

MALAYSIA Environmental Quality Report

2009



Department of Environment
Ministry of Natural Resources and Environment
Malaysia

Department of Environment, Malaysia

Department of Environment, Malaysia

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Foreword



In compliance with Section 3(1)(i) of the Environmental Quality Act 1974, the 2009 Environmental Quality Report is hereby published.

Compared to 2008, there was a slight deterioration in river water quality. There was a reduction in the number of clean rivers compared with 2008. There were 306 clean rivers in 2009 as compared with 334 in 2008 while the number of slightly polluted rivers increased from 197 to 217. There was also an increase in the number of polluted rivers from 48 in 2008 to 54 in 2009. However, the quality of the marine environment with respect to coastal and estuarine areas were within normal variations compared with the Malaysian Marine Water Quality Criteria and Standard (MWQCS).

Based on the Air Pollutant Index (API), the overall air quality for Malaysia in 2009 was between good and moderate level most of the time. However, there was a slight decrease in the number of good air quality days recorded in 2009 at 56 percent compared to 59 percent in 2008. This is partly due to peatland fires and transboundary air pollution that occurred during hot and dry weather conditions.

The Department of Environment will continue to strengthen and implement its strategies, programs and activities effectively in managing the environment sustainably. Foremost in our agenda is to ensure that the environment remain clean, safe, healthy and productive, both ecologically and environmentally, in order to support socio – economic development of the country.

“Environmental Conservation, Our Shared Responsibility”

With best wishes,

A handwritten signature in black ink, reading "Rosnani Ibarahim". The signature is written in a cursive style and is positioned above a horizontal line.

Dato' Hajah Rosnani Ibarahim
Director General of Environmental Quality
Malaysia

30 June 2010

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Chapter 1: Air Quality

AIR QUALITY MONITORING

The Department of Environment (DOE) monitors the country's ambient air quality through a network of 51 continuous monitoring stations (**Map 1.1 and Map 1.2**). These monitoring stations are strategically located in residential, urban and industrial areas to detect any significant change in the air quality which may be harmful to human health and the environment.

Table 1.1 Malaysia: Air Pollutant Index (API)

API	AIR QUALITY STATUS
0 – 50	Good
51 – 100	Moderate
101 – 200	Unhealthy
201 – 300	Very Unhealthy
> 300	Hazardous



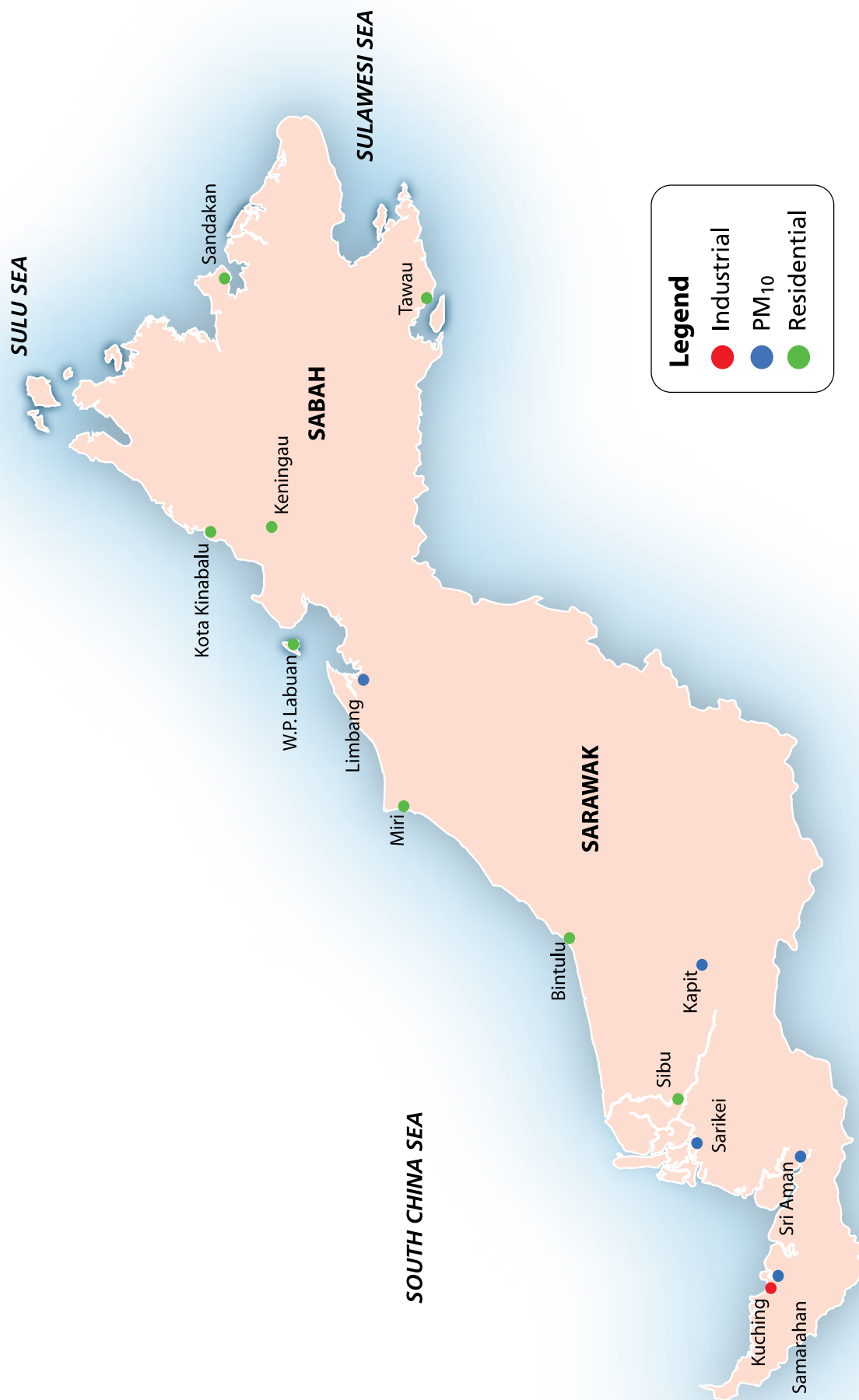
A view of Seri Perdana, Putrajaya on a clear bright day

In addition to the 51 stations in the National Continuous Air Quality Monitoring Network, manual air quality monitoring stations using High Volume Samplers were also established at 21 different sites for measuring total suspended particulates, particulate matter (PM₁₀) and heavy metals such as lead.

The air quality status is reported in terms of Air Pollutant Index (API). The air pollutants used in computing the API are ground level ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and particulate matter of less than 10 microns in size (PM₁₀). The API is categorized as good, moderate, unhealthy, very unhealthy and hazardous as presented in **Table 1.1**.



Map 1.1 Malaysia : Location of Continuous Air Quality Monitoring Stations, Peninsular Malaysia, 2009



Map 1.2 Malaysia: Location of Continuous Air Quality Monitoring Stations, East Malaysia, 2009



Canopy of green with good air quality

AIR QUALITY STATUS

Based on the Air Pollutant Index (API), the overall air quality for Malaysia in 2009 was between good to moderate levels most of the time. However, there was a slight decrease in the number of good air quality days recorded in 2009 (55.6 percent of the time) compared to that in 2008 (59 percent of the time) while remaining 43 percent at moderate

level and only 1.4 percent at unhealthy level. This is partly due to peatland fires and transboundary air pollution that occurred during the hot and dry weather conditions (moderate to strong El Nino) experienced in the region during the months of June to August which resulted in a short spell of haze episode.

Table 1.2 Malaysia : Ambient Air Quality Guidelines

Pollutant	Averaging Time	Malaysia Guidelines	
		ppm	($\mu\text{g}/\text{m}^3$)
Ozone	1 Hour	0.10	200
	8 Hour	0.06	120
Carbon Monoxide**	1 Hour	30.0	35
	8 Hour	9.0	10
Nitrogen Dioxide	1 Hour	0.17	320
	24 hour	0.04	
Sulphur Dioxide	1 hour	0.13	350
	24 Hour	0.04	105
Particulate Matter (PM ₁₀)	24 Hour		150
	12 Month		50
Total Suspended Particulate (TSP)	24 Hour		260
	12 Month		90
Lead	3 Month		1.5

Note: **(mg/m^3)

The annual average concentrations of air pollutants measured namely CO, NO₂, O₃, SO₂ and PM₁₀ were found to be below the stipulated levels of the Malaysian Ambient Air Quality Guidelines (Table 1.2).

Besides PM₁₀, O₃ remained the pollutant of concern due to the conducive atmospheric condition and emission from motor vehicles in urban areas that enhance its formation. These resulted in several unhealthy days recorded at various locations in the Klang Valley and in the States of Melaka, Negeri Sembilan, Perak, Pulau Pinang, Johor and Sabah.

On some days the daily maximum 1-hour concentration of O₃ exceeded the Malaysian Ambient Air Quality Guidelines for several stations

in the Klang Valley, as shown in Figure 1.1(a) and Figure 1.1(b). These conditions led to a number of unhealthy days recorded in those stations located in areas of central business districts with heavy traffic volume.

With respect to PM₁₀, the daily concentrations of PM₁₀ in Klang occasionally exceeded the guidelines value as shown in Figure 1.1(c) due to unfavourable weather conditions of hot and dry periods. However, the daily concentrations of PM₁₀ in other areas were found to be in compliance to the Malaysian Ambient Air Quality Guidelines. Figure 1.1(d) shows the daily concentrations of PM₁₀ for Klang in comparison with selected stations in suburban and rural areas which recorded lower levels of PM₁₀.

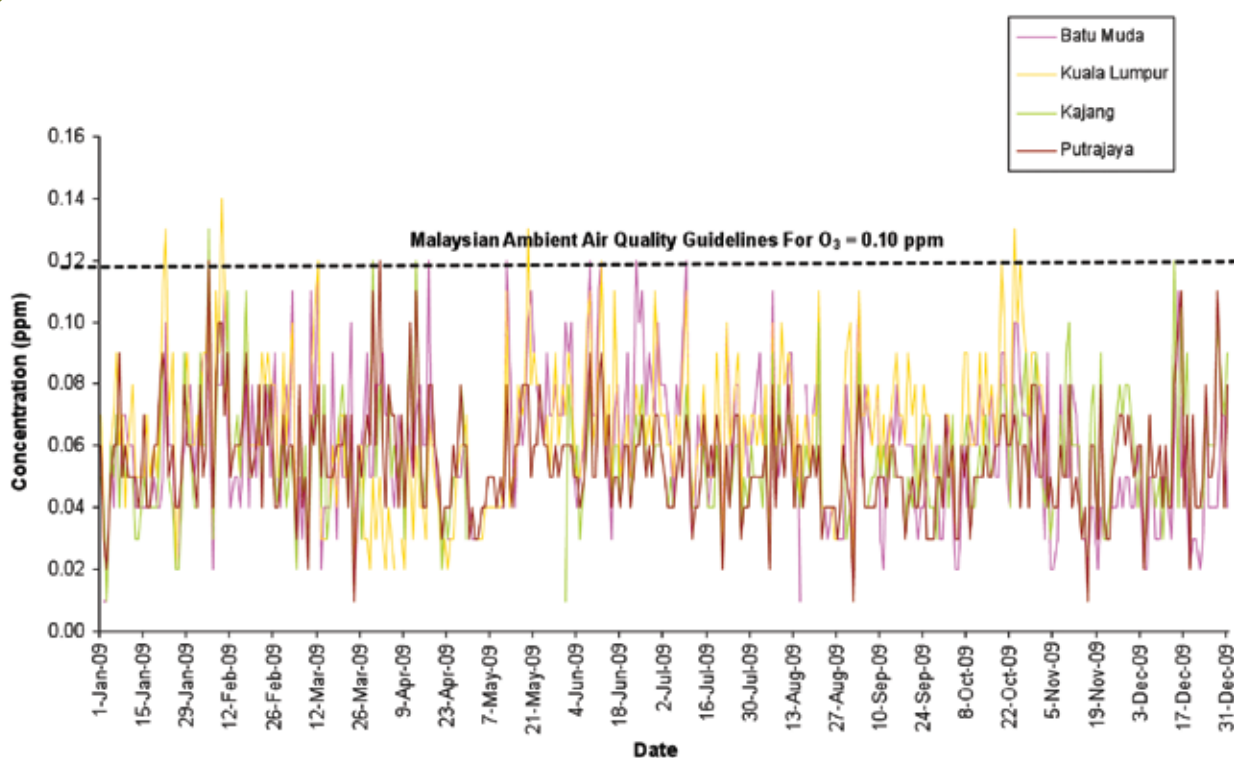


Figure 1.1(a) Malaysia : Trend of Daily Maximum 1-hour Concentration of Ozone (O₃), Klang Valley, 2009

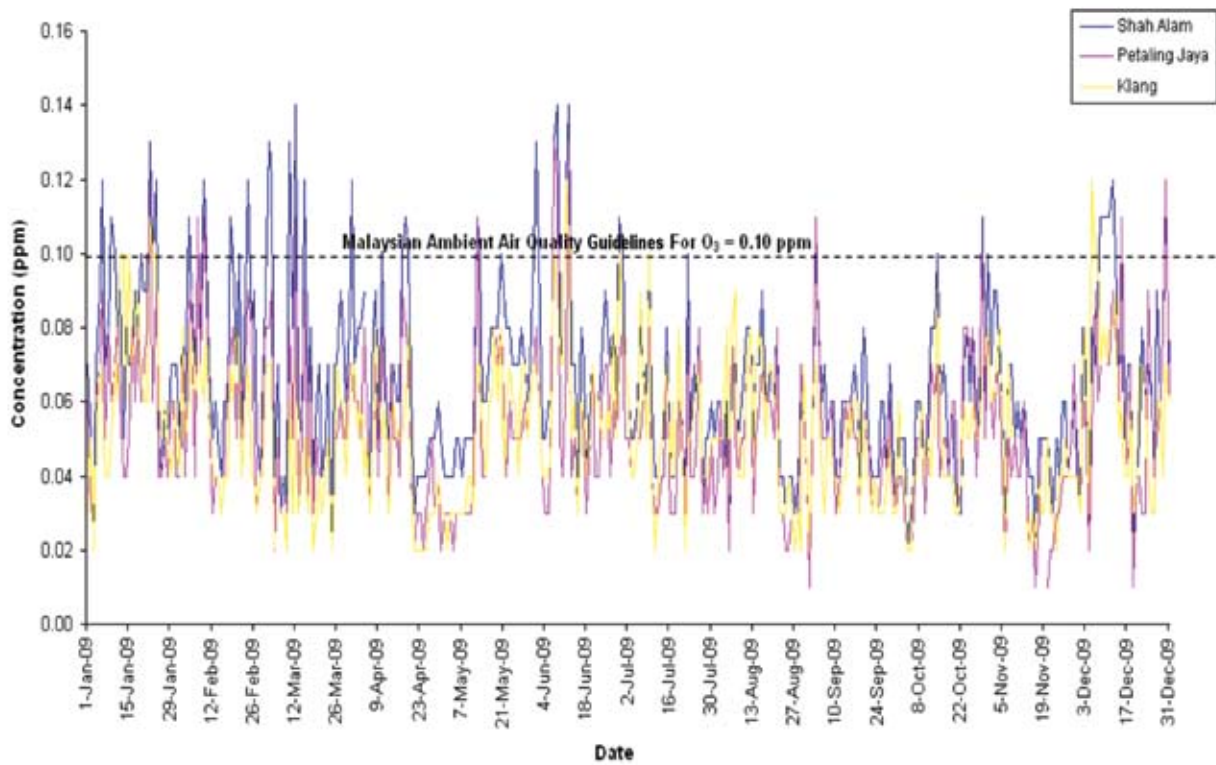


Figure 1.1(b) Malaysia : Trend of Daily Maximum 1-hour Concentration of Ozone (O₃), Klang Valley, 2009

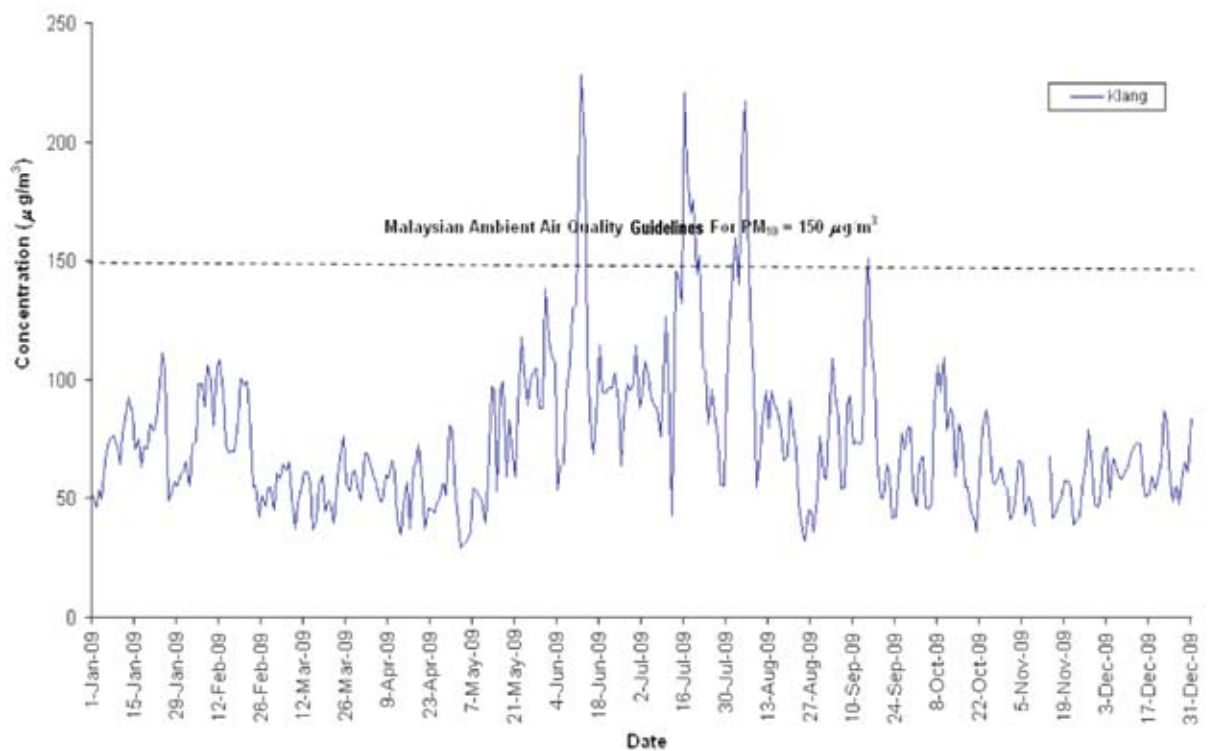


Figure 1.1(c) Malaysia : Trend of 24-hour Concentration of Particulate Matter (PM₁₀), Klang, 2009

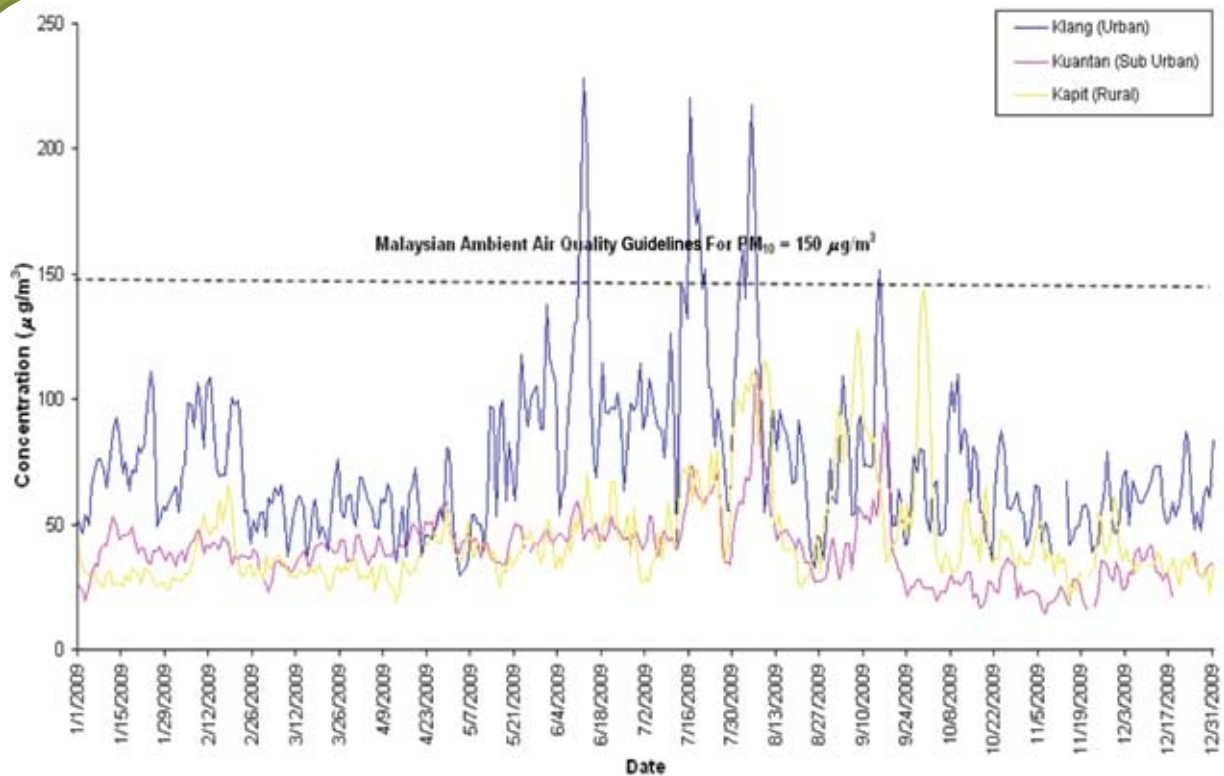
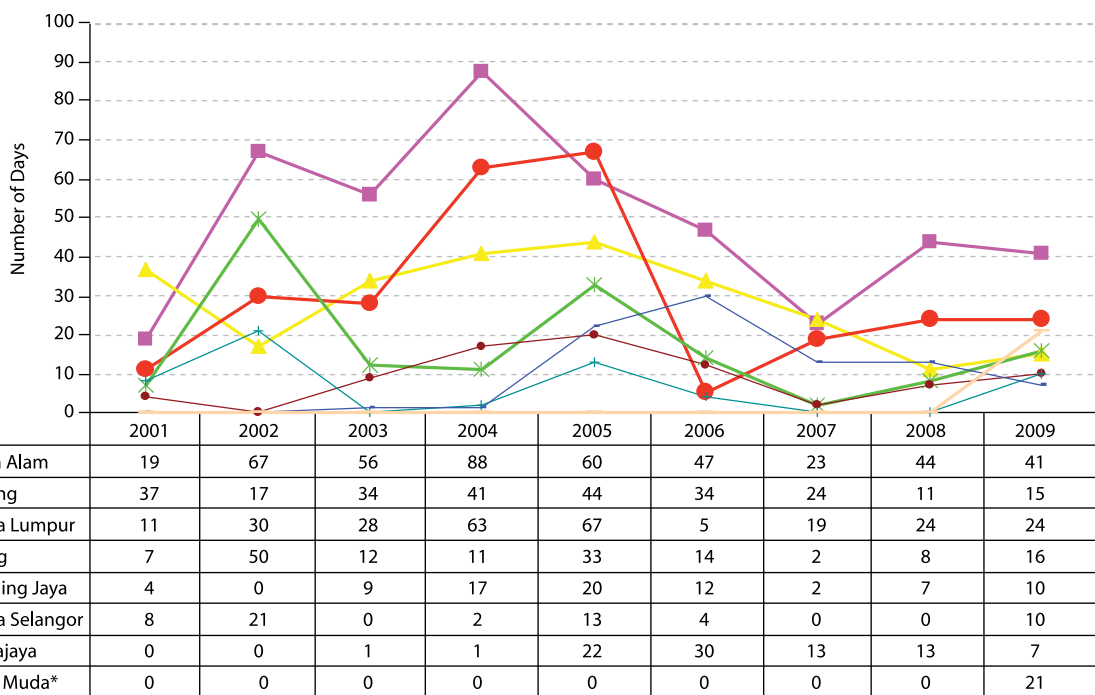


Figure 1.1(d) Malaysia : Trend of 24-hour Concentration of Particulate Matter (PM₁₀), Klang and Selected Sub Urban/Rural Areas, 2009



Note: *Previous station in Gombak was replaced with Batu Muda and started operation in 2009

Figure 1.1 Malaysia : Number of Unhealthy Days, Klang Valley, 2001 - 2009

Air Quality Status in the West Coast

Klang Valley

In 2009, the air quality in the Klang Valley was good 29 percent of the time, moderate 66 percent and the remaining five (5) percent at an unhealthy level. The highest number of unhealthy days was recorded in Shah Alam (41 days) (**Figure 1.1**) as compared to 44 days in 2008. The unhealthy days recorded were due to the ground level Ozone (O_3). In Klang area, the unhealthy days were caused by particulate matter (PM_{10}) due to peatland burning during the dry period. The overall air quality status in Klang Valley is shown in **Figure 1.2**.

Northern Region

The overall air quality of the northern region of the West Coast of Malaysia (Perlis, Kedah, Pulau Pinang and Perak), was between good to moderate

most of the time. However Tanjung Malim recorded 24 unhealthy days while Tasek, Ipoh, Manjung, Seberang Jaya and Prai recorded 1 unhealthy day, each. The pollutants of concerned were particulate matter (PM_{10}) and ground level Ozone (O_3).

Southern Region

In the southern region of the West Coast of Peninsular Malaysia (Negeri Sembilan, Melaka and Johor) the air quality was also between good to moderate most of the time, with the exception of a few unhealthy days recorded in Port Dickson (3 days), Bukit Rambai (3 days), Bandaraya Melaka (6 days), Nilai (1 day), Muar (5 days) and Pasir Gudang (5 days). The pollutants of concerned were particulate matter (PM_{10}) and ground level Ozone (O_3). **Figure 1.3** shows the overall air quality status for the West Coast of Peninsular Malaysia.

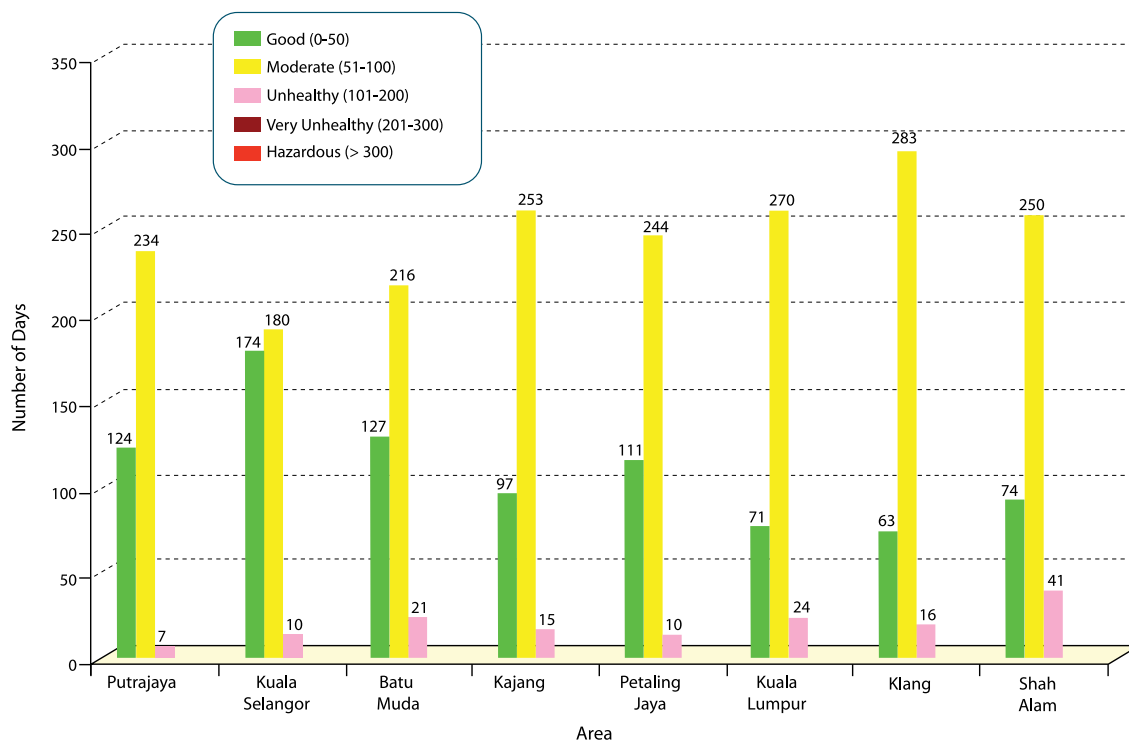


Figure 1.2 Malaysia : Klang Valley Air Quality Status, 2009

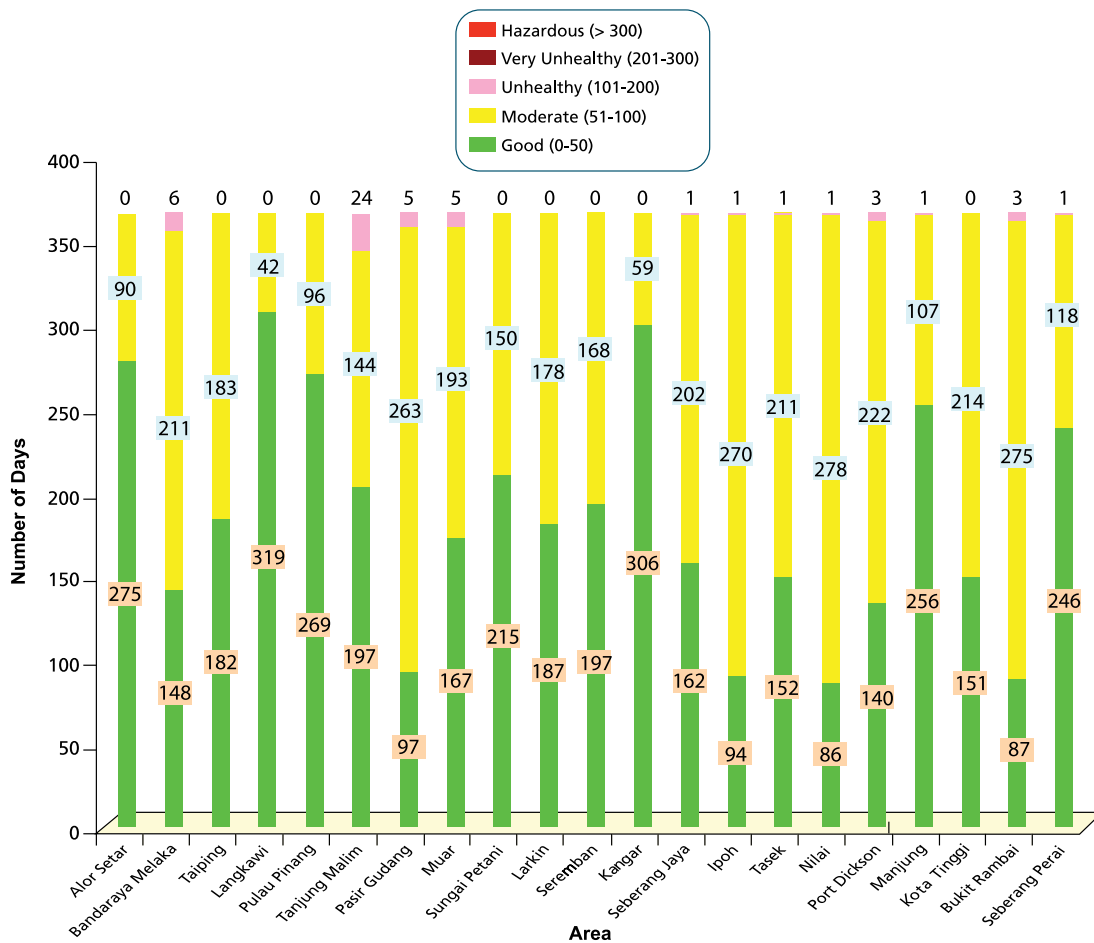


Figure 1.3 Malaysia : Air Quality Status, West Coast Peninsular Malaysia, 2009

Air Quality Status in the East Coast

In the East Coast of Peninsular Malaysia (Pahang, Terengganu and Kelantan) the air quality remained good most of the time and occasionally moderate. Only Balok Baru in Pahang which is located in an industrial area recorded 2 unhealthy days due to high level of particulate matter (PM₁₀). The overall air quality status in the East Coast of Peninsular Malaysia is shown in **Figure 1.4**.

Air Quality Status in Sabah, Labuan and Sarawak

The air quality in Sabah, Labuan and Sarawak was generally good and moderate. Several areas in Kuching, Sibul, Miri, Bintulu, Sri Aman and Samarahan, Sarawak recorded unhealthy status in

August 2009 due to peatland fires and land and forest fires in West Kalimantan as reported by the ASEAN Specialized Meteorological Centre (ASMC). The overall air quality status in Sabah, Labuan and Sarawak is shown in **Figure 1.5**.

AIR QUALITY TREND

Five (5) air pollutants, namely Carbon Monoxide (CO), Nitrogen Dioxide (NO₂), Ozone (O₃), Sulphur Dioxide (SO₂) and Particulate Matter (PM₁₀) were monitored continuously at 51 locations. The air quality trend for the period of 1998 to 2009 was computed by averaging direct measurements from the monitoring sites on a yearly basis and cross-reference with the Malaysian Ambient Air Quality Guidelines as shown in **Table 1.2**.

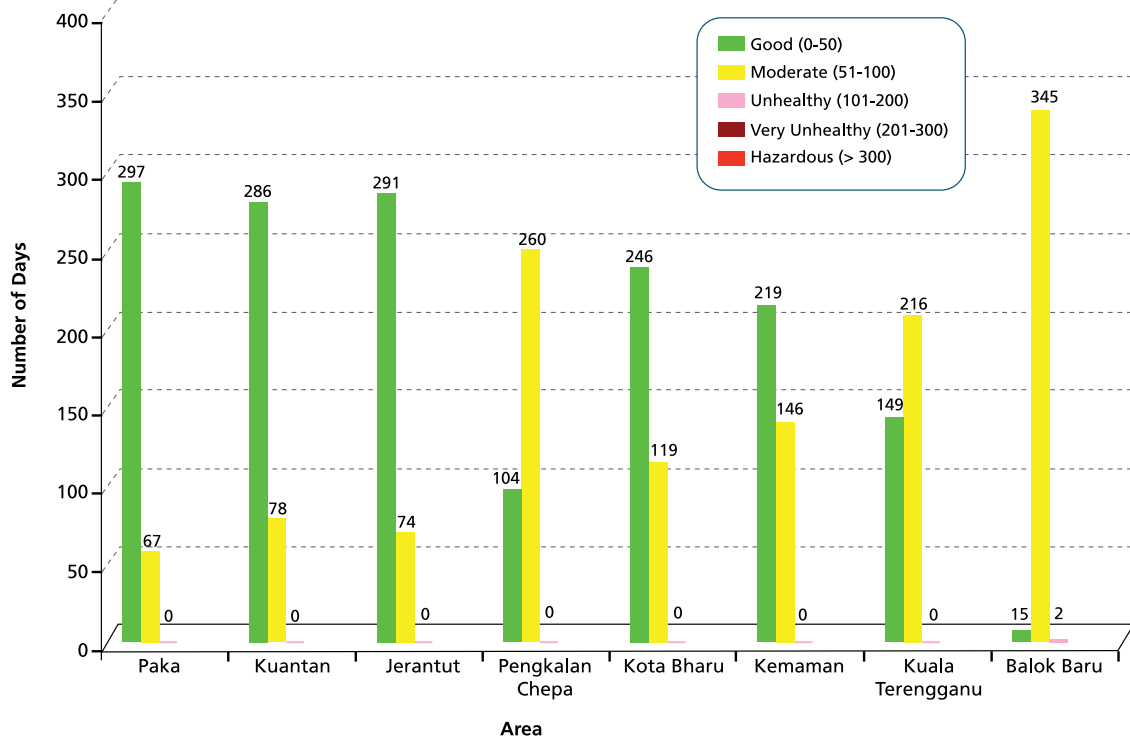


Figure 1.4 Malaysia : Air Quality Status, East Coast Peninsular Malaysia, 2009

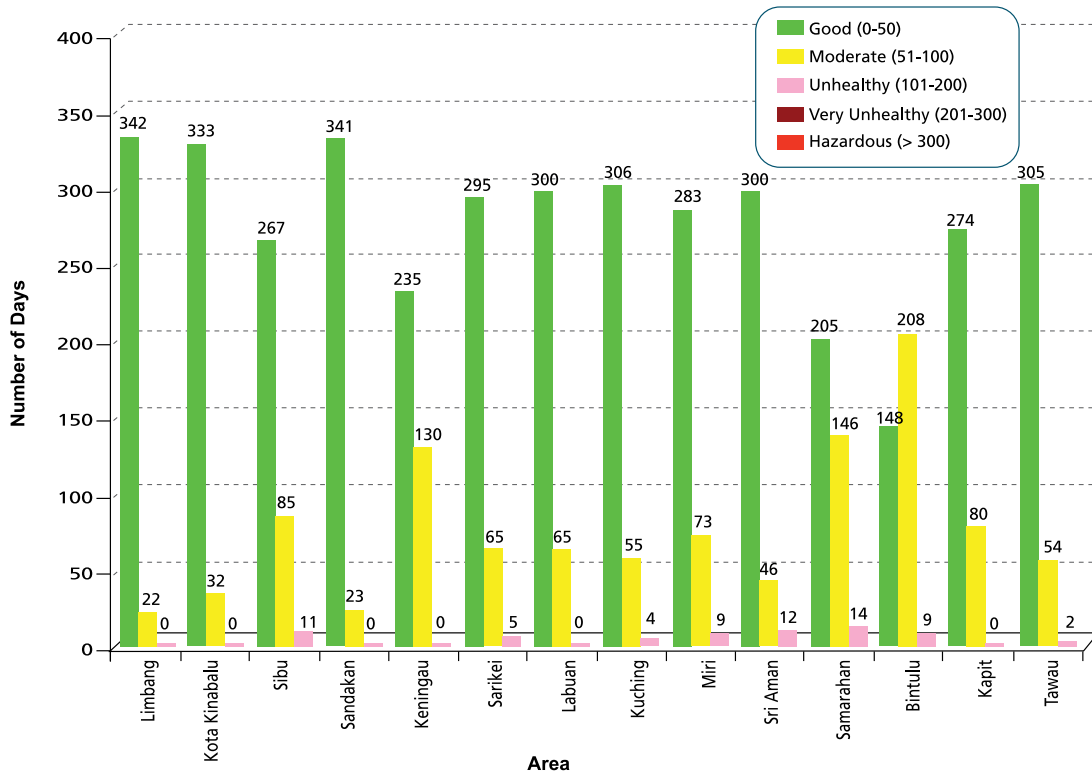


Figure 1.5 Malaysia : Air Quality Status in Sabah, Labuan and Sarawak, 2009

Particulate Matter (PM₁₀)

In 2009 the annual average value of PM₁₀ was 44 µg/m³ which is below the Malaysian Ambient Air Quality Guidelines value of 50 µg/m³. There was no significant change compared to the annual average of PM₁₀ (42 µg/m³) in 2008. Incidences of local peatland fires and transboundary haze had contributed to a higher level of PM₁₀ recorded intermittently in several areas in Selangor and Sarawak from June to August 2009.

The trend of the annual average levels of PM₁₀ concentration in the ambient air between 1999 and 2009 complied to the Malaysian Ambient Air Quality Guidelines as shown in **Figure 1.6**. Based on land use categories, PM₁₀ concentration was also below the Malaysian Ambient Air Quality Guidelines as shown in **Figure 1.6(a)**.

Sulphur Dioxide (SO₂)

Generally the annual average SO₂ concentration shows a declining trend between 1999 and 2009 (**Figure 1.7**). It is well below the Malaysian Ambient Air Quality Guidelines. This could be attributed to stricter enforcement by the DOE as well as more widely use of natural gas for industrial combustion process and vehicles. **Figure 1.7(a)** shows the annual average concentrations of sulphur dioxide for different categories of land use.

Nitrogen Dioxide (NO₂)

In 2009, there was no significant change of NO₂ concentration compared to the 2008 level. The NO₂ concentrations remain high in urban and industrial areas mainly due to a significant increase in the number of motor vehicles and combustion

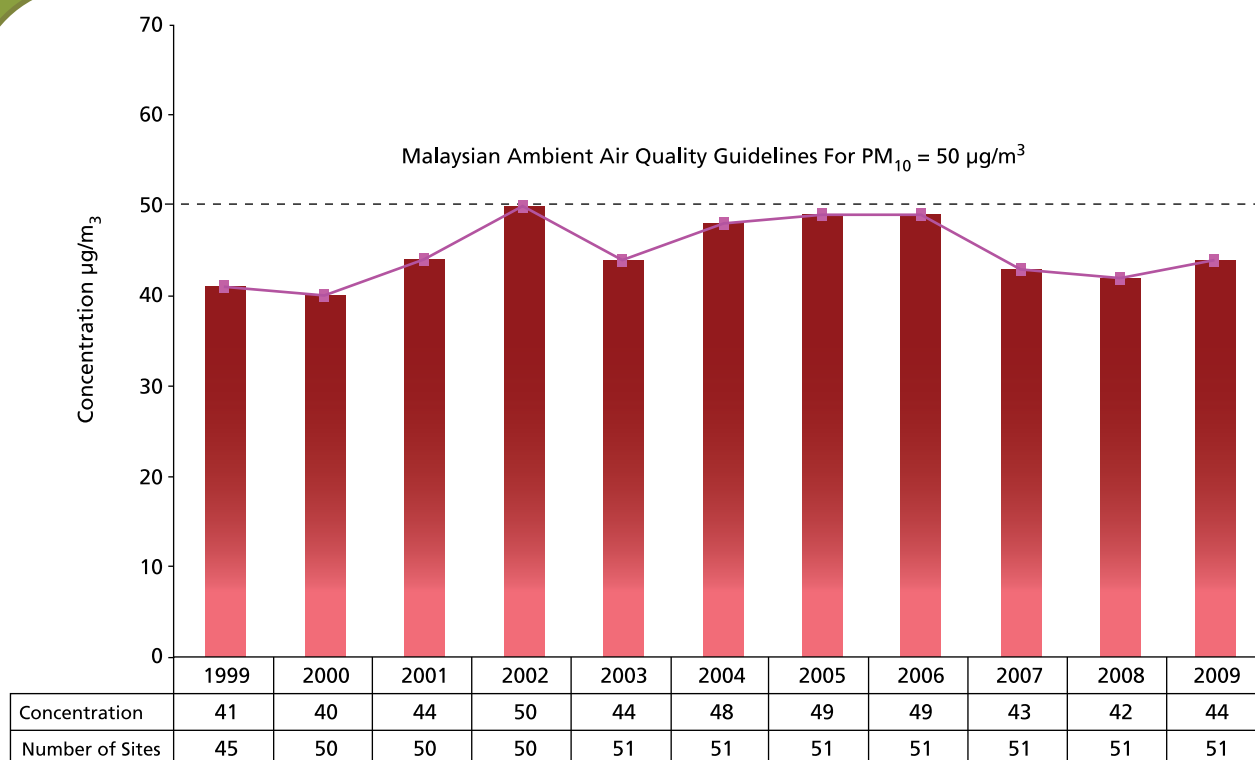


Figure 1.6 Malaysia: Annual Average Concentration of Particulate Matter (PM₁₀), 1999 - 2009



Forests acting as valuable carbon sinks

processes. Estimate on NO_2 emission load indicates 28 percent is from motor vehicles, 69 percent from power stations and industries and the remaining three (3) percent from other sources.

The annual average concentrations of NO_2 in the ambient air from 1999 to 2009 remains almost constant and well below the Malaysian Ambient Air Quality Guidelines. **(Figure 1.8 and Figure 1.8(a)).**

Ground Level Ozone (O_3)

In 2009, the annual average daily maximum one-hour O_3 concentrations decreased by six (6) percent compared to 2008. The annual average daily maximum one-hour O_3 concentrations in ambient air for 1999 to 2009 were well below the Malaysian Ambient Quality Guidelines as shown in **Figure 1.9.**

Figure 1.9(a) shows the O_3 concentration for various land use categories between 1999 and 2009. Urban areas recorded higher levels of O_3 due to higher traffic volume and a conducive atmospheric condition resulting in its formation.

Carbon Monoxide (CO)

There was an almost 15 percent decreased in CO levels in 2009 compared to 2008. However the trend of CO concentration from 1999 to 2009 remains almost constant. The levels recorded were well below the Malaysian Ambient Air Quality Guidelines **(Figure 1.10)**. In urban areas the concentration of CO was higher where the main source of emission was motor vehicles which contributed to 95 percent of CO emission load in 2009. **Figure 1.10(a)** shows CO concentrations for various categories of land use.

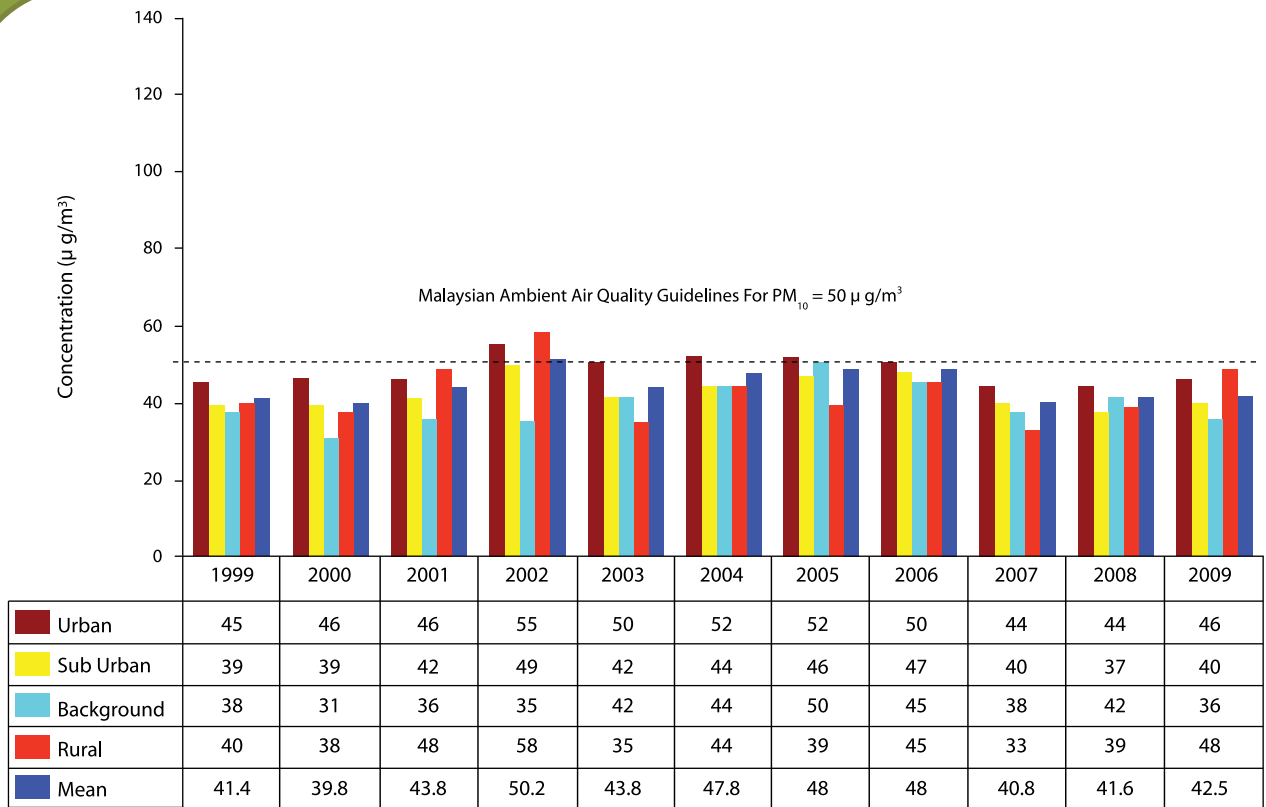


Figure 1.6(a) Malaysia : Annual Average Concentration of Particulate Matter (PM_{10}) by Land Use, 1999-2009

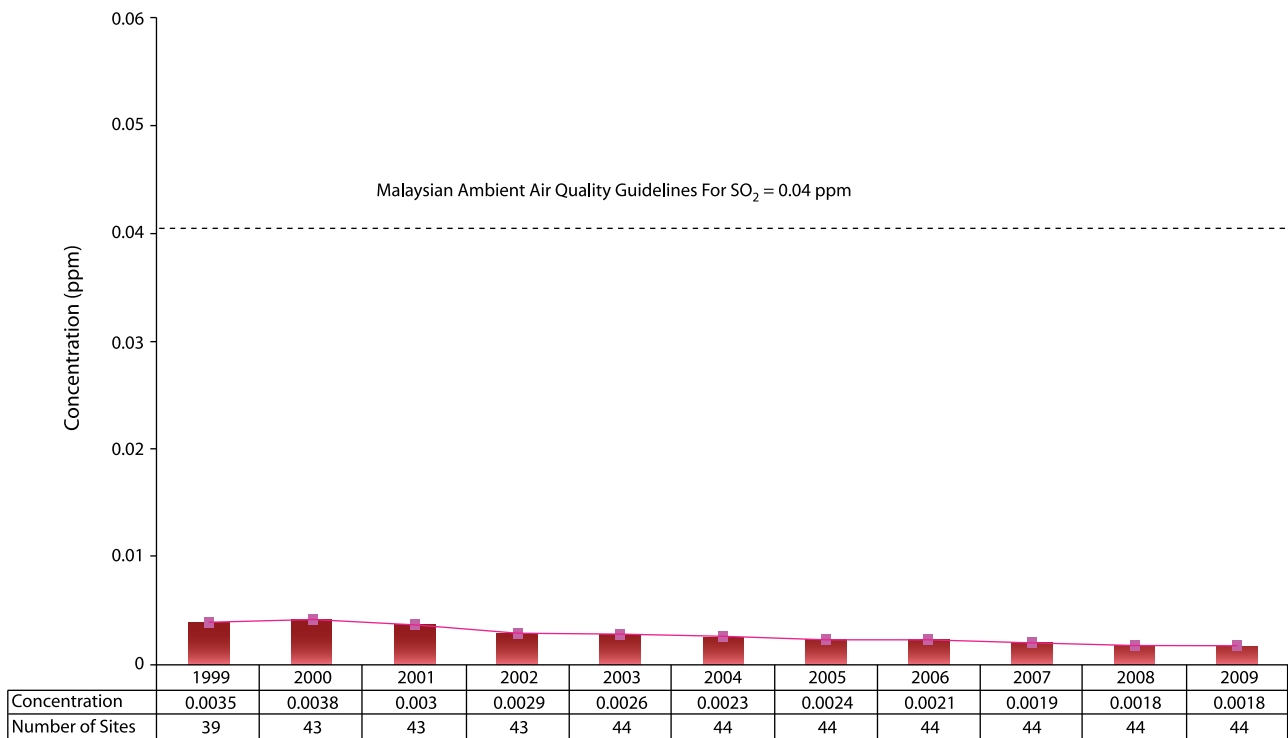


Figure 1.7 Malaysia : Annual Average Concentration of Sulphur Dioxide (SO_2) 1999-2009

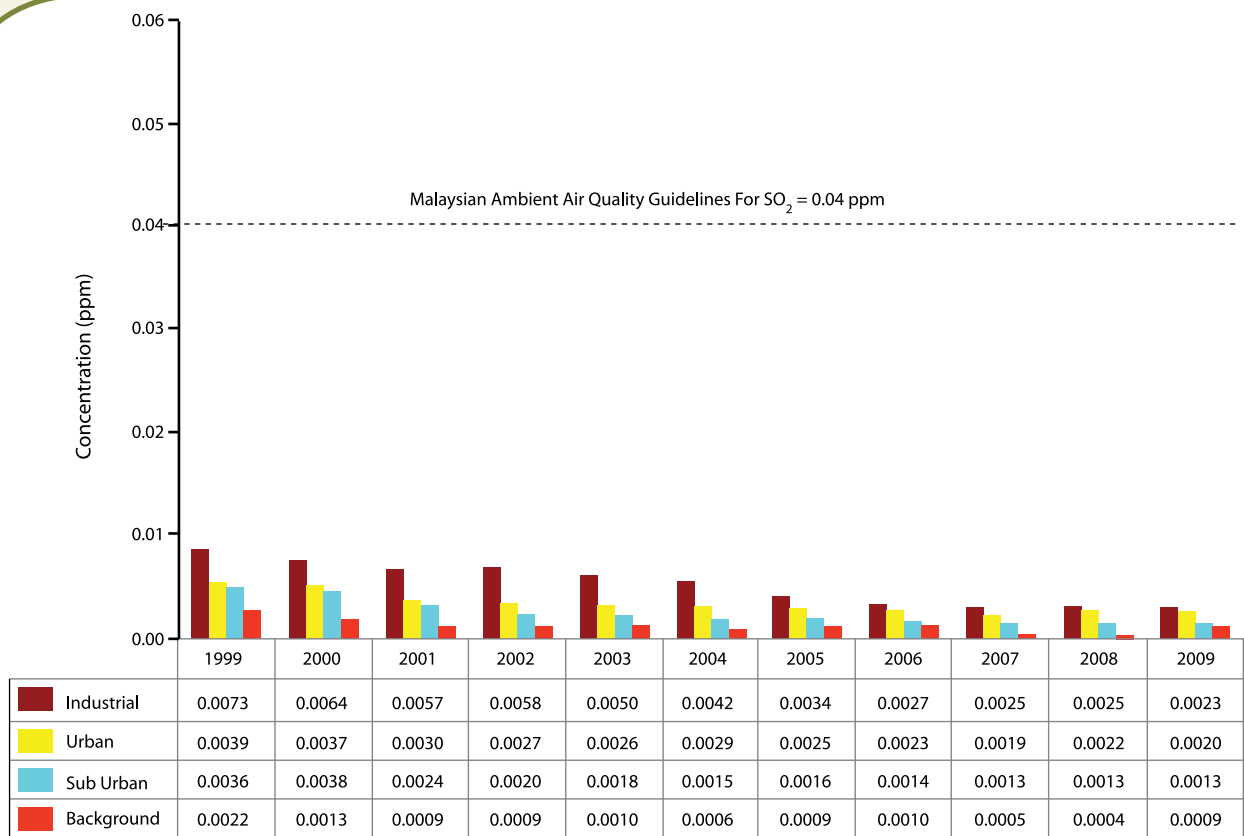


Figure 1.7(a) Malaysia: Annual Average Concentration of Sulphur Dioxide (SO₂) by Land Use, 1999-2009

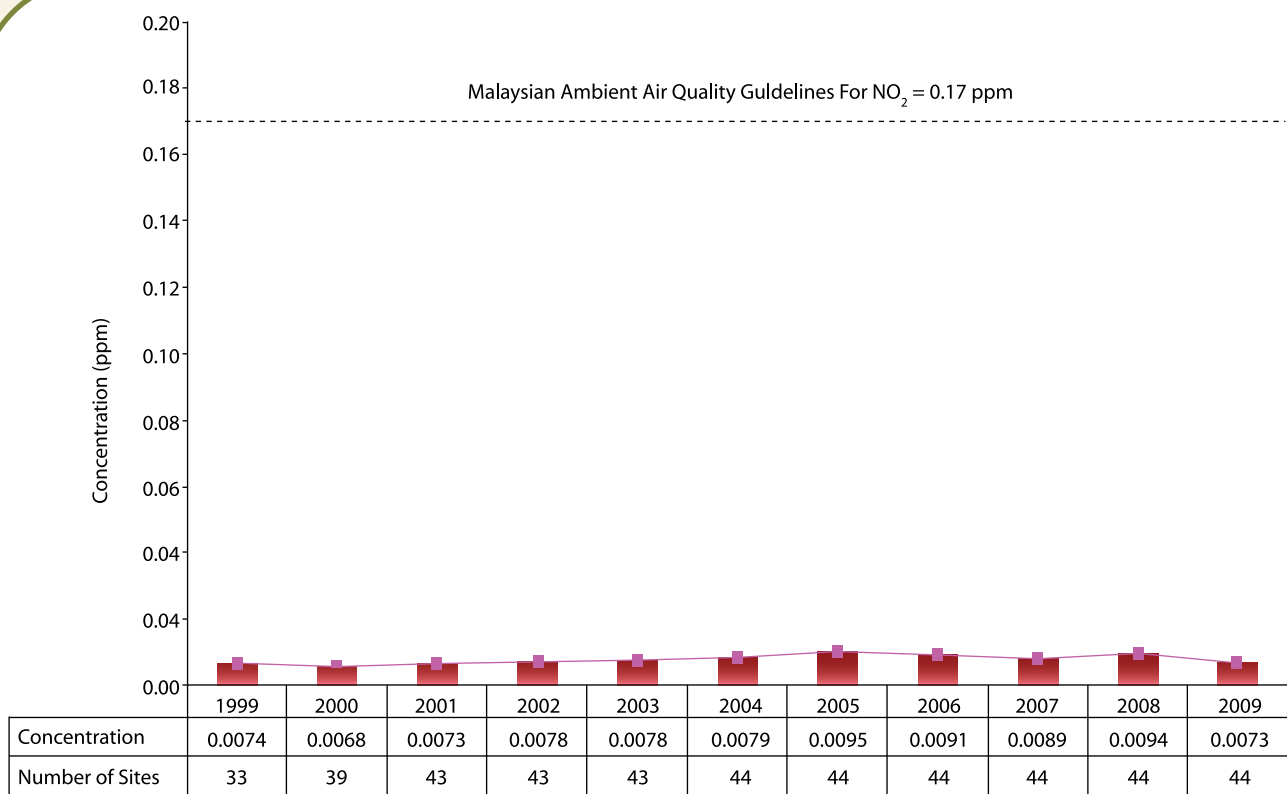


Figure 1.8 Malaysia: Annual Average Concentration of Nitrogen Dioxide (NO₂), 1999-2009

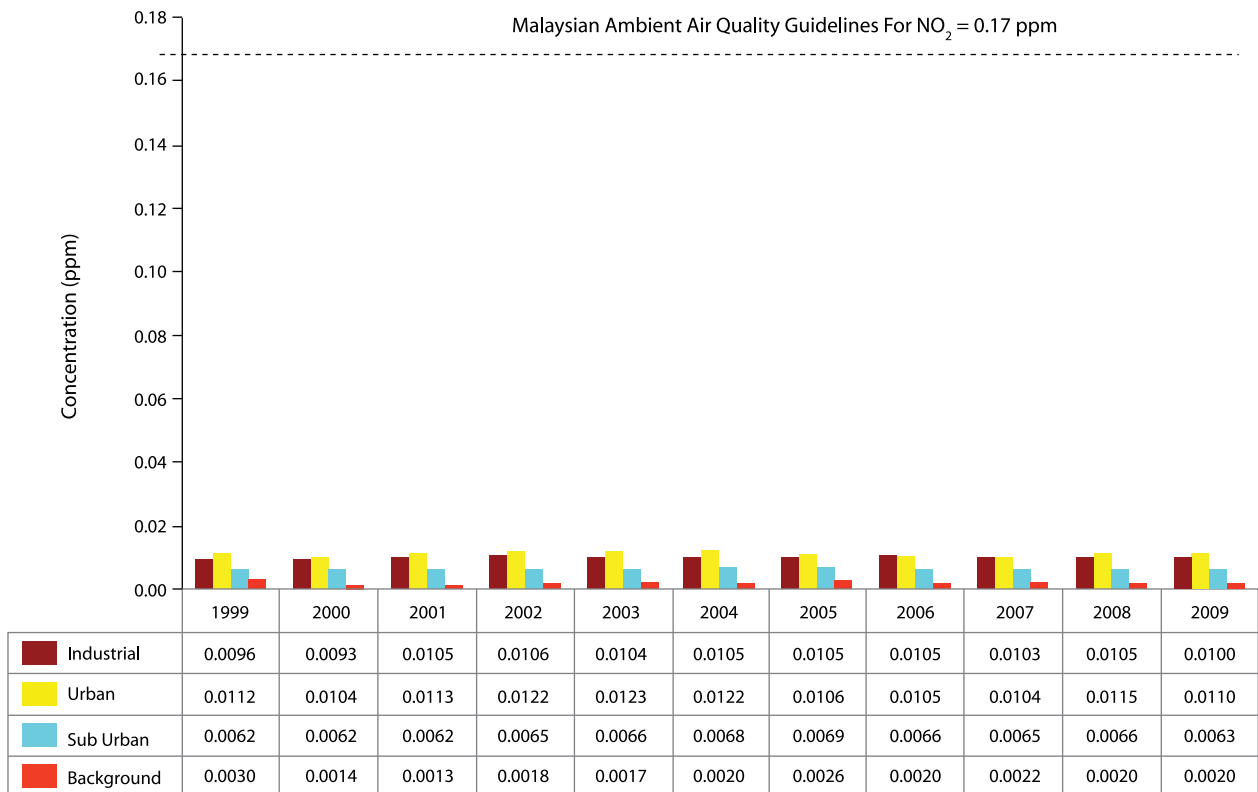


Figure 1.8(a) Malaysia : Annual Average Concentration of Nitrogen Dioxide (NO₂) by Land Use, 1999-2009

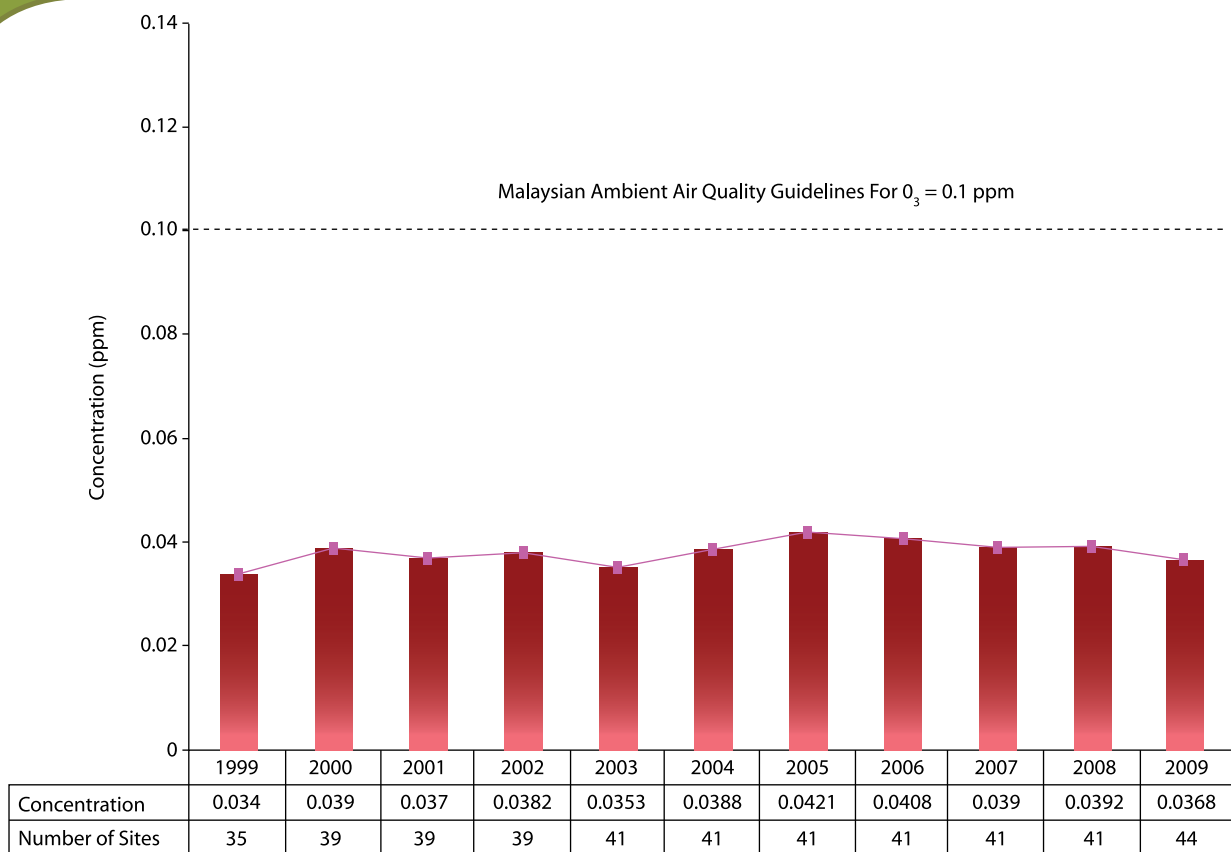


Figure 1.9 Malaysia : Annual Average Daily Maximum 1 Hour Concentration of Ozone (O₃), 1999-2009

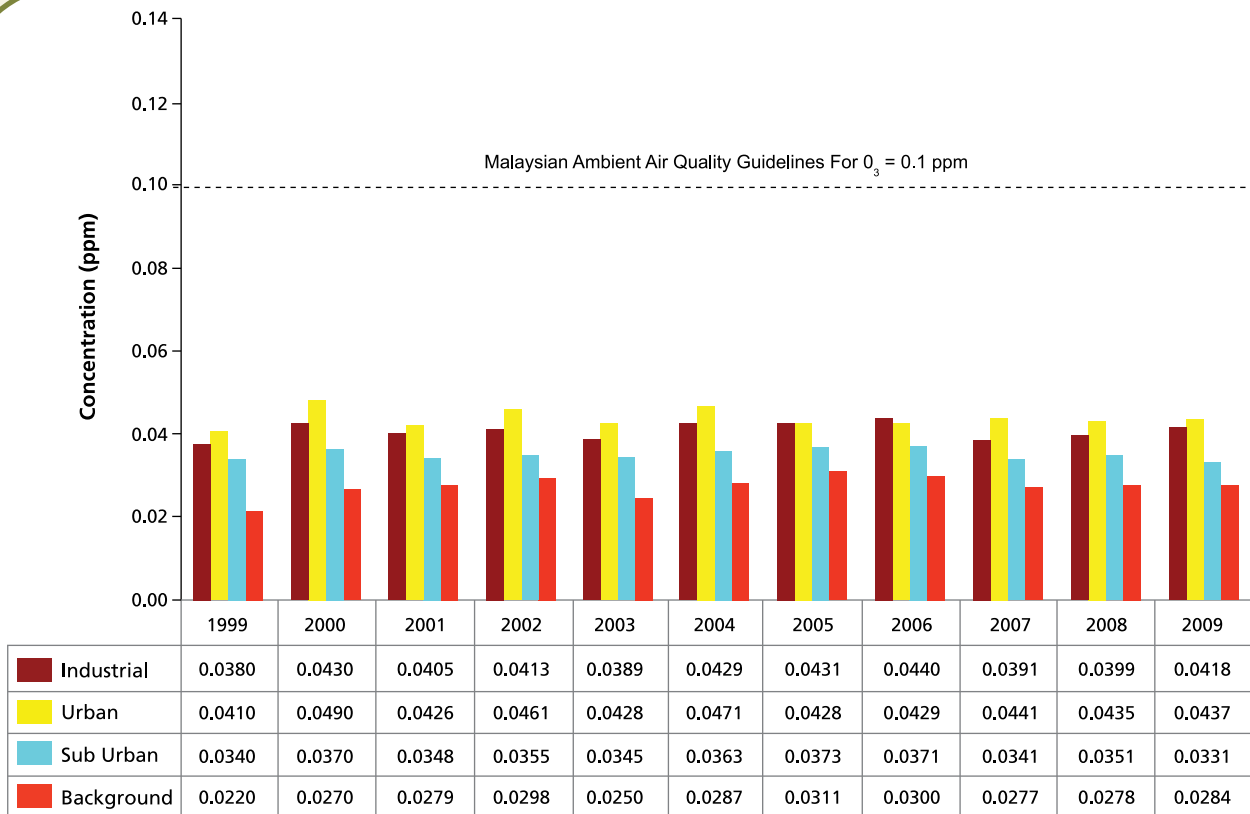


Figure 1.9(a) Malaysia : Annual Average Daily Maximum 1 Hour Concentration of Ozone (O₃) by Land Use, 1999-2009

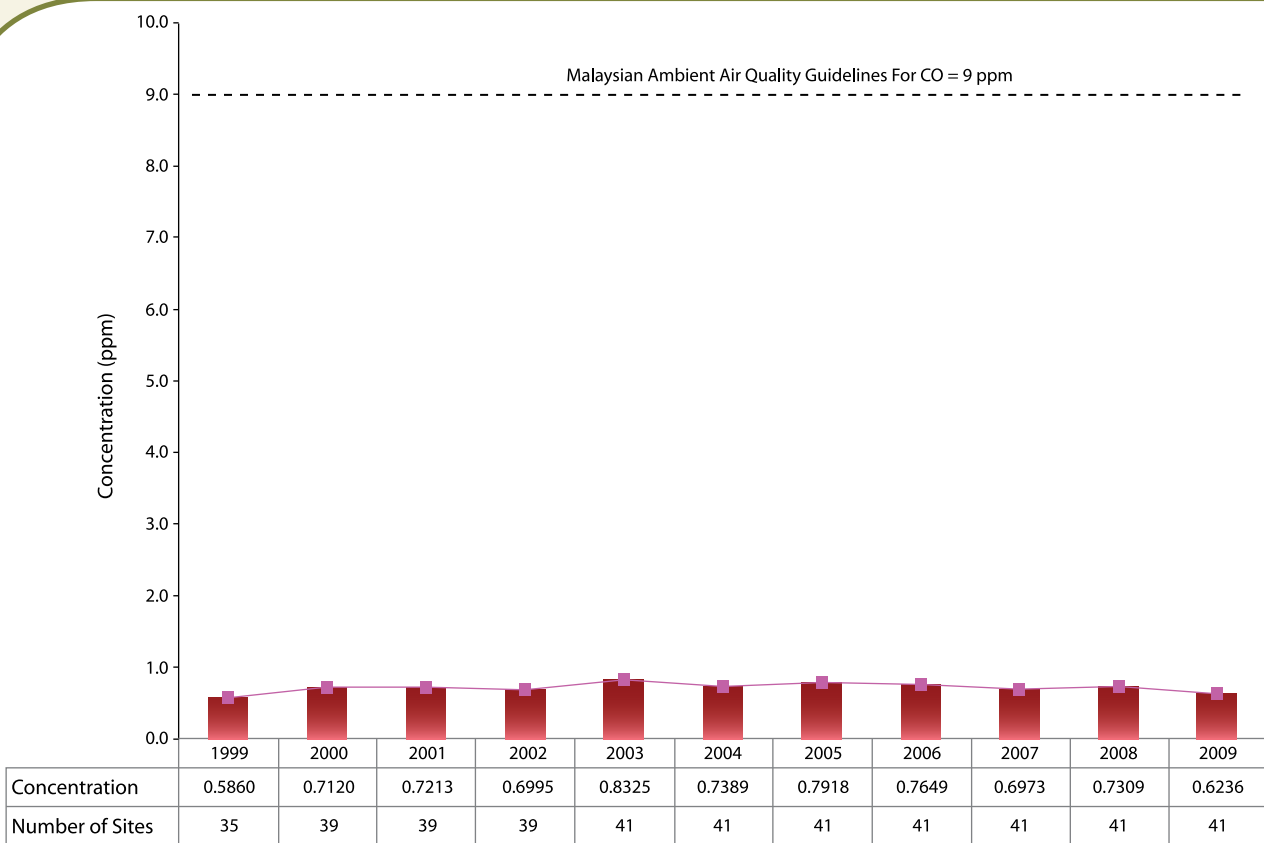


Figure 1.10 Malaysia : Annual Average Concentration of Carbon Monoxide (CO), 1999-2009

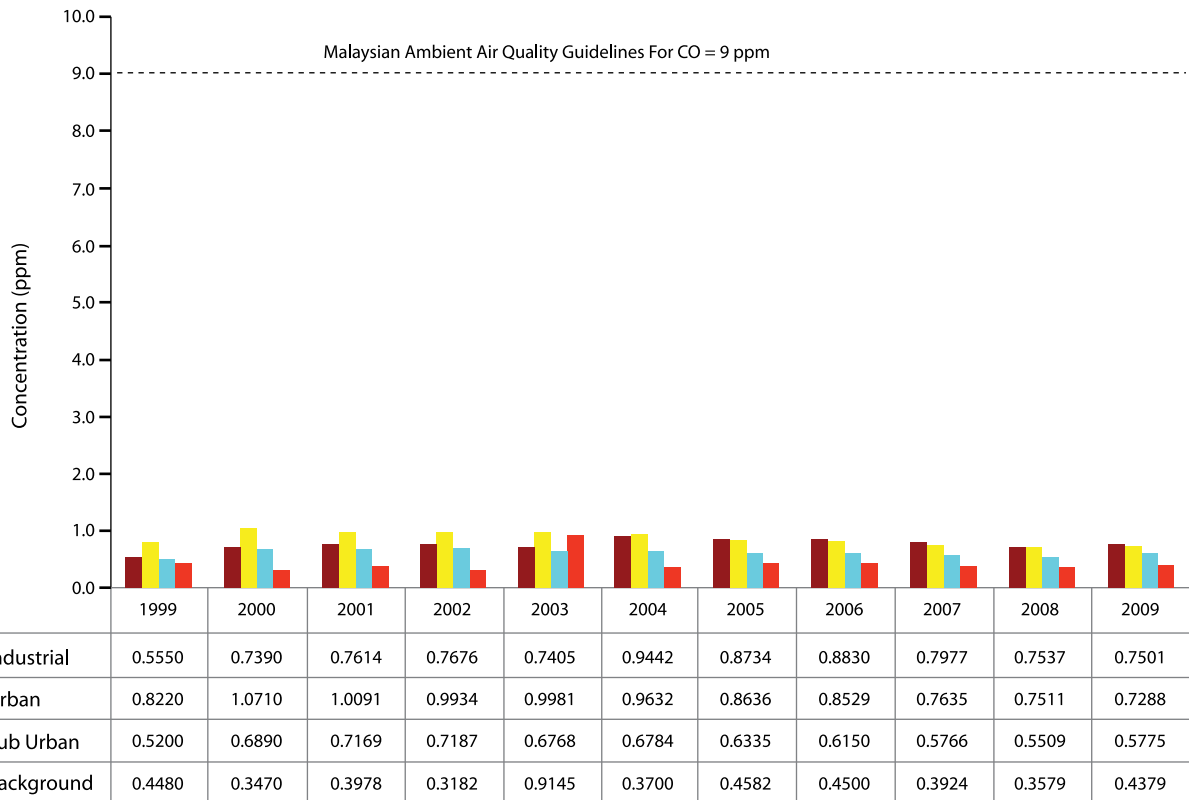


Figure 1.10(a) Malaysia : Annual Average Concentration of Carbon Monoxide (CO) by Land Use, 1999-2009



A panoramic view of Jambu Bongkok Forest Reserve near Rantau Abang, Terengganu