

Air quality bulletin

Central Queensland

September 2023



Queensland
Government

Prepared by: Air Quality Monitoring, Department of Environment, Science and Innovation

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March 2024

Introduction

Air quality monitoring gathers information on the quality of the air environment. The objectives of the monitoring are to check compliance with ambient air quality guidelines, identify long-term trends in air quality, investigate local air quality concerns, and assess the effectiveness of air quality management strategies.

In Central Queensland, air quality monitoring was carried out by the Queensland Government at eight sites in the Gladstone region, two sites in Moranbah, and one site in Mackay, Emerald, Blackwater and Bluff during September 2023.

Air pollutants monitored included nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, benzene, toluene, total xylenes, formaldehyde, PM₁₀ and PM_{2.5} (particles with diameters less than 10µm and 2.5µm respectively) and visibility-reducing particles. The air pollutants monitored at Central Queensland sites are shown in Table 1. Site locations are shown in Figure 25 at the end of this bulletin.

The monitoring site in central Gladstone (Memorial Park) uses an open-path monitoring method. Pollutant measurements at this site are the average concentration over the light path running from the Gladstone Entertainment Centre to Memorial Park (see Figure 25).

The monitoring site at Fisherman's Landing was established in March 2016 to measure the impact of any emissions from LNG facilities situated on Curtis Island. The site is located on industrial land and, as such, measured pollutant levels do not reflect typical population exposure in the Gladstone region.

The Moranbah (East) site on Utah Drive was established in March 2011 to assess the impact of coal mining operations on the community. In July 2020 a second Moranbah (West) site on Cunningham Way was commissioned to further assess mining impacts.

The Blackwater and Bluff monitoring sites were established in February 2019 and November 2020 respectively to also assess the impact of coal mining operations. The Emerald site was established in February 2020 to obtain information on particle levels in an inland community not impacted by mining activities.

Reporting protocol

Data presented in this bulletin are based on clock hours. Hourly or other averages are constrained to start and finish on a clock hour.

Air quality summary graphs

The maximum recorded level for each day is used to show the day-to-day variation in air quality. Figures 1 to 19 summarise the air quality data for the Gladstone region sites and figures 20 to 24 summarise the air quality data for the Mackay and Inland Central Queensland sites.

Air quality summary tables

Tables 4 to 17 present monthly summaries of air quality data for the preceding 12 months. These tables show the month-to-month variation in air quality. A monthly entry is given when at least three-fifths of the maximum possible number of observations during the month are available. When data is not available for the entire month, due to equipment malfunction or other reason, this is indicated by the abbreviation 'n.d.' (no data). A dash is inserted when less than three-fifths of the data are available. Where no data is recorded, the reason for the low data availability is summarised in Table 18 at the end of this bulletin.

Guidelines

Air quality measurements are compared against air quality standards contained in the Queensland Environmental Protection (Air) Policy 2019 (EPP (Air)) to assess whether pollutant levels could harm health and wellbeing. The EPP (Air) visibility objective is used to assess the impact of visibility-reducing particles on visual air quality. The relevant guidelines are shown in the air quality summary table for each pollutant.

Table 1. Air pollutants monitored at Central Queensland sites.

		Nitrogen dioxide	Sulfur dioxide	Carbon monoxide	Ozone	Benzene	Toluene	Total xylenes	Formaldehyde	PM ₁₀	PM _{2.5}	Visibility-reducing particles
Gladstone region	Targinie	✓	✓							✓	✓	✓
	Fisherman's Landing									✓	✓	✓
	Boat Creek	✓	✓							✓	✓	✓
	Clinton	✓	✓							✓	✓	✓
	Auckland Point									✓		
	Memorial Park	✓	✓		✓	✓	✓	✓	✓			
	South Gladstone	✓	✓							✓	✓	✓
	Boyne Island	✓	✓	✓						✓	✓	✓
Mackay	West Mackay									✓	✓	✓
Inland Central Queensland	Moranbah (East)									✓	✓	
	Moranbah (West)									✓	✓	
	Blackwater									✓	✓	
	Bluff									✓		
	Emerald									✓	✓	

Compliance with air quality guidelines - Gladstone region

During September, measured pollutant levels, with the exception of PM₁₀, PM_{2.5} and visibility-reducing particles, did not exceed the relevant air quality guideline at Queensland Government and industry air monitoring sites in the Gladstone

Smoke from a vegetation fire near Landing Road, Yarwun resulted in exceedances of the EPP (Air) PM₁₀ and PM_{2.5} 24-hour objectives at the Boat Creek monitoring site on 6 September. The smoke also reduced visibility to less than the EPP (Air) 1-hour objective of 20km at the Boat Creek site for two one-hour periods on this day.

The EPP (Air) PM₁₀ 24-hour objective was exceeded at the Fisherman's Landing monitoring site on 12 September. The elevated PM₁₀ concentrations occurred during southerly winds, indicating that the LNG facilities located to the north-east of the site did not contribute to this exceedance. Activities taking place within the industrial area where the Fisherman's Landing monitoring site is located, including vehicle movements on unsealed roads, are likely to have been responsible. The elevated dust levels did not extend beyond the industrial area, as demonstrated by the significantly lower PM₁₀ concentrations measured at the nearby Boat Creek and Targinie monitoring sites on this day.

Over the 12-month period ending September 2023, the EPP (Air) annual average PM₁₀ objective was exceeded at the Fisherman's Landing monitoring site. This was primarily due to activities taking place within the industrial area where the monitoring station is located, in particular dust generated by vehicle movements on unsealed roads.

Table 2. Number of occasions during September when measured levels exceeded EPP (Air) objectives for nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone, benzene, toluene, xylenes, formaldehyde, PM₁₀, PM_{2.5} and visibility-reducing particles at the Queensland Government air monitoring sites in the Gladstone region.

Air Pollutant	Averaging period	Exceedances
Nitrogen dioxide	<i>EPP (Air)</i>	
	Annual	0
	1-hour	0
Sulfur dioxide	<i>EPP (Air)</i>	
	Annual	0
	24-hour	0
	1-hour	0
Carbon monoxide	<i>EPP (Air)</i>	
	8-hour	0
Ozone	<i>EPP (Air)</i>	
	4-hour	0
	1-hour	0
Benzene	<i>EPP (Air)</i>	
	Annual	0
Toluene	<i>EPP (Air)</i>	
	Annual	0
	24-hour	0
Xylenes	<i>EPP (Air)</i>	
	Annual	0
	24-hour	0
Formaldehyde	<i>EPP (Air)</i>	
	24-hour	0
PM ₁₀	<i>EPP (Air)</i>	
	Annual	1
	24-hour	2
PM _{2.5}	<i>EPP (Air)</i>	
	Annual	0
	24-hour	1
Visibility-reducing particles (refers to protecting aesthetic environment, not health and wellbeing).	<i>EPP (Air)</i>	
	1-hour	2

Compliance with air quality guidelines - Mackay and inland Central Queensland.

During September, measured pollutant levels with the exception of PM₁₀ and PM_{2.5}, did not exceed EPP (Air) air quality objectives at the Queensland Government air monitoring sites in Mackay, Moranbah, Emerald, Blackwater and Bluff.

During September, there were a number of major vegetation fires in the Central Queensland region at times. Between 9 and 15 September, smoke from bushfires in the Dingo and Humboldt areas was responsible for exceedances of the EPP (Air) 24-hour PM₁₀ objective at Blackwater on three days and at Bluff on six days. The EPP (Air) 24-hour PM_{2.5} objective was also exceeded at Blackwater station on six days over this period.

Smoke from a bushfire in the Blackdown Tableland National Park was responsible for exceedances of the EPP (Air) 24-hour PM₁₀ objective at Bluff on 21 September and at Emerald, Blackwater and Bluff on 22 September. The EPP (Air) 24-hour PM_{2.5} objective was also exceeded at Emerald and Blackwater on 22 September.

The EPP (Air) 24-hour PM₁₀ objective was exceeded at the Moranbah (West) monitoring site on 22 June. The elevated PM₁₀ levels were measured over a two hour period during northeasterly winds. While a specific source of the particles could not be determined, significantly lower PM₁₀ levels at the Moranbah (East) site over the same period suggests that the source was in close proximity to the Moranbah (West) site, and could possibly have been vehicle movements on unsealed roads.

Over the 12-month period ending September 2023, the EPP (Air) annual average PM₁₀ objective was exceeded at the Bluff monitoring site. Local PM₁₀ emission sources, including dust from coal mining operations, together with additional PM₁₀ emissions from large regional hazard reduction burning and bushfire smoke events in May and September 2023, led to this exceedance.

Table 3. Number of occasions during September when measured levels exceeded EPP (Air) objectives for PM_{2.5}, PM₁₀, and visibility-reducing particles at Queensland Government air monitoring sites in Mackay, Moranbah, Emerald, Blackwater and Bluff.

Pollutant	Averaging period	Exceedences
PM ₁₀	<i>EPP (Air)</i>	1
	Annual 24-hour	14
PM _{2.5}	<i>EPP (Air)</i>	0
	Annual 24-hour	8
Visibility-reducing particles (refers to protecting aesthetic environment, not health and wellbeing).	<i>EPP (Air)</i> 1-hour	0

Measured ambient concentrations - Gladstone region

Nitrogen dioxide

Figure 1. Ambient concentrations of nitrogen dioxide at Targinie, Boat Creek and Clinton sites. Daily maximum 1-hour average concentrations (ppm), September 2023.

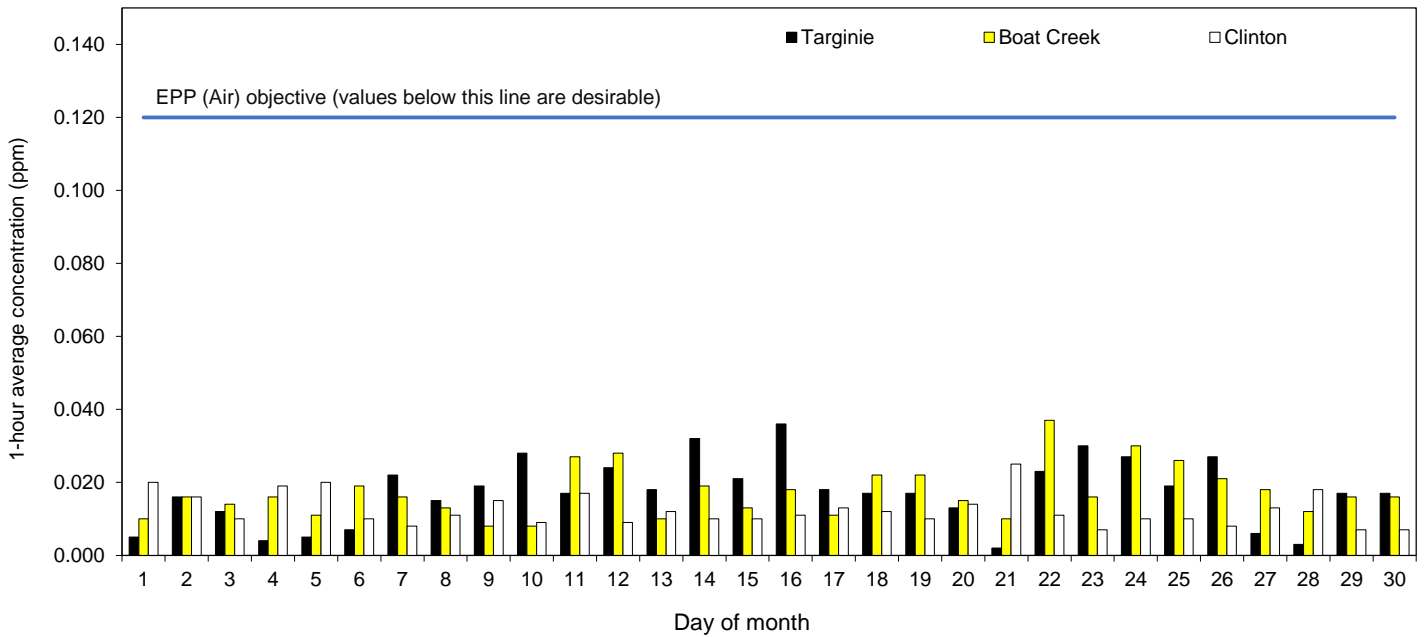


Figure 2. Ambient concentrations of nitrogen dioxide at Memorial Park, South Gladstone and Boyne Island sites. Daily maximum 1-hour average concentrations (ppm), September 2023.

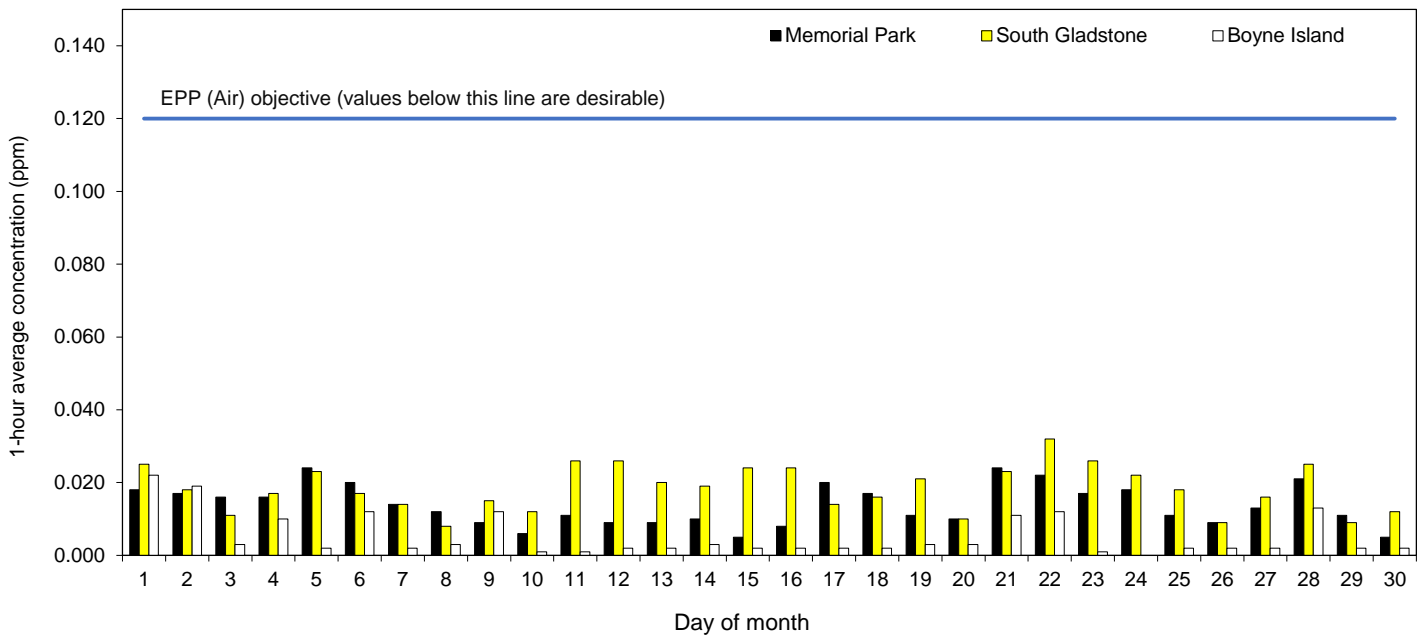


Table 4. Ambient concentrations of nitrogen dioxide. Annual average and monthly maximum 1-hour concentrations (ppm), October 2022 to September 2023.

Site		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region													
Targinie													
Annual average:	0.003												
Maximum 1-hour		n.d.	n.d.	n.d.	-	0.020	0.022	0.032	0.031	0.029	0.032	0.037	0.036
% I.A.		0	0	0	43	99	98	100	100	99	100	99	100
Boat Creek													
Annual average:	0.005												
Maximum 1-hour		0.028	0.022	0.023	0.025	0.023	0.022	0.024	0.026	0.030	0.024	0.031	0.037
% I.A.		99	100	99	100	99	99	100	99	100	100	100	100
Clinton													
Annual average:	0.004												
Maximum 1-hour		0.022	0.016	0.025	0.011	-	0.016	0.020	0.028	0.030	0.023	0.022	0.025
% I.A.		99	99	86	66	27	71	100	100	99	100	99	100
Memorial Park													
Annual average:	0.004												
Maximum 1-hour		0.024	0.022	0.019	0.020	0.039	0.023	0.022	0.030	0.030	0.031	0.029	0.024
% I.A.		100	100	100	91	100	100	100	100	99	99	100	99
South Gladstone													
Annual average:	0.004												
Maximum 1-hour		0.026	0.024	0.023	0.021	0.033	0.032	0.023	0.026	0.029	0.030	0.027	0.032
% I.A.		99	100	100	100	99	100	100	99	100	99	96	99
Boyne Island													
Annual average:	0.001												
Maximum 1-hour		0.020	0.016	0.018	0.012	0.015	0.010	0.025	0.007	0.016	0.009	0.024	0.022
% I.A.		99	99	100	99	97	100	100	100	99	99	100	100
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.													
The Environmental Protection (Air) Policy 2019 air quality objectives for nitrogen dioxide are an annual average of 0.030ppm and a 1-hour average of 0.120ppm.													

Sulfur dioxide

Figure 3. Ambient concentrations of sulfur dioxide at Targinie, Boat Creek and Clinton sites. Daily 24-hour average concentrations (ppm), September 2023.

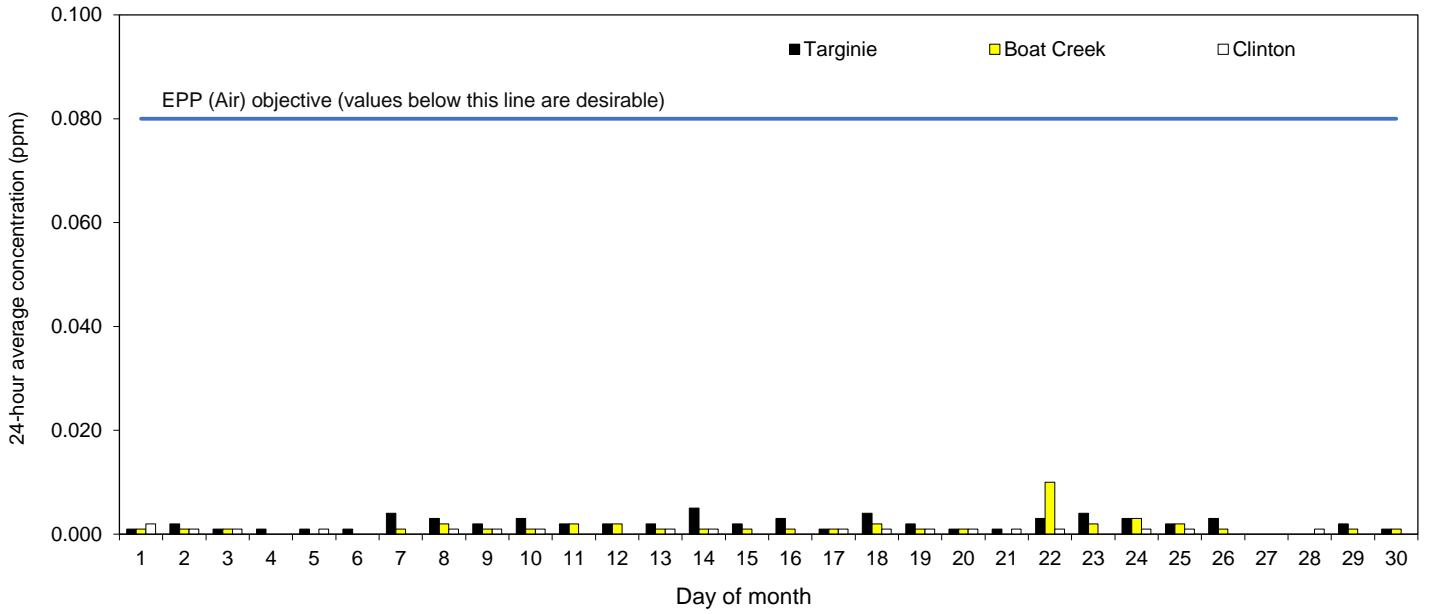


Figure 4. Ambient concentrations of sulfur dioxide at Memorial Park, South Gladstone and Boyne Island sites. Daily 24-hour average concentrations (ppm), September 2023.

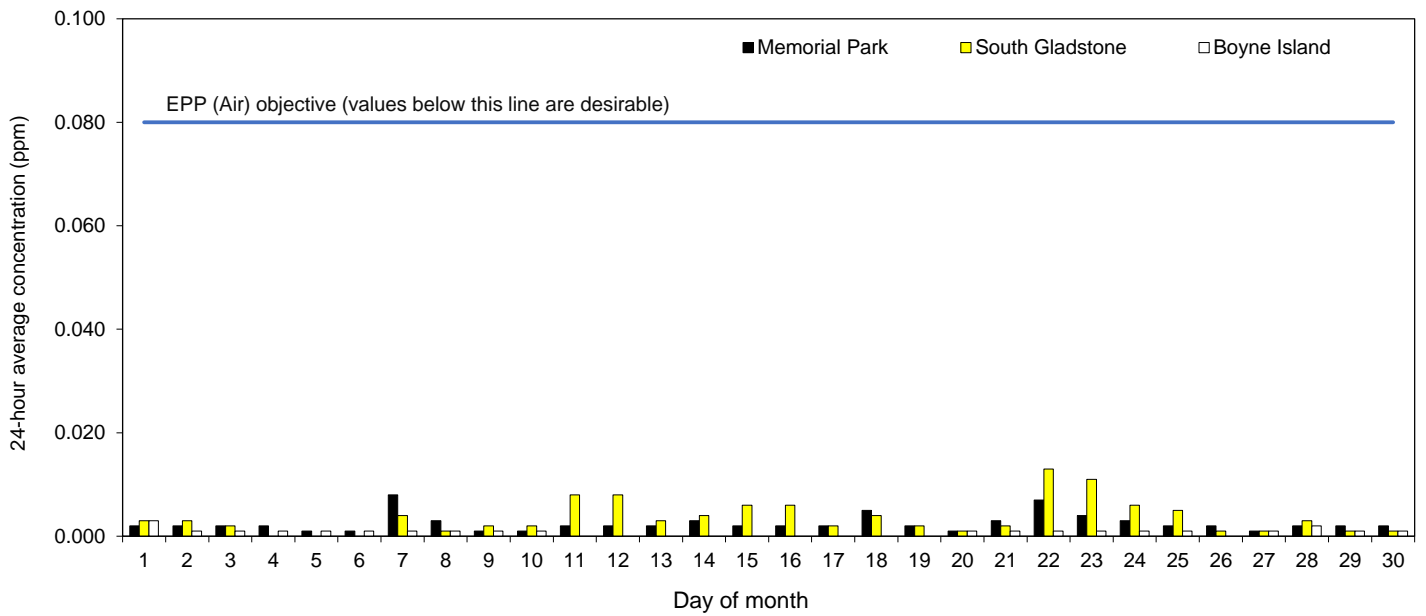


Figure 5. Ambient concentrations of sulfur dioxide at Targinie, Boat Creek and Clinton sites. Daily maximum 1-hour average concentrations (ppm), September 2023.

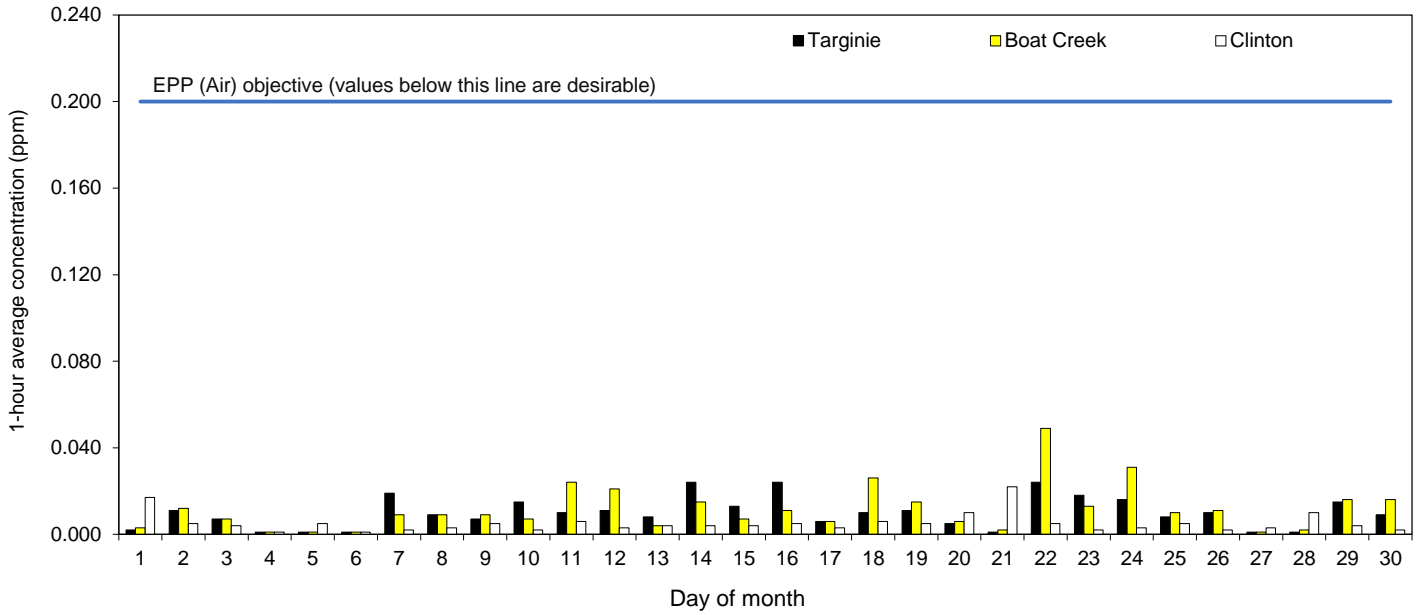


Figure 6. Ambient concentrations of sulfur dioxide at Memorial Park, South Gladstone and Boyne Island sites. Daily maximum 1-hour average concentrations (ppm), September 2023.

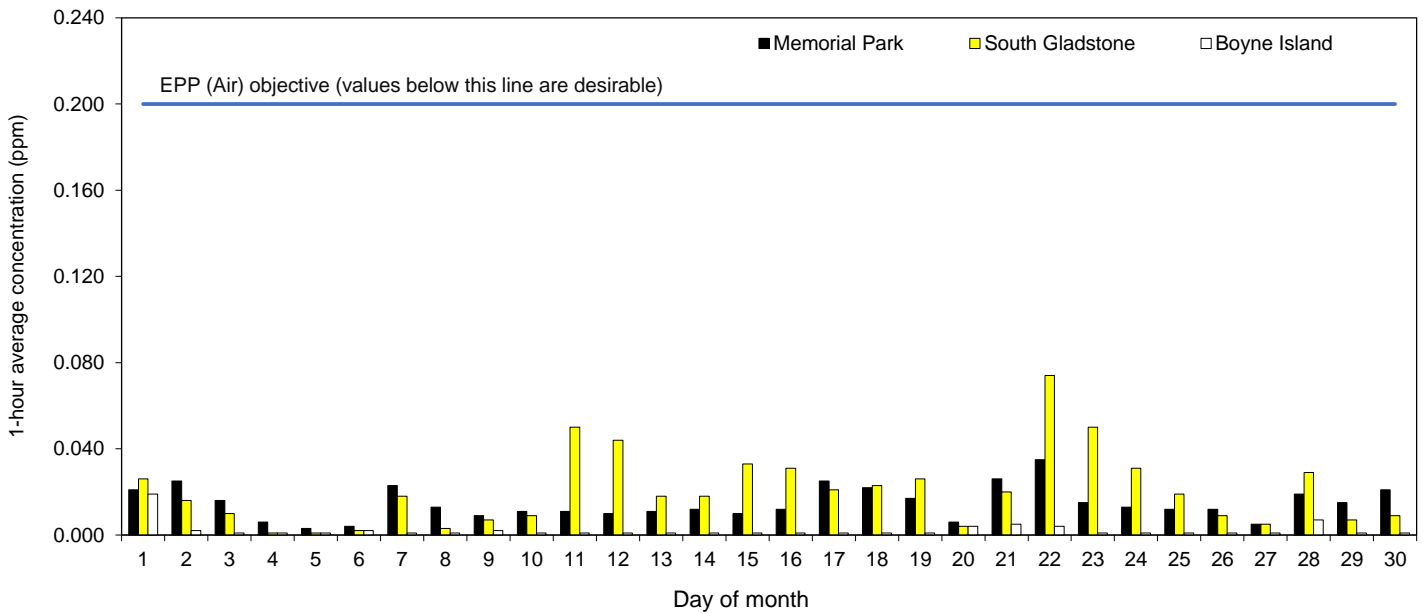


Table 5. Ambient concentrations of sulfur dioxide. Annual average and monthly maximum 24-hour and 1-hour average concentrations (ppm), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Targinie												
Annual average:	0.002											
Maximum 24-hour	n.d.	n.d.	n.d.	-	0.007	0.005	0.004	0.005	0.005	0.006	0.005	0.005
Maximum 1-hour	n.d.	n.d.	n.d.	-	0.020	0.019	0.025	0.025	0.028	0.024	0.035	0.024
% I.A.	0	0	0	43	99	91	100	100	99	99	99	100
Boat Creek												
Annual average:	0.001											
Maximum 24-hour	0.007	0.002	0.005	0.005	0.003	0.003	0.003	0.007	0.010	0.007	0.003	0.010
Maximum 1-hour	0.031	0.015	0.024	0.040	0.018	0.019	0.026	0.030	0.048	0.034	0.024	0.049
% I.A.	99	100	99	100	99	99	100	75	100	100	100	100
Clinton												
Annual average:	0.001											
Maximum 24-hour	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.001	0.003	0.002	0.001	0.002
Maximum 1-hour	0.012	0.016	0.027	0.014	0.016	0.016	0.011	0.013	0.021	0.011	0.008	0.022
% I.A.	99	99	99	99	89	78	100	100	99	100	64	100
Memorial Park												
Annual average:	0.002											
Maximum 24-hour	0.010	0.006	0.005	0.005	0.008	0.006	0.007	0.004	0.006	0.010	0.005	0.008
Maximum 1-hour	0.081	0.035	0.022	0.024	0.082	0.048	0.032	0.044	0.044	0.037	0.043	0.035
% I.A.	100	100	100	91	100	100	100	100	98	99	100	99
South Gladstone												
Annual average:	0.002											
Maximum 24-hour	0.012	0.010	0.015	0.008	0.010	0.009	0.005	0.005	0.005	0.004	0.007	0.013
Maximum 1-hour	0.039	0.055	0.058	0.046	0.056	0.045	0.044	0.039	0.031	0.035	0.041	0.074
% I.A.	99	100	100	100	99	100	100	99	100	99	96	99
Boyne Island												
Annual average:	0.001											
Maximum 24-hour	0.004	0.002	0.002	0.004	0.002	0.002	0.007	0.002	0.004	0.002	0.011	0.003
Maximum 1-hour	0.030	0.015	0.011	0.026	0.022	0.009	0.042	0.007	0.026	0.008	0.055	0.019
% I.A.	99	99	99	99	97	100	100	100	99	100	100	100
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.												
The Environmental Protection (Air) Policy 2019 air quality objectives for sulfur dioxide are an annual average of 0.020ppm, a 24-hour average of 0.080ppm (not to be exceeded on more than one day per year) and a 1-hour average of 0.200ppm (not to be exceeded on more than one day per year).												

Carbon monoxide

Figure 7. Ambient concentrations of carbon monoxide at Boyne Island site. Daily maximum 8-hour average concentrations (ppm), September 2023.

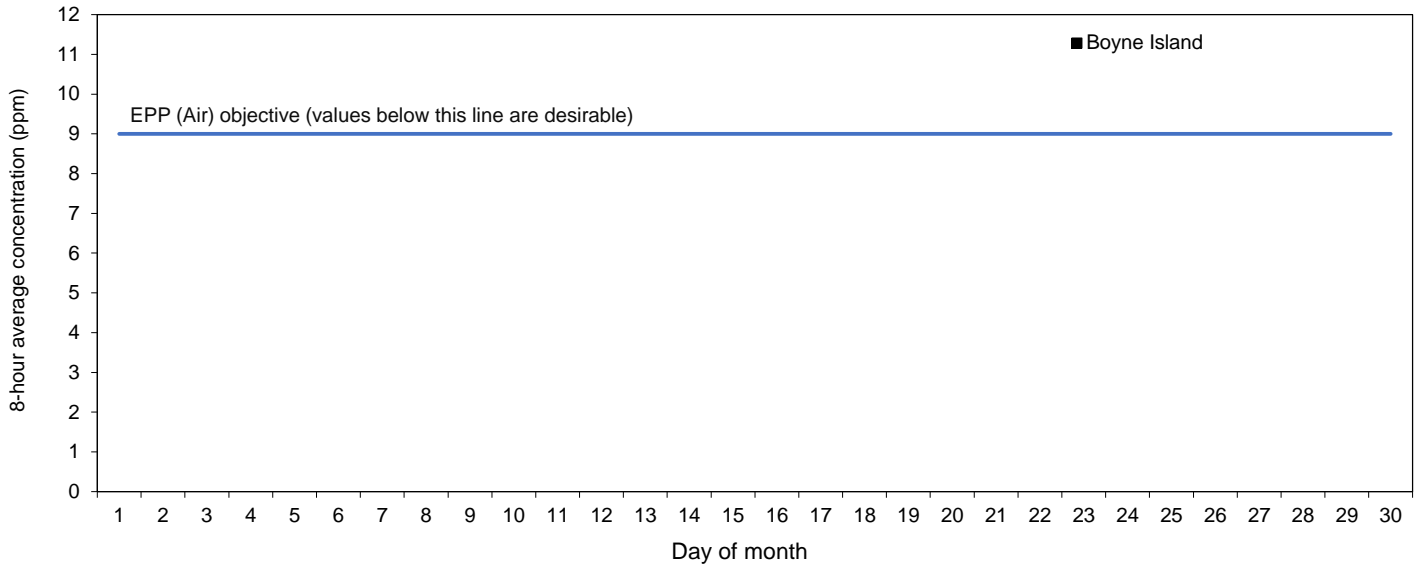


Table 6. Ambient concentrations of carbon monoxide. Monthly maximum 8-hour average concentrations (ppm), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Boyne Island												
Maximum 8-hour	-	n.d.	n.d.	n.d.	-	0.26	0.30	0.21	0.27	n.d.	n.d.	n.d.
% I.A.	37	0	0	0	50	100	100	100	99	0	0	0
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objective for carbon monoxide is an 8-hour average of 9ppm (not to be exceeded on more than one day per year).												

Ozone (photochemical oxidants)

Figure 8. Ambient concentrations of ozone at Memorial Park site. Daily maximum 4-hour average concentrations (ppm), September 2023.

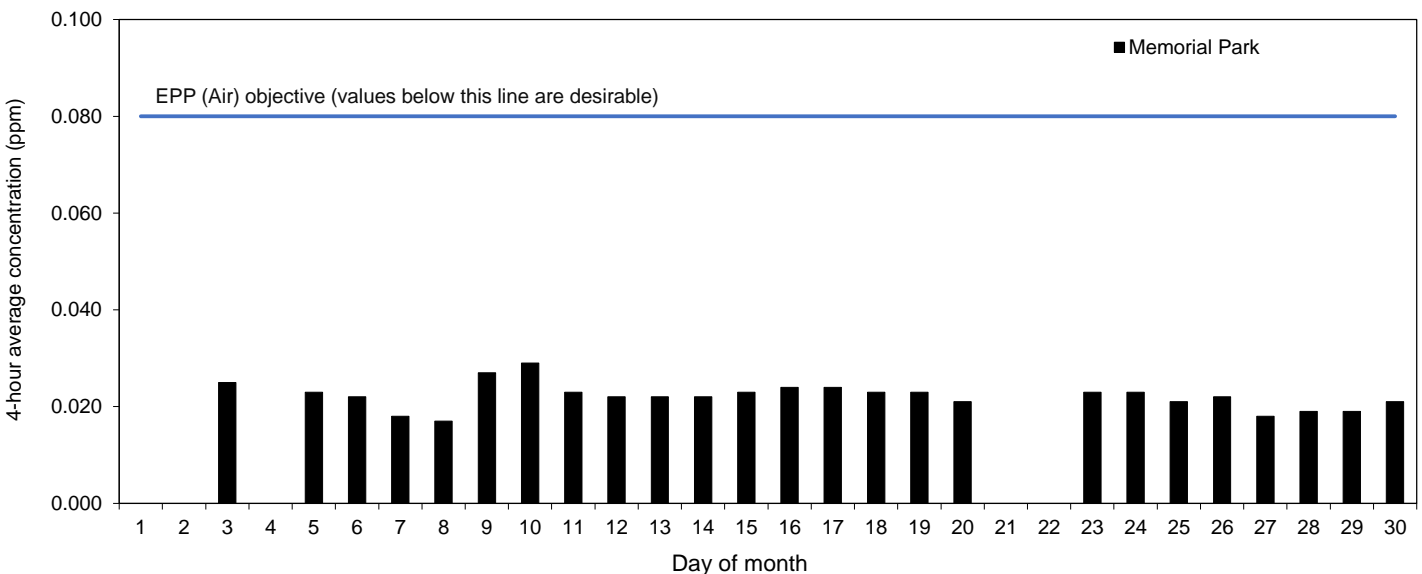


Figure 9. Ambient concentrations of ozone at Memorial Park site. Daily maximum 1-hour average concentrations (ppm), September 2023.

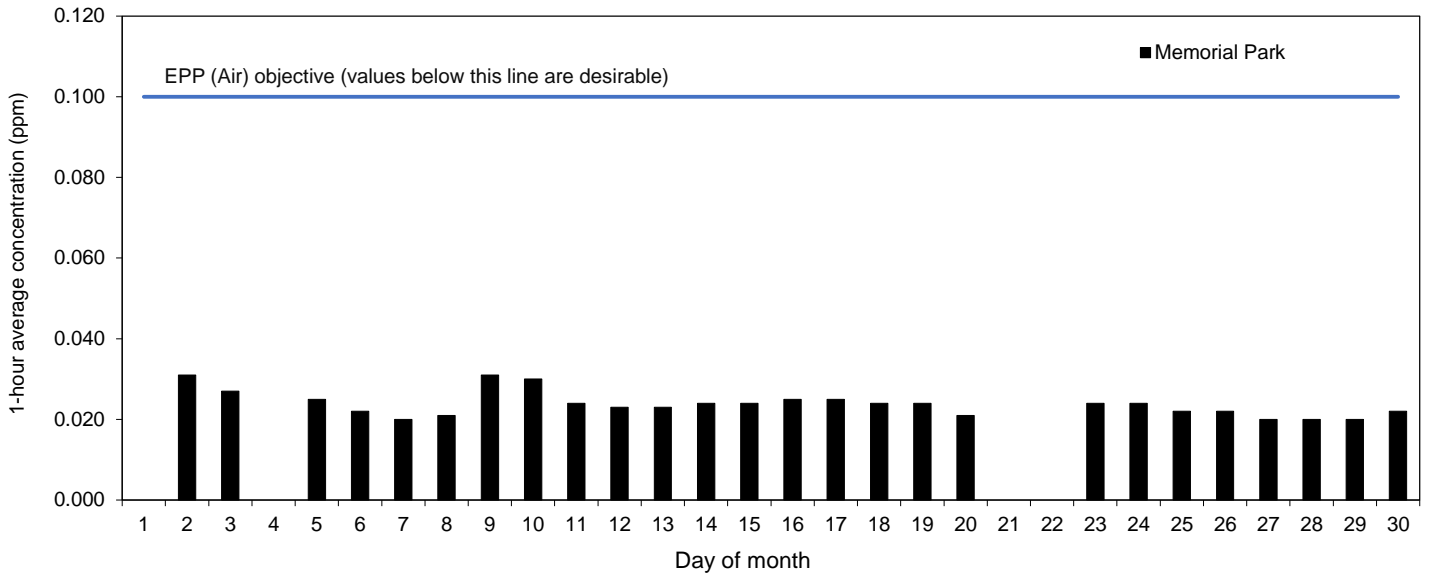


Table 7. Ambient concentrations of ozone. Monthly maximum 4-hour and 1-hour average concentrations (ppm), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Memorial Park												
Maximum 4-hour	0.039	0.026	0.029	0.029	0.029	0.032	0.032	0.027	0.031	0.028	0.030	0.029
Maximum 1-hour	0.043	0.028	0.031	0.032	0.031	0.035	0.034	0.029	0.036	0.030	0.035	0.031
% I.A.	97	100	97	88	97	94	98	95	94	96	96	92

% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.

The Environmental Protection (Air) Policy 2019 air quality objectives for ozone are a 4-hour average of 0.080ppm (not to be exceeded on more than one day per year) and a 1-hour average of 0.100ppm (not to be exceeded on more than one day per year).

Benzene

Figure 10. Ambient concentrations of benzene at Memorial Park site. Daily 24-hour average concentrations (ppb), September 2023.

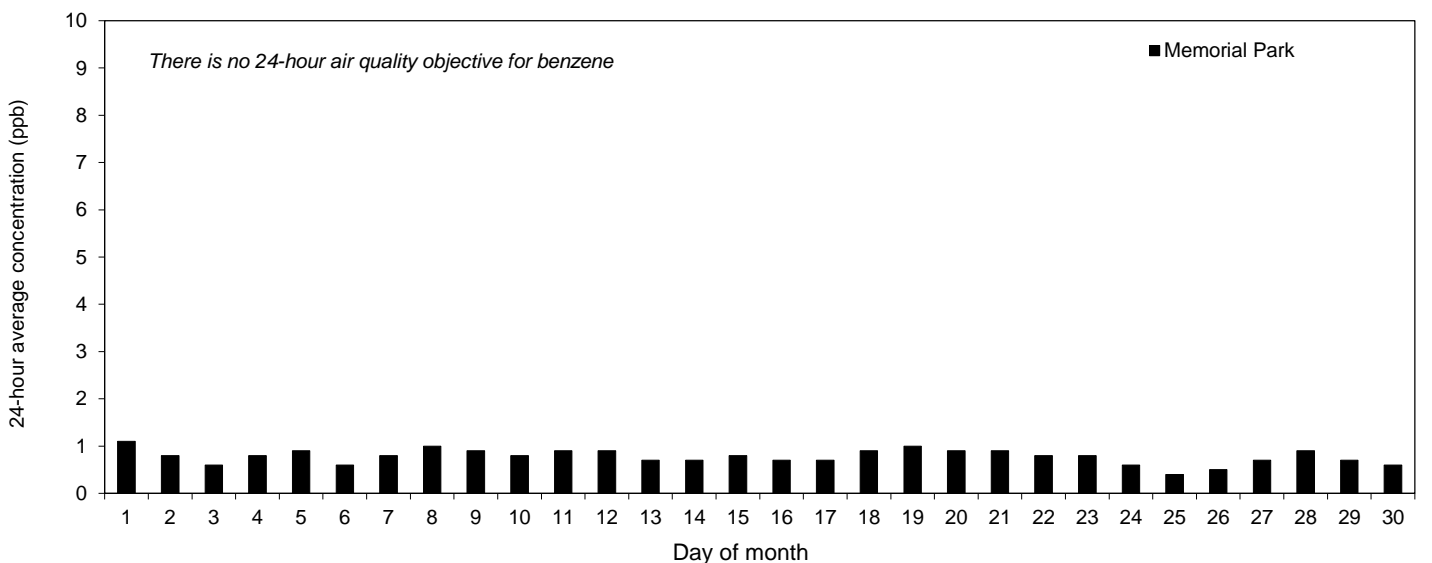


Table 8. Ambient concentrations of benzene. Annual average and monthly maximum 24-hour concentrations (ppb), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Memorial Park												
Annual average:	0.8											
Maximum 24-hour	1.1	0.9	1.1	1.0	1.0	1.2	1.2	1.1	1.1	1.2	1.0	1.1
% I.A.	99	100	99	91	99	100	99	99	97	98	99	98
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objective for benzene is an annual average of 0.002ppm (2ppb).												

Toluene

Figure 11. Ambient concentrations of toluene at Memorial Park site. Daily 24-hour average concentrations (ppb), September 2023.

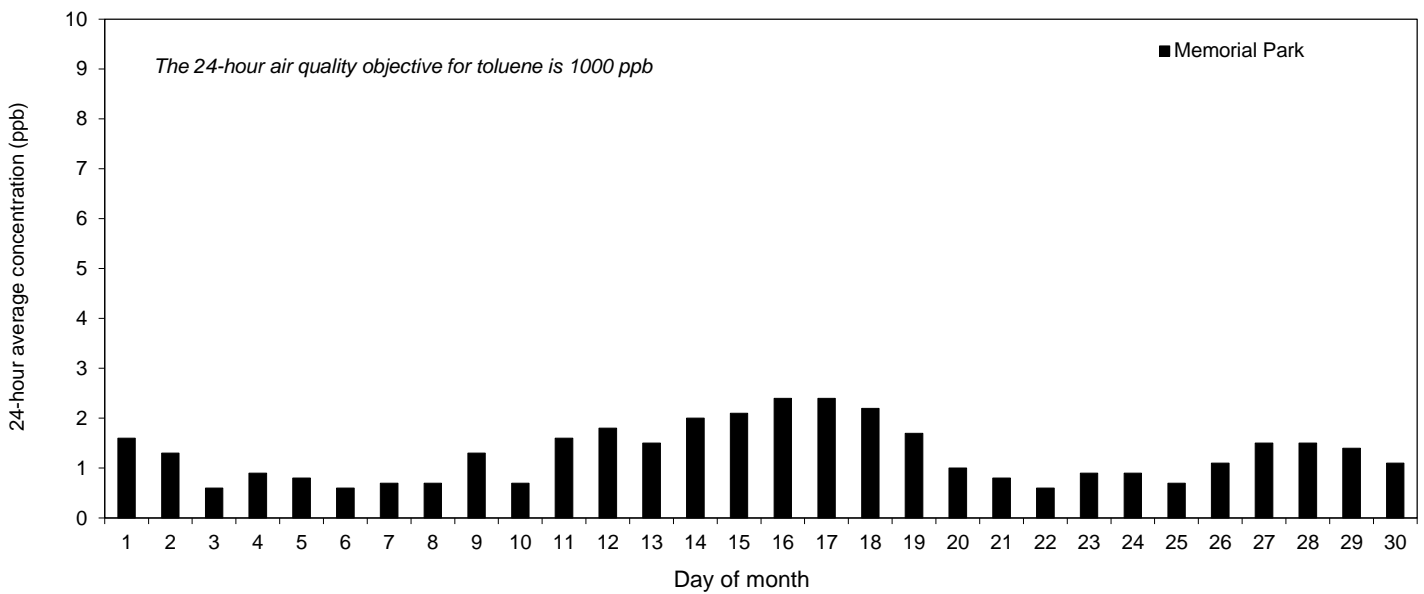


Table 9. Ambient concentrations of toluene. Annual average and monthly maximum 24-hour concentrations (ppb), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Memorial Park												
Annual average:	1.0											
Maximum 24-hour	1.4	1.3	1.3	0.9	1.1	4.2	1.9	4.0	4.3	4.1	2.9	2.4
% I.A.	99	100	99	90	99	99	100	99	98	99	99	98
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objectives for toluene are an annual average of 0.1ppm (100ppb) and a 24-hour average of 1ppm (1000ppb).												

Total xylenes

Figure 12. Ambient concentrations of total xylenes at Memorial Park site. Daily 24-hour average concentrations (ppb), September 2023.

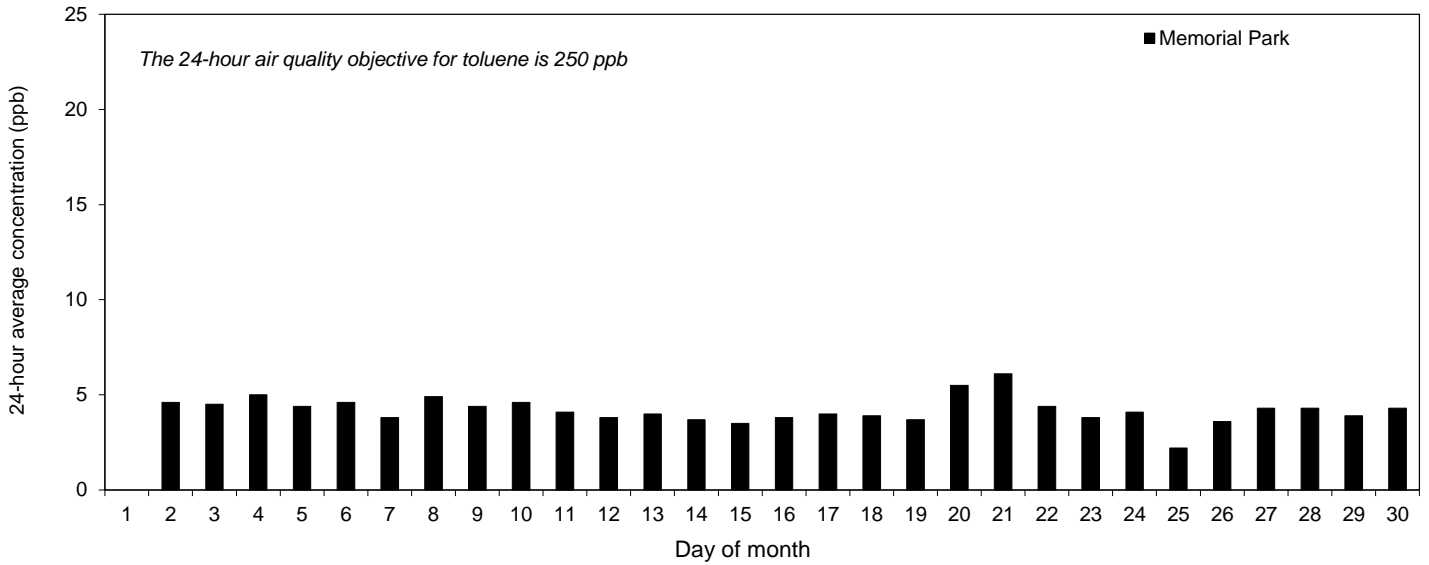


Table 10. Ambient concentrations of total xylenes. Annual average and monthly maximum 24-hour concentrations (ppb), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Memorial Park												
Annual average:	3.7											
Maximum 24-hour	5.5	8.7	5.8	5.0	5.0	4.1	5.4	4.7	4.3	5.8	5.2	6.1
% I.A.	97	100	97	88	98	97	96	94	94	98	98	95
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objectives for total xylenes are an annual average of 0.2ppm (200ppb) and a 24-hour average of 0.25ppm (250ppb).												

Formaldehyde

Figure 13. Ambient concentrations of formaldehyde at Memorial Park site. Daily 24-hour average concentrations (ppb), September 2023.

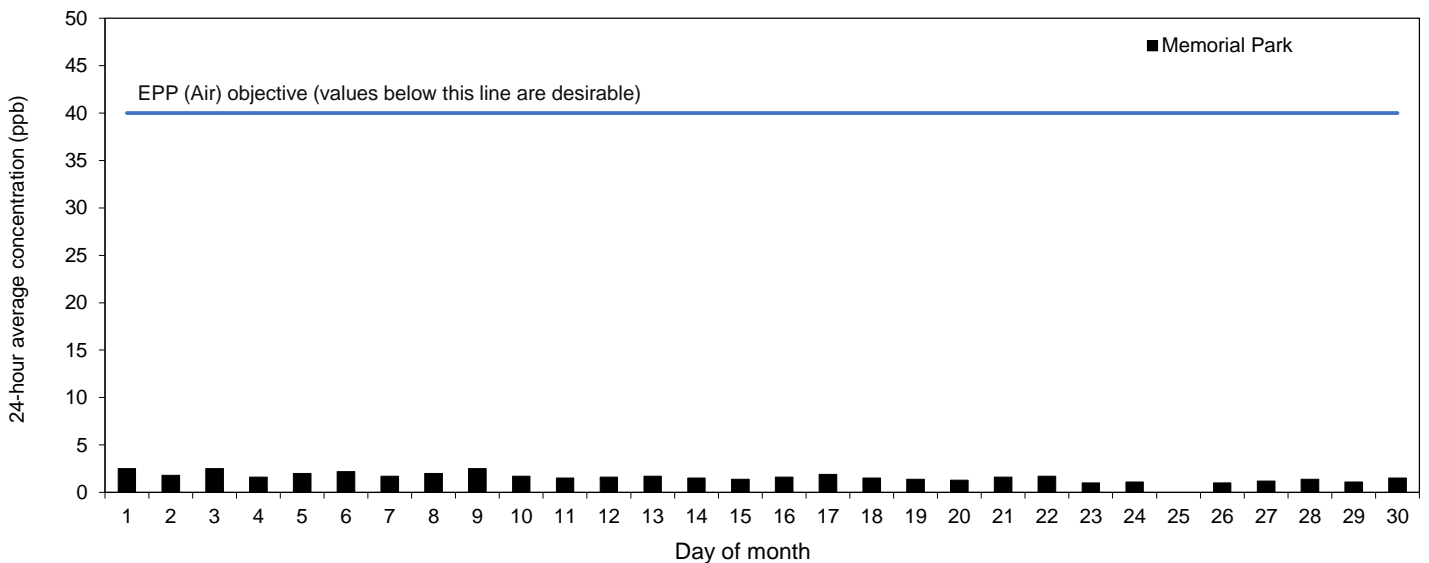


Table 11. Ambient concentrations of formaldehyde. Monthly maximum 24-hour concentrations (ppb), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Memorial Park												
Maximum 24-hour	3.4	3.3	3.7	4.1	3.1	4.4	3.6	3.3	3.7	3.0	2.4	2.5
% I.A.	66	99	98	90	62	84	99	98	97	98	99	97

% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.

The Environmental Protection (Air) Policy 2019 air quality objective for formaldehyde is a 24-hour average of 0.04ppm (40ppb).

PM₁₀

Figure 14. Ambient concentrations of PM₁₀ at Targinie, Fisherman's Landing, Boat Creek and Clinton sites. Daily 24-hour average concentrations (µg/m³), September 2023.

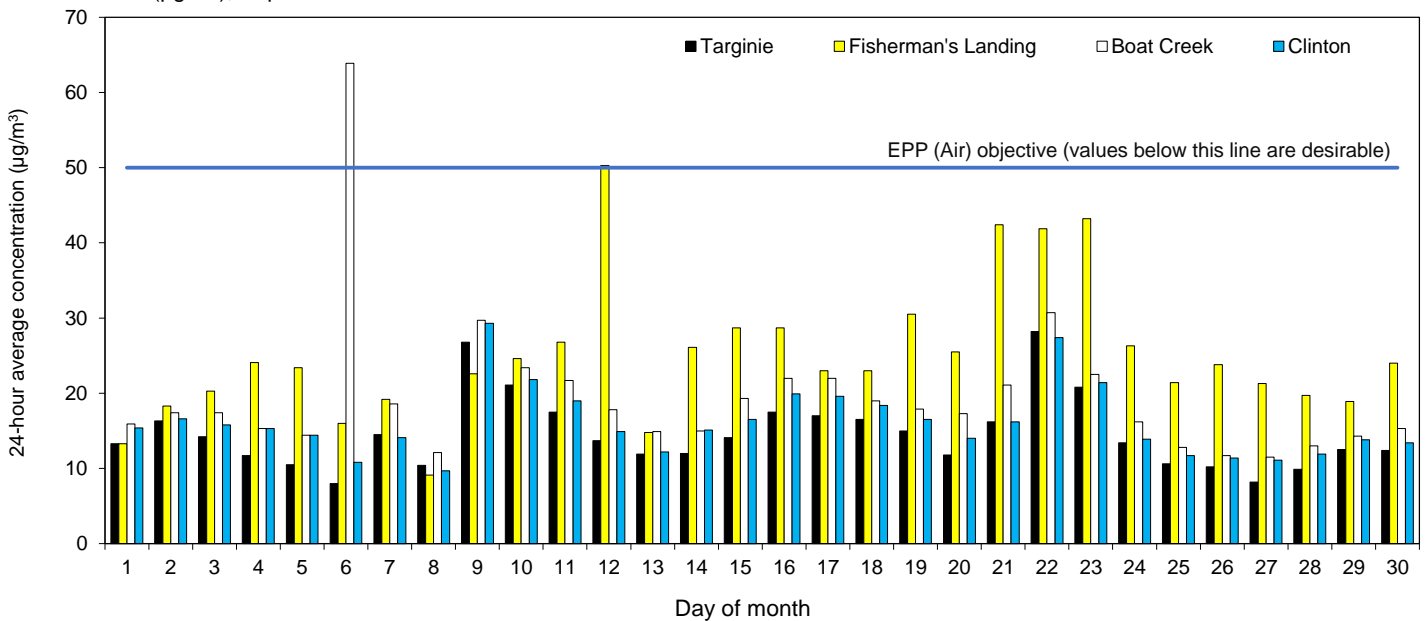


Figure 15. Ambient concentrations of PM₁₀ at Auckland Point, South Gladstone and Boyne Island sites. Daily 24-hour average concentrations (µg/m³), September 2023.

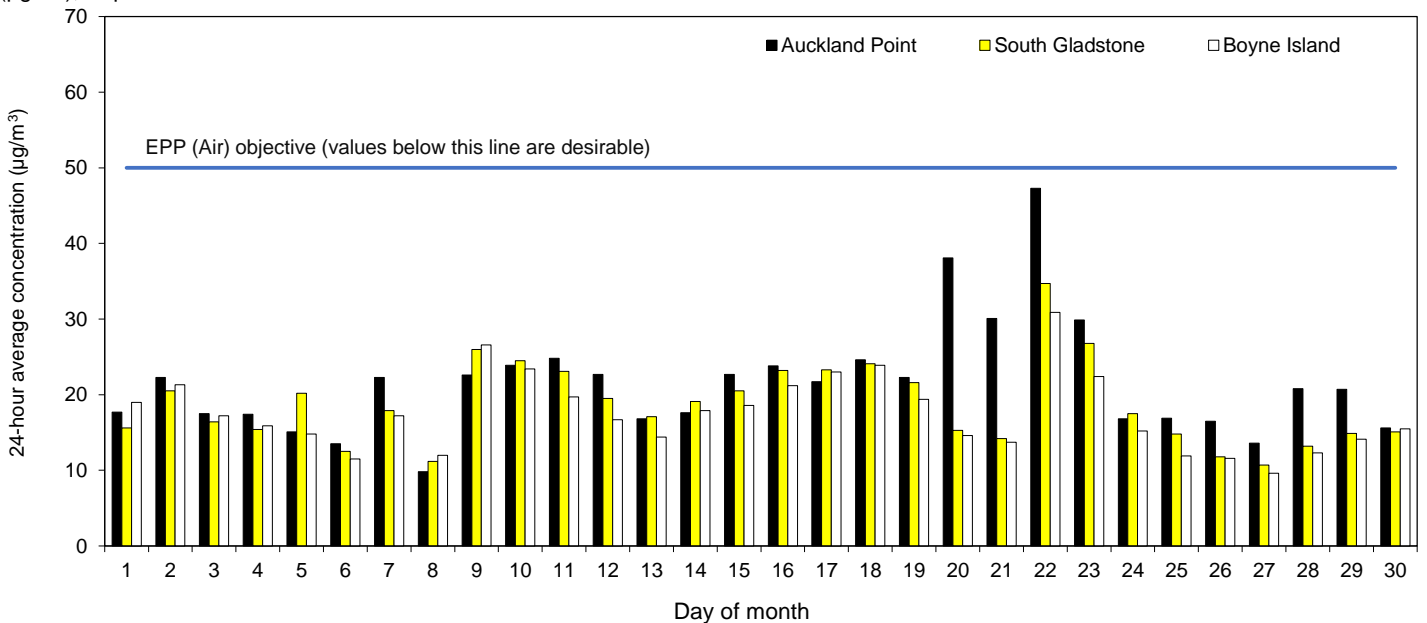


Table 12. Ambient concentrations of PM₁₀. Annual average and monthly maximum 24-hour concentrations (µg/m³), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Targinie												
Annual average:	13.6											
Maximum 24-hour	19.7	22.5	23.8	23.7	23.8	45.7	26.5	29.2	36.7	31.5	19.0	28.2
% I.A.	100	100	100	63	98	98	100	100	100	100	99	100
Fisherman's Landing												
Annual average:	25.1											
Maximum 24-hour	34.7	65.5	42.9	39.4	70.1	39.6	67.9	63.4	68.1	92.9	-	50.3
% I.A.	100	99	99	100	99	100	100	100	100	84	24	100
Boat Creek												
Annual average:	16.7											
Maximum 24-hour	18.3	27.2	29.4	29.1	28.3	30.2	46.4	32.1	43.1	27.0	23.0	63.9
% I.A.	100	100	100	100	100	100	100	99	100	100	100	100
Clinton												
Annual average:	14.3											
Maximum 24-hour	17.2	23.0	24.9	26.7	22.8	28.1	26.1	19.4	46.3	23.2	19.3	29.3
% I.A.	100	100	99	100	100	100	100	100	99	100	100	100
Auckland Point												
Annual average:	17.8											
Maximum 24-hour	19.8	25.3	33.5	41.5	27.5	49.1	43.2	59.2	42.4	26.8	32.5	47.3
% I.A.	99	99	99	99	100	100	100	100	100	100	100	100
South Gladstone												
Annual average:	17.0											
Maximum 24-hour	17.3	19.8	24.2	30.5	33.4	30.1	32.3	28.8	48.6	27.5	27.3	34.7
% I.A.	99	99	99	100	99	100	100	100	100	96	94	92
Boyne Island												
Annual average:	15.2											
Maximum 24-hour	19.3	23.3	27.1	27.1	24.2	22.8	27.0	18.3	45.8	20.5	115.5	30.9
% I.A.	100	99	100	100	87	100	100	100	100	100	100	100
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.												
The Environmental Protection (Air) Policy 2019 air quality objectives for PM ₁₀ are an annual average of 25µg/m ³ and a 24-hour average of 50µg/m ³ .												

PM_{2.5}

Figure 16. Ambient concentrations of PM_{2.5} at Targinie, Fisherman's Landing and Boat Creek sites. Daily 24-hour average concentrations (µg/m³), September 2023.

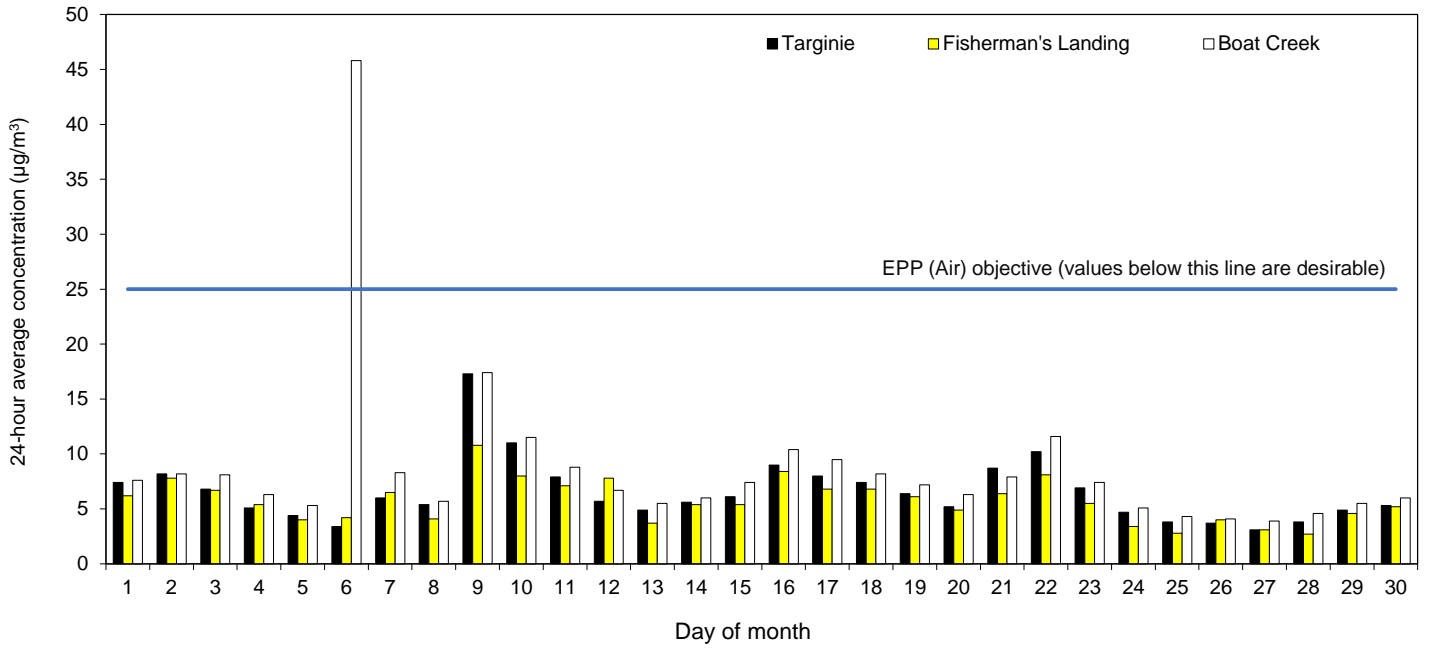


Figure 17. Ambient concentrations of PM_{2.5} at Clinton, South Gladstone and Boyne Island sites. Daily 24-hour average concentrations (µg/m³), September 2023.

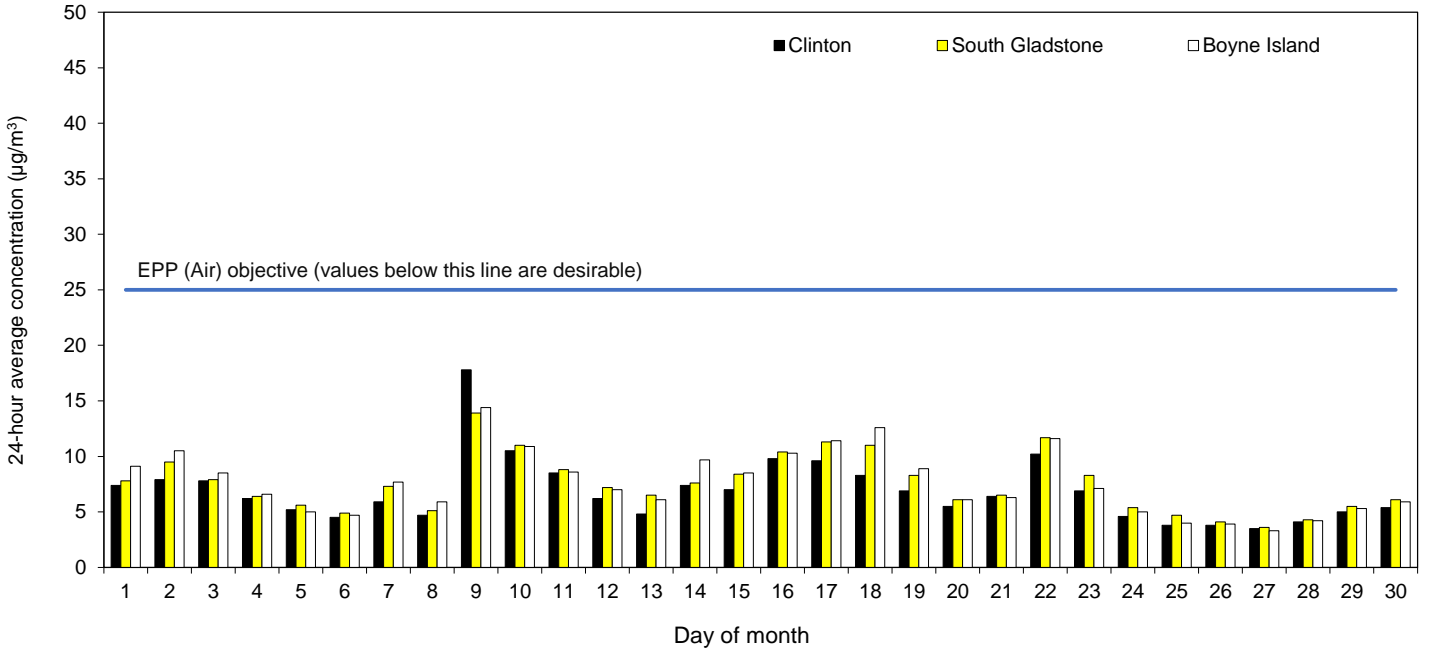


Table 13. Ambient concentrations of PM_{2.5}. Annual average and monthly maximum 24-hour concentrations (µg/m³), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Targinie												
Annual average:	5.3											
Maximum 24-hour	9.6	7.8	9.2	8.7	8.3	36.0	9.0	21.0	25.9	20.3	10.2	17.3
% I.A.	100	100	100	63	98	99	100	100	100	100	99	100
Fisherman's Landing												
Annual average:	5.3											
Maximum 24-hour	8.0	12.0	6.7	6.3	8.4	20.1	37.6	15.2	22.5	11.3	-	10.8
% I.A.	100	99	99	100	99	100	100	100	100	84	24	100
Boat Creek												
Annual average:	6.0											
Maximum 24-hour	7.1	8.9	10.1	10.1	8.1	20.6	24.9	17.9	27.1	14.0	10.5	45.8
% I.A.	100	100	100	100	100	100	100	99	100	100	100	100
Clinton												
Annual average:	5.7											
Maximum 24-hour	7.9	8.8	9.3	9.3	7.4	19.3	8.9	10.8	32.5	12.1	10.1	17.8
% I.A.	100	100	99	100	100	100	100	100	99	100	100	100
South Gladstone												
Annual average:	6.1											
Maximum 24-hour	7.5	7.2	8.4	10.7	8.5	15.6	10.3	6.9	32.4	10.6	11.3	13.9
% I.A.	99	99	99	100	99	100	100	100	100	99	96	99
Boyne Island												
Annual average:	6.1											
Maximum 24-hour	7.9	9.8	9.7	9.7	8.0	13.8	11.0	8.0	32.2	12.9	83.5	14.4
% I.A.	100	99	100	100	87	100	100	100	100	100	100	100
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.												
The Environmental Protection (Air) Policy 2019 air quality objectives for PM _{2.5} are an annual average of 8µg/m ³ and a 24-hour average of 25µg/m ³ .												

Visibility-reducing particles

Figure 18. Ambient concentrations of visibility-reducing particle levels at Targinie, Fisherman's Landing and Boat Creek sites. Daily maximum 1-hour average light scattering coefficient (B_{sp}) values (Mm^{-1}), September 2023.

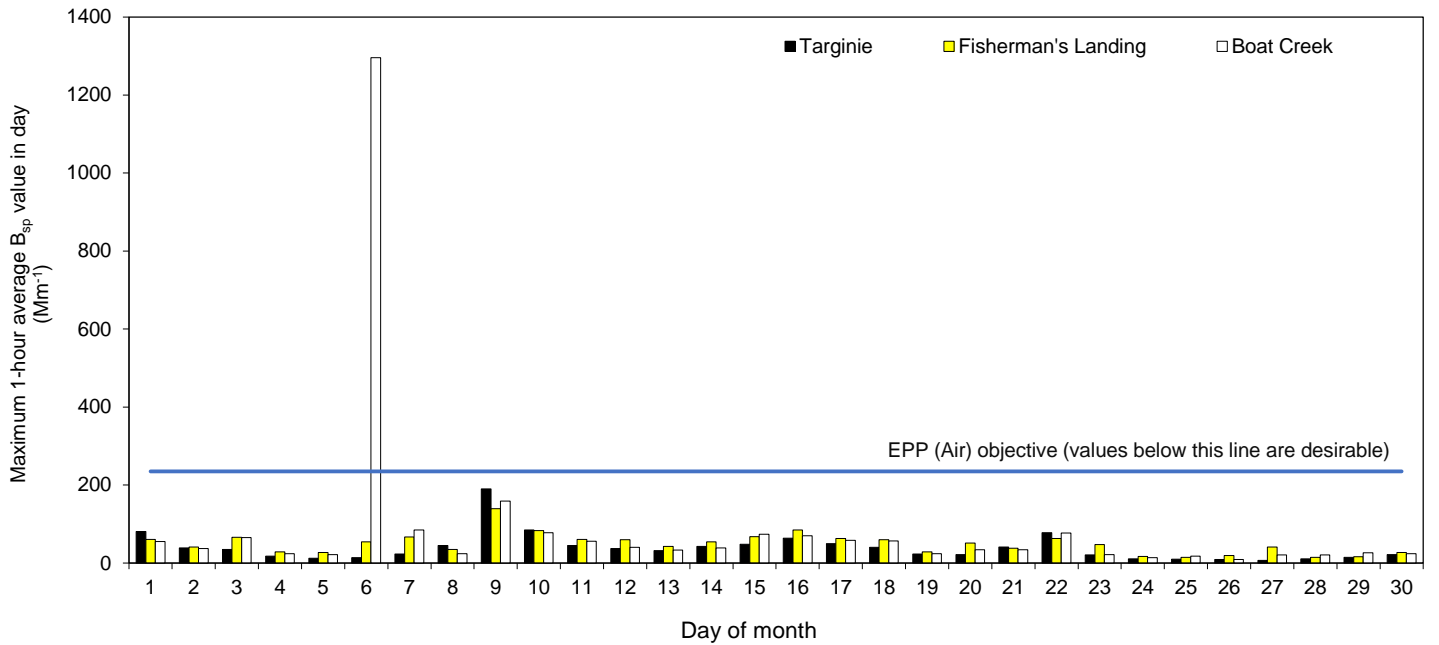


Figure 19. Ambient concentrations of visibility-reducing particle levels at Clinton, South Gladstone and Boyne Island sites. Daily maximum 1-hour average light scattering coefficient (B_{sp}) values (Mm^{-1}), September 2023.

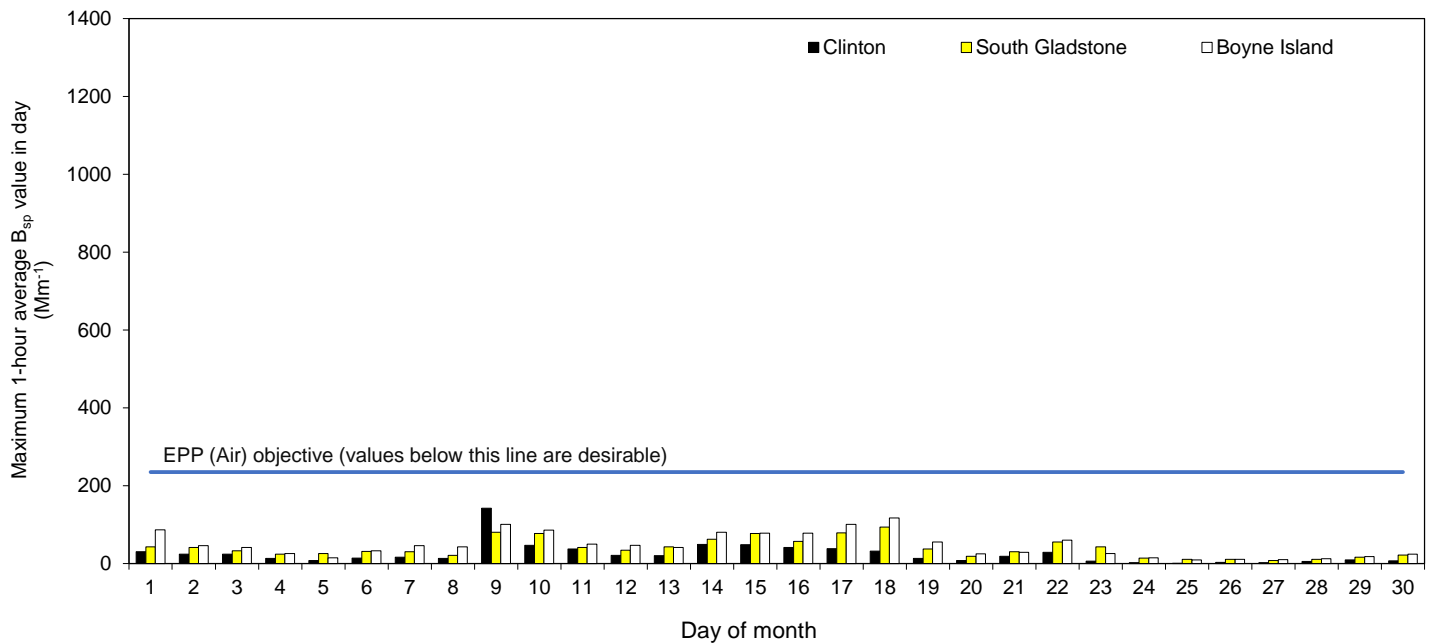


Table 14. Ambient visibility-reducing particle levels. Monthly maximum 1-hour light scattering coefficient (B_{sp}) values (Mm^{-1}), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Gladstone region												
Targinie												
Maximum 1-hour	133	61	44	36	98	559	137	387	248	562	61	190
% I.A.	100	99	100	100	100	98	100	100	99	100	99	100
Fisherman's Landing												
Maximum 1-hour	121	350	64	124	81	581	1222	421	336	254	72	139
% I.A.	100	99	99	100	96	100	100	100	100	100	100	100
Boat Creek												
Maximum 1-hour	106	222	42	38	51	359	624	376	224	234	67	1296
% I.A.	93	100	99	100	100	99	100	99	100	100	100	100
Clinton												
Maximum 1-hour	44	47	28	29	54	567	39	93	268	131	40	142
% I.A.	99	100	99	99	96	98	100	100	99	100	99	100
South Gladstone												
Maximum 1-hour	58	40	48	40	67	238	69	67	358	65	54	94
% I.A.	99	100	93	100	99	100	100	99	100	99	96	99
Boyne Island												
Maximum 1-hour	129	61	49	128	98	152	105	65	376	119	921	117
% I.A.	99	100	100	99	99	100	100	100	99	100	100	100
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objective for visibility-reducing particles is 20km visibility. This equates to light scattering coefficient values of $235Mm^{-1}$ or less.												

Measured ambient concentrations - Mackay, Moranbah, Emerald, Blackwater and Bluff

PM₁₀

Figure 20. Ambient concentrations of PM₁₀ at West Mackay, Moranbah (East) and Moranbah (West) sites. Daily 24-hour average concentrations ($\mu g/m^3$), September 2023.

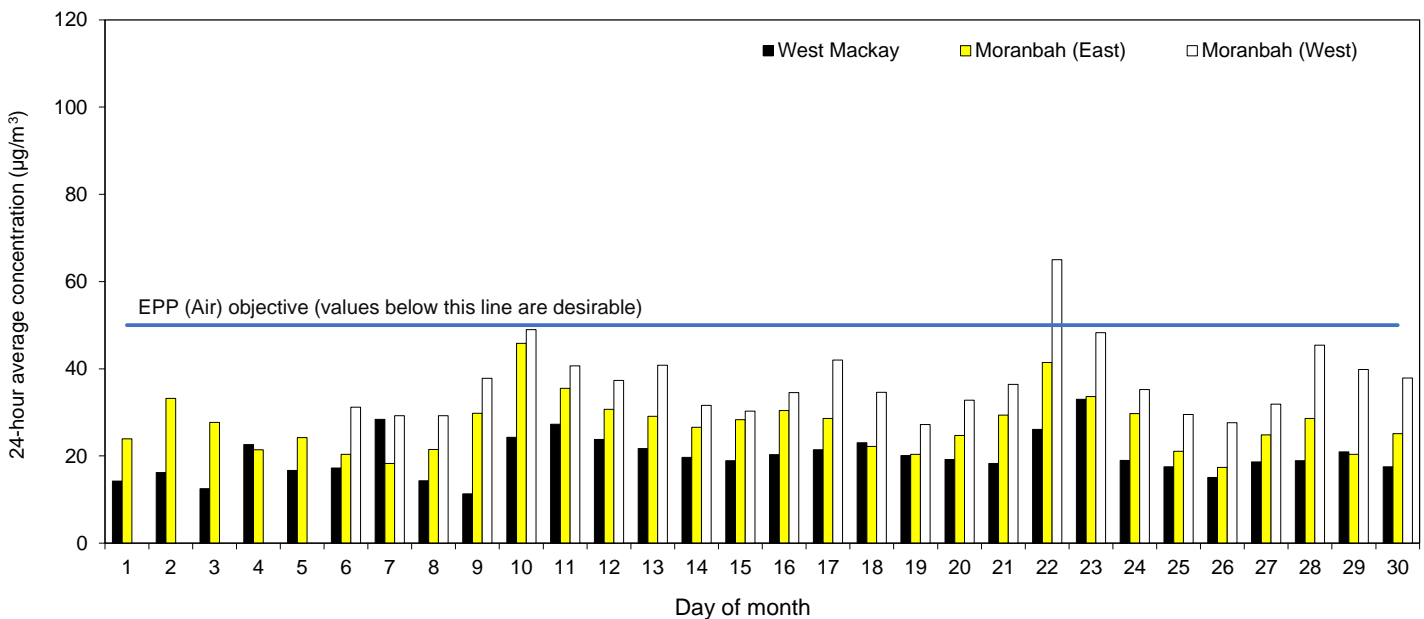


Figure 21. Ambient concentrations of PM₁₀ at Emerald, Blackwater and Bluff sites. Daily 24-hour average concentrations (µg/m³), September 2023.

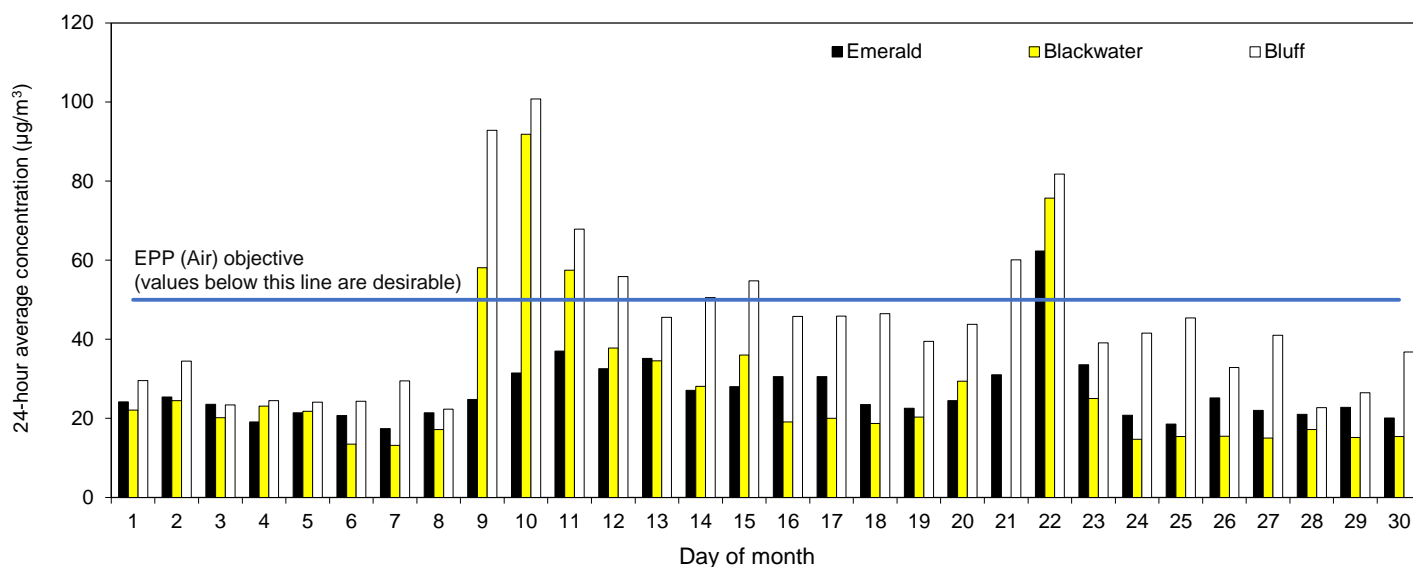


Table 15. Ambient concentrations of PM₁₀. Annual average and monthly maximum 24-hour and 1-hour average concentrations (µg/m³), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mackay												
West Mackay												
Annual average:	18.0											
Maximum 24-hour	23.4	28.0	26.7	28.2	26.6	21.9	26.1	29.1	32.7	38.4	24.3	33.0
% I.A.	95	96	99	96	93	99	100	81	95	92	98	99
Inland Central Queensland												
Moranbah (East)												
Annual average:	22.5											
Maximum 24-hour	43.5	39.1	33.8	30.0	28.8	36.8	36.6	75.7	45.4	40.0	56.1	45.8
% I.A.	100	100	100	100	100	99	100	100	100	100	100	100
Moranbah (West)												
Annual average:	24.2											
Maximum 24-hour	41.5	50.7	34.8	29.0	31.9	39.0	32.8	44.9	46.1	-	38.0	65.0
% I.A.	100	100	100	100	100	100	100	100	100	16	69	85
Emerald												
Annual average:	18.0											
Maximum 24-hour	33.7	25.9	19.5	23.8	33.5	24.3	26.9	28.8	39.3	24.1	30.8	62.3
% I.A.	100	100	100	100	100	100	100	100	100	100	100	100
Blackwater												
Annual average:	17.7											
Maximum 24-hour	29.4	25.0	29.8	23.4	27.4	23.8	34.8	44.3	49.6	30.6	41.8	91.9
% I.A.	100	100	100	100	100	88	99	100	100	100	100	98
Bluff												
Annual average:	27.4											
Maximum 24-hour	25.0	38.9	30.9	32.9	59.4	52.4	52.8	65.6	62.3	49.5	51.0	100.8
% I.A.	85	99	99	100	100	99	99	97	98	100	99	99
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.												
The Environmental Protection (Air) Policy 2019 air quality objectives for PM ₁₀ are an annual average of 25µg/m ³ and a 24-hour average of 50µg/m ³ .												

PM_{2.5}

Figure 22. Ambient concentrations of PM_{2.5} at West Mackay, Moranbah (East) and Moranbah (West) sites. Daily 24-hour average concentrations (µg/m³), September 2023.

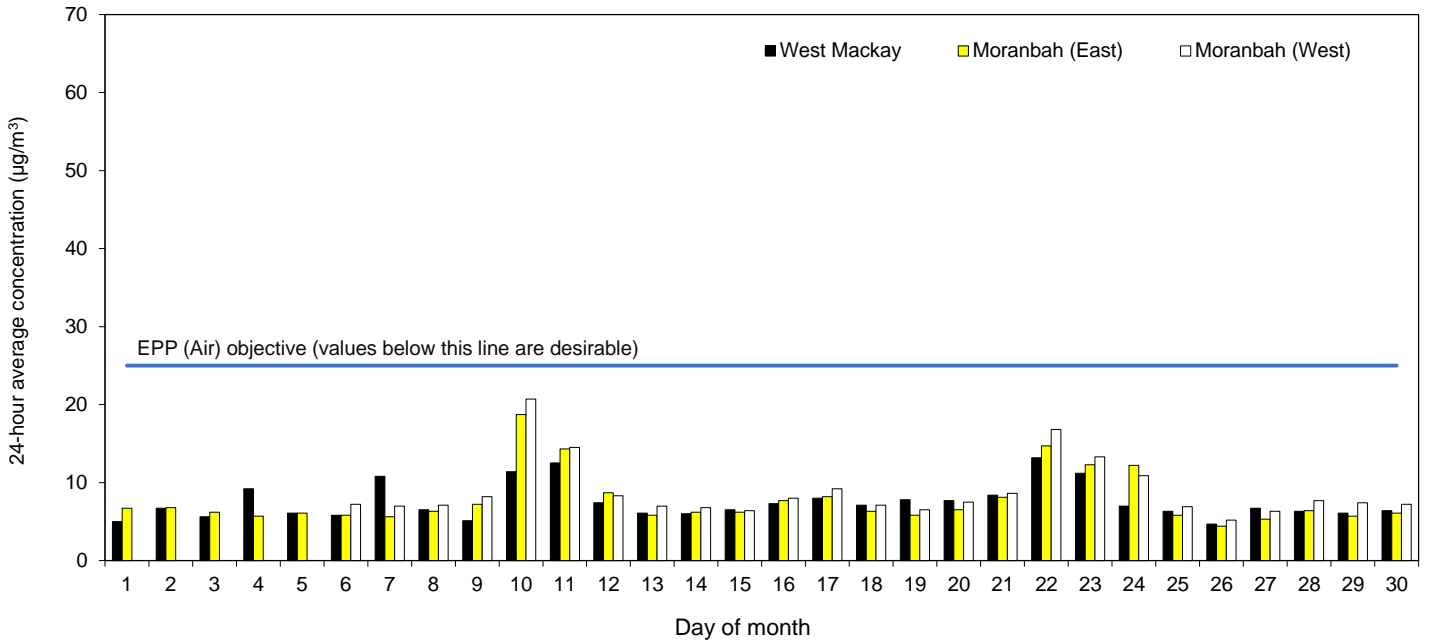


Figure 23. Ambient concentrations of PM_{2.5} at Emerald and Blackwater sites. Daily 24-hour average concentrations (µg/m³), September 2023.

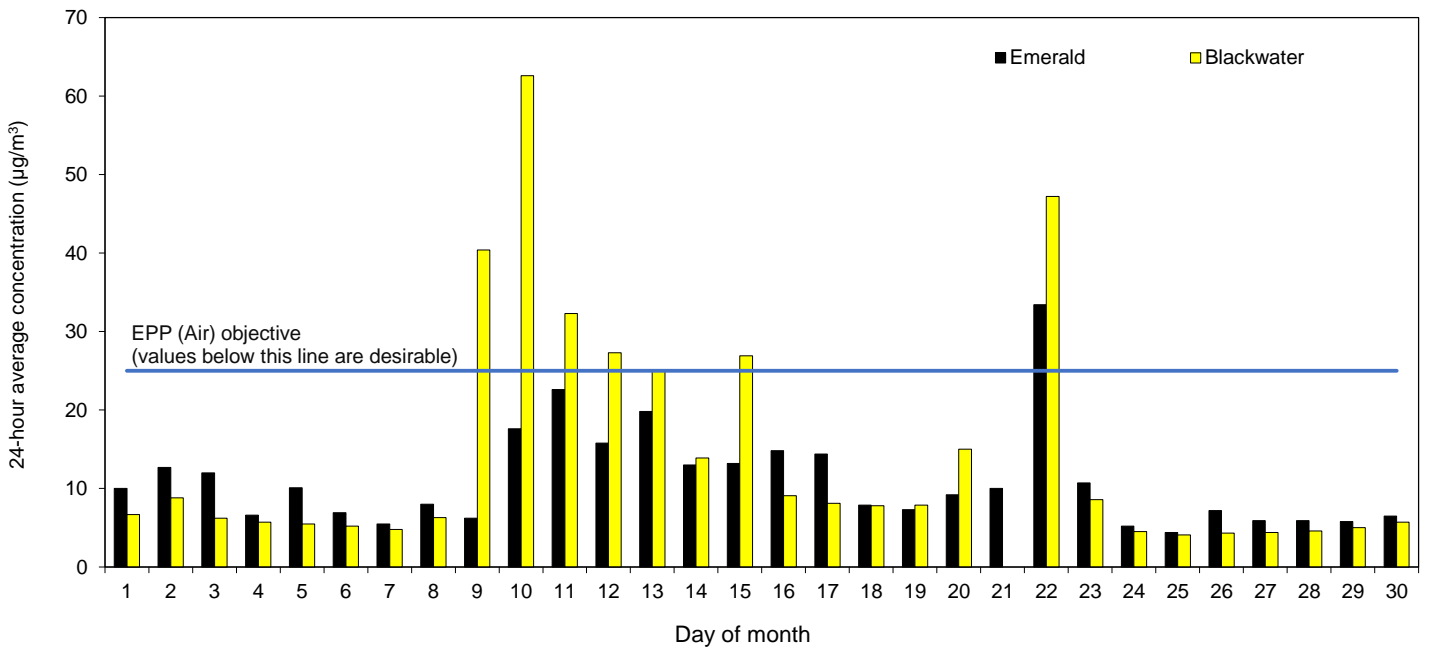


Table 16. Ambient concentrations of PM_{2.5}. Annual average and monthly maximum 24-hour concentrations (µg/m³), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mackay												
West Mackay												
Annual average:	6.5											
Maximum 24-hour	9.2	9.1	10.0	11.5	8.8	8.0	9.9	15.3	20.4	20.6	9.5	13.2
% I.A.	95	96	99	96	93	99	100	81	95	92	98	99
Inland Central Queensland												
Moranbah (East)												
Annual average:	6.1											
Maximum 24-hour	9.1	10.6	18.1	8.5	7.4	13.0	8.3	11.9	18.5	7.9	10.4	18.7
% I.A.	100	100	100	100	100	99	100	100	100	100	100	100
Moranbah (West)												
Annual average:	6.3											
Maximum 24-hour	9.7	22.5	16.9	8.2	7.3	11.1	7.5	13.7	18.6	-	9.3	20.7
% I.A.	100	100	100	100	100	100	100	100	100	16	69	85
Emerald												
Annual average:	6.3											
Maximum 24-hour	11.4	9.4	7.3	8.4	16.3	8.0	8.3	13.2	19.4	9.3	13.5	33.4
% I.A.	100	100	100	100	100	100	100	100	100	100	100	100
Blackwater												
Annual average:	6.0											
Maximum 24-hour	6.7	7.6	8.0	8.3	7.1	12.4	9.3	24.8	16.2	15.5	9.2	62.6
% I.A.	100	100	100	100	100	88	99	100	100	100	100	98
% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available. The Environmental Protection (Air) Policy 2019 air quality objectives for PM _{2.5} are an annual average of 8µg/m ³ and a 24-hour average of 25µg/m ³ .												

Visibility-reducing particles

Figure 24. Ambient concentrations of visibility-reducing particle levels at West Mackay site. Daily maximum 1-hour average light scattering coefficient (B_{sp}) values (Mm⁻¹), September 2023.

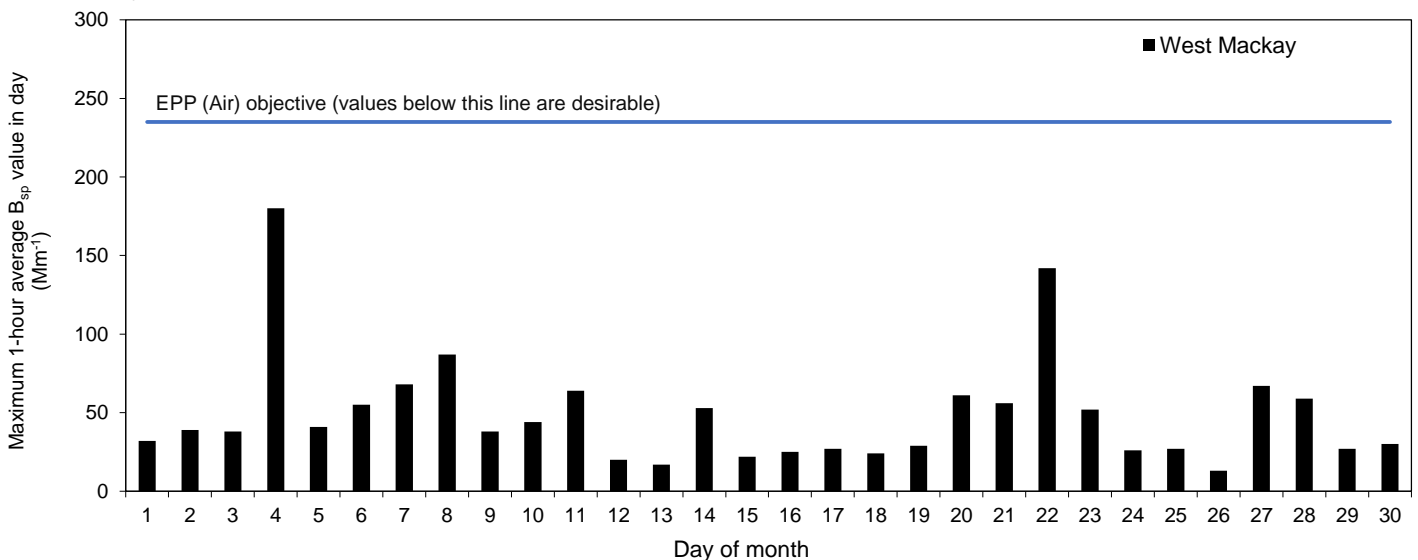


Table 17. Ambient visibility-reducing particle levels. Monthly maximum 1-hour light scattering coefficient (B_{sp}) values (Mm^{-1}), October 2022 to September 2023.

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Mackay												
West Mackay												
Maximum 1-hour	83	96	113	85	60	39	38	259	178	184	115	180
% I.A.	95	96	99	96	94	99	100	81	95	92	98	99

% I.A. indicates instrument availability. - indicates less than three-fifths of the data are available. n.d. indicates no data are available.
 The Environmental Protection (Air) Policy 2019 air quality objective for visibility-reducing particles is 20km visibility. This equates to light scattering coefficient values of $235Mm^{-1}$ or less.

Data availability

When required, Table 18 summarises the reasons for data availability below the minimum criteria for reporting at Central Queensland monitoring sites.

Table 18. Reasons for low data availability at Central Queensland ambient air monitoring sites during September 2023.

Station	Air Pollutant	Cause
Boyne Island	Carbon monoxide	Instrument fault

Related air quality information

Current hourly air quality data is available online at <https://apps.des.qld.gov.au/air-quality/>.

Additional information on air quality monitoring and related issues is also available from the above website.

Further information

For further information about the data presented in this bulletin or related publications, contact:

Air Quality Monitoring
 Coastal and Air Unit
 Science Division
 Department of Environment, Science and Innovation
 Ecosciences Precinct
 41 Boggo Rd
 DUTTON PARK QLD 4102
 Telephone (07) 3170 5477
 Email: air.sciences@des.qld.gov.au

Figure 25. Central Queensland ambient air quality monitoring station locations.

