



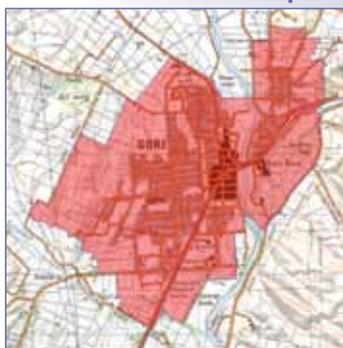
Air Quality

Annual Monitoring Summary 2011-12

Invercargill airshed



Gore airshed map



Further information

For more information on heating your home sustainably visit:
www.energywise.govt.nz

You'll find more details on the Air Quality Monitoring Programme and winter 2012 results on our website:
www.es.govt.nz.

For more information on the National Environmental Standards for air quality see: www.mfe.govt.nz

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Why we monitor air quality

Most poor air quality in Southland is caused by high levels of small particulate matter known as PM₁₀ from burning wood and coal for home heating in winter.

Regional Councils are required to monitor areas where air quality is likely or known to breach the PM₁₀ standard – these areas are known as 'airsheds' and PM₁₀ levels must comply with National Environmental Standards. Southland has two airsheds within Invercargill and Gore.

The National Environmental Standards (NES) for air quality are health-based standards – the daily level set for PM₁₀ is 50 micrograms per cubic metre (µg/m³) as a 24 hour average (midnight to midnight), with just one exceedance allowed per year. Government have recently amended the target dates for achieving this standard, with compliance required by 1 September 2016 for polluted airsheds such as Gore and 1 September 2020 (with an interim measure of 3 exceedances by 1 September 2016) for heavily polluted airsheds such as Invercargill.

A PM₁₀ particle is less than 10 microns in diameter - equivalent to one-fifth the diameter of human hair. These are easily inhaled and can be readily absorbed into the lungs so can cause significant health effects, particularly for the elderly and infants, people with asthma and other respiratory diseases and those with chronic conditions such as heart disease.

Studies have shown that over 90% of PM₁₀ emissions in the Southland airsheds come from solid fuel home heating appliances. The rate of coal use in the South Island is higher than the national average and coal fires emit significantly more PM₁₀ than even the least efficient wood burners. This, together with the likelihood of temperature inversions and generally lower winter temperatures, contributes to generally higher pollution levels and exceedances compared to the North Island. Weather has an important influence on air quality and yearly weather patterns are reflected in PM₁₀ levels, which will continue to vary.

Where and how we monitor air quality?

Environment Southland monitors air quality in Invercargill and Gore. We also investigate air quality in smaller towns – in 2012 these were Riverton and Te Anau. We use two types of equipment to collect data. Both draw a known volume of air through a filter, which captures particles that enter through a PM₁₀-sized inlet. One type is automated and monitors continuously every hour – this is used for monitoring within the airsheds. The other type is manually operated and operates for a 24 hour period at a time, working one day in two during winter and one day in six outside this period – this is generally used for reconnaissance monitoring. Values are reported as a mass/ flow unit - micrograms per cubic metre (µg/m³) averaged over 24 hours (midnight to midnight).



A layer of smoke pollution settles over Invercargill City

What was our air quality like in winter 2012

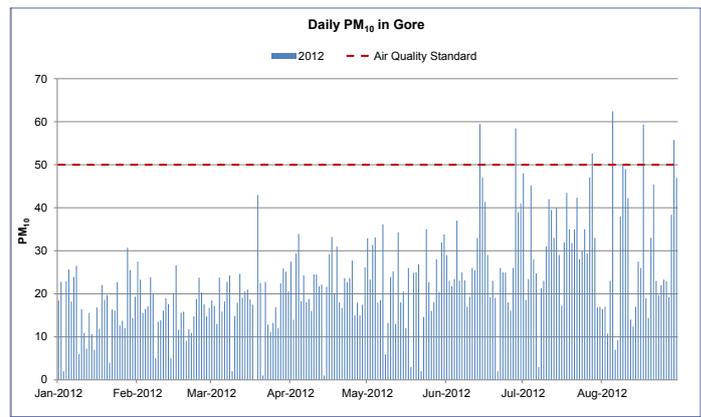
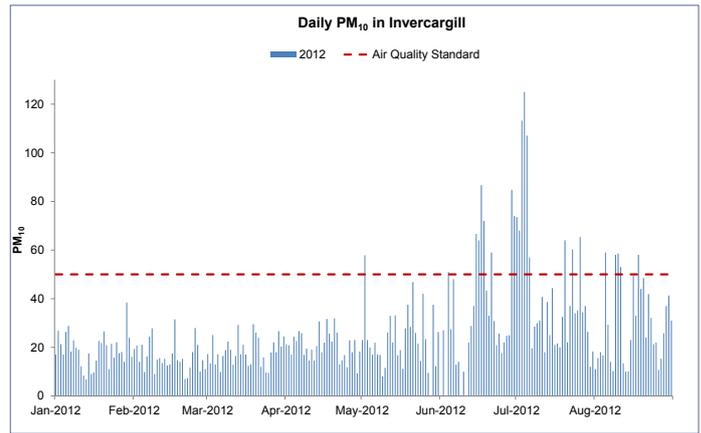
During winter 2012 there were a total of 23 confirmed exceedances reported in Invercargill, six in Gore and none in Riverton or Te Anau. This compares with the previous winter (2011) when there were 13 exceedances in Invercargill, four in Gore and none in Riverton or Te Anau. See graphs on the right.

What we did in 2012

- We continued our reconnaissance monitoring programme at Riverton and Te Anau.
- In the Gore airshed we continued a co-location study of the BAM monitoring method with the High Vol reference method which will enable us to determine a gravimetric equivalence (correction factor) to be applied to our measurements this year. This is already done in Invercargill.
- We continued to inform the public over the winter about air quality in Invercargill, Gore, Riverton and Te Anau, reporting weekly in *The Invercargill Eye* and *The Ensign*, monthly in *The Fiordland Advocate* and also on the Environment Southland website.
- In the Long-term Plan we added the position of an Air Quality Scientist to help progress the Air Plan Review and work towards achieving the NES for Air Quality.

Graphs on the right highlight the daily PM₁₀ concentrations in Invercargill and Gore during winter 2012.

The Invercargill NES Exceedence graph shows the number of days when the NES was exceeded; the maximum concentration and the second highest concentration from 2008-2012 (measured at Pomona Street).



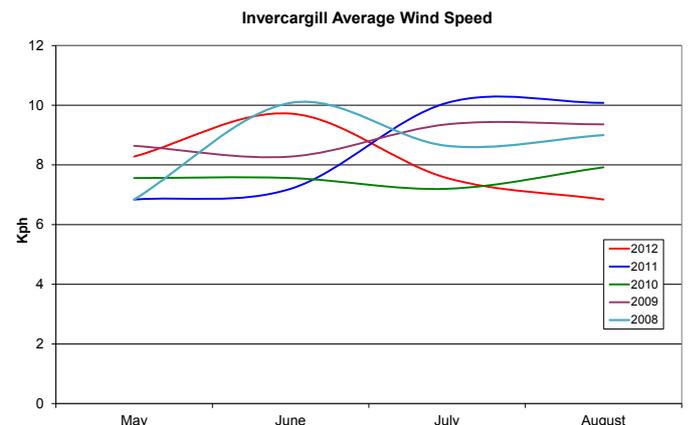
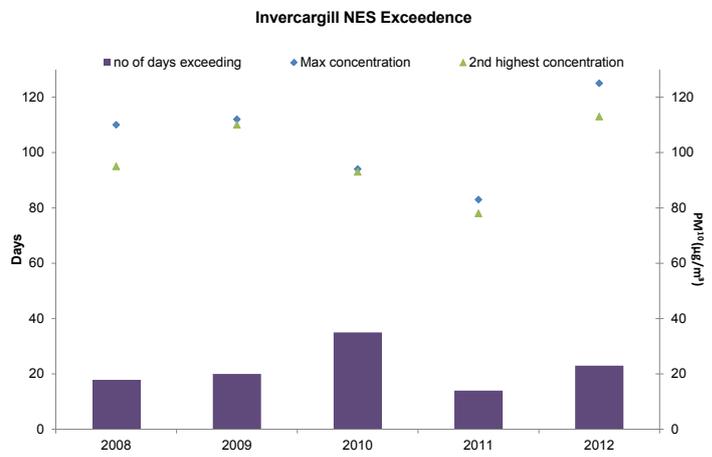
How to improve air quality

If you use a burner, the following steps will ensure clean burning and more effective heating:

- Burn dry wood.
- Burn smaller, hotter fires, as these are more effective and efficient.
- Never overload your burner with too much wood or coal.
- Do not turn down ('dampen down') your burner overnight – a slow smouldering fire creates lots of smoke.
- Ensure your chimney is clean – this also reduces the risk of chimney fires.

Results for Invercargill suggest PM₁₀ concentrations for 2012 were slightly worse than the previous year. However, the extent to which this reflects changes in actual emissions is uncertain due to the variability in annual weather conditions.

The Invercargill Average Wind Speed graph (right) shows that the average wind speeds for winter 2012 were almost the opposite to the previous year with a lower range of wind speeds for the latter half of winter, resulting in less dilution and dispersion of PM₁₀ emissions and increased likelihood of temperature inversion that can trap pollutants at ground level.



Summary

- The NES for PM₁₀ is exceeded in the airsheds of Invercargill and Gore.
- Solid fuel burning for domestic home heating is the main source of PM₁₀.
- Coal produces disproportionately more PM₁₀ emissions than burning dry wood.
- Studies have estimated that to achieve the NES, further reductions in PM₁₀ of 47% are required in Invercargill and 38% in Gore.
- An emission inventory study has indicated that on an average winter night, around 2681 and 798 kilograms of PM₁₀ is discharged in Invercargill and Gore respectively.