Government of **Western Australia**
Department of **Water and Environmental Regulation**

2022 Western Australian air monitoring report

Annual report under the National Environment Protection (Ambient Air Quality) Measure

Department of Water and Environmental Regulation

November 2024

Department of Water and Environmental Regulation
Prime House, 8 Davidson Terrace
Joondalup Western Australia 6027
Locked Bag 10 Joondalup DC WA 6919

Telephone +61 8 6364 7000
Facsimile +61 8 6364 7001
National Relay Service 13 36 77
www.wa.gov.au/dwer

FIRST 116042

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Acknowledgement of Country

We acknowledge the Traditional Owners of the land upon which we live and work throughout Western Australia, and pay our respects to their Elders past and present.

We recognise the practice of intergenerational care for Country and its relevance to our work as water and environmental managers.

We seek to listen, learn and genuinely engage and build strong partnerships. We aim to provide sustainable opportunities for Aboriginal people within our workforce and through our business.

Working with the community, we move forward with a shared commitment to protect and conserve Country for future generations, recognising Country is a term used by Aboriginal people to describe the lands, waterways and seas to which they are intrinsically linked, and to which their wellbeing, law, place, custom, language, spiritual belief, cultural practice, material sustenance, family and identity belong.

Disclaimer

This publication is available at our website www.wa.gov.au/dwer

Contents

Summary

Western Australia (WA) is a signatory to the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM) and is required to report annually on the results of air quality monitoring undertaken by the Department of Water and Environmental Regulation (the department). This report has been prepared to comply with these AAQ NEPM reporting requirements.

During 2022, the department was responsible for the operation and maintenance of 16 air quality monitoring sites in WA. Ten of these sites – Armadale, Caversham, Duncraig, Mandurah, Quinns Rocks, Rolling Green, Rockingham, South Lake, Swanbourne and Wattleup – are within the Greater Perth region. There are six regional sites in Albany, Bunbury, Busselton, Collie, Geraldton and Kalgoorlie.

Due to changing land use, Wattleup was decommissioned in February 2023. A new site in the region is being actively sought.

This report is based on the AAQ NEPM registered on 26 May 2021 and available at www.legislation.gov.au/Details/F2021C00475.

During calendar year 2022, the AAQ NEPM 8-hour average ozone standard and goal was not met at Rockingham due to unknown causes, and the 1-hour average nitrogen dioxide standard and goal was not met at Quinns Rocks due to smoke from a local burn.

The AAQ NEPM goal for 1-day average PM_{10} particles was not met at:

- Collie
- Mandurah
- Quinns Rocks.

The AAQ NEPM goal for 1-day average $PM_{2.5}$ particles was not met at:

- Albany
- Busselton
- Caversham
- Collie
- Kalgoorlie
- Quinns Rocks.

The AAQ NEPM annual average standard for $PM_{2.5}$ was not met at:

- Busselton
- Collie
- Quinns Rocks.

The AAQ NEPM annual average standards were met for nitrogen dioxide and sulfur dioxide.

Across all monitoring sites, there were 128 AAQ NEPM standard exceedances in 2022, comprising one ozone exceedance, one nitrogen dioxide exceedance, 34 exceedances of the 1-day PM_{10} standard made up of 24 exceptional events and 10 assessable events, and 92 exceedances of the 1-day $PM_{2.5}$ standard made up of 62 exceptional events and 30 assessable events.

Of the 86 PM_{10} and $PM_{2.5}$ particle exceedances that were classed as exceptional events:

- 79 were due to prescribed burning activities
- six were due to bushfires
- one was due to windborne dust.

These ‘exceptional event’ exceedances are not included in the AAQ NEPM goal assessment, in accordance with AAQ NEPM protocols.

Kaartdijin Noongar – Whadjuk Noongar calendar

The First Nations people of Australia are the world's oldest continuous culture. Within WA there are more than 200 nations made up of many distinct language groups, each with their own culture, customs, languages, laws and a rich and deep understanding of the land and its seasons. Many of the air quality sites operated by the department are located within the Noongar Nation[1] which encompasses most of the south-west of Western Australia. This region has seasons which, unlike the conventional western classification, have six distinct seasonal periods.[2]

The seasons referred to in the calendar follow the Whadjuk Noongar perspective from a Swan Coastal Plain point of view.

Commencing in December and January, Birak represents the initial season, characterised by scorching heat, aridity, and customary controlled burning practices employed for land management. Following is Bunuru, encompassing February and March and featuring relentless heat, clear skies, and the gradual depletion of water sources. This period has an increased focus on coastal activities and fishing endeavours.

The arrival of April and May heralds Djeran, a season marked by cooler temperatures and the onset of autumn. It is a time of fertility and regeneration, as flora and fauna prepare for the forthcoming winter. Occupying June and July, Makuru encapsulates the coldest and wettest phase of the year, prompting gatherings and feasts centred around the abundance of seasonal sustenance. Djilba follows, spanning from August to September, during which milder temperatures, lengthening daylight, and the blossoming of wildflowers permeate the landscape. This stage signifies birth and growth, with various creatures nurturing their young.

Lastly, Kambarang, encompassing October and November, presents a season of warmth and extended daylight hours. The vibrant display of colourful blooms serves as a backdrop for activities like hunting, gathering, and cultural festivities.

These six Noongar seasons exemplify the profound interconnection between the Noongar people and their environment, elucidating their intricate knowledge of natural cycles and the imperative of harmonious coexistence with the natural world.

The ozone minimum and carbon monoxide maximum in most years occur in Makuru when cold and wet conditions predominate, and wood heaters are in use. Birak and Bunuru bring the hot and sunny conditions conducive to the photochemical formation of ozone.

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1 Please be aware that there are different ways to spell Noongar (e.g. Nyungar, Nyoongar, Noongah) and Noongar words. Noongar language, as all traditional languages in Australia, is an oral language. Throughout this calendar, we have maintained the spelling as Noongar, and we respectfully include all people in the south-west.

2 Bureau of Meteorology Indigenous Weather Knowledge

Figure S1 A selection of department monitoring stations in relation to Native Title agreements

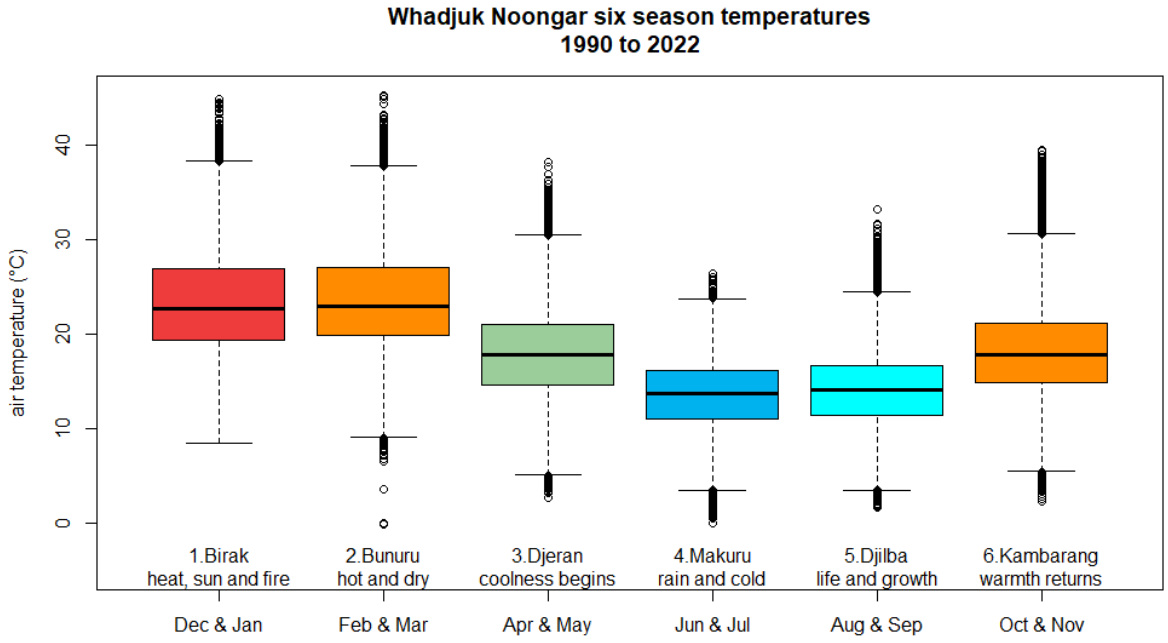


Figure S2-1 Wadjuk Noongar six season temperatures 1990 to 2022

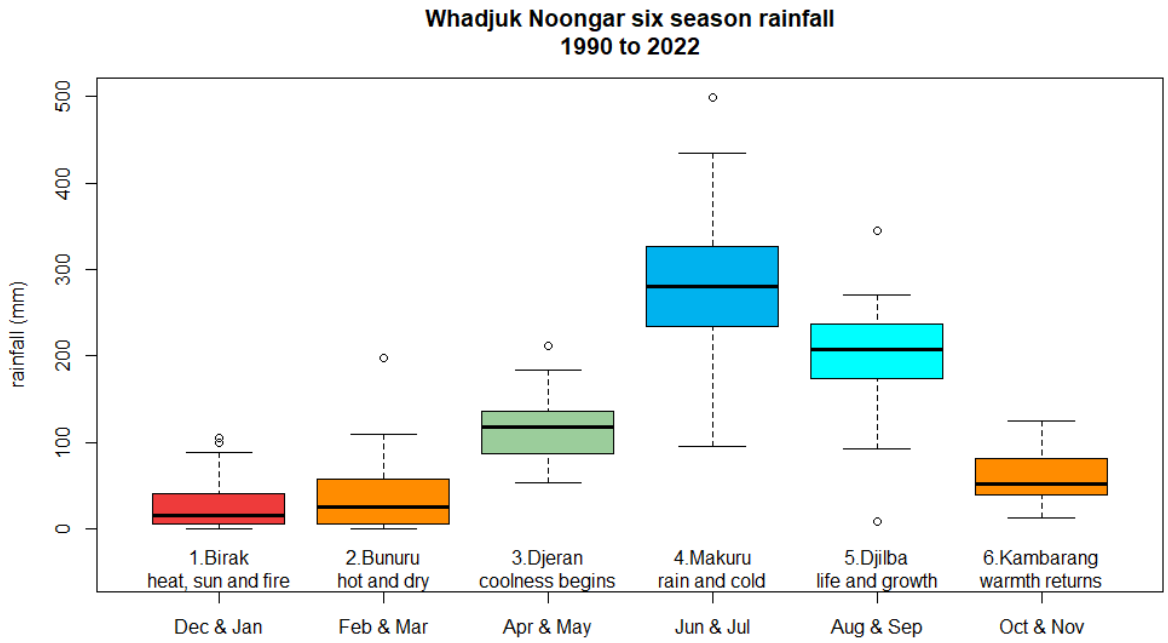


Figure S2-2 Wadjuk Noongar six season rainfall 1990 to 2022

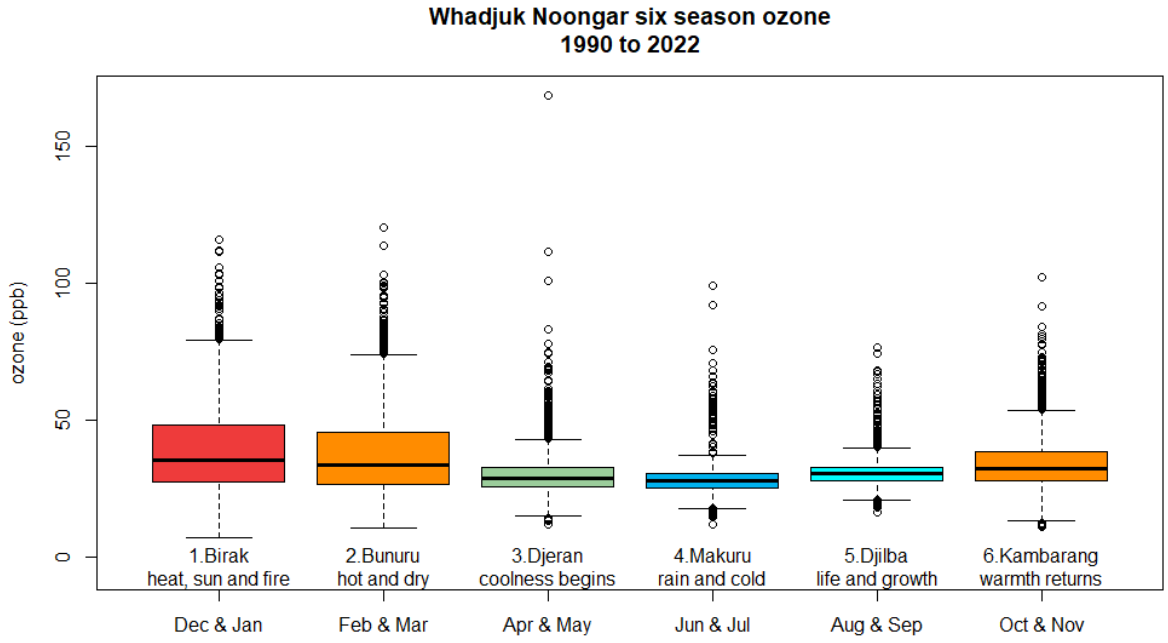


Figure S2-3 Wadjuk Noongar six season ozone 1990 to 2022

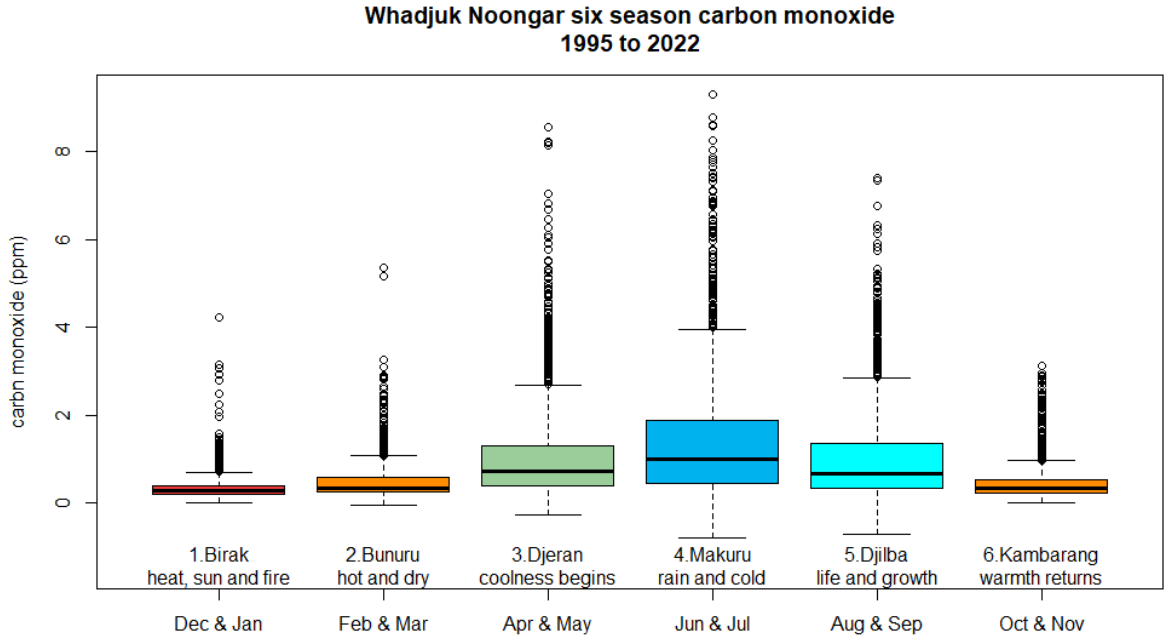


Figure S2-4 Wadjuk Noongar six season carbon monoxide 1990 to 2022

A. Monitoring summary

This section summarises pollution data collected from each air quality monitoring site.

A.1 Current monitoring sites

The department's urban monitoring network shown in Figure A1 was originally designed for the purposes of the Perth Photochemical Smog Study, the Perth Haze Study and the management of pollutants in the Kwinana area.

The then Commonwealth Scientific and Industrial Research Organisation (CSIRO) Division of Atmospheric Research provided advice on monitoring site locations for the two studies. The network's design was based on the knowledge of emissions sources, pollutant chemistry and meteorological features.

More recently, new urban sites have been established at Armadale and Mandurah. The Armadale site was located to capture particle plumes in the south-east metropolitan region, while Mandurah was located to capture particles and photochemical smog development in the Peel region. Regional monitoring sites (Figure A2) at Bunbury, Busselton, Collie and Albany were established to monitor smoke from prescribed burns. The Geraldton site was established in the mid-west of the state to monitor windblown crustal material and smoke from bushfires, prescribed burns, agricultural stubble burning and wood-fired home heaters. The Kalgoorlie site was established to monitor particles from windblown crustal material and smoke, and sulfur dioxide from industry.

Tables A1 to A8 present summaries of site locations, monitoring methods and other information relating to the monitoring network including air quality standards.

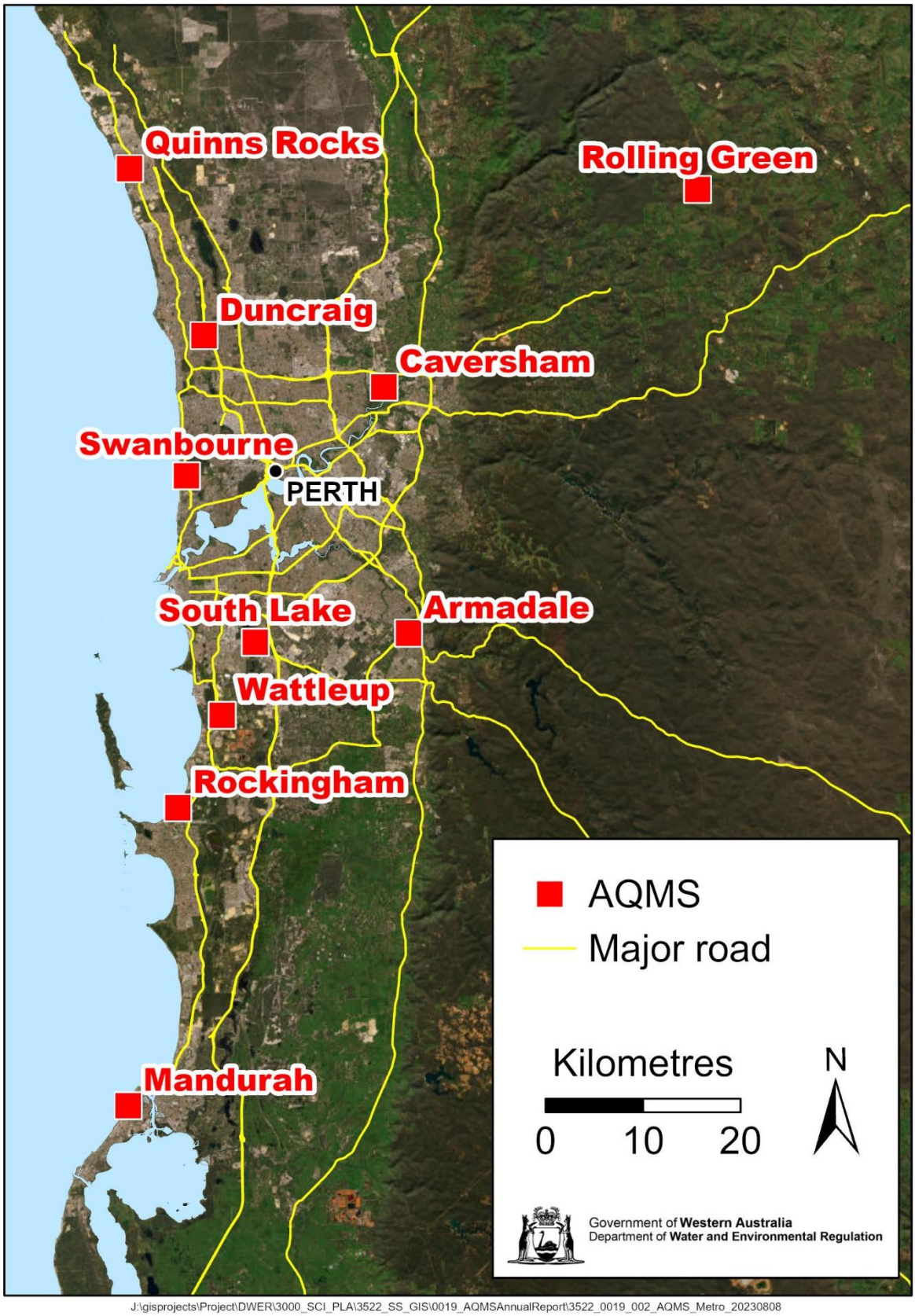


Figure A1 Department air quality monitoring sites in the Perth Metropolitan and Peel regions

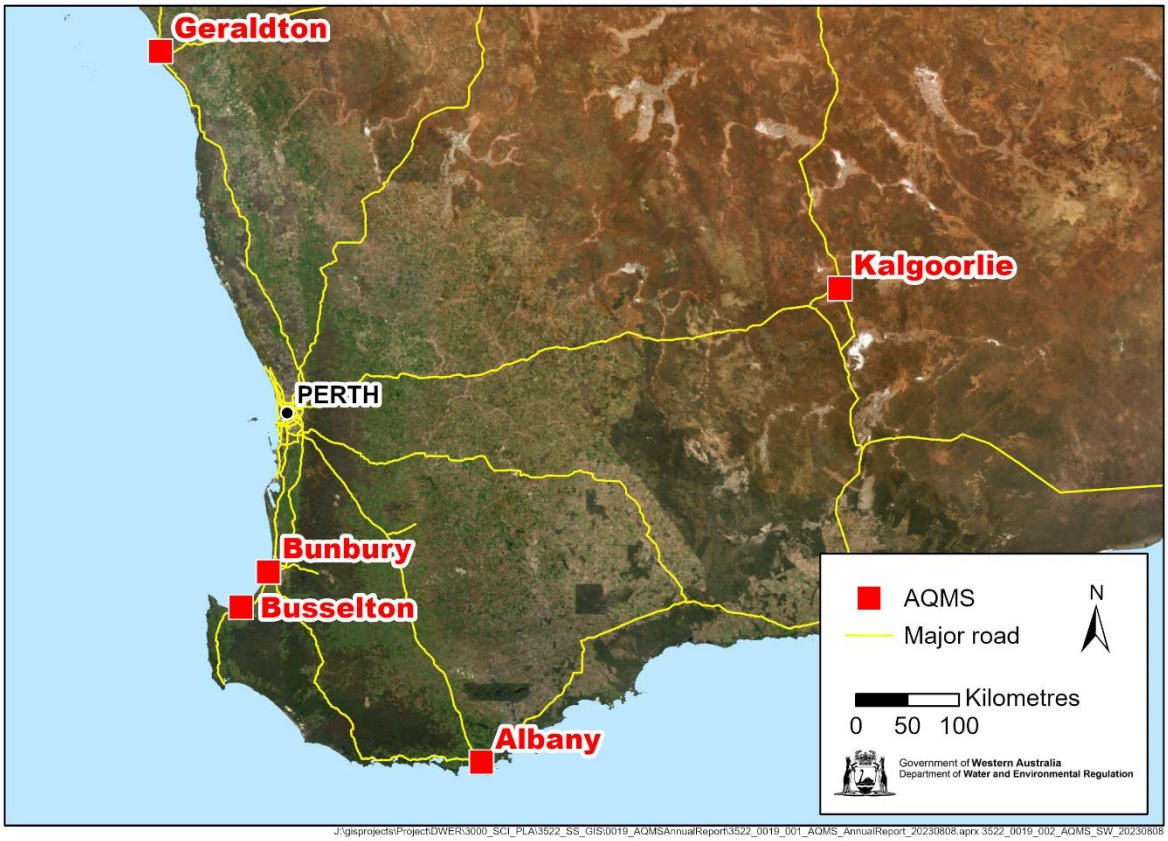


Figure A2 Department air quality monitoring sites in regional WA

Table A1 Monitoring sites, air pollutants measured and periods of operation

Monitoring site	CO	O_3	NO_2	SO_2	PM_{10}	$PM_{2.5}$
Albany					07/2006 to present	10/2021 to present
Armadale					07/2020 to present	07/2020 to present
Bunbury					06/1999 to present	04/1997 to present
Busselton					05/2020 to present	11/2006 to present
Caversham	08/1993 to present	11/1989 to present	09/1990 to present		01/2004 to present	03/1994 to present
Collie					02/2008 to present	10/2021 to present
Duncraig	08/1995 to present		08/1995 to present		06/1996 to present	01/1995 to present
Geraldton					09/2005 to present	01/2019 to present
Kalgoorlie	12/2017 to present			12/2017 to present	12/2017 to present	12/2017 to present
Mandurah	10/2019 to present	10/2019 to present	10/2019 to present		10/2019 to present	10/2019 to present
Quinns Rocks		11/1992 to present*	11/1992 to present*		04/2020 to present	07/2006 to present*
Rockingham		12/1995 to present	12/1995 to present	07/1988 to present		
Rolling Green		01/1993 to present	01/1993 to present			
South Lake	03/2000 to present	03/2000 to present	03/2000 to present	03/2000 to present	03/2000 to present	04/2006 to present
Swanbourne		01/1993 to present	03/1993 to present			
Wattleup				01/1988 to 02/2023		

*The Quinns Rocks site was decommissioned in March 2017 and re-established at a new location in April 2020

Table A2 Monitoring site descriptions

Site	Description
Albany	Large rural town 380 km south-south-west of Perth with medium-density housing.
Armadale	South-east metropolitan site 22 km south-east of Perth with medium-density housing and moderate traffic flow. The site is 200 m east of the Tonkin Highway, a main north–south arterial road carrying about 27,000 vehicles daily.
Bunbury	Large rural town 145 km south of Perth with medium-density housing.
Busselton	Small rural town 185 km south of Perth with medium-density housing.
Caversham	Semi-rural north-east metropolitan suburb in the Swan Valley – a grape-growing region next to the Perth foothills – 14 km north-east of the Perth CBD. The region mainly comprises low-density housing and paddocks. Some brick manufacturing.
Collie	Small rural town within a forested region 152 km south of Perth with medium-density housing and typical traffic flows. Coal mining and power-generation industries.
Duncraig	North metropolitan suburb 16 km north-north-west of the Perth CBD with medium-density housing and moderate-to-high traffic flows. The site is 200 m west of the Mitchell Freeway, a main north–south arterial road carrying about 98,000 vehicles daily.
Geraldton	Large rural town 377 km north of Perth in the mid-west with medium-density housing.
Kalgoorlie	Large rural town 500 km east-north-east of Perth in the goldfields with a dry climate and medium-density housing.
Mandurah	City on the south-west coast of WA, 70 km south of Perth. It is the state's second-largest city and has a Mediterranean climate. The site is about 100 m from the coast and is affected by marine aerosols during westerly winds.
Quinns Rocks	Outer-north coastal suburb 35 km north of Perth with medium-density housing.
Rolling Green	Outer-east rural suburb 56 km north-east of Perth with low-density rural housing and low traffic flows. The closest road is 80 m east of the site with 3,200 vehicles per day.
Rockingham	South-coastal site 35 km south of Perth with medium-density housing and typical traffic flows, situated adjacent to the southern border of the Kwinana Industrial Area. A major arterial road carrying 34,700 vehicles per day runs 1 km east of the site.
South Lake	South-east metropolitan site 17 km south of Perth with medium-density housing and moderate-to-high traffic flows. The site is 1.6 km west of the Kwinana Freeway, a main north–south arterial road carrying about 87,000 vehicles daily and is 4 km north-east of the northern border of the Kwinana Industrial Area.
Swanbourne	An inner-coastal site on coastal sand dunes 9 km west of the Perth CBD, and 150 m west of a major north–south arterial road carrying about 27,200 vehicles per day.
Wattleup	A south metropolitan site 25 km south of Perth within a defined buffer area for the Kwinana Industrial Area. Surrounding land uses are retail outlets and market gardens. The site was decommissioned in early 2023.

Table A3 Monitoring site classification

Site	CO	O_3	NO_2	SO_2	PM_{10}	$PM_{2.5}$
Albany					P/T	P/T
Armadale					P/T	P/T
Bunbury					P/T	P/T
Busselton					DWER	DWER
Caversham	DWER	P/T	P/T		P/T	P/T
Collie					DWER	DWER
Duncraig	P/T		DWER		P/T	P/T
Geraldton					P/T	P/T
Kalgoorlie	M			P/T	P/T	P/T
Mandurah	P/T	P/T	P/T		P/T	P/T
Quinns Rocks		DWER	DWER		DWER	DWER
Rolling Green		DWER	DWER			
Rockingham		DWER	DWER	DWER		
South Lake	P/T	P/T	P/T	P	P/T	P/T
Swanbourne		P/T	P/T			
Wattleup				DWER		

Key

P	Performance monitoring site
T	Trend performance monitoring site
M	Campaign monitoring
DWER	Instrument will be maintained by the department

Table A4 Screening procedures to demonstrate if monitoring is required

Notation	Screening procedures
A	Campaign monitoring at a generally representative upper bound (GRUB or upper bound) monitoring location (with no significant deterioration expected over 5–10 years).
B	Use of historical data within a region which will contain one or more GRUB monitoring sites to demonstrate the full number of sites is not required, either to detect exceedances or gain a more representative depiction of pollutant distribution.
C	Use of modelling within a region which will contain one or more GRUB monitoring sites to demonstrate the full number of sites is not required, either to detect exceedances or gain a more representative depiction of pollutant distribution.
D	In a region with no performance monitoring, use of validated modelling with detailed and reliable estimates of emissions and meteorological data.
E	In a region with no performance monitoring, and in the absence of emissions and detailed meteorological data, use of generic model results based on gross emissions estimates, ‘worst case’ meteorology estimates and other conservative assumptions.
F	In a region with no performance monitoring, comparison with a NEPM-compliant region with a greater population, emissions and pollution potential.
P	Performance monitoring. (A site used to measure achievement against the NEPM goal.)
T	Trend monitoring (A long-term performance monitoring site.)
M	Campaign monitoring. (A short-term site to determine if there is a pollution issue.)

Table A5 Screening procedures satisfied at each site

Site	Population	CO	O_3	NO_2	SO_2	Pb	Particles
Perth and Rockingham	2,224,475	P/T/M	P/T/M	P/T/M	B&C	B	P/T/M
Mandurah	95,509	P/T/M	P/T/M	P/T/M	F	F	P/T
Albany	40,434	F	F	F	F	F	P/T
Bunbury	76,452	A&F	E&F	E&F	D&F	F	P/T
Kalgoorlie–Boulder	30,697	M	E&F	E&F	P/T	F	P/T
Geraldton	41,514	F	E&F	E&F	D&F	F	P/T

* Population based on 2022 data at www.abs.gov.au/statistics/people/population.

Details of screening procedures are given in the Western Australian Monitoring Plan available at: www.nepc.gov.au/resource/ephc-archive-ambient-air-quality-nepm.

Table A6 Monitoring methods used

Pollutant	Standard	Method
Carbon monoxide	AS/NZS 3580.7.1 Determination of carbon monoxide – direct-reading instrumental method.	Gas filter correlation spectrophotometry
Ozone	AS 3580.6.1 Determination of ozone – direct-reading instrumental method.	Ultraviolet absorption
Nitrogen dioxide	AS 3580.5.1 Determination of oxides of nitrogen – chemiluminescence method.	Chemiluminescence
Sulfur dioxide	AS 3580.4.1 Determination of sulfur dioxide – direct-reading instrumental method.	Ultraviolet fluorescence
Particles as $PM_{2.5}$ and PM_{10}	AS/NZS 3580.9.7 Determination of suspended particulate matter – dichotomous sampler (PM_{10}, coarse PM and $PM_{2.5}$) – gravimetric method.	Dichotomous FDMS
	AS/NZS 3580.9.16 PM_{10} continuous direct mass method using a tapered element oscillating microbalance monitor incorporating a filter dynamic measurement system (FDMS) unit.	Tapered element oscillating microbalance

Table A7 Site compliance with AS/NZ 3580.1.1

	Height above ground	Minimum distance to support structures	Clear sky angle of 120°	Unrestricted airflow of 270°/360°	20 m from trees	No extraneous sources nearby	Minimum distance from road or traffic	Sample line material	Sample line length	Comments
Perth region										
Armadale	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Caversham	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Duncraig	☑	☑	☒	☑	☒	☑	☑	☑	☑	6 m to medium-sized trees and presence of power pole.
Quinns Rocks	☑	☑	☑	☑	☒	☑	☑	☑	☑	
Rockingham	☑	☑	☑	☑	☒	☑	☑	☑	☑	12 m to trees. Northern vector dominated by grain storage facility.
Rolling Green	☑	☑	☑	☑	☑	☑	☑	☑	☑	
South Lake	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Swanbourne	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Wattleup	☑	☑	☑	☑	☑	☑	☑	☑	☑	Decommissioned February 2023
Peel region										
Mandurah	☑	☑	☑	☑	☑	☑	☑	☑	☑	
South West region										
Albany	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Bunbury	☑	☑	☑	☑	☒	☑	☑	☑	☑	15 m from small to medium-sized eucalyptus trees.
Busselton	☑	☑	☑	☑	☒	☑	☑	☑	☑	5 m from small to medium-sized eucalyptus trees.
Collie	☑	☑	☒	☑	☒	☑	☑	☑	☑	Some trees and shipping containers nearby.
Mid West region										
Geraldton	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Goldfields region										
Kalgoorlie	☑	☑	☑	☑	☑	☑	☑	☑	☑	

Table A8 AAQ NEPM standards for criteria pollutants

Pollutant	Averaging period	Maximum concentration standard
Carbon monoxide	8 hours	9.0 ppm
Nitrogen dioxide	1 hour 1 year	0.08 ppm 0.015 ppm
Photochemical oxidants (as ozone)	8 hours	0.065 ppm
Sulfur dioxide	1 hour 1 day	0.10 ppm 0.02 ppm
Lead	1 year	0.50 µg/m^3
Particles as PM_{10}	1 day 1 year	50 µg/m^3 25 µg/m^3
Particles as $PM_{2.5}$	1 day 1 year	25 µg/m^3 8 µg/m^3

Note: There are no exceedances allowed for carbon monoxide, nitrogen dioxide, sulfur dioxide and lead. For the purpose of reporting compliance against the PM_{10} and $PM_{2.5}$ 1-day average and photochemical oxidants (as ozone) 8-hour average standards specified in this measure, monitoring data that have been determined as being directly associated with an exceptional event have been excluded.

A.2 Carbon monoxide

This section summarises carbon monoxide (CO) monitoring performed in WA.

Performance monitoring of CO occurs at the nominated trend sites of Duncraig and South Lake. CO is also monitored at Mandurah, Caversham and Kalgoorlie.

The Duncraig monitoring site is an upper-bound site for monitoring the combined effects of emissions from vehicles on the nearby Mitchell Freeway and from domestic wood fires. The site is 200 m west of the Mitchell Freeway and lies in a depression through which the freeway passes. The effect of stable air pooling in the depression is likely to lead to elevated CO concentrations. This geographic feature is found in many other places across the Swan Coastal Plain. The site is representative of a medium-density suburb.

The South Lake monitoring site is in an urban area and has previously recorded moderate levels of CO from domestic wood fires. It is not as close to major roads as the Duncraig site and is therefore more typical of a population-average site.

The concentration of CO caused by motor vehicles at the Mandurah monitoring site is expected to be low; however, there is likely to be some contribution from wood fires and controlled burns. Data have only been collected from Mandurah since October 2019 and from Kalgoorlie since 2017, therefore long-term trend analysis is not possible at this time.

The Caversham monitoring site is in a region of low population density and is therefore not considered a performance monitoring site. The Kalgoorlie site is nominated as campaign monitoring to provide enough data to determine if performance monitoring is warranted.

Trend analysis for each site shows that the maximum of the 8-hourly averages has consistently declined between 0.1 and 0.03 ppm per year as shown in Figure A3. Distinct seasonal influences can be seen in Figure A3 with CO concentrations peaking during winter months and falling during summer.

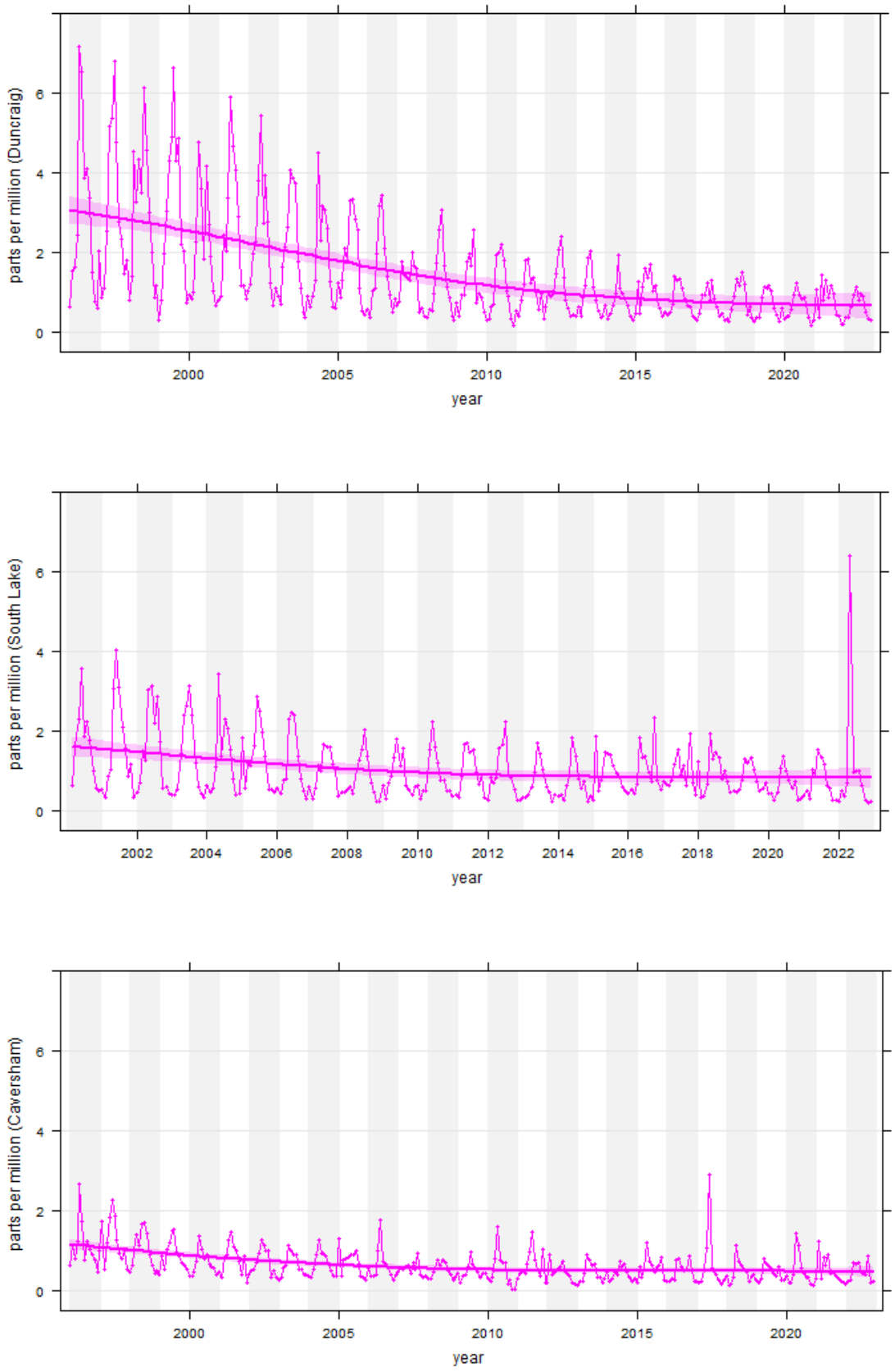


Figure A3 *Smoothed trend (dark lines) for CO at Duncraig (top), South Lake (centre) and Caversham (bottom)*

According to the National Pollutant Inventory, for the 2021–22 reporting year, more than 80 per cent of the CO emissions were from Burning/Wildfires (1.7 million tonnes [MT]) and 12 per cent from Motor Vehicles (0.25 MT). Metal Ore Mining (0.05 MT) and Domestic Solid Fuel Burning (0.041 MT) were the next highest contributors.

The CO maximum (blue), 99th (red) and 95th (green) concentration percentiles for each hour of the day at Duncraig over five-year periods 1998–2002, 2008–12 and 2018–22 are presented in Figure A4. The CO profile shows a marked decrease in overnight concentrations over the 24-year timespan. A likely reason for this is the introduction of the Environmental Protection (Domestic Solid Fuel Burning Appliances and Firewood Supply) Regulations 1998.[3] These require heating appliances (wood heaters) for sale to meet emission standards set out in the relevant Australian and New Zealand Standard (AS/NZS4013:1999) and regulate the moisture content of wood sold as firewood, leading to improved emissions performance.

Over the same period, motor vehicle engine technologies have also improved, reducing the emissions of harmful exhaust products and contributing to the overall reduction of CO concentrations.

[3] Repealed and replaced by the Environmental Protection (Solid Fuel Heater and Firewood) Regulations 2018 on 1 September 2018.

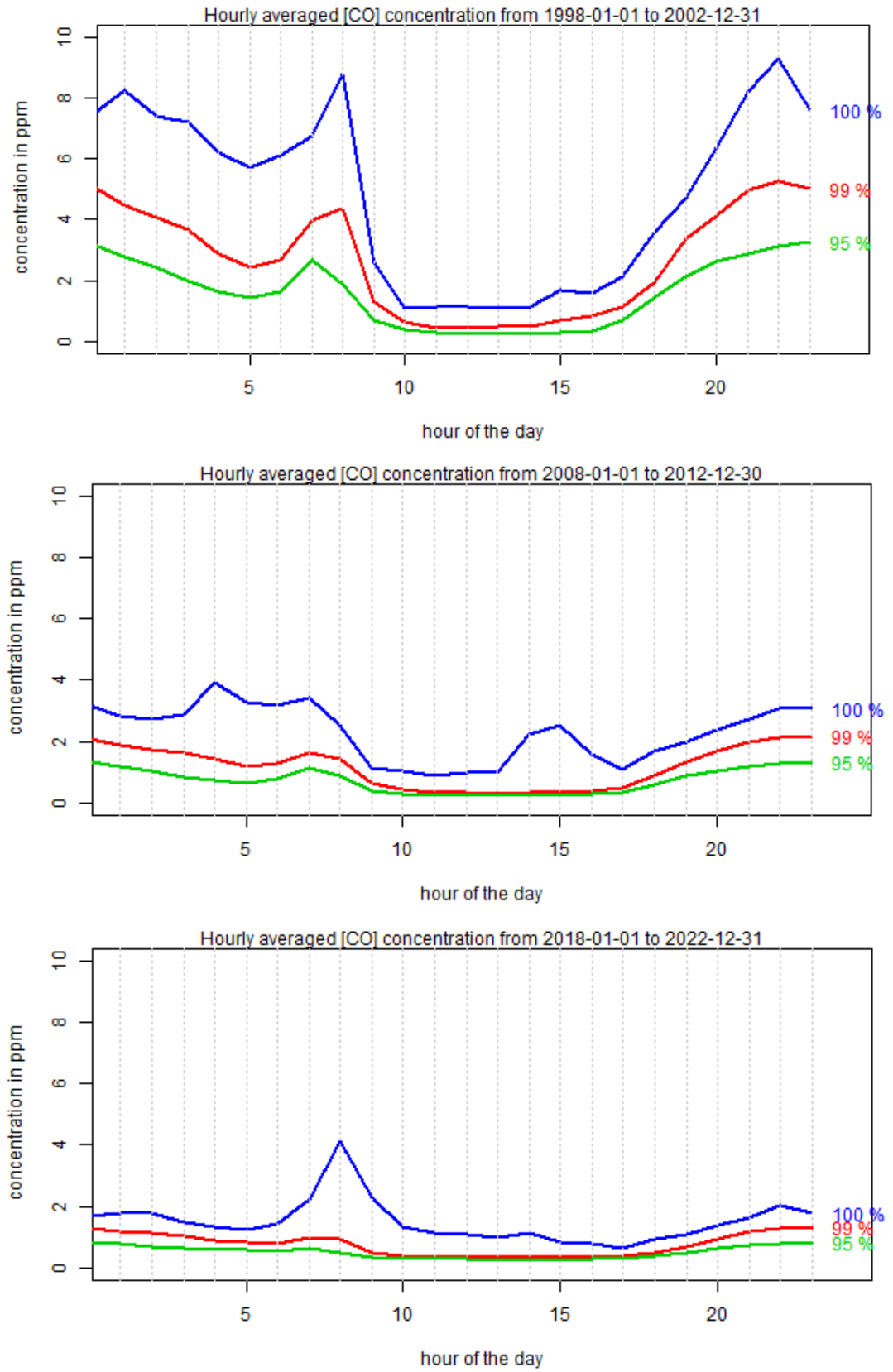


Figure A4 *The CO maximum (blue), 99th (red) and 95th (green) percentiles for each hour of the day at Duncraig over five-year periods 1998–2002 (top), 2008–12 (centre) and 2018–22 (bottom)*

A.3 Photochemical oxidants as ozone

This section describes ozone (O_3) monitoring performed in WA.

O_3 formation in metropolitan Perth occurs due to a complex interaction between nitrogen oxides, organic compounds, prevailing winds and relatively high levels of sunlight. This often occurs with easterly winds during the morning, until an afternoon sea breeze pushes an ozone-rich plume back over the city.

Statistical analysis of the coastal sites of Quinns Rocks, Swanbourne and Rockingham indicates there is little difference between O_3 levels at each site over the long term. Swanbourne was selected as a performance monitoring site, while the Quinns Rocks and Rockingham sites were maintained to provide additional information on O_3 events.

Given its location, the Caversham monitoring site represents an upper-bound, middle-distance inland site. Accordingly, Caversham was selected as a performance monitoring site.

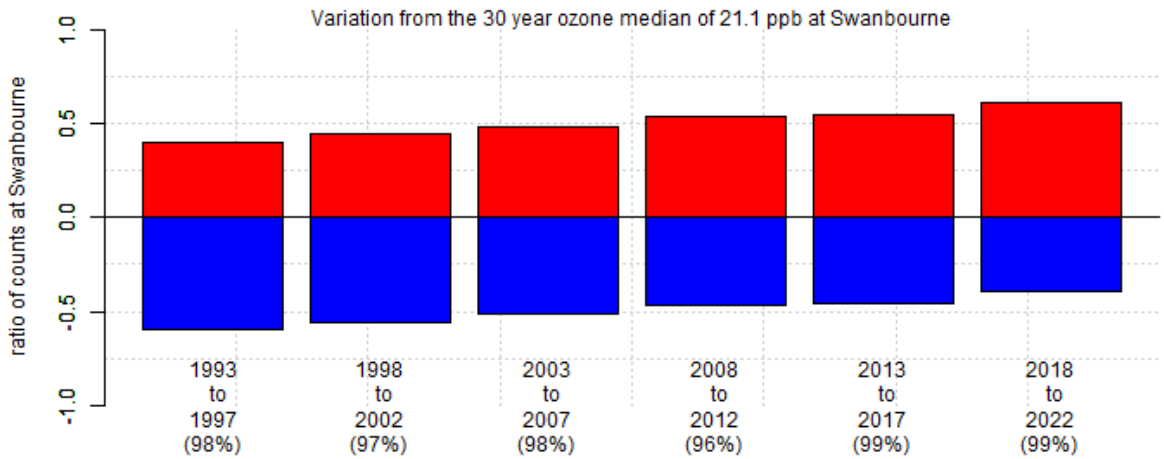
A third performance monitoring site is South Lake. It was chosen because:

- it provides a good spatial spread of sites (it will measure O_3 returning on shore in the southern part of the metropolitan area)
- it is a moderate distance inland in a growing urban area, so it is classified as a population-average site
- it may occasionally detect the interactions of O_3-rich air with the nitrogen oxide-rich (NO_x) plumes from Kwinana industry, which potentially result in elevated nitrogen dioxide (NO_2) concentrations.

Caversham, Swanbourne and South Lake sites are all nominated as trend sites.

The department will continue to maintain the sites at Rockingham, Quinns Rocks and Rolling Green as part of its wider O_3 network to enable a better understanding of O_3 events.

Long-term analysis is presented in Figure A5. The number of times when the 1-hour O_3 concentration exceeded the long-term average at the coastal site of Swanbourne has increased for every five-year period analysed.



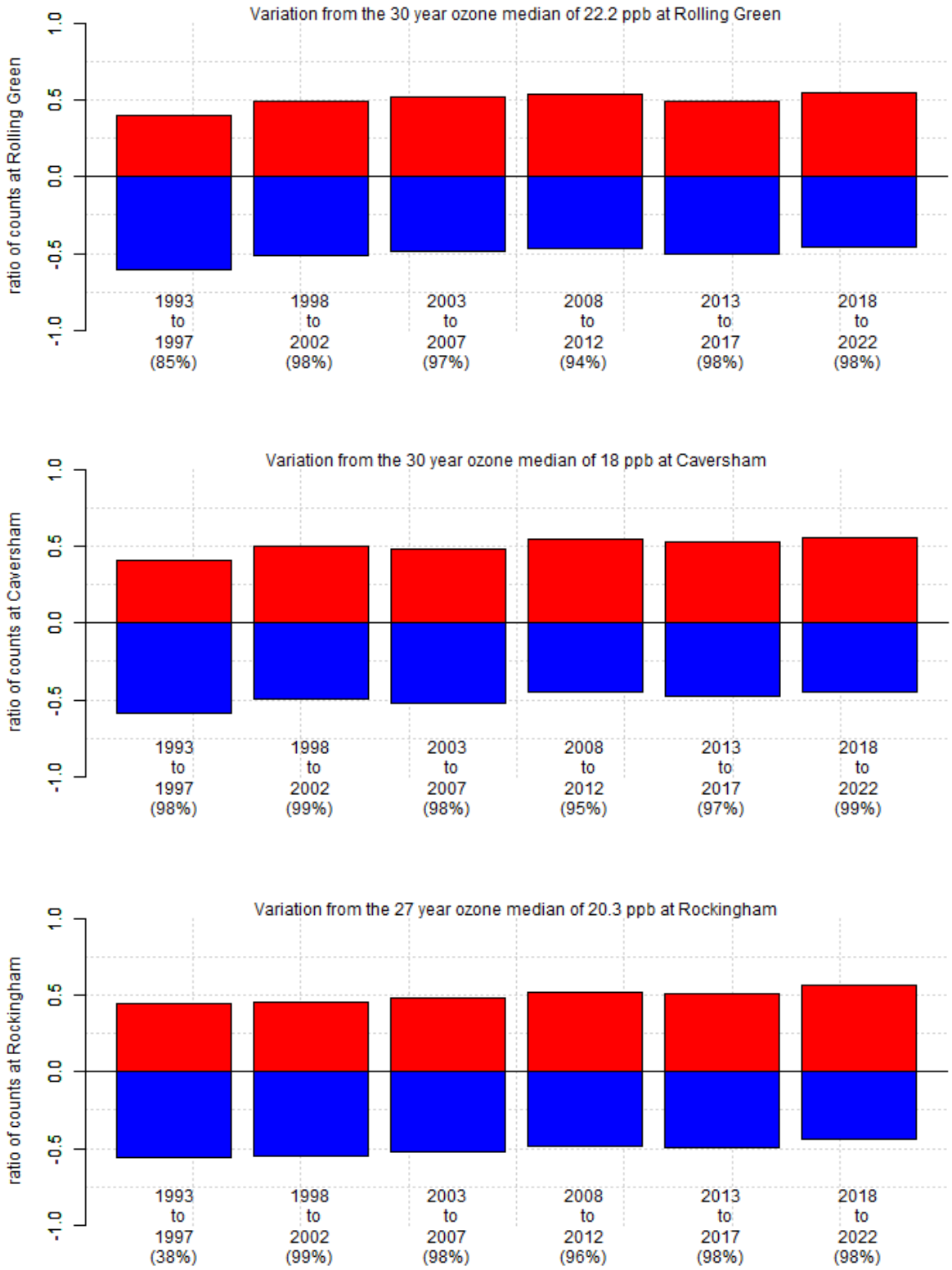


Figure A5 *Ratio of the number of hourly averaged ozone concentrations at Swanbourne (top panel), Rolling Green, Caversham and Rockingham (bottom panel) that was higher (red) or equal to or lower (blue) than the long-term average concentration for that site (bracketed percentages indicate data recovery for the nominated period)*

A similar increasing pattern is not as evident at the inland sites of Caversham and Rolling Green.

A.4 Nitrogen dioxide

This section describes NO_2 monitoring performed in WA.

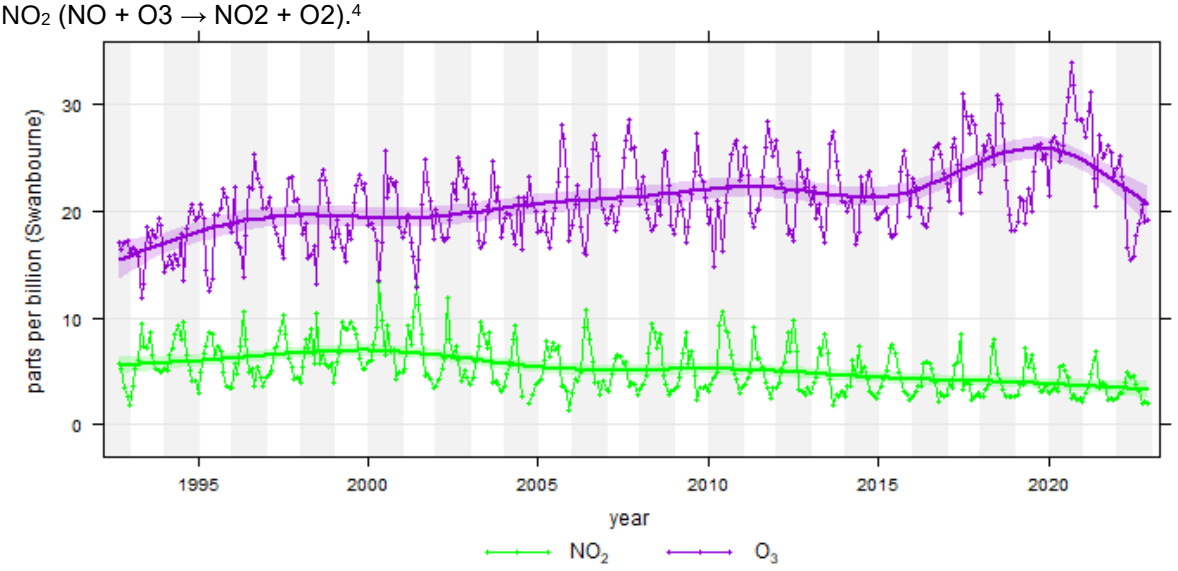
Nitrogen oxides (NO + NO_2) are primarily emitted from vehicle use and industrial processes.

Owing to their interrelated chemical reactivity, NO_2 is currently being monitored at all sites where O_3 is monitored. Caversham, Swanbourne and South Lake sites were chosen as performance monitoring sites for NO_2 as they provided a good spatial distribution. Caversham, Swanbourne and South Lake sites are also trend sites.

The department will continue to measure NO_2 at Quinns Rocks, Rolling Green and Duncraig as part of its wider network to enable a better understanding of photochemical smog formation.

Figure A6 demonstrates how the monthly averages for NO_2 have decreased at all sites. The monthly NO has also seen a general decrease over time, with Duncraig experiencing an average of 0.65 parts per billion (ppb) per annum decrease since 1996.

Decreasing concentrations of nitrogen oxides can lead to an earlier build-up of O_3 near populated areas, since they are unable to fully suppress O_3 formation through typically producing NO_2 (NO + O3 → NO2 + O2).[4]



[4] Stedman DH (2004) 'Photochemical ozone formation, simplified', *Environmental Chemistry* 1(2): 65-66.

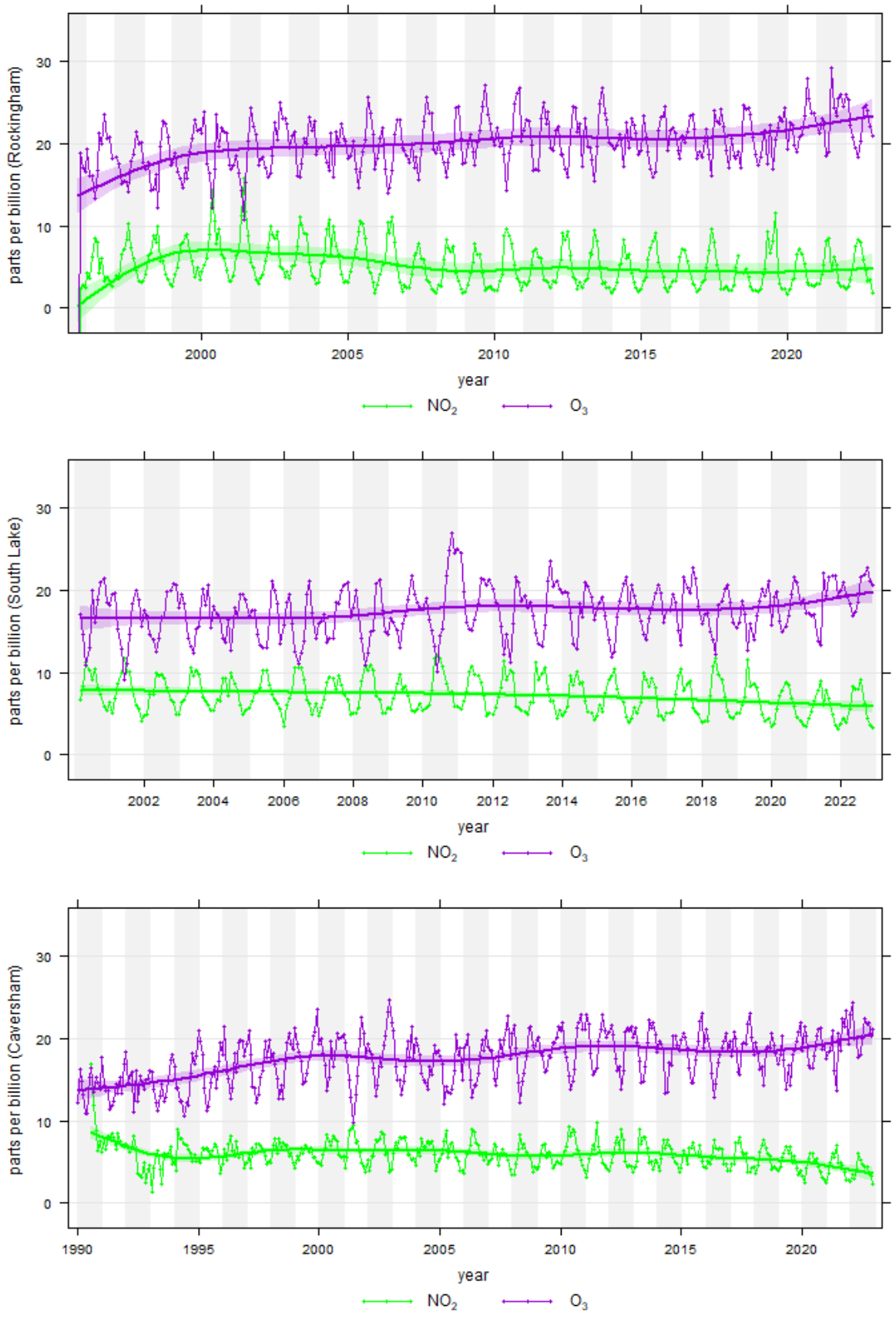


Figure A6 *Smoothed trend (dark lines) at Swanbourne (top panel), Rockingham, South Lake and Caversham (bottom panel) using the monthly average concentration of NO_2 (green) and O_3 (violet)*

A.5 Sulfur dioxide

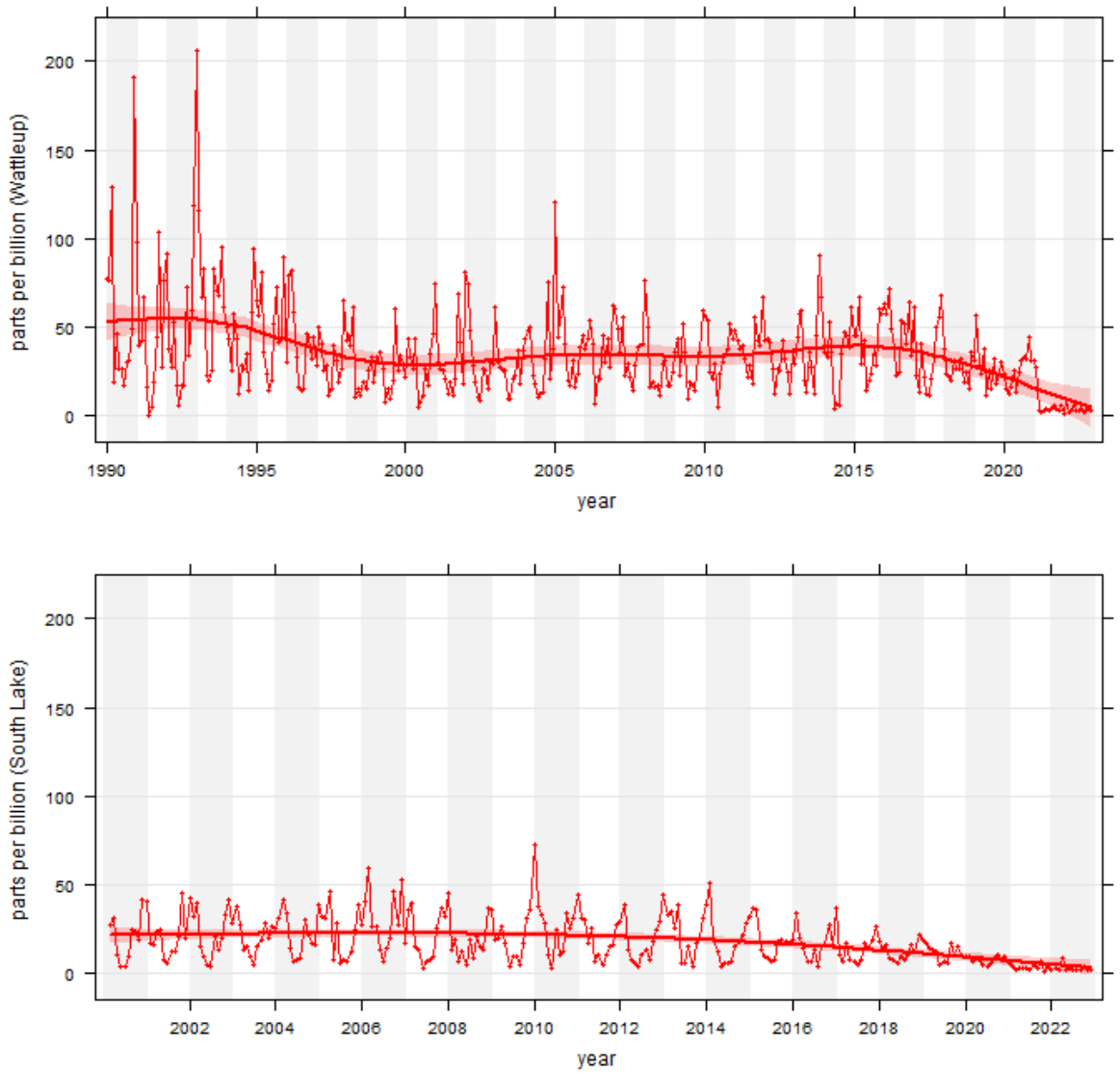
This section describes SO_2 monitoring performed in WA.

Heavy industry in the Kwinana Industrial Area is the only significant source of SO_2 in the Perth region. Concentrations of SO_2 have reduced substantially since the late 1970s because of the transition from high to low-sulfur content fuels and the installation of sulfur dioxide emission control technologies. Emissions from industry are controlled through licences issued by the department under Part V of the *Environmental Protection Act 1986*, together with the *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999* (EPP), to ensure ambient concentrations do not exceed the standards and limits set in the EPP.

The department operates one performance monitoring site at South Lake for SO_2, while maintaining a source management network which includes the Wattleup and Rockingham monitoring sites. The Wattleup site was decommissioned in February 2023 due to changed land use; however, a replacement site is actively being sought.

South Lake site is an upper-bound performance monitoring site for SO_2, and a trend site. South Lake is near the southern extent of the main urban population and downwind of Kwinana during sea breezes.

Long-term trends for SO_2 are presented in Figure A7.



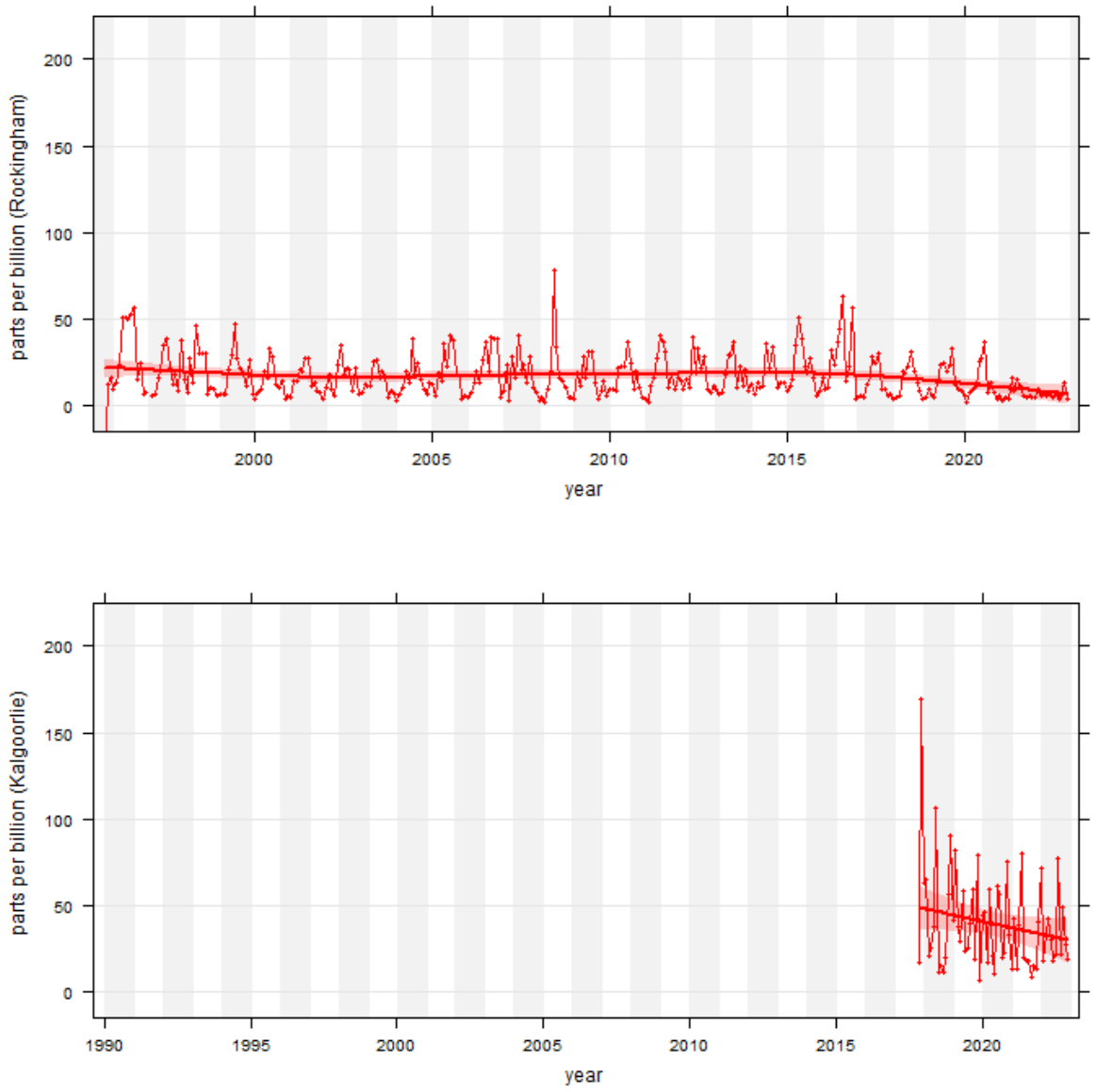


Figure A7 *Trend line for maximum hourly averaged SO_2 concentration at Wattleup, within the Kwinana industrial buffer (top), South Lake (centre top), Rockingham (centre bottom) and Kalgoorlie (bottom)*

A.6 Lead

This section describes lead monitoring previously performed in WA.

Since 1995, lead levels within the Perth CBD have been below 60 per cent of the AAQ NEPM annual standard of 0.5 particle micrograms per cubic metre (µg/m^3). In 2001, the average lead level in Perth was 0.022 µg/m^3, which is less than 5 per cent of the AAQ NEPM standard. The decreasing trend evident in Figure A8 was the result of the phase-out of leaded petrol.

In accordance with *AAQ NEPM Technical Paper No. 4: Screening Procedures*, and the *National Environment Protection Measure for Ambient Air Quality Monitoring Plan for Western Australia*, a performance monitoring site for lead has not been maintained since 2001.

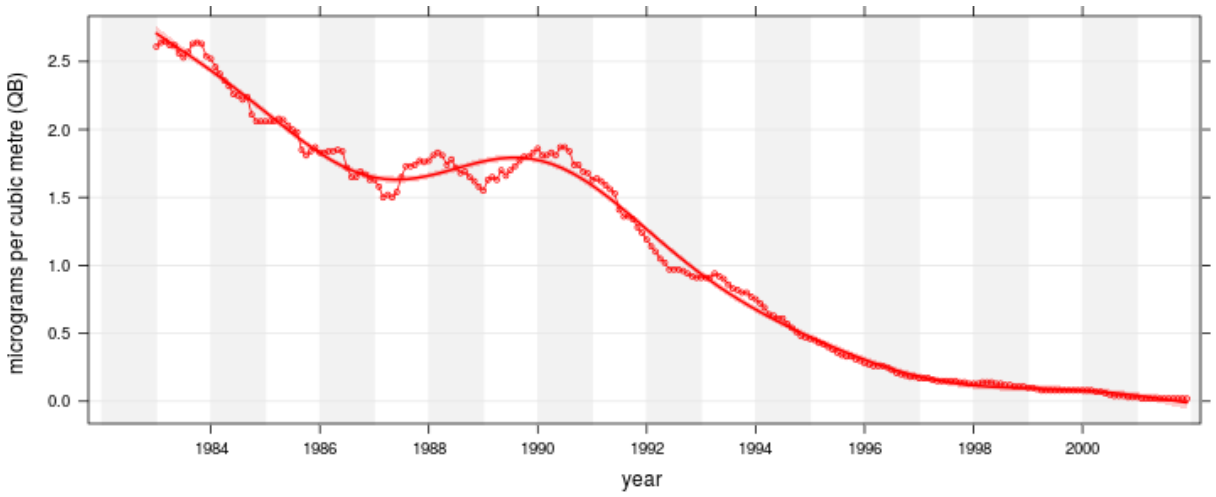


Figure A8 Trend line for annual moving average lead concentration within the Perth CBD

A.7 Particles as PM_{10}

This section describes PM_{10} particle monitoring performed in WA.

According to the National Pollutant Inventory, for the 2021–22 reporting year, emissions from natural and man-made sources such as Metal Ore Mining (50%), Burning/Wildfires (17%), Windblown Dust (15%), Paved and Unpaved Roads (13%) were the biggest sources of particles as PM_{10} from an overall airshed perspective.

Duncraig is an upper-bound performance monitoring site for PM_{10}. High levels of PM_{10} at this location are caused by a combination of vehicle and domestic wood heater emissions during strongly stable meteorological conditions.

Similarly, South Lake measures PM_{10} concentrations arising from local sources including wood fires and industrial emissions.

Duncraig and South Lake are both nominated as trend sites.

Additional monitoring sites were established at Geraldton in 2005, Albany in 2006, Collie in 2008, Kalgoorlie in 2017, Mandurah in 2019 and Armadale in 2020.

A frequency distribution of hourly particle concentrations is shown in Figure A9 for three metropolitan sites and two regional sites for the five years between 2018 and 2022. Figure A9 shows differences in the ratio of $PM_{2.5}$:PM_{10} and provides some insight as to the source of the pollutant. That is, a high ratio of $PM_{2.5}$:PM_{10} indicates a high proportion of smaller particles and is generally caused by particles originating from smoke. A lower ratio generally indicates anthropogenic dust or crustal materials.

The blue plots in Figure A9 represent periods where the 1-hour average PM_{10} exceeded an arbitrary concentration of 50 µg/m^3. This cut-off was chosen to limit the analysis to those concentrations at the higher end of the spectrum. While Duncraig exhibits a lower overall number, both Duncraig and Bunbury exhibit a higher proportion of high-ratio events where the composition is dominated by fine particles, and both Caversham and South Lake display a larger number of low-ratio events where the

composition is dominated by coarse particles. Kalgoorlie has the greatest proportion of low-ratio events dominated by course particles.

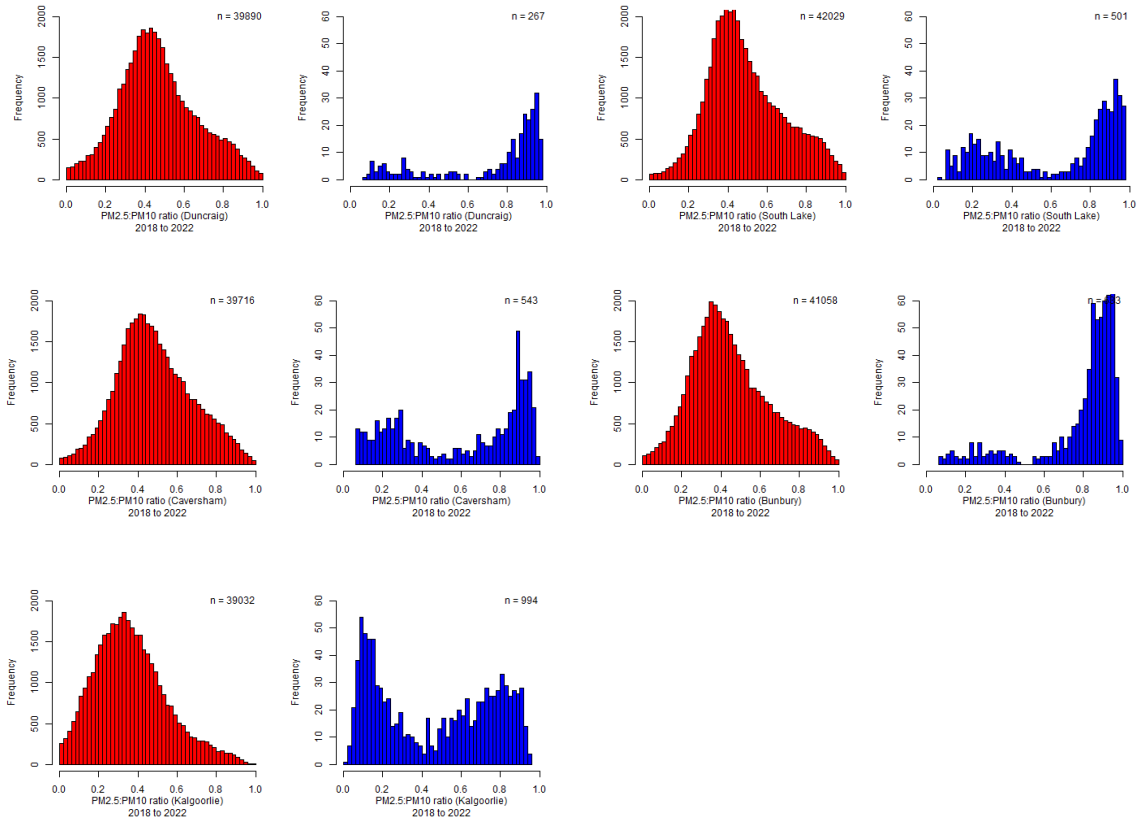


Figure A9 *Frequency distribution of $PM_{2.5}$:PM_{10} ratios of hourly averages at Duncraig (top left), South Lake (top right), Caversham (mid left) and Bunbury (mid right,) and Kalgoorlie (lower left) for the five-year period from 2018 to 2022 using all data (red) and data where hourly averaged PM_{10} was greater than or equal to 50µg/m^3 (blue)*

These differences can be explained based on the site locations.

Duncraig is 3.5 km from the coast within a medium-density housing area with no industry close by, so will be mainly influenced by vehicles, sea salt and smoke from the occasional bushfire or prescribed burn and, to a lesser extent, domestic wood heater emissions. Consequently, the site is likely to record a higher $PM_{2.5}$:PM_{10} ratio, which is characteristic of combustion products.

Bunbury is a small city in the south-west of the state surrounded by farms and bushland which are subjected to controlled burns and occasional bushfires. Consequently, a higher $PM_{2.5}$:PM_{10} ratio characteristic of combustion products would also be expected.

Caversham is in the semi-rural Swan Valley north-east of Perth CBD and has horticulture and some brick manufacturing facilities. These activities are more likely to produce coarse fraction particles producing a lower $PM_{2.5}$:PM_{10} ratio.

South Lake, within a medium-density housing area, is close to the Kwinana Industrial Area, horticultural areas, new housing developments and a cement manufacturing plant. It is, therefore, more likely that $PM_{2.5}$:PM_{10} ratios will be lower.

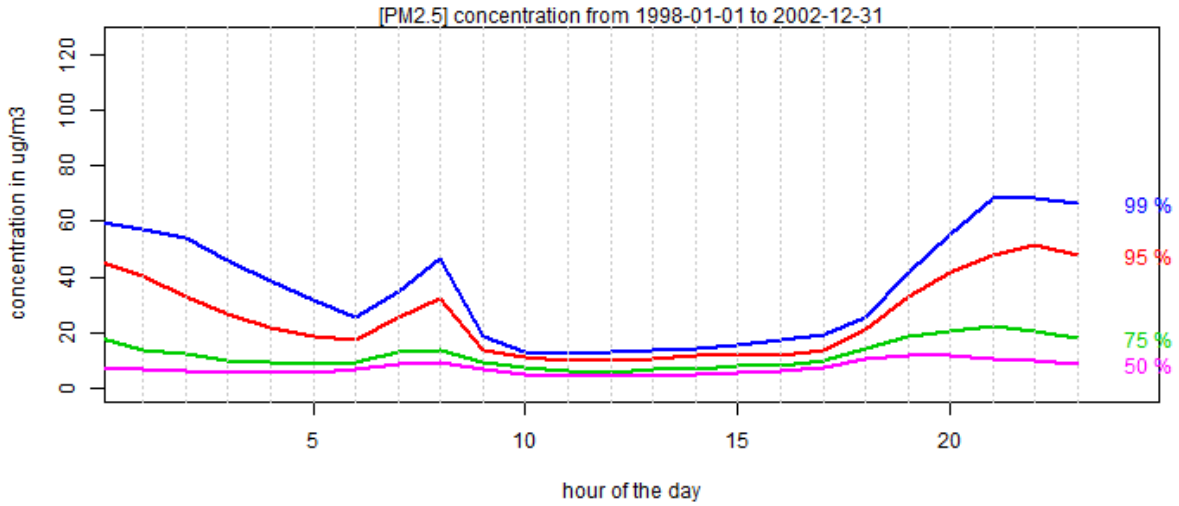
The Kalgoorlie monitoring site is located on the edge of the City of Kalgoorlie–Boulder within 2 km of active mining areas in a very dry climate. Consequently, it is influenced by both winter wood heater smoke, mining activity and periodic dust storms under high wind conditions.

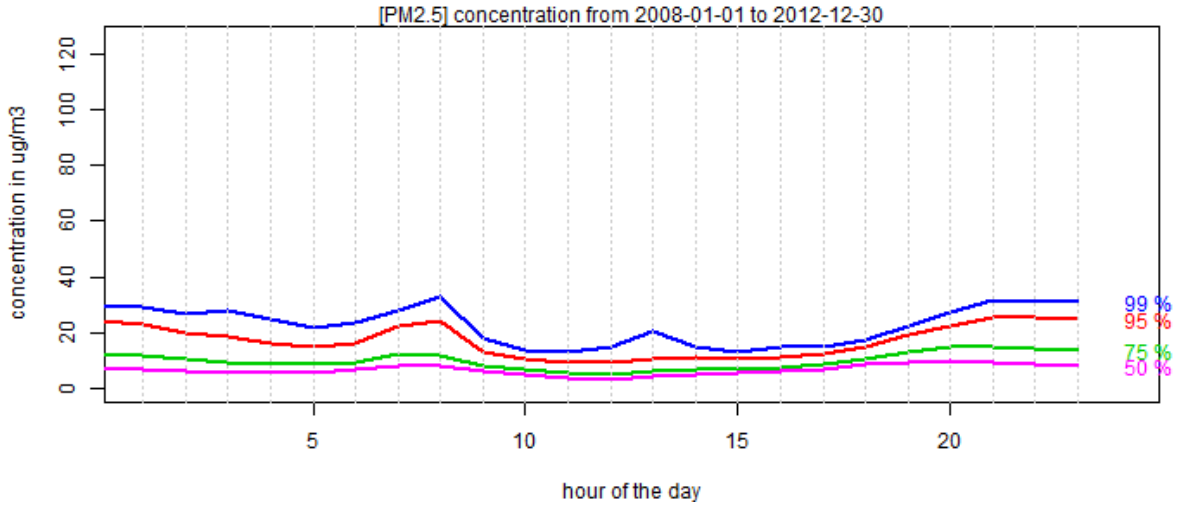
A.8 Particles as $PM_{2.5}$

This section describes $PM_{2.5}$ particle monitoring performed in WA.

To make assessments against the AAQ NEPM standard, $PM_{2.5}$ tapered element oscillating microbalances (TEOMs) have been installed in the greater Perth Metropolitan and Peel regions at Quinns Rocks, Caversham, Duncraig, South Lake, Armadale and Mandurah, and in the regional locations of Albany, Bunbury, Busselton, Collie, Geraldton and Kalgoorlie. All will remain at these locations indefinitely with the intention of developing trend data.

All TEOMs used by the department are operated continuously and unadjusted for temperature.





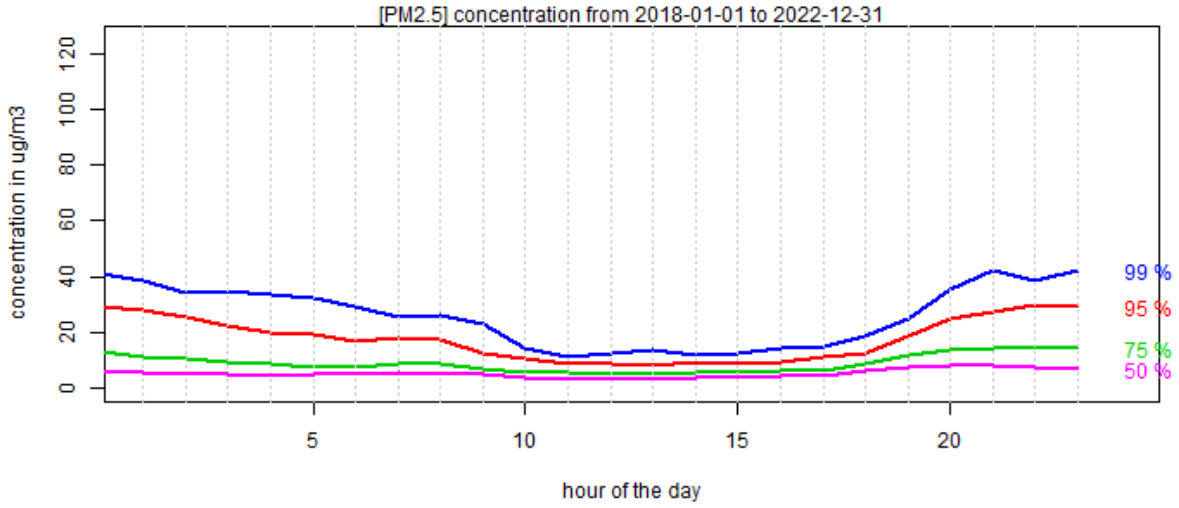


Figure A10 *The $PM_{2.5}$ 99th (blue), 95th (red), 75th (green) and 50th (mauve) percentiles for each hour of the day at Duncraig over winter months spanning the five-year periods 1998–2002 (top), 2008–12 (centre) and 2018–22 (bottom)*

Percentile concentrations for $PM_{2.5}$ for each hour of the day over winter months during three four-year periods at Duncraig are shown in Figure A10. The $PM_{2.5}$ profile shows a marked decrease in overnight concentrations between the first two four-year timespans with a little or no improvement over the subsequent second and third periods. As indicated in Section A2 (carbon monoxide), a likely reason for this initial and dramatic decrease in fine particle concentrations during winter is the introduction of the Environmental Protection (Domestic Solid Fuel Burning Appliances and Firewood Supply) Regulations 1998, which require heating appliances (wood heaters) for sale to meet emission standards set out in the relevant Australian and New Zealand Standard (AS/NZS4013:1999) and regulate the moisture content of wood sold as firewood.

In addition, in 2006 and 2007, wood heater replacement programs were conducted by the department, which offered up to $600 as an economic incentive to encourage people using wood heaters or fireplaces as the main source of heating in their homes to convert to an alternative heating source.

A.9 Population exposure

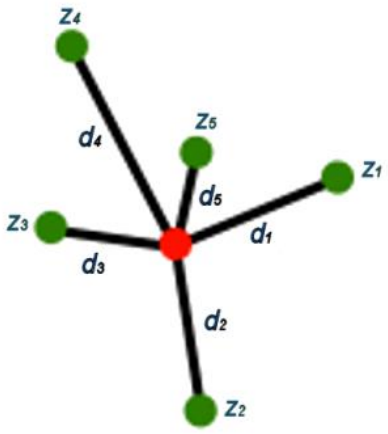
The requirement for an annual assessment of population exposure to particles as $PM_{2.5}$ has been in place since 26 February 2016. In May 2021, this was extended to the annual reporting of population exposure to O_3 and NO_2.

Pending a nationally consistent method to assess population exposures for various pollutants, the WA assessment has used a simple inverse distance weighing (IDW) method.

$$Z(x) = \frac{\sum w_i z_i}{\sum w_i}$$

where

$$w_i = \frac{1}{d(x, x_i)^2}$$



In this simple IDW function, $Z(x)$ represents a known location for which a $PM_{2.5}$ concentration needs to be estimated, z_i represents known locations for which $PM_{2.5}$ concentrations are available while $d(x, x_i)$ is the distance from a point x_i for which we have a known concentration to a point x where the concentration estimate is needed.

$$Population\ exposure = \sum \frac{Z(x)P_x}{P_{total}}$$

where

$$P_x = population\ at\ each\ Z(x)\ or\ suburb$$

It is important to note that this method uses a very simple interpolation and does not consider land-use or terrain effects. This results in the concentrations of nearer sites having a greater effect on the estimated concentration than more distant sites.

$PM_{2.5}$ particle, ozone and nitrogen dioxide data were analysed for metropolitan sites. Using the centroid of each suburb in metropolitan Perth and their associated population data, the population weighted averages for Perth are presented in Table A9.

Table A9 Population weighted average exposure for Perth

Pollutant	Number of sites	Concentration
$PM_{2.5}$	8	6.7 µg/m^3
Ozone	7	21.3 ppb
Nitrogen dioxide	8	4.2 ppb

A.10 Mandurah and marine aerosols

The *National Environment Protection Measure for Ambient Air Quality Monitoring Plan for Western Australia*, prepared in accordance with the AAQ NEPM in 2001, describes the monitoring required to determine compliance with the standards and goals of the AAQ NEPM. The plan identified that monitoring sites were required in Mandurah, Geraldton and Kalgoorlie–Boulder, based on population size.

In relation to Mandurah, the plan states:

> The preferred Mandurah monitoring site is close to the coast, in order to measure ozone concentrations before any significant titration with fresh nitric oxide occurs and before

> convective mixing over the land causes significant dilution … PM_{10} particles will be measured at Mandurah. Wood fires, wildfires and prescribed burning, sea salt and, to a lesser extent, vehicles are likely sources. Secondary particles in smog plumes from the Perth Region may also be measured.

The Mandurah air quality monitoring site was commissioned in November 2019 with the site located about 100 m from the ocean in the suburb of Halls Head. Since installation, the Mandurah site has been recording a larger than expected number of PM_{10} particle exceedances of the AAQ NEPM standard. During the 2022 calendar year, eight PM_{10} and four $PM_{2.5}$ particle exceedances were recorded at Mandurah. Of these, five PM_{10} exceedances were due to marine aerosols. There were no marine aerosol $PM_{2.5}$ 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 AAQ NEPM defines an ‘exceptional event’ as a fire or dust occurrence which adversely affects air quality at a particular location and causes an exceedance of 1-day standards in excess of normal historical fluctuations and background levels, and which is directly related to bushfire, jurisdiction-authorised hazard reduction burning or continental-scale windblown dust. Clause 18(3C) of the AAQ NEPM states:

> For the purpose of reporting compliance against PM_{10} and $PM_{2.5}$ 1-day average standards, jurisdictions shall exclude monitoring data that has been determined as being directly associated with an exceptional event.

As the Mandurah particle exceedances caused by marine aerosols cannot be defined as exceptional events, these exceedances are deemed assessable events and have been counted for the purposes of determining whether the AAQ NEPM PM_{10} goal of no allowable exceedances has been met at Mandurah. Notwithstanding these exceedances, the Department of Health has provided advice that inhaling ‘sea air’ or ‘ocean air’ is not harmful.

Mandurah $PM_{2.5}$ concentrations are similar to those at other metropolitan sites.

A.11 Variation to the AAQ NEPM

In May 2021, the AAQ NEPM was varied to:

- establish an O_3 standard with an 8-hour averaging period that reflects the health evidence and its use internationally, with a numerical value of 65 ppb
- significantly strengthen NO_2 reporting standards for 1-hour and annual average NO_2 to 80 ppb and 15 ppb respectively, bringing forward standards initially proposed for 2025. This reflects the most recent health evidence emerging about the health impacts of NO_2
- significantly strengthen SO_2 reporting standards for 1-hour and 1-day SO_2 to 100 ppb and 20 ppb respectively. The 1-hour SO_2 standard will be strengthened again in 2025 to 75 ppb
- remove annual SO_2 and 1-hour and 4-hour O_3 averaging periods to align the standards with the recent health evidence and for consistency with many international agencies
- change the form of the standards to the maximum value with no allowable exceedances
- apply the existing exceptional events rule that applies to the particle standards to O_3 given the linkages between elevated O_3 levels and fire events. This rule is used by jurisdictions to determine compliance with the standards
- extend annual reporting of population exposure from particles as $PM_{2.5}$ to O_3 and NO_2 given the widespread exposure across whole populations.

A.12 Exceedance summary

There were exceedances of the O_3 8-hour standard, the NO_2 hourly standard and the $PM_{2.5}$ and PM_{10} 1-day standards in 2022 which are listed in Table A10. Daily plots of all exceedances are provided in Section F.

Table A10 AAQ NEPM standard exceedances recorded during 2022

Date	Pollutant and averaging period	Site	Concentration in µg/m^3 unless otherwise indicated	Causes	Exceptional Events	Assessable Events
21/01/2022	O_3 - 8-hours	Rockingham	65.6 ppb	U		AE
15/03/2022	PM2.5 - 1-day	Collie	26.9	BF	EE	
18/03/2022	PM10 - 1-day	Bunbury	57.5	BF	EE	
18/03/2022	PM2.5 - 1-day	Bunbury	50.2	BF	EE	
18/03/2022	PM2.5 - 1-day	Busselton	25.7	BF	EE	
18/03/2022	PM2.5 - 1-day	Collie	33.4	BF	EE	
18/03/2022	PM2.5 - 1-day	Mandurah	29.6	BF	EE	
15/04/2022	PM10 - 1-day	Collie	50.5	PB	EE	
15/04/2022	PM2.5 - 1-day	Collie	44.6	PB	EE	
16/04/2022	PM10 - 1-day	Bunbury	54.5	PB	EE	
16/04/2022	PM2.5 - 1-day	Bunbury	49.9	PB	EE	
16/04/2022	PM2.5 - 1-day	Collie	30.3	PB	EE	
17/04/2022	PM2.5 - 1-day	Bunbury	29.2	PB	EE	
19/04/2022	PM10 - 1-day	Armadale	53.7	PB	EE	
19/04/2022	PM2.5 - 1-day	Armadale	48.4	PB	EE	
19/04/2022	PM2.5 - 1-day	Caversham	36.7	PB	EE	
19/04/2022	PM2.5 - 1-day	Duncraig	28.0	PB	EE	
19/04/2022	PM2.5 - 1-day	Quinns Rocks	33.2	PB	EE	
19/04/2022	PM2.5 - 1-day	South Lake	33.2	PB	EE	
20/04/2022	PM2.5 - 1-day	Quinns Rocks	26.5	LB		AE
21/04/2022	PM10 - 1-day	Caversham	50.3	PB	EE	
21/04/2022	PM2.5 - 1-day	Caversham	45.6	PB	EE	
21/04/2022	PM2.5 - 1-day	Duncraig	33.4	PB	EE	
2/05/2022	PM2.5 - 1-day	Armadale	35.7	PB	EE	
4/05/2022	PM10 - 1-day	Quinns Rocks	137	LB		AE
4/05/2022	PM2.5 - 1-day	Quinns Rocks	122	LB		AE
4/05/2022	NO_2 – 1-hour	Quinns Rocks	170 ppb	LB		AE
5/05/2022	PM10 - 1-day	Mandurah	68.5	PB	EE	
5/05/2022	PM2.5 - 1-day	Mandurah	60.5	PB	EE	
6/05/2022	PM2.5 - 1-day	Bunbury	32.7	PB	EE	
6/05/2022	PM2.5 - 1-day	Busselton	28.3	PB	EE	
7/05/2022	PM10 - 1-day	Armadale	189	PB	EE	
7/05/2022	PM10 - 1-day	Bunbury	75.9	PB	EE	
7/05/2022	PM10 - 1-day	Busselton	71.1	PB	EE	
7/05/2022	PM10 - 1-day	Collie	105	PB	EE	
7/05/2022	PM2.5 - 1-day	Armadale	181	PB	EE	
7/05/2022	PM2.5 - 1-day	Bunbury	67.5	PB	EE	
7/05/2022	PM2.5 - 1-day	Busselton	62.6	PB	EE	
7/05/2022	PM2.5 - 1-day	Collie	88.9	PB	EE	
8/05/2022	PM10 - 1-day	Bunbury	51.0	PB	EE	

Date	Pollutant and averaging period	Site	Concentration in µg/m^3 unless otherwise indicated	Causes	Exceptional Events	Assessable Events
8/05/2022	PM10 - 1-day	Busselton	72.6	PB	EE	
8/05/2022	PM10 - 1-day	Collie	72.0	PB	EE	
8/05/2022	PM10 - 1-day	Mandurah	72.4	PB	EE	
8/05/2022	PM10 - 1-day	South Lake	144	PB	EE	
8/05/2022	PM2.5 - 1-day	Bunbury	43.7	PB	EE	
8/05/2022	PM2.5 - 1-day	Busselton	65.4	PB	EE	
8/05/2022	PM2.5 - 1-day	Collie	65.1	PB	EE	
8/05/2022	PM2.5 - 1-day	Mandurah	60.7	PB	EE	
8/05/2022	PM2.5 - 1-day	South Lake	136	PB	EE	
9/05/2022	PM10 - 1-day	Collie	56.0	PB	EE	
9/05/2022	PM2.5 - 1-day	Collie	50.0	PB	EE	
9/05/2022	PM2.5 - 1-day	South Lake	38.3	PB	EE	
10/05/2022	PM10 - 1-day	Armadale	85.6	PB	EE	
10/05/2022	PM2.5 - 1-day	Armadale	76.3	PB	EE	
10/05/2022	PM2.5 - 1-day	Collie	27.7	PB	EE	
11/05/2022	PM10 - 1-day	Armadale	91.4	PB	EE	
11/05/2022	PM2.5 - 1-day	Armadale	86.1	PB	EE	
11/05/2022	PM2.5 - 1-day	Collie	31.1	PB	EE	
15/05/2022	PM2.5 - 1-day	Collie	25.9	WH		AE
19/05/2022	PM2.5 - 1-day	Collie	31.7	WH		AE
21/05/2022	PM2.5 - 1-day	Collie	26.7	WH		AE
23/05/2022	PM10 - 1-day	Mandurah	53.0	MA		AE
25/05/2022	PM2.5 - 1-day	Collie	28.4	WH		AE
26/05/2022	PM2.5 - 1-day	Collie	35.7	WH		AE
27/05/2022	PM2.5 - 1-day	Collie	42.6	WH		AE
28/05/2022	PM2.5 - 1-day	Collie	28.5	WH		AE
1/06/2022	PM2.5 - 1-day	Collie	28.3	PB	EE	
2/06/2022	PM2.5 - 1-day	Collie	27.2	PB	EE	
2/06/2022	PM2.5 - 1-day	South Lake	26.3	PB	EE	
3/06/2022	PM2.5 - 1-day	Collie	25.4	PB	EE	
4/06/2022	PM2.5 - 1-day	Collie	26.2	PB	EE	
5/06/2022	PM2.5 - 1-day	Caversham	35.8	WH		AE
7/06/2022	PM10 - 1-day	Geraldton	74.0	WD	EE	
16/06/2022	PM2.5 - 1-day	Collie	25.1	WH		AE
21/06/2022	PM2.5 - 1-day	Kalgoorlie	29.0	WH		AE
25/06/2022	PM10 - 1-day	Collie	55.9	WH		AE
25/06/2022	PM2.5 - 1-day	Collie	52.7	WH		AE
26/06/2022	PM2.5 - 1-day	Collie	42.6	WH		AE
27/06/2022	PM2.5 - 1-day	Collie	37.0	WH		AE
28/06/2022	PM2.5 - 1-day	Collie	37.1	WH		AE
1/07/2022	PM2.5 - 1-day	Collie	29.9	WH		AE
2/07/2022	PM2.5 - 1-day	Collie	45.0	WH		AE
2/07/2022	PM2.5 - 1-day	Albany	27.4	WH		AE
3/07/2022	PM10 - 1-day	Collie	57.6	WH		AE
3/07/2022	PM2.5 - 1-day	Collie	54.3	WH		AE
6/07/2022	PM2.5 - 1-day	Collie	32.0	WH		AE
7/07/2022	PM2.5 - 1-day	Collie	34.9	WH		AE

Date	Pollutant and averaging period	Site	Concentration in µg/m^3 unless otherwise indicated	Causes	Exceptional Events	Assessable Events
8/07/2022	PM2.5 - 1-day	Collie	25.5	WH		AE
11/07/2022	PM10 - 1-day	Collie	50.5	WH		AE
11/07/2022	PM2.5 - 1-day	Collie	45.7	WH		AE
12/07/2022	PM10 - 1-day	Collie	50.8	WH		AE
12/07/2022	PM2.5 - 1-day	Collie	46.4	WH		AE
13/07/2022	PM2.5 - 1-day	Busselton	25.3	WH		AE
15/07/2022	PM10 - 1-day	Mandurah	58.2	MA		AE
25/07/2022	PM2.5 - 1-day	Kalgoorlie	25.4	WH		AE
2/08/2022	PM10 - 1-day	Mandurah	60.3	MA		AE
3/08/2022	PM10 - 1-day	Mandurah	53.0	MA		AE
5/08/2022	PM2.5 - 1-day	Collie	32.9	WH		AE
6/08/2022	PM2.5 - 1-day	Collie	26.5	WH		AE
11/08/2022	PM2.5 - 1-day	Collie	31.8	WH		AE
14/08/2022	PM10 - 1-day	Mandurah	57.8	MA		AE
14/08/2022	PM2.5 - 1-day	Collie	31.0	PB	EE	
30/08/2022	PM2.5 - 1-day	Collie	35.9	PB	EE	
31/08/2022	PM2.5 - 1-day	Collie	25.1	PB	EE	
11/09/2022	PM2.5 - 1-day	Collie	28.5	PB	EE	
11/09/2022	PM2.5 - 1-day	Quinns Rocks	25.6	PB	EE	
27/09/2022	PM2.5 - 1-day	Quinns Rocks	27.6	PB	EE	
28/09/2022	PM2.5 - 1-day	Quinns Rocks	29.0	PB	EE	
29/09/2022	PM2.5 - 1-day	Armadale	44.1	PB	EE	
29/09/2022	PM2.5 - 1-day	Quinns Rocks	26.3	PB	EE	
30/09/2022	PM2.5 - 1-day	Armadale	27.2	PB	EE	
30/09/2022	PM2.5 - 1-day	Quinns Rocks	28.4	PB	EE	
30/09/2022	PM2.5 - 1-day	South Lake	26.3	PB	EE	
1/10/2022	PM10 - 1-day	Caversham	53.0	PB	EE	
1/10/2022	PM2.5 - 1-day	Caversham	47.6	PB	EE	
1/10/2022	PM2.5 - 1-day	Quinns Rocks	35.3	PB	EE	
4/10/2022	PM10 - 1-day	Collie	62.0	PB	EE	
4/10/2022	PM2.5 - 1-day	Collie	57.6	PB	EE	
18/10/2022	PM10 - 1-day	Collie	56.9	PB	EE	
18/10/2022	PM2.5 - 1-day	Collie	54.7	PB	EE	
10/11/2022	PM2.5 - 1-day	Collie	37.0	PB	EE	
27/11/2022	PM2.5 - 1-day	Busselton	40.4	PB	EE	
28/11/2022	PM10 - 1-day	Busselton	85.7	PB	EE	
28/11/2022	PM10 - 1-day	Mandurah	83.4	PB	EE	
28/11/2022	PM2.5 - 1-day	Bunbury	41.0	PB	EE	
28/11/2022	PM2.5 - 1-day	Busselton	72.0	PB	EE	
28/11/2022	PM2.5 - 1-day	Mandurah	74.3	PB	EE	
29/11/2022	PM2.5 - 1-day	Busselton	33.2	PB	EE	

1. Event cause and type

Event cause		Event type	
BF	Bushfire	AE	Assessable Event
MA	Marine aerosols	EE	Exceptional Event
PB	Prescribed burning activities		
LB	Local burn		
WD	Windborne dust		
WH	Wood heater		
U	Unknown		

B. Assessment of compliance with standards and goals

Tables B1–6 provide an assessment of each site's compliance with the NEPM standards and goals. Performance against the standards and goal are indicated by 'met', 'not met' or 'not demonstrated' (ND).

Table B1 2022 compliance summary for carbon monoxide

AAQ NEPM standard
9.0 ppm (8-hour average)

Regional performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Perth region							
Caversham (North-East Metro)	95.9	94.3	96	94.2	95.1	0	met
Duncraig (North Metro)	96.7	97.3	97.6	97.6	97.3	0	met
South Lake (South-East Metro)	97.7	96.1	97.7	97.9	97.4	0	met
Peel region							
Mandurah	93.1	97.6	97.6	97.6	96.5	0	met
Goldfields region							
Kalgoorlie	96.6	95.3	96	95.3	95.8	0	met

Table B2 2022 compliance summary for nitrogen dioxide

AAQ NEPM standard
0.08 ppm (1-hour average)
0.015 ppm (1-year average)

Regional performance monitoring station	Data availability rates (% of hours)					Annual average	Number of exceedances	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	(ppm)	(days)	1-hour	1-year
Perth region									
Caversham (North-East Metro)	99.0	99.8	97.9	96.4	98.3	0.004	0	met	met
Duncraig (North Metro)	88.4	99.4	96.0	99.7	95.9	0.005	0	met	met
Quinns Rocks (Outer North Coast)	99.7	96.1	99.6	98.5	98.5	0.004	1	not met	met
Rockingham (South Coast)	99.7	99.8	99.7	99.9	99.8	0.005	0	met	met
Rolling Green (Outer East Rural)	99.8	99.9	99.3	99.3	99.6	0.002	0	met	met
South Lake (South-East Metro)	96.0	98.8	99.9	100	98.7	0.006	0	met	met
Swanbourne (Inner West Coast)	99.8	99.9	99.8	99.9	99.9	0.003	0	met	met
Peel region									
Mandurah	84.4	99.3	99.2	99.1	95.6	0.002	0	met	met

Table B3 2022 compliance summary for ozone

AAQ NEPM standard
0.065 ppm (8-hour average)

Regional performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual	8-hour	8-hour
Perth region							
Caversham (North-East Metro)	99.1	100	98.0	99.0	99.0	0	met
Quinns Rocks (Outer North Coast)	98.1	94.9	99.7	96.5	97.3	0	met
Rockingham (South Coast)	97.0	99.8	99.8	100	99.1	1	not met
Rolling Green (Outer East Rural)	99.9	96.3	99.4	99.8	98.8	0	met
South Lake (South-East Metro)	98.6	99.0	99.9	100	99.4	0	met
Swanbourne (Inner West Coast)	100	100	99.9	99.4	99.8	0	met
Peel region							
Mandurah	98.7	99.5	99.7	99.9	99.5	0	met

Table B4 2022 compliance summary for sulfur dioxide

AAQ NEPM standard
0.10 ppm (1-hour average)
0.02 ppm (1-day average)

Regional performance monitoring station	Data availability rates (% of hours)					Number of exceedances (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	1-day	1-hour	1-day
Perth region									
Rockingham (South Coast)	97.7	97.7	95.7	97.9	97.2	0	0	met	met
South Lake (South-East Metro)	97.7	93.5	97.8	97.9	96.7	0	0	met	met
Wattleup (South Metro)	97.6	87.5	97.6	96.5	94.8	0	0	met	met
Goldfields region									
Kalgoorlie	96.3	94.9	95.5	94.8	95.4	0	0	met	met

Table B5 2022 compliance summary for particles as PM_{10}

AAQ NEPM standard
50 µg/m^3 (1-day average)
25 µg/m^3 (annual average)

Regional performance monitoring station	Data availability rates (% of days)					Number of exceedances	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	(days)	1-day	Annual
Perth region								
Armadale (South-East Metro)	92.3	98.1	99.6	99.6	97.4	4	Met	Met
Caversham (North-East Metro)	98.8	99.3	97.7	98.8	98.6	2	Met	Met
Duncraig (North Metro)	98.8	99	78.6	98.4	93.7	0	Met	Met
Quinns Rocks (Outer North Coast)	99.7	79.6	99	98.8	94.3	1	Not met	Met
South Lake (South-East Metro)	99.8	98.8	99.9	99.4	99.5	1	Met	Met
Peel region								
Mandurah	87	94.7	97.6	99.1	94.6	8	Not met	Met
South West region								
Albany	99.3	99.7	99.6	99.4	99.5	0	Met	Met
Bunbury	99.8	99.6	98.1	99.4	99.2	4	Met	Met
Busselton	93.1	99.4	99.4	98.5	97.6	3	Met	Met
Collie	99.4	99.7	90.3	99.5	97.2	10	Not met	Met
Mid West region								
Geraldton	92.5	98.4	99.6	98.8	97.4	1	Met	Met
Goldfields region								
Kalgoorlie	98.5	97.3	94.7	96.9	96.8	0	Met	Met

Table B6 2022 compliance summary for particles as $PM_{2.5}$

AAQ NEPM standard
25 µg/m^3 (1-day average)
8 µg/m^3 (annual average)

Regional performance monitoring station	Data availability rates (% of days)					Number of exceedances	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	(Days)	1-day	annual
Perth region								
Armadale (South-East Metro)	92.3	98.1	99.6	99.6	97.4	7	Met	Met
Caversham (North-East Metro)	98.8	99.3	97.7	98.8	98.6	4	Not met	Met
Duncraig (North Metro)	98.8	99	78.6	98.4	93.7	2	Met	Met
Quinns Rocks (Outer North Coast)	99.7	79.6	99	98.8	94.3	9	Not met	Not met
South Lake (South-East Metro)	99.7	98.8	99.9	99.4	99.4	5	Met	Met
Peel region								
Mandurah	87	94.7	97.6	99.2	94.7	4	Met	Met
South West region								
Albany	99.3	99.7	99.6	99.4	99.5	1	Not met	Met
Bunbury	99.8	99.6	98.2	99.4	99.2	7	Met	Met
Busselton	93.1	99.4	99.4	98.5	97.6	8	Not met	Not met
Collie	99.4	99.7	90.4	99.6	97.2	42	Not met	Not met
Mid West region								
Geraldton	92.5	98.4	99.8	99	97.5	0	Met	Met
Goldfields region								
Kalgoorlie	98.5	97.3	94.7	96.9	96.8	2	Not met	Met

C. Analysis of air quality monitoring

C.1 Carbon monoxide

The AAQ NEPM standard for carbon monoxide of 9.0 ppm averaged over eight hours was not exceeded at any site during 2022. The AAQ NEPM goal of no exceedance at each site was met. Table C1 contains the summary statistics for daily peak 8-hour carbon monoxide.

Table C1 2022 summary statistics for daily peak 8-hour carbon monoxide

						AAQ NEPM standard 9.0 ppm (8-hour average)	
Regional performance monitoring station	Data availability rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd highest (ppm)	2nd highest (date)	2nd highest (time)
Perth region							
Caversham (North-East Metro)	95.1	0.9	01/10/2022	1000	0.8	09/05/2022	1100
Duncraig (North Metro)	97.3	1.1	02/06/2022	0400	1.0	11/08/2022	0700
South Lake (South-East Metro)	97.4	6.4	08/05/2022	1000	1.9	09/05/2022	1100
Peel region							
Mandurah	96.5	2.5	08/05/2022	1200	1.5	29/11/2022	0100
Goldfields region							
Kalgoorlie	95.8	1.8	21/06/2022	0400	1.3	07/08/2022	0500

C.2 Nitrogen dioxide

The AAQ NEPM standard for nitrogen dioxide of 0.08 ppm averaged over one hour and the 0.03 ppm annual average was exceeded at Quinns Rocks during 2022. The AAQ NEPM goal of no exceedance was not met at Quinns Rocks. Table C2 contains the summary statistics for daily peak 1-hour nitrogen dioxide. Bold numerals indicate where a standard has been exceeded.

Table C2 2022 summary statistics for daily peak 1-hour nitrogen dioxide

AAQ NEPM standard
0.08 ppm (1-hour average)

Regional performance monitoring station	Data availability rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd highest (ppm)	2nd highest (date)	2nd highest (time)
Perth region							
Caversham (North-East Metro)	98.3	0.030	07/04/2022	2100	0.026	18/08/2022	2000
Duncraig (North Metro)	95.9	0.029	11/03/2022	1900	0.028	24/04/2022	2000
Quinns Rocks (Outer North Coast)	98.5	**0.170**	04/05/2022	1100	0.034	27/05/2022	1900
Rockingham (South Coast)	99.8	0.031	04/07/2022	2100	0.027	01/06/2022	1900
Rolling Green (Outer East Rural)	99.6	0.036	15/02/2022	2300	0.029	16/02/2022	0100
South Lake (South-East Metro)	98.7	0.037	25/03/2022	1900	0.033	04/08/2022	0700
Swanbourne (Inner West Coast)	99.9	0.023	12/07/2022	2200	0.022	27/05/2022	1800
Peel region							
Mandurah	95.6	0.023	13/07/2022	2000	0.020	01/06/2022	2000

The AAQ NEPM standard for nitrogen dioxide of 0.015 ppm averaged over one year was not exceeded at any site during 2022. Table C2a contains the summary statistics for annual nitrogen dioxide.

Table C2a 2022 summary statistics for annual nitrogen dioxide

AAQ NEPM standard
0.03 ppm (annual average)

Regional performance monitoring station	Data availability rates (%)	Annual average (ppm)
Perth region		
Caversham (North-East Metro)	98.3	0.004
Duncraig (North Metro)	95.9	0.005
Quinns Rocks (Outer North Coast)	98.5	0.004
Rockingham (South Coast)	99.8	0.005
Rolling Green (Outer East Rural)	99.6	0.002
South Lake (South-East Metro)	98.7	0.006
Swanbourne (Inner West Coast)	99.9	0.003
Peel region		
Mandurah	95.6	0.002

C.3 Photochemical smog as ozone

The AAQ NEPM standard for ozone of 0.065 ppm averaged over eight hours was exceeded during 2022 at Rockingham. Table C3 contains the summary statistics for daily peak 8-hour ozone in WA. Bold numerals indicate where a standard has been exceeded.

Table C3 2022 summary statistics for daily peak 1-hour ozone

AAQ NEPM standard
0.065 ppm (8-hour average)

Regional performance monitoring station	Data availability rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd highest (ppm)	2nd highest (date)	2nd highest (time)
Perth region							
Caversham (North-East Metro)	99.0	0.058	19/02/2022	1700	0.057	14/02/2022	1900
Quinns Rocks (Outer North Coast)	97.3	0.059	14/02/2022	1900	0.059	21/01/2022	2100
Rockingham (South Coast)	99.1	0.066	21/01/2022	2000	0.061	20/01/2022	1900
Rolling Green (Outer East Rural)	98.8	0.056	25/02/2022	2000	0.054	21/12/2022	2200
South Lake (South-East Metro)	99.4	0.055	16/02/2022	1700	0.054	21/01/2022	1800
Swanbourne (Inner West Coast)	99.8	0.062	21/01/2022	1800	0.060	18/02/2022	2000
Peel region							
Mandurah	99.5	0.058	19/01/2022	1900	0.057	18/01/2022	1900

C.4 Sulfur dioxide

The AAQ NEPM standard for sulfur dioxide of 0.20 ppm averaged over one hour was not exceeded at any site during 2022. Table C4 contains the summary statistics for daily peak 1-hour sulfur dioxide.

Table C4 2022 summary statistics for daily peak 1-hour sulfur dioxide

AAQ NEPM standard
0.10 ppm (1-hour average)

Regional performance monitoring station	Data availability rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd highest (ppm)	2nd highest (date)	2nd highest (time)
Perth region							
Rockingham (South Coast)	97.2	0.013	30/11/2022	0800	0.010	19/02/2022	0500
South Lake (South-East Metro)	96.7	0.009	07/04/2022	0800	0.005	08/10/2022	0900
Wattleup (South Metro)	94.8	0.010	19/02/2022	0400	0.006	30/05/2022	0800
Goldfields region							
Kalgoorlie	95.4	0.077	21/08/2022	2300	0.072	09/01/2022	0800

The AAQ NEPM standard for sulfur dioxide of 0.02 ppm averaged over 24 hours was not exceeded at any site during 2022. Table C5 contains the summary statistics for daily peak 1-day sulfur dioxide.

Table C5 2022 summary statistics for 1-day sulfur dioxide

AAQ NEPM standard
0.02 ppm (1-day average)

Regional performance monitoring station	Data availability rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd highest (ppm)	2nd highest (date)	2nd highest (time)
Perth region							
Rockingham (South Coast)	97.2	0.007	16/08/2022	2400	0.006	30/11/2022	2400
South Lake (South-East Metro)	96.7	0.003	08/10/2022	2400	0.003	04/10/2022	2400
Wattleup (South Metro)	94.8	0.003	16/11/2022	2400	0.003	16/08/2022	2400
Goldfields region							
Kalgoorlie	95.4	0.011	14/01/2022	2400	0.007	02/04/2022	2400

C.5 Particles as PM_{10}

The AAQ NEPM standard for particles as PM_{10} of 50 µg/m^3 averaged over 1 day was exceeded during 2022, as detailed in Table A10. Table C6 contains the summary statistics for daily peak 1-day PM_{10}. Bold numerals indicate where a standard has been exceeded.

Table C6 2022 summary statistics for 1-day particles as PM_{10}

AAQ NEPM standard
50 µg/m^3 (1-day average)

Regional performance monitoring station	Data availability rates	Highest		6th highest	
	(%)	(µg/m^3)	(date)	(µg/m^3)	(date)
Perth region					
Armadale (South-East Metro)	97.4	**189**	07/05/2022	39.5	02/05/2022
Caversham (North-East Metro)	98.6	**53.0**	01/10/2022	28.1	08/05/2022
Duncraig (North Metro)	93.7	38.7	21/04/2022	24.5	18/03/2022
Quinns Rocks (Outer North Coast)	94.3	**101**	04/05/2022	37.3	13/09/2022
South Lake (South-East Metro)	99.5	**144**	08/05/2022	31.5	02/06/2022
Peel region					
Mandurah	94.6	**83.2**	28/11/2022	**57.8**	14/08/2022
South West region					
Albany	99.5	30.5	02/07/2022	25.5	08/05/2022
Bunbury	99.2	**75.9**	07/05/2022	41.2	06/05/2022
Busselton	97.6	**85.4**	28/11/2022	38.0	14/02/2022
Collie	97.2	**105**	07/05/2022	**56.0**	09/05/2022
Mid West region					
Geraldton	97.4	**74.0**	07/06/2022	36.4	31/01/2022
Goldfields region					
Kalgoorlie	96.8	41.7	21/06/2022	30.0	06/08/2022

Table C7 contains the summary statistics for annual PM_{10}.

Table C7 2022 summary statistics for annual particles as PM_{10}

Regional performance monitoring station	Data availability rates (%)	Annual average (µg/m^3)
		AAQ NEPM standard 25 µg/m^3 (annual average)
Perth region		
Armadale (South-East Metro)	97.4	12.6
Caversham (North-East Metro)	98.6	12.2
Duncraig (North Metro)	93.7	11.3
Quinns Rocks (Outer North Coast)	94.3	18.8
South Lake (South-East Metro)	99.5	14.4
Peel region		
Mandurah	94.6	19.9
South West region		
Albany	99.5	10.7
Bunbury	99.2	14.0
Busselton	97.6	15.7
Collie	97.2	18.0
Mid West region		
Geraldton	97.4	14.8
Goldfields region		
Kalgoorlie	96.8	11.7

C.6 Particles as $PM_{2.5}$

The AAQ NEPM standard for particles as $PM_{2.5}$ of 25 µg/m^3 averaged over one day was exceeded in 2022, as detailed in Table A10. Table C8 contains the summary statistics for daily $PM_{2.5}$. Bold numerals indicate where a standard has been exceeded.

Table C8 2022 summary statistics for 1-day particles as $PM_{2.5}$

AAQ NEPM standard
25 µg/m^3 (1-day average)

Regional performance monitoring station	Data availability rates (%)	Highest		6th highest	
		(µg/m^3)	(date)	(µg/m^3)	(date)
Perth Region					
Armadale (South-East Metro)	97.4	**180**	07/05/2022	**35.7**	02/05/2022
Caversham (North-East Metro)	98.6	**47.6**	01/10/2022	22.3	08/05/2022
Duncraig (North Metro)	93.7	**33.4**	21/04/2022	16.3	18/03/2022
Quinns Rocks (Outer North Coast)	94.3	**88.7**	04/05/2022	**27.6**	27/09/2022
South Lake (South-East Metro)	99.4	**136**	08/05/2022	24.5	05/06/2022
Peel Region					
Mandurah	94.7	**74.3**	28/11/2022	22.7	09/05/2022
South West Region					
Albany	99.5	**27.4**	02/07/2022	17.4	27/05/2022
Bunbury	99.2	**67.5**	07/05/2022	**32.7**	06/05/2022
Busselton	97.6	**71.8**	28/11/2022	28.2	06/05/2022
Collie	97.2	**88.9**	07/05/2022	**52.7**	25/06/2022
Mid West Region					
Geraldton	97.5	14.7	30/11/2022	10.9	31/01/2022
Goldfields Region					
Kalgoorlie	96.8	**29.0**	21/06/2022	16.4	26/07/2022

Table C9 contains the summary statistics for annual $PM_{2.5}$ in WA. Bold numerals indicate where a standard has been exceeded.

Table C9 2022 summary statistics for annual particles as $PM_{2.5}$

Regional performance monitoring station	Data availability rates (%)	Annual average (µg/m^3)
		AAQ NEPM standard 8 µg/m^3 (annual average)
Perth region		
Armadale (South-East Metro)	97.4	6.8
Caversham (North-East Metro)	98.6	6.4
Duncraig (North Metro)	93.7	4.8
Quinns Rocks (Outer North Coast)	94.3	**11.0**
South Lake (South-East Metro)	99.4	7.2
Peel region		
Mandurah	94.7	7.0
South West region		
Albany	99.5	4.0
Bunbury	99.2	6.5
Busselton	97.6	**8.7**
Collie	97.2	**11.4**
Mid West region		
Geraldton	97.5	4.2
Goldfields region		
Kalgoorlie	96.8	4.2

D. Trends and pollutant distributions

D.1 Maxima and percentiles by pollutant in 2022

Tables D1–64 show the various statistical measures for each pollutant at each site. Note that bold numerals indicate where a standard has been exceeded.

Table D1 2022 percentiles of daily peak 8-hour carbon monoxide concentrations

AAQ NEPM standard
9.0 ppm (8-hour average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth region								
Caversham (North-East Metro)	95.1	0.9	0.7	0.7	0.4	0.3	0.2	0.2
Duncraig (North Metro)	97.3	1.1	0.9	0.8	0.7	0.5	0.3	0.2
South Lake (South-East Metro)	97.4	6.4	1.0	0.9	0.7	0.5	0.3	0.2
Peel region								
Mandurah	96.5	2.5	0.9	0.6	0.5	0.4	0.2	0.2
Goldfields region								
Kalgoorlie	95.8	1.8	1.1	1.0	0.7	0.3	0.2	0.1

Table D2 2022 percentiles of daily peak 1-hour nitrogen dioxide concentrations

AAQ NEPM standard
0.12 ppm (1-hour average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth region								
Caversham (North-East Metro)	98.3	0.030	0.025	0.024	0.022	0.019	0.015	0.011
Duncraig (North Metro)	95.9	0.029	0.027	0.026	0.024	0.023	0.019	0.013
Quinns Rocks (Outer North Coast)	98.5	**0.170**	0.030	0.029	0.026	0.022	0.016	0.010
Rockingham (South Coast)	99.8	0.031	0.026	0.025	0.023	0.021	0.017	0.011
Rolling Green (Outer East Rural)	99.6	0.036	0.020	0.018	0.014	0.011	0.007	0.004
South Lake (South-East Metro)	98.7	0.037	0.031	0.029	0.027	0.025	0.019	0.014
Swanbourne (Inner West Coast)	99.9	0.023	0.022	0.021	0.018	0.015	0.011	0.007
Peel region								
Mandurah	95.6	0.023	0.017	0.016	0.013	0.011	0.007	0.004

Table D3 2022 percentiles of daily peak 8-hour ozone concentrations

AAQ NEPM standard
0.065 ppm (4-hour average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth region								
Caversham (North-East Metro)	99.0	0.058	0.052	0.049	0.042	0.036	0.031	0.028
Quinns Rocks (Outer North Coast)	97.3	0.059	0.057	0.052	0.042	0.038	0.035	0.030
Rockingham (South Coast)	99.1	**0.066**	0.056	0.052	0.041	0.037	0.033	0.029
Rolling Green (Outer East Rural)	98.8	0.056	0.050	0.046	0.041	0.036	0.032	0.029
South Lake (South-East Metro)	99.4	0.055	0.048	0.045	0.037	0.035	0.031	0.027
Swanbourne (Inner West Coast)	99.8	0.062	0.057	0.052	0.041	0.035	0.028	0.023
Peel region								
Mandurah	99.5	0.058	0.049	0.044	0.039	0.036	0.032	0.029

Table D4 2022 percentiles of daily peak 1-hour sulfur dioxide concentrations

AAQ NEPM standard
0.10 ppm (1-hour average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth region								
Rockingham (South Coast)	97.2	0.013	0.007	0.007	0.006	0.005	0.004	0.003
South Lake (South-East Metro)	96.7	0.009	0.004	0.003	0.002	0.002	0.002	0.002
Wattleup (South Metro)	94.8	0.010	0.004	0.003	0.003	0.003	0.002	0.002
Goldfields region								
Kalgoorlie	95.4	0.077	0.045	0.037	0.025	0.015	0.005	0.002

Table D5 2022 percentiles of daily peak 1-day sulfur dioxide concentrations

AAQ NEPM standard
0.02 ppm (1-day average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth region								
Rockingham (South Coast)	97.2	0.007	0.006	0.005	0.005	0.004	0.003	0.003
South Lake (South-East Metro)	96.7	0.003	0.002	0.002	0.002	0.002	0.001	0.001
Wattleup (South Metro)	94.8	0.003	0.003	0.003	0.003	0.002	0.002	0.001
Goldfields region								
Kalgoorlie	95.4	0.011	0.006	0.005	0.004	0.003	0.002	0.001

Table D6 2022 percentiles of daily peak 1-day particles as PM_{10} concentrations

AAQ NEPM standard
50 µg/m³ (1-day average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
Perth region								
Armadale (South-East Metro)	97.4	**189**	**50.9**	30.8	21.6	18.7	14.6	10.3
Caversham (North-East Metro)	98.6	**53.0**	33.0	27.0	21.8	18.3	14.7	10.9
Duncraig (North Metro)	93.7	38.7	28.4	23.3	19.9	18.2	14.3	10.7
Quinns Rocks (Outer North Coast)	94.3	**101**	39.6	35.6	32.2	27.9	22.9	18.1
South Lake (South-East Metro)	99.5	**144**	32.2	30.0	25.6	21.7	17.4	12.8
Peel region								
Mandurah	94.6	**83.2**	**59.4**	**53.0**	44.0	34.8	23.2	17.1
South West region								
Albany	99.5	30.5	26.7	24.0	21.7	17.5	12.8	9.6
Bunbury	99.2	**75.9**	49.8	27.3	22.7	20.4	16.8	12.7
Busselton	97.6	**85.4**	42.6	35.0	28.0	23.9	19.1	14.1
Collie	97.2	**105**	**57.2**	**50.7**	40.5	31.0	20.8	14.8
Mid West region								
Geraldton	97.4	**74.0**	38.5	34.3	29.7	26.0	19.8	12.1
Goldfields region								
Kalgoorlie	96.8	41.7	31.6	28.8	23.1	19.6	14.6	10.7

Table D7 2022 percentiles of daily peak 1-day particles as $PM_{2.5}$ concentrations

AAQ NEPM standard
25 µg/m³ (1-day average)

Regional performance monitoring station	Data availability rates (%)	Max conc. (µg/m³)	99th percentile (µg/m³)	98th percentile (µg/m³)	95th percentile (µg/m³)	90th percentile (µg/m³)	75th percentile (µg/m³)	50th percentile (µg/m³)
Perth region								
Armadale (South-East Metro)	97.4	**180**	**45.9**	21.9	12.5	9.6	6.6	4.7
Caversham (North-East Metro)	98.6	**47.6**	**28.6**	20.8	14.3	10.5	7.2	5.1
Duncraig (North Metro)	93.7	**33.4**	21.5	14.8	10.1	8.5	6.2	4.0
Quinns Rocks (Outer North Coast)	94.3	**88.7**	**28.7**	**26.3**	20.8	16.7	13.8	10.1
South Lake (South-East Metro)	99.4	**136**	**26.3**	21.6	13.5	10.9	7.9	6.1
Peel region								
Mandurah	94.7	**74.3**	**27.3**	21.0	14.9	11.7	7.5	5.6
South West region								
Albany	99.5	**27.4**	18.0	16.3	9.4	7.3	4.7	3.1
Bunbury	99.2	**67.5**	**42.0**	21.2	14.1	11.6	7.4	4.9
Busselton	97.6	**71.8**	**36.3**	**25.2**	17.8	15.7	10.6	7.2
Collie	97.2	**88.9**	**54.5**	**46.4**	**35.2**	**26.6**	13.4	6.6
Mid West region								
Geraldton	97.5	14.7	11.3	10.2	9.3	7.6	5.7	3.6
Goldfields region								
Kalgoorlie	96.8	**29.0**	20.2	15.4	12.6	7.3	4.7	3.1

D.2 Maxima and percentiles by site 2013–22

Note for tables: Bold numerals indicate where a standard has been exceeded.

Table D8 Daily peak 8-hour carbon monoxide at Caversham (2013–22)
Trend station/region: Caversham

AAQ NEPM standard
9.0 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.5	0	0.9	0.7	0.6	0.5	0.4
2014	96.1	0	0.7	0.7	0.6	0.5	0.4
2015	94.1	0	1.2	0.8	0.7	0.6	0.5
2016	99.2	0	0.9	0.6	0.6	0.5	0.4
2017	97.5	0	2.9	1.1	0.8	0.5	0.4
2018	97.4	0	1.1	0.7	0.6	0.5	0.4
2019	96.6	0	1.0	0.7	0.6	0.5	0.4
2020	97.1	0	1.6	0.9	0.7	0.5	0.4
2021	97.5	0	1.2	0.9	0.7	0.5	0.4
2022	95.1	0	0.9	0.7	0.7	0.4	0.3

Table D9 Daily peak 8-hour carbon monoxide at Duncraig (2013–22)
Trend station/region: Duncraig

AAQ NEPM standard
9.0 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	99.5	0	2.1	1.8	1.6	1.2	0.8
2014	99.7	0	1.9	1.4	1.0	0.8	0.7
2015	99.5	0	1.7	1.4	1.3	1.0	0.7
2016	99.8	0	1.4	1.2	1.1	0.8	0.7
2017	96.9	0	1.4	1.1	0.9	0.8	0.6
2018	98.7	0	1.5	1.2	1.0	0.8	0.7
2019	97.4	0	1.2	1.1	1.0	0.8	0.6
2020	97.4	0	1.2	1.0	0.9	0.7	0.6
2021	94.9	0	1.5	1.2	1.1	0.8	0.6
2022	97.3	0	1.1	0.9	0.8	0.7	0.5

Table D10 Daily peak 8-hour carbon monoxide at South Lake (2013–22)
Trend station/region: South Lake

AAQ NEPM standard
9.0 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	98.5	0	1.7	1.3	1.2	1.0	0.6
2014	99.5	0	1.8	1.4	1.0	0.8	0.7
2015	98.5	0	1.9	1.3	1.2	0.9	0.8
2016	99.8	0	2.3	1.3	1.1	0.9	0.7
2017	98.6	0	1.9	1.4	1.3	1.0	0.7
2018	99.7	0	1.9	1.3	1.3	1.0	0.9
2019	97.3	0	1.4	1.2	1.2	1.0	0.8
2020	96.6	0	1.4	1.1	1.0	0.8	0.6
2021	96.8	0	1.5	1.2	1.1	0.8	0.6
2022	97.4	0	6.4	1.0	0.9	0.7	0.5

Table D11 Daily peak 8-hour carbon monoxide at Kalgoorlie (2013–22)

Campaign station/region: Kalgoorlie

AAQ NEPM standard
9.0 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	86.9	0	1.9	0.9	0.8	0.5	0.4
2019	95.5	0	2.1	1.1	1.0	0.8	0.5
2020	97.4	0	2.0	1.3	1.1	0.7	0.4
2021	89.7	0	1.8	1.3	1.2	0.8	0.4
2022	95.8	0	1.8	1.1	1.0	0.7	0.3

Table D12 Daily peak 8-hour carbon monoxide at Mandurah (2013–22)

Campaign station/region: Mandurah

AAQ NEPM standard
9.0 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	96.6	0	1.8	0.6	0.5	0.4	0.3
2021	94.6	0	1.6	0.6	0.6	0.5	0.4
2022	96.5	0	2.5	0.9	0.6	0.5	0.4

Table D13 Daily peak 1-hour nitrogen dioxide at Caversham (2013–22)

Trend station/region: Caversham

AAQ NEPM standard
0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.5	0	0.043	0.034	0.032	0.029	0.025
2014	94.2	0	0.033	0.031	0.030	0.026	0.024
2015	94.6	0	0.041	0.035	0.032	0.027	0.025
2016	99.5	0	0.036	0.032	0.030	0.026	0.024
2017	95.3	0	0.042	0.032	0.031	0.028	0.025
2018	98.6	0	0.034	0.029	0.028	0.026	0.024
2019	98.4	0	0.039	0.030	0.028	0.025	0.023
2020	99.1	0	0.030	0.028	0.025	0.023	0.020
2021	99.3	0	0.034	0.029	0.027	0.024	0.021
2022	98.3	0	0.030	0.025	0.024	0.022	0.019

Table D14 Daily peak 1-hour nitrogen dioxide at Duncraig (2013–22)

Trend station/region: Duncraig

AAQ NEPM standard
0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.9	0	0.040	0.031	0.030	0.028	0.026
2014	99.3	0	0.048	0.029	0.028	0.026	0.024
2015	98.2	0	0.036	0.034	0.032	0.028	0.026
2016	99.8	0	0.033	0.029	0.028	0.026	0.024
2017	98.2	0	0.032	0.031	0.030	0.027	0.026
2018	97.1	0	0.036	0.031	0.030	0.027	0.025
2019	95.9	0	0.037	0.033	0.031	0.028	0.025
2020	99.3	0	0.031	0.030	0.028	0.026	0.025
2021	94.6	0	0.033	0.028	0.027	0.025	0.024
2022	95.9	0	0.029	0.027	0.026	0.024	0.023

Table D15 Daily peak 1-hour nitrogen dioxide at Quinns Rocks (2013–22)

Trend station/region: Quinns Rocks

AAQ NEPM standard
0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.9	0	0.032	0.026	0.026	0.023	0.020
2014	99.6	0	0.031	0.026	0.024	0.020	0.017
2015	98.8	0	0.030	0.028	0.026	0.024	0.020
2016	97.8	0	0.029	0.026	0.024	0.022	0.020
2017	21.5	0	0.019	0.017	0.016	0.015	0.014
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	72.0	0	0.038	0.033	0.032	0.028	0.026
2021	99.7	0	0.033	0.031	0.030	0.026	0.022
2022	98.5	1	**0.170**	0.030	0.029	0.026	0.022

Table D16 Daily peak 1-hour nitrogen dioxide at Rockingham (2013–22)

Trend station/region: Rockingham

AAQ NEPM standard
0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.8	0	0.035	0.031	0.029	0.027	0.025
2014	98.7	0	0.034	0.027	0.026	0.024	0.021
2015	98.8	0	0.062	0.032	0.029	0.026	0.023
2016	99.3	0	0.029	0.027	0.026	0.024	0.022
2017	93.4	0	0.074	0.047	0.034	0.026	0.023
2018	82.2	0	0.029	0.026	0.025	0.023	0.020
2019	93.4	0	**0.107**	0.059	0.042	0.029	0.025
2020	96.6	0	0.041	0.028	0.027	0.024	0.021
2021	99.8	0	0.037	0.028	0.027	0.025	0.023
2022	99.8	0	0.031	0.026	0.025	0.023	0.021

Table D17 Daily peak 1-hour nitrogen dioxide at Rolling Green (2013–22)

Trend station/region: Rolling Green

AAQ NEPM standard

0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	96.5	0	0.030	0.018	0.017	0.015	0.013
2014	97.2	0	0.021	0.017	0.015	0.013	0.013
2015	98.0	0	0.023	0.018	0.017	0.016	0.013
2016	97.5	0	0.023	0.016	0.016	0.013	0.012
2017	99.1	0	0.018	0.017	0.016	0.014	0.013
2018	99.8	0	0.023	0.018	0.016	0.014	0.012
2019	99.6	0	0.023	0.015	0.015	0.012	0.011
2020	99.2	0	0.018	0.015	0.014	0.012	0.010
2021	98.9	0	0.020	0.017	0.014	0.012	0.010
2022	99.6	0	0.036	0.020	0.018	0.014	0.011

Table D18 Daily peak 1-hour nitrogen dioxide at South Lake (2013–22)

Trend station/region: South Lake

AAQ NEPM standard

0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	97.1	0	0.043	0.037	0.033	0.031	0.027
2014	99.5	0	0.034	0.032	0.029	0.028	0.026
2015	98.7	0	0.043	0.034	0.031	0.028	0.026
2016	95.0	0	0.038	0.030	0.029	0.027	0.025
2017	97.3	0	0.045	0.034	0.030	0.028	0.026
2018	98.9	0	0.047	0.035	0.033	0.029	0.027
2019	97.9	0	0.036	0.031	0.030	0.028	0.026
2020	99.1	0	0.036	0.031	0.028	0.025	0.024
2021	98.4	0	0.034	0.030	0.029	0.026	0.024
2022	98.7	0	0.037	0.031	0.029	0.027	0.025

Table D19 Daily peak 1-hour nitrogen dioxide at Swanbourne (2013–22)

Trend station/region: Swanbourne

AAQ NEPM standard

0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	99.6	0	0.037	0.033	0.031	0.027	0.025
2014	99.8	0	0.036	0.029	0.028	0.024	0.022
2015	99.5	0	0.036	0.034	0.030	0.027	0.023
2016	96.1	0	0.030	0.028	0.026	0.024	0.020
2017	99.8	0	0.033	0.032	0.030	0.026	0.022
2018	99.3	0	0.039	0.031	0.029	0.026	0.021
2019	98.9	0	0.037	0.031	0.029	0.026	0.022
2020	99.2	0	0.032	0.029	0.027	0.023	0.019
2021	99.4	0	0.033	0.027	0.027	0.024	0.019
2022	99.9	0	0.023	0.022	0.021	0.018	0.015

Table D20 Daily peak 1-hour nitrogen dioxide at Mandurah (2013–22)

Trend station/region: Mandurah

AAQ NEPM standard

0.08 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	98.6	0	0.022	0.019	0.017	0.014	0.011
2021	96.4	0	0.021	0.019	0.017	0.014	0.011
2022	95.6	0	0.023	0.017	0.016	0.013	0.011

Table D21 Daily peak 8-hour ozone at Caversham (2013–22)

Trend station/region: Caversham

AAQ NEPM standard

0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	95.7	0	0.060	0.056	0.052	0.043	0.039
2014	96.3	0	0.062	0.045	0.042	0.039	0.035
2015	95.4	1	**0.069**	0.060	0.057	0.047	0.039
2016	99.6	1	**0.073**	0.055	0.046	0.039	0.036
2017	98.7	0	0.061	0.056	0.053	0.043	0.039
2018	99.8	0	0.049	0.046	0.042	0.038	0.034
2019	98.6	0	0.054	0.051	0.049	0.042	0.036
2020	99.2	0	0.053	0.045	0.044	0.040	0.036
2021	99.6	1	**0.078**	0.050	0.046	0.041	0.036
2022	99.0	0	0.058	0.052	0.049	0.042	0.036

Table D22 Daily peak 8-hour ozone at Quinns Rocks (2013–22)

Trend station/region: Quinns Rocks

AAQ NEPM standard

0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	99.2	2	**0.068**	0.060	0.054	0.047	0.041
2014	99.3	0	0.053	0.048	0.046	0.041	0.038
2015	98.9	0	0.061	0.058	0.055	0.047	0.038
2016	98.7	2	**0.072**	0.055	0.052	0.046	0.040
2017	21.5	0	0.057	0.053	0.049	0.046	0.043
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	73.2	0	0.048	0.044	0.041	0.038	0.036
2021	99.5	1	**0.079**	0.050	0.047	0.042	0.038
2022	97.3	0	0.059	0.057	0.052	0.042	0.038

Table D23 Daily peak 8-hour ozone at Rockingham (2013–22)

Trend station/region: Rockingham

AAQ NEPM standard
0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	98.8	1	**0.067**	0.054	0.049	0.043	0.037
2014	99.0	0	0.058	0.046	0.043	0.039	0.035
2015	98.9	0	0.061	0.053	0.050	0.043	0.037
2016	98.8	2	**0.072**	0.056	0.051	0.043	0.038
2017	99.1	0	0.052	0.050	0.049	0.041	0.036
2018	99.8	0	0.049	0.040	0.039	0.036	0.035
2019	97.2	0	0.059	0.053	0.047	0.040	0.036
2020	98.6	0	0.051	0.046	0.043	0.039	0.036
2021	99.5	0	0.064	0.057	0.053	0.043	0.038
2022	99.1	1	**0.066**	0.056	0.052	0.041	0.037

Table D24 Daily peak 8-hour ozone at Rolling Green (2013–22)

Trend station/region: Rolling Green

AAQ NEPM standard
0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	96.8	1	**0.065**	0.055	0.050	0.045	0.039
2014	98.1	0	0.060	0.047	0.045	0.041	0.038
2015	99.2	2	**0.079**	0.056	0.053	0.048	0.044
2016	97.5	0	0.060	0.052	0.048	0.042	0.037
2017	98.6	0	0.055	0.049	0.046	0.039	0.035
2018	98.0	0	0.058	0.049	0.046	0.043	0.038
2019	97.9	1	**0.067**	0.059	0.055	0.049	0.042
2020	99.5	0	0.053	0.049	0.046	0.042	0.039
2021	97.4	1	**0.065**	0.050	0.047	0.043	0.037
2022	98.8	0	0.056	0.050	0.046	0.041	0.036

Table D25 Daily peak 8-hour ozone at South Lake (2013–22)

Trend station/region: South Lake

AAQ NEPM standard
0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	98.6	0	0.065	0.051	0.047	0.041	0.035
2014	99.4	0	0.051	0.046	0.041	0.037	0.034
2015	98.8	0	0.055	0.049	0.048	0.039	0.033
2016	99.6	1	**0.069**	0.048	0.046	0.039	0.034
2017	98.5	0	0.057	0.050	0.047	0.040	0.035
2018	99.6	0	0.046	0.039	0.036	0.032	0.030
2019	98.1	0	0.060	0.049	0.044	0.037	0.032
2020	99.3	0	0.047	0.044	0.040	0.036	0.032
2021	99.8	0	0.059	0.046	0.042	0.038	0.034
2022	99.4	0	0.055	0.048	0.045	0.037	0.035

Table D26 Daily peak 8-hour ozone at Swanbourne (2013–22)

Trend station/region: Swanbourne

AAQ NEPM standard
0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	99.8	0	0.059	0.053	0.049	0.043	0.038
2014	97.8	0	0.049	0.045	0.043	0.039	0.035
2015	99.9	0	0.062	0.053	0.051	0.043	0.036
2016	98.7	2	**0.069**	0.055	0.052	0.046	0.039
2017	99.5	0	0.065	0.054	0.051	0.047	0.042
2018	99.8	0	0.053	0.047	0.043	0.041	0.039
2019	98.7	0	0.058	0.051	0.047	0.043	0.038
2020	99.7	0	0.053	0.051	0.048	0.044	0.041
2021	99.7	1	**0.076**	0.056	0.053	0.047	0.041
2022	99.8	0	0.062	0.057	0.052	0.041	0.035

Table D27 Daily peak 8-hour ozone at Mandurah (2013–22)

Trend station/region: Mandurah

AAQ NEPM standard
0.065 ppm (8-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	98.9	0	0.053	0.046	0.043	0.040	0.037
2021	98.1	0	0.061	0.056	0.045	0.040	0.035
2022	99.5	0	0.058	0.049	0.044	0.039	0.036

Table D28 Daily peak 1-hour sulfur dioxide at Rockingham (2013–22)

Trend station/region: Rockingham

AAQ NEPM standard
0.10 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	94.5	0	0.037	0.028	0.022	0.016	0.011
2014	93.9	0	0.036	0.024	0.021	0.013	0.008
2015	94.6	0	0.051	0.033	0.023	0.018	0.012
2016	96.1	0	0.064	0.041	0.035	0.020	0.013
2017	95.8	0	0.030	0.024	0.017	0.012	0.008
2018	95.4	0	0.031	0.021	0.019	0.013	0.008
2019	94.7	0	0.034	0.023	0.020	0.015	0.011
2020	92.4	0	0.037	0.024	0.018	0.008	0.006
2021	97.8	0	0.016	0.008	0.006	0.005	0.005
2022	97.2	0	0.013	0.007	0.007	0.006	0.005

Table D29 Daily peak 1-hour sulfur dioxide at South Lake (2013–22)

Trend station/region: South Lake

AAQ NEPM standard
0.10 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	93.3	0	0.044	0.034	0.031	0.020	0.015
2014	94.5	0	0.051	0.028	0.024	0.016	0.012
2015	95.5	0	0.037	0.031	0.029	0.020	0.016
2016	97.4	0	0.034	0.020	0.017	0.014	0.011
2017	95.2	0	0.037	0.023	0.019	0.017	0.013
2018	97.4	0	0.022	0.016	0.015	0.012	0.010
2019	97.3	0	0.019	0.016	0.014	0.012	0.010
2020	99.2	0	0.010	0.009	0.009	0.008	0.006
2021	98.1	0	0.007	0.005	0.004	0.003	0.003
2022	96.7	0	0.009	0.004	0.003	0.002	0.002

Table D30 Daily peak 1-hour sulfur dioxide at Wattleup (2013–22)

Trend station/region: Wattleup

AAQ NEPM standard
0.10 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	92.5	0	0.090	0.059	0.047	0.037	0.027
2014	95.1	0	0.061	0.046	0.037	0.031	0.024
2015	95.6	0	0.067	0.046	0.045	0.039	0.031
2016	94.5	0	0.072	0.055	0.048	0.033	0.025
2017	96.3	0	0.068	0.051	0.036	0.026	0.021
2018	97.0	0	0.038	0.033	0.029	0.023	0.017
2019	95.2	0	0.057	0.031	0.029	0.023	0.018
2020	92.0	0	0.044	0.032	0.027	0.022	0.016
2021	94.2	0	0.032	0.022	0.018	0.007	0.003
2022	94.8	0	0.010	0.004	0.003	0.003	0.003

Table D31 Daily peak 1-hour sulfur dioxide at Kalgoorlie (2013–22)

Trend station/region: Goldfields

AAQ NEPM standard
0.10 ppm (1-hour average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	92.2	1	**0.106**	0.060	0.038	0.019	0.014
2019	95.7	0	0.082	0.053	0.038	0.020	0.012
2020	95.6	0	0.075	0.055	0.046	0.022	0.012
2021	88.9	0	0.081	0.037	0.021	0.013	0.009
2022	95.4	0	0.077	0.045	0.037	0.025	0.015

Table D32 Daily peak 1-day sulfur dioxide at Rockingham (2013–22)

Trend station/region: Rockingham

AAQ NEPM standard

0.02 ppm (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	94.5	0	0.007	0.005	0.004	0.003	0.002
2014	93.9	0	0.007	0.005	0.004	0.003	0.002
2015	94.6	0	0.013	0.007	0.006	0.004	0.003
2016	96.1	0	0.014	0.010	0.007	0.004	0.002
2017	95.8	0	0.009	0.004	0.003	0.003	0.002
2018	95.4	0	0.007	0.004	0.004	0.003	0.002
2019	94.7	0	0.009	0.005	0.004	0.003	0.002
2020	92.4	0	0.008	0.004	0.003	0.002	0.002
2021	97.8	0	0.006	0.005	0.005	0.004	0.004
2022	97.2	0	0.007	0.006	0.005	0.005	0.004

Table D33 Daily peak 1-day sulfur dioxide at South Lake (2013–22)

Trend station/region: South Lake

AAQ NEPM standard

0.02 ppm (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	93.3	0	0.014	0.005	0.004	0.003	0.002
2014	94.5	0	0.010	0.005	0.004	0.003	0.003
2015	95.5	0	0.007	0.006	0.005	0.005	0.004
2016	97.4	0	0.010	0.007	0.007	0.006	0.005
2017	95.2	0	0.009	0.008	0.008	0.006	0.005
2018	97.4	0	0.005	0.004	0.004	0.004	0.003
2019	97.3	0	0.006	0.005	0.005	0.004	0.004
2020	99.2	0	0.006	0.005	0.005	0.004	0.003
2021	98.1	0	0.002	0.002	0.002	0.001	0.001
2022	96.7	0	0.003	0.002	0.002	0.002	0.002

Table D34 Daily peak 1-day sulfur dioxide at Wattleup (2013–22)

Trend station/region: Wattleup

AAQ NEPM standard

0.02 ppm (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	92.5	0	0.010	0.008	0.006	0.005	0.004
2014	95.1	0	0.008	0.007	0.006	0.005	0.004
2015	95.6	0	0.009	0.007	0.006	0.006	0.005
2016	94.5	0	0.011	0.006	0.005	0.004	0.003
2017	96.3	0	0.007	0.005	0.005	0.004	0.003
2018	97.0	0	0.007	0.006	0.005	0.004	0.003
2019	95.2	0	0.008	0.005	0.005	0.004	0.003
2020	92.0	0	0.006	0.005	0.004	0.003	0.003
2021	94.2	0	0.004	0.003	0.002	0.002	0.002
2022	94.8	0	0.003	0.003	0.003	0.003	0.002

Table D35 Daily peak 1-day sulfur dioxide at Kalgoorlie (2013–22)

Trend station/region: Goldfields

AAQ NEPM standard
0.02 ppm (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	95.7	0	0.012	0.005	0.004	0.003	0.002
2020	95.6	0	0.011	0.006	0.004	0.003	0.002
2021	88.9	0	0.007	0.004	0.003	0.003	0.002
2022	95.4	0	0.011	0.006	0.005	0.004	0.003

Table D36 Daily peak 1-day particles as PM_{10} at Caversham (2013–22)

Trend station/region: Caversham

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	97.4	1	**62.4**	34.4	30.7	26.2	23.6
2014	97.2	1	**52.6**	37.3	34.5	27.2	24.8
2015	95.7	0	46.8	40.7	37.4	30.4	26.3
2016	99.1	0	38.1	33.7	31.5	26.4	22.8
2017	98.6	3	**79.2**	43.3	32.6	27.8	25.0
2018	98.9	2	**77.9**	36.1	33.2	27.8	25.0
2019	82.1	1	**108**	42.1	38.1	29.6	27.0
2020	97.8	3	**71.5**	43.1	36.9	28.0	24.3
2021	97.4	3	**97.7**	37.5	32.9	24.3	20.3
2022	98.6	2	**53.0**	33.0	27.0	21.8	18.3

Table D37 Daily peak 1-day particles as PM_{10} at Duncraig (2013–22)

Trend station/region: Duncraig

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	99.3	0	37.6	32.1	28.1	25.6	22.8
2014	99.4	1	**53.0**	31.2	28.1	25.1	22.4
2015	99.4	1	**82.7**	40.1	36.7	28.0	25.2
2016	99.6	0	40.0	34.2	29.7	25.8	21.8
2017	98.4	1	**51.4**	33.4	30.1	26.4	22.5
2018	99.3	1	**61.3**	33.1	28.0	24.1	21.4
2019	96.0	1	**68.1**	30.7	27.2	23.7	22.2
2020	97.8	1	**61.8**	30.7	24.9	23.3	19.5
2021	97.7	2	**105**	39.6	31.1	22.8	18.8
2022	93.7	0	38.7	28.4	23.3	19.9	18.2

Table D38 Daily peak 1-day particles as PM_{10} at South Lake (2013–2022)

Trend station/region: South Lake

AAQ NEPM standard 50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.6	0	38.8	34.4	32.3	28.9	25.9
2014	99.4	0	44.5	38.2	34.0	29.4	26.3
2015	97.4	2	**53.3**	45.7	41.7	34.4	28.5
2016	99.5	0	47.0	38.7	33.4	28.9	24.3
2017	98.2	0	49.6	37.7	31.3	28.6	26.2
2018	99.6	1	**57.1**	40.7	34.3	26.7	23.7
2019	98.6	2	**98.8**	40.4	37.0	30.7	26.7
2020	99.0	0	45.2	32.8	31.8	25.3	21.7
2021	99.0	1	**102**	34.9	31.1	24.7	21.8
2022	99.5	1	**144**	32.2	30.0	25.6	21.7

Table D39 Daily peak 1-day particles as PM_{10} at Mandurah (2013–22)

Trend station/region: Mandurah

AAQ NEPM standard 50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	96.5	30	**84.4**	**71.9**	**65.3**	**57.3**	48.5
2021	95.8	19	**103**	**66.1**	**57.2**	**52.3**	40.9
2022	94.6	9	**83.2**	**59.4**	**53.0**	44.0	34.8

Table D40 Daily peak 1-day particles as PM_{10} at Albany (2013–22)

Trend station/region: Albany

AAQ NEPM standard 50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.1	3	**111**	43.3	36.0	29.1	23.8
2014	98.6	0	43.5	35.5	31.4	28.1	24.4
2015	99.1	2	**76.7**	37.3	34.7	28.4	24.5
2016	95.5	6	**94.9**	**56.5**	45.2	35.1	28.7
2017	99.5	2	**61.8**	46.7	41.4	30.7	25.8
2018	93.5	2	**89.6**	43.9	30.1	26.3	21.8
2019	98.2	1	**129**	35.5	30.9	27.1	22.5
2020	98.4	0	37.2	32.7	29.3	25.9	21.3
2021	99.2	0	34.3	27.9	26.1	23.1	20.6
2022	99.5	0	30.5	26.7	24.0	21.7	17.5

Table D41 Daily peak 1-day particles as PM_{10} at Bunbury (2013–22)

Trend station/region: Bunbury

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.9	0	46.8	38.1	33.5	26.8	22.6
2014	98.1	0	44.5	31.7	26.2	24.6	22.8
2015	99.7	3	**62.9**	48.6	40.6	35.6	27.2
2016	97.5	2	**74.6**	44.4	33.0	28.6	24.9
2017	99.6	0	45.5	36.1	32.9	27.8	24.5
2018	99.6	1	**51.9**	37.8	35.2	27.8	24.4
2019	98.9	3	**131**	38.4	31.8	26.8	23.6
2020	95.1	1	**61.1**	41.7	34.9	28.7	24.2
2021	97.2	1	**89.6**	35.6	30.0	24.3	21.7
2022	99.2	4	**75.9**	49.8	27.3	22.7	20.4

Table D42 Daily peak 1-day particles as PM_{10} at Collie (2013–22)

Trend station/region: Collie

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	99.0	3	**61.6**	46.0	41.3	36.0	32.0
2014	99.3	2	**73.3**	42.2	38.8	34.0	29.8
2015	99.0	10	**112**	**67.4**	**53.9**	41.9	37.8
2016	99.5	5	**89.9**	**51.0**	46.9	38.6	30.4
2017	96.8	11	**81.5**	**56.3**	**53.7**	42.5	33.7
2018	98.9	10	**84.6**	**57.4**	**52.4**	39.6	30.8
2019	99.7	7	**83.5**	**60.4**	48.6	39.5	33.9
2020	96.6	5	**131**	**57.0**	41.9	35.0	27.4
2021	96.8	4	**84.7**	48.8	36.1	28.3	25.3
2022	97.2	10	**105**	**57.2**	**50.7**	40.5	31.0

Table D43 Daily peak 1-day particles as PM_{10} at Geraldton (2013–22)

Trend station/region: Geraldton

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	99.3	2	**63.1**	45.9	42.1	38.9	34.6
2014	98.8	4	**55.7**	49.7	47.1	41.4	37.5
2015	98.9	5	**68.1**	**54.5**	44.4	39.8	35.2
2016	96.7	3	**66.0**	49.3	42.1	37.3	32.1
2017	99.8	3	**73.5**	44.3	40.0	36.9	33.7
2018	96.0	3	**70.0**	42.2	41.0	36.7	31.8
2019	99.5	6	**88.4**	**51.5**	46.0	39.4	35.2
2020	98.5	3	**446**	47.1	43.5	38.3	33.4
2021	98.5	6	**120**	**52.0**	45.2	37.2	32.8
2022	97.4	1	**74.0**	38.5	34.3	29.7	26.0

Table D44 Daily peak 1-day particles as PM_{10} at Kalgoorlie (2013–22)

Trend station/region: Kalgoorlie

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	93.6	1	**60.5**	31.8	29.3	22.8	20.6
2019	97.7	4	**67.6**	46.6	41.4	31.8	27.2
2020	98.2	4	**77.3**	49.3	39.1	31.8	24.3
2021	90.6	0	42.7	29.1	27.4	23.2	19.0
2022	96.8	0	41.7	31.6	28.8	23.1	19.6

Table D44a Daily peak 1-day particles as PM_{10} at Armadale (2013–22)

Trend station/region: Armadale

AAQ NEPM standard
50 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	46.2	0	31.3	28.7	22.5	19.7	15.4
2021	96.6	2	**96.2**	35.4	29.8	20.7	17.3
2022	97.4	4	**189**	**50.9**	30.8	21.6	18.7

Table D45 Daily peak 1-day particles as $PM_{2.5}$ at Caversham (2013–22)

Trend station/region: Caversham

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	97.4	0	22.6	17.2	16.4	13.6	11.6
2014	97.0	1	**39.3**	16.2	15.2	14.1	11.9
2015	95.8	5	**30.0**	**27.2**	22.4	16.1	12.8
2016	99.5	0	24.1	17.0	14.2	12.6	10.9
2017	98.7	5	**65.9**	**31.3**	21.8	15.7	11.8
2018	99.5	2	**36.7**	20.6	17.3	14.8	11.6
2019	82.1	1	**25.4**	18.2	17.3	15.2	12.4
2020	97.8	9	**60.9**	**30.9**	**27.9**	17.6	14.6
2021	97.4	6	**88.3**	**31.7**	22.2	18.3	13.1
2022	98.6	4	**47.6**	**28.6**	20.8	14.3	10.5

Table D46 Daily peak 1-day particles as $PM_{2.5}$ at Duncraig (2013–22)

Trend station/region: Duncraig

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.5	0	18.7	15.6	14.4	12.7	11.4
2014	99.7	1	**47.6**	16.8	15.3	13.0	11.0
2015	99.6	3	**35.8**	22.9	18.3	15.2	12.9
2016	99.4	1	**27.0**	15.9	15.4	12.0	10.9
2017	98.5	3	**40.5**	22.9	19.0	14.2	11.5
2018	99.4	1	**48.6**	19.3	15.6	12.9	11.1
2019	97.3	0	25.0	20.2	15.9	13.9	11.6
2020	98.6	2	**37.2**	18.1	16.3	11.7	9.8
2021	97.7	6	**96.6**	**31.0**	23.9	16.0	11.5
2022	93.7	2	**33.4**	21.5	14.8	10.1	8.5

Table D47 Daily peak 1-day particles as $PM_{2.5}$ at Quinns Rocks (2013–22)

Trend station/region: Quinns Rocks

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.5	0	19.3	16.6	15.0	13.1	10.9
2014	98.8	2	**39.5**	15.8	14.5	13.4	11.7
2015	98.9	2	**37.9**	22.2	20.9	14.8	12.4
2016	98.7	2	**28.8**	18.4	14.8	12.7	10.8
2017	20.7	0	12.2	12.2	11.8	11.1	10.8
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	70.7	1	**39.8**	19.7	16.9	11.2	10.4
2021	97.4	5	**42.2**	**28.3**	22.3	18.5	15.4
2022	94.3	9	**88.7**	**28.7**	**26.3**	20.8	16.7

Table D48 Daily peak 1-day particles as $PM_{2.5}$ at Mandurah (2013–22)

Trend station/region: Mandurah

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	96.5	5	**53.8**	**26.5**	22.0	20.0	17.1
2021	95.8	3	**87.9**	24.5	19.7	13.8	11.0
2022	94.7	4	**74.3**	**27.3**	21.0	14.9	11.7

Table D49 Daily peak 1-day particles as $PM_{2.5}$ at South Lake (2013–22)

Trend station/region: South Lake

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.6	0	17.1	15.2	14.9	14.0	11.7
2014	98.7	2	**29.8**	17.7	15.0	13.4	11.5
2015	97.0	5	**34.5**	**29.8**	22.8	17.0	13.4
2016	99.6	3	**30.4**	17.2	15.3	13.1	11.6
2017	98.4	3	**46.6**	24.2	19.8	14.5	12.8
2018	99.7	5	**43.3**	**27.6**	20.2	15.0	12.3
2019	98.7	2	**28.9**	18.0	16.0	13.5	12.4
2020	99.0	4	**34.6**	24.7	21.8	14.3	11.3
2021	99.0	7	**92.2**	**26.1**	24.8	18.2	13.7
2022	99.4	5	**136**	**26.3**	21.6	13.5	10.9

Table D50 Daily peak 1-day particles as $PM_{2.5}$ at Bunbury (2013–22)

Trend station/region: Bunbury

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (µg/m^3)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	99.3	1	**38.3**	16.6	15.7	14.0	11.5
2014	98.4	1	**34.6**	16.1	15.0	13.3	11.7
2015	97.6	9	**52.1**	**35.0**	**30.2**	20.2	14.4
2016	99.7	6	**61.5**	**33.6**	22.4	14.9	12.2
2017	99.5	6	**33.9**	**27.2**	21.5	14.3	12.7
2018	99.7	5	**38.4**	**26.0**	22.2	17.2	12.5
2019	99.0	6	**118**	**27.3**	22.5	14.2	12.1
2020	95.2	11	**55.5**	**31.4**	**27.5**	22.1	16.4
2021	97.2	4	**83.1**	**26.0**	20.0	16.5	12.2
2022	99.2	7	**67.5**	**42.0**	21.2	14.1	11.6

Table D51 Daily peak 1-day particles as $PM_{2.5}$ at Busselton (2013–22)

Trend station/region: Busselton

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	98.6	0	17.9	16.6	15.5	12.9	10.9
2014	99.6	1	**25.1**	13.2	12.4	11.1	10.2
2015	99.1	4	**37.8**	24.4	21.3	18.6	13.9
2016	99.5	4	**61.1**	22.8	17.5	13.7	11.3
2017	97.8	1	**28.8**	22.8	18.0	14.9	12.2
2018	97.0	7	**56.5**	**28.9**	22.2	16.4	11.3
2019	97.8	5	**78.5**	**29.4**	21.6	13.2	11.0
2020	84.0	5	**37.1**	**27.7**	21.2	16.2	14.2
2021	98.0	8	**126**	**29.5**	25.0	20.4	15.1
2022	97.6	8	**71.8**	**36.3**	25.2	17.8	15.7

Table D52 Daily peak 1-day particles as $PM_{2.5}$ at Kalgoorlie (2013–22)

Trend station/region: Kalgoorlie

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	93.6	1	**36.2**	16.4	14.0	10.2	8.2
2019	97.7	3	**40.8**	24.1	22.1	16.6	12.8
2020	99.3	2	**33.3**	22.0	19.9	13.4	8.9
2021	90.6	2	**34.0**	22.1	18.9	12.1	6.9
2022	96.8	2	**29.0**	20.2	15.4	12.6	7.3

Table D53 Daily peak 1-day particles as $PM_{2.5}$ at Geraldton (2013–22)

Trend station/region: Geraldton

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	99.4	0	18.4	16.5	14.6	13.3	11.8
2020	96.4	1	**162**	17.2	15.8	14.1	12.1
2021	98.5	2	**29.2**	17.9	16.2	12.4	11.2
2022	97.5	0	14.7	11.3	10.2	9.3	7.6

Table D54 Daily peak 1-day particles as $PM_{2.5}$ at Collie (2013–22)

Trend station/region: Collie

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-
2021	23.7	1	**25.9**	15.8	14.1	11.9	9.5
2022	97.2	42	**88.9**	**54.5**	**46.4**	**35.2**	**26.6**

Table D55 Daily peak 1-day particles as $PM_{2.5}$ at Albany (2013–22)

Trend station/region: Albany

AAQ NEPM standard
25 µg/m^3 (1-day average)

Year	Data recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (µg/m^3)	98th percentile (µg/m^3)	95th percentile (µg/m^3)	90th percentile (µg/m^3)
2013	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-
2018	-	-	-	-	-	-	-
2019	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-
2021	6.3	0	11.6	10.9	10.2	8.3	6.8
2022	99.5	1	**27.4**	18.0	16.3	9.4	7.3

D.3 Maxima by pollutant 2013–22

Note that in the tables below, bold numerals indicate where a standard has been exceeded.

Table D56 Peak 8-hour carbon monoxide concentrations (ppm) for 2013–22

AAQ NEPM standard
9.0 ppm (8-hour average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	0.9	0.7	1.2	0.9	2.9	1.1	1.0	1.6	1.2	0.9
Duncraig (North Metro)	2.1	1.9	1.7	1.4	1.4	1.5	1.2	1.2	1.5	1.1
South Lake (South-East Metro)	1.7	1.8	1.9	2.3	1.9	1.9	1.4	1.4	1.5	6.4
Peel region										
Mandurah	-	-	-	-	-	-	-	1.8	1.6	2.5
Goldfields region										
Kalgoorlie	-	-	-	-	-	1.9	2.1	2.0	1.8	1.8

Table D57 Peak 1-hour nitrogen dioxide concentrations (ppm) for 2013–22

AAQ NEPM standard
0.08 ppm (1-hour average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	0.043	0.033	0.041	0.036	0.042	0.034	0.039	0.030	0.034	0.030
Duncraig (North Metro)	0.040	0.048	0.036	0.033	0.032	0.036	0.037	0.031	0.033	0.029
Quinns Rocks (Outer North Coast)	0.032	0.031	0.030	0.029	0.019	-	-	0.038	0.033	**0.170**
Rockingham (South Coast)	0.035	0.034	0.062	0.029	0.074	0.029	**0.107**	0.041	0.037	0.031
Rolling Green (Outer East Rural)	0.030	0.021	0.023	0.023	0.018	0.023	0.023	0.018	0.020	0.036
South Lake (South-East Metro)	0.043	0.034	0.043	0.038	0.045	0.047	0.036	0.036	0.034	0.037
Swanbourne (Inner West Coast)	0.037	0.036	0.036	0.030	0.033	0.039	0.037	0.032	0.033	0.023
Peel region										
Mandurah	-	-	-	-	-	-	-	0.022	0.021	0.023

Table D58 Peak 8-hour ozone concentrations (ppm) for 2013–22

AAQ NEPM standard
0.065 ppm (8-hour average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	0.060	0.062	**0.069**	**0.073**	0.061	0.049	0.054	0.053	**0.078**	0.058
Quinns Rocks (Outer North Coast)	**0.068**	0.053	0.061	**0.072**	0.057	-	-	0.048	**0.079**	0.059
Rockingham (South Coast)	**0.067**	0.058	0.061	**0.072**	0.052	0.049	0.059	0.051	0.064	**0.066**
Rolling Green (Outer East Rural)	0.065	0.060	**0.079**	0.060	0.055	0.058	**0.067**	0.053	0.065	0.056
South Lake (South-East Metro)	0.065	0.051	0.055	**0.069**	0.057	0.046	0.060	0.047	0.059	0.055
Swanbourne (Inner West Coast)	0.059	0.049	0.062	**0.069**	0.065	0.053	0.058	0.053	**0.076**	0.062
Peel region										
Mandurah	-	-	-	-	-	-	-	0.053	0.061	0.058

Table D59 Peak 1-hour sulfur dioxide concentrations (ppm) for 2013–22

AAQ NEPM standard
0.10 ppm (1-hour average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Rockingham (South Coast)	0.037	0.036	0.051	0.064	0.030	0.031	0.034	0.037	0.016	0.013
South Lake (South-East Metro)	0.044	0.051	0.037	0.034	0.037	0.022	0.019	0.010	0.007	0.009
Wattleup (South Metro)	0.090	0.061	0.067	0.072	0.068	0.038	0.057	0.044	0.032	0.010
Goldfields region										
Kalgoorlie	-	-	-	-	-	**0.106**	0.082	0.075	0.081	0.077

Table D60 Peak 1-day sulfur dioxide concentrations (ppm) for 2013–22

AAQ NEPM standard
0.02 ppm (1-day average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Rockingham (South Coast)	0.007	0.007	0.013	0.014	0.009	0.007	0.009	0.008	0.006	0.007
South Lake (South-East Metro)	0.014	0.010	0.007	0.010	0.009	0.005	0.006	0.006	0.002	0.003
Wattleup (South Metro)	0.010	0.008	0.009	0.011	0.007	0.007	0.008	0.006	0.004	0.003
Goldfields region										
Kalgoorlie	-	-	-	-	-	0.008	0.012	0.011	0.007	0.011

Table D61 Peak 1-day particles as PM_{10} concentrations ($\mu g/m^3$) for 2013–22

AAQ NEPM standard
50 $\mu g/m^3$ (1-day average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth Region										
Caversham (North-East Metro)	**62.4**	**52.6**	46.8	38.1	**79.2**	**77.9**	**108**	**71.5**	**97.7**	**53.0**
Duncraig (North Metro)	37.6	**53.0**	**82.7**	40.0	**51.4**	**61.3**	**68.1**	**61.8**	**105**	38.7
Quinns Rocks (Outer North Coast)	-	-	-	-	-	-	-	**77.7**	47.6	**101**
South Lake (South-East Metro)	38.8	44.5	**53.3**	47.0	49.6	**57.1**	**98.8**	45.2	**102**	**144**
Armadale (South-East Metro)	-	-	-	-	-	-	-	31.3	**96.2**	**189**
Peel region										
Mandurah	-	-	-	-	-	-	-	**84.4**	**103.2**	**83.2**
South West region										
Bunbury	46.8	44.5	**62.9**	**74.6**	45.5	**51.9**	**131**	**61.1**	**89.6**	**75.9**
Collie	**61.6**	**73.3**	**112**	**89.9**	**81.5**	**84.6**	**83.5**	**131**	**84.7**	**105**
Albany	**111**	43.5	**76.7**	**94.9**	**61.8**	**89.6**	**129**	37.2	34.3	30.5
Mid West region										
Geraldton	**63.1**	**55.7**	**68.1**	**66.0**	**73.5**	**70.0**	**88.4**	**446**	**120**	**74.0**
Goldfields region										
Kalgoorlie	-	-	-	-	-	**60.5**	**67.6**	**77.3**	42.7	41.7

For explanation of this year's exceedances, please see Table A10 of this report.
For explanation of exceedances in previous years, please refer to the relevant year's report.

Table D62 Peak 1-day particles as $PM_{2.5}$ concentrations (µg/m³) for 2013–22

AAQ NEPM standard
25 µg/m³ (1-day average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	22.6	**39.3**	**30.0**	24.1	**65.9**	**36.7**	**25.4**	**60.9**	**88.3**	**47.6**
Duncraig (North Metro)	18.7	**47.6**	**35.8**	**27.0**	**40.5**	**48.6**	25.0	**37.2**	**96.6**	**33.4**
Quinns Rocks (Outer North Coast)	19.3	**39.5**	**37.9**	**28.8**	12.2	-	-	**39.8**	**42.2**	**88.7**
South Lake (South-East Metro)	17.1	**29.8**	**34.5**	**30.4**	**46.6**	**43.3**	**28.9**	**34.6**	**92.2**	**136**
Armadale (South-East Metro)	-	-	-	-	-	-	-	**26.2**	**88.6**	**180**
Peel region										
Mandurah	-	-	-	-	-	-	-	**53.8**	**87.9**	**74.3**
South West region										
Albany	-	-	-	-	-	-	-	-	11.6	**27.4**
Bunbury	**38.3**	**34.6**	**52.1**	**61.5**	**33.9**	**38.4**	**118**	**55.5**	**83.1**	**67.5**
Busselton	17.9	**25.1**	**37.8**	**61.1**	**28.8**	**56.5**	**78.5**	**37.1**	**126**	**71.8**
Collie	-	-	-	-	-	-	-	-	**25.9**	**88.9**
Mid West region										
Geraldton	-	-	-	-	-	-	18.4	**162**	**29.2**	14.7
Goldfields region										
Kalgoorlie	-	-	-	-	-	**36.2**	**40.8**	**33.3**	**34.0**	**29.0**

For explanation of this year's exceedances, please see Table A10 of this report.
For explanation of exceedances in previous years, please refer to the relevant year's report.

Table D63 Annual averaged particles as PM_{10} concentrations (µg/m³) for 2013–22

AAQ NEPM standard
25 µg/m³ (annual average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	15.4	17.4	16.7	15.0	16.1	16.3	18.7	15.1	13.2	12.2
Duncraig (North Metro)	15.5	15.5	16.5	14.4	15.7	15.1	14.8	13.4	13.2	11.3
Quinns Rocks (Outer North Coast)	-	-	-	-	-	-	-	12.5	17.2	18.8
South Lake (South-East Metro)	16.6	17.4	17.9	15.8	16.7	16.3	17.7	13.9	14.5	14.4
Armadale (South-East Metro)	-	-	-	-	-	-	-	10.9	11.9	12.6
Peel Region										
Mandurah	-	-	-	-	-	-	-	**26.6**	22.2	19.9
South West region										
Bunbury	16.8	16.1	17.5	16.5	16.5	16.1	16.6	15.5	14.3	14.0
Collie	20.1	19.2	22.4	19.3	21.7	19.3	22.0	18.1	17.0	18.0
Albany	15.4	16.0	15.9	17.5	16.6	14.6	15.3	14.2	14.3	10.7
Mid West region										
Geraldton	20.9	22.3	20.2	18.8	21.3	20.1	22.2	20.9	19.4	14.8
Goldfields region										
Kalgoorlie	-	-	-	-	-	12.8	15.2	14.2	11.3	11.7

For explanation of this year's exceedances, please see Table A10 of this report.
For explanation of exceedances in previous years, please refer to the relevant year's report.

Table D64 Annual averaged particles as $PM_{2.5}$ concentrations (µg/m³) for 2013–22

AAQ NEPM standard
8 µg/m³ (annual average)

Regional performance monitoring station	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Perth region										
Caversham (North-East Metro)	7.9	**8.1**	**8.5**	7.7	**8.5**	8.0	**8.3**	7.8	6.9	6.4
Duncraig (North Metro)	7.6	7.6	**8.4**	7.5	**8.2**	7.7	7.4	6.3	6.7	4.8
Quinns Rocks (Outer North Coast)	7.8	8.0	**8.3**	7.5	7.8	-	-	5.4	**9.7**	**11.0**
South Lake (Outer North Coast)	8.0	**8.1**	**8.8**	8.0	**8.7**	**8.4**	**8.2**	7.2	7.6	7.2
Armadale (South-East Metro)	-	-	-	-	-	-	-	5.7	6.2	6.8
Peel region										
Mandurah	-	-	-	-	-	-	-	**10.0**	6.7	7.0
South West region										
Albany	-	-	-	-	-	-	-	-	3.6	4.0
Bunbury	7.8	7.8	**9.3**	**8.4**	**8.7**	**8.4**	**8.5**	7.9	6.5	6.5
Busselton	7.7	7.2	**8.6**	**8.1**	**8.2**	7.9	**8.1**	**8.1**	**8.4**	**8.7**
Collie	-	-	-	-	-	-	-	-	5.4	**11.4**
Mid West region										
Geraldton	-	-	-	-	-	-	7.9	8.0	7.0	4.2
Goldfields region										
Kalgoorlie	-	-	-	-	-	5.1	5.6	4.7	4.0	4.2

E. Graphical trends

This section provides graphical representations of the tables in Section D.

Each graph shows the maximum, 99th percentile, 98th percentile, 95th percentile and 90th percentile of daily maximum concentrations for all pollutants monitored by the department. The nominated percentiles can also be expressed as an nth highest concentration.

Based on 100 per cent data recovery and a normal year (365 days), the following table gives each percentile an equivalent nth highest ordinal value. The bracketed numbers represent the exact (as calculated) value of the ordinal number.

Percentile	Nth highest
100	1 (maximum)
99	5 (4.65)
98	8 (8.3)
95	19 (19.25)
90	38 (37.5)

E.1 Carbon monoxide

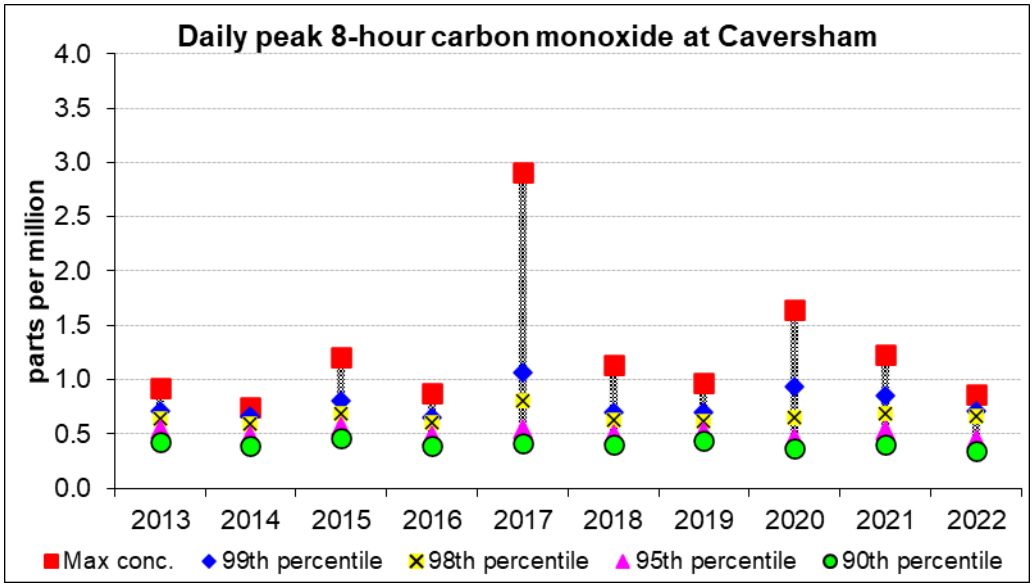


Figure E1-1 8-hour carbon monoxide at Caversham

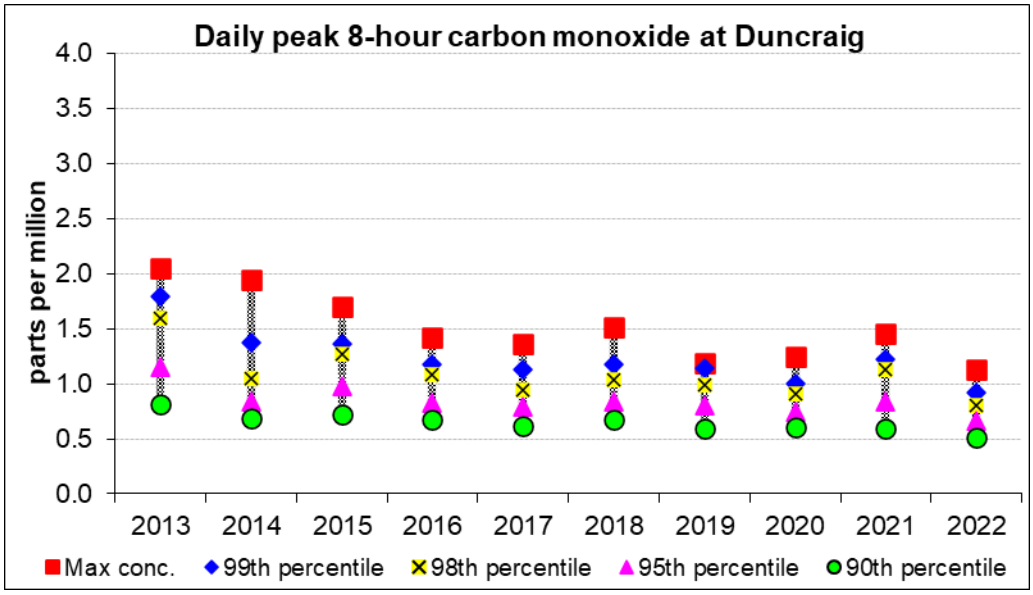


Figure E1-2 8-hour carbon monoxide at Duncraig

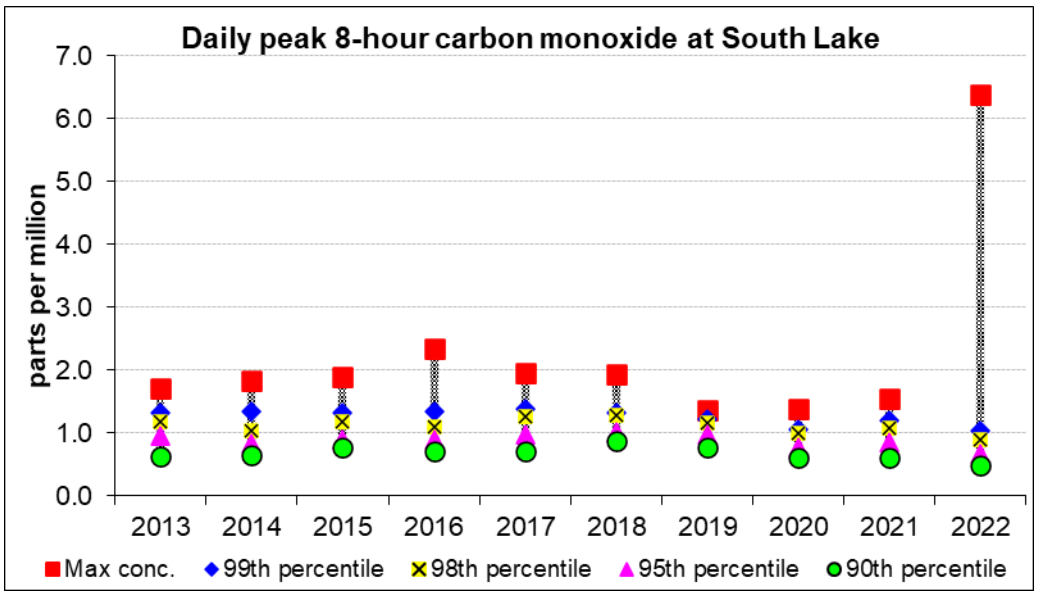


Figure E1-3 8-hour carbon monoxide at South Lake

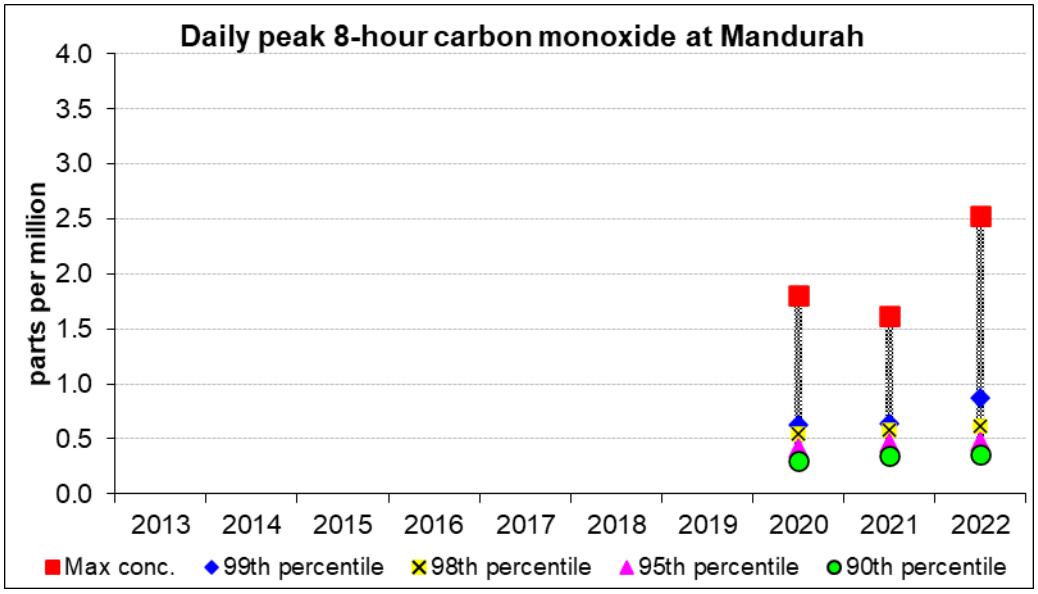


Figure E1-4 8-hour carbon monoxide at Mandurah

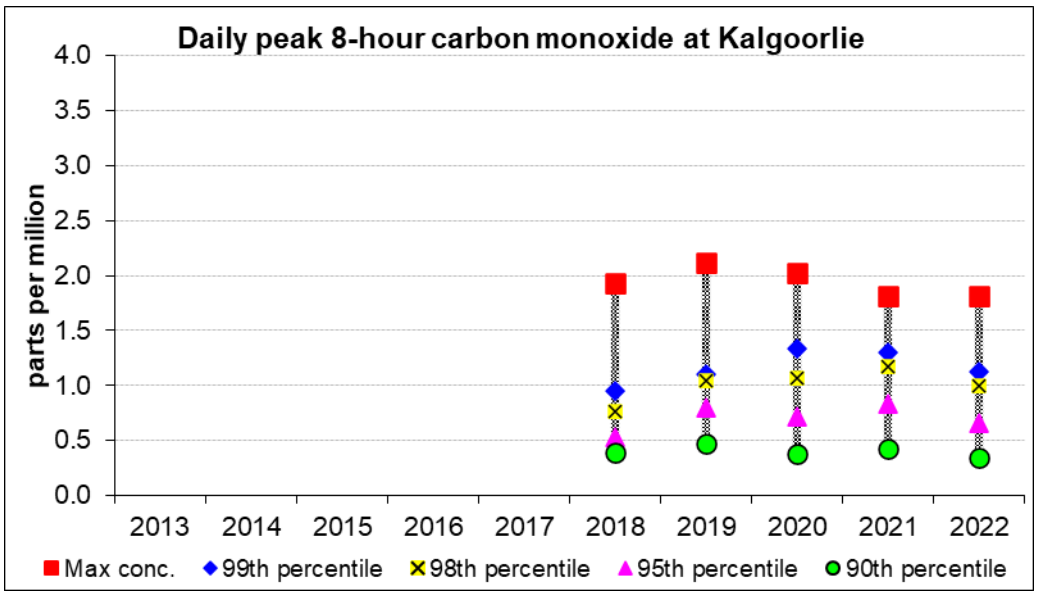


Figure E1-5 8-hour carbon monoxide at Kalgoorlie

E.2 Nitrogen dioxide

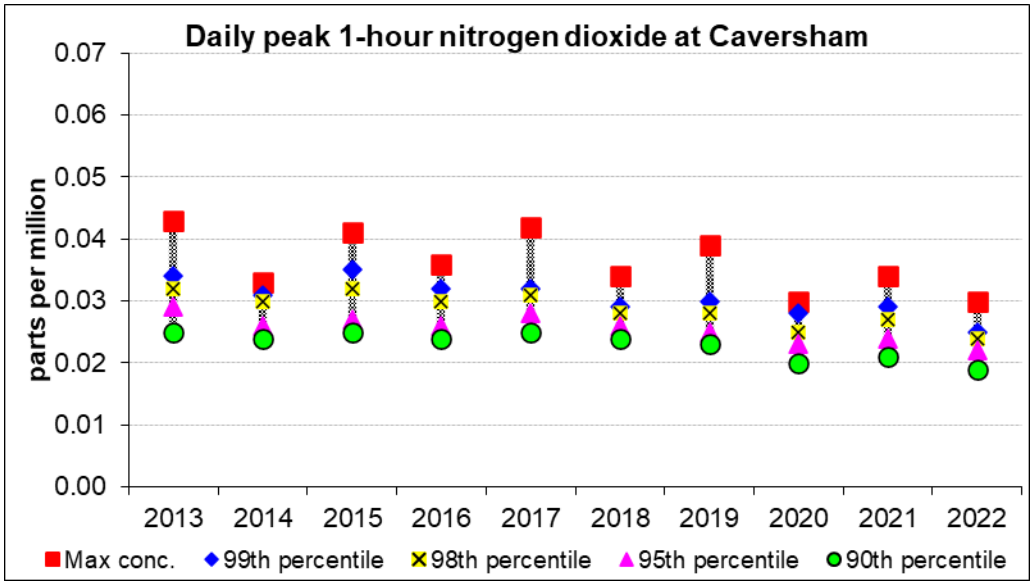


Figure E2-1 1-hour nitrogen dioxide at Caversham

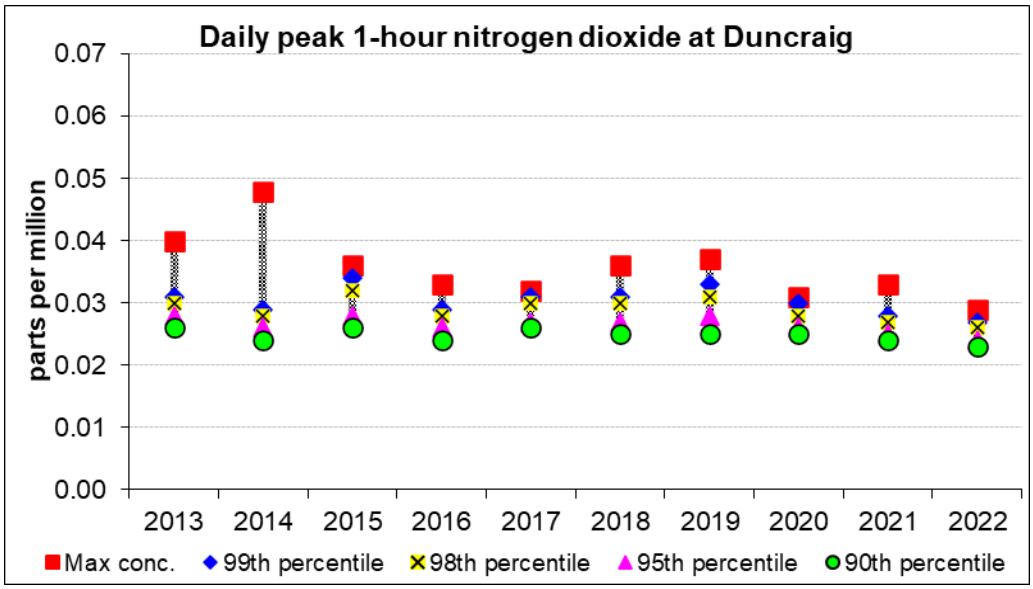


Figure E2-2 1-hour nitrogen dioxide at Duncraig

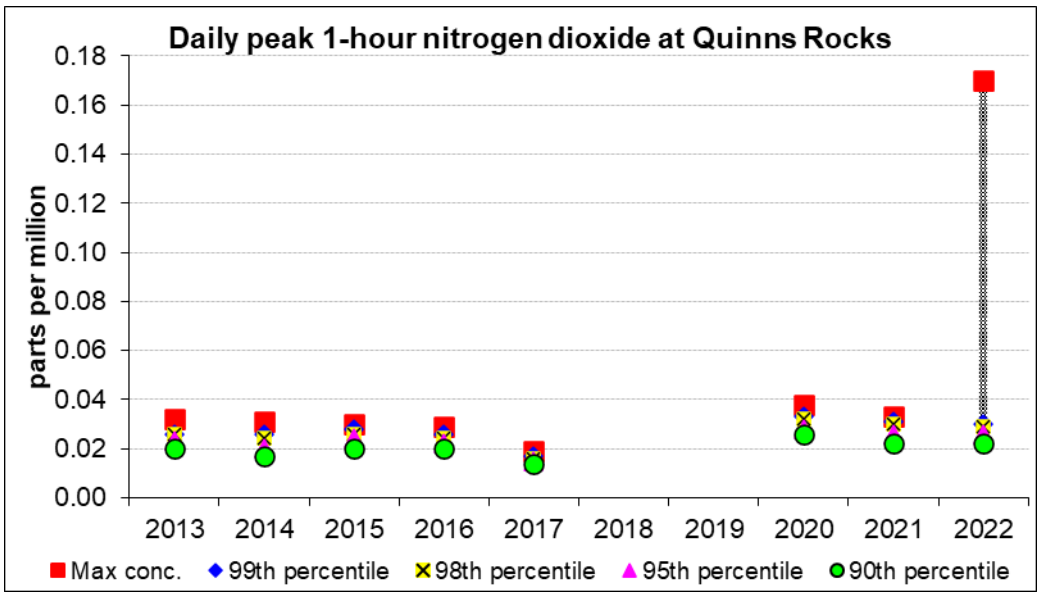


Figure E2-3 1-hour nitrogen dioxide at Quinns Rocks (2017–19 not included)

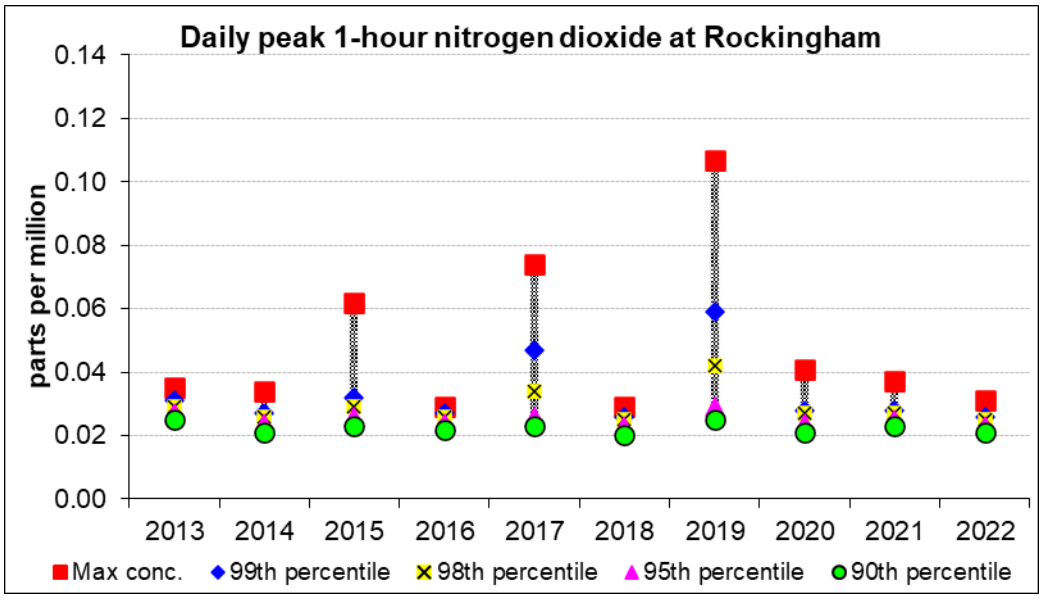


Figure E2-4 1-hour nitrogen dioxide at Rockingham

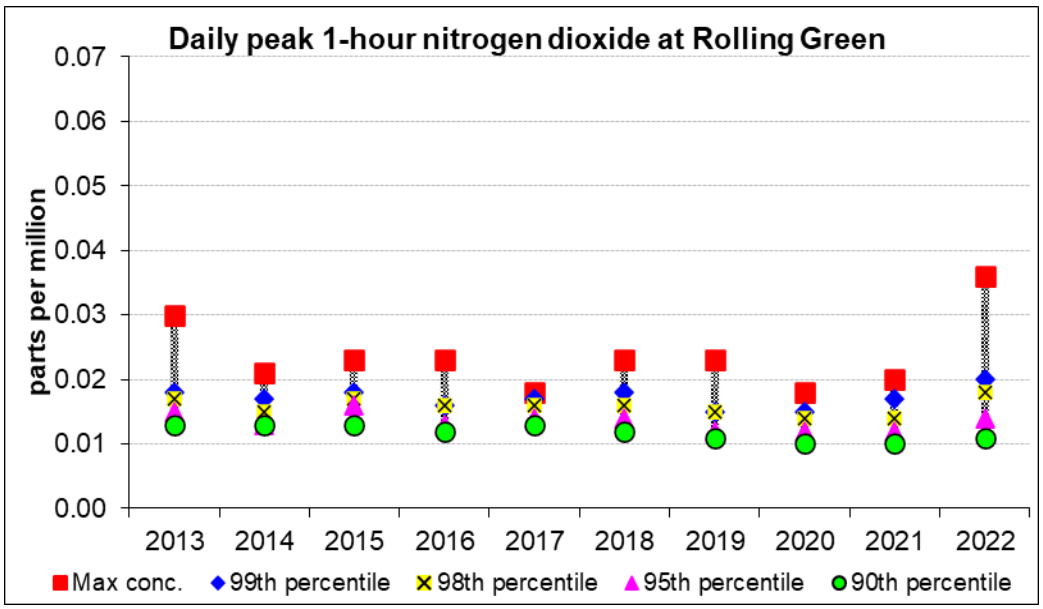


Figure E2-5 1-hour nitrogen dioxide at Rolling Green

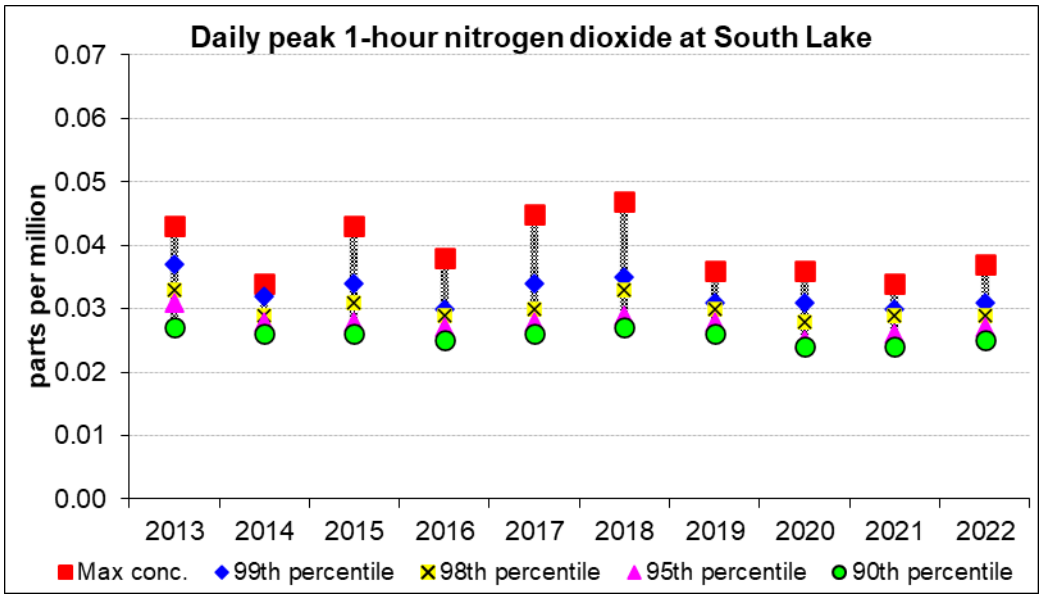


Figure E2-6 1-hour nitrogen dioxide at South Lake

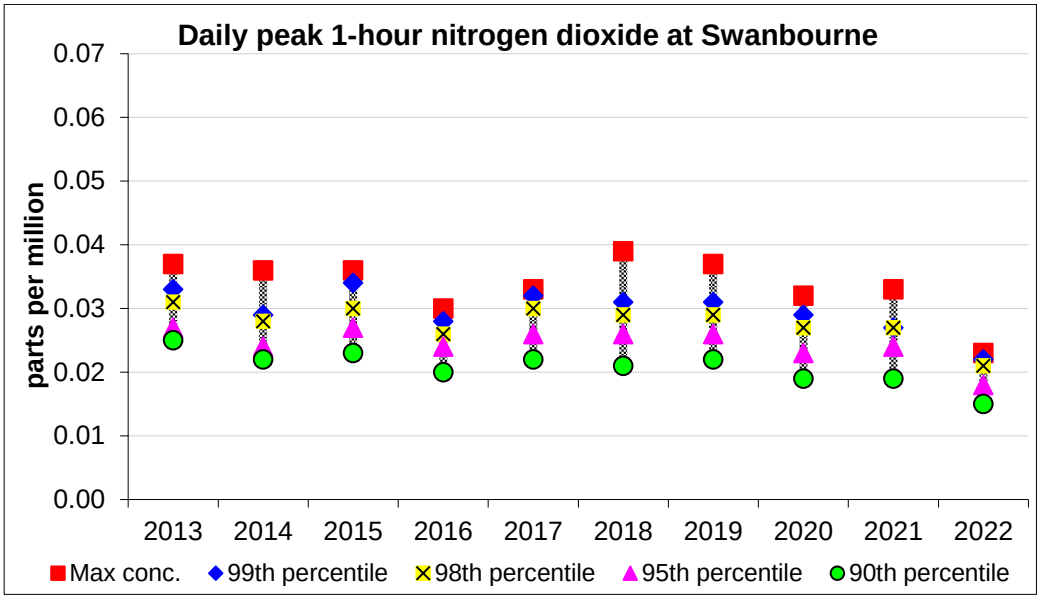


Figure E2-7 1-hour nitrogen dioxide at Swanbourne

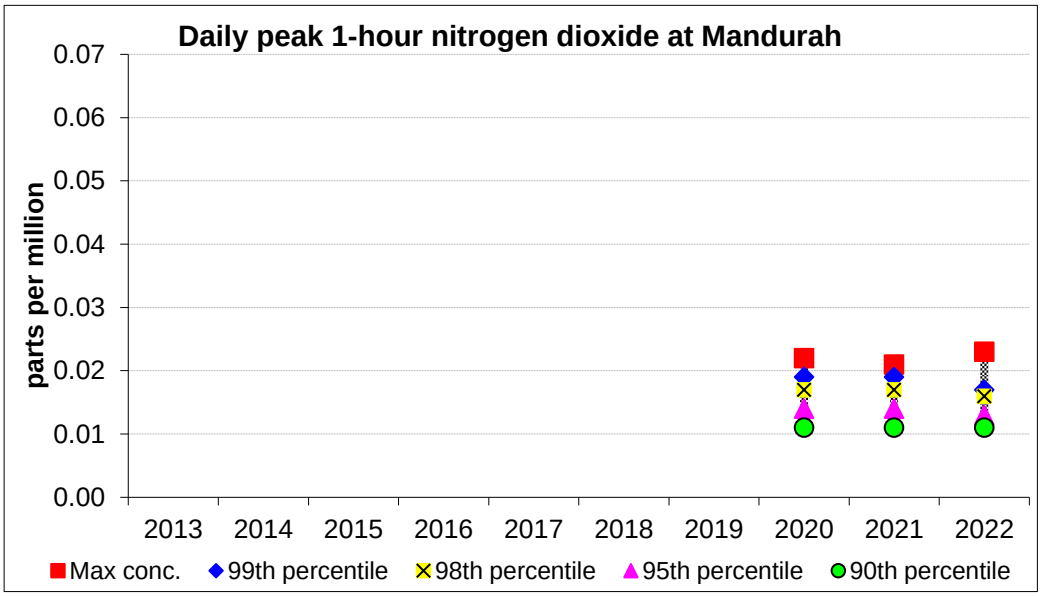


Figure E2-8 1-hour nitrogen dioxide at Mandurah

E.3 Ozone

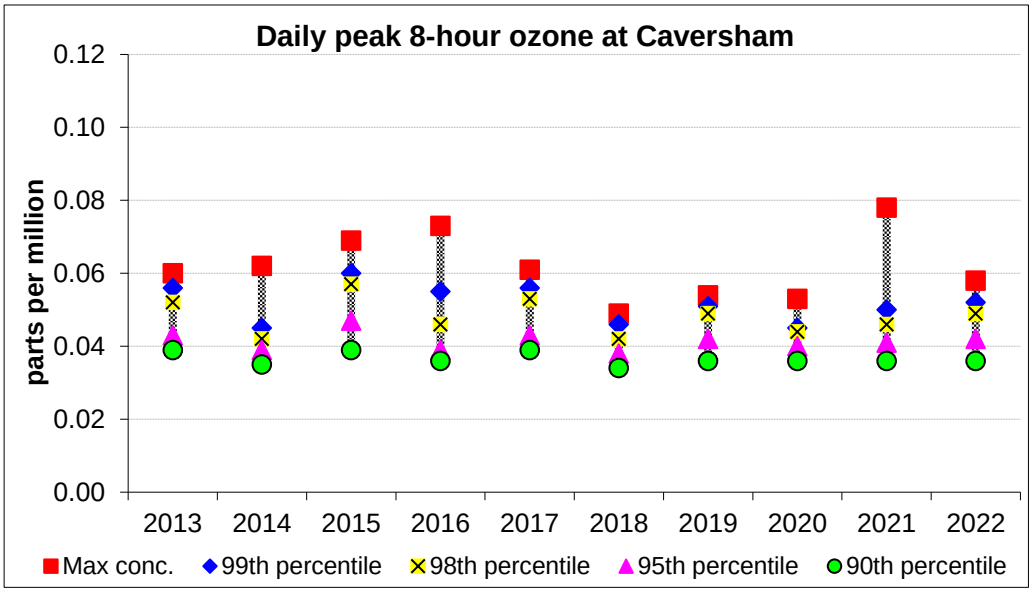


Figure E3-1 8-hour ozone at Caversham

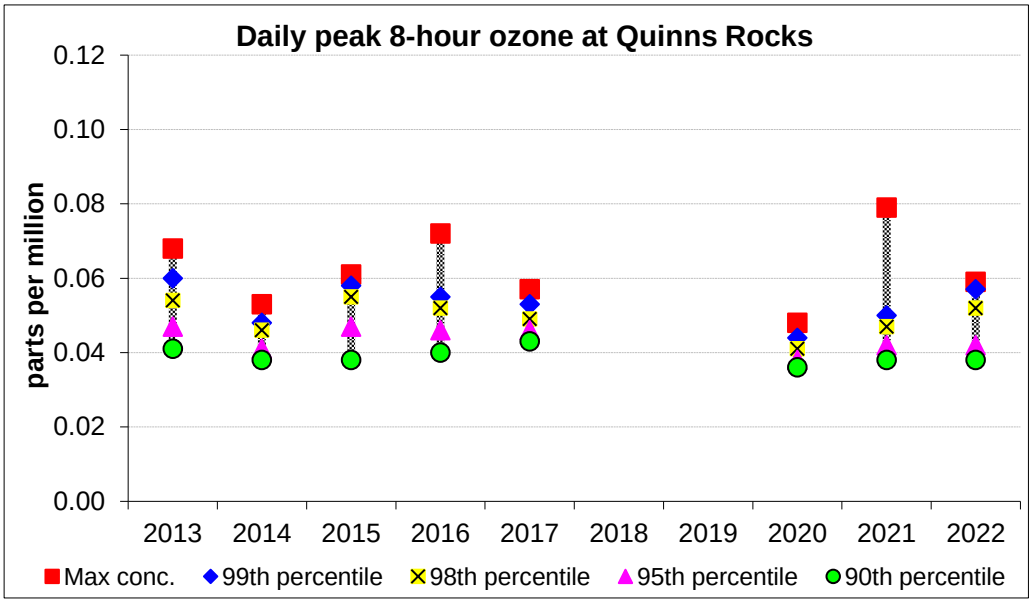


Figure E3-2 8-hour ozone at Quinns Rocks (2017–19 not included)

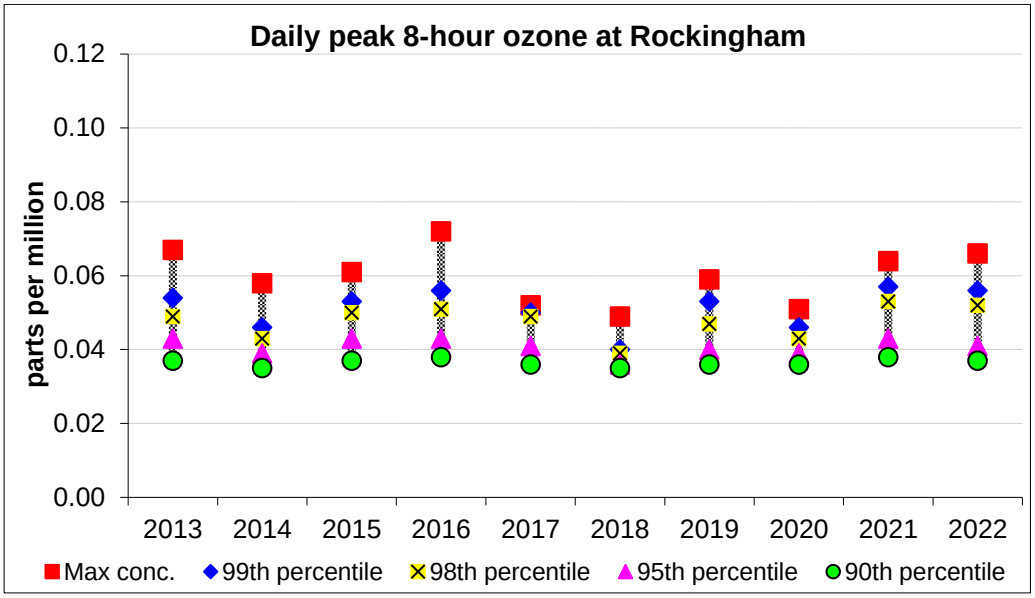


Figure E3-3 8-hour ozone at Rockingham

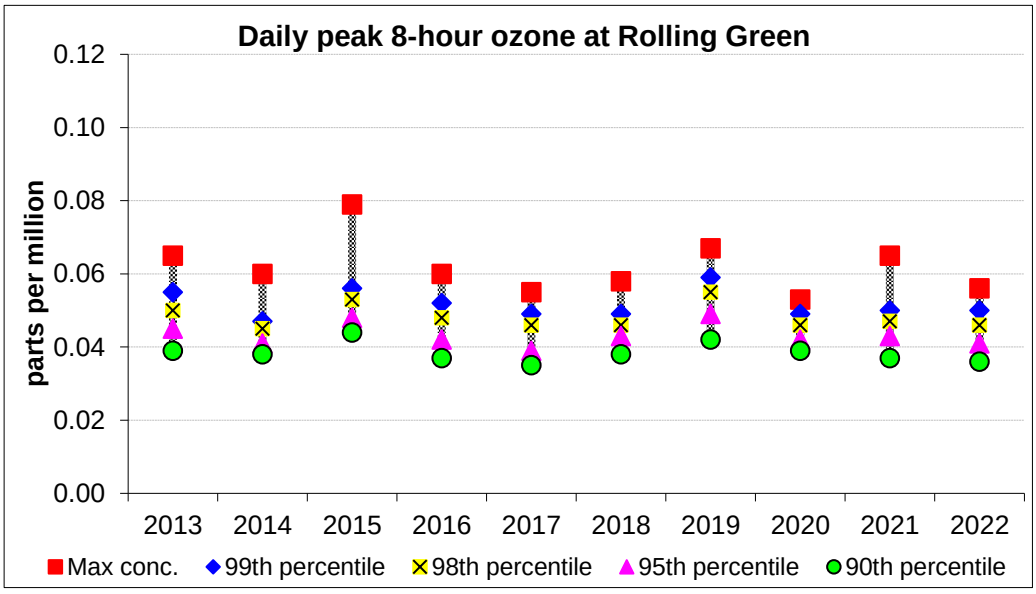


Figure E3-4 8-hour ozone at Rolling Green

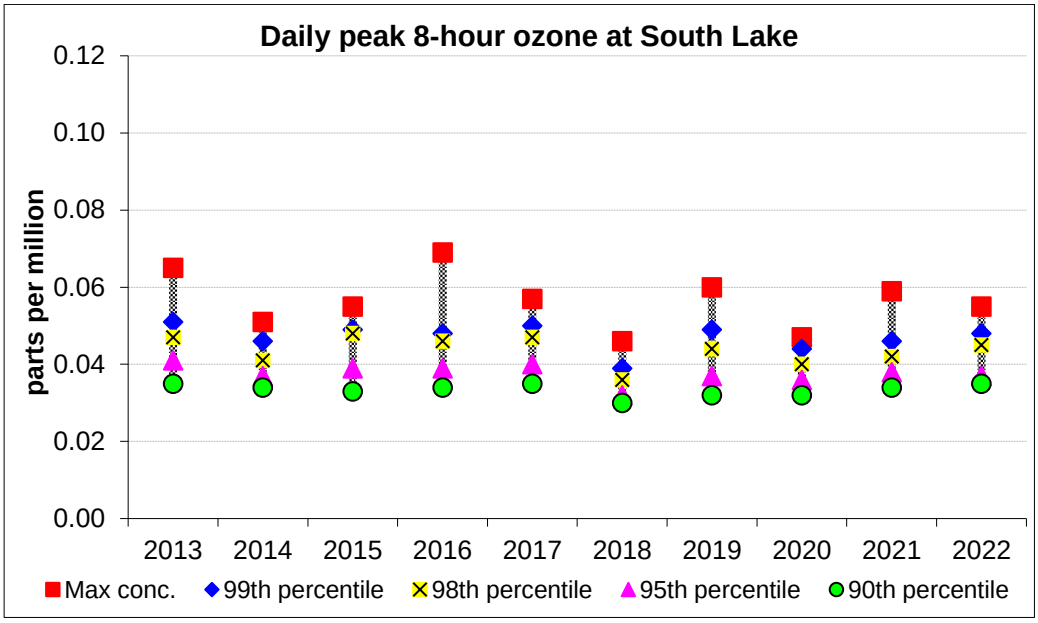


Figure E3-5 8-hour ozone at South Lake

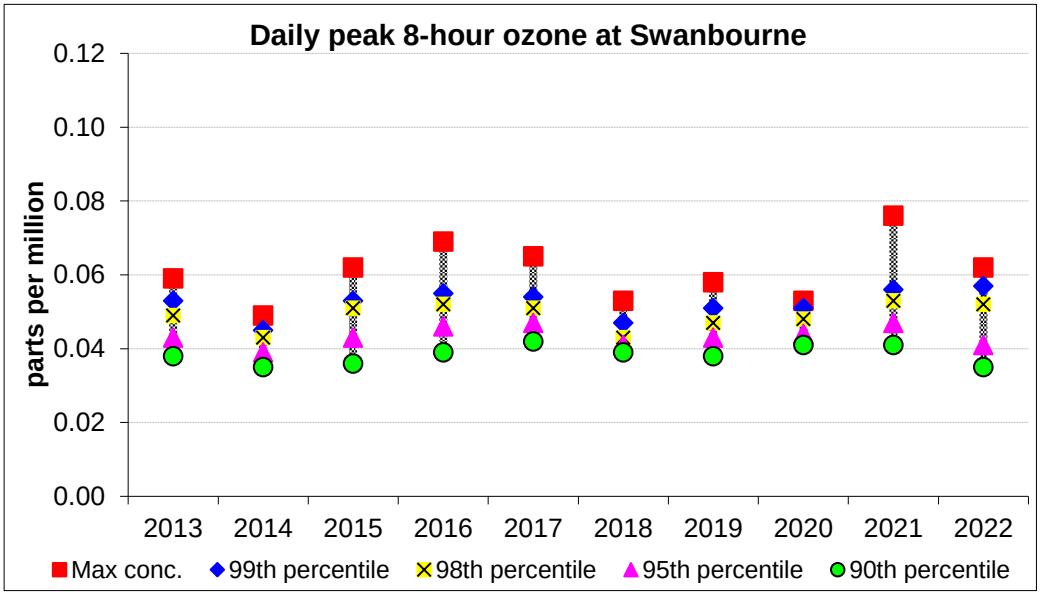


Figure E3-6 8-hour ozone at Swanbourne

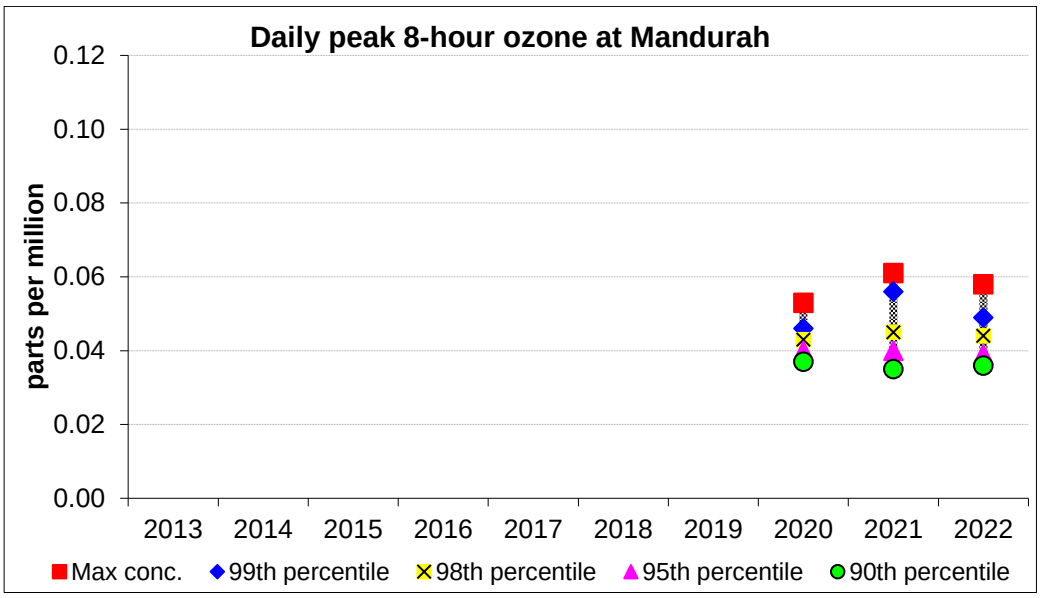


Figure E3-7 8-hour ozone at Mandurah

E.4 Sulfur dioxide

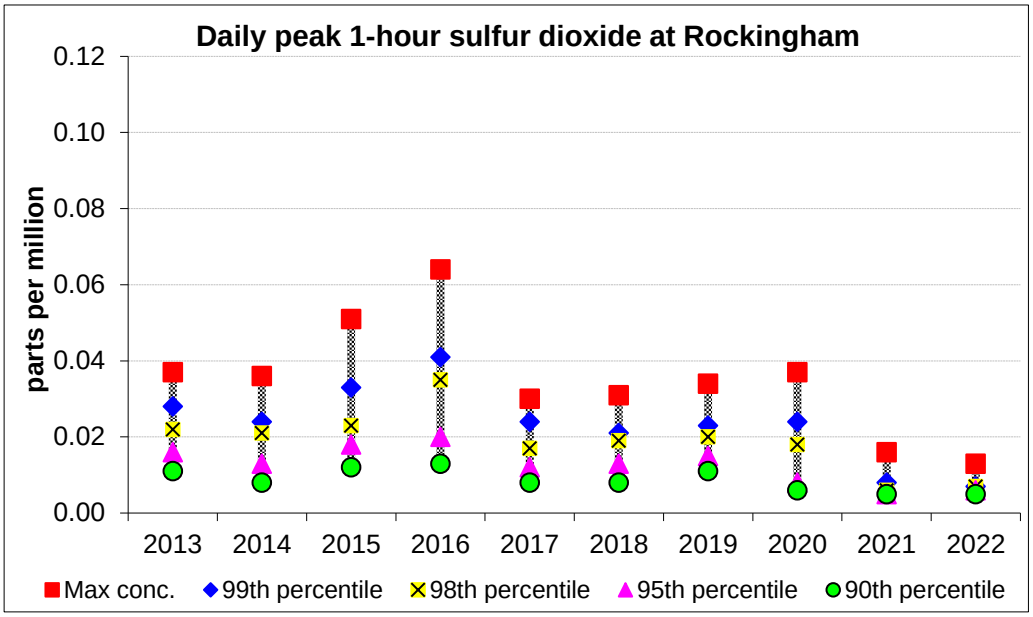


Figure E4-1 1-hour sulfur dioxide at Rockingham

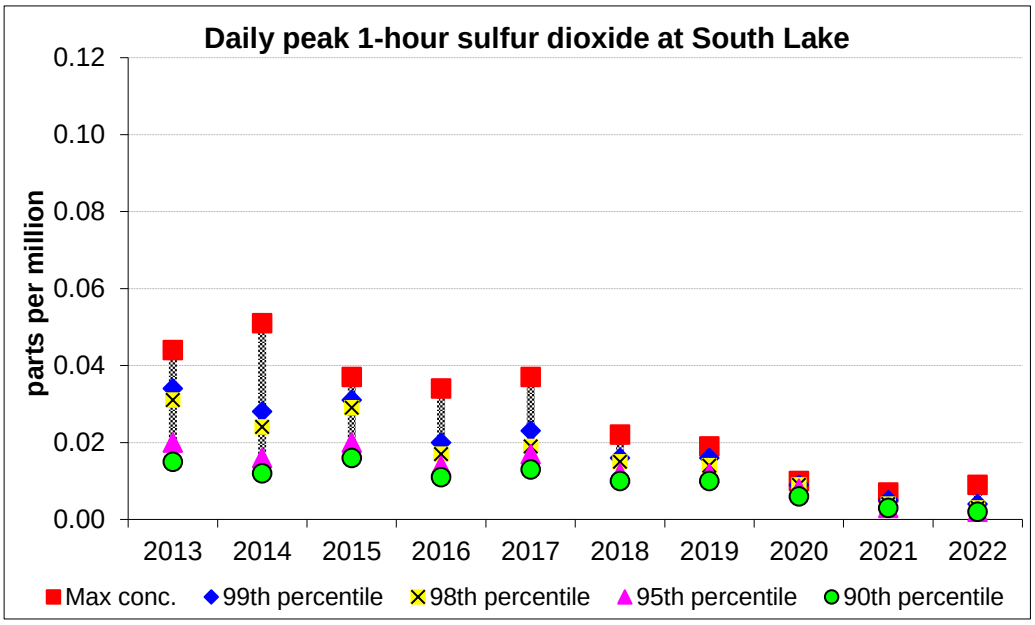


Figure E4-2 1-hour sulfur dioxide at South Lake

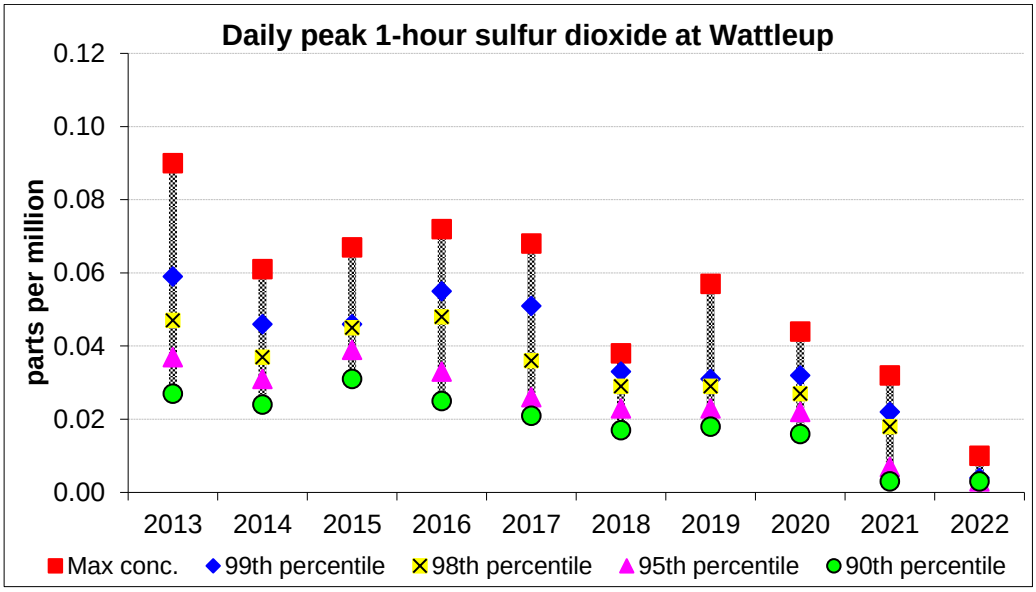


Figure E4-3 1-hour sulfur dioxide at Wattleup

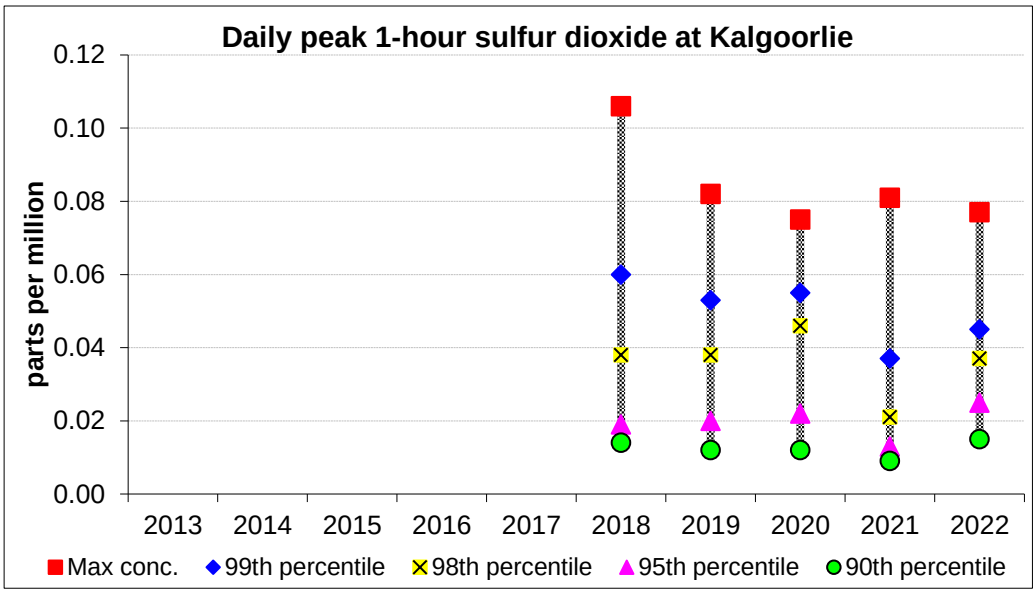


Figure E4-4 1-hour sulfur dioxide at Kalgoorlie

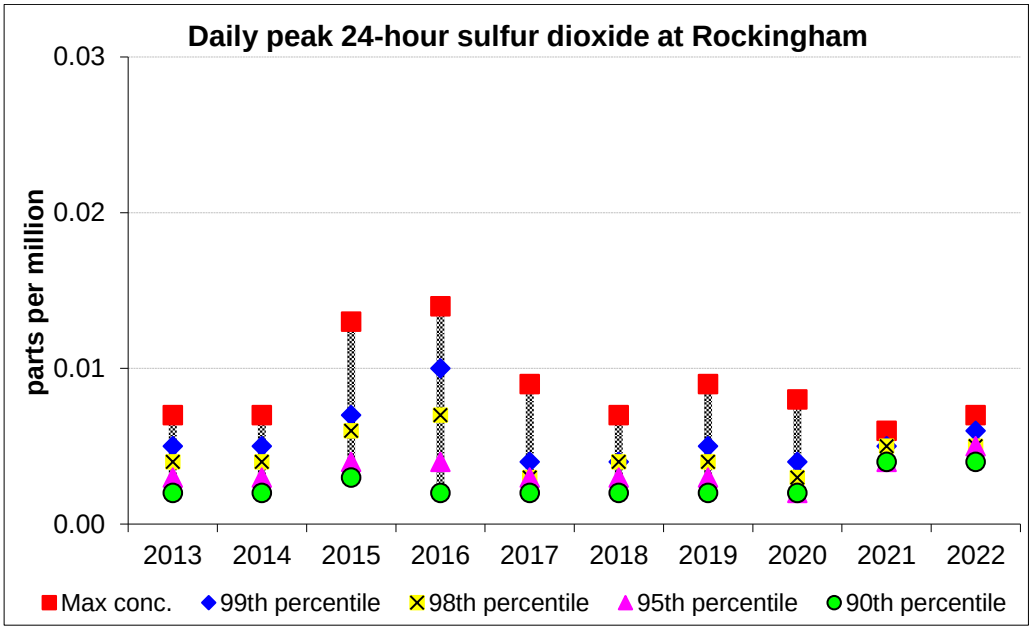


Figure E4-5 1-day sulfur dioxide at Rockingham

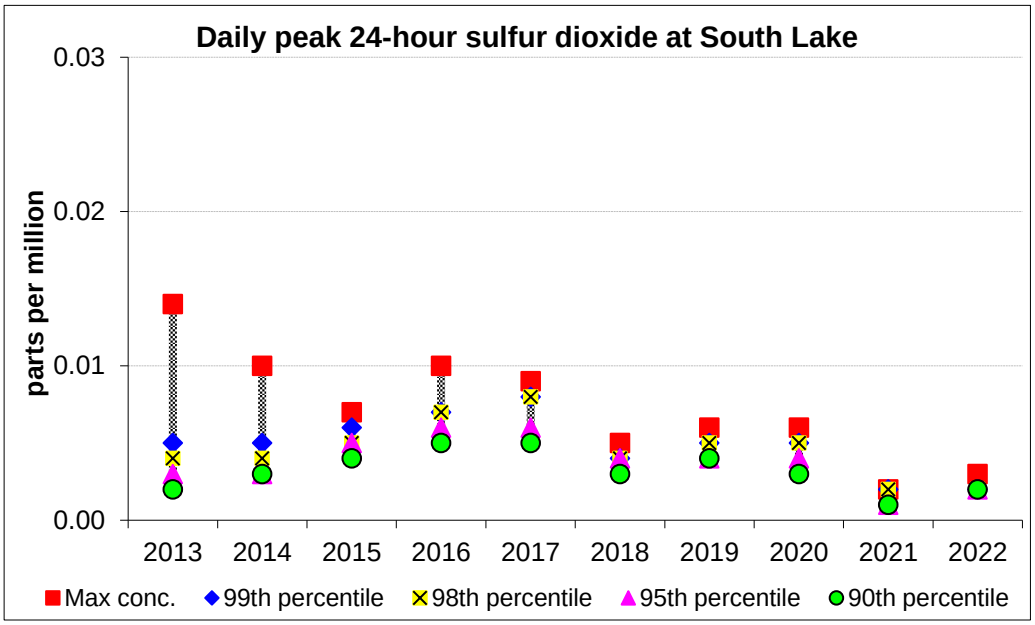


Figure E4-6 1-day sulfur dioxide at South Lake

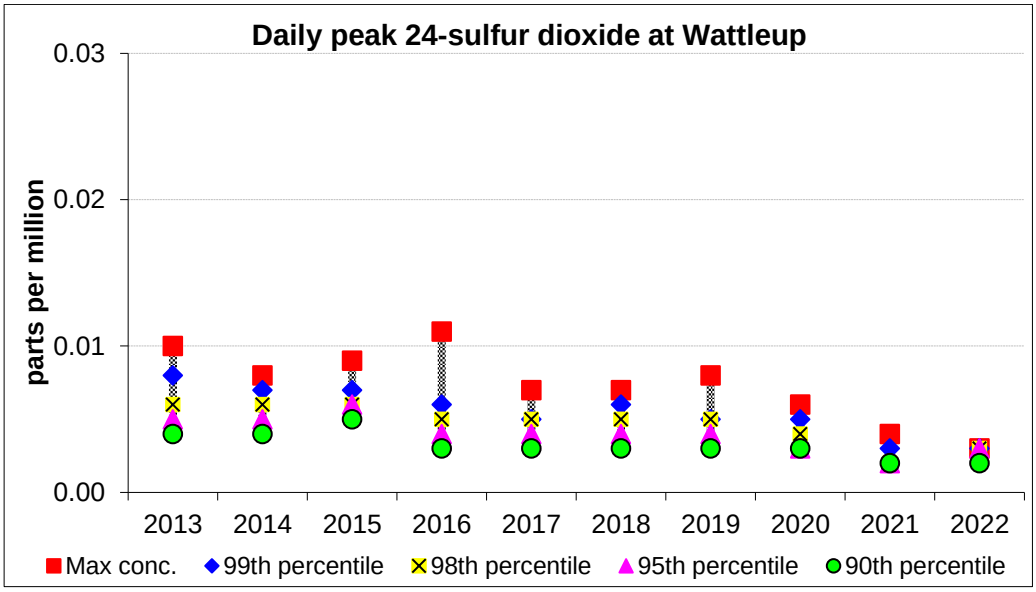


Figure E4-7 1-day sulfur dioxide at Wattleup.

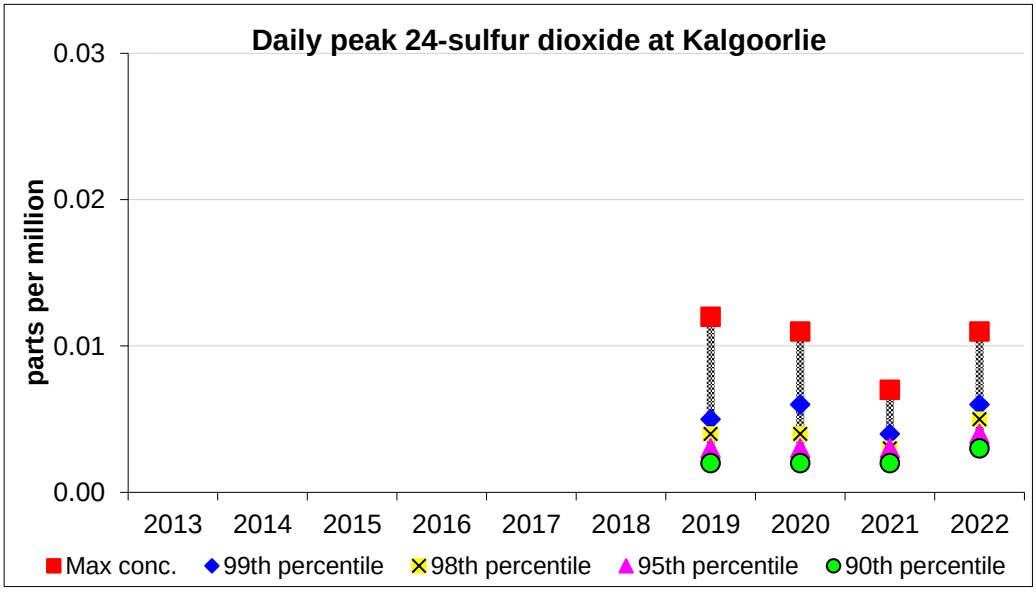


Figure E4-8 1-day sulfur dioxide at Kalgoorlie

E.5 Particles as PM_{10}

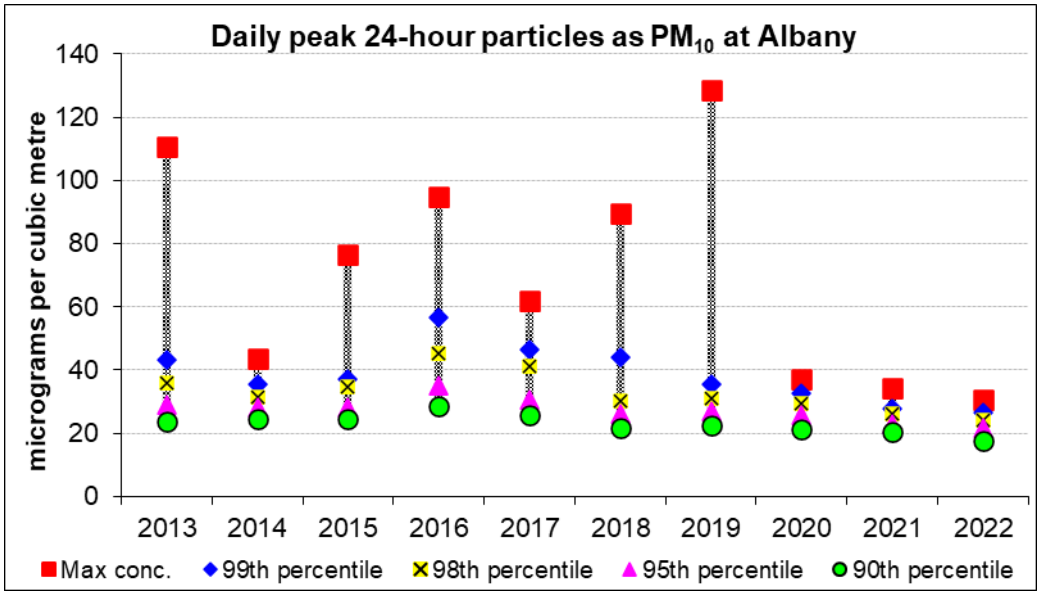


Figure E5-1 1-day PM_{10} at Albany

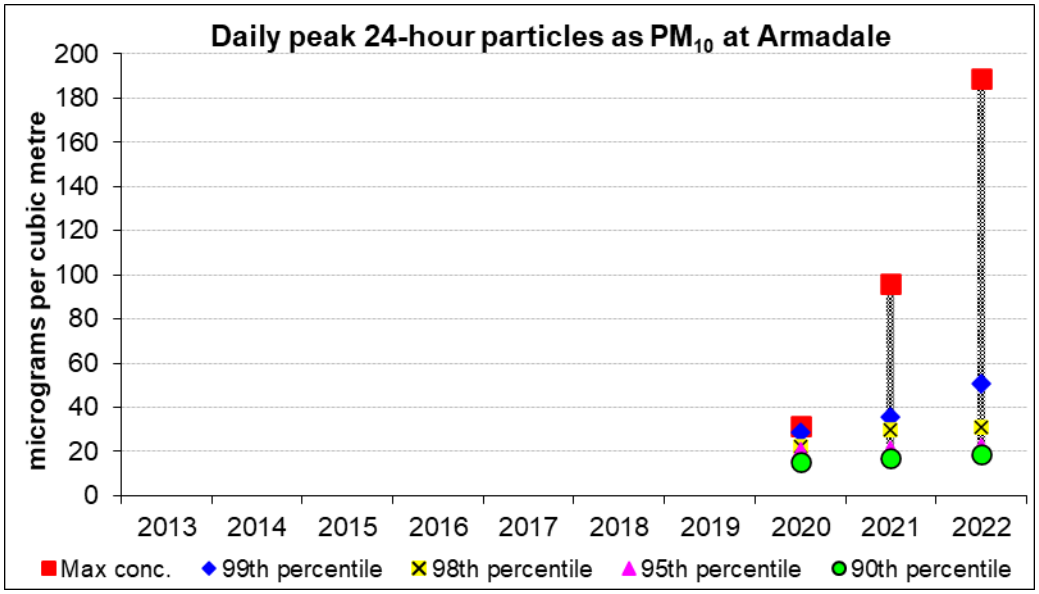


Figure E5-2 1-day PM_{10} at Armadale

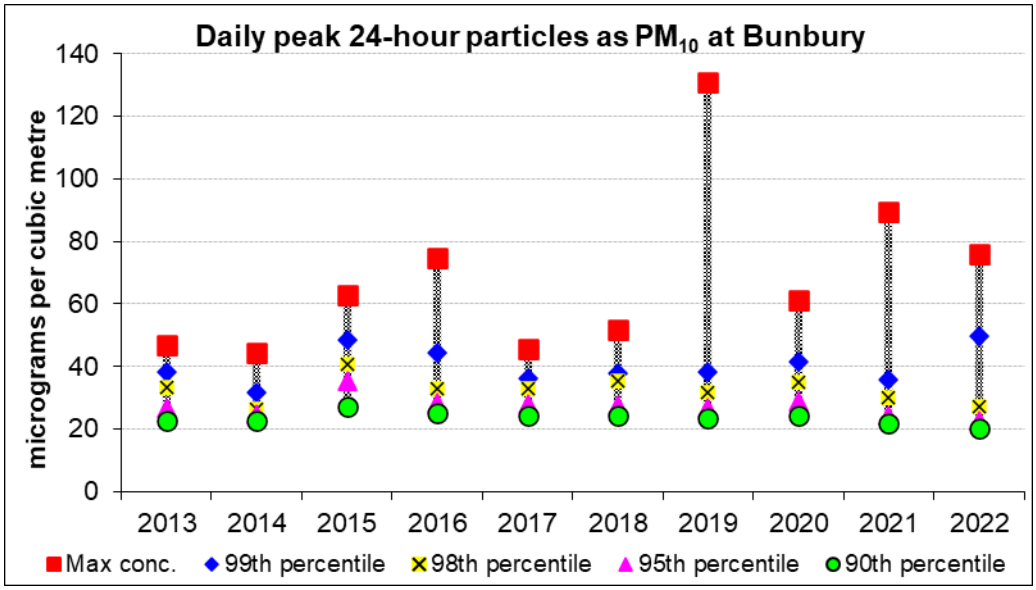


Figure E5-3 1-day PM_{10} at Bunbury

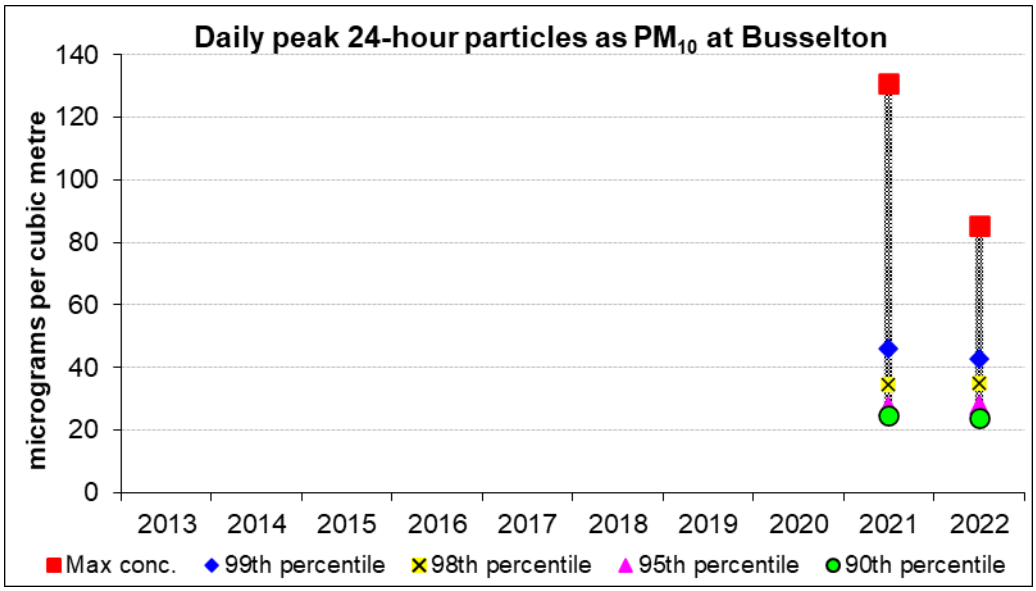


Figure E5-4 1-day PM_{10} at Busselton

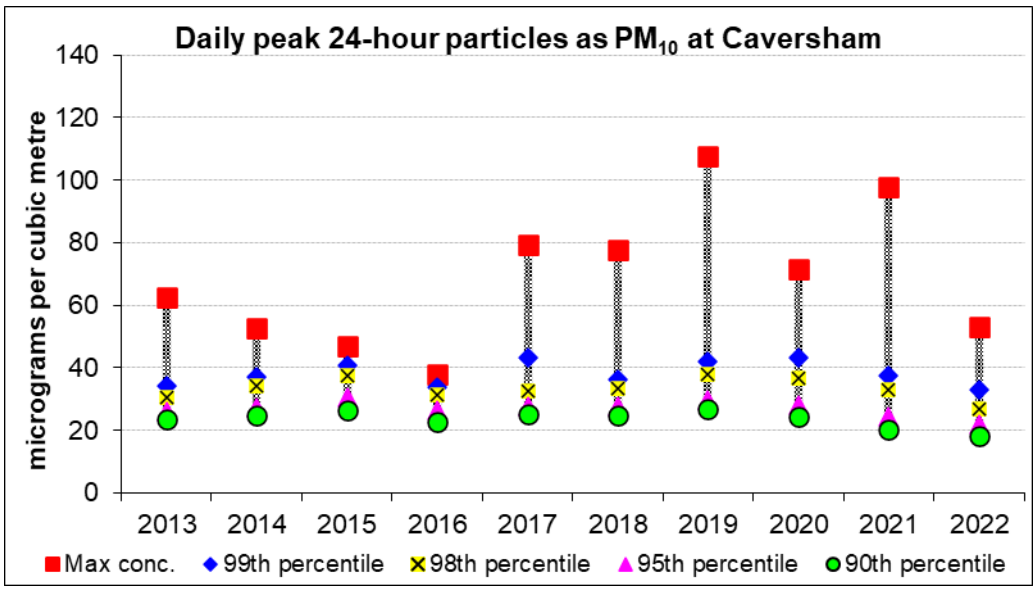


Figure E5-5 1-day PM_{10} at Caversham

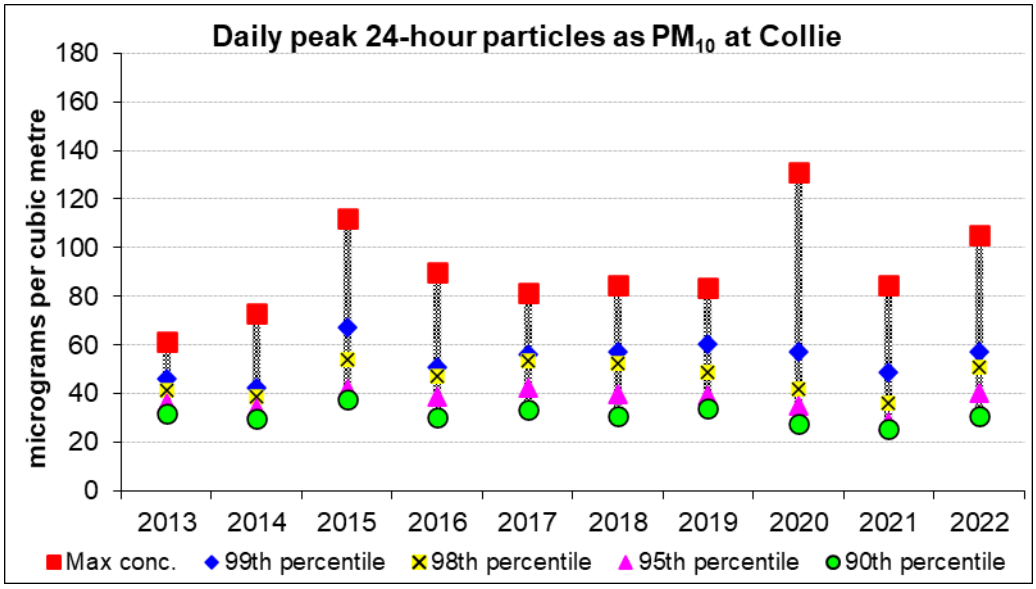


Figure E5-6 1-day PM_{10} at Collie

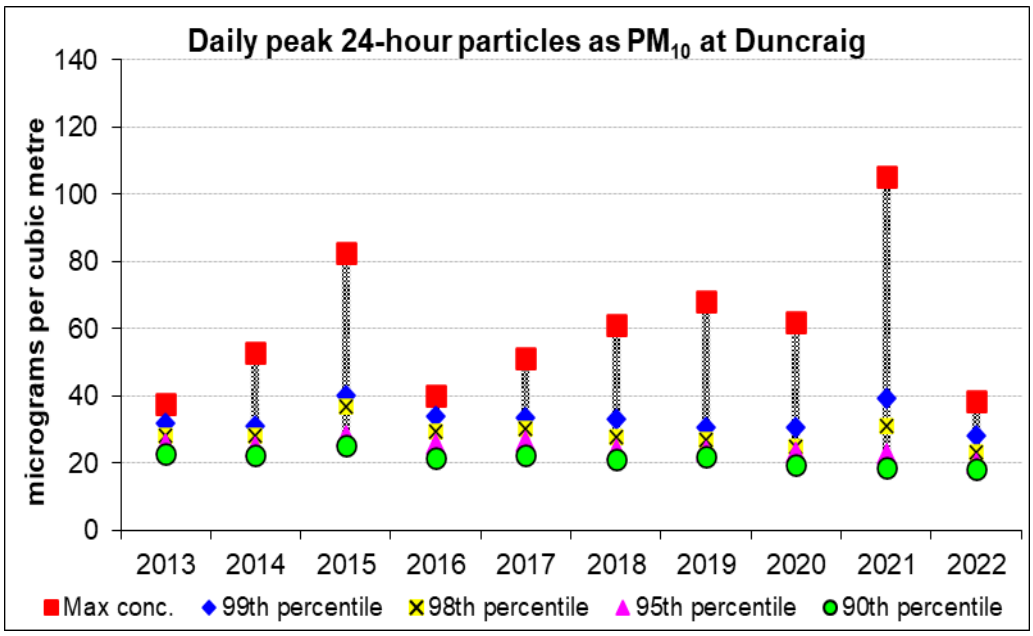


Figure E5-7 1-day PM_{10} at Duncraig

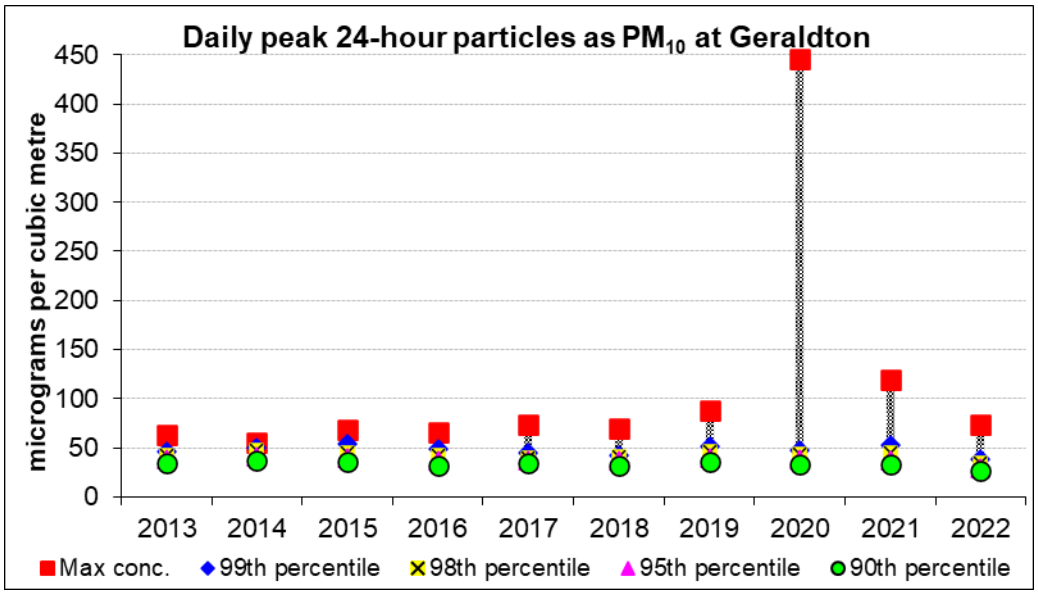


Figure E5-8 1-day PM_{10} at Geraldton

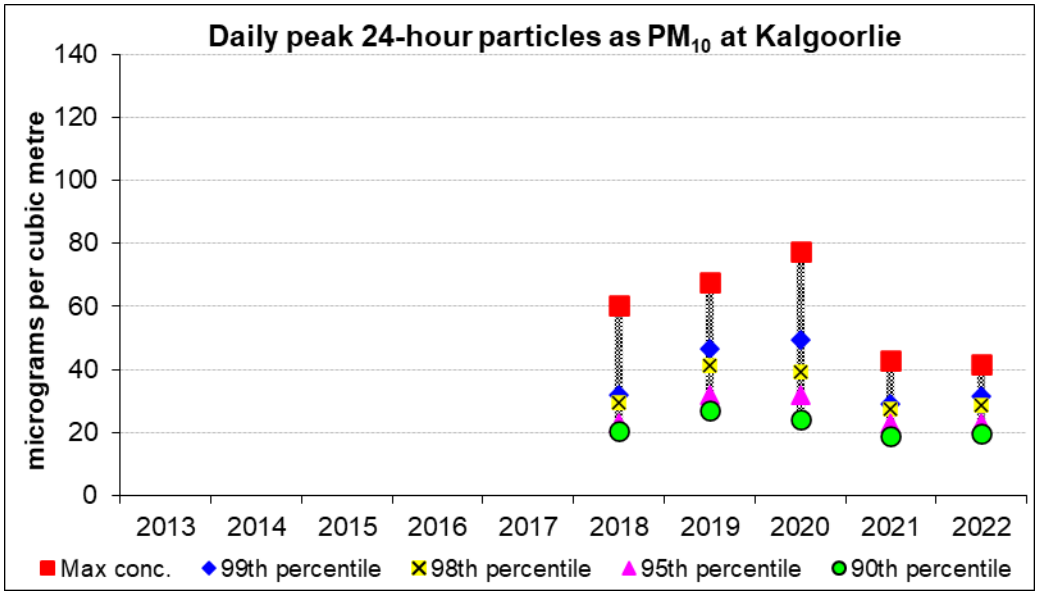


Figure E5-9 1-day PM_{10} at Kalgoorlie

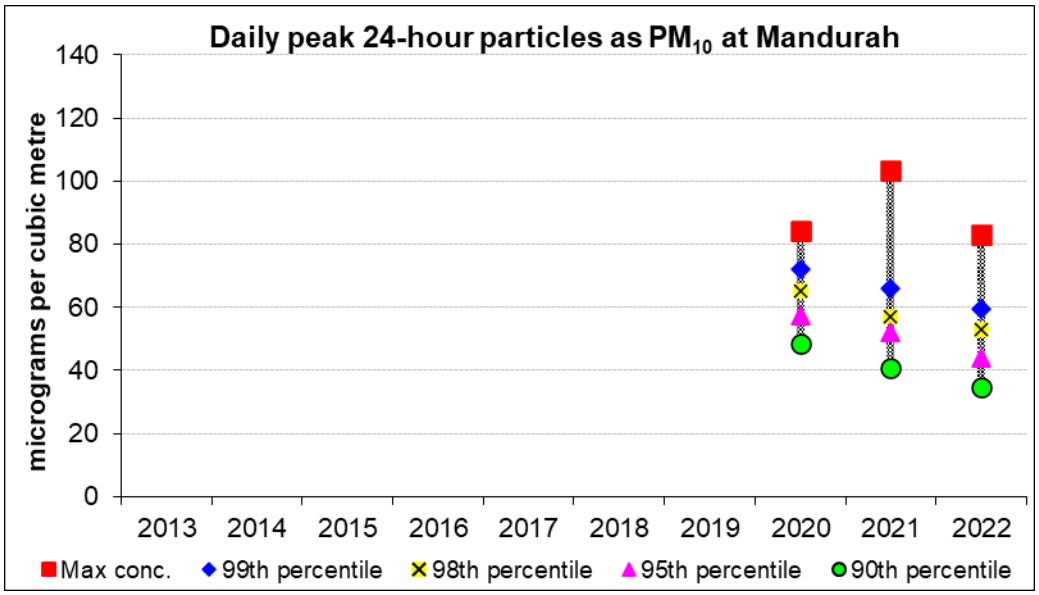


Figure E5-10 1-day PM_{10} at Mandurah

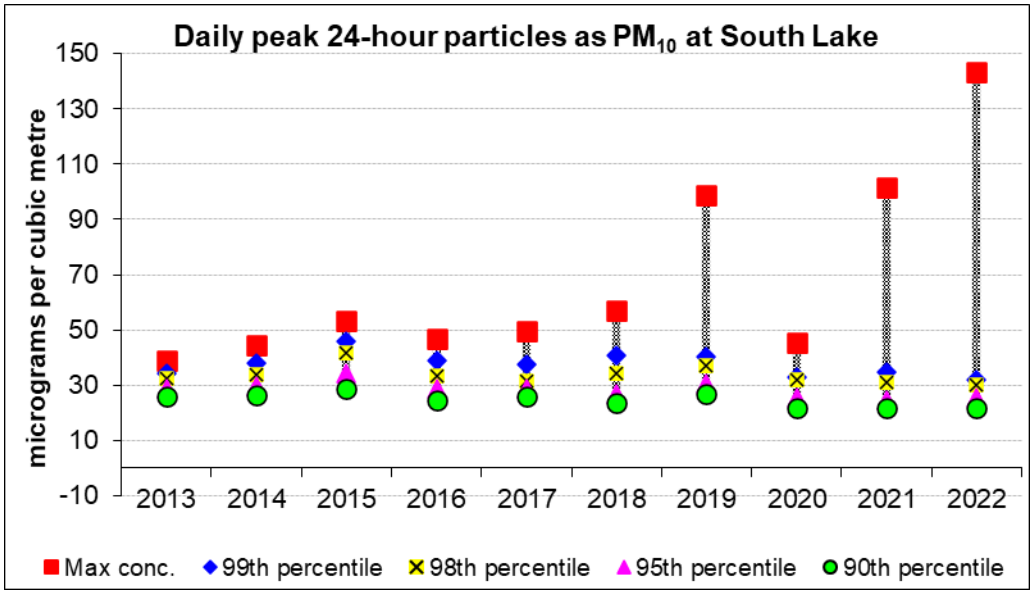


Figure E5-11 1-day PM_{10} at South Lake

E.6 Particles as $PM_{2.5}$

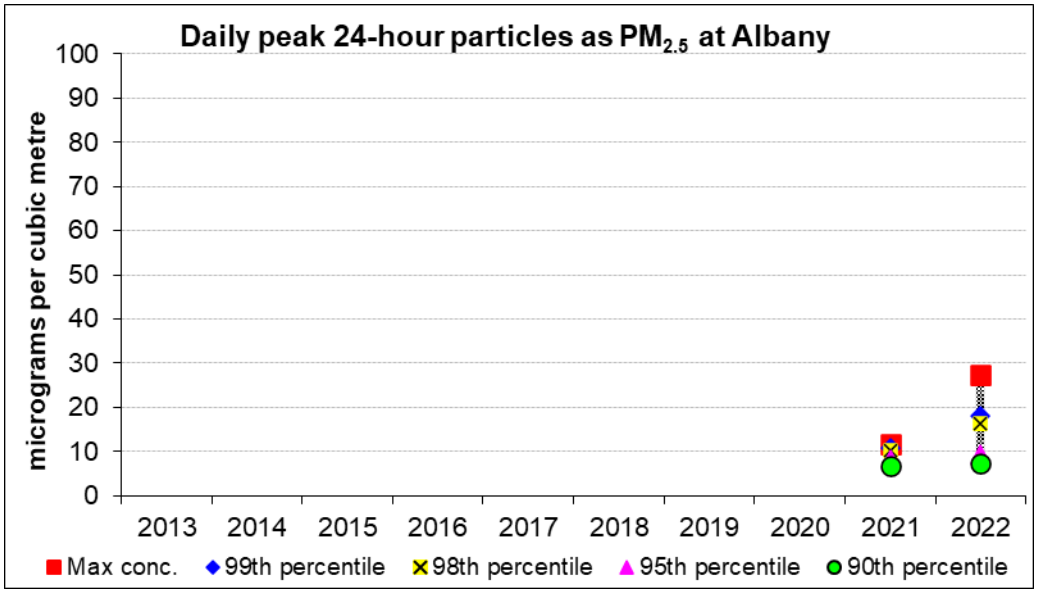


Figure E6-1 1-day $PM_{2.5}$ at Albany

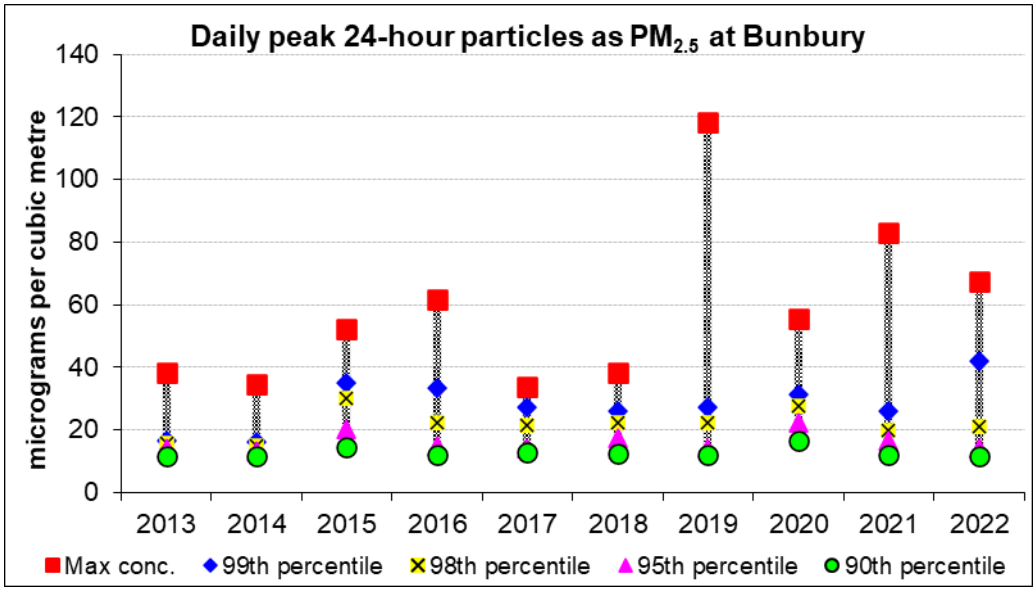


Figure E6-2 1-day $PM_{2.5}$ at Bunbury

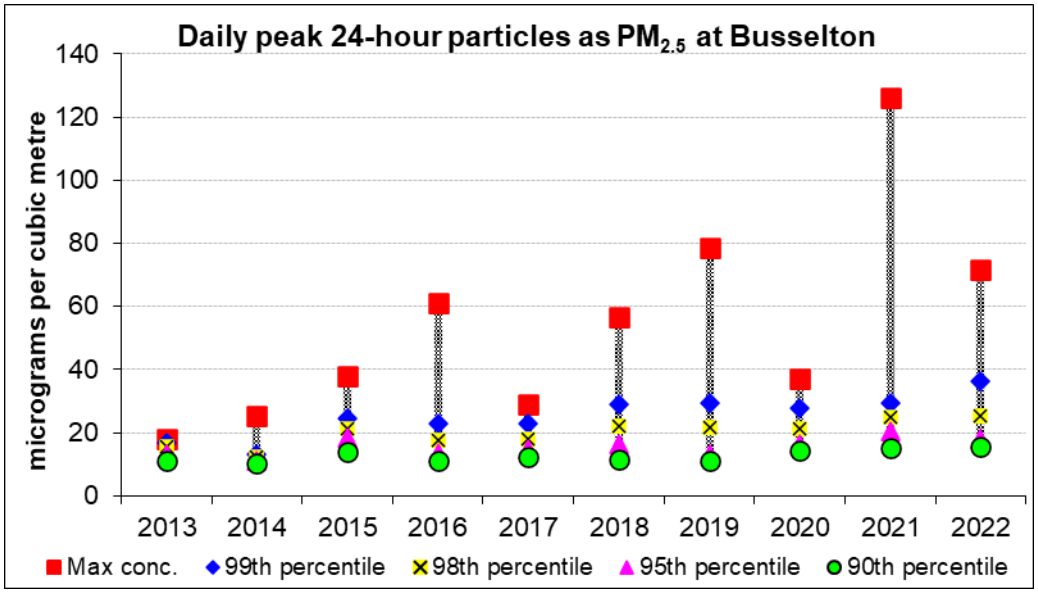


Figure E6-3 1-day $PM_{2.5}$ at Busselton

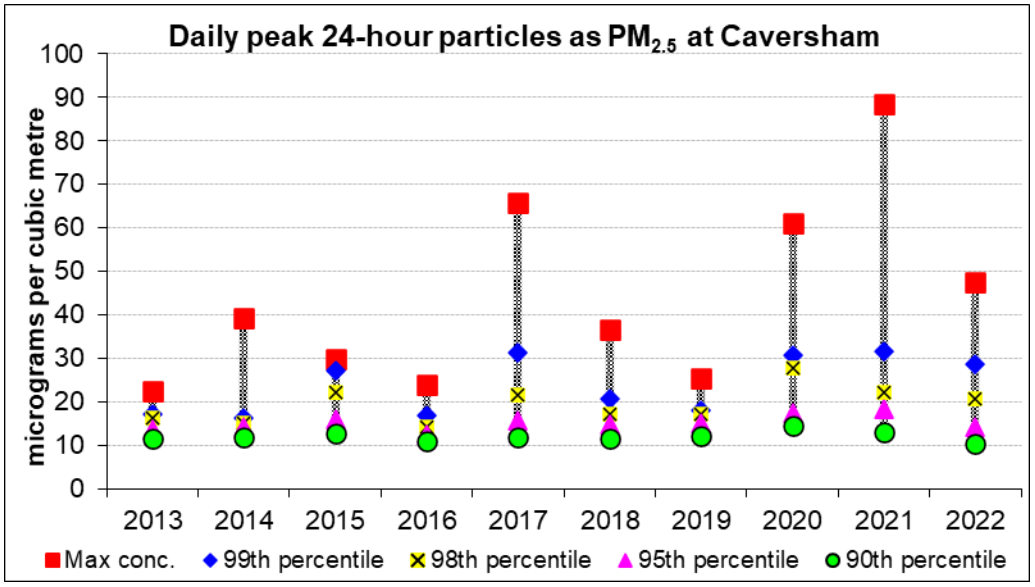


Figure E6-4 1-day $PM_{2.5}$ at Caversham

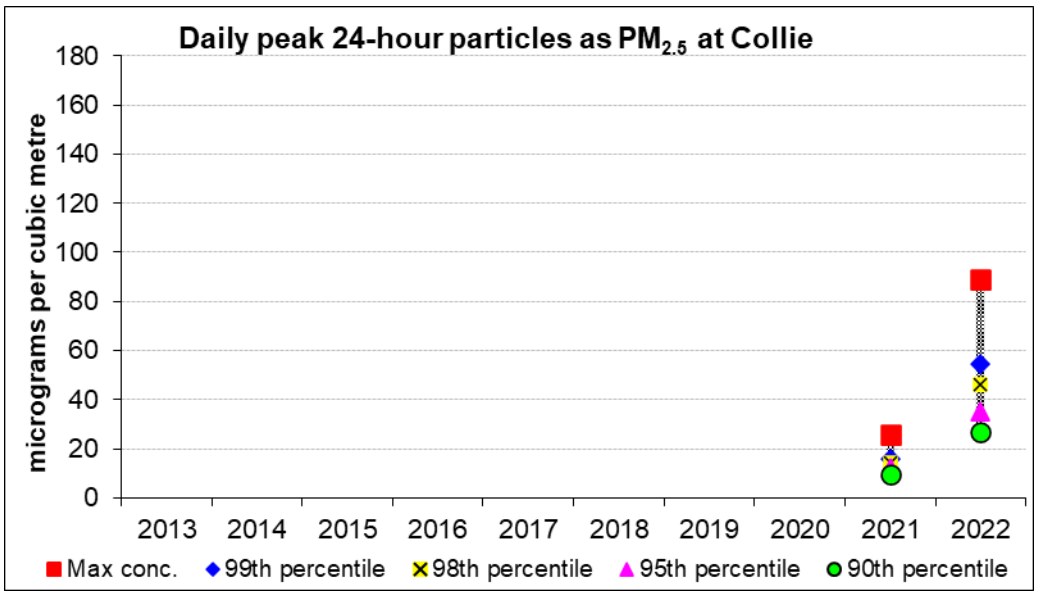


Figure E6-5 1-day $PM_{2.5}$ at Collie

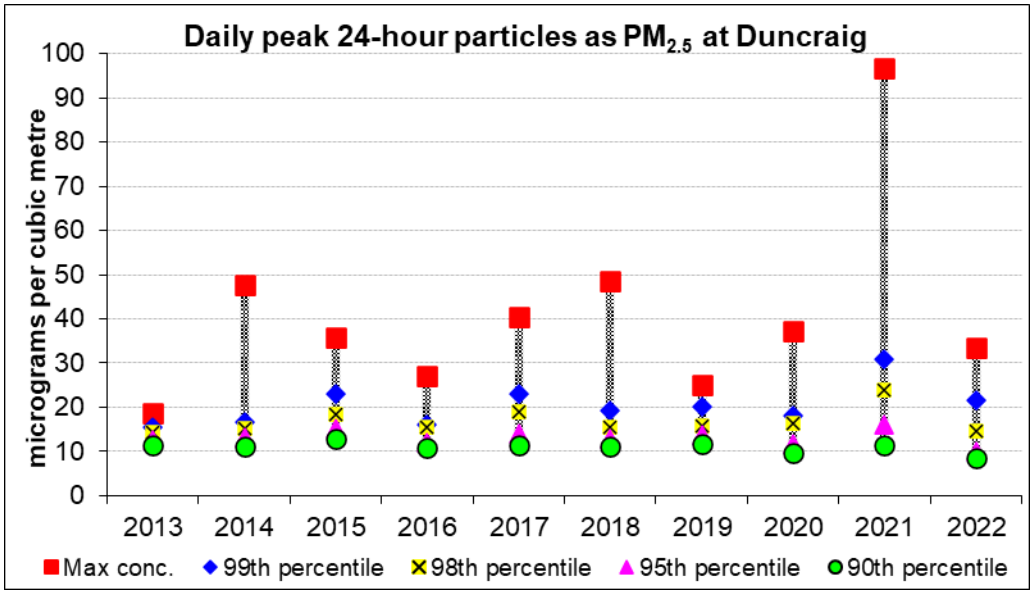


Figure E6-6 1-day $PM_{2.5}$ at Duncraig

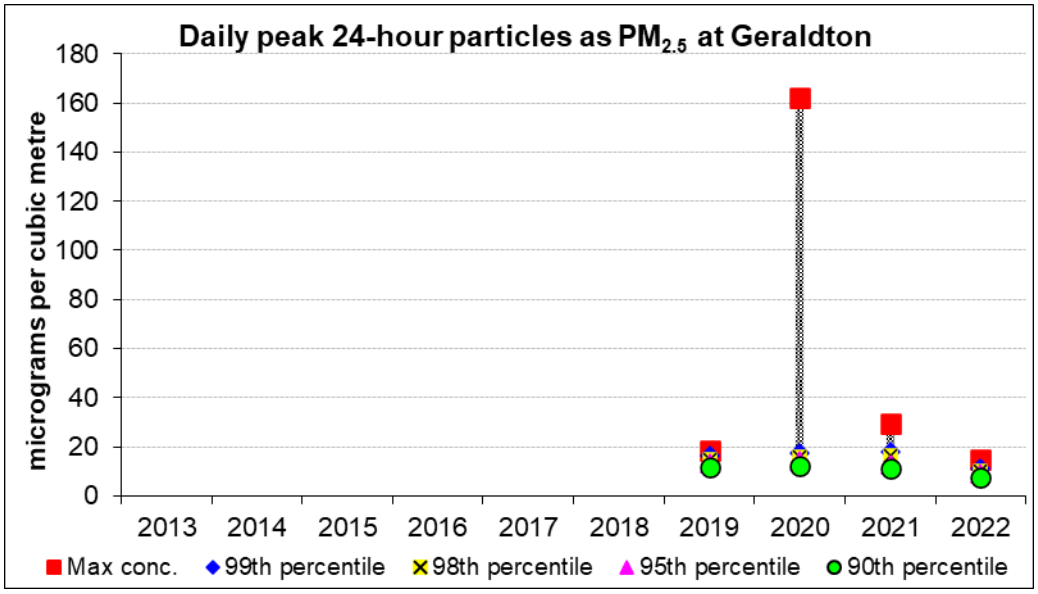


Figure E6-7 1-day $PM_{2.5}$ at Geraldton

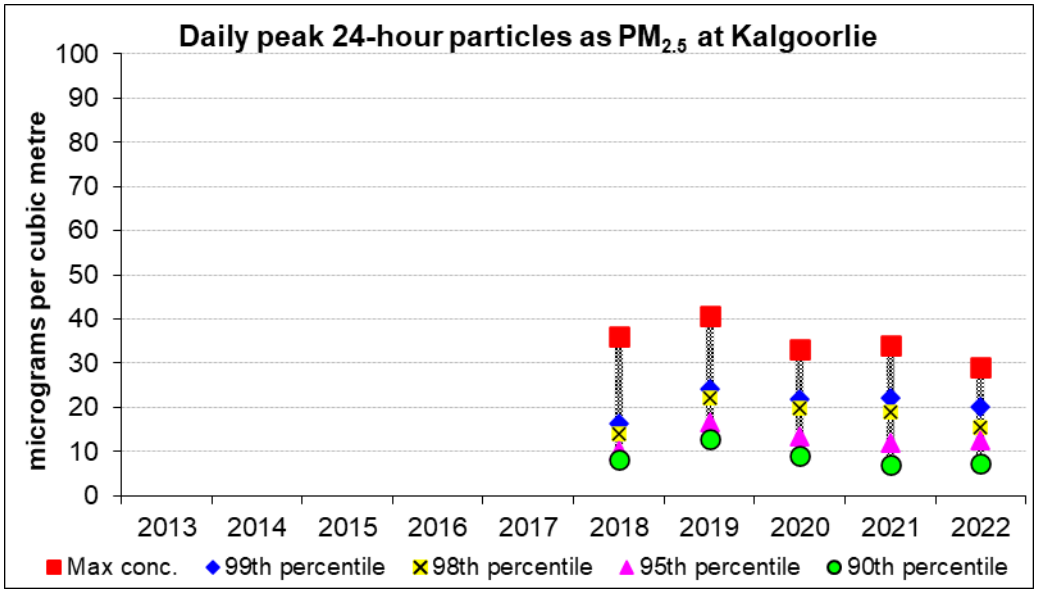


Figure E6-8 1-day $PM_{2.5}$ at Kalgoorlie

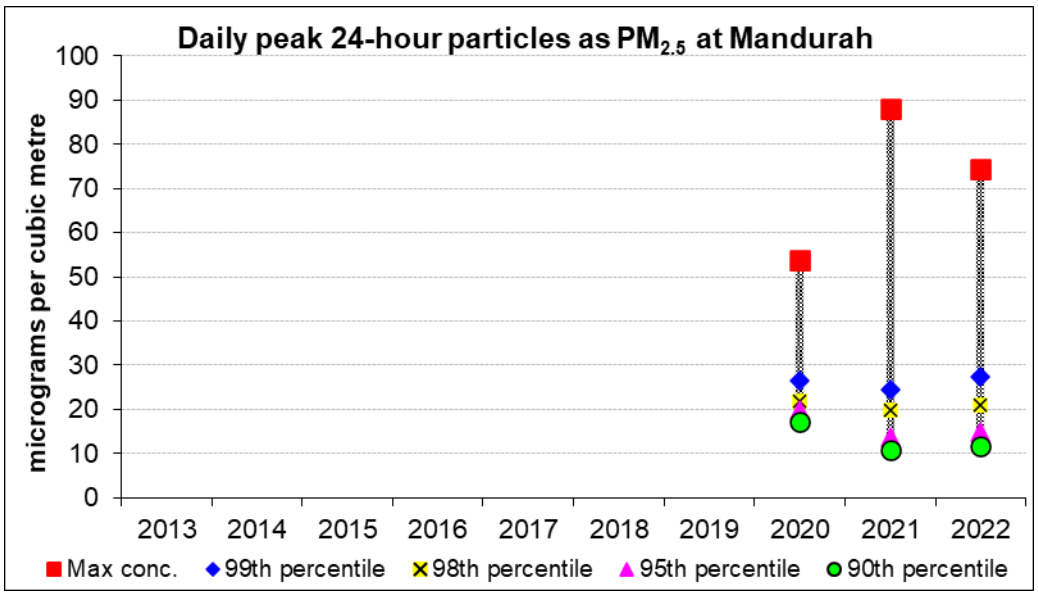


Figure E6-9 1-day $PM_{2.5}$ at Mandurah

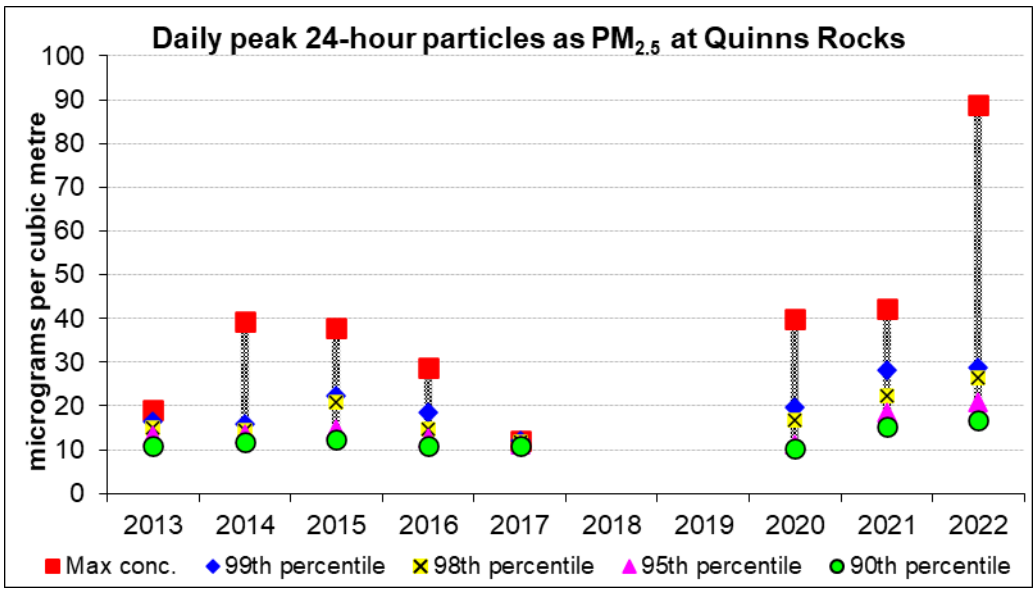


Figure E6-10 1-day $PM_{2.5}$ at Quinns Rocks (2017–19 not included)

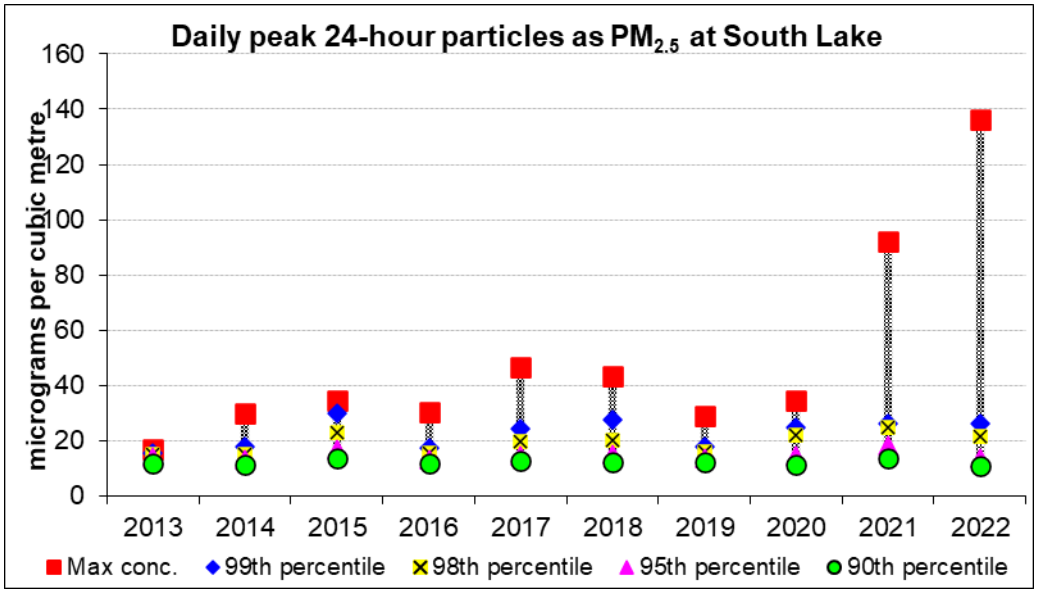


Figure E6-11 1-day $PM_{2.5}$ at South Lake

F. Exceedance analysis

This section contains time-series plots specific to each pollutant exceeding the relevant AAQ NEPM standard during 2022. Each is provided in date order together with information on the specific concentrations reached and possible sources. Where available, a satellite image of the region is included, together with possible sources. Satellite images are obtained from worldview.earthdata.nasa.gov, where available and when cloud cover does not obscure the plume.

Pollutant concentrations are provided for all sites measuring particles together with the ratio of $PM_{2.5}$ to PM_{10}. Where a site does not have valid data available for a particular day, NaN (Not a Number) is displayed for that site. While the plots for each exceedance are displayed as 5-minute or hourly averages, exceedance concentration averages used are:

- Nitrogen dioxide – one clock hour
- Ozone – eight clock hours
- Particles – one calendar day

Assessments for each exceedance can never be exact and are made using a combination of:

- location of any nearby bushfires or prescribed burning activities as provided by the Department of Biodiversity, Conservation and Attractions (DBCA)
- site location and meteorological information (e.g. particle levels at coastal sites are prone to be influenced by marine aerosols during westerly winds and generally have a low $PM_{2.5}$:PM_{10} ratio)
- $PM_{2.5}$:PM_{10} ratios and the shape of the concentration plot (e.g. high $PM_{2.5}$:PM_{10} ratio indicates smoke. High morning and/or evening particle levels during the winter months are generally caused by wood heater smoke whereas in summer it is likely a bushfire)
- satellite images (showing either smoke or red hotspots) and any available eye witness accounts (e.g. while satellite images taken on the exceedance day have been included where available, these may not have been taken at the exact time of the event).

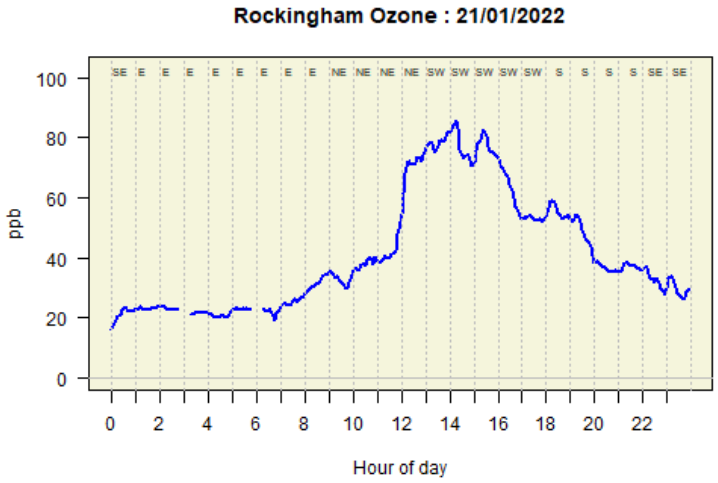
On occasions where there is conflicting information, such as morning and evening particle peaks during winter *and* control burns in the region *and* satellite image of the region showing no smoke, a value judgement is made on the cause of the exceedance.

Where the cause of an exceedance cannot be determined, the exceedance is classified as an Assessable Event.

Abbreviations are used to represent the department's sites. These are:

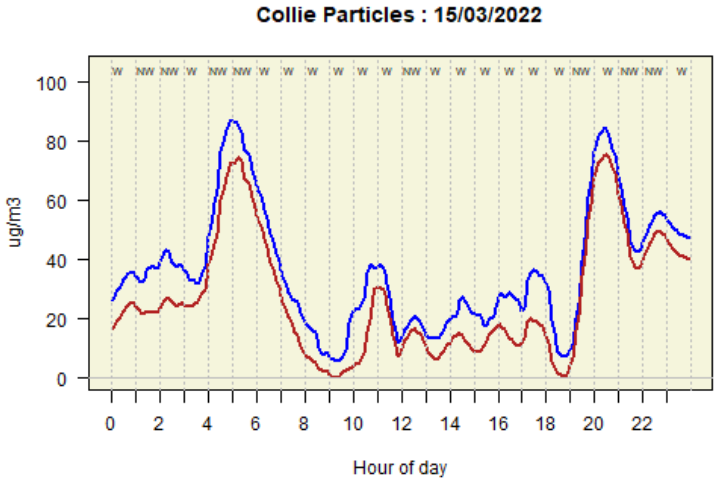
Metropolitan sites	
Ar	Armadale
Ca	Caversham
Du	Duncraig
Ma	Mandurah
QR	Quinns Rocks
Ro	Rockingham
RG	Rolling Green
SL	South Lake
Sw	Swanbourne
Wt	Wattleup

Regional sites	
Al	Albany
Bn	Bunbury
Bs	Busselton
Co	Collie
Ge	Geraldton
Ka	Kalgoorlie



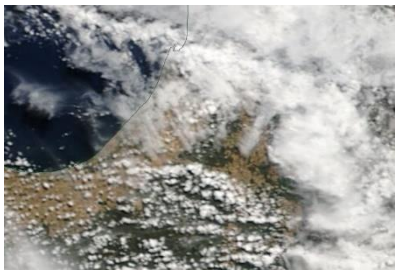
21/01/2022	
SITE	Ozone
Ca	48.7
RG	31.8
QR	59.1
SW	62.1
Ro	65.6
SL	53.8
Ma	49.0

The above ozone exceedance was 65.6 parts per billion averaged over eight hours. Particle concentrations throughout the department network were not elevated. This exceedance therefore has an unknown cause and is classed as an Assessable Event.

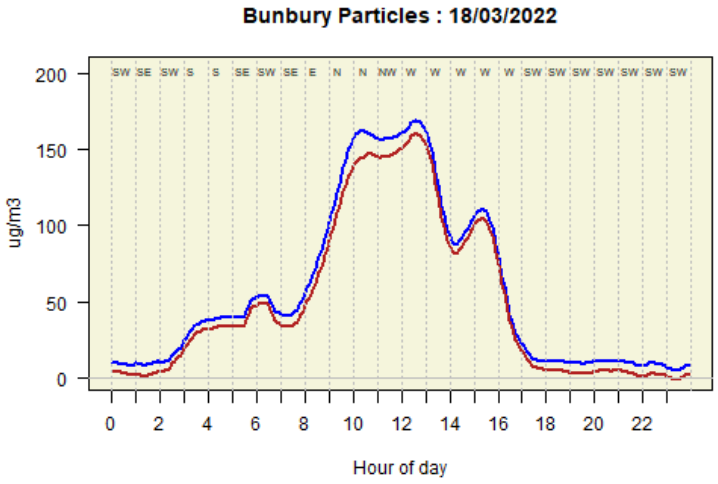


15/03/2022			
SITE	PM10	PM2.5	RATIO
Al	17.6	8.5	0.49
Ar	16.6	7.5	0.45
Bn	12.4	4.8	0.39
Bs	13.5	5.5	0.41
Ca	14.3	7.3	0.51
Co	36.5	26.9	0.74
Du	12.3	5.8	0.48
Ge	13.1	5.8	0.44
Ka	17.0	8.5	0.50
Ma	17.9	7.4	0.41
QR	12.6	5.6	0.45
SL	16.4	8.8	0.54

The above particle exceedance was likely caused by bushfire smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the area.



worldview.earthdata.nasa.gov

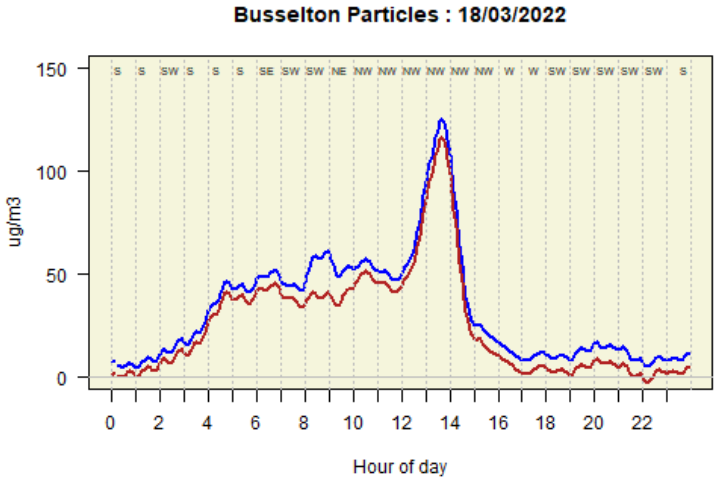


18/03/2022

SITE	PM10	PM2.5	RATIO
Al	14.0	6.1	0.44
Ar	32.7	21.9	0.67
Bn	57.5	50.2	0.87
Bs	32.9	25.7	0.78
Ca	25.7	16.6	0.65
Co	44.0	33.4	0.76
Du	24.5	16.3	0.67
Ge	19.6	5.3	0.27
Ka	14.6	5.1	0.35
Ma	42.9	29.6	0.69
QR	29.0	16.5	0.57
SL	31.5	21.5	0.68

The above particle exceedance was likely caused by bushfire smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the area.

worldview.earthdata.nasa.gov

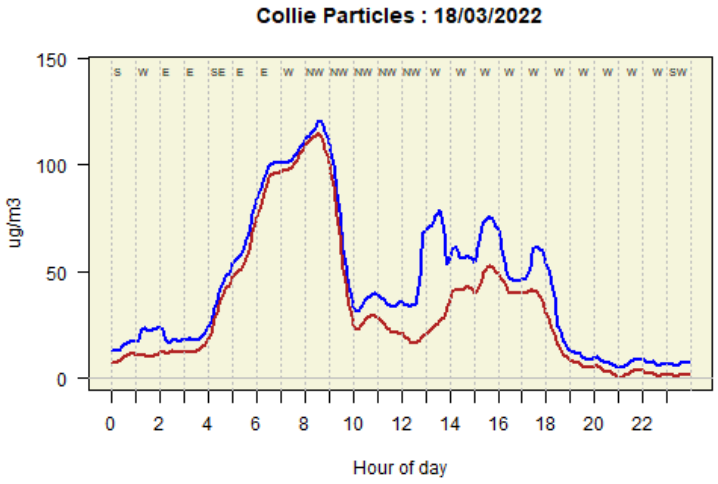


18/03/2022

SITE	PM10	PM2.5	RATIO
Al	14.0	6.1	0.44
Ar	32.7	21.9	0.67
Bn	57.5	50.2	0.87
Bs	32.9	25.7	0.78
Ca	25.7	16.6	0.65
Co	44.0	33.4	0.76
Du	24.5	16.3	0.67
Ge	19.6	5.3	0.27
Ka	14.6	5.1	0.35
Ma	42.9	29.6	0.69
QR	29.0	16.5	0.57
SL	31.5	21.5	0.68

The above particle exceedance was likely caused by bushfire smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the area.

worldview.earthdata.nasa.gov

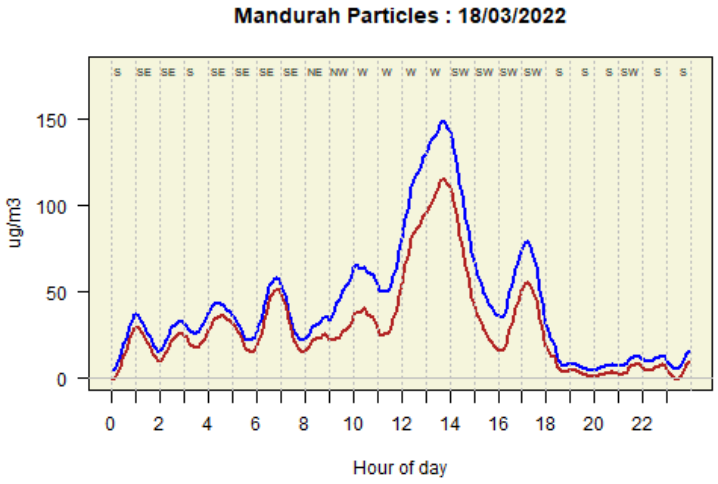


18/03/2022

SITE	PM10	PM2.5	RATIO
Al	14.0	6.1	0.44
Ar	32.7	21.9	0.67
Bn	57.5	50.2	0.87
Bs	32.9	25.7	0.78
Ca	25.7	16.6	0.65
Co	44.0	33.4	0.76
Du	24.5	16.3	0.67
Ge	19.6	5.3	0.27
Ka	14.6	5.1	0.35
Ma	42.9	29.6	0.69
QR	29.0	16.5	0.57
SL	31.5	21.5	0.68

The above particle exceedance was likely caused by bushfire smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the area.

worldview.earthdata.nasa.gov

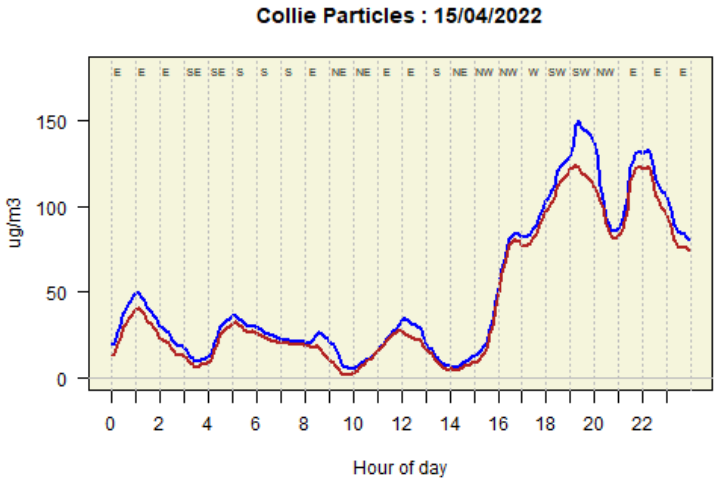


18/03/2022

SITE	PM10	PM2.5	RATIO
Al	14.0	6.1	0.44
Ar	32.7	21.9	0.67
Bn	57.5	50.2	0.87
Bs	32.9	25.7	0.78
Ca	25.7	16.6	0.65
Co	44.0	33.4	0.76
Du	24.5	16.3	0.67
Ge	19.6	5.3	0.27
Ka	14.6	5.1	0.35
Ma	42.9	29.6	0.69
QR	29.0	16.5	0.57
SL	31.5	21.5	0.68

The above particle exceedance was likely caused by bushfire smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the area.

worldview.earthdata.nasa.gov

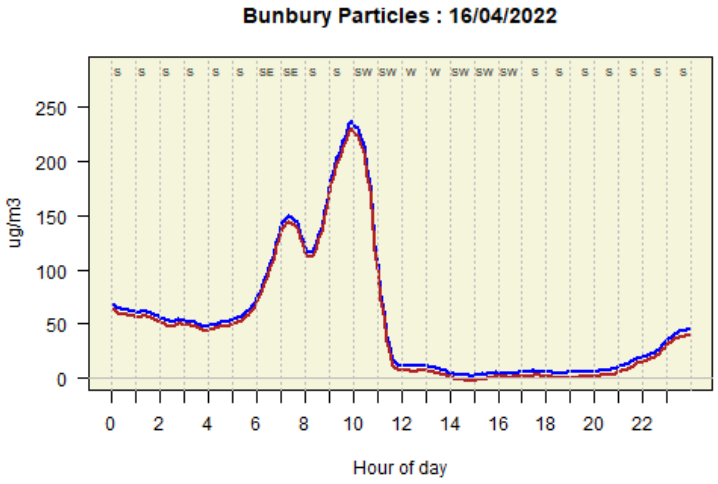


15/04/2022

SITE	PM10	PM2.5	RATIO
Al	11.4	7.9	0.69
Ar	6.2	3.4	0.54
Bn	16.2	12.7	0.78
Bs	25.5	21.9	0.86
Ca	6.4	4.1	0.63
Co	50.5	44.6	0.88
Du	6.5	3.5	0.54
Ge	9.1	4.4	0.48
Ka	4.1	1.5	0.35
Ma	9.5	4.1	0.43
QR	8.5	5.4	0.64
SL	9.6	6.1	0.64

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns 7 km north-east of Collie.

worldview.earthdata.nasa.gov

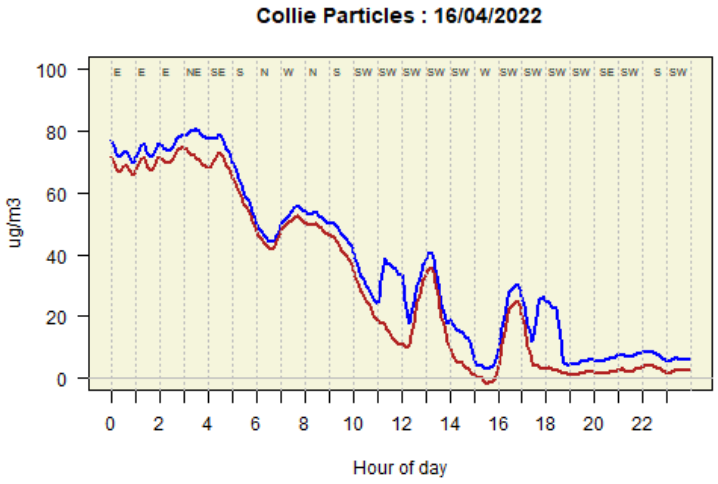


16/04/2022

SITE	PM10	PM2.5	RATIO
Al	9.6	5.3	0.55
Ar	14.7	10.6	0.72
Bn	54.5	49.9	0.92
Bs	16.1	11.7	0.73
Ca	17.2	12.5	0.73
Co	36.5	30.3	0.83
Du	13.0	8.6	0.66
Ge	13.1	6.4	0.49
Ka	11.9	6.0	0.50
Ma	18.6	13.9	0.75
QR	16.1	11.3	0.70
SL	17.8	12.0	0.67

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Bunbury–Busselton townships.

worldview.earthdata.nasa.gov

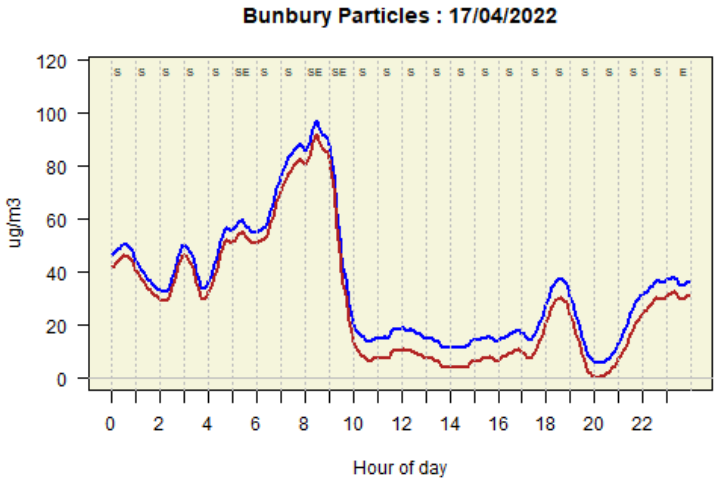


16/04/2022

SITE	PM10	PM2.5	RATIO
Al	9.6	5.3	0.55
Ar	14.7	10.6	0.72
Bn	54.5	49.9	0.92
Bs	16.1	11.7	0.73
Ca	17.2	12.5	0.73
Co	36.5	30.3	0.83
Du	13.0	8.6	0.66
Ge	13.1	6.4	0.49
Ka	11.9	6.0	0.50
Ma	18.6	13.9	0.75
QR	16.1	11.3	0.70
SL	17.8	12.0	0.67

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns 7 km north-east of Collie.

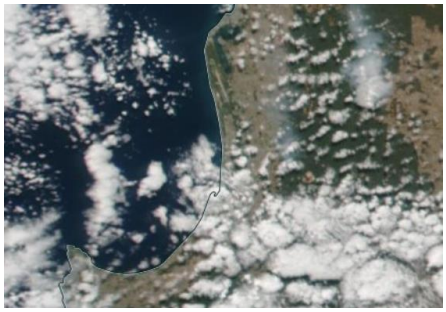
worldview.earthdata.nasa.gov



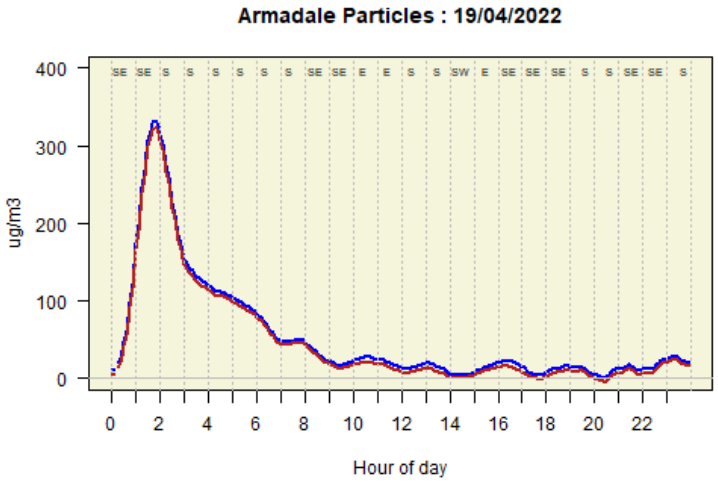
17/04/2022

SITE	PM10	PM2.5	RATIO
Al	8.2	1.7	0.21
Ar	17.5	11.4	0.65
Bn	35.1	29.2	0.83
Bs	14.9	9.8	0.66
Ca	14.6	9.4	0.64
Co	12.9	6.5	0.50
Du	14.3	8.6	0.60
Ge	12.8	5.2	0.40
Ka	8.4	4.7	0.56
Ma	16.2	10.9	0.67
QR	15.0	9.2	0.62
SL	18.2	11.5	0.63

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Bunbury–Busselton townships.



worldview.earthdata.nasa.gov

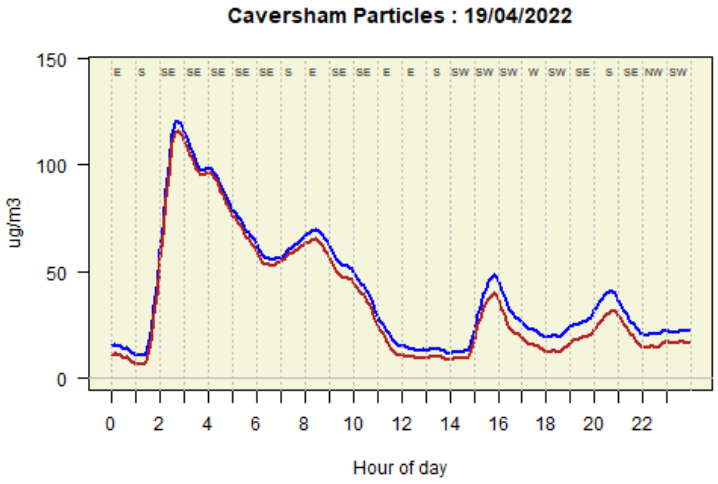


19/04/2022

SITE	PM10	PM2.5	RATIO
Al	5.6	1.5	0.27
Ar	53.7	48.4	0.90
Bn	16.4	11.7	0.71
Bs	10.3	6.9	0.67
Ca	41.7	36.7	0.88
Co	22.8	16.7	0.73
Du	33.7	28.0	0.83
Ge	15.5	6.3	0.40
Ka	9.3	2.8	0.31
Ma	17.5	13.0	0.74
QR	40.8	33.2	0.81
SL	40.6	33.2	0.82

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring.

worldview.earthdata.nasa.gov

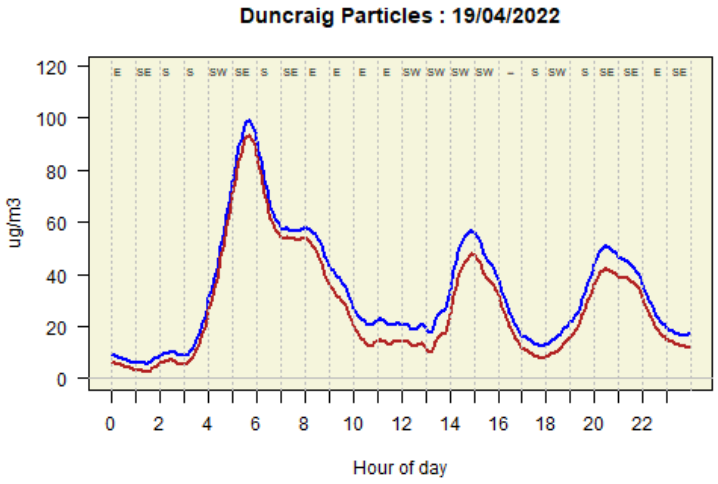


19/04/2022

SITE	PM10	PM2.5	RATIO
Al	5.6	1.5	0.27
Ar	53.7	48.4	0.90
Bn	16.4	11.7	0.71
Bs	10.3	6.9	0.67
Ca	41.7	36.7	0.88
Co	22.8	16.7	0.73
Du	33.7	28.0	0.83
Ge	15.5	6.3	0.40
Ka	9.3	2.8	0.31
Ma	17.5	13.0	0.74
QR	40.8	33.2	0.81
SL	40.6	33.2	0.82

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Wanneroo.

worldview.earthdata.nasa.gov

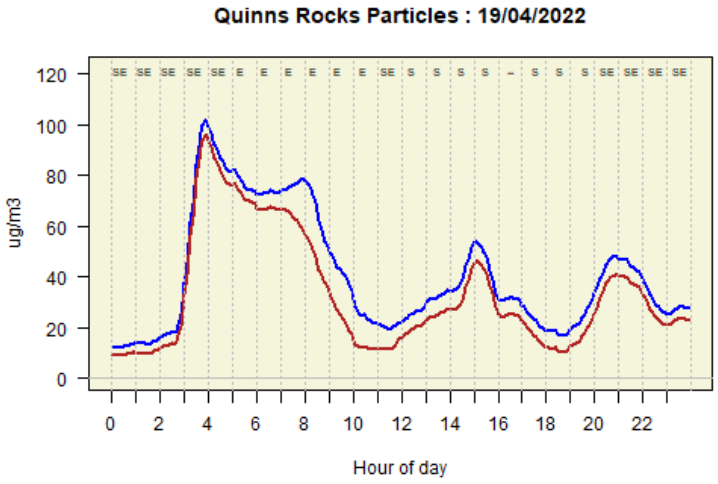


19/04/2022

SITE	PM10	PM2.5	RATIO
Al	5.6	1.5	0.27
Ar	53.7	48.4	0.90
Bn	16.4	11.7	0.71
Bs	10.3	6.9	0.67
Ca	41.7	36.7	0.88
Co	22.8	16.7	0.73
Du	33.7	28.0	0.83
Ge	15.5	6.3	0.40
Ka	9.3	2.8	0.31
Ma	17.5	13.0	0.74
QR	40.8	33.2	0.81
SL	40.6	33.2	0.82

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring and Wanneroo.

worldview.earthdata.nasa.gov

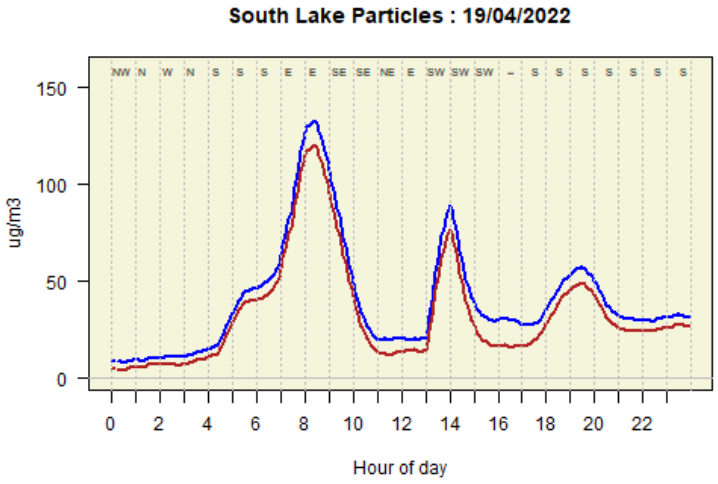


19/04/2022

SITE	PM10	PM2.5	RATIO
Al	5.6	1.5	0.27
Ar	53.7	48.4	0.90
Bn	16.4	11.7	0.71
Bs	10.3	6.9	0.67
Ca	41.7	36.7	0.88
Co	22.8	16.7	0.73
Du	33.7	28.0	0.83
Ge	15.5	6.3	0.40
Ka	9.3	2.8	0.31
Ma	17.5	13.0	0.74
QR	40.8	33.2	0.81
SL	40.6	33.2	0.82

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring and Wanneroo.

worldview.earthdata.nasa.gov

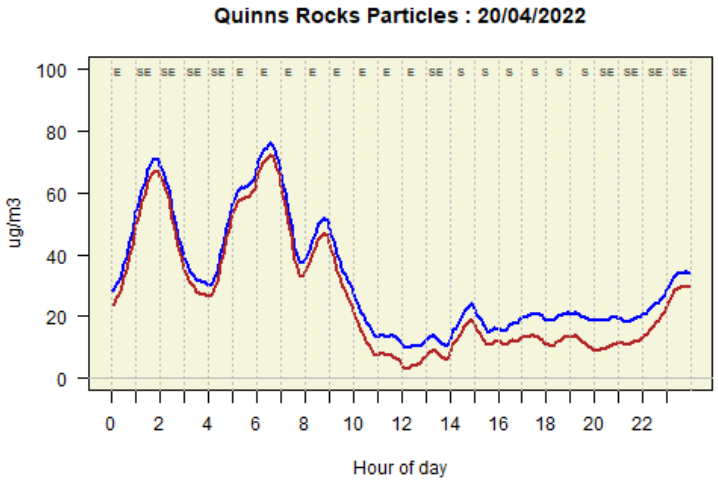


19/04/2022

SITE	PM10	PM2.5	RATIO
Al	5.6	1.5	0.27
Ar	53.7	48.4	0.90
Bn	16.4	11.7	0.71
Bs	10.3	6.9	0.67
Ca	41.7	36.7	0.88
Co	22.8	16.7	0.73
Du	33.7	28.0	0.83
Ge	15.5	6.3	0.40
Ka	9.3	2.8	0.31
Ma	17.5	13.0	0.74
QR	40.8	33.2	0.81
SL	40.6	33.2	0.82

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring and Wanneroo.

worldview.earthdata.nasa.gov



20/04/2022

SITE	PM10	PM2.5	RATIO
Al	3.7	1.0	0.26
Ar	10.7	7.2	0.67
Bn	9.5	5.0	0.53
Bs	16.6	12.8	0.77
Ca	20.3	16.0	0.79
Co	14.2	8.1	0.57
Du	19.4	14.0	0.72
Ge	18.4	5.2	0.28
Ka	5.9	1.7	0.29
Ma	21.5	17.5	0.81
QR	31.8	26.5	0.83
SL	19.6	13.5	0.69

The above particle exceedance was likely caused by local burn smoke and is therefore classed as an Assessable Event. DBCA indicated there were no active burns in the vicinity of the monitoring site.

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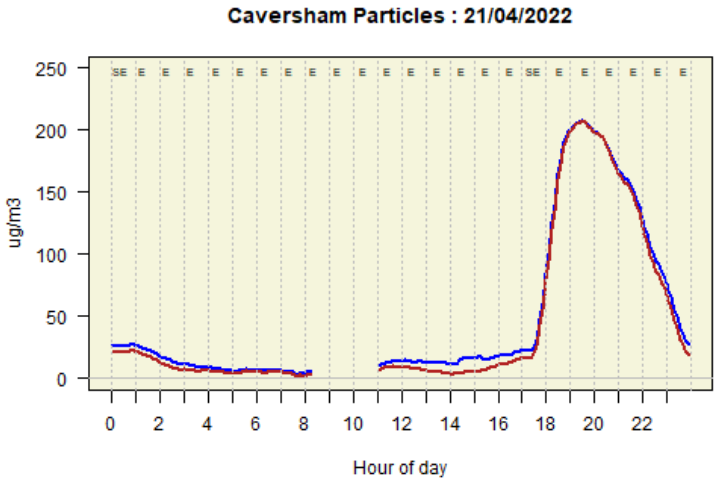
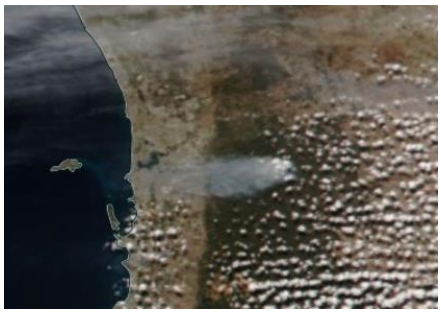


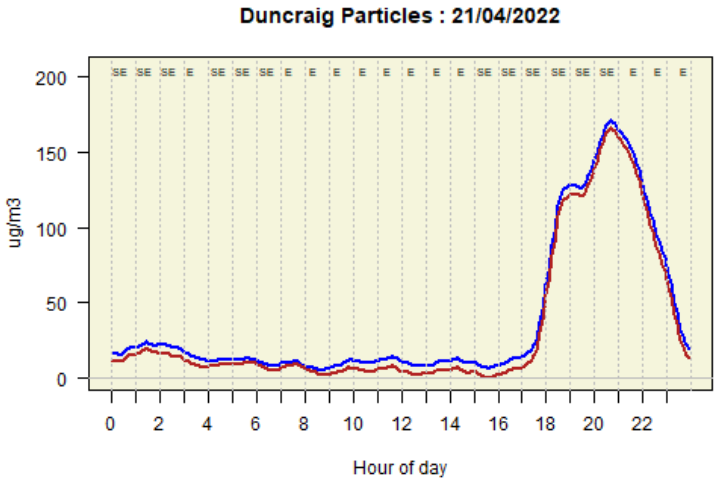
21/04/2022

SITE	PM10	PM2.5	RATIO
Al	4.9	1.6	0.34
Ar	15.2	10.5	0.69
Bn	8.2	3.8	0.47
Bs	28.2	23.9	0.85
Ca	50.3	45.6	0.91
Co	13.2	6.3	0.48
Du	38.7	33.4	0.86
Ge	11.6	2.5	0.22
Ka	4.9	1.4	0.30
Ma	21.2	16.1	0.76
QR	18.5	13.1	0.71
SL	20.0	13.9	0.69

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring.



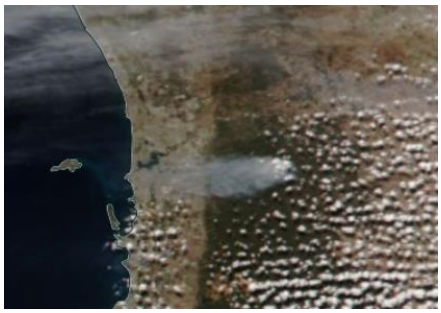
worldview.earthdata.nasa.gov



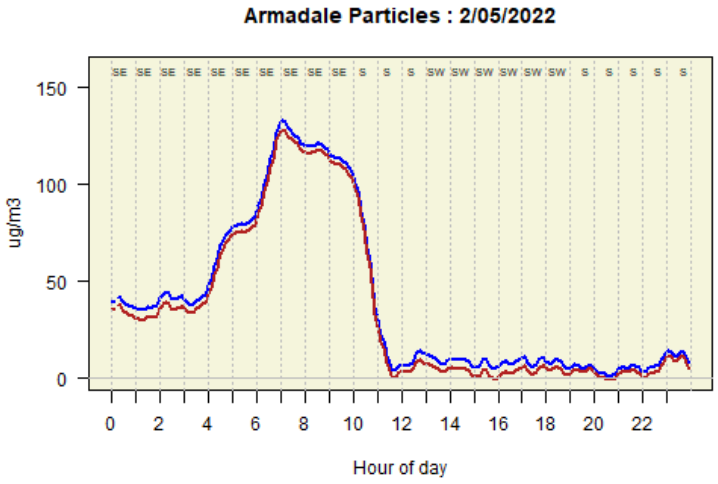
21/04/2022

SITE	PM10	PM2.5	RATIO
Al	4.9	1.6	0.34
Ar	15.2	10.5	0.69
Bn	8.2	3.8	0.47
Bs	28.2	23.9	0.85
Ca	50.3	45.6	0.91
Co	13.2	6.3	0.48
Du	38.7	33.4	0.86
Ge	11.6	2.5	0.22
Ka	4.9	1.4	0.30
Ma	21.2	16.1	0.76
QR	18.5	13.1	0.71
SL	20.0	13.9	0.69

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Mundaring.

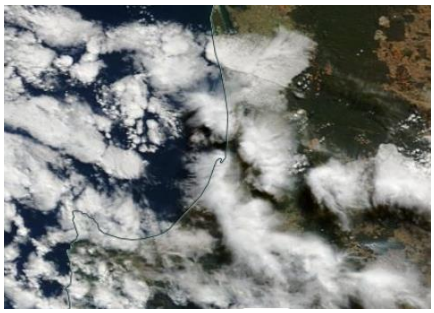


worldview.earthdata.nasa.gov

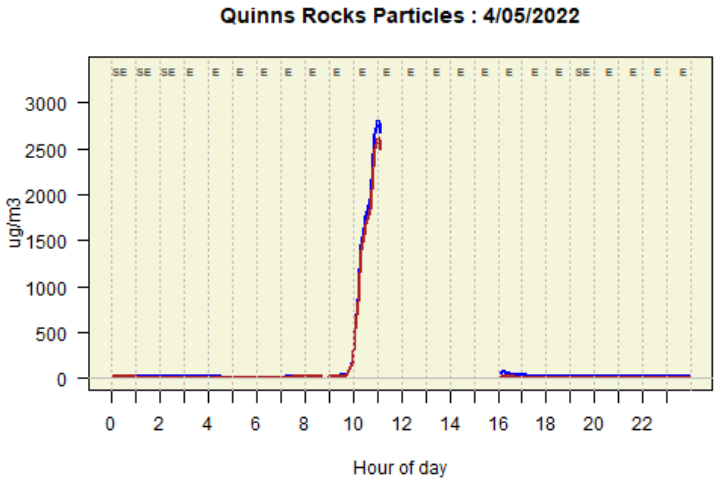


2/05/2022			
SITE	PM10	PM2.5	RATIO
Al	9.9	3.0	0.30
Ar	39.5	35.7	0.90
Bn	14.6	8.8	0.60
Bs	13.1	7.7	0.59
Ca	18.8	14.6	0.78
Co	25.6	18.9	0.74
Du	11.6	8.0	0.69
Ge	15.7	6.4	0.41
Ka	14.7	5.2	0.35
Ma	11.9	4.1	0.35
QR	19.5	15.5	0.79
SL	14.1	9.8	0.70

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Jarrahdale and Harvey.

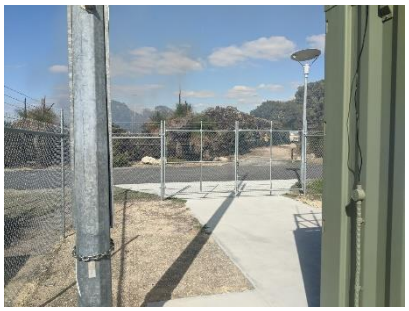


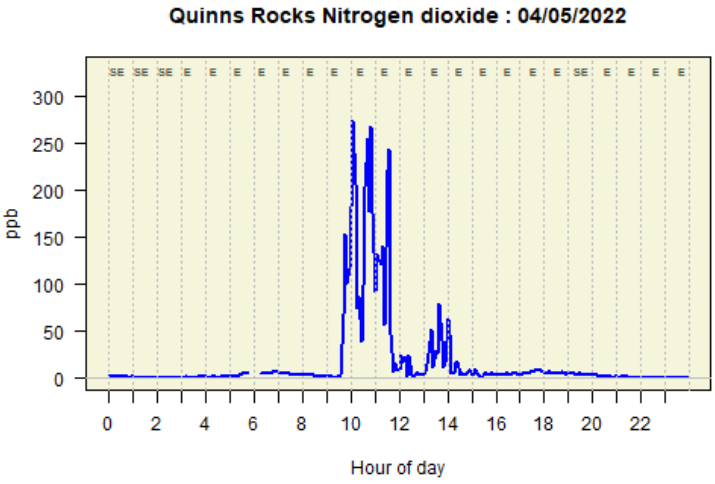
worldview.earthdata.nasa.gov



4/05/2022			
SITE	PM10	PM2.5	RATIO
Al	8.7	2.4	0.27
Ar	15.7	10.4	0.67
Bn	9.6	4.1	0.43
Bs	13.7	8.9	0.65
Ca	9.0	3.1	0.34
Co	13.4	4.5	0.33
Du	8.7	2.3	0.26
Ge	14.8	2.6	0.18
Ka	6.3	1.6	0.26
Ma	7.4	3.1	0.41
QR	137.2	122.3	0.89
SL	18.0	11.8	0.66

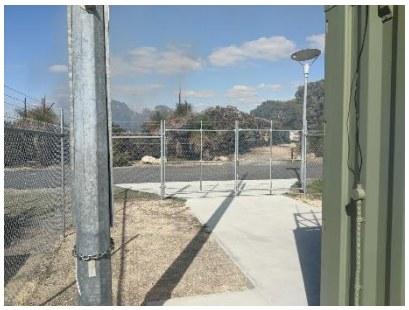
The above particle exceedance was caused by a local burn conducted next to the monitoring station and is therefore classed as an Assessable Event. Particle levels were too high and blocked the filter, which prevented further readings.

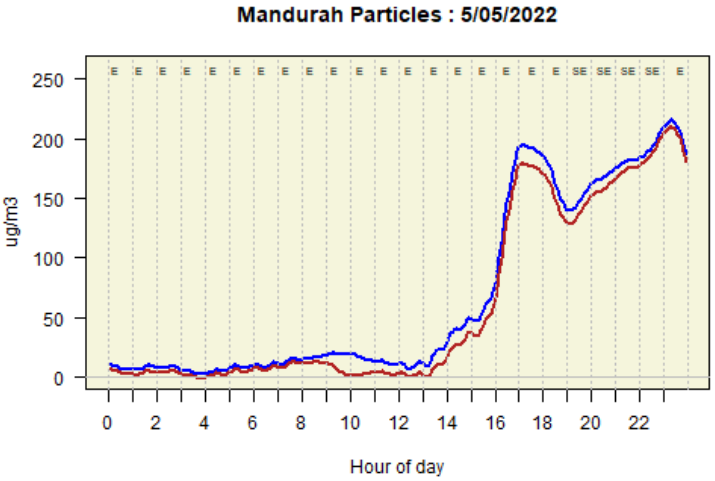




04/05/2022	
SITE	NO2
Ca	3.2
Du	13.3
RG	1.6
QR	170.4
SW	4.7
Ro	17.5
SL	16.3
Ma	3.8

The above nitrogen dioxide exceedance of 170 parts per billion averaged over one hour was caused by a local burn conducted next to the monitoring station and is therefore classed as an Assessable Event.





5/05/2022			
SITE	PM10	PM2.5	RATIO
Al	5.8	1.9	0.33
Ar	10.4	3.7	0.36
Bn	20.7	12.4	0.60
Bs	16.1	7.3	0.46
Ca	11.4	3.8	0.33
Co	16.4	4.8	0.29
Du	9.1	2.2	0.24
Ge	17.6	3.2	0.18
Ka	7.7	1.7	0.22
Ma	68.5	60.5	0.88
QR	18.0	6.8	0.37
SL	14.0	6.3	0.45

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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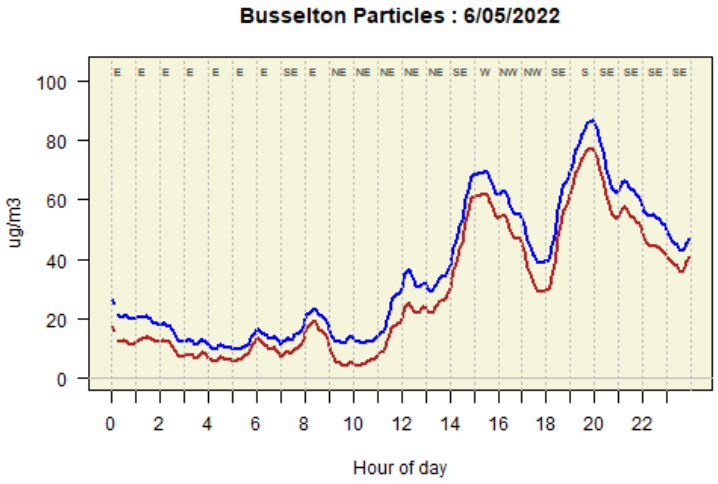
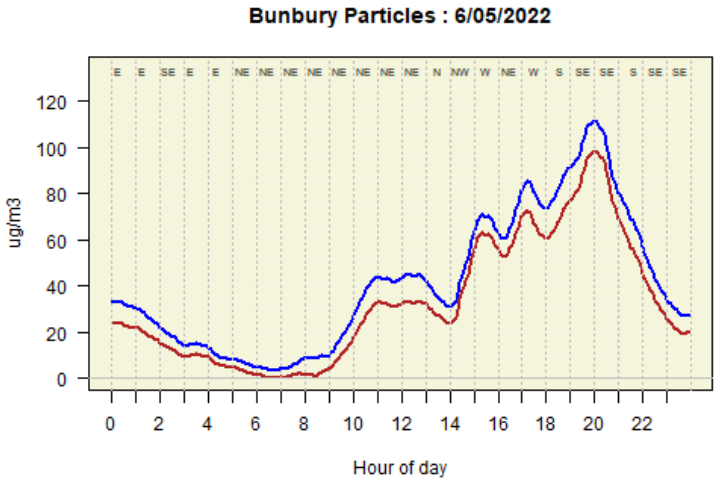


6/05/2022			
SITE	PM10	PM2.5	RATIO
Al	7.6	4.2	0.55
Ar	9.8	3.9	0.40
Bn	41.2	32.7	0.79
Bs	35.4	28.3	0.80
Ca	12.4	6.5	0.52
Co	24.2	15.4	0.64
Du	9.8	4.2	0.43
Ge	12.1	2.2	0.19
Ka	8.5	2.3	0.27
Ma	26.1	19.3	0.74
QR	14.1	7.1	0.51
SL	17.7	11.2	0.63

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

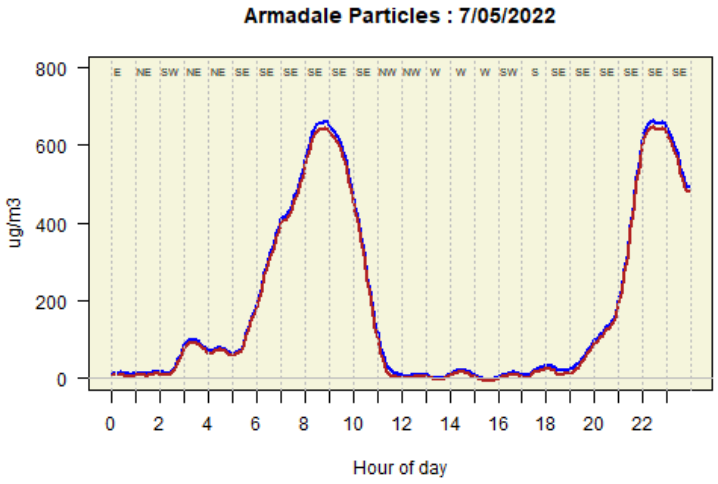
worldview.earthdata.nasa.gov



6/05/2022			
SITE	PM10	PM2.5	RATIO
Al	7.6	4.2	0.55
Ar	9.8	3.9	0.40
Bn	41.2	32.7	0.79
Bs	35.4	28.3	0.80
Ca	12.4	6.5	0.52
Co	24.2	15.4	0.64
Du	9.8	4.2	0.43
Ge	12.1	2.2	0.19
Ka	8.5	2.3	0.27
Ma	26.1	19.3	0.74
QR	14.1	7.1	0.51
SL	17.7	11.2	0.63

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

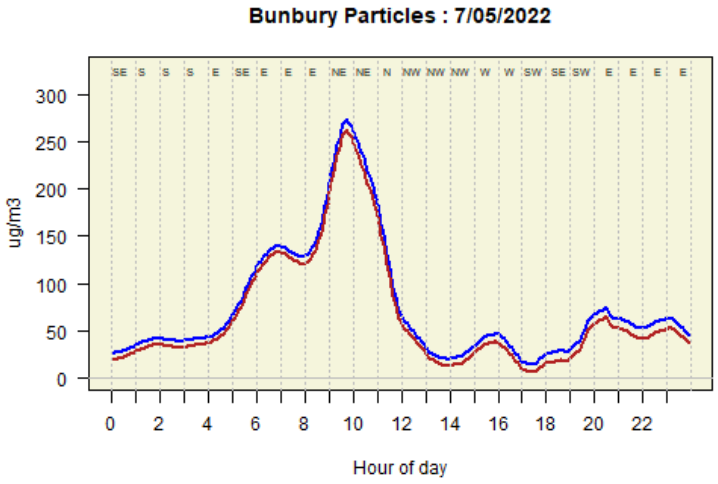
worldview.earthdata.nasa.gov



7/05/2022			
SITE	PM10	PM2.5	RATIO
Al	16.9	11.1	0.66
Ar	189.3	180.7	0.95
Bn	75.9	67.5	0.89
Bs	71.1	62.6	0.88
Ca	20.8	14.3	0.69
Co	105.3	88.9	0.84
Du	12.3	6.4	0.52
Ge	11.6	3.3	0.29
Ka	6.9	2.1	0.30
Ma	37.3	20.7	0.56
QR	10.8	4.1	0.38
SL	22.1	15.9	0.72

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there was an active burn in Karragullen.

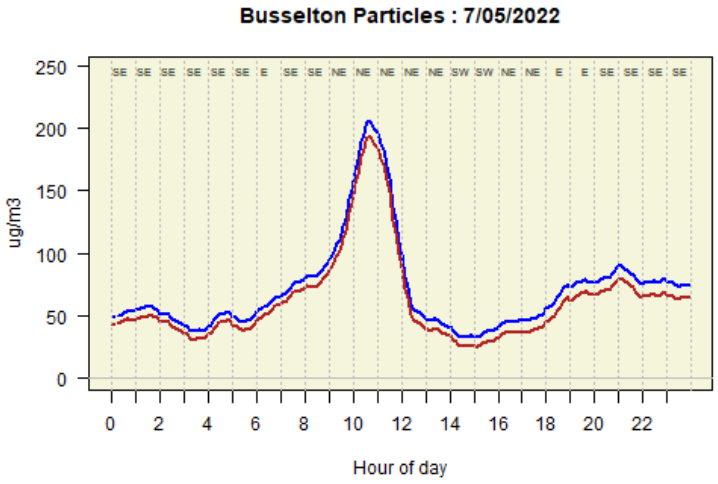
worldview.earthdata.nasa.gov



7/05/2022			
SITE	PM10	PM2.5	RATIO
Al	16.9	11.1	0.66
Ar	189.3	180.7	0.95
Bn	75.9	67.5	0.89
Bs	71.1	62.6	0.88
Ca	20.8	14.3	0.69
Co	105.3	88.9	0.84
Du	12.3	6.4	0.52
Ge	11.6	3.3	0.29
Ka	6.9	2.1	0.30
Ma	37.3	20.7	0.56
QR	10.8	4.1	0.38
SL	22.1	15.9	0.72

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

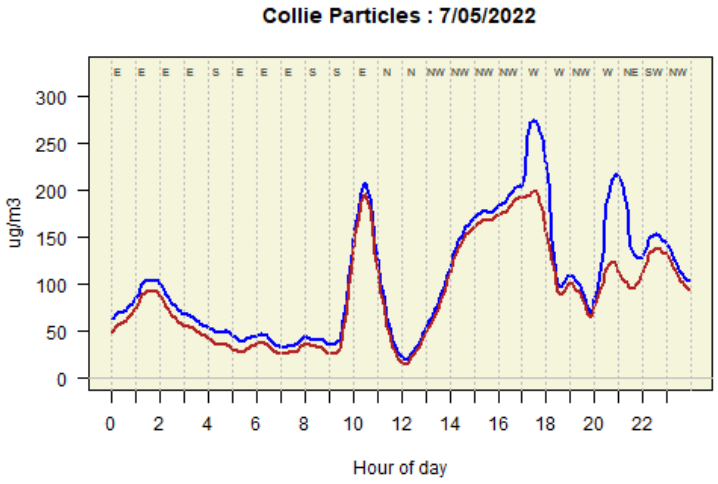


7/05/2022

SITE	PM10	PM2.5	RATIO
Al	16.9	11.1	0.66
Ar	189.3	180.7	0.95
Bn	75.9	67.5	0.89
Bs	71.1	62.6	0.88
Ca	20.8	14.3	0.69
Co	105.3	88.9	0.84
Du	12.3	6.4	0.52
Ge	11.6	3.3	0.29
Ka	6.9	2.1	0.30
Ma	37.3	20.7	0.56
QR	10.8	4.1	0.38
SL	22.1	15.9	0.72

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

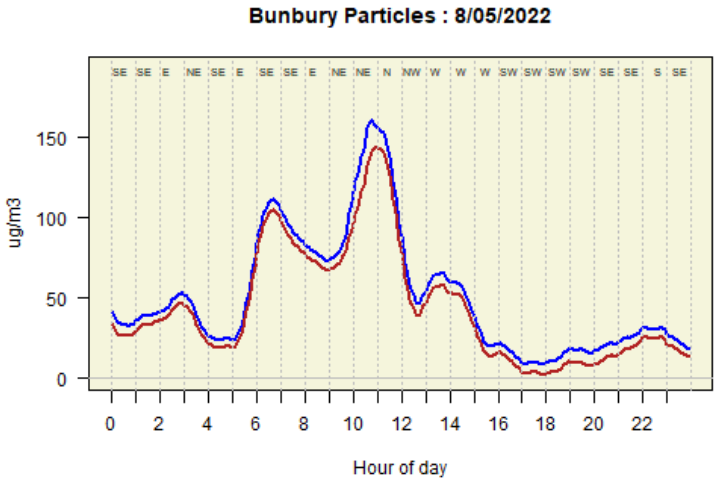


7/05/2022

SITE	PM10	PM2.5	RATIO
Al	16.9	11.1	0.66
Ar	189.3	180.7	0.95
Bn	75.9	67.5	0.89
Bs	71.1	62.6	0.88
Ca	20.8	14.3	0.69
Co	105.3	88.9	0.84
Du	12.3	6.4	0.52
Ge	11.6	3.3	0.29
Ka	6.9	2.1	0.30
Ma	37.3	20.7	0.56
QR	10.8	4.1	0.38
SL	22.1	15.9	0.72

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

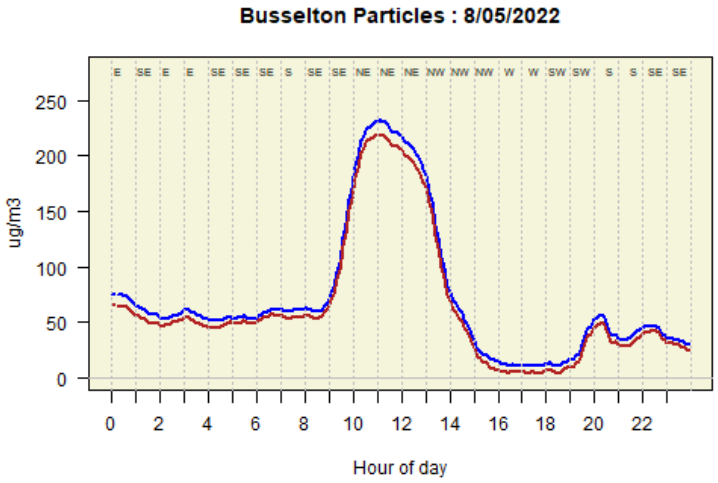
worldview.earthdata.nasa.gov



8/05/2022			
SITE	PM10	PM2.5	RATIO
Al	25.5	18.9	0.74
Ar	NA	NA	
Bn	51.0	43.7	0.86
Bs	72.6	65.4	0.90
Ca	28.1	22.3	0.79
Co	72.0	65.1	0.90
Du	27.8	23.1	0.83
Ge	14.2	4.7	0.33
Ka	12.8	3.8	0.30
Ma	72.4	60.7	0.84
QR	23.4	16.6	0.71
SL	143.5	136.1	0.95

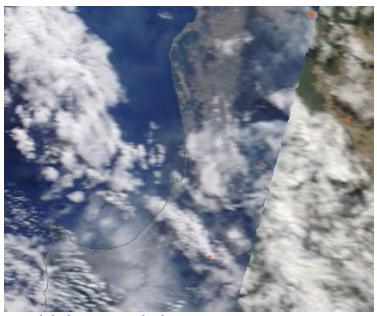
The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

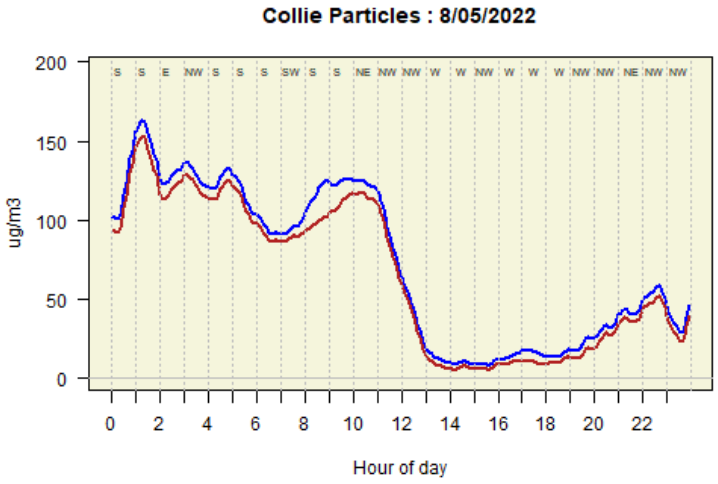


8/05/2022			
SITE	PM10	PM2.5	RATIO
Al	25.5	18.9	0.74
Ar	NA	NA	
Bn	51.0	43.7	0.86
Bs	72.6	65.4	0.90
Ca	28.1	22.3	0.79
Co	72.0	65.1	0.90
Du	27.8	23.1	0.83
Ge	14.2	4.7	0.33
Ka	12.8	3.8	0.30
Ma	72.4	60.7	0.84
QR	23.4	16.6	0.71
SL	143.5	136.1	0.95

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.



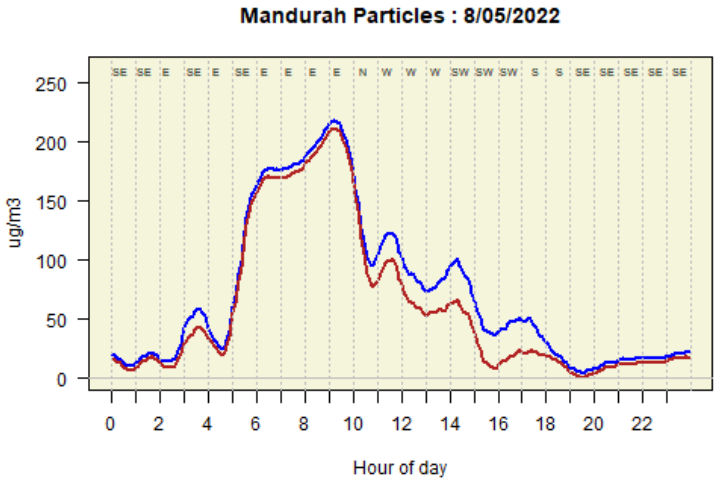
worldview.earthdata.nasa.gov



8/05/2022			
SITE	PM10	PM2.5	RATIO
Al	25.5	18.9	0.74
Ar	NA	NA	
Bn	51.0	43.7	0.86
Bs	72.6	65.4	0.90
Ca	28.1	22.3	0.79
Co	72.0	65.1	0.90
Du	27.8	23.1	0.83
Ge	14.2	4.7	0.33
Ka	12.8	3.8	0.30
Ma	72.4	60.7	0.84
QR	23.4	16.6	0.71
SL	143.5	136.1	0.95

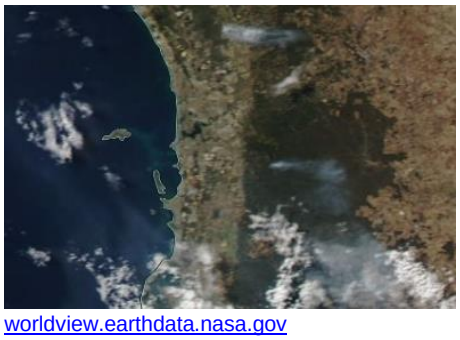
The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

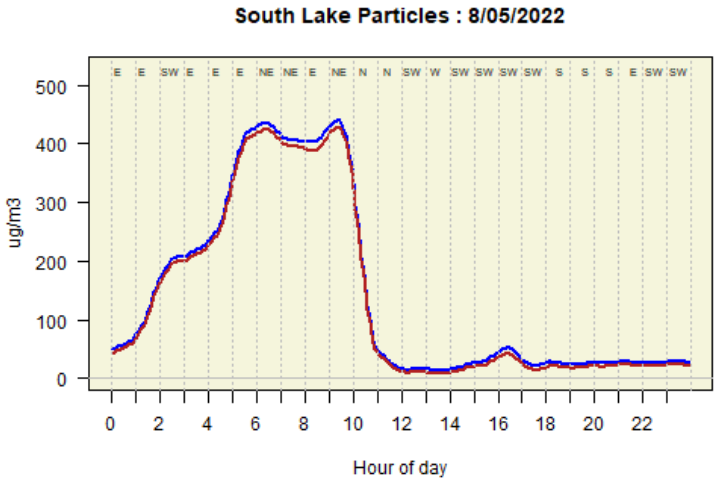


8/05/2022			
SITE	PM10	PM2.5	RATIO
Al	25.5	18.9	0.74
Ar	NA	NA	
Bn	51.0	43.7	0.86
Bs	72.6	65.4	0.90
Ca	28.1	22.3	0.79
Co	72.0	65.1	0.90
Du	27.8	23.1	0.83
Ge	14.2	4.7	0.33
Ka	12.8	3.8	0.30
Ma	72.4	60.7	0.84
QR	23.4	16.6	0.71
SL	143.5	136.1	0.95

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.



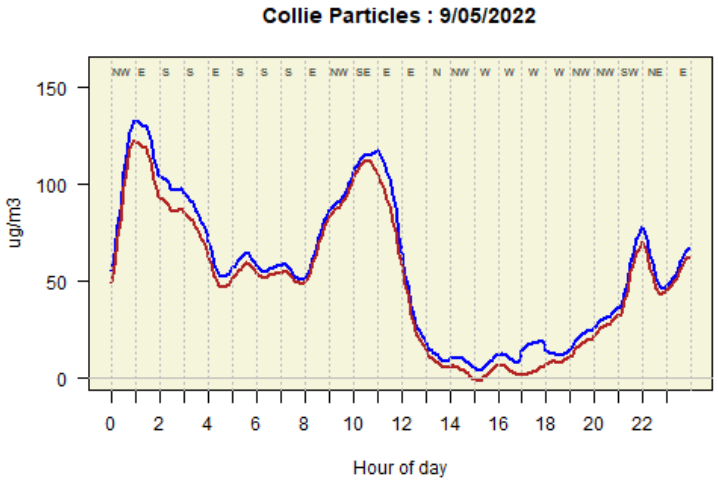
worldview.earthdata.nasa.gov



8/05/2022			
SITE	PM10	PM2.5	RATIO
Al	25.5	18.9	0.74
Ar	NA	NA	
Bn	51.0	43.7	0.86
Bs	72.6	65.4	0.90
Ca	28.1	22.3	0.79
Co	72.0	65.1	0.90
Du	27.8	23.1	0.83
Ge	14.2	4.7	0.33
Ka	12.8	3.8	0.30
Ma	72.4	60.7	0.84
QR	23.4	16.6	0.71
SL	143.5	136.1	0.95

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

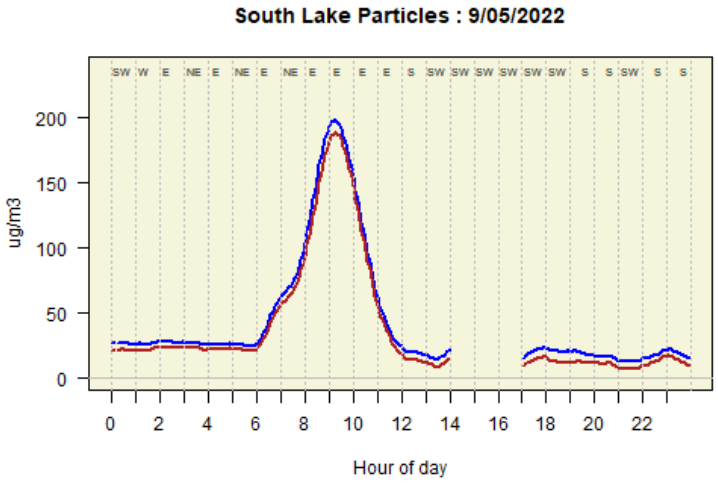
worldview.earthdata.nasa.gov



9/05/2022			
SITE	PM10	PM2.5	RATIO
Al	18.1	13.0	0.72
Ar	NA	NA	
Bn	16.7	11.0	0.65
Bs	16.3	12.1	0.74
Ca	25.1	20.4	0.81
Co	56.0	50.0	0.89
Du	19.1	14.7	0.77
Ge	25.0	11.3	0.45
Ka	15.6	2.7	0.17
Ma	32.4	22.7	0.70
QR	18.3	10.4	0.57
SL	44.2	38.3	0.87

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

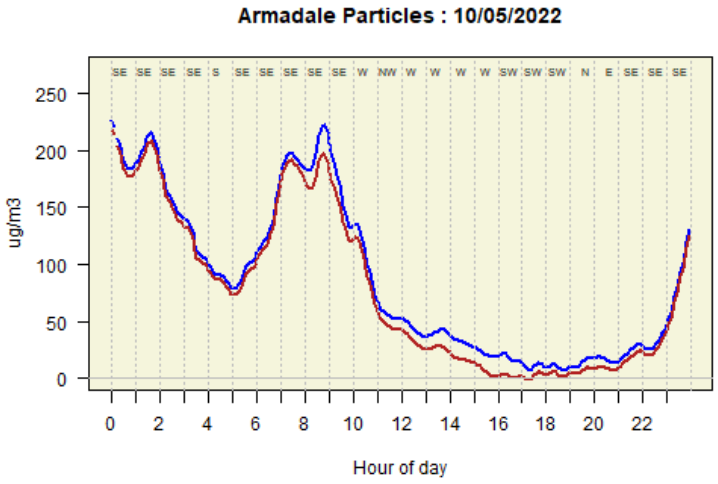


9/05/2022

SITE	PM10	PM2.5	RATIO
Al	18.1	13.0	0.72
Ar	NA	NA	
Bn	16.7	11.0	0.65
Bs	16.3	12.1	0.74
Ca	25.1	20.4	0.81
Co	56.0	50.0	0.89
Du	19.1	14.7	0.77
Ge	25.0	11.3	0.45
Ka	15.6	2.7	0.17
Ma	32.4	22.7	0.70
QR	18.3	10.4	0.57
SL	44.2	38.3	0.87

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

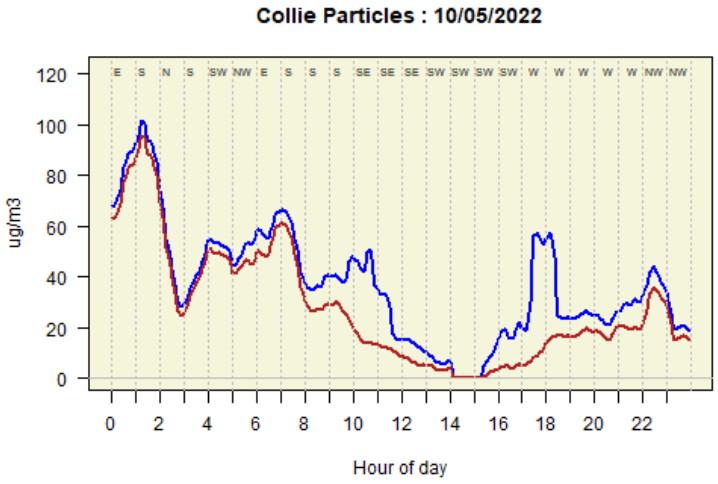


10/05/2022

SITE	PM10	PM2.5	RATIO
Al	28.5	17.6	0.62
Ar	85.6	76.3	0.89
Bn	15.4	10.2	0.66
Bs	23.9	15.0	0.63
Ca	28.8	20.8	0.72
Co	37.0	27.7	0.75
Du	24.1	19.2	0.79
Ge	19.2	6.9	0.36
Ka	10.6	2.2	0.21
Ma	24.8	16.4	0.66
QR	23.1	15.1	0.65
SL	28.7	21.8	0.76

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov

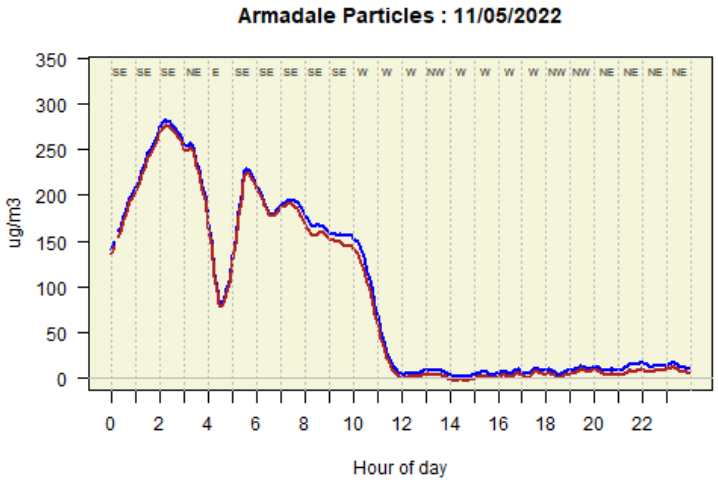


10/05/2022

SITE	PM10	PM2.5	RATIO
Al	28.5	17.6	0.62
Ar	85.6	76.3	0.89
Bn	15.4	10.2	0.66
Bs	23.9	15.0	0.63
Ca	28.8	20.8	0.72
Co	37.0	27.7	0.75
Du	24.1	19.2	0.79
Ge	19.2	6.9	0.36
Ka	10.6	2.2	0.21
Ma	24.8	16.4	0.66
QR	23.1	15.1	0.65
SL	28.7	21.8	0.76

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

worldview.earthdata.nasa.gov



11/05/2022

SITE	PM10	PM2.5	RATIO
Al	22.3	15.6	0.70
Ar	91.4	86.1	0.94
Bn	13.5	7.6	0.56
Bs	19.0	14.3	0.75
Ca	13.4	8.5	0.63
Co	38.4	31.1	0.81
Du	8.3	4.6	0.56
Ge	15.7	5.7	0.37
Ka	7.7	1.9	0.24
Ma	31.8	6.7	0.21
QR	10.2	6.4	0.62
SL	17.8	13.2	0.74

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

SATELLITE IMAGE OBSCURED BY CLOUD

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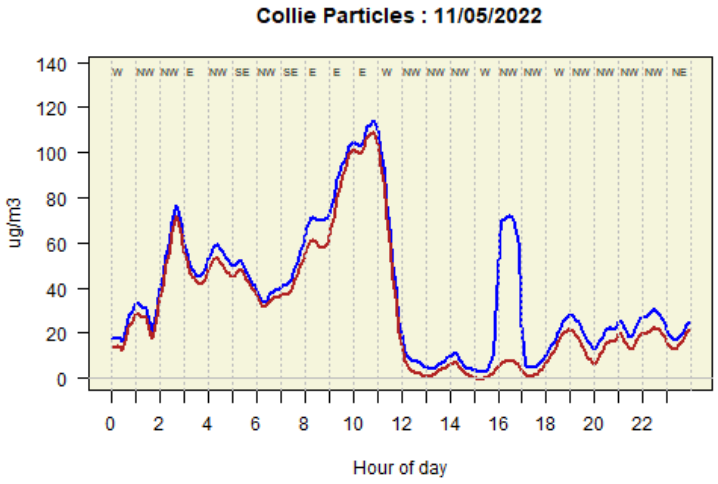

11/05/2022

SITE	PM10	PM2.5	RATIO
Al	22.3	15.6	0.70
Ar	91.4	86.1	0.94
Bn	13.5	7.6	0.56
Bs	19.0	14.3	0.75
Ca	13.4	8.5	0.63
Co	38.4	31.1	0.81
Du	8.3	4.6	0.56
Ge	15.7	5.7	0.37
Ka	7.7	1.9	0.24
Ma	31.8	6.7	0.21
QR	10.2	6.4	0.62
SL	17.8	13.2	0.74

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

SATELLITE IMAGE OBSCURED BY CLOUD

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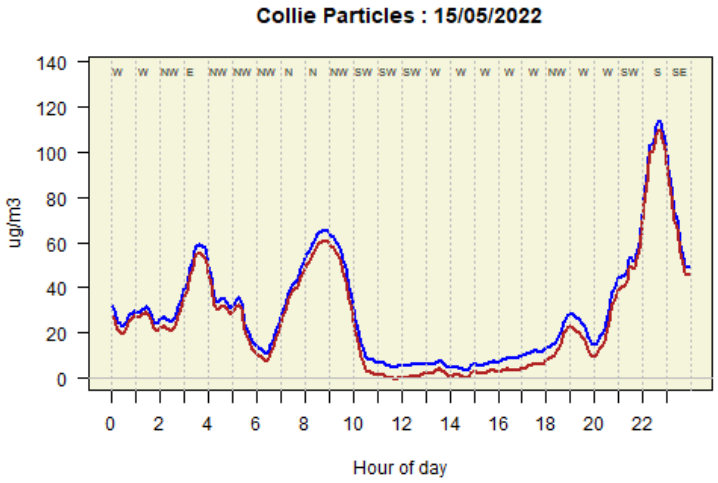

15/05/2022

SITE	PM10	PM2.5	RATIO
Al	8.9	3.8	0.43
Ar	16.3	10.6	0.65
Bn	16.9	9.6	0.57
Bs	17.6	12.4	0.71
Ca	12.0	7.2	0.60
Co	30.1	25.9	0.86
Du	10.2	3.6	0.36
Ge	5.7	1.5	0.26
Ka	8.4	4.1	0.49
Ma	16.7	6.1	0.37
QR	NaN	NaN	NaN
SL	13.8	7.8	0.56

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity.

SATELLITE IMAGE OBSCURED BY CLOUD

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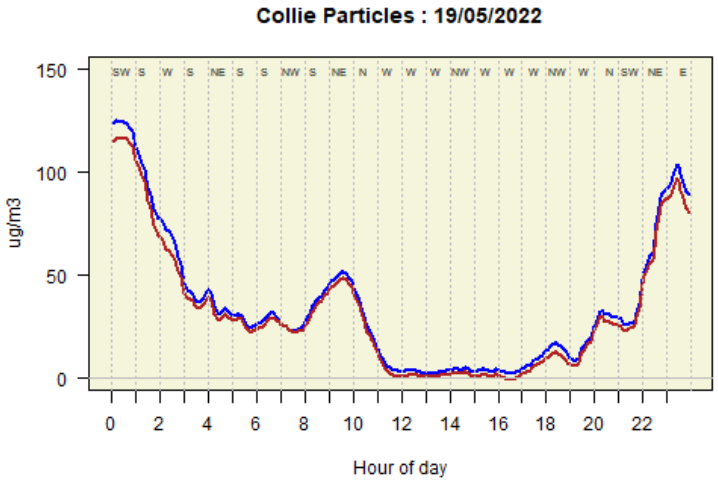


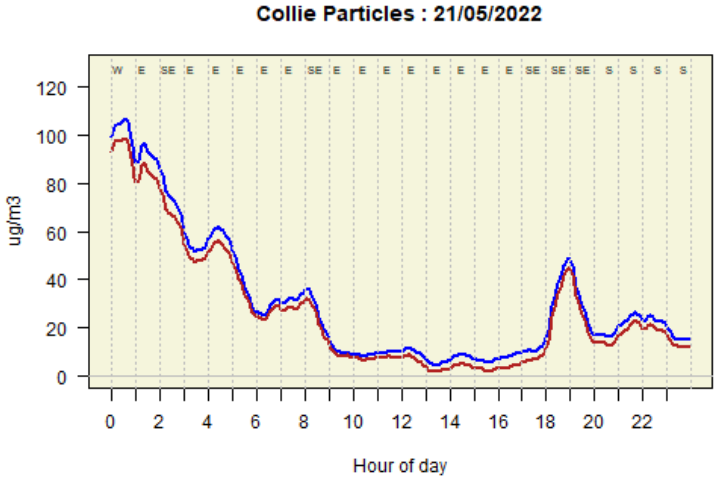
19/05/2022

SITE	PM10	PM2.5	RATIO
Al	12.5	7.4	0.59
Ar	15.3	12.1	0.79
Bn	10.1	5.3	0.53
Bs	10.2	7.4	0.72
Ca	5.9	3.7	0.63
Co	35.0	31.7	0.90
Du	3.8	1.9	0.49
Ge	5.7	1.5	0.27
Ka	18.3	8.3	0.45
Ma	26.5	3.2	0.12
QR	NaN	NaN	NaN
SL	8.2	5.0	0.61

The above particle exceedance was likely caused by wood heater smoke due to the diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

SATELLITE IMAGE OBSCURED BY CLOUD

worldview.earthdata.nasa.gov

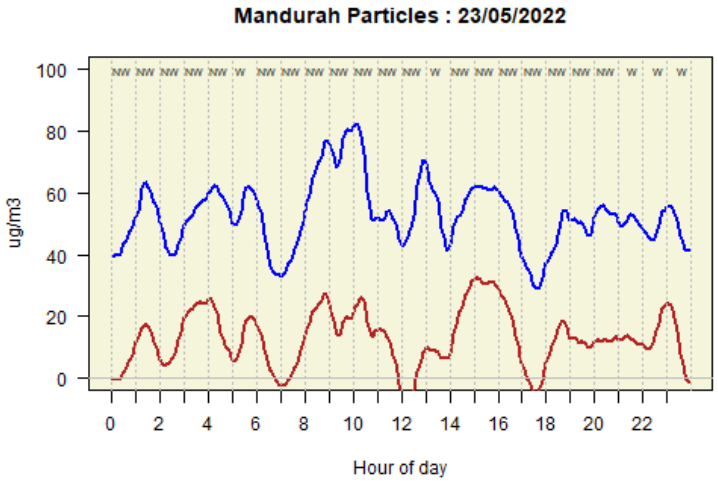


21/05/2022

SITE	PM10	PM2.5	RATIO
Al	16.8	11.3	0.67
Ar	10.6	8.2	0.77
Bn	14.3	11.0	0.77
Bs	16.9	14.2	0.84
Ca	15.8	12.7	0.80
Co	30.6	26.7	0.87
Du	14.0	8.9	0.64
Ge	9.4	3.5	0.37
Ka	7.4	2.8	0.38
Ma	24.6	10.6	0.43
QR	NaN	NaN	NaN
SL	13.7	8.9	0.65

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity.

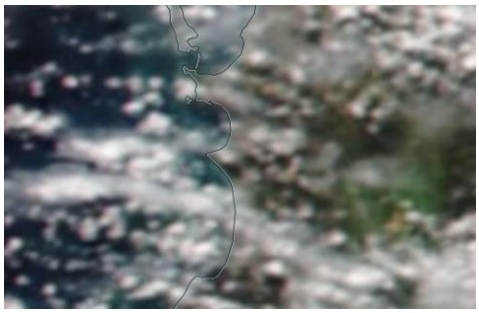
worldview.earthdata.nasa.gov



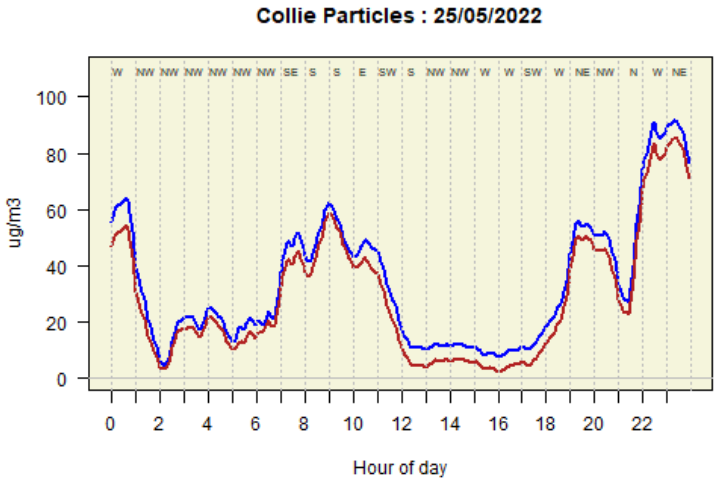
23/05/2022

SITE	PM10	PM2.5	RATIO
Al	4.2	0.9	0.21
Ar	9.1	2.9	0.31
Bn	20.4	5.3	0.26
Bs	21.1	3.2	0.15
Ca	8.5	3.1	0.37
Co	8.5	4.2	0.50
Du	11.2	3.1	0.28
Ge	18.8	4.0	0.21
Ka	4.9	1.7	0.35
Ma	53.0	13.1	0.25
QR	NaN	NaN	NaN
SL	11.7	2.8	0.24

The above particle exceedance was caused by marine aerosols on a westerly wind and is therefore classed as an Assessable Event.



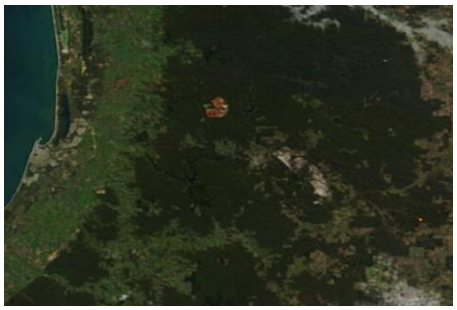
worldview.earthdata.nasa.gov



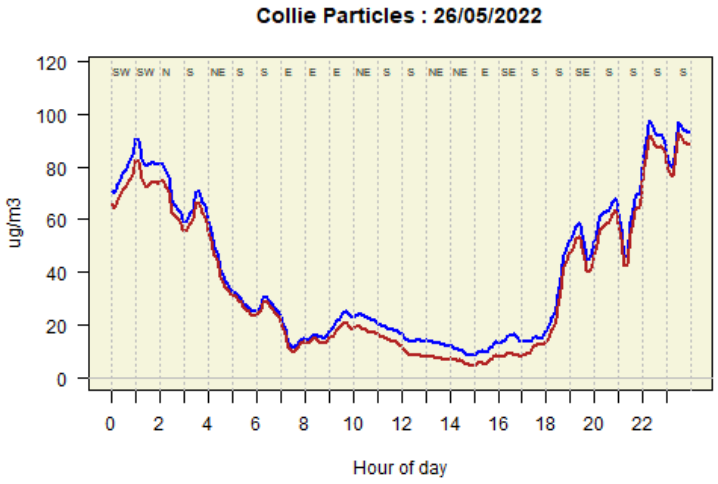
25/05/2022

SITE	PM10	PM2.5	RATIO
Al	11.9	4.3	0.36
Ar	11.6	5.4	0.46
Bn	22.0	14.1	0.64
Bs	18.9	12.2	0.64
Ca	10.8	6.3	0.59
Co	33.8	28.4	0.84
Du	13.1	7.2	0.55
Ge	6.3	1.6	0.25
Ka	11.9	6.0	0.50
Ma	15.0	6.1	0.41
QR	13.4	7.6	0.57
SL	16.4	8.7	0.53

The above particle exceedance was likely caused by wood heater smoke due to the diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity.



worldview.earthdata.nasa.gov



26/05/2022

SITE	PM10	PM2.5	RATIO
Al	18.2	11.6	0.64
Ar	8.2	4.7	0.57
Bn	19.5	13.2	0.68
Bs	18.6	13.5	0.72
Ca	9.9	5.8	0.59
Co	39.9	35.7	0.89
Du	10.0	5.3	0.53
Ge	8.2	2.6	0.32
Ka	12.4	5.3	0.43
Ma	11.3	6.9	0.61
QR	8.8	4.4	0.50
SL	11.7	6.9	0.59

The above particle exceedance was likely caused by wood heater smoke due to the diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity.

SATELLITE IMAGE OBSCURED BY CLOUDS

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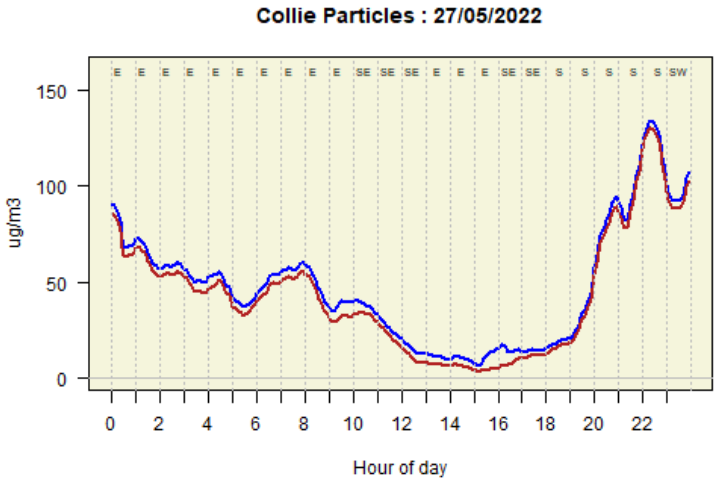
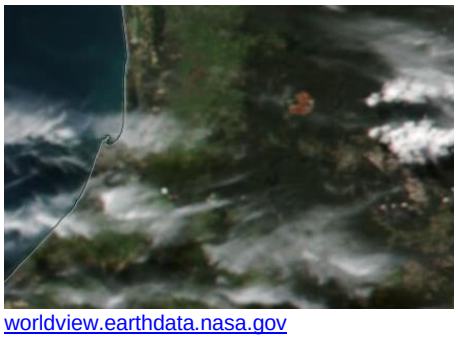


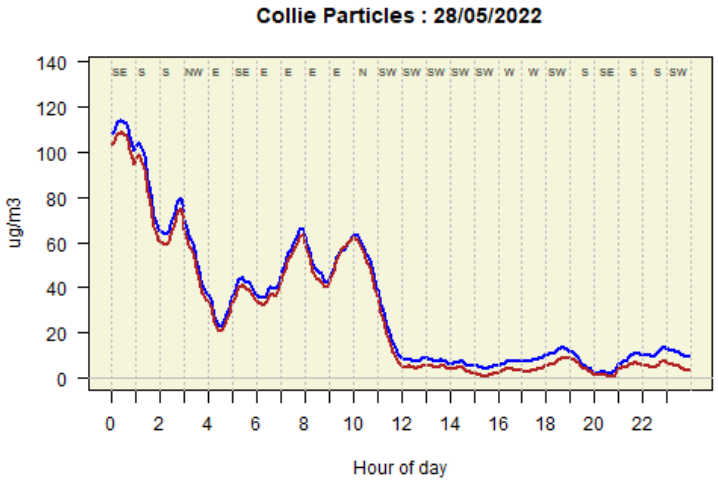
27/05/2022

SITE	PM10	PM2.5	RATIO
Al	24.4	17.4	0.71
Ar	7.2	4.7	0.66
Bn	20.7	16.7	0.81
Bs	18.1	14.3	0.79
Ca	11.1	7.2	0.65
Co	47.1	42.6	0.91
Du	8.0	4.1	0.52
Ge	10.4	3.0	0.28
Ka	10.8	2.8	0.26
Ma	11.3	7.5	0.66
QR	9.9	5.5	0.56
SL	10.8	6.6	0.61

The above particle exceedance was likely caused by wood heater smoke due to the diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were some active burns in the vicinity.



worldview.earthdata.nasa.gov

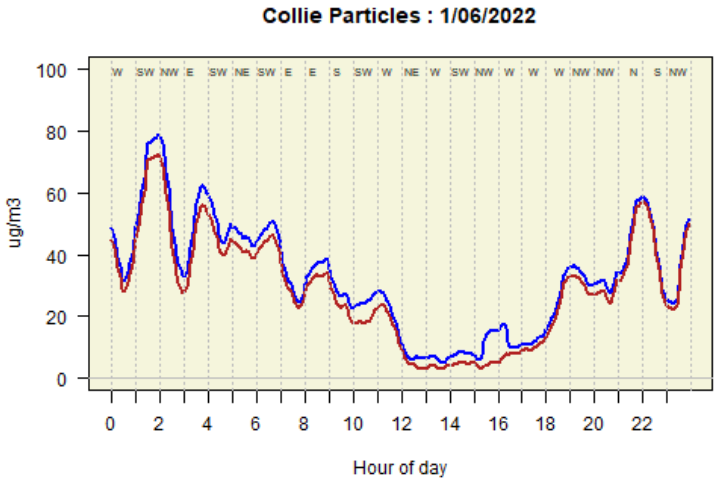


28/05/2022

SITE	PM10	PM2.5	RATIO
Al	13.6	8.1	0.60
Ar	7.4	3.5	0.47
Bn	16.6	12.0	0.73
Bs	14.6	9.3	0.63
Ca	10.0	5.7	0.57
Co	32.0	28.5	0.89
Du	8.4	3.8	0.45
Ge	8.6	3.2	0.37
Ka	12.1	4.1	0.34
Ma	12.5	4.9	0.39
QR	8.6	3.0	0.34
SL	9.3	4.4	0.48

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity.

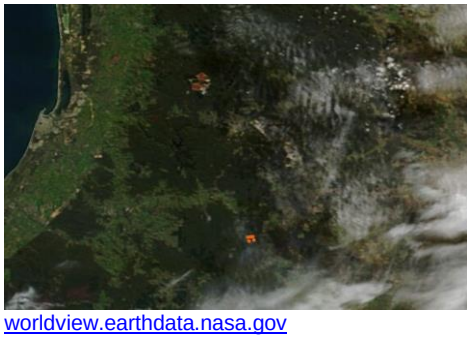
worldview.earthdata.nasa.gov



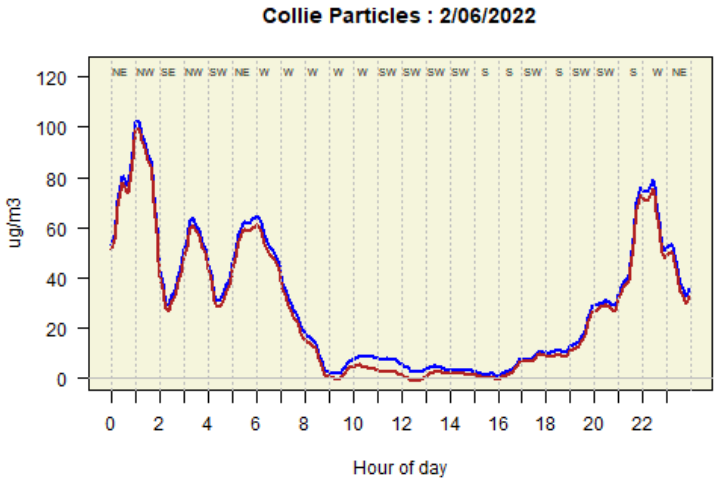
1/06/2022

SITE	PM10	PM2.5	RATIO
Al	29.6	25.3	0.85
Ar	15.2	12.5	0.82
Bn	21.7	14.7	0.68
Bs	23.0	19.9	0.86
Ca	21.3	17.3	0.81
Co	32.2	28.3	0.88
Du	13.0	9.6	0.74
Ge	7.5	2.1	0.28
Ka	6.4	2.5	0.39
Ma	18.8	13.7	0.73
QR	14.3	11.8	0.82
SL	16.0	11.8	0.74

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Collie.



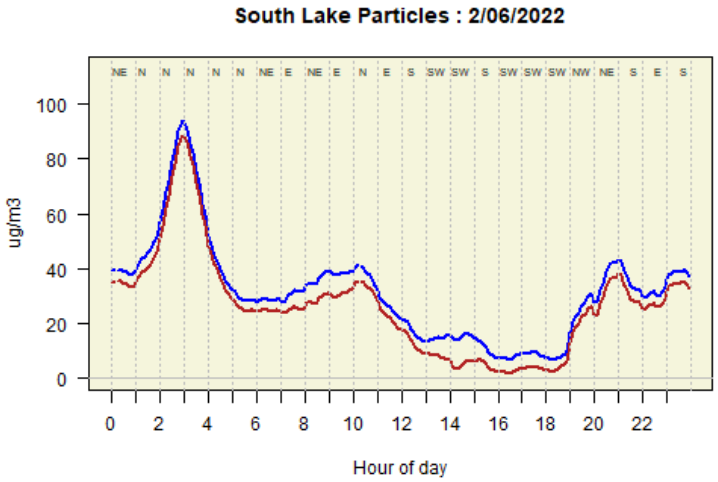
worldview.earthdata.nasa.gov



	2/06/2022		
SITE	PM10	PM2.5	RATIO
Al	6.8	3.0	0.44
Ar	18.3	15.3	0.84
Bn	14.1	10.8	0.77
Bs	15.5	12.7	0.82
Ca	27.1	23.3	0.86
Co	29.7	27.2	0.92
Du	18.1	13.8	0.76
Ge	6.5	2.7	0.42
Ka	12.0	8.3	0.69
Ma	16.3	8.9	0.54
QR	23.4	19.4	0.83
SL	31.4	26.3	0.84

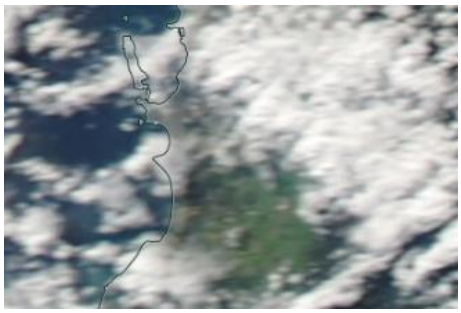
The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the vicinity of Collie; however, cloud cover has obscured satellite images.

worldview.earthdata.nasa.gov

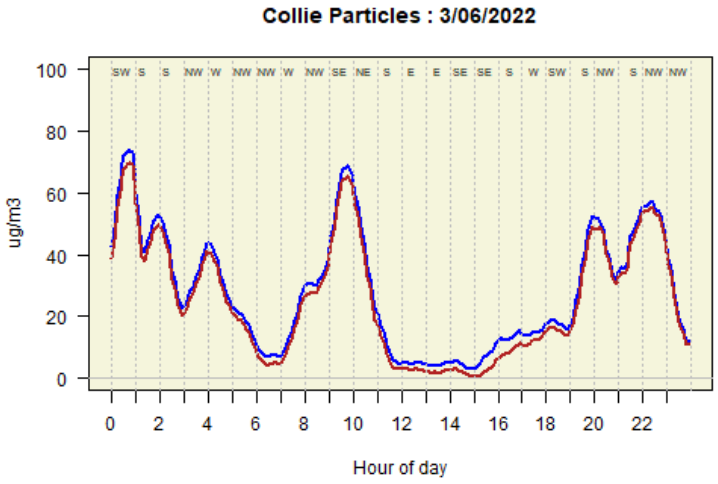


	2/06/2022		
SITE	PM10	PM2.5	RATIO
Al	6.8	3.0	0.44
Ar	18.3	15.3	0.84
Bn	14.1	10.8	0.77
Bs	15.5	12.7	0.82
Ca	27.1	23.3	0.86
Co	29.7	27.2	0.92
Du	18.1	13.8	0.76
Ge	6.5	2.7	0.42
Ka	12.0	8.3	0.69
Ma	16.3	8.9	0.54
QR	23.4	19.4	0.83
SL	31.4	26.3	0.84

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the south-west.



worldview.earthdata.nasa.gov



3/06/2022			
SITE	PM10	PM2.5	RATIO
Al	6.0	1.4	0.23
Ar	6.3	3.5	0.56
Bn	17.7	13.8	0.78
Bs	11.0	7.9	0.71
Ca	12.8	9.4	0.73
Co	28.0	25.4	0.90
Du	10.6	6.4	0.61
Ge	11.3	3.7	0.32
Ka	8.3	3.1	0.37
Ma	6.7	4.0	0.61
QR	16.0	11.8	0.74
SL	14.7	10.4	0.71

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns the previous day in the south-west.

SATELLITE IMAGE OBSCURED BY CLOUD

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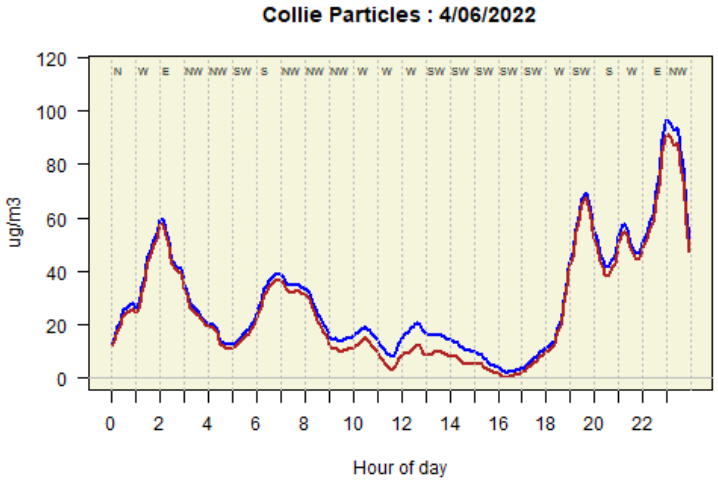
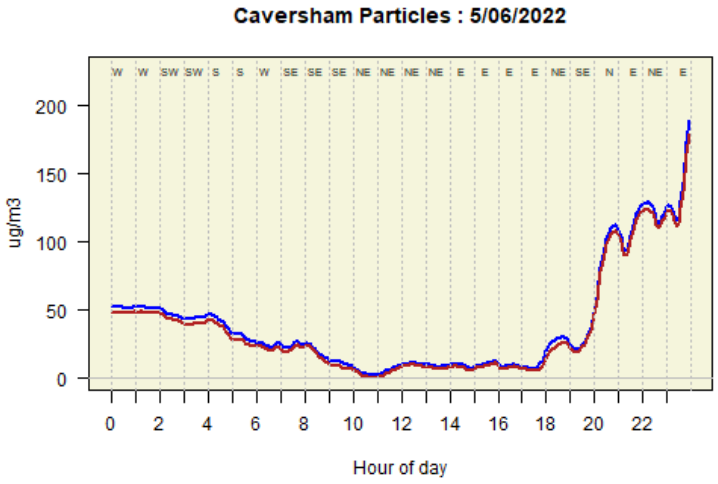


4/06/2022			
SITE	PM10	PM2.5	RATIO
Al	7.7	1.7	0.21
Ar	13.9	10.4	0.75
Bn	18.3	12.9	0.71
Bs	12.0	8.5	0.71
Ca	20.4	17.1	0.84
Co	29.2	26.2	0.90
Du	14.7	11.0	0.74
Ge	10.0	3.8	0.38
Ka	12.3	8.0	0.65
Ma	12.1	8.1	0.67
QR	18.3	15.2	0.83
SL	19.9	15.4	0.77

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were active burns in the previous days in the south-west combined with wood heater smoke.

SATELLITE IMAGE OBSCURED BY CLOUD

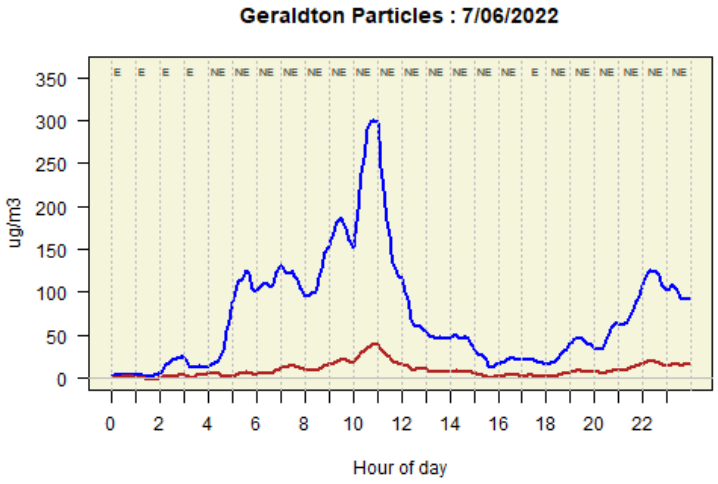
worldview.earthdata.nasa.gov



5/06/2022			
SITE	PM10	PM2.5	RATIO
Al	5.5	1.4	0.25
Ar	13.3	11.1	0.84
Bn	19.6	17.4	0.89
Bs	11.2	9.5	0.85
Ca	38.8	35.8	0.92
Co	26.5	23.4	0.88
Du	16.3	13.7	0.84
Ge	8.0	1.6	0.20
Ka	3.3	0.9	0.28
Ma	12.9	10.3	0.80
QR	22.1	20.1	0.91
SL	27.4	24.5	0.90

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the south-west.

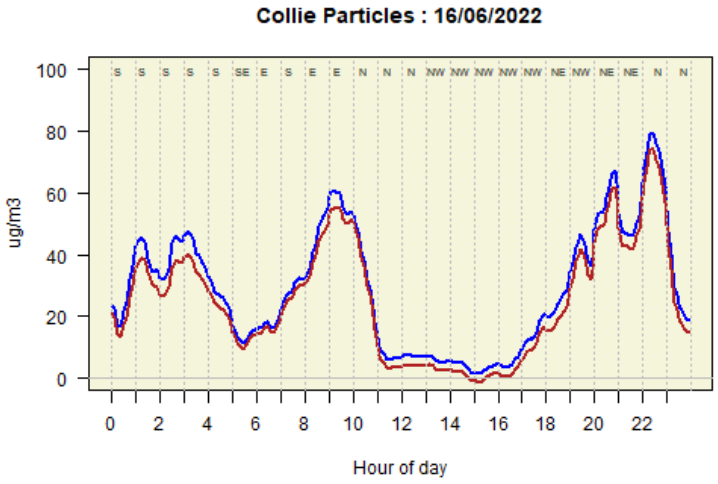
worldview.earthdata.nasa.gov



7/06/2022			
SITE	PM10	PM2.5	RATIO
Al	4.4	1.3	0.29
Ar	3.9	1.2	0.32
Bn	5.6	2.5	0.45
Bs	6.4	4.3	0.67
Ca	12.7	6.2	0.49
Co	9.3	5.3	0.56
Du	4.8	-0.2	-0.03
Ge	74.0	9.3	0.13
Ka	7.8	1.2	0.15
Ma	6.1	1.6	0.27
QR	15.2	11.2	0.74
SL	7.4	3.0	0.41

The above particle exceedance was likely caused by windborne dust due to the low particle ratio and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were no active burns in the region.

worldview.earthdata.nasa.gov

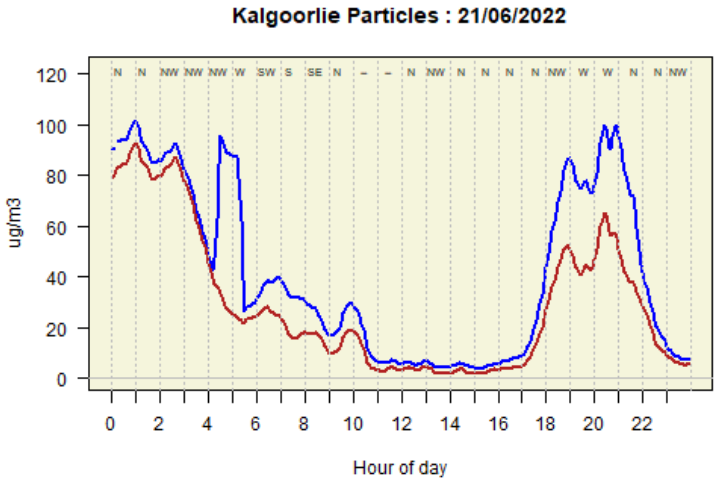


16/06/2022

SITE	PM10	PM2.5	RATIO
Al	7.8	4.5	0.57
Ar	10.8	6.8	0.63
Bn	15.4	4.8	0.31
Bs	12.3	1.6	0.13
Ca	13.7	10.5	0.77
Co	28.9	25.1	0.87
Du	8.8	4.9	0.55
Ge	5.6	3.3	0.59
Ka	10.0	5.8	0.58
Ma	46.2	14.5	0.31
QR	16.5	13.4	0.81
SL	13.7	9.6	0.70

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the south-west.

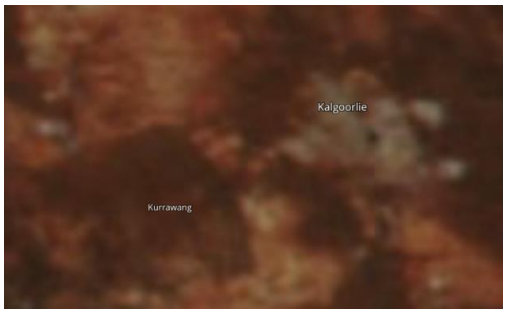
worldview.earthdata.nasa.gov



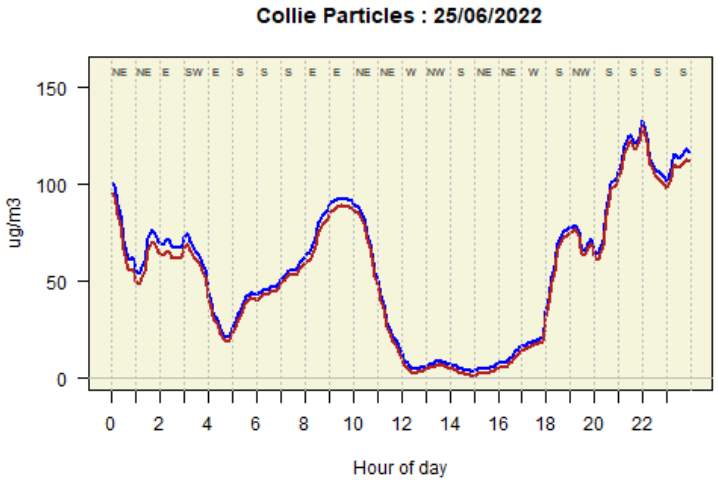
21/06/2022

SITE	PM10	PM2.5	RATIO
Al	5.2	2.6	0.50
Ar	7.2	4.9	0.67
Bn	10.8	3.0	0.28
Bs	6.2	1.5	0.25
Ca	8.3	5.8	0.71
Co	17.5	14.3	0.82
Du	5.9	3.6	0.61
Ge	5.6	1.5	0.26
Ka	41.5	29.0	0.70
Ma	36.9	12.5	0.34
QR	16.0	13.7	0.86
SL	10.5	8.0	0.75

The above particle exceedance was likely caused by wood heater smoke due to the diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.



worldview.earthdata.nasa.gov

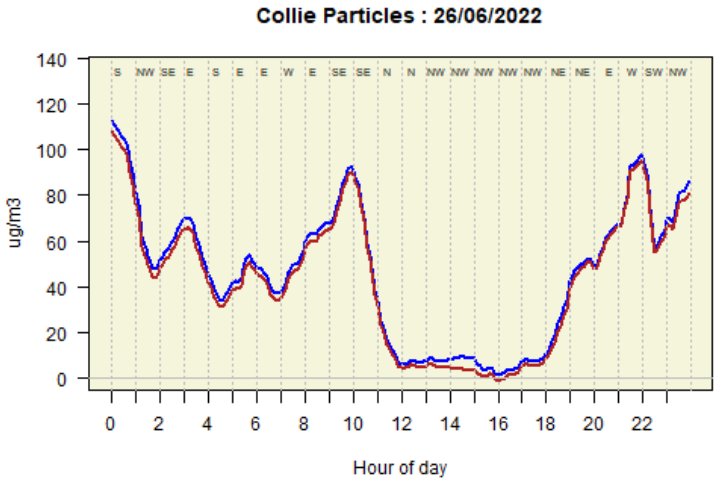


25/06/2022

SITE	PM10	PM2.5	RATIO
Al	12.3	7.9	0.64
Ar	12.1	10.3	0.85
Bn	18.6	13.1	0.71
Bs	15.5	12.1	0.78
Ca	12.1	9.6	0.80
Co	55.9	52.7	0.94
Du	11.9	9.6	0.81
Ge	7.6	3.9	0.52
Ka	4.7	1.2	0.26
Ma	13.6	10.6	0.78
QR	22.2	20.7	0.93
SL	16.5	14.0	0.85

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

worldview.earthdata.nasa.gov

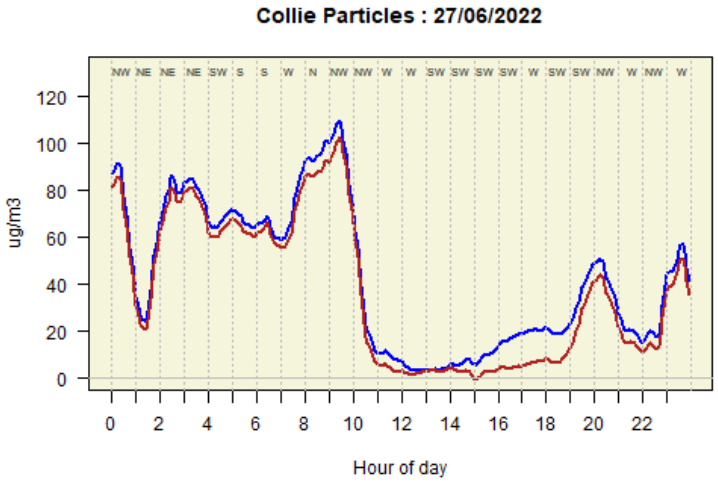


26/06/2022

SITE	PM10	PM2.5	RATIO
Al	10.2	7.5	0.74
Ar	8.4	6.7	0.79
Bn	14.0	8.5	0.61
Bs	13.1	5.9	0.45
Ca	15.4	12.9	0.84
Co	45.5	42.6	0.94
Du	7.6	5.9	0.77
Ge	5.9	2.8	0.46
Ka	7.7	2.3	0.29
Ma	25.5	6.2	0.24
QR	17.8	17.3	0.97
SL	13.1	11.1	0.85

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

worldview.earthdata.nasa.gov



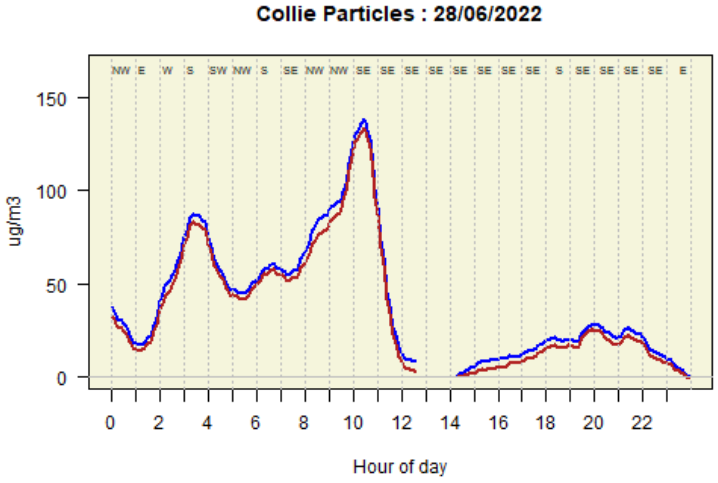
27/06/2022

SITE	PM10	PM2.5	RATIO
Al	11.9	4.5	0.38
Ar	12.5	5.9	0.47
Bn	22.7	11.6	0.51
Bs	22.4	10.1	0.45
Ca	18.3	11.8	0.64
Co	42.8	37.0	0.86
Du	9.7	3.3	0.34
Ge	7.6	3.0	0.40
Ka	32.8	12.9	0.39
Ma	20.2	7.3	0.36
QR	21.6	16.3	0.76
SL	17.6	7.2	0.41

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGE OBSCURED BY CLOUDS

worldview.earthdata.nasa.gov



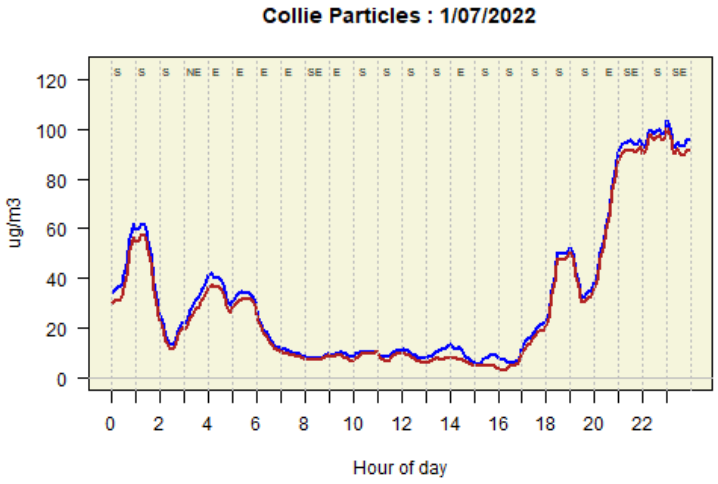
28/06/2022

SITE	PM10	PM2.5	RATIO
Al	7.7	2.2	0.28
Ar	11.8	5.8	0.49
Bn	17.7	12.2	0.69
Bs	15.8	9.1	0.57
Ca	13.3	6.6	0.50
Co	41.0	37.1	0.91
Du	12.6	6.0	0.48
Ge	8.3	2.9	0.35
Ka	18.7	8.8	0.47
Ma	11.1	4.5	0.41
QR	25.8	18.5	0.71
SL	12.6	5.6	0.45

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGE OBSCURED BY CLOUDS

worldview.earthdata.nasa.gov

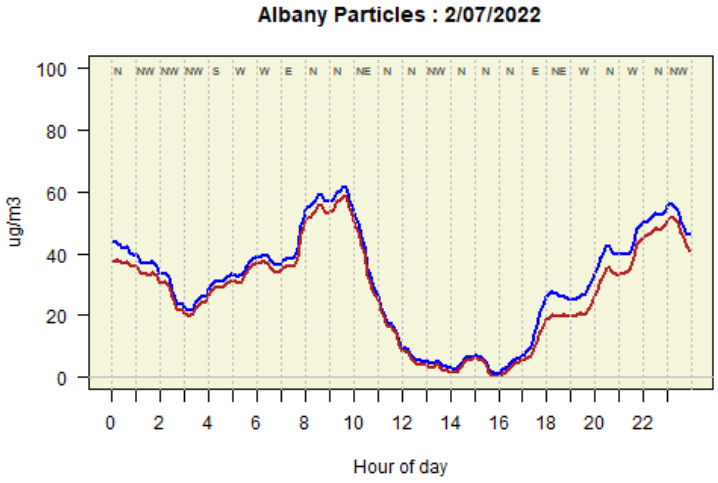


1/07/2022

SITE	PM10	PM2.5	RATIO
Al	23.5	18.8	0.80
Ar	5.9	4.3	0.73
Bn	19.5	15.6	0.80
Bs	18.8	15.6	0.83
Ca	9.4	7.6	0.81
Co	32.3	29.9	0.93
Du	7.3	5.3	0.72
Ge	7.4	1.6	0.22
Ka	5.9	1.8	0.31
Ma	11.4	6.2	0.54
QR	9.9	8.2	0.83
SL	11.7	8.3	0.71

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

worldview.earthdata.nasa.gov

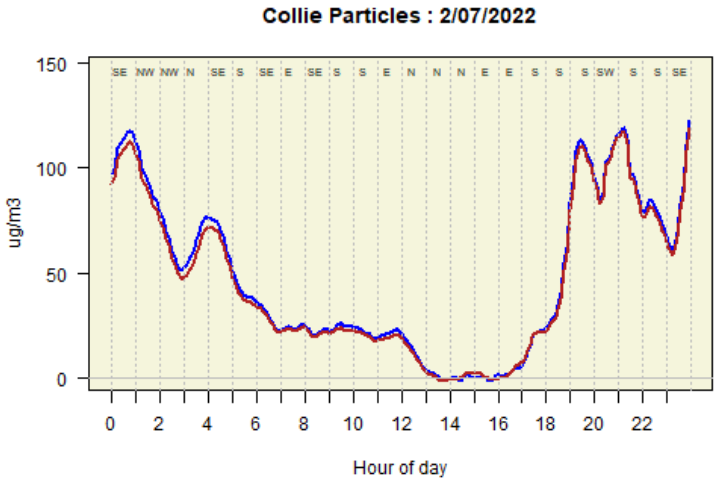


2/07/2022

SITE	PM10	PM2.5	RATIO
Al	30.5	27.4	0.90
Ar	8.1	6.7	0.83
Bn	18.5	15.6	0.84
Bs	18.8	16.3	0.87
Ca	15.0	13.1	0.87
Co	47.0	45.0	0.96
Du	11.8	10.1	0.86
Ge	4.2	1.0	0.25
Ka	12.4	2.1	0.17
Ma	22.3	12.4	0.56
QR	13.7	12.4	0.90
SL	12.5	10.4	0.83

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

worldview.earthdata.nasa.gov

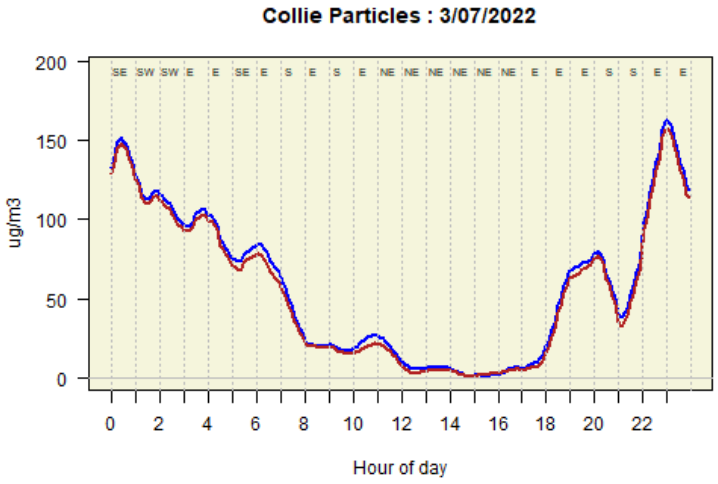


2/07/2022

SITE	PM10	PM2.5	RATIO
Al	30.5	27.4	0.90
Ar	8.1	6.7	0.83
Bn	18.5	15.6	0.84
Bs	18.7	16.2	0.87
Ca	15.0	13.1	0.87
Co	47.0	45.0	0.96
Du	11.8	10.1	0.86
Ge	4.2	1.0	0.25
Ka	12.4	2.1	0.17
Ma	22.3	12.4	0.56
QR	13.8	12.4	0.90
SL	12.5	10.4	0.83

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

worldview.earthdata.nasa.gov

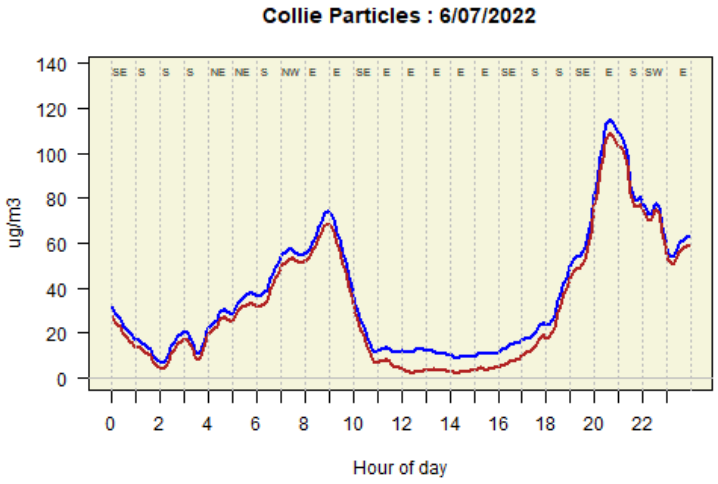


3/07/2022

SITE	PM10	PM2.5	RATIO
Al	19.7	16.6	0.84
Ar	5.6	4.4	0.77
Bn	18.8	14.6	0.78
Bs	18.7	15.5	0.83
Ca	11.2	9.6	0.86
Co	57.6	54.3	0.94
Du	12.4	10.8	0.87
Ge	7.9	3.9	0.49
Ka	11.5	1.8	0.16
Ma	10.7	7.2	0.67
QR	11.4	10.1	0.88
SL	8.2	6.7	0.81

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

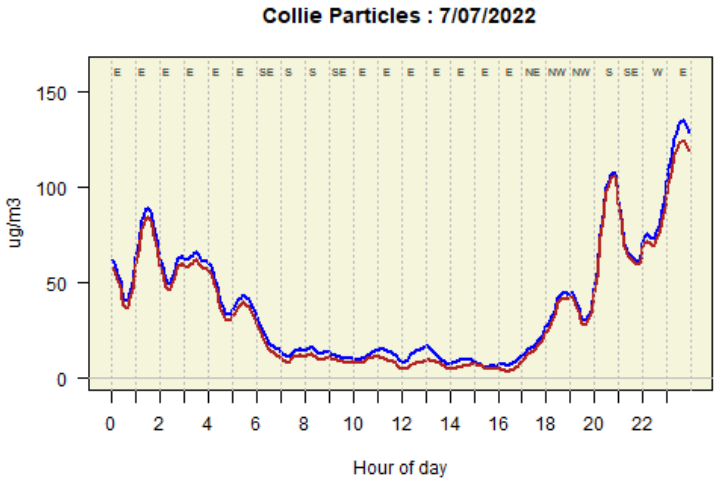
worldview.earthdata.nasa.gov



6/07/2022			
SITE	PM10	PM2.5	RATIO
Al	22.5	14.7	0.65
Ar	6.3	3.1	0.50
Bn	16.2	9.0	0.56
Bs	22.6	17.5	0.78
Ca	7.7	5.6	0.73
Co	36.9	32.0	0.87
Du	6.8	3.8	0.56
Ge	7.9	2.9	0.37
Ka	29.9	13.3	0.45
Ma	9.1	4.0	0.43
QR	9.6	7.0	0.73
SL	13.4	9.5	0.71

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns.

worldview.earthdata.nasa.gov

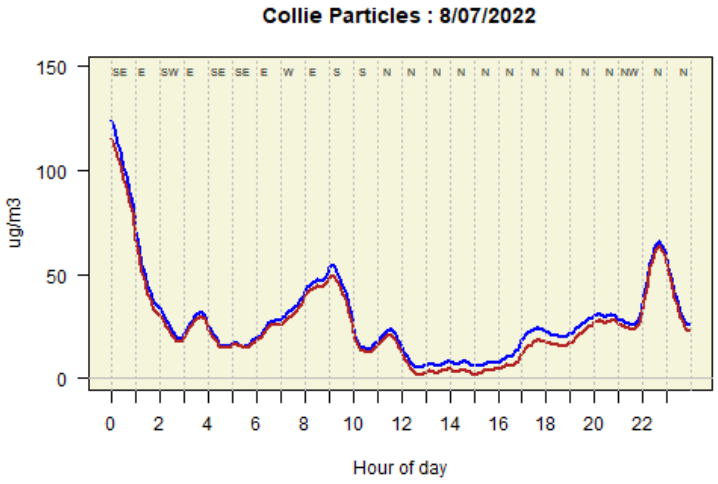


7/07/2022			
SITE	PM10	PM2.5	RATIO
Al	20.8	17.2	0.83
Ar	4.6	3.6	0.78
Bn	16.6	13.0	0.78
Bs	20.3	18.1	0.89
Ca	6.1	4.8	0.78
Co	38.3	34.9	0.91
Du	4.6	2.3	0.51
Ge	11.6	4.2	0.37
Ka	16.8	4.9	0.29
Ma	6.1	4.2	0.69
QR	7.5	6.0	0.79
SL	9.7	6.8	0.70

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGE OBSCURED BY CLOUD

worldview.earthdata.nasa.gov



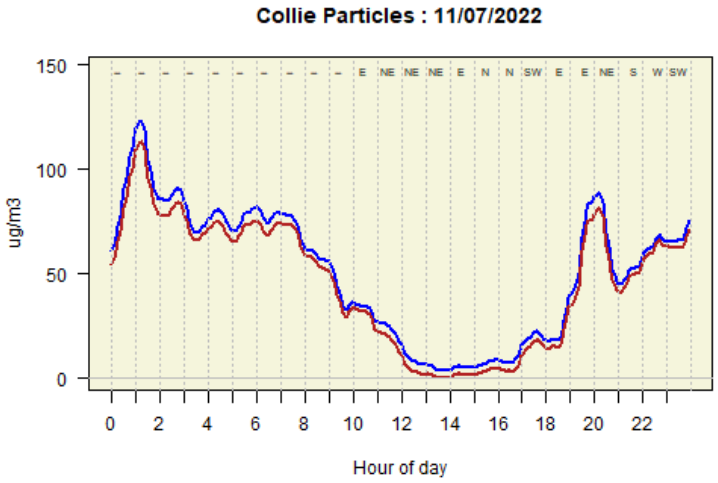
8/07/2022

SITE	PM10	PM2.5	RATIO
Al	10.8	8.0	0.74
Ar	8.7	5.0	0.58
Bn	17.9	9.7	0.54
Bs	26.0	15.9	0.61
Ca	13.2	9.6	0.73
Co	28.7	25.5	0.89
Du	5.0	1.5	0.30
Ge	9.5	3.8	0.40
Ka	12.0	2.8	0.23
Ma	21.9	8.1	0.37
QR	11.4	7.4	0.65
SL	13.5	9.8	0.73

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

SATELLITE IMAGE OBSCURED BY CLOUD

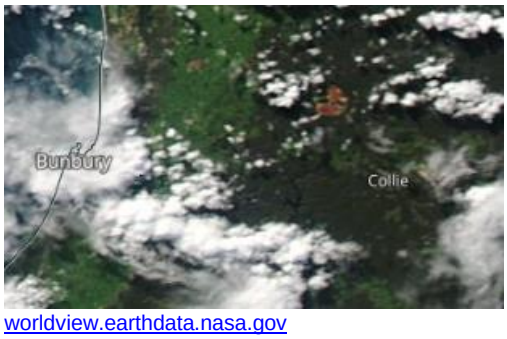
worldview.earthdata.nasa.gov



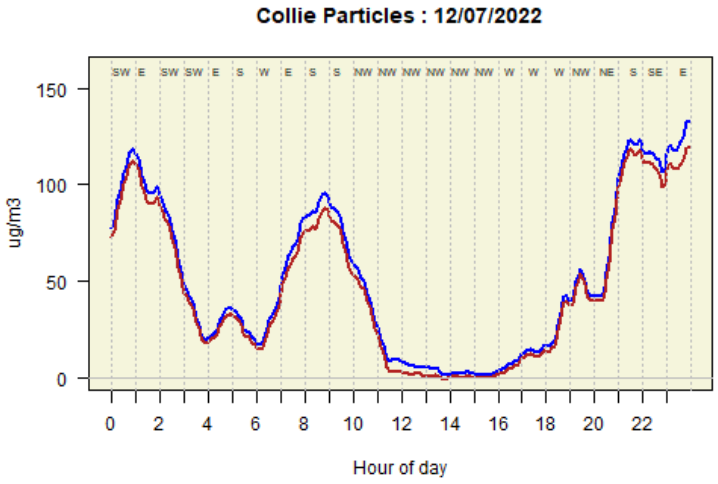
11/07/2022

SITE	PM10	PM2.5	RATIO
Al	14.5	9.2	0.64
Ar	11.0	7.6	0.69
Bn	18.0	10.7	0.60
Bs	23.5	17.7	0.75
Ca	11.9	8.9	0.75
Co	50.5	45.7	0.91
Du	9.0	5.2	0.58
Ge	5.0	1.6	0.32
Ka	14.1	8.2	0.58
Ma	44.3	10.2	0.23
QR	9.9	6.5	0.65
SL	17.7	13.4	0.76

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.



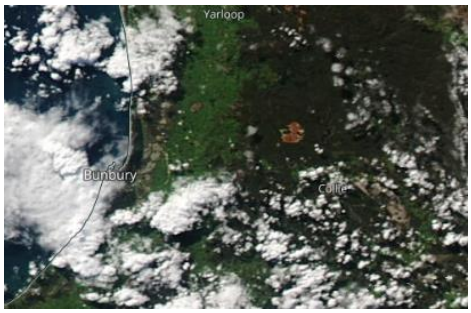
worldview.earthdata.nasa.gov



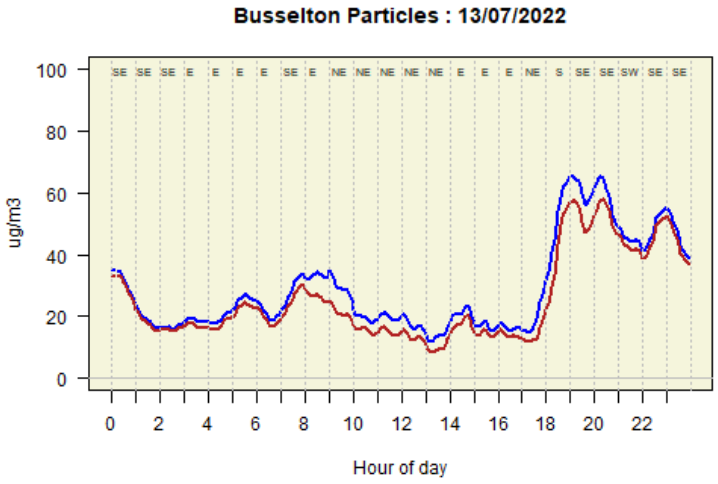
12/07/2022

SITE	PM10	PM2.5	RATIO
Al	11.6	7.7	0.66
Ar	9.0	6.0	0.67
Bn	13.1	6.3	0.48
Bs	19.1	11.6	0.61
Ca	14.7	10.9	0.74
Co	50.8	46.4	0.91
Du	11.6	8.4	0.73
Ge	6.1	1.9	0.31
Ka	28.7	15.7	0.55
Ma	22.3	7.0	0.32
QR	12.5	9.2	0.74
SL	18.9	15.2	0.81

The above particle exceedance was likely caused by wood heater smoke due to the typical diurnal pattern and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.



worldview.earthdata.nasa.gov

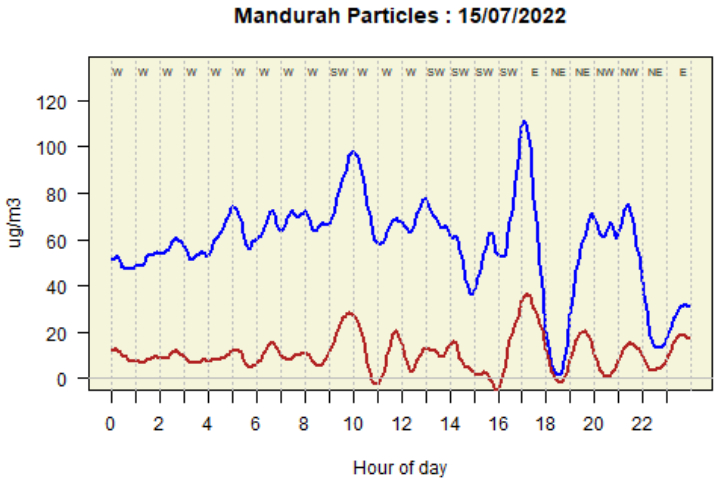


13/07/2022

SITE	PM10	PM2.5	RATIO
Al	8.3	5.1	0.61
Ar	7.1	3.8	0.54
Bn	22.1	17.9	0.81
Bs	29.1	25.3	0.87
Ca	10.2	7.2	0.71
Co	50.0	45.4	0.91
Du	11.7	7.8	0.67
Ge	10.8	3.6	0.33
Ka	11.7	3.7	0.31
Ma	36.3	13.8	0.38
QR	19.8	15.4	0.78
SL	16.1	11.3	0.70

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the vicinity of the monitoring site.

worldview.earthdata.nasa.gov



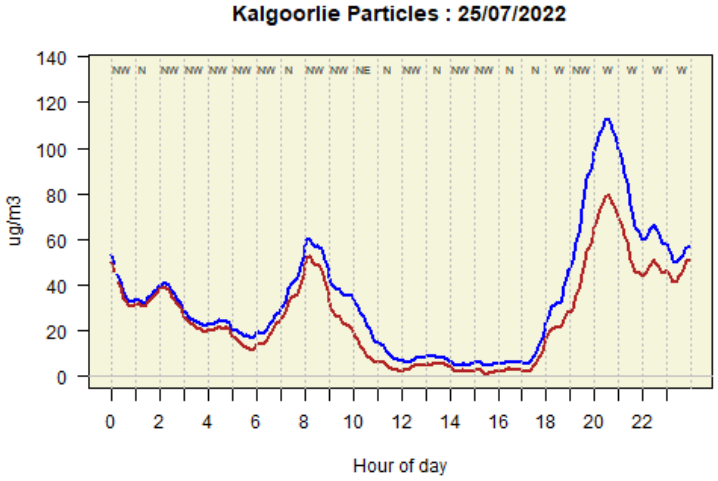
15/07/2022

SITE	PM10	PM2.5	RATIO
Al	7.5	2.2	0.29
Ar	11.7	5.9	0.50
Bn	24.6	14.1	0.57
Bs	27.9	20.1	0.72
Ca	11.5	5.8	0.50
Co	NaN	NaN	NaN
Du	13.1	5.8	0.44
Ge	11.6	2.2	0.19
Ka	6.4	2.8	0.44
Ma	58.2	10.6	0.18
QR	18.4	10.3	0.56
SL	11.1	4.8	0.43

The above particle exceedance was likely caused by marine aerosols and is therefore classed as an Assessable Event.

SATELLITE IMAGE OBSCURED BY CLOUDS

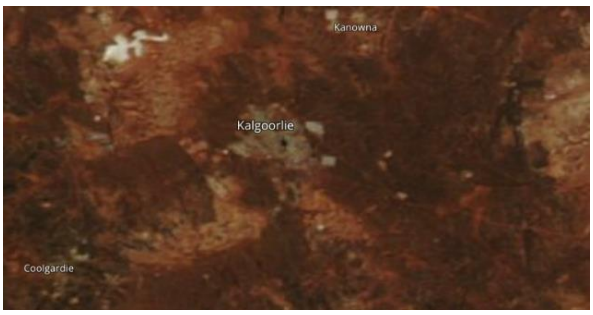
worldview.earthdata.nasa.gov



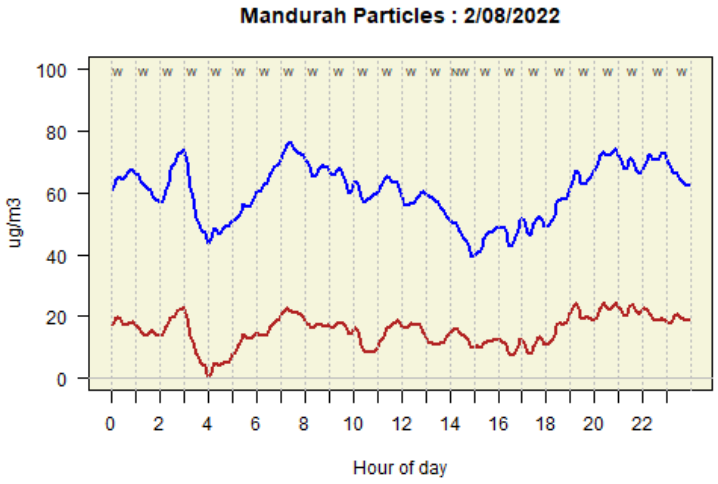
25/07/2022

SITE	PM10	PM2.5	RATIO
Al	4.7	1.8	0.38
Ar	8.9	3.9	0.43
Bn	12.7	2.9	0.23
Bs	21.5	10.4	0.48
Ca	9.7	5.4	0.56
Co	9.1	7.0	0.76
Du	5.0	0.3	0.07
Ge	5.6	2.2	0.39
Ka	34.0	25.4	0.75
Ma	42.5	6.8	0.16
QR	11.3	6.6	0.59
SL	10.2	5.0	0.49

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.



worldview.earthdata.nasa.gov



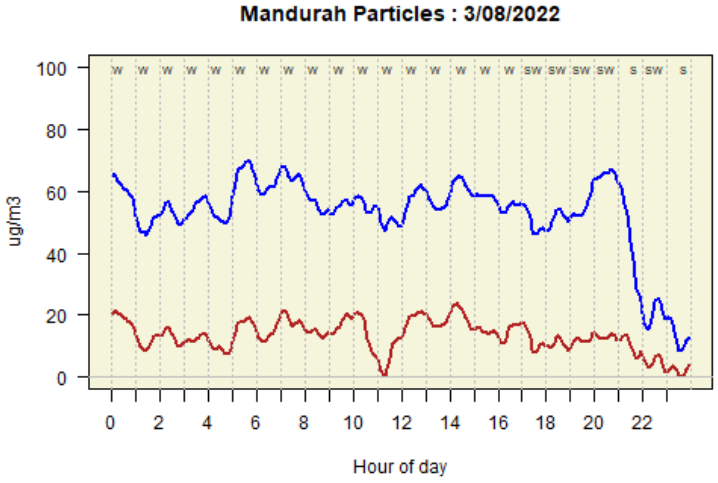
2/08/2022

SITE	PM10	PM2.5	RATIO
Al	3.6	1.8	0.49
Ar	17.3	5.2	0.30
Bn	24.9	7.4	0.30
Bs	24.1	7.2	0.30
Ca	18.3	7.4	0.40
Co	12.7	5.0	0.39
Du	NaN	NaN	NaN
Ge	19.4	5.0	0.26
Ka	8.3	3.3	0.40
Ma	60.3	15.5	0.26
QR	32.3	14.0	0.43
SL	23.5	8.2	0.35

The above particle exceedance was likely caused by marine aerosols and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGE OBSCURED BU CLOUDS

worldview.earthdata.nasa.gov



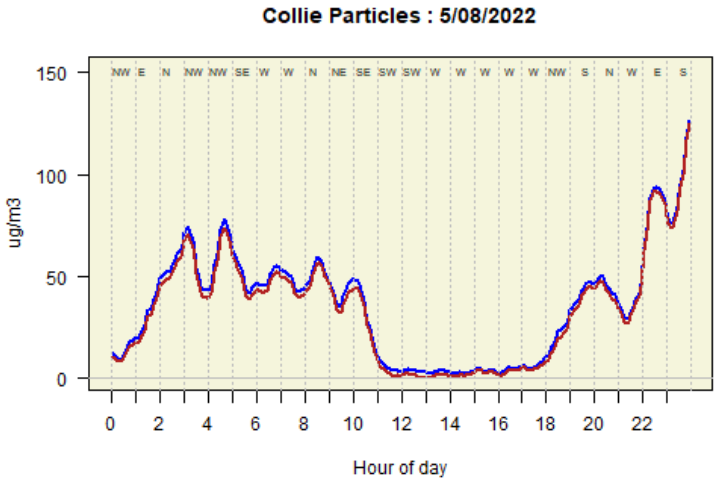
3/08/2022

SITE	PM10	PM2.5	RATIO
Al	8.9	3.2	0.36
Ar	12.3	3.4	0.27
Bn	23.5	7.2	0.30
Bs	23.5	10.4	0.44
Ca	14.1	5.6	0.40
Co	11.8	4.8	0.41
Du	NaN	NaN	NaN
Ge	17.6	4.6	0.26
Ka	11.5	2.6	0.23
Ma	53.0	13.3	0.25
QR	26.4	11.3	0.43
SL	17.1	5.8	0.34

The above particle exceedance was likely caused by marine aerosols during a westerly wind and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGES OBSCURED BY CLOUDS

worldview.earthdata.nasa.gov

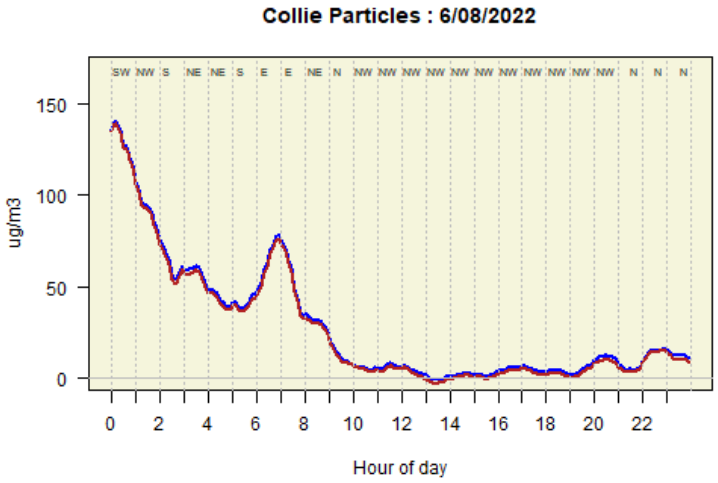


5/08/2022			
SITE	PM10	PM2.5	RATIO
Al	11.0	8.0	0.72
Ar	8.0	4.9	0.61
Bn	11.9	6.3	0.53
Bs	19.3	17.1	0.89
Ca	9.0	6.4	0.71
Co	35.3	32.9	0.93
Du	NaN	NaN	NaN
Ge	8.4	3.3	0.39
Ka	6.0	2.7	0.46
Ma	19.1	4.7	0.25
QR	10.3	8.3	0.80
SL	12.6	9.1	0.72

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGES OBSCURED BY CLOUDS

worldview.earthdata.nasa.gov

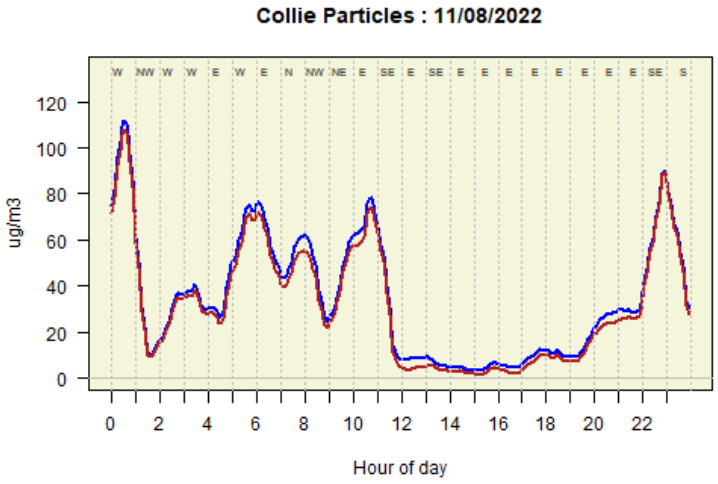


6/08/2022			
SITE	PM10	PM2.5	RATIO
Al	7.5	5.9	0.79
Ar	3.2	1.7	0.54
Bn	9.1	3.2	0.35
Bs	15.5	10.6	0.68
Ca	4.2	2.9	0.67
Co	28.1	26.5	0.94
Du	NaN	NaN	NaN
Ge	6.2	3.8	0.61
Ka	30.0	23.4	0.78
Ma	15.0	2.7	0.18
QR	8.2	6.8	0.82
SL	5.2	3.5	0.68

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.

SATELLITE IMAGES OBSCURED BY CLOUDS

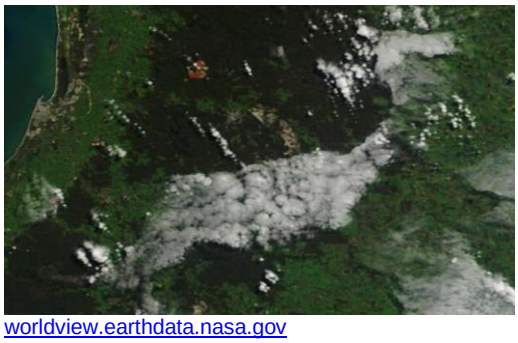
worldview.earthdata.nasa.gov



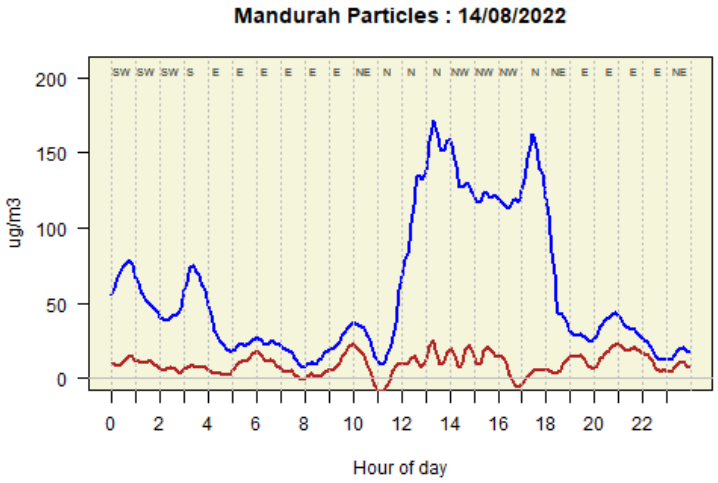
11/08/2022

SITE	PM10	PM2.5	RATIO
Al	7.3	3.1	0.43
Ar	4.5	2.4	0.54
Bn	11.4	6.9	0.61
Bs	16.7	13.0	0.78
Ca	9.1	6.2	0.68
Co	34.7	31.8	0.92
Du	NaN	NaN	NaN
Ge	5.9	1.7	0.28
Ka	NaN	NaN	NaN
Ma	11.9	7.9	0.67
QR	14.1	10.3	0.73
SL	17.9	14.8	0.82

The above particle exceedance was likely caused by wood heater smoke and is therefore classed as an Assessable Event. Burn-off advice from DBCA indicated there were no active burns in the region.



worldview.earthdata.nasa.gov



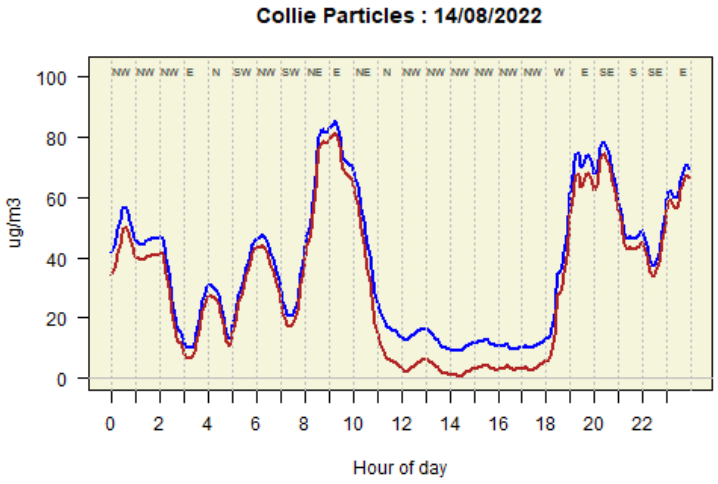
14/08/2022

SITE	PM10	PM2.5	RATIO
Al	14.8	7.5	0.51
Ar	11.8	5.8	0.49
Bn	25.1	8.6	0.34
Bs	23.9	8.7	0.37
Ca	10.9	6.0	0.55
Co	36.7	31.0	0.84
Du	NaN	NaN	NaN
Ge	14.8	3.8	0.26
Ka	8.5	3.8	0.45
Ma	57.8	9.4	0.16
QR	18.9	9.3	0.49
SL	14.6	7.6	0.52

The above particle exceedance was likely caused by marine aerosols and is therefore classed as an Assessable Event.

SATELLITE IMAGES OBSCURED BY CLOUDS

worldview.earthdata.nasa.gov

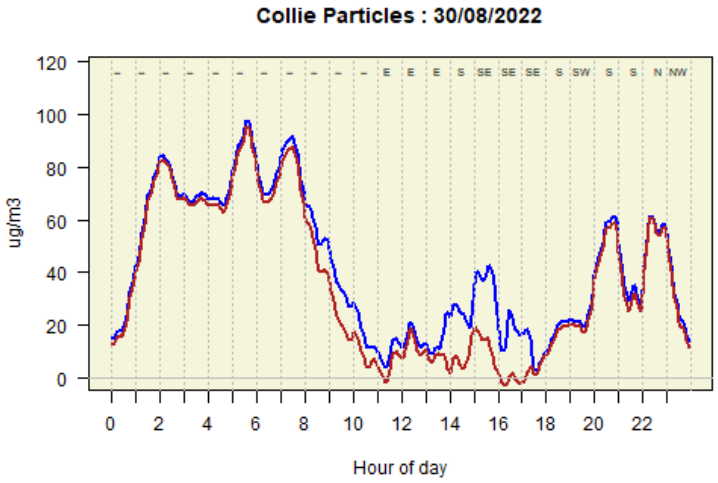


14/08/2022

SITE	PM10	PM2.5	RATIO
Al	14.8	7.5	0.51
Ar	11.8	5.8	0.49
Bn	25.1	8.6	0.34
Bs	23.9	8.7	0.37
Ca	10.9	6.0	0.55
Co	36.7	31.0	0.84
Du	NaN	NaN	NaN
Ge	14.8	3.8	0.26
Ka	8.5	3.8	0.45
Ma	57.8	9.4	0.16
QR	18.9	9.3	0.49
SL	14.6	7.6	0.52

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west the previous day.

worldview.earthdata.nasa.gov

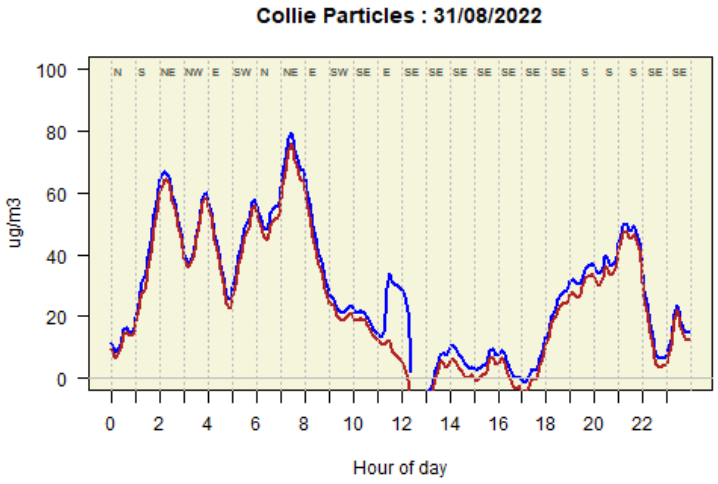


30/08/2022

SITE	PM10	PM2.5	RATIO
Al	9.5	6.0	0.64
Ar	7.4	5.0	0.67
Bn	11.7	6.6	0.56
Bs	10.0	6.8	0.68
Ca	9.6	6.8	0.71
Co	41.9	35.9	0.86
Du	7.8	4.3	0.55
Ge	7.8	2.5	0.31
Ka	14.2	2.2	0.16
Ma	7.0	2.7	0.39
QR	9.8	5.9	0.60
SL	10.3	6.5	0.63

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

worldview.earthdata.nasa.gov

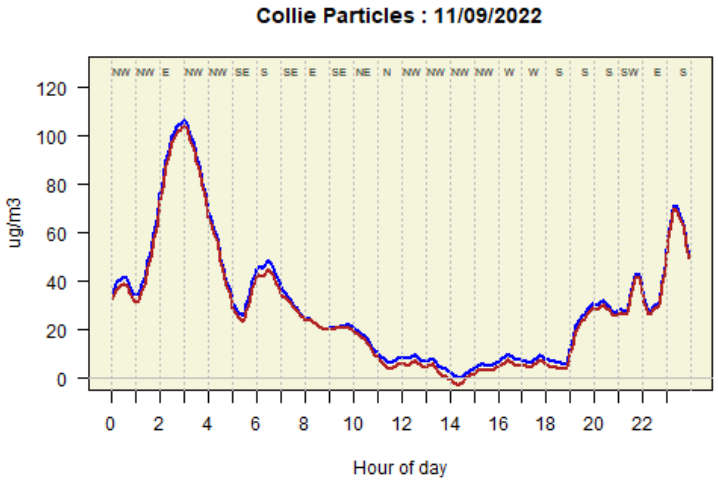


31/08/2022

SITE	PM10	PM2.5	RATIO
Al	8.2	4.3	0.52
Ar	5.1	3.5	0.68
Bn	6.8	3.3	0.49
Bs	9.0	5.3	0.59
Ca	5.8	3.9	0.68
Co	28.8	25.1	0.87
Du	9.1	5.6	0.62
Ge	11.6	3.9	0.34
Ka	12.3	2.5	0.20
Ma	5.5	2.6	0.47
QR	8.9	4.6	0.52
SL	8.3	5.0	0.61

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

worldview.earthdata.nasa.gov

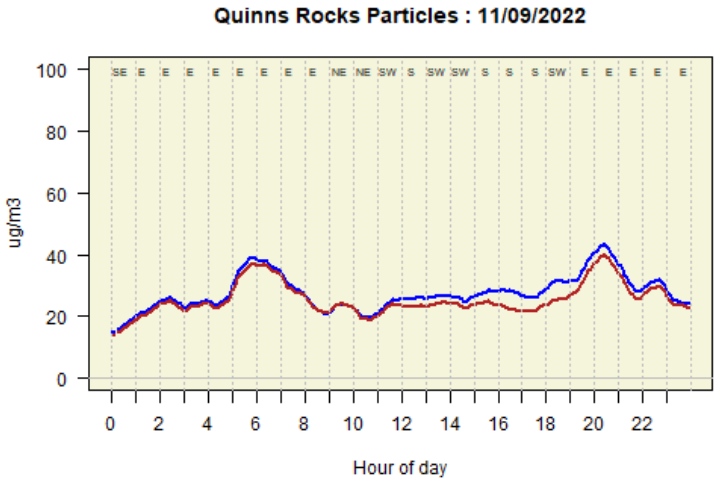


11/09/2022

SITE	PM10	PM2.5	RATIO
Al	8.8	4.1	0.47
Ar	8.8	5.9	0.67
Bn	12.8	9.4	0.74
Bs	13.2	10.4	0.79
Ca	15.9	13.5	0.85
Co	30.5	28.5	0.93
Du	14.1	10.9	0.77
Ge	6.6	2.0	0.30
Ka	9.5	3.3	0.35
Ma	25.6	9.2	0.36
QR	27.6	25.6	0.92
SL	15.9	12.9	0.81

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north-east suburbs and the south-west.

worldview.earthdata.nasa.gov

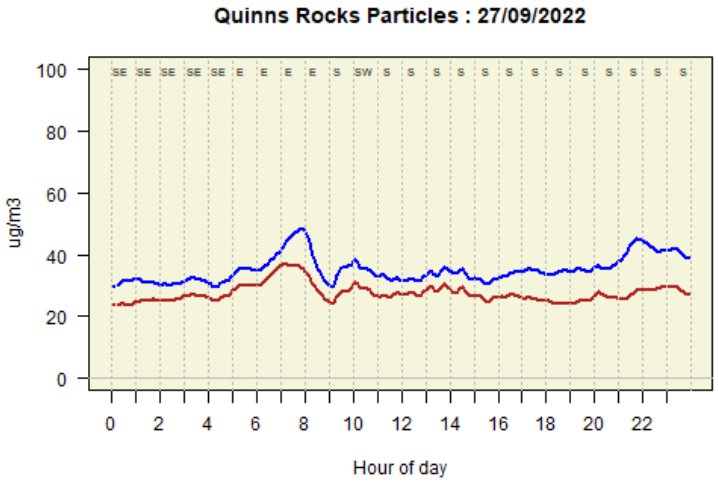


11/09/2022

SITE	PM10	PM2.5	RATIO
Al	8.8	4.1	0.47
Ar	8.8	5.9	0.67
Bn	12.8	9.4	0.74
Bs	13.2	10.4	0.79
Ca	15.9	13.5	0.85
Co	30.5	28.5	0.93
Du	14.1	10.9	0.77
Ge	6.6	2.0	0.30
Ka	9.5	3.3	0.35
Ma	25.6	9.2	0.36
QR	27.6	25.6	0.92
SL	15.9	12.9	0.81

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north-east suburbs and the south-west.

worldview.earthdata.nasa.gov

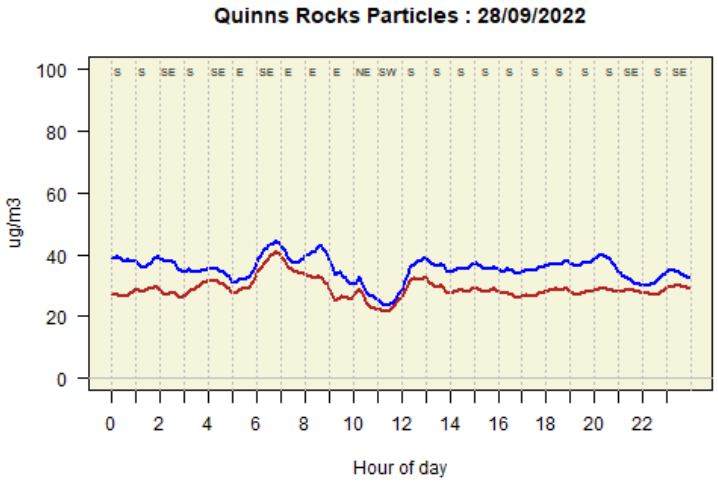


27/09/2022

SITE	PM10	PM2.5	RATIO
Al	9.5	3.7	0.39
Ar	17.2	11.6	0.67
Bn	12.1	5.8	0.48
Bs	12.3	6.6	0.53
Ca	14.4	8.8	0.61
Co	18.1	13.9	0.77
Du	13.3	6.7	0.50
Ge	12.6	3.5	0.28
Ka	8.1	2.1	0.26
Ma	18.9	6.2	0.33
QR	35.2	27.6	0.78
SL	17.1	8.9	0.52

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

worldview.earthdata.nasa.gov

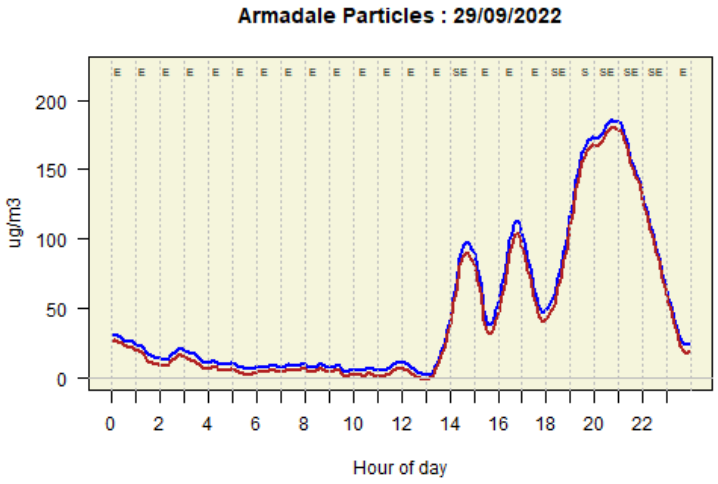


28/09/2022

SITE	PM10	PM2.5	RATIO
Al	9.6	2.6	0.27
Ar	26.8	21.4	0.80
Bn	15.5	9.6	0.62
Bs	11.3	5.2	0.46
Ca	17.6	12.3	0.70
Co	10.7	5.1	0.48
Du	13.0	6.9	0.53
Ge	16.2	6.8	0.42
Ka	18.2	3.5	0.19
Ma	19.0	6.6	0.35
QR	35.4	29.0	0.82
SL	18.3	10.4	0.57

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

worldview.earthdata.nasa.gov

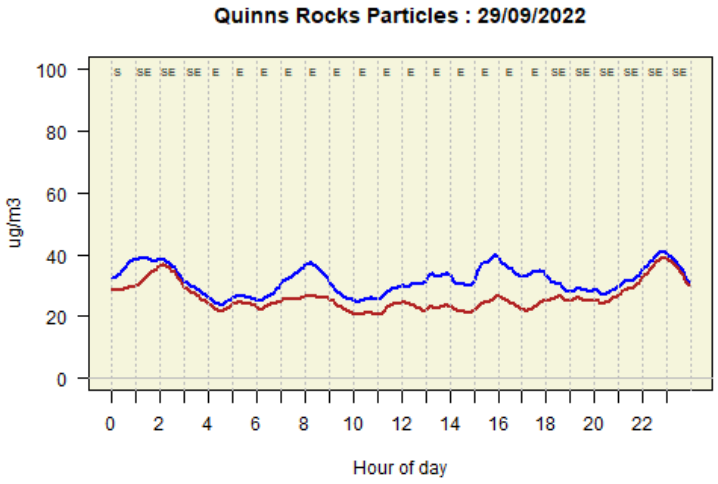


29/09/2022

SITE	PM10	PM2.5	RATIO
Al	17.7	4.5	0.25
Ar	48.8	44.1	0.90
Bn	16.0	7.8	0.49
Bs	12.6	6.2	0.49
Ca	17.5	11.1	0.63
Co	13.7	6.4	0.47
Du	28.8	23.1	0.80
Ge	16.2	3.5	0.22
Ka	20.0	2.9	0.14
Ma	12.1	6.5	0.54
QR	31.8	26.3	0.83
SL	30.5	24.3	0.80

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

worldview.earthdata.nasa.gov



29/09/2022

SITE	PM10	PM2.5	RATIO
Al	17.7	4.5	0.25
Ar	48.8	44.1	0.90
Bn	16.0	7.8	0.49
Bs	12.6	6.2	0.49
Ca	17.5	11.1	0.63
Co	13.7	6.4	0.47
Du	28.8	23.1	0.80
Ge	16.2	3.5	0.22
Ka	20.0	2.9	0.14
Ma	12.1	6.5	0.54
QR	31.8	26.3	0.83
SL	30.5	24.3	0.80

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs and the south-west.

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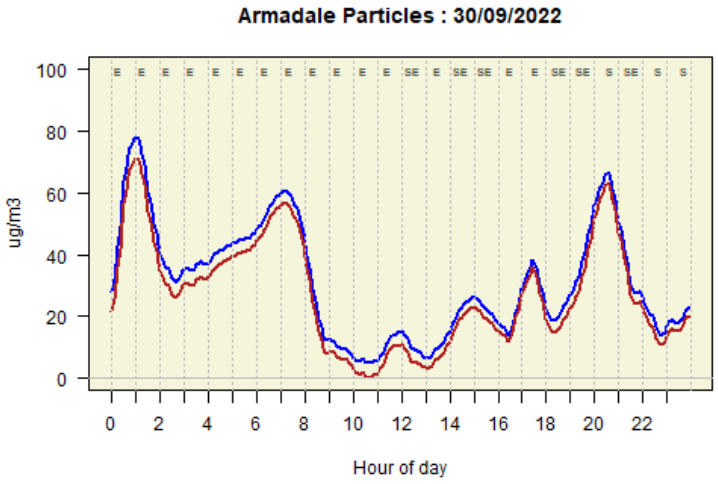
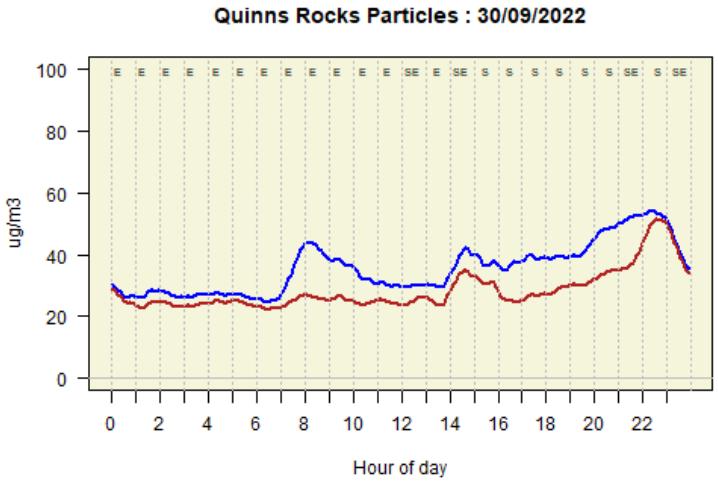


30/09/2022

SITE	PM10	PM2.5	RATIO
Al	10.3	1.6	0.15
Ar	31.2	27.2	0.87
Bn	19.4	13.8	0.71
Bs	10.7	5.6	0.52
Ca	18.1	13.3	0.73
Co	19.6	7.3	0.37
Du	15.7	9.1	0.58
Ge	15.5	5.6	0.36
Ka	12.6	3.2	0.25
Ma	17.9	12.6	0.70
QR	35.6	28.4	0.80
SL	33.4	26.3	0.79

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

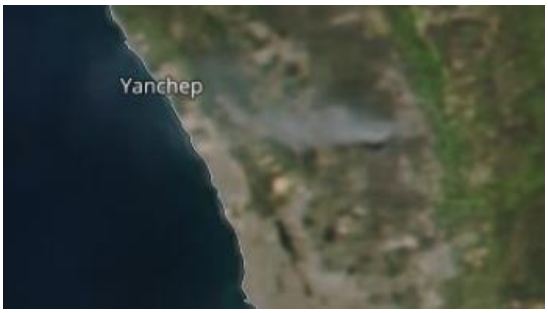
worldview.earthdata.nasa.gov



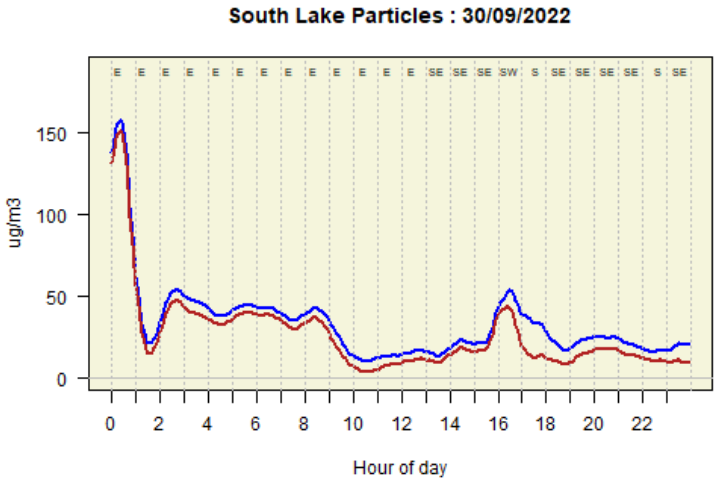
30/09/2022

SITE	PM10	PM2.5	RATIO
Al	10.3	1.6	0.15
Ar	31.2	27.2	0.87
Bn	19.4	13.8	0.71
Bs	10.7	5.6	0.52
Ca	18.1	13.3	0.73
Co	19.6	7.3	0.37
Du	15.7	9.1	0.58
Ge	15.5	5.6	0.36
Ka	12.6	3.2	0.25
Ma	17.9	12.6	0.70
QR	35.6	28.4	0.80
SL	33.4	26.3	0.79

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs.



worldview.earthdata.nasa.gov



30/09/2022

SITE	PM10	PM2.5	RATIO
Al	10.3	1.6	0.15
Ar	31.2	27.2	0.87
Bn	19.4	13.8	0.71
Bs	10.7	5.6	0.52
Ca	18.1	13.3	0.73
Co	19.6	7.3	0.37
Du	15.7	9.1	0.58
Ge	15.5	5.6	0.36
Ka	12.6	3.2	0.25
Ma	17.9	12.6	0.70
QR	35.6	28.4	0.80
SL	33.4	26.3	0.79

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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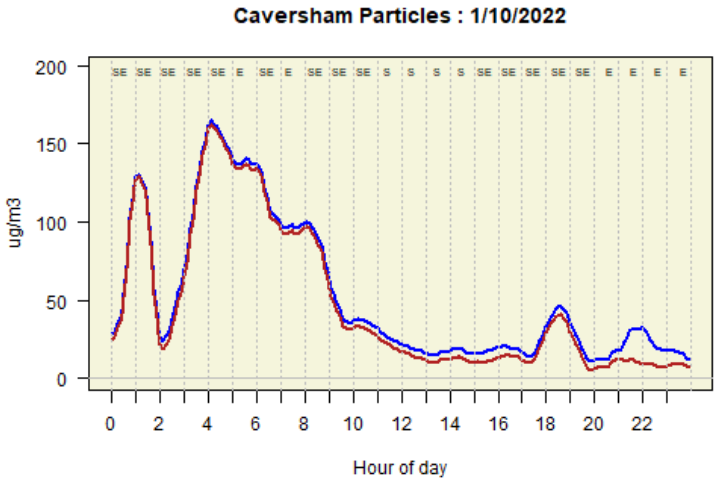
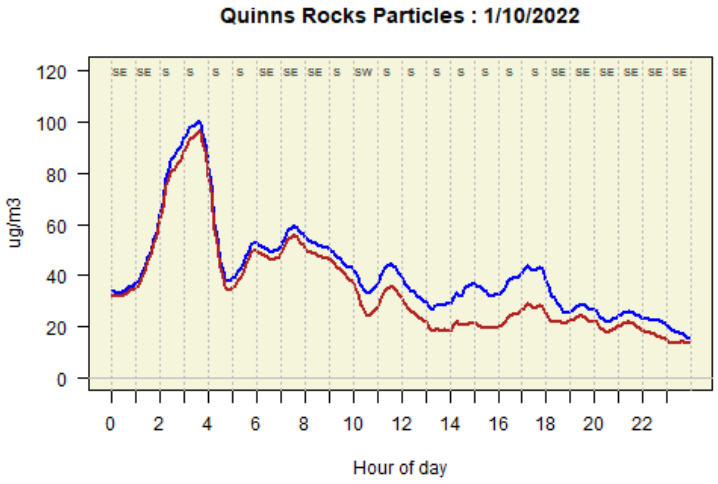


1/10/2022

SITE	PM10	PM2.5	RATIO
Al	9.5	3.1	0.33
Ar	19.6	15.2	0.78
Bn	15.1	9.1	0.61
Bs	9.1	2.8	0.31
Ca	53.0	47.6	0.90
Co	19.5	10.8	0.55
Du	17.2	11.2	0.65
Ge	21.1	8.1	0.38
Ka	5.9	2.4	0.40
Ma	15.2	9.8	0.64
QR	41.6	35.3	0.85
SL	11.4	5.3	0.46

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs.

worldview.earthdata.nasa.gov



1/10/2022

SITE	PM10	PM2.5	RATIO
Al	9.5	3.1	0.33
Ar	19.6	15.2	0.78
Bn	15.1	9.1	0.61
Bs	9.1	2.8	0.31
Ca	53.0	47.6	0.90
Co	19.5	10.8	0.55
Du	17.2	11.2	0.65
Ge	21.1	8.1	0.38
Ka	5.9	2.4	0.40
Ma	15.2	9.8	0.64
QR	41.6	35.3	0.85
SL	11.4	5.3	0.46

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the outer north suburbs.

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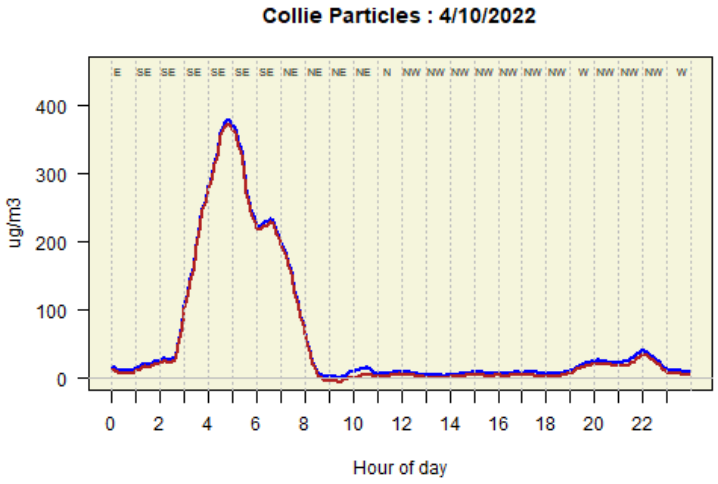
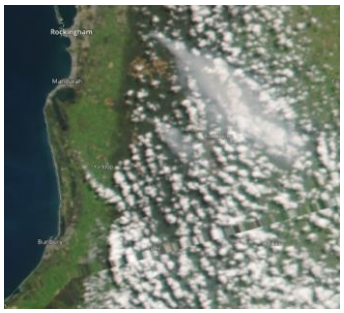


4/10/2022

SITE	PM10	PM2.5	RATIO
Al	6.5	2.3	0.36
Ar	6.2	2.8	0.46
Bn	9.4	3.8	0.40
Bs	9.4	3.1	0.33
Ca	7.6	3.3	0.44
Co	62.0	57.6	0.93
Du	6.1	2.0	0.33
Ge	10.0	3.3	0.33
Ka	9.1	2.9	0.32
Ma	13.2	2.5	0.19
QR	15.0	11.5	0.77
SL	8.0	3.8	0.47

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.



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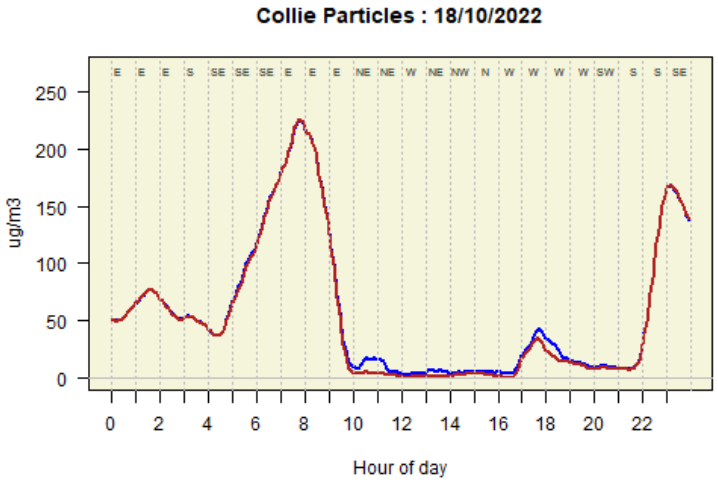

18/10/2022

SITE	PM10	PM2.5	RATIO
Al	11.7	3.9	0.34
Ar	17.0	12.5	0.73
Bn	7.7	0.9	0.11
Bs	11.3	4.6	0.40
Ca	10.7	5.6	0.53
Co	56.9	54.7	0.96
Du	9.9	4.0	0.41
Ge	12.0	2.8	0.24
Ka	8.5	2.5	0.29
Ma	15.9	5.7	0.36
QR	21.0	15.6	0.74
SL	11.1	5.4	0.49

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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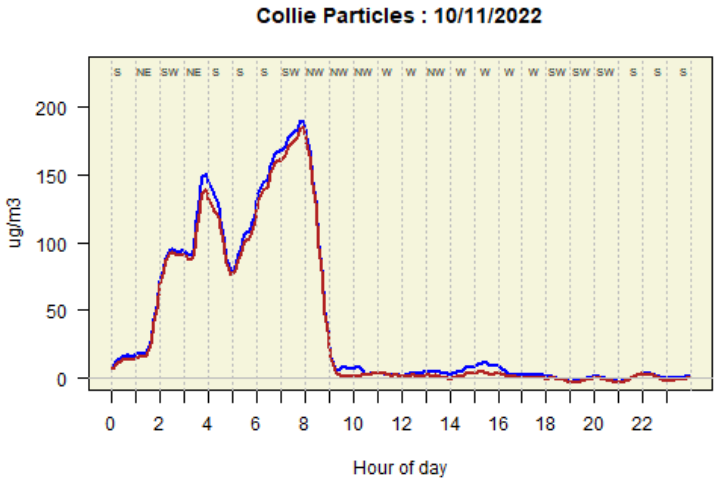

10/11/2022

SITE	PM10	PM2.5	RATIO
Al	5.1	1.6	0.31
Ar	5.7	2.1	0.37
Bn	8.8	2.3	0.26
Bs	5.4	1.2	0.21
Ca	6.4	2.6	0.40
Co	40.1	37.0	0.92
Du	6.2	1.9	0.31
Ge	7.2	1.5	0.21
Ka	6.9	3.0	0.43
Ma	20.3	2.5	0.12
QR	19.6	15.2	0.78
SL	7.4	2.8	0.38

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

SATELLITE IMAGES OBSCURED BY CLOUDS

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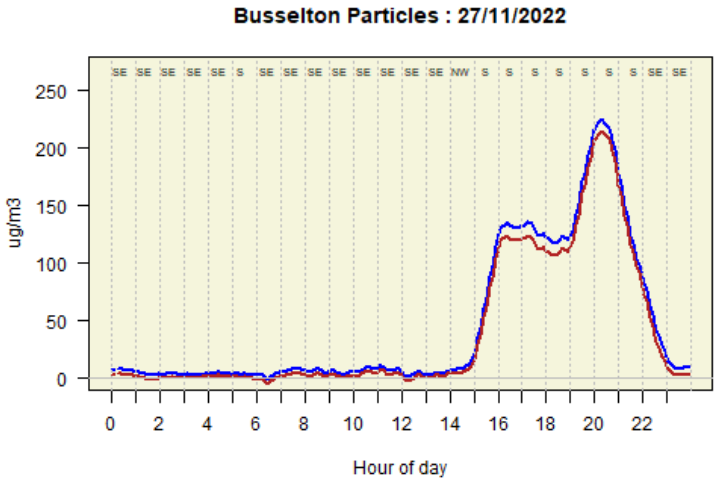

27/11/2022

SITE	PM10	PM2.5	RATIO
Al	8.4	2.3	0.27
Ar	7.3	1.8	0.25
Bn	11.7	5.7	0.49
Bs	46.1	40.4	0.88
Ca	10.4	4.3	0.42
Co	7.2	2.9	0.40
Du	14.4	6.7	0.46
Ge	24.2	8.5	0.35
Ka	7.4	2.3	0.31
Ma	15.3	8.1	0.53
QR	24.6	16.8	0.68
SL	17.5	8.6	0.49

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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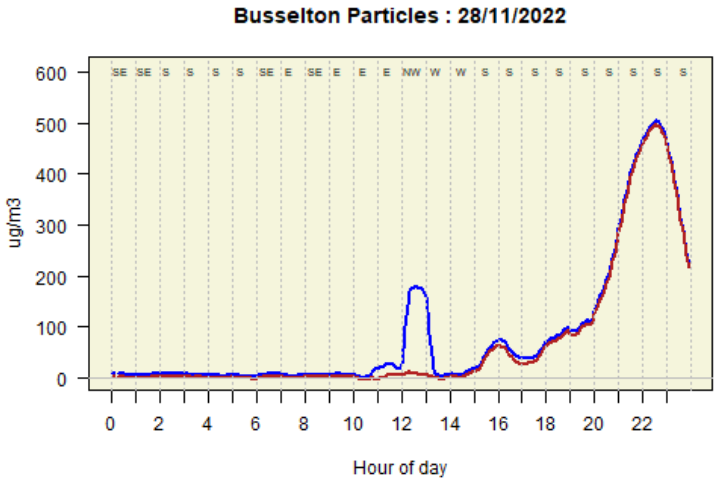

28/11/2022

SITE	PM10	PM2.5	RATIO
Al	4.8	1.3	0.27
Ar	11.4	4.7	0.41
Bn	49.2	41.0	0.83
Bs	85.7	72.0	0.84
Ca	13.4	5.1	0.38
Co	13.0	3.5	0.27
Du	15.3	6.2	0.41
Ge	24.6	8.3	0.34
Ka	11.9	3.4	0.28
Ma	83.4	74.3	0.89
QR	27.0	15.3	0.57
SL	21.5	11.6	0.54

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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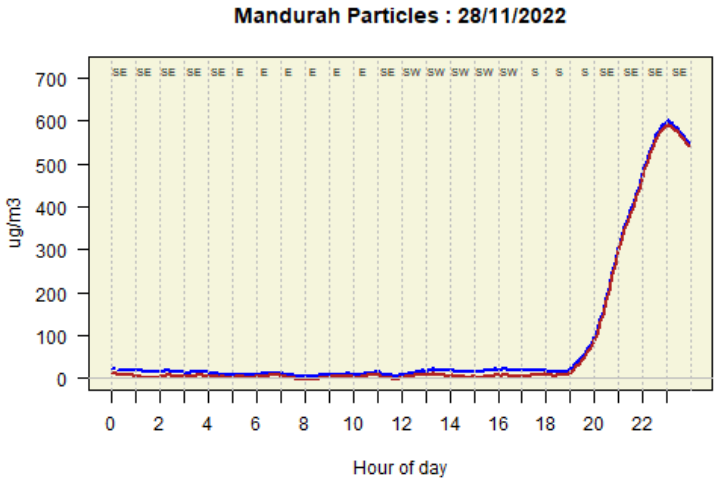

28/11/2022

SITE	PM10	PM2.5	RATIO
Al	4.8	1.3	0.27
Ar	11.4	4.7	0.41
Bn	49.2	41.0	0.83
Bs	85.7	72.0	0.84
Ca	13.4	5.1	0.38
Co	13.0	3.5	0.27
Du	15.3	6.2	0.41
Ge	24.6	8.3	0.34
Ka	11.9	3.4	0.28
Ma	83.4	74.3	0.89
QR	27.0	15.3	0.57
SL	21.5	11.6	0.54

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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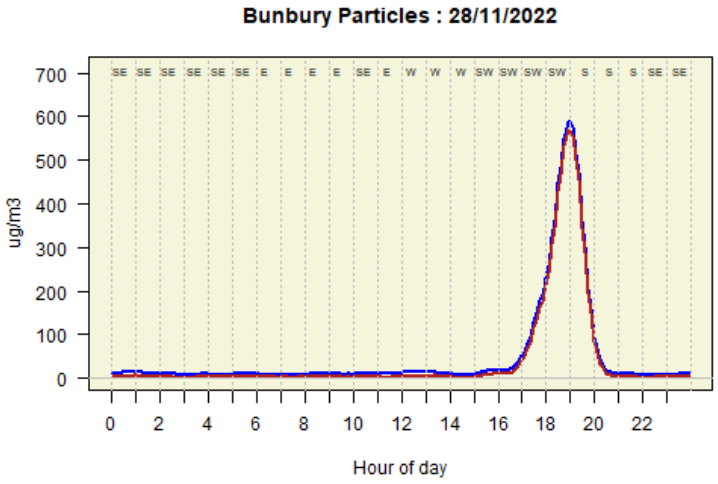

28/11/2022

SITE	PM10	PM2.5	RATIO
Al	4.8	1.3	0.27
Ar	11.4	4.7	0.41
Bn	49.2	41.0	0.83
Bs	85.7	72.0	0.84
Ca	13.4	5.1	0.38
Co	13.0	3.5	0.27
Du	15.3	6.2	0.41
Ge	24.6	8.3	0.34
Ka	11.9	3.4	0.28
Ma	83.4	74.3	0.89
QR	27.0	15.3	0.57
SL	21.5	11.6	0.54

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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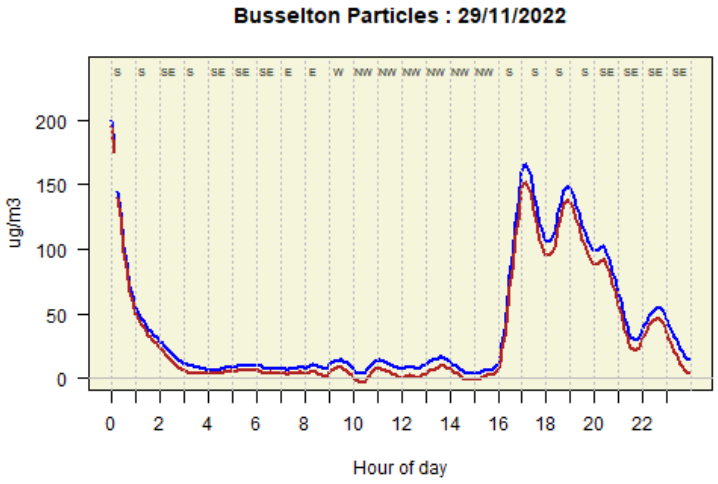

29/11/2022

SITE	PM10	PM2.5	RATIO
Al	12.6	3.3	0.26
Ar	11.7	5.3	0.45
Bn	13.7	4.9	0.36
Bs	39.9	33.2	0.83
Ca	12.8	4.4	0.35
Co	14.2	6.3	0.45
Du	15.9	5.6	0.35
Ge	24.1	6.9	0.29
Ka	10.3	2.0	0.19
Ma	34.5	24.2	0.70
QR	17.5	8.9	0.51
SL	15.3	7.2	0.47

The above particle exceedance was likely caused by prescribed burn smoke and is therefore classed as an Exceptional Event. Burn-off advice from DBCA indicated there were several active burns in the south-west.

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END OF REPORT