

Air monitoring report 2012 - Compliance with the National Environment Protection (Ambient Air Quality) Measure

Environment
report



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Overview

This report presents the results of air quality monitoring in Victoria in 2012 and assesses them against the requirements of the Ambient Air Quality National Environment Protection Measure¹ (AAQ NEPM). EPA also produces an annual air quality summary and data tables on its website².

The AAQ NEPM establishes:

- requirements for monitoring air quality
- air quality standards that are levels of specified pollutants against which air quality can be assessed
- a goal that the air quality standards be met to the extent specified in the NEPM. Recognising that certain events can impact on air quality, the NEPM specifies a maximum number of days on which it is permissible to exceed the standard.

Victoria's air quality in 2012 was generally good. The major impacts on Victoria's air quality during the year were associated with PM₁₀ particles (particles less than 10 micrometres in diameter) on five days - local dust (23 March, 4 October), planned burning (5 April) and urban emissions (19 April, 1 June).

In 2012, the goals were met at all stations where there was sufficient data captured. The exceptions due to insufficient data capture were carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃) and sulfur dioxide (SO₂) at Alphington (Q1, Q2, Q3, Q4), and nitrogen dioxide and ozone at Footscray (Q4) due to technical problems with equipment.

In the Port Phillip region in 2012 the goal was met for particles as PM₁₀ at all NEPM stations for the third successive year. The goal for particles as PM₁₀ was also met at Traralgon in the Latrobe Valley for the sixth successive year.

Separate to this report, issue-specific stations not included in the NEPM network are located at the Brooklyn industrial precinct; Francis Street, Yarraville³ and Morwell East in the Latrobe Valley. Particle levels at Brooklyn

were higher than the nearby Footscray station due to impacts from local sources. Air quality results at Francis Street, Yarraville were slightly higher than at Alphington and Footscray due to the impact of vehicles. Air quality at Morwell East was comparable to that measured at Traralgon. Results for these stations are reported separately on EPA Victoria's website.³

The maximum number of days when the levels were measured above the PM₁₀ air quality standard at a single station (three) occurred at the Footscray monitoring station in the Port Phillip region. This was still below the goal of no more than five days having levels above the standard.

The causes at Footscray were local dust (23 March), planned burning (5 April) and urban emissions (19 April).

The 24-hour advisory reporting standard for particles as PM_{2.5} (particles less than 2.5 micrometres in diameter) was not exceeded at Alphington or Footscray in the Port Phillip region. The annual reporting standard for PM_{2.5} was met at both Alphington and Footscray.

The standards and goals for ozone (O₃) were met at all stations under typical summer smog formation conditions where sufficient air monitoring data was available.

Monitoring in 2012 showed the AAQ NEPM goals and standards were met for carbon monoxide, nitrogen dioxide and sulfur dioxide where sufficient air monitoring data was available. A lack of air monitoring data prevented assessment of carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide at Alphington (Q1, Q2, Q3, Q4) and nitrogen dioxide and ozone at Footscray (Q4).

Monitoring was performed in accordance with a modified form of Victoria's monitoring plan⁴, AAQ NEPM Technical Papers and EPA's NATA accreditation.

1 *National Environment Protection Measure for Ambient Air Quality*, National Environment Protection Council publication, available from www.ephc.gov.au

2 <http://www.epa.vic.gov.au/our-work/monitoring-the-environment/monitoring-victorias-air>

3 *Environment Report-Air monitoring at Brooklyn year 3: November 2011 to October 2012*, available from <http://www.epa.vic.gov.au/our-work/publications?q=brooklyn&f=0&page=1#resultsAnchor>
Francis St Monitoring Program - Report one (October 2012)
Francis St Monitoring Program - Report two (February 2013)
<http://www.epa.vic.gov.au/our-work/publications?q=francis&f=0&page=1#resultsAnchor>

4 *Ambient Air Quality NEPM Monitoring Plan Victoria* (EPA publication 763) available from <http://www.epa.vic.gov.au/our-work/publications/publication/2002/january/763>

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A Monitoring summary

Current performance monitoring stations

Victoria's AAQ NEPM air monitoring plan was approved by the National Environment Protection Council Ministers in February 2001. Data presented in this report has been produced in accordance with the monitoring plan, except where noted.

The AAQ NEPM requires the monitoring of the pollutants carbon monoxide (CO), nitrogen dioxide (NO₂), ozone (O₃), sulfur dioxide (SO₂), lead (Pb), particles less than 10 micrometres in diameter (PM₁₀) and particles less than 2.5 micrometres in diameter (PM_{2.5}).

Eight regions are defined in the monitoring plan. Consistent with the monitoring plan:

- Port Phillip and Latrobe Valley regions have permanent performance monitoring stations.
- Campaign monitoring has been conducted in Ballarat, Bendigo, Shepparton, Warrnambool and Mildura.
- Data from New South Wales monitoring at Albury has been used for Wodonga.

Stations at which monitoring was conducted in 2012 are shown in Figures 1 and 2.

The monitoring stations, pollutants monitored and site types are summarised in Table 2. Site types are defined as generally representative upper bound for community exposure sites and population-average sites⁵.

Description of exposed population

The exposed population represented by each monitoring station is described qualitatively by the location category column in Tables 1 and 2. Further information is given in Appendix C of the monitoring plan.

Investigative monitoring stations

A short term, targeted air monitoring program for particles was also conducted in Brooklyn and Sunshine West to measure dust impacts from a local industrial estate in the Brooklyn area. These sites are not included in Victoria's NEPM monitoring plan and are reported in separate environment reports.

Table 1: Victorian performance monitoring stations

Region	Location category	Site type				
		CO	NO ₂	O ₃	SO ₂	PM ₁₀
Port Phillip						
Alphington	Res/LI	G*	G*	Pop	Pop*	G*
Altona North	I/Res				G	
Brighton	Res		G	Pop*		Pop
Dandenong	LI			Pop		Pop
Footscray	I/Res		G*	G*		G*
Geelong South	LI/Res	G*	G*	Pop*	G*	G*
Melton	Res			G		
Mooroolbark	Res			Pop		Pop
Point Cook	Rur/Res		Pop*	G*		
Point Henry ^c	I/Rur			Pop		
Richmond	Res	G				G
RMIT (CBD) ^a	CBD	G*	G*		G	G*
Latrobe Valley						
Moe ^b	Res		Pop	G	G	G
Traralgon	Res		G*	G*	G*	G*

RMIT (CBD) RMIT University (central business district)
 LI Light industrial
 Rur Rural
 Pop Population-average
 a RMIT station closed in 2006
 b Moe closed in 2009
 c Point Henry closed in 2011

I Industrial
 Res Residential
 G Generally representative upper bound
 * Trend station

Alternatives for RMIT, Moe and Point Henry will be considered as part of an overall review of Victoria's monitoring plan.

⁵ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 3, *Monitoring Strategy*, www.ephc.gov.au/taxonomy/term/74.

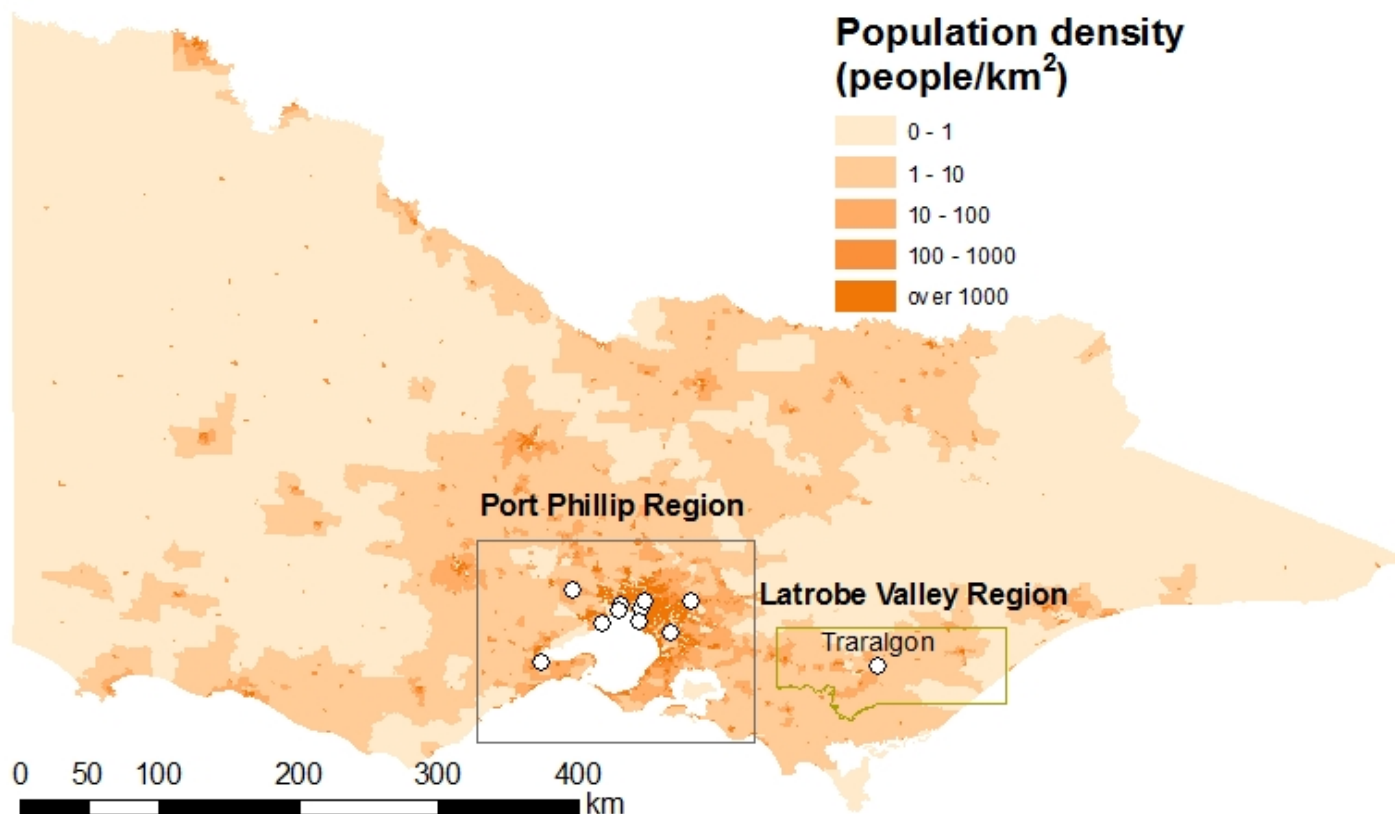


Figure 1: AAQ NEPM regions and population density in Victoria.

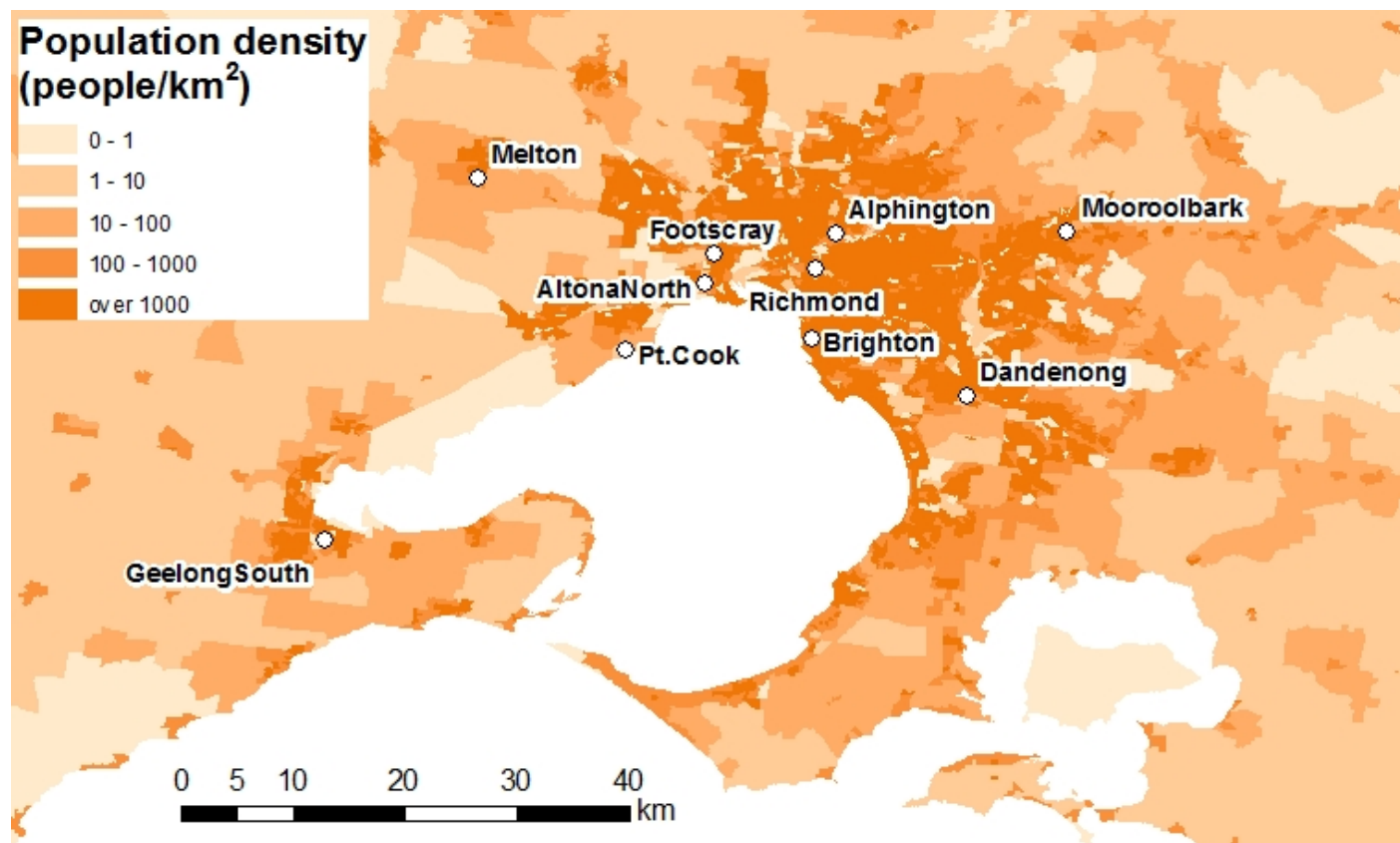


Figure 2: Monitoring stations and population density in the Port Phillip region.

Table 2: Summary of stations' siting compliance with Australian Standard 3580.1.1-2007

Region Station	Location category	Height above ground	Minimum distance to support structure	Clear sky angle of 120°	Unrestricted airflow of 270°/360°	20 m from trees	No boilers or incinerators nearby	Minimum distance from road or traffic
Port Phillip								
Alphington	Res/LI	☑	☑	☑	☑	☒	☑	☑
Altona North	I/Res	☑	☑	☑	☑	☑	☑	☑
Brighton	Res	☑	☑	☑	☑	☑	☑	☑
Dandenong	LI	☑	☑	☑	☑	☑	☑	☑
Footscray	I/Res	☑	☑	☑	☑	☑	☑	☑
Geelong South	LI/Res	☑	☑	☑	☑	☑	☑	☑
Melton	Res	☑	☑	☑	☑	☑	☑	☑
Mooroolbark	Res	☑	☑	☑	☑	☑	☑	☑
Point Cook	Rur/Res	☑	☑	☑	☑	☑	☑	☑
Richmond	Res	☑	☑	☑	☑	☒	☑	☑
Latrobe Valley								
Traralgon	Res	☑	☑	☑	☑	☒	☑	☑

I Industrial LI Light industrial Res Residential Rur Rural

Implementation of the monitoring plan

Victoria's air quality monitoring program is continually examined and options for current and future monitoring are considered yearly, depending on needs and the findings of reviews. Since implementing the AAQ NEPM monitoring plan for Victoria³, a number of modifications and reviews of components of the original plan have been made. A review of the monitoring plan is underway and the monitoring plan will be finalised by the end of the 2013-14 financial year.

Monitoring ceased at the CBD station (at RMIT University) in October 2006, when the lease was terminated due to building extensions. The station at Paisley was renamed Altona North in June 2006 to better reflect its geographic location.

The peak station for lead, in Collingwood, was closed in December 2004 because levels were so low compared to the air quality objective. This change to Victoria's

monitoring plan was approved in accordance with NEPM procedures⁶.

The station at Moe was closed in October 2009 when the lease was terminated due to building construction works, and following a review which found the Traralgon station was comparable to Moe and representative of the Latrobe Valley region.

Ozone monitoring was stopped at Point Henry in March 2011 as the Point Henry site was not representative of the general population-average exposure. Also, regional airshed modelling using TAPM showed ozone levels at EPA's Geelong South site were comparable to the Point Henry site.

Each of the monitoring stations meet the recommendations of the Australian Standard for siting of sampling units as shown in Table 2. Alphington, Richmond and Traralgon continue to have minor non-compliances due to the proximity of trees. Only a few small trees are within the 20 metre requirement at the Richmond site. An

⁶ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, *Lead Monitoring*, available from www.ephc.gov.au/taxonomy/term/74.

assessment of the impact and options for the trees on the Alphington and Traralgon sites is being conducted.

Monitoring methods

Victorian monitoring is conducted in accordance with the standards shown in Table 3. Data not meeting the requirements of these standards and EPA's quality assurance procedures is identified as invalid and not included in reporting.

Particle concentration units of $\mu\text{g}/\text{m}^3$ refer to volumes at 0 °C and one atmosphere of pressure.

TEOM PM_{10} data included in this report has been adjusted according to the approved procedure⁷, using the temperature-dependent formula with a constant value of K equal to 0.04.

The resulting adjustments vary from no change at daily average temperatures at or above 15 °C, to an increase of 40 per cent at a temperature of 5 °C.

⁷ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 10, *Collection and Reporting of TEOM PM_{10} Data*, available from www.ephc.gov.au/taxonomy/term/74.

Table 3: Methods for monitoring the NEPM pollutants

Pollutant		Standard	Title	Method used
Carbon monoxide	CO	AS3580.7.1-2011	Ambient air – Determination of carbon monoxide – Direct reading instrument method	Gas filter correlation/infrared
Nitrogen dioxide	NO ₂	AS3580.5.1-2011	Ambient air – Determination of oxides of nitrogen – Chemiluminescence method	Gas phase chemiluminescence
Photochemical oxidant (ozone)	O ₃	AS3580.6.1-2011	Ambient air – Determination of ozone – Direct reading instrument method	Non-dispersive ultraviolet
Sulfur dioxide	SO ₂	AS3580.4.1-2008	Ambient air – Determination of sulfur dioxide – Direct reading instrument method	Pulsed fluorescence
Particles	PM ₁₀	AS3580.9.8-2001	Determination of suspended particulate matter – PM ₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser	Tapered element oscillating microbalance (TEOM)
	PM _{2.5}	AS/NZS3580.9.10-2006a	Reference method for the determination of fine particulate matter as PM _{2.5} in the atmosphere	Gravimetric reference method
	PM _{2.5}	AS3580.9.8-2001b	Technical paper on monitoring for particles as PM _{2.5}	TEOM

a Modified for use in the PM_{2.5} Equivalence Program according to the NEPM Technical Paper.

NATA status

All current performance monitoring stations operated by EPA are covered by its NATA accreditation (Number 15119). EPA was successfully reaccredited in 2011.

Monitoring in the Latrobe Valley region was performed for EPA by Aurecon under its NATA accreditation (Number 4669).

Screening

The monitoring plan outlines processes to demonstrate whether levels of pollutants are consistently below the standards. Monitoring is not required, or may be required at fewer than the specified number of stations, if screening procedures are satisfied⁸. Screening procedures conducted in accordance with the NEPM have been satisfied for Victorian regions, except for PM₁₀ at Ballarat, Bendigo, Mildura, Shepparton, Wodonga and Warrnambool.

Details of screening arguments are given in the monitoring plan and previous annual reports.

Regional campaign monitoring has recorded elevated concentrations of PM₁₀ that do not meet screening criteria. This issue will be considered further.

PM_{2.5} monitoring

In 2003 the NEPM was varied to include advisory reporting standards for PM_{2.5}. Victoria monitors PM_{2.5} by the reference method specified in the NEPM (on a one-day-in-three basis) at two stations (Alphington and Footscray).

Victoria also participates in the PM_{2.5} Equivalence Program, with TEOM monitors located at Alphington and Footscray. Alphington was substituted for Mooroolbark, which was originally proposed. TEOM PM_{2.5} readings are taken with the inbuilt adjustment for PM₁₀ removed (A and B constants set to 0 and 1 respectively) and no adjustment for loss of volatiles.⁹

⁸ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 4, *Screening Procedures* (Revision 1, 2007), available from www.ephc.gov.au/taxonomy/term/74.

⁹ *National Environment Protection (Ambient Air Quality) Measure Technical Paper on Monitoring for PM_{2.5}*, available from www.ephc.gov.au/search/node/pm2.5.

B Assessment of compliance with the standards and goals

Air quality is assessed against the AAQ NEPM standards and the associated goals shown in Table 5.

- Standards are concentrations, in parts per million (ppm) or micrograms per cubic metre ($\mu\text{g}/\text{m}^3$), against which air quality can be assessed.
- The goal of the AAQ NEPM is to achieve the National Environment Protection Standards within ten years from commencement (that is, by 2008), as assessed in accordance with the monitoring protocol, to the extent specified in Schedule 2 of the AAQ NEPM. The extent is expressed as a maximum allowable number of exceedances for each standard (shown in column four of Table 5).

The number of allowable exceedances associated with the standards has been set to account for unusual meteorological conditions and, in the case of particles, natural events such as bushfires and dust storms that cannot be controlled through normal air quality management strategies.

Air quality monitoring data from each monitoring site is assessed against these standards and the associated goals.

The AAQ NEPM also specifies advisory reporting standards for $\text{PM}_{2.5}$, with a daily ($25 \mu\text{g}/\text{m}^3$) and annual ($8 \mu\text{g}/\text{m}^3$) standard. The goal for $\text{PM}_{2.5}$ is to collect sufficient data to allow a review of the $\text{PM}_{2.5}$ standards.

Table 5: AAQ NEPM air quality standards and associated goal

Pollutant	Averaging period	Standard	Goal max. allowable exceedances
Carbon monoxide	8 hours	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	none
Ozone	1 hour	0.10 ppm	1 day a year
	4 hours	0.08 ppm	1 day a year
Sulfur dioxide	1 hour	0.20 ppm	1 day a year
	1 day	0.08 ppm	1 day a year
	1 year	0.02 ppm	none
Particles as PM_{10}	1 day	$50 \mu\text{g}/\text{m}^3$	5 days a year
Lead	1 year	$0.50 \mu\text{g}/\text{m}^3$	none
Particles as $\text{PM}_{2.5}$	1 day	$25 \mu\text{g}/\text{m}^3$	not applicable
	1 year	$8 \mu\text{g}/\text{m}^3$	not applicable

The following tables summarise compliance with the standards and associated goals of the AAQ NEPM.

Air quality is assessed as complying with the NEPM if the number of exceedances of the standard is no more than the number specified in Schedule 2 of the AAQ NEPM and data availability was at least 75 per cent in each quarter of the year. Regions also meet the standards and associated goals if they do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant standards.

Air quality is assessed as 'not demonstrated' if there has been insufficient data collected to demonstrate that the standards and goal have been met or not met.

Regions may also be assessed as 'not demonstrated' if screening has not been completed.

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Carbon monoxide

Table 6: 2012 compliance summary for carbon monoxide in Victoria

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	62.0	66.6	2.4	0.0	32.6	0	ND
Geelong South	94.7	94.2	94.7	94.3	94.5	0	met
Richmond	92.1	87.6	94.5	94.9	92.3	0	met

ND: Not demonstrated by monitoring. See comments below.

Regions that do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standard are Latrobe Valley, Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga and Mildura.

Compliance was not demonstrated (ND) at Alphington (Q1, Q2, Q3 and Q4) due to technical problems with equipment.

At all other stations operated during 2012, the carbon monoxide standard was not exceeded and compliance was demonstrated.

Nitrogen dioxide

Table 7: 2012 compliance summary for nitrogen dioxide in Victoria

AAQ NEPM standards: 0.12 ppm (one-hour average); 0.03 ppm (one-year average)
AAQ NEPM goal: one-hour standard exceeded on no more than one day per year

Region	Data availability rates (% of hours)					Number of exceedances (days)	Annual mean (ppm)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Port Phillip									
Alphington	62.0	66.6	2.4	0.0	32.6	0	0.009	ND	ND
Brighton	92.3	94.8	94.6	95.2	94.2	0	0.008	met	met
Footscray	94.8	94.6	94.2	57.8	85.3	0	0.010	ND	ND
Geelong South	94.7	94.6	87.0	83.6	89.9	0	0.006	met	met
Point Cook	90.1	92.6	93.7	94.3	92.7	0	0.004	met	met
Latrobe Valley									
Traralgon	88.8	95.4	95.3	95.3	93.7	0	0.007	met	met

ND: Not demonstrated by monitoring. See comments below.

Regions that do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standards are Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga and Mildura.

Compliance was not demonstrated (ND) at Alphington (Q1, Q2, Q3 and Q4) and Footscray (Q4) due to technical problems with equipment.

At all other stations operating during 2012, the nitrogen dioxide standards were not exceeded and compliance was demonstrated.

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Ozone

Table 8: 2012 compliance summary for ozone in Victoria

AAQ NEPM standards: 0.10 ppm (one-hour average); 0.08 ppm (four-hour average)
AAQ NEPM goal: standards exceeded on no more than one day per year

Region 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	4-hour	1-hour	4-hour
Port Phillip									
Alphington	62.0	66.5	2.4	0.0	32.6	0	0	ND	ND
Brighton	93.7	94.8	94.7	95.2	94.6	0	0	met	met
Dandenong	95.1	91.8	94.6	95.2	94.2	0	0	met	met
Footscray	94.8	63.5	94.2	57.8	77.6	0	0	ND	ND
Geelong South	94.7	94.3	93.0	94.3	94.1	0	0	met	met
Melton	87.2	95.2	93.1	92.9	92.1	0	0	met	met
Mooroolbark	94.6	94.7	94.7	95.0	94.8	0	0	met	met
Point Cook	94.8	92.5	93.7	94.3	93.8	0	0	met	met
Latrobe Valley									
Traralgon	95.0	95.3	95.3	95.3	95.2	0	0	met	met

ND: Not demonstrated by monitoring. See comments below.

Regions that do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standards are Shepparton, Warrnambool, Wodonga and Mildura.

Compliance was not demonstrated (ND) at Alphington (Q1, Q2, Q3 and Q4) and Footscray (Q4) due to technical problems with equipment.

At all other stations operating during 2012, the one and four-hour ozone standards were not exceeded and compliance was demonstrated.

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Sulfur dioxide

Table 9: 2012 compliance summary for sulfur dioxide in Victoria

AAQ NEPM standards: 0.20 ppm (one-hour average); 0.08 ppm (24-hour average); 0.02 ppm (one-year average)
AAQ NEPM goal: one-hour and 24-hour standards exceeded on no more than one day per year

Region	Data availability rates (% of hours)					Exceedances (days)		Annual mean (ppm)	Performance against the standards and goal		
	Performance monitoring station	Q1	Q2	Q3	Q4	Annual	1-hour		24-hour	1-hour	24- hour
Port Phillip											
Alphington	59.3	64.5	2.4	0.0	31.4	0	0	0.000	ND	ND	ND
Altona North	86.8	92.4	93.9	95.1	92.0	0	0	0.002	met	met	met
Geelong South	88.6	91.6	91.1	90.4	90.4	0	0	0.001	met	met	met
Latrobe Valley											
Traralgon	94.9	95.4	95.3	95.4	95.2	0	0	0.002	met	met	met

ND: Not demonstrated by monitoring. See comments below.

Regions that do not require monitoring on the basis that screening shows pollutant levels are reasonably expected to be consistently below the relevant AAQ NEPM standards are Ballarat, Bendigo, Shepparton, Warrnambool, Wodonga and Mildura.

Compliance was not demonstrated (ND) at Alphington (Q1, Q2, Q3 and Q4) due to technical problems with equipment.

At all other stations operating during 2012, the sulfur dioxide standards were not exceeded and compliance was demonstrated. Annual mean values were close to the limits of detection.

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Particles as PM₁₀

Table 10: 2012 compliance summary for PM₁₀ in Victoria

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Region	Data availability rates (% of days)					Number of exceedances (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	100.0	93.4	100.0	97.8	97.8	0	met
Brighton	97.8	96.7	100.0	100.0	98.6	0	met
Dandenong	100.0	94.5	100.0	100.0	98.6	0	met
Footscray	96.7	100.0	98.9	100.0	98.9	3	met
Geelong South	97.8	94.5	100.0	100.0	98.1	1	met
Mooroolbark	96.7	100.0	100.0	100.0	99.2	2	met
Richmond	97.8	87.9	98.9	100.0	96.2	0	met
Latrobe Valley							
Traralgon	98.9	97.8	100.0	94.6	97.8	0	met

Monitoring was by TEOM.

Screening to establish that PM₁₀ levels are reasonably consistently below the relevant AAQ NEPM standard have not been satisfied for other regions (Ballarat, Bendigo, Shepparton, Wodonga and Mildura). These are assessed as 'not demonstrated'.

The PM₁₀ standard was exceeded at Footscray, Geelong South and Mooroolbark. These exceedances were the result of urban sources, planned burning and local dust, as detailed in Section C. Compliance and the NEPM goal was met at all stations.

Particles as PM_{2.5}

The NEPM was varied in 2003 to include advisory reporting standards for particles as PM_{2.5}. There is no time frame for compliance, but monitoring by the reference method and other acceptable methods must be reported.

Table 11 summarises Victoria's monitoring of PM_{2.5} by the reference method. Only reference method monitoring is to be used for comparisons with the advisory reporting standards. The goal is to gather sufficient data nationally to facilitate a review of the advisory reporting standards as part of the review of the NEPM that commenced in 2005.

Table 11: 2012 monitoring summary for PM_{2.5} in Victoria

AAQ NEPM advisory reporting standards: 25 µg/m³ (24-hour average); 8 µg/m³ (one-year average)

Region	Data availability rates (% of days)					Number of exceedances (days)	Annual mean (µg/m ³)
	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	96.7	100.0	100.0	96.8	98.4	0	6.6
Footscray	100.0	100.0	100.0	100.0	100.0	0	6.1

Monitoring by reference method (one-day-in-three).

No exceedances of the 24-hour PM_{2.5} reporting standard were recorded in 2012.

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Table 12 summarises Victoria's monitoring of PM_{2.5} by TEOM for the Equivalence Program. TEOM PM_{2.5} data is usually lower than the reference method, especially in the cooler months, due to the loss of the volatile component of PM_{2.5}. Details are given in Section C.

Table 12: PM_{2.5} Equivalence Program 2012 TEOM monitoring summary

Region Performance monitoring station	Data availability rates (% of days)					Annual mean
	Q1	Q2	Q3	Q4	Annual	(µg/m ³)
Port Phillip						
Alphington	87.9	89.0	93.5	95.7	91.5	4.3
Footscray	100.0	95.6	93.5	100.0	97.3	4.4

Monitoring by TEOM (daily).

Lead

Following the phasing out of leaded petrol, concentrations at the peak station, Collingwood, were below the level specified for discontinuing monitoring¹⁰. Monitoring of lead in Melbourne ceased at the end of 2004. All other regions meet screening criteria as set out in the monitoring plan and all regions are assessed as complying with the standard and goal.

¹⁰ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 9, *Lead monitoring*, available from www.ephc.gov.au/taxonomy/term/74.

C Analysis of air quality monitoring

Annual summary statistics are presented in this section. The AAQ NEPM states that the short term standards should not be exceeded on more than one day per year for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, or on more than five days per year for PM₁₀. The second highest non-overlapping daily value for the year (or the sixth for PM₁₀) can indicate the extent to which the standards are, or are not, met. In the following tables, concentrations exceeding the standard are highlighted in bold.

All occasions when a standard was exceeded are listed, as are the circumstances leading to the exceedance.

Tables of monitoring statistics presented in this section have been prepared according to AAQ NEPM guidelines¹⁰.

Carbon monoxide

Table 13: 2012 summary statistics for daily peak eight-hour carbon monoxide in Victoria

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington	120	1.6	Jun 20:02 Jun 19:24		
Geelong South	358	1.7	Jun 28:02	1.5	Jun 27:24
Richmond	351	2.2	Jun 2:02	1.9	Jun 1:24

Carbon monoxide levels were well within the standard at all stations. The highest readings occurred at Richmond, where carbon monoxide reached 24 per cent of the standard.

¹⁰ National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8, *Annual reports*, available from www.ephc.gov.au/taxonomy/term/74.

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Nitrogen dioxide

Table 14: 2012 summary statistics for daily peak one-hour nitrogen dioxide in Victoria

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington	121	0.037	Feb 24:20	0.036	Jun 19:20
Brighton	360	0.041	Jun 19:21	0.039	Feb 15:21
Footscray	327	0.058	Feb 24:21	0.049	Apr 19:13
Geelong South	345	0.041	Apr 13:21	0.036	Apr 19:19
Point Cook	351	0.039	Jul 23:13	0.037	Jun 19:21 Dec 23:23
Latrobe Valley					
Traralgon	358	0.032	Apr 13:19	0.029	Sep 12:19 Aug 4:19

Nitrogen dioxide levels were well within the standard at all stations. The highest one-hour average occurred at Footscray and was 48 per cent of the hourly standard. The highest annual average also occurred at Footscray and was 35 per cent of the standard (see Table 7).

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Ozone

Table 15: 2012 summary statistics for daily peak one-hour ozone in Victoria

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington	121	0.057	Jan 1:18	0.056	Jan 23:16
Brighton	363	0.069	Jan 29:13	0.062	Feb 24:17
Dandenong	361	0.068	Feb 24:18	0.063	Jan 1:12
Footscray	297	0.057	Jan 1:13 Feb 24:16		
Geelong South	362	0.079	Nov 29:14	0.064	Feb 24:16
Melton	351	0.068	Nov 28:17	0.063	Feb 24:19 Jan 1:14
Mooroolbark	364	0.077	Jan 3:14	0.070	Apr 5:15
Point Cook	357	0.092	Feb 24:17	0.077	Jan 29:13
Latrobe Valley					
Traralgon	365	0.054	Feb 25:17	0.050	Jan 3:12

Table 16: 2012 summary statistics for daily peak four-hour ozone in Victoria

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington	121	0.054	Jan 1:18	0.048	Feb 25:15 Feb 24:18 Jan 23:18
Brighton	363	0.065	Jan 29:16	0.060	Nov 29:16 Feb 24:18
Dandenong	361	0.066	Feb 24:18	0.061	Jan 1:15
Footscray	297	0.052	Jan 1:15	0.049	Jan 23:18 Jan 29:17
Geelong South	362	0.070	Nov 29:16	0.059	Feb 24:18
Melton	351	0.061	Nov 28:19	0.060	Jan 1:16
Mooroolbark	364	0.069	Jan 3:15	0.066	Apr 5:17
Point Cook	357	0.073	Feb 24:19	0.065	Jan 29:17
Latrobe Valley					
Traralgon	365	0.053	Feb 25:18	0.046	Jan 3:13 Dec 23:18

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Ozone is generated by chemical reactions in strong sunlight as precursor chemicals are transported from the point of emission. Ozone events in Melbourne typically occur when air masses are recirculated back into the metropolitan area. Compared to their respective standards, the four-hour averages are usually proportionally higher than the one-hour averages, leading to more exceedances of the four-hour standard.

The standards for ozone were met at all stations during 2012 for the one-hour average and four-hour average. There were no exceedances of the one-hour and four-hour standards. The highest one-hour average in the Port Phillip region, at Point Cook, was 92 per cent of the standard and in the Latrobe Valley, at Traralgon, 54 per cent of the standard. The highest four-hour average in the Port Phillip region, at Point Cook, was 91 per cent of the standard and in the Latrobe Valley, at Traralgon, 66 per cent of the standard.

Table 17: 2012 ozone exceedances

AAQ NEPM standards: 0.10 ppm (one-hour average), 0.08 ppm (four-hour average)
AAQ NEPM goal: standards exceeded on no more than one day per year

Date	Region	Station	Exceedance	Inferred cause
Averaging period one-hour				
	Port Phillip	Alphington	none	none
		Brighton	none	none
		Dandenong	none	none
		Footscray	none	none
		Geelong South	none	none
		Melton	none	none
		Mooroolbark	none	none
		Point Cook	none	none
	Latrobe Valley	Traralgon	none	none
Averaging period four-hour				
	Port Phillip	Alphington	none	none
		Brighton	none	none
		Dandenong	none	none
		Footscray	none	none
		Geelong South	none	none
		Melton	none	none
		Mooroolbark	none	none
		Point Cook	none	none
	Latrobe Valley	Traralgon	none	none

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Sulfur dioxide

Table 18: 2012 summary statistics for daily peak one-hour sulfur dioxide in Victoria

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd highest (date:hour)
Port Phillip					
Alphington	121	0.014	May 12:12	0.011	Jan 3:15
Altona North	352	0.066	Jul 2:10	0.060	Jan 13:19
Geelong South	358	0.060	Nov 16:23	0.050	Apr 30:02
Latrobe Valley					
Traralgon	365	0.101	Nov 23:14	0.085	Jan 19:14

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Table 19: 2012 summary statistics for daily peak 24-hour sulfur dioxide in Victoria

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date)	2nd highest (ppm)	2nd highest (date)
Port Phillip					
Alphington	121	0.003	May 28 Jan 3		
Altona North	352	0.018	Jul 2	0.014	Jan 30
Geelong South	358	0.006	Jun 12	0.005	Apr 5 Dec 23
Latrobe Valley					
Traralgon	365	0.015	Nov 23	0.011	Jan 19

Sulfur dioxide levels were well below the standards at all stations. Maximum one-hour averages were higher relative to the standard than the 24-hour or annual averages. The highest one-hour average in the Port Phillip region, at Altona North, was 33 per cent of the standard and in the Latrobe Valley, at Traralgon, 51 per cent of the standard. The highest 24-hour average in the Port Phillip region, at Altona North, was 23 per cent of the standard and in the Latrobe Valley, at Traralgon, 19 per cent of the standard. Annual averages at all stations (see Table 9) are close to the limit of detection.

Particles as PM₁₀

Table 20: 2012 summary statistics for 24-hour PM₁₀ in Victoria

AAQ NEPM standard: 50 µg/m³ (24-hour average)
 AAQ NEPM goal: standard exceeded on no more than five days per year

Region Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)	6th highest (µg/m ³)	6th highest (date)
Port Phillip					
Alphington	358	40.7	Apr 5	30.4	Nov 21
Brighton	361	45.8	Apr 5	31.6	Jun 11
Dandenong	361	49.8	Apr 5	37.7	Apr 19
Footscray	362	57.7	Apr 19	43.8	Apr 4
Geelong South	359	43.8	Oct 4	39.6	Sep 11
Mooroolbark	363	53.9	Apr 5	40.4	Jun 7
Richmond	352	47.4	Apr 5	29.8	Nov 21
Latrobe Valley					
Traralgon	363	35.0	Jan 25	28.4	May 18

The NEPM goal was achieved at all stations (see Table 10) in the Port Phillip region and at Traralgon in the Latrobe Valley.

In addition to TEOM monitoring, PM₁₀ was monitored every sixth day at Alphington and Footscray by a high-volume sampler. The highest high-volume sampler readings were 33 µg/m³ at Alphington (19 Apr) and 58 µg/m³ at Footscray (19 Apr).

In 2012, PM₁₀ exceedances occurred on the days listed in Table 21. The likely causes have been inferred, with the exceedances attributed to dust, fires and urban emissions.

Overall there has been a significant reduction in exceedances since 2009. In 2012 there were six exceedances over five days compared to four exceedances over three days in 2011, 11 exceedances over 11 days in 2010, and 90 exceedances over 32 days in 2009.

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Table 21: 2012 PM₁₀ exceedances

AAQ NEPM standard: 50 µg/m³ (24-hour average)
 AAQ NEPM goal: standard exceeded on no more than five days per year

Date	Port Phillip							Latrobe Valley	Inferred cause ^a
	Alphington	Brighton	Dandenong	Footscray	Geelong South	Mooroolbark	Richmond	Traralgon	
Mar 23				51.1					dust
Apr 5				52.5		53.9			fire
Apr 19				57.7					urban
Jun 1						51.5			urban
Oct 4					53.8				dust
Total	0	0	0	3	1	2	0	0	

All readings in µg/m³

a dust = windborne crustal dust, often from distant sources

fire = smoke from bushfires, planned burning or agricultural burning

urban = particles accumulating in stable atmospheric conditions, typically from motor vehicles or domestic wood heaters.

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Particles as PM_{2.5}

Table 22: 2012 summary statistics for 24-hour PM_{2.5} in Victoria

AAQ NEPM advisory reporting standard: 25 µg/m³ (24-hour average)

Region Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)
Port Phillip			
Alphington	120	19.0	Apr 19
Footscray	122	23.1	Apr 19

Monitoring by reference method (one-day-in-three).

The 24-hour reporting standard for PM_{2.5} was not exceeded at Alphington or Footscray during 2012.

The annual reporting standard (8 µg/m³) was achieved at both stations (see Table 11).

Results of PM_{2.5} monitoring by TEOM (see Table 23) are not adjusted for loss of volatiles. The highest readings at Alphington and Footscray (Apr 5) occurred on a day where particles accumulated from planned burning.

Table 23: PM_{2.5} Equivalence Program 2012 TEOM monitoring - daily statistics

Region Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)
Port Phillip			
Alphington	335	21.1	Apr 5
Footscray	356	26.3	Apr 5

Summary of progress towards achieving the AAQ NEPM goals

Compliance in 2012

The AAQ NEPM goals for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead and PM₁₀ are to achieve the standards, to the extent specified by the number of times allowed to exceed the standard.

In 2012, the goals were met at all stations where there was sufficient data captured. The exceptions due to insufficient data capture were carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide at Alphington (Q1, Q2, Q3, Q4) and nitrogen dioxide and ozone at Footscray (Q4).

All of the days when PM₁₀ exceedances were recorded in the Port Phillip region were attributed to either dust, fire or urban emissions (five days). The exceedances on 23 March (Footscray) and 4 October (Geelong South) were attributed to local dust; 5 April (Footscray and Mooroolbark) planned burning; and 19 April (Footscray) and June 1 (Mooroolbark) urban emission particles accumulating in stable atmospheric conditions, typically from motor vehicles or domestic wood heaters.

The one-hour average and four-hour average ozone standards and the goals for ozone were met at all stations where there was sufficient data captured during 2012 in the Port Phillip region and at Traralgon in the Latrobe Valley. There were no exceedances of the one-hour and four-hour standards.

The 24-hour advisory reporting standard for PM_{2.5} was not exceeded in the Port Phillip region. The annual reporting standard (8 µg/m³) was met for PM_{2.5}.

Trends in compliance

An analysis of Victoria's compliance with the NEPM has been performed taking into account monitoring over 2003-12¹¹ and screening (summarised in Table 4).

Between 2003-12, the goals and standards have been consistently met in Victoria for carbon monoxide, nitrogen dioxide, sulfur dioxide and lead.

For ozone, the NEPM goal was met in six of the last ten years in the Port Phillip region (2004, 2005, 2007, 2010, 2011 and 2012)¹² and in eight of the last nine years in the Latrobe Valley region (2003, 2004, 2005, 2007, 2008, 2009, 2010, 2011 and 2012)¹². Exceedances of both the four-hour and (less frequently) one-hour standards have been recorded. Major bushfires in 2003, 2006 and 2007 caused or exacerbated many of the ozone exceedances observed (see Figure 3)¹³. Ozone monitoring in other rural regions did not record any exceedances and all except Ballarat satisfied the screening criteria.

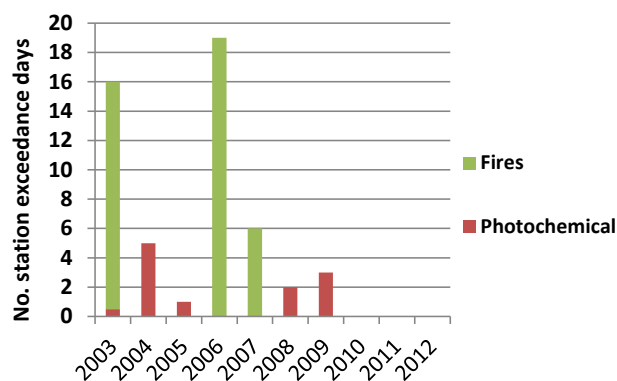


Figure 3: Inferred causes of exceedances of the ozone four-hour standard (Port Phillip region 2003-12)

In the Port Phillip region, the particles as PM₁₀ goal has only been met between 2010 and 2012 during the period 2003-12. The elevated particle levels above the air quality standard were attributed (see Figure 4) to fires (bushfires and planned burning) and windborne dust (either locally raised dust or dust storms with transport over larger distances). 2003, 2006 and 2009 were particularly affected by fires, with no station in the Port Phillip region meeting the goal. In other years, although some stations did not meet the goal, the majority of stations in the region met the goal.

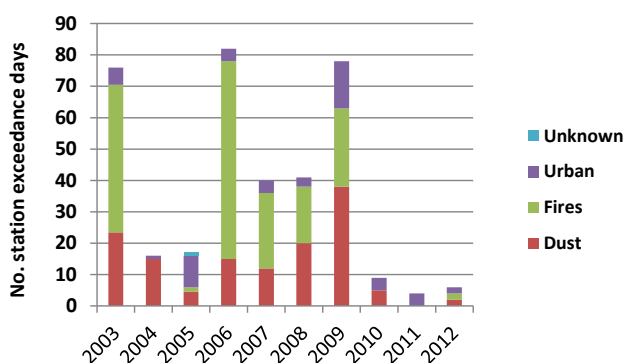


Figure 4: Inferred causes of exceedances of the PM₁₀ standard (Port Phillip region 2003-12)

In the Latrobe Valley region, the particles as PM₁₀ goal was not met for the years 2003, 2006, 2007, 2008 and 2009 during the period 2002-12.

The major causes of the elevated particle levels were mainly attributed to fires, (bushfires and planned burning) and windborne dust (either locally raised dust or dust storms with transport over larger distances).

The AAQ NEPM goal for PM_{2.5} is to gather sufficient data to facilitate a review of the advisory reporting standards as part of the review of the NEPM. PM_{2.5} has been monitored at two stations (Alphington and Footscray) in the Port Phillip region since 2002. Exceedances of the 24-hour PM_{2.5} standard have occurred at these stations (see Figure 5), attributed to urban as well as bushfire and planned burning sources.

11 Prior to 2003 Victoria's monitoring network was not fully established for ozone and particles.

12 A region achieves the goal in any year if all stations in the region achieve the goal.

13 The regional exceedances shown in Figures 3 to 5 are the sum of the exceedance days recorded at all stations in the region. This number cannot be compared with the AAQ NEPM goal.

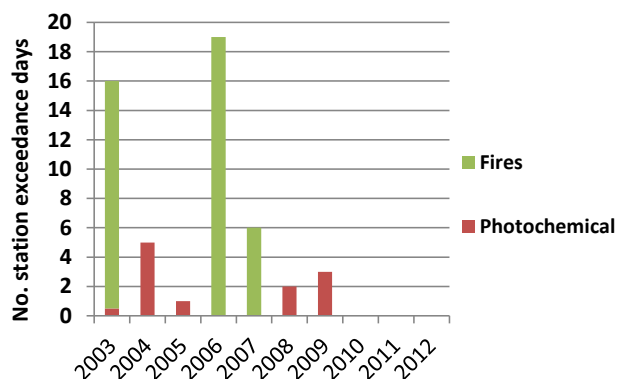


Figure 5: Inferred causes of exceedances of the PM_{2.5} 24-hour standard (Port Phillip region 2003-12)

Data capture

Compliance with the standards and associated goals can only be demonstrated if data capture is at least 75 per cent in each quarter of the year¹⁴. In 2012 this requirement was achieved for all pollutants at all stations except carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide at Alphington (Q1, Q2, Q3, Q4) and nitrogen dioxide and ozone at Footscray (Q4).

Screening

Screening indicates that pollutant levels will meet the goal for carbon monoxide, nitrogen dioxide and ozone for the rural regions of Ballarat, Bendigo, Mildura, Shepparton, Wodonga and Warrnambool. Campaign monitoring in these regions (with the exception of Mildura) showed that PM₁₀ met the goal, although levels exceeded the air quality standard on some days. Monitoring at Mildura indicated the region did not meet the goal during the monitoring period due to frequent dust storms.

¹⁴ National Environment Protection (Ambient Air Quality) Measure Technical paper No. 8, *Annual reports*, available from www.ephc.gov.au/taxonomy/term/74.

D Trends and pollutant distributions

Results and further analysis of the monitoring data are presented in this section. Percentiles of 2012 daily peak concentrations are provided for each station and standard. In these tables, daily peak values are formed only when at least 75 per cent of the data for the day are valid. Data for stations with less than 15 per cent data in the year are omitted and stations with less than 75 per cent data are shown in italics. Exceedances are shown in bold. The percentiles for eight-hour carbon monoxide and four-hour ozone are based on running averages, including those that overlap from one day to the next.

Percentiles of the daily peak concentrations in the Port Phillip region are plotted after 2001, when monitoring according to the NEPM protocol ensured greater continuity of stations operating each year. The values plotted are averages of the percentiles from stations having at least 75 per cent of data in the year. Different stations and different statistics can suggest different trend behaviour; no estimates of statistical significance are presented.

Annual statistics are also presented in tables for each station with at least five years of data. Trend data for lead is presented, although monitoring ceased in 2004.

Carbon monoxide

Table 24: 2012 percentiles of daily peak eight-hour carbon monoxide concentrations in Victoria

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	<i>32.8</i>	<i>1.6</i>	<i>1.5</i>	<i>1.3</i>	<i>1.1</i>	<i>0.9</i>	<i>0.5</i>	<i>0.2</i>
Geelong South	97.8	1.7	1.2	0.9	0.8	0.6	0.4	0.3
Richmond	95.9	2.2	1.6	1.5	1.1	0.8	0.4	0.3

Data availability below 75 per cent shown in italics.

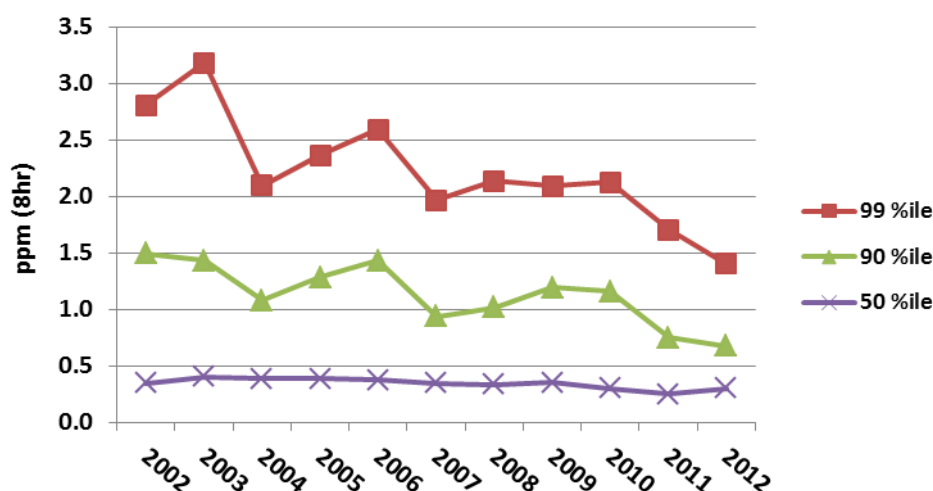


Figure 6: Percentiles of daily maximum eight-hour carbon monoxide (average of Port Phillip stations 2002-12)

In interpreting trends, it should be noted that monitoring at RMIT ceased in October 2006. This CBD station tended to record higher carbon monoxide levels, so averages in later years may be relatively lower.

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Table 25: Percentiles of daily maximum eight-hour carbon monoxide at Alphington (1995-2012)

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances (days)	Max (ppm)	Percentiles (ppm)					
	(% of days)			99th	98th	95th	90th	75th	50th
1995	92.1	0	6.0	4.9	4.5	3.4	2.5	1.5	0.8
1996	98.6	0	6.5	5.8	5.0	3.3	2.5	1.6	0.8
1997	98.9	0	6.5	5.5	4.4	3.4	2.6	1.5	0.8
1998	95.3	0	6.8	6.0	5.1	3.9	2.7	1.7	0.7
<i>1999</i>	<i>55.1</i>	<i>0</i>	<i>6.2</i>	<i>4.7</i>	<i>4.1</i>	<i>3.0</i>	<i>2.1</i>	<i>1.1</i>	<i>0.6</i>
2000	96.7	0	5.0	4.5	4.3	3.1	2.4	1.2	0.6
2001	92.9	0	5.2	3.8	3.4	2.9	2.0	1.1	0.6
2002	93.7	0	3.8	3.5	3.1	2.7	2.0	0.9	0.4
2003	96.7	0	5.4	3.9	3.5	2.7	1.8	0.9	0.5
2004	97.0	0	3.7	2.4	2.3	1.7	1.3	0.8	0.5
2005	93.7	0	3.1	2.5	2.4	2.0	1.6	0.9	0.6
2006	89.6	0	3.6	3.2	3.0	2.5	1.9	1.0	0.6
2007	98.6	0	2.8	2.3	1.9	1.6	1.2	0.8	0.5
2008	98.4	0	3.2	2.7	2.3	1.7	1.4	0.8	0.4
2009	97.5	0	2.6	2.1	2.0	1.8	1.3	0.7	0.3
2010	97.5	0	2.8	2.4	2.1	1.8	1.4	0.4	0.1
2011	95.1	0	2.9	1.8	1.6	1.2	0.8	0.3	0.1
<i>2012</i>	<i>32.8</i>	<i>0</i>	<i>1.6</i>	<i>1.5</i>	<i>1.3</i>	<i>1.1</i>	<i>0.9</i>	<i>0.5</i>	<i>0.2</i>

Years with data availability below 75 per cent shown in italics.

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Table 26: Percentiles of daily maximum eight-hour carbon monoxide at Geelong South (1995-2012)

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	80.5	0	4.2	3.2	2.9	2.4	1.6	0.8	0.4
1996	86.3	0	4.3	3.3	2.9	1.9	1.2	0.5	0.3
<i>1997</i>	<i>0.0</i>								
<i>1998</i>	<i>66.0</i>	<i>0</i>	<i>3.3</i>	<i>2.8</i>	<i>2.6</i>	<i>2.3</i>	<i>1.6</i>	<i>0.7</i>	<i>0.4</i>
1999	92.6	0	3.0	2.7	2.3	1.6	1.1	0.7	0.3
2000	85.8	0	2.7	2.1	1.9	1.4	1.0	0.5	0.3
2001	87.7	0	2.2	1.9	1.6	1.2	0.9	0.5	0.2
2002	87.1	0	2.3	1.8	1.4	1.0	0.6	0.3	0.1
2003	87.1	0	3.2	1.8	1.6	1.1	0.7	0.4	0.2
2004	85.8	0	2.9 ^a	1.7	1.6	0.9	0.6	0.4	0.1
2005	96.4	0	3.5	1.8	1.5	0.9	0.7	0.2	0.1
2006	92.3	0	2.2	1.9	1.6	1.2	0.7	0.3	0.1
2007	98.1	0	1.9	1.3	1.1	0.7	0.6	0.4	0.2
2008	94.5	0	2.2	1.8	1.6	1.0	0.5	0.3	0.2
2009	98.6	0	2.6	1.6	1.2	1.0	0.7	0.4	0.3
2010	98.1	0	1.8	1.3	1.2	0.8	0.7	0.5	0.3
2011	98.1	0	2.1	1.5	1.1	0.7	0.6	0.4	0.3
2012	97.8	0	1.7	1.2	0.9	0.8	0.6	0.4	0.3

a Recorded on a day with less than 75 per cent of valid eight-hour averages.

Years with data availability below 75 per cent shown in italics.

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Table 27: Percentiles of daily maximum eight-hour carbon monoxide at Richmond (2001-12)

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
2001	89.3	0	4.0	3.4	3.1	2.7	2.0	1.1	0.5
2002	93.2	0	5.0	3.1	2.8	2.4	1.9	0.8	0.3
2003	96.4	0	6.4	4.0	3.6	2.6	1.7	0.8	0.3
2004	96.2	0	3.9	2.4	2.2	1.8	1.2	0.6	0.3
2005	96.2	0	3.8	3.1	2.8	2.2	1.5	0.6	0.2
2006	95.3	0	3.2	2.9	2.8	2.3	1.7	0.7	0.3
2007	97.3	0	2.9	2.3	1.9	1.5	1.0	0.5	0.3
2008	95.4	0	3.7	1.9	1.6	1.5	1.2	0.6	0.4
2009	95.3	0	3.3 ^a	2.5	2.3	2.0	1.5	0.8	0.5
2010	94.0	0	3.8	2.7	1.9	1.6	1.4	0.7	0.5
2011	87.4	0	2.6	1.8	1.5	1.2	0.9	0.6	0.4
2012	95.9	0	2.2	1.6	1.5	1.1	0.8	0.4	0.3

a Recorded on a day with less than 75 per cent of valid eight-hour averages.

Table 28: Percentiles of daily maximum eight-hour carbon monoxide at RMIT (CBD) (1995-2006)

AAQ NEPM standard: 9.0 ppm (eight-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
<i>1995</i>	<i>2.7</i>								
1996	90.4	0	5.5	4.5	3.8	2.8	2.2	1.6	0.9
1997	98.4	0	5.5	4.3	3.8	2.9	2.4	1.4	0.9
1998	86.3	0	5.9	4.7	4.4	3.0	2.1	1.4	0.8
<i>1999</i>	<i>35.6</i>	0	5.9	5.0	3.3	2.7	2.0	1.5	1.2
2000	96.4	0	5.0	3.4	3.2	2.5	1.8	1.1	0.8
2001	88.8	0	3.6	2.7	2.4	2.1	1.7	1.1	0.7
2002	85.2	0	3.2	2.9	2.7	1.8	1.5	0.9	0.5
2003	96.7	0	3.9	3.0	2.6	1.8	1.5	0.9	0.6
2004	91.5	0	2.1	1.9	1.8	1.5	1.2	0.8	0.6
2005	95.3	0	2.4	2.1	2.0	1.7	1.3	0.9	0.6
2006	77.0	0	2.9	2.5	2.0	1.7	1.5	1.0	0.6

Years with data availability below 75 per cent shown in italics.

Nitrogen dioxide

Table 29: 2012 percentiles of daily peak one-hour nitrogen dioxide concentrations in Victoria

AAQ NEPM standard: 0.12 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	33.1	0.037	0.036	0.033	0.030	0.028	0.025	0.020
Brighton	98.4	0.041	0.035	0.034	0.031	0.029	0.024	0.017
Footscray	89.3	0.058	0.042	0.040	0.036	0.032	0.027	0.020
Geelong South	94.3	0.041	0.032	0.031	0.028	0.026	0.020	0.014
Point Cook	95.9	0.039	0.036	0.033	0.027	0.024	0.017	0.011
Latrobe Valley								
Traralgon	97.8	0.032	0.028	0.026	0.025	0.022	0.019	0.013

Data availability below 75 per cent shown in italics.

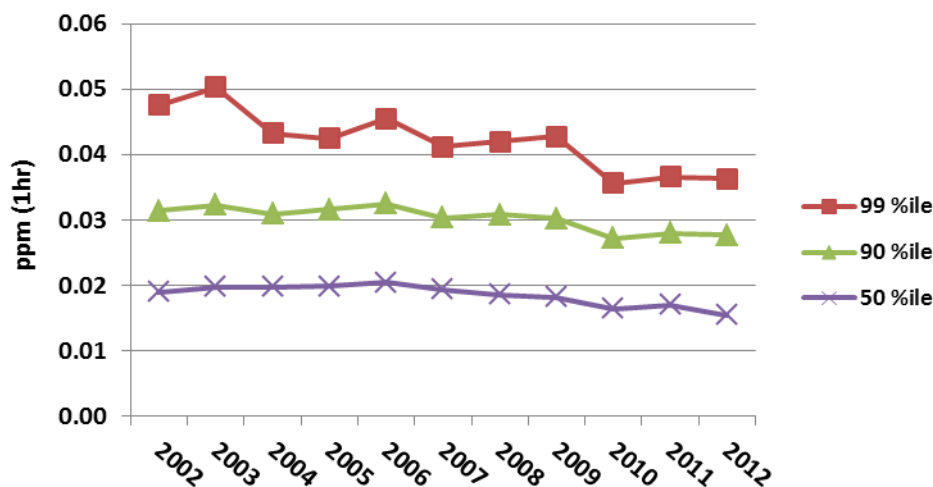


Figure 7: Percentiles of daily maximum one-hour nitrogen dioxide (avg of Port Phillip stations 2002-12)

In interpreting trends, it should be noted that monitoring at RMIT ceased in October 2006. This CBD station tended to record higher nitrogen dioxide levels, so averages in later years may be relatively lower.

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Table 30: Percentiles of daily maximum one-hour nitrogen dioxide at Alphington (1995-2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	72.6	0	0.052	0.046	0.043	0.039	0.035	0.030	0.025
1996	93.7	0	0.061	0.046	0.043	0.038	0.034	0.029	0.024
1997	84.4	0	0.075	0.059	0.051	0.044	0.038	0.030	0.025
1998	95.9	0	0.073	0.058	0.055	0.045	0.039	0.031	0.026
1999	97.5	0	0.065	0.046	0.045	0.038	0.035	0.029	0.025
2000	89.0	0	0.069	0.053	0.048	0.040	0.035	0.029	0.024
2001	90.4	0	0.060	0.052	0.047	0.039	0.034	0.029	0.024
2002	93.7	0	0.060	0.048	0.046	0.038	0.034	0.030	0.023
2003	90.1	0	0.065	0.050	0.046	0.037	0.032	0.027	0.023
2004	95.6	0	0.056	0.044	0.039	0.034	0.032	0.028	0.023
2005	94.8	0	0.050	0.043	0.039	0.035	0.033	0.027	0.022
2006	90.7	0	0.069	0.044	0.042	0.038	0.034	0.030	0.024
2007	100.0	0	0.052	0.046	0.039	0.035	0.033	0.029	0.024
2008	97.8	0	0.060	0.043	0.039	0.035	0.032	0.028	0.022
2009	98.4	0	0.051	0.043	0.042	0.035	0.031	0.026	0.020
2010	98.4	0	0.038	0.034	0.034	0.031	0.028	0.024	0.019
2011	96.2	0	0.046	0.040	0.035	0.031	0.029	0.026	0.021
<i>2012</i>	<i>33.1</i>	<i>0</i>	<i>0.032</i>	<i>0.028</i>	<i>0.026</i>	<i>0.025</i>	<i>0.022</i>	<i>0.019</i>	<i>0.013</i>

Years with data availability below 75 per cent shown in italics.

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Table 31: Percentiles of daily maximum one-hour nitrogen dioxide at Brighton (1995-2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	85.2	0	0.060	0.049	0.042	0.038	0.034	0.028	0.022
1996	82.8	0	0.056	0.044	0.044	0.038	0.034	0.028	0.022
1997	90.7	0	0.075	0.063	0.058	0.047	0.042	0.034	0.026
1998	85.5	0	0.054	0.048	0.044	0.040	0.035	0.028	0.022
1999	99.7	0	0.054	0.047	0.043	0.040	0.035	0.030	0.024
2000	92.3	0	0.061	0.054	0.044	0.038	0.033	0.028	0.022
2001	81.9	0	0.058	0.049	0.043	0.037	0.035	0.029	0.022
2002	94.8	0	0.053	0.049	0.044	0.038	0.033	0.028	0.021
2003	98.1	0	0.074	0.053	0.045	0.037	0.033	0.027	0.021
2004	96.4	0	0.049	0.042	0.039	0.035	0.031	0.025	0.019
2005	99.2	0	0.054	0.040	0.038	0.034	0.032	0.027	0.020
2006	94.0	0	0.052	0.045	0.040	0.036	0.032	0.026	0.019
2007	99.7	0	0.048	0.040	0.038	0.034	0.032	0.026	0.020
2008	98.9	0	0.053	0.042	0.039	0.035	0.033	0.027	0.021
2009	97.0	0	0.049	0.041	0.038	0.034	0.031	0.026	0.020
2010	99.7	0	0.045	0.036	0.035	0.032	0.029	0.024	0.018
2011	99.2	0	0.042	0.035	0.034	0.032	0.030	0.025	0.018
2012	98.4	0	0.041	0.035	0.034	0.031	0.029	0.024	0.017

Table 32: Percentiles of daily maximum one-hour nitrogen dioxide at Footscray (1995-2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	87.1	0	0.056	0.051	0.048	0.043	0.038	0.031	0.024
1996	91.5	0	0.071	0.054	0.049	0.043	0.037	0.028	0.023
1997	98.1	0	0.088	0.066	0.058	0.048	0.040	0.032	0.026
1998	89.9	0	0.070	0.057	0.053	0.048	0.042	0.032	0.024
1999	97.8	0	0.081	0.057	0.051	0.045	0.040	0.033	0.026
2000	82.7	0	0.070	0.060	0.054	0.046	0.039	0.030	0.025
<i>2001</i>	<i>32.6</i>	<i>0</i>	<i>0.041</i>	<i>0.040</i>	<i>0.039</i>	<i>0.036</i>	<i>0.033</i>	<i>0.028</i>	<i>0.021</i>
2002	91.8	0	0.059	0.055	0.049	0.040	0.035	0.029	0.022
2003	97.8	0	0.065	0.058	0.054	0.044	0.037	0.029	0.022
2004	95.6	0	0.056	0.047	0.044	0.040	0.035	0.029	0.023
2005	99.5	0	0.053	0.046	0.043	0.038	0.034	0.027	0.021
2006	87.7	0	0.071	0.051	0.046	0.040	0.034	0.028	0.022
2007	99.7	0	0.056	0.050	0.045	0.038	0.035	0.030	0.025
2008	100.0	0	0.064	0.048	0.045	0.038	0.034	0.029	0.022
2009	99.5	0	0.064	0.052	0.047	0.041	0.036	0.029	0.023
2010	99.7	0	0.062	0.045	0.043	0.036	0.032	0.026	0.020
2011	96.7	0	0.053	0.044	0.038	0.035	0.032	0.027	0.021
2012	89.3	0	0.058	0.042	0.040	0.036	0.032	0.027	0.020

Years with data availability below 75 per cent shown in italics.

Table 33: Percentiles of daily maximum one-hour nitrogen dioxide at Geelong South (1995–2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	68.8	0	0.048	0.039	0.038	0.034	0.031	0.025	0.021
1996	86.6	0	0.044	0.041	0.038	0.033	0.028	0.024	0.018
1997	0.0								
<i>1998</i>	<i>68.5</i>	<i>0</i>	<i>0.067</i>	<i>0.039</i>	<i>0.037</i>	<i>0.034</i>	<i>0.032</i>	<i>0.026</i>	<i>0.020</i>
1999	93.7	0	0.046	0.038	0.035	0.031	0.028	0.022	0.016
2000	85.2	0	0.048	0.038	0.037	0.028	0.024	0.019	0.015
2001	91.2	0	0.047	0.035	0.032	0.029	0.027	0.022	0.015
2002	94.2	0	0.056	0.036	0.031	0.027	0.025	0.019	0.012
2003	87.7	0	0.050	0.034	0.033	0.028	0.025	0.021	0.014
2004	93.2	0	0.050	0.037	0.030	0.027	0.024	0.020	0.015
2005	98.1	0	0.048	0.038	0.034	0.029	0.026	0.021	0.015
2006	92.9	0	0.043	0.036	0.034	0.028	0.026	0.022	0.016
2007	99.7	0	0.037	0.032	0.030	0.028	0.026	0.022	0.015
2008	99.5	0	0.052	0.039	0.033	0.029	0.027	0.021	0.015
2009	97.8	0	0.048	0.036	0.032	0.028	0.025	0.021	0.014
2010	98.6	0	0.039	0.029	0.028	0.025	0.023	0.020	0.013
2011	99.7	0	0.040	0.031	0.030	0.028	0.025	0.020	0.013
2012	94.3	0	0.041	0.032	0.031	0.028	0.026	0.020	0.014

Years with data availability below 75 per cent shown in italics.

Table 34: Percentiles of daily maximum one-hour nitrogen dioxide at Point Cook (1995-2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	83.6	0	0.048	0.041	0.038	0.032	0.028	0.020	0.014
1996	91.5	0	0.054	0.046	0.045	0.038	0.029	0.023	0.015
1997	<i>0.0</i>								
1998	92.1	0	0.064	0.049	0.046	0.036	0.028	0.022	0.015
1999	84.4	0	0.044	0.037	0.036	0.032	0.028	0.018	0.011
2000	<i>68.8</i>	<i>0</i>	<i>0.048</i>	<i>0.043</i>	<i>0.039</i>	<i>0.032</i>	<i>0.028</i>	<i>0.020</i>	<i>0.014</i>
2001	87.7	0	0.054	0.044	0.040	0.033	0.029	0.022	0.015
2002	96.2	0	0.056	0.045	0.041	0.031	0.027	0.021	0.013
2003	93.2	0	0.064	0.048	0.044	0.031	0.028	0.020	0.013
2004	94.8	0	0.066	0.041	0.035	0.030	0.026	0.020	0.013
2005	96.7	0	0.043	0.039	0.037	0.032	0.027	0.021	0.014
2006	89.6	0	0.049	0.047	0.043	0.033	0.028	0.022	0.014
2007	97.0	0	0.046	0.038	0.034	0.029	0.025	0.020	0.013
2008	99.7	0	0.065	0.037	0.035	0.032	0.028	0.020	0.013
2009	98.1	0	0.055	0.041	0.036	0.032	0.028	0.021	0.014
2010	89.3	0	0.037	0.033	0.032	0.027	0.024	0.010	0.012
2011	91.2	0	0.038	0.033	0.031	0.027	0.024	0.019	0.012
2012	95.9	0	0.039	0.036	0.033	0.027	0.024	0.017	0.011

Years with data availability below 75 per cent shown in italics.

Table 35: Percentiles of daily maximum one-hour nitrogen dioxide at RMIT (CBD) (1996–2006)

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1996	92.1	0	0.085	0.059	0.052	0.045	0.040	0.032	0.027
1997	90.4	0	0.100	0.074	0.065	0.055	0.046	0.039	0.032
1998	83.8	0	0.089	0.067	0.057	0.049	0.046	0.036	0.028
1999	97.3	0	0.078	0.062	0.050	0.045	0.041	0.033	0.028
2000	91.5	0	0.090	0.064	0.058	0.049	0.041	0.032	0.026
2001	93.4	0	0.071	0.055	0.050	0.043	0.036	0.029	0.024
2002	94.2	0	0.079	0.053	0.046	0.039	0.035	0.028	0.023
2003	98.9	0	0.069	0.059	0.053	0.045	0.039	0.032	0.026
2004	93.7	0	0.075	0.049	0.046	0.040	0.037	0.031	0.026
2005	98.1	0	0.058	0.050	0.047	0.041	0.037	0.032	0.027
2006	78.9	0	0.056	0.051	0.048	0.044	0.040	0.033	0.028

Table 36: Percentiles of daily maximum one-hour nitrogen dioxide at Moe (1995–2009)

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
<i>1995</i>	<i>74.8</i>	<i>0</i>	<i>0.031</i>	<i>0.028</i>	<i>0.026</i>	<i>0.024</i>	<i>0.022</i>	<i>0.018</i>	<i>0.014</i>
<i>1996</i>	<i>26.8</i>	<i>0</i>	<i>0.027</i>	<i>0.021</i>	<i>0.018</i>	<i>0.016</i>	<i>0.013</i>	<i>0.012</i>	<i>0.009</i>
1997	69.6	0	0.036	0.031	0.031	0.026	0.023	0.020	0.016
1998	87.9	0	0.049	0.036	0.033	0.029	0.026	0.022	0.016
1999	86.0	0	0.049	0.035	0.032	0.028	0.025	0.022	0.017
2000	73.5	0	0.050	0.040	0.036	0.027	0.024	0.020	0.015
2001	95.1	0	0.036	0.028	0.026	0.024	0.022	0.018	0.014
2002	96.7	0	0.036	0.030	0.029	0.027	0.026	0.021	0.014
2003	98.4	0	0.034	0.031	0.029	0.027	0.024	0.020	0.014
2004	100.0	0	0.032	0.026	0.024	0.023	0.021	0.018	0.014
2005	99.5	0	0.039	0.034	0.032	0.027	0.024	0.019	0.014
2006	81.1	0	0.058	0.030	0.029	0.026	0.024	0.020	0.016
2007	98.4	0	0.032	0.028	0.027	0.024	0.022	0.019	0.014
2008	99.7	0	0.046	0.028	0.026	0.023	0.021	0.017	0.013
2009	81.6	0	0.062	0.025	0.025	0.022	0.020	0.017	0.012

Years with data availability below 75 per cent shown in italics.

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Table 37: Percentiles of daily maximum one-hour nitrogen dioxide at Traralgon (1995-2012)

AAQ NEPM standard: 0.12 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	94.0	0	0.040	0.029	0.028	0.027	0.024	0.021	0.016
1996	85.8	0	0.035	0.032	0.029	0.027	0.025	0.022	0.016
1997	64.7	0	0.038	0.037	0.034	0.031	0.028	0.024	0.018
1998	89.0	0	0.036	0.030	0.029	0.027	0.025	0.022	0.016
1999	80.8	0	0.042	0.034	0.031	0.028	0.027	0.023	0.018
2000	98.4	0	0.041	0.037	0.033	0.027	0.025	0.021	0.017
2001	98.9	0	0.033	0.031	0.026	0.024	0.022	0.019	0.015
2002	98.1	0	0.033	0.031	0.030	0.027	0.025	0.020	0.015
2003	99.2	0	0.053	0.032	0.030	0.028	0.026	0.022	0.016
2004	98.6	0	0.036	0.034	0.030	0.028	0.024	0.019	0.015
2005	91.5	0	0.040	0.032	0.030	0.028	0.026	0.023	0.016
2006	99.2	0	0.045	0.027	0.026	0.025	0.023	0.020	0.015
2007	97.5	0	0.032	0.029	0.027	0.026	0.024	0.019	0.015
2008	99.5	0	0.039	0.033	0.029	0.026	0.024	0.020	0.014
2009	99.7	0	0.067	0.030	0.028	0.027	0.025	0.020	0.013
2010	99.2	0	0.031	0.026	0.026	0.025	0.023	0.019	0.014
2011	99.5	0	0.034	0.028	0.027	0.025	0.023	0.019	0.013
2012	97.8	0	0.032	0.028	0.026	0.025	0.022	0.019	0.013

Years with data availability below 75 per cent shown in italics.

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Ozone

Table 38: 2012 percentiles of daily peak one-hour ozone concentrations in Victoria

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	<i>33.1</i>	<i>0.057</i>	<i>0.055</i>	<i>0.051</i>	<i>0.042</i>	<i>0.033</i>	<i>0.026</i>	<i>0.023</i>
Brighton	99.2	0.069	0.055	0.050	0.044	0.038	0.030	0.026
Dandenong	98.6	0.068	0.060	0.051	0.042	0.038	0.029	0.026
Footscray	81.1	0.057	0.053	0.044	0.042	0.036	0.030	0.026
Geelong South	98.9	0.079	0.059	0.053	0.039	0.034	0.029	0.026
Melton	95.9	0.068	0.060	0.050	0.044	0.037	0.031	0.027
Mooroolbark	99.5	0.077	0.057	0.055	0.048	0.039	0.031	0.027
Point Cook	97.5	0.092	0.061	0.058	0.046	0.039	0.032	0.028
Latrobe Valley								
Traralgon	99.7	0.054	0.047	0.043	0.036	0.033	0.028	0.024

Stations with data availability below 75 per cent shown in italics.

Table 39: 2012 percentiles of daily peak four-hour ozone concentrations in Victoria

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	<i>33.1</i>	<i>0.054</i>	<i>0.048</i>	<i>0.048</i>	<i>0.038</i>	<i>0.032</i>	<i>0.025</i>	<i>0.022</i>
Brighton	99.2	0.065	0.052	0.048	0.041	0.037	0.029	0.025
Dandenong	98.6	0.066	0.052	0.048	0.040	0.036	0.028	0.024
Footscray	81.1	0.052	0.048	0.043	0.038	0.034	0.029	0.025
Geelong South	98.9	0.070	0.053	0.049	0.037	0.032	0.028	0.025
Melton	95.9	0.061	0.052	0.046	0.040	0.035	0.030	0.027
Mooroolbark	99.5	0.069	0.055	0.050	0.043	0.036	0.030	0.026
Point Cook	97.5	0.073	0.058	0.051	0.043	0.037	0.031	0.027
Latrobe Valley								
Traralgon	100.0	0.044	0.037	0.036	0.033	0.030	0.026	0.021

Stations with data availability below 75 per cent shown in italics.

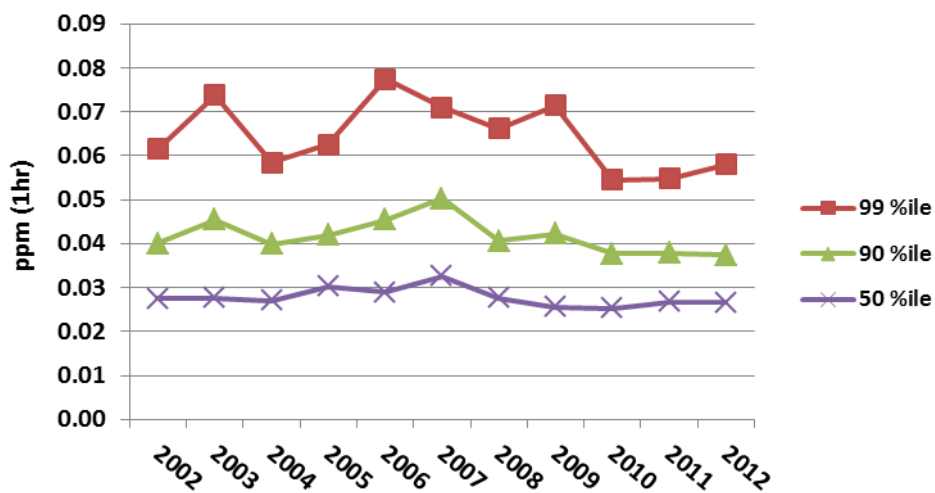


Figure 8: Percentiles of daily maximum one-hour ozone (average of Port Phillip stations 2002-12)

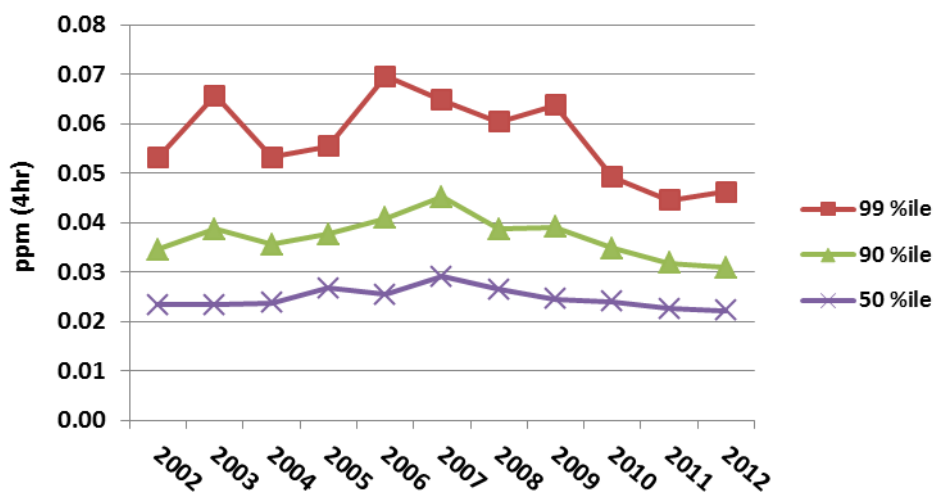


Figure 9: Percentiles of daily maximum four-hour ozone (average of Port Phillip stations 2002-12)

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Table 40: Percentiles of daily maximum one-hour ozone at Alphington (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	95.9	0	0.089	0.057	0.050	0.041	0.034	0.027	0.022
1996	97.3	0	0.076	0.062	0.060	0.044	0.038	0.026	0.021
1997	91.2	0	0.099	0.076	0.069	0.050	0.036	0.026	0.020
1998	96.2	0	0.088	0.061	0.056	0.044	0.035	0.023	0.018
1999	97.8	0	0.074	0.063	0.057	0.047	0.035	0.026	0.020
2000	98.1	0	0.067	0.055	0.049	0.045	0.034	0.024	0.020
2001	92.1	0	0.077	0.054	0.051	0.042	0.036	0.026	0.021
2002	89.6	0	0.051	0.048	0.046	0.040	0.036	0.027	0.023
2003	96.4	1	0.102	0.064	0.059	0.050	0.041	0.030	0.025
2004	96.7	0	0.073	0.048	0.046	0.040	0.037	0.028	0.023
2005	92.9	0	0.077	0.058	0.051	0.045	0.039	0.031	0.026
2006	90.1	3	0.127	0.084	0.068	0.059	0.048	0.033	0.026
2007	98.9	1	0.121	0.072	0.067	0.060	0.048	0.034	0.029
2008	97.3	0	0.075	0.056	0.051	0.044	0.037	0.028	0.023
2009	96.7	0	0.084	0.070	0.055	0.045	0.040	0.028	0.023
2010	88.2	0	0.061	0.048	0.044	0.040	0.035	0.027	0.022
2011	96.7	0	0.073	0.053	0.052	0.045	0.038	0.031	0.026
<i>2012</i>	<i>33.1</i>	0	<i>0.057</i>	<i>0.055</i>	<i>0.051</i>	<i>0.042</i>	<i>0.033</i>	<i>0.026</i>	<i>0.023</i>

Exceedances shown in bold. Stations with data availability below 75 per cent shown in italics.

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Table 41: Percentiles of daily maximum one-hour ozone at Brighton (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	95.1	1	0.108	0.078	0.071	0.047	0.039	0.030	0.025
1996	95.6	0	0.089	0.077	0.062	0.049	0.039	0.029	0.024
1997	95.6	3	0.112	0.082	0.072	0.056	0.039	0.028	0.024
1998	95.6	0	0.085	0.070	0.060	0.050	0.037	0.027	0.022
1999	99.5	0	0.070	0.067	0.063	0.052	0.041	0.030	0.024
2000	96.4	0	0.073	0.068	0.060	0.048	0.041	0.028	0.023
2001	80.3	0	0.078	0.071	0.058	0.049	0.039	0.029	0.024
2002	93.7	0	0.085	0.063	0.053	0.043	0.036	0.029	0.025
2003	99.2	2	0.109	0.070	0.065	0.056	0.046	0.029	0.025
2004	94.5	1	0.106	0.062	0.058	0.043	0.039	0.030	0.025
2005	97.8	0	0.088	0.067	0.053	0.047	0.040	0.032	0.028
2006	92.9	1	0.114	0.080	0.072	0.059	0.046	0.032	0.026
2007	99.7	1	0.122	0.076	0.069	0.060	0.053	0.039	0.032
2008	98.9	0	0.090	0.073	0.071	0.050	0.044	0.034	0.029
2009	95.3	0	0.077	0.072	0.064	0.052	0.042	0.030	0.025
2010	80.5	0	0.060	0.053	0.051	0.043	0.038	0.030	0.026
2011	98.6	0	0.074	0.057	0.053	0.044	0.038	0.031	0.027
2012	99.2	0	0.069	0.055	0.050	0.044	0.038	0.030	0.026

Exceedances shown in bold.

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Table 42: Percentiles of daily maximum one-hour ozone at Dandenong (1995–2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	97.0	0	0.098	0.057	0.052	0.043	0.036	0.029	0.025
1996	94.0	0	0.075	0.063	0.055	0.047	0.038	0.028	0.023
1997	93.2	2	0.107	0.078	0.073	0.049	0.039	0.030	0.025
1998	98.9	0	0.096	0.078	0.063	0.049	0.039	0.029	0.024
1999	98.9	0	0.077	0.070	0.065	0.053	0.042	0.032	0.025
<i>2000</i>	<i>63.6</i>	<i>0</i>	<i>0.071</i>	<i>0.065</i>	<i>0.062</i>	<i>0.052</i>	<i>0.043</i>	<i>0.028</i>	<i>0.023</i>
2001	75.9	0	0.073	0.062	0.058	0.048	0.041	0.032	0.026
2002	84.9	0	0.078	0.064	0.054	0.047	0.040	0.032	0.027
2003	97.5	0	0.098	0.079	0.061	0.053	0.044	0.028	0.024
2004	96.4	0	0.080	0.064	0.049	0.042	0.038	0.029	0.024
2005	92.6	0	0.072	0.062	0.054	0.045	0.041	0.033	0.028
2006	98.9	1	0.108	0.067	0.065	0.057	0.046	0.033	0.027
2007	98.6	1	0.112	0.072	0.063	0.056	0.047	0.035	0.028
2008	100.0	0	0.074	0.063	0.056	0.048	0.041	0.031	0.027
2009	98.4	0	0.068	0.065	0.063	0.051	0.042	0.030	0.025
2010	97.8	0	0.077	0.059	0.053	0.044	0.038	0.029	0.024
2011	99.7	0	0.063	0.059	0.054	0.047	0.038	0.032	0.027
2012	98.6	0	0.068	0.060	0.051	0.042	0.038	0.029	0.026

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 43: Percentiles of daily maximum one-hour ozone at Footscray (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	95.9	0	0.091	0.063	0.058	0.043	0.037	0.029	0.025
1996	96.4	0	0.082	0.069	0.063	0.049	0.040	0.028	0.025
1997	98.1	1	0.105	0.090	0.073	0.055	0.042	0.030	0.025
1998	94.2	1	0.113	0.064	0.059	0.048	0.038	0.028	0.023
1999	95.9	0	0.079	0.070	0.066	0.054	0.041	0.032	0.025
2000	88.2	0	0.064	0.054	0.052	0.046	0.038	0.027	0.022
<i>2001</i>	<i>34.5</i>	<i>0</i>	<i>0.044</i>	<i>0.043</i>	<i>0.041</i>	<i>0.038</i>	<i>0.036</i>	<i>0.030</i>	<i>0.026</i>
2002	96.7	0	0.095	0.066	0.047	0.042	0.038	0.028	0.024
2003	98.1	1	0.105	0.072	0.061	0.051	0.041	0.027	0.023
2004	94.8	1	0.106	0.058	0.049	0.042	0.036	0.028	0.024
2005	99.2	0	0.082	0.063	0.052	0.044	0.039	0.031	0.027
2006	91.5	1	0.127	0.082	0.066	0.053	0.041	0.030	0.024
2007	99.2	1	0.127	0.067	0.063	0.057	0.049	0.035	0.029
2008	98.4	0	0.073	0.065	0.055	0.048	0.041	0.032	0.026
2009	94.2	0	0.085	0.071	0.060	0.051	0.043	0.030	0.025
2010	99.7	0	0.068	0.053	0.049	0.042	0.038	0.030	0.025
2011	97.8	0	0.078	0.050	0.049	0.044	0.037	0.030	0.026
2012	81.1	0	0.057	0.053	0.044	0.042	0.036	0.030	0.026

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 44: Percentiles of daily maximum one-hour ozone at Geelong South (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	82.2	0	0.071	0.056	0.052	0.040	0.030	0.026	0.023
1996	86.8	0	0.091	0.063	0.056	0.044	0.033	0.027	0.022
<i>1997</i>	<i>0.0</i>								
1998	95.3	0	0.083	0.056	0.046	0.035	0.031	0.027	0.024
1999	95.3	0	0.073	0.053	0.048	0.040	0.033	0.027	0.022
2000	88.8	0	0.065	0.057	0.049	0.040	0.033	0.021	0.017
2001	92.3	0	0.082	0.064	0.057	0.040	0.032	0.024	0.020
2002	90.7	0	0.058	0.056	0.053	0.043	0.032	0.025	0.021
2003	97.3	0	0.081	0.069	0.063	0.043	0.033	0.023	0.020
2004	92.1	0	0.094	0.061	0.058	0.044	0.035	0.030	0.025
2005	97.8	0	0.080	0.059	0.056	0.046	0.039	0.031	0.028
2006	95.1	2	0.169	0.076	0.062	0.049	0.040	0.031	0.026
2007	99.7	0	0.088	0.068	0.063	0.053	0.045	0.035	0.030
2008	98.6	0	0.084	0.073	0.063	0.047	0.038	0.032	0.029
2009	99.5	0	0.083	0.066	0.059	0.050	0.038	0.030	0.026
2010	96.2	0	0.084	0.057	0.052	0.047	0.039	0.031	0.027
2011	99.7	0	0.055	0.050	0.046	0.040	0.036	0.030	0.026
2012	98.9	0	0.079	0.059	0.053	0.039	0.034	0.029	0.026

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 45: Percentiles of daily maximum one-hour ozone at Melton (2002-12)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)						
	(% of days)			(days)	(ppm)	99th	98th	95th	90th	75th
<i>2002</i>	<i>14.2</i>									
2003	97.8	1	0.112	0.083	0.074	0.056	0.046	0.032	0.029	
2004	94.0	0	0.076	0.053	0.050	0.047	0.040	0.033	0.028	
2005	94.0	0	0.079	0.063	0.056	0.048	0.043	0.036	0.031	
2006	99.2	1	0.126	0.084	0.067	0.053	0.046	0.036	0.030	
2007	89.6	0	0.085	0.076	0.071	0.064	0.054	0.037	0.032	
2008	90.2	0	0.067	0.056	0.052	0.047	0.041	0.033	0.030	
2009	97.5	0	0.092	0.074	0.065	0.054	0.044	0.032	0.027	
2010	90.4	0	0.062	0.059	0.051	0.044	0.039	0.031	0.027	
2011	96.4	0	0.071	0.054	0.050	0.043	0.038	0.031	0.028	
2012	95.9	0	0.068	0.060	0.050	0.044	0.037	0.031	0.027	

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 46: Percentiles of daily maximum one-hour ozone at Mooroolbark (2002-12)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
<i>2002</i>	<i>57.5</i>	<i>0</i>	<i>0.089</i>	<i>0.070</i>	<i>0.055</i>	<i>0.046</i>	<i>0.038</i>	<i>0.033</i>	<i>0.028</i>
2003	99.7	0	0.098	0.072	0.065	0.055	0.047	0.031	0.026
2004	95.6	0	0.072	0.056	0.053	0.047	0.042	0.034	0.027
2005	97.8	0	0.089	0.064	0.053	0.045	0.042	0.035	0.029
2006	96.2	1	0.101	0.086	0.071	0.058	0.048	0.036	0.028
2007	99.7	0	0.084	0.076	0.072	0.057	0.051	0.038	0.031
2008	98.6	0	0.081	0.064	0.057	0.051	0.045	0.034	0.027
2009	96.7	0	0.087	0.077	0.068	0.055	0.048	0.036	0.027
2010	96.2	0	0.066	0.055	0.051	0.042	0.037	0.030	0.025
2011	100.0	0	0.078	0.060	0.051	0.043	0.037	0.031	0.026
2012	99.5	0	0.069	0.055	0.050	0.043	0.036	0.030	0.026

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 47: Percentiles of daily maximum one-hour ozone at Point Cook (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	99.7	1	0.111	0.076	0.060	0.046	0.039	0.031	0.027
1996	99.5	0	0.090	0.079	0.069	0.051	0.038	0.030	0.026
1997	86.8	2	0.126	0.080	0.064	0.049	0.037	0.030	0.025
1998	94.5	1	0.107	0.083	0.063	0.044	0.034	0.025	0.021
1999	91.2	0	0.083	0.071	0.067	0.055	0.040	0.028	0.023
2000	85.2	0	0.079	0.067	0.063	0.049	0.040	0.032	0.028
2001	91.0	0	0.099	0.072	0.064	0.050	0.044	0.031	0.025
2002	97.0	0	0.093	0.068	0.063	0.048	0.039	0.030	0.027
2003	97.0	0	0.094	0.080	0.069	0.053	0.041	0.031	0.025
2004	98.6	0	0.093	0.065	0.056	0.047	0.039	0.028	0.025
2005	97.0	0	0.092	0.068	0.059	0.047	0.038	0.031	0.027
2006	85.2	1	0.104	0.069	0.062	0.048	0.039	0.029	0.026
2007	99.5	0	0.095	0.070	0.064	0.057	0.047	0.038	0.034
2008	99.7	0	0.088	0.081	0.065	0.049	0.043	0.035	0.031
2009	96.2	2	0.102	0.085	0.071	0.057	0.045	0.032	0.026
2010	95.9	0	0.058	0.053	0.047	0.042	0.037	0.030	0.025
2011	91.5	0	0.069	0.054	0.052	0.047	0.041	0.032	0.028
2012	97.5	0	0.092	0.061	0.058	0.046	0.039	0.032	0.028

Exceedances shown in bold.

Table 48: Percentiles of daily maximum one-hour ozone at Point Henry (1995-2011)

AAQ NEPM standard: 0.10 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
<i>1995</i>	<i>69.3</i>	<i>0</i>	<i>0.060</i>	<i>0.047</i>	<i>0.044</i>	<i>0.042</i>	<i>0.039</i>	<i>0.036</i>	<i>0.033</i>
1996	98.1	1	0.104	0.065	0.058	0.047	0.036	0.032	0.029
1997	80.3	0	0.081	0.062	0.057	0.046	0.038	0.029	0.024
<i>1998</i>	<i>27.7</i>	<i>0</i>	<i>0.087</i>	<i>0.072</i>	<i>0.067</i>	<i>0.052</i>	<i>0.043</i>	<i>0.032</i>	<i>0.025</i>
<i>1999</i>	<i>0.0</i>								
<i>2000</i>	<i>14.2</i>								
<i>2001</i>	<i>57.3</i>	<i>0</i>	<i>0.089</i>	<i>0.074</i>	<i>0.068</i>	<i>0.052</i>	<i>0.045</i>	<i>0.032</i>	<i>0.024</i>
2002	97.0	0	0.069	0.065	0.059	0.045	0.040	0.030	0.027
2003	97.8	0	0.095	0.075	0.071	0.052	0.041	0.030	0.025
2004	97.3	0	0.093	0.060	0.054	0.043	0.037	0.029	0.025
2005	99.5	0	0.088	0.059	0.057	0.048	0.038	0.033	0.029
2006	98.9	1	0.144	0.070	0.057	0.047	0.039	0.030	0.026
2007	99.7	1	0.101	0.062	0.059	0.048	0.041	0.030	0.027
2008	98.6	0	0.080	0.064	0.057	0.043	0.036	0.030	0.027
2009	98.1	0	0.087	0.063	0.060	0.048	0.038	0.029	0.026
2010	81.1	0	0.077	0.053	0.049	0.043	0.038	0.031	0.026
<i>2011</i>	<i>17.3</i>	<i>0</i>	<i>0.050</i>	<i>0.049</i>	<i>0.047</i>	<i>0.040</i>	<i>0.038</i>	<i>0.035</i>	<i>0.022</i>

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 49: Percentiles of daily maximum one-hour ozone at Moe (1995-2009)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	98.1	0	0.068	0.051	0.049	0.042	0.035	0.030	0.026
1996	98.4	0	0.052	0.042	0.038	0.034	0.030	0.025	0.022
1997	92.9	0	0.072	0.058	0.049	0.036	0.031	0.026	0.021
1998	94.2	0	0.046	0.043	0.039	0.031	0.028	0.022	0.018
1999	81.1	0	0.063	0.042	0.038	0.032	0.030	0.027	0.022
2000	86.6	0	0.066	0.055	0.049	0.040	0.034	0.029	0.025
2001	99.5	0	0.070	0.052	0.048	0.043	0.037	0.030	0.024
2002	96.4	0	0.059	0.050	0.046	0.041	0.036	0.031	0.027
2003	97.3	0	0.083	0.061	0.060	0.051	0.043	0.031	0.026
2004	100.0	0	0.055	0.052	0.049	0.044	0.039	0.031	0.027
2005	99.5	0	0.062	0.055	0.047	0.041	0.036	0.031	0.027
2006	89.0	1	0.104	0.077	0.069	0.051	0.041	0.030	0.027
2007	97.8	0	0.099	0.070	0.065	0.054	0.044	0.034	0.030
2008	100.0	0	0.057	0.052	0.047	0.038	0.031	0.024	0.021
2009	81.6	0	0.057	0.043	0.037	0.030	0.026	0.020	0.016

Exceedances shown in bold.

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Table 50: Percentiles of daily maximum one-hour ozone at Traralgon (1995-2012)

AAQ NEPM standard: 0.10 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	92.6	0	0.050	0.043	0.041	0.036	0.031	0.025	0.021
1996	80.8	0	0.049	0.043	0.041	0.036	0.033	0.028	0.022
<i>1997</i>	<i>60.3</i>	0	<i>0.072</i>	<i>0.058</i>	<i>0.057</i>	<i>0.052</i>	<i>0.041</i>	<i>0.030</i>	<i>0.025</i>
1998	92.3	0	0.075	0.062	0.054	0.044	0.037	0.030	0.026
<i>1999</i>	<i>31.8</i>	0	<i>0.060</i>	<i>0.055</i>	<i>0.050</i>	<i>0.043</i>	<i>0.036</i>	<i>0.028</i>	<i>0.023</i>
2000	96.2	0	0.056	0.050	0.047	0.039	0.033	0.027	0.023
2001	97.0	0	0.064	0.053	0.048	0.040	0.034	0.028	0.024
2002	100.0	0	0.057	0.048	0.043	0.036	0.033	0.029	0.024
2003	97.3	0	0.077	0.062	0.060	0.049	0.037	0.030	0.024
2004	97.5	0	0.058	0.049	0.048	0.042	0.037	0.031	0.025
2005	86.3	0	0.067	0.050	0.046	0.040	0.035	0.031	0.026
2006	100.0	3	0.138	0.083	0.077	0.052	0.044	0.033	0.027
2007	99.2	0	0.094	0.067	0.061	0.052	0.041	0.031	0.027
2008	100.0	0	0.061	0.055	0.048	0.038	0.032	0.026	0.023
2009	95.3	1	0.104	0.053	0.050	0.040	0.034	0.027	0.024
2010	100.0	0	0.057	0.050	0.047	0.039	0.033	0.027	0.024
2011	100.0	0	0.050	0.040	0.039	0.035	0.031	0.027	0.022
2012	99.7	0	0.054	0.047	0.043	0.036	0.033	0.028	0.024

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 51: Percentiles of daily maximum four-hour ozone at Alphington (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	95.9	0	0.067	0.050	0.046	0.039	0.032	0.025	0.021
1996	97.3	0	0.064	0.053	0.052	0.042	0.036	0.025	0.020
1997	91.2	0	0.078	0.070	0.060	0.049	0.035	0.024	0.018
1998	96.4	0	0.075	0.055	0.050	0.040	0.033	0.022	0.016
1999	97.8	0	0.067	0.054	0.052	0.041	0.033	0.025	0.018
2000	97.3	0	0.060	0.047	0.046	0.042	0.033	0.022	0.018
2001	91.5	0	0.062	0.051	0.046	0.040	0.034	0.025	0.020
2002	89.3	0	0.046	0.044	0.043	0.038	0.033	0.026	0.021
2003	95.9	1	0.090	0.058	0.053	0.047	0.038	0.028	0.023
2004	96.4	0	0.069	0.045	0.044	0.038	0.034	0.026	0.022
2005	92.9	0	0.070	0.050	0.047	0.042	0.037	0.030	0.025
2006	90.1	3	0.116	0.073	0.063	0.054	0.045	0.031	0.025
2007	98.6	1	0.115	0.065	0.062	0.053	0.046	0.033	0.027
2008	97.3	0	0.063	0.050	0.047	0.038	0.035	0.027	0.022
2009	96.4	0	0.080	0.064	0.048	0.041	0.036	0.027	0.022
2010	87.9	0	0.057	0.044	0.041	0.037	0.033	0.026	0.021
2011	97.0	0	0.069	0.048	0.045	0.042	0.036	0.029	0.025
<i>2012</i>	<i>33.1</i>	<i>0</i>	<i>0.054</i>	<i>0.048</i>	<i>0.048</i>	<i>0.038</i>	<i>0.032</i>	<i>0.025</i>	<i>0.022</i>

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 52: Percentiles of daily maximum four-hour ozone at Brighton (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	95.1	1	0.087	0.067	0.058	0.043	0.036	0.028	0.024
1996	95.6	0	0.078	0.065	0.056	0.044	0.035	0.027	0.022
1997	95.6	3	0.097	0.068	0.062	0.049	0.037	0.026	0.023
1998	95.6	1	0.082	0.062	0.055	0.042	0.034	0.026	0.021
1999	99.5	0	0.069	0.059	0.056	0.047	0.037	0.028	0.022
2000	96.4	0	0.064	0.061	0.052	0.044	0.038	0.026	0.022
2001	80.0	0	0.068	0.059	0.055	0.046	0.038	0.027	0.022
2002	93.2	0	0.072	0.056	0.048	0.039	0.034	0.028	0.023
2003	98.4	2	0.102	0.065	0.061	0.048	0.042	0.028	0.024
2004	94.5	1	0.092	0.057	0.051	0.042	0.036	0.029	0.024
2005	97.5	0	0.069	0.062	0.051	0.043	0.038	0.030	0.026
2006	92.9	3	0.105	0.075	0.065	0.054	0.043	0.031	0.025
2007	99.7	1	0.111	0.068	0.063	0.054	0.049	0.036	0.031
2008	98.6	0	0.079	0.068	0.066	0.047	0.041	0.033	0.028
2009	95.3	0	0.069	0.066	0.058	0.049	0.038	0.029	0.024
2010	80.0	0	0.055	0.048	0.046	0.039	0.035	0.029	0.024
2011	97.8	0	0.063	0.053	0.047	0.041	0.036	0.030	0.026
2012	99.2	0	0.065	0.052	0.048	0.041	0.037	0.029	0.025

Exceedances shown in bold.

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Table 53: Percentiles of daily maximum four-hour ozone at Dandenong (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	97.0	1	0.082	0.052	0.049	0.041	0.033	0.028	0.023
1996	94.2	0	0.068	0.056	0.050	0.044	0.035	0.027	0.022
1997	93.2	1	0.092	0.068	0.062	0.047	0.035	0.028	0.024
1998	98.9	0	0.076	0.065	0.059	0.044	0.036	0.027	0.023
1999	98.6	0	0.074	0.062	0.058	0.048	0.039	0.030	0.023
<i>2000</i>	<i>64.1</i>	<i>0</i>	<i>0.066</i>	<i>0.060</i>	<i>0.056</i>	<i>0.047</i>	<i>0.040</i>	<i>0.027</i>	<i>0.021</i>
2001	75.3	0	0.063	0.055	0.054	0.045	0.038	0.030	0.025
2002	85.2	0	0.063	0.053	0.052	0.043	0.038	0.030	0.025
2003	97.8	2	0.093	0.067	0.059	0.047	0.040	0.027	0.023
2004	96.7	0	0.067	0.058	0.046	0.040	0.035	0.027	0.023
2005	92.6	0	0.067	0.054	0.052	0.043	0.039	0.031	0.026
2006	98.6	1	0.096	0.061	0.058	0.052	0.042	0.031	0.026
2007	98.6	1	0.106	0.064	0.060	0.052	0.044	0.033	0.027
2008	100.0	0	0.073	0.058	0.053	0.044	0.040	0.030	0.025
2009	98.4	0	0.063	0.059	0.054	0.047	0.039	0.028	0.024
2010	97.5	0	0.071	0.054	0.048	0.043	0.037	0.030	0.025
2011	99.5	0	0.058	0.054	0.051	0.044	0.037	0.031	0.026
2012	98.6	0	0.066	0.052	0.048	0.040	0.036	0.028	0.024

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 54: Percentiles of daily maximum four-hour ozone at Footscray (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	95.9	0	0.080	0.058	0.051	0.039	0.034	0.028	0.023
1996	96.2	0	0.070	0.062	0.057	0.043	0.036	0.027	0.023
1997	98.1	3	0.095	0.072	0.063	0.049	0.038	0.028	0.024
1998	94.2	1	0.089	0.055	0.051	0.041	0.035	0.027	0.022
1999	95.9	0	0.069	0.063	0.057	0.048	0.037	0.030	0.024
2000	87.7	0	0.055	0.052	0.047	0.043	0.035	0.026	0.021
<i>2001</i>	<i>34.5</i>	<i>0</i>	<i>0.042</i>	<i>0.042</i>	<i>0.040</i>	<i>0.035</i>	<i>0.034</i>	<i>0.028</i>	<i>0.025</i>
2002	96.7	0	0.080	0.051	0.046	0.038	0.034	0.027	0.023
2003	97.8	2	0.094	0.063	0.056	0.045	0.038	0.026	0.021
2004	94.8	1	0.083	0.051	0.045	0.039	0.034	0.027	0.022
2005	98.9	0	0.066	0.053	0.047	0.042	0.035	0.030	0.025
2006	91.2	3	0.103	0.070	0.059	0.047	0.040	0.028	0.023
2007	98.9	1	0.113	0.060	0.057	0.052	0.045	0.033	0.028
2008	98.1	0	0.064	0.059	0.053	0.042	0.039	0.030	0.025
2009	94.2	0	0.073	0.063	0.055	0.046	0.038	0.028	0.024
2010	99.7	0	0.061	0.050	0.045	0.040	0.034	0.029	0.024
2011	97.3	0	0.067	0.045	0.044	0.041	0.034	0.029	0.024
2012	81.1	0	0.052	0.048	0.043	0.038	0.034	0.029	0.025

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 55: Percentiles of daily maximum four-hour ozone at Geelong South (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	91.8	0	0.065	0.051	0.048	0.037	0.028	0.025	0.022
1996	86.8	0	0.076	0.058	0.051	0.039	0.031	0.026	0.021
<i>1997</i>	<i>0.0</i>								
1998	95.1	0	0.076	0.048	0.042	0.033	0.029	0.026	0.022
1999	95.6	0	0.063	0.048	0.044	0.038	0.031	0.026	0.021
2000	89.0	0	0.057	0.052	0.045	0.035	0.030	0.020	0.016
2001	92.3	0	0.075	0.057	0.054	0.038	0.030	0.023	0.019
2002	89.3	0	0.053	0.048	0.046	0.038	0.031	0.024	0.020
2003	97.0	0	0.072	0.059	0.054	0.040	0.029	0.022	0.019
2004	91.3	1	0.085	0.054	0.052	0.041	0.034	0.028	0.023
2005	97.3	0	0.068	0.055	0.049	0.042	0.037	0.030	0.026
2006	94.2	2	0.142	0.070	0.059	0.047	0.038	0.030	0.025
2007	99.7	0	0.076	0.062	0.057	0.049	0.042	0.034	0.029
2008	98.1	0	0.076	0.067	0.060	0.045	0.038	0.031	0.028
2009	99.5	0	0.079	0.058	0.054	0.046	0.036	0.029	0.025
2010	95.9	0	0.067	0.048	0.044	0.039	0.035	0.029	0.024
2011	99.2	0	0.052	0.045	0.043	0.037	0.034	0.029	0.025
2012	98.9	0	0.070	0.053	0.049	0.037	0.032	0.028	0.025

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 56: Percentiles of daily maximum four-hour ozone at Melton (2002-12)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)						
	(% of days)			(days)	(ppm)	99th	98th	95th	90th	75th
<i>2002</i>	<i>14.5</i>									
2003	97.8	4	0.099	0.077	0.063	0.052	0.042	0.032	0.028	
2004	94.0	0	0.068	0.050	0.047	0.043	0.038	0.031	0.027	
2005	94.2	0	0.075	0.054	0.051	0.045	0.041	0.034	0.030	
2006	99.2	3	0.115	0.073	0.060	0.051	0.043	0.034	0.029	
2007	89.9	0	0.080	0.068	0.066	0.057	0.050	0.036	0.031	
2008	90.2	0	0.057	0.052	0.048	0.045	0.039	0.032	0.029	
2009	97.5	0	0.078	0.063	0.057	0.049	0.042	0.031	0.026	
2010	90.1	0	0.058	0.048	0.042	0.040	0.035	0.029	0.026	
2011	96.4	0	0.065	0.051	0.047	0.041	0.036	0.030	0.027	
2012	95.9	0	0.061	0.052	0.046	0.040	0.035	0.030	0.027	

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 57: Percentiles of daily maximum four-hour ozone at Mooroolbark (2002-12)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
<i>2002</i>	<i>57.5</i>	<i>0</i>	<i>0.075</i>	<i>0.063</i>	<i>0.047</i>	<i>0.041</i>	<i>0.036</i>	<i>0.030</i>	<i>0.026</i>
2003	98.9	3	0.090	0.065	0.056	0.050	0.044	0.030	0.025
2004	95.6	0	0.059	0.050	0.049	0.044	0.038	0.032	0.025
2005	97.8	0	0.072	0.055	0.049	0.043	0.039	0.033	0.028
2006	96.2	2	0.091	0.077	0.064	0.054	0.045	0.034	0.026
2007	99.5	0	0.077	0.072	0.066	0.054	0.047	0.036	0.030
2008	98.6	0	0.073	0.057	0.053	0.047	0.041	0.032	0.027
2009	96.7	0	0.076	0.066	0.062	0.050	0.045	0.033	0.026
2010	95.9	0	0.062	0.055	0.052	0.044	0.036	0.027	0.023
2011	99.7	0	0.069	0.053	0.046	0.039	0.035	0.029	0.024
2012	99.5	0	0.069	0.055	0.050	0.043	0.036	0.030	0.026

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 58: Percentiles of daily maximum four-hour ozone at Point Cook (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	99.7	1	0.095	0.063	0.057	0.043	0.036	0.030	0.026
1996	99.5	0	0.079	0.066	0.057	0.045	0.034	0.029	0.025
1997	86.8	2	0.113	0.073	0.057	0.044	0.034	0.028	0.024
1998	94.8	3	0.090	0.075	0.061	0.039	0.032	0.024	0.020
1999	91.2	0	0.069	0.065	0.060	0.047	0.035	0.026	0.022
2000	85.5	0	0.067	0.060	0.058	0.046	0.037	0.030	0.027
2001	91.0	1	0.095	0.063	0.057	0.048	0.040	0.029	0.024
2002	96.4	0	0.070	0.062	0.056	0.044	0.036	0.029	0.025
2003	96.2	1	0.093	0.072	0.063	0.048	0.038	0.029	0.024
2004	98.6	1	0.082	0.058	0.051	0.044	0.036	0.027	0.024
2005	96.7	1	0.082	0.062	0.050	0.043	0.037	0.030	0.026
2006	84.9	1	0.089	0.061	0.057	0.046	0.036	0.027	0.025
2007	99.5	1	0.086	0.067	0.060	0.052	0.044	0.037	0.033
2008	99.7	2	0.082	0.074	0.061	0.045	0.040	0.034	0.030
2009	95.9	2	0.095	0.074	0.069	0.053	0.042	0.030	0.025
2010	96.2	0	0.054	0.044	0.044	0.037	0.034	0.029	0.026
2011	91.2	0	0.058	0.051	0.048	0.044	0.039	0.031	0.027
2012	97.5	0	0.073	0.058	0.051	0.043	0.037	0.031	0.027

Exceedances shown in bold.

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Table 59: Percentiles of daily maximum four-hour ozone at Point Henry (1995-2011)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
<i>1995</i>	<i>69.3</i>	<i>0</i>	<i>0.056</i>	<i>0.042</i>	<i>0.042</i>	<i>0.039</i>	<i>0.038</i>	<i>0.035</i>	<i>0.032</i>
1996	98.1	1	0.097	0.058	0.054	0.042	0.034	0.031	0.028
1997	80.3	0	0.070	0.059	0.053	0.043	0.038	0.028	0.023
<i>1998</i>	<i>27.7</i>	<i>0</i>	<i>0.076</i>	<i>0.064</i>	<i>0.060</i>	<i>0.043</i>	<i>0.038</i>	<i>0.030</i>	<i>0.023</i>
<i>1999</i>	<i>0.0</i>								
<i>2000</i>	<i>14.2</i>								
<i>2001</i>	<i>57.3</i>	<i>1</i>	<i>0.085</i>	<i>0.067</i>	<i>0.061</i>	<i>0.051</i>	<i>0.042</i>	<i>0.030</i>	<i>0.023</i>
2002	96.7	0	0.064	0.058	0.052	0.042	0.036	0.029	0.026
2003	97.8	1	0.083	0.065	0.061	0.049	0.037	0.029	0.024
2004	97.3	1	0.085	0.056	0.048	0.041	0.035	0.027	0.024
2005	99.5	0	0.076	0.056	0.051	0.045	0.036	0.031	0.028
2006	98.4	1	0.126	0.067	0.053	0.043	0.036	0.029	0.025
2007	99.7	1	0.085	0.058	0.052	0.045	0.038	0.029	0.026
2008	98.6	0	0.073	0.058	0.050	0.041	0.035	0.029	0.026
2009	98.4	1	0.082	0.060	0.052	0.045	0.036	0.028	0.025
2010	81.1	0	0.067	0.052	0.046	0.042	0.034	0.029	0.025
<i>2011</i>	<i>17.3</i>	<i>0</i>	<i>0.048</i>	<i>0.045</i>	<i>0.042</i>	<i>0.037</i>	<i>0.035</i>	<i>0.031</i>	<i>0.021</i>

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 60: Percentiles of daily maximum four-hour ozone at Moe (1995-2009)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
1995	98.1	0	0.059	0.047	0.044	0.039	0.034	0.029	0.024
1996	98.4	0	0.047	0.038	0.036	0.032	0.029	0.025	0.021
1997	92.9	0	0.067	0.050	0.047	0.033	0.029	0.024	0.020
1998	94.2	0	0.044	0.038	0.035	0.030	0.025	0.020	0.017
1999	81.1	0	0.045	0.039	0.036	0.030	0.028	0.025	0.020
2000	86.6	0	0.056	0.051	0.045	0.037	0.033	0.028	0.024
2001	99.5	0	0.054	0.047	0.044	0.040	0.034	0.028	0.023
2002	96.7	0	0.056	0.046	0.041	0.037	0.035	0.030	0.026
2003	97.3	0	0.072	0.059	0.056	0.048	0.038	0.029	0.025
2004	100.0	0	0.051	0.046	0.044	0.040	0.036	0.030	0.025
2005	99.5	0	0.051	0.049	0.042	0.038	0.034	0.030	0.025
2006	88.8	3	0.094	0.065	0.056	0.047	0.038	0.030	0.025
2007	97.8	1	0.089	0.064	0.059	0.050	0.040	0.033	0.029
2008	100.0	0	0.057	0.048	0.043	0.036	0.029	0.023	0.020
2009	81.6	0	0.047	0.040	0.034	0.028	0.025	0.019	0.015

Exceedances shown in bold.

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Table 61: Percentiles of daily maximum four-hour ozone at Traralgon (1995-2012)

AAQ NEPM standard: 0.08 ppm (four-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	93.2	0	0.048	0.040	0.038	0.032	0.028	0.024	0.020
1996	80.8	0	0.043	0.039	0.037	0.033	0.031	0.026	0.021
<i>1997</i>	<i>60.5</i>	<i>0</i>	<i>0.064</i>	<i>0.055</i>	<i>0.051</i>	<i>0.045</i>	<i>0.039</i>	<i>0.029</i>	<i>0.024</i>
1998	92.1	0	0.058	0.053	0.048	0.041	0.035	0.029	0.024
<i>1999</i>	<i>31.8</i>	<i>0</i>	<i>0.053</i>	<i>0.051</i>	<i>0.044</i>	<i>0.040</i>	<i>0.033</i>	<i>0.026</i>	<i>0.021</i>
2000	96.7	0	0.050	0.046	0.043	0.034	0.031	0.026	0.021
2001	97.3	0	0.052	0.047	0.045	0.037	0.031	0.026	0.022
2002	100.0	0	0.049	0.046	0.038	0.034	0.031	0.027	0.022
2003	97.3	0	0.067	0.056	0.052	0.046	0.035	0.027	0.023
2004	97.3	0	0.050	0.044	0.043	0.039	0.034	0.029	0.023
2005	86.1	0	0.055	0.046	0.039	0.035	0.033	0.029	0.024
2006	100.0	2	0.123	0.072	0.067	0.046	0.041	0.031	0.026
2007	99.2	1	0.082	0.058	0.056	0.047	0.037	0.029	0.026
2008	100.0	0	0.053	0.050	0.042	0.036	0.030	0.025	0.022
2009	95.6	0	0.074	0.047	0.045	0.037	0.031	0.026	0.022
2010	100.0	0	0.047	0.043	0.040	0.036	0.031	0.026	0.022
2011	100.0	0	0.044	0.037	0.036	0.033	0.030	0.026	0.021
2012	100.0	0	0.044	0.037	0.036	0.033	0.030	0.026	0.021

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Sulfur dioxide

Table 62: 2012 percentiles of daily peak one-hour sulfur dioxide concentrations in Victoria

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	<i>33.1</i>	<i>0.014</i>	<i>0.011</i>	<i>0.009</i>	<i>0.006</i>	<i>0.004</i>	<i>0.003</i>	<i>0.002</i>
Altona North	96.2	0.066	0.043	0.033	0.026	0.021	0.012	0.005
Geelong South	97.8	0.060	0.027	0.021	0.015	0.013	0.007	0.003
Latrobe Valley								
Traralgon	99.7	0.101	0.023	0.017	0.013	0.010	0.005	0.003

Stations with data availability below 75 per cent shown in italics.

Table 63: 2012 percentiles of daily 24-hour sulfur dioxide concentrations in Victoria

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Region	Data availability	Max	Percentiles (ppm)					
Performance monitoring station	(% of days)	(ppm)	99th	98th	95th	90th	75th	50th
Port Phillip								
<i>Alphington</i>	<i>33.1</i>	<i>0.003</i>	<i>0.003</i>	<i>0.002</i>	<i>0.002</i>	<i>0.001</i>	<i>0.001</i>	<i>0.000</i>
Altona North	96.2	0.018	0.010	0.008	0.005	0.004	0.002	0.001
Geelong South	97.8	0.006	0.004	0.004	0.003	0.002	0.001	0.001
Latrobe Valley								
Traralgon	99.7	0.015	0.005	0.004	0.004	0.003	0.002	0.002

Stations with data availability below 75 per cent shown in italics.

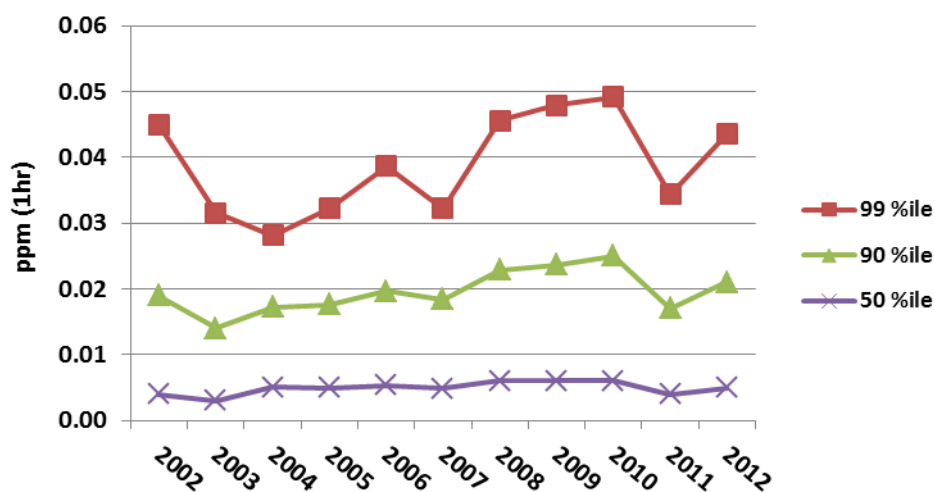


Figure 10: Percentiles of daily maximum one-hour sulfur dioxide at Altona North (2002-12)

As there are few sulfur dioxide stations, and some changes from year to year, only data from Altona North is presented. This station consistently records the highest readings in the Port Phillip region.

Table 64: Percentiles of daily maximum one-hour sulfur dioxide at Alphington (1995-2012)

AAQ NEPM standard: 0.20 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability (% of days)	No. of exceedances (days)	Max (ppm)	Percentiles (ppm)					
				99th	98th	95th	90th	75th	50th
1995	71.5	0	0.015	0.008	0.007	0.005	0.004	0.002	0.000
1996	97.0	0	0.008	0.006	0.006	0.005	0.003	0.002	0.001
1997	94.2	0	0.012	0.010	0.008	0.006	0.004	0.003	0.001
1998	97.0	0	0.015	0.012	0.008	0.007	0.005	0.003	0.002
1999	97.8	0	0.012	0.007	0.006	0.005	0.003	0.002	0.001
2000	97.8	0	0.010	0.007	0.006	0.004	0.003	0.001	0.000
2001	93.4	0	0.009	0.008	0.007	0.006	0.004	0.002	0.000
2002	98.4	0	0.012	0.008	0.007	0.006	0.004	0.002	0.000
2003	96.7	0	0.021	0.007	0.006	0.004	0.003	0.002	0.001
2004	99.7	0	0.014	0.009	0.007	0.005	0.004	0.003	0.001
2005	94.5	0	0.011	0.008	0.007	0.005	0.004	0.002	0.001
2006	90.7	0	0.013	0.011	0.009	0.008	0.006	0.004	0.002
2007	99.5	0	0.022	0.010	0.008	0.006	0.005	0.004	0.002
2008	98.4	0	0.014	0.010	0.009	0.006	0.005	0.003	0.002
2009	97.5	0	0.012	0.009	0.008	0.006	0.005	0.002	0.001
2010	95.6	0	0.008	0.007	0.007	0.005	0.004	0.002	0.001
2011	94.2	0	0.011	0.007	0.006	0.004	0.004	0.002	0.001
2012	33.1	0	0.014	0.011	0.009	0.006	0.004	0.003	0.002

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Years with data availability below 75 per cent shown in italics.

Table 65: Percentiles of daily maximum one-hour sulfur dioxide at Altona North (1995-2012)

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	97.5	0	0.039	0.023	0.022	0.018	0.015	0.008	0.004
1996	87.7	0	0.041	0.025	0.021	0.017	0.012	0.008	0.005
1997	96.4	0	0.069	0.054	0.048	0.031	0.022	0.009	0.004
1998	92.9	0	0.125	0.080	0.073	0.051	0.035	0.017	0.007
1999	96.2	0	0.059	0.044	0.039	0.032	0.024	0.012	0.005
2000	92.3	0	0.068	0.049	0.044	0.031	0.024	0.010	0.003
2001	95.6	0	0.073	0.053	0.043	0.035	0.026	0.012	0.004
2002	97.3	0	0.122	0.045	0.037	0.024	0.019	0.010	0.004
2003	94.8	0	0.036	0.032	0.027	0.020	0.014	0.007	0.003
2004	97.5	0	0.044	0.028	0.026	0.021	0.017	0.010	0.005
2005	96.2	0	0.044	0.032	0.028	0.021	0.018	0.009	0.005
2006	92.3	0	0.053	0.039	0.031	0.024	0.020	0.011	0.005
2007	97.3	0	0.039	0.032	0.029	0.023	0.018	0.010	0.005
2008	98.9	0	0.059	0.046	0.038	0.029	0.023	0.011	0.006
2009	97.0	0	0.068 ^a	0.048	0.040	0.031	0.024	0.012	0.006
2010	92.1	0	0.068	0.049	0.040	0.032	0.025	0.012	0.006
2011	98.4	0	0.047	0.034	0.030	0.023	0.017	0.008	0.004
2012	96.2	0	0.066	0.043	0.033	0.026	0.021	0.012	0.005

^a Recorded on a day with less than 75 per cent of valid one-hour averages.

Table 66: Percentiles of daily maximum one-hour sulfur dioxide at Geelong South (1995-2012)

AAQ NEPM standard: 0.20 ppm (one-hour average)
 AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	88.2	0	0.088	0.030	0.023	0.015	0.011	0.006	0.002
1996	76.8	0	0.032	0.026	0.023	0.016	0.010	0.004	0.001
<i>1997</i>	<i>0.0</i>								
<i>1998</i>	<i>68.8</i>	<i>0</i>	<i>0.038</i>	<i>0.023</i>	<i>0.021</i>	<i>0.016</i>	<i>0.012</i>	<i>0.008</i>	<i>0.003</i>
1999	94.0	0	0.032	0.020	0.019	0.015	0.011	0.007	0.003
2000	88.2	0	0.029	0.019	0.014	0.010	0.007	0.004	0.001
<i>2001</i>	<i>50.7</i>	<i>0</i>	<i>0.037</i>	<i>0.024</i>	<i>0.023</i>	<i>0.018</i>	<i>0.012</i>	<i>0.006</i>	<i>0.002</i>
2002	84.9	0	0.040	0.029	0.024	0.016	0.012	0.005	0.001
2003	96.2	0	0.039	0.032	0.026	0.015	0.011	0.005	0.001
2004	90.7	0	0.069	0.026	0.023	0.019	0.013	0.007	0.003
2005	96.4	0	0.054	0.029	0.022	0.017	0.012	0.008	0.003
2006	93.2	0	0.036	0.029	0.026	0.017	0.013	0.007	0.003
2007	98.9	0	0.083	0.033	0.027	0.017	0.013	0.008	0.003
2008	96.7	0	0.050	0.032	0.024	0.016	0.014	0.007	0.003
2009	98.9	0	0.037	0.026	0.024	0.017	0.012	0.007	0.003
2010	92.6	0	0.052	0.028	0.025	0.019	0.013	0.007	0.003
2011	97.5	0	0.033	0.029	0.027	0.017	0.015	0.008	0.003
2012	97.8	0	0.060	0.027	0.021	0.015	0.013	0.007	0.003

Years with data availability below 75 per cent shown in italics.

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Table 67: Percentiles of daily maximum one-hour sulfur dioxide at RMIT (CBD) (1995–2006)

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)	(days)	(ppm)	99th	98th	95th	90th	75th	50th
<i>1995</i>	<i>2.7</i>								
1996	82.8	0	0.016	0.014	0.013	0.009	0.007	0.004	0.001
1997	97.8	0	0.029	0.025	0.018	0.014	0.011	0.007	0.004
1998	92.6	0	0.038	0.020	0.016	0.013	0.010	0.007	0.003
1999	98.6	0	0.020	0.013	0.012	0.010	0.008	0.005	0.002
2000	96.7	0	0.017	0.014	0.013	0.010	0.007	0.004	0.002
2001	94.2	0	0.018	0.015	0.013	0.012	0.009	0.006	0.002
2002	94.2	0	0.024	0.017	0.013	0.012	0.010	0.006	0.002
2003	99.2	0	0.035	0.017	0.013	0.010	0.008	0.005	0.002
2004	98.4	0	0.023	0.017	0.015	0.011	0.009	0.006	0.003
2005	98.9	0	0.017	0.015	0.012	0.010	0.008	0.005	0.003
2006	76.2	0	0.034	0.020	0.017	0.014	0.011	0.007	0.003

Years with data availability below 75 per cent shown in italics.

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Table 68: Percentiles of daily maximum one-hour sulfur dioxide at Moe (1995-2009)

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	97.8	0	0.025	0.021	0.017	0.011	0.008	0.004	0.002
1996	98.9	0	0.033	0.019	0.015	0.012	0.008	0.004	0.002
1997	92.3	0	0.047	0.024	0.018	0.014	0.010	0.005	0.002
1998	94.8	0	0.032	0.023	0.021	0.013	0.009	0.005	0.002
1999	94.0	0	0.030	0.020	0.017	0.015	0.011	0.006	0.002
2000	98.4	0	0.039	0.032	0.025	0.017	0.013	0.007	0.004
2001	98.4	0	0.034	0.026	0.022	0.016	0.012	0.007	0.003
2002	97.5	0	0.046	0.022	0.020	0.014	0.010	0.005	0.003
2003	99.2	0	0.030	0.026	0.024	0.019	0.013	0.006	0.003
2004	99.7	0	0.048	0.024	0.021	0.016	0.009	0.004	0.001
2005	100.0	0	0.047	0.029	0.026	0.017	0.012	0.006	0.002
2006	88.5	0	0.046	0.028	0.024	0.017	0.012	0.005	0.002
2007	98.9	0	0.066	0.032	0.019	0.015	0.011	0.007	0.003
2008	99.2	0	0.033	0.025	0.023	0.016	0.012	0.006	0.002
2009	81.6	0	0.054	0.026	0.021	0.016	0.011	0.005	0.003

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Table 69: Percentiles of daily maximum one-hour sulfur dioxide at Traralgon (1995-2012)

AAQ NEPM standard: 0.20 ppm (one-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	88.5	0	0.049	0.021	0.020	0.015	0.011	0.007	0.004
1996	85.8	0	0.032	0.017	0.014	0.011	0.008	0.006	0.003
<i>1997</i>	<i>67.1</i>	<i>0</i>	<i>0.116</i>	<i>0.025</i>	<i>0.021</i>	<i>0.014</i>	<i>0.011</i>	<i>0.007</i>	<i>0.004</i>
1998	84.1	0	0.055	0.022	0.020	0.016	0.013	0.009	0.006
1999	80.3	0	0.032	0.020	0.017	0.013	0.012	0.007	0.004
2000	90.4	0	0.061	0.038	0.024	0.018	0.013	0.008	0.004
2001	98.6	0	0.063	0.036	0.020	0.014	0.011	0.008	0.005
2002	96.7	0	0.062	0.032	0.022	0.016	0.012	0.008	0.005
2003	97.5	0	0.082	0.038	0.030	0.020	0.015	0.009	0.005
2004	98.4	0	0.079	0.042	0.030	0.018	0.013	0.008	0.005
2005	91.5	0	0.061	0.044	0.034	0.022	0.015	0.009	0.005
2006	97.5	0	0.095	0.037	0.033	0.022	0.017	0.010	0.006
2007	96.2	0	0.092	0.041	0.029	0.022	0.016	0.011	0.006
2008	97.8	0	0.170	0.042	0.032	0.018	0.013	0.009	0.005
2009	99.5	0	0.110	0.040	0.030	0.019	0.013	0.008	0.004
2010	100.0	0	0.049	0.028	0.021	0.012	0.009	0.006	0.003
2011	99.5	0	0.038	0.019	0.016	0.013	0.009	0.006	0.003
2012	99.7	0	0.101	0.023	0.017	0.013	0.010	0.005	0.003

Years with data availability below 75 per cent shown in italics.

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Table 70: Percentiles of daily average sulfur dioxide at Alphington (1995-2012)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)						
	(% of days)			(days)	(ppm)	99th	98th	95th	90th	75th
<i>1995</i>	<i>71.5</i>	<i>0</i>	<i>0.002</i>	<i>0.001</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>-0.001</i>	<i>-0.001</i>
1996	97.0	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1997	94.2	0	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.000
1998	97.0	0	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.000
1999	97.8	0	0.001	0.001	0.001	0.001	0.000	0.000	0.000	-0.001
2000	97.8	0	0.002	0.001	0.001	0.000	0.000	0.000	0.000	-0.001
2001	93.4	0	0.002	0.001	0.001	0.000	0.000	0.000	0.000	-0.001
2002	98.4	0	0.002	0.001	0.001	0.000	0.000	0.000	0.000	-0.001
2003	96.7	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
2004	99.7	0	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.000
2005	94.5	0	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.000
2006	90.7	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2007	99.5	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2008	98.4	0	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.001
2009	97.5	0	0.003	0.002	0.002	0.002	0.001	0.000	0.000	-0.001
2010	95.6	0	0.004	0.002	0.001	0.001	0.001	0.000	0.000	-0.001
2011	94.2	0	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.000
<i>2012</i>	<i>33.1</i>	<i>0</i>	<i>0.003</i>	<i>0.003</i>	<i>0.002</i>	<i>0.002</i>	<i>0.001</i>	<i>0.001</i>	<i>0.001</i>	<i>0.000</i>

Years with data availability below 75 per cent shown in italics.

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Table 71: Percentiles of daily average sulfur dioxide at Altona North (1995-2012)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	97.5	0	0.007	0.005	0.005	0.003	0.002	0.001	0.000
1996	87.7	0	0.018	0.008	0.005	0.004	0.004	0.002	0.001
1997	96.4	0	0.011	0.010	0.008	0.005	0.003	0.001	0.000
1998	92.9	0	0.021	0.017	0.014	0.010	0.005	0.003	0.001
1999	96.2	0	0.016	0.009	0.006	0.005	0.003	0.001	0.000
2000	92.3	0	0.010	0.008	0.006	0.004	0.003	0.001	0.000
2001	95.6	0	0.033	0.013	0.011	0.006	0.004	0.001	0.000
2002	97.3	0	0.019	0.008	0.008	0.005	0.003	0.001	0.001
2003	94.8	0	0.009	0.007	0.005	0.003	0.002	0.001	0.000
2004	97.5	0	0.013	0.008	0.006	0.005	0.003	0.002	0.001
2005	96.2	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
2006	92.3	0	0.019	0.009	0.006	0.004	0.003	0.002	0.001
2007	97.3	0	0.013	0.008	0.006	0.004	0.003	0.002	0.001
2008	98.9	0	0.015	0.009	0.007	0.006	0.004	0.002	0.001
2009	97.0	0	0.034	0.011	0.009	0.006	0.005	0.003	0.001
2010	92.1	0	0.026	0.012	0.009	0.006	0.004	0.003	0.001
2011	98.4	0	0.012	0.009	0.007	0.005	0.003	0.002	0.001
2012	96.2	0	0.018	0.010	0.008	0.005	0.004	0.002	0.001

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Table 72: Percentiles of daily average sulfur dioxide at Geelong South (1995-2012)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	98.4	0	0.004	0.003	0.003	0.002	0.001	0.000	-0.001
1996	76.8	0	0.005	0.004	0.003	0.002	0.001	0.000	-0.001
<i>1997</i>	<i>0.0</i>								
<i>1998</i>	<i>68.8</i>	<i>0</i>	<i>0.006</i>	<i>0.004</i>	<i>0.004</i>	<i>0.003</i>	<i>0.002</i>	<i>0.001</i>	<i>0.001</i>
1999	94.0	0	0.005	0.003	0.003	0.002	0.002	0.001	0.000
2000	88.2	0	0.006	0.003	0.002	0.002	0.001	0.001	0.000
<i>2001</i>	<i>50.7</i>	<i>0</i>	<i>0.006</i>	<i>0.005</i>	<i>0.003</i>	<i>0.002</i>	<i>0.001</i>	<i>0.000</i>	<i>-0.001</i>
2002	84.9	0	0.004	0.002	0.002	0.001	0.001	0.000	-0.001
2003	96.2	0	0.004	0.003	0.002	0.002	0.001	0.000	-0.001
2004	90.7	0	0.006	0.004	0.003	0.002	0.002	0.001	0.000
2005	96.4	0	0.008	0.005	0.004	0.003	0.002	0.001	0.001
2006	93.2	0	0.005	0.005	0.004	0.003	0.002	0.001	0.001
2007	98.9	0	0.009	0.004	0.003	0.003	0.002	0.001	0.001
2008	96.7	0	0.007	0.004	0.004	0.003	0.002	0.001	0.001
2009	98.9	0	0.006	0.004	0.003	0.003	0.002	0.001	0.001
2010	92.6	0	0.007	0.004	0.004	0.003	0.002	0.001	0.001
2011	97.5	0	0.005	0.004	0.004	0.004	0.003	0.002	0.001
2012	97.8	0	0.006	0.004	0.004	0.003	0.002	0.001	0.001

Years with data availability below 75 per cent shown in italics.

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Table 73: Percentiles of daily average sulfur dioxide at RMIT (CBD) (1995-2006)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)						
	(% of days)			(days)	(ppm)	99th	98th	95th	90th	75th
<i>1995</i>	<i>2.7</i>									
1996	82.8	0	0.003	0.003	0.002	0.002	0.001	0.000	-0.001	
1997	97.8	0	0.006	0.006	0.005	0.004	0.003	0.002	0.001	
1998	92.6	0	0.007	0.005	0.004	0.003	0.002	0.001	0.000	
1999	98.6	0	0.005	0.003	0.003	0.002	0.002	0.001	0.000	
2000	96.7	0	0.006	0.004	0.003	0.002	0.002	0.001	0.000	
2001	94.2	0	0.004	0.004	0.003	0.002	0.002	0.000	0.000	
2002	94.2	0	0.005	0.004	0.003	0.003	0.002	0.001	0.000	
2003	99.2	0	0.006	0.005	0.004	0.003	0.002	0.001	0.001	
2004	98.4	0	0.007	0.004	0.004	0.003	0.003	0.002	0.001	
2005	98.9	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	
2006	76.2	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001	

Years with data availability below 75 per cent shown in italics.

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Table 74: Percentiles of daily average sulfur dioxide at Moe (1995-2009)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	97.8	0	0.007	0.005	0.004	0.004	0.003	0.002	0.001
1996	98.9	0	0.008	0.005	0.004	0.003	0.003	0.002	0.001
1997	92.3	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
1998	94.8	0	0.007	0.005	0.005	0.004	0.003	0.001	0.000
1999	94.0	0	0.008	0.005	0.005	0.004	0.003	0.002	0.001
2000	98.4	0	0.012	0.008	0.007	0.006	0.005	0.003	0.002
2001	98.4	0	0.009	0.006	0.006	0.005	0.004	0.003	0.001
2002	97.5	0	0.010	0.007	0.006	0.004	0.004	0.002	0.001
2003	99.2	0	0.009	0.007	0.007	0.005	0.004	0.002	0.001
2004	99.7	0	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2005	100.0	0	0.009	0.006	0.004	0.004	0.003	0.002	0.001
2006	88.5	0	0.009	0.007	0.005	0.004	0.003	0.002	0.001
2007	98.4	0	0.010	0.006	0.005	0.004	0.003	0.002	0.001
2008	99.2	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001
2009	81.6	0	0.011	0.005	0.005	0.004	0.003	0.002	0.002

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Table 75: Percentiles of daily average sulfur dioxide at Traralgon (1995-2012)

AAQ NEPM standard: 0.08 ppm (24-hour average)
AAQ NEPM goal: standard exceeded on no more than one day per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(ppm)	99th	98th	95th	90th
1995	88.5	0	0.005	0.004	0.004	0.003	0.003	0.002	0.001
1996	85.8	0	0.008	0.004	0.003	0.003	0.002	0.002	0.001
<i>1997</i>	<i>67.1</i>	<i>0</i>	<i>0.028</i>	<i>0.008</i>	<i>0.006</i>	<i>0.004</i>	<i>0.003</i>	<i>0.002</i>	<i>0.001</i>
1998	84.1	0	0.009	0.007	0.007	0.005	0.005	0.004	0.002
1999	80.3	0	0.006	0.005	0.004	0.004	0.003	0.003	0.001
2000	90.4	0	0.013	0.007	0.005	0.004	0.003	0.002	0.001
2001	98.6	0	0.008	0.006	0.005	0.004	0.003	0.002	0.002
2002	96.7	0	0.009	0.008	0.005	0.004	0.004	0.003	0.002
2003	97.5	0	0.008	0.006	0.005	0.005	0.004	0.002	0.001
2004	98.4	0	0.010	0.007	0.006	0.004	0.003	0.002	0.001
2005	91.5	0	0.012	0.007	0.005	0.004	0.003	0.002	0.001
2006	97.5	0	0.023	0.007	0.006	0.005	0.004	0.003	0.002
2007	95.6	0	0.011	0.009	0.008	0.006	0.005	0.003	0.002
2008	97.8	0	0.026	0.008	0.007	0.005	0.004	0.003	0.002
2009	99.5	0	0.013	0.008	0.006	0.005	0.004	0.003	0.002
2010	100.0	0	0.007	0.005	0.004	0.003	0.003	0.002	0.001
2011	99.5	0	0.005	0.004	0.004	0.003	0.003	0.002	0.001
2012	99.7	0	0.015	0.005	0.004	0.004	0.003	0.002	0.002

Years with data availability below 75 per cent shown in italics.

Particles as PM₁₀

Table 76: 2012 percentiles of daily PM₁₀ concentrations in Victoria

AAQ NEPM standard: 50 µg/m³ (24-hour average)
 AAQ NEPM goal: standard exceeded on no more than five days per year

Region	Data availability	Max	Percentiles (µg/m ³)					
Performance monitoring station	(% of days)	(µg/m ³)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	97.8	40.7	30.8	29.5	26.3	23.7	19.4	15.1
Brighton	98.6	45.8	31.8	30.7	27.5	24.8	20.1	15.5
Dandenong	98.6	49.8	39.7	35.4	30.8	27.8	22.1	16.9
Footscray	98.9	57.7	45.1	38.7	33.7	28.6	23.6	17.1
Geelong South	98.1	53.8	42.7	38.7	34.9	29.8	23.6	16.9
Mooroolbark	99.2	53.9	40.8	38.2	34.0	31.2	23.7	17.6
Richmond	96.2	47.4	32.7	29.2	26.7	24.7	20.5	15.6
Latrobe Valley								
Traralgon	97.8	35.0	29.4	27.6	24.4	21.4	18.1	14.5

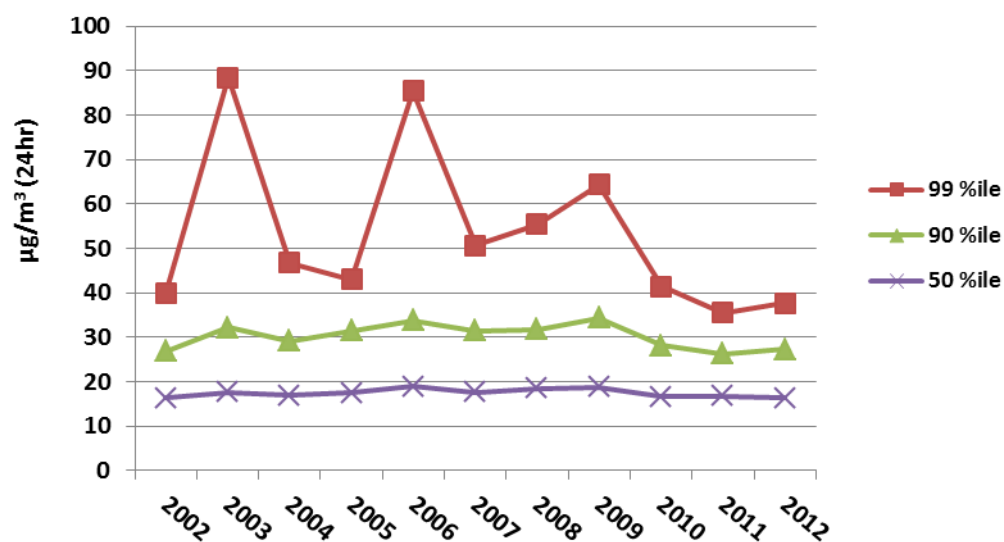


Figure 11: Percentiles of daily PM₁₀ (average of Port Phillip stations 2002-12)

In interpreting trends, it should be noted that PM₁₀ monitoring commenced at Geelong and Mooroolbark during 2002 (<75 per cent data captured that year) and these stations, which tend to record higher PM₁₀, are not included in the average for 2002.

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Table 77: Percentiles of 24-hour PM₁₀ at Alphington (1995-2012)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)	(days)	(µg/m ³)	99th	98th	95th	90th	75th	50th
<i>1995</i>	<i>63.0</i>	<i>0</i>	<i>43.3</i>	<i>37.3</i>	<i>35.1</i>	<i>30.4</i>	<i>26.1</i>	<i>21.2</i>	<i>17.0</i>
1996	97.0	0	41.7	39.6	37.8	30.4	26.1	21.5	17.2
1997	98.1	2	68.6	44.3	37.8	33.4	29.5	23.0	18.1
1998	90.1	1	53.5	46.0	42.1	36.6	31.8	24.4	18.5
1999	84.7	0	43.7	34.1	32.7	30.3	26.3	21.6	17.4
2000	95.1	2	56.5	43.6	34.8	31.6	26.8	21.4	16.8
2001	91.0	2	72.6	39.6	35.1	32.8	27.9	23.4	17.2
2002	97.5	1	66.2	35.9	34.5	30.4	27.9	22.4	17.2
2003	95.9	10	181.7	80.9	56.4	38.3	30.9	22.9	17.2
2004	97.0	1	51.6	45.2	36.8	30.9	27.6	22.0	16.5
2005	92.6	0	46.6	40.7	36.8	34.5	31.4	23.3	17.0
2006	87.1	8	154.7	82.5	58.4	40.0	31.3	23.9	18.4
2007	100.0	2	83.1	43.5	40.4	35.2	30.8	22.8	17.6
2008	99.5	3	71.1	45.2	40.0	34.8	29.1	23.5	17.8
2009	98.1	7	140.8	58.9	49.6	39.8	31.5	25.3	18.5
2010	97.8	0	47.7	37.7	35.2	31.3	27.6	22.9	17.7
2011	97.0	1	50.3	31.7	31.1	26.3	23.6	19.5	15.6
2012	97.8	0	40.7	30.8	29.5	26.3	23.7	19.4	15.1

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 78: Percentiles of 24-hour PM₁₀ at Brighton (1996–2012)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)	(days)	(µg/m ³)	99th	98th	95th	90th	75th	50th
<i>1996</i>	<i>5.5</i>								
<i>1997</i>	<i>47.4</i>	1	54.8	43.9	36.9	32.9	30.2	22.4	17.7
1998	85.2	0	49.0	44.7	40.3	34.0	29.0	21.4	16.4
1999	99.5	0	49.0	32.0	31.0	26.0	23.9	19.3	15.7
2000	94.0	2	52.6	45.0	32.5	26.4	23.4	17.9	13.8
2001	95.6	1	70.8	33.4	30.9	26.5	24.3	19.4	13.9
2002	97.3	1	69.1	34.7	31.1	28.2	24.8	19.6	14.7
2003	88.8	8	182.3	89.3	67.8	35.9	30.5	21.5	15.8
2004	89.3	0	44.9	40.5	36.6	30.4	26.4	20.9	15.9
2005	84.1	0	41.5	33.8	32.7	28.0	25.8	19.7	14.4
2006	89.9	6	109.1	78.0	46.2	36.7	25.9	19.8	13.8
2007	99.7	1	78.4	35.9	32.7	29.4	24.1	18.1	13.7
2008	100.0	5	65.3	52.5	43.8	33.4	26.7	21.8	16.1
2009	99.5	6	132.4	57.1	48.5	35.7	29.1	22.8	17.1
2010	91.5	0	41.0	35.8	33.3	28.2	25.7	20.1	15.4
2011	98.6	0	41.9	30.0	28.7	26.4	24.4	19.9	15.5
2012	98.6	0	45.8	31.8	30.7	27.5	24.8	20.1	15.5

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 79: Percentiles of 24-hour PM₁₀ at Dandenong (1998-2012)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>1998</i>	<i>69.6</i>	1	50.4	42.8	41.1	35.1	30.3	23.5	17.4
<i>1999</i>	<i>65.2</i>	1	52.3	40.9	37.0	32.1	27.3	22.4	17.1
<i>2000</i>	<i>73.8</i>	1	74.5	43.8	39.8	32.3	29.3	22.5	15.3
<i>2001</i>	<i>14.5</i>								
2002	87.4	3	84.8	45.6	37.6	31.5	26.5	21.0	15.8
2003	93.4	8	295.1	92.3	52.4	39.0	30.9	23.4	17.6
2004	92.3	1	50.1	44.5	42.1	35.7	30.8	23.4	16.7
2005	90.1	0	43.7	40.5	37.5	34.0	31.5	24.8	17.4
2006	100.0	12	149.2	90.9	71.3	47.5	38.2	30.0	22.8
2007	100.0	5	84.6	52.3	47.3	39.4	35.0	27.4	19.1
2008	99.2	8	88.6	61.3	52.8	39.4	33.2	25.4	19.1
2009	94.2	12	199.7	63.7	54.8	43.3	36.8	26.0	18.7
2010	98.6	0	43.7	38.6	36.0	31.8	27.4	21.8	15.8
2011	99.5	0	43.5	34.5	30.7	28.9	26.6	21.5	17.4
2012	98.6	0	49.8	39.7	35.4	30.8	27.8	22.1	16.9

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 80: Percentiles of 24-hour PM₁₀ at Footscray (1996-2012)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)						
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th	75th
<i>1996</i>	<i>13.1</i>									
1997	98.9	4	65.5	50.1	41.5	38.2	32.5	25.7	19.8	
1998	94.8	4	59.8	50.5	43.9	41.4	34.7	26.9	19.8	
1999	96.7	1	50.7	41.2	38.0	32.8	28.4	23.9	19.1	
2000	89.0	2	57.8	43.6	40.7	36.6	30.0	23.9	17.6	
<i>2001</i>	<i>40.5</i>	0	38.9	33.7	28.4	26.3	23.5	18.2	15.1	
2002	98.4	2	79.1	42.9	38.7	32.2	28.3	22.1	17.5	
2003	87.7	10	314.5	89.1	66.0	41.0	32.2	23.4	17.6	
2004	93.2	3	58.1	48.4	40.4	33.5	29.1	22.3	16.1	
2005	96.4	0	48.9	44.7	41.3	37.4	35.0	26.0	18.9	
2006	90.1	11	124.5	77.0	55.9	41.0	35.5	25.8	19.5	
2007	99.5	4	65.9	49.8	42.2	38.6	32.2	24.4	17.8	
2008	100.0	4	89.3	48.6	46.0	42.0	33.1	25.8	19.2	
2009	98.9	13	166.5	67.9	58.5	43.5	34.8	27.0	18.7	
2010	99.2	4	74.8	50.8	41.3	35.4	29.3	23.2	17.4	
2011	98.9	0	49.6	36.6	34.4	30.4	27.9	23.0	17.9	
2012	98.9	3	57.7	45.1	38.7	33.7	28.6	23.6	17.1	

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 81: Percentiles of 24-hour PM₁₀ at Geelong South (2002-12)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>32.1</i>	6	81.1	73.2	56.8	49.5	35.8	27.4	20.1
2003	94.0	10	148.7	80.2	57.7	45.3	35.3	25.6	18.4
2004	91.8	11	149.0	62.5	53.5	44.0	34.3	26.1	18.3
2005	96.2	7	83.0	55.2	49.3	40.6	33.7	26.6	18.5
2006	91.0	17	116.4	98.0	72.2	49.1	38.0	26.9	19.6
2007	98.9	14	129.1	65.2	59.9	43.4	32.8	26.5	19.1
2008	99.7	6	168.7	66.6	48.8	39.4	35.4	26.4	18.9
2009	85.2	12	154.6	65.4	57.3	46.2	36.6	27.8	20.1
2010	99.5	1	50.4	44.6	42.3	34.0	29.6	22.2	16.5
2011	98.9	2	57.4	46.2	43.8	35.1	29.4	23.2	17.7
2012	98.1	1	53.8	42.7	38.7	34.9	29.8	23.6	16.9

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 82: Percentiles of 24-hour PM₁₀ at Mooroolbark (2002-12)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>57.0</i>	1	66.7	<i>44.9</i>	<i>44.3</i>	<i>39.7</i>	<i>33.2</i>	<i>27.0</i>	<i>19.9</i>
2003	91.8	13	322.2	118.1	91.3	45.6	37.4	26.8	19.1
2004	94.8	1	63.9	46.0	42.8	34.7	30.1	23.9	17.3
2005	99.5	9	57.6	53.7	52.1	43.1	36.1	27.4	19.3
2006	97.3	17	219.9	135.9	69.6	46.1	39.2	29.1	21.3
2007	100.0	11	136.1	63.0	51.7	43.0	37.3	27.4	19.4
2008	97.8	10	99.9	60.6	54.7	44.5	37.8	27.7	21.1
2009	98.1	20	214.1	82.3	67.5	50.7	41.6	28.6	20.7
2010	94.0	3	53.8	48.1	43.9	36.5	32.3	25.6	17.6
2011	99.2	1	50.1	36.2	35.6	31.7	27.4	21.7	17.0
2012	99.2	2	53.9	40.8	38.2	34.0	31.2	23.7	17.6

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 83: Percentiles of 24-hour PM₁₀ at Richmond (2002-12)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
2002	92.6	1	70.0	40.3	34.7	29.2	26.5	21.2	16.5
2003	92.3	6	274.9	73.8	48.2	33.2	29.1	21.6	16.5
2004	100.0	0	43.9	40.6	35.7	30.0	26.0	20.7	15.9
2005	96.2	1	54.9	39.0	37.0	32.0	28.9	22.5	17.1
2006	97.5	9	140.0	78.6	53.5	37.9	31.4	24.3	18.4
2007	94.0	3	78.7	44.8	36.6	32.5	27.9	21.0	16.3
2008	97.5	5	73.5	53.2	44.3	34.0	27.2	22.4	17.4
2009	95.3	8	121.2	55.2	50.3	36.7	30.0	23.5	17.8
2010	97.3	0	46.6	33.7	30.9	27.6	24.8	20.3	15.8
2011	92.3	0	42.4	33.7	32.2	28.0	24.9	20.2	15.8
2012	96.2	0	47.4	32.7	29.2	26.7	24.7	20.5	15.6

Exceedances shown in bold.

Table 84: Percentiles of 24-hour PM₁₀ at RMIT (CBD) (2002-06)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>23.3</i>	2	82.9	66.3	51.5	37.6	33.3	27.2	21.1
2003	96.7	11	279.4	83.5	58.3	38.8	31.3	23.9	18.7
2004	94.5	2	79.8	46.7	41.8	32.3	28.9	23.5	18.2
2005	98.4	0	41.7	36.5	35.2	33.2	29.4	22.8	17.4
2006	78.1	1	53.0	42.6	41.4	36.0	30.0	23.6	18.0

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Table 85: Percentiles of 24-hour PM₁₀ at Moe (2002-09)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)						
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th	75th
<i>2002</i>	<i>14.8</i>									
2003	98.1	11	288.8	81.2	56.2	37.7	31.0	21.2	14.7	
2004	90.2	1	56.3	41.2	37.6	31.8	27.8	20.0	14.5	
2005	99.7	0	36.9	33.4	32.6	28.5	24.7	19.8	14.2	
2006	87.9	15	254.0	135.3	85.2	42.3	28.7	21.6	16.0	
2007	90.7	13	137.2	71.0	56.3	43.5	35.1	25.6	18.6	
2008	98.9	6	90.9	61.9	46.5	36.3	27.8	20.8	15.8	
2009	81.6	7	169.6	55.2	51.8	37.6	30.0	21.6	16.3	

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Table 86: Percentiles of 24-hour PM₁₀ at Traralgon (2002-12)

AAQ NEPM standard: 50 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (µg/m ³)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>15.3</i>	0	<i>37.1</i>	<i>33.2</i>	<i>30.0</i>	<i>28.8</i>	<i>26.4</i>	<i>23.5</i>	<i>18.7</i>
2003	98.1	7	237.8	59.3	47.5	37.2	27.3	21.6	16.8
2004	99.7	0	44.5	34.2	31.8	29.8	25.9	20.6	15.9
2005	90.1	0	44.9	41.0	36.8	31.5	26.3	20.8	16.2
2006	99.2	9	193.5	82.7	50.5	32.9	27.4	22.1	17.5
2007	96.4	5	151.2	52.0	40.8	32.3	27.0	21.7	17.0
2008	100.0	2	64.9	42.1	39.2	33.2	27.9	22.4	17.6
2009	100.0	5	125.7	51.0	40.4	35.3	29.2	23.5	17.9
2010	100.0	3	77.6	39.5	33.4	28.1	24.4	19.4	15.6
2011	99.5	0	41.8	31.6	30.1	26.0	21.7	18.2	15.0
2012	97.8	0	35.0	29.4	27.6	24.4	21.4	18.1	14.5

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

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Particles as PM_{2.5}

Table 87: 2012 percentiles of daily PM_{2.5} concentrations in Victoria

AAQ NEPM Advisory Reporting Standard: 25 µg/m³ (24-hour average)

Region	Data availability	Max	Percentiles (µg/m ³)					
Performance monitoring station	(% of days)	(µg/m ³)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	98.4	19.0	17.6	15.2	13.8	10.6	7.8	5.7
Footscray	100.0	23.1	16.2	14.9	11.2	10.0	7.2	5.5

Monitoring by reference method (one-day-in-three).

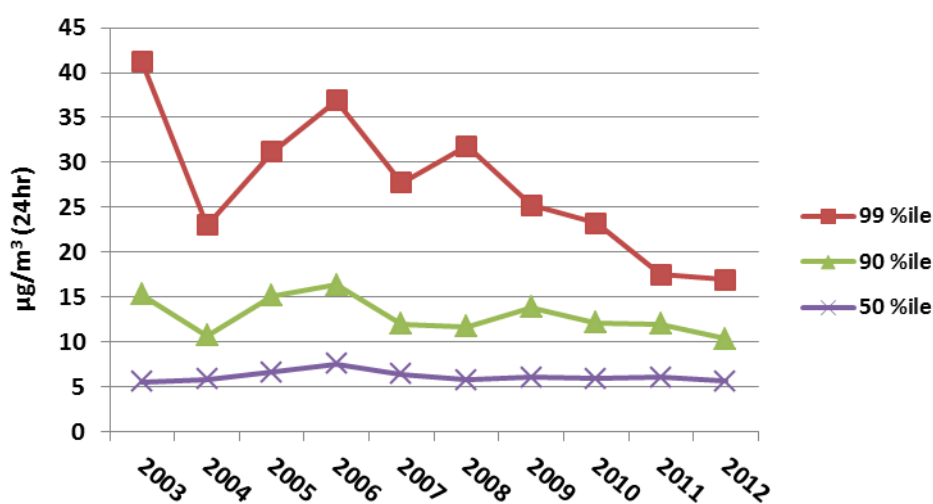


Figure 12: Percentiles of daily PM_{2.5} (average of Port Phillip stations 2003-12)

Monitoring for the PM_{2.5} Equivalence Program was conducted using TEOM instruments. Results are presented in Tables 88, 91 and 92.

Table 88: PM_{2.5} Equivalence Program 2012 TEOM monitoring - Daily concentrations in Victoria

Region	Data availability	Max	Percentiles (µg/m ³)					
Performance monitoring station	(% of days)	(µg/m ³)	99th	98th	95th	90th	75th	50th
Port Phillip								
Alphington	91.5	21.1	13.5	12.3	9.9	8.2	5.6	3.6
Footscray	97.3	26.3	14.8	13.1	10.4	8.0	5.5	3.7

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Table 89: Percentiles of daily PM_{2.5} at Alphington (2002-12)

AAQ NEPM standard: 25 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>33.6</i>	<i>0</i>	<i>19.3</i>	<i>17.9</i>	<i>16.6</i>	<i>11.6</i>	<i>11.0</i>	<i>8.7</i>	<i>6.0</i>
2003	91.8	5	41.0	39.0	34.2	19.2	15.5	9.1	6.0
2004	94.3	1	27.4	24.2	19.4	13.0	11.3	8.6	6.0
2005	94.3	3	38.3	31.2	27.0	19.5	16.8	9.3	7.2
2006	86.9	6	56.4	36.9	31.0	25.4	16.4	10.7	7.6
2007	95.1	3	36.0	30.7	24.7	17.1	12.6	8.9	6.5
2008	100.0	4	46.7	34.5	32.2	15.8	11.6	8.6	6.0
2009	100.0	2	27.0	26.4	24.1	21.2	15.0	9.1	6.6
2010	100.0	3	27.0	26.3	22.9	15.8	12.5	8.7	6.1
2011	95.9	0	21.2	18.4	17.4	15.7	12.7	8.9	6.3
2012	98.4	0	19.0	17.6	15.2	13.8	10.6	7.8	5.7

Monitoring by reference method (one-day-in-three). Years with data availability below 75 per cent shown in italics.

Exceedances shown in bold.

Table 90: Percentiles of daily PM_{2.5} at Footscray (2002-12)

AAQ NEPM standard: 25 µg/m³ (24-hour average)
AAQ NEPM goal: standard exceeded on no more than five days per year

Year	Data availability	No. of exceedances	Max	Percentiles (ppm)					
	(% of days)			(days)	(µg/m ³)	99th	98th	95th	90th
<i>2002</i>	<i>22.1</i>	<i>0</i>	<i>10.2</i>	<i>10.2</i>	<i>10.1</i>	<i>9.6</i>	<i>8.3</i>	<i>7.2</i>	<i>4.2</i>
2003	80.3	3	55.7	43.5	29.2	22.5	15.0	8.4	5.1
2004	89.3	0	22.3	21.8	19.7	13.9	10.2	7.5	5.7
2005	81.1	2	32.8	31.2	21.3	16.8	13.5	9.0	6.1
2006	<i>65.6</i>	2	36.7	31.4	22.5	16.6	14.3	9.4	6.1
2007	95.1	1	33.1	24.7	22.4	17.0	11.3	8.5	6.4
2008	92.6	3	30.5	29.2	23.9	13.9	11.9	7.9	5.5
2009	92.6	1	26.9	24.1	19.4	15.7	12.7	9.4	5.6
2010	95.9	0	24.5	20.2	18.7	14.1	11.7	8.5	5.7
2011	100.0	0	18.1	16.6	15.3	14.0	11.3	8.3	5.9
2012	100.0	0	23.1	16.2	14.9	11.2	10.0	7.2	5.5

Monitoring by reference method (one-day-in-three). Years with data availability below 75 per cent shown in italics.

Exceedances shown in bold.

Table 91: Percentiles of daily TEOM PM_{2.5} (Equivalence Program) at Alphington (2003-12)

Year	Data availability	Max (µg/m ³)	Percentiles (µg/m ³)					
	(% of days)		99th	98th	95th	90th	75th	50th
2003	94.2	59.5	39.2	29.9	17.9	13.7	8.3	5.6
2004	94.8	21.7	15.6	12.3	10.1	7.8	6.1	4.3
2005	93.4	24.8	17.9	16.2	14.0	11.2	6.9	4.3
2006	87.7	112.6	50.5	28.7	14.9	11.2	7.6	4.7
2007	100.0	59.4	21.7	17.9	14.3	12.0	7.5	5.0
2008	99.5	44.2	25.6	19.0	12.8	9.9	6.8	4.7
2009	98.4	32.7	22.4	21.3	14.8	11.7	7.3	4.7
2010	98.1	17.3	16.1	14.4	11.1	9.4	6.2	4.1
2011	89.9	20.2	14.8	13.7	11.6	8.9	6.1	4.2
2012	91.5	21.1	13.5	12.3	9.9	8.2	5.6	3.6

Table 92: Percentiles of daily TEOM PM_{2.5} (Equivalence Program) at Footscray (2003-12)

Year	Data availability	Max (µg/m ³)	Percentiles (µg/m ³)					
	(% of days)		99th	98th	95th	90th	75th	50th
<i>2003</i>	<i>10.1</i>							
2004	88.5	23.8	14.1	12.5	9.9	8.2	5.8	3.8
2005	99.7	20.3	14.3	13.0	10.8	9.0	5.9	3.9
2006	91.8	95.7	44.0	23.2	15.6	11.3	6.8	4.3
2007	99.5	42.9	18.9	16.0	12.0	10.4	6.3	4.2
2008	99.7	34.5	23.2	16.6	11.6	9.2	6.6	4.5
2009	99.5	32.9	23.3	19.4	13.8	10.8	7.3	4.2
2010	98.9	22.9	15.7	12.5	10.3	8.4	5.7	3.7
2011	99.2	15.7	12.6	11.9	10.2	8.3	6.1	4.0
2012	97.3	26.3	14.8	13.1	10.4	8.0	5.5	3.7

Exceedances shown in bold. Years with data availability below 75 per cent shown in italics.

Lead

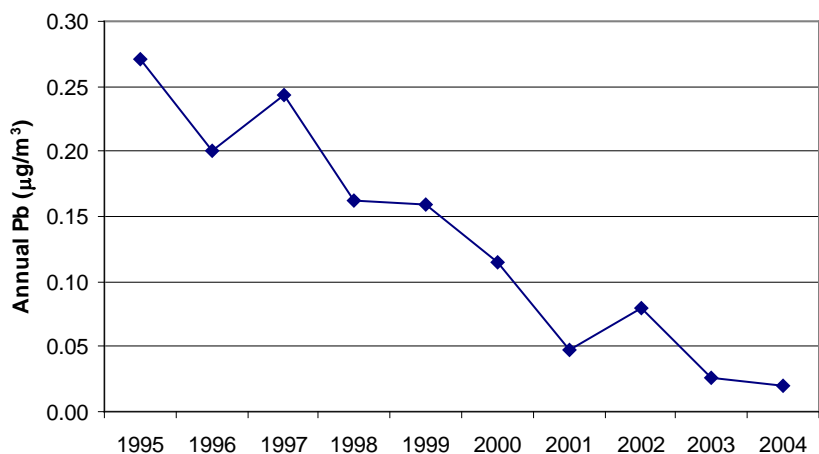


Figure 13: Annual average lead (Collingwood 1995-2004)

Table 93: Annual average lead (Collingwood 1995-2004)

AAQ NEPM standard: 0.50 µg/m³ (one-year average)

Year	Data availability (% of days)	Annual Average (µg/m³)
1995	80.5	0.27
1996	100.0	0.20
1997	100.0	0.24
1998	90.4	0.16
1999	98.6	0.16
2000	100.0	0.11
2001	92.1	0.05
2002	92.1	0.08
2003	98.6	0.03
2004	91.8	0.02