Background

Its overall goal is to answer the question “is our air quality improving?” representing the end of a long work lifecycle.
Seeking Solutions to Print

Print can be an iterative and expensive process.
Plug and play with new data for reduced long-term costs.

Print editors control the narrative, weighing content and length.
Focused content with user-controlled narrative.

Many Americans get their information from the internet.
Content at one’s fingertips.

Finding new audiences to maximize readership.
Social media connections.

Connect readers with the underlying data.
Single click access to data.

Finding Answers Online
Overview on air pollution, sources and effects

Interactive charts and maps showing concentration, emission and visibility trends

Infographic based on Minnesota’s 2016 Dashboard (thank you Minnesota)
Interact with Both Near and Long-Term Data

Evaluating the past both near and far can aid with setting future priorities.

Long-term change can be easy to see.

Near-term change a little more difficult.

Visualizing and interacting with all the points helps us evaluate both.

-66%

-7%
Design and style updates throughout

Consistent chart and map navigation through use of 1 data viz library instead of 3

More monitors = more data

Downloadable data and infographic

Access to source code and documentation via GitHub
Since 1970...

**Gross Domestic Product** $\uparrow$ 253%

**Aggregate Emissions** $\downarrow$ 73%

Since 2000...

**Unhealthy air quality days** $\downarrow$ 66%

Since 2013...

**All national criteria pollutant concentration averages remain below the most recent standard**
2017 Publication

Published August 2, 2017

Featured on epa.gov

Available via:
epa.gov/air-trends

Or directly:
gispub.epa.gov/air/trendsreport/2017/
Your work…

Your report…

Our Nation’s Air.
In Development – Interactive NEI Report
In Development – Interactive NEI Report

Arizona Point Source Emissions

Select One or More Pollutants

Select One or More Locations

Select One or More Facility Types

Select one state at a time to drill down and select counties

Arizona Total Point Source Emissions

Pollutant: All
Point source count: 3
Total emissions in tons: 34,772

Source: U.S. EPA National Emissions Inventory 2014 ver. 1
OUR NATION'S AIR
Welcome!

The U.S. Environmental Protection Agency (EPA) is committed to protecting public health by improving air quality and reducing air pollution. This annual report presents the trends in the nation's air quality, and summarizes the detailed information found at EPA’s AirTrends website (link will open in a new tab).

Please scroll down to view the annual report or use the top menu to jump to a topic. If you encounter any issues viewing content, update or try opening the website in another browser.
The U.S. leads the world in having clean air and a strong economy due to implementation of the Clean Air Act and technological advancements from American innovators. Cleaner air provides important public health benefits.
Air Quality Improves as America Grows

Nationally, concentrations of the criteria and hazardous air pollutants have dropped significantly since 1990:

- Carbon Monoxide (CO) 8-Hour: 77%
- Lead (Pb) 3-Month Average: 99%
- Nitrogen Dioxide (NO₂) Annual: 56%
- Nitrogen Dioxide (NO₂) 1-Hour: 50%
- Ozone (O₃) 8-Hour: 22%
- Particulate Matter 10 microns (PM₁₀) 24-Hour: 59%
- Particulate Matter 2.5 microns (PM₂.₅) Annual: 42%
- Particulate Matter 2.5 microns (PM₂.₅) 24-Hour: 44%
- Sulfur Dioxide (SO₂) 1-Hour: 85%

Numerous air toxics have declined with percentages varying by pollutant.

During this same period, the U.S. economy continued to grow. Americans drove more miles and population and energy use increased.
Air Pollution Includes Gases and Particles

Air pollution consists of gas and particle contaminants that are present in the atmosphere. Gaseous pollutants include sulfur dioxide (SO₂), oxides of nitrogen (NOₓ), ozone (O₃), carbon monoxide (CO), volatile organic compounds (VOCs), certain toxic air pollutants and some gaseous forms of metals. Particle pollution (PM₂.₅ and PM₁₀) includes a mixture of compounds that can be grouped into five major categories: sulfate, nitrate, elemental (black) carbon, organic carbon and crustal material.

Some pollutants are released directly into the atmosphere while other pollutants are formed in the air from chemical reactions. Ground-level ozone forms when emissions of NOₓ and VOCs react in the presence of sunlight. Air pollution impacts human health and the environment through a variety of pathways.

SIX COMMON POLLUTANTS
Understanding Emission Sources Helps Control Air Pollution

Generally, emissions of air pollution come from:

- stationary fuel combustion sources (such as electric utilities and industrial boilers),
- industrial and other processes (such as metal smelters, petroleum refineries, cement kilns, and dry cleaners),
- highway vehicles, and
- non-road mobile sources (such as recreational and construction equipment, marine vessels, aircraft and locomotives).

As the chart shows, pollutants are emitted by a variety of sources. For example, electric utilities, part of the stationary fuel combustion category, release SO₂, NOₓ, and particulate matter.

EMISSION INVENTORIES
Air Pollution Can Affect Our Health and Environment in Many Ways

Numerous scientific studies have linked air pollution to a variety of health problems. People at greater risk for experiencing air pollution-related health effects may, depending on the pollutant, include older adults, children and those with heart and respiratory diseases – 30-second Healthy Heart video (link will open in a new tab).

- Ozone (O₃)
  - Health Effects: Ozone exposure reduces lung function and causes respiratory symptoms, such as coughing and shortness of breath. Ozone exposure also aggravates asthma and lung diseases such as emphysema leading to increased medication use, hospital admissions, and emergency department visits. Exposure to ozone may also increase the risk of premature mortality from respiratory causes. Short-term exposure to ozone is also associated with increased total non-accidental mortality which includes deaths from respiratory causes.
  - Environmental Effects: Ozone damages vegetation by injuring leaves, reducing photosynthesis, impairing reproduction and growth and decreasing crop yields. Ozone damage to plants may alter ecosystem structure, reduce biodiversity and decrease plant uptake of CO₂. Ozone is also a greenhouse gas that contributes to the warming of the atmosphere.

- Particulate Matter (PM)
- Carbon Monoxide (CO)
- Lead (Pb)
- Nitrogen Dioxide (NO₂)
- Sulfur Dioxide (SO₂)
- Oxides of Nitrogen and Sulfur (NOₓ and SOₓ)
- Hazardous Air Pollutants (also known as Air Toxics)
For more than forty years, the Clean Air Act has been a key part of cutting pollution as the U.S. economy has grown.
Economic Growth with Cleaner Air

Between 1970 and 2016, the combined emissions of the six common pollutants (PM$_{2.5}$ and PM$_{10}$, SO$_2$, NO$_x$, VOCs, CO and Pb) dropped by 75 percent. This progress occurred while the U.S. economy continued to grow. Americans drove more miles and population and energy use increased.

To learn more about the EPA and environmental milestones to reduce pollution please visit the [EPA history website](#) (link will open in a new tab).

Click any of the legend items on the right side of the chart to hide or include trend lines. The year is may change based on the selection.
Today Americans breathe cleaner air and face lower risks of adverse health effects.

2003 – 2016 NO₂ satellite imagery courtesy of NASA
Criteria Pollutant Trends Show Clean Air Progress

Select a NAAQS to view concentration and emission trends.

Ozone (Fourth Daily Max 8-hour)

Ozone 8-hour Concentration

NOx Emissions

Maps Symbols indicate values above or below the most recent standard. Click any point to display annual concentration data. Double-click the map to zoom in and click the home button to reset. Please be patient with map exports.

Charts: Click emission tabs to change the emissions chart. The play/stop button controls animation, or manually change the year by dragging the yellow circle in the chart or the slider's gray square. Read about weather influences on ozone (ex: wet years open in a new tab).
Understanding PM$_{2.5}$ Composition Helps Reduce Fine Particle Pollution

The different components that make up particle pollution come from specific sources and are often formed in the atmosphere. The major components, or species, are elemental carbon (EC), organic carbon (OC), sulfate and nitrate compounds, and crustal materials such as soil and ash.

As previously shown, PM$_{2.5}$ concentrations are declining. Assessing particle pollution concentrations along with composition data aids in understanding the effectiveness of pollution controls and in quantifying the impacts to public health, regional visibility, ecology, and climate.

Click any point to display 2016-2015 annual and quarterly PM$_{2.5}$ concentration trends, and select maximize to enlarge the chart. Double-click the map to zoom in and click the home button to reset.
Unhealthy Air Quality Days Trending Down

The Air Quality Index (AQI) is a color-coded index EPA uses to communicate daily air pollution for ozone, particulate pollution, NO₂, CO and SO₂. A value in the unhealthy range, above the national air quality standard for any pollutant, is of concern first for sensitive groups, then for everyone as the AQI value increases. Fewer unhealthy air quality days means better health, longevity, and quality of life for all of us.

Shown are the number of days in which the combined ozone and PM₂·₅ AQI was unhealthy for sensitive groups (exposed to either acid rain, ozone or mercury) for the years 2000-2015. Click the bar chart or these links to view the AQI retrospective reviews for ozone and PM₂·₅ (included with all pollutants).
Air Quality in Nonattainment Areas Improves

EPA works collaboratively with state, local and tribal agencies to identify areas of the U.S. that do not meet the national ambient air quality standards (NAAQS). These areas, known as nonattainment areas, must develop plans to reduce air pollution and attain the NAAQS.

Through successful state led implementation, numerous areas across the country are showing improvement and fewer areas are in nonattainment. Since 2010, there were no violations of the standards for CO and NO₂.

Shown is a snapshot of the 2008 ozone nonattainment area map. Click the map to view a larger interactive version that includes all current NAAQS nonattainment areas.
EPA has made significant progress in improving visibility in our nation's parks and wilderness areas.
Visibility Improves in Scenic Areas

The National Park Service celebrated 100 years on August 25, 2016. Together, EPA and other agencies monitor visibility trends in 155 of the 156 national parks and wilderness areas (i.e., Class I areas).

The map indicates several Class I areas have improving visibility or decreasing haze (indicated by the downward pointing arrows). To learn more about visibility in parks and view live webcams please visit this National Park Service website and EPA's visibility story map (links will open in a new tab).

Click any point to display 2000-2015 trends, and select maximize to enlarge the chart. Double click the map to zoom in and click the home button to reset.
EPA works with state, local and tribal governments to reduce emissions of 187 hazardous air pollutants.
Air Toxics Levels Trending Down

Ambient monitoring data show that some of the toxic air pollutants, such as benzene, 1,3-butadiene and several metals, are declining at most sites.

Points on the map indicate the long-term statistical trend direction: **Decreasing**, **Increasing** and **No Trend**. Depicted in gray are sites where a trend direction is undetermined due to insufficient data.

Use the dropdown menu to select a pollutant, click any point to display trends, and select maximize to enlarge the chart. Double-click the map to zoom in and click the home button to reset.

View a **tabular summary** of all toxic trends by selecting a pollutant.
Our Nation's Air Continues to Improve.

However, work must continue to ensure healthy air for all communities. EPA and our partners at the state, tribal and local levels will continue to work to address the complex air quality problems we face.

Highlights from this report are available for download by clicking the icon in the top menu.
Social Media

Use the share button at the top to share this report with others, and follow the latest EPA activities to protect human health and the environment using the links below.

Source code, data and documentation are available for download at the GitHub repository below.