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AIR QUALITY MONITORING

To ensure that all Virginians have healthy and clean air to breathe, the Department of Environmental Quality monitors Virginia's air pollutant levels daily. DEQ's Office of Air Quality Monitoring works with the Environmental Protection Agency to uphold standards for clean air under the U.S. Clean Air Act and monitors for the following six main pollutants: ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, particle pollution and lead.

When present in large concentrations, these pollutants can cause health problems, including lung irritation and cardiac stress, can aggravate conditions like asthma and heart disease and can cause damage to crops and forests. The EPA established the National Ambient Air Quality Standards to regulate how much of each pollutant is allowable in the air. The two agencies work together to see that Virginia's air meets these standards.

DEQ issues air quality forecasts for fine particulates in the metropolitan areas of Richmond, Roanoke, Hampton Roads and Winchester using meteorological, statistical and collected data. The forecast for Northern Virginia is issued through a collaborative effort with other state and local meteorologists and monitoring personnel in the greater Washington, D.C., metropolitan area. Forecasts and other information are available on DEQ's air monitoring web site, www.deq.virginia.gov/airmon.

How DEQ monitors air quality

The DEQ Office of Air Quality Monitoring is responsible for organizing and maintaining the instruments used in the monitoring network around the Commonwealth and regularly retrieves data from approximately 50 monitoring sites in the state. The agency's air data analysis group uses the data to make forecasts of air quality.

Virginia's monitoring stations are primarily in or near urban areas, such as Richmond, Roanoke, Hampton Roads, Winchester and Northern Virginia. Locations are determined by factors such as population density, emissions sources, permitting needs, modeling results and site accessibility. The office works with the Maryland, Washington, D.C., Alexandria and Fairfax County to monitor air quality in Northern Virginia.



DEQ's Anton Sorkin installs a particle pollution monitor at a Henrico County site.

DEQ also operates some stations in rural areas that are near these urban areas. They provide background air quality data and help assess the amount of pollution that urban areas contribute to surrounding air. In addition, rural sites provide examples of long-range transport of pollution that comes into Virginia from outside its borders. For instance, the station in Shenandoah National Park, which is 3,000 feet above sea level, allows DEQ to observe pollutant concentrations high in the atmosphere that could descend to more populated areas.

The monitors used to measure air quality operate continuously and must be located in secure, temperature-controlled shelters that are powered with electricity and connected to telephone service. The figures are compiled and automatically sent to the DEQ and EPA AIRNow web sites, where they are used to produce maps and inform the public of the current Air Quality Index (AQI), a calculated measurement of air quality from ozone and fine particle pollution information over several hours. A higher AQI indicates a higher level of air pollution and, consequently, a greater potential for health problems.



Above: Rockpoint Overlook, Augusta County, Virginia

Air Quality Index Levels of Health Concern	Color	Numerical Value	Meaning
Good	Green	0-50	Good air quality. Little or no health risk.
Moderate	Yellow	51-100	Moderate air quality. People who are unusually sensitive to air pollution may be mildly affected.
Unhealthy for Sensitive Groups	Orange	101-150	Unhealthy for sensitive groups. These groups may experience health problems due to air pollution.
Unhealthy	Red	151-200	Unhealthy. The general public may experience mild health effects. Sensitive groups may have more serious health problems.
Very Unhealthy	Purple	201-300	Very unhealthy. Everyone is susceptible to more serious health problems.

The Air Quality Index is a measurement calculated daily from ozone and fine particle pollution measurements. It is color-coded by level of health concern.

How monitoring information affects Virginians

Virginia focuses primarily on monitoring ground level ozone and particle pollution.

Ground-level ozone is a colorless gas formed by the chemical reaction of pollutants from automobiles, industries, and other sources, in the presence of sunlight. Ozone is a seasonal pollutant and occurs mainly in the summer months during weather periods of hot, stagnant air. Ozone levels are significantly lower in the cooler months and, as a result, DEQ's ozone monitors run only from April 1 to October 31. Harmful ozone pollution can lead to aggravated asthma or to inflammation and damage to the lungs.

Particle pollution consists of microscopic particles of solids and liquid droplets suspended in air, some of which are so small that they are only one-fifth the size of a human hair. This matter is made up of particles found in soot, dust, smoke and fumes produced from burning coal, oil, diesel and other fuels. These particles are of greatest concern because they can be inhaled deep into the lungs and cause respiratory issues or aggravate existing lung and heart problems. Particle pollutants have been linked to chronic bronchitis, asthma and heart attacks.

DEQ maintains a daily log of current air quality conditions at www.deq.virginia.gov/air and provides the information to the EPA, news media and other state agencies. The EPA's AIRNow web site is another resource for information on the daily AQI and is located at www.epa.gov/airnow.

Future air monitoring issues

EPA made the national air quality standards for ozone stricter in 2008 and is proposing to make the standard even more strict in 2010. Many areas of Virginia may not meet the new standard for ozone depending on where EPA ultimately sets it. DEQ is working with EPA to devise strategies to meet the new standard in all areas of the state.

Northern Virginia has been designated nonattainment for particles because it is part of the greater Washington metropolitan area. Air quality has improved in the Washington metropolitan area so that the area is now meeting the 1997 standards. Information from all other areas of the state shows Virginia meets the standards for particles. Once new emissions controls on PM_{2.5} precursors take effect, DEQ expects that Virginia will have even better air quality in regard to particulate matter.

As part of the future monitoring strategy, EPA is placing added focus on air toxics monitoring. In addition, EPA is reviewing the existing standards for sulfur dioxide, carbon monoxide and oxides of nitrogen and is placing greater emphasis on trace levels of these pollutants. As a result, DEQ will be expanding its monitoring network across the state.

Once Virginians are aware of the air quality in their area, they can take precautionary steps to reduce future problems and to stay safe and healthy. By reducing emissions, the public can help reduce pollutants in the air we breathe.

More information on DEQ's efforts is available on the Office of Air Quality Monitoring web site at www.deq.virginia.gov/air.