
H A U
A I R

AIR 2022 – 2023

General Statement

The management and monitoring of air pollutants is crucial to the health and wellbeing of people.

This chapter details the air quality monitoring carried out across the region by Waikato Regional Council (WRC) to maintain and improve our current levels of air quality.

Through extensive climate monitoring at sites across the region, WRC has collected data on air quality, which helps guide decision-making by the Waikato Regional Council and many other individuals and agencies including MPDC.

Exceeding safe limits of air pollution can have adverse effects on people, by causing respiratory conditions, cardiovascular issues, and irritation of the skin, nose, eyes and throat. Air pollution can also affect people's emotional and mental wellbeing.

Air is made up of nitrogen and oxygen gases, with minute amounts of carbon dioxide and other gases. Contamination of the air occurs through solid contamination such as dust and discharged particles from fires, liquid contamination such as pesticides and herbicides, and gas contamination. Some air contamination occurs naturally, through geothermal emissions but most, occurs through human activity.

In the Waikato region, emissions are mostly from house fires, agrichemicals, motor vehicle emissions, industry discharge, outdoor burning and livestock farming practices. Air is considered to be polluted when these contaminants are airborne for long enough, and at concentrations that could affect people, plants and animals. Air pollution can happen at multiple scales. Particle matter like dust and smoke, transport emission and industry discharge are influential at a regional level, but contribute to accumulative global scale pollution, which culminates in adverse effects such as climate change and ozone deterioration.

Sources of pollutants

The Waikato Regional Council monitors the proportion of carbon dioxide (CO2), carbon monoxide (CO), nitrogen oxide, sulphur dioxide and fine particle matter (PM_{10}) in the air daily, from industry, motor vehicles and domestic heating throughout the Waikato Region.

Common Sources of pollutants are:

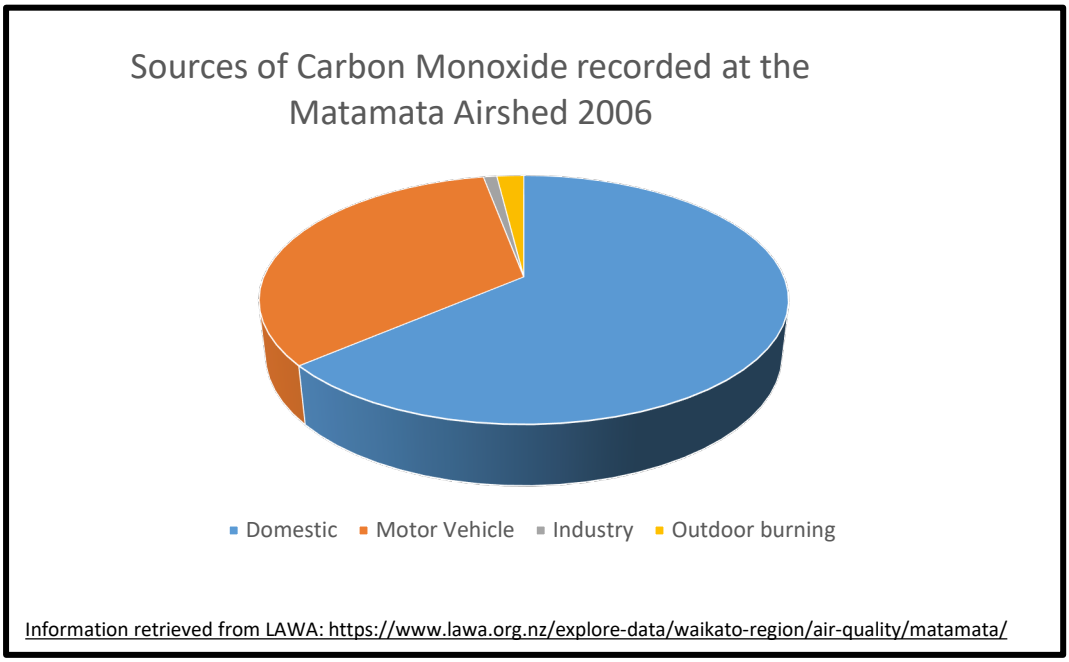
- Carbon dioxide - is a greenhouse gas. It is thought that increasing amounts of gases will contribute to climate change.

- Carbon monoxide - is a poisonous gas that is colourless, odourless and tasteless. It is absorbed into the bloodstream of people and animals, causing health effects ranging from headaches and dizziness to loss of consciousness and death.
- Nitrogen oxide - can affect people's health by causing respiratory problems. It can be damaging to our environment by contributing to ozone loss and greenhouse gases.
- Sulphur dioxides - have a strong, unpleasant smell, and can harm people's health and our environment.

Carbon Monoxide

Most carbon monoxide in urban areas are sourced from motor vehicle, domestic home heating and industry. The figure below indicates the most recent published carbon monoxide readings for Matamata – 2006 (Land Air Water Aotearoa).

Sixty five percent of all carbon monoxide pollutants were from domestic contributions such as home fires, 34% of carbon monoxide pollutants were from vehicle use, only 2% were from outdoor burning and less than 1% were from Industry related processes.

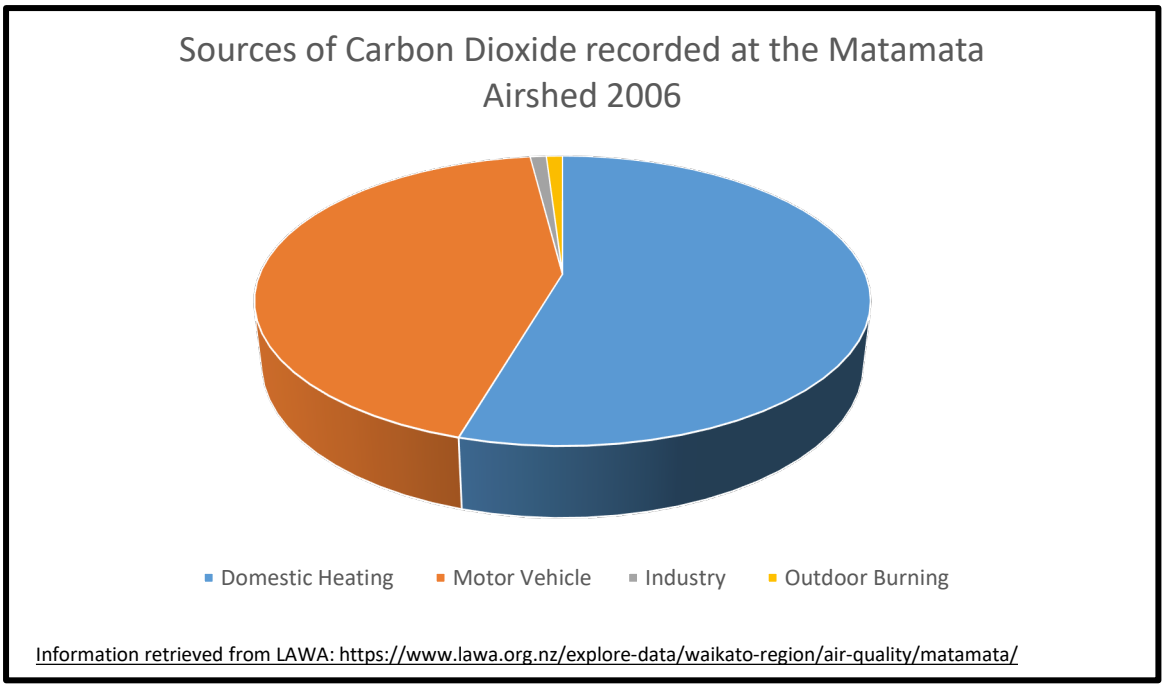


Information retrieved from LAWA: https://www.lawa.org.nz/explore-data/waikato-region/air-quality/matamata/

Carbon Dioxide

Measuring the amounts of carbon dioxide in the air, and identifying the sources of this gas is critical as this greenhouse gas is thought to be one of the greatest contributors to global shifts such as climate change. It is critical to highlight the sources and find methods of reducing this pollutant as this plays greatly into the role of planning for large-scale changes in our natural and built environments in the future.

In the Waikato Region, carbon dioxide is sourced mostly from motor vehicles, industry and home heating. Over 50% of all carbon dioxide emissions sourced from the Matamata airshed is from domestic heating, followed by motor vehicles at approximately 43%. Carbon dioxide sourced from industry and outdoor burning equates to less than 3% of the districts total.



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Fine Particle Monitoring (PM_{10})

Amongst the most significant air pollutant in New Zealand are small airborne particles known as particulate matter. Particulate pollutants are usually found in higher concentrations in towns and cities. Exposure to high levels of airborne particle pollutants has the potential to cause respiratory and cardiovascular issues for asthmatics, children and the elderly as well as increased risks of lung cancer and bronchitis. The size of these particles are smaller than 10 microns (1 micron is one-millionth of a metre), which makes it easy to inhale and difficult to detect.

The National Environmental Standards for Air Quality (NES-AQ) are set by the New Zealand Government and are legally binding in New Zealand. The NES-AQ set limits for five air pollutants and allows some exceedances. Air quality limits set by the NES-AQ include daily average PM_{10}, hourly average nitrogen dioxide and sulphur dioxide. A national standard for $PM_{2.5}$ is pending.

Regional councils and unitary authorities are responsible for managing air quality under the Resource Management Act. They are required to identify areas where air quality is likely, or known, to exceed the NES-AQ. These areas are known as airsheds.

Land Air Water Aotearoa (LAWA) and the Waikato Regional Council (WRC) Reports on PM_{10} concentrations each year.

Fine Particle Matter in Our District

There is currently one gazetted airshed in our district that monitors PM_{10} concentrations, which is located at Morrinsville College. This data is collected and reported as an average level for each 24-hour period. This 24-hour period is significant in determining adverse effects on human health and notifying the public if unsafe concentrations are reached.

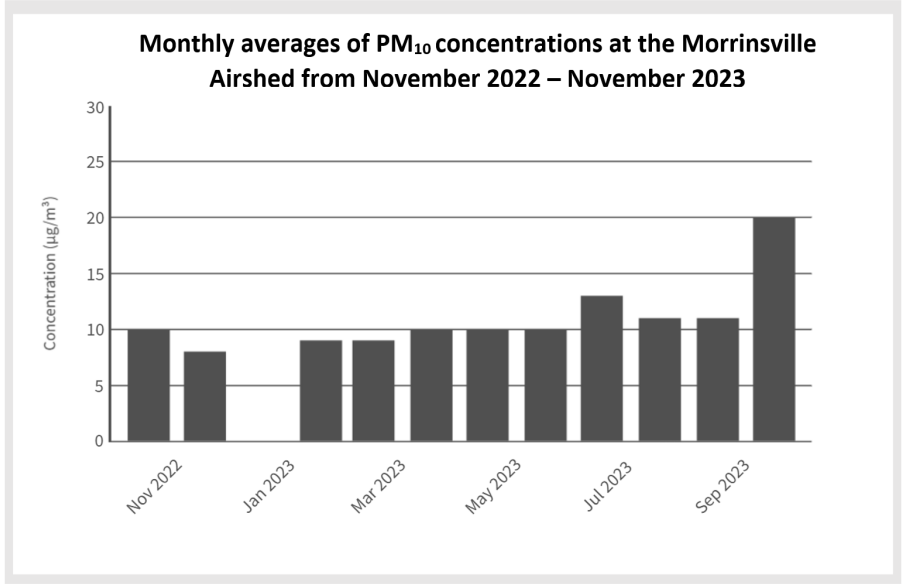
According to LAWA, the data below from the Morrinsville Airshed shows there was one exceedance between November 2022 and November 2023, which still meets the NES-AQ standards. The PM_{10} daily average concentrations and exceedance days are compared to the National Standard (NES-AQ), and the PM_{10} annual average concentrations are compared to the WHO guideline. There are no guidelines for hourly or monthly average concentrations.

PM_{10} Average concentrations at the Morrinsville Airshed from November 2022 – November 2023

PM_{10}	Data verified to 01/05/2023			
HOURLY AVERAGE	DAILY AVERAGE	MONTHLY AVERAGE	ANNUAL AVERAGE	EXCEEDANCE
13 Nov 2023 hour to 8:00 PM	12 Nov 2023	October 2023	2022	2023 Year to date
8 µg/m³	10 µg/m³	20 µg/m³	9 µg/m³	1 Exceedances
No guideline	Under NES-AQ (<=50 µg/m³)	No guideline	Under WHO (<=15 µg/m³)	Meets NES-AQ

Information retrieved from LAWA: https://www.lawa.org.nz/explore-data/waikato-region/air-quality/morrinsville/morrinsville-college/

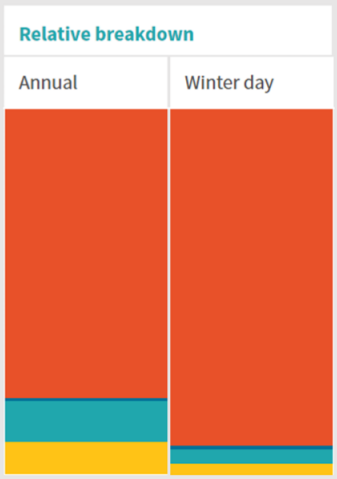
The information below shows that generally, concentrations are good for most of the year, with an increase in PM concentrations during cooler months, which is due the majority of PM_{10} in the Waikato being produced by home fires. Overall, the air quality in the Matamata-Piako District is well below the NES-AQ maximum threshold for daily averages, with all concentrations of PM_{10} for the year remaining below half of the World Health Organisation's acceptable threshold.



Information Retrieved from LAWA: https://www.lawa.org.nz/explore-data/waikato-region/air-quality/morrinsville/morrinsville-college/

The data below is taken from the Matamata Airshed, which shows that major sources of PM_{10}. Annual averages suggest that home heating is still the largest source of fine particle matter at 79%, outdoor burning accounted for 11% of fine particle matter and 10% from motor vehicles. Industrial activity accounted for 1% in both annual and winter-day readings

Source	Annual percentage	Winter day percentage
Home heating	79%	92%
Industrial	1%	1%
Outdoor burning	11%	4%
Traffic	10%	4%



*Sources of PM_{10} in **Matamata** from home heating, industrial activities, outdoor burning and motor vehicle use. Indoor sources and natural sources are not included in this information. Values used in this table are from Ministry for the Environment Data Service 2013. Information sourced from: LAWA, 2021 (https://www.lawa.org.nz/explore-data/waikato-region/air-quality/matamata/)*

Over the last 10 years, there has been a decline in particulate matter present in the air, particularly in the winter months. This suggests that residents of the district are shifting from domestic fires to alternative means of warming their homes, which is a positive trend. By shifting away from domestic fires as a way of heating homes, there could be a significant change in the hourly readings, therefore reducing the overall average suspended fine particle matter within the district. This could result in better health outcomes for residents and for the environment.