



## Fact sheet

# Air quality monitoring in Mandurah

## 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).

## 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).

The WA Monitoring Plan describes the rationale for the air quality monitoring needed to determine compliance with the standards and goals of the AAQ-NEPM.

The Mandurah station was established in November 2019 and is one of 15 air quality monitoring stations (AQMS) operated by the department.

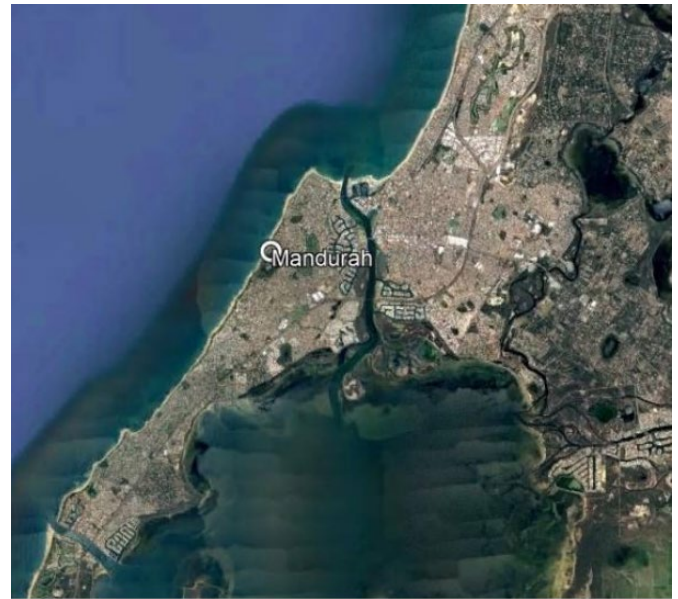
### Key points - air quality in Perth and Peel

- Air quality in Perth and Peel 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.

The City of Mandurah, about 72 km south of Perth, is WA's second-largest city, with a population of about 97,000. The AQMS is in the Mandurah suburb of Halls Head and is about 100 m from the coast, as shown in Figure 1.

To the south of the AQMS lies the Mandurah Estuary comprising 155 km<sup>2</sup> of open water and

waterways. North-east of the AQMS, the coast turns to the east. The site is therefore mostly surrounded by saltwater bodies.



**Figure 1** Location of Mandurah air quality monitoring station

## What is monitored?

The Mandurah AQMS has instruments that measure ozone, carbon monoxide, oxides of nitrogen and particles as PM<sub>10</sub> and PM<sub>2.5</sub>.

PM<sub>10</sub> is made up of small particles found in air that are less than 10 micrometres (µm) in diameter. PM<sub>2.5</sub> particles are even finer with diameters less than 2.5 µm.

PM<sub>10</sub> and PM<sub>2.5</sub> are both associated with adverse health outcomes. Common sources of these pollutants include bushfires, hazard-reduction burns, wood heaters and motor vehicles.

## Air quality particle criteria

The AAQ-NEPM provides standards for PM<sub>10</sub> and PM<sub>2.5</sub> particles as shown in Table 1.

**Table 1 Air quality particle standards**

Pollutant	Averaging Period	Maximum concentration (micrograms per cubic metre)
Particulate matter as PM <sub>10</sub>	1 day	50 µg/m <sup>3</sup>
	1 year	25 µg/m <sup>3</sup>
Particulate matter as PM <sub>2.5</sub>	1 day	25 µg/m <sup>3</sup>
	1 year	8 µg/m <sup>3</sup>

All exceedances of these standards (referred to as 'events') are identified and reported by the department in accordance with the AAQ-NEPM protocols.

Events that were caused by a hazard-reduction burn, bushfire or continental dust event are called 'exceptional events'. All other events are referred to as 'assessable events'.

The goal of the AAQ-NEPM is to have no exceedances because of assessable events in any year. Exceedances because of exceptional events are not included in this assessment.

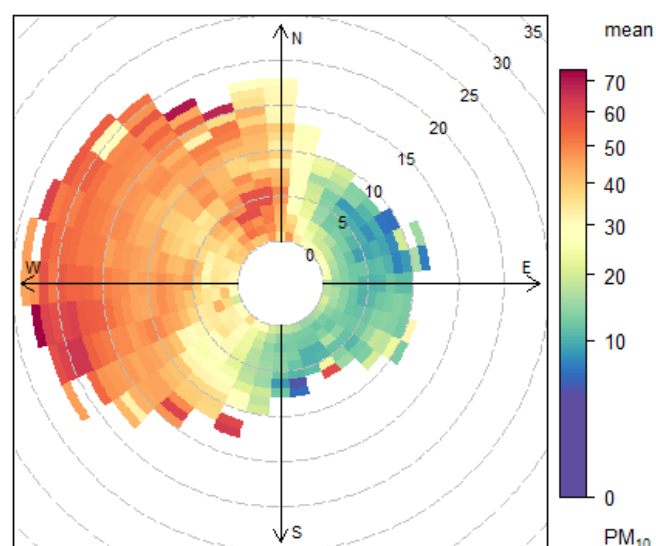
## Particle levels in Mandurah

The Mandurah site has been recording some exceedances of the AAQ-NEPM standard for PM<sub>10</sub> owing to sea-salt from the nearby beach. The levels of other pollutants monitored are low.

During the 2021 calendar year, 19 PM<sub>10</sub> and three PM<sub>2.5</sub> particle exceedances were recorded at Mandurah. Of these, 17 PM<sub>10</sub> exceedances were due to marine aerosols. There were no marine aerosol PM<sub>2.5</sub> exceedances.

Marine aerosols include all types of particles associated with ocean processes. These include particles generated mechanically at the sea surface, such as salt and other compounds, as well as compounds formed chemically from the atmospheric reactions of gases emitted from the sea surface. The Department of Health has provided advice that inhaling 'sea air' or 'ocean air' is not harmful.

The image in Figure 2 shows the wind speed (concentric rings) and wind direction (compass bearings) along with the average PM<sub>10</sub> concentration (shaded area of image) measured at the Mandurah AQMS. The image shows that higher concentrations of PM<sub>10</sub> (yellow-orange colours) mostly occur under westerly winds, that is, from the direction of the ocean.



**Figure 2 Polar plot from January 2021 to December 2022 showing the higher concentrations of PM<sub>10</sub> originating from the western (ocean) side of the site (orange-red portion of plot) indicating the likely influence of marine aerosols (sea salt)**

The Mandurah AQMS is the closest station to the coast when compared with other Perth and regional monitoring stations. Concentrations at the other monitoring stations, which are farther inland, do not show this strong relationship with wind direction.

Although the PM<sub>10</sub> NEPM standard has been exceeded at the Mandurah AQMS on some occasions, our analysis of the monitoring data suggests that these exceedances are most likely because of marine aerosols. The Department of Health has provided advice that inhaling 'sea air' or 'ocean air' is not harmful.

Monitoring data collected at the Mandurah AQMS and other department stations are available on the department's [website](#).

## 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) which exhibits the same aerodynamic behaviour as the particle in question. Particles are sampled and described on the basis of their EAD but usually simply called the particle size. PM<sub>10</sub> particles are any substances that have an EAD less than or equal to 10 µm in diameter. PM<sub>2.5</sub> particles are any substances that have an EAD less than or equal to 2.5 µm in diameter. Particles in the PM<sub>2.5</sub> size range make up a large portion of smoke 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 PM<sub>10</sub> and PM<sub>2.5</sub> are not one particular 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](mailto:info@dwer.wa.gov.au).

## Related documents

The latest [WA air monitoring reports](#) contain detailed air quality data for the Perth and Peel regions.

## 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](http://www.legislation.wa.gov.au) for copies of the relevant legislation.