

Air monitoring report 2011 - Compliance with the National Environment Protection (Ambient Air Quality) Measure

Environment
Report



Publication number 1483 July 2012

Authorised and published by EPA Victoria, 200 Victoria Street, Carlton

Overview

This report presents the results of air quality monitoring in Victoria in 2011 and assesses them against the requirements of the *Ambient Air Quality National Environment Protection Measure*¹ (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 2011 was generally good. The major impacts on Victoria's air quality during the year were associated with urban emissions during stable atmospheric conditions.

In the Port Phillip region in 2011 the goal was met for particles as PM₁₀ at all NEPM stations for the second successive year. The goal for particles as PM₁₀ was also met at Traralgon in the Latrobe Valley. An issue-specific station not included in the NEPM network, located in Brooklyn, did not report good air quality due to impacts from local sources³.

The maximum number of days when the levels were measured above the PM₁₀ air quality standard at a single station (two) occurred at the Geelong South 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 South Geelong were attributed to urban **sources**, typically from vehicle traffic and/or domestic wood heaters.

The 24-hour advisory reporting standard for particles as PM_{2.5} 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 goals for ozone (O₃) were met at all stations under typical summer smog formation conditions where sufficient air monitoring data was available. O₃ 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 air-shed modelling using TAPM showed ozone levels at EPA's Geelong South site were comparable to the Point Henry site.

Monitoring in 2011 showed the AAQ NEPM goals and standards were met for carbon monoxide (CO), nitrogen dioxide (NO₂) and sulfur dioxide (SO₂) where sufficient air monitoring data was available. A lack of air monitoring data prevented assessment of CO at Richmond in Quarter 3 (Q3).

Monitoring was performed in accordance with a modified form of Victoria's monitoring plan⁴, AAQ NEPM Technical Papers and EPA's NATA accreditation. Data capture targets were achieved at all stations, except for CO at Richmond (Q3) due to technical problems with equipment, while O₃ monitoring was stopped at Point Henry during Quarter 1 (Q1).

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

² www.epa.vic.gov.au/air/monitoring

³ Environment Report-Air monitoring at Brooklyn year 2: November 2010 to October 2011, available from www.epa.vic.gov.au/air/brooklyn_estate.asp

⁴ *Ambient Air Quality NEPM Monitoring Plan Victoria* (EPA publication 763) available from www.epa.vic.gov.au/publications.

Table of contents

A	MONITORING SUMMARY	3
	Current performance monitoring stations	3
	Description of exposed population	3
	Investigative monitoring stations	3
	Implementation of the monitoring plan	5
	Monitoring methods	6
	NATA status	7
	Screening.....	7
	PM _{2.5} monitoring	7
B	ASSESSMENT OF COMPLIANCE WITH STANDARDS AND GOALS	8
	Carbon monoxide.....	9
	Nitrogen dioxide.....	9
	Ozone	10
	Sulfur dioxide.....	11
	Particles as PM ₁₀	12
	Particles as PM _{2.5}	12
	Lead	13
C	ANALYSIS OF AIR QUALITY MONITORING	14
	Carbon monoxide.....	14
	Nitrogen dioxide.....	15
	Ozone	16
	Sulfur dioxide.....	19
	Particles as PM ₁₀	21
	Particles as PM _{2.5}	23
	Summary of progress towards achieving the AAQ NEPM goals	23
D	TRENDS AND POLLUTANT DISTRIBUTIONS.....	25
	Carbon monoxide	25
	Nitrogen dioxide.....	29
	Ozone	37
	Sulfur dioxide.....	59
	Particles as PM ₁₀	72
	Particles as PM _{2.5}	80
	Lead	83

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 2011 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.

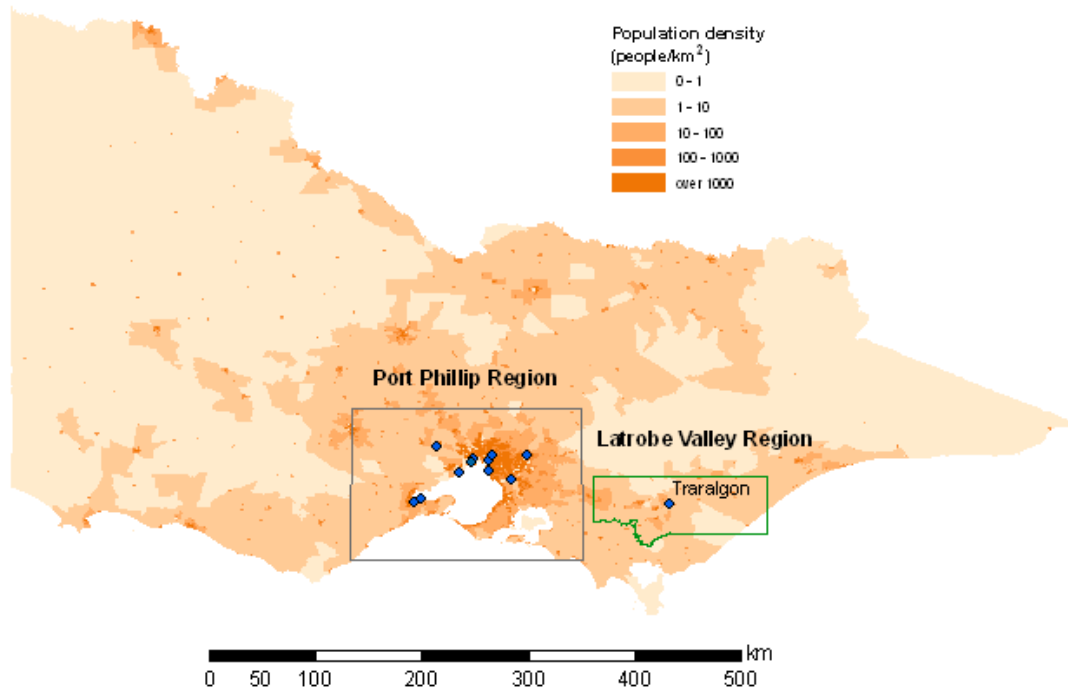


Figure 1: AAQ NEPM regions and population density in Victoria.

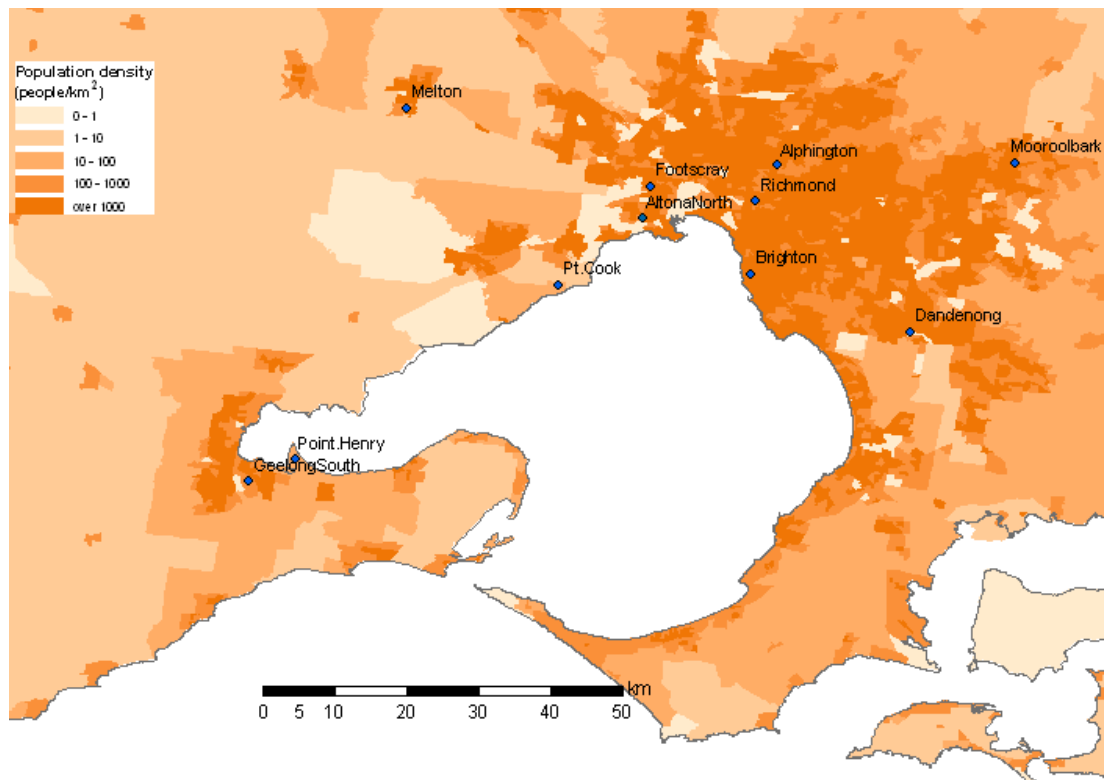


Figure 2: Monitoring stations and population density in the Port Phillip region.

Table 2: Summary of stations' siting compliance with AS 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	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Altona North	I/Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Brighton	Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Dandenong	LI	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Footscray	I/Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Geelong South	LI/Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Melton	Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Mooroolbark	Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Point Cook	Rur/Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Point Henry	I/Rur	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Richmond	Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Latrobe Valley								
Traralgon	Res	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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 2012-13 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 Latrobe Valley.

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

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

due to the proximity of trees. Only a few small trees are within the 20 metre requirement at the Richmond site. An assessment of the impact of the trees on the Alphington and Traralgon sites, which have trees close to the station, is being conducted to determine whether the sites need to be relocated close by.

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	<i>Ambient air – Determination of carbon monoxide – Direct reading instrument method</i>	Gas filter correlation/infrared
Nitrogen dioxide	NO ₂	AS3580.5.1-2011	<i>Ambient air – Determination of oxides of nitrogen – Chemiluminescence method</i>	Gas phase chemiluminescence
Photochemical oxidant (ozone)	O ₃	AS3580.6.1-2011	<i>Ambient air – Determination of ozone – Direct reading instrument method</i>	Non-dispersive ultraviolet
Sulfur dioxide	SO ₂	AS3580.4.1-2008	<i>Ambient air – Determination of sulfur dioxide – Direct reading instrument method</i>	Pulsed fluorescence
Particles	PM ₁₀	AS3580.9.8-2001	<i>Determination of suspended particulate matter – PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser</i>	Tapered element oscillating microbalance (TEOM)
	PM _{2.5}	AS/NZS3580.9.10-2006a	<i>Reference method for the determination of fine particulate matter as PM_{2.5} in the atmosphere</i>	Gravimetric reference method
	PM _{2.5}	AS3580.9.8-2001b	<i>Technical paper on monitoring for particles as PM_{2.5}</i>	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 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 in the current review of monitoring.

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) and no adjustment for loss of volatiles⁹.

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 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 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 goal 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.

Air monitoring report 2011

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

Carbon monoxide

Table 6: 2011 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
Performance monitoring station	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	92.4	90.5	92.8	91.5	91.8	0	met
Geelong South	94.8	94.4	94.7	94.1	94.5	0	met
Richmond	94.7	90.2	70.5	86.0	85.3	0	ND

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 Richmond (Q3) due to technical problems with equipment.

At all other stations operated during 2011, the carbon monoxide standard was not exceeded and compliance was demonstrated.

Nitrogen dioxide

Table 7: 2011 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	
Performance monitoring station	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Port Phillip									
Alphington	92.9	89.2	92.9	92.0	91.8	0	0.010	met	met
Brighton	94.8	95.1	94.7	92.4	94.3	0	0.008	met	met
Footscray	94.7	94.7	84.4	94.5	92.1	0	0.011	met	met
Geelong South	94.8	94.3	94.7	94.1	94.5	0	0.007	met	met
Point Cook	78.7	88.9	91.3	93.1	88.1	0	0.005	met	met
Latrobe Valley									
Traralgon	95.3	95.4	94.4	95.5	95.2	0	0.007	met	met

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.

At all stations operating during 2011, the nitrogen dioxide standards were not exceeded and compliance was demonstrated.

Air monitoring report 2011

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

Ozone

Table 8: 2011 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	92.9	92.3	93.9	91.9	92.8	0	0	met	met
Brighton	94.8	95.1	94.8	91.5	94.1	0	0	met	met
Dandenong	94.5	94.6	94.4	94.8	94.6	0	0	met	met
Footscray	93.1	94.7	90.6	94.5	93.2	0	0	met	met
Geelong South	94.8	94.3	94.7	94.1	94.5	0	0	met	met
Melton	88.5	92.7	94.2	94.0	92.4	0	0	met	met
Mooroolbark	94.8	94.9	94.8	94.5	94.7	0	0	met	met
Point Cook	89.8	76.3	93.9	92.8	88.2	0	0	met	met
Point Henry	66.9	0.0	0.0	0.0	16.5	0	0	ND	ND
Latrobe Valley									
Traralgon	95.3	95.4	95.4	95.5	95.4	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.

The goals for the one and four-hour ozone levels were met at all operating stations in 2011. Point Henry was closed in March of 2011 as the Point Henry site was not representative of the general population-average exposure. Also, regional air-shed modelling using TAPM showed ozone levels at EPA's Geelong South site were comparable to the Point Henry site.

Air monitoring report 2011

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

Sulfur dioxide

Table 9: 2011 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	81.1	88.9	90.4	88.2	87.2	0	0	0.000	met	met	met
Altona North	93.4	94.0	94.1	89.9	92.8	0	0	0.001	met	met	met
Geelong South	94.6	94.1	94.2	88.6	92.9	0	0	0.001	met	met	met
Latrobe Valley											
Traralgon	95.3	95.5	94.5	95.4	95.2	0	0	0.002	met	met	met

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.

At all stations operating during 2011, the sulfur dioxide standards were not exceeded and compliance was demonstrated. Annual mean values were close to the limits of detection.

Air monitoring report 2011

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

Particles as PM₁₀

Table 10: 2011 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
Performance monitoring station	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	97.8	96.7	100.0	93.5	97.0	1	met
Brighton	100.0	97.8	100.0	96.7	98.6	0	met
Dandenong	100.0	97.8	100.0	100.0	99.5	0	met
Footscray	100.0	100.0	95.7	100.0	98.9	0	met
Geelong South	100.0	97.8	100.0	97.8	98.9	2	met
Mooroolbark	97.8	100.0	100.0	98.9	99.2	1	met
Richmond	100.0	94.5	78.3	96.7	92.3	0	met
Latrobe Valley							
Traralgon	97.8	100.0	100.0	100.0	99.5	0	met

Monitoring was by TEOM.

Screening arguments that PM₁₀ levels are reasonably expected to be 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, Mooroolbark and Traralgon. These exceedances were the result of urban sources, 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: 2011 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)
Performance monitoring station	Q1	Q2	Q3	Q4	Annual		
Port Phillip							
Alphington	100.0	90.3	96.7	96.8	95.9	0	7.3
Footscray	100.0	100.0	100.0	100.0	100.0	0	6.5

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

No exceedances of the 24 hour PM_{2.5} reporting standard were recorded in 2011.

Air monitoring report 2011

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

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 2011 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	97.8	95.6	91.3	75.0	89.9	4.9
Footscray	98.9	97.8	100.0	100.0	99.2	4.6

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: 2011 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	347	2.9	Jun 02:02	2.7	Jun 01:24
Geelong South	358	2.1	Jun 02:02	1.8	Jun 01:24
Richmond	319	2.6	Jun 02:02	2.3	Jun 01:24

Carbon monoxide levels were well within the standard at all stations. The highest readings occurred at Alphington, where carbon monoxide reached 32 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.

Nitrogen dioxide

Table 14: 2011 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	351	0.046	Jun 01:19	0.042	Apr 27:18
Brighton	362	0.042	Jun 01:15	0.036	Jun 15:21
					Sep 02:20
					Nov 05:22
Footscray	353	0.053	Jun 01:14	0.051	Jan 31:23
Geelong South	364	0.040	Jun 15:08	0.035	May 20:08
Point Cook	333	0.038	Nov 05:23		
			Feb 01:01		
Latrobe Valley					
Traralgon	363	0.034	Aug 27:19	0.030	Aug 24:19
					Aug 04:18

Nitrogen dioxide levels were well within the standard at all stations. The highest one-hour average occurred at Footscray and was 44 per cent of the hourly standard. The highest annual average also occurred at Footscray and was 37 per cent of the standard (see Table 7).

Ozone

Table 15: 2011 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	353	0.073	Dec 23:17	0.060	Dec 24:17
Brighton	360	0.074	Dec 23:16	0.061	Jan 06:18
Dandenong	364	0.063	Jan 29:16	0.062	Feb 02:17
					Jan 06:17
Footscray	357	0.078	Dec 23:16	0.056	Jan 06:17
Geelong South	364	0.055	Nov 05:17	0.052	Nov 09:14
					Dec 31:18
Melton	352	0.071	Jan 06:19	0.070	Dec 23:16
Mooroolbark	365	0.078	Dec 24:16	0.071	Jan 29:18
Point Cook	334	0.069	Dec 23:15	0.057	Nov 08:18
Point Henry	63	0.050	Feb 15:15	0.048	Mar 12:15
Latrobe Valley					
Traralgon	365	0.050	Feb 26:16	0.042	Dec 24:16

Table 16: 2011 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	354	0.069	Dec 23:18	0.057	Dec 24:17
Brighton	357	0.063	Dec 23:17	0.056	Nov 09:17
Dandenong	363	0.058	Feb 02:18		
			Dec 23:17		
Footscray	355	0.067	Dec 23:17	0.048	Nov 09:17
					Jan 20:18
Geelong South	362	0.052	Nov 05:17	0.050	Nov 09:16
Melton	352	0.065	Jan 06:20	0.062	Dec 23:18
Mooroolbark	364	0.069	Dec 24:18	0.059	Jan 15:16
					Jan 29:19
Point Cook	333	0.058	Dec 23:17	0.052	Dec 07:19
					Nov 08:20
					Nov 09:16
Point Henry	63	0.048	Feb 15:17	0.043	Mar 12:16
Latrobe Valley					
Traralgon	365	0.044	Feb 26:18	0.038	Sep 04:09
					Oct 21:04

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 2011 for the one-hour average and four-hour average ozone. There were no exceedances of the one-hour and four-hour standards. The highest one-hour average in the Port Phillip region, at Footscray and Mooroolbark, was 78 per cent of the standard and in the Latrobe Valley, at Traralgon, 50 per cent of the standard. The highest four-hour average in the Port Phillip region, at Alphington and Mooroolbark, was 86 per cent of the standard and in the Latrobe Valley, at Traralgon, 55 per cent of the standard.

Table 17: 2011 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
		Point Henry	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
		Point Henry	none	none
	Latrobe Valley	Traralgon	none	none

Sulfur dioxide

Table 18: 2011 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	344	0.011	May 10:13	0.009	Oct 17:21
Altona North	359	0.047	Jul 07:11	0.046	Apr 12:12
Geelong South	356	0.033	Sep 10:18	0.030	May 23:18
					Aug 21:14
					Jul 16:13
Latrobe Valley					
Traralgon	363	0.038	Dec 14:17	0.025	Mar 27:13

Table 19: 2011 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	344	0.003	Apr 02	0.002	Dec 12
					Jan 18
					May 30
					Jun 28
					Jul 07
					Jul 14
					Apr 03
					May 14
					Jun 01
Altona North	359	0.012	Jun 08	0.010	Mar 25
					Apr 12
Geelong South	356	0.005	Sep 17		
			Oct 29		
			Apr 12		
			May 04		
Latrobe Valley					
Traralgon	363	0.005	Dec 29		
			Dec 14		
			Jul 11		

Sulfur dioxide levels were well below the standards at all stations. Maximum one-hour averages are higher relative to the standard than the 24-hour or annual averages. The highest one-hour reading occurred at Altona North and was 24 per cent of the one-hour standard. The highest 24-hour reading also occurred at Altona North and was 15 per cent of the 24-hour standard. The maximum one-hour average at Traralgon was 19 per cent of the one-hour standard. The maximum 24-hour average at Traralgon was six per cent of the 24-hour standard. Annual averages at all stations (see Table 9) are close to the limit of detection.

Particles as PM₁₀

Table 20: 2011 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	354	50.3	Jun 01	31.5	Jul 23
Brighton	330	41.9	Jun 01	29.2	Oct 17
Dandenong	363	43.5	Mar 21	33.2	Dec 21
					Jul 15
Footscray	361	49.6	Jun 01	35.7	Aug 25
Geelong South	361	57.4	May 20	45.1	Aug 25
Mooroolbark	362	50.1	May 20	36.1	Jan 31
Richmond	337	42.4	Jun 06	33.2	Aug 11
Latrobe Valley					
Traralgon	363	41.8	Mar 08	31.3	Jun 03
					Apr 09

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 30 µg/m³ at Alphington (31 Jan) and 22 µg/m³ at Footscray (11 Aug).

In 2011, PM₁₀ exceedances occurred on the days listed in Table 21. The likely causes have been inferred, with the exceedances all attributed to the build up of pollution in stable atmospheric conditions with low winds (three days).

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

Table 21: 2011 PM₁₀ exceedances

AAQ NEPM standard: 50µg/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		
May 19					52.8				urban
May 20					57.4	50.1			urban
Jun 1	50.3								urban
Total	1	0	0	0	2	1	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.

Particles as PM_{2.5}

Table 22: 2011 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	117	21.2	Jul 15
Footscray	122	18.1	Jun 15

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 2011.

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 (Jun 1) occurred on a day where particles accumulated typically from vehicle traffic or domestic wood heaters.

Table 23: PM_{2.5} Equivalence Program 2011 TEOM monitoring - daily statistics

Region Performance monitoring station	Number of valid days	Highest (µg/m ³)	Highest (date)
Port Phillip			
Alphington	328	20.2	Jun 01
Footscray	362	15.7	Jun 01

Summary of progress towards achieving the AAQ NEPM goals

Compliance in 2011

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 2011, the goals were met at all stations where there was sufficient data captured. The exceptions were carbon monoxide where there was insufficient data at Richmond (Q3) and ozone where there was insufficient data at Point Henry (station removed).

All of the days when PM₁₀ exceedances were recorded in the Port Phillip region were attributed to the accumulation of urban emissions (three days).

The one-hour average and four-hour average ozone standards and the goals for ozone (O₃) were met at all stations where there was sufficient data captured during 2011 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 2003-11¹¹ and screening (summarised in Table 4).

Between 2003-11, 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 five of the last nine years in the Port Phillip region (2004, 2005, 2007, 2010 and 2011) and in eight of the last nine years in the Latrobe Valley region (2003, 2004, 2005, 2007, 2008, 2009, 2010 and 2011)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 screening criteria.

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.

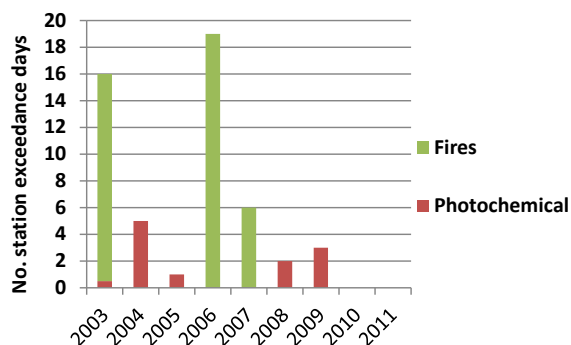


Figure 3: Inferred causes of exceedances of the ozone four-hour standard (Port Phillip region 2003-11)

In the Port Phillip region, the particles as PM₁₀ goal has only been met in 2010 and 2011 during the period 2003-11. The elevated particle levels above the air quality standard were attributed (see Figure 4) to fires (bushfires or planned burning) as the most frequent cause, followed by 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.

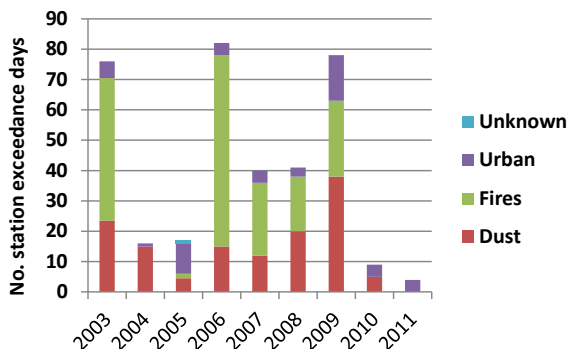


Figure 4: Inferred causes of exceedances of the PM₁₀ standard (Port Phillip region 2003-11)

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 2002-11.

The major cause of the elevated particle levels were mainly attributed to fire – bushfires and/or planned burning – followed by 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.

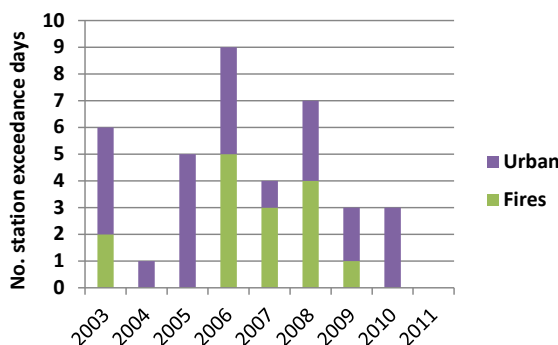


Figure 5: Inferred causes of exceedances of the PM_{2.5} 24-hour standard (Port Phillip region 2003-11)

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 2011 this requirement was achieved for all pollutants at all stations except Richmond (Q3) for carbon monoxide and Point Henry (station closure) for ozone. Point Henry was closed as the site was not representative of the general population-average exposure. Also, regional air-shed modelling using TAPM showed ozone levels at EPA's Geelong South site were comparable to the Point Henry site.

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 2011 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 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: 2011 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								
Alphington	95.1	2.9	1.8	1.6	1.2	0.8	0.3	0.1
Geelong South	98.1	2.1	1.5	1.1	0.7	0.6	0.4	0.3
Richmond	87.4	2.6	1.8	1.5	1.2	0.9	0.6	0.4

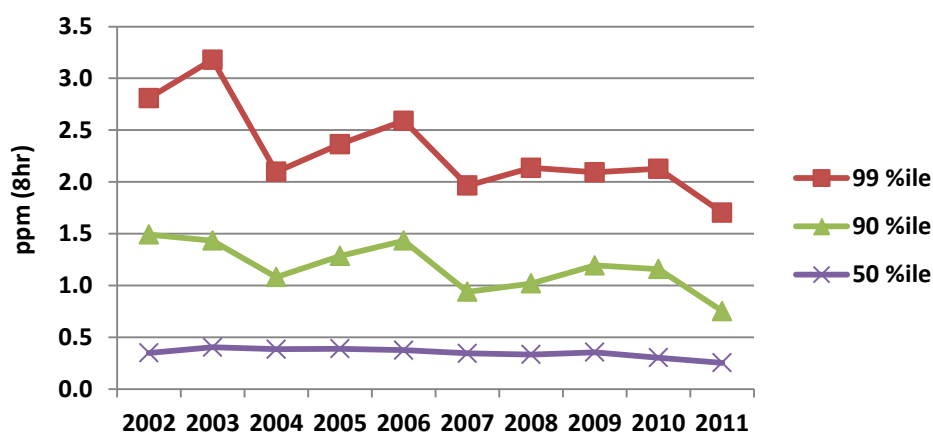


Figure 6: Percentiles of daily maximum eight-hour carbon monoxide (average of Port Phillip stations 2002-11)

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

Table 25: Percentiles of daily maximum eight-hour carbon monoxide at Alphington (1995-2011)

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
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
1999	<i>55.1</i>	0	6.2	<i>4.7</i>	<i>4.1</i>	3.0	<i>2.1</i>	<i>1.1</i>	0.6
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

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

Table 26: Percentiles of daily maximum eight-hour carbon monoxide at Geelong South (1995-2011)

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
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
1997	<i>0.0</i>								
1998	66.0	0	3.3	2.8	2.6	2.3	1.6	0.7	0.4
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

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.

Table 27: Percentiles of daily maximum eight-hour carbon monoxide at Richmond (2001-11)

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
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

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
<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: 2011 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								
Alphington	96.2	0.046	0.040	0.035	0.031	0.029	0.026	0.021
Brighton	99.2	0.042	0.035	0.034	0.032	0.030	0.025	0.018
Footscray	96.7	0.053	0.044	0.038	0.035	0.032	0.027	0.021
Geelong South	99.7	0.040	0.031	0.030	0.028	0.025	0.020	0.013
Point Cook	91.2	0.038	0.033	0.031	0.027	0.024	0.019	0.012
Latrobe Valley								
Traralgon	99.5	0.034	0.028	0.027	0.025	0.023	0.019	0.013

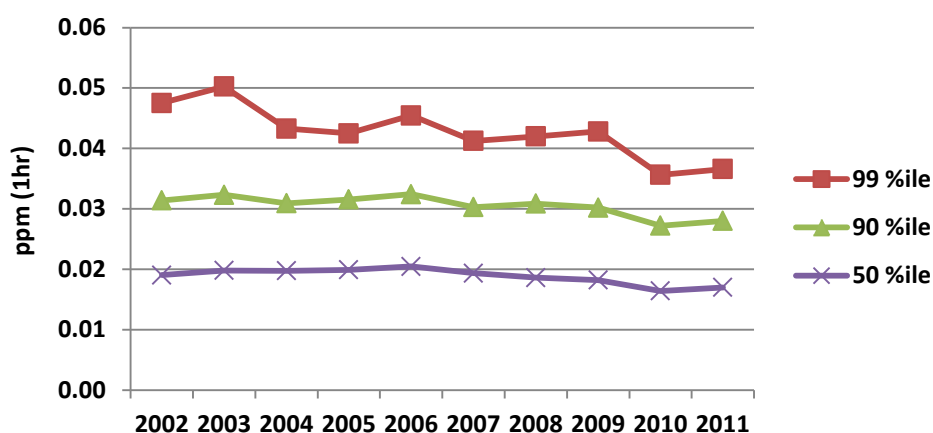


Figure 7: Percentiles of daily maximum one-hour nitrogen dioxide (average of Port Phillip stations 2002-11)

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

Table 30: Percentiles of daily maximum one-hour nitrogen dioxide at Alphington (1995-2011)

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	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

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

Table 31: Percentiles of daily maximum one-hour nitrogen dioxide at Brighton (1995-2011)

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

Table 32: Percentiles of daily maximum one-hour nitrogen dioxide at Footscray (1995-2011)

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
2001	32.6	0	0.041	0.040	0.039	0.036	0.033	0.028	0.021
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

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

Table 33: Percentiles of daily maximum one-hour nitrogen dioxide at Geelong South (1995-2011)

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								
1998	68.5	0	0.067	0.039	0.037	0.034	0.032	0.026	0.020
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

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

Table 34: Percentiles of daily maximum one-hour nitrogen dioxide at Point Cook (1995-2011)

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	0.0								
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	68.8	0	0.048	0.043	0.039	0.032	0.028	0.020	0.014
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

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>	0	0.031	0.028	0.026	0.024	0.022	0.018	0.014
<i>1996</i>	<i>26.8</i>	0	0.027	0.021	0.018	0.016	0.013	0.012	0.009
<i>1997</i>	<i>69.6</i>	0	0.036	0.031	0.031	0.026	0.023	0.020	0.016
<i>1998</i>	<i>87.9</i>	0	0.049	0.036	0.033	0.029	0.026	0.022	0.016
<i>1999</i>	<i>86.0</i>	0	0.049	0.035	0.032	0.028	0.025	0.022	0.017
<i>2000</i>	<i>73.5</i>	0	0.050	0.040	0.036	0.027	0.024	0.020	0.015
<i>2001</i>	<i>95.1</i>	0	0.036	0.028	0.026	0.024	0.022	0.018	0.014
<i>2002</i>	<i>96.7</i>	0	0.036	0.030	0.029	0.027	0.026	0.021	0.014
<i>2003</i>	<i>98.4</i>	0	0.034	0.031	0.029	0.027	0.024	0.020	0.014
<i>2004</i>	<i>100.0</i>	0	0.032	0.026	0.024	0.023	0.021	0.018	0.014
<i>2005</i>	<i>99.5</i>	0	0.039	0.034	0.032	0.027	0.024	0.019	0.014
<i>2006</i>	<i>81.1</i>	0	0.058	0.030	0.029	0.026	0.024	0.020	0.016
<i>2007</i>	<i>98.4</i>	0	0.032	0.028	0.027	0.024	0.022	0.019	0.014
<i>2008</i>	<i>99.7</i>	0	0.046	0.028	0.026	0.023	0.021	0.017	0.013
<i>2009</i>	<i>81.6</i>	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.

Table 37: Percentiles of daily maximum one-hour nitrogen dioxide at Traralgon (1995-2011)

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
<i>1997</i>	<i>64.7</i>	<i>0</i>	<i>0.038</i>	<i>0.037</i>	<i>0.034</i>	<i>0.031</i>	<i>0.028</i>	<i>0.024</i>	<i>0.018</i>
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

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

Air monitoring report 2011

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

Ozone

Table 38: 2011 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								
Alphington	96.7	0.073	0.053	0.052	0.045	0.038	0.031	0.026
Brighton	98.6	0.074	0.057	0.053	0.044	0.038	0.031	0.027
Dandenong	99.7	0.063	0.059	0.054	0.047	0.038	0.032	0.027
Footscray	97.8	0.078	0.050	0.049	0.044	0.037	0.030	0.026
Geelong South	99.7	0.055	0.050	0.046	0.040	0.036	0.030	0.026
Melton	96.4	0.071	0.054	0.050	0.043	0.038	0.031	0.028
Mooroolbark	100.0	0.078	0.060	0.051	0.043	0.037	0.031	0.026
Point Cook	91.5	0.069	0.054	0.052	0.047	0.041	0.032	0.028
<i>Point Henry</i>	<i>17.3</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>
Latrobe Valley								
Traralgon	100.0	0.050	0.040	0.039	0.035	0.031	0.027	0.022

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

Table 39: 2011 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								
Alphington	97.0	0.069	0.048	0.045	0.042	0.036	0.029	0.025
Brighton	97.8	0.063	0.053	0.047	0.041	0.036	0.030	0.026
Dandenong	99.5	0.058	0.054	0.051	0.044	0.037	0.031	0.026
Footscray	97.3	0.067	0.045	0.044	0.041	0.034	0.029	0.024
Geelong South	99.2	0.052	0.045	0.043	0.037	0.034	0.029	0.025
Melton	96.4	0.065	0.051	0.047	0.041	0.036	0.030	0.027
Mooroolbark	99.7	0.069	0.053	0.046	0.039	0.035	0.029	0.024
Point Cook	91.2	0.058	0.051	0.048	0.044	0.039	0.031	0.027
<i>Point Henry</i>	<i>17.3</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>
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.

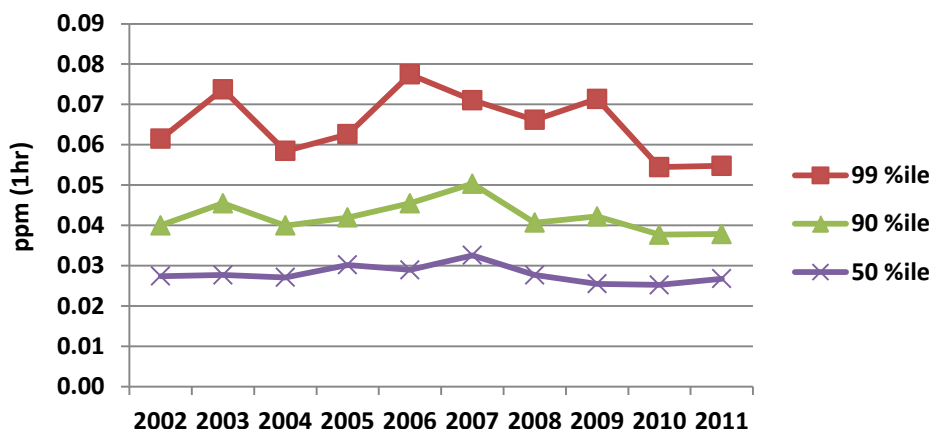


Figure 8: Percentiles of daily maximum one-hour ozone (average of Port Phillip stations 2002-11)

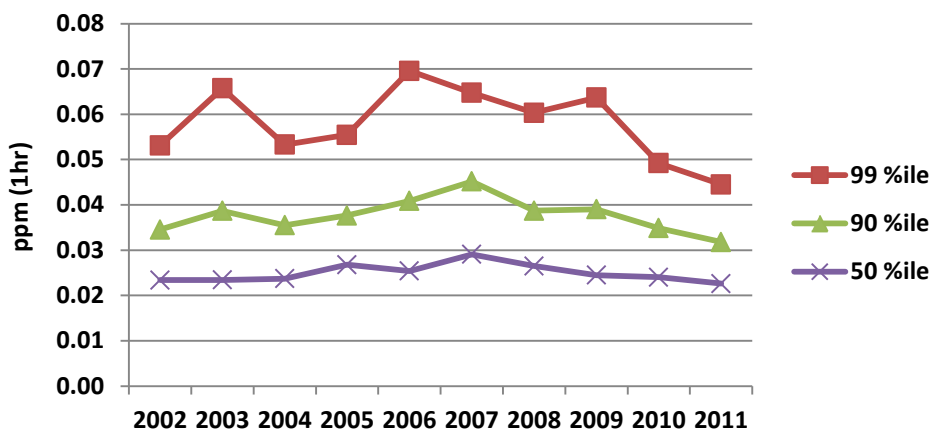


Figure 9: Percentiles of daily maximum four-hour ozone (average of Port Phillip stations 2002-11)

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

Exceedances shown in bold.

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

Exceedances shown in bold.

Table 42: Percentiles of daily maximum one-hour ozone at Dandenong (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
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
2000	63.6	0	<i>0.071</i>	0.065	0.062	0.052	0.043	0.028	0.023
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

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

Table 43: Percentiles of daily maximum one-hour ozone at Footscray (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
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
2001	34.5	0	<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

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 (1995-2011)

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
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

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 (2002-11)

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
2002	<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	

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 (2002-11)

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
2002	<i>57.5</i>	0	0.089	0.070	0.055	0.046	0.038	0.033	0.028
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

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

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

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
1995	69.3	0	0.060	0.047	0.044	0.042	0.039	0.036	0.033
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
1998	27.7	0	0.087	0.072	0.067	0.052	0.043	0.032	0.025
1999	0.0								
2000	14.2								
2001	57.3	0	0.089	0.074	0.068	0.052	0.045	0.032	0.024
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
2011	17.3	0	0.050	0.049	0.047	0.040	0.038	0.035	0.022

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

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.

Table 50: Percentiles of daily maximum one-hour ozone at Traralgon (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
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
1997	60.3	0	0.072	0.058	0.057	0.052	0.041	0.030	0.025
1998	92.3	0	0.075	0.062	0.054	0.044	0.037	0.030	0.026
1999	31.8	0	0.060	0.055	0.050	0.043	0.036	0.028	0.023
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

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

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

Exceedances shown in bold.

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

Exceedances shown in bold.

Table 53: Percentiles of daily maximum four-hour ozone at Dandenong (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
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
2000	<i>64.1</i>	0	<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

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

Table 54: Percentiles of daily maximum four-hour ozone at Footscray (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
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
2001	34.5	0	<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

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

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

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

Table 56: Percentiles of daily maximum four-hour ozone at Melton (2002-11)

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
2002	<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	

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 (2002-11)

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
2002	<i>57.5</i>	0	0.075	0.063	0.047	0.041	0.036	0.030	0.026
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

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

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

Exceedances shown in bold.

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
1995	69.3	0	0.056	0.042	0.042	0.039	0.038	0.035	0.032
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
1998	27.7	0	0.076	0.064	0.060	0.043	0.038	0.030	0.023
1999	0.0								
2000	14.2								
2001	57.3	/	0.085	0.067	0.061	0.051	0.042	0.030	0.023
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
2011	17.3	0	0.048	0.045	0.042	0.037	0.035	0.031	0.021

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

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
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.

Table 61: Percentiles of daily maximum four-hour ozone at Traralgon (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
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
1997	60.5	0	0.064	0.055	0.051	0.045	0.039	0.029	0.024
1998	92.1	0	0.058	0.053	0.048	0.041	0.035	0.029	0.024
1999	31.8	0	0.053	0.051	0.044	0.040	0.033	0.026	0.021
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

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

Sulfur dioxide

Table 62: 2011 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								
Alphington	94.2	0.011	0.007	0.006	0.004	0.004	0.002	0.001
Altona North	98.4	0.047	0.034	0.030	0.023	0.017	0.008	0.004
Geelong South	97.5	0.033	0.029	0.027	0.017	0.015	0.008	0.003
Latrobe Valley								
Traralgon	99.5	0.038	0.019	0.016	0.013	0.009	0.006	0.003

Table 63: 2011 percentiles of daily 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								
Alphington	94.2	0.003	0.002	0.002	0.001	0.001	0.001	0.000
Altona North	98.4	0.012	0.009	0.007	0.005	0.003	0.002	0.001
Geelong South	97.5	0.005	0.004	0.004	0.004	0.003	0.002	0.001
Latrobe Valley								
Traralgon	99.5	0.005	0.004	0.004	0.003	0.003	0.002	0.001

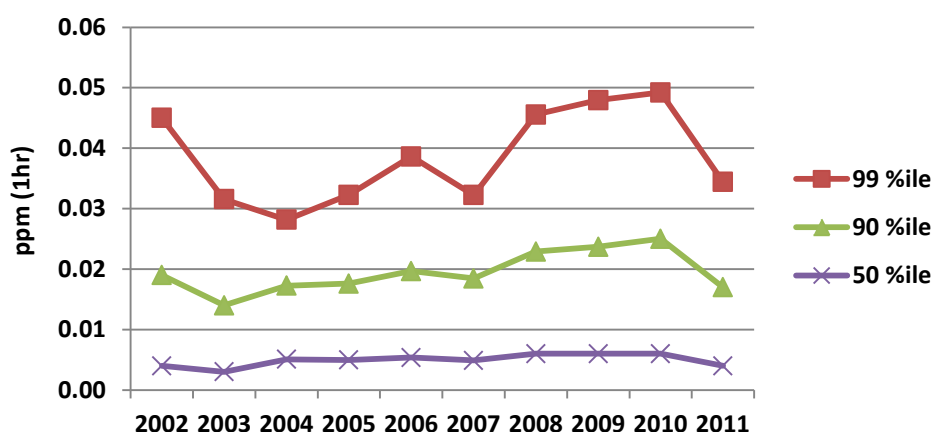


Figure 10: Percentiles of daily maximum one-hour sulfur dioxide (Altona North 2002-2011)

As there are few SO₂ 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 (1995-2011)

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	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

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

Table 65: Percentiles of daily maximum one-hour sulfur dioxide at Altona North (1995-2011)

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

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 (1995-2011)

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
1997	0.0								
1998	68.8	0	0.038	0.023	0.021	0.016	0.012	0.008	0.003
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
2001	50.7	0	0.037	0.024	0.023	0.018	0.012	0.006	0.002
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

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

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
1995	<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.

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

Table 69: Percentiles of daily maximum one-hour sulfur dioxide at Traralgon (1995-2011)

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
1997	<i>67.1</i>	0	<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

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

Table 70: Percentiles of daily average sulfur dioxide at Alphington (1995-2011)

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
1995	<i>71.5</i>	0	0.002	0.001	0.000	0.000	0.000	0.000	-0.001	-0.001
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

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

Table 71: Percentiles of daily average sulfur dioxide at Altona North (1995-2011)

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

Table 72: Percentiles of daily average sulfur dioxide at Geelong South (1995-2011)

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
1997	0.0								
1998	68.8	0	0.006	0.004	0.004	0.003	0.002	0.001	0.001
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
2001	50.7	0	0.006	0.005	0.003	0.002	0.001	0.000	-0.001
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

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

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
1995	<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.

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

Table 75: Percentiles of daily average sulfur dioxide at Traralgon (1995-2011)

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
1997	<i>67.1</i>	0	0.028	0.008	0.006	0.004	0.003	0.002	0.001
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

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

Particles as PM₁₀

Table 76: 2011 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	97.0	50.3	31.7	31.1	26.3	23.6	19.5	15.6
Brighton	98.6	41.9	30.0	28.7	26.4	24.4	19.9	15.5
Dandenong	99.5	43.5	34.5	30.7	28.9	26.6	21.5	17.4
Footscray	98.9	49.6	36.6	34.4	30.4	27.9	23.0	17.9
Geelong South	98.9	57.4	46.2	43.8	35.1	29.4	23.2	17.7
Mooroolbark	99.2	50.1	36.2	35.6	31.7	27.4	21.7	17.0
Richmond	92.3	42.4	33.7	32.2	28.0	24.9	20.2	15.8
Latrobe Valley								
Traralgon	99.5	41.8	31.6	30.1	26.0	21.7	18.2	15.0

Exceedances shown in bold.

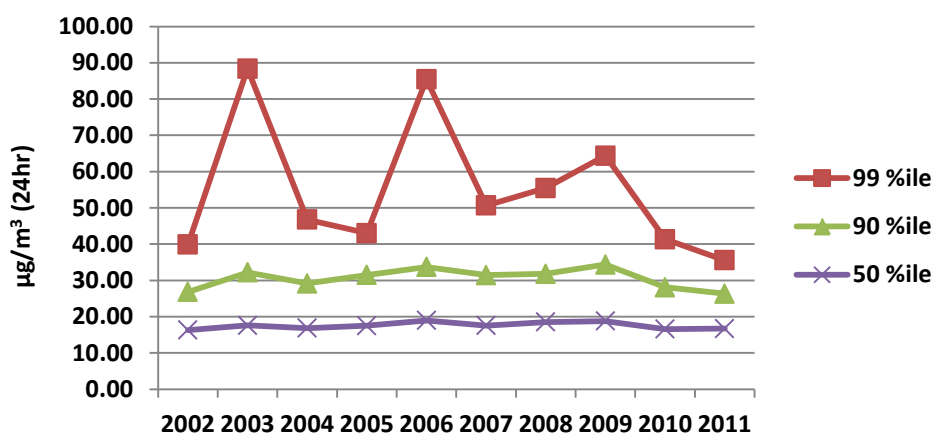


Figure 11: Percentiles of daily PM₁₀ (average of Port Phillip stations 2002-2011)

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

Table 77: Percentiles of 24-hour PM₁₀ at Alphington (1995-2011)

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 (days)	Max (µg/m ³)	Percentiles (µg/m ³)					
	(% of days)			99th	98th	95th	90th	75th	50th
1995	<i>63.0</i>	0	<i>43.3</i>	37.3	35.1	30.4	26.1	21.2	17.0
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

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

Table 78: Percentiles of 24-hour PM₁₀ at Brighton (1996-2011)

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
1996	<i>5.5</i>									
1997	<i>47.4</i>	<i>1</i>	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	

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

Table 79: Percentiles of 24-hour PM₁₀ at Dandenong (1998-2011)

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
1998	69.6	1	50.4	42.8	41.1	35.1	30.3	23.5	17.4
1999	65.2	1	52.3	40.9	37.0	32.1	27.3	22.4	17.1
2000	73.8	1	74.5	43.8	39.8	32.3	29.3	22.5	15.3
2001	14.5								
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

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

Table 80: Percentiles of 24-hour PM₁₀ at Footscray (1996-2011)

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 (days)	Max (µg/m ³)	Percentiles (µg/m ³)						
	(% of days)			99th	98th	95th	90th	75th	50th	
1996	<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	
2001	<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	

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

Table 81: Percentiles of 24-hour PM₁₀ at Geelong South (2002-11)

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	<i>32.1</i>	6	<i>81.1</i>	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

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

Table 82: Percentiles of 24-hour PM₁₀ at Mooroolbark (2002-11)

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	<i>57.0</i>	1	<i>66.7</i>	44.9	44.3	39.7	33.2	27.0	19.9
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

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

Table 83: Percentiles of 24-hour PM₁₀ at Richmond (2002-11)

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

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
2002	23.3	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

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

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
2002	<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	

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

Table 86: Percentiles of 24-hour PM₁₀ at Traralgon (2002-11)

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	<i>15.3</i>	0	37.1	33.2	30.0	28.8	26.4	23.5	18.7
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

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

Particles as PM_{2.5}

Table 87: 2011 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	95.9	21.2	18.4	17.4	15.7	12.7	8.9	6.3
Footscray	100.0	18.1	16.6	15.3	14.0	11.3	8.3	5.9

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

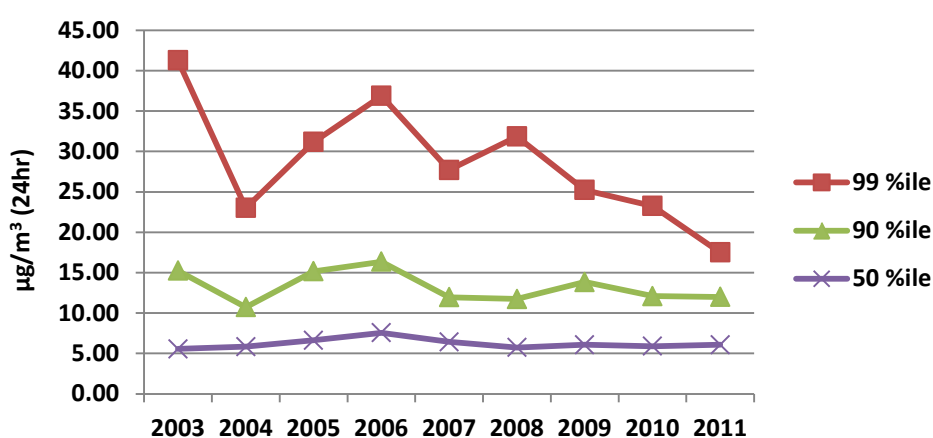


Figure 12: Percentiles of daily PM_{2.5} (average of Port Phillip stations 2003-10)

Table 88: Percentiles of daily PM_{2.5} at Alphington (2002-11)

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	75th	50th
2002	33.6	0	19.3	17.9	16.6	11.6	11.0	8.7	6.0
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

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

Table 89: Percentiles of daily PM_{2.5} at Footscray (2002-11)

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
2002	<i>22.1</i>	0	10.2	10.2	10.1	9.6	8.3	7.2	4.2
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	65.6	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

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

Monitoring for the PM_{2.5} Equivalence Program was conducted using TEOM instruments. Results are presented in Tables 90 to 92.

Table 90: PM_{2.5} Equivalence Program 2011 TEOM monitoring - Daily concentrations in Victoria

Region	Data availability	Max	Percentiles (µg/m ³)						
	(% of days)		(µg/m ³)	99th	98th	95th	90th	75th	50th
Performance monitoring station									
Port Phillip									
Alphington	89.9	20.2	14.8	13.7	11.6	8.9	6.1	4.2	
Footscray	99.2	15.7	12.6	11.9	10.2	8.3	6.1	4.0	

Table 91: Percentiles of daily TEOM PM_{2.5} (Equivalence Program) at Alphington (2003-11)

Year	Data availability	Max ($\mu\text{g}/\text{m}^3$)	Percentiles ($\mu\text{g}/\text{m}^3$)					
	(% 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

Table 92: Percentiles of daily TEOM PM_{2.5} (Equivalence Program) at Footscray (2003-11)

Year	Data availability	Max ($\mu\text{g}/\text{m}^3$)	Percentiles ($\mu\text{g}/\text{m}^3$)					
	(% of days)		99th	98th	95th	90th	75th	50th
2003	<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

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

Lead

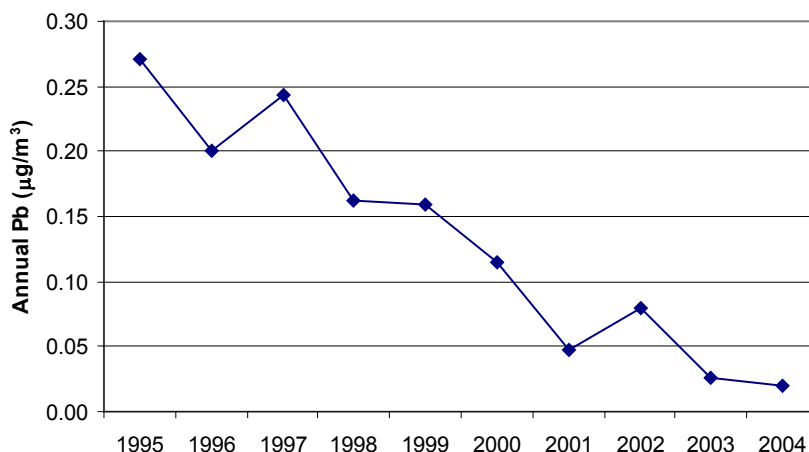


Figure 13: Annual average lead (Collingwood 1995-2004)

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