

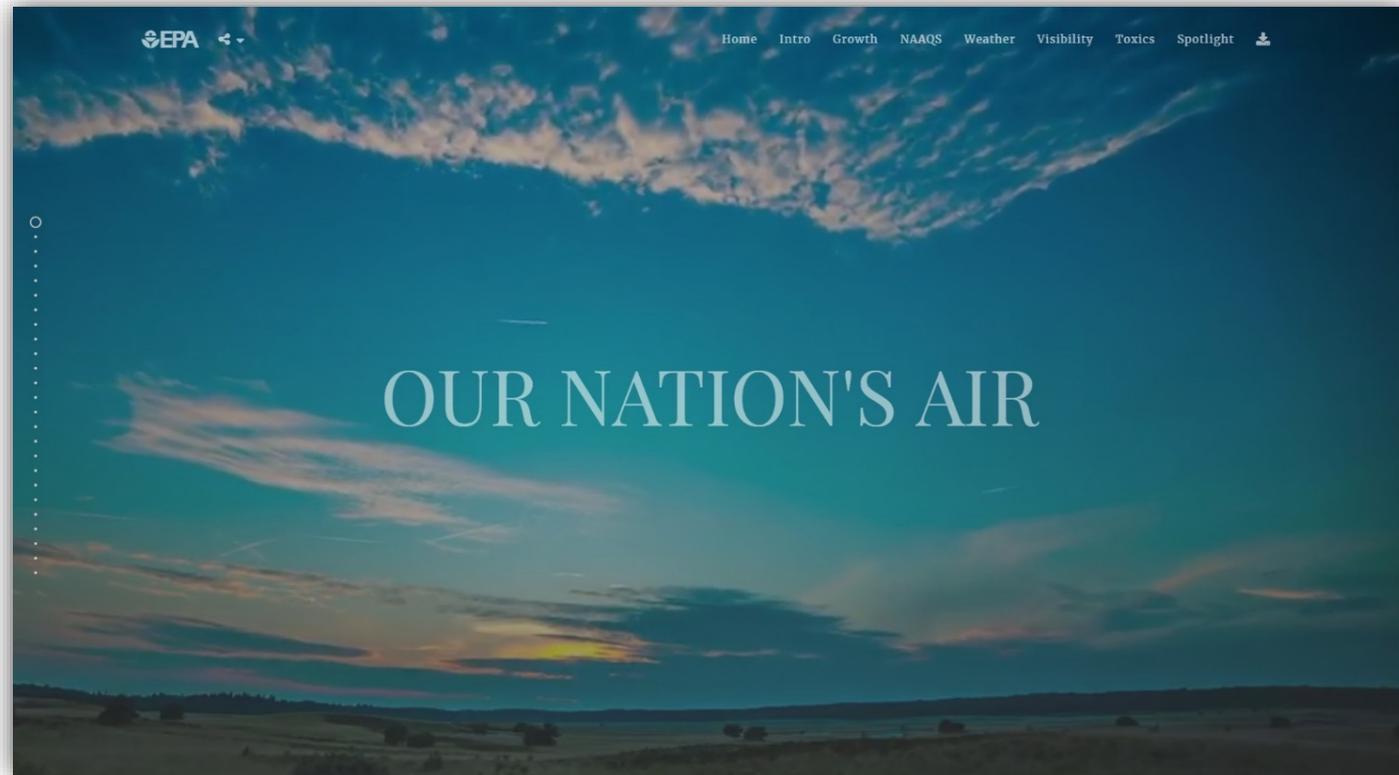
# *Our Nation's Air*

## Interactive Air Trends Report

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# 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

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**Plug and play with new data for reduced long-term costs**

Print editors control the narrative, weighing content and length

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**Focused content with user-controlled narrative**

Many Americans get their information from the internet

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**Content at one's fingertips**

Finding new audiences to maximize readership

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**Social media connections**

Connect readers with the underlying data

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**Single click access to data**

## Finding Answers Online

# General Contents

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)

## Dashboard 2016

Environmental and performance measures related to the work of our agency

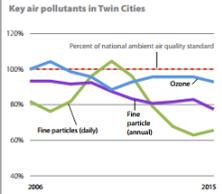


### Air

#### Is our air healthy to breathe?

The MPCA monitors air pollution such as fine particulates and ground-level ozone (smog) and compares them to federal standards set to protect our health. Overall, air pollution levels in Minnesota have improved over the last 10 years. But standards have tightened over this same time period, reflecting new knowledge of how these pollutants affect us.

Moderate progress

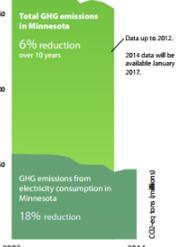


The line for each pollutant represents the worst air quality readings among the many sites that are monitored.

#### Are we making progress on reducing greenhouse gas emissions?

Most greenhouse gases come from burning fossil fuels (natural gas, coal, and petroleum) to run our cars, power plants, and factories. Minnesota produced more than 154 million tons of greenhouse gases in 2012. As a general trend, greenhouse gas emissions are decreasing slightly.

Slow progress



#### Is point-source air pollution improving?

Today much of the air pollution in Minnesota comes from cars, trucks, construction vehicles, and fuel combustion for things like home heating—where there are few regulations. In contrast, the amount of air pollution coming from factories and electric utilities—sources that are subject to regulation and hold MPCA permits—has decreased significantly over the last 10 years, largely due to government and industry efforts to reduce smogstack emissions.

Point source emissions 2005–2014



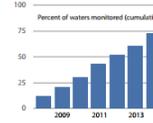
### Water

#### Surface water protection and restoration

How much has been tested?

Over the last 8 years, we have increased our monitoring efforts. To date, more than half of major watersheds have been intensively monitored. By 2017, we expect to have all watersheds monitored. In 2018, the cycle starts again to help us see if water quality has improved.

Good progress

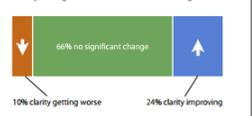


#### Are Minnesota's lakes and streams getting cleaner?

We use the information we gather from monitoring to determine if water quality standards are being met to protect public health, recreational use, and aquatic life. In general, our assessments show that 60% of our lakes and streams meet standards.

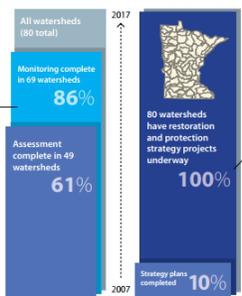
Moderate progress

Clarity changes in Minnesota lakes through 2014

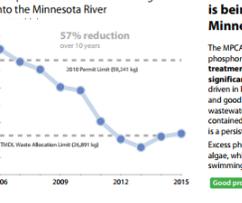


Clarity is improving in about a quarter of lakes. A smaller fraction has seen a decline in clarity. Hundreds of volunteers help the MPCA measure water clarity to detect signs of degradation in a lake. Repeat measurements from lakes that have been monitored for at least 8 years.

#### Status of watershed approach (10-year cycle)



#### Phosphorus in wastewater flowing into the Minnesota River



#### How much phosphorus is being released into the Minnesota River?

The MPCA regulates the amount of phosphorus discharged from wastewater treatment facilities. Over the last 10 years, significant reductions have been made, driven in large part by tighter permit limits and good compliance from community wastewater treatment plants. Phosphorus contained in sediment runoff from cropland is a persistent problem. Excess phosphorus stimulates growth of algae, which can make waters unsuitable for swimming and fishing.

Good progress



## Our Nation's Air

Air Quality Improves as America Grows

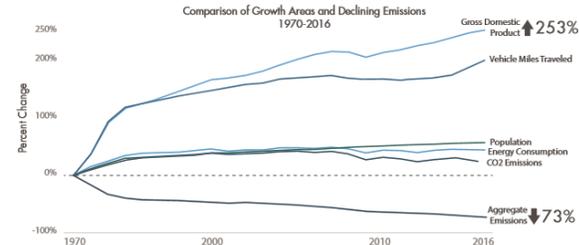
Status and Trends Through 2016

<https://gispub.epa.gov/air/trendsreport/2017>



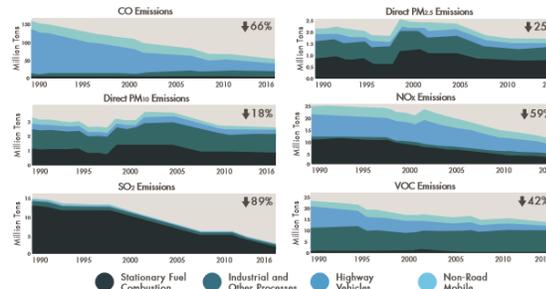
### Economic Growth with Clean Air

Between 1970 and 2016, the combined emissions of the six common pollutants (PM2.5 and PM10, SO2, NOx, VOCs, CO and Pb) dropped by 73 percent. This progress occurred while the U.S. economy continued to grow, Americans drove more miles and population and energy use increased.



### Air Pollutant Emissions Decreasing

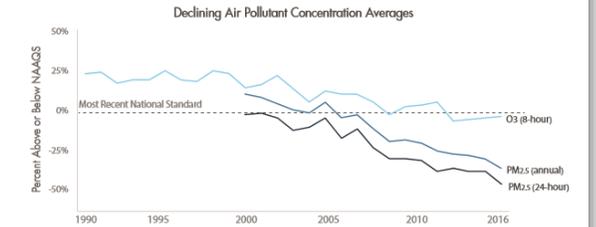
Emissions of key air pollutants continue to decline from 1990 levels. These reductions are driven by federal and state implementation of stationary and mobile source regulations.



Stationary Fuel Combustion, Industrial and Other Processes, Highway Vehicles, Non-Road Mobile

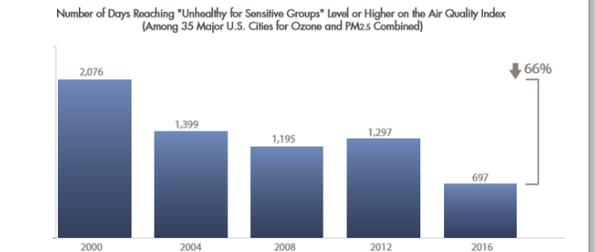
### Criteria Pollutant Trends Show Clean Air Progress

Ground-level ozone and fine particles (PM2.5) continue to pose serious air quality problems in many areas of the U.S. People with heart or lung disease, older adults, and children may be particularly sensitive. Levels of both pollutants have decreased over the years, improving quality of life for many Americans.



### Unhealthy Air Days Trending Down

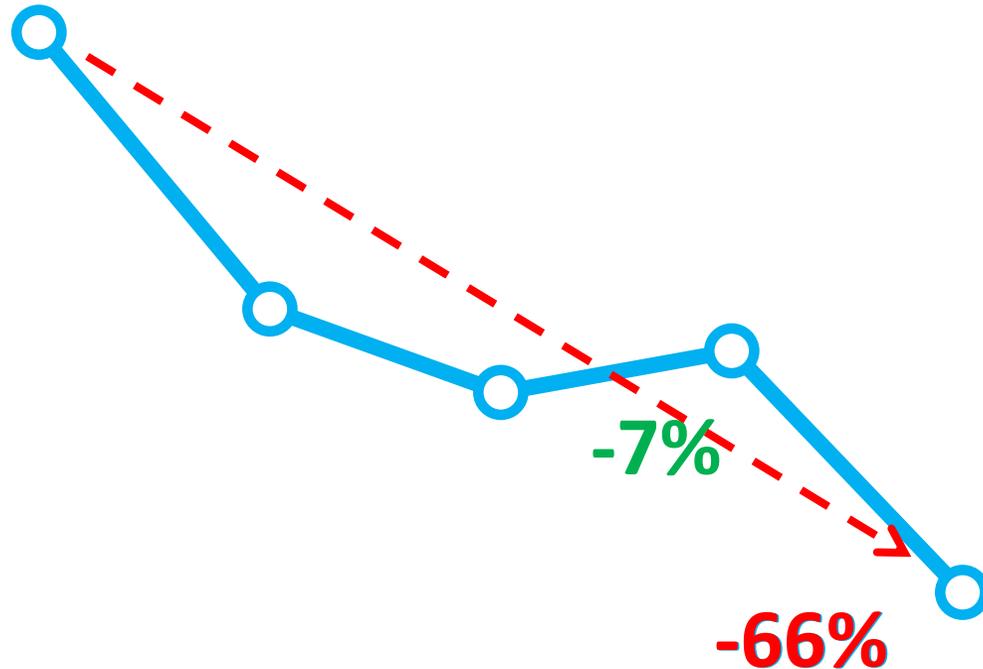
The Air Quality Index (AQI) is a color-coded index EPA uses to communicate daily air pollution for ozone, particulate pollution, NO2, CO, and SO2. A value in the unhealthy range, above national air quality standard for any pollutant, is of concern first for sensitive groups, then for everyone as the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



# Interact with Both Near and Long-Term Data

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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

# 2017 Change Summary

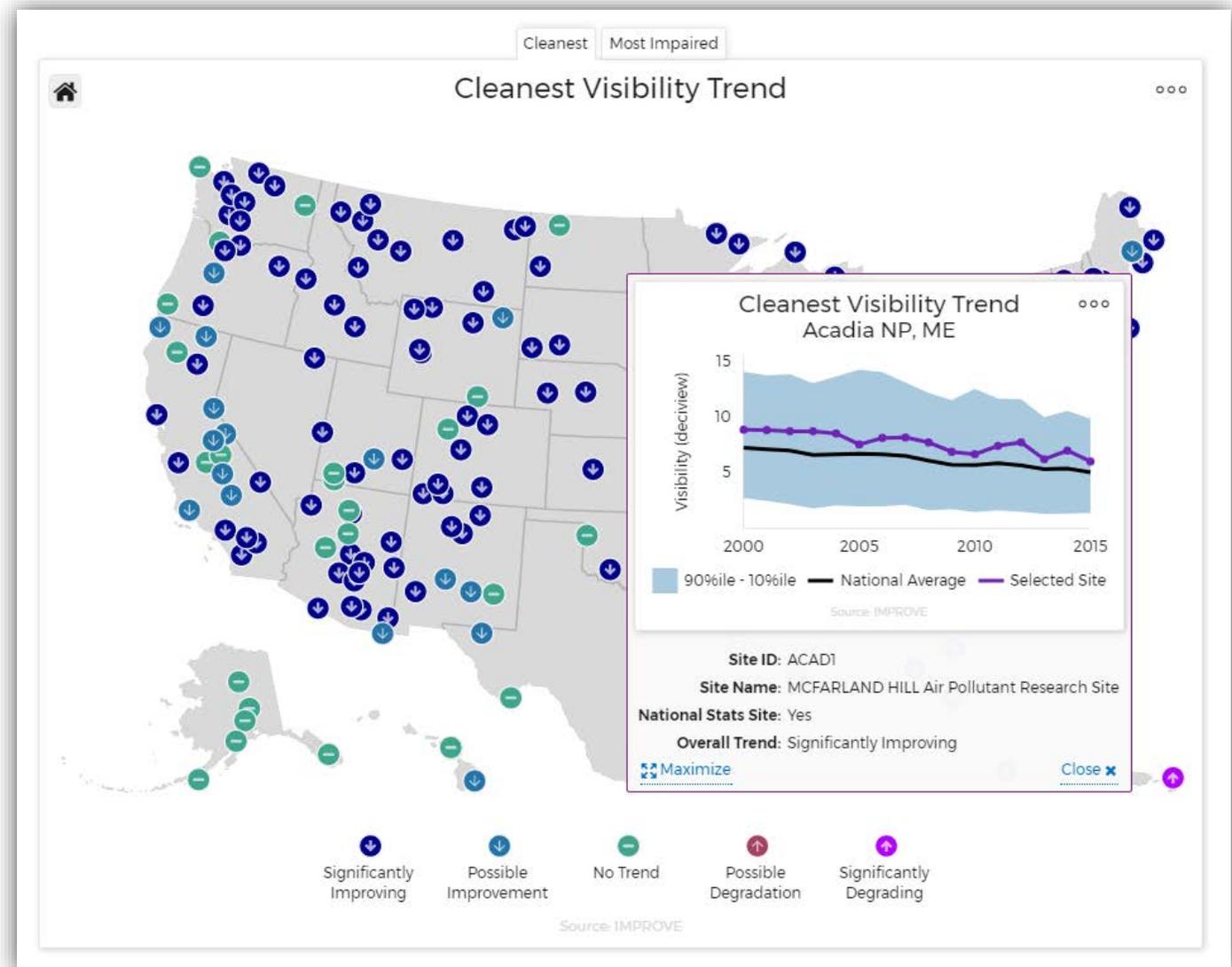
Design and style updates throughout

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



# 2017 Quick Stats

Since 1970...

Gross Domestic Product ↑ 253%

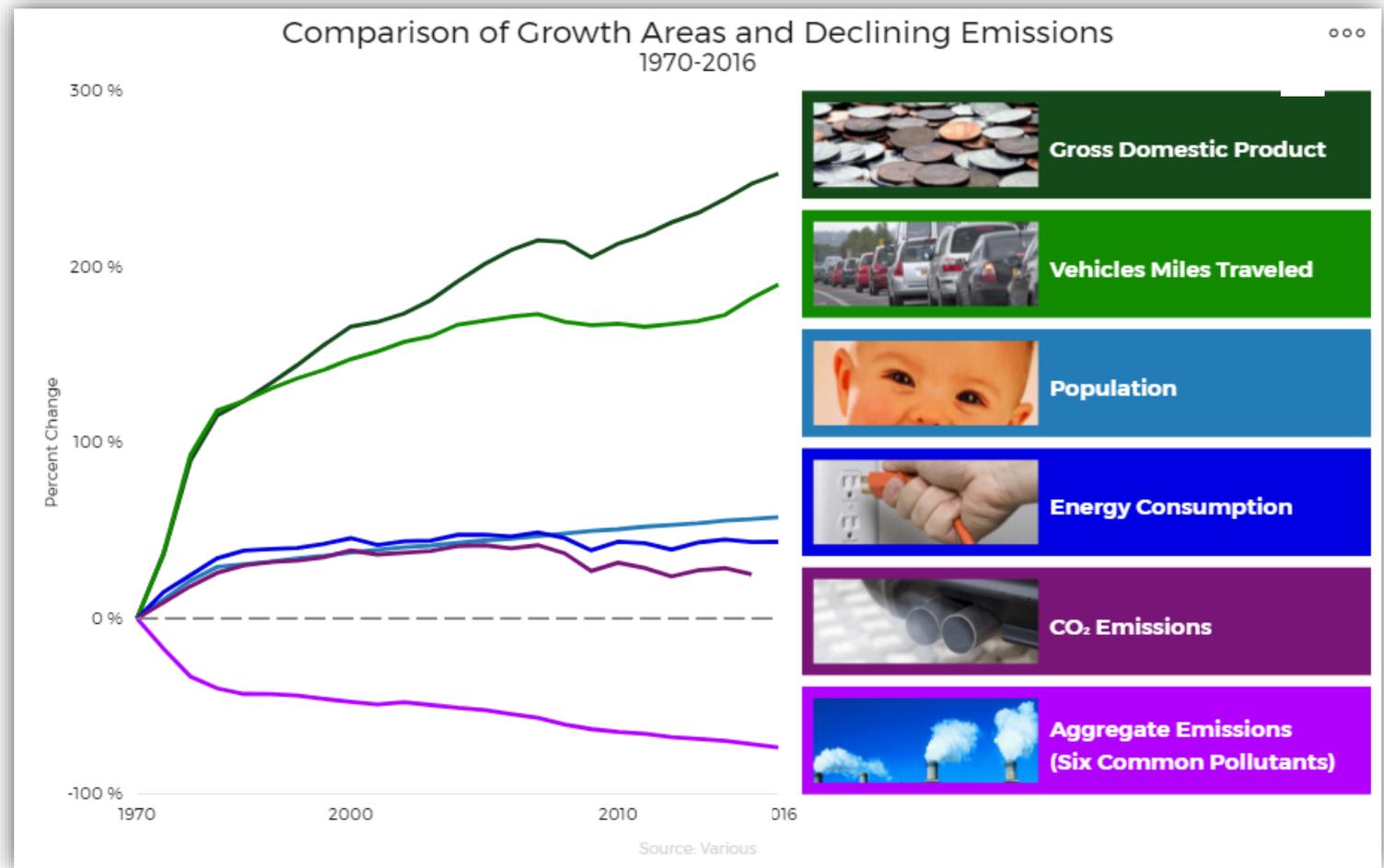
Aggregate Emissions ↓ 73%

Since 2000...

Unhealthy air quality days ↓ 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](http://epa.gov)

Available via:

[epa.gov/air-trends](http://epa.gov/air-trends)

Or directly:

[gispub.epa.gov/air/trendsreport/2017/](http://gispub.epa.gov/air/trendsreport/2017/)

The screenshot shows the EPA website homepage. At the top is the EPA logo and navigation menu with links for Environmental Topics, Laws & Regulations, and About EPA. A search bar is on the right. Below the navigation is the main header 'U.S. Environmental Protection Agency' with social media icons for contact and sharing. The main content area features a large article titled 'Air Quality Improves as America Grows' with a map of the United States showing air quality data points. To the right is a sidebar for 'EPA's Superfund Taskforce' with a list of goals. Below the main article are sections for 'Video Highlights' (featuring a video player for the Superfund Taskforce), 'News' (with a list of recent news releases), and 'Social Media' (showing tweets from @EPA).

**U.S. Environmental Protection Agency**

## Air Quality Improves as America Grows

EPA's annual air quality report highlights the clean air accomplishments of state, tribal, federal, and local agencies across the U.S.

[Read the news release](#)  
[Explore the interactive report](#)

### Video Highlights

#### EPA's Superfund Taskforce

Administrator Scott Pruitt met with members of EPA's Superfund Taskforce to discuss revitalizing the program to expedite cleanups and remediation, engaging partners and stakeholders, and promoting redevelopment and community improvement.

[More EPA Videos](#)

### News

- [Brownfields Grant and Assistance to three Vermont Communities](#)
- [Second Phase of Cleanup at Peninsula Boulevard Site, NY](#)
- [President's 2016 Environmental Youth Award Winners](#)
- [Deadline Extended for 2015 Ozone NAAQS Areas](#)

[More news releases](#)

### Social Media

Tweets by @EPA

U.S. EPA @EPA

Is your house prone to flooding? Check out ways to stay safe and prevent associated health problems: [epa.gov/natural-disast...](http://epa.gov/natural-disast...)

Flooding | US EPA  
Ways to prepare for or resp...  
[epa.gov](http://epa.gov)

Embed View on Twitter

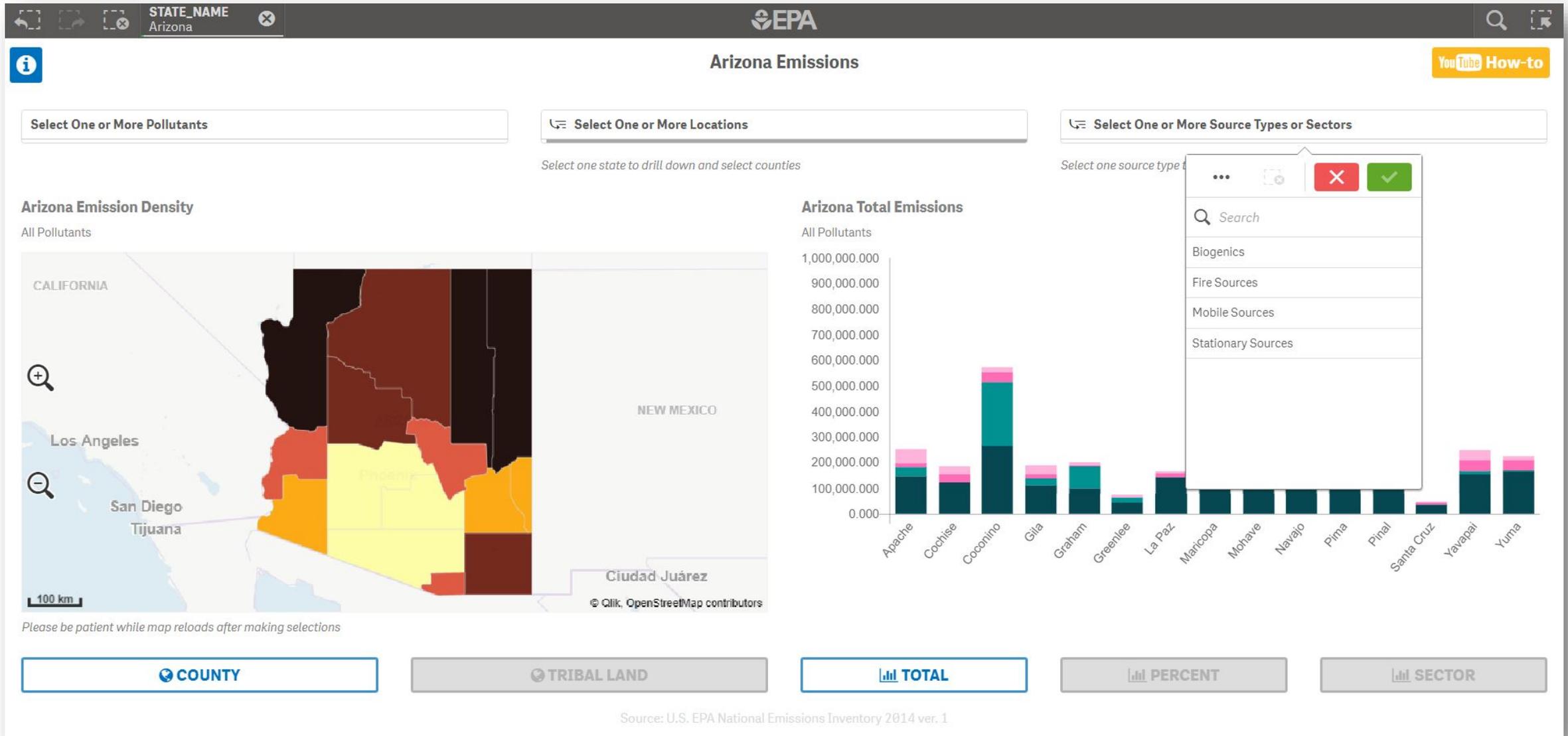


Your work...

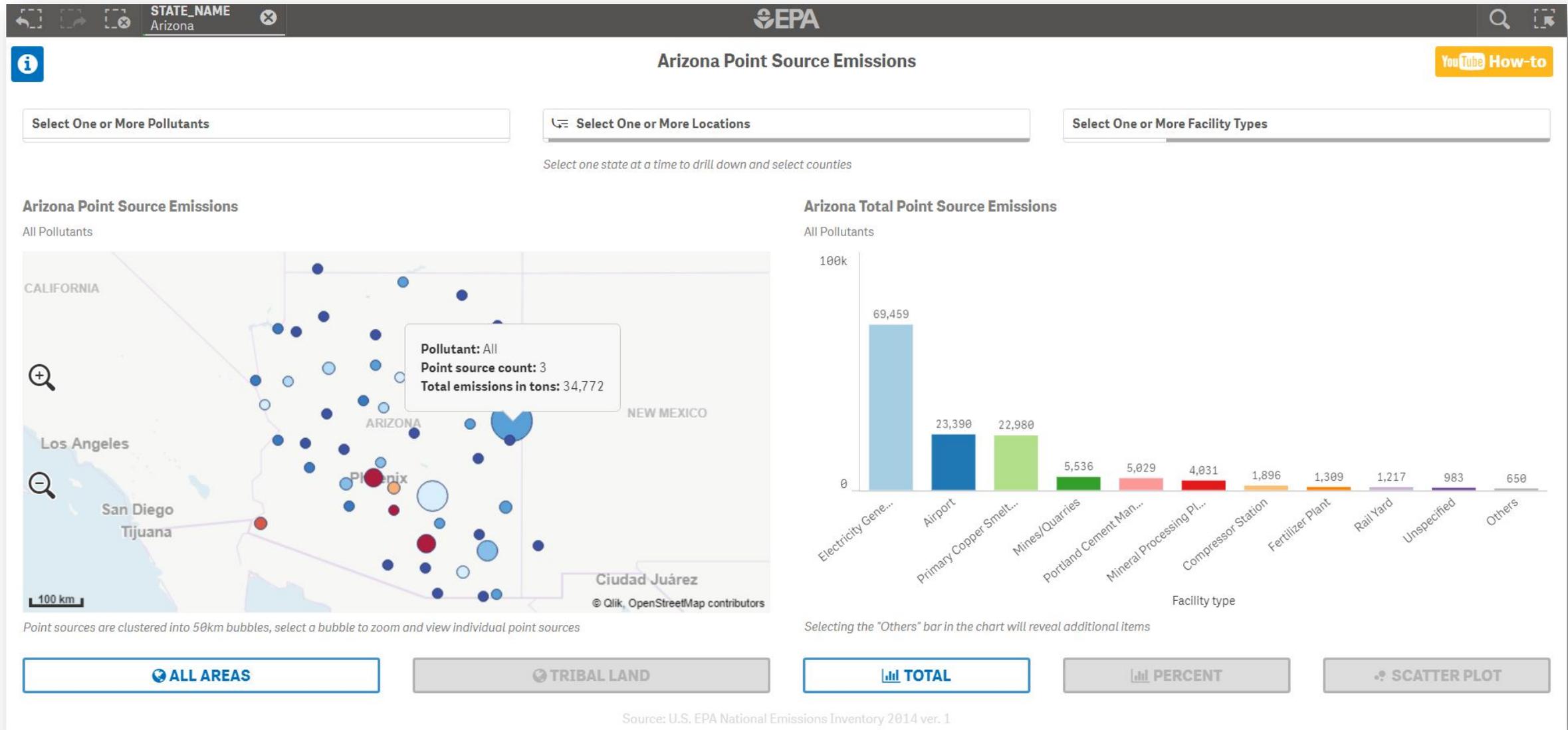
Your report...

*Our Nation's Air.*

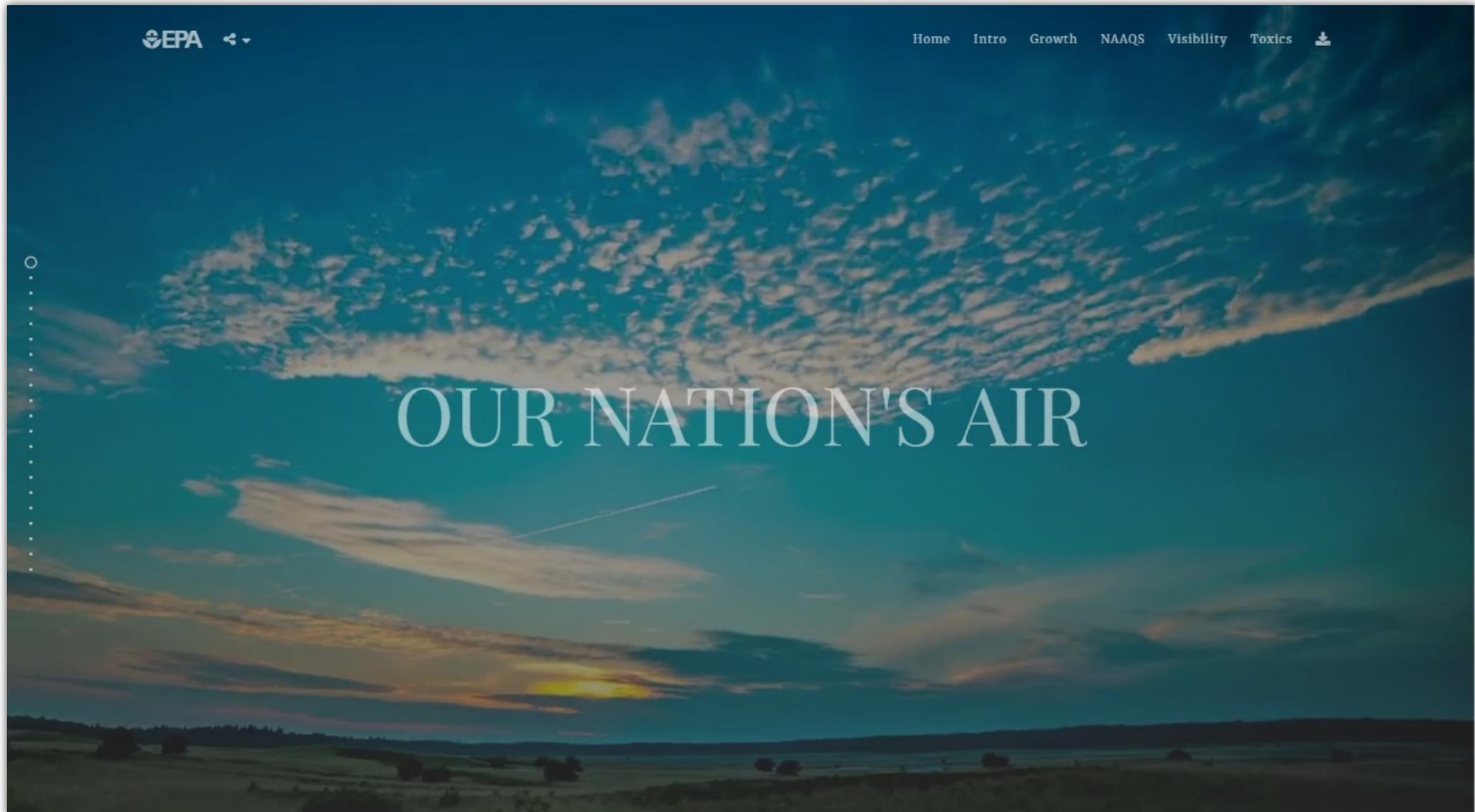
# In Development – Interactive NEI Report



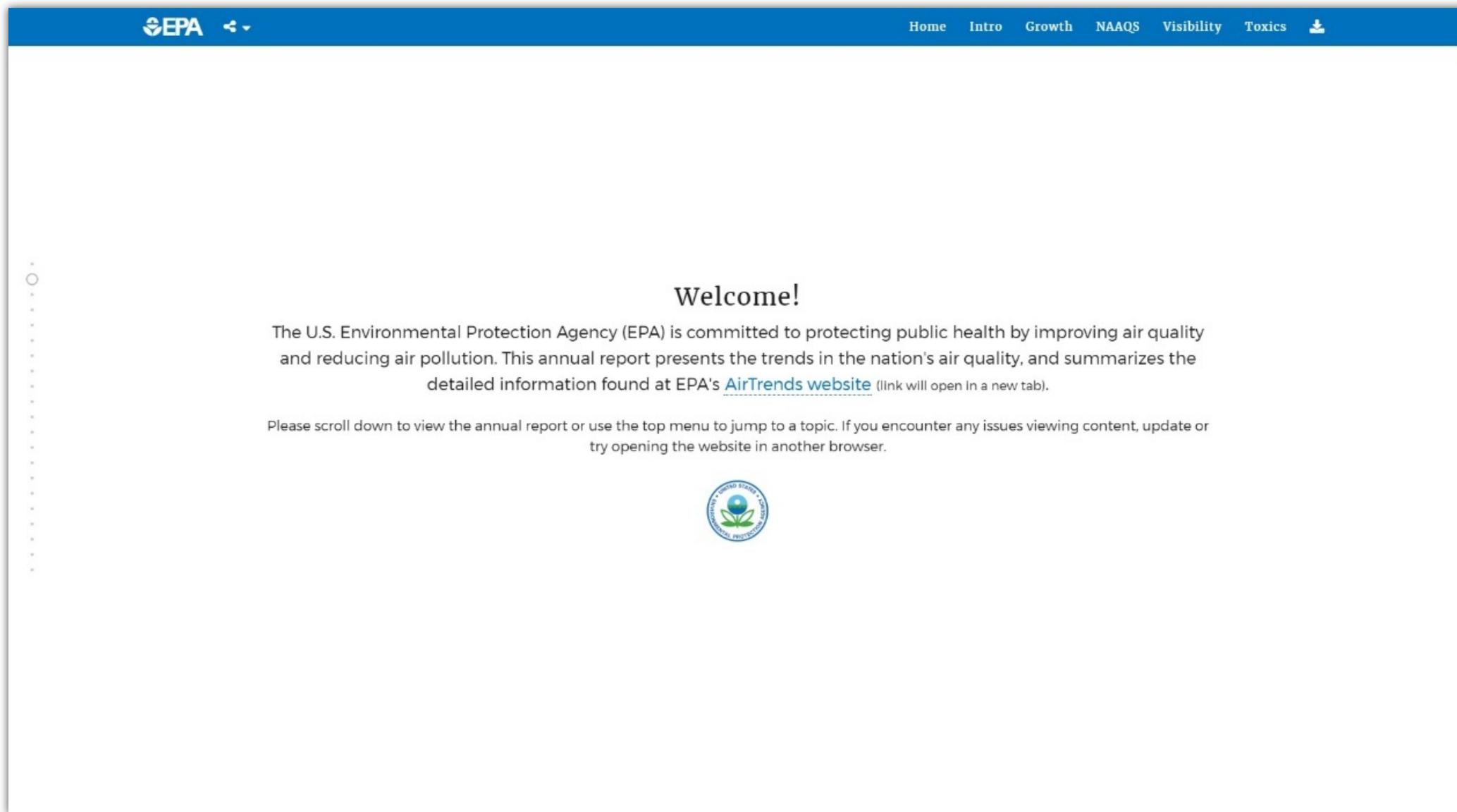
# In Development – Interactive NEI Report



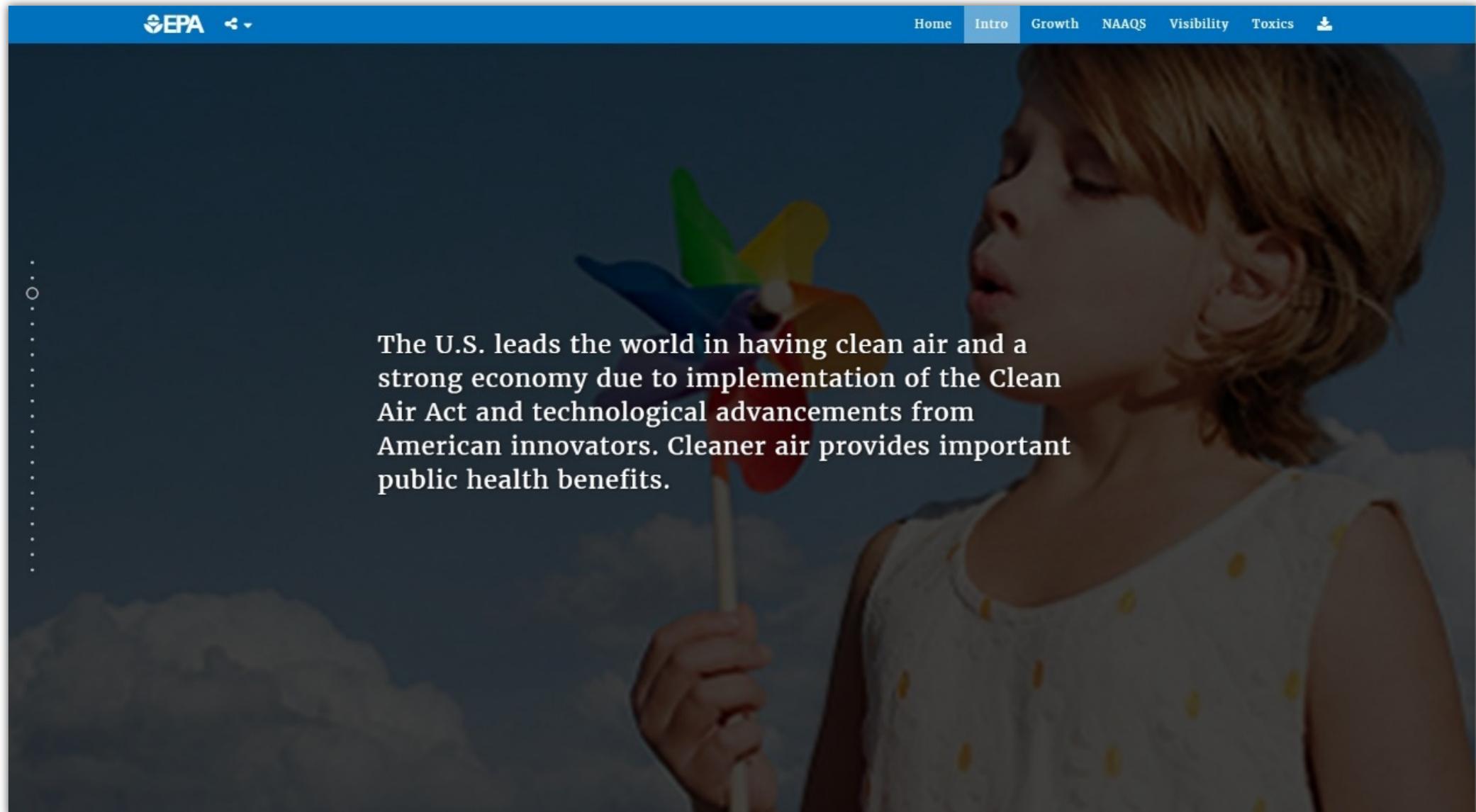
# Screenshots



# Screenshots



# Screenshots



# Screenshots

[Home](#) [Intro](#) [Growth](#) [NAAQS](#) [Visibility](#) [Toxics](#)

## 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 (NO<sub>2</sub>) Annual, ↓ 56%
- Nitrogen Dioxide (NO<sub>2</sub>) 1-Hour, ↓ 50%
- Ozone (O<sub>3</sub>) 8-Hour, ↓ 22%
- Particulate Matter 10 microns (PM<sub>10</sub>) 24-Hour, ↓ 39%
- Particulate Matter 2.5 microns (PM<sub>2.5</sub>) Annual, ↓ 42%
- Particulate Matter 2.5 microns (PM<sub>2.5</sub>) 24-Hour, ↓ 44%
- Sulfur Dioxide (SO<sub>2</sub>) 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.

**TIP** Click pollutant names in the chart legend to hide or include trend lines, and hover over any line to display percentages above or below the most recent standard. Click the emission trends button below to open a popup window.

[EMISSION TRENDS](#)

### Declining National Air Pollutant Concentration Averages

Pollutant	1990	1995	2000	2005	2010	2015
Pb (5-month)	~100%	~50%	~10%	~0%	~-5%	~-10%
CO (8-hour)	~20%	~10%	~5%	~0%	~-5%	~-10%
NO <sub>2</sub> (annual)	~10%	~5%	~0%	~-5%	~-10%	~-15%
NO <sub>2</sub> (1-hour)	~10%	~5%	~0%	~-5%	~-10%	~-15%
O <sub>3</sub> (8-hour)	~20%	~15%	~10%	~5%	~0%	~-5%
PM <sub>2.5</sub> (annual)	~10%	~5%	~0%	~-5%	~-10%	~-15%
PM <sub>2.5</sub> (24-hour)	~10%	~5%	~0%	~-5%	~-10%	~-15%
PM <sub>10</sub> (24-hour)	~10%	~5%	~0%	~-5%	~-10%	~-15%
SO <sub>2</sub> (1-hour)	~10%	~5%	~0%	~-5%	~-10%	~-15%

Source: U.S. EPA Air Quality System

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# Screenshots

## 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 (SO<sub>2</sub>), oxides of nitrogen (NO<sub>x</sub>), ozone (O<sub>3</sub>), carbon monoxide (CO), volatile organic compounds (VOCs), certain toxic air pollutants and some gaseous forms of metals. Particle pollution (PM<sub>2.5</sub> and PM<sub>10</sub>) 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 NO<sub>x</sub> and VOCs react in the presence of sunlight. Air pollution impacts human health and the environment through a variety of pathways.

SIX COMMON POLLUTANTS



# Screenshots

EPA Home Intro Growth NAAQS Visibility Toxics

## 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 SO<sub>2</sub>, NO<sub>x</sub> and particles.

[EMISSION INVENTORIES](#)

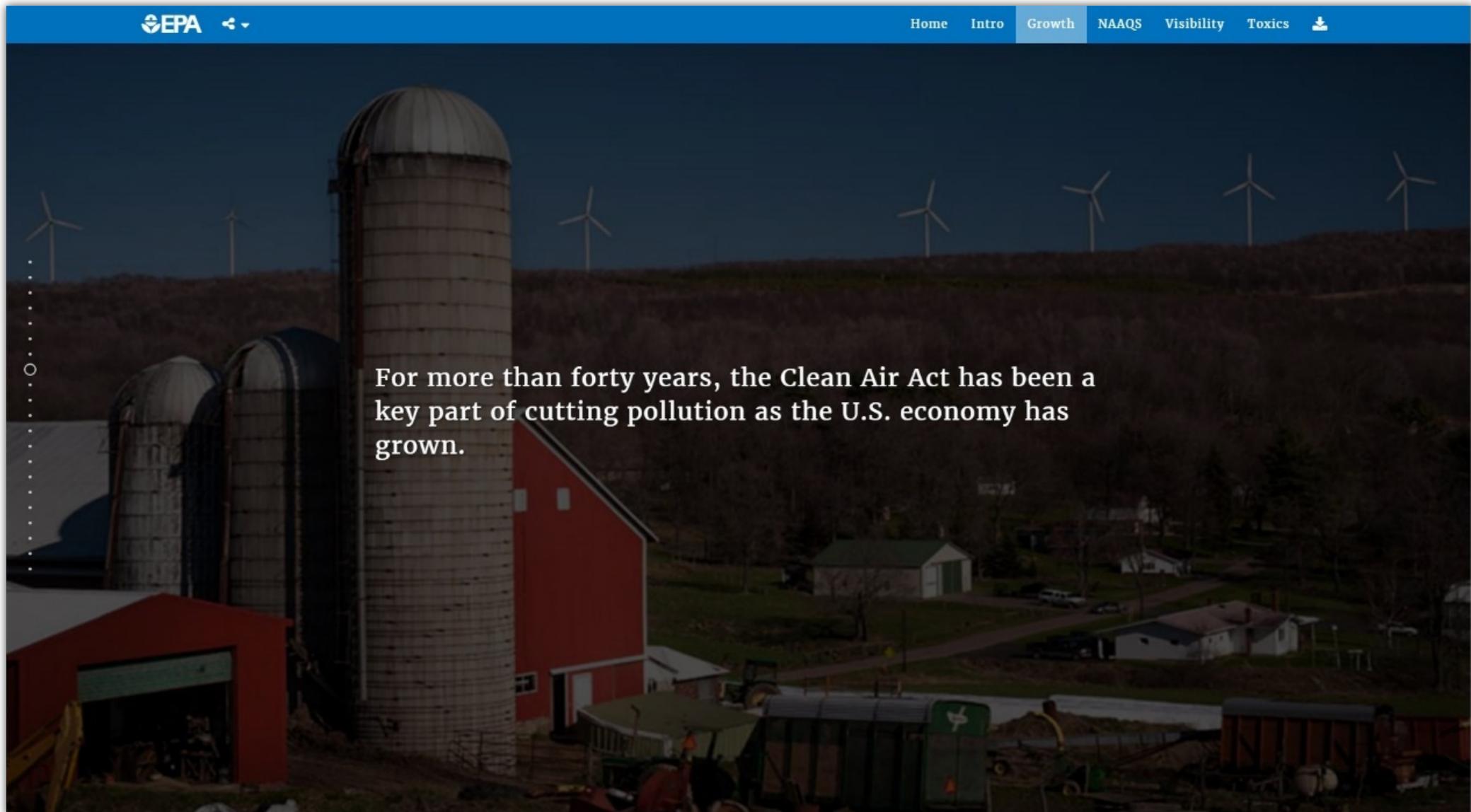
### National Emissions By Source Category

Pollutant	Stationary Fuel Combustion (%)	Industrial and Other Processes (%)	Highway Vehicles (%)	Non-Road Mobile (%)
CO	10	30	35	25
NH3	2	95	2	1
NOx	25	15	35	25
Direct PM2.5	45	40	10	5
Direct PM10	35	45	15	5
SO2	75	15	5	5
VOC	5	70	15	10

Source: U.S. EPA National Emissions Inventory 2014 ver. 1



# Screenshots



# Screenshots

EPA

Home Intro Growth NAAQS Visibility Toxics

## Economic Growth with Cleaner Air

Between 1970 and 2016, the combined emissions of the six common pollutants (PM<sub>2.5</sub> and PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, VOCs, CO and Pb) dropped by 73 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).

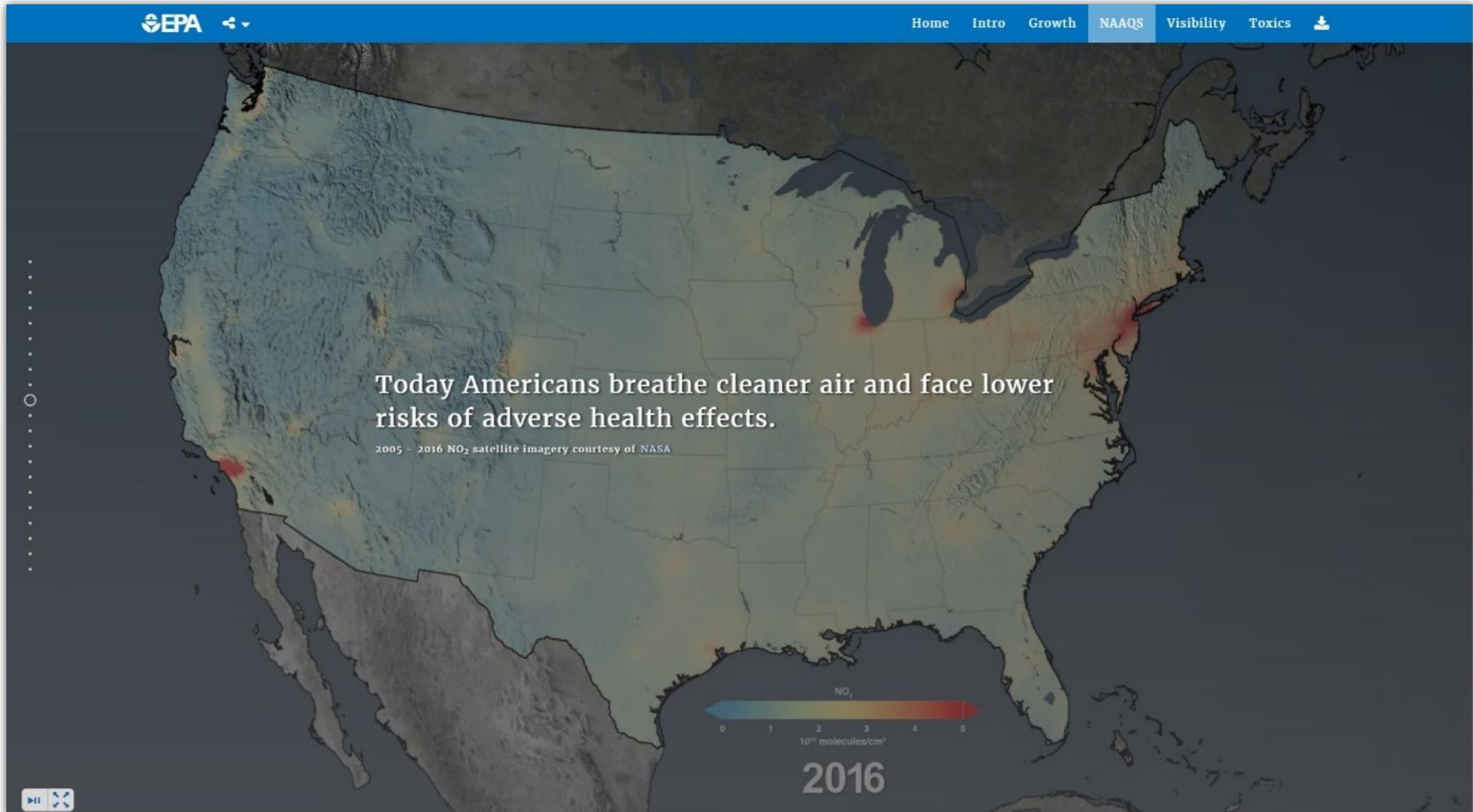
Click any of the legend items on the right side of the chart to hide or include trend lines. The y-axis may change based on the selections.

### Comparison of Growth Areas and Declining Emissions 1970-2016

Year	Gross Domestic Product	Vehicles Miles Traveled	Population	Energy Consumption	CO <sub>2</sub> Emissions	Aggregate Emissions (Six Common Pollutants)
1970	0%	0%	0%	0%	0%	0%
2000	~150%	~100%	~40%	~40%	~30%	~-40%
2010	~200%	~150%	~50%	~50%	~30%	~-60%
2016	~250%	~180%	~60%	~60%	~30%	~-73%

Source: Various

# Screenshots



# Screenshots

EPA Home Intro Growth NAAQS Visibility Toxics

## 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

Concentration (ppm)

90thile - 10thile National Average Selected Site

Source: U.S. EPA Air Quality System

### NO<sub>x</sub> Emissions

Million Tons

Stationary Fuel Combustion Industrial and Other Processes Highway Vehicles Non-Road Mobile

Source: U.S. EPA National Emissions Inventory 2014 ver. 1

NO<sub>x</sub> Emissions VOC Emissions

### Ozone 8-hour Concentration

Year: 1990

Year: 1990

Ozone 8-hour Concentration

Source: U.S. EPA Air Quality System

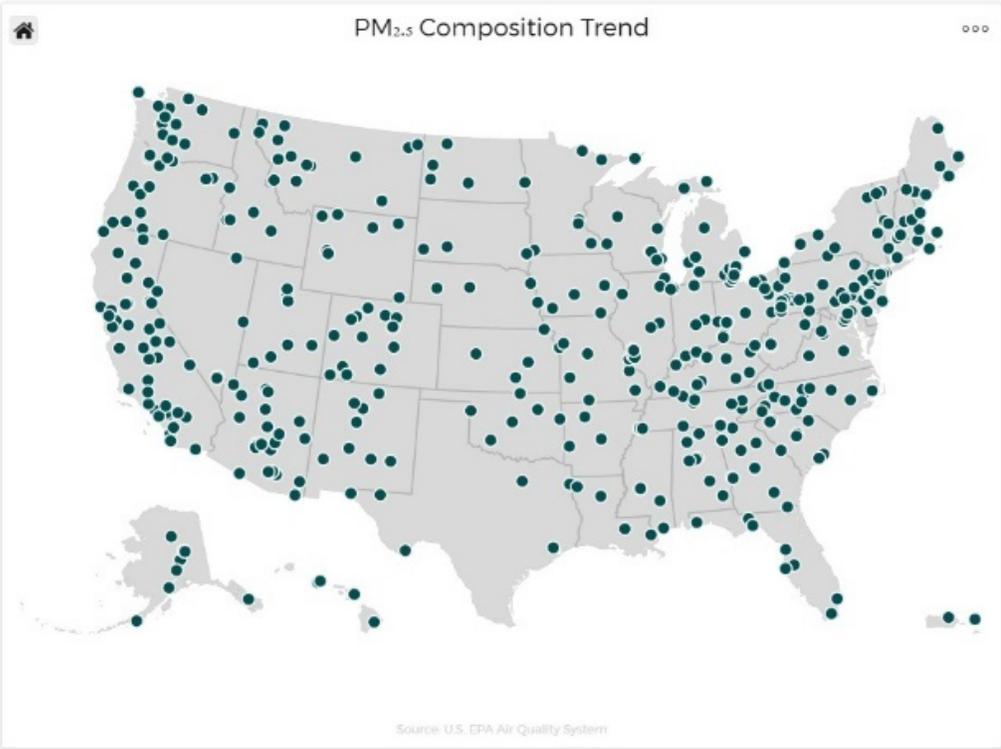
≤ 0.054 0.055 - 0.07 0.071 - 0.085 ≥ 0.086

Source: U.S. EPA Air Quality System

**CHARTS** Click emission tabs to change the emissions chart. The play/pause 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](#) link will open in a new tab.

**MAP** 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.

# Screenshots



**Understanding PM<sub>2.5</sub> 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<sub>2.5</sub> 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 2006-2015 annual and quarterly PM<sub>2.5</sub> speciation trends, and select maximize to enlarge the chart. Double click the map to zoom in and click the home button to reset.

Source: U.S. EPA Air Quality System

# Screenshots

EPA Home Intro Growth NAAQS Visibility Toxics

## 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, particle pollution, NO<sub>2</sub>, CO and SO<sub>2</sub>. 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 PM<sub>2.5</sub> AQI was unhealthy for sensitive groups (orange) or above (red, purple or maroon) for the years 2000-2016. Click the bar chart, or these links, to view the AQI retrospective reviews: [PM<sub>2.5</sub>](#) and [ozone](#) (links will open in a new tab).

[AQI FORECAST](#)

### Number of Days Reaching "Unhealthy for Sensitive Groups" Level or Above on the Air Quality Index (Among 35 Major U.S. Cities for Ozone and PM<sub>2.5</sub> Combined)

Year	Number of Days
2000	2,076
2001	2,155
2002	2,084
2003	1,789
2004	1,399
2005	1,990
2006	1,723
2007	1,797
2008	1,195
2009	788
2010	1,112
2011	1,253
2012	1,297
2013	677
2014	599
2015	706
2016	697

# Screenshots

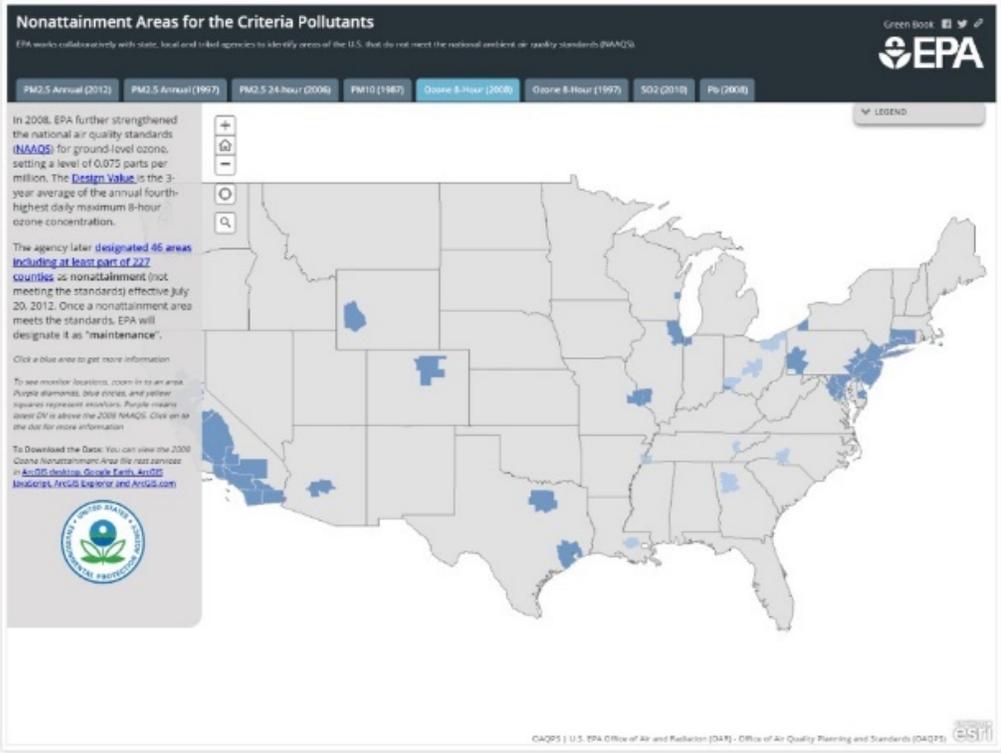
EPA Home Intro Growth NAAQS Visibility Toxics

## 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 NO<sub>2</sub>.

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.



**Nonattainment Areas for the Criteria Pollutants**  
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).

PM2.5 Annual (2012) PM2.5 Annual (1997) PM2.5 24-Hour (2006) PM10 (1987) Ozone 8-Hour (2008) Ozone 8-Hour (1997) SO2 (2018) Pb (2008)

In 2008, EPA further strengthened the national air quality standards (NAAQS) for ground-level ozone, setting a level of 0.075 parts per million. The **Design Value** is the 3-year average of the annual fourth-highest daily maximum 8-hour ozone concentration.

The agency later designated **46 areas including at least part of 227 counties as nonattainment** (not meeting the standards) effective July 20, 2012. Once a nonattainment area meets the standards, EPA will designate it as "maintenance".

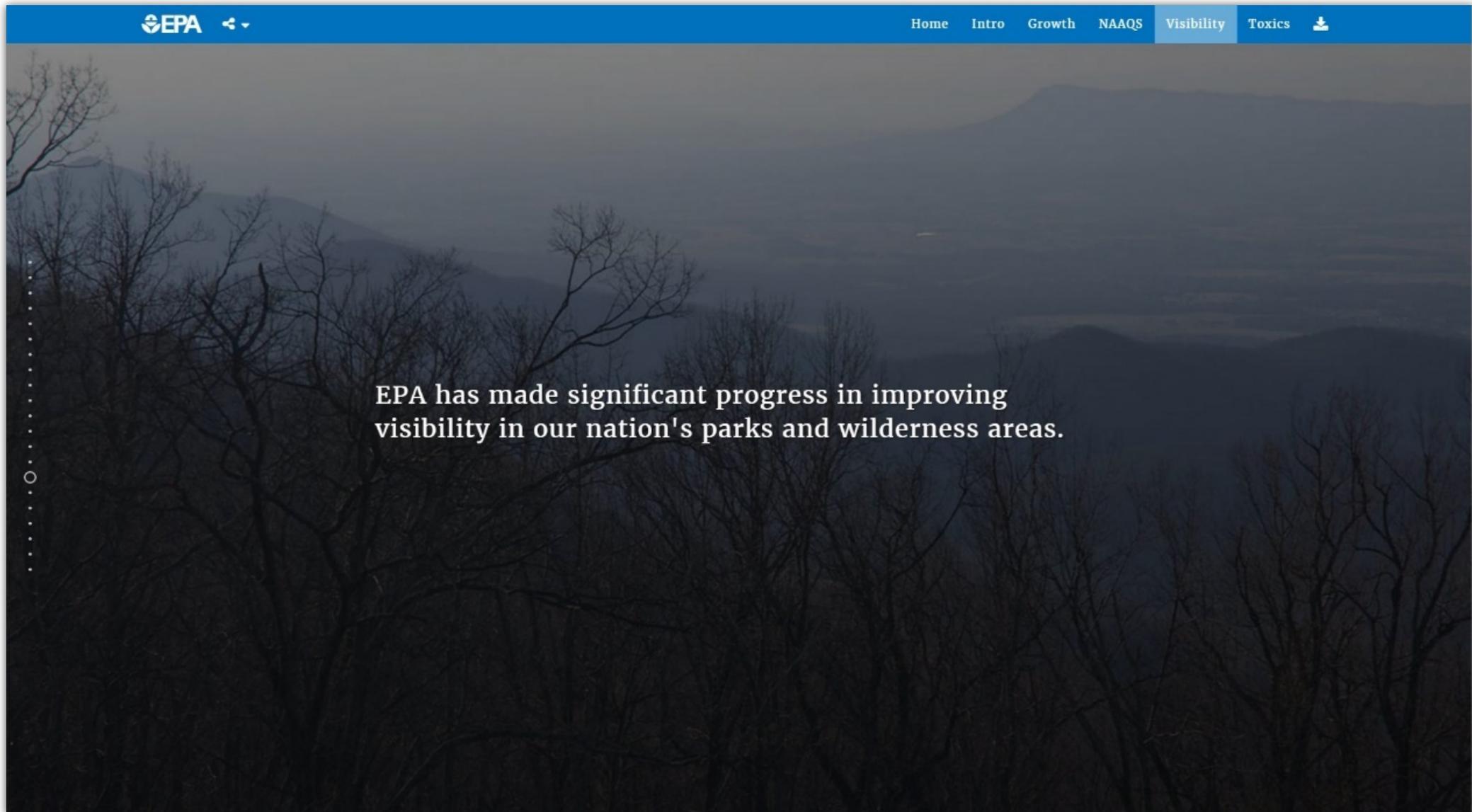
Click a blue area to get more information.

To see monitor locations, zoom in to an area. Purple diamonds, blue circles, and yellow squares represent monitors. Purple means latest PM<sub>10</sub> is above the 2008 NAAQS. Click on an area for more information.

To Download the Data: You can view the 2008 Ozone Nonattainment Area file, the 2012 ozone NAAQS design, Ozone PM<sub>10</sub> and PM<sub>2.5</sub> locations, AQS, Smap and AQSUS.com

CAQPS | U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS) esri

# Screenshots



# Screenshots

EPA Home Intro Growth NAAQS Visibility Toxics

## 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.

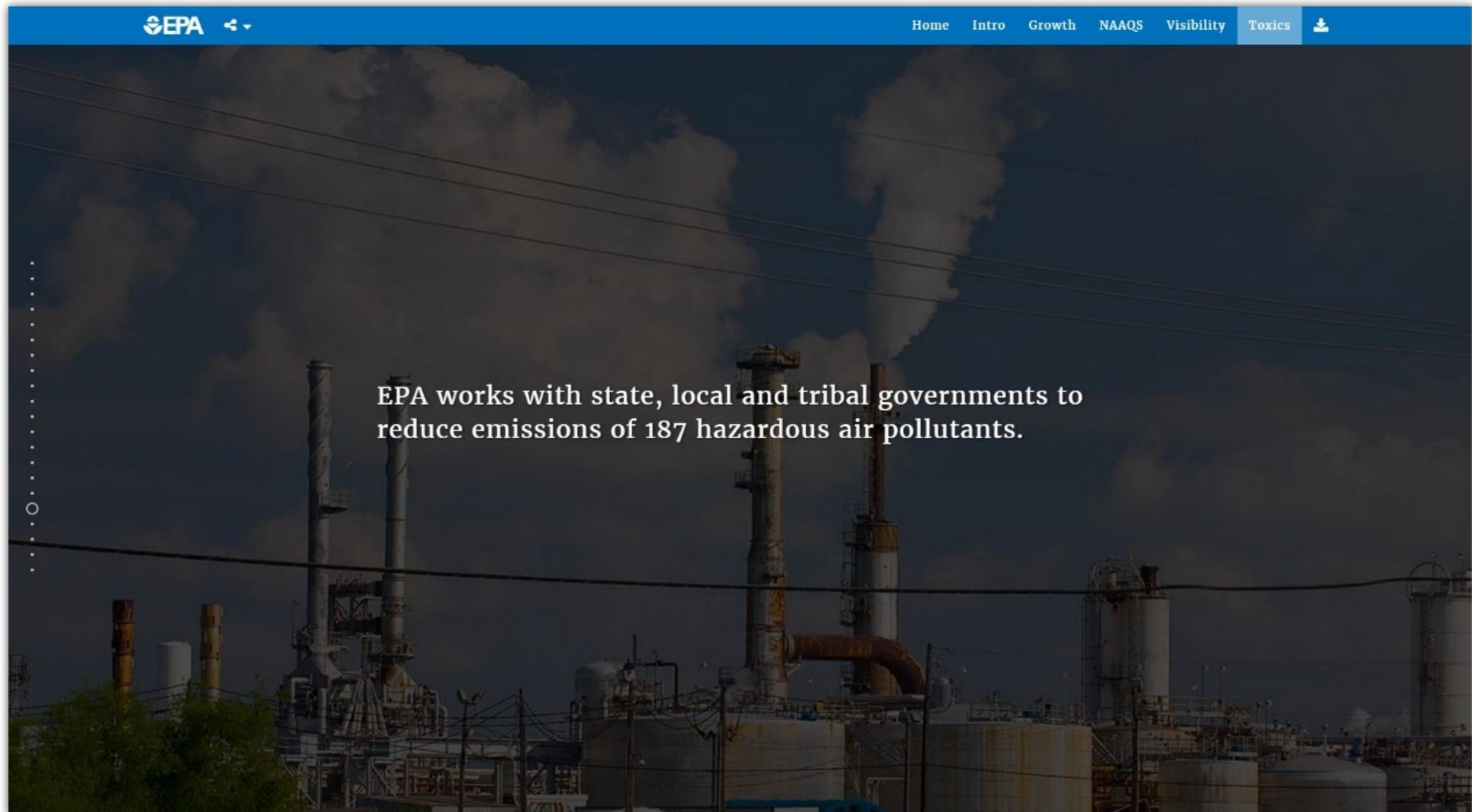
**REGIONAL HAZE RULE**

### Cleanest Visibility Trend

Significantly Improving Possible Improvement No Trend Possible Degradation Significantly Degrading

Source: IMPROVE

# Screenshots



# Screenshots

The screenshot displays the EPA's National Air Toxics Assessment interface. At the top, the EPA logo and navigation menu (Home, Intro, Growth, NAAQS, Visibility, Toxics) are visible. The main content area is titled "Air Toxics Levels Trending Down" and includes explanatory text about ambient monitoring data and trend directions. A dropdown menu is set to "Acetaldehyde". Below it, a map of the United States is titled "Acetaldehyde Concentration Trend", showing various monitoring sites marked with colored circles and arrows indicating their trend direction. A legend at the bottom of the map defines the symbols: a blue circle with a downward arrow for "Decreasing", a green circle with a rightward arrow for "No Trend", a red circle with an upward arrow for "Increasing", and a gray circle for "Undetermined". A "NATIONAL AIR TOXICS ASSESSMENT" button is located on the left side of the page.

**EPA** Home Intro Growth NAAQS Visibility Toxics

## 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 air toxics trends (link will open in a new tab).

**NATIONAL AIR TOXICS ASSESSMENT**

Select an air toxic to view concentration trends

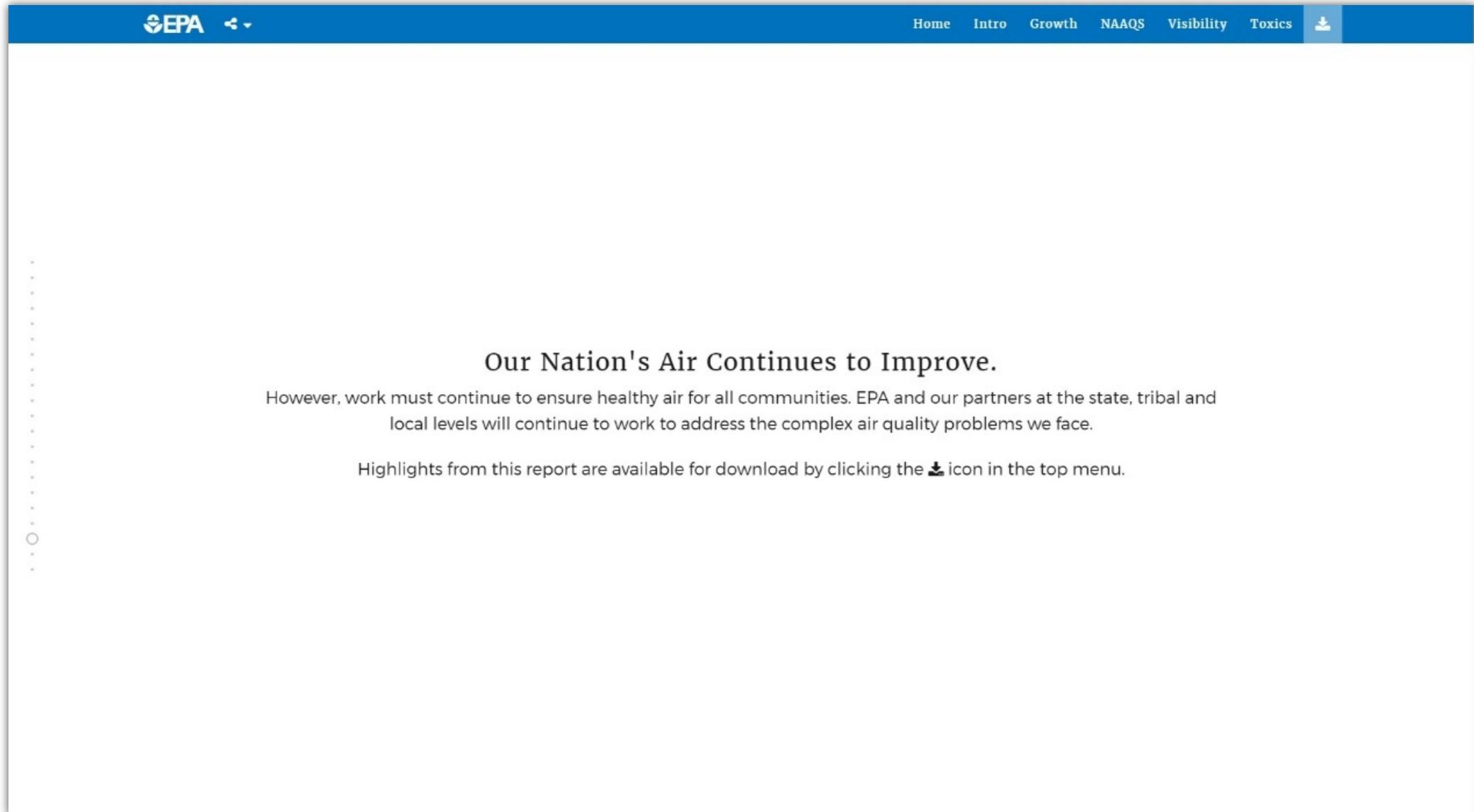
Acetaldehyde

### Acetaldehyde Concentration Trend

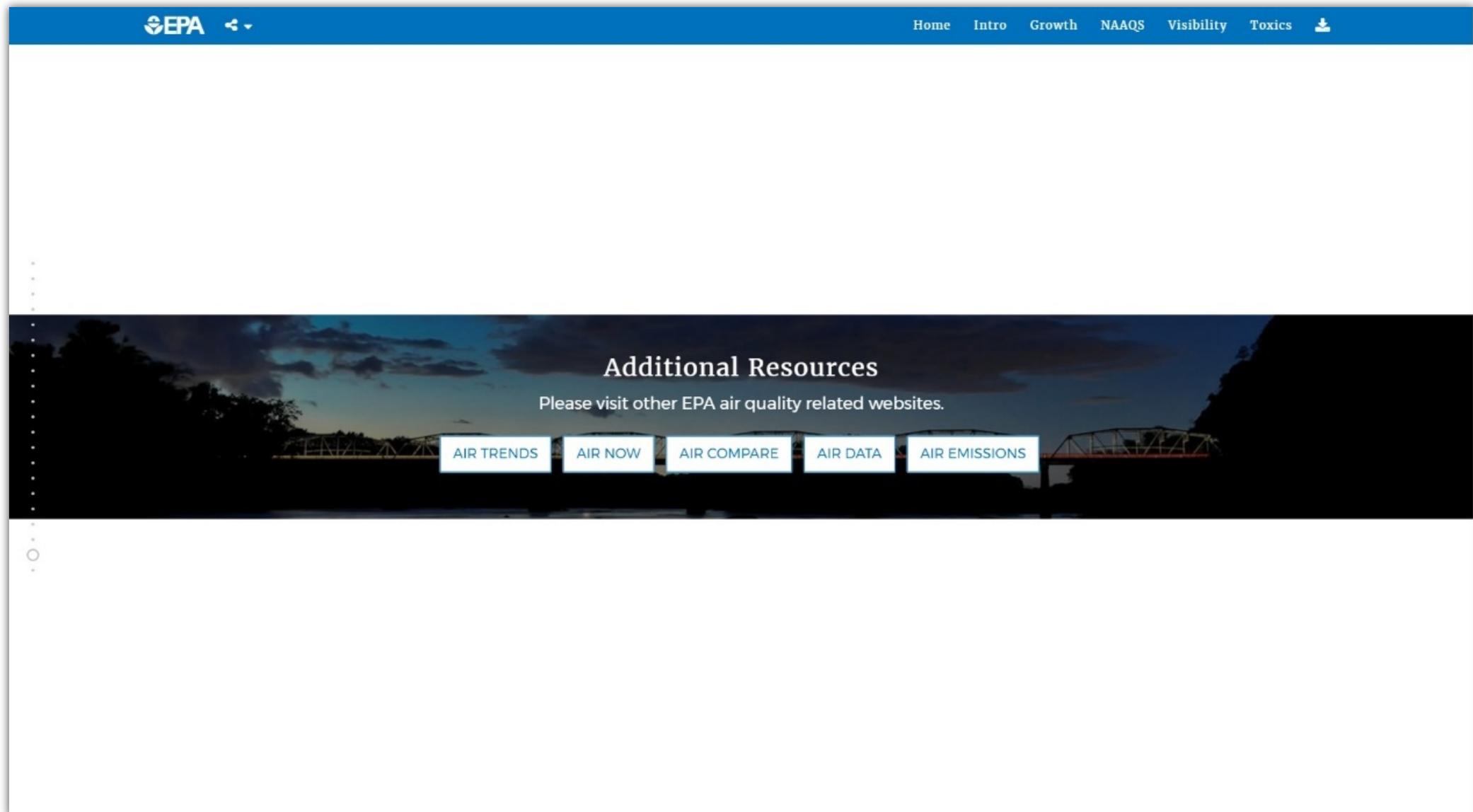
Decreasing No Trend Increasing Undetermined

Source: Phase XI of the Ambient Monitoring Archive (AMA)

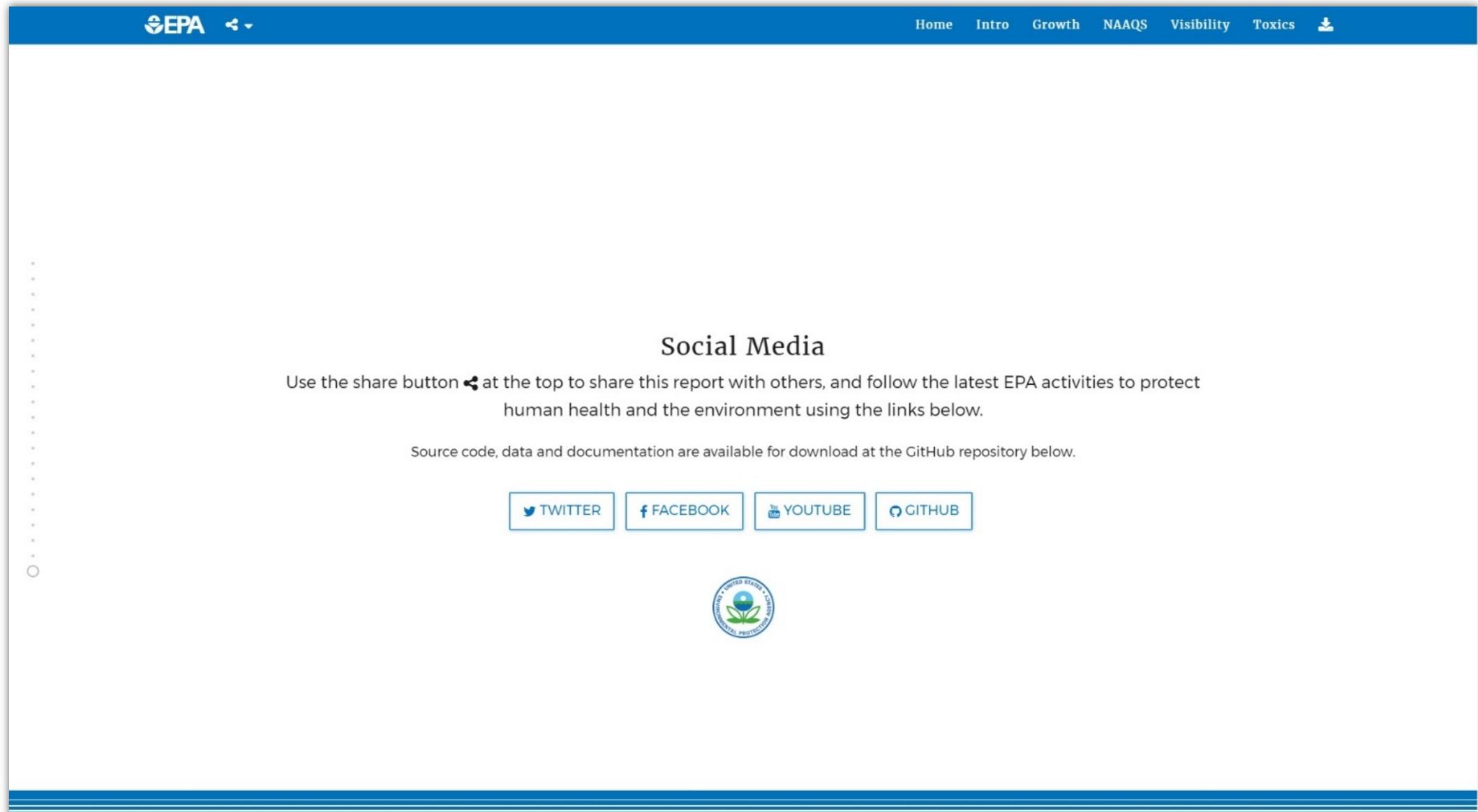
# Screenshots



# Screenshots



# Screenshots



The screenshot shows a web page with a blue header. On the left of the header is the EPA logo and a share icon. On the right are navigation links: Home, Intro, Growth, NAAQS, Visibility, Toxics, and a download icon. The main content area has a vertical list of small icons on the left side. The central text reads: "Social Media", "Use the share button [share icon] 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.", and "Source code, data and documentation are available for download at the GitHub repository below." Below this text are four buttons: TWITTER, FACEBOOK, YOUTUBE, and GITHUB. At the bottom center is the EPA seal.

EPA

Home Intro Growth NAAQS Visibility Toxics

## 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.

 TWITTER  FACEBOOK  YOUTUBE  GITHUB

