



Office of
Environment
& Heritage



Air Quality Trends in the Illawarra

Key findings

Air Quality Trends in the Illawarra describes how air quality has changed in the Illawarra over the past two decades. The key findings are presented here. Air Quality Trends in the Illawarra is available in full on the Office of Environment and Heritage website.

Illawarra region

The Illawarra is home to about 300,000 people living in the Wollongong, Shellharbour and Kiama local government areas. The region occupies a relatively narrow strip, bounded by the Illawarra escarpment to the west and the coastline between Garie Beach in the north and Gerroa in the south. Proximity to the coast and the Illawarra's terrain significantly influences local weather patterns and consequently air quality in the region.

What is the Illawarra air quality monitoring network?

National air quality standards are intended to protect the community against the detrimental health impacts of air pollution. These standards cover six common air pollutants - carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), ozone, lead and particles as PM₁₀ (particles less than 10 micrometres in diameter) and an advisory standard for particles as PM_{2.5} (fine particles less than 2.5 micrometres in diameter).

The Office of Environment and Heritage operates a comprehensive air quality monitoring network to provide the community with accurate and up-to-date information about air quality. In the Illawarra, air quality monitoring is undertaken at Wollongong, Kembla Grange and Albion Park South, where common air pollutants are monitored and compared to national air quality standards. Data from the monitoring network is presented online as ambient concentrations and air quality index (AQI) values which are updated hourly and stored in a database.

You can access the data at [Air quality data readings](#). Air quality information for the Illawarra is also reported within annual reports at [OEH air quality monitoring reports](#).

What is the current state of air quality in the Illawarra?

Air quality in the Illawarra is similar to other Australian cities and is generally good by international standards. Over the past five years (2010–2014) air quality in the Illawarra was 'very good or good' for 78% to 85% of the time, 'fair' for 13% to 20% of the time, and 'poor or worse' for 1% to 7% of the time. Poor air quality generally occurs as a result of high levels of particle or ozone pollution. Years affected by bushfires, dust storms and high temperatures coincided with the greatest number of 'poor or worse' air quality days.

How has air quality in the Illawarra changed?

Air quality in the Illawarra has been generally improving over time. Carbon monoxide, nitrogen dioxide, sulfur dioxide and lead have decreased since the 1990s and are all consistently below national standards. However, particle (PM₁₀ and PM_{2.5}) and ozone levels can exceed national standards from time-to-time, posing health risks. Particle and ozone levels vary from year to year, often higher in hotter, drier years. Health effects from particle and ozone pollution are known to occur at levels below the current national standards, so continued efforts to reduce air pollutants will provide additional health benefits.

What is particle pollution and how does it affect health?

Particle pollution refers to matter suspended in ambient air, including solid particles, liquid droplets and aggregates of particles and liquids. While most particles are emitted directly

from sources, secondary particles can also be formed in the air by the chemical reaction of gaseous pollutants.

The particles of most concern are fine particles (PM_{2.5}). These small particles can be breathed deep into the lungs and even pass into the bloodstream. Exposure to particles is linked with increased risk of respiratory and cardiovascular disease. Those most affected by particle pollution are the elderly, children and people with existing heart and lung health conditions.

The chemical composition of PM_{2.5} measured at Warrawong is similar to that measured in Sydney and the Hunter. Fine particles are typically made up chemical elements such as ammonium sulfate, sea salt, black carbon, organic matter and soil. The composition of fine particles indicates that ambient particle pollution is due to particles emitted directly from sources (e.g. black carbon from vehicle and wood heater emissions), and from particles formed in the air from gaseous emissions (e.g. sulfur dioxide emissions react with ammonia to form ammonium sulfate particles). The composition of airborne particles also indicates that natural sources (e.g. sea salt) and human-made sources (e.g. road transport) contribute to PM_{2.5} concentrations. The small size of PM_{2.5} particles means that they can stay in the air for long periods (days to weeks) and travel considerable distances (100s to 1000s of km), explaining why the composition of ambient PM_{2.5} particles in the Illawarra is generally similar to Sydney and the Hunter.

What is ozone pollution and how does it affect health?

Ground-level ozone is formed in the air when oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) react in the presence of sunlight. It can be seen as a whitish haze or 'smog' on warm, sunny days.

Exposure to ozone pollution can cause respiratory difficulties, chest pain, throat irritation and congestion. It can also aggravate existing conditions such as bronchitis, emphysema and asthma.

What sources affect the Illawarra's air quality?

Air quality in the Illawarra is affected by sources in the region as well as sources outside the region. High ozone levels can occur due to the combined effect of local emission sources and air pollutants transported by wind down the coast from Sydney. Bushfires outside the region can contribute to high ozone and particle levels, as occurred in the October 2013 bushfires. Regional dust storms are responsible for some of the highest peaks in particle pollution, as occurred in the September 2009 dust storm which affected much of New South Wales.

Major sources of air emissions emitted in the Illawarra can be classified in the following sectors:

- **EPA-licensed industry** is a major source of particle, SO₂ and NO_x emissions in the Illawarra, with the highest emission levels occurring in the industrial area of Port Kembla. Iron and steel production, mining and quarrying are a major source of particle emissions from the industry sector. Emissions from the industry sector are regulated by the Environment Protection Authority (EPA) and appear to be decreasing.
- **Household activities and commercial businesses** are a significant source of near-ground level particle and VOC emissions. Residential wood heating accounts for over 90% of the particle emissions from this sector. The use of solvents, aerosols and paints are a major source of VOC emissions. Emissions from household activities and commercial businesses are largely unregulated and are increasing in line with population growth.

- **Road transport** is a notable source of NO_x and contributes to emissions of other air pollutants. Despite increases in vehicle activity over the past decade, emissions from road transport have decreased due to vehicle technology, stricter emission standards and cleaner fuels. Managing emissions from road transport remains a priority due to the potential for population exposure along transport corridors and the continued growth in vehicle activity.
- No emission standards are in place for **non-road equipment and transport**, which includes construction and mining equipment and rail locomotives. This sector is the largest source of fine particles that remains largely unregulated. Emissions from this sector are increasing.
- **Natural sources** include VOC emissions from forested areas, smoke from bushfires and wind-blown dust from exposed areas. Emissions from natural sources are greater in hotter, drier years.

The *Air Emissions in My Community* web tool presents air inventory data at a glance in a variety of interactive charts for the community to use. Data can be displayed for different areas, from the Illawarra, to local government area, and down to postcode level. You can find the tool at [Air emissions - Web tool overview](#).

The Environment Protection Authority implements a variety of programs to improve air quality. Detailed information can be found at: [Air – EPA NSW initiatives](#).

How will air quality change in the future?

Future air quality in the Illawarra will be affected by population growth, changes in transport and industrial activity levels, and changes in climate. The Illawarra is expected to be home to 365 000 people by 2031, exposing more people to air pollution. Reductions in emissions from road transport and the EPA-licensed industry sectors may be offset by increased emissions from the non-road equipment and transport and household sectors. Increased temperatures associated with climate change are projected to increase ozone pollution in the Illawarra.

Changes to rainfall, temperature and weather patterns may also increase bushfires and dust storms, leading to more particle pollution. You can access climate change projections for the Illawarra at [Adapt NSW](#).

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Every effort has been made to ensure that the information in this document is accurate at the time of publication. However, as appropriate, readers should obtain independent advice before making any decision based on this information.

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