# Air Quality Report: Greater Detroit Area

October 2024

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## INTRODUCTION

This air quality report, developed by the U.S. Environmental Protection Agency and the Michigan Department of Environment, Energy and Great Lakes:

- identifies the locations of regulatory air monitoring sites operated by EGLE in the greater Detroit area;
- summarizes air quality monitoring data measured in the greater Detroit area;
- shows how air quality has changed over time;
- provides information about the pollutants that are measured;
- explains the potential health effects from exposure to the pollutants; and
- describes how to access air quality data in real-time on the EPA and EGLE websites.

This report is for anyone committed to understanding and improving air quality in the greater Detroit area. Understanding air pollution, its potential health effects, and being able to access air quality data is important so community members can stay informed, make decisions, and prioritize actions to further improve air quality and reduce exposure to air pollution. This report compliments several other air monitoring and air quality documents developed by EGLE each year. These documents are referenced and linked throughout the report for additional information and context.

Air pollution has been measured in Detroit and the surrounding area for several decades. The data summarized in this report demonstrate the significant improvements in air quality that have been achieved by the collective efforts of EPA, EGLE, the City of Detroit, local and regional industry, and Detroit's citizens. For additional information on air quality across the State of Michigan, see the EGLE Air Monitoring website.

It is important to recognize that air quality monitoring may have limitations, such as local air pollution "hotspots" – areas with levels of higher air pollution higher than shown at monitoring sites. The available data indicate that while there is variability in levels of air pollutant across the area, levels of air pollution have decreased in the greater Detroit area over the past two decades.

While much progress has been made, EPA and EGLE both recognize there is still more work to be done. Our agencies are committed to advancing environmental justice and incorporating equity considerations into all aspects of our work. Going forward, we will continue to review new monitoring data for the Detroit area and investigate any potential issues raised by the data. This may include analyzing available wind data, evaluating nearby sources, and making referrals to the enforcement program, as appropriate. EPA and EGLE commit to making air quality data easily available and understandable to the public. As we work to protect human health and the environment, we will continue to engage with the community on improving air quality.

## AIR MONITORING NETWORK OVERVIEW

The Clean Air Act requires EPA to set National Ambient Air Quality Standards for six pollutants, called "criteria" pollutants. These pollutants are common in outdoor air, can be harmful to public health and the environment, and come from a variety of different sources. The six criteria pollutants are carbon monoxide (CO), ozone ($O_3$), lead (Pb), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), inhalable particulate matter with a diameter less than or equal to 10 micrometers ($PM_{10}$) and fine particulate matter with a diameter less than or equal to 2.5 micrometers ($PM_{2.5}$). The purpose of ambient air monitoring is to measure and report the levels of criteria pollutants and other compounds to evaluate air quality in cities and regions. Ambient air monitoring is not used to determine if specific industrial facilities are in compliance with their air permits.

The primary NAAQS provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. The Clean Air Act also directs EPA to set secondary NAAQS to protect the “public welfare” against adverse effects, including ecological effects—such as damage to vegetation—caused by criteria pollutants. EPA periodically reviews the science the primary and secondary NAAQS are based on to protect public health and the environment. On February 7, 2024, EPA strengthened the primary standard for fine particulate matter, which will have significant health and economic benefits across the United States, including up to 4,500 avoided premature deaths, 800,000 avoided cases of asthma symptoms, and 290,000 avoided lost workdays in 2032.

To compare an area's air pollution levels with the NAAQS, EPA requires every state to establish a network of air monitoring stations for criteria pollutants. Air monitoring data are used to calculate a design value, which is compared to the standard. With the exception of sulfur dioxide, the greater Detroit area is designated as attaining all of the NAAQS.

States also monitor hazardous air pollutants, which are also referred to as air toxics. HAPs are pollutants that are known or suspected to cause cancer or other serious health impacts. NAAQS have not been set for pollutants in this category. Instead, the Clean Air Act requires EPA to regulate air toxics by setting limits on the amount of pollution industrial sources can release into the air.

In the greater Detroit area, EGLE operates all air monitors in the state’s network. Each year, EGLE’s network plan is opened for public comment before being submitted to EPA for final approval. EPA approved EGLE’s 2025 Air Monitoring Network Plan on September 10, 2024. It meets and exceeds the monitoring network requirements that are described in Clean Air Act regulations (40 CFR Part 58). EGLE collects, reviews, and validates the data collected at its sites—following EPA’s regulations, policies, and guidance—and submits the data to EPA.

The City of Detroit is in the process of establishing a network of regulatory-grade air quality monitors with near real time reporting, funded in part by an American Rescue Plan grant awarded by EPA. EGLE is working collaboratively with the City of Detroit on its deployment of air monitoring equipment.

In addition to the state-run network and the city-run network being established, industrial monitoring and air sensor measurements are also taking place across the state. Industrial monitors are privately owned and operated. They are not run by a Tribal, state or local government. They are typically located near the fenceline of a facility. The industrial monitors may be required as part of a permit or enforcement agreement or installed voluntarily to provide information about its impact on air quality in the neighborhood it operates. Air sensors are operated by individuals, organizations, local governments, Tribes and states. Sensors provide information to supplement the data provided by the regulatory air quality monitors. They are lower in cost, portable and generally easier to operate than regulatory-grade monitors.

## GREATER DETROIT AIR MONITORING NETWORK

Air quality monitoring in Michigan has been conducted since the 1970s. Table 1 below describes the network of air monitors in Detroit and the surrounding area. All monitors in the network are in areas with environmental justice concerns, defined as having one or more EJScreen environmental justice index at or above the 80% level. EGLE currently operates seven criteria air monitoring stations in the City of Detroit with plans to add additional monitoring sites in the north Detroit-Hamtramck area and on Detroit's east side. Additional details about the air monitors can be viewed online using the interactive map found on EGLE's Air Monitoring website or in EGLE's Air Monitoring Network Plan.

*Table 1: Table of monitoring locations, by type, in the greater Detroit area*

| Air Quality System ID | Site Name | Location | District | Pollutants Monitored | State/Industrial |
|---|---|---|---|---|---|
| 261250001 | Oak Park | 13701 Oak Park Blvd. | n/a | $PM_{2.5}$ and $O_3$ | EGLE – Criteria |
| 261630001 | Allen Park | 14700 Goddard | n/a | $O_3$, $PM_{2.5}$, $PM_{10}$, PMcoarse, CO, $SO_2$, $NO_y$, BC and $PM_{2.5}$ Speciation | EGLE - Criteria |
| 261630005 | River Rouge | 315 Genesee | n/a | Carbonyls, Pb and TSP metals | EGLE - Criteria |
| 261630015 | Detroit SW | 150 Waterman | District 6 | $PM_{2.5}$, $PM_{2.5}$ speciation, $PM_{10}$, $NO_x$, $SO_2$, BC, VOCs, Carbonyls, Pb, and TSP metals | EGLE – Criteria and Toxics |
| 261630019 | E. 7 Mile | 11600 East Seven Mile Rd. | District 3 | $O_3$, $PM_{2.5}$, NO, $NO_2$, $NO_y$, VOCs, and Carbonyls | EGLE – Criteria and Toxics |
| 261630033 | Dearborn | 2842 Wyoming | n/a | $PM_{2.5}$, $PM_{10}$, BC, $PM_{2.5}$ Speciation, VOCs, Carbonyls, PAHs, Pb and TSP metals | EGLE – Criteria and Toxics |
| 261630093 | Eliza Howell – Near Road | 23751 Fenkell St. | District 1 | $PM_{2.5}$, $NO_2$ and CO | EGLE – Criteria |

| Air Quality System ID | Site Name | Location | District | Pollutants Monitored | State/Industrial |
|---|---|---|---|---|---|
| 261630097 | New Mt Herman Church | 3225 S Deacon St. | District 6 | $PM_{2.5}$, $SO_2$, Pb and TSP metals | EGLE – Criteria and Toxics |
| 261630098 | Detroit Police 4th Precinct (Gordie Howe International Bridge) | 4700 West Fort St. | District 6 | $NO_x$, $SO_2$, CO, $PM_{2.5}$, BC, Pb and TSP metals | EGLE – Criteria and Toxics |
| 261630099 | Trinity (Gordie Howe International Bridge) | 9191 W Fort St. | District 6 | $NO_x$, $SO_2$, CO, $PM_{2.5}$, BC, Pb and TSP metals | EGLE – Criteria and Toxics |
| 261630100 | Military Park (Gordie Howe International Bridge) | 1238 Military St. | District 6 | $NO_x$, $SO_2$, $PM_{2.5}$, BC, Pb, and TSP metals | EGLE – Criteria and Toxics |
| 261631005 | Northwest (Marathon) | Near Oakwood Blvd. and Fordsom St. | District 6 | $SO_2$, CO, $PM_{10}$, TRS and VOCs | Industrial - Criteria and Toxics |
| 261631006 | West Corner (Marathon) | Near S. Dix St. and Schaefer Rd. | District 6 | $SO_2$, CO, $PM_{10}$, TRS and VOCs | Industrial - Criteria and Toxics |
| 261631008 | Northeast Corner (Marathon) | Near S. Fort St. and Pleasant St. | District 6 | $SO_2$, CO, $PM_{10}$, TRS and VOCs | Industrial - Criteria and Toxics |
| 261631009 | Mark Twain MS (Marathon) | 12800 Visger St. | District 6 | $SO_2$, CO, $PM_{10}$, TRS and VOCs | Industrial - Criteria and Toxics |
| 261631013 | Stellantis-FCA (Fiat Chrysler) | 11570 Warren Ave. | District 4 | $NO_2$, $PM_{2.5}$ and VOCs | Industrial – Criteria and Toxics |

Abbreviations

BC: black carbon
CO: carbon monoxide
NO: nitrogen oxide
$NO_2$: nitrogen dioxide
$NO_x$: nitrogen oxides
$NO_y$: reactive nitrogen compounds
$O_3$: ozone
PAHs: polycyclic aromatic compounds
Pb: lead
$PM_{2.5}$: particulate matter with an aerodynamic diameter ≤ 2.5 microns
$PM_{10}$: particulate matter with an aerodynamic diameter ≤ 10 microns
PM coarse: particulate matter with an aerodynamic diameter between 10 and 2.5 microns
$SO_2$: sulfur dioxide
TRS: total reduced sulfur
TSP: total suspended particulate
VOCs: volatile organic compounds

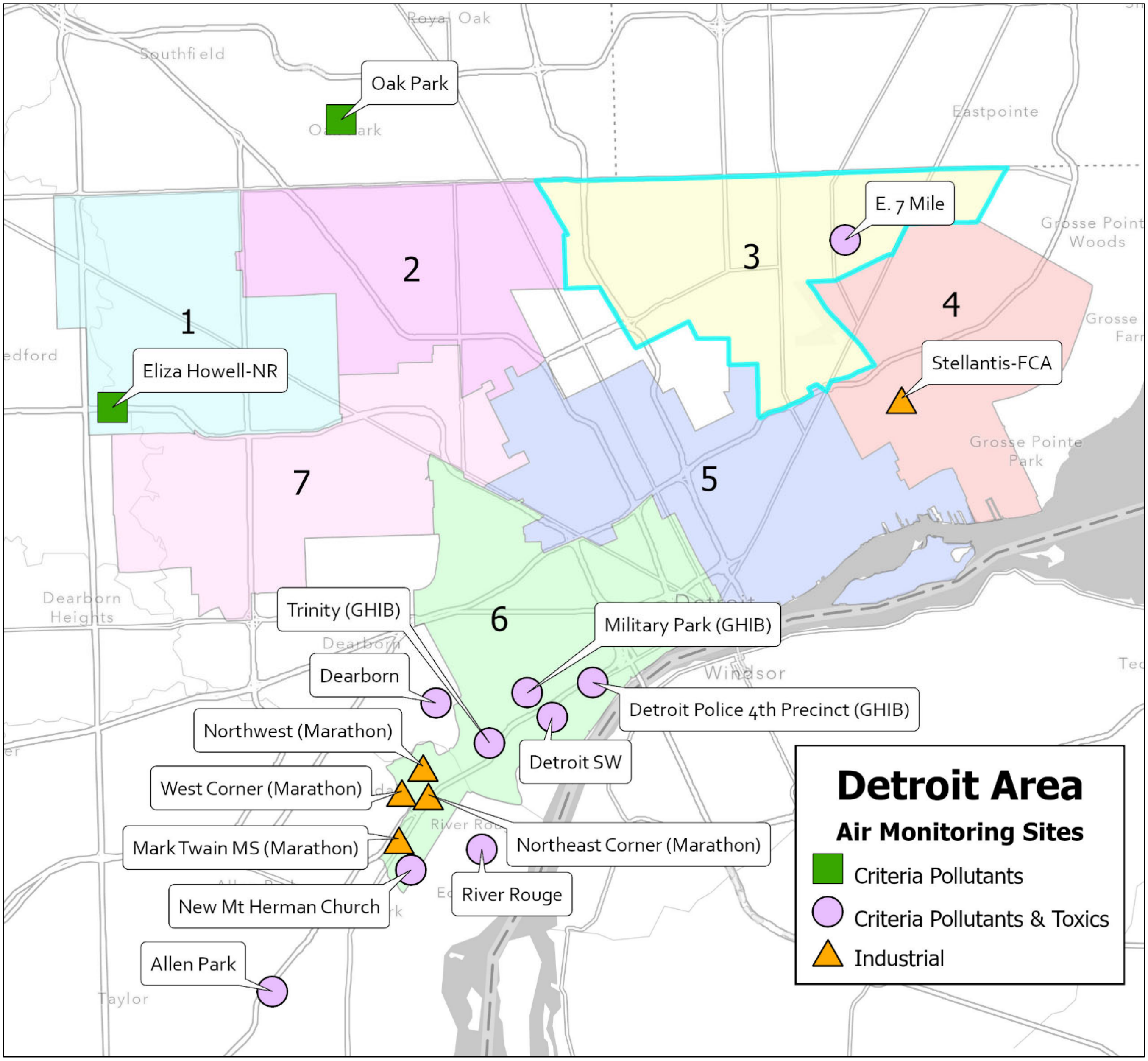



*Figure 1: Map showing the locations of air monitoring sites in the greater Detroit area*

## CRITERIA POLLUTANT MONITORING

### Particulate Matter

[Particulate matter] is a general term used for a mixture of solid particles and liquid droplets or aerosols found in the air. Some particulates are emitted directly from sources, such as construction sites, unpaved roads, fields, smokestacks, or fires. Most particles form in the atmosphere as a result of reactions between chemicals, such as sulfur dioxide and nitrogen oxides. These pollutants are released from industries like power plants and automobiles. Exposure to PM can harm people's health. Large segments of the U.S. population, including children, people with heart or lung conditions, and people of color, are at risk of health effects from PM.

EPA has set NAAQS for two sizes of particulate matter pollution: (1) inhalable particles with diameters that are 10 micrometers and smaller—$PM_{10}$; and (2) fine particulate matter with diameters that are 2.5 micrometers and smaller—$PM_{2.5}$. The average human hair is about 70 micrometers in diameter—making it 30 times larger than the largest fine particle.

For $PM_{10}$, the design value is measured by the number of days the standard has been exceeded. It is not to be exceeded more than once per year on average over three years. The level is 150 micrograms per cubic meter.

For $PM_{2.5}$, there is a long-term annual NAAQS and a short-term daily NAAQS. On February 7, 2024, EPA announced a final rule to strengthen the NAAQS for the annual $PM_{2.5}$ standard from 12.0 µg/m$^3$ to 9.0 µg/m$^3$. This was done to provide increased public health protection, consistent with the available health science, as required by the Clean Air Act. The design value for the annual standard is calculated as an annual mean, averaged over three years. EPA retained the primary 24-hour $PM_{2.5}$ standard at the current level of 35 µg/m$^3$. The design value for the daily standard is calculated as the annual 98th percentile, averaged over three years. Additional information on the 2024 revision to the NAAQS can be found on EPA's PM NAAQS website.

*Table 2: PM NAAQS*

| Pollutant | | Primary/Secondary | Averaging Time | Level (µg/m$^3$) | Form |
|---|---|---|---|---|---|
| Particle Pollution (PM) | $PM_{2.5}$ | Primary | 1 year | 9.0 | Annual mean, averaged over 3 years |
| | | Secondary | 1 year | 15.0 | Annual mean, averaged over 3 years |
| | | Primary and secondary | 24 hours | 35 | 98th percentile, averaged over 3 years |
| | $PM_{10}$ | Primary and secondary | 24 hours | 150 | Not to be exceeded more than once per year on average over 3 years |

The 2023 wildfire season significantly affected air quality in Detroit and the entire upper Midwest. Over the last 10 years, an average of around 6.7 million acres burned by wildfires per year in Canada. In 2023, a record breaking 45 million Canadian acres burned. Several of these Canadian wildfire smoke plumes affected PM and ozone concentrations in the Detroit area. EPA, EGLE, and other stakeholders continue to evaluate the impacts of wildfire smoke from the summer of 2023 and how it will affect the evaluation of Detroit's air quality for regulatory purposes consistent with the Clean Air Act's Exceptional Event Rule.

EGLE has been monitoring for PM in Southeast Michigan for over 50 years. $PM_{2.5}$ concentrations measured across the greater Detroit area are summarized below. Figure 2 shows the historical downward trend of PM concentrations at the Detroit SW site and the strengthening of the annual $PM_{2.5}$ standard.

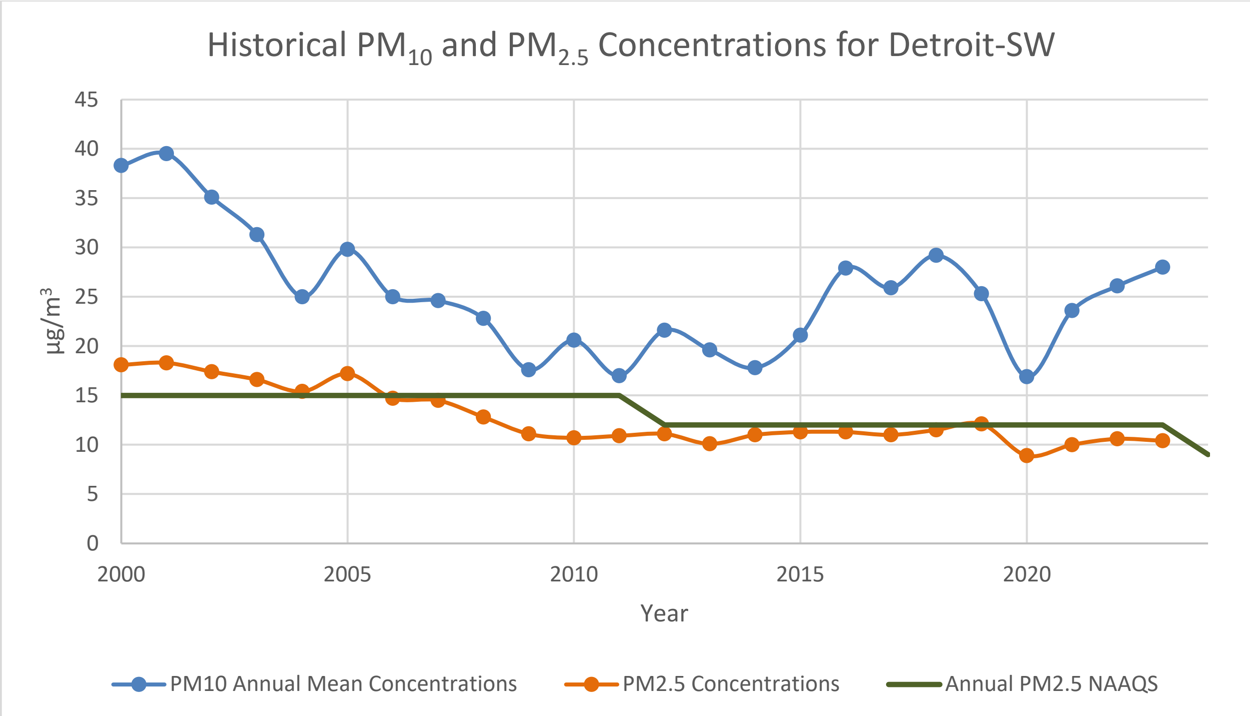



*Figure 2: Historical PM trends at Detroit SW*

Figure 3 shows annual 2021-2023 design values as compared against the annual $PM_{2.5}$ NAAQS for all Detroit area monitors. The most recent annual design values range from 8.0 µg/m³ to 13.0 µg/m³.

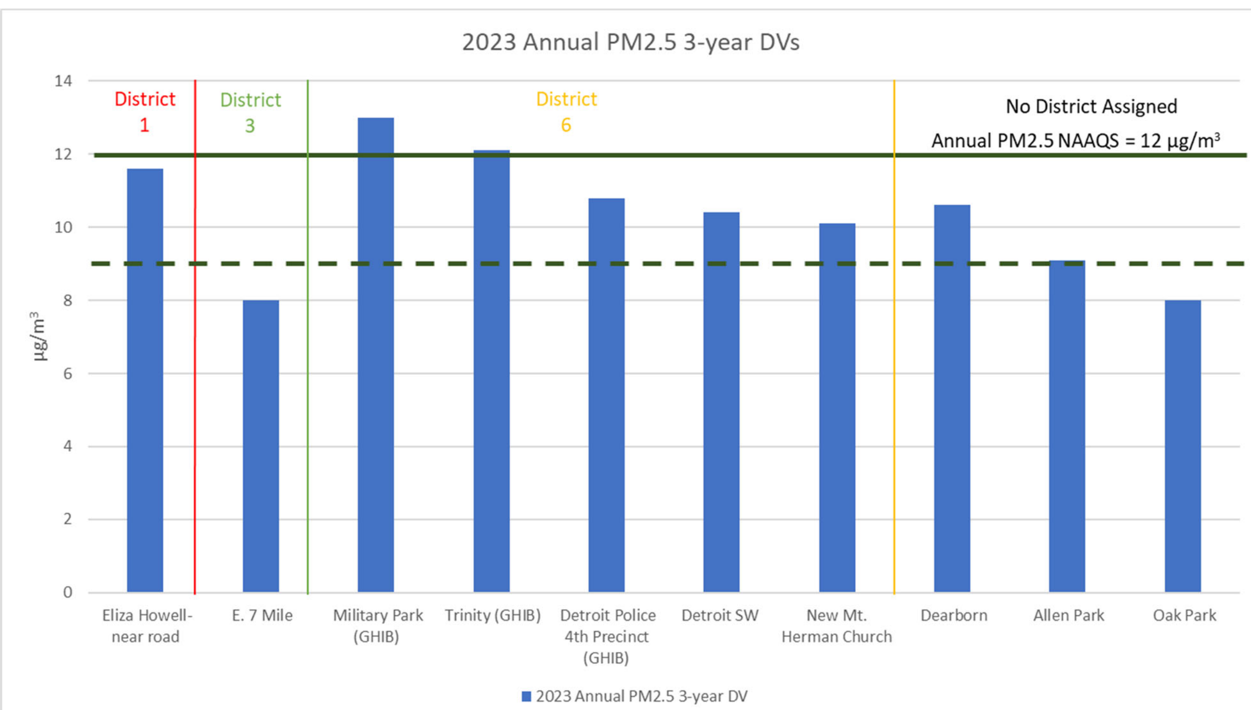



*Figure 3: 2023 annual 3-year design values for Detroit area PM2.5 sites*

Within two years after finalization of the new NAAQS, EPA intends to designate areas as meeting (attainment areas) or not meeting (nonattainment areas) the final NAAQS, considering the most recent air quality monitoring data and input from Tribes and states.

### Ozone

Ground level ozone is not released directly into the air, but is created by oxides of nitrogen and volatile organic compounds mixing and reacting in the presence of sunlight. We call the chemicals that react to form ozone "precursors." Precursors come from cars, power plants, industrial boilers, refineries, chemical plants, and other sources. In Earth's upper atmosphere (the stratosphere), ozone helps by absorbing much of the sun's ultraviolet radiation, but in the lower atmosphere (the troposphere), ozone is an air pollutant. Ozone is a key ingredient of urban smog and can be transported hundreds of miles under certain meteorological conditions. Maximum ozone concentrations are likely to be located 10-30 miles downwind from an urban area where precursor pollutants originate.

Those most at risk from breathing air containing ozone include people with asthma, children, older adults and those who are active outdoors, especially people who work outside. Depending on the level of exposure, ozone can cause coughing, difficulty breathing, and damage to the airways, make the lungs more susceptible to infection, and aggravate lung diseases.

For ozone, the design value is measured as the annual fourth-highest daily maximum 8-hour concentration, averaged over three years. The most recent NAAQS was set at 70 parts per billion (ppb) in 2015.

*Table 3: Ozone NAAQS*

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Ozone ($O_3$) | Primary and secondary | 8 hours | 70 ppb | Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years |

In May of 2023, EPA redesignated the Detroit area to attainment with the 2015 ozone NAAQS. The redesignation was based on air quality data from 2019-2021 and 2020-2022 showing that the area had met EPA's health-based standard. Before the redesignation, EPA finalized a Clean Data Determination, concluding that the area monitored attainment with the health-based air quality standard for ozone. This determination was based on an analysis from EGLE that wildfires caused high ozone values in June 2022. This is considered an "exceptional event" which can be excluded when determining if an area is meeting an air quality standard. EPA reviewed and agreed with EGLE's analysis and determined that EGLE has satisfied all requirements to exclude the data. Additional information on the Detroit CDD can be found on EPA's website.

EGLE has been monitoring ozone for over 40 years in Southeast Michigan. Figure 4 shows the historical downward trend of ozone concentrations at the Detroit-E. 7 Mile site. Ozone is influenced by weather conditions, so ozone concentrations can be more variable, year to year, than other pollutants. Ozone is also monitored primarily in warmer months from March 1 to October 31.

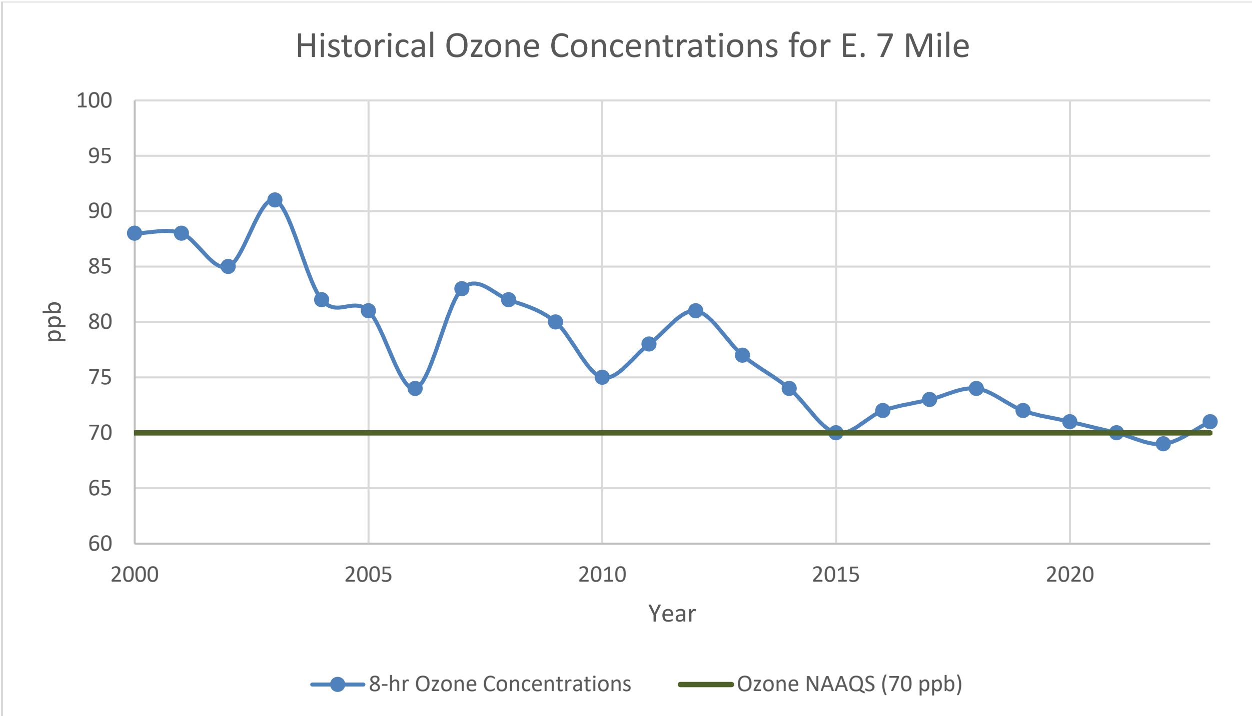



*Figure 4: Historical ozone trends at Detroit-E. 7 Mile*

Figure 5 shows the 2021-2023 design values for ozone sites in the greater Detroit area. In both figures, the dark green line is the level of the NAAQS. The most recent design values from all monitors in the Detroit area range from 69 ppb to 71 ppb. EPA expects that EGLE will complete an analysis to assess whether the highest value of 71 ppb, recorded at the East 7 Mile monitor, was impacted by Canadian wildfires in June 2023.

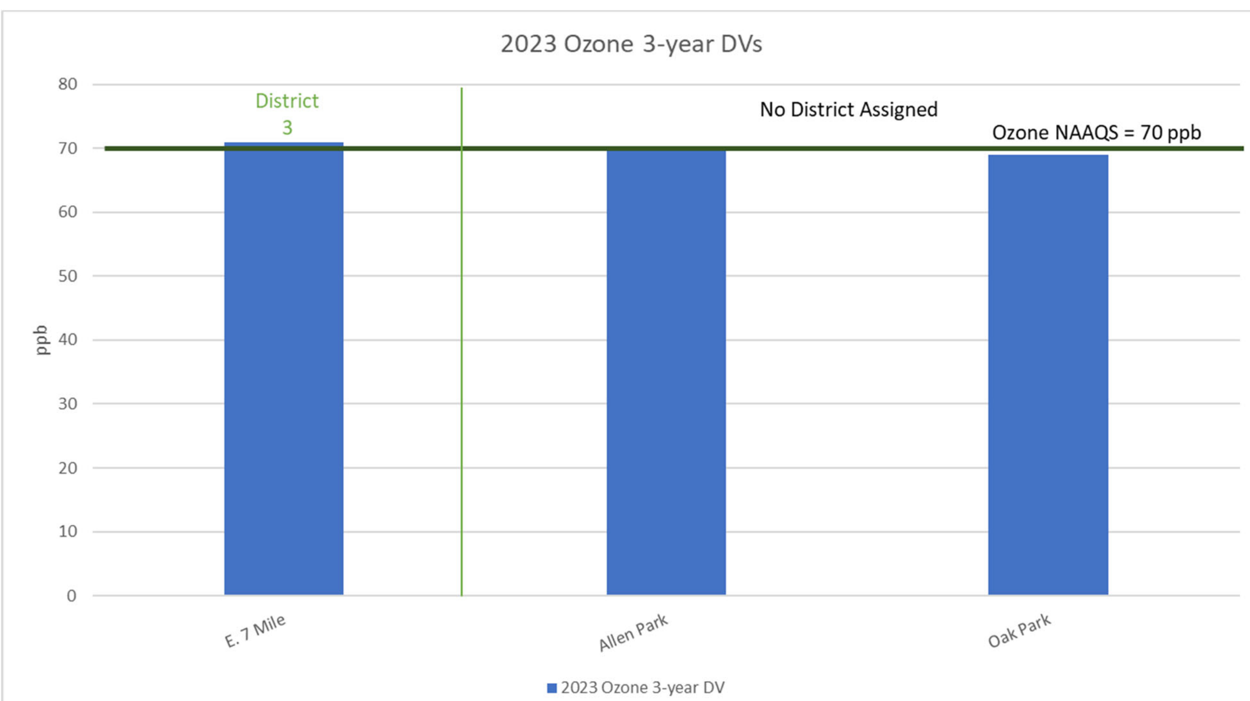



*Figure 5: 2023 3-year design values for Detroit area ozone sites*

Should the area violate the standard in the future, EGLE is required to conduct a study to determine whether additional control measures are required and has committed to implementing these contingency provisions if necessary. EPA and EGLE will continue to track ozone levels in Detroit.

### Sulfur Dioxide

Sulfur dioxide is a gas formed by the burning of sulfur-containing material. The largest source of $SO_2$ in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities. Smaller sources of $SO_2$ emissions include metal extraction and locomotives, ships and other vehicles, and heavy equipment that burn fuel with a high sulfur content.

$SO_2$ and other sulfur oxides can contribute to acid rain, which is harmful to sensitive ecosystems. Short-term exposures to $SO_2$ can harm the human respiratory system and make breathing difficult. People with asthma, particularly children, are sensitive to the effects of $SO_2$.

For $SO_2$, the design value is based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations. This standard is 75 ppb. There is also a secondary standard—a 3-hour average that cannot exceed 500 ppb once per year.

*Table 4: $SO_2$ NAAQS*

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Sulfur Dioxide ($SO_2$) | Primary | 1 hour | 75 ppb | 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Secondary | 3 hours | 500 ppb | Not to be exceeded more than once per year |

In 2010, when the EPA changed the standard from an annual average to a 1-hour standard, a portion of Wayne County was designated nonattainment. Since then, $SO_2$ concentrations have decreased at this site and monitored values are currently under the level of the NAAQS. On October 2, 2022, EPA issued a plan with emission limits and construction requirements for the facilities in the area that ensures the area meets the standard and continues to into the future.

EGLE has been monitoring for $SO_2$ in Southeast Michigan for over 45 years. Figure 6 shows the historical downward trend of $SO_2$ concentrations at the Detroit SW monitoring site.

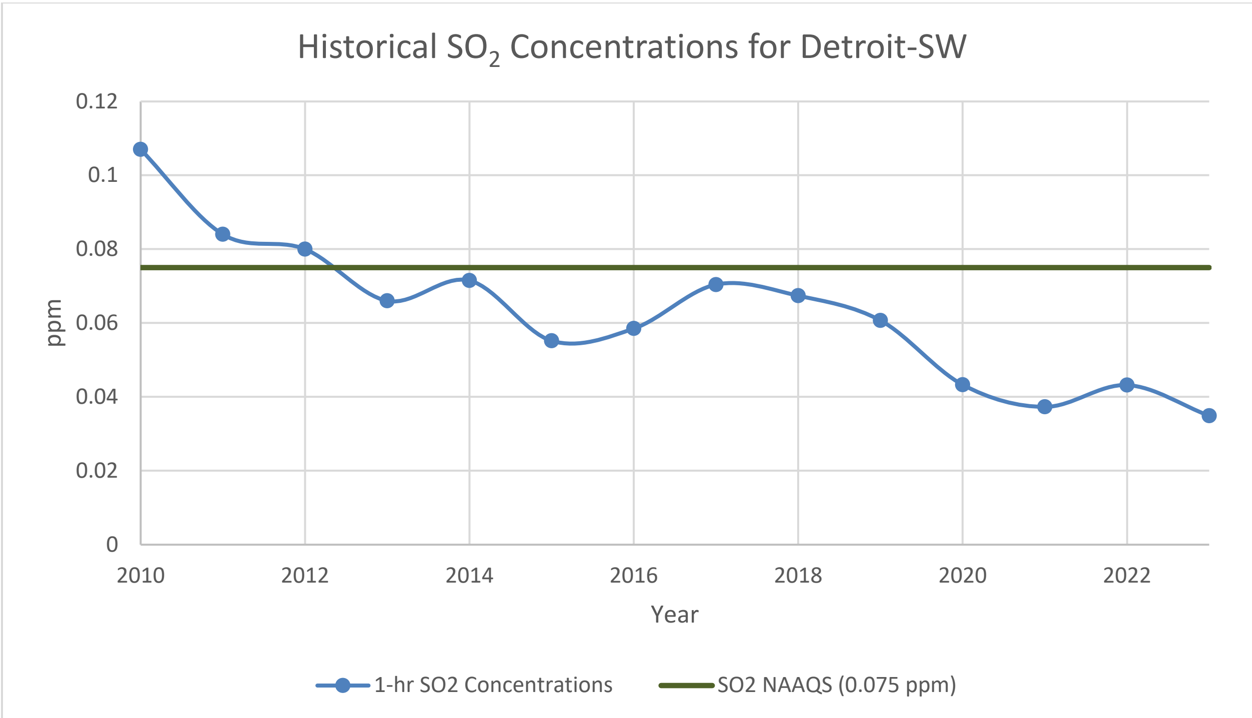



*Figure 6: Historical SO2 trends at Detroit SW*

Figure 7 shows the 2021-2023 design values for $SO_2$ sites in the greater Detroit area. In both figures, the dark green line is the level of the NAAQS. The most recent design values range from 15 ppb to 38 ppb.

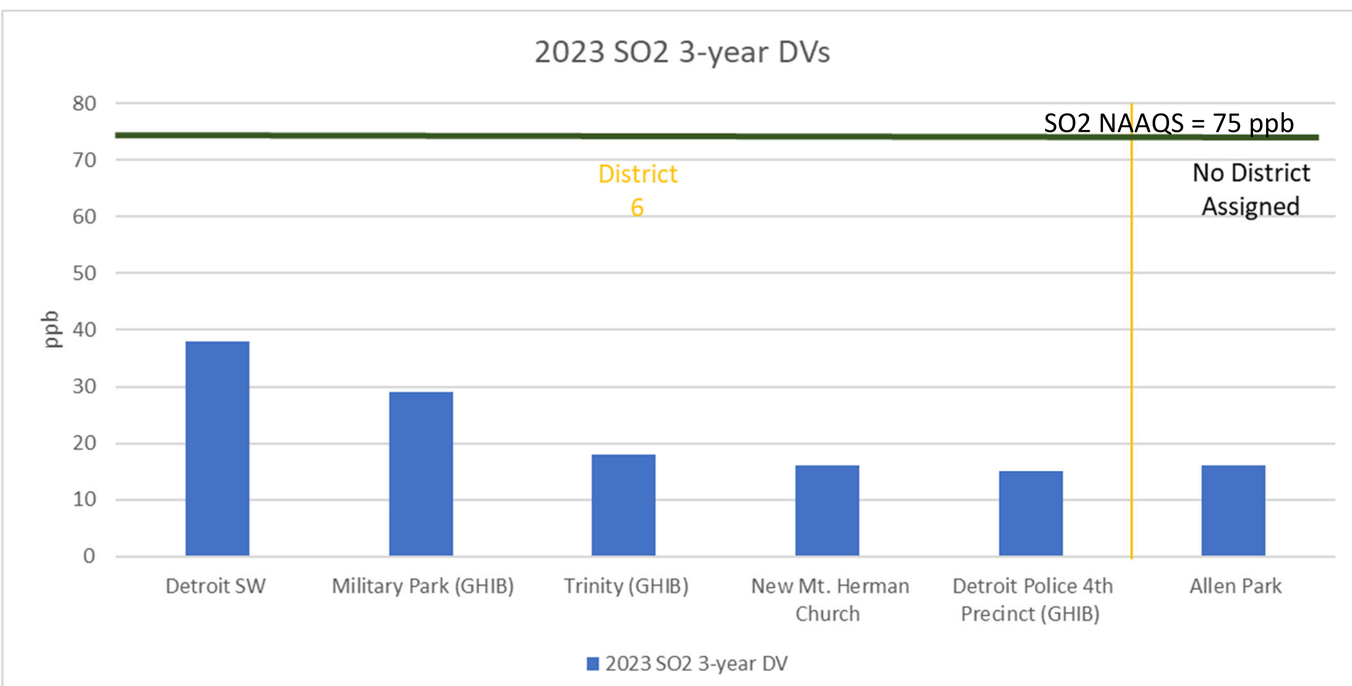



*Figure 7: 2023 design values for Detroit area $SO_2$ sites*

## Lead

As a result of EPA's regulatory efforts including the removal of lead from motor vehicle gasoline, levels of [lead](#) in the air decreased by 98 percent between 1980 and 2014. Industrial operations that may result in lead emissions include ore and metals processing, smelting, waste incineration, and lead-acid battery manufacturing.

Lead is rapidly absorbed into the bloodstream, which can affect many organ systems. Infants and young children are especially sensitive to lead exposures, which may contribute to behavioral problems, learning deficits, and lowered IQ. Ingestion is the main route of human exposure.

For lead, the design value is measured as the maximum arithmetic 3-month mean concentration for a 3-year period that is not to be exceeded. The level is 0.15 µg/m$^3$.

*Table 5: Lead NAAQS*

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Lead (Pb) | Primary and secondary | Rolling 3-month average | 0.15 µg/m$^3$ | Not to be exceeded |

EGLE has been monitoring for lead in Southeast Michigan for over 40 years. Figure 8 shows the historical downward trend of lead concentrations at the Dearborn monitoring site.

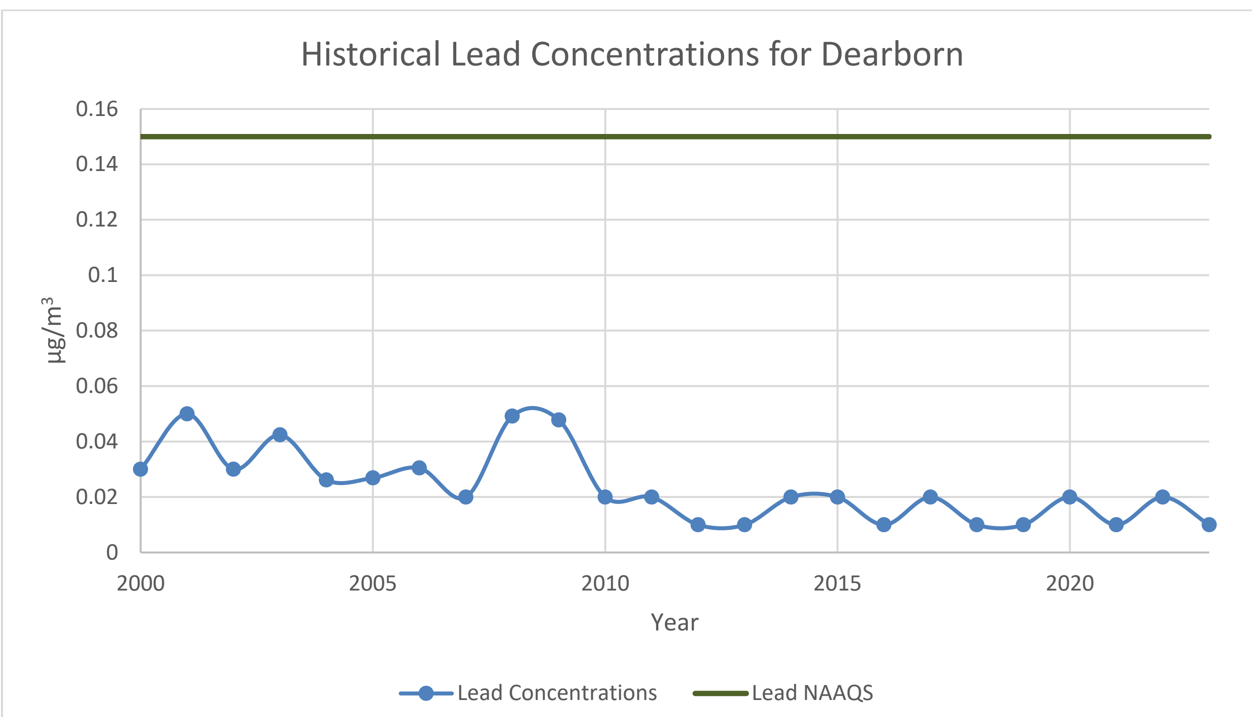



*Figure 8: Historical trends for lead at Dearborn*

Figure 9 shows the 2021-2023 design values for lead monitoring sites in the greater Detroit area. In both figures, the dark green line is the level of the NAAQS. All monitors in the Detroit area are in attainment with the lead NAAQS. The most recent annual design values range from 0.01 µg/m$^3$ to 0.02 µg/m$^3$. In 2022, the national average maximum 3-month average of lead from all monitors was 0.03 µg/m$^3$.

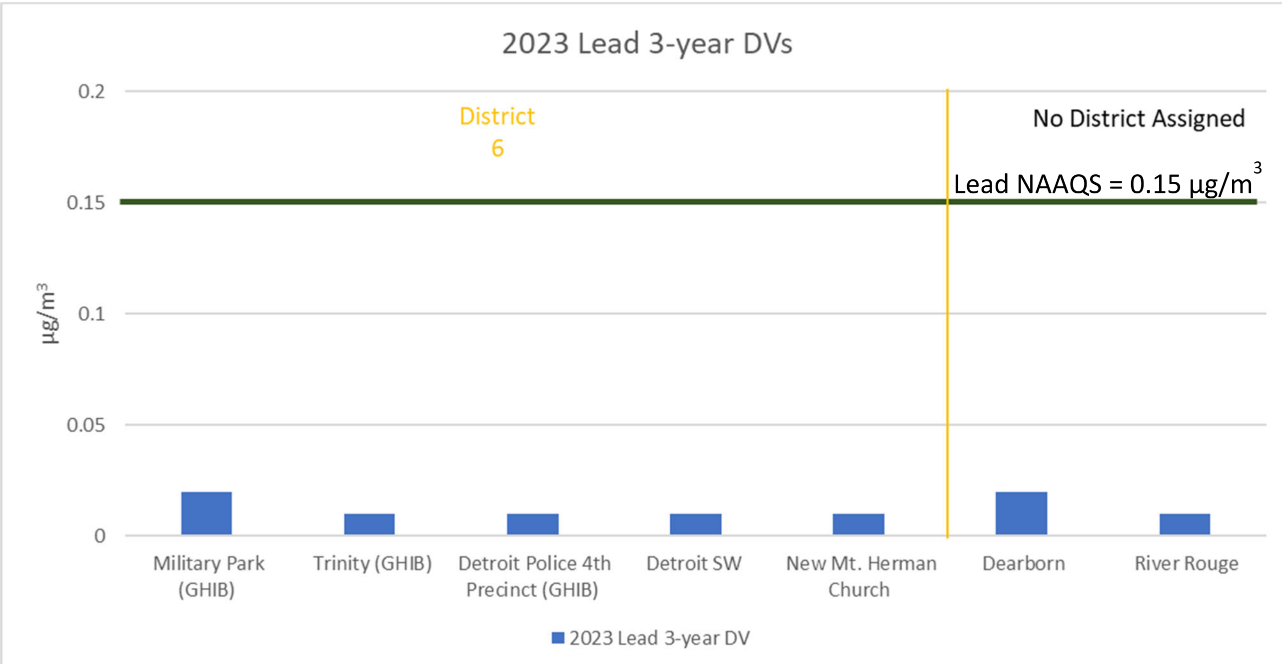



*Figure 9: 2023 design values for Detroit area lead sites*

## Nitrogen Dioxide

Nitrogen dioxide is a reddish-brown, highly reactive gas. $NO_2$ comes from emissions from cars, trucks and buses, power plants, and off-road equipment. When mixed with other gases in the air, it becomes yellow or invisible. High concentrations produce a pungent odor, and lower levels have an odor like bleach.

Breathing air with a high concentration of $NO_2$ can irritate airways and aggravate respiratory diseases, particularly asthma. Longer exposures to elevated concentrations of $NO_2$ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections.

For $NO_2$, there is a long-term annual NAAQS and a short-term 1-hour NAAQS. The design value for the annual standard is calculated as an annual average. The level is 53 ppb. The design value for the 1-hour standard is based on the 3-year average of 98th percentile of the yearly distribution of 1-hour daily maximum concentrations. The level is 100 ppb.

*Table 6: $NO_2$ NAAQS*

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Nitrogen Dioxide ($NO_2$) | Primary | 1 hour | 100 ppb | 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years |
| | Primary and secondary | 1 year | 53 ppb | Annual Mean |

EGLE has been monitoring for $NO_2$ in Southeast Michigan for 40 years. Figure 10 shows the historical trend of $NO_2$ at the Detroit-E. 7 Mile Road monitoring site. Due to instrumentation changes, $NO_2$ data were not collected for 2019 and 2020 but instrument operations resumed in 2021. Levels throughout Michigan have also remained below the 1-hour standard and continue to decrease.

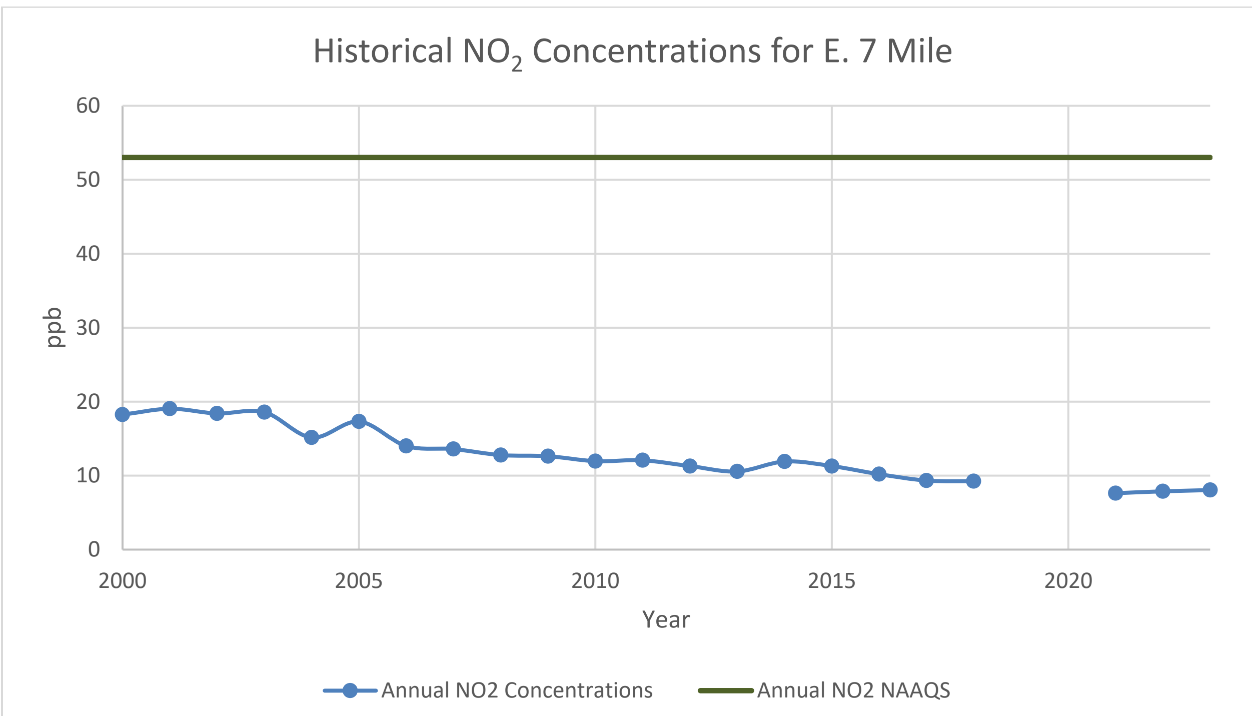



*Figure 10: Historical annual NO2 trends at Detroit-E. 7 Mile*

## Carbon Monoxide

Carbon monoxide is a gas formed during incomplete burning of fuel. The greatest outdoor air sources are cars, trucks, and other vehicles or machinery that burn fossil fuels. Levels peak during colder months primarily due to cold temperatures that affect how efficient engines run. Carbon monoxide is colorless, odorless, and tasteless, and is lethal at elevated concentrations.

Very high levels of carbon monoxide are not likely to occur outdoors. However, elevated levels outdoors can be concerning for people with some types of heart disease. This is because carbon monoxide reduces how much oxygen is transported in the blood stream to critical organs.

For carbon monoxide, there are two standards—9 parts per million, measured over 8 hours, and 35 ppm, measured over 1 hour.

*Table 7: Carbon Monoxide NAAQS*

| Pollutant | Primary/ Secondary | Averaging Time | Level | Form |
|---|---|---|---|---|
| Carbon Monoxide (CO) | Primary | 8 hours | 9 ppm | Not to be exceeded more than once per year |
| | | 1 hour | 35 ppm | |

EGLE has been monitoring carbon monoxide in Southeast Michigan for 50 years. The values have continued to decrease over time and are well below the NAAQS, as shown in Figure 11.

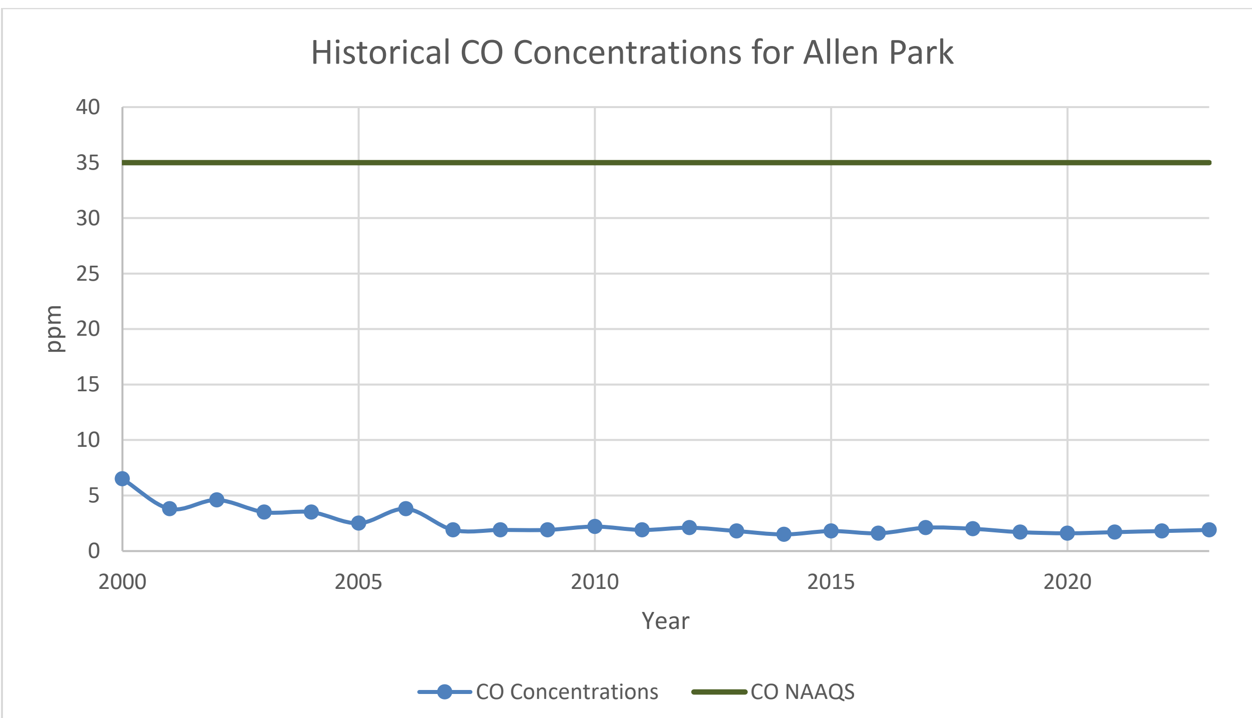



*Figure 11: Historical CO trends at Allen Park*

## AIR TOXICS MONITORING

This section provides an overview of annual concentrations for several common Urban Air Toxics (UATs) monitored in Detroit, Dearborn, and River Rouge. Although there are many UATs monitored in the state, some have been added or removed over time. Specific UATs and sites were selected to illustrate trends over a longer timeframe. They each have at least 10 years of data reported to EPA's [Air Quality System](#) database and the UATs selected were reported at multiple monitors in the area. Data were analyzed for 20 years, from 2002 to 2022.

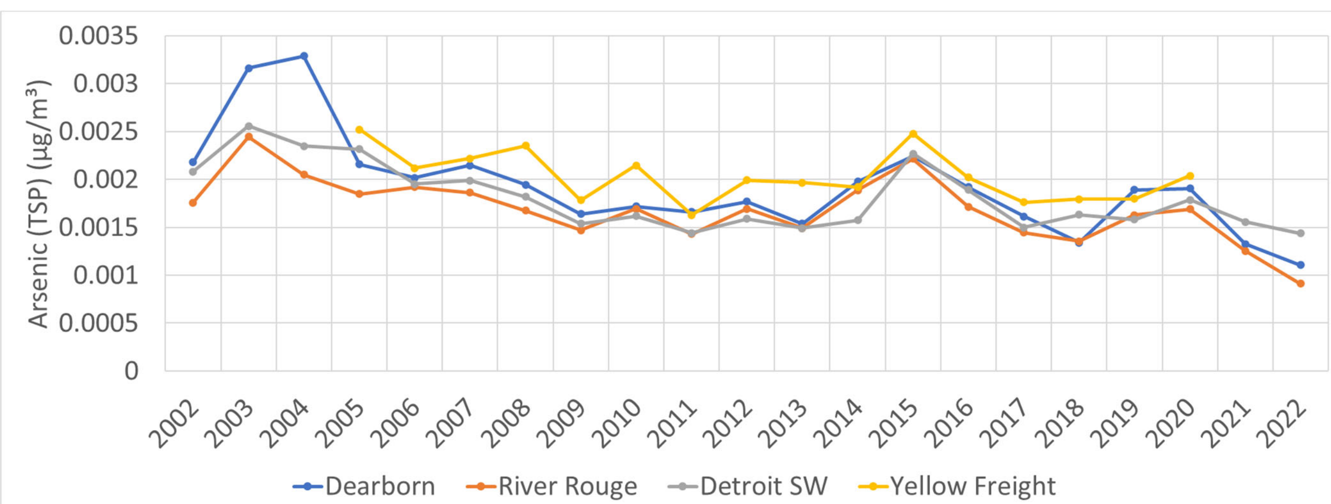
This section also provides the average concentration of common UATs in 2022 by monitoring site. To understand what the data mean, EPA compared the results to current health benchmarks for cancer risk and noncancer health effects.

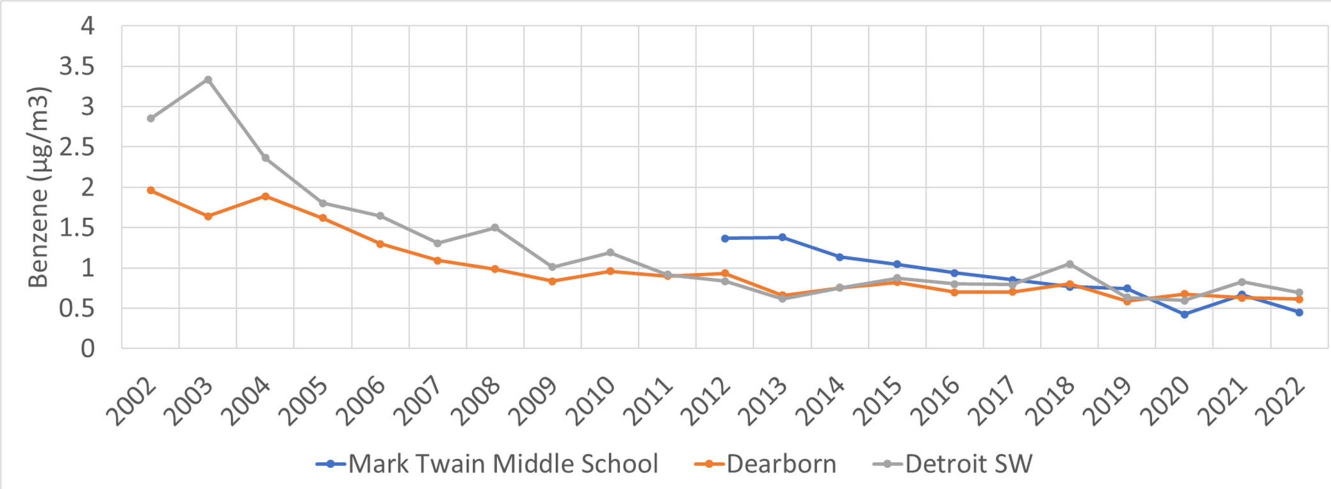
### Historical Trends

EPA examined the trend of five common UATS—arsenic, benzene, formaldehyde, manganese, and nickel.

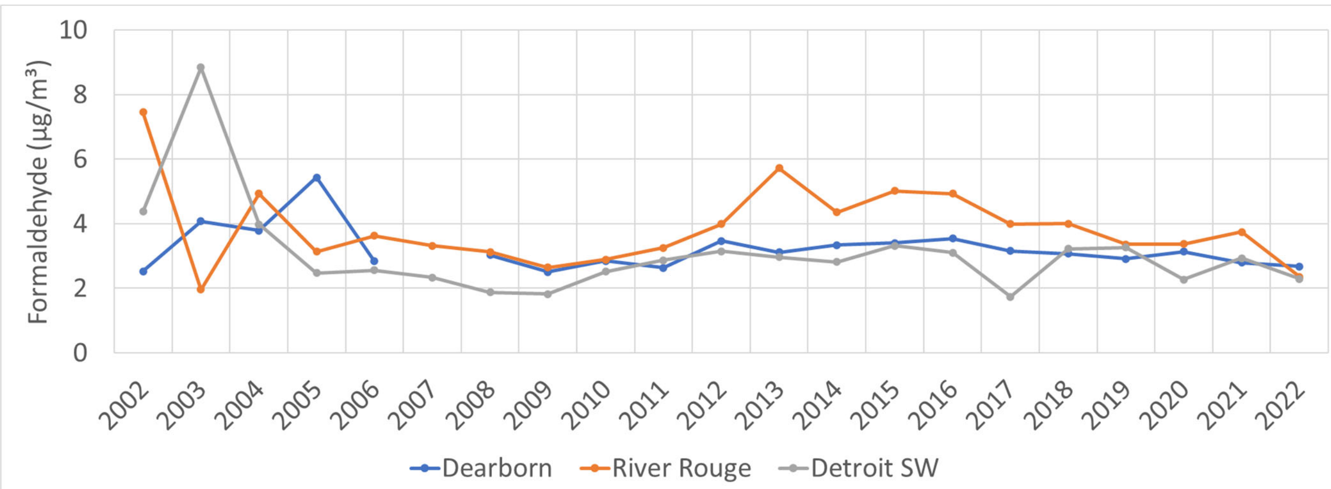
Arsenic can come from natural sources such as weathering of arsenic-containing minerals and ores, as well as metal smelting operations and burning wood treated with an arsenical wood preservative. Benzene typically comes from burning coal and oil, motor vehicle exhaust, evaporation from gasoline service stations, and industrial solvents. Formaldehyde concentrations are unlikely to be caused by a single source, but rather through chemical reactions of other emitted pollutants. The major sources of formaldehyde are typically power plants, manufacturing facilities, incinerators, and automobile exhaust emissions. Manganese can be released into the air by iron and steel production plants, power plants, coke ovens, and mining activities. Nickel found in the air may come from releases from oil and coal combustion, nickel metal refining, sewage sludge incineration, and manufacturing facilities.

Figures 12 through 16 show that, over the past 20 years, concentrations of all five of these UATs have trended downward. Arsenic, manganese, and nickel are measured as total suspended particulate.

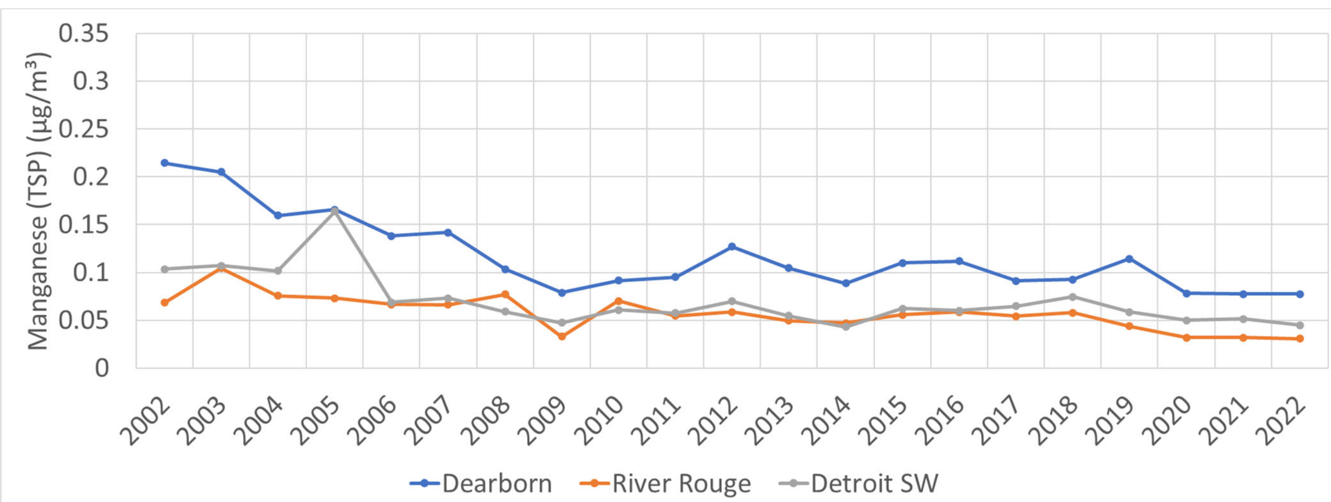




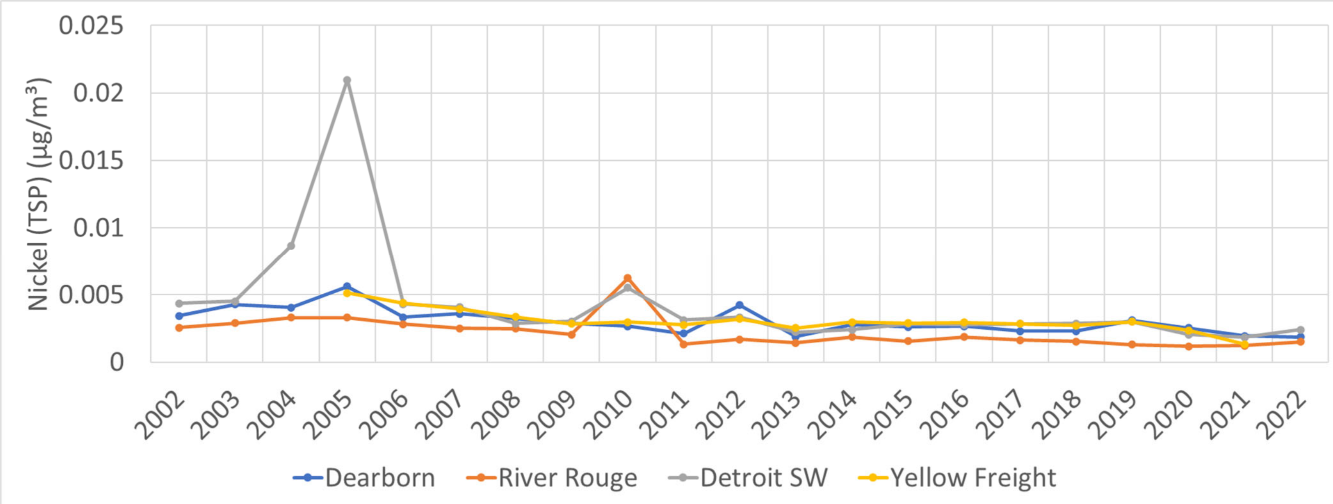
Benzene (µg/m3)
4
3.5
3
2.5
2
1.5
1
0.5
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Mark Twain Middle School
Dearborn
Detroit SW

Formaldehyde (µg/m³)
10
8
6
4
2
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Dearborn
River Rouge
Detroit SW

Manganese (TSP) (µg/m³)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022
Dearborn
River Rouge
Detroit SW




*Figures 12-16: Historical trend of common UATs—arsenic, benzene, formaldehyde, manganese, & nickel*

## Current Levels of Air Toxics

Table 8 provides a summary of the average concentration of common UATs in 2022 by monitoring site. To understand what the data mean, EPA compared the results to current health benchmarks for cancer risk and noncancer health effects. All pollutants are *lower* than the current health benchmarks.

When assessing cancer risk, EPA assumes people are exposed to the pollutant for 24 hours a day, 365 days a year, for 70 years, to represent a lifetime of exposure. EPA generally takes an action if the maximum individual risk (MIR) is higher than 1 in 10 thousand (or 100 in a million). If the MIR to a person from continuously breathing air over a lifetime was 100 in a million, he or she would theoretically have an additional 100-in-a million increased chance of developing cancer as a direct result of breathing this air. This estimated risk is in addition to people's overall risk for getting cancer for other reasons, like demographics, genetics, and smoking status.

When assessing noncancer risk, EPA compares actual concentrations of a pollutant to its reference concentration (RfC). The RfC is an estimate of continuous inhalation exposure to the human population, including sensitive subgroups, that is likely to be without an appreciable risk of harmful effects during a lifetime of exposure.

For a complete summary of all HAP monitoring data, including how concentrations compare to levels in other cities, see EGLE's annual air quality reports.

*Table 8. Average annual concentrations of common urban air toxics by monitoring site*

| Site | Pollutant | Average Annual Concentration (µg/m³) | Concentration at which Cancer Risk is 100-in-a-Million | Non-Cancer Reference Concentration (µg/m³) |
|---|---|---|---|---|
| River Rouge | Arsenic (TSP) | 0.0009 | 0.0233 | 0.0150 |
| River Rouge | Formaldehyde | 2.3570 | 9.0909 | 7.0000 |
| River Rouge | Lead (TSP) | 0.0052 | - | 0.1500 |
| River Rouge | Manganese (TSP) | 0.0338 | - | 0.3000 |
| River Rouge | Nickel (TSP) | 0.0015 | 0.2083 | 0.0900 |
| Detroit SW | Arsenic (TSP) | 0.0014 | 0.0233 | 0.0150 |
| Detroit SW | Benzene | 0.6936 | 12.8205 | 30.0000 |
| Detroit SW | Formaldehyde | 2.2965 | 9.0909 | 7.0000 |
| Detroit SW | Lead (TSP) | 0.0073 | - | 0.1500 |
| Detroit SW | Manganese (TSP) | 0.0530 | - | 0.3000 |
| Detroit SW | Nickel (TSP) | 0.0024 | 0.2083 | 0.0900 |
| Dearborn | Arsenic (TSP) | 0.0011 | 0.0233 | 0.0150 |
| Dearborn | Benzene | 0.6132 | 12.8205 | 30.0000 |
| Dearborn | Formaldehyde | 2.6738 | 9.0909 | 7.0000 |
| Dearborn | Lead (TSP) | 0.0127 | - | 0.1500 |
| Dearborn | Manganese (TSP) | 0.0910 | - | 0.3000 |
| Dearborn | Nickel (TSP) | 0.0018 | 0.2083 | 0.0900 |
| New Mt Herman Church | Arsenic (TSP) | 0.0009 | 0.0233 | 0.0150 |
| New Mt Herman Church | Lead (TSP) | 0.0034 | - | 0.1500 |
| New Mt Herman Church | Manganese (TSP) | 0.0196 | - | 0.3000 |
| New Mt Herman Church | Nickel (TSP) | 0.0010 | 0.2083 | 0.0900 |
| Detroit Police 4th Precinct | Arsenic (TSP) | 0.0010 | 0.0233 | 0.0150 |
| Detroit Police 4th Precinct | Lead (TSP) | 0.0060 | - | 0.1500 |
| Detroit Police 4th Precinct | Manganese (TSP) | 0.0473 | - | 0.3000 |
| Detroit Police 4th Precinct | Nickel (TSP) | 0.0017 | 0.2083 | 0.0900 |
| Trinity St. Marks (GH) | Arsenic (TSP) | 0.0017 | 0.0233 | 0.0150 |
| Trinity St. Marks (GH) | Lead (TSP) | 0.0080 | - | 0.1500 |
| Trinity St. Marks (GH) | Manganese (TSP) | 0.0707 | - | 0.3000 |
| Trinity St. Marks (GH) | Nickel (TSP) | 0.0027 | 0.2083 | 0.0900 |
| Military Park (GH) | Arsenic (TSP) | 0.0014 | 0.0233 | 0.0150 |
| Military Park (GH) | Lead (TSP) | 0.0084 | - | 0.1500 |

| Site | Pollutant | Average Annual Concentration (µg/m³) | Concentration at which Cancer Risk is 100-in-a-Million | Non-Cancer Reference Concentration (µg/m³) |
|---|---|---|---|---|
| Military Park (GH) | Manganese (TSP) | 0.0496 | - | 0.3000 |
| Military Park (GH) | Nickel (TSP) | 0.0016 | 0.2083 | 0.0900 |
| Mark Twain Middle School | Benzene | 0.4489 | 12.8205 | 30.0000 |

## INDUSTRIAL MONITORING

EPA and EGLE have been actively involved in numerous air monitoring activities in Detroit for many years. In 2021, the agencies jointly inspected 18 companies—many of which were in response to feedback from residents—to determine if they comply with the Clean Air Act. As a result of these inspections, several enforcement actions are in development.

Through the permitting process, EGLE has negotiated with both Marathon Petroleum Refinery and the FCA-Stellantis Mack Assembly Plant to include air monitoring on their properties. While the data from these monitors are not used for regulatory compliance or to enforce permit emission limits (which is done through inspections, continuous emission monitoring on the stacks, and stack testing), it is used to provide the surrounding communities with information about air quality. EGLE staff review the monitoring data and upload the results to EPA's Air Quality System database and can be downloaded from EPA's AirData website. The FCA Stellantis data are summarized on a quarterly basis on the Stellantis website.

In addition, as part of a past enforcement action, Marathon completed a supplemental environmental project that required the company to create a public webpage for anyone to see real-time $PM_{10}$, total reduced sulfur, $SO_2$ and carbon monoxide data that is collected at four monitoring stations on the border of the refinery. The webpage also shows weekly data for total volatile organic compounds. Along with the real-time environmental data, this page shows the wind direction and the level of pollutants that may cause concern for people who are sensitive to air pollution.

## REAL-TIME MONITORING INFORMATION

MIair and EPA's AirNow page provides real-time air quality information for select pollutants. It shows the current Air Quality Index map and displays air quality forecasts for "today" and "tomorrow" for ozone and $PM_{2.5}$. Through this page, users can also enroll in EnviroFlash to receive automatic messages about air quality alerts. In late 2024, EGLE's real-time data will be posted on an EGLE-hosted webpage. When that link is available, it will posted on EGLE's air monitoring webpage.

The Air Quality Index or AQI (see Figure 13) is EPA's index for reporting air quality. The AQI is used to communicate current air quality information to the public, along with associated health effects that may be a concern. It focuses on criteria pollutants and not toxics. The AQI is like a yardstick that runs from 0 to 500. The higher the AQI value, the greater the level of air pollution and the greater the health concern. The current day's forecasted and real-time AQI values, ranging from "Good," “Moderate,” “Unhealthy for Sensitive Groups,” “Unhealthy,” “Very Unhealthy” to “Hazardous,” are displayed on EGLE’s Current Air Quality website and on EPA’s AirNow website. EPA’s AirNow also has a Fire and Smoke map and mobile app which provides a simple interface for quickly checking current and forecast air quality information for planning daily activities and protecting one’s health.

AQI Basics for Ozone and Particle Pollution

| Daily AQI Color | Levels of Concern | Values of Index | Description of Air Quality |
|---|---|---|---|
| **Green** | **Good** | **0 to 50** | **Air quality is satisfactory, and air pollution poses little or no risk.** |
| **Yellow** | **Moderate** | **51 to 100** | **Air quality is acceptable. However, there may be a risk for some people, particularly those who are unusually sensitive to air pollution.** |
| **Orange** | **Unhealthy for Sensitive Groups** | **101 to 150** | **Members of sensitive groups may experience health effects. The general public is less likely to be affected.** |
| **Red** | **Unhealthy** | **151 to 200** | **Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.** |
| **Purple** | **Very Unhealthy** | **201 to 300** | **Health alert: The risk of health effects is increased for everyone.** |
| **Maroon** | **Hazardous** | **301 and higher** | **Health warning of emergency conditions: everyone is more likely to be affected.** |

*Figure 17: The Ozone and PM Air Quality Index*

Air quality in Michigan is typically in the “Good” or “Moderate” range of the AQI. However, the Detroit area occasionally experiences air quality in the “Unhealthy for Sensitive Groups” range, and even less frequently, “Unhealthy” and “Hazardous” ranges, especially during periods with wildfire smoke or other unusual events. For example, “Unhealthy” and “Hazardous” air quality ranges were observed in Detroit and across the State of Michigan during the Canadian wildfire smoke events in the summer of 2023.

## CONCLUSION

While there is still work to be done to reduce air pollution in the greater Detroit area, concentrations of criteria pollutants and air toxics are trending downward. Key findings include:

- EGLE’s air monitoring network meets or exceeds EPA’s federal network requirements in monitoring ambient air quality.
- Over the past several decades, concentrations of all NAAQS pollutants have decreased in the Detroit area.
- When comparing concentrations from 2000 to 2023, levels of $SO_2$, lead, $NO_2$, and CO have all decreased by over 50%.
- Over the past two decades, $PM_{2.5}$ concentrations have decreased by over 30%, but wildfire smoke in 2023 affected PM concentrations in the Detroit area. The current highest annual design value is 13.0 µg/m³ at the Military Park site, which is above the 2024 $PM_{2.5}$ NAAQS of 9 µg/m³.

- Even with wildfire smoke impacts on 2023 ozone data, ozone concentrations have decreased by 17 ppb from 2000 to 2023.
- EPA and EGLE, through air monitoring data, work together to identify areas where concentrations exceed the NAAQS. If concentrations violate the NAAQS, further actions are pursued to bring concentrations below the standards.
- EPA reviews and revises the NAAQS, if necessary, to ensure the standards protect public health.
- Average concentrations of air toxics have decreased over time and are currently below health benchmarks.

EGLE has continued to maintain a robust air monitoring network of sites in Detroit and Southeast Michigan and plans to enhance this work through additional Inflation Reduction Act and American Rescue Plan funds.

Additionally, EPA has announced IRA and ARP grants to the Asthma & Allergy Foundation of American Michigan Chapter, the City of Detroit, the Green Door Initiative, and the Wildlife Habitat Council to perform additional air monitoring work in Detroit. EGLE is working collaboratively with the City of Detroit on its deployment of air monitoring equipment as well as low-cost sensor technology. Sensor data in Wayne County and the City of Detroit can be accessed through JustAir. Other low-cost sensor data for particulate matter can be accessed through PurpleAir.com.

EPA and EGLE intend for this report about the greater Detroit area to help answer questions about air quality where people live, work, learn and play. As our agencies pursue our missions to protect human health and the environment, we will continue to engage with the community and partners on improving air quality.