbols), with sampling type indicated as: DDG – dust deposition gauge; DHVAS – directional high-volume air sampler; HVAS – high-volume air sampler**

The monitoring network applies 3 different sampling methods (Table 1; further details in Appendix):

- High-volume air sampler (HVAS) – installed at 4 sites, that is, the National Parks, Wetlands, North Memorial Oval and South Morish St sites, to measure total suspended particle (TSP) and lead (Pb) levels in μg/m^3, with instruments runing 24 hours every sixth day.

- Directional high-volume air sampler (DHVAS) – installed at one site, that is, the Wentworth Rd site, to measure TSP and lead levels in µg/m^3 when winds are blown from the sector between the northwest (225°) and northeast (40°) directions (that is, winds passing over line of lode areas). The DHVAS operates only when wind speed exceeds 0.2 m/s and the wind blows downwind of the line of lode area for at least 90 seconds. To be considered valid, DHVAS samples must meet a minimum sampling duration of 480 minutes, otherwise, they are discarded.
- Dust deposition gauges (DDG) – installed at each of the 7 sites, to measure dust deposition contents in g/m^2/month, with samples analysed to estimate total dust mass, total lead mass deposited, and lead content in the dust samples per month.

Table 1 Site coordinates (latitude, longitude) and varying sampling commencement time (month/year)

Site name	Longitude	Latitude	HVAS	DHVAS	DDG
National Parks (NPWS)	141.4633	-31.9607	3/2020	–	7/2020
Wetlands	141.4737	-31.9485	3/2020	–	7/2020
Sewerage Works (Sewerage Pumping Station)	141.4405	-31.9795	–	–	7/2020
Water Tank (Waterboards)	141.4705	-31.9706	–	–	7/2020
Wentworth Rd (Silver City Highway)	141.4512	-31.9897	–	3/2020	7/2020
North Memorial Oval (North Mem Oval)	141.4509	-31.9565	6/2021	–	2/2022
South Morish St (Old South pool)	141.4664	-31.9800	6/2021	–	2/2022

For both the HVAS and DHVAS, the filters are collected and sent to an ISO 17025 accredited laboratory every 6 to 7 days for analysis to obtain TSP and lead measurements. The DDG dust samples are collected and sent to the lab for analysis monthly to obtain measurements for total dust mass, total lead mass deposited and lead content in the dust samples.

TSP refers to all airborne particulate matter suspended in the atmosphere, typically covering a wide size range up to about 100 micrometres.

DDG provides an integrated picture of local dust loadings, capturing both natural and anthropogenic sources such as soil dust, industrial activities, vehicle movements, and mine operations.

2. Monitoring results

A summary is given in the following sections for measurements from the HVAS, DDG and DHVAS monitoring during March 2020 to June 2025 (note- monitoring is ongoing as at the time of this report).

For regulatory air quality reporting of HVAS measurements, annual averages must be based on at least 75% available and valid data (requirement for data quality compliance under the NEPM guidelines). In some instances, for example, where monitoring data were available only for part of a year (Table 1; for example, there are sites with data available starting from February or June 2020 and all sites having data till June 2025), averages reported in this report do not fulfill this minimum data requirement. DDG and DHVAS do not have NEPM guidelines for sample collection and reporting.

For completeness, we report summary statistics based on all valid data available, hence, results from these datasets should be interpreted with caution.

2.1 High-volume air sampling data

HVAS samples are used to quantify TSP levels and determine lead concentrations across monitoring sites at the annual and seasonal levels. In the AAQ NEPM framework, lead is assessed against an annual average air quality standard of 0.50 µg/m^3 standard.

The HVAS monitoring starting date varied slightly across sites (Table 1). Monitoring at National Parks and Wetlands commenced on 15 March 2020, providing the longest and most complete datasets, with 297 and 294 samples respectively. Monitoring at North Memorial Oval and South Morish St began later, on 26 June 2021, yielding 222 and 221 samples, respectively.

2.1.1 Total suspended particulates concentrations (µg/m^3)

Figure 2 illustrates the data distributions for 24-hr TSP measurements at 4 sites for the period March 2020 to June 2025. Figures 3 and 4 show the annual and seasonal average TSP at these sites for the same period.

Across this monitoring period, National Parks recorded the highest TSP concentrations (Figure 2), with annual means ranging from 34 to 67 µg/m^3 and a full period average of around 45 µg/m^3 (Figure 3). In contrast, Wetlands showed lower levels (annual means 23–44 µg/m^3, period average of 30 µg/m^3), followed by South Morish St (annual means 19–28 µg/m^3, period average of 23 µg/m^3) and North Memorial Oval (North Mem Oval), which consistently had the lowest concentrations (annual means 17–30 µg/m^3, period average of 21 µg/m^3).

At the seasonal level (Figure 4), summer typically experiences the highest TSP concentrations and winter experiences the lowest concentrations.

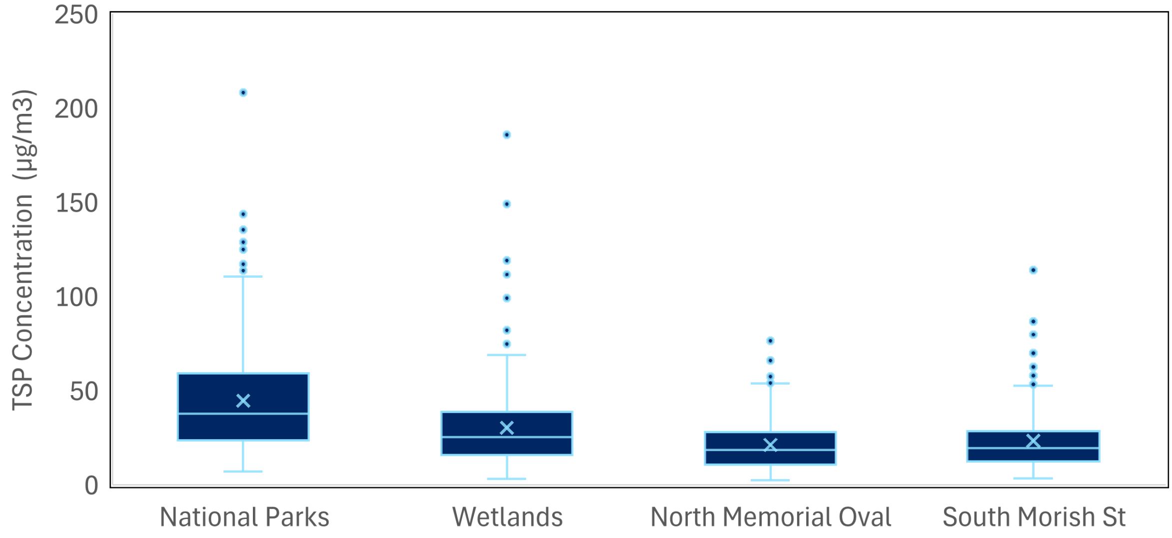

Figure 2 Distribution of 24-hour total suspended particulate (TSP) concentrations (µg/m^3) at 4 monitoring sites, March 2020 to June 2025. Boxplots of total suspended particles (TSP) concentrations (µg/m^3) at the 4 monitoring sites. Each box represents the interquartile range (IQR), with the lower boundary showing the 25th percentile and the upper boundary showing the 75th percentile. The horizontal line inside each box marks the median, while the 'X' symbol indicates the mean concentration. The whiskers extend to 1.5 × IQR, representing the typical variability in the dataset. Points plotted beyond the whiskers represent outliers, indicating days with unusually high TSP levels relative to the rest of the data

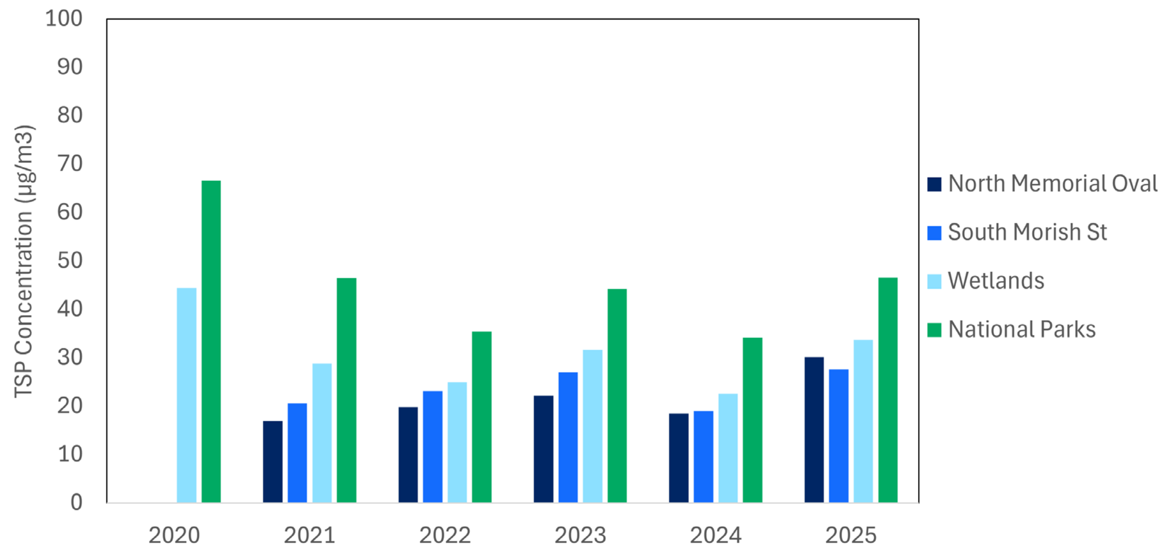

Figure 3 Annual average TSP concentrations (µg/m^3) at 4 monitoring sites, March 2020 to June 2025. The NEPM requirement for minimum (75%) data availability rate was not met in 2020 and 2025 for all sites, and in 2021 for North Memorial Oval and South Morish St in 2021

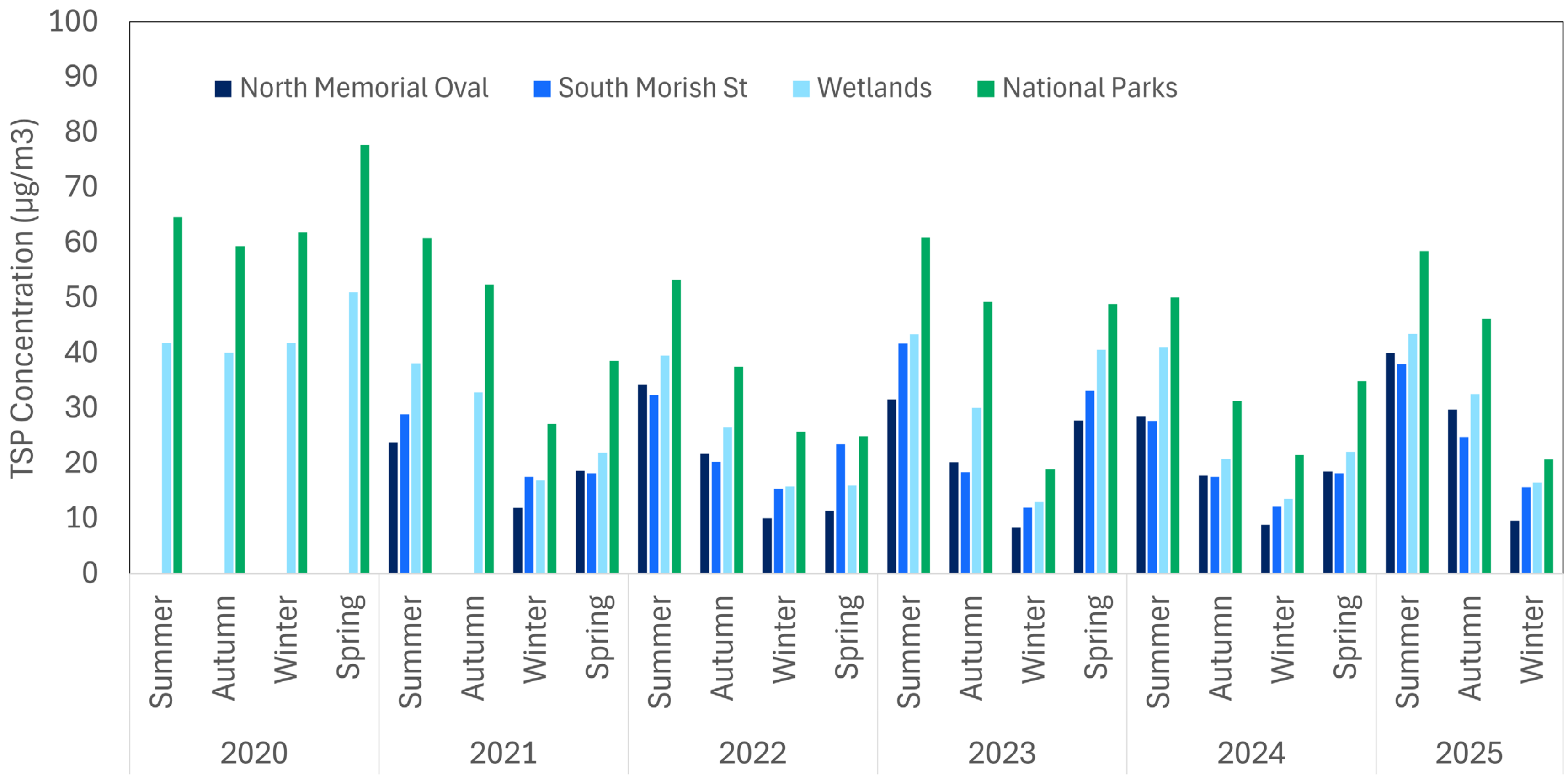

Figure 4 **Seasonal average TSP concentrations (µg/m^3) at 4 monitoring sites, March 2020 to June 2025. Note: the winter averages for 2025 were based on June datasets only; the data availability rates also differed in 2020 and 2021 among the sites, as indicated in Table 1**

2.1.2 Lead concentrations (µg/m^3)

Figure 5 presents the distribution of 24-hour Pb concentration data across 4 sites, and Figures 6 and 7 show the annual and seasonal average Pb levels. The NEPM requirement for minimum (75%) (valid) data availability rate was not met for annual averages in 2020 and 2025 for all sites, and in 2021 also for monitoring at North Memorial Oval and South Morish St in 2021.

Across the reporting period (Figure 5), National Parks exhibited the highest median and the widest spread of 24-hr Pb values. The overall average Pb concentration for this reporting period was below the NEPM annual standard of 0.50 µg/m^3 across all sites.

The annual mean Pb concentrations across the 4 sites show a relatively consistent spatial variation pattern over the monitoring period (Figure 6). Main points are summarised below:

- National Parks consistently recorded the highest Pb concentrations, with annual means ranging from 0.087 to 0.128 µg/m^3 and a full period average of 0.112 µg/m^3.
- South Morish St measured lower Pb levels, with annual means in the range of 0.029–0.074 µg/m^3 and a period average of 0.051 µg/m^3, while Wetlands annual means varied from 0.045 to 0.063 µg/m^3 with a period average of 0.052 µg/m^3.
- North Memorial Oval (North Mem Oval) recorded the lowest Pb concentrations, with annual means ranging from 0.032 to 0.043 µg/m^3 and a period average of 0.039 µg/m^3.

The seasonal mean Pb concentration plot (Figure 7) shows consistently low Pb levels (relative to the NEPM annual standard) across all 4 monitoring sites and across all reporting years, with higher Pb concentrations typically observed in the summer and lower concentrations observed in the winter.

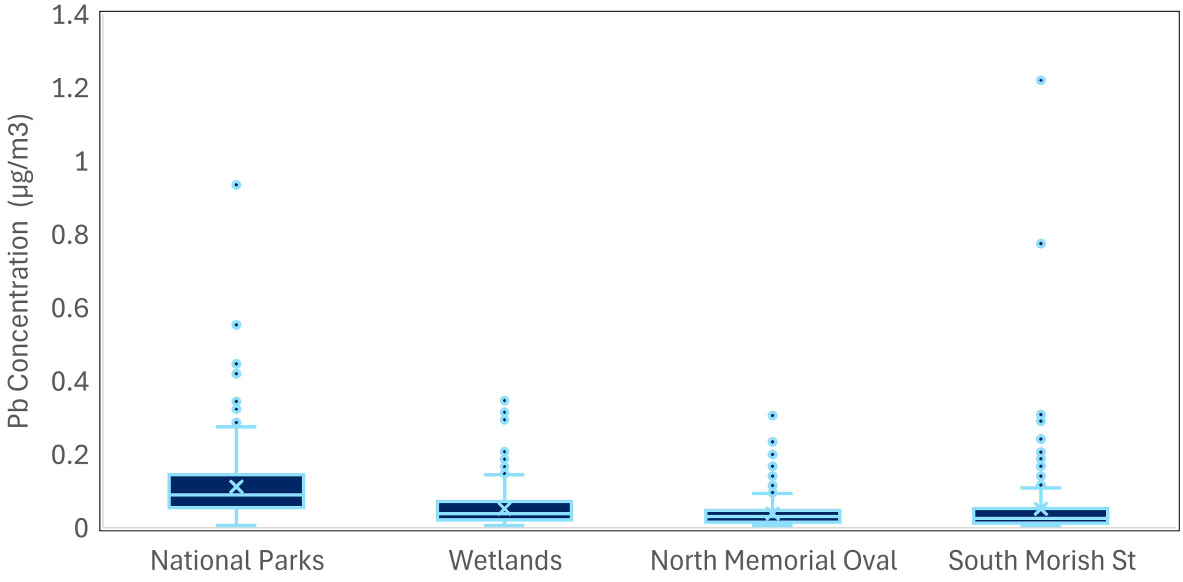

Figure 5 **Distribution of 24-hour lead (Pb) concentrations (µg/m³) at 4 monitoring sites, March 2020 to June 2025. Boxplots of airborne lead (Pb) concentrations (µg/m³) measured at the 4 monitoring sites. The box shows the interquartile range (IQR), spanning the 25th to 75th percentiles. The horizontal line inside each box represents the median, while the 'X' symbol shows the mean Pb concentration. The whiskers extend to 1.5 × IQR, indicating the expected spread of the data. Points plotted beyond the whiskers are outliers, representing days with Pb levels notably higher than typical background concentrations. These outliers reflect episodic high-dust or resuspension events rather than sustained elevated conditions**

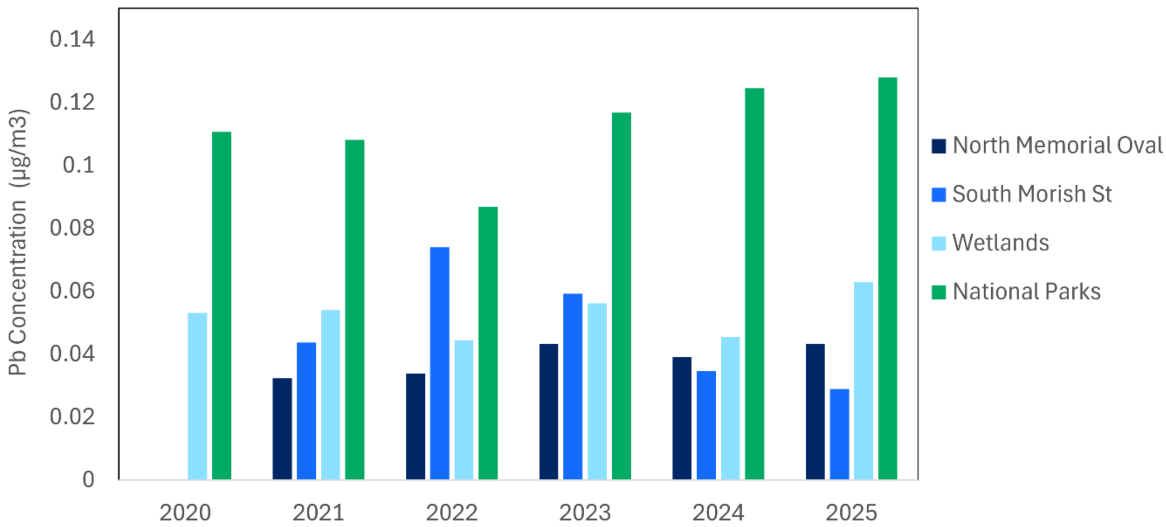

Figure 6 **Annual average Pb concentrations (µg/m³) at 4 monitoring sites, March 2020 to June 2025. The NEPM requirement for minimum (75%) data availability rate was not met for annual averages in 2020 and 2025 for all sites, and in 2021 also for monitoring at North Memorial Oval and South Morish St in 2021**

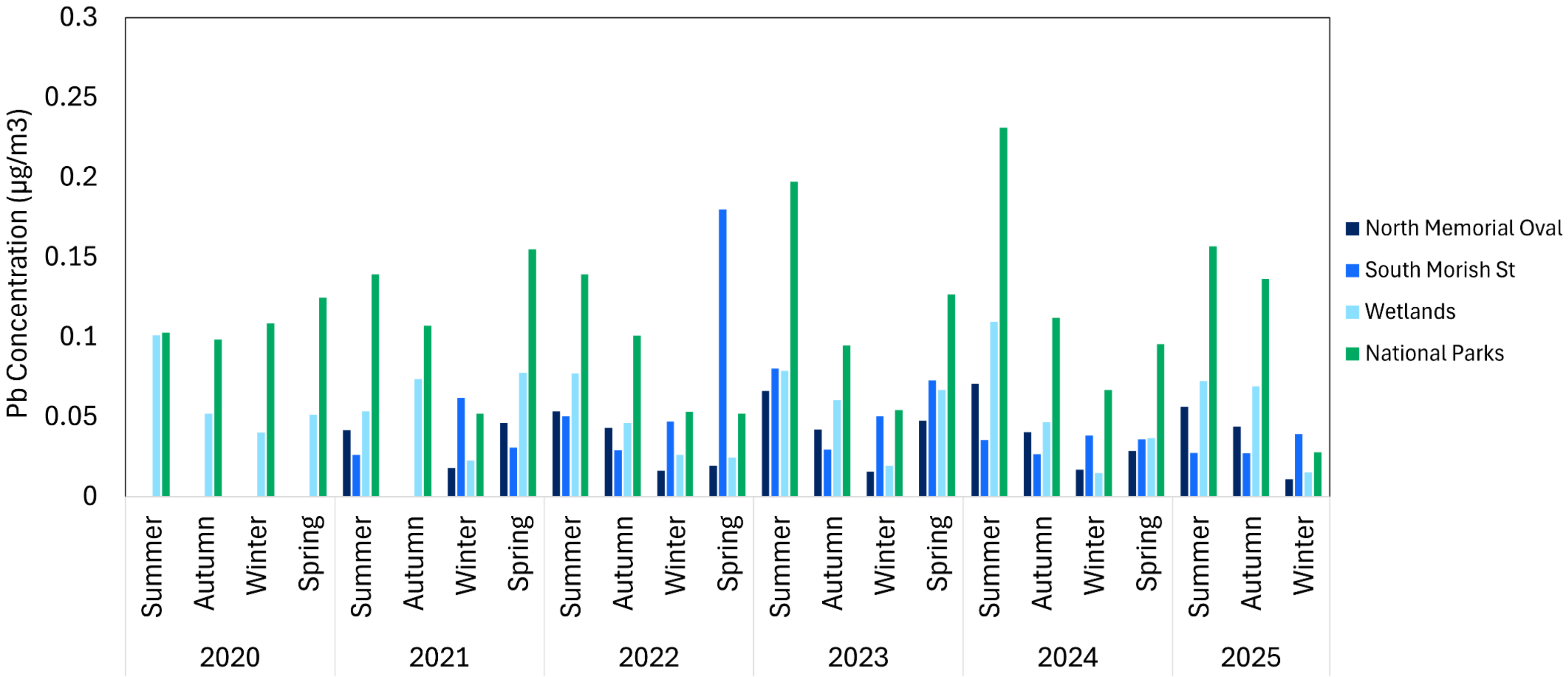

Figure 7 **Seasonal average Pb concentrations (μg/m^3) at the 4 monitoring sites, March 2020 to June 2025. Note: 1) the data at South Morish St for spring 2022 could have been heavily impacted by localised earthworks occurring in the proximity of the monitor and thus the data may not be representative of ambient conditions; 2) the winter averages for 2025 were based on June datasets only, while data availability also differed in 2020 and 2021 among the sites, as indicated in Table 1**

2.2 Dust deposition data

Across the March 2020 to June 2025 monitoring period, monthly DDG sampling was undertaken across all 7 monitoring sites with slightly varying commencement dates (Table 1). The National Parks, Wetlands, Water Tank, Sewerage Works and Wentworth Rd sites have monthly records starting from 1 July 2020, providing the longest and most complete datasets. Monitoring at North Memorial Oval and South Morish St began later, on 4 February 2022. Across the full data reporting period, Wentworth Rd recorded the highest number of DDG samples (53), followed by National Parks (49), Sewerage Works (49) and Wetlands (48). Water Tank contributed 45 samples, while the more recent sites South Morish St (35) and North Memorial Oval (34) had fewer samples due to later commencement.

2.2.1 Dust deposition rates (g/m^2/month)

Figure 8 shows annual total solids (dust) deposition rates in g/m^2/month in March 2020 to June 2025. The averages for 2025 were based on June datasets only, while data availability also differed for 2020 and 2021 across sites, as indicated in Table 1. The main points are summarised below:

- National Parks had the highest loads overall, with annual means ranging from about 1.9 to 4.2 g/m^2/month and a period average of around 3.3 g/m^2/month. Wetlands also recorded relatively high deposition, with annual means of 1.6–3.9 g/m^2/month and an overall average of around 2.9 g/m^2/month.
- Water Tank and Wentworth Rd sat in the mid-range, with annual means in the range of 1.0–3.5 g/m^2/month and 1.8–2.9 g/m^2/month, respectively, and period averages of 2.4 g/m^2/month at both sites. Sewerage Works shows similar behaviour, with annual means 1.2–3.1 g/m^2/month and a period average of 2.3 g/m^2/month.
- North Memorial Oval and South Morish St, monitored from 2022 onwards, have low to moderate deposition, with annual means of 1.3–3.4 g/m^2/month and 1.4–2.5 g/m^2/month, and period averages of 1.8 and 2.1 g/m^2/month, respectively.

Multi-year mean seasonal total dust deposition varied substantially across some sites, with lower rates of deposition generally occurring during cooler (winter) months of the year and higher rates in warmer (summer) months (Figure 9).

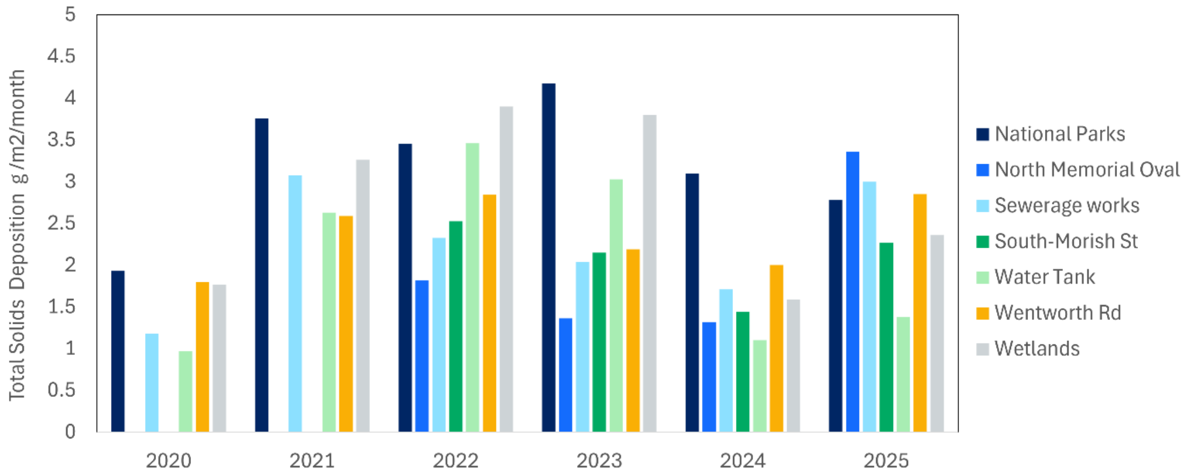

Figure 8 **Annual mean dust deposition (g/m²/month) measured at 7 monitoring sites, March 2020 to June 2025. Note: the averages for 2025 were based on June datasets only, while data availability rates differed for 2020 and 2021 across some sites, as indicated in Table 1**

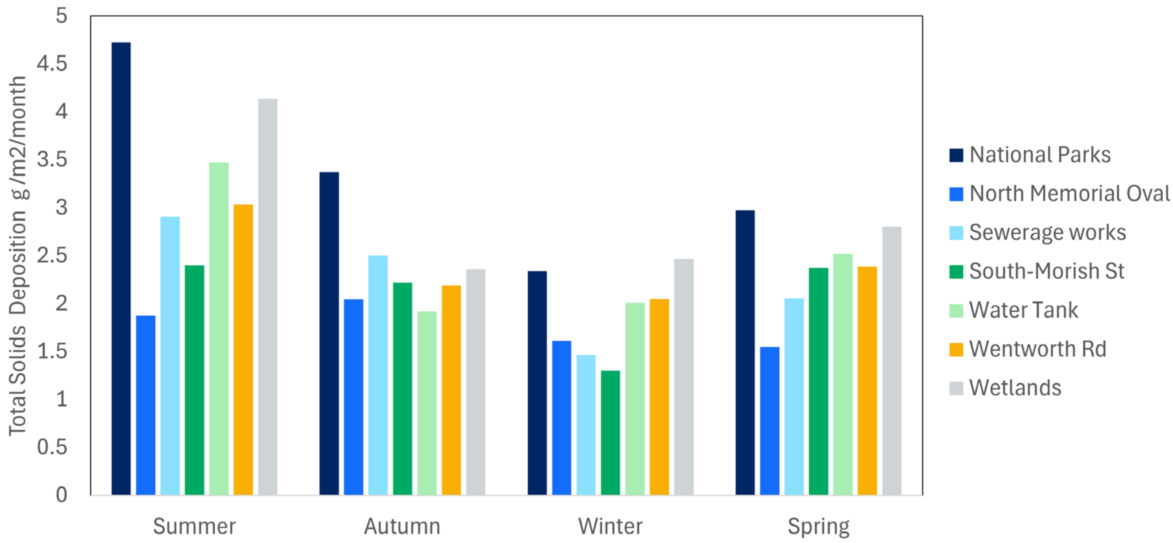

Figure 9 **Multi-year mean seasonal total dust deposition (g/m²/month) at 7 monitoring sites, calculated on all available data during March 2020 to June 2025, as indicated in Table 1**

2.2.2 Lead in dust deposition (g/m²/month)

Figure 10 shows the annual average lead deposition rates across 7 sites. The averages for 2025 were based on June datasets only, with data availability rates also differed in 2020 and 2021 across sites, as indicated in Table 1. Across the 2020 to 2025 monitoring period, Pb deposition showed clear spatial variations among 7 sites. Some main points are summarised below:

- Wentworth Rd recorded the highest Pb loads overall, with annual deposition rates ranging from 0.0026 to 0.0059 g/m²/month and a period mean of 0.00405 g/m²/month.

- National Parks measured the second highest Pb deposition, with annual values between 0.00134 and 0.00343 g/m^2/month and a period average of 0.00232 g/m^2/month.
- Sewerage Works also had relatively elevated Pb levels, ranging from 0.00178 to 0.00304 g/m^2/month, with a multi-year mean of 0.00245 g/m^2/month.
- Wetlands had moderate Pb deposition, between 0.00081 and 0.00169 g/m^2/month, averaging 0.00127 g/m^2/month.
- Water Tank recorded lower Pb loads, ranging from 0.00054 to 0.00124 g/m^2/month and averaging 0.00093 g/m^2/month.
- South Morish St , monitored from 2022 onward, had annual values of 0.00047–0.00069 g/m^2/month with an average of 0.00060 g/m^2/month.
- North Memorial Oval, where monitoring also commenced in 2022, measured the lowest deposition, ranging from 0.00034 to 0.00092 g/m^2/month and averaging 0.00048 g/m^2/month.

Figure 11 shows multi-year seasonal mean Pb deposition rates for March 2020 to June 2025 across 7 sites, with notable seasonal variability across 4 sites (Wentworth, National Parks, Sewerage Works and Wetlands) but lower variability across the other three sites.

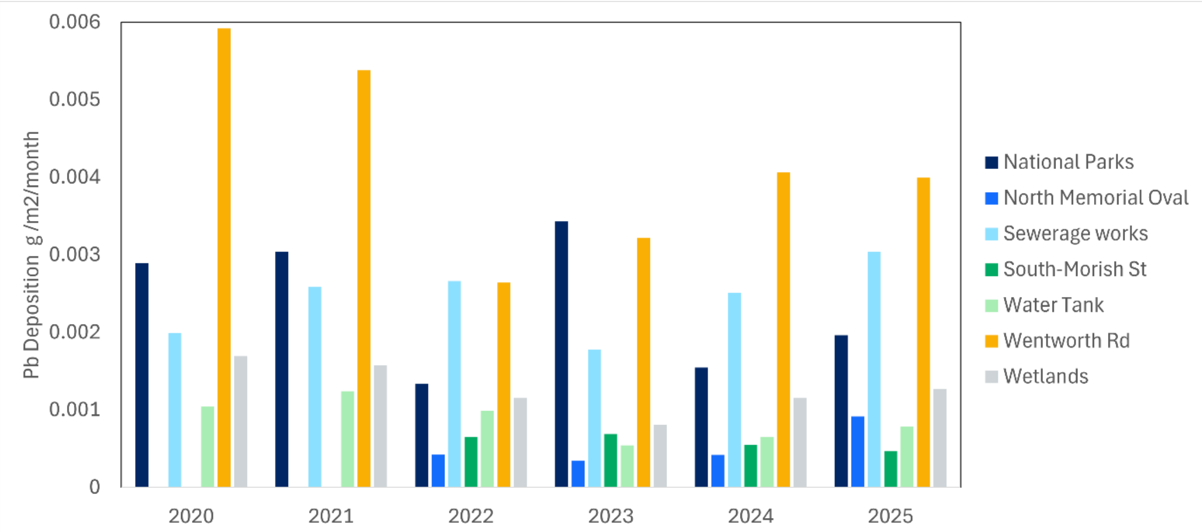

Figure 10 **Annual mean Pb deposition rates (g/m^2/month) at 7 monitoring sites in March 2020 to June 2025. The averages for 2025 were based on June datasets only, while data availability also differed in 2020 and 2021 across other sites, as indicated in Table 1**

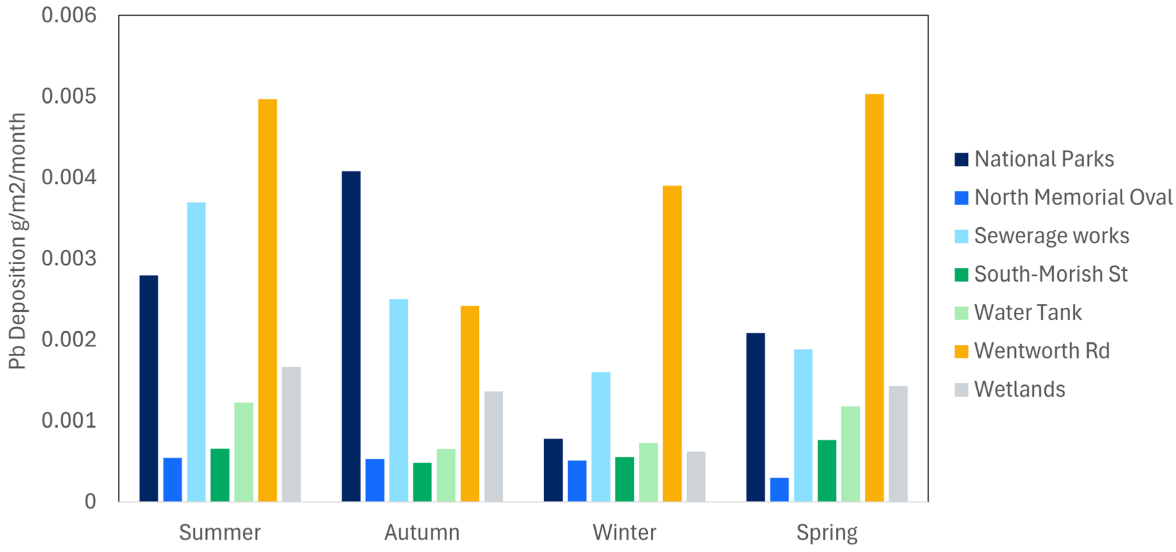

Figure 11 **Multi-year mean seasonal Pb deposition rates (g/m^2/month) at the 7 monitoring sites calculated from all valid data during March 2020 to June 2025**

2.3 Directional high-volume air sampling data

One DHVAS sampler was installed at the Wentworth Rd site, to selectively collect airborne particles while also identifying the wind direction from which those particles originate. A total of 284 samples were collected from the Wentworth Rd site during March 2020 to June 2025. Of these samples, 214 were valid – that is, a total of 67 samples failed to meet the minimum 480-minute run-time requirement and were accordingly excluded from the valid dataset for reporting (see Appendix for further information).

The DHVAS data is presented for completeness in this report (Table 2; Figure 12), and is not intended to represent potential average pollutant exposure in the same way as the average concentrations from the normal HVAS monitoring. These samples do not represent compliance monitoring, as DHVAS operates with varying run-times under specific wind direction(s) and does not follow the NEPM-required 24-hour sampling protocol. The DHVAS Pb concentration data exhibits variability across the 2020 to 2025 period, indicating that additional variables, beyond wind direction, play a role in influencing pollutant load observed at this monitoring location.

Table 2 **Annual DHVAS TSP and Pb concentrations (µg/m³) at Wentworth Rd for the period 2020 to 2025. Only partial year data were available in 2020 and 2025, as indicated in Table 1**

Year	Average of TSP (ug/m³)	Average of Pb (ug/m³)
2020	83.53	0.831
2021	48.36	0.474
2022	39.53	0.437
2023	55.32	0.796
2024	40.17	0.613
2025	53.43	0.700

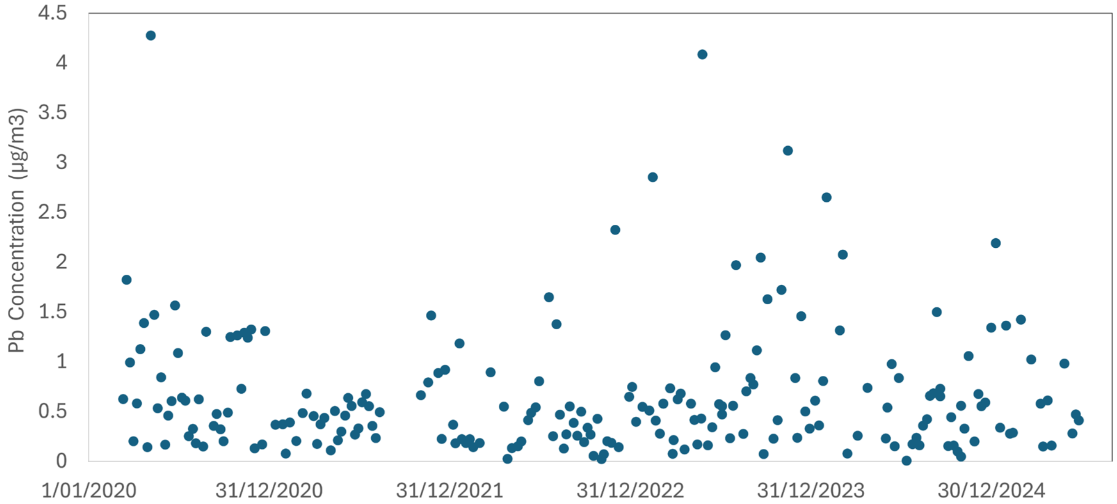

Figure 12 **Individual sample Pb concentrations (µg/m³) measured by the DHVAS at Wentworth Rd in March 2020 to June 2025. Only partial year data were available in 2020 and 2025, as indicated in Table 1**

3. Climatic context

Historical records indicate that Broken Hill had generally a hot, arid climate, with low annual rainfall, high summer temperatures and cool winters.

Some brief results are presented in this section to demonstrate how the climatic conditions during 2020 to 2025 (recent years) compared to those prior to 2020, based on the long-term climate data from Broken Hill Airport. The data were from the Australian Bureau of Meteorology (BoM), including: monthly rainfall (mm) data for September 1947 to October 2025, temperature (°C) data for January 1992 to October 2025, and high-resolution (1-minute) wind speed (m/s) and direction (degree) records for 14 January 2009 to 15 May 2025.

Overall, the climatic conditions in the reporting period (2020 to 2025) were generally within the range of long-term climate variabilities in the region. It was relatively cooler and drier in the early part of the period, and has been tending towards warmer and somewhat wetter in more recent years, compared to long-term averages.

3.1 Temperature

Long-term data (January 1992 to October 2025) indicate clear seasonal variability in daily temperatures in Broken Hill, with mean maximum temperatures ranging from around 16°C in July to frequently exceeding 30°C in January. Mean minimum temperatures showed similar seasonal variation patterns, with winter morning temperatures often falling below 5°C.

There were significant interannual variabilities in monthly mean maximum (Tmax) and monthly mean minimum (Tmin) temperatures. Figure 13 illustrates the annual anomalies in monthly mean maximum (Tmax) and monthly mean minimum (Tmin) temperatures, compared to the long-term climatology (all-year average in January 1992 to October 2025). The main points are summarised below:

- Relatively cooler (below-average) temperatures occurred in most of the 1990s, as indicated by negative anomaly values.
- Warmer (above-average) temperatures occurred in the 2000s and most of the decade prior to 2020 (excluding 2010 and 2012), as indicated by positive anomaly values.
- The years 2020 to 2022 were cooler, with strong negative anomalies in maximum temperature but near-average or slightly negative anomalies in minimum temperature.
- More recent 2023 to 2025 tended to manifest as warmer years, featuring above-average maximum temperatures and near-average minimum temperatures.

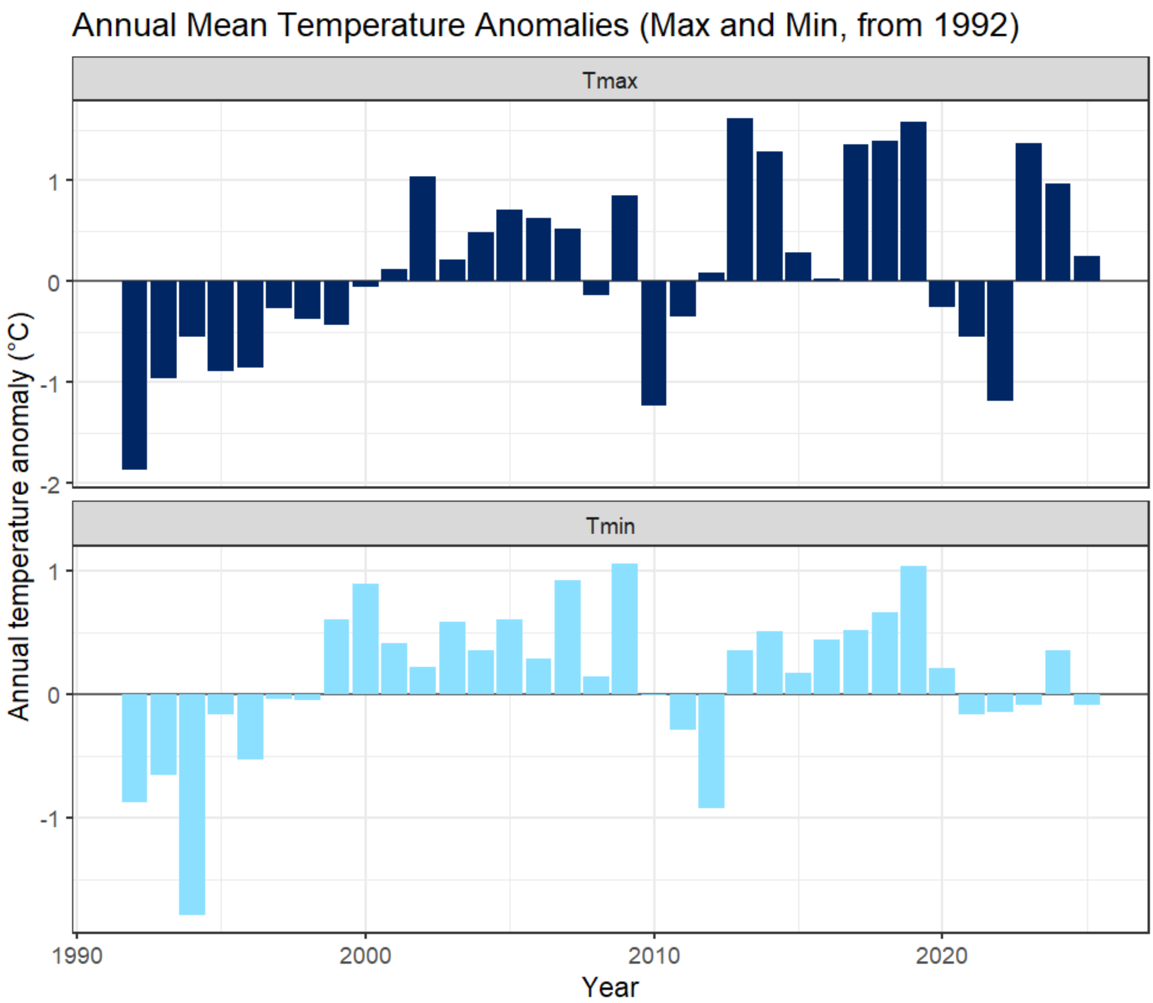

Figure 13 **Annual anomalies of maximum (Tmax) and minimum (Tmin) temperatures at the Broken Hill Airport, calculated as deviations from the long-term (January 1992 to October 2025) monthly mean Tmax and Tmin values. Bars above zero indicate years warmer than the long-term mean; bars below zero indicate years cooler than the long-term mean. Data source: Bureau of Meteorology**

3.2 Rainfall

Long-term records (September 1947 to October 2025) indicate that annual rainfall in Broken Hill was approximately 220 mm and is highly variable from year to year. Monthly totals were generally low across all seasons (about 14–26 mm), and the number of rain days per year was limited.

The interannual variability in rainfall remained pronounced in recent years compared to earlier periods (Figure 14). Main points are summarised below:

- In the years immediately before 2020 (2017 to 2019), the annual rainfall anomalies were negative, indicating a run of relatively dry years. This aligns with the well-known dry conditions and below-average rainfall across broad NSW inland regions in this period.
- The years 2020, 2021 and 2023 had slightly negative anomalies, indicating near-average or slightly below-average rainfall.

- 2022 and 2024 showed positive anomalies, that is, were significantly wetter than average, reflecting strong rainfall events and wetter climatic conditions.

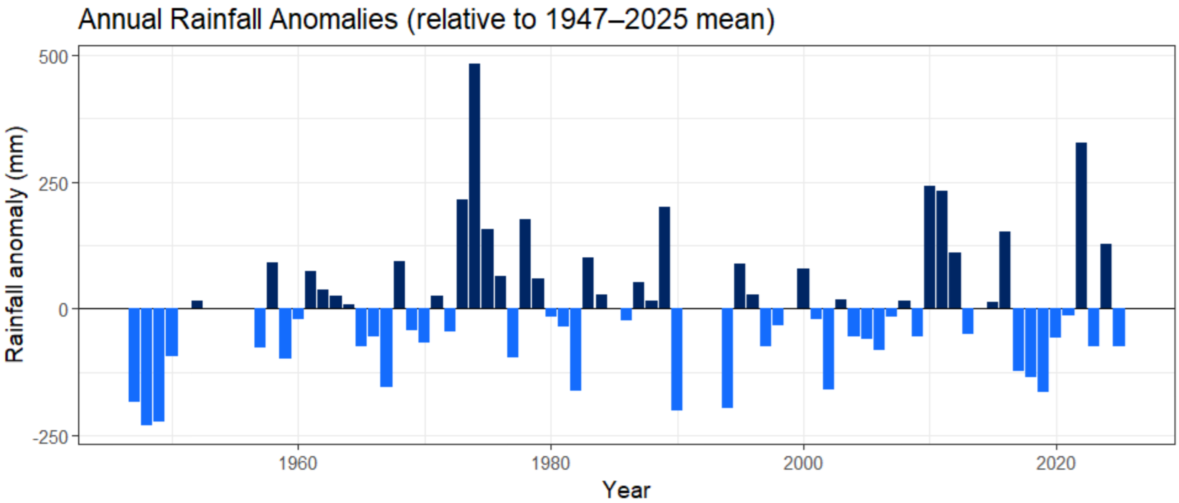

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Figure 14 **Annual rainfall anomalies calculated as deviations from the long-term monthly rainfall (September 1947 to October 2025). Positive bars represent wetter-than-average years, while negative bars indicate drier-than-average years. Data source: Bureau of Meteorology**

3.3 Wind

Historical records (14 January 2009 to 15 May 2025) indicate that the region was often characteristically windy, typical of predominant southerly to south-westerlies and secondarily north-westerlies. Mean wind speeds were often in the moderate to strong range in most years. Strong gusts were occasionally recorded, with calm days being rare. Wind variations were typical, with stronger winds more common during daytime and in transitional seasons (spring and autumn).

Figure 15 provides a comparison of wind conditions in recent years (2020 to 2025) compared to earlier long-term (2009 to 2019) records at the Broken Hill Airport. Overall, wind conditions during 2020 to 2025 were in line with the long-term patterns, with frequent moderate winds and occasional strong gusts. Mean wind speeds and calm conditions remain comparable between the 2 periods, indicating little long-term change in dominant wind patterns at this site.

Figure 16 shows the wind roses for individual years in 2020 to 2025. These plots indicate general dominance of the southerly to south-westerly and north-westerly wind patterns in the region, with some degree of observable variabilities across years, indicating little long-term change in dominant wind patterns. Mean wind speeds and calm-condition percentages vary only slightly between years, indicating stable wind behaviour over the monitoring period.

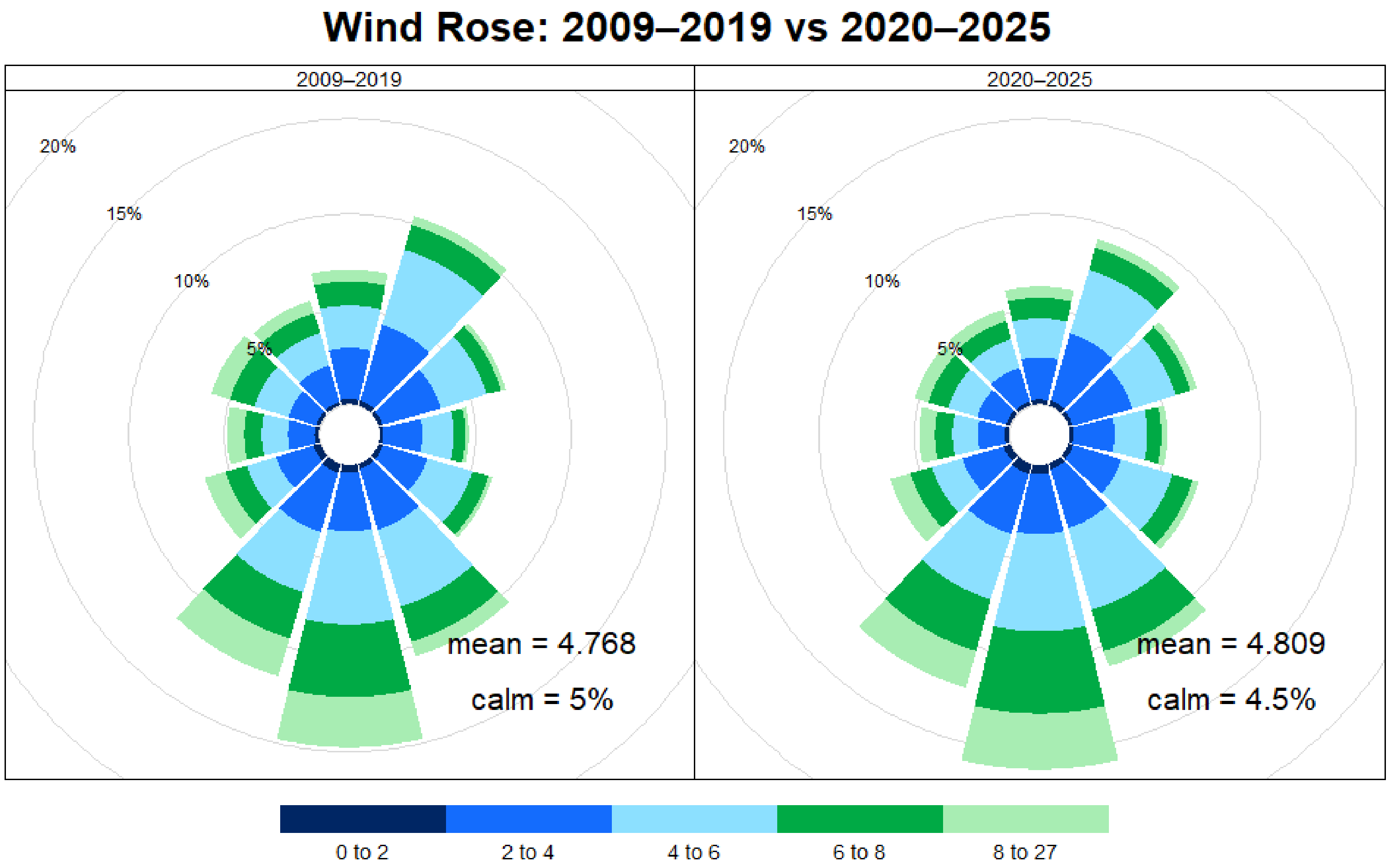

Figure 15 **Windrose comparison for the periods prior to and post 2020. The plots show the frequency distribution of wind direction and corresponding wind-speed classes. In both periods, winds predominantly originated from the southern sectors, with a similar distribution of moderate (2–6 m/s) and higher (>6 m/s) wind speeds. Data source: Bureau of Meteorology**

Wind Roses: 2009–2019 and 2020–2025

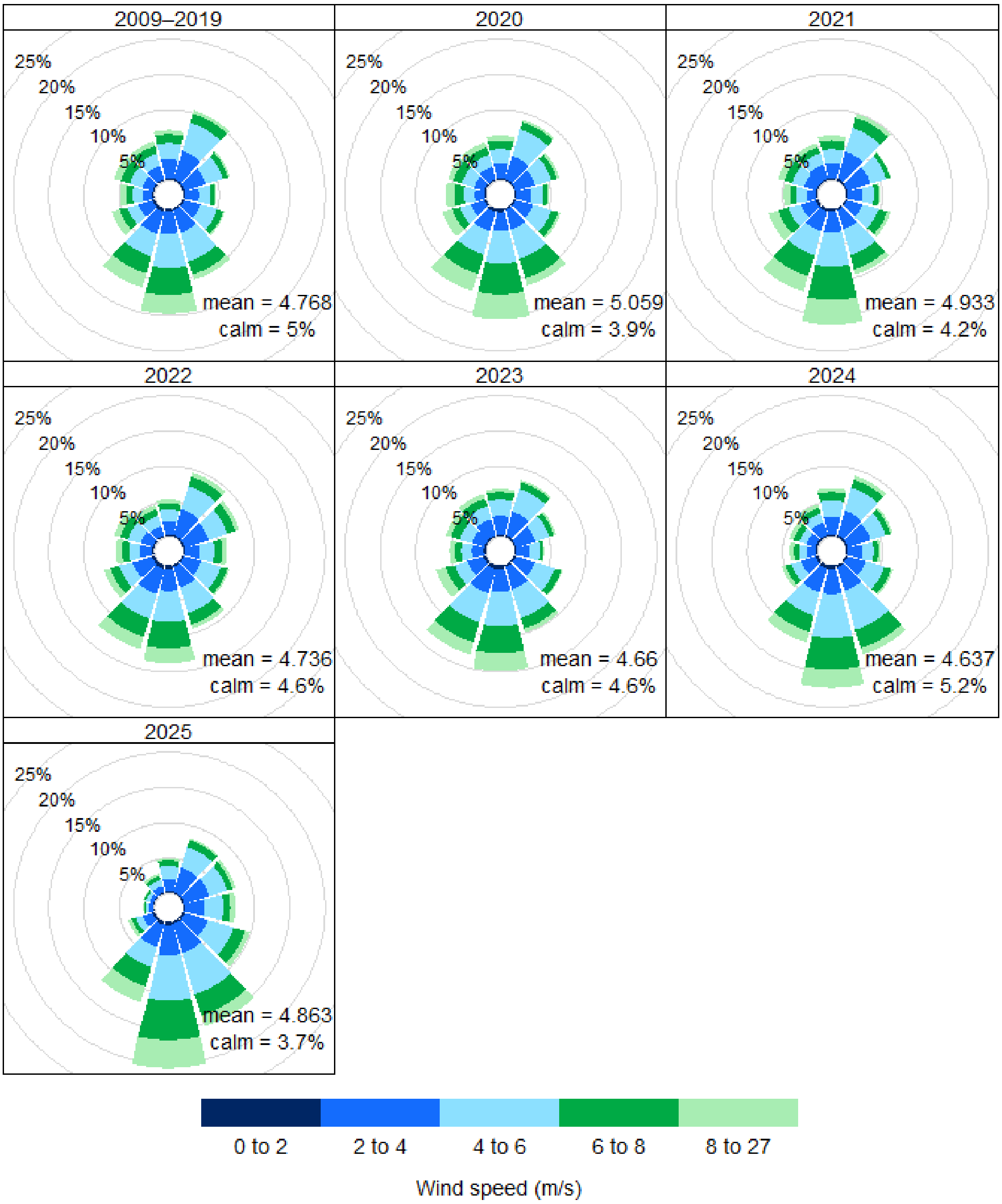

Figure 16 **Wind roses for the period prior to 2020 compared to those for individual years in 2021 to (May) 2025. Each panel shows the frequency of wind direction and associated wind-speed classes. Across all years, winds predominantly arrived from the southern and south-eastern sectors, with generally consistent distributions of moderate (2–6 m/s) and higher (>6 m/s) wind speeds. Data source: Bureau of Meteorology**

Appendix: sampling methods

High-volume air sampling (HVAS)

HVAS uses a gravimetric method for the determination of suspended particulate matter in ambient air. In Broken Hill, sampling is conducted over a 24-hour period, once every 6 days. Ambient air is drawn through a glass-fibre filter via a specially designed sampling inlet. The filter (together with sampling metadata) is sent for analysis at an ISO 17025 accredited laboratory. The sample is weighed (gravimetrically), and the total suspended particulate (TSP) concentration is determined by dividing the mass of collected particulate matter by the sample volume. Subsequent analysis is then performed via inductively coupled plasma-atomic emission spectroscopy (ICP-AES) to determine the lead concentration.

Directional high-volume air sampling (DHVAS)

This sampling method is based on the same principles as the HVAS method described above. However, the application of the method is distinctly different. This sampling is conducted over a week-long period, and sampling only takes place when the wind is blowing from a predefined sector, that is, between the northwest (225°) and northeast (40°) directions, for at least 90 seconds and at a speed greater than 0.2 m/s. The frequency and duration of sampling is determined by the frequency and duration of the wind direction and speed. To be considered valid, DHVAS samples must meet a minimum sampling duration of 480 minutes, otherwise, they are discarded.

This sampling method is used to help distinguish the relative contributions of TSP and lead from different sources. It is not used for direct comparison with the AAQ NEPM goals. There are no Australian or international standards for DHVAS for source apportionment purposes.

Dust deposition gauge (DDG)

DDG can be applied to provide an estimate of the mean surface concentration of dust settling from the air over a one-month period. This method is used primarily to establish long-term trends and to track localised dust fall.

In Broken Hill, DDG sampling is used to determine total dust mass, total lead mass deposited, and lead content in the dust. The sampler collects dust particles that settle from the ambient air via a glass funnel and a collection bottle. The collected sample is passed through a sieve and filtered to separate the insoluble and soluble materials - both are gravimetrically determined. The lead concentration is determined subsequently via ICP-AES (inductively coupled plasma-atomic emission spectroscopy) analysis.

The mass deposition rate of deposited matter is calculated from the mass of solids obtained, the funnel cross-sectional area and the exposure period and reported as grams per square metre per month ($g/m^{2.}/month$).

Sample collection and analysis standards

Samples are collected and analysed using validated laboratory procedures based on established international and national methods sourced from US EPA, APHA, AS and NEPM. These include references to AS 3580.9.3, AS 3580.9.6, AS 3580.9.14, AS2800/AS3580.9.3, AS 3580.10.1, USEPA Method IO-3.2, APHA 3125, and USEPA SW846, 6010 (ICP-AES).