DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

Air quality in the Upper Hunter Valley

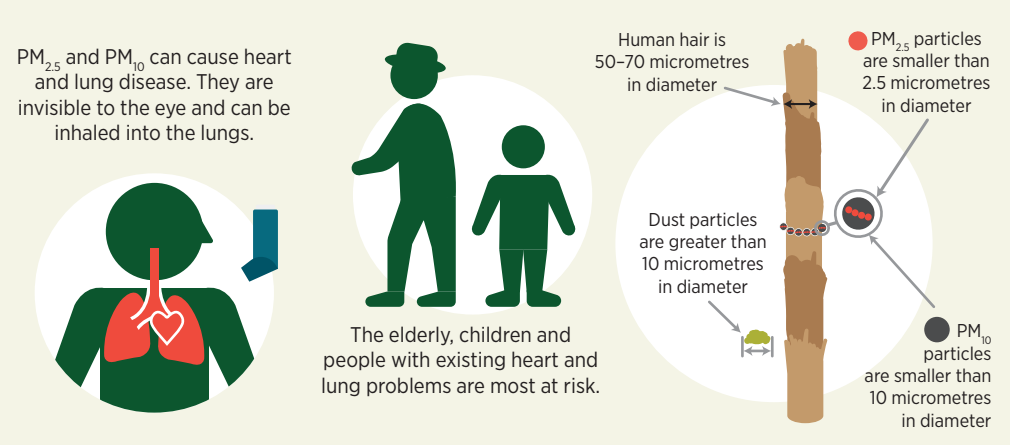
Your local air quality monitoring network

The NSW Government has been running 14 air quality monitoring stations in the Upper Hunter since the air quality monitoring network was fully established in 2012. We measure common air pollutants and weather conditions continuously. Air pollution levels are reported and updated hourly on the environment website.

Health effects of common air pollutants

Common air pollutants, such as particulate matter (referred to as PM_{10} and $PM_{2.5}$) and gases, are emitted from human activity and natural sources. PM_{10} and $PM_{2.5}$ also form in the air from chemical reactions between particles and gases, such as SO_2 (sulfur dioxide) and NO_2 (nitrogen dioxide). Long-term exposure to $PM_{2.5}$ from vehicles, industry, wood smoke and fires can cause from heart and lung disease. Short-term exposure may exacerbate the symptoms of these diseases.

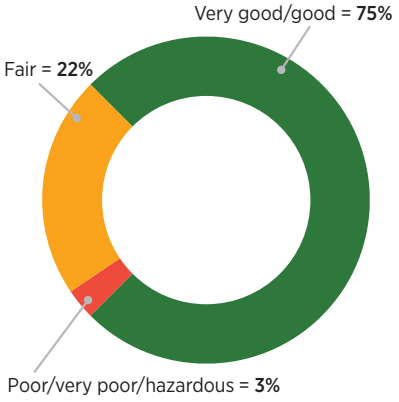
Most of the dust we see is made up of larger particles that are filtered out by our nose and throat. The smaller particles, PM_{10} and particularly $PM_{2.5}$, have the greatest health effects, because they can travel deep into the lungs.

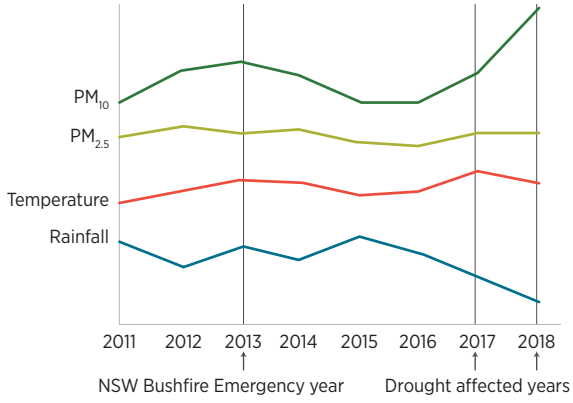


Trends in air quality

Air quality in the larger population centres, Muswellbrook, Singleton and Aberdeen, met national standards 97% of the time in 2012-2018.

In warm dry years, the PM_{10} and $PM_{2.5}$ particle levels increase, and air quality decreases.





What's happening in the Upper Hunter?

Climate, weather and low-lying terrain, as well as local particle sources, can influence air quality levels significantly in the Upper Hunter.

Particle pollution sources

The major sources of particle pollution in the Upper Hunter are coal mining, coal-fired electricity generation, non-road vehicles and equipment, planned burning and bushfires, windblown dust and household wood heating.

Dust travels a long way

Strong winds raise loose soil and transport dust over long distances. Windblown dust may travel from western parts of the state to the Upper Hunter when conditions are dry. Rain washes out pollutants in the air. When the ground is wet, windblown dust decreases.

The seasons influence our air quality

Smoke from wood heaters increases $PM_{2.5}$ particle levels in cooler months. Smoke from hazard reduction burning in autumn to spring and bushfires in spring and summer increase PM_{10} and $PM_{2.5}$ particle levels.

Windblown dust during dry conditions, especially in spring and summer, increases PM_{10} particle levels. Winds typically flow from the south-east in warmer months and change to north-westerly in cooler months.

Low-lying terrain may trap particle pollution

Low-lying areas may trap air pollutants overnight when the air is calm. In winter, wood smoke from household wood heaters may build up to harmful levels in Muswellbrook and Singleton.

Climatic influences

Drought increases dust and bushfire risk. Climate change intensifies hot dry phases in natural climate variability.

Case study: Sources of $PM_{2.5}$ particles in Muswellbrook and Singleton in 2012

The CSIRO studied the make-up of $PM_{2.5}$ particles collected at Muswellbrook (M) and Singleton (S), in 2012–2013, the first years of operation of the Upper Hunter Air Quality Monitoring Network. The findings led the government and councils to raise community awareness of the potentially harmful levels of $PM_{2.5}$ from wood smoke in winter. The bar graphs below show the findings of the study.

Sources of overall air pollution		Sources of $PM_{2.5}$ air pollution (%)
Vehicles and industry	Coal mining activity and equipment, coal-fired power stations and motor vehicles emit PM_{10}, $PM_{2.5}$, NO_2 and SO_2.	M 31% S 40%
Wood smoke from home heating	Household wood heating in cooler months emits $PM_{2.5}$ particles.	M 31% S 15%
Sea salt combined with particles from industry	Sea salt combines with particles from industry, over time, to form $PM_{2.5}$ particles.	M 13% S 17%
Bushfires and planned burns	Smoke from bushfires and hazard reduction burning emits PM_{10} and $PM_{2.5}$.	M 12% S 8%
Soil	Dust storms transport windblown PM_{10} and $PM_{2.5}$ particles across the region.	M 10% S 12%
Fresh sea salt	PM_{10} and $PM_{2.5}$ particles are blown inland as fresh sea salt from the coast.	M 3% S 8%

Air quality varies across the Upper Hunter due to local particle sources and surface exposure to wind

Particle levels vary between monitoring stations, due to local particle sources and exposure to wind. Four types of monitoring stations help to understand the air quality throughout the region. Stations in larger population centres and smaller communities measure air quality experienced in these centres.

Diagnostic stations measure air quality near mines to help diagnose sources and movements of particles. Background stations measure air quality at the north-west and south-east extents of the Upper Hunter.

For more information

Simple steps to protect your health: www.health.nsw.gov.au/environment/air/Pages/simple-steps.aspx

Air pollution alerts by email or SMS: www.environment.nsw.gov.au/aqms/subscribe.htm

Air pollution levels (updated hourly): www.environment.nsw.gov.au/aqms/uhunteraqmap.htm

Common air pollutants: www.health.nsw.gov.au/environment/air/Pages/common-air-pollutants.aspx

NSW Air Quality Index: www.environment.nsw.gov.au/topics/air/understanding-air-quality-data/air-quality-index

Upper Hunter air quality monitoring network: www.environment.nsw.gov.au/topics/air/monitoring-air-quality/upper-hunter

Upper Hunter Air Quality Advisory Committee: www.epa.nsw.gov.au/working-together/community-engagement/community-news/upaq-advisory-committee

Seasonal air quality reports: www.environment.nsw.gov.au/topics/air/upper-hunter-air-quality-reports

How to reduce your wood smoke: www.epa.nsw.gov.au/news/media-releases/2019/epamedia190619-wood-smoke-isnt-good-smoke---tips-to-reduce-wood-heater-pollution

How the EPA regulates industry: www.epa.nsw.gov.au/your-environment/air/industrial-emissions

Industry compliance with project approvals: www.planning.nsw.gov.au/Assess-and-Regulate/About-compliance/Inspections-and-enforcements

Upper Hunter Fine Particle Characterisation Study: www.environment.nsw.gov.au/topics/air/research/previous-research/upper-hunter-fine-particle-characterisation-study

What are we doing to protect people and air quality in the Upper Hunter?

Clean air is important for our health. Air pollution is a local, regional and global issue. The choices and actions of governments and people can improve the liveability of our communities.

Getting the message out

Air quality alerts are issued to the media and subscribers when air quality is poor. Hunter New England Health encourages community members to check the local air quality index to find information on current air pollution levels. Seasonal and annual newsletters report air quality compliance with national health goals.

Regulating industry

The NSW Government actively regulates industry to reduce emissions of air pollutants. The EPA requires mines to minimise dust from their activities. It inspects mines, especially during hot, dry weather. The EPA reviews the licences of mines, power stations and other industries to limit emissions.

The Department of Planning, Industry and Environment's Compliance Team regulates coal mines through a project approval procedure. The approval has conditions to manage air quality, including a requirement to implement an Air Quality Management Plan to monitor and minimise air pollution.

The NSW Resources Regulator regulates the exposure of workers to dust as well as mine rehabilitation.

Minimising smoke impacts from bushfires

The NSW Government reduces the risks of large bushfires by conducting controlled hazard reduction burning, which also benefits our native ecology. Weather conditions are considered when planning hazard reduction burning, to minimise air quality impacts.

Heating homes sensibly

Wood smoke from household wood heating increases particle pollution in cooler months. The NSW Government and local councils offer support to help householders switch to cleaner heating sources.

Reducing soil exposure

Effective land management means improving ground cover. Rehabilitation of exposed and disturbed soil surfaces reduces the risk of windblown dust.

Have your say

- To have your say on air quality in the Upper Hunter, email info@epa.nsw.gov.au, marked 'For the attention of the Upper Hunter Air Quality Advisory Committee'.
- To report pollution, phone 131 555 (the NSW Environment Protection Authority's Environment Line) or email info@epa.nsw.gov.au.
- For urgent health issues, please contact your GP or hospital emergency department. To report public health concerns, contact Hunter New England Health Population Health, on (02) 4924 6477.

Photo: Singleton Air Quality Monitoring Station (Jason Potts/DPIE)

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