Northern Territory Environment Protection Authority

Northern Territory Ambient Air Quality Monitoring Report 2012

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

June 2013
Version 1.0

1 Background

Clause 18 of the National Environment Protection Measure (Ambient Air Quality) (AAQ NEPM) requires jurisdictions to submit a report on their compliance with the AAQ NEPM for each calendar year. The content of the jurisdictional report is prescribed in clause 17 of the AAQ NEPM.

Consistent with the reporting period defined in the NEPM this report covers the calendar year ending on 31 December 2012. The report is based on Technical Paper No. 8 (Annual Reports) which details the format and data requirements of the Annual Report. It is a technical report to the National Environment Protection Council (NEPC) and supplements the annual summary report provided each year by each jurisdiction under the NEPC Act on the overall implementation of the AAQ NEPM.

This report is available on the NT EPA website at ntepa.nt.gov.au.

2 Overview of the 2012 AAQ NEPM Monitoring Network and Activities

2.1 Monitoring Requirements

The results of air quality monitoring in 2000-2001 were used to determine the monitoring requirements for the Northern Territory over the longer term. This monitoring identified particles from landscape fires affecting the Darwin region as the primary air pollutant of concern in the Northern Territory. Analysis of the 2000-2001 data against the AAQ NEPM standards indicated that nitrogen oxides, sulfur dioxide, carbon monoxide, ozone and lead aerosols were not a cause for concern in the Darwin/Palmerston region.

Since the initial monitoring population and industrial activity in Darwin has increased and more detailed monitoring of airborne pollutants is required. In 2010 the establishment and operation of a comprehensive air quality monitoring system for the Darwin region commenced. This was completed in July 2012 allowing for monitoring of all pollutants identified in the AAQ NEPM with the exception of lead. Monitoring for lead was not deemed necessary as there are no significant sources close to populated areas in the region.

The air quality monitoring system consists of two stations, a performance monitoring station located near Palmerston and long term trend monitoring station located at the Bureau of Meteorology (BoM) site in Winnellie. Due to issues finalising site access the Winnellie station was only operational for the second half of 2012 while Palmerston station has been operational since the beginning of 2011.

2.2 Current Monitoring Stations for the Purposes of this Report

The Winnellie station meets requirements as a generally representative upper bound (GRUB) station. It is located between Darwin's northern suburbs and Darwin CDB, the two most densely populated areas in the Territory (Figure 1). The station consists of an air conditioned instrument shed which houses all instrumentation. A single gas sampling manifold supplies atmospheric gases for nitrogen oxides, ozone, sulfur dioxide and carbon monoxide determination. Air for particulate sampling comes from a mast attached directly to the station roof. Meteorological data to assist in analysis of pollutant sources comes directly from BoM instruments located on the same site.

The Palmerston station has been located to provide information on airborne pollutants which may be moving from industrial activities in Middle harbour to populations in the Palmerston area. This station meets all siting and instrumentation requirements for reporting under the AiAQ NEPM and is designated as a trend station. It is located in light bushland approximately 4km SW of Palmerston (Figure 1). The station houses the same gas and particulate sampling instruments as Winnellie and also has instruments for collection of meteorological data.

A table of station instrumentation and siting details for both stations is available in Tables 1 and 2 below.

2.3 Determination of Exposed Population for each Performance Monitoring Station

Two areas within the Northern Territory exceed the population threshold for ambient air quality monitoring of greater than 25,000. These are the Darwin/Palmerston region (129,800) and Alice Springs (27,800).

The major air pollutant of concern for Darwin and Palmerston is particles from bushfire smoke in the Dry season (April - October). Prevailing winds during the Dry season are South-Easterly to Easterly, causing the population of the region to be frequently exposed to particulate pollution from relatively small fires in local bushland and more distant large scale bushfires.

Monitoring for particulates has been conducted at several sites in the Darwin / Palmerston region since 2002. There have been a number of periods in which particulate levels were monitored simultaneously at two sites. Results from simultaneous monitoring have shown that aside from spikes attributable to local fire events particulate levels are reasonably uniform

across the region on a seasonal basis. This uniformity has also been confirmed by comparison of data across different sites in different years. As industrial development increases divergence in particulate and other pollutant levels may occur between sites.

No monitoring was undertaken in the Alice Springs region during the reporting period. .

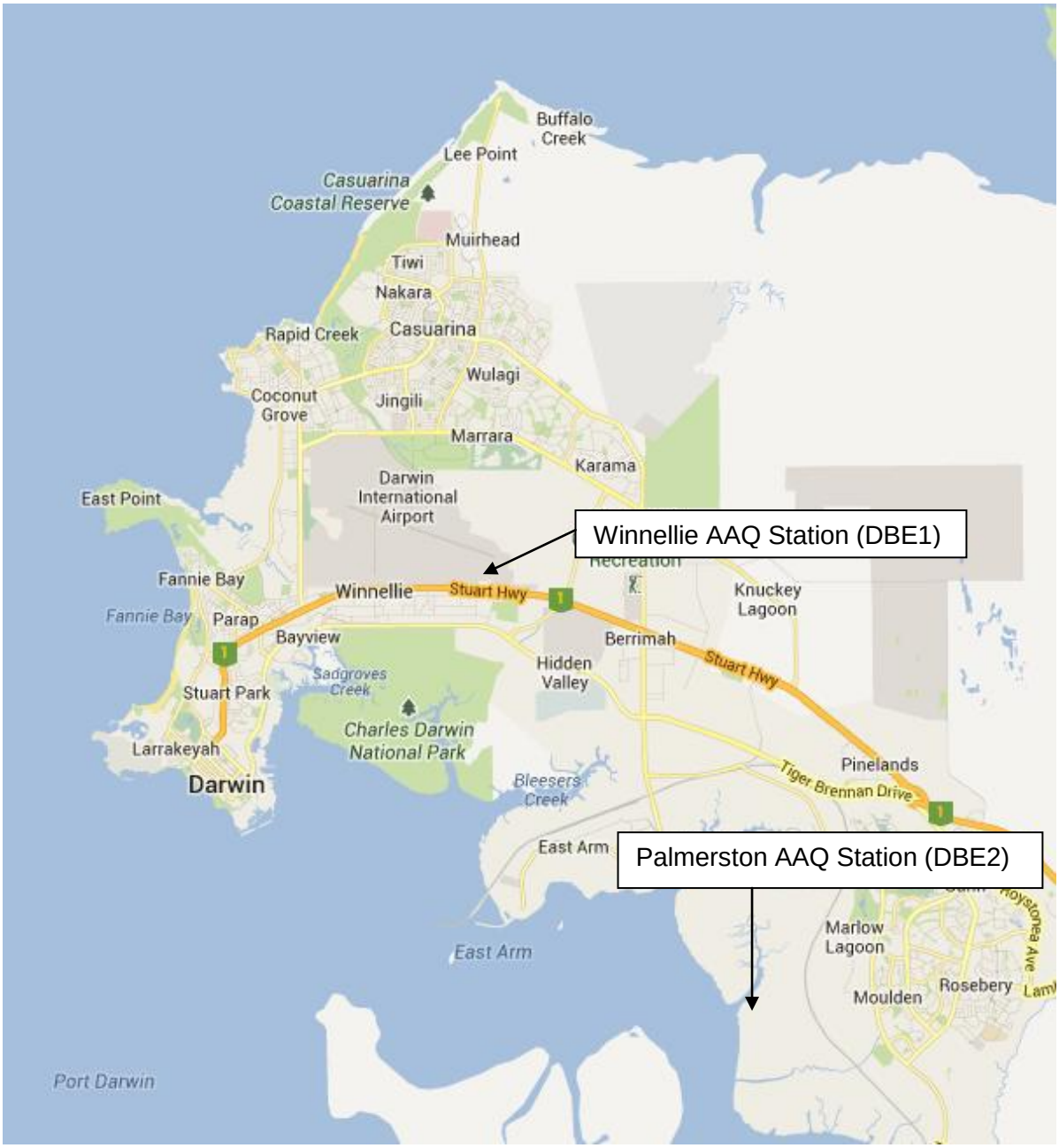

Figure 1: Darwin/Palmerston region showing location of Palmerston and Winnellie monitoring station sites.

Table 1: Summary of station instrument siting compliance with AS 580.1.1.2007

Station	Location Category	Height above ground	Clear Sky Angle	Unrestricted airflow of 360º	20 m from trees	No boilers or incinerators nearby	Minimum distance from road or traffic
Winnellie DBE 1	Bushland	6 m	Yes	Yes	Yes	Yes	Yes
Palmerston DBE 2	Bushland	4.5 m	Yes	Yes	Yes	Yes	Yes

Table 2 – Ambient air quality station instrumentation

Parameter	Data available from	Data available to	Instrument	Sampling frequency
PM_{10}	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	TEOM 1405D	continuous
$PM_{2.5}$	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	TEOM 1405D	continuous
SO_2	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	Thermo Model 43i.	continuous
NOx, NO, NO_2	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	Thermo Model 42i.	continuous
O_3	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	Thermo Model 49i.	continuous
CO	01/01/11 (Palmerston) 18/07/12 (Winnellie)	present	Thermo Model 48i.	Continuous
Meteorology (mast height: 10 m)				
Wind direction	01/01/12	present	RM Young, model 85000.	continuous
Wind speed	01/01/12	present	RM Young, model 85000.	continuous
Temperature	01/01/12	present	RM Young, model 41382LC	continuous

Humidity	01/01/12	present	RM Young, model 41382LC	continuous

2.4 Monitoring during the Reporting Period

Winnellie and Palmerston stations monitor the same range of pollutants. The Winnellie station was operational from 18 July 2012 and Palmerston was operational for the whole of 2012.

2.5 Changes to the Approved Monitoring Plan

Commissioning of the Winnellie station in 2012 completed the NT monitoring plan. Cessation of National Association of Testing Authorities (NATA) accreditation during 2012 was not formalised within the monitoring plan. See 2.7 below.

2.6 Unresolved Issues

There are no unresolved issues in the reporting period.

2.7 Status of NATA Accreditation

Data from the start of 2012 to September is validated under NATA. From October 2012 on NATA accreditation of the data validation processes was no longer carried out. The decision not to continue with NATA accreditation was made in response to budget constraints on the ambient air quality monitoring program. Data quality from October has been maintained using quality control manuals developed as part of the earlier NATA accreditation process. Australian Standards followed in the manuals are:

- AS3580.1.1 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment;
- AS3580.2.2 Preparation of reference test atmospheres -Compressed Gas Method;
- AS3580.4.1 Determination of sulfur dioxide - Direct Reading Instrument Method;
- AS3580.5.1 Determination of Oxides of Nitrogen – Chemiluminescence Method;
- AS3580.6.1 Determination of Ozone – Direct Reading Instrument Method;
- AS3580.7.1 Determination of Carbon Monoxide – Direct Reading Instrument Method;
- AS3580.9.8 Determination of Suspended Particulate Matter – PM10 Continuous Direct Mass Method Using Tapered Element Oscillating Microbalance Analyser

2.8 Methods Other than Physical Monitoring

No other methods were used in the reporting period.

3 Assessment of Compliance with the AAQ NEPM Standards and Goals

Standards and goals for pollutants in accordance with the AAQ NEPM are shown in Table 3.

The following tables summarise compliance with the standards and goals of the AAQ NEPM. For each pollutant, the data availability (quarterly and annual), the number of days when standards were exceeded, the annual mean (where an annual standard exists) and an assessment of compliance are given.

Performance is assessed as not complying with the NEPM (i.e.'NOT MET') if there is more than the number of exceedances specified in Schedule 2 of the AAQ NEPM.

Table 3: Air NEPM Standards

Pollutant	Averaging period	Maximum (ambient) **concentration**	**Goal within 10 years (maximum allowable exceedences**
Carbon monoxide	8 hour	9.0 ppm	1 day a year
Nitrogen dioxide	1 hour	0.12 ppm	1 day a year
	1 year	0.03 ppm	none
Photochemical oxidants (as ozone)	1 hour	0.10ppm	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 µg/m^3	5 days a year
Particles as PM2.5	1 day	25 µg/m^3	Advisory standard
	1 year	8 µg/m3	

CARBON MONOXIDE

Table 4: 2012 compliance summary for CO in the Northern Territory

AAQ NEPM Standard

9.0 ppm (8 hour average)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Winnellie	0	0	78	96	43	0	Insufficient data
Palmerston	100	92	92	100	90	0	Met

NITROGEN DIOXIDE

Table 5: 2012 compliance summary for NO_2 in the Northern Territory

AAQ NEPM Standard

0.12 ppm (1 hour average)

0.03 ppm (1 year average)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)	Annual mean (ppm)	Performance against the standard and goal	
	Q1	Q2	Q3	Q4	Annual			1h	1y
Winnellie	0	0	57	88	36	0	0.004	Insufficient data	
Palmerston	92	88	87	79	87	0	0.003	Met	Met

OZONE

Table 6: 2012 compliance summary for Ozone in the Northern Territory

AAQ NEPM Standard

0.10 ppm (1 hour average)

0.08 ppm (4 hour average)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)		Performance against the standard and goal	
	Q1	Q2	Q3	Q4	Annual	1 h	4 h	1h	4h
Winnellie	0	0	73	92	42	0	0	Insufficient data	
Palmerston	95	92	95	86	92	1	0	Not met	Met

SULFUR DIOXIDE

Table 7: 2012 compliance summary for SO_2 in the Northern Territory

AAQ NEPM Standard

0.20 ppm (1 hour average)

0.08 ppm (24 hour average)

0.02 ppm (1 year average)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)		Annual mean (ppm)	Performance against the standard and goal		
	Q1	Q2	Q3	Q4	Annual	1h	24h		1h	24h	1y
Winnellie	0	0	72	88	40	0	0	0.0005	Insufficient data		
Palmerston	95	92	93	82	91	0	0	0.0007	Met	Met	Met

PARTICULATES PM_{10}

Table 8: 2012 compliance summary for PM_{10} in the Northern Territory

AAQ NEPM Standard

50 µg m^{-3} (24-hour average, 5 days/year)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Winnellie	0	0	68	93	40	2	Insufficient data
Palmerston	98	96	100	68	91	23	Not met

PARTICULATES $PM_{2.5}$

Table 9: 2012 compliance summary for $PM_{2.5}$ in the Northern Territory

AAQ NEPM Advisory Standard

25 µg/m^3 (24-hour average)

8 µg/m^3 (1 year average)

Region/ Performance monitoring station	Data Availability Rates (% of Days)					Number of exceedences (days)	Annual average µg/m^3 (24 hour)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual			
Winnellie	0	0	68	93	40	1	13	Insufficient data
Palmerston	98	96	100	68	91	24	12	Not met

Figures 2 and 3 show the close relationship in particulate levels across the Darwin/Palmerston region. Both $PM_{2.5}$ and PM_{10} are associated with smoke from burning vegetation. All particulate exceedences in 2012 occurred during the Dry season. The majority of dust and smoke leading to these exceedences would be generated by vegetation burning in more distant areas. Smoke from these events is pushed into the Darwin airshed by the seasonally prevailing South Easterly winds. The wide spread nature of these particulate events is reflected by particulate levels at both stations often rising and falling at the same time. Instances where particulate levels vary significantly between sites on a daily basis are indicative of localised burning or dust generating activities such as construction.

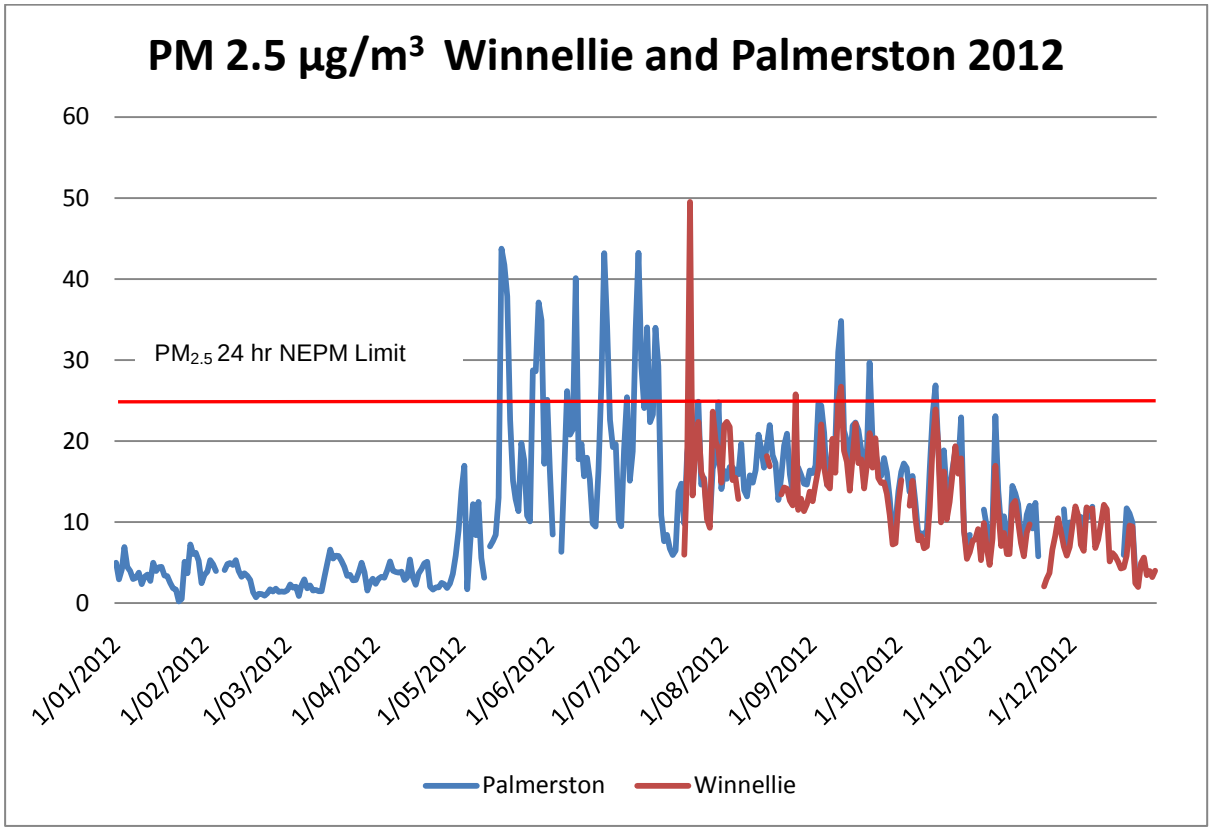

Figure 2: $PM_{2.5}$ Winnellie and Palmerston

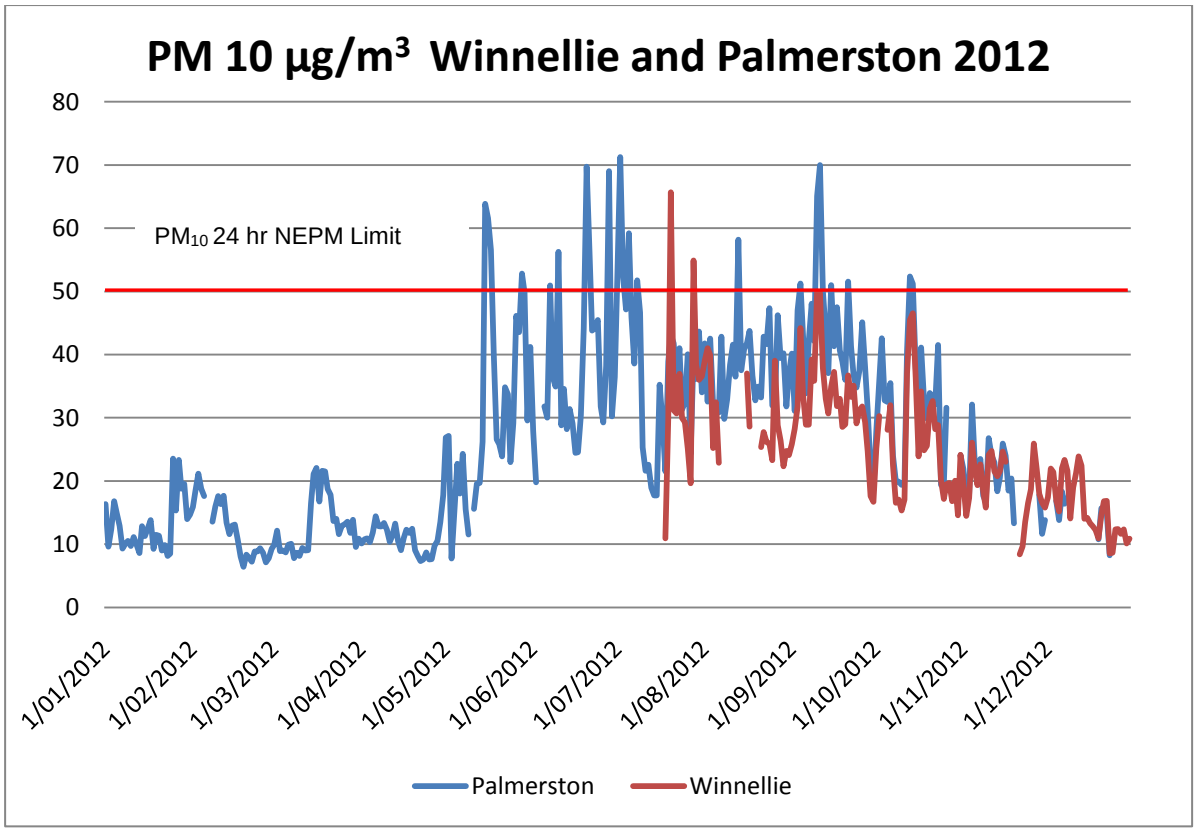

Figure 3: PM_{10} Winnellie and Palmerston

Figure 4 shows annul ozone levels as measured at the Palmerston station. In 2012 there was one exceedence of the 1 hour ozone level. The Air NEPM allowance is one exceedence per annum. In general ozone levels are fairly low in the Darwin region and there have been no previous instances of exceedences of the NEPM standard. This exceedence is further analysed in Section 5 of this report.

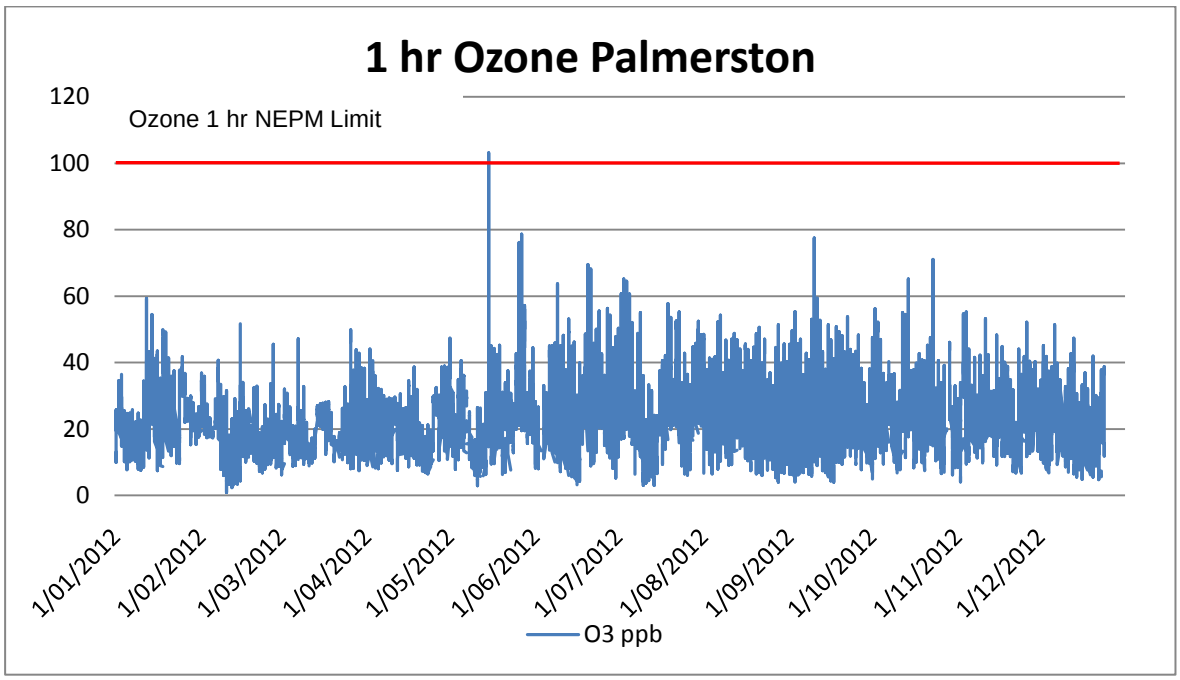

Figure 4: 1 hr Ozone Palmerston

4 Assessment of Monitoring Data Against the Standards

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 for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide, or on more than five days per year for PM_{10}. In 2012 the only exceedences were for 24 hour concentrations of PM_{10}, 1 hour concentrations of ozone and the advisory standard for $PM_{2.5}$ was also exceeded on both a daily and annual average.

Table 10: 2012 summary statistics for daily peak 8 hour CO in the Northern Territory

AAQ NEPM Standard

9.0 ppm (8 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd Highest (date:hour)
Winnellie	157	0.5	24:00 04/09	0.4	16:00 15/08
Palmerston	349	8.1	16:00 14/09	0.96	08:00 10/06

Table 11: 2012 summary statistics for daily peak 1 hour NO_2 in the Northern Territory

AAQ NEPM Standard

0.12 ppm (1 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd Highest (date:hour)
Winnellie	139	0.033	08:00 24/08	0.030	08:00 13/08
Palmerston	332	0.020	22:00 26/10	0.019	21:00 17/05

Table 12: 2012 summary statistics for daily peak 1 hour O_3 in the Northern Territory

AAQ NEPM Standard

0.10 ppm (1 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd Highest (date:hour)
Winnellie	156	0.09	15:00 10/09	0.08	15:00 07/08
Palmerston	353	0.10	18:00 15/05	0.08	17:00 27/05

Table 13: 2012 summary statistics for daily peak 4 hour O_3 in the Northern Territory

AAQ NEPM Standard

0.08 ppm (4 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date:hour)	2nd highest (ppm)	2nd Highest (date:hour)
Winnellie	**156**	0.076	16:00 10/09	0.071	16:00 11/11
Palmerston	**353**	0.077	20:00 15/05	0.070	16:00 10/09

Table 14: 2012 summary statistics for 24 hour SO_2 in the Northern Territory

AAQ NEPM Standard

0.08 ppm (24 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (ppm)	Highest (date)	2nd highest (ppm)	2nd Highest (date)
Winnellie	**157**	0.0013	02/12	0.0012	07/12
Palmerston	**345**	0.0017	7/12	0.0016	01/12

Table 15: 2012 summary statistics for 24 hour PM_{10} in the Northern Territory

AAQ NEPM Standard

50 µg m^{-3} (24 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (µg m^{-3})	Highest (date)	2nd highest (µg m^{-3})	2nd Highest (date)
Winnellie	148	66	20/07	55	28/07
Palmerston	332	71	02/07	70	11/09

Table 16: 2012 summary statistics for 24 hour $PM_{2.5}$ in the Northern Territory

AAQ NEPM Advisory Standard

25 µg m^{-3} (24 hour average)

Region/ Performance monitoring station	Number of valid days	Highest (µg m^{-3})	Highest (date)	2nd highest (µg m^{-3})	2nd Highest (date)
Winnellie	148	50	20/07	27	11/09
Palmerston	332	44	15/05	43	02/07

5 Analysis of Exceedences and Progress in Achieving Air NEPM Goals

Particulates generated by vegetation burning are the primary pollutant in the Darwin region this results in significant variation in air quality between the Dry (May - November) and the Wet (December- April). In general air quality was very good during the Wet and fair to poor during the Dry. Averaged daily levels of $PM_{2.5}$ at the Palmerston station over the six months of the Dry were 18µg m^{-3}, well above the Air NEPM annual Advisory standard of 8µg m^{-3} and significantly higher than levels in all other Australian cities. Averaged daily $PM_{2.5}$ levels during the Wet of the same year were 5µg m^{-3}.

Air NEPM parameters for PM_{10} and $PM_{2.5}$ had multiple exceedences in 2012 (Tables 17-20 below). There were 23 daily exceedences for both PM_{10} and $PM_{2.5}$ at the Palmerston station and the annual advisory limit for $PM_{2.5}$ was also exceeded. The Winnellie station was not operational for a sufficient amount of time to collect data on exceedences in that area. Given the close correlation of particulate data from both stations in the period they were both operational (Figures 2 and 3 above) it could reasonably be assumed that the Winnellie station would have recorded a similar number of exceedencs to the Palmerston station in 2012.

The one incident of exceedence of the 1 hour ozone standard at the Palmerston station correlated with a spike in both PM2.5 and PM10 (Figure 5). This was most likely the result of a localised fire or heavy machinery working near the station. Ozone is formed when pollutants from cars, industry and other sources react chemically in strong sunlight. These pollutants are commonly referred to as NOx (oxides of nitrogen) and VOCs (volatile organic compounds) and may be included in particulates from burning of fossil fuels and vegetation.

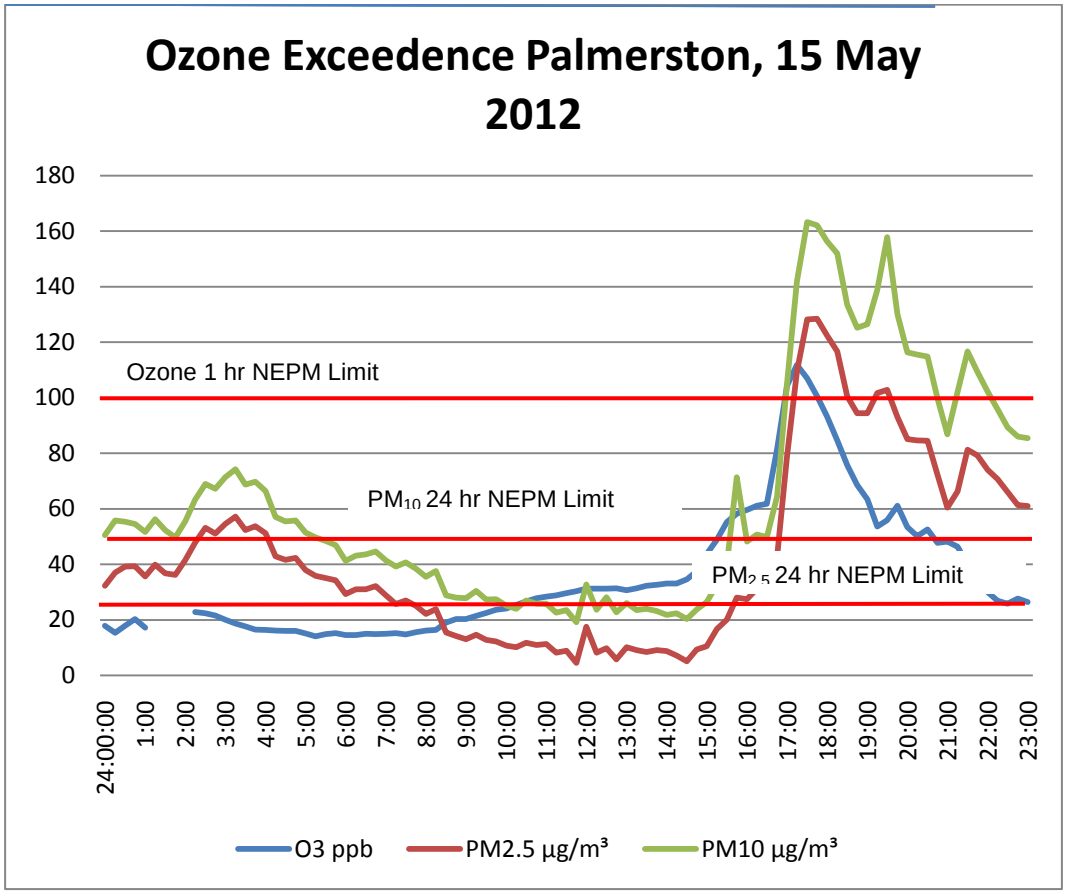

Figure 5: Ozone exceedence coinciding with particulate spike

Table 17: 2012 PM_{10} exceedences of NEPM reporting level at Palmerston

Date	PM_{10} m (µg m^{-3})	Inferred Cause
2/07/2012	71.25	Smoke
11/09/2012	70.01	Smoke
20/06/2012	69.76	Smoke
28/06/2012	69.01	Smoke
10/09/2012	65.07	Smoke
15/05/2012	63.86	Smoke
16/05/2012	61.57	Smoke
5/07/2012	59.18	Smoke
13/08/2012	58.21	Smoke

17/05/2012	56.58	Smoke
21/06/2012	56.27	Smoke
10/06/2012	56.25	Smoke
28/05/2012	52.8	Smoke
1/07/2012	52.43	Smoke
13/10/2012	52.35	Smoke
3/07/2012	52.23	Smoke
8/07/2012	51.77	Smoke
21/09/2012	51.55	Smoke
4/09/2012	51.26	Smoke
14/10/2012	51.19	Smoke
15/09/2012	50.97	Smoke
7/06/2012	50.94	Smoke
12/09/2012	50.09	Smoke

Table 18: 2012 PM_{10} exceedences of NEPM reporting level at Winnellie

Date	PM_{10} m ($\mu g\ m^{-3}$)	Inferred Cause
20/07	65.67	Smoke
28/07	54.88	Smoke
10/09	50	Smoke

Table 19: 2012 $PM_{2.5}$ exceedences of NEPM Advisory Standard at Palmerston

Date	TEOM $PM_{2.5}$ m (µg m^{-3})	Inferred Cause
15/05	43.76	Smoke
2/07	43.22	Smoke
20/06	43.19	Smoke
16/05	41.74	Smoke
10/06	40.11	Smoke
17/05	37.86	Smoke
28/05	37.13	Smoke
29/05	34.88	Smoke
11/09	34.83	Smoke
21/06	34.14	Smoke
5/07	34.01	Smoke
8/07	33.98	Smoke
1/07	33.61	Smoke
10/09	30.99	Smoke
21/09	29.67	Smoke
3/07	29.28	Smoke
9/07	29.24	Smoke
26/05	28.73	Smoke
27/05	28.6	Smoke
19/06	27.05	Smoke
14/10	26.89	Smoke
7/06	26.17	Smoke
28/06	25.42	Smoke
Exceedence of NEPM Advisory Standard – Annual average $PM_{2.5}$ 8 µg m^{-3}		
Palmerston	11	Smoke and dust

Table 20: 2012 $PM_{2.5}$ exceedences of NEPM Advisory Standard at Winnellie

Date	$PM_{2.5}$ m (µg m^{-3})	Inferred Cause
20/07	49.5	Smoke
11/09	26.73	Smoke
26/08	25.79	Smoke
Exceedence of NEPM Advisory Standard – Annual average $PM_{2.5}$ 8 µg m^{-3}		
Insufficient data available for this site		

Table 21: 2012 1hr Ozone exceedences of NEPM reporting level at Palmerston

Date	ppm	Inferred Cause
15/05	0.0103	Smoke

The high number of exeedences for the particulate standards is due to burning vegetation dust from the desiccated landscape as there are currently no other significant source of particles affecting the region apart from localised impacts associated with land clearing and urban development.

Monitoring of particles will contribute towards development of NT Government air quality policy and may provide the basis for the development of management strategies aimed at reducing the impact of particulates on urban populations in the future. Controlled burns present some opportunity for managing particulates. By timing the burn in consideration of wind direction and location it may be possible to reduce particulate levels in population centres. However control of particulates from large scale vegetation burning is difficult as fires are often started accidentally or by arson.

The advisory reporting standard for $PM_{2.5}$ has the same numerical value as a compliance standard but without an associated goal setting a timeframe for compliance. There is no timeframe set for compliance with the standard or an allowable number of exceedences. There is strong evidence that $PM_{2.5}$ poses a significant risk to human health and this remains a key driver for consideration of the need for compliance standards for this pollutant.

No monitoring has been undertaken in Alice Springs and compliance with the AAQ NEPM has not been demonstrated.

6 Data analysis and trends

The year on year increase in particulate levels between 2010 and 2012 appears to be directly linked to year on year increases in the percentage of the landscape burned in the area likely to produce smoke affecting the Darwin region over those years (Figure 6). The possibility that there were stronger than average winds lifting dust, or coincidence between the timing of fire events and wind direction directing smoke plume across the stations was not investigated.

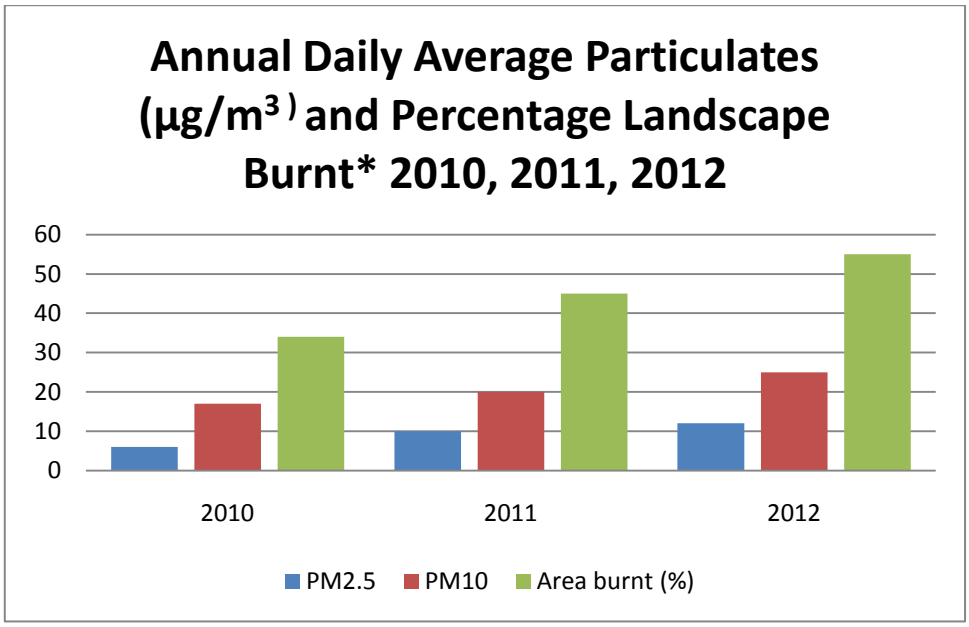

Figure 6: Annual daily average particulate levels and area burnt

***** for the purpose of this report landscape considered to be likely to generate smoke affecting the Darwin region is the land area within a 350km radius of Darwin. (Data sourced from NAFI)

In comparison to previous years in 2012 the number of days with elevated particulate levels, as well as the annual daily average were significantly higher than usual (Figure 7). For both $PM_{2.5}$ and PM_{10} there was a very significant rise in the number of daily exceedences and the annual average particulate levels. This increase is more pronounced when compared to 2010 (Table 22).

Table 22: Annual number of exceedences for particulate Air NEPM Standards

Year	PM2.5 (24hr) exceedences	PM10 (24hr) exceedences	PM2.5 (annual)
2010 (Casuarina)	2	2	6.3µg m^{-3}
2011 (Palmerston)	15	3	10.5µg m^{-3}
2012 (Palmerston)	23	23	12µg m^{-3}

Tables 23 and 24 below compare the number of exceedences in the NT over a longer period of time time in accordance with AAQ NEPM technical requirements. This comparison is of limited utility in providing an accurate indication of particulate trends as different sampling techniques have been used since monitoring began in 2002 (TEOM and Partisol) and instruments have not been located consistently throughout the sampling period.

Issues with historical data include:

- 2004 - data collection for this project did not commence until the second quarter.
- 2004 and 2005 - TEOM was located in Palmerston at the Charles Darwin University Palmerston campus.
- 2006 - TEOM data availability was below 75% for each quarter so Partisol data was used.
- 2009 - dust produced from local constructions activity in close proximity to the station required that exceedences for a period over the dry be removed as they were not necessarily representative of air quality in the larger air shed..
- 2010 – there was significant downtime with the Partisol and also TEOM instruments.

Table 23: Trends in percentiles of daily peak concentration (µg m^{-3}) PM_{10}, 2004-2011 (TEOM or dichotomous Partisol sampler for 2006)

AAQ NEPM standard

50 µg m^{-3} (24-hour average)

Year	Data Availability (% of days)	No. of exceedences (days)	Max. conc. µg m^{-3}
2004	*69%*	*1*	*54*
2005	98%	2	63
2006	97%	0	44
2007	95%	0	45
2008	97%	1	65
2009	90%	0	50
2010	78%	1	54
2011	96%	3	92
2012	91%	23	70

Table 24: Trends in percentiles of daily peak concentration (µg m^{-3}) $PM_{2.5}$, 2004-2011

Year	Data Availability (% of days)	No. of exceedences (days)	Max. conc. µg m^{-3}
2004	*60%*	*5*	*37*
2005	98%	5	58
2006	97%	5	30
2007	*68%*	*4*	*48*
2008	*72%*	*2*	*32*
2009	87%	1	26
2010	*62%*	*2*	*30*
2011	96%	15	77
2012	91%	23	44

The increase in exccedences of the particulate standards over the past two years (Figure 7) is most likely a function of the lower than average area burned in 2010 and the greater sensitivity of instruments in the new Palmerston station which provided particulate data from 2011 on. Other variables which may lead to increased particulate levels such as increased local fire and construction activity or a change in timing of fires (a.m/p.m) are not explored in this report.

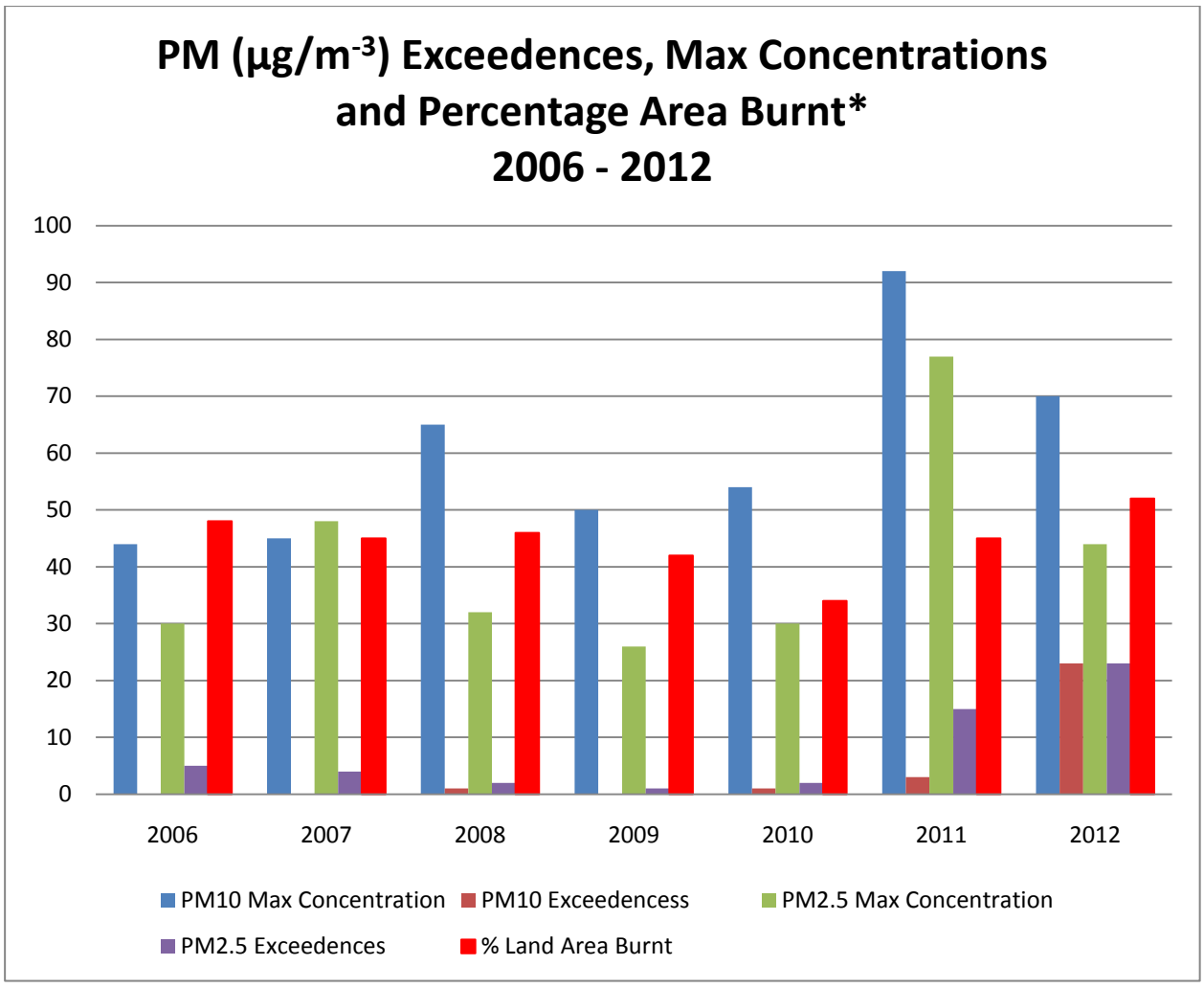

Figure 7: Northern Territory particulate trends and percentage area burnt 2006 – 2012

Reference

NAFI (North Australian Fire Information) www.firenorth.org.au, *Fire Reports, Fire History by Year - 2004-2012, Darwin region* , Accessed June 2013