NSW GOVERNMENT

CLEANAIR FOR NSW

MONITORING AIR QUALITY IN NSW

WHAT IS THE NSW AIR QUALITY MONITORING NETWORK?

NSW Government operates an extensive network of accredited air quality monitoring stations to provide the community with accurate and up-to-date information about air quality[1]. The NSW Air Quality Monitoring Network (AQMN) includes 43 monitoring stations across several networks:

- government networks monitoring regional air quality to assess general population exposures and compliance with national standards:
  - 4 regional NSW stations Albury, Bathurst, Tamworth and Wagga Wagga
  - 15-station Greater Sydney network
  - 3-station Lower Hunter network
  - 3-station Illawarra network
  - 1-Central Coast station
- industry funded, government operated networks:
  - 14-station Upper Hunter network
  - 3-station Newcastle Local network

Air pollutants measured are particles (PM_{10}, $PM_{2.5}$), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3) and nitrogen dioxide (NO_2). Wind speed and direction, air temperature and humidity are also recorded. An Air Quality Index (AQI) is used to summarise the overall air quality based on all air pollutants measured, with air quality classified as 'very good', 'good', 'fair', 'poor', 'very poor' and 'hazardous'[2].

HOW DOES MONITORING IN NSW COMPARE WITH INTERNATIONAL PRACTICES?

A review of the NSW Air Quality Monitoring Network in 2016 found that it compares favourably to air quality compliance networks in the Unites States, Europe and Canada. Areas identified for improvement were the expansion of $PM_{2.5}$ monitoring, noting that recent changes to national standards will require further monitoring and reporting for $PM_{2.5}$ by 2018, and the need to update the NSW Air Quality Monitoring Plan and reassess, on a risk basis, the need for additional monitoring sites given population growth in some regions. In 2016 and 2017 $PM_{2.5}$ monitoring was rolled out to all stations across the NSW Air Quality Monitoring Network, and a review into the need for further sites is underway.

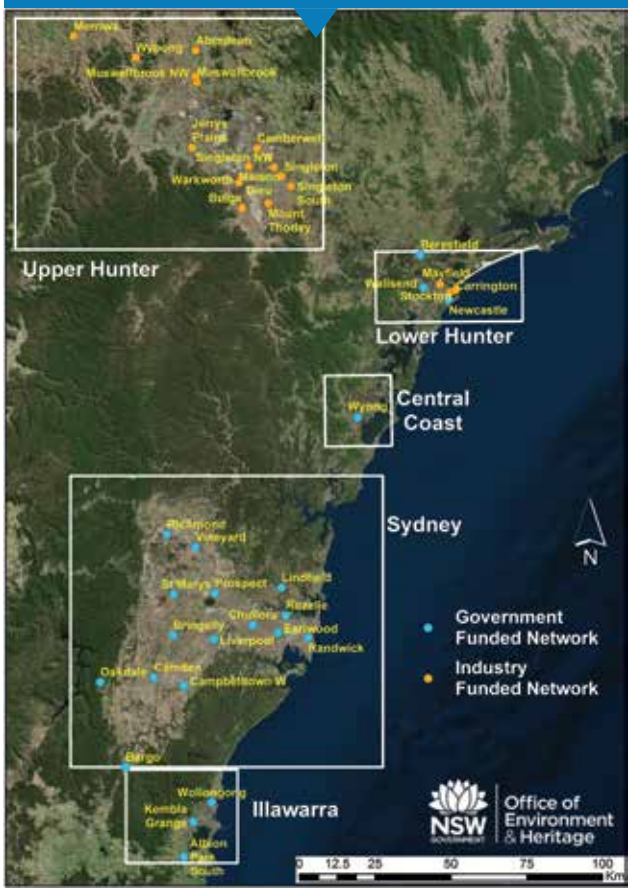
WHAT ABOUT AIR POLLUTION INCIDENT MONITORING?

Air pollution from major incidents such as large bushfires and industrial accidents pose a risk to the health and well-being of NSW communities. Timely access to best available information on air pollution and associated health risks is needed to inform emergency management responses to reduce health impacts within communities affected by major incidents.

NSW government has established air pollution incident response monitoring capabilities for incidents where air quality impacts may be experienced in the community for a period of several days or longer. Portable monitoring pods are equipped with compliance air quality monitors and meteorological monitors, and are fitted with communications systems for rapid transfer of information to a publically accessible website. These pods have been used to investigate an industrial fire at Chullora in Sydney and hazard reduction burn smoke at Kembla Grange in the Illawarra. When not being used for incidents, the pods are deployed to support research programs.

IN 2016 AND 2017 $PM_{2.5}$ MONITORING WAS ROLLED OUT TO ALL STATIONS ACROSS THE NSW AIR QUALITY MONITORING NETWORK

Air quality monitoring stations in the Sydney, Illawarra, Central Coast, lower Hunter and upper Hunter regions



OEH Portable air quality monitoring pod

HOW AND WHY IS PARTICLE COMPOSITION MEASURED?

NSW Government partners with CSIRO and the Australian Nuclear Science and Technology Organisation (ANSTO) to sample and study the chemical composition of airborne particles to help identify sources contributing to particle pollution. The Upper Hunter Fine Particle Characterisation Study[3] delivered in 2013, and Lower Hunter Particle Characterisation Study[4] completed in 2016, contributed to the evidence base that Government relies on to inform policies and programs to reduce particle air pollution. The Office of Environment and Heritage (OEH) continues to partner with ANSTO to support ongoing sampling and chemical speciation analysis of $PM_{2.5}$ in Sydney and the Lower Hunter.

OEH is testing the measurement of 'black carbon' using seven wavelength aethalometers at sites in Sydney and the Lower Hunter to provide information on the likely sources contributing fine particle pollution. Black carbon is a major component of $PM_{2.5}$ in urban areas and has received increasing attention internationally due to its effects on urban air quality, public health and global climate. These fine particles are directly emitted into the air during the incomplete combustion of fossil fuels used for transport, heating and industrial activities, and from vegetation fires. The monitoring of black carbon as a proxy for traffic combustion exhaust is being applied in a number of European, American and Asian urban environments.

HOW WILL SENSORS BE USED IN FUTURE IN NSW?

NSW Government is collaborating with leading research partners and environment agencies in Victoria, South Australia and Queensland to design and deploy sensor networks for real-time air pollution mapping. RMIT, Curtin University, Tsinghua University in Beijing, and environment agencies in Victoria, Queensland and South Australia. Data from sensor networks will be integrated with high quality AQMN data, regional airshed modelling and remote sensing information. Applications will include intra-urban mapping of air quality to investigate pollution levels within transport corridors, and network deployment to investigate the impact of smoke from bushfires and planned burns on NSW communities.

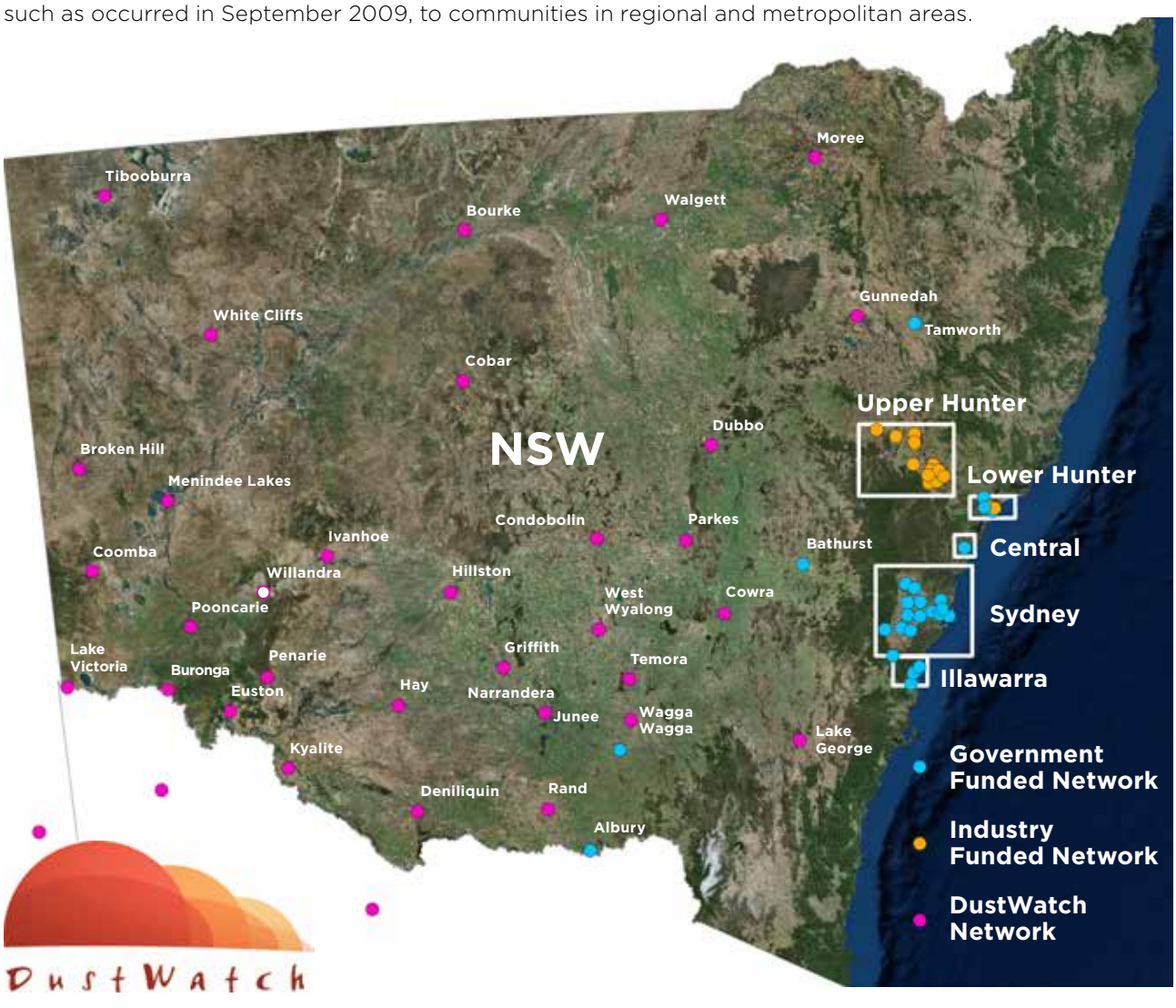
WHAT IS DUSTWATCH?

DustWatch is a community program that monitors and reports on the extent and severity of wind erosion across regional NSW. For over a decade OEH scientists, with support from the community and other government agencies, have:

- reported on the extent and severity of wind erosion
- raised awareness of the effects of wind erosion on the landscape
- raised awareness of the impacts of dust on the community.

In 2017 the community-driven DustWatch will be integrated as a Tier 2 network within the NSW Air Quality Monitoring Network. This will involve testing and enhancing measurements for air quality assessment purposes and serving data and information from the OEH air quality website.

The addition of DustWatch to the state network will help deliver real-time air quality information for communities in regional NSW, while continuing to provide early warnings of major regional dust storms, such as occurred in September 2009, to communities in regional and metropolitan areas.



1 NSW Office of Environment and Heritage (2015). Monitoring Air Quality, http://www.environment.nsw.gov.au/aqms/index.htm

2 NSW Office of Environment and Heritage (2015). About the Air Quality index, http://www.environment.nsw.gov.au/AQMS/aboutaqi.htm

3 Hibberd MF, Selleck, PW, Keywood MD, Cohen DD, Stelcer E and Atanacio, AJ (2013). Upper Hunter Fine Particle Characterisation Study. http://www.environment.nsw.gov.au/aqms/uhaqmnfpcs.htm

4 Hibberd MF, Keywood MD, Selleck PW, Cohen DD, Stelcer E, Scorgie Y & Chang L (2016). Lower Hunter Particle Characterisation Study, April 2016. http://www.environment.nsw.gov.au/aqms/lowhunterparticle.htm