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Committee Regulatory
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Annual air quality monitoring report for the Wellington region, 2007

1. Purpose

To present the results of the air quality monitoring that has been carried out at various locations within the Wellington region for the 2007 calendar year, including a 2008 winter update for particulate matter (PM₁₀) monitoring.

2. Background

2.1 Greater Wellington Regional Air Quality Management Plan

Ambient air quality is the general quality of the air that surrounds us. Ambient air quality reflects the cumulative effects of contaminants discharged to air from all sources, both anthropogenic (from human activities) and natural sources.

The Regional Air Quality Management Plan (Air Plan) contains the following primary Objective:

4.1.1 "High quality air in the Region is maintained and protected, degraded air is enhanced, and there is no significant deterioration in ambient air quality in any part of the Region."

Method 6.1.2 of the Air Plan required the establishment of an ambient air quality monitoring network. The network has been progressively installed since 2002, with new stations at Tawa (Porirua airshed) and Karori established in 2007. There are now seven permanent monitoring stations throughout the region (shown in Figure 3.1). These stations provide the information needed to characterise the quality of our air and to assess public health risk. At least 10 years worth of monitoring data is required to reliably establish trends.

2.2 National environmental standards for air quality

The National Environmental Standards for Air Quality (NES-AQ) is a package consisting of:

- **ambient standards** for carbon monoxide (CO), particulate matter (PM₁₀), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and ozone (O₃);
- **prohibitive standards**, which prohibit various activities that discharge unacceptable quantities of contaminants into the air; and
- **an emission standard** for the design of small, domestic solid-fuel-burning appliances.

The implementation of NES-AQ has implications for Greater Wellington. For example:

- (i) all breaches of the NES-AQ ambient standards need to be publicly notified;
- (ii) policies and strategies to reduce domestic emissions of particulate matter (PM₁₀) will be needed to achieve the NES-AQ in some areas, such as Masterton; and
- (iii) Resource consents to discharge PM₁₀ to air cannot be granted in airsheds that continue to fail to meet the NES-AQ after 1 September 2013.

2.3 LTCCP target

The air quality target for the region is that by 2013 there will be no recorded instances when air pollution reaches the “Alert” levels of the NES-AQ. The “Alert” level is two thirds of the allowable limit and is described in Table 3.1.

Remaining below the “Alert” level for PM₁₀ provides a greater degree of health protection for the community and susceptible individuals, as there is no known concentration of PM₁₀ in air that does not cause harm.

3. Air quality monitoring network and reporting criteria

3.1 Contaminants monitored

The contaminants that are currently being monitored in the Wellington region are particulate matter (PM₁₀), carbon monoxide (CO), and nitrogen dioxide (NO₂). These contaminants cause a range of adverse health effects, including restricted activity days in exposed populations if levels are high enough. Several meteorological parameters are also being monitored (wind speed, wind direction, relative humidity and temperature), as they all have an effect on air pollutant concentrations.

3.2 Airsheds for air quality management

Greater Wellington has eight airsheds shown in Figure 3.1. These airsheds were Gazetted on 1 September 2005 by the Minister for the Environment pursuant to the NES-AQ. We are required to monitor in an airshed where it is likely that the contaminants will exceed the NES-AQ. Each airshed has its own microclimate, meteorological conditions and sources of emissions.

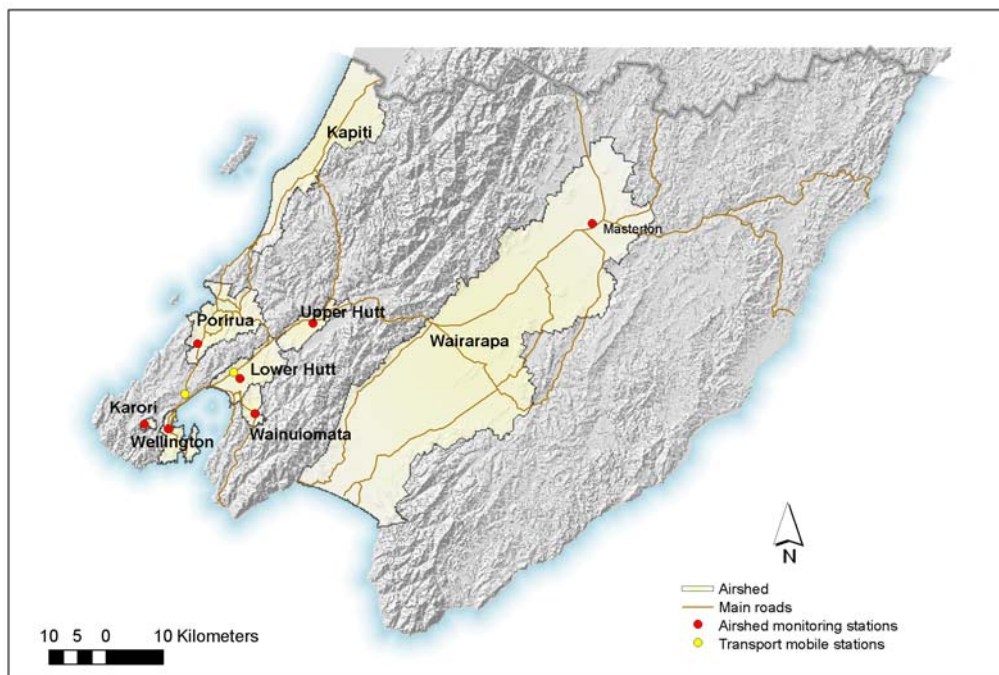


Figure 3.1: Airsheds and location of monitoring stations

3.3 Air quality indicators

A useful method to illustrate the significance of the results is to depict the percentage of time that the results fall into certain categories. This method is described by the Ministry for the Environment in the discussion document on Environmental Performance Indicators (Ministry for the Environment, October 1997). Table 3.1 provides a description of these categories.

Table 3.1: Air quality categories

Category	Measured Values compared to NES-AQ contaminant limits	Comment
Action	Exceeds limit	Completely unacceptable by national and international standards.
Alert	Between 66% and 100% of the limit	A warning level which can lead to guidelines being exceeded if trends are not curbed.
Acceptable	Between 33% and 66% of the limit	A broad category, where maximum values might be of concern in some sensitive locations, but are generally at a level that does not warrant dramatic action.
Good	Between 10% and 33% of the limit	Peak measurements in this range are unlikely to affect air quality.
Excellent	Less than 10% of the limit	Of little concern.

4. Ambient air quality monitoring results

4.1 Summary of monitoring results

The results of air quality monitoring for PM₁₀ concentrations undertaken in 2007 are presented in Figure 4.1. The results have been assessed against the NES-AQ using the categories described in Table 3.1. On 28 June 2007 the NES-AQ for PM₁₀ was exceeded at Wainuiomata and at Tawa monitoring stations.

Carbon monoxide concentrations were mostly ‘Excellent’ and nitrogen dioxide concentrations were “Acceptable” or better at all sites throughout the year.

A full analysis of the results will be provided in the technical report, *Annual air quality monitoring report for the Wellington region, 2007*.



Figure 4.1: PM₁₀ monitoring results for the Wellington region

4.2 Roadside air quality monitoring

In collaboration with the Transport Strategy Development Department, two mobile air quality stations were set up to monitor air quality near busy roads to assess the impact of traffic emissions on local air quality. During 2007 air quality monitoring was undertaken at the Melling bridge intersection (SH 1, Lower Hutt) and at Ngauranga Gorge (Centennial Highway, Wellington).

The results of air quality monitoring undertaken in 2007 are presented in Figure 4.2 and Figure 4.3. These results have been assessed using the NES-AQ and the categories described in Table 3.1. Apart from one exceedance of the NES-AQ for PM₁₀ at Ngauranga Gorge, the air quality at both sites was “Acceptable” or better. The single elevated PM₁₀ daily average recorded at Ngauranga is thought to be due to a local industrial source, rather than being traffic-related.

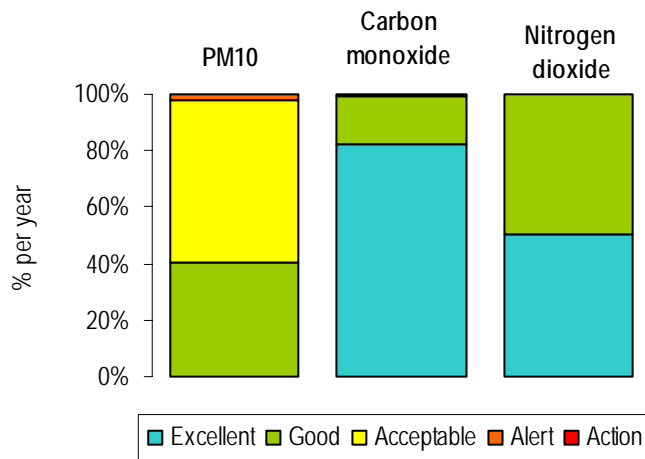


Figure 4.2: Air quality monitoring results for Ngauranga Gorge

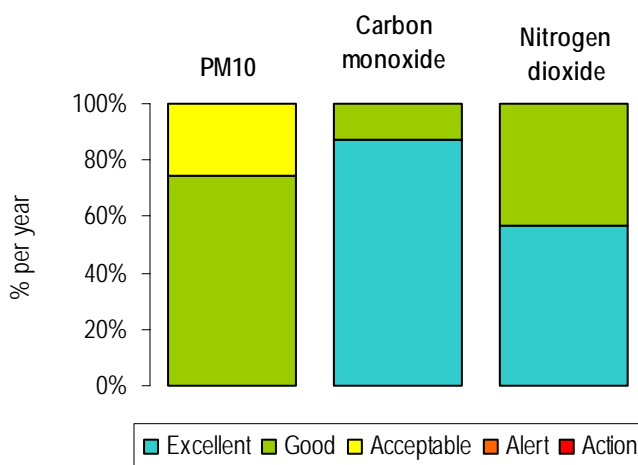


Figure 4.3: Air quality monitoring results for Melling intersection

4.3 Winter 2008 PM₁₀ update

Over the 2008 winter to date, the ambient air quality monitoring station at Wairarapa College in Masterton has recorded two exceedances of the NES-AQ for PM₁₀. In accordance with the regulations, a public notice was placed in the Wairarapa Times Age on 26 July 2008 that the NES-AQ had been breached. Greater Wellington commissioned a survey of domestic households in Masterton during June 2008 to determine the types of home heating used and to estimate the emissions of particulate matter from solid fuel heaters. This information will be used to set targets to improve air quality so that the NES-AQ can be met, given a severe winter, by 2013.

5. Discussion

The results of the ambient air quality monitoring carried out in the Wellington region over the past year, once again, have indicated that the highest concentrations of air pollutants occurred during the winter. In winter 2007, the ambient air quality monitoring station at Tawa and Wainuiomata recorded an exceedance of the NES-AQ for PM₁₀. In winter 2008 the Wairarapa College in Masterton recorded two exceedances of the NES-AQ for PM₁₀. The higher winter time air pollution levels are associated with periods of cold, calm

weather combined with emissions from domestic woodburners. Cool, calm conditions restrict the dispersion of air pollutants.

6. Conclusion

Ambient air quality monitoring within the Wellington region shows that air quality is generally good during the summer months at suburban locations. However, at times during the winter, certain areas can experience degraded air quality that may pose a risk to the health of the local community. With the establishment of a permanent air quality monitoring network clear trends in air pollution levels are becoming evident, with winter being the likely time for pollution episodes to occur, the severity of which are entirely dependent on the type of winter we experience.

The NES-AQ requires Greater Wellington to manage air quality in airsheds within our region. Ambient air quality monitoring during 2007 and in winter 2008 shows that air quality in Masterton, Wainuiomata and Tawa exceeded the daily NES-AQ threshold for particulate matter (PM₁₀).

7. Future monitoring

A monitoring station will be established this financial year in the Kapiti Coast airshed.

8. Communications

The results of the air quality monitoring will be reported to the public by media releases and the information is available on Greater Wellington's web site.

Copies of the *Annual air quality monitoring report for the Wellington region, 2007* will be sent out to the region's territorial authorities, Regional Public Health, the Ministry for the Environment, other regional councils and tertiary academic institutions. Copies of the report will also be available on request to members of the public. The *Annual air quality monitoring report for the Wellington region, 2007* also contains the monitoring results and statistics necessary to fulfil our part of the Environmental Monitoring Partnership Protocol Agreement between Greater Wellington and Ministry for the Environment.

Information about air quality in 2007 will also be summarised into an Annual Report Card which will be available for more general distribution to the public later this year.

9. Recommendation

It is recommended that the Committee:

1. *receive this report; and*
2. *note the contents.*

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