

Air quality patterns in Queenstown

Spatial PM₁₀ study: 2012

Study objective

Queenstown was designated in Air Zone 2 in the ORC Regional Plan (Air) based on its size and population density. Preliminary air quality monitoring indicated that the town's air quality was good and would not breach the National Environmental Standard for Air Quality (NESAQ). The NES sets a daily threshold concentration of 50µg/m³, with one exceedance allowed per year.

In winter 2012, ORC conducted a spatial air quality study using a portable monitor to sample PM₁₀ at numerous locations throughout the Queenstown air zone. The purpose of the study was to assess the original evaluation of compliance with the NES. In addition, due to the mobile nature of the monitor, areas of relatively high emissions and concentrations are identified. Overall, the information will assist with ORC's air quality management objectives.

Background

The Queenstown air zone, with a population of approximately 29,000, is located alongside Lake Wakatipu and includes the built-up area from the Fernhill suburb at Sunshine Bay around to, and including, Frankton. There is moderate use of solid-fuel domestic heating which is the source of the majority of PM₁₀. Cold-air drainage down the mountain sides in the evening assists in flushing smoke emissions out to the open lake area.

Study design

Using a portable air sampler, samples were taken at 45 locations during various times of day and night over several days. The real-time PM₁₀ sensor was mounted in a vehicle with the intake on the roof bar at about 1.5m above the ground. The monitor logged PM₁₀ data for about a minute at every site. Typically, two runs per session were done to ensure robust data collection. Then an overall spatial pattern was developed by averaging all the data.

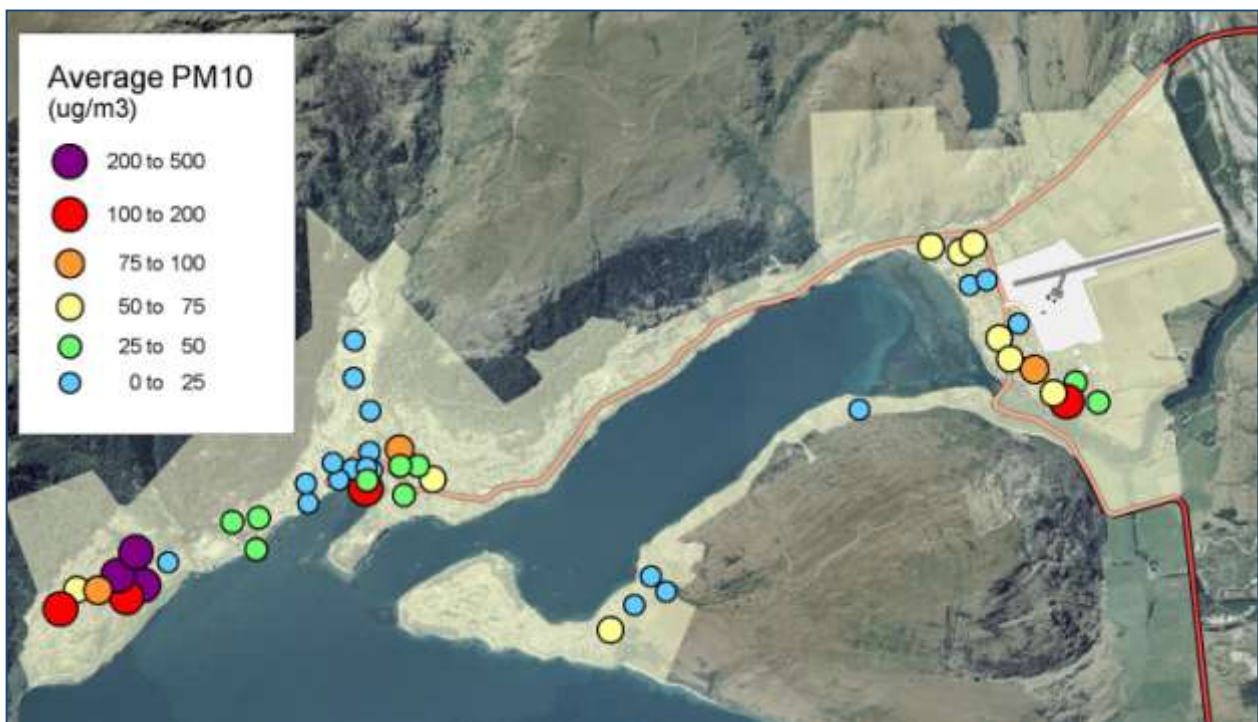


Results

Queenstown

Results show that Fernhill, located at the western end of the air zone (shaded yellow), is the area of highest concentrations. These concentration levels are high in the short-term, but observation showed that smoke dissipates relatively quickly due to fairly constant air movement in the area.

Some higher concentrations can also be found in the residential area up the hill behind the commercial zone, but overnight monitoring indicates that the air clears during the night time.



Frankton

In Frankton, on the eastern side of the air zone, PM₁₀ concentrations are relatively consistent throughout the town, with slightly higher values found in the southern portion. Causes may include a higher density of housing in that area, the fact that the area is a bit lower in elevation, and/or because the prevailing wind direction is from the northeast. Smoke may tend to accumulate there before it finds a way 'out' of the area.

Overall Queenstown Air Zone

Taking into account results of previous monitoring done in Queenstown and Frankton, along with the current project's results and observations, it appears that even though the area experiences some short-term degraded air quality in various locations during the evenings, overall it is most likely that the area will meet the standards set in the NESAQ.

For further information call Dr. John Threlfall or Deborah Mills at ORC: 0800 474 082.