

It's the air you're breathing... Think. Act. Breathe.

What is air pollution?

Where does air pollution come from?

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How can I protect myself and my family? What can I do to help)?!

What is air pollution?

Air Pollution is a general term for many different substances in the air. Pollution generally means a man-made substance that is harmful to human health, to wildlife and plant populations, or to other parts of the environment. Some pollutants are completely man-made and don't occur naturally in the environment. Some substances occur in nature, but are also produced in large amounts by human activities. These substances are considered pollutants because these large man-made concentrations are harmful to human health and/or the environment. An example of this type of pollutant is ground-level ozone, which occurs naturally in very small amounts but is harmful in the large concentrations produced by humans.

Air Pollutants can be grouped in two categories: Criteria air pollutants and air toxics. Criteria air pollutants are six chemicals for which the federal government has set limits, or criteria, under the Clean Air Act. State and local governments monitor the levels of all criteria pollutants in outdoor, or ambient, air. The EPA's standards are health-based standards, so levels of a pollutant that are above the standard pose a risk to human health.

North Carolina is meeting the federal standards for four criteria pollutants: nitrogen dioxide, sulfur dioxide, lead, and carbon monoxide. However, many areas in North Carolina are violating the ground-level ozone standard as well as the fine particulate matter annual standard. In other words, we have too much ground-level ozone and particulate pollution in North Carolina.

Where does air pollution come from?

Put simply, we make air pollution when we use energy. When we burn fuel in our cars, bulldozers, boats, lawnmowers, and generators, we make pollution. When power plants burn coal, oil, or other fuel to produce electricity, and when factories or other facilities use fuel to fire boilers and equipment, air pollution results. Other human activities also produce air pollution. Industries sometimes emit air toxics in the manufacture of consumer goods. Paints, solvents, and even the fragrances in personal care products vaporize to become air pollution. Burning your yard waste ("open burning") pollutes the air.

Ground-level ozone doesn't come directly out of a tailpipe or smokestack. It's formed when other man-made pollutants combine in a chemical reaction driven by sunlight and heat. This is why ozone pollution is mainly a summertime problem. The two main ozone-forming pollutants are nitrogen oxides (NO_x) and volatile organic compounds (VOCs), also called hydrocarbons. In North Carolina's urban areas, up to 70% of ozone-forming nitrogen oxides come from "on-road" motor vehicles - our cars and trucks. Ozone-forming pollution also comes from "off-road" engines such as construction equipment and lawnmowers, and from power plants and industry.

It's important to note that ground-level ozone is not the same thing as the "ozone layer". The ozone layer in the upper atmosphere occurs naturally and protects us from ultraviolet radiation. Ozone at ground level is largely man-made and is a harmful pollutant.

Particulate matter, sometimes called soot, is a mixture of many types of small particles. Some particles are directly emitted, like the particles in diesel exhaust. Other tiny particles are indirectly formed when chemicals like sulfates, nitrates, and carbon condense and combine in the air. The human sources for both direct and indirect particulate pollution are largely the same as for ozone: motor vehicles, power plants, and industry.

How does pollution affect our health?

Air pollution affects everyone. Every day, the average adult breathes over 3,000 gallons of air. Children breathe even more air per pound of body weight and are thus more susceptible to air pollution. Healthy people who exercise frequently outdoors are also more at risk, because they may breathe polluted air more often, and at a higher respiratory rate. Children and adults with asthma or other respiratory disease are especially sensitive to the harmful effects of air pollution.

Ozone is a highly reactive gas. It has an oxidizing effect and can damage fabric, rubber, and other materials. It is also a powerful respiratory irritant. Some health experts describe the effects of breathing ozone as "a sunburn inside the lungs". Short-term symptoms of ozone exposure can include a tight feeling in the chest, difficulty drawing a deep breath, throat and eye irritation, and coughing. The irritation and inflammation of lung tissues reduces lung function at least temporarily, and repeated exposure to high concentrations can cause permanent lung function reduction in children and adults.(1) Ozone pollution aggravates asthma and has been implicated in causing asthma in children.(2) Ozone damage can reduce the immune system's ability to fight off respiratory infections. More detailed information on ozone's effects is available from the U.S. EPA and the North Carolina Department of Health and Human Services.

Particulate matter can cause many of the same symptoms as ozone: lung irritation, shortness of breath, coughing, and aggravation of asthma. In addition, fine particulate matter may cause cardiac problems, including heart attacks. Click [here](#) for information from the U.S. EPA on particulate matter health effects.

What are some other effects of air pollution?

.Water Pollution

The nitrogen oxides that contribute to ozone pollution also fall back to the earth as nitrogen compounds, contributing to nutrient pollution of streams, rivers, and estuaries. As much as half of the nitrogen pollution in North Carolina's coastal waters may come from air pollution. Nutrient pollution contributes to algal blooms, reduced oxygen content of water, and fish kills.

.Crop Damage

Ozone pollution can damage plant tissues, reducing growth rates and agricultural yields. In 1995, ozone pollution caused \$2.7 billion in crop loss nationwide, according to the U.S. EPA.

.Acid deposition

Sulfur dioxide and nitrogen oxides in the air combine with moisture to form sulfuric acid and nitric acid, which fall back to the earth as acid rain, snow, fog, or as "dry" particles. The resulting acidification of soil and water damages plants, trees, fish populations, and other aquatic life. Sources of sulfur dioxide and nitrogen oxides include power plants and other industry, motor vehicles, and even large animal farming operations that emit ammonia to the air.

How polluted is North Carolina's air?

Several areas in North Carolina are violating federal standards for ozone and fine particulate matter. Because ground-level ozone formation is influenced by weather conditions, some years are worse than others. In 2002, a hot, dry year, we experienced 29 Ozone Action Days of air quality code orange or red in the Triangle, 31 in the Triad, and 36 in the Charlotte area. That's about a month of unhealthy air conditions in each of North Carolina's three major population centers. The Division of Air Quality's Ozone Forecasting Center has compiled historical statistics of ozone levels in North Carolina's ozone forecast areas.

How can I protect myself and my family?

On days with poor air quality, your exposure to air pollution depends on the **level and duration** of outdoor exertion. Put simply, the harder you're breathing, and the longer you're exerting outside, the more polluted air you'll take in. So an easy way to reduce your risk from air pollution on bad air days is to take it easy outside, especially in the afternoons, when ozone levels are usually highest. The first step is to **know the air quality forecast**. Air Quality forecasts are issued from May 1 - September 30 for the Triangle, Fayetteville, Triad, Charlotte, Hickory, and Asheville areas. Watch for the color-coded forecast on your local television news, on the radio or in your newspaper. You can also check the forecast at <http://daq.state.nc.us/airaware/ozone/> or <http://www.co.forsyth.nc.us/envAffairs/DlyAirQualRpt.htm> for the Triad. On air quality code orange or red days, reduce your outdoor activity. Groups especially at risk include children, those with asthma or respiratory disease, and anyone frequently active outdoors. If you fall into one of these categories, avoid outdoor exertion on code red days. See the ozone color code guide or EP A's ozone health information for detailed recommendations.

What can I do to help?

Because so many of our daily activities contribute to air pollution, there are lots of ways each of us can help clean up the air. The biggest way to help is by driving less. Try commute options like carpooling, vanpooling, and riding public transportation. Bring your lunch to work instead of driving out to eat. When driving, combine errands into one trip to reduce "cold starts", and avoid unnecessary idling. And keep your engine tuned and tires inflated - you'll end up saving gas and money as well as reducing pollution. Because electricity generation contributes to pollution, conserving electricity will also help clear the air while saving you money. Start by trying a few of these actions on code orange and red air quality action days. By following these tips every day, you'll help the air even more!

For more information...

Call the North Carolina Air Awareness program at 1-888-RU4NCAIR or send us an email at Air.Awareness@ncmail.net. Also check out the NC Division of Air Quality and the North Carolina Air Awareness pages.