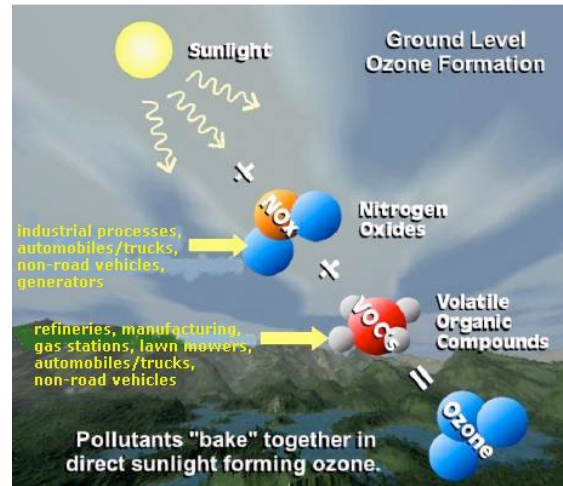


# Ozone

**What is ozone?** Ozone is a highly reactive gas consisting of three oxygen atoms.

**How does ground-level ozone form?** In West Michigan, ground-level ozone is a warm-weather problem. It is caused when Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs) react with sunlight and create ozone pollution, or smog.



[www.hcphe.org](http://www.hcphe.org)

**Where do VOCs and NOx come from?** VOCs are released by industrial plants, gasoline engines, manufacturing processes (like printing operations and painting), and numerous smaller sources. NOx emissions are a product of processes employing high temperature combustion. Power plants, industrial boilers, and motor vehicles are the principle NOx sources.

**How can ozone be both good and bad?** In the upper atmosphere, ozone is naturally-occurring and protects us from the sun's harmful rays. At ground-level, ozone is a powerful gas that can irritate and even damage our lungs.



**What problems does ground-level ozone cause?** Ground-level ozone damages crops, forests, and materials such as rubber and plastics. Adverse health effects include eye irritation, decreased vision, increased asthma and chronic lung disease incidence, coughing, dizziness, nausea, and reduced heart and lung capacity.



## What is a Clean Air Action Day?

A Clean Air Action Day is called when the Air Quality Index (AQI) (see below) is forecast to reach levels that are Unhealthy for Sensitive Groups because of high levels of ground-level ozone or fine particulate matter pollution. On these days, the public is asked to take voluntary actions to reduce emissions and protect their health.

## Who is considered to be in a "Sensitive Group" on Clean Air Action Days?

Sensitive groups include children, the elderly, those with heart and lung disease, and those who are active outdoors. People who are in a sensitive group should reduce exertion on Clean Air Action Days.

## Take Action on Clean Air Action Days (and save time, money, and gasoline)!

### During Every Season

- Carpool or ride the bus
- Telecommute (work from home)
- Combine errands
- Shut off the engine if stopping for a minute or more to reduce emissions from idling, and skip the drive-thru
- Keep your vehicle tuned up and your tires properly inflated to reduce emissions and improve gas mileage
- Burn only untreated wood in a well-maintained stove or fireplace, or better yet, wait to burn if you can
- Refrain from burning trash or yard waste
- Conserve energy by unplugging unused appliances to reduce pollution from power plants

### During the Spring and Summer (in addition to the actions to the left)

- Refuel after 6:00 pm
- Don't top off the tank
- Mow the lawn after 6:00 pm, or use an electric or push mower

### Stay updated about air quality year-round!

Call the Clean Air Action Hotline for a current air quality forecast: 1-800-656-0663

Check the air quality forecast online: [www.wmcac.org](http://www.wmcac.org)

Sign up for Enviroflash to receive air quality notifications: [www.enviroflash.info](http://www.enviroflash.info)

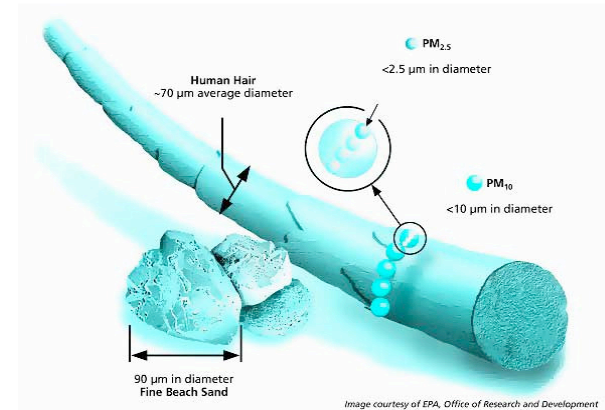
Air Quality	Air Quality Index	Health Advisory for Particle Pollution and Ozone
Good	0-50	None.
Moderate	51-100	Unusually sensitive people should consider limiting prolonged outdoor exertion.
Unhealthy for Sensitive Groups	101-150	People with heart disease or lung disease, such as asthma; children and older adults; and people who are active outdoors should reduce prolonged outdoor exertion.
Unhealthy	151-200	People with heart disease or lung disease, such as asthma; children and older adults; and people who are active outdoors should avoid prolonged or heavy outdoor exertion. Everyone else should reduce prolonged outdoor exertion.
Very Unhealthy (Alert)	201-300	People with heart disease or lung disease, such as asthma; children and older adults; and people who are active outdoors should avoid all outdoor physical activity and exertion. Everyone else should avoid prolonged or heavy exertion.

Brought to you by the West Michigan Clean Air Coalition, a partnership of businesses, academic institutions, government agencies, industry, and non-profit organizations in Kent, Ottawa, Muskegon, and Kalamazoo counties working together to achieve cleaner air in the region through the education and promotion of voluntary emission reduction activities.

Visit our web site: [www.wmcac.org](http://www.wmcac.org)

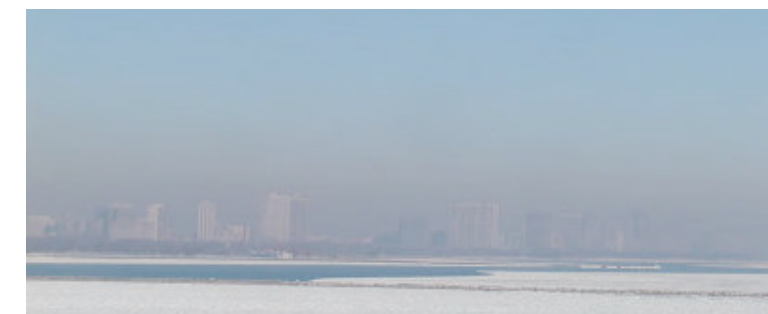
# Particulate Matter

**What is particulate matter?** Particulate matter is the term for a mixture of solid particles and liquid droplets found in the air. It can come in many shapes and sizes and can be made up of hundreds of different chemicals. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small, they can only be detected using an electron microscope. When the finest form of particulate matter, which is known as PM<sub>2.5</sub>, is expected to reach levels unhealthy for sensitive groups, a Clean Air Action Day is called.



**How does particulate matter form?** Some particles, known as **primary particles**, are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks or fires. Others form in complicated reactions in the atmosphere between chemicals such as sulfur dioxides and nitrogen oxides that are emitted from power plants, industries and automobiles. These particles, known as **secondary particles**, make up most of the fine particulate matter in the country.

**What season has the highest amounts of particulate matter?** While particulate matter can form year round, its levels are usually highest in the summer and winter.



High Winter PM Day

## What problems does particulate matter cause?

Particulate matter can acidify lakes and streams, deplete nutrients in the soil, create haze (see picture above), and damage stone and other materials. Adverse health effects include respiratory symptoms, such as irritation of the airways, difficulty breathing, and increased asthma; and cardiac problems, such as irregular heartbeat and nonfatal heart attacks.