

SCIENCE SNAPSHOT

Air quality in the Canterbury region

Update for 2021



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Key Points

- Air pollution can be an issue in Canterbury towns and cities, mainly during the coldest months.
- The pollutants of concern in Canterbury are particles (PM₁₀, PM_{2.5}), nitrogen dioxide (NO₂) and benzo(a)pyrene (BaP).
- We compare concentrations of these pollutants in the air to the National Environmental Standards for Air Quality (NESAQ), targets in the Canterbury Air Regional Plan (CARP), and New Zealand's Ambient Air Quality (AAQ) guidelines. Where there are no New Zealand standards and guidelines, we use the World Health Organisation (WHO) 2021 guidelines.
- PM₁₀ and PM_{2.5} exceed the NESAQ or CARP in all Canterbury airsheds. The CARP targets are to be met by 2030.
- BaP exceeded guidelines when monitored in Christchurch and Timaru.
- Home heating is the main source of PM₁₀, PM_{2.5} and BaP in most Canterbury airsheds.
- Current strategies aimed at reducing emissions of PM₁₀ from home heating will also lower emissions of PM_{2.5} and BaP.
- Specific solutions are needed in those areas where home heating is not the main source of PM₁₀ e.g. in the industrial area of Washdyke.
- NO₂ concentrations at roadside and residential sites in Christchurch were below NESAQ limits but above guidelines recommended by the World Health Organisation (WHO). Motor vehicles are the main source of NO₂.
- Concentrations of other gases like sulphur dioxide (SO₂), carbon monoxide (CO), ozone (O₃) and benzene have historically been well below guidelines and standards. We now only monitor these gases at a small number of sites.

Air pollutants monitored

- Particulate Matter (PM)
 - » PM_{2.5}, particles smaller than 2.5 micrometres in size
 - » PM₁₀, includes all the PM_{2.5} particles and larger coarse particles up to 10 micrometres
- Nitrogen dioxide (NO₂)
- Sulphur dioxide (SO₂)
- Carbon monoxide (CO)
- Ozone (O₃)
- Benzene
- Benzo(a)pyrene (BaP)
- Black carbon
- Concentrations are reported in micrograms per cubic metre of air (µg/m³)

Find more information about these pollutants at environment.govt.nz/facts-and-science/air/air-pollutants

Overview of air quality in Canterbury

The Canterbury map (Figure 1) shows the number of days PM₁₀ concentrations exceeded the National Environmental Standards for Air Quality (NESAQ) during 2021. The highest number of exceedances were in Timaru and Washdyke. It also shows the number of days PM_{2.5} concentrations exceeded the Canterbury Air Regional Plan (CARP), which has a target of no exceedances by 2030. The highest number were in Timaru and Kaiapoi. Concentrations of the gases NO₂, SO₂ and CO are not reported as they have been well below the NESAQ at sites measured in recent years.

Managing air quality to meet the NESAQ has been the focus for more than 15 years and great progress has been made. Table 1 shows the number of days PM exceeded the NESAQ or CARP in the last five years. A graph of these over the last 20 years can be viewed at www.ecan.govt.nz/your-region/your-environment/air-quality/the-science-behind-our-air-quality/data-from-past-years.

Pollutants tend to accumulate when the weather is stable and there is little to no wind. These conditions often occur on cold frosty mornings and cold clear evenings in the winter when homes need heating. In late June, the sun sets at around 5pm, coinciding with peak commuter traffic time. During this period, vehicle emissions and wood burning for home heating are both significant sources of air pollution. Concentrations of all pollutants are highest in most Canterbury towns during the months from April to September.

Canterbury has eight air quality management areas (airsheds). These airsheds are all towns or cities except for Washdyke, which is an industrial area in the northern part of Timaru.

In seven of our airsheds burning wood for home heating is the main source of PM₁₀, PM_{2.5} and BaP. This source is reducing as older coal and wood burners are replaced with lower emitting, modern burners.

In Washdyke, high concentrations of coarse particles (those larger than 2.5 µm in diameter) occur during daytime hours and on weekdays. These are related to industrial activities and the movement of vehicles on unpaved areas.

Motor vehicles are the main source of NO₂. This gas has been monitored in Christchurch for many years at a roadside site (Riccarton Road) and in a residential area (St Albans) with no exceedances of the NESAQ. A short period of monitoring in Timaru in 2005 showed similar concentrations to those measured at the St Albans site during winter. The updated WHO guidelines indicate health impacts occur at lower concentrations than those in the NESAQ. Further monitoring is needed to better understand where NO₂ may be of concern.

The following pages focus on each airshed showing how annual average PM₁₀ and PM_{2.5} concentrations have changed over the last 20 years and how daily average PM₁₀ and PM_{2.5} concentrations varied during 2021. In Christchurch, annual and daily average NO₂ concentrations are also shown.

Table 1: Number of days of high PM₁₀ and PM_{2.5} from 2017 to 2021

Airshed	Number of days PM ₁₀ > 50 µg/m ³					Number of days PM _{2.5} > 25 µg/m ³				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Rangiora	6	0	2	4	2	21	8	21	20	17
Kaiapoi	10	2	8	3	3	37	23	27	24	24
ChCh Airshed	5	4	7	8	1	19	10	19	13	7
ChCh St Albans	4	3	4	2		19	10	19	13	7
ChCh Woolston	1	4	5	7	1	10	6	11	6	1
Ashburton	3	2	1	0	0	20	9	8	9	4
Geraldine	1	1	1	0	0	24	14	15	5	3
Timaru	17	8	12	10	13	46	23	30	26	42
Washdyke	1	1	14	22	30	1	0	0	0	1
Waimate	2	0	1	0	0	21	5	16	10	9

*units of measurement are micrograms per cubic metre

Environment Canterbury monitors concentrations of various contaminants. PM₁₀ is currently measured at nine locations in Canterbury's eight airsheds.

**The Christchurch airshed includes St. Albans and Woolston*

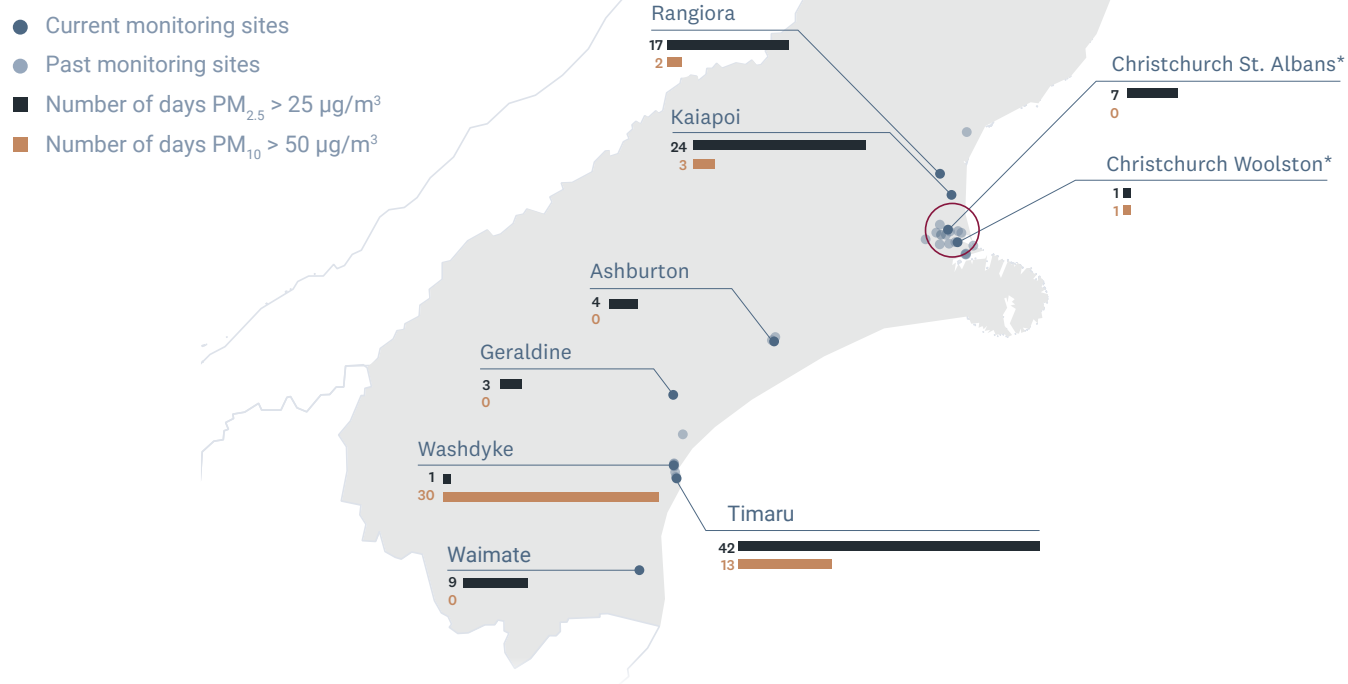
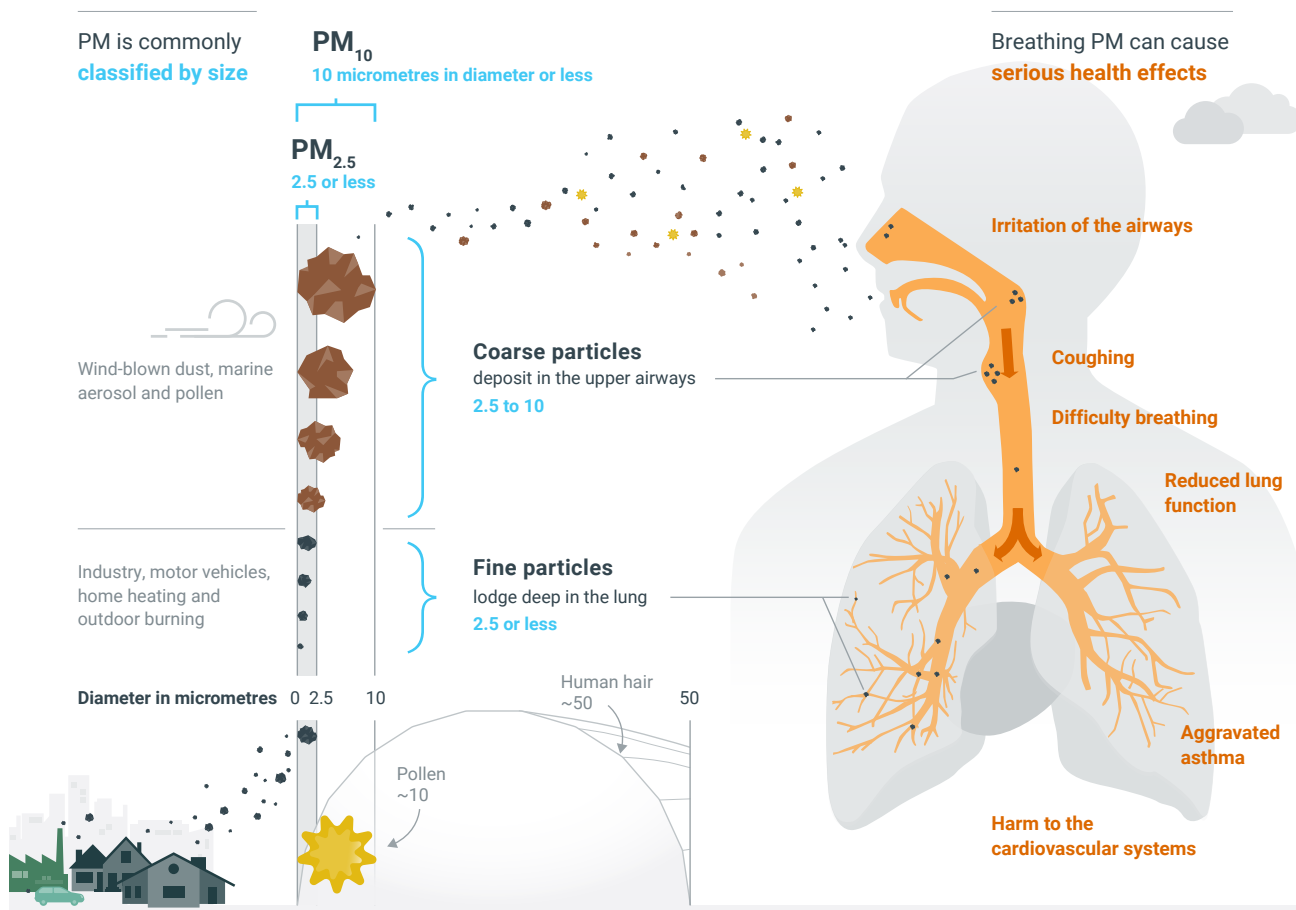


Figure 1: Number of days with high PM₁₀ and PM_{2.5} in 2021

Particulate matter and health



Standards and guidelines in Canterbury

The Ministry for the Environment (MfE) is responsible for setting national air quality guidelines and standards. These include the Ambient Air Quality Guidelines (AAQG, last updated in 2002) and the NESAQ. The NESAQ, introduced in 2004, includes standards for PM₁₀, NO₂, CO, SO₂ and O₃. These are currently under review, and future NESAQ are expected to include standards for PM_{2.5}. The recently updated WHO ambient air quality guidelines and the findings of the Health and Air Pollution in New Zealand (HAPINZ) study will most likely be considered during this review. For NO₂ these indicate health impacts occur at lower concentrations than those in the NESAQ.

All the standards and guidelines that can be used as benchmarks for air quality are shown in Table 2. There are allowable exceedances for some of the pollutant concentrations including one daily PM₁₀ exceedance of the NESAQ, and three for WHO guidelines.

In Canterbury we regulate PM_{2.5} concentrations through our CARP so the CARP guidelines are shown in the graphs on the following pages. PM₁₀ concentrations are shown with the 24-hour NESAQ of 50 micrograms per cubic metre of air (µg/m³) and the annual AAQ guideline of 20 µg/m³. NO₂ concentrations in Christchurch are shown with the WHO guideline for annual averages and the daily AAQ guideline of 100 µg/m³ as well as the updated WHO guideline of 25 µg/m³.

Table 2: Standards and guidelines for different averaging periods:

Pollutant	1-hour	8-hour	24-hour	Annual
PM ₁₀ (µg/m ³)			50 ¹ 45 ⁴	20 ³ 15 ⁴
PM _{2.5} (µg/m ³)			25 ² 15 ⁴	10 ² 5 ⁴
SO ₂ (µg/m ³)	350 ¹		120 ³ 40 ⁴	
CO (mg/m ³)	30 ³	10 ¹	4 ⁴	
O ₃ (µg/m ³)	150 ¹	100 ³		6-month average 60 ⁴
NO ₂ (µg/m ³)	200 ¹		100 ³ 25 ⁴	10 ⁴
Benzene (µg/m ³)				3.6 ³
Benzo(a)pyrene (µg/m ³)				0.0003 ³

¹ National Environmental Standards (2004)

² Canterbury Air Regional Plan (2017)

³ Ambient Air Quality Guidelines (2002)

⁴ World Health Organisation guidelines (2021)

What is Environment Canterbury doing in response to air pollution?

- Implementing the rules and policies under the CARP to meet the NESAQ including ensuring only compliant woodburners are installed in homes
- Annually reviewing and updating education and compliance approaches in each airshed in response to air quality data
- Helping householders reduce emissions through better wood burning for home heating
- Financial assistance for households to upgrade their home heating through subsidies
- Authorising low and ultra-low emissions technology for those who want to continue to use wood for home heating
- Working with key partners and stakeholders, such as Ngāi Tahu, territorial authorities, district health boards, government agencies, suppliers of home heating and industries
- Monitoring air quality in the eight airsheds
- Responding to smoky chimney complaints.

Actions everyone can take to reduce contaminant emissions

Home heating

- Burn dry, seasoned wood only
- Use better burning techniques (details at WarmerCheaper.co.nz)
- Get your fire going quickly with lots of kindling and keep it burning hot
- Don't damp your fire down over night
- Switch to a non-emitting home heating source
- Switch to a pellet fire or an ultra-low emission wood burner
- Never burn treated timber.

Vehicles

- Keep your vehicle regularly serviced and tuned
- Consider alternative travel methods—bus, bike or walk
- For your next car purchase choose a lower emission vehicle, such as a hybrid or electric vehicle
- Work from home, if suitable
- Reduce the number of vehicle journeys by doing several errands at once.

Find out about other air quality monitoring information:

- Environment Canterbury science reports – search for 'The science behind our air quality' at ecan.govt.nz
- LAWA air quality lawa.org.nz/explore-data/air-quality
- Ministry for the Environment air quality reports mfe.govt.nz/publications
- Statistics New Zealand Air indicators stats.govt.nz/topics/air

Key points

- Air pollution can be an issue in Rangiora, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Benzene was monitored for a year in 2009/2010 and the annual average was less than one third of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 2.
- Annual average PM₁₀ concentrations are below the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations are below the CARP guideline of 10 µg/m³.

- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 3.
- There were two days in 2021 when PM₁₀ concentrations exceeded 50 µg/m³, breaching the NESAQ.
- There were 17 days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Rangiora airshed

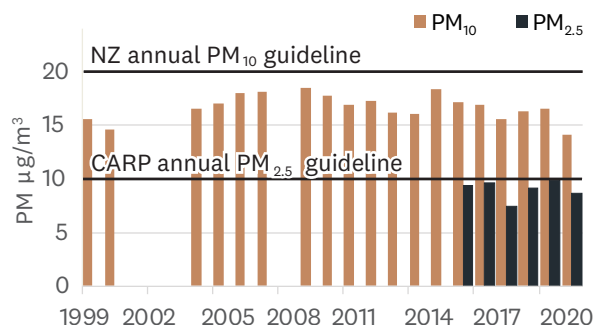


Figure 2: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Rangiora monitoring site. PM_{2.5} monitoring started in August 2015.

See lawa.org.nz/explore-data/air-quality to check air pollution in Rangiora during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

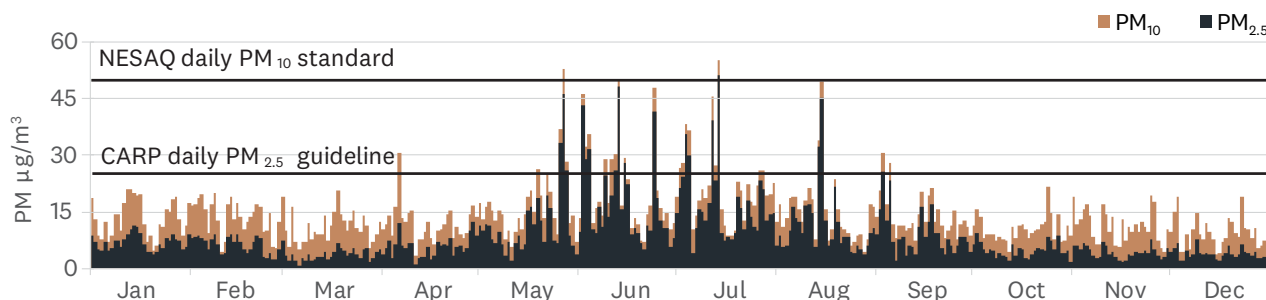


Figure 3: Daily average PM₁₀ and PM_{2.5} concentrations at the Rangiora monitoring site in 2021.

Key points

- Air pollution can be an issue in Kaiapoi, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Benzene was monitored for a year in 2009/2010 and the annual average was less than one third of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 4.
- Annual average PM₁₀ concentrations since 2012 are below the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations since 2020 are below the CARP guideline of 10 µg/m³.

- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 5.
- There were three days in 2021 when PM₁₀ concentrations exceeded 50 µg/m³, breaching the NESAQ.
- There were 24 days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Kaiapoi airshed

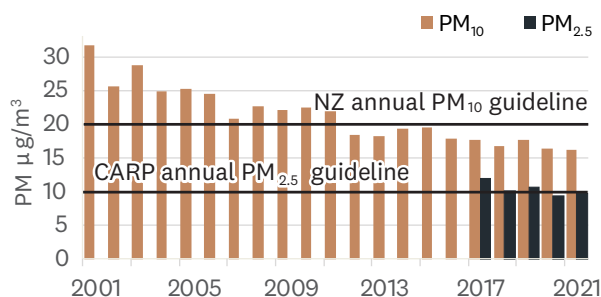


Figure 4: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Kaiapoi monitoring site. PM_{2.5} monitoring started in September 2017.

See lawa.org.nz/explore-data/air-quality to check air pollution in Kaiapoi during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

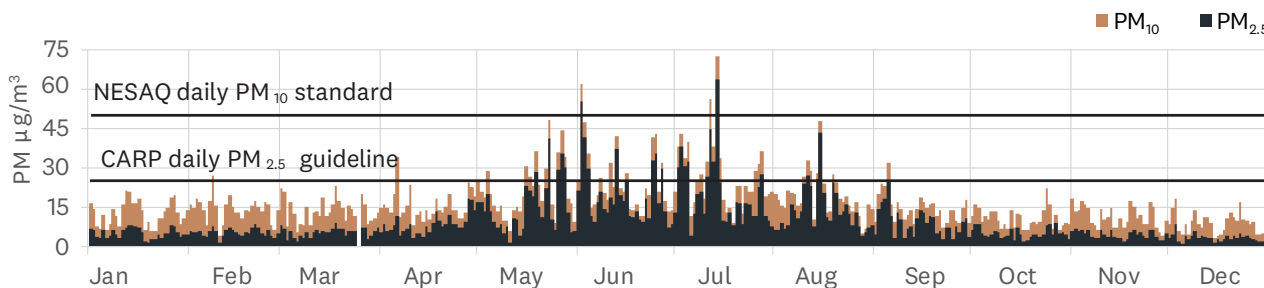


Figure 5: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Kaiapoi monitoring site in 2021.

Key points

- Air pollution can be an issue in Christchurch, mainly during the coldest months.
- PM₁₀, PM_{2.5}, NO₂, SO₂, CO, benzene and BaP have been measured.
- Monitoring sites are currently located in St Albans, Woolston and Riccarton. Historical monitoring has occurred at other sites*.
- Monitoring sites are influenced by different pollutant sources. St Albans is a residential area, there are several industries in Woolston, and Riccarton Rd is a busy, congested road.
- Pollutants mainly from motor vehicles include benzene, CO and NO₂, which have been monitored for many years at roadside sites.
- Pollutants mainly from smoke from home heating include PM₁₀, PM_{2.5} and CO.
- SO₂ comes from some industrial processes and burning fuels like coal in industrial boilers. Coal used to be used for home fires. With SO₂ concentrations now very low, monitoring has stopped.
- In 2008 the annual average benzene concentration at the Riccarton Road site was just over the guideline and has decreased since then. In 2021, the annual average was one quarter of the guideline.
- CO and NO₂ concentrations don't breach the NESAQ. Annual average NO₂ concentrations at the sites in Riccarton Road and St Albans have been higher than the 2021 WHO guideline (Figure 6).
- Annual average PM₁₀ and PM_{2.5} concentrations measured at the St Albans site are shown in Figure 7. In 2021, the St Albans site was moved and only PM_{2.5} was monitored.
- Annual average PM₁₀ concentrations since 2011 are below the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations since 2016 are below the CARP guideline of 10 µg/m³.
- Daily average PM₁₀, PM_{2.5} and NO₂ concentrations measured during 2020 and 2021 are shown in Figures 8, 9 and 10.
- There was one day in 2021 when PM₁₀ concentrations exceeded 50 µg/m³, which is not a breach of the NESAQ.
- There were seven days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- Figure 10 shows the difference between daily average NO₂ concentrations measured at the roadside site and in a residential area. The concentrations do not exceed the AAQ guideline. The updated WHO guideline is much less and there are many days when NO₂ concentrations exceeded 25 µg/m³. There have been no breaches of the NESAQ for NO₂, which is for an hour average.
- BaP was measured in 2003 and 2008 and the annual average concentration was ten times the guideline.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

*www.lawa.org.nz/explore-data/canterbury-region/air-quality/christchurch/

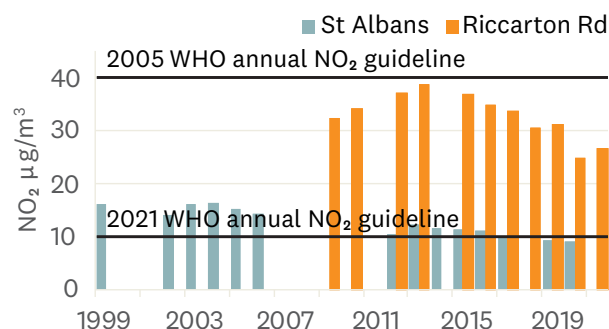


Figure 6: Annual average NO₂ concentrations measured at monitoring sites in Christchurch.

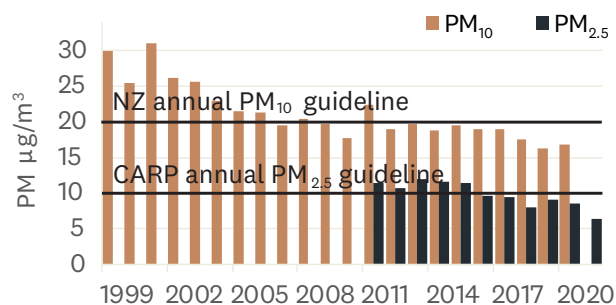


Figure 7: Annual average PM₁₀ and PM_{2.5} concentrations measured at the monitoring site in St Albans. PM_{2.5} monitoring started in 2011.

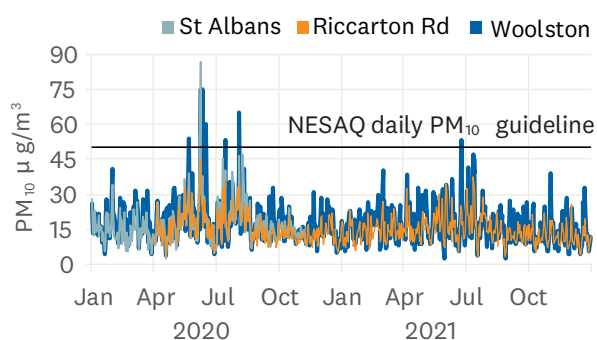


Figure 8: Daily average PM₁₀ concentrations measured at monitoring sites in Christchurch in 2020 and 2021.

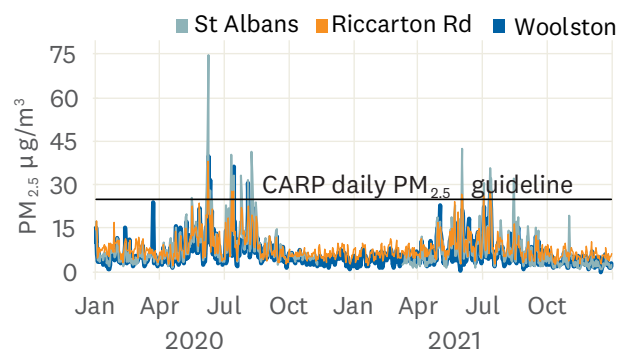


Figure 9: Daily average PM_{2.5} concentrations measured at monitoring sites in Christchurch in 2020 and 2021.

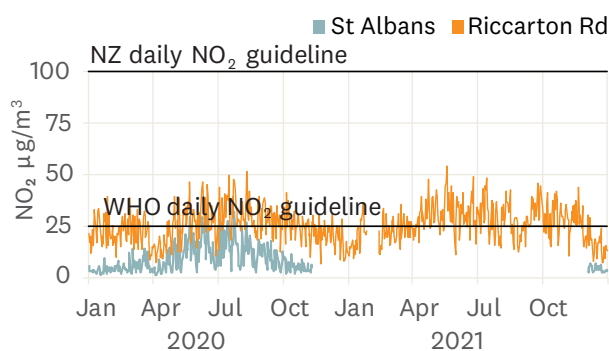
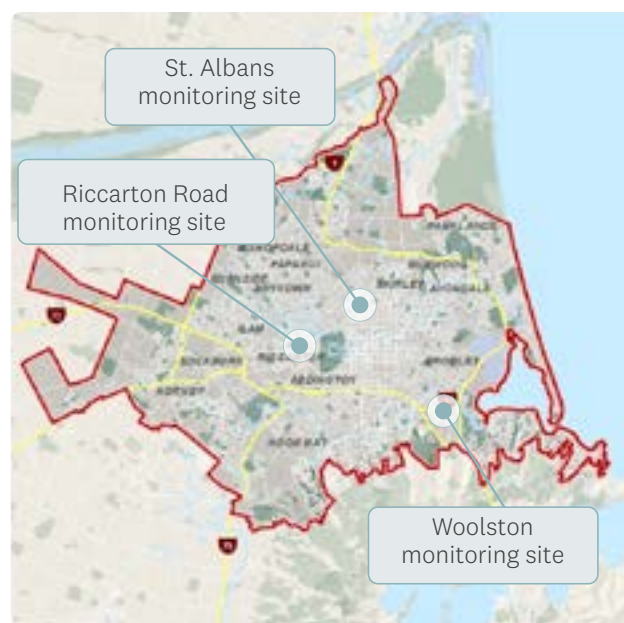


Figure 10: Daily average NO₂ concentrations measured at monitoring sites in Christchurch in 2020 and 2021.

See lawa.org.nz/explore-data/air-quality to check air pollution in Christchurch during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

The Christchurch airshed



Key points

- Air pollution can be an issue in Ashburton, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Benzene was monitored for a year in 2009/2010 and the annual average was less than one third of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 11.
- Annual average PM₁₀ concentrations since 2015 are below the NZ AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations since 2017 are below the CARP guideline of 10 µg/m³.

- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 12.
- PM₁₀ concentrations did not exceed 50 µg/m³ and the NESAQ hasn't been breached since 2018. Find out more at www.ecan.govt.nz/exceedances.
- There were four days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Ashburton airshed

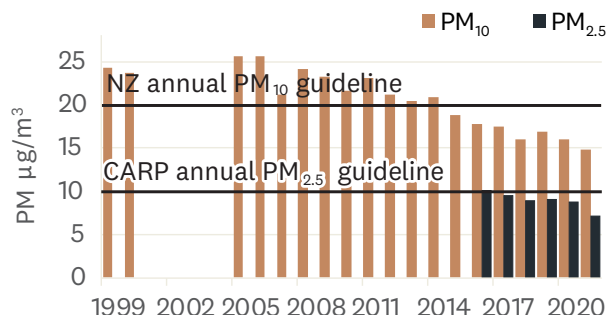


Figure 11: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Ashburton monitoring site. PM_{2.5} monitoring started in September 2015.

See lawa.org.nz/explore-data/air-quality to check air pollution in Ashburton during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

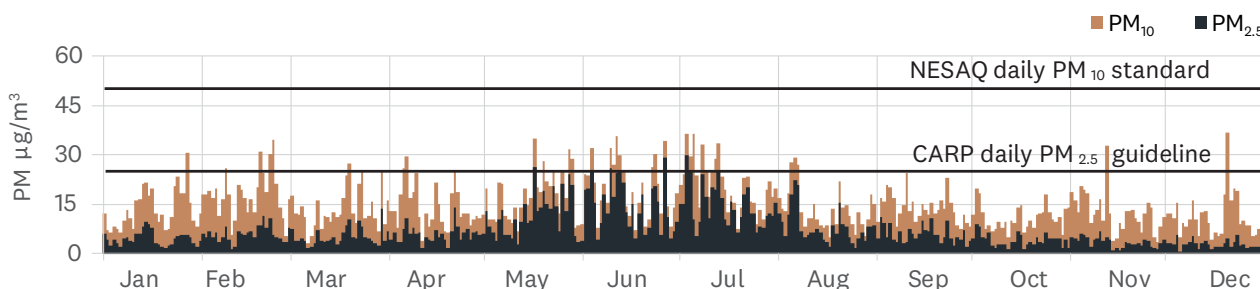


Figure 12: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Ashburton monitoring site in 2021.

Key points

- Air pollution can be an issue in Geraldine, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Benzene was monitored for a year in 2009/2010 and the annual average was less than one quarter of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 13.
- Annual average PM₁₀ concentrations since 2013 are below the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations since 2018 are below the CARP guideline of 10 µg/m³.
- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 14.
- PM₁₀ concentrations did not exceed 50 µg/m³ and the NESAQ hasn't been breached since 2015. Find out more at www.ecan.govt.nz/exceedances.
- There were three days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Geraldine airshed

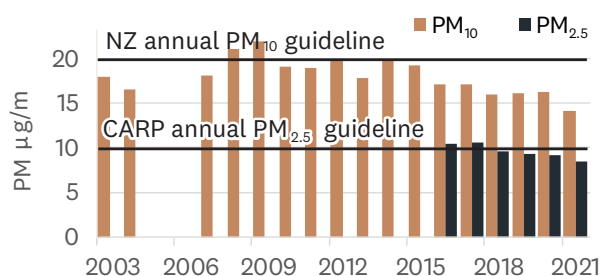


Figure 13: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Geraldine monitoring site. PM_{2.5} monitoring started in February 2016.

See lawa.org.nz/explore-data/air-quality to check air pollution in Geraldine during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

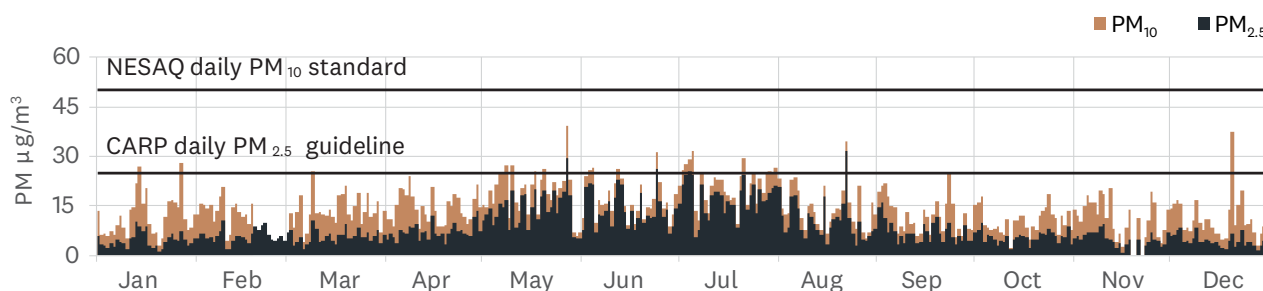


Figure 14: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Geraldine monitoring site in 2021.

Key points

- Air pollution can be an issue in Timaru, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Concentrations of NO₂ were below the NESAQ when monitored for 5 months in 2005 at the Grey Road site. However, because those concentrations are higher than the updated WHO guidelines, we will do further NO₂ monitoring at the site from 2023.
- Benzene was monitored for a year in 2007/2008 at three sites and the annual average was between one and two thirds of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 15.
- Annual average PM₁₀ concentrations are above the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations are above the CARP guideline of 10 µg/m³ except in 2020.
- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 16.
- There were 13 days in 2021 when PM₁₀ concentrations exceeded 50 µg/m³, breaching the NESAQ.
- There were 42 days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- BaP was measured in 2006 and 2012 and the annual average concentration was more than ten times the guideline.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Timaru airshed

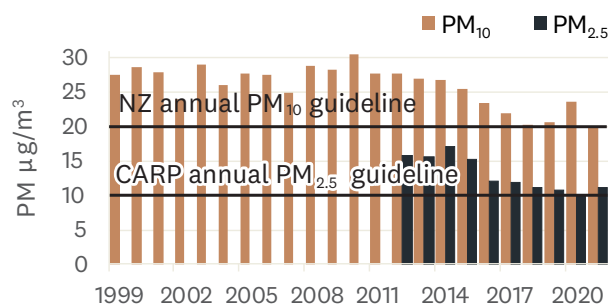


Figure 15: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Anzac Square monitoring site since 2006 and PM₁₀ at the Grey Road site before 2006. PM_{2.5} monitoring started in 2012.

See lawa.org.nz/explore-data/air-quality to check air pollution in Timaru during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

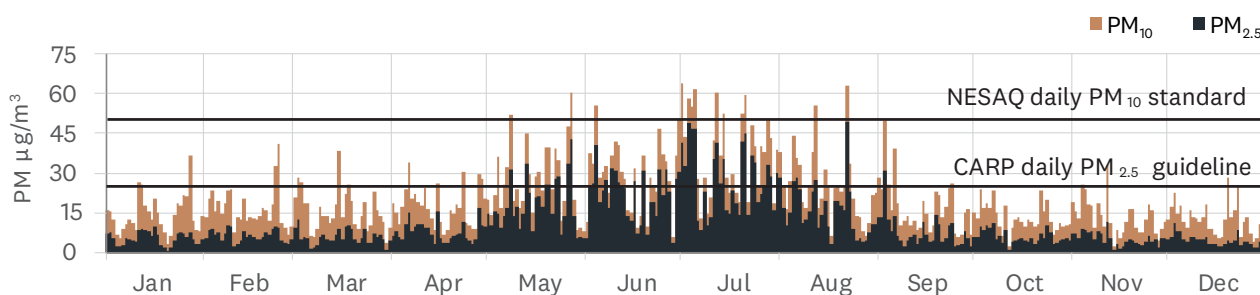


Figure 16: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Anzac Square monitoring site in 2021.

Key points

- Washdyke is a predominantly industrial area in the north of Timaru. The Washdyke airshed has different sources of air pollutants to other airsheds in Canterbury.
- These sources include road dust and dusty activities near the monitoring site during very light winds or calm periods; sea salt during light north-easterlies (especially when there is heavy sea-fog); soil particles during strong north-west winds; and dust from south of the monitoring site during strong southerlies.
- Most of the PM₁₀ measured are coarse, not fine particles, and the new location of the monitoring site from 2019 onwards is closer to sources of these particles.
- Due to redevelopment at the Washdyke Flat Road monitoring site, a new site was established on Meadows Road in March 2019.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years at both sites. SO₂ and CO concentrations were well below guidelines. Monitoring of CO has stopped.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 17.
- Annual average PM₁₀ concentrations at the new site are higher than at the old site and higher than the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations are below the CARP guideline of 10 µg/m³.
- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 18.
- There were 30 days in 2021 when PM₁₀ concentrations exceeded 50 µg/m³, breaching the NESAQ, usually on weekdays. At the Washdyke Flat Road site the number of PM₁₀ exceedances each year had ranged over the period of monitoring from one to six.
- There was one day in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- Monitoring of fine and coarse particles since July 2015 shows that most of the PM₁₀ particles were larger than 2.5 µm, especially outside the winter period, and indicate sources such as dust, rather than the woodsmoke from home heating.

The Washdyke airshed

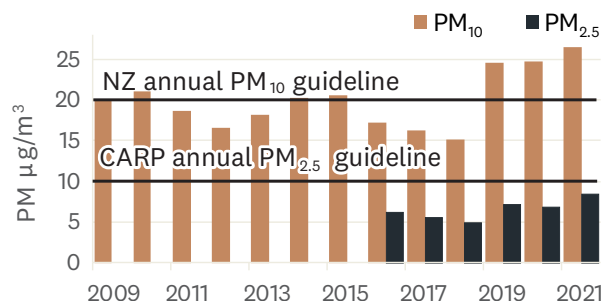
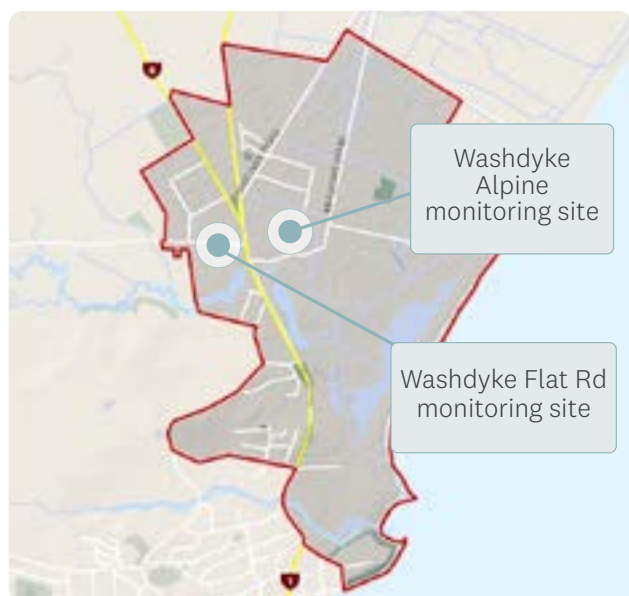


Figure 17: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Washdyke Flat Road monitoring site up until 2018 and Washdyke Alpine monitoring site since 2019. PM_{2.5} monitoring started in July 2015.

See lawa.org.nz/explore-data/air-quality to check air pollution in Washdyke during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

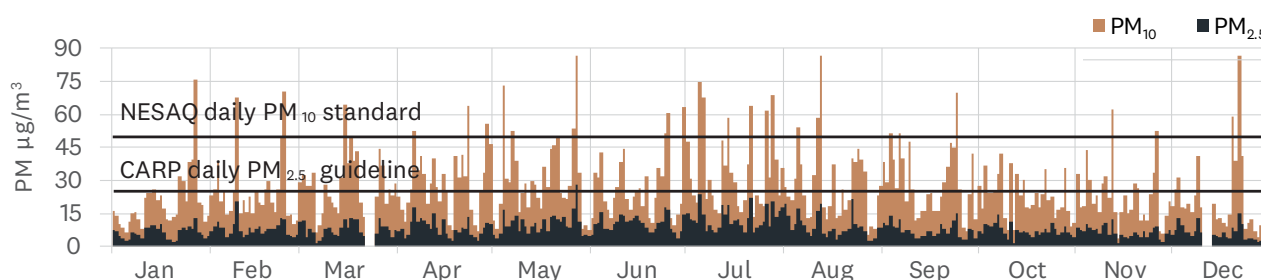


Figure 18: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Washdyke Alpine monitoring site in 2021.

Key points

- Air pollution can be an issue in Waimate, mainly during the coldest months.
- PM₁₀, PM_{2.5}, SO₂ and CO have been measured over several years. SO₂ and CO concentrations were well below guidelines and monitoring of these gases has stopped.
- Benzene was monitored for a year in 2009/2010 and the annual average was less than one quarter of the guideline.
- Annual average PM₁₀ and PM_{2.5} concentrations are shown in Figure 19.
- Annual average PM₁₀ concentrations since 2011 are below the AAQ guideline of 20 µg/m³.
- Annual average PM_{2.5} concentrations are below the CARP guideline of 10 µg/m³.

- Daily average PM₁₀ and PM_{2.5} concentrations measured in 2021 are shown in Figure 20.
- PM₁₀ concentrations did not exceed 50 µg/m³ and the NESAQ hasn't been breached since 2017. Find out more at www.ecan.govt.nz/exceedances.
- There were nine days in 2021 when PM_{2.5} concentrations exceeded 25 µg/m³. The number of days needs to reduce to zero by 2030 to meet our CARP.
- The main source of PM₁₀, PM_{2.5} and BaP in winter (when concentrations are highest) is home heating.
- Strategies are in place to reduce emissions of PM₁₀ from home heating and these will also lower emissions of PM_{2.5} and BaP.

The Waimate airshed

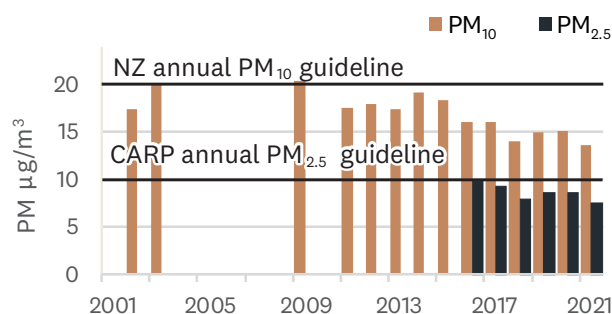


Figure 19: Annual average PM₁₀ and PM_{2.5} concentrations measured at the Waimate Kennedy monitoring site since 2016 and PM₁₀ at the Stadium site before 2016.

See lawa.org.nz/explore-data/air-quality to check air pollution in Waimate during the last few hours and days. You can also find more information on Environment Canterbury's air quality page ecan.govt.nz/data/air-quality-data

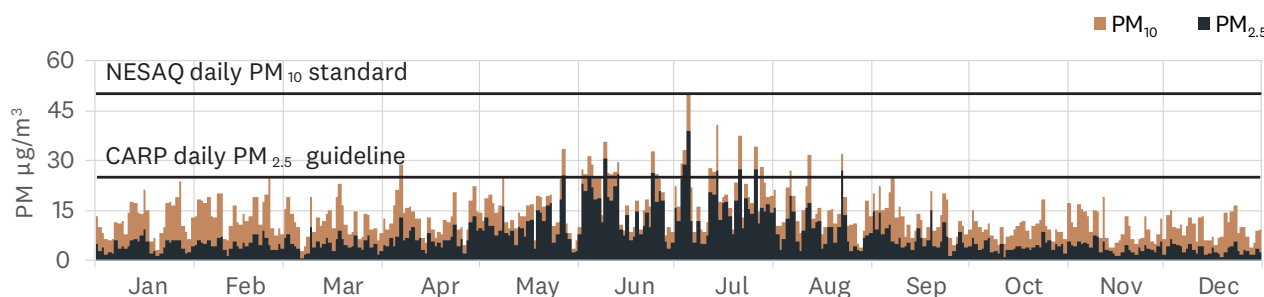


Figure 20: Daily average PM₁₀ and PM_{2.5} concentrations measured at the Waimate Kennedy monitoring site in 2021.

Environment Canterbury offices

Christchurch

200 Tuam Street
PO Box 345
Christchurch 8140

P 03 365 3828

Timaru

75 Church Street
PO Box 550
Timaru 7940

P 03 687 7800

Kaikōura

96 West End
PO Box 59
Kaikōura 7340

P 03 319 5781

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