



Fact sheet

Air quality monitoring in Kalgoorlie

Purpose

The purpose of this fact sheet is to provide information on air quality monitoring undertaken by the Department of Water and Environmental Regulation (the department) in Kalgoorlie.

Introduction

Air quality monitoring is undertaken by the department at selected regional and metropolitan locations in Western Australia (WA) in accordance with the [National Environment Protection \(Ambient Air Quality\) Measure](#) (AAQ NEPM).

We are responsible for the operation and maintenance of 15 air quality monitoring sites in WA, including Kalgoorlie.

Kalgoorlie’s air quality monitoring site was founded in 2017, primarily to monitor smoke from bushfires, hazard reduction burns, wood-fired home heaters and emissions from gold mining industries.

- sulfur dioxide – a toxic gas found in air that reacts to form compounds such as sulfuric acid, sulfurous acid and sulfate particles that are also harmful to humans. Sources include industrial activities and the processing of some mineral ores that contain sulfur
- particle matter (as PM₁₀ and PM_{2.5}) found in air that is less than 10 micrometres in diameter (PM₁₀) and less than 2.5 micrometres in diameter (PM_{2.5}). The small particles are harmful to humans and can be attributed to industrial activities as well as natural sources such as bushfires, dust storms and pollen.

Air quality standards

The AAQ NEPM provides air quality standards for pollutants as shown in Table 1.

Table 1 Air quality standards

Pollutant	Averaging period	Maximum concentration*
Carbon monoxide	8 hours	9.0 ppm
Sulfur dioxide	1 hour	0.10 ppm
	1 day	0.02 ppm
Particulate matter as PM ₁₀	1 day	50 µg/m ³
	1 year	25 µg/m ³
Particulate matter as PM _{2.5}	1 day	25 µg/m ³
	1 year	8 µg/m ³

* ppm = parts per million; µg/m³ = micrograms per cubic metre

All exceedances and events within the department network are identified and reported. If an authorised hazard reduction burn, bushfire or continental-scale dust event causes the one-day average particle concentration to exceed the standard, it is referred to as an exceptional event.

Key points - air quality in Kalgoorlie

- Air quality in Kalgoorlie is considered good on most days, although some poor air quality events occur in any given year.
- Poor air quality events have been primarily attributed to fire hazard reduction burns or bushfires.
- Monitoring will continue in accordance with the AAQ NEPM as the national standard.

What is monitored?

Air quality pollutants monitored in Kalgoorlie include:

- carbon monoxide – a gas found in air that is harmful to humans with the main source being attributed to motor vehicles and industrial activities

Carbon monoxide

Carbon monoxide (CO) has been measured in Kalgoorlie since 2018. Figure 1 shows that concentrations of CO measured in Kalgoorlie are less than 25 per cent of the standard and are similar to those measured in the Perth metropolitan region.

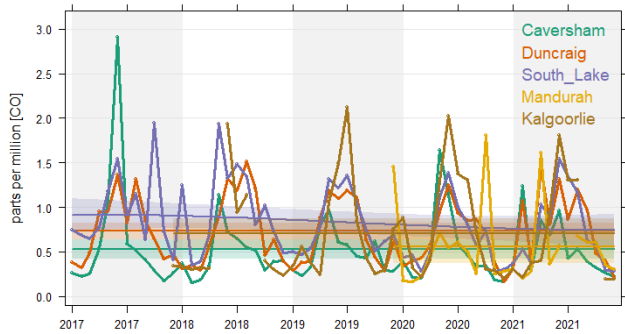


Figure 1 Maximum eight-hour averaged CO concentrations measured every month

Sulfur dioxide

Sulfur dioxide (SO₂) has been measured in Kalgoorlie since 2018, with peak concentrations at around or slightly exceeding the SO₂ (one-hour) standard.

While the instrument was only installed in 2018, Figure 2 indicates that the maximum hourly averages for each month have consistently declined year on year since installation.

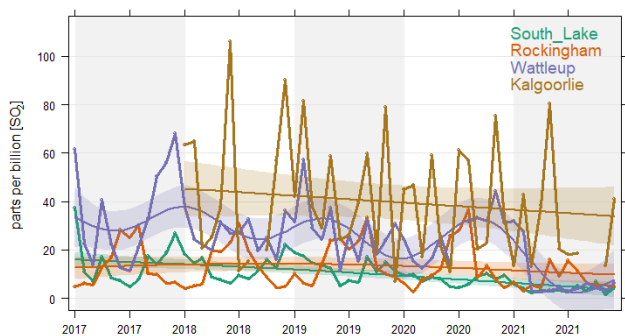


Figure 2 Maximum one-hour averaged sulfur dioxide concentrations measured every month at a range of sites

Particle levels in Kalgoorlie

Kalgoorlie has occasionally exceeded the daily (24-hour) standard of 50 µg/m³ for PM₁₀ since 2017, as shown in Figure 3.

The site had no exceedances of the daily AAQ NEPM PM₁₀ standard in 2021. The two PM_{2.5} exceedances were because of smoke from wood heaters.

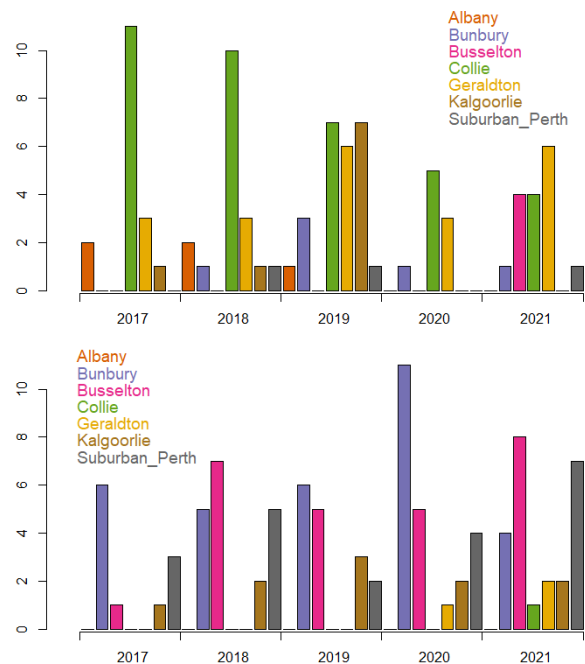


Figure 3 Number of times the NEPM 24-hour standard for PM₁₀ (upper) and PM_{2.5} (lower) was exceeded at a range of sites

Since particle monitoring started in 2017, Kalgoorlie has not exceeded the AAQ NEPM annual standard for PM₁₀ size particles of 25 µg/m³ (Figure 4).

In 2021, the annual average PM₁₀ and PM_{2.5} concentrations in Kalgoorlie were 11.3 µg/m³ and 4.0 µg/m³ respectively.

The main sources of particles in towns such as Kalgoorlie are from bushfires, fire hazard reduction burning and wood heaters.

Monitoring data collected at the department sites are available on the department's [website](#).

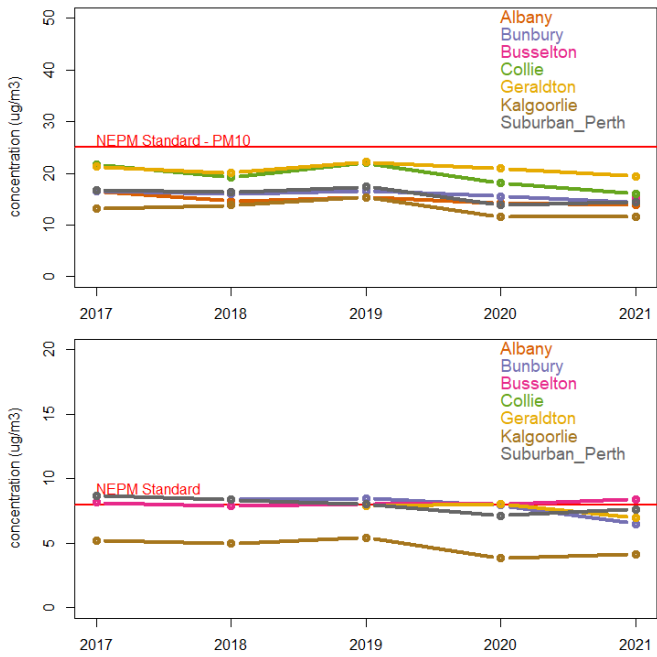


Figure 4 Annual average PM₁₀ (upper) and PM_{2.5} (lower) concentrations at a range of sites

As Figure 5 shows, over the past five years elevated averaged particulate levels at Kalgoorlie have occurred predominantly in afternoons and generally in drier summer and autumn months.

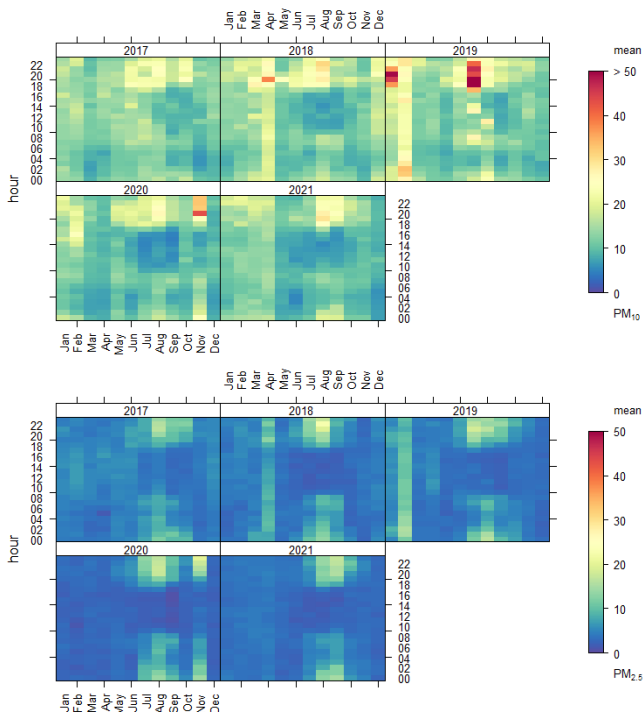


Figure 5 Average PM₁₀ (upper) and PM_{2.5} (lower) concentrations at Kalgoorlie for each hour over the last five years

Particles explained

Airborne particles are commonly classified by size in terms of their equivalent aerodynamic diameter (EAD). An EAD is the diameter of a spherical particle of density 1 gram per cubic centimetre (the same density as water) that exhibits the same aerodynamic behaviour as the particle in question. Particles are sampled and described on the basis of their EAD but are usually simply called the particle size.

PM₁₀ particles are any substances that have an EAD less than or equal to 10 micrometres in diameter. PM_{2.5} are any substances that have an EAD less than or equal to 2.5 micrometres in diameter. Particles in this size range make up a large portion of dust that can be drawn into the lungs. Larger particles tend to be trapped in the nose, mouth or throat.

The important thing to note is that PM₁₀ and PM_{2.5} is not one specific substance, but simply a classification of particle or dust size.

More information

For advice on air quality or related matters, please contact info@dwer.wa.gov.au.

Related documents

The [WA air monitoring reports](#) contain detailed air quality data for Kalgoorlie.

Legislation

This document is provided for guidance only. It should not be relied on to address every aspect of the relevant legislation. Please refer to the Western Australian Legislation website at www.legislation.wa.gov.au for copies of the relevant legislation.