Ohio Air Quality 2014

Division of Air Pollution Control

October 2015

STATE OF OHIO
AIR QUALITY
CALENDAR YEAR 2014

PREPARED BY

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OHIO ENVIRONMENTAL PROTECTION AGENCY

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Our friend and the long-time manager of the Air Monitoring Section, Randy Hock has retired after 30 years of devoted service to the Ohio EPA. Randy facilitated and assisted in establishing the first computerized system of data polling and processing ambient monitoring data in the country many years ago. His last project was managing the speedy set-up of a large monitoring site in eastern Ohio.

EXECUTIVE SUMMARY

A. General Review

2014 air quality data are summarized for the seven criteria pollutants: particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead (Pb). Data are also summarized for total suspended particulates (TSP).

A section discussing Toxics monitoring projects conducted in 2014 is included.

Trend studies are presented for three criteria pollutants: SO_2, CO, and O_3.

Precision and accuracy data gathered through the quality assurance programs are also included.

B. Discussion of Violations

Violations of multiple-year, annual and short term air quality standards by county and pollutant are shown in Figures 3 through 18 and in Table 3.

C. Conclusions

In 2014 there were 30 PM_{10} monitoring sites and 49 $PM_{2.5}$ monitoring sites with 115 monitors 76 of which are Federal Reference Monitors, 26 continuous (4 of which are Federal Equivalent Monitors), and 13 speciation. In 1987 there were 30 PM_{10} and no $PM_{2.5}$ monitoring sites. Nearly all monitoring for particulate matter is conducted using PM_{10} and $PM_{2.5}$ samplers. Monitoring for TSP has essentially been discontinued. During 2014, 9 TSP sites reported data, down from 217 sites in 1987. Of those 9 sites all are monitoring for lead or other metals and also report TSP data.

2. Sulfur dioxide levels in urban areas have dropped an average of 55.7% in the last ten years. There were no violations of the 3-Hour, 24-Hour or annual SO_2 air quality standards in 2014. There are two counties: Lake and Morgan that are in violation of the 1-Hour standard (2012-2014).

3. No overall trend is indicated for the past several years for carbon monoxide. Figure 23 shows individual urban area trends.

4. Thirty one counties are monitoring attainment of the 0.075 ppm eight hour ozone standard. There is one county, Lake, with monitored non-attainment based on data from 2012 through 2014.

5. No violations of air quality standards for nitrogen dioxide were recorded in 2014.

6. No air pollution alerts were declared in 2014.

D. The Ohio Network

In 2014 there were a total of 299 individual monitors reporting data from 124 sites. There were 13 carbon monoxide, 33 sulfur dioxide, 6 nitrogen dioxide, 51 ozone, 47 10 micron particulate (PM_{10}), 115 2.5 micron particulate monitors ($PM_{2.5}$) and 22 lead monitors(21 TSP and 1 PM_{10}).

The only states with comparable or more monitors are California with 880, Texas with 317 and Pennsylvania with 309.

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I. INTRODUCTION

A. General

A variety of substances are generated and released into the atmosphere by a multitude of manmade and natural sources. Those substances that may affect public health and welfare are regarded as "air pollutants". The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to safeguard the public health and welfare from selected air pollutants. The pollutants for which standards have been promulgated are: Sulfur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Ozone (O_3), Lead (Pb), Particulate Matter ≤10 microns (PM_{10}) and Particulate Matter ≤2.5 microns ($PM_{2.5}$). The standards are ambient concentrations that are expressed in micrograms per cubic meter ($\mu g/m^3$) or parts per million (ppm) per duration (1 hr., 3 hr., etc.) with a restriction (not to be exceeded or not to be exceeded more than once per year, etc.). Table 1 shows the NAAQS in effect at the end of 2014.

In some cases, standards are separated into two parts: primary and secondary. The primary standard sets the level of air pollution above which human health is endangered. The secondary standard sets the level above which the welfare of citizens is endangered due to air pollution damage to crops, animals, vegetation and materials.

This report contains a summary of measured high concentrations of the pollutants, selected statistics, including quality assurance of the data, and trend analyses for various areas in Ohio. A brief description of the pollutants, the sources from which the pollutants originate and the adverse health effects of the pollutants and the monitoring methods used, precede the tabulated pollutant concentrations.

Ambient air is usually defined as air that is accessible to the general public. The air that is within (over) the fenced-in or guarded areas of facility property is not considered ambient.

Data for this report were collected by Ohio EPA, local air pollution control agencies and private industry. An indication of the accuracy of data from each reporting organization is located in a separate section on Quality Assurance.

B. Development of the Ohio Air Monitoring System

Society's concern about air pollution brought about the first national law, the Clean Air Act of July 14, 1955. This Act and its subsequent amendments first encouraged, and then authorized, grants to help finance the establishment of state and local air pollution control programs.

In 1963, aided in part by this federal program, the Ohio Department of Health established the Ohio Air Sampling Network (OASN) with 21 monitoring sites. The OASN was designed to measure the levels of "Total Suspended Particulate" (TSP) throughout the state.

The Clean Air Act Amendments of 1970 mandated the promulgation of the NAAQS and delegated authority to develop plans for their attainment to the individual states. To oversee the provisions of this Act, the U.S. EPA was formed in February of 1972 by Presidential Order.

After proposing standards for the criteria air pollutants, the U.S. EPA worked with Ohio to set up the State Implementation Plan (SIP) which included a detailed air monitoring program for the original six criteria pollutants: TSP, sulfur dioxide, carbon monoxide, nitrogen dioxide, lead and ozone. The SIP is a state's master plan for achievement of the NAAQS. The SIP contains detailed provisions for reducing concentrations of each of the regulated pollutants, where necessary, to achieve and maintain the NAAQS.

In October 1972, Ohio EPA was established by State law (Ohio Revised Code Section 3745.01) and the air monitoring program was significantly enlarged. Many local air pollution control agencies and private industries participated in this program. See Figure 1 for the location of the five districts and the nine local air agencies currently supporting the air program.

In 1980, the U.S. EPA and Ohio EPA established and designated certain portions of Ohio's network to be a part of the National Air Monitoring Station (NAMS) network, created for the purpose of tracking national trends. In 1980, the US EPA also required that all sites produce data of adequate quality to meet monitoring objectives and adequate quantity to meet statistical and trend requirements. All NAMS sites were to meet these requirements beginning with 1981 data, and all other sites beginning with 1983 data.

On January 1, 2011 U.S. EPA made changes to the designations of sites. The NAMS designation, used for national trends in concentrations was eliminated in favor of NCore sites, a much smaller network of sites with many more parameters per site monitored. There are three sites in Ohio, one each in Cincinnati, Cleveland and Preble Co.

On March 20, 1984, the U.S. EPA proposed a standard for inhalable particles of ten micrometers in diameter and smaller. To enable the states to begin collecting data without excessive delay the U.S. EPA provided the states with monitors in late 1984. Ohio's field offices began collecting PM_{10} data during 1985 and a network of sites was primarily located in urban areas. The PM_{10} standard was promulgated on July 1, 1987 and became effective on July 31, 1987.

The U.S. EPA promulgated new particulate monitoring regulations and National Ambient Air Quality Standards on July 18, 1997. The new particulate standard is for particulate matter less than or equal to 2.5 micrometers in diameter. The first monitors began to collect data in January 1999. Monitors to determine the chemical makeup of the particulate were added in the year 2000 and in 2001 hourly reading monitors were added.

The one hour ozone standard was supplemented on July 18, 1997 with an eight hour standard. The eight hour standard is a three year average of the fourth highest daily eight hour averages. The level of the standard was set at 0.08 ppm which was not to be exceeded.

In 2001 The United States Supreme Court found U.S. EPA’s previously proposed implementation plan for ozone unlawful and further held that, in the setting of a standard for ozone pursuant to Section 109 of the Clean Air Act U.S. EPA must set air quality standards at the level that is “requisite”-no higher or lower than is necessary-to protect the public health with an adequate margin of safety. The Supreme Court then sent the case back to the D.C. Circuit Court of Appeals to review U.S. EPA’s subsequent actions. On March 26, 2002, that court upheld U.S. EPA’s revision of the ozone NAAQS, which had been published in the Federal Register by U.S. EPA as a proposal on November 14, 2001.

In March 2008 the 8-Hour ozone standard was changed to be less than or equal to 0.075 ppm as the three year average of each site’s annual fourth high 8-Hour average. The summary tables in this report use the new standard.

In 2009 the standard for lead (Pb) was changed to 0.15 $\mu g/m^3$ as a three month average. This standard replaces the 1.5 $\mu g/m^3$ calendar quarter average. New monitors near presumed sources were required to be operational on the first sampling day of January 2010.

During 2014, more than 290 ambient air monitors were operated in Ohio. Table 2 enumerates the number and type of criteria pollutant monitors that were operated in the various District Office and Local Air Agency jurisdictions.

The goals of the ambient monitoring program are to determine compliance with the ambient air quality standards, to provide real-time monitoring of air pollution episodes, to provide data for trend analyses, regulation evaluation and planning, and to provide information to the public on a daily basis concerning the quality of the air in high population areas, near major emission sources and in rural areas.

C. Remote Ambient Data System

The Remote Ambient-Air Data System (RADS) is a system for the automatic acquisition and transmission of data from a remote monitor to a central computer. Each continuous monitoring site operated by Ohio EPA's district offices is furnished with a data logger that is automatically polled hourly by the central computer in Columbus.

A major benefit of RADS is that the data can now be handled more quickly with fewer chances of error. Formerly the data was manually read from recorder strip charts, handwritten on a computer input form, keyed into the computer and then made available for retrieval. This process took three to four weeks.

The data in the RADS computer is available for review by the district and central office staff on a daily basis. The individual sites can also be contacted through the data logger for instantaneous data and interrogated further by remote testing of zero-span for any parameter. This is particularly valuable when pollutant levels are, or may become, elevated, as during an air stagnation episode.

RADS was installed during the fall of 1985 and went into operation on January 1, 1986. Local air agencies have automated their continuous monitors and Ohio EPA has expanded RADS to include the automation of the local air agencies' networks. Industrial networks will also be added.

RADS has been upgraded for remote access to the data by digital cellular wireless technology to telemeter data to the central computer.

D. Data Availability on the Internet

For the past several years Ohio EPA has provided ozone and $PM_{2.5}$ data updates several times a day to the U.S. EPA for a public outreach web site where current data and data forecasts are displayed in the form of tables and maps. This web site can be viewed at: www.airnow.gov. From this site different states can be chosen to view forecasts of ozone and $PM_{2.5}$ levels and to link to animated ozone concentration maps.

As part of the AIRNow effort there is also a page that displays a map of North America that has sites that can be clicked upon for current environmental data. This page is updated frequently and is called Enviroflash at: www.enviroflash.info.

Historical ambient air quality data can also be found at: www.epa.gov/airdata/. This site is a gateway to maps, reports and user selected data that reside in the U.S. EPA's Air Quality System (AQS) database.

For those with specific health concerns (asthma, heart disease) or who want general information for older adults, children or who are active outdoors and who want to compare the air quality of different counties or states, the U.S. EPA has a web site that allows comparisons at: www.epa.gov/aircompare/ .

E. Designation of Air Quality Control Regions

The fact that air pollution does not respect state boundaries was recognized in early control efforts. To effectively deal with pollution and attain the NAAQS, U.S. EPA, with advice from local governments and the public, divided the nation into areas called Air Quality Control Regions (AQCR's). Boundaries for each region were set by consideration of air pollution levels, population density, geography, and common meteorological conditions. While AQCR's may consist of parts of more than one state, each state has the authority to implement air quality standards only in its portion of the region. Portions of Ohio are included in a total of fourteen different AQCR's, each labeled numerically and by geographical description. Figure 2 illustrates the boundaries of Ohio's AQCR's.

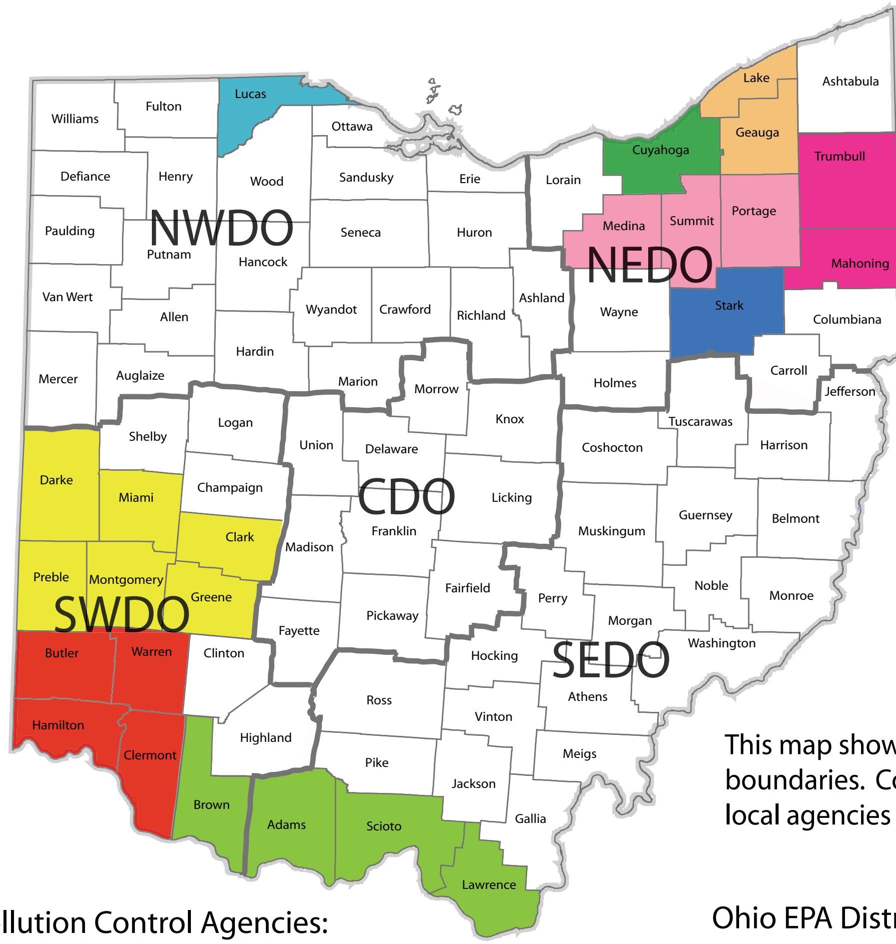
TABLE 1
U.S. EPA & OHIO EPA AMBIENT AIR QUALITY STANDARDS
NATIONAL AMBIENT AIR QUALITY STANDARDS

			MAXIMUM ALLOWABLE CONCENTRATION	
POLLUTANT	DURATION	RESTRICTION	PRIMARY	SECONDARY
$PM_{2.5}$	Annual arithmetic mean 24-Hour concentration	Not to be exceeded Three year average Not to be exceeded Three year average of 98th percentile	12.0 $\mu g/m^3$ 35 $\mu g/m^3$	15.0 $\mu g/m^3$ 35 $\mu g/m^3$
PM_{10}	24-Hr concentration	Not to be exceeded more than once per year averaged over three years	150 $\mu g/m^3$	150 $\mu g/m^3$
SULFUR DIOXIDE	1-Hr mean concentration 3-Hour mean concentration	Each year's daily 1-Hour maximum 99th percentile value averaged over 3 years Not to be exceeded more than once per year	75 ppb	 0.5 ppm (1300 $\mu g/m^3$)
CARBON MONOXIDE	8-Hr mean concentration 1-Hr concentration	Not to be exceeded more than once per year Not to be exceeded more than once per year	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	
OZONE	8-Hr concentration	Each year's fourth high averaged over three years. Not to be exceeded	0.075 ppm	0.075 ppm
NITROGEN DIOXIDE	1-Hour Average Annual mean	Each year's daily maximum 98th percentile 1-Hour value averaged over 3 years. Not to be exceeded. Not to be exceeded	100 ppb 53 ppb	 0.053 ppm
LEAD	3-Month mean concentration	Three month rolling average over a three year period. Not to be exceeded.	0.15 $\mu g/m^3$	0.15 $\mu g/m^3$

Notes:
Primary standards are established for the protection of public health
Secondary standards are established for the protection of public welfare

$\mu g/m^3$ = micrograms per cubic meter
ppm = parts per million
ppb = parts per billion
mg/m^3 = milligrams per cubic meter

Figure 1



This map shows jurisdictional boundaries. Colored areas represent local agencies within Ohio EPA districts

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10/20/14

Figure 2

Air Quality Control Regions in Ohio

TABLE 2

AMBIENT AIR MONITORING SITES IN OHIO (2014)

Local Air Agency/ District Office	$PM_{2.5}$	PM_{10}	Sulfur Dioxide SO_2	Ozone O_3	Carbon Monoxide CO	Nitrogen Dioxide NO_2	Lead	Total
Akron	4	0	2	3	2	0	0	11
Canton	2	0	0	3	1	0	1	7
Cincinnati (HC-DOES)	12	7	5	7/0/1	2	2	2	37/0/1
Cleveland	6	5	4	4	2	2	6	29
Lake Co. Health District	1	1	2	3	1	0	0	8
Warren-Youngstown (M-TAPCA)	3	4	1	3	0	0	1	12
Toledo	3	0	1	3	0	0	0	7
Dayton (RAPCA)	5	2	2	6	2	0	1	18
Portsmouth	3	3/3	3/2	2	0	0	0	11/5
CDO	5	1	1	7/0/1	2	2	2	20/0/1
NEDO	1	3	2	2	0	0	3	11
NWDO	1	0	1	2	0	0	3	7
SEDO	3	2	4/2	2/0/1	0	0	2	13/2/1
SWDO	0	0	0	1	0	0	1	2
Totals	49	28/3	28/4	48/0/3	12	6	22	193/7/3

Sites required by Ohio EPA: Government Operated/Industry Operated/CASTNET

II. Summary of 2014 Air Quality Data

The following pages, in a series of maps and tables, summarize the data presented in Section V of the report.

Figures 3-14 indicate the highest annual, second highest concentrations or percentile concentrations for PM_{10}, $PM_{2.5}$, SO_2, CO, and NO_2, in each county where valid data were collected[1].

Figure 15 indicates the second highest 1-Hour concentration of ozone recorded in each county.

FIGURE 16 indicates the counties in which the highest reading ozone monitor recorded a three year average of fourth highest eight hour averages greater than the standard.

Figure 17 indicates the three year average of the 4^{th} high 8-Hour averages of ozone. The highest reading site was used.

Figure 18 indicates the highest average of three-month average concentrations in three years of lead data in each county where data were collected.

Table 3 gives a breakdown of air quality standard violations by county.

A more detailed presentation of air quality data can be found in Section V of the report.

[1] The Federal averaging criteria for PM_{10} and $PM_{2.5}$ monitors requires that at least seventy-five percent of scheduled samples are collected each quarter. Many intermittent monitors in Ohio run on a six-day sampling schedule (one daily reading every six days) yielding up to sixty-one samples per year. To meet averaging criteria for continuous (hourly) monitors, a monitor must have valid data for at least seventy-five percent of each calendar quarter, approximately 1655 hours. For a valid ozone monitoring day, the monitor must collect at least 18 hours of data or have an average that is greater than the standard.

PM_{10}

Figure 3

2014 PM_{10} Highest Annual Mean Concentration

(In counties where data were collected-values in $\mu g/m^3$)

PM_{10}

Figure 4
2014 PM_{10} 2nd High 24-Hour Concentration
(In counties where data were collected-values in $\mu g/m^3$)

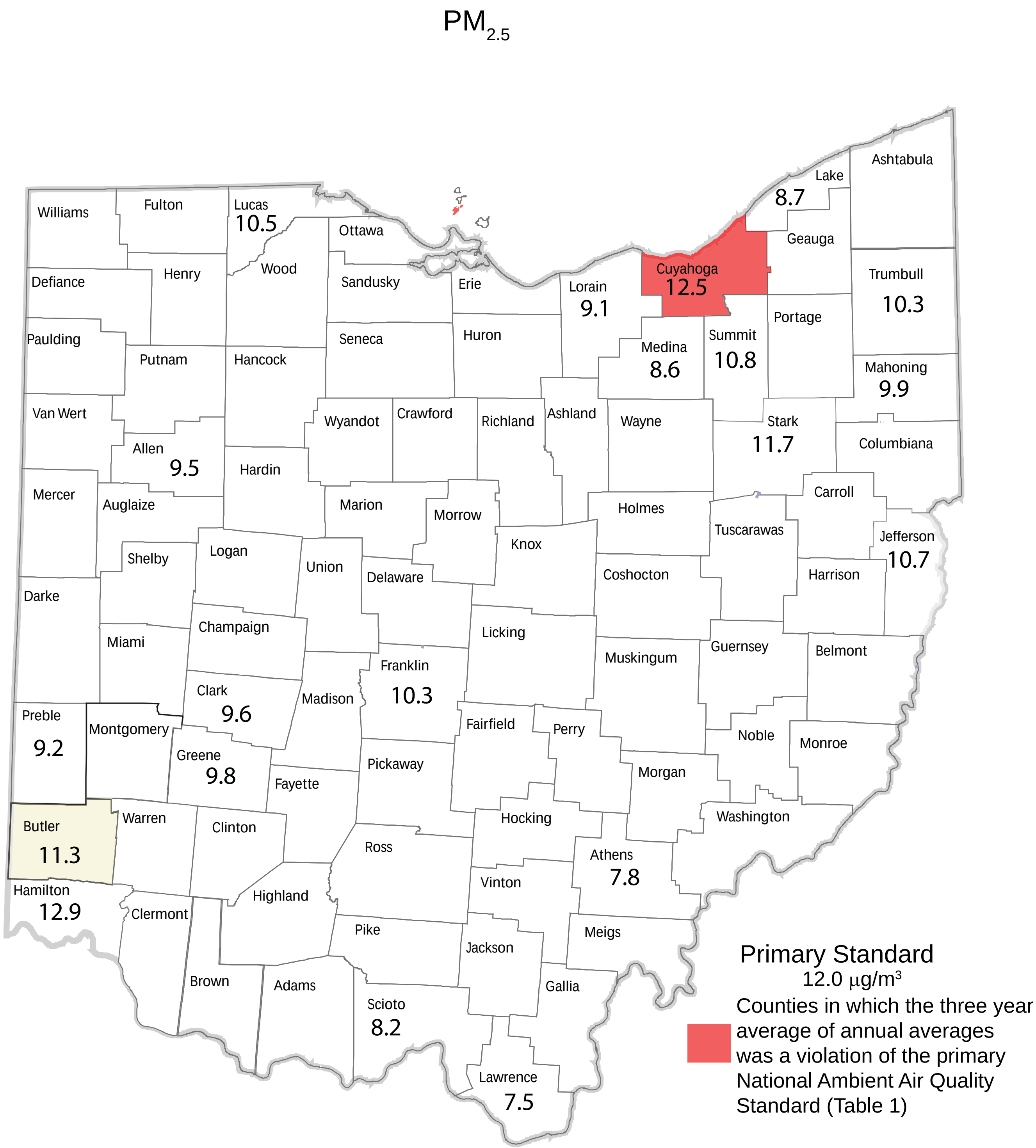


Figure 5

2014 $PM_{2.5}$ Highest Annual Average Concentration

(In counties where data were collected-values in $\mu g/m^3$)

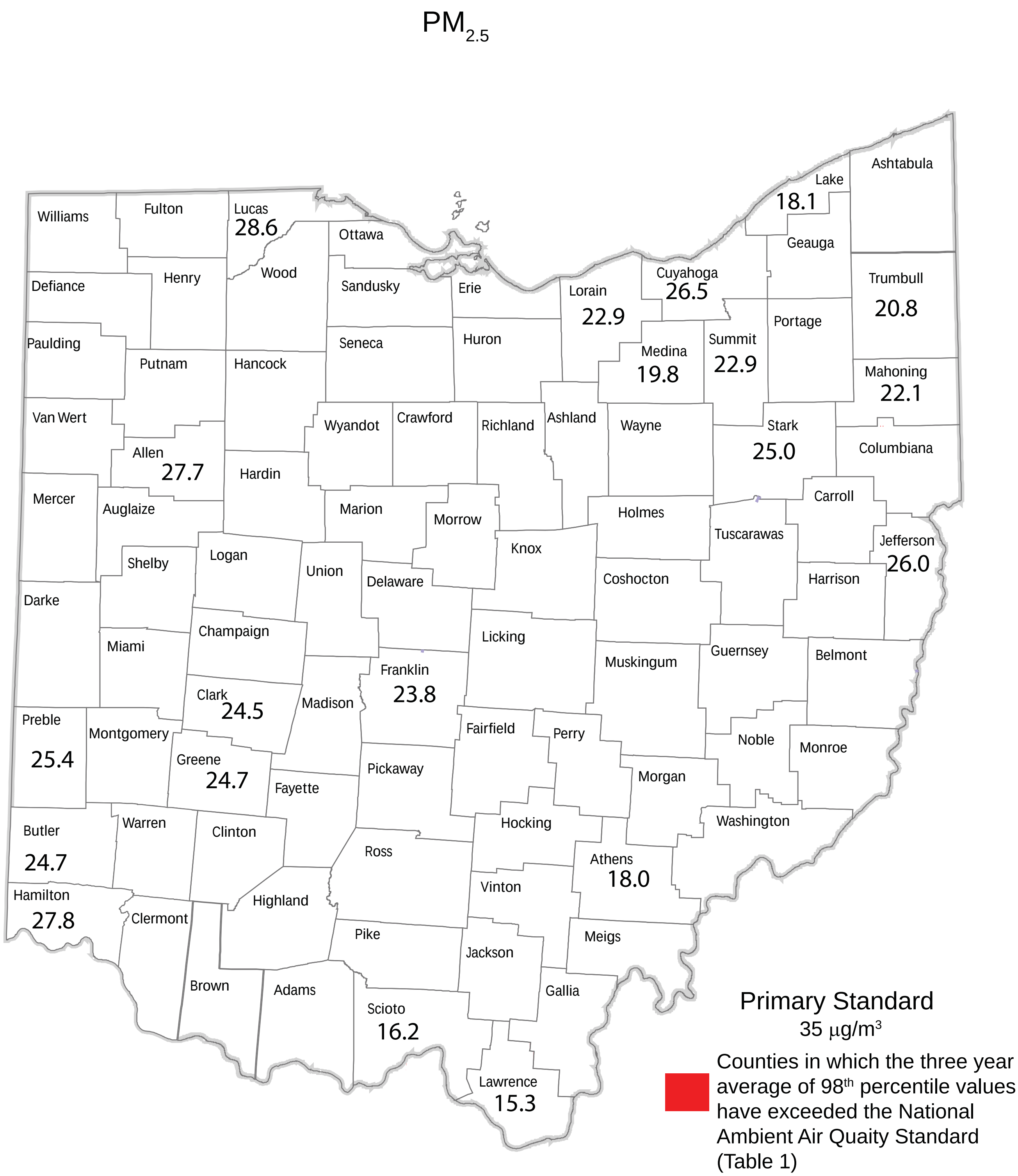


Figure 6

2014 PM$_{2.5}$ 98th Percentile 24-Hour Concentration

(In counties where data were collected-values in µg/m^3)

$PM_{2.5}$

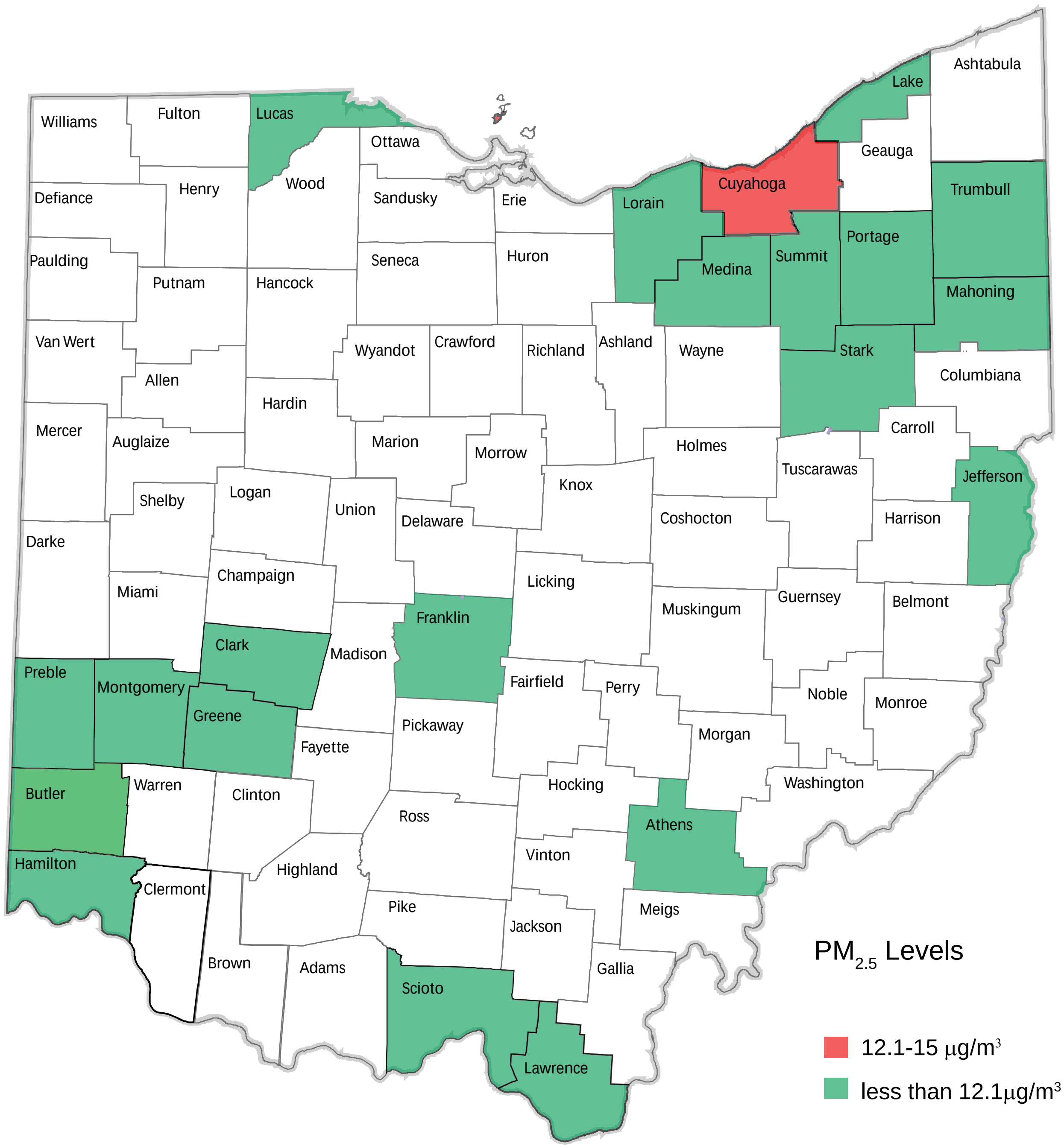


Figure 7

2012-2014 Average of Annual Averages
Highest Site in the County Used

Sulfur Dioxide

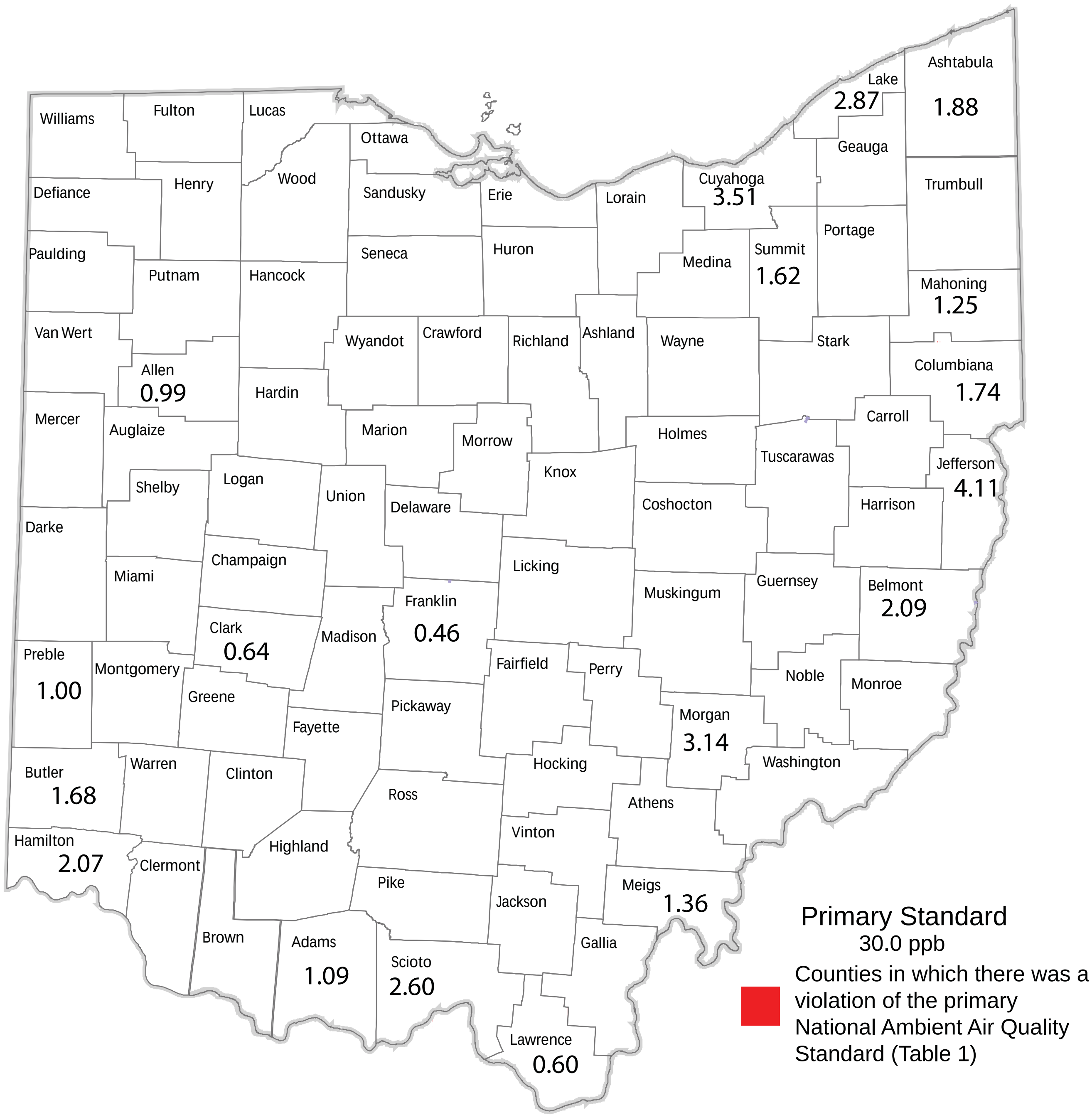


Figure 8
2014 SO_2 Highest Annual Arithmetic Mean Concentration
(In counties where data were collected-values in ppb)

Sulfur Dioxide

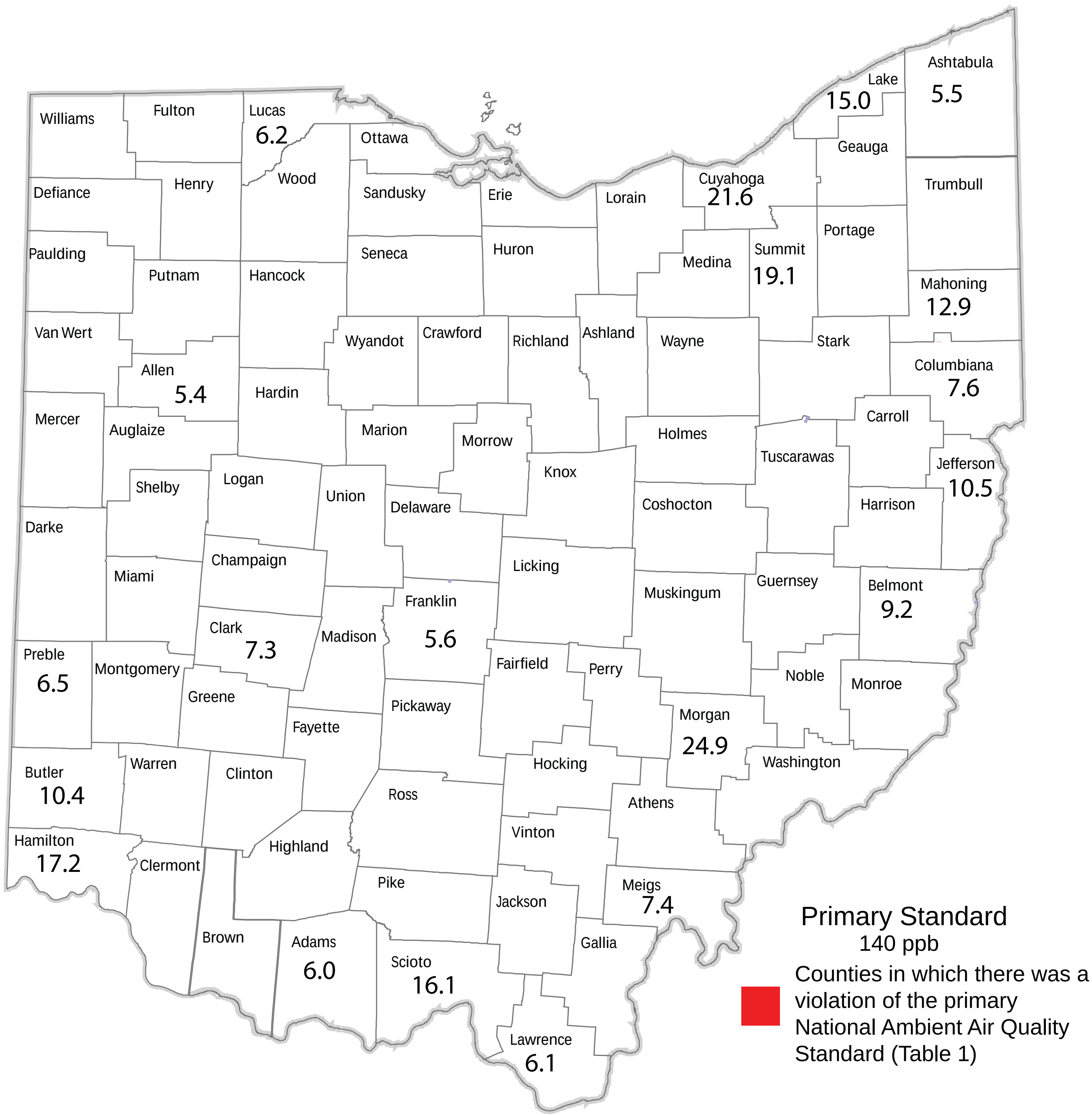


Figure 9
2014 SO_2 2nd Highest 24-Hour Concentration
(In counties where data were collected-values in ppb)

Sulfur Dioxide

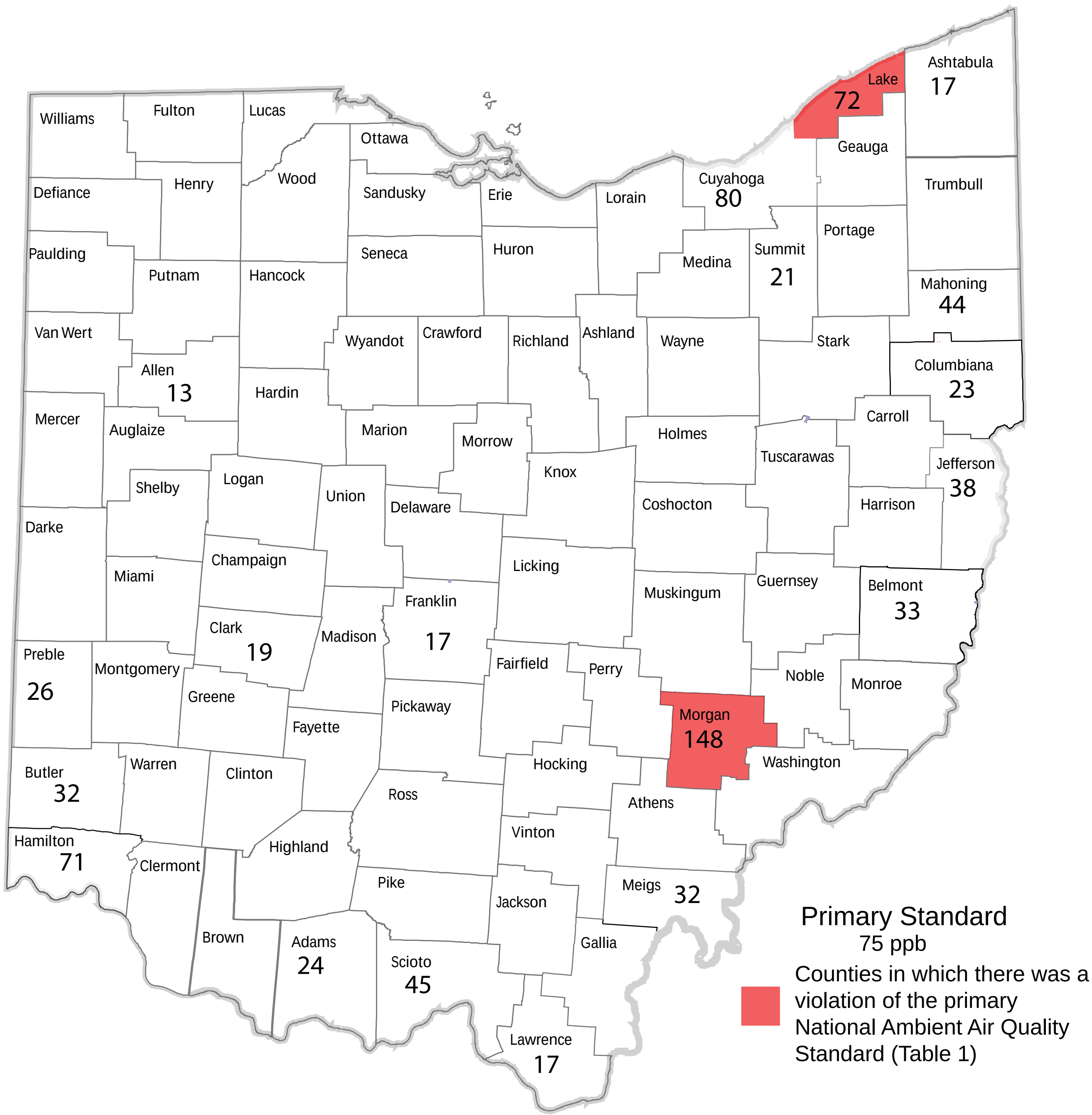


Figure 10
2014 SO_2 99th Percentile 1-Hour Concentration
(In counties where data were collected-values in ppb)

Carbon Monoxide

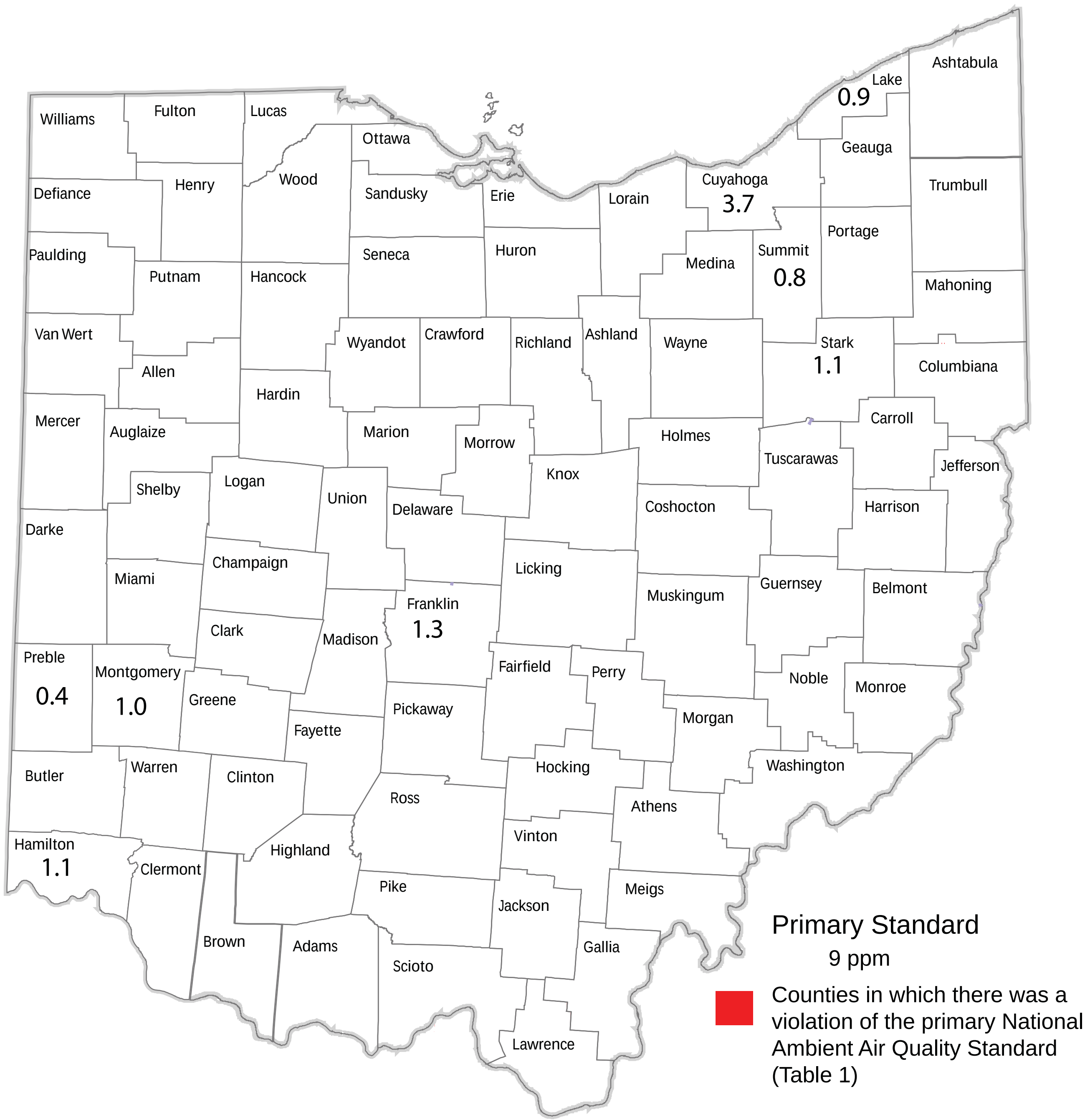


Figure 11

2014 Carbon Monoxide 2nd Highest 8-Hour Concentration
(In counties where data were collected-values in ppm)

Carbon Monoxide

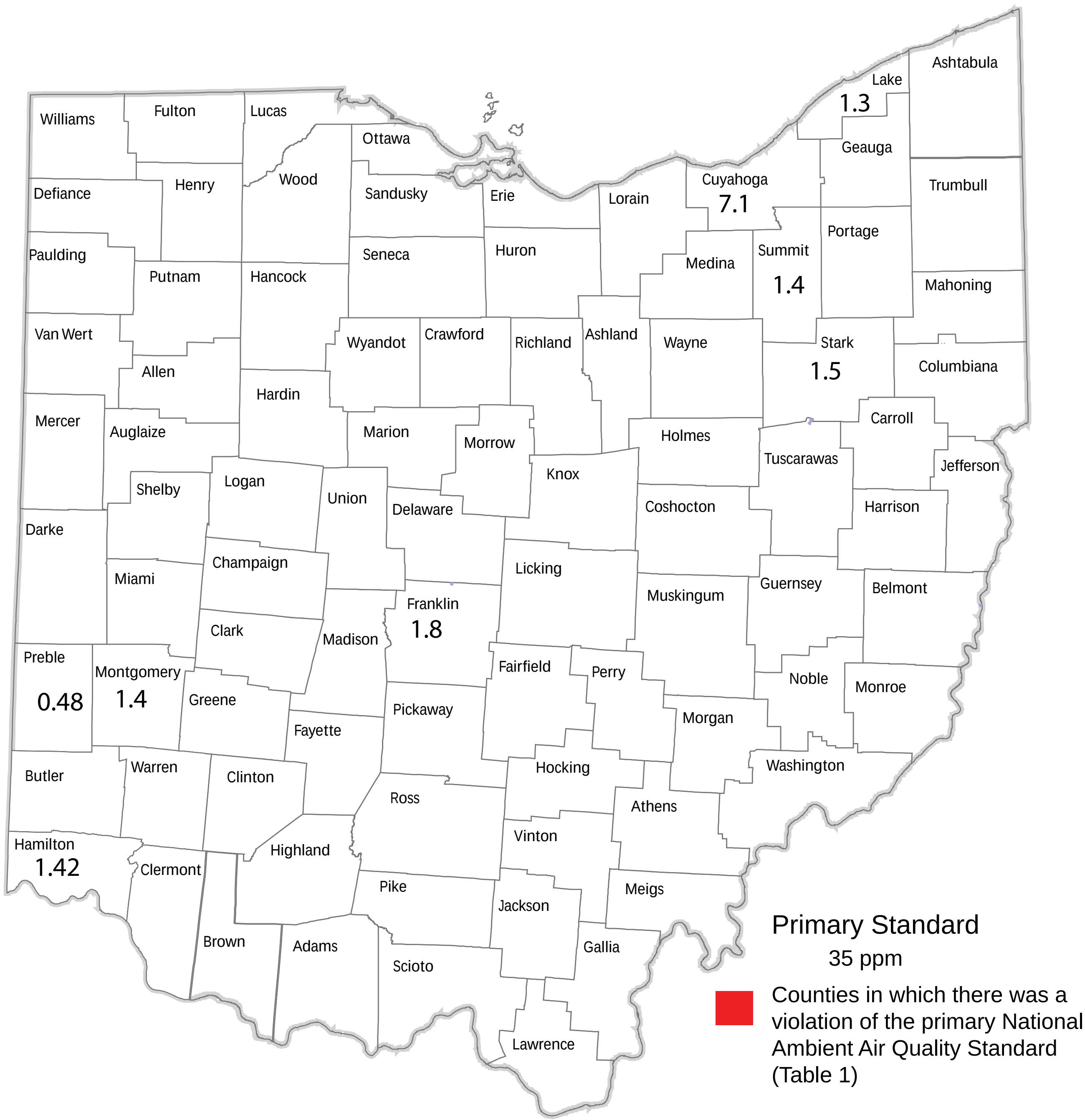


Figure 12

2014 Carbon Monoxide 2nd Highest 1-Hour Concentration
(In counties where data were collected-values in ppm)

Nitrogen Dioxide

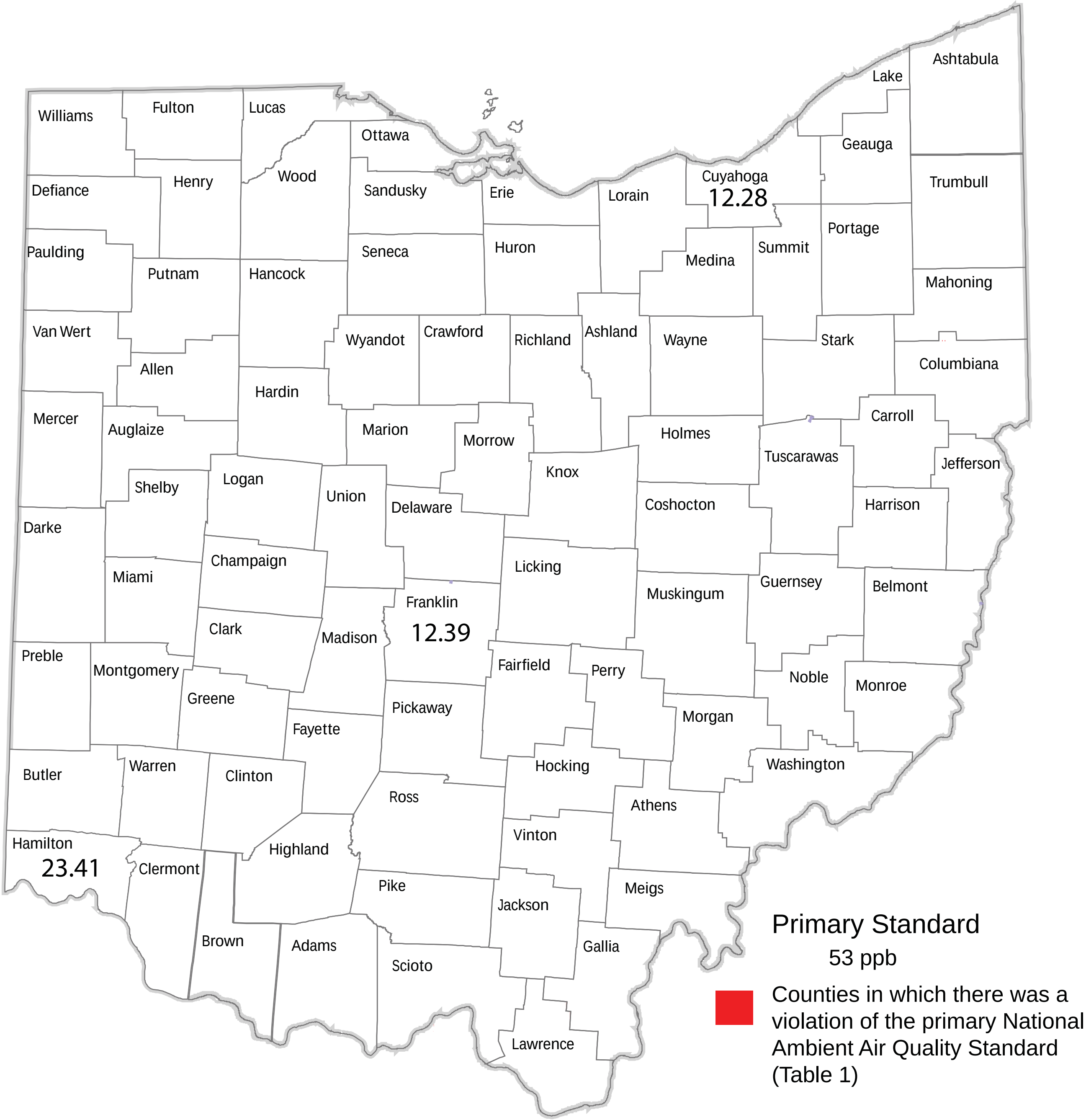


Figure 13

2014 Nitrogen Dioxide Annual Arithmetic Mean Concentration
(In counties where data were collected-values in ppb)

Nitrogen Dioxide

Figure 14

2014 Nitrogen Dioxide 98th Percentile 1-Hour Concentration
(In counties where data were collected-values in ppb)

Ozone

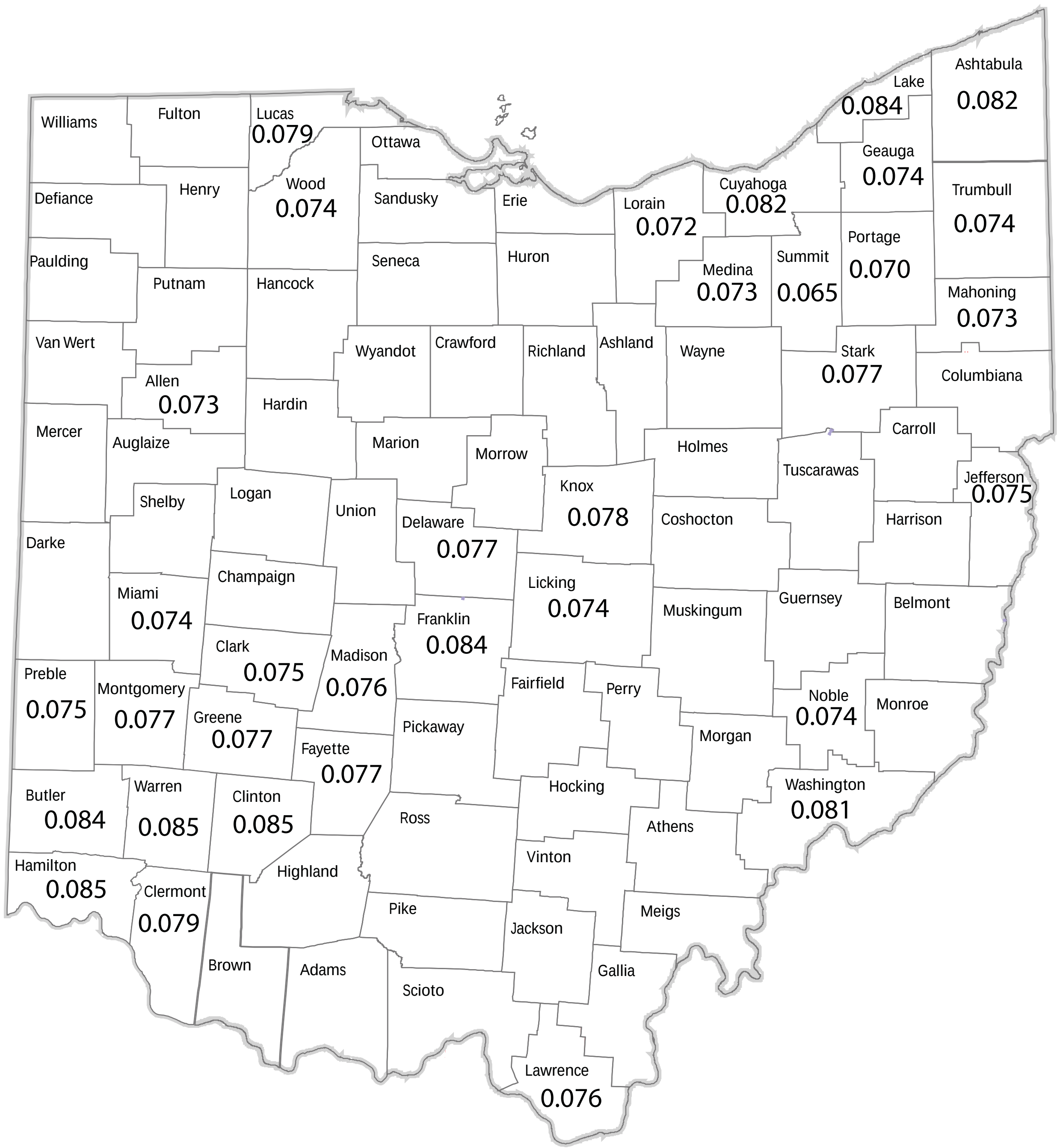


Figure 15

2014 Ozone 2nd Highest 1-Hour Concentration
(In counties where data were collected-values in ppm)

Ozone

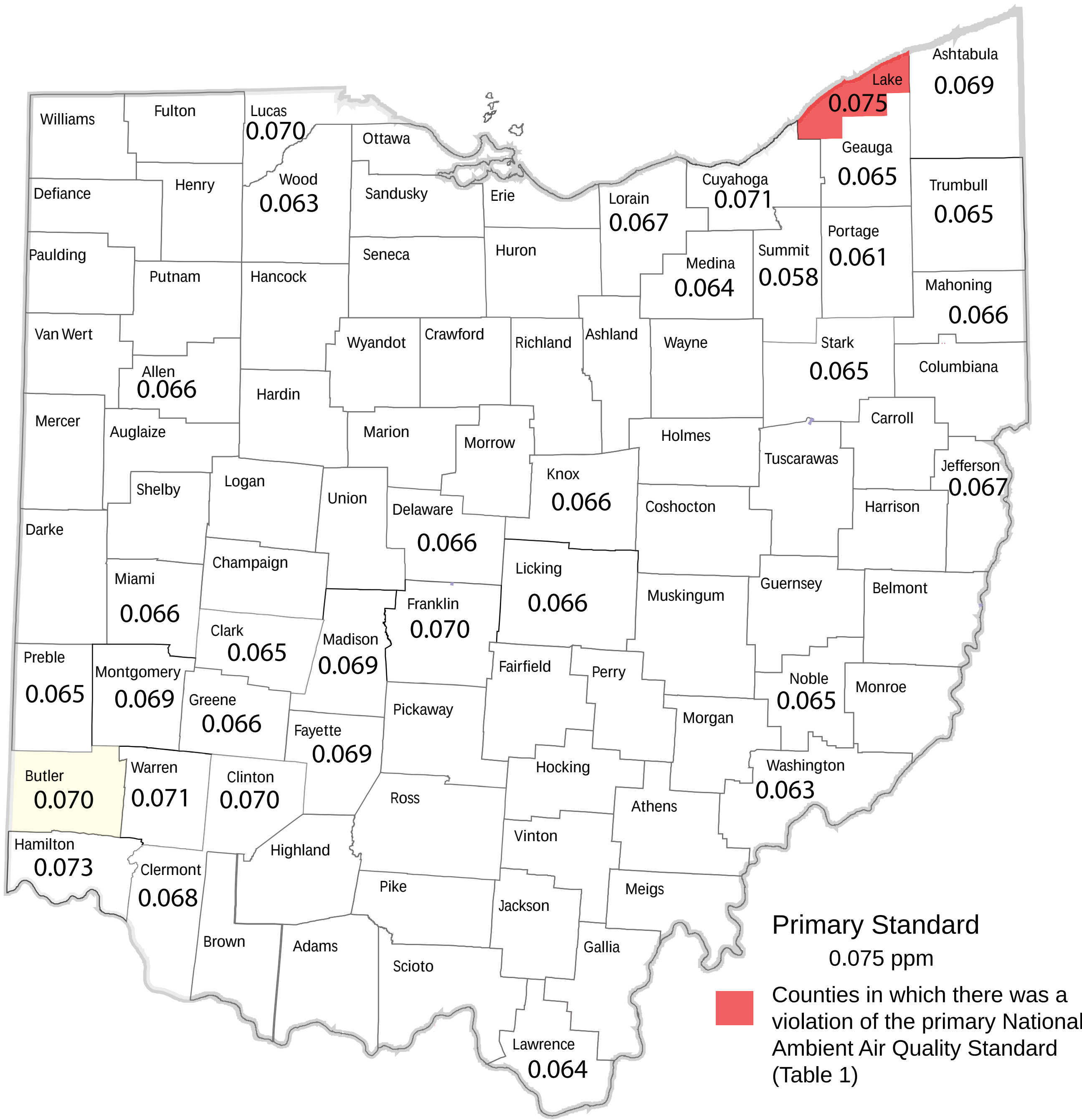


Figure 16

2014 Ozone 4th Highest 8-Hour Concentration
(In counties where data were collected-values in ppm)

Ozone

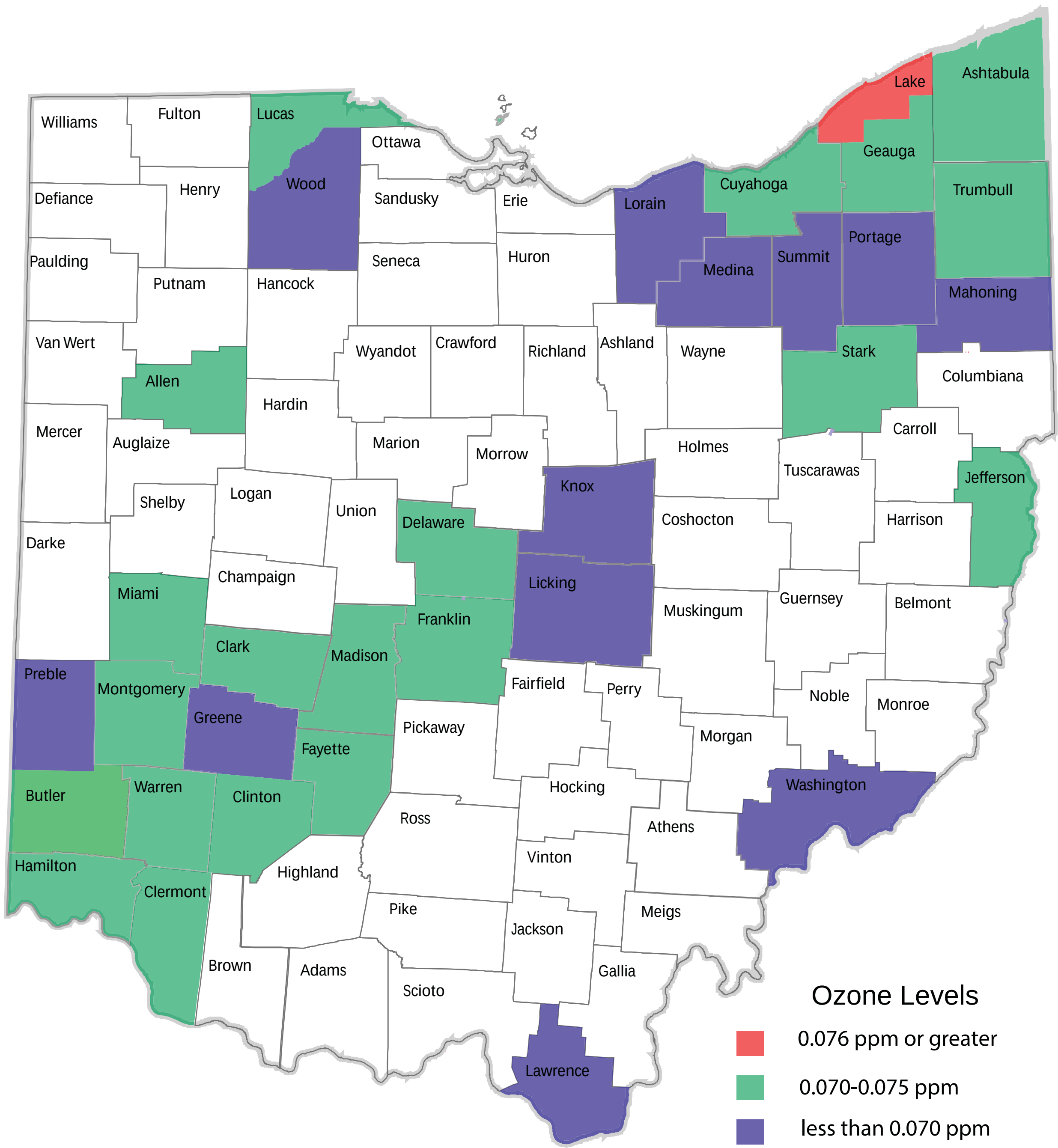


Figure 17

2012-2014 Average of the 4th High 8-Hour Averages using the highest reading site in each county

Lead

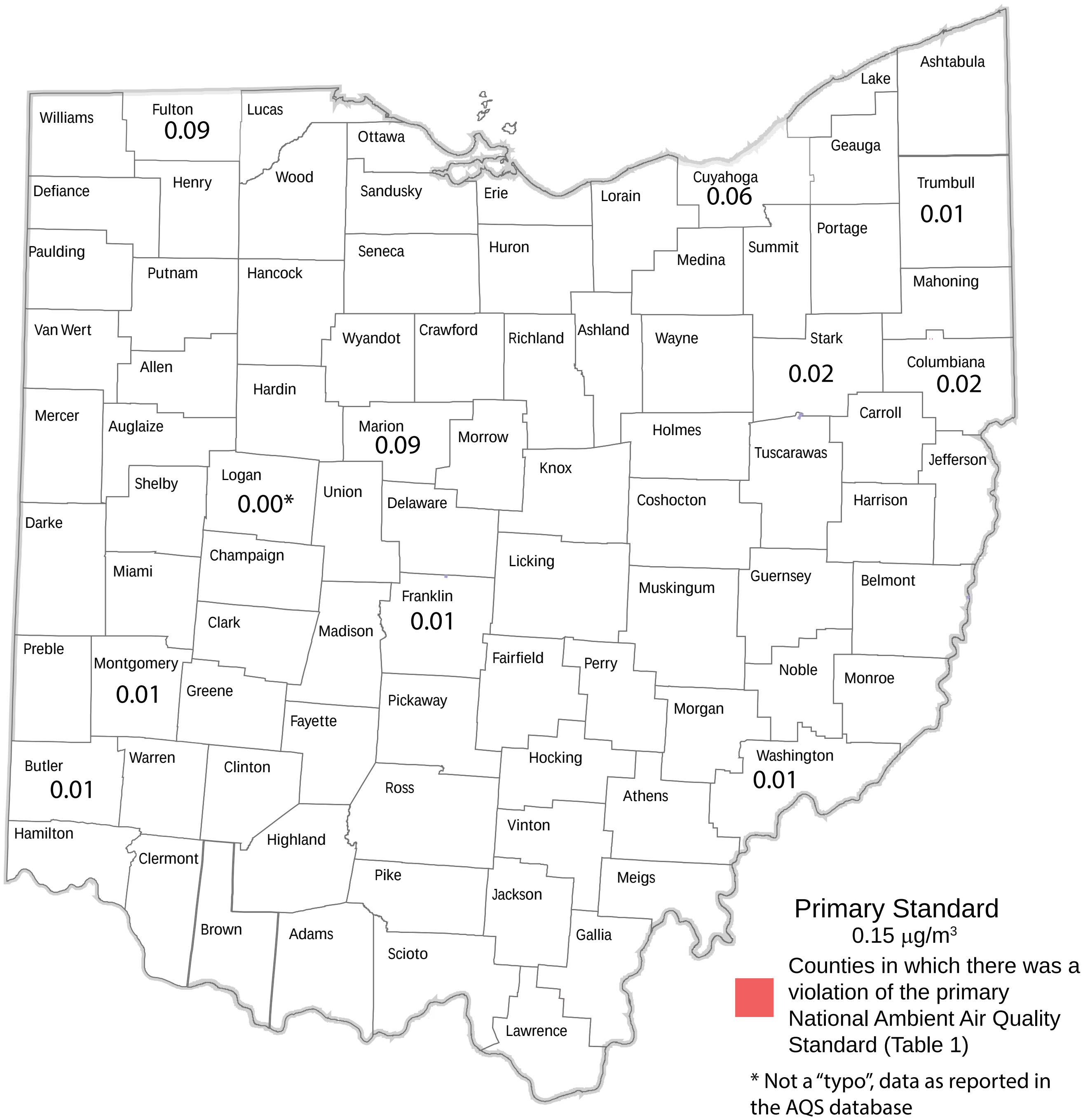


Figure 18
2012-2014 Lead, Highest 3 Month Concentration
(In counties where data were collected-values in $\mu g/m^3$)

TABLE 3
VIOLATIONS OF AIR QUALITY STANDARDS BY COUNTY
2014

There were no violations of the PM_{10}, NO_2 or CO standards that were in effect during 2013.

Ozone 8-Hour 2012-2014	Lead 3-Month 2012-2014	SO_2 1-Hr 99^{th} Percentile 2012-2014	$PM_{2.5}$ Annual 2012-2014
Lake	None	Lake Morgan	Cuyahoga

III. Air Quality Trends

Federal regulations promulgated in 1980 established a number of urban sites in Ohio as part of a national network for determining trends of the criteria pollutants. This network, called National Air Monitoring Stations (NAMS), required the exclusion (for purposes of trend studies only) of those urban sites not designated as NAMS. This requirement permits a more accurate comparison of trends in different areas of the nation. The NAMS group was easily integrated into Ohio's monitoring system starting with the 1980 data.

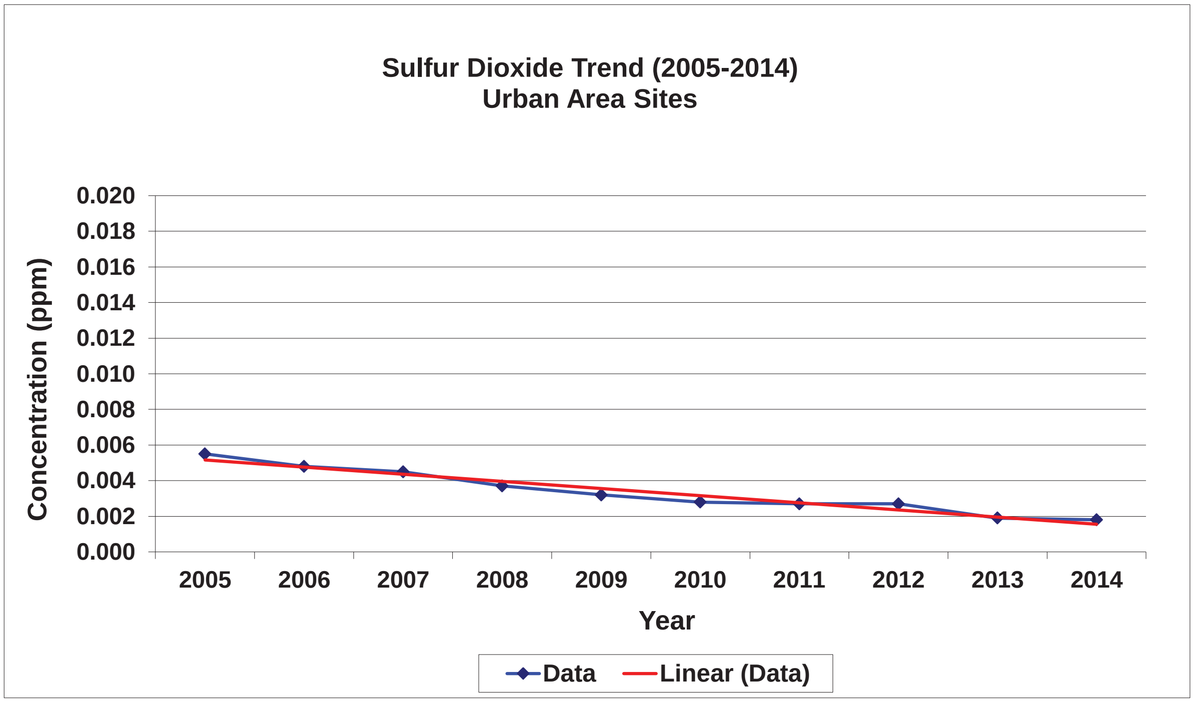
SO_2 TRENDS

Data for SO_2 continuous instruments in urban areas which met the NAMS siting requirements were used to generate Ohio SO_2 trend studies for years 2005 through 2014. The resulting data, based on annual average SO_2 concentrations, top chart, are plotted in Figure 19. Percent improvement is calculated using values derived from the method of "least squares". The bottom chart plots the 99^{th} percentile value which is the new, short term, 1-Hour, NAAQS for $S0_2$.

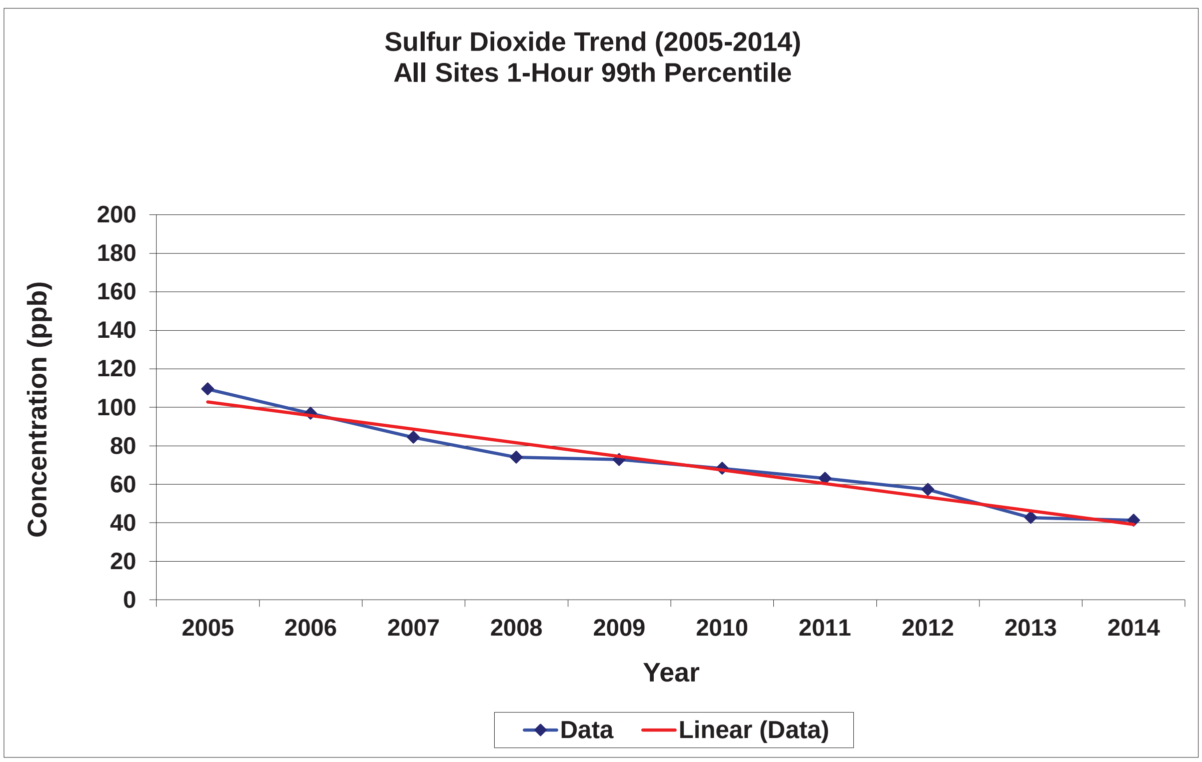
Table 4

SO_2 TRENDS FOR 2005-2014

SITE CATEGORY	IMPROVEMENT
Urban Area NAMS	55.7%



Sulfur Dioxide Trend (2005-2014)
Urban Area Sites
Concentration (ppm)
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
Data
Linear (Data)



Sulfur Dioxide Trend (2005-2014)
All Sites 1-Hour 99th Percentile
Concentration (ppb)
200
180
160
140
120
100
80
60
40
20
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
Data
Linear (Data)

Figure 19

Ozone Trends

Assessing progress towards the attainment of the ozone air quality standards is difficult because of the influence of meteorology on ozone levels. Differences in weather conditions can cause variations from year to year in both the NAAQS exceedances and the second highest 1-Hour ozone levels.

High temperatures, brilliant sunshine and stagnant air contribute to high levels of evaporation from fuel storage tanks, fuel systems and auto refueling activities emitted by millions of cars and trucks. Also daily emissions of nitrogen oxides and hydrocarbons by millions of cars and trucks are a major contributor to low level ozone pollution during these atmospheric conditions. In the presence of sunlight, hydrocarbons and nitrogen oxides create high levels of ground-level ozone.

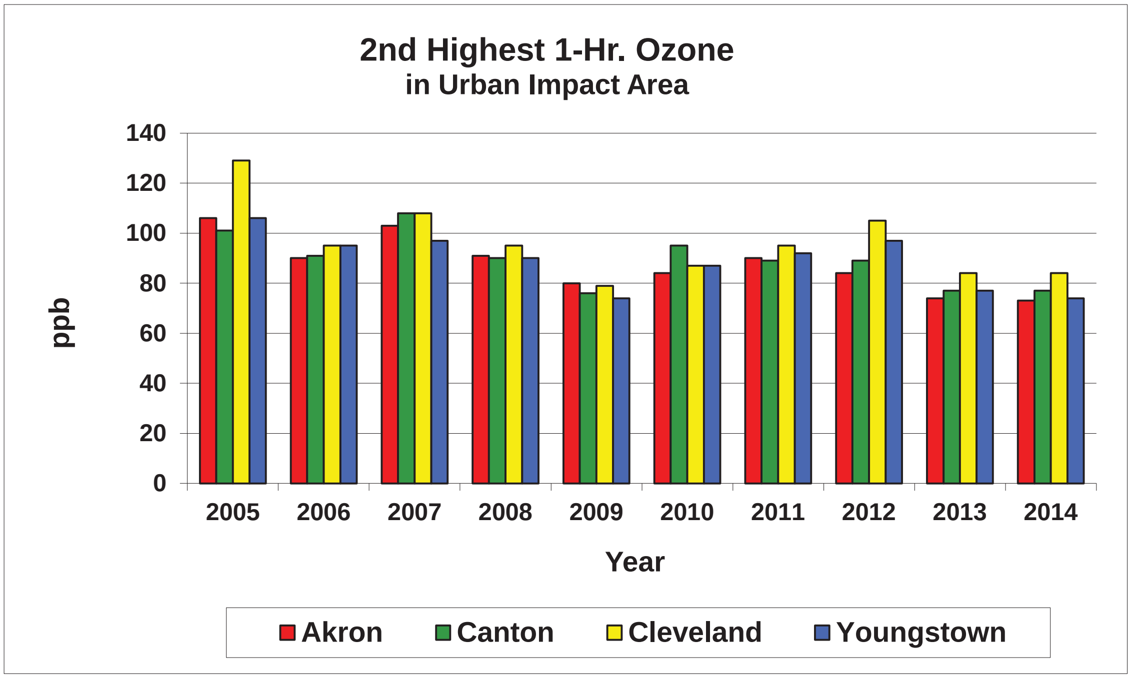
One Hour Data:

Information is presented from eight metropolitan areas in Ohio for the period of 2005 through 2014. Figure 20 is a bar chart which shows, for each year, the second highest 1-Hour average. In an area where ozone is monitored at several sites, the site with the highest second high for each year was used which may be a different site from year to year.

Eight Hour Standard:

Eight metropolitan areas are presented with the three year average of the 4^{th} highest 8-Hour daily ozone averages for the years 2005 through 2014. The year listed is the last year of the three year period. Figure 21 is a bar chart with those concentrations. The ambient air quality standard is a three year average of the fourth high 8-Hour averages, that concentration must be less than or equal to 0.075 parts per million (75 parts per billion) for an area to be in compliance with the standard. The monitor with the highest 4^{th} high in each three year period was used, not necessarily the same monitor for all years.

The three year averages for each site in Ohio are listed in the ozone portion of: Section V. AIR QUALITY DATA 2014.


2nd Highest 1-Hr. Ozone
in Urban Impact Area
140
120
100
80
60
40
20
0
ppb
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
Akron
Canton
Cleveland
Youngstown

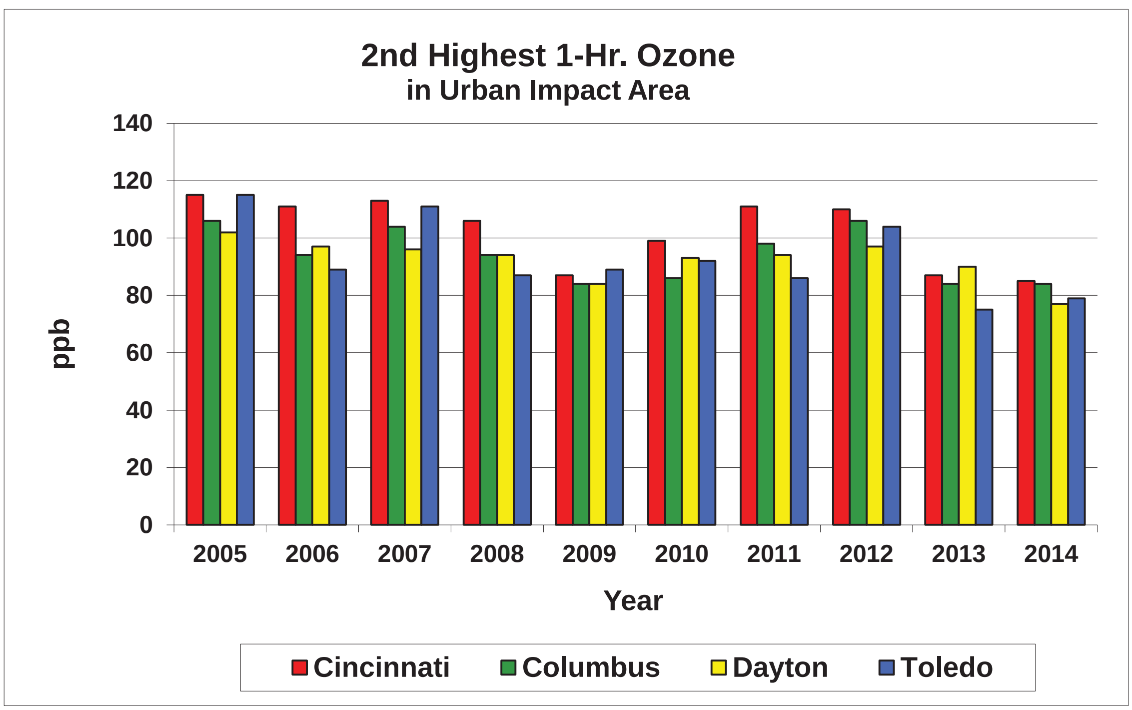
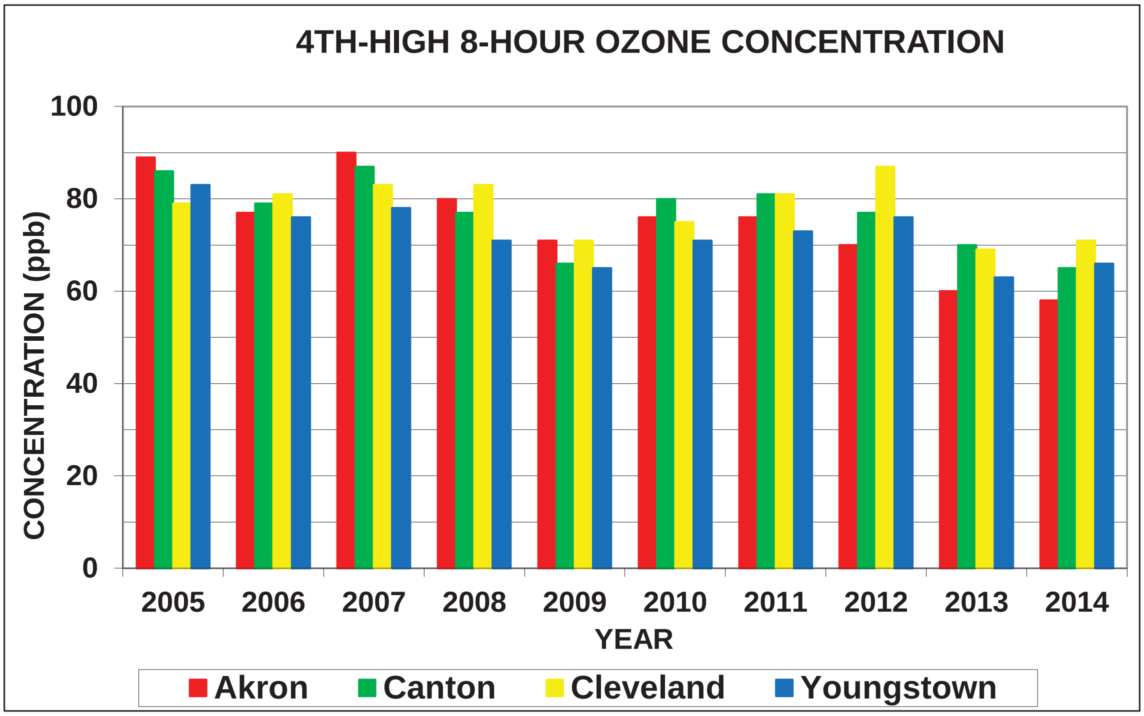

2nd Highest 1-Hr. Ozone
in Urban Impact Area
140
120
100
80
60
40
20
0
ppb
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
Cincinnati
Columbus
Dayton
Toledo

Figure 20


4TH-HIGH 8-HOUR OZONE CONCENTRATION
100
80
60
40
20
0
CONCENTRATION (ppb)
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
YEAR
Akron
Canton
Cleveland
Youngstown

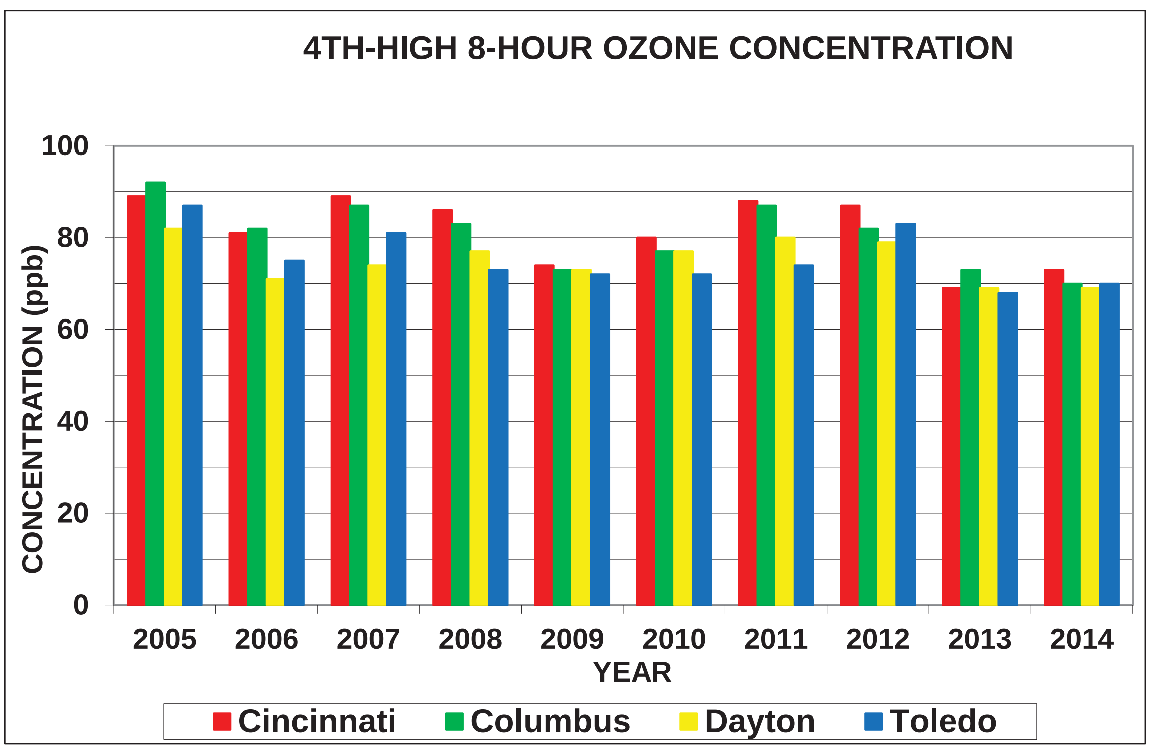
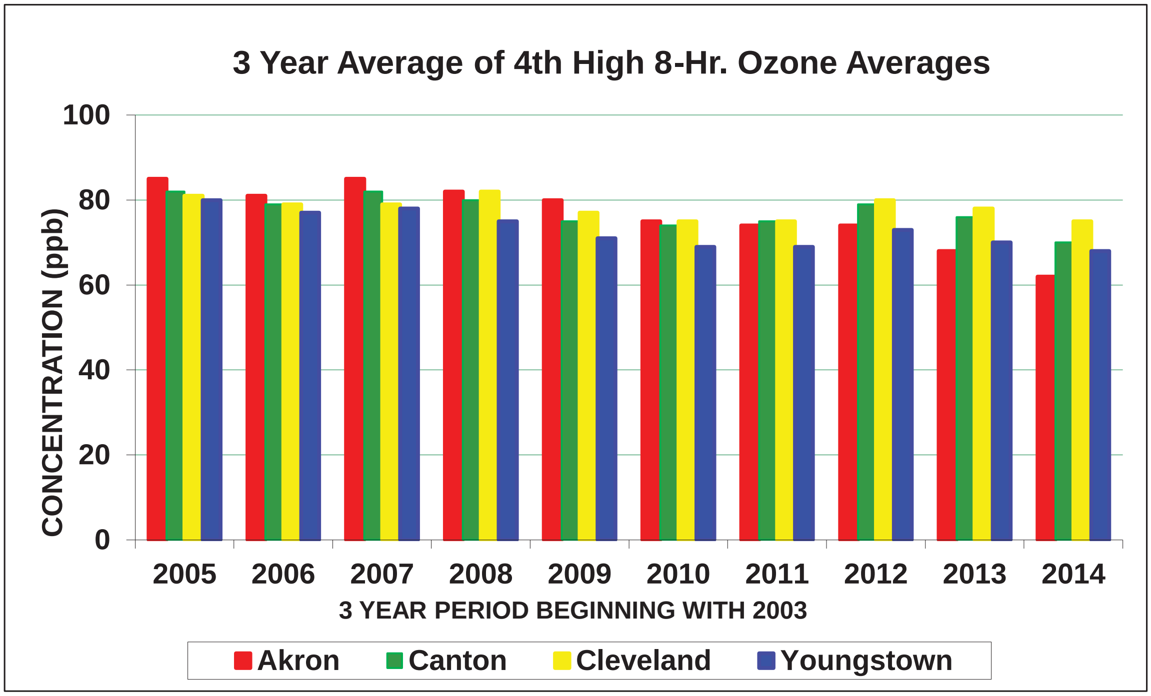

4TH-HIGH 8-HOUR OZONE CONCENTRATION
100
80
60
40
20
0
CONCENTRATION (ppb)
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
YEAR
Cincinnati
Columbus
Dayton
Toledo

Figure 21


3 Year Average of 4th High 8-Hr. Ozone Averages
CONCENTRATION (ppb)
100
80
60
40
20
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
3 YEAR PERIOD BEGINNING WITH 2003
Akron
Canton
Cleveland
Youngstown

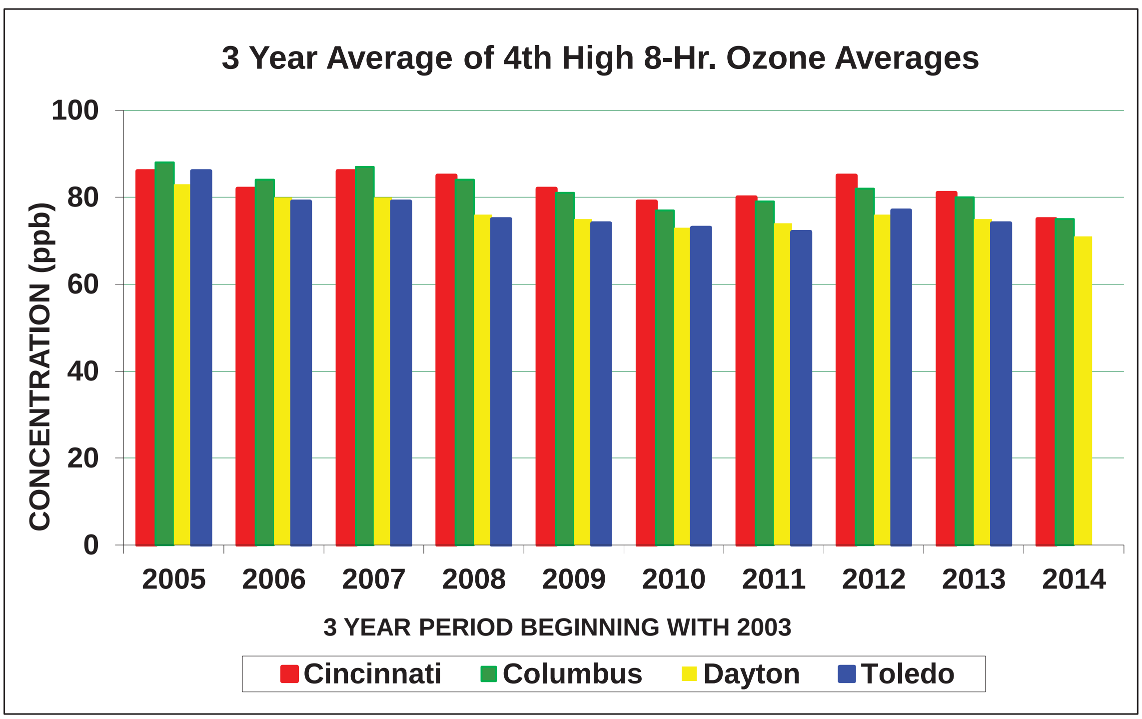
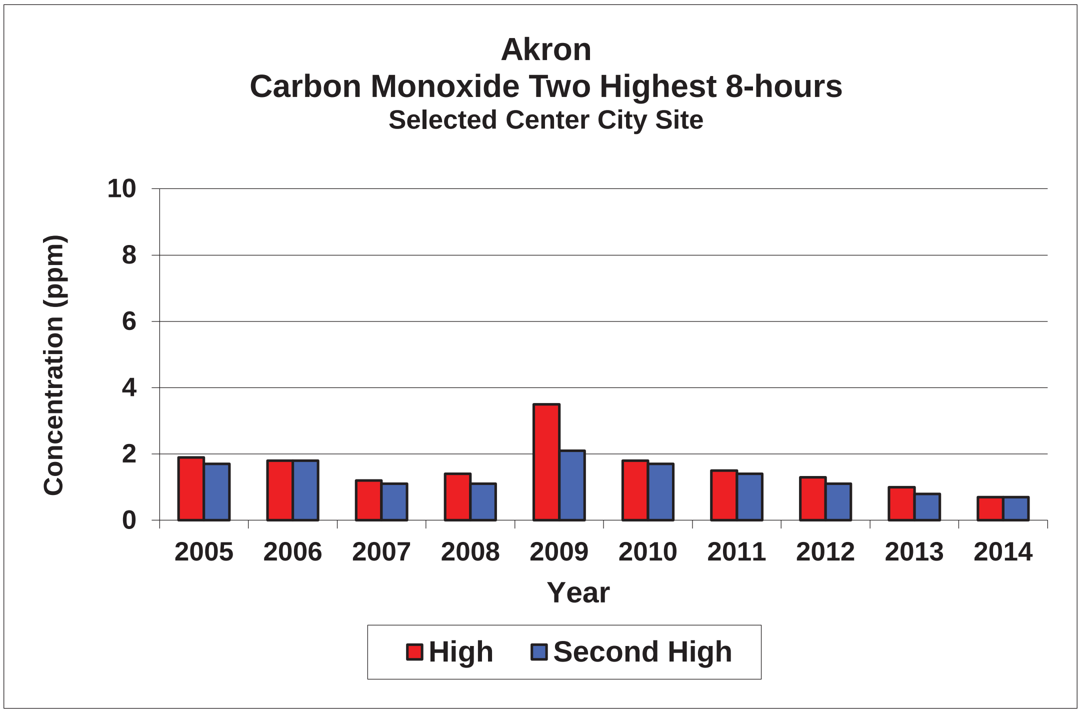

3 Year Average of 4th High 8-Hr. Ozone Averages
CONCENTRATION (ppb)
100
80
60
40
20
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
3 YEAR PERIOD BEGINNING WITH 2003
Cincinnati
Columbus
Dayton
Toledo

Figure 22

CO Trends

The database for carbon monoxide (CO) is less extensive than for sulfur dioxide or ozone. A comparative plot of changes in CO in past years for ten major Ohio cities is presented. One central-city monitor in each urban area was selected to yield data for a study of 8-hour average CO concentrations. Data for the years 2005-2014 are used in the graphs. See Figure 23 for the results of this study.


Akron
Carbon Monoxide Two Highest 8-hours
Selected Center City Site
Concentration (ppm)
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
High
Second High

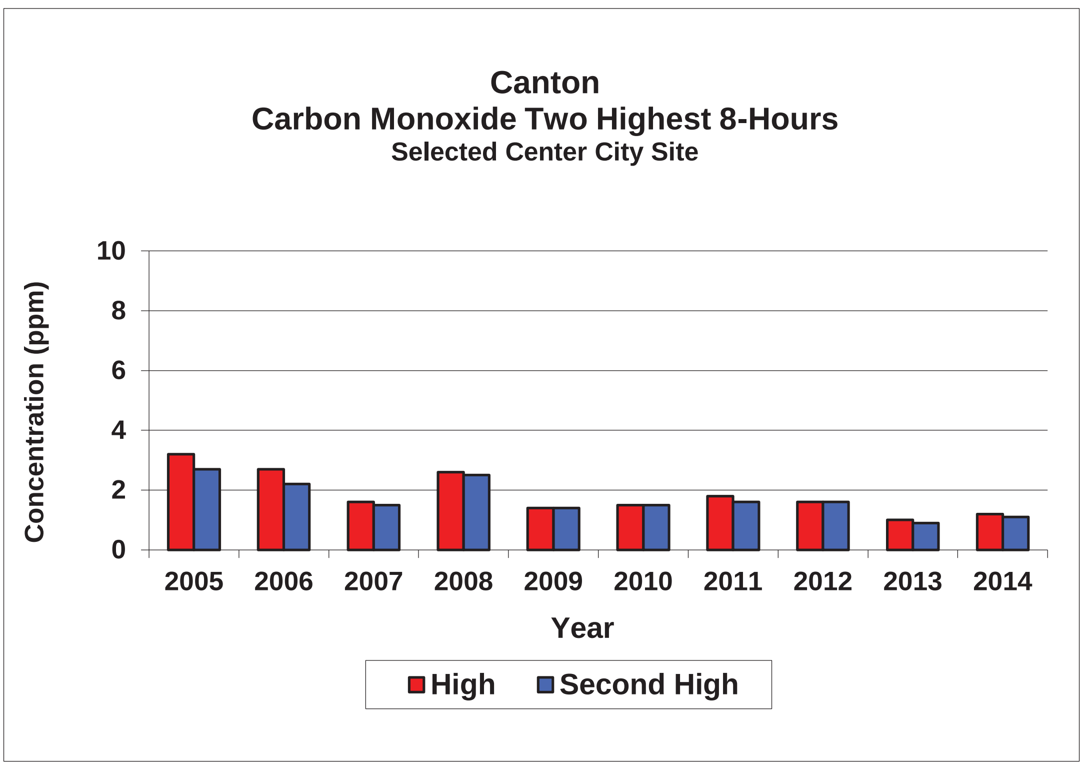
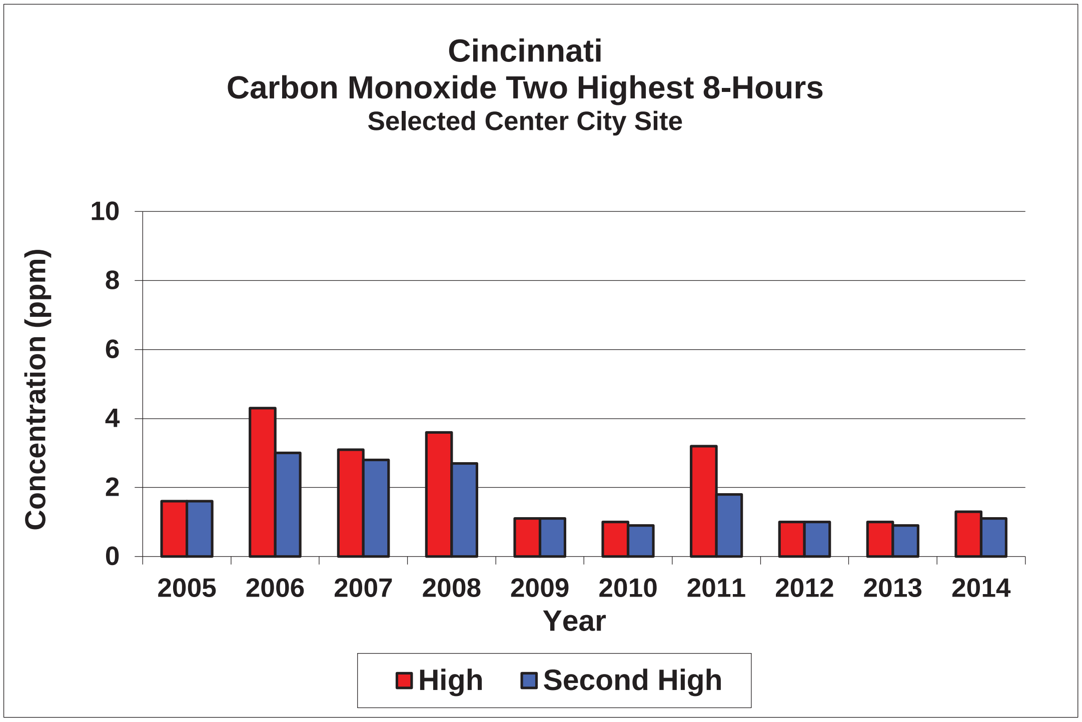

Canton
Carbon Monoxide Two Highest 8-Hours
Selected Center City Site
Concentration (ppm)
10
8
6
4
2
0
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Year
High
Second High

Figure 23



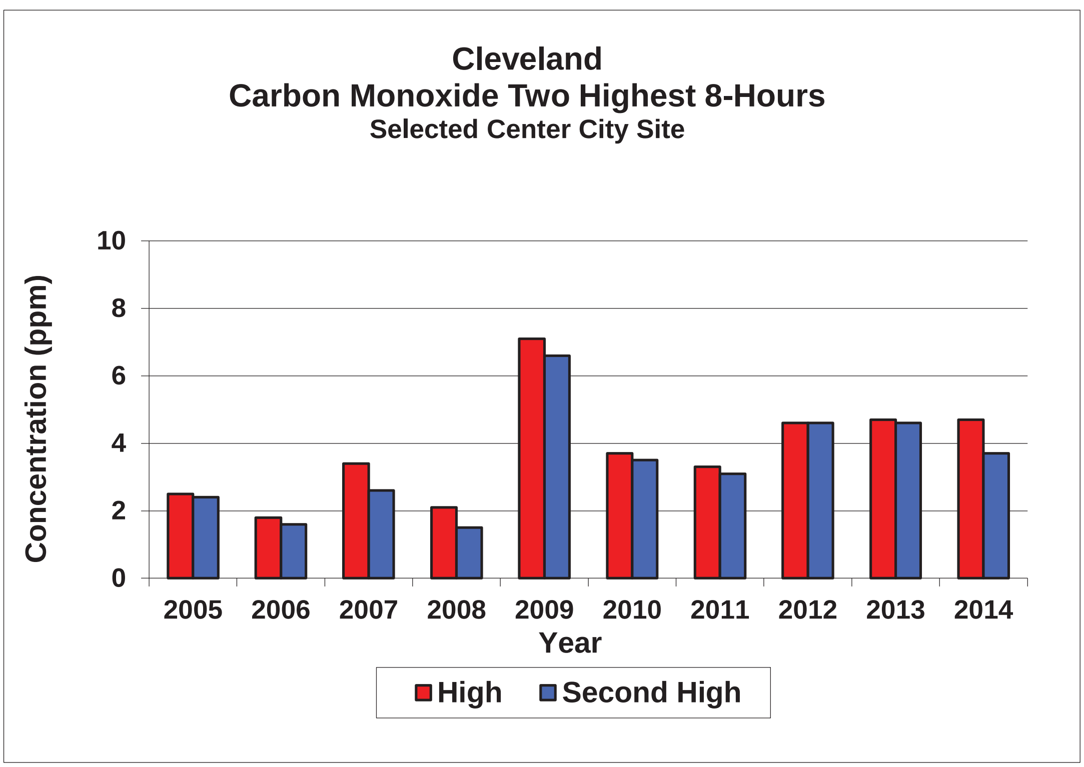
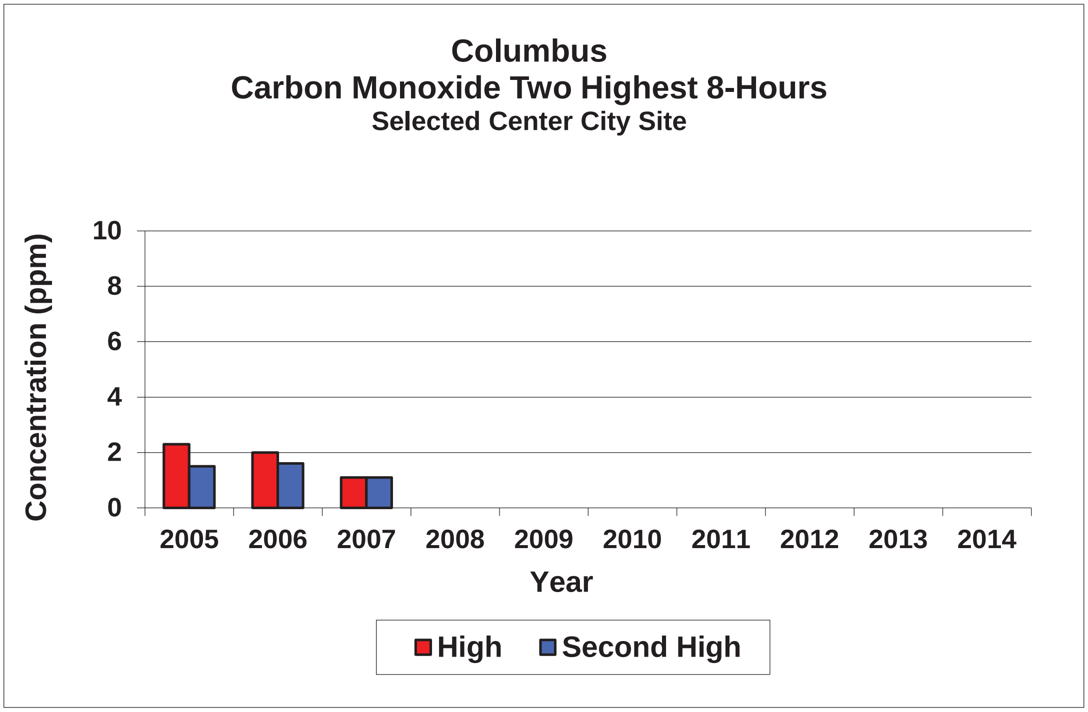


Figure 23 (continued)



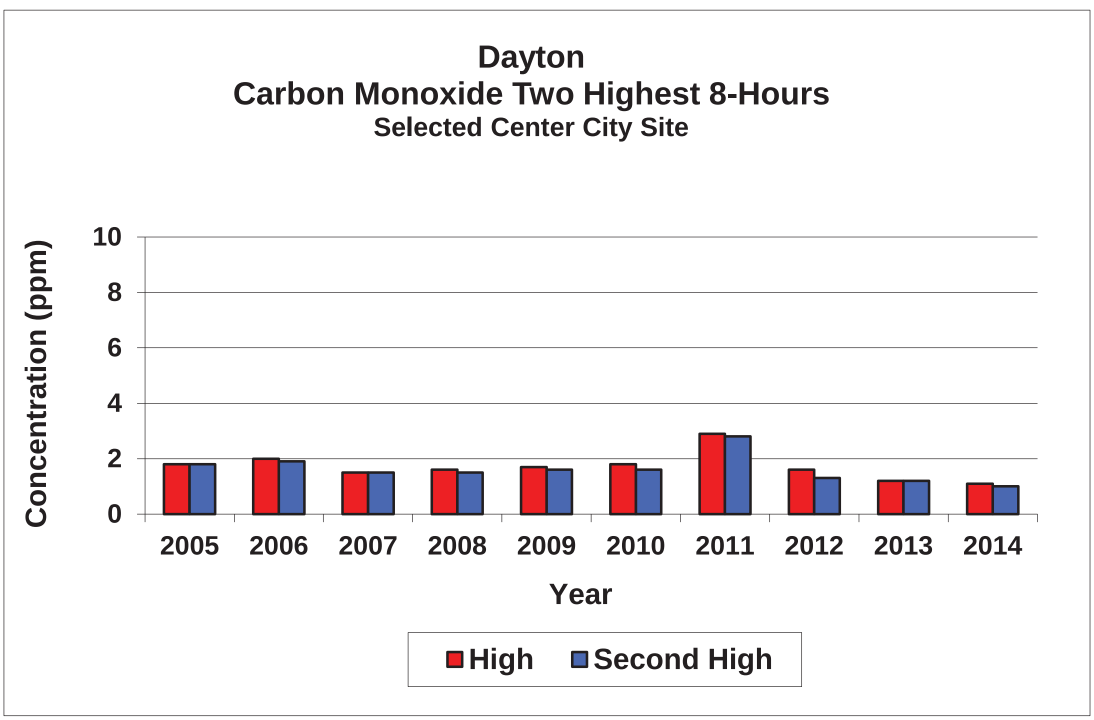
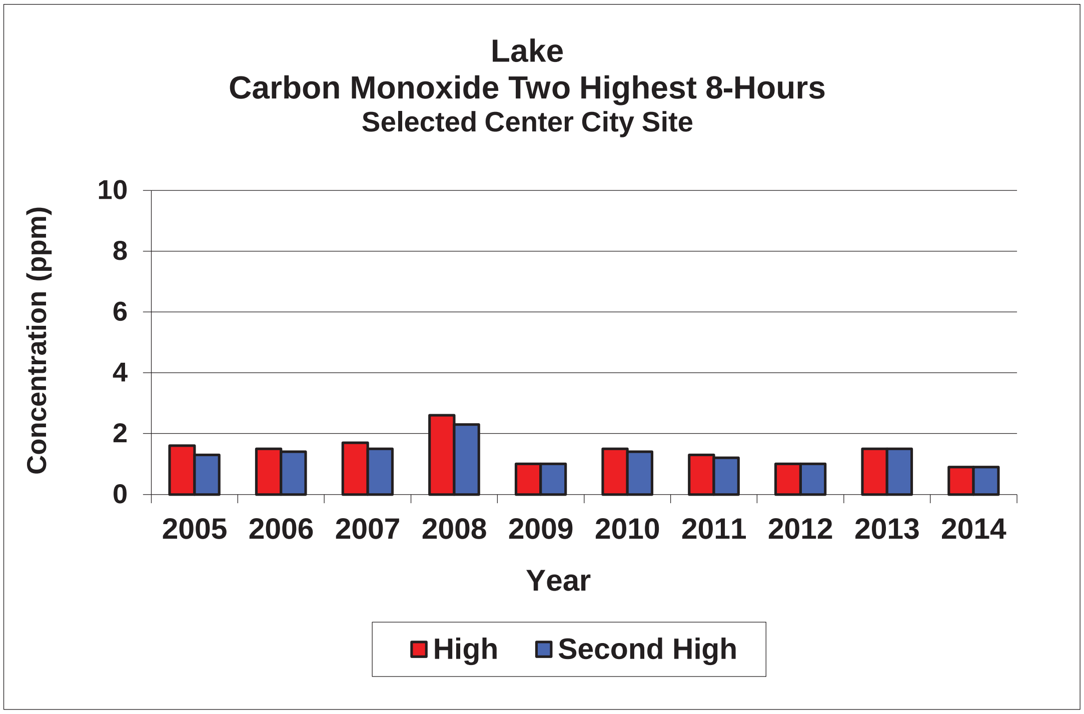


Figure 23 (continued)



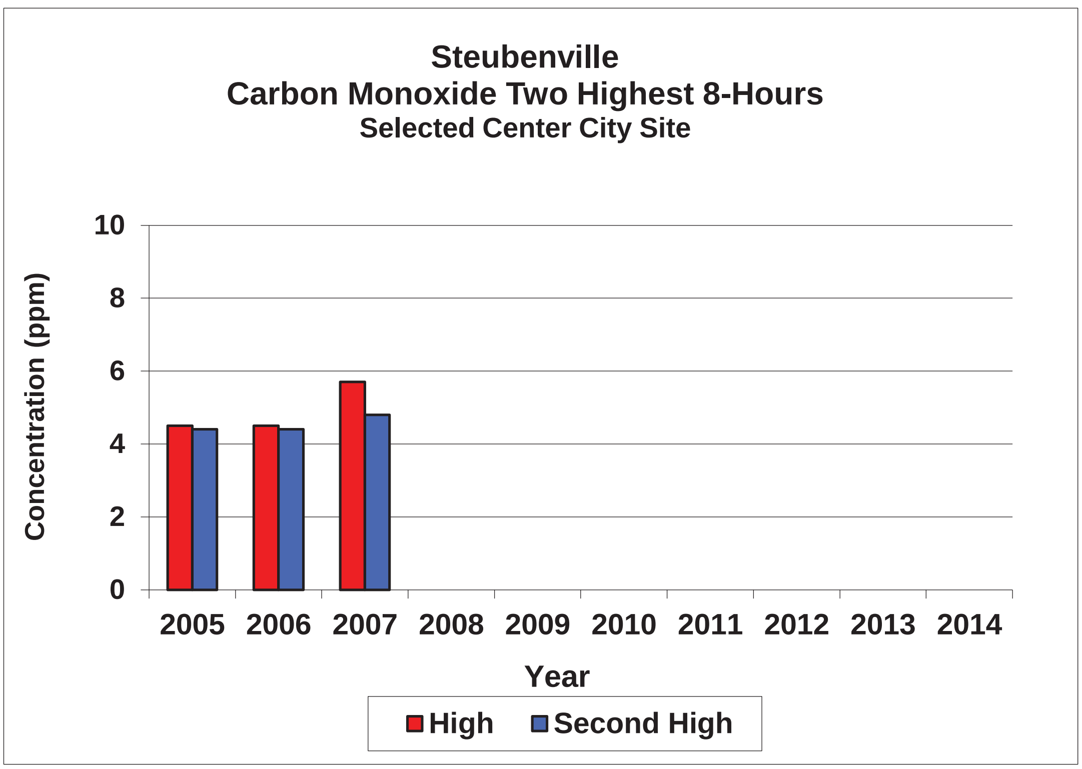


Figure 23 (continued)

IV. QUALITY ASSURANCE PROGRAM

A. GENERAL

Air monitoring data collected by State and Local Air Monitoring Stations (SLAMS) are required to meet Quality Assurance guidance in Appendix A of 40 CFR Part 58. That appendix specifies the minimum quality system requirements for SLAMS data for the pollutants SO_2, NO_2, O_3, CO, Lead, $PM_{2.5}$, and PM_{10}.

Air monitoring agencies are required to have a quality system in place. The quality system is the means by which an organization manages the quality of the monitoring data it produces in a systematic, organized manner. It provides a framework for planning, implementing, assessing and reporting work performed by an organization. It provides for required quality assurance and quality control activities. A quality system includes an overall Quality Management Plan and specific Quality Assurance Project Plans for the pollutants measured.

For air monitoring data the measurements of accuracy and precision are integral to the quality assurance and quality control of the data. Accuracy is defined as the degree the measurement is close to the true value of the parameter measured. Precision is defined as the repeatability of the measurements.

B. Accuracy and Precision Requirements

Accuracy requirements for manual Lead, PM_{10} and $PM_{2.5}$ samplers and continuous PM_{10} and $PM_{2.5}$ monitors include audits of the flow rate of each sampler compared to a known flow rate at least once every 6 months. For continuous monitors for SO_2, NO_2, O_3, and CO, quarterly audits of at least 25% of the analyzers are recommended. One audit per monitor per calendar year is required. During the audits the analyzers are tested with a gas in three specific concentration levels.

Precision requirements for Lead, PM_{10} and $PM_{2.5}$ are met by selecting sites in areas of expected highest concentration for side-by-side (collocated) sampling. Duplicate samples for comparison purposes are collected on an every 12-day schedule although it may be more frequent. Each $PM_{2.5}$ sampler or continuous $PM_{2.5}$ monitor should have a quality control flow rate verification each month. Each Lead and PM_{10} sampler should have a flow rate verification every quarter. For continuous SO_2, NO_2, O_3, and CO monitors the determination of precision is by a one-point quality control check against a gas of known concentration at least once every two weeks for each analyzer. The analyzers are operated in the normal sampling mode during this check.

The accuracy audit data and the precision data are collected by local and state agencies and reported to the US EPA Air Quality System (AQS) within 90 days of the quarter when they were performed.

C. The Statistics of Accuracy and Precision

Statistical calculations are available from reports in the Air Quality System as calculated from the reported accuracy and precision data. Calculations are as shown in Appendix A of 40 CFR 58. The results of those data are available to the reporting organization that collected the data and to other AQS data users. Statistics that are available for 1-Point Quality Control include results for percent of data completeness, coefficient of variation (CV) and bias for each analyzer plus a combined summary for the reporting organization for the pollutant. Results of collocated data for PM_{10} and for $PM_{2.5}$ include the number of collocated data pairs, the percentage completeness and the coefficient of variation. For manual PM_{10} and $PM_{2.5}$ accuracy the number of flow rate audits, the percent completeness and the lower and upper confidence limits are included.

For accuracy statistics the summary results that are included in the accompanying tables for SO_2, NO_2, CO and O_3 include 1-Point Confidence Limits and percentage of data between confidence limits.

In general lower numbers for the coefficient of variation are desirable because indicates more consistency of the test measurements. For SO_2, NO_2 and CO 10% is the CV upper target. For those pollutants 10% is the bias target also. For O_3 7% is the CV target and 7% for bias. For $PM_{2.5}$ 10% or less is the target for precision. For $PM_{2.5}$ accuracy audits less than 5% for design is the upper limit. For QA statistics 100% data completeness is desired.

Tables 5-8 give summaries of the percent completeness, coefficient of variation and bias for precision and 1-point confidence limits and percent of data between confidence limits for accuracy for each reporting organization in the state, for SO_2, NO_2, CO and O_3 monitors.

Tables 9-11 give summaries of number of duplicate samples, percent completeness and coefficient of variation for precision and percent completeness and lower and upper confidence limits for accuracy for PM_{10}, $PM_{2.5}$ and Lead.

TABLE 5

2014 Sulfur Dioxide Data Evaluation

	One Point Quality Check			Annual Performance Eval.	
LAA/DO	Precision	Bias	Complete	Bias	Complete
Central District	2.86	±2.40	100	1.19	100
Northeast District	3. 40	±3.00	98	±1.75	67
Northwest District	5.17	±4.96	100	1.25	100
Southeast District	5.63	±5.48	98	±2.64	100
Akron	2.89	2.96	82	- 0.25	100
Toledo	4.50	±5.83	38	0.99	100
Cleveland	4.05	±3.79	100	±3.55	100
RAPCA	4.62	±4.01	87	±1. 58	100
SWOAQA	3. 15	±2.62	100	±3.18	100
Lake County	2.13	±2.60	90	- 1.96	100
MTAPCA	1.59	±1.22	35	- 9.57	100
Portsmouth	2.69	±2.14	98	±2.84	100

TABLE 6

2014 Nitrogen Dioxide Data Evaluation

	One Point Quality		Check	Annual Performance Evaluation	
L AA/DO	Precision	Bias	Complete	Bias	Complete
Cleveland	2. 43	±3.52	96	±9.87	100
Central District	3.8 9	±5.34	100	- 4.17	50
Hamilton County	3.8	±3. 99	77	±8.26	100

TABLE 7

2014 Carbon Monoxide Data Evaluation

	One Point Quality Check			Annual Performance Evaluation	
LAA/DO	Precision	Bias	Complete	Bias	Complete
Central Office	1.01	±2.10	100	±2.0 1	100
Akron	3.78	±2.97	86	0.88	100
Canton	4.08	±3.37	96	2.30	100
SWOAQA	4.75	±3.67	96	0.68	100
Cleveland	3.35	±2.59	87	1.35	100
RAPCA	7.15	±5.90	81	1.85	100
Lake County	1.67	- 4.32	88	- 0.21	100

TABLE 8

2014 Ozone Data Evaluation

	One Point Quality Check			Annual Performance Eval.	
LAA/DO	Precision	Bias	Complete	Bias	Complete
Central District	1.92	±1.7 7	100	±2.30	100
Northeast District	4.46	±4.27	100	2.55	100
Northwest District	1.76	±1.45	100	3.35	100
Southeast District	4.04	±3.72	100	4.68	100
Southwest District	2.46	±1.92	100	2.15	100
Akron	2.54	±2.01	89	- 0.72	100
Canton	0.88	±0.92	100	2.86	100
Toledo	0.95	±0.91	78	2.84	100
Cleveland	2.89	±1.90	100	±1.74	100
RAPCA	1.39	±1.28	76	±0.80	100
SWOAQA	2.55	±2.21	100	2.81	100
Lake County	2.21	±2.23	87	2.21	100
MTAPCA	1.92	±1.55	73	3.48	100
Portsmouth	3.56	+2.78	90	- 1.22	100

Table 9

2014 PM2.5 Data Evaluation

LAA/DO Site	Methods	Average Bias	Complete	Collocated CV	Complete
		POC 1			
Central District	120,118	±0.56	100	9.47	100
Northeast District	120	±0.30	100	8.68	100
Northwest District	142	+0.92	100	12.61	100
Southeast District	145,142	- 0.44	100	11.77	90
Portsmouth	118, 120,145	±0.48	100	12.19	100
Akron	145	+1.49	100	4.41	100
Canton	142	1.15	100	4.89	100
Toledo	145	- 1.03	100	10.94	100
Cleveland	120,145,179	±1.30	100	5.93	100
RAPCA	142,145	±1.89	85	4.65	100
SWOAQA	142,120	±1.43	100	3.89	100
Lake County	120	- 0.05	100	11.26	100
MTAPCA	142,120	±0.54	100	9.23	100

Table 10

2014 PM10 Data Evaluation

LAA/DO Site	POC	Average Bias	Complete	Collocated CV	Complete
Central District	1	±1.45	100	7.13	100
Northeast District	1	+3.78	100	NA	NA
Southeast District	1	+3. 19	100	7. 23	100
Cleveland	1	3.16	95	NA	NA
RAPCA	1	±1.76	83	6.24	100
SWOAQA	1	±1.41	100	3.50	100
Lake County	1	+1.18	100	5.70	100
MTAPCA	1	±1.42	100	8.17	100
Portsmouth	1	±2.28	100	4.83	100

Table 11

2014 Lead Data Evaluation

LAA/DO Site	POC	Average Bias	Complete	Collocated CV	Complete
Central District	1	1.69	83	<0.20	0
Northeast District	1	±1.75	100	13.96	100
Northwest District	1	±3.08	100	19.56	100
Southeast District	1	±2.02	100	<0.02	100
Southwest District	1	- 0.28	100	NA	NA
Cleveland	1	2.71	100	9.71	100
RAPCA	1	2.48	100	<0.02	100
SWOAQA	1	±1.26	100	<0. 02	98
MTAPCA/CANTON	1	±1.06	50	<0.02	100

V. AIR QUALITY DATA 2014

Total Suspended Particulate (TSP)

Total suspended particulate matter is defined as any liquid (aerosol) or solid substance found in the atmosphere. Particles larger than approximately 100 microns in diameter settle rapidly due to gravity and are not considered suspended particulates. Fly ash, process dusts, soot and oil aerosols are all common forms of suspended particulate matter. The major sources of particulate pollution are industrial processes, electric power generation, industrial fuel combustion, and dust from plowed fields, roadways, or construction sites. Particulate pollution causes a wide range of damage to materials, as well as limiting visibility and reducing the amount of sunlight reaching the earth. Components of particulates may be harmful, such as sulfates, nitrates and metals. The major adverse health effects on humans are related to damage to the respiratory system through interference with the lung's natural cleansing process.

Such adverse health effects are dependent, in a general sense, upon (1) the concentration, size and chemical composition of the particles of which the TSP consists and (2) the concentration and composition of any pollutant gases in combination with it. Particles greater than 10 microns in diameter can rarely penetrate below the larynx and, therefore, are less likely to damage the respiratory system. Particles less than 6 microns in diameter can penetrate the bronchial passage and those of less than 1 micron in diameter can usually penetrate and be deposited in the capillaries and alveoli of the lungs. (I.M. Campbell, Energy and the Atmosphere: A Physical Chemical Approach, John Wiley & Sons, LTD., 1977).

An inhaled particle may exert a toxic effect in one or more of the following four ways: (1) the particle may be intrinsically toxic because of its inherent chemical or physical characteristics; (2) the particle may interfere with one or more of the mechanisms that normally clear the respiratory track; (3) the particle may act as a carrier of an absorbed toxic substance; or (4) the particle may act as a carrier of an absorbent toxic substance.

It is difficult to obtain direct relationships between exposures to various concentrations of TSP and resulting effects upon human health because of the problems of isolating the effects of TSP from those of other environmental pollutants and of reproducing in the laboratory the exact conditions that prevail in the ambient air. Also, it has been observed that exposure to TSP in combination with other pollutants such as sulfur dioxide (SO_2) produces more severe effects than does exposure to each pollutant separately. Nevertheless, statistical analyses of morbidity and mortality data do indicate a relationship between increased TSP concentrations and increased numbers of hospital and clinic admissions for upper respiratory infections, cardiac diseases, bronchitis, asthma, pneumonia, emphysema and the like. (Air Pollution: Its Origin and Control, Harper & Row, 1976.) TSP ceased to be a criteria pollutant on August 1, 1987, having been replaced by PM_{10}.

Starting in 1987 TSP sampling was gradually replaced by ten micron particulate sampling (PM_{10}). There were over 200 TSP monitors in 1987. In 2014 there were 9 monitors reporting TSP data, all are used for lead or other metals monitoring. In July 1997 the U.S. EPA promulgated regulations adding a National Ambient Air Quality Standard for 2.5 micron particulate matter ($PM_{2.5}$). The $PM_{2.5}$ monitors supplement and partially replace the PM_{10} network. They started collecting data in January 1999.

Sampling Method

TSP is measured by the high-volume air sampler method. This instrument draws measured volumes of air through a pre-weighed glass fiber or quartz filter for a specific time (normally 24 hours). Particulate matter in the air is trapped on the filter, which is then re-weighed to determine the mass of the particulates collected. Results are reported as micrograms of particulate matter per cubic meter of air ($\mu g/m^3$). Normal sampling is done intermittently with 24-hour samples taken once every six days.

Parameter		Unit	POC	PQAO	Year	Meth	# Obs	1st Max Value	2nd Max Value	3rd Max Value	4th Max Value	Arith. Mean	Duration	Cert& Eval	EDT
Site ID: 39-017-0015	City: Middletown	County: Butler						Address: 3901 LEFFERSON							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	2	1259	2014	091	57	119	82	82	81	39.7	24 HOUR		0
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	3	1259	2014	091	29	87	82	77	74	42.6	24 HOUR		0
Site ID: 39-029-0020	City: East Liverpool	County: Columbiana						Address: 2220 MICHIGAN							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0807	2014	091	61	163	152	116	92	45.1	24 HOUR		0
Site ID: 39-035-0038	City: Cleveland	County: Cuyahoga						Address: 2547 ST TIKHON							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	57	170	115	103	101	55.2	24 HOUR		0
Site ID: 39-035-0042	City: Cleveland	County: Cuyahoga						Address: 3136 LORAIN AVE., F.S. 4							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	59	115	85	71	71	37.2	24 HOUR		0
Site ID: 39-035-0049	City: Cleveland	County: Cuyahoga						Address: E. 56TH ST.							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	59	122	114	111	108	56.8	24 HOUR		0
Site ID: 39-035-0060	City: Cleveland	County: Cuyahoga						Address: E. 14TH & ORANGE							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	58	236	212	197	173	88.2	24 HOUR		0
Site ID: 39-035-0061	City: Cleveland	County: Cuyahoga						Address: W. SIDE OF WEST 3RD.							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	61	157	129	114	109	57.0	24 HOUR		0
Site ID: 39-035-0072	City: Warrensville Heights	County: Cuyahoga						Address: 26565 MILES ROAD							
11101	Suspended particulate (TSP)	Micrograms/cubic meter (25 C)	1	0229	2014	091	61	59	46	45	41	24.9	24 HOUR		0

Particulate Matter (<10µ, PM_{10})

On July 1, 1987, the U.S. EPA promulgated revisions to the National Ambient Air Quality Standards for particulate matter. The primary standard includes only those particles with an aerodynamic diameter smaller than or equal to a nominal 10 micrometers. This standard is referred to as the PM_{10} standard (particulate matter <10 micrometers). From July 1987 until July 18, 1997 the annual standard was 50 $\mu g/m^3$ annual arithmetic mean (average over three years' data). The 24-hour standard, not to be exceeded more than once, was 150 $\mu g/m^3$. The standard is that the 24-hour level of 150 $\mu g/m^3$ is not to be exceeded more than once per year averaged over three years.

The annual standard was retained until the changes to the particulate standards that became effective on December 18, 2006 when the 24-Hour standard was retained and the annual standard was revoked.

The standards were changed in July 1997, when the $PM_{2.5}$ standard was promulgated. Changing the standard from TSP to PM_{10} and then adding $PM_{2.5}$ was due to research findings concerning particle size. Particulate matter can harm body tissue such as the linings of the nose and throat and the lungs by simple mechanical irritation. Nasal hairs and sneezing are the body's natural defenses against some of the relatively large particles (15-100 microns). However, small particles can slip past these defenses and penetrate deep into the lungs where they can damage lung tissues.

Because of the final action to set the fine particulate standards by U.S. EPA to replace TSP, the Ohio Air Monitoring Network was expanded to include 21 PM_{10} sites in 1986, to 45 in 1988 and to a high of 91 in 1997. During the year 2014 monitors were operated at 30 sites.

Samples are taken each weekday at urban sites used in reporting the Air Quality Index (AQI).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM10 Total 0-10um STP (81102) Ohio Micrograms/cubic meter (25 C) (001)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >STD	EST DAYS >STD	WTD ARITH MEAN	CERT and EVAL	EDT
39-017-0003	1	1259	Middletown	Butler	BONITA & ST JOHN	2014	063	59	61	59	97	34	30	30	27	0	0	16.0	S	0
39-017-0015	1	1259	Middletown	Butler	3901 LEFFERSON	2014	063	57	61	57	93	43	37	35	34	0	0	18.7	S	0
39-017-0019	1	1259	Middletown	Butler	1300 OXFORD STATE ROAD	2014	125	61	61	61	100	35	35	32	32	0	0	17.9	S	0
39-017-0020	1	1259	Middletown	Butler	3350 YANKEE ROAD	2014	125	58	61	58	95	82	75	70	62	0	0	32.2	S	0
39-029-0020	1	0807	East Liverpool	Columbiana	2220 MICHIGAN	2014	062	60	61	60	98	38	37	36	34	0	0	17.8	S	0
39-029-0022	1	0807	East Liverpool	Columbiana	500 MARYLAND	2014	062	61	61	61	100	30	28	27	25	0	0	14.2	S	0
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	063	65	365	65	18	66	50	50	47	0	0	27.1*	S	0
39-035-0038	4	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	063	69	365	69	19	72	54	49	48	0	0	27.7*	S	0
39-035-0038	6	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	063	71	365	71	19	59	54	41	39	0	0	21.9*	S	0
39-035-0038	7	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	063	72	365	72	20	71	68	65	64	0	0	24.7*	S	0
39-035-0038	8	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	063	71	365	71	19	56	54	51	49	0	0	27.3*	S	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWAY AVE.	2014	063	59	61	59	97	46	36	35	32	0	0	22.0	M	0
39-035-0045	2	0229	Cleveland	Cuyahoga	4950 BROADWAY AVE.	2014	063	59	61	59	97	38	38	34	34	0	0	21.4	M	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	063	60	61	60	98	93	86	86	80	0	0	38.6	M	0
39-035-0060	3	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	079	8577	365	357	98	126	93	89	82	0	0	28.0	M	0
39-035-0065	1	0229	Newburgh Heights	Cuyahoga	4600 HARVARD AVE.	2014	063	57	61	57	93	82	60	60	55	0	0	31.0	M	0
39-035-1002	1	0229	Brook Park	Cuyahoga	16900 HOLLAND	2014	063	59	61	59	97	30	29	26	23	0	0	14.5	M	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM10 Total 0-10um STP (81102) Ohio Micrograms/cubic meter (25 C) (001)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >STD	EST DAYS >STD	WTD ARITH MEAN	CERT and EVAL	EDT
					RD.															
39-049-0024	1	0805	Columbus	Franklin	STATE FAIRGROUNDS	2014	063	58	61	58	95	80	46	40	38	0	0	22.9	M	0
39-049-0024	2	0805	Columbus	Franklin	STATE FAIRGROUNDS	2014	063	58	61	58	95	71	43	42	39	0	0	22.3	M	0
39-057-0005	1	0287	Yellow Springs	Greene	100 DAYTON ST.	2014	062	58	61	58	95	34	28	26	26	0	0	14.3	S	0
39-061-0014	1	1259	Cincinnati	Hamilton	SEYMOUR & VINE ST.	2014	063	60	61	60	98	52	36	33	32	0	0	19.4	S	0
39-061-0040	4	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	125	114	122	114	93	57	42	36	34	0	0	18.0	S	0
39-061-0040	5	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	125	73	61	58	95	35	32	31	31	0	0	16.6	S	0
39-061-0040	9	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	079	8670	365	362	99	55	46	43	43	0	0	19.1	S	0
39-061-5001	1	1259	Lockland	Hamilton	101 COOPER AVE.	2014	063	56	61	56	92	29	27	26	26	0	0	15.2	S	0
39-061-5001	2	1259	Lockland	Hamilton	101 COOPER AVE.	2014	063	58	61	58	95	30	28	27	27	0	0	15.6	S	0
39-081-0001	1	0809	Not in a city	Jefferson	1004 THIRD ST., BRILLIANT	2014	063	60	61	60	98	46	41	33	33	0	0	20.7	S	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	063	58	61	58	95	48	36	34	33	0	0	20.2	S	0
39-081-0017	2	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	063	60	61	60	98	49	35	34	33	0	0	19.9	S	0
39-085-1001	1	0595	Fairport Harbor (Fairport)	Lake	325 VINE ST.	2014	062	55	61	55	90	31	28	28	27	0	0	14.1*	M	0
39-085-1001	2	0595	Fairport Harbor (Fairport)	Lake	325 VINE ST.	2014	062	54	61	54	89	30	30	30	28	0	0	14.3*	M	0
39-087-0012	1	0880	Ironton	Lawrence	450 Commerce Drive	2014	062	58	61	58	95	30	30	26	26	0	0	17.8	M	0

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM10 Total 0-10um STP (81102) Ohio Micrograms/cubic meter (25 C) (001)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	#OBS	NUM REQ	VALID DAYS	%OBS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	DAY MAX >STD	EST DAYS >STD	WTD ARITH MEAN	CERT and EVAL	EDT
39-093-3002	1	0807	Sheffield	Lorain	2180 LAKE BREEZE	2014	062	58	61	58	95	19	19	18	18	0	0	9.4	S	0
39-099-0005	1	0634	Youngstown	Mahoning	145 MADISON AVE.	2014	063	58	61	58	95	39	26	26	26	0	0	15.6	M	0
39-099-0006	1	0634	Youngstown	Mahoning	1524 OAKLAND AVE.	2014	063	58	61	58	95	31	28	28	28	0	0	17.3	M	0
39-099-0006	2	0634	Youngstown	Mahoning	1524 OAKLAND AVE.	2014	063	58	61	58	95	35	28	27	26	0	0	17.2	M	0
39-113-7001	1	0287	Moraine	Montgomery	2728 VIKING LANE	2014	063	59	61	59	97	36	35	30	30	0	0	18.7	S	0
39-113-7001	2	0287	Moraine	Montgomery	2728 VIKING LANE	2014	063	59	61	59	97	38	35	30	30	0	0	18.3	S	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA	2014	062	61	61	61	100	29	27	26	25	0	0	16.9	M	0
39-145-0013	2	0880	Portsmouth	Scioto	4862 GALLIA	2014	062	60	61	60	98	30	28	26	23	0	0	16.9	M	0
39-145-0019	1	0880	Portsmouth	Scioto	605 WASHINGTON	2014	062	59	61	59	97	29	27	26	25	0	0	17.1	M	0
39-145-0020	1	1299	Not in a city	Scioto	2840 BACK RD.	2014	150	8682	365	360	99	81	70	51	47	0	0	13.5	S	0
39-145-0021	1	1299	Franklin Furnace	Scioto	2446 GALLIA PIKE	2014	150	8461	365	351	96	132	52	38	35	0	0	17.4	S	0
39-145-0022	1	1299	Franklin Furnace	Scioto	1740 GALLIA PIKE	2014	150	8684	365	361	99	53	46	38	32	0	0	14.0	S	0
39-155-0005	1	0634	Warren	Trumbull	540 LAIRD AVE.	2014	062	55	61	55	90	26	26	26	26	0	0	13.5	M	0
39-155-0005	2	0634	Warren	Trumbull	540 LAIRD AVE.	2014	062	59	61	59	97	27	26	25	24	0	0	13.0	M	0
39-155-0006	1	0634	Warren	Trumbull	2323 MAIN AVE.	2014	062	57	61	57	93	26	24	23	22	0	0	11.9	M	0

Particulate Matter <2.5µ ($PM_{2.5}$)

On July 18, 1997, the U.S. EPA promulgated revisions to the National Ambient Air Quality Standards for particulate matter. The primary standard includes only those particles with an aerodynamic diameter smaller than or equal to a nominal 2.5 micrometers. This new standard is referred to as the $PM_{2.5}$ standard (particulate matter <2.5 micrometers).

The annual standard is 12.0µg/m^3 annual arithmetic mean (average over three consecutive years' data). The 24-hour standard is met when the 98^{th} percentile concentration averaged over three consecutive years, is less than or equal to 35µg/m^3.

The Annual National Ambient Air Quality Standard was changed from 15.0µg/m^3 to 12.0µg/m^3, announced on December 14, 2012 and effective in January 2013.

The 24-Hour National Ambient Air Quality Standard was changed from 65µg/m^3 to 35µg/m^3 effective in December 2006.

This revision to the particulate matter program is due to research findings concerning particle size. Particulate matter can harm body tissue such as the linings of the nose and throat and the lungs by simple mechanical irritation. Nasal hairs and sneezing are the body's natural defenses against some of the relatively large particles (15-100 microns). However, small particles can slip past these defenses and penetrate deep into the lungs where they can damage lung tissues.

Because of the final action to set the fine particulate standards by U.S. EPA to supplement PM_{10}, the Ohio Air Monitoring Network had a peak of 52 sites in 2008. There were 49 $PM_{2.5}$ sites in 2014. Those 49 sites have a total of 115 monitors reporting data. There are 26 continuous monitors of which 4 are Federal Equivalent Method monitors and 13 speciation monitors in addition to the 76 Federal Reference monitors.

The Federal Reference and Federal Equivalent Method monitors are used to determine compliance with the National Ambient Air Quality Standards, the speciation monitors are used for analysis to determine the composition of the particulate and the continuous monitors are primarily used for the Air Quality Index and for “real time” reporting of particulate data to the public.

Since most continuous and all speciation analysis monitors are not Federal Reference or Equivalent Methods those data are not used to determine compliance with the National Ambient Air Quality Standards.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM2.5 - Local Conditions (88101) | Ohio | Micrograms/cubic meter (LC) (105)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	NUM CRED DAYS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT and EVAL	EDT
39-003-0009	1	0808	Lima	Allen	2850 BIBLE ROAD	2014	142	51	31.0	27.7	21.4	19.9	27.7	9.07*	S	0
39-003-0009	2	0808	Lima	Allen	2850 BIBLE ROAD	2014	142	42	20.6	19.6	17.8	16.4	20.6	8.65*	S	0
39-009-0003	1	0809	Not in a city	Athens	S.R. 377 GIFFORD STATE FOREST	2014	142	55	18.3	18.0	17.6	16.4	18.0	7.80	S	0
39-009-0003	2	0809	Not in a city	Athens	S.R. 377 GIFFORD STATE FOREST	2014	142	47	19.5	17.5	17.3	13.7	19.5	8.28*	S	0
39-017-0003	1	1259	Middletown	Butler	BONITA & ST JOHN	2014	142	61	33.2	22.3	21.8	21.6	22.3	11.68*	Y	0
39-017-0003	4	1259	Middletown	Butler	BONITA & ST JOHN	2014	142	55	30.6	24.7	23.2	19.6	24.7	10.88*	Y	0
39-017-0016	1	1259	Fairfield	Butler	400 NILLES RD.	2014	142	59	27.8	23.6	22.0	21.7	23.6	11.05*	Y	0
39-017-0016	4	1259	Fairfield	Butler	400 NILLES RD.	2014	142	61	29.0	20.6	18.5	17.3	20.6	10.26*	Y	0
39-017-0019	1	1259	Middletown	Butler	1300 OXFORD STATE ROAD	2014	142	63	30.9	21.1	20.9	20.8	21.1	11.31*	Y	0
39-017-0019	4	1259	Middletown	Butler	1300 OXFORD STATE ROAD	2014	142	56	30.9	23.9	23.0	21.7	23.9	10.97*	Y	0
39-017-0020	1	1259	Middletown	Butler	3350 YANKEE ROAD	2014	142	60	34.0	23.0	21.8	21.6	23.0	13.25*	Y	0
39-017-0020	4	1259	Middletown	Butler	3350 YANKEE ROAD	2014	142	60	30.7	27.8	23.1	22.3	27.8	12.57*	Y	0
39-023-0005	1	0287	Springfield	Clark	350 N. FOUNTAIN AVE.	2014	142	60	32.7	22.7	19.9	19.1	22.7	10.47*	S	0
39-023-0005	4	0287	Springfield	Clark	350 N. FOUNTAIN AVE.	2014	142	57	34.4	24.5	20.8	18.5	24.5	9.47*	S	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152 ST.	2014	000	119	27.5	25.1	23.2	21.7	23.2	9.64	M	0

Note: The * indicates that the mean does not satisfy summary criteria.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

PM2.5 - Local Conditions (88101) | Ohio | Micrograms/cubic meter (LC) (105)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	NUM CRED DAYS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT and EVAL	EDT
39-035-0038	1	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	145	111	35.1	31.4	26.5	26.3	26.5	12.18	M	0
39-035-0038	2	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	145	20	29.2	26.0	25.9	25.3	29.2	11.60*	M	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWAY AVE.	2014	120	115	34.9	26.4	25.7	22.4	25.7	11.40	M	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	000	96	31.8	31.0	26.2	26.1	31.0	12.09*	S	0
39-035-0060	3	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	170	244	34.9	32.5	32.4	31.0	29.9	12.61*		0
39-035-0065	1	0229	Newburgh Heights	Cuyahoga	4600 HARVARD AVE.	2014	000	115	37.1	26.7	26.2	24.9	26.2	12.48	M	0
39-035-1002	1	0229	Brook Park	Cuyahoga	16900 HOLLAND RD.	2014	000	109	31.2	24.1	22.7	20.7	22.7	9.71*	M	0
39-049-0024	1	0805	Columbus	Franklin	STATE FAIRGROUNDS	2014	118	113	27.1	25.5	21.0	19.5	21.0	10.12	M	0
39-049-0025	1	0805	Columbus	Franklin	1700 ANN ST.	2014	120	72	31.5	24.7	21.9	19.0	24.7	11.29*	S	0
39-049-0025	2	0805	Columbus	Franklin	1700 ANN ST.	2014	120	38	34.3	23.7	20.0	19.2	34.3	10.92*	S	0
39-049-0029	3	0805	New Albany	Franklin	7600 FODOR RD.	2014	170	365	32.4	30.9	29.1	26.8	22.2	10.88		0
39-049-0039	1	0805	Columbus	Franklin	580 E. WOODROW AVE.	2014	120	29	19.2	16.8	15.9	15.8	19.2	9.00*	M	0
39-049-0039	2	0805	Columbus	Franklin	580 E. WOODROW AVE.	2014	120	16	15.4	15.2	13.9	12.7	15.4	8.09*	M	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CANYON	2014	118	118	34.9	30.8	23.8	20.9	23.8	10.32	M	0
39-057-0005	1	0287	Yellow Springs	Greene	100 DAYTON ST.	2014	142	59	32.9	24.7	19.0	19.0	24.7	10.14*	S	0
39-057-0005	2	0287	Yellow Springs	Greene	100 DAYTON ST.	2014	142	59	24.2	19.8	18.7	18.3	19.8	8.98	S	0
39-057-0005	4	0287	Yellow	Greene	100 DAYTON	2014	142	60	31.2	20.7	20.3	17.6	20.7	9.66*	S	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM2.5 - Local Conditions (88101) Ohio Micrograms/cubic meter (LC) (105)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	NUM CRED DAYS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT and EVAL	EDT
			Springs		ST.											
39-061-0006	1	1259	Blue Ash	Hamilton	11590 GROOMS RD	2014	120	119	30.8	28.8	22.4	21.9	22.4	10.32	Y	0
39-061-0010	1	1259	Cleves	Hamilton	6950 RIPPLE RD.	2014	142	57	26.8	24.3	20.3	18.9	24.3	10.12*	Y	0
39-061-0010	4	1259	Cleves	Hamilton	6950 RIPPLE RD.	2014	142	56	25.0	22.2	21.2	21.0	22.2	10.45*	Y	0
39-061-0014	1	1259	Cincinnati	Hamilton	SEYMOUR & VINE ST.	2014	120	121	28.7	24.1	23.2	22.1	23.2	11.29	Y	0
39-061-0014	2	1259	Cincinnati	Hamilton	SEYMOUR & VINE ST.	2014	120	61	29.3	25.2	23.7	20.7	25.2	11.21	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	142	120	28.4	27.8	23.6	23.5	23.6	10.42	Y	0
39-061-0040	4	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	142	58	28.3	23.8	20.6	18.9	23.8	9.98	Y	0
39-061-0042	1	1259	Cincinnati	Hamilton	2101 W. 8TH ST.	2014	142	43	26.3	24.8	22.7	22.0	26.3	11.60*	Y	0
39-061-0042	4	1259	Cincinnati	Hamilton	2101 W. 8TH ST.	2014	142	66	28.1	23.3	21.0	20.4	23.3	11.07*	Y	0
39-061-0048	1	1259	Cincinnati	Hamilton	3428 COLERAIN AVE.	2014	142	60	29.1	26.3	25.0	24.5	26.3	13.26*		0
39-061-0048	4	1259	Cincinnati	Hamilton	3428 COLERAIN AVE.	2014	142	59	35.5	27.8	24.5	22.1	27.8	12.61*		0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	145	113	31.8	26.3	26.0	22.0	26.0	10.80	S	0
39-081-0017	2	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	145	99	30.8	26.9	21.7	21.5	26.9	10.17*	S	0
39-081-0017	3	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	170	321	39.8	34.3	34.0	33.9	30.0	12.98*		0
39-081-0021	1	0809	Mingo Junction	Jefferson	110 STUEBEN ST.	2014	142	58	31.1	22.7	21.5	20.1	22.7	10.62	S	0
39-085-0007	1	0595	Painesville	Lake	177 MAIN STREET	2014	120	117	19.2	18.1	17.7	17.5	17.7	8.57	M	0
39-085-0007	2	0595	Painesville	Lake	177 MAIN	2014	120	58	24.1	22.7	18.5	17.7	22.7	8.32	M	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM2.5 - Local Conditions (88101) Ohio Micrograms/cubic meter (LC) (105)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	NUM CRED DAYS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT and EVAL	EDT
					STREET											
39-087-0012	1	0880	Ironton	Lawrence	450 Commerce Drive	2014	145	118	19.7	17.0	15.3	14.2	15.3	7.50	M	0
39-093-3002	1	0807	Sheffield	Lorain	2180 LAKE BREEZE	2014	120	119	26.2	23.2	22.9	21.0	22.9	9.05	M	0
39-093-3002	2	0807	Sheffield	Lorain	2180 LAKE BREEZE	2014	120	56	25.5	22.5	19.0	17.3	22.5	8.80	M	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE	2014	145	119	28.9	27.0	24.8	23.5	24.8	10.63	M	0
39-095-0024	2	0220	Toledo	Lucas	348 S. ERIE	2014	145	57	28.3	23.1	22.9	21.7	23.1	10.50	M	0
39-095-0026	1	0220	Toledo	Lucas	4208 AIRPORT HIGHWAY	2014	145	119	28.9	28.8	28.6	25.4	28.6	10.33	M	0
39-095-0028	1	0220	Toledo	Lucas	3040 YORK ST.	2014	145	108	29.9	26.2	24.4	23.8	24.4	10.64*	M	0
39-099-0005	1	0634	Youngstown	Mahoning	145 MADISON AVE.	2014	142	58	23.6	22.1	21.8	19.6	22.1	10.01	M	0
39-099-0005	2	0634	Youngstown	Mahoning	145 MADISON AVE.	2014	142	61	22.8	21.8	21.6	19.6	21.8	9.89	M	0
39-099-0014	1	0634	Youngstown	Mahoning	345 OAKHILL AVE.	2014	000	78	26.6	23.2	22.1	20.7	23.2	9.82*	S	0
39-099-0014	4	0634	Youngstown	Mahoning	345 OAKHILL AVE.	2014	142	25	20.7	20.6	16.8	16.1	20.7	9.84*	S	0
39-103-0004	1	0012	Not in a city	Medina	BALLASH ROAD	2014	145	111	23.5	20.3	19.8	19.2	19.8	8.64	S	0
39-113-0032	1	0287	Dayton	Montgomery	215 EAST THIRD ST.	2014	145	83	36.6	30.8	24.0	23.1	30.8	11.16*	S	0
39-113-0032	2	0287	Dayton	Montgomery	215 EAST THIRD ST.	2014	145	43	31.2	24.8	22.2	20.3	31.2	11.21*	S	0
39-113-0038	1	0287	Dayton	Montgomery	444 West Third Street	2014	145	31	18.7	18.0	16.7	14.3	18.7	8.71*	S	0
39-113-0038	2	0287	Dayton	Montgomery	444 West Third Street	2014	145	16	14.4	12.1	11.7	10.6	14.4	7.83*	S	0
39-133-0002	1	0012	Ravenna	Portage	531 WASHINGTON	2014	145	95	21.1	19.3	18.9	18.8	19.3	9.00*	S	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM2.5 - Local Conditions (88101) Ohio Micrograms/cubic meter (LC) (105)

24-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	NUM CRED DAYS	1ST MAX	2ND MAX	3RD MAX	4TH MAX	98TH PERCENTILE VALUE	WTD ARITH MEAN	CERT and EVAL	EDT
39-135-1001	1	0287	New Paris	Preble	6940 OXFORD GETTYSBURG RD.	2014	145	111	32.6	28.3	25.4	21.9	25.4	9.25	S	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA	2014	000	116	18.3	16.4	16.2	15.9	16.2	8.21	M	0
39-145-0013	2	0880	Portsmouth	Scioto	4862 GALLIA	2014	000	56	18.4	15.1	13.3	12.9	15.1	8.08	M	0
39-151-0017	1	0151	Canton	Stark	1330 DUEBER	2014	142	119	26.2	26.0	25.0	24.5	25.0	11.59	Y	0
39-151-0017	2	0151	Canton	Stark	1330 DUEBER	2014	142	61	25.3	24.4	23.5	21.3	24.4	11.22	Y	0
39-151-0020	1	0151	Canton	Stark	420 MARKET	2014	142	118	25.0	24.1	23.5	22.6	23.5	10.58	Y	0
39-153-0017	1	0012	Akron	Summit	80 BRITTAIN	2014	145	120	24.7	22.9	22.9	22.5	22.9	10.78	Y	0
39-153-0017	2	0012	Akron	Summit	80 BRITTAIN	2014	145	58	25.0	24.0	23.7	19.4	24.0	10.61	Y	0
39-153-0023	1	0012	Akron	Summit	660 W. EXCHANGE ST.	2014	145	118	23.8	23.4	21.8	21.1	21.8	9.98	Y	0
39-155-0005	1	0634	Warren	Trumbull	540 LAIRD AVE.	2014	142	59	22.0	20.8	20.0	18.9	20.8	11.03*	M	0
39-155-0005	4	0634	Warren	Trumbull	540 LAIRD AVE.	2014	142	56	20.8	20.6	18.5	18.4	20.6	9.41*	M	0

Note: The * indicates that the mean does not satisfy summary criteria.

PM-2.5 Continuous Monitor Data

Site ID	POC	Rep Org	City	County	Address	Year	Method	#OBS	1st Max	2nd Max	3rd Max	4th Max	Arith Mean		
39-001-0001	3	0880	West Union	Adams	210 N. Wilson Dr.	2014	753	8651	102.0	43.0	42.0	41.7	7.16	1-Hr	
39-001-0001	3	0880	West Union	Adams	210 N. Wilson Dr.	2014	753	359	19.8	19.1	16.1	16.1	7.08	24-Hr	
39-003-0009	3	0808		Allen	2850 Bible Rd.	2014	701	8543	48.7	48.4	43.2	36.1	6.25	1-Hr	
39-003-0009	3	0808		Allen	2850 Bible Rd.	2014	701	355	21.0	19.9	17.6	17.5	6.22	24-Hr	
39-017-0019	3	1259	Middletown	Butler	Oxford Rd.	2014	753	352	37.1	28.0	25.7	24.5	10.23	24-Hr	
39-017-0019	3	1259	Middletown	Butler	Oxford Rd.	2014	753	8503	116.5	99.6	95.3	87.4	10.32	1-Hr	
39-017-0020	3	1259	Middletown	Butler	Yankee Rd.	2014	753	365	41.2	31.9	31.0	28.7	13.25	24-Hr	
39-017-0020	3	1259	Middletown	Butler	Yankee Rd.	2014	753	8751	122.1	106.8	99.4	97.7	13.29	1-Hr	
39-023-0005	3	0287	Springfield	Clark	350 N. Fountain Ave.	2014	750	354	34.5	34.1	33.6	26.0	9.95	24-Hr	
39-023-0005	3	287	Springfield	Clark	350 N. Fountain Ave.	2014	750	8526	217.7	165.4	165.3	80.0	9.99	1-Hr	
39-025-0022	3	1259	Batavia	Clermont	2400 Clermont Center Dr.	2014	761	8200	75.2	74.4	69.6	60.1	11.88	1-Hr	
39-025-0022	3	1259	Batavia	Clermont	2400 Clermont Center Dr.	2014	761	342	30.5	29.0	29.0	27.5	11.84	24-Hr	
39-035-0060	3	0229	Cleveland	Cuyahoga	E. 14th & Orange	2014	170	244	34.9	32.5	32.4	31.0	12.64	24-Hr	*
39-035-0060	3	0229	Cleveland	Cuyahoga	E. 14th & Orange	2014	170	5810	80.3	77.4	72.5	70.4	12.70	1-Hr	*
39-049-0029	3	0805	New Albany	Franklin	7600 Fodor Rd.	2014	170	365	32.4	30.9	29.1	26.8	10.87	24-Hr	
39-049-0029	3	0805	New Albany	Franklin	7600 Fodor Rd.	2014	170	8723	59.9	53.8	52.8	50.2	10.93	1-Hr	
39-049-0034	3	0805	Columbus	Franklin	Korbel Ave.	2014	701	8377	96.6	60.6	57.6	55.3	7.39	1-Hr	
39-049-0034	3	0805	Columbus	Franklin	Korbel Ave.	2014	701	349	21.1	20.3	18.7	18.0	7.33	24-Hr	
39-057-0005	3	0287	Yellow Springs	Greene	314 Dayton St.	2014	750	8634	83.8	78.1	76.3	76.0	10.58	1-Hr	
39-057-0005	3	0287	Yellow Springs	Greene	314 Dayton St.	2014	750	358	40.3	36.5	32.9	28.8	10.51	24-Hr	
39-061-0006	3	1259	Cincinnati	Hamilton	11590 Grooms Rd.	2014	753	8542	99.5	94.5	91.4	91.3	10.25	1-Hr	
39-061-0006	3	1259	Cincinnati	Hamilton	11590 Grooms Rd.	2014	753	354	35.3	29.2	27.9	25.4	10.21	24-Hr	
39-061-0010	3	1259	Cleves	Hamilton	6950 Ripple Rd	2014	731	8631	75.2	73.2	72.5	65.4	13.99	1-Hr	
39-061-0010	3	1259	Cleves	Hamilton	6950 Ripple Rd	2014	731	360	37.1	36.3	34.1	34.1	13.95	24-Hr	
39-061-0040	3	1259	Cincinnati	Hamilton	250 Wm Howard Taft	2014	733	354	31.4	31.0	29.9	28.7	11.95	24-Hr	
39-061-0040	3	1259	Cincinnati	Hamilton	250 Wm Howard Taft	2014	733	8531	147.8	74.5	73.7	70.8	12.01	1-Hr	
39-081-0017	3	0809	Steubenville	Jefferson	618 Logan St.	2014	170	321	39.8	34.3	34.0	33.9	12.97	24-Hr	*
39-081-0017	3	0809	Steubenville	Jefferson	618 Logan St.	2014	170	7737	118.3	100.9	95.6	89.4	13.05	1-Hr	
39-085-0007	3	0595	Painesville	Lake	177 Main St.	2014	760	8675	59.0	58.0	53.0	52.0	9.88	1-Hr	
39-085-0007	3	0595	Painesville	Lake	177 Main St.	2014	760	360	38.6	25.2	23.8	21.2	9.82	24-Hr	
39-087-0012	3	0880	Ironton	Lawrence	450 Commerce Dr.	2014	750	8452	61.3	55.4	55.4	54.7	9.92	1-Hr	
39-087-0012	3	0880	Ironton	Lawrence	450 Commerce Dr.	2014	750	347	28.5	22.5	22.0	20.6	9.87	24-Hr	
39-093-3002	3	0807	Sheffield	Lorain	2180 Lake Breeze	2014	701	356	19.4	17.1	16.8	16.3	6.07	24-Hr	
39-093-3002	3	0807	Sheffield	Lorain	2180 Lake Breeze	2014	701	8562	56.7	30.7	30.0	29.1	6.10	1-Hr	
39-095-0024	3	0220	Toledo	Lucas	348 S. Erie	2014	701	362	49.3	28.1	25.1	25.0	10.29	24-Hr	
39-095-0024	3	0220	Toledo	Lucas	348 S. Erie	2014	701	8679	301.0	267.2	211.3	202.3	10.32	1-Hr	
39-099-0014	3	0634	Youngstown	Mahoning	345 Oakhill Ave.	2014	701	8631	117.0	100.6	84.5	76.2	10.22	1-Hr	
39-099-0014	3	0634	Youngstown	Mahoning	345 Oakhill Ave.	2014	701	359	30.2	23.7	21.4	20.5	10.17	24-Hr	

Hourly data not to be compared to the National Ambient Air Quality Standards

PM-2.5 Continuous Monitor Data

Site ID	POC	Rep Org	City	County	Address	Year	Method	#OBS	1st Max	2nd Max	3rd Max	4th Max	Arith Mean		
39-113-0032	3	0287	Dayton	Montgomery	215 East Third St.	2014	750	213	39.9	28.9	33.5	32.7	12.26	24-Hr	*
39-113-0032	3	0287	Dayton	Montgomery	215 East Third St.	2014	750	5269	82.4	81.9	73.4	68.6	12.32	1-Hr	
39-113-0038	3	0287	Dayton	Montgomery	444 West Third St.	2014	750	2190	59.1	48.8	42.4	42.1	9.95	1-Hr	
39-113-0038	3	0287	Dayton	Montgomery	444 West Third St.	2014	750	91	24.2	21.2	21.1	20.9	9.91	24-Hr	*
39-135-1001	3	0287	New Paris	Preble	National Trails	2014	750	337	43.0	35.6	29.1	28.6	9.81	24-Hr	*
39-135-1001	3	0287	New Paris	Preble	National Trails	2014	750	8126	73.4	71.8	70.7	69.1	9.83	1-Hr	
39-151-0020	3	0151	Canton	Stark	420 Market	2014	701	8610	30.1	25.0	24.3	23.3	7.40	1-Hr	
39-151-0020	3	0151	Canton	Stark	420 Market	2014	701	357	13.2	13.1	13.1	12.7	7.36	24-Hr	
39-153-0017	3	0012	Akron	Summit	80 Brittain	2014	733	88	31.2	27.0	26.3	24.0	12.20	24-Hr	*
39-153-0017	3	0012	Akron	Summit	80 Brittain	2014	733	2118	45.4	43.7	39.8	38.9	12.24	1-Hr	
39-155-0005	3	0634	Warren	Trumbull	540 Laird Ave.	2014	701	343	36.1	24.2	22	20.8	10.34	24-Hr	
39-155-0005	3	0634	Warren	Trumbull	540 Laird Ave.	2014	701	8211	178.8	177.2	130.8	87.1	10.40	1-Hr	
39-165-0007	3	1259	Lebanon	Warren	416 Southeast S.	2014	731	8015	82.3	79.8	76.8	74.7	12.99	1-Hr	
39-165-0007	3	1259	Lebanon	Warren	416 Southeast S.	2014	731	331	37.1	34.7	34.4	33.3	12.99	24-Hr	

Note: The * indicates that the mean does not satisfy the summary criteria

Hourly data not to be compared to the National Ambient Air Quality Standards

PM-2.5 Speciation Monitor Data

Site ID	POC	PQAO	City	County	Address	Year	Method	#OBS	1st Max	2nd Max	3rd Max	4th Max	Arith Mean
39-035-0038	6	0229	Cleveland	Cuyahoga	2547 St. Tikhon	2014	810	40	33.1	32.1	28.6	25.5	13.07 *
39-035-0060	5	0229	Cleveland	Cuyahoga	E. 14th & Orange	2014	810	72	30.4	26.5	24.2	23.9	13.68 *
39-035-0060	6	0229	Cleveland	Cuyahoga	E. 14th & Orange	2014	810	39	98.6	43.4	35.8	31.6	16.87 *
39-049-0081	6	0805	Columbus	Franklin	5750 Maple Canyon	2014	810	45	35.8	24.2	20.9	19.5	10.94 *
39-061-0040	5	1259	Cincinnati	Hamilton	250 Wm Howard Taft	2014	810	90	29.0	26.7	23.0	22.9	11.62 *
39-081-0017	5	0809	Steubenville	Jefferson	618 Logan St.	2014	810	39	55.4	44.4	39.7	29.6	14.02 *
39-087-0012	5	0880	Ironton	Lawrence	450 Commerce Dr.	2014	810	45	36.2	32.6	29.3	23.0	12.02 *
39-093-3002	5	0807	Sheffield	Lorain	2180 Lake Breeze	2014	810	44	22.2	20.9	19.4	18.8	9.86 *
39-095-0026	5	0220	Toledo	Lucas	4208 Airport Highway	2014	810	40	23.2	22.9	22.3	19.8	10.37 *
39-099-0014	5	0634	Youngstown	Mahoning	345 Oakhill Ave.	2014	810	33	40.6	30.1	29.6	24.0	12.63 *
39-113-0032	5	0287	Dayton	Montgomery	215 East Third St.	2014	810	39	29.0	24.7	23.8	21.1	11.23 *
39-135-1001	5	0287	New Paris	Preble	6940 Oxford Gettysburg Rd.	2014	810	90	33.4	26.8	26.7	21.6	10.66 *
39-151-0017	5	0151	Canton	Stark	1330 Dueber	2014	810	44	25.6	24.3	23.9	21.8	12.21 *
39-153-0023	5	0012	Akron	Summit	660 W. Exchange St.	2014	810	37	38.0	34.6	23.9	21.0	12.02 *

Note: The * indicates that the mean does not satisfy the summary criteria

24-Hour 98th Percentile Averages

Site	County	Year 2012	2013	2014	Average '12-'14
39-003-0009	Allen	20.7	19.0	27.7	22
39-009-0003	Athens	15.6	15.6	18.0	16
39-017-0003	Butler	20.2	25.8	24.7	24
39-017-0016		23.2	23.3	23.6	23
39-017-0019		22.8	25.5	23.9	24
39-017-0020		27.5	26.4	27.8	27
39-023-0005	Clark	22.3	24.4	24.5	24
39-035-0034	Cuyahoga	19.5	23.7	23.2	22
39-035-0038		28.8	26.4	26.5	27
39-035-0045		24.5	23.7	25.7	25
39-035-0060		33.5	26.0	31.0	30
39-035-0065		23.3	23.1	26.2	24
39-035-1002		19.9	22.5	22.7	22
39-049-0024	Franklin	22.0	23.8	21.0	22
39-049-0025		22.0	24.3	31.5	26
39-049-0081		20.7	23.6	23.8	23
39-057-0005	Greene	20.2	19.0	24.7	21
39-061-0006	Hamilton	21.7	23.2	22.4	22
39-061-0010		21.7	22.4	24.3	23
39-061-0014		25.2	24.1	23.2	24
39-061-0040		20.0	24.5	23.6	23
39-061-0042		23.3	26.4	24.8	25
39-061-0048				27.8	
39-081-0017	Jefferson	22.7	25.9	26.0	25
39-081-0021			12.2	22.7	
39-081-1001		21.0	19.7		
39-085-0007	Lake	19.4	18.8	18.1	19
39-087-0012	Lawrence	21.3	18.5	15.3	18
39-093-3002		22.0	20.9	22.9	22
39-095-0024	Lucas	21.3	21.3	24.8	22
39-095-0026		21.5	21.6	28.6	24
39-095-0028		24.7	20.1	24.4	23
39-099-0005	Mahoning	23.2	22.9	22.1	23
39-099-0014		20.7	21.9	22.1	22
39-103-0004	Medina	19.1	22.5	19.8	20
39-113-0032	Montgomery	21.9	22.7	30.8	25
39-133-0002	Portage	18.2	23.3	19.3	20
39-135-1001	Preble	19.5	21.0	25.4	22
39-145-0013	Scioto	18.8	18.2	16.2	18
39-151-0017	Stark	25.4	27.8	25.0	26
39-151-0020		22.7	24.3	23.5	24
39-153-0017	Summit	20.3	24.9	22.9	23
39-153-0023		19.8	24.0	21.8	22
39-155-0005	Trumbull	19.3	24.5	20.8	22

Insufficient data
Not used in comparison with the NAAQS

PM-2.5 Average of Annual Averages

Site	County	Year 2012	2013	2014	Average '12-'14
39-003-0009	Allen	10.0	9.9	9.5	9.8
39-009-0003	Athens	8.7	8.1	7.8	8.2
39-017-0003	Butler	11.2	11.1	11.3	11.2
39-017-0016		10.8	10.7	10.7	10.7
39-017-0019		11.4	11.0	11.2	11.2
39-017-0020		13.9	13.3	12.9	13.4
39-023-0005	Clark	10.4	10.1	10.0	10.2
39-035-0034	Cuyahoga	9.3	9.5	9.6	9.5
39-035-0038		12.3	12.2	12.3	12.3
39-035-0045		11.4	11.2	11.4	11.3
39-035-0060		12.8	12.2	12.1	12.4
39-035-0065		12.3	11.4	12.5	12.0
39-035-1002		9.7	9.2	9.7	9.5
39-049-0024	Franklin	10.7	10.1	10.1	10.3
39-049-0025		10.7	10.2	11.5	10.8
39-049-0081		10.1	9.8	10.3	10.1
39-057-0005	Greene	9.6	9.7	9.8	9.7
39-061-0006	Hamilton	10.3	10.1	10.3	10.2
39-061-0010		10.6	10.5	10.4	10.5
39-061-0014		12.1	11.6	11.3	11.7
39-061-0040		10.5	11.5	10.4	10.5
39-061-0042		11.7	11.5	11.2	11.5
39-061-0048				12.9	
39-081-0017	Jefferson	11.3	10.9	10.7	10.9
39-081-0021			7.6	10.6	
39-081-1001		10.0	11.0		
39-085-0007	Lake	9.0	8.6	8.7	8.7
39-087-0012	Lawrence	10.9	9.1	7.5	9.2
39-093-3002	Lorain	9.5	8.8	9.1	9.1
39-095-0024	Lucas	10.0	9.6	10.5	10.0
39-095-0026		9.9	9.6	10.3	10.0
39-095-0028		10.0	9.5	10.6	10.1
39-099-0005	Mahoning	10.6	10.9	9.9	10.5
39-099-0014		10.1	9.7	9.8	9.9
39-103-0004	Medina	9.3	9.1	8.6	9.0
39-113-0031	Montgomery				
39-113-0032		10.7	10.3	11.1	10.7
39-133-0002	Portage	9.3	8.9	9.0	9.1
39-135-1001	Preble	9.3	9.7	9.2	9.4
39-145-0013	Scioto	9.8	9.0	8.2	9.0
39-151-0017	Stark	11.9	11.6	11.7	11.7
39-151-0020		10.4	10.7	10.6	10.6
39-153-0017	Summit	10.8	10.4	10.8	10.7
39-153-0023		10.0	9.9	10.0	10.0
39-155-0005	Trumbull	9.3	9.8	10.3	9.8

Insufficient data
Not used in comparison with the NAAQS

Sulfur Dioxide (SO_2)

Sulfur dioxide is a colorless gas formed through the combination of sulfur and oxygen during combustion. The major sources of SO_2 are the burning of sulfur-containing fossil fuels (mainly coal), with lesser amounts caused by industrial processes such as smelting. Over 40% of the SO_2 found in the ambient air is the result of human activities.

The control of SO_2 emissions from these sources is accomplished primarily by burning coal or oil with a relatively low sulfur content. Newer boilers may be equipped with flue gas desulfurization (FGD) systems that use a caustic solution to scrub SO_2 from the exhaust gas stream.

Sulfur dioxide is harmful because it can be converted to sulfuric acid (H_2SO_4) when it comes in contact with moisture, either in the atmosphere, on plants, materials, or in the lungs. Sulfur Dioxide can also be converted to a sulfate (SO_4^{2-}) which as a particulate (aerosol) helps form acid rain and can also be a lung irritant.

The presence of increased levels of SO_2 in the atmosphere has been associated with a higher incidence of respiratory diseases, higher death rates, and property damage.

Sampling Methods

Sulfur dioxide is measured continuously by instruments using pulsed fluorescent techniques.

Fluorescent analyzers irradiate an ambient air sample with ultraviolet light. Sulfur dioxide gas molecules absorb a portion of this energy, and then re-emit the energy at a characteristic wavelength of light. This light energy emitted by SO_2 molecules is sensed by a photomultiplier tube and converted to an electronic signal proportional to the concentration of SO_2 present.

All concentrations for SO_2 are given in parts per million (ppm). Reports for 1995 and earlier used the units 'micrograms per cubic meter' (μg/m^3) to report data. The primary units to report data were changed by U.S. EPA in May of 1996.

National Ambient Air Quality Standards

On June 22, 2010 the U.S. EPA revised the NAAQS for SO_2 by adding a 1-Hour standard which is the three year average of the 99th percentile concentration in each year at each monitoring site. The level of the standard is 75 ppb which is not to be exceeded.

The older NAAQS: Annual, 24-Hour and 3-Hour were retained.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Sulfur dioxide (42401) | Ohio | Parts per billion (008)

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	OBS	COMP QTRS	1ST MAX 1-HR	2ND MAX 1-HR	99TH PCTL 1-HR	1ST MAX 24-HR	2ND MAX 24-HR	Days >24HR STD	ARITH MEAN AN-STD	CERT and EVAL	EDT
39-001-0001	1	0880	West Union	Adams	210 N. WILSON DR.	2014	060	8323	4	31.0	31.0	24.0	7.0	6.0	0	1.09	M	0
39-003-0009	1	0808	Lima	Allen	2850 BIBLE ROAD	2014	100	8360	4	14.0	13.0	13.0	6.8	5.4	0	.99	M	0
39-007-1001	1	0807	Conneaut	Ashtabula	770 LAKE RD.	2014	060	8194	4	31.0	17.0	17.0	5.9	5.5	0	1.88	M	0
39-013-3002	2	0809	Shadyside	Belmont	EAST 40 ST.	2014	000	8376	4	61.0	50.0	33.0	12.7	9.2	0	2.09	M	0
39-017-0019	1	1259	Middletown	Butler	1300 OXFORD STATE ROAD	2014	100	8639	4	59.0	34.0	27.0	9.0	8.8	0	1.55	S	0
39-017-0020	1	1259	Middletown	Butler	3350 YANKEE ROAD	2014	100	8684	4	88.0	48.0	30.0	27.2	10.4	0	1.14	S	0
39-017-0021	1	1259	Middletown	Butler	1491 MADE INDUSTRIAL DR.	2014	100	8504	4	55.0	44.0	32.0	11.1	8.4	0	1.68		0
39-023-0003	1	0287	Enon	Clark	5400 SPANGLER	2014	060	8697	4	41.0	25.0	19.0	7.8	7.3	0	.64	S	0
39-029-0019	1	0807	East Liverpool	Columbiana	1250 GEORGE, COLUMBIANA PORT AUTHORITY	2014	060	8388	4	42.0	33.0	23.0	8.7	7.6	0	1.74	M	0
39-035-0038	2	0229	Cleveland	Cuyahoga	2547 ST TIKHON	2014	060	8457	4	105.0	85.0	65.0	23.3	21.6	0	3.51	M	0
39-035-0045	1	0229	Cleveland	Cuyahoga	4950 BROADWAY AVE.	2014	060	8619	4	30.0	30.0	17.0	4.3	3.8	0	.46	M	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	060	8229	4	71.0	56.0	53.0	16.9	14.7	0	2.29	M	0
39-035-0060	2	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	560	8149	4	59.4	54.8	50.4	16.1	16.0	0	2.53	M	0
39-035-0065	1	0229	Newburgh Heights	Cuyahoga	4600 HARVARD AVE.	2014	100	8089	4	125.0	98.0	80.0	19.8	18.2	0	2.35	M	0
39-049-0034	1	0805	Columbus	Franklin	KORBEL AVE.	2014	060	8346	4	63.0	23.0	17.0	8.5	5.6	0	.46	M	0

Sulfur dioxide (42401) Ohio Parts per billion (008)

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	OBS	COMP QTRS	1ST MAX 1-HR	2ND MAX 1-HR	99TH PCTL 1-HR	1ST MAX 24-HR	2ND MAX 24-HR	Days >24HR STD	ARITH MEAN AN-STD	CERT and EVAL	EDT
39-061-0010	2	1259	Cleves	Hamilton	6950 RIPPLE RD.	2014	100	8658	4	99.0	96.0	71.0	16.7	15.7	0	2.07	S	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	592	7865	4	123.8	105.9	67.2	17.4	17.2	0	1.98	S	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	100	8169	4	93.0	60.0	30.0	18.1	8.3	0	1.24	M	0
39-081-0018	1	1373	Not in a city	Jefferson	3487 COUNTY RD. 19	2014	060	8361	4	57.0	50.0	38.0	11.1	10.5	0	4.11		0
39-081-0020	1	1373	Not in a city	Jefferson	1469 3rd ST.	2014	060	8333	4	30.0	27.0	24.0	8.1	7.9	0	2.30		0
39-085-0003	1	0595	Eastlake	Lake	36010 LAKESHORE	2014	100	8726	4	95.0	74.0	33.0	18.1	8.9	0	1.76	M	0
39-085-0007	1	0595	Painesville	Lake	177 MAIN STREET	2014	100	8684	4	201.0	117.0	72.0	17.8	15.0	0	2.87	M	0
39-087-0012	1	0880	Ironton	Lawrence	450 Commerce Drive	2014	060	8317	4	27.0	19.0	17.0	6.6	6.1	0	.60	M	0
39-095-0008	2	0220	Toledo	Lucas	3040 YORK ST.	2014	060	5648	1	26.0	20.0	17.0	6.9	6.2	0	1.56*	S	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL	2014	061	8267	4	48.0	47.0	44.0	14.3	12.9	0	1.25	M	0
39-105-0003	1	0809	Pomeroy	Meigs	117 MEMORIAL DRIVE	2014	060	8358	4	85.0	47.0	32.0	10.4	7.4	0	1.36	M	0
39-115-0004	1	0809	Not in a city	Morgan	S.R. 83	2014	100	8375	4	197.0	186.0	148.0	25.6	24.9	0	3.14	M	0
39-135-1001	1	0287	New Paris	Preble	6940 OXFORD GETTYSBURG RD.	2014	000	8172	4	32.7	32.7	25.6	9.8	6.5	0	1.00	S	0
39-145-0013	1	0880	Portsmouth	Scioto	4862 GALLIA	2014	060	8287	4	23.0	21.0	8.0	6.9	5.3	0	.70	M	0
39-145-0020	1	1299	Not in a city	Scioto	2840 BACK RD.	2014	060	8636	4	70.1	57.8	44.9	26.0	16.1	0	2.38	S	0
39-145-0022	1	1299	Franklin Furnace	Scioto	1740 GALLIA PIKE	2014	060	8682	4	42.2	34.8	28.5	8.4	7.8	0	2.60	S	0
39-153-0017	1	0012	Akron	Summit	80 BRITTAIN	2014	100	8333	4	42.0	23.0	21.0	8.2	7.2	0	1.62	S	0

Note: The * indicates that the mean does not satisfy summary criteria.

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Sulfur dioxide (42401) Ohio Parts per billion (008)

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	OBS	COMP QTRS	1ST MAX 1-HR	2ND MAX 1-HR	99TH PCTL 1-HR	1ST MAX 24-HR	2ND MAX 24-HR	Days >24HR STD	ARITH MEAN AN-STD	CERT and EVAL	EDT
39-153-0022	1	0012	Akron	Summit	177 S. BROADWAY	2014	100	6915	3	54.0	51.0	43.0	23.0	19.1	0	2.15*	S	0

Note: The * indicates that the mean does not satisfy summary criteria.

Nitrogen Dioxide (NO_2)

Nitrogen dioxide is a toxic gas formed in high temperature combustion processes, when nitrogen in the air is oxidized to nitric oxide (NO) or nitrogen dioxide (NO_2). The major sources of NO_2 are high temperature fuel combustion, motor vehicles, and certain chemical processes.

Nitrogen dioxide has been associated with a variety of respiratory diseases through its ability to reduce cell immunity or resistance to bacteria and viruses. Nitrogen dioxide is also harmful due to its involvement in the production of photochemical oxidants such as ozone (O_3).

Sampling Methods

Continuous monitoring of nitrogen dioxide is based on a chemiluminescent reaction between NO and O_3. When these two gases react, light energy at a specific wavelength is produced. In the monitor, ambient air is drawn along two paths. In the first path, the air is reacted directly with ozone, and the light energy produced is proportional to the amount of nitric oxide in the air. In the second path, the air is reacted with ozone after it passes through a catalytic reduction surface. The reduction surface converts NO_2 to NO and the light energy produced is a measure of the total oxides of nitrogen in the air sample. The electronic difference of these two signals yields the concentration of nitrogen dioxide.

All concentrations for NO_2 are given in parts per billion (ppb).

National Ambient Air Quality Standards

On February 9, 2010 the U.S. EPA revised the NAAQS for NO_2 by adding a 1-Hour standard which is the three year average of the annual 98th percentile values. The level of the standard is 100 ppb which is not to be exceeded.

The older annual NAAQS of 53 ppb was retained.

Nitrogen dioxide (NO2) (42602) Ohio Parts per billion (008)

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	COMP QTRS	1ST MAX 1-HR	2ND MAX 1-HR	98TH PCTL	OBS	PCT COMP	ARITH MEAN	CERT and EVAL	EDT
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	074	4	66.0	58.0	48.0	8106	93	12.28	M	0
39-035-0073	1	0229	Warrensville Heights	Cuyahoga	25609 EMERY ROAD	2014	099	1	45.0	39.0	36.0	3524	40	9.87*		0
39-049-0037	1	0805	Columbus	Franklin	1777 E. BROAD	2014	099	4	63.0	63.0	51.0	8355	95	9.62	M	0
39-049-0038	1	0805	Columbus	Franklin	7560 SMOKEY ROW RD.	2014	099	4	53.0	53.0	47.0	8343	95	12.39	M	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	099	4	50.0	49.0	45.0	8360	95	11.27	S	0
39-061-0048	1	1259	Cincinnati	Hamilton	3428 COLERAIN AVE.	2014	099	4	68.0	68.0	59.0	8546	98	23.41		0

Note: The * indicates that the mean does not satisfy summary criteria.

Carbon Monoxide (CO)

Carbon monoxide, a colorless and odorless gas, is the most abundant and widely distributed pollutant found in the lower atmosphere. It is produced by the incomplete combustion of carbon containing fuels, primarily in the internal combustion engine. About 95 to 98% of urban carbon monoxide comes from manmade sources, with transportation vehicles ranking as the largest source.

The main effect of CO on human health involves its tendency to reduce the oxygen carrying capacity of the blood by binding chemically to hemoglobin, the substance that carries oxygen to the cells. This may lead to short-term impairment of mental processes. Exposure to concentrations as low as 10-15 ppm for several hours has affected time interval discrimination in test subjects, while exposures of 31 ppm under similar conditions have temporarily altered the function of the brain.

Sampling Method

Carbon monoxide is monitored continuously by analyzers that operate on the infrared absorption principle. Ambient air is drawn into a sample chamber and a beam of infrared light is passed through it. CO absorbs infrared radiation, and any decrease in the intensity of the beam is due to the presence of CO molecules. This decrease is directly related to the concentration of CO in the ambient air. A special detector measures the difference in the radiation between this beam and a duplicate beam passing through a reference chamber with no CO present. This difference in intensity is electronically translated into a reading of the CO present in the ambient air, measured in parts per million.

National Ambient Air Quality Standard

The NAAQS for carbon monoxide are a 1-Hour concentration of 35 ppm which is not to be exceeded more than once per year and an 8-Hour concentration of 9 ppm which is not to be exceeded more than once per year. These standards were reaffirmed on August 31, 2011.

Carbon monoxide (42101) Ohio Parts per million (007)

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	# OBS	1ST MAX 1-HR	2ND MAX 1-HR	OBS >1HR STD	1ST MAX 8-HR	2ND MAX 8-HR	OBS >8HR STD	CERT and EVAL	EDT
39-035-0051	1	0229	Cleveland	Cuyahoga	1301 E. 9TH ST.	2014	054	8666	7.2	7.1	0	4.7	3.7	0	M	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	554	8148	3.400	2.434	0	1.3	1.1	0	M	0
39-035-0073	1	0229	Warrensville Heights	Cuyahoga	25609 EMERY ROAD	2014	093	1740	.8	.7	0	.4	.4	0		0
39-049-0005	1	0805	Columbus	Franklin	1585 MORSE RD.	2014	093	8642	2.0	1.8	0	1.4	1.3	0	M	0
39-049-0038	1	0805	Columbus	Franklin	7560 SMOKEY ROW RD.	2014	093	8459	1.5	1.4	0	.9	.8	0	M	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	588	8235	1.310	1.160	0	.8	.8	0	S	0
39-061-0048	1	1259	Cincinnati	Hamilton	3428 COLERAIN AVE.	2014	593	3659	1.510	1.420	0	1.3	1.1	0		0
39-085-0006	1	0595	Mentor	Lake	8443 MENTOR AVE.	2014	051	8659	1.4	1.3	0	.9	.9	0	M	0
39-113-0034	1	0287	Dayton	Montgomery	117 SOUTH MAIN ST.	2014	054	8620	1.6	1.4	0	1.1	1.0	0	S	0
39-135-1001	1	0287	New Paris	Preble	6940 OXFORD GETTYSBURG RD.	2014	554	8229	.500	.480	0	.4	.4	0	S	0
39-151-0020	1	0151	Canton	Stark	420 MARKET	2014	054	8638	1.6	1.5	0	1.2	1.1	0	S	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON AVE.	2014	093	8722	1.5	1.4	0	.8	.8	0	S	0
39-153-0022	1	0012	Akron	Summit	177 S. BROADWAY	2014	093	6909	1.3	1.2	0	.7	.7	0	S	0

Ozone (O_3)

Ozone differs from other pollutants in that it is not directly emitted into the atmosphere from sources. Rather, it is created photochemically in the lower atmosphere by the reaction of volatile organic compounds and oxides of nitrogen in the presence of sunlight. For this reason, it is referred to as a secondary pollutant. Ozone is the predominant oxidant component of photochemical smog.

In urban areas, emissions of nitrogen oxides and volatile organic compounds lead to the formation of ozone and other photochemical oxidants in the lower atmosphere. Nitrogen oxides, important in triggering the sequence of photochemical reactions, are emitted primarily from combustion sources such as the internal combustion engine, electric power generation units, and gas and oil-fired space heaters. Volatile organic compounds, important in sustaining the reactions, are emitted in the exhausts of gasoline, diesel and jet engines, through the evaporation of gasoline and solvents such as dry-cleaning fluids, and from industrial and non-industrial surface coating operations such as paint booths, from open burning, and other combustion sources.

Although ozone is beneficial in the upper atmosphere, where it screens out ultraviolet rays from the sun, it is harmful in the lower atmosphere. Due to the role of temperature and sunlight in its formation, the largest concentrations occur during the summer months. Ozone irritates mucous membranes of the nose and throat, causes eye irritation, reduces resistance to respiratory infections, damages plants and contributes to the deterioration of materials. Individuals with asthma or disease of the heart or circulatory system experience symptoms when concentrations are above the air quality standards.

Prior to July 1997 there was a one hour standard of 0.12 ppm with more than three exceedances being a violation of the standard. The one hour standard was revoked in 2006.

The standard from July 1997 to May 27, 2008 was an eight hour average of 0.08 ppm with the fourth high eight hour average averaged in each year over three consecutive years.

The current standard is a three year average of the fourth highest eight hour averages at each monitoring site. If that three year average is greater than 0.075 ppm (76 ppb or greater) a violation of the standard has occurred

In 2001 The United States Supreme Court found U.S. EPA's previously proposed implementation plan for ozone unlawful and further held that, in the setting of a standard for ozone pursuant to Section 109 of the Clean Air Act U.S. EPA must set air quality standards at the level that is "requisite"-no higher or lower than is necessary-to protect the public health with an adequate margin of safety. The Supreme Court then sent the case back to the D.C. Circuit Court of Appeals to review U.S. EPA's subsequent actions. On March 26, 2002, that court upheld U.S. EPA's revision of the ozone NAAQS, which had been published in the Federal Register by U.S. EPA as a proposal on November 14, 2001.

This report contains a printout of the one hour data and eight hour average data, as in previous reports, and printouts of the three year average of the fourth high eight hour averages calculated for each site in Ohio for the years 2012 through 2014 and the four highest eight hour averages during 2014. A three year average was not calculated if one or more years had insufficient data.

Sampling Methods

Ozone is monitored continuously during our ozone season, April 1st through October 31st using analyzers that operate on ultraviolet absorption techniques.

Ozone absorbs ultraviolet light. Analyzers designed to measure ozone by ultraviolet photometry use this property. An air sample is drawn into the analyzer and irradiated with an ultraviolet light of 253.7 nanometers wavelength. The amount of light absorbed is related to the amount of ozone present. This is the type of monitor used by Ohio EPA and our Local Air Agencies.

All concentrations for ozone are given in parts per million (ppm).

On the following pages are tables of ozone sites with the:

- Highest through fourth highest 1-Hour ozone values
- Highest through fourth highest 8-Hour ozone values
- Three year average of fourth highest 8-Hour ozone values (see NAAQS TABLE 1)
- First day in each year from 1992 that recorded an exceedance of the 1-Hour or 8-Hour standard with the number of sites and the total number of exceedances
- Last day in the year upon which an exceedance of the 1-Hour or 8-Hour standard occurred with the number of sites and values listed

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) Ohio Parts per million (007)

1-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 1-HR	2ND MAX 1-HR	3RD MAX 1-HR	4TH MAX 1-HR	DAY MAX> STD	EST DAYS> STD	MISS DAYS< STD	CERT and EVAL	EDT
39-003-0009	1	0808	Lima	Allen	2850 BIBLE ROAD	2014	047	214	214	.076	.073	.071	.071	0	0.0	0	Y	0
39-007-1001	1	0807	Conneaut	Ashtabula	770 LAKE RD.	2014	047	213	214	.082	.082	.082	.079	0	0.0	1	Y	0
39-017-0004	1	1259	Hamilton	Butler	SCHULER AND BENDER	2014	087	213	214	.089	.081	.077	.077	0	0.0	1	Y	0
39-017-0018	1	1259	Middletown	Butler	1701 Runway Dr.	2014	087	213	214	.088	.084	.078	.078	0	0.0	1	Y	0
39-017-9991	1	1344	Not in a city	Butler	Ecology Research Center, Miami University, Oxford, Ohio 45056	2014	047	203	214	.078	.077	.077	.076	0	0.0	7	S	0
39-023-0001	1	0287	Springfield	Clark	5171 URBANA	2014	047	214	214	.076	.075	.074	.073	0	0.0	0	Y	0
39-023-0003	1	0287	Enon	Clark	5400 SPANGLER	2014	047	214	214	.075	.072	.072	.071	0	0.0	0	Y	0
39-025-0022	1	1259	Batavia	Clermont	2400 CLERMONT CENTER DR.	2014	087	211	214	.079	.079	.078	.077	0	0.0	3	Y	0
39-027-1002	1	0810	Not in a city	Clinton	62 LAUREL DR.	2014	047	212	214	.089	.085	.075	.074	0	0.0	2	Y	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152 ST.	2014	087	212	214	.082	.082	.076	.075	0	0.0	0	Y	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	087	212	214	.091	.076	.075	.075	0	0.0	0		0
39-035-0064	1	0229	Berea	Cuyahoga	390 FAIR ST.	2014	087	210	214	.068	.068	.065	.064	0	0.0	2	Y	0
39-035-5002	1	0229	Mayfield	Cuyahoga	6116 WILSON MILLS	2014	019	213	214	.078	.070	.065	.065	0	0.0	1	Y	0
39-041-0002	1	0805	Delaware	Delaware	359 MAIN RD.	2014	047	214	214	.077	.077	.076	.071	0	0.0	0	Y	0
39-047-9991	1	1344	Not in a city	Fayette	Deer Creek State Park, Mt Sterling, OH 43143	2014	047	203	214	.084	.077	.077	.075	0	0.0	1	S	0
39-049-0029	1	0805	New Albany	Franklin	7600 FODOR RD.	2014	047	214	214	.078	.078	.078	.077	0	0.0	0	Y	0
39-049-0037	1	0805	Columbus	Franklin	1777 E. BROAD	2014	047	213	214	.085	.084	.077	.075	0	0.0	1	Y	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CANYON	2014	047	214	214	.085	.081	.079	.074	0	0.0	0	Y	0

Ozone (44201) Ohio Parts per million (007)

1-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 1-HR	2ND MAX 1-HR	3RD MAX 1-HR	4TH MAX 1-HR	DAY MAX> STD	EST DAYS> STD	MISS DAYS< STD	CERT and EVAL	EDT
39-055-0004	1	0595	Not in a city	Geauga	13000 AUBURN	2014	087	214	214	.082	.074	.071	.070	0	0.0	0	Y	0
39-057-0006	1	0287	Xenia	Greene	541 LEDBETTER RD.,	2014	047	214	214	.077	.077	.074	.073	0	0.0	0	Y	0
39-061-0006	1	1259	Blue Ash	Hamilton	11590 GROOMS RD	2014	087	208	214	.091	.085	.085	.078	0	0.0	3	Y	0
39-061-0010	1	1259	Cleves	Hamilton	6950 RIPPLE RD.	2014	087	213	214	.085	.083	.082	.078	0	0.0	1	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	087	213	214	.085	.081	.081	.076	0	0.0	1	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	047	212	214	.076	.075	.075	.074	0	0.0	2	Y	0
39-083-0002	1	0805	Centerburg	Knox	WATER PLT, SR. 314	2014	047	213	214	.079	.078	.075	.074	0	0.0	1	Y	0
39-085-0003	1	0595	Eastlake	Lake	36010 LAKESHORE	2014	087	214	214	.085	.084	.083	.083	0	0.0	0	Y	0
39-085-0007	1	0595	Painesville	Lake	177 MAIN STREET	2014	087	214	214	.080	.071	.071	.069	0	0.0	0	Y	0
39-087-0011	1	0880	Not in a city	Lawrence	S.R. 141, WILGUS	2014	047	209	214	.079	.076	.071	.070	0	0.0	5	Y	0
39-087-0012	1	0880	Ironton	Lawrence	450 Commerce Drive	2014	047	210	214	.076	.072	.071	.070	0	0.0	4	Y	0
39-089-0005	1	0805	Heath (Fourmile Lock)	Licking	300 LICKING VIEW DR.	2014	047	214	214	.081	.074	.074	.071	0	0.0	0	Y	0
39-093-0018	1	0807	Sheffield	Lorain	4706 DETROIT RD.	2014	047	212	214	.073	.072	.070	.070	0	0.0	2	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE	2014	047	167	214	.083	.079	.078	.078	0	0.0	1	Y	0
39-095-0027	1	0220	Waterville	Lucas	200 SOUTH RIVER RD.	2014	047	214	214	.074	.072	.070	.070	0	0.0	0	Y	0
39-095-0034	1	0220	Not in a city	Lucas	306 N. YONDOTA	2014	047	200	214	.080	.078	.072	.071	0	0.0	12	Y	0
39-097-0007	1	0805	Not in a city	Madison	940 SR 38 SW	2014	047	204	214	.082	.076	.075	.074	0	0.0	1	Y	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL	2014	087	206	214	.080	.073	.073	.071	0	0.0	1	N	0
39-103-0004	1	0012	Not in a city	Medina	BALLASH ROAD	2014	087	213	214	.075	.073	.072	.071	0	0.0	1	Y	0
39-109-0005	1	0287	Casstown	Miami	3825 NORTH S. R. 589	2014	047	214	214	.074	.074	.074	.072	0	0.0	0	Y	0
39-113-0037	1	0287	Dayton	Montgomery	1401 Harshman Road	2014	047	214	214	.079	.077	.075	.074	0	0.0	0	Y	0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) | Ohio | Parts per million (007)

1-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 1-HR	2ND MAX 1-HR	3RD MAX 1-HR	4TH MAX 1-HR	DAY MAX> STD	EST DAYS> STD	MISS DAYS< STD	CERT and EVAL	EDT
39-121-9991	1	1344	Not in a city	Noble	58163 St. Johns Rd, Quaker City, OH 43773	2014	047	207	214	.077	.074	.073	.073	0	0.0	7	S	0
39-133-1001	1	0012	Not in a city	Portage	1570 RAVENNA RD.	2014	000	212	214	.070	.070	.069	.069	0	0.0	0	Y	0
39-135-1001	1	0287	New Paris	Preble	6940 OXFORD GETTYSBURG RD.	2014	047	214	214	.075	.075	.071	.070	0	0.0	0	Y	0
39-151-0016	1	0151	Canton	Stark	515 25TH. ST.	2014	047	209	214	.078	.077	.071	.071	0	0.0	5	Y	0
39-151-0022	1	0151	Brewster	Stark	45 S. WABASH AVENUE, S.R 93	2014	047	209	214	.076	.071	.067	.067	0	0.0	5	Y	0
39-151-4005	1	0151	Alliance	Stark	1175 WEST VINE	2014	047	214	214	.073	.071	.071	.067	0	0.0	0	Y	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON AVE.	2014	087	214	214	.072	.065	.064	.063	0	0.0	0	Y	0
39-155-0009	1	0634	Not in a city	Trumbull	6425 KINSMAN RD. NE	2014	087	214	214	.084	.073	.072	.070	0	0.0	0	Y	0
39-155-0011	1	0634	Not in a city	Trumbull	842 YOUNGSTOWN-KINGSVILLE RD.	2014	087	198	214	.077	.074	.071	.070	0	0.0	0	Y	0
39-165-0007	1	1259	Lebanon	Warren	416 SOUTHEAST ST.	2014	087	214	214	.089	.085	.083	.082	0	0.0	0	Y	0
39-167-0004	1	0809	Marietta	Washington	2000 4TH STREET	2014	047	200	214	.083	.081	.073	.071	0	0.0	0	Y	0
39-173-0003	1	0808	Bowling Green	Wood	347 N DUNBRIDGE	2014	047	213	214	.074	.074	.070	.069	0	0.0	1	Y	0

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)

Ozone (44201) | Ohio | Parts per million (007)

8-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX> STD	CERT and EVAL	EDT
39-003-0009	1	0808	Lima	Allen	2850 BIBLE ROAD	2014	047	100	214	214	.073	.068	.067	.066	0	Y	0
39-007-1001	1	0807	Conneaut	Ashtabula	770 LAKE RD.	2014	047	100	213	214	.076	.073	.070	.069	1	Y	0
39-017-0004	1	1259	Hamilton	Butler	SCHULER AND BENDER	2014	087	99	212	214	.080	.072	.071	.070	1	Y	0
39-017-0018	1	1259	Middletown	Butler	1701 Runway Dr.	2014	087	99	212	214	.075	.073	.071	.069	0	Y	0
39-017-9991	1	1344	Not in a city	Butler	Ecology Research Center, Miami University, Oxford, Ohio 45056	2014	047	94	201	214	.074	.072	.071	.069	0	S	0
39-023-0001	1	0287	Springfield	Clark	5171 URBANA	2014	047	100	214	214	.072	.068	.066	.065	0	Y	0
39-023-0003	1	0287	Enon	Clark	5400 SPANGLER	2014	047	100	214	214	.071	.068	.068	.064	0	Y	0
39-025-0022	1	1259	Batavia	Clermont	2400 CLERMONT CENTER DR.	2014	087	98	210	214	.070	.069	.068	.068	0	Y	0
39-027-1002	1	0810	Not in a city	Clinton	62 LAUREL DR.	2014	047	99	212	214	.077	.071	.070	.070	1	Y	0
39-035-0034	1	0229	Cleveland	Cuyahoga	891 E. 152 ST.	2014	087	99	212	214	.075	.074	.072	.071	0	Y	0
39-035-0060	1	0229	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	087	97	208	214	.069	.068	.067	.066	0		0
39-035-0064	1	0229	Berea	Cuyahoga	390 FAIR ST.	2014	087	97	208	214	.066	.062	.061	.059	0	Y	0
39-035-5002	1	0229	Mayfield	Cuyahoga	6116 WILSON MILLS	2014	019	99	211	214	.075	.064	.063	.061	0	Y	0
39-041-0002	1	0805	Delaware	Delaware	359 MAIN RD.	2014	047	100	213	214	.072	.071	.067	.066	0	Y	0
39-047-9991	1	1344	Not in a city	Fayette	Deer Creek State Park, Mt Sterling, OH 43143	2014	047	95	203	214	.077	.072	.070	.069	1	S	0
39-049-0029	1	0805	New Albany	Franklin	7600 FODOR RD.	2014	047	100	214	214	.075	.073	.071	.070	0	Y	0
39-049-0037	1	0805	Columbus	Franklin	1777 E. BROAD	2014	047	100	213	214	.075	.075	.070	.069	0	Y	0
39-049-0081	1	0805	Columbus	Franklin	5750 MAPLE CANYON	2014	047	100	214	214	.075	.071	.070	.068	0	Y	0

Ozone (44201) Ohio Parts per million (007)

8-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX> STD	CERT and EVAL	EDT
39-055-0004	1	0595	Not in a city	Geauga	13000 AUBURN	2014	087	100	214	214	.077	.068	.067	.065	1	Y	0
39-057-0006	1	0287	Xenia	Greene	541 LEDBETTER RD.,	2014	047	100	214	214	.068	.068	.066	.066	0	Y	0
39-061-0006	1	1259	Blue Ash	Hamilton	11590 GROOMS RD	2014	087	96	205	214	.083	.072	.071	.070	1	Y	0
39-061-0010	1	1259	Cleves	Hamilton	6950 RIPPLE RD.	2014	087	100	213	214	.076	.075	.074	.073	1	Y	0
39-061-0040	1	1259	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	087	100	213	214	.078	.074	.069	.069	1	Y	0
39-081-0017	1	0809	Steubenville	Jefferson	618 LOGAN ST.	2014	047	99	212	214	.073	.070	.068	.067	0	Y	0
39-083-0002	1	0805	Centerburg	Knox	WATER PLT, SR. 314	2014	047	100	213	214	.069	.068	.067	.066	0	Y	0
39-085-0003	1	0595	Eastlake	Lake	36010 LAKESHORE	2014	087	100	214	214	.079	.078	.076	.075	3	Y	0
39-085-0007	1	0595	Painesville	Lake	177 MAIN STREET	2014	087	100	214	214	.073	.066	.064	.062	0	Y	0
39-087-0011	1	0880	Not in a city	Lawrence	S.R. 141, WILGUS	2014	047	97	207	214	.068	.066	.066	.064	0	Y	0
39-087-0012	1	0880	Ironton	Lawrence	450 Commerce Drive	2014	047	98	209	214	.065	.064	.063	.062	0	Y	0
39-089-0005	1	0805	Heath (Fourmile Lock)	Licking	300 LICKING VIEW DR.	2014	047	100	214	214	.070	.068	.066	.066	0	Y	0
39-093-0018	1	0807	Sheffield	Lorain	4706 DETROIT RD.	2014	047	99	212	214	.068	.068	.067	.067	0	Y	0
39-095-0024	1	0220	Toledo	Lucas	348 S. ERIE	2014	047	76	163	214	.075	.075	.072	.070	0	Y	0
39-095-0027	1	0220	Waterville	Lucas	200 SOUTH RIVER RD.	2014	047	100	213	214	.069	.069	.066	.064	0	Y	0
39-095-0034	1	0220	Not in a city	Lucas	306 N. YONDOTA	2014	047	89	191	214	.074	.073	.065	.065	0	Y	0
39-097-0007	1	0805	Not in a city	Madison	940 SR 38 SW	2014	047	95	204	214	.073	.073	.071	.069	0	Y	0
39-099-0013	1	0634	Youngstown	Mahoning	345 OAKHILL	2014	087	95	204	214	.070	.069	.067	.066	0	N	0
39-103-0004	1	0012	Not in a city	Medina	BALLASH ROAD	2014	087	100	213	214	.072	.065	.065	.064	0	Y	0
39-109-0005	1	0287	Casstown	Miami	3825 NORTH S. R. 589	2014	047	100	214	214	.072	.068	.067	.066	0	Y	0
39-113-0037	1	0287	Dayton	Montgomery	1401 Harshman Road	2014	047	100	213	214	.070	.070	.070	.069	0	Y	0

Ozone (44201) | Ohio | Parts per million (007)

8-HOUR

SITE ID	POC	PQAO	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX> STD	CERT and EVAL	EDT
39-121-9991	1	1344	Not in a city	Noble	58163 St. Johns Rd, Quaker City, OH 43773	2014	047	95	204	214	.074	.070	.065	.065	0	S	0
39-133-1001	1	0012	Not in a city	Portage	1570 RAVENNA RD.	2014	000	99	212	214	.066	.065	.063	.061	0	Y	0
39-135-1001	1	0287	New Paris	Preble	6940 OXFORD GETTYSBURG RD.	2014	047	100	214	214	.072	.070	.065	.065	0	Y	0
39-151-0016	1	0151	Canton	Stark	515 25TH. ST.	2014	047	97	208	214	.073	.071	.065	.065	0	Y	0
39-151-0022	1	0151	Brewster	Stark	45 S. WABASH AVENUE, S.R 93	2014	047	98	210	214	.071	.064	.060	.059	0	Y	0
39-151-4005	1	0151	Alliance	Stark	1175 WEST VINE	2014	047	100	213	214	.068	.066	.062	.061	0	Y	0
39-153-0020	1	0012	Akron	Summit	800 PATTERSON AVE.	2014	087	100	214	214	.066	.062	.059	.058	0	Y	0
39-155-0009	1	0634	Not in a city	Trumbull	6425 KINSMAN RD. NE	2014	087	100	214	214	.078	.068	.065	.065	1	Y	0
39-155-0011	1	0634	Not in a city	Trumbull	842 YOUNGSTOWN-KINGSVILLE RD.	2014	087	92	197	214	.073	.070	.066	.065	0	Y	0
39-165-0007	1	1259	Lebanon	Warren	416 SOUTHEAST ST.	2014	087	100	213	214	.074	.073	.071	.071	0	Y	0
39-167-0004	1	0809	Marietta	Washington	2000 4TH STREET	2014	047	93	199	214	.074	.072	.064	.063	0	Y	0
39-173-0003	1	0808	Bowling Green	Wood	347 N DUNBRIDGE	2014	047	100	213	214	.071	.070	.064	.063	0	Y	0

Three Year Average of Fourth High 8-Hr Averages

Site ID	City	County	Address	4th high in Year			3 Year
				2012	2013	2014	Average
39-003-0009		Allen	2650 Bible Rd.	0.079	0.068	0.066	0.071
39-007-1001	Conneaut	Ashtabula	JQ Conneaut Water Plant	0.079	0.070	0.069	0.072
39-017-0004	Hamilton	Butler	Schuler & Bender Rds.	0.083	0.068	0.070	0.073
39-017-0018	Middletown	Butler	1701 Runway Dr.	0.084	0.068	0.069	0.073
39-023-0001	Springfield	Clark	5171 Urbana Rd.	0.077	0.071	0.065	0.071
39-023-0003		Clark	5400 Spangler Rd.	0.075	0.067	0.064	0.068
39-025-0022		Clermont	2400 Clermont Center Dr.	0.091	0.066	0.068	0.075
39-027-1002		Clinton	62 Laurel Rd.	0.086	0.064	0.070	0.073
39-035-0034	Cleveland	Cuyahoga	891 E. 152nd St.	0.085	0.069	0.071	0.075
39-035-0060	Cleveland	Cuyahoga	E. 14th & Orange	0.073	0.057	0.066	0.065
39-035-0064	Berea	Cuyahoga	390 Fair St.	0.083	0.066	0.059	0.069
39-035-5002	Mayfield	Cuyahoga	6116 Wilson Mill Rd.	0.087	0.065	0.061	0.071
39-041-0002		Delaware	359 Main Rd.	0.077	0.070	0.066	0.071
39-049-0029	New Albany	Franklin	7600 Fodor Rd.	0.082	0.073	0.070	0.075
39-049-0037	Columbus	Franklin	1777 E. Broad St.	0.081	0.070	0.069	0.073
39-049-0081	Columbus	Franklin	5750 Maple Canyon	0.076	0.065	0.068	0.069
39-055-0004		Geauga	13000 Auburn Rd.	0.082	0.065	0.065	0.070
39-057-0006	Xenia	Greene	541 Ledbetter Rd.	0.077	0.066	0.066	0.069
39-061-0006		Hamilton	11590 Grooms Rd.	0.087	0.069	0.070	0.075
39-061-0010		Hamilton	6950 Ripple Rd.	0.083	0.064	0.073	0.073
39-061-0040	Cincinnati	Hamilton	250 Wm. Howard Taft	0.082	0.069	0.069	0.073
39-081-0017	Steubenville	Jefferson	618 Logan	0.077	0.066	0.067	0.070
39-083-0002		Knox	Water Plant SR 3	0.074	0.067	0.066	0.069
39-085-0003	Eastlake	Lake	Jefferson Elementary	0.089	0.070	0.075	0.078
39-085-0007	Painesville	Lake	177 Main St.	0.083	0.068	0.062	0.071
39-087-0011		Lawrence	SR 775 & SR	0.072	0.060	0.064	0.065
39-087-0012	Ironton	Lawrence	450 Commerce Dr.	0.075	0.063	0.062	0.066
39-089-0005	Heath	Licking	300 Licking View	0.077	0.065	0.066	0.069
39-093-0018	Lorain	Lorain	4706 Detroit Rd.	0.081	0.060	0.067	0.069
39-095-0024	Toledo	Lucas	348 S. Erie St.	0.083	0.620	0.070	0.257
39-095-0027	Waterville	Lucas	200 S. Byrne	0.074	0.068	0.064	0.068
39-095-0034	Toledo	Lucas	306 N. Yondota	0.082	0.066	0.065	0.071

Three Year Average of Fourth High 8-Hr Averages

Site ID	City	County	Address	4th high in Year			3 Year
				2012	2013	2014	Average
39-097-0007		Madison	9940 SR 38 SW	0.078	0.066	0.069	0.071
39-099-0013	Youngstown	Mahoning	345 Oakhill Ave.	0.076	0.063	0.066	0.068
39-103-0004		Medina	Ballash Rd.	0.074	0.065	0.064	0.067
39-109-0005		Miami	3825 North State	0.077	0.070	0.066	0.071
39-113-0037	Dayton	Montgomery	1401 Harshman Rd.	0.079	0.069	0.069	0.072
39-133-1001		Portage	1570 Ravenna Rd.	0.074	0.058	0.061	0.064
39-135-1001		Preble	National Trails	0.077	0.067	0.065	0.069
39-151-0016	Canton	Stark	Malone College	0.077	0.070	0.065	0.070
39-151-0022	Brewster	Stark	45 S. Wabash	0.073	0.067	0.059	0.066
39-151-4005	Alliance	Stark	1175 West Vine St.	0.071	0.067	0.061	0.066
39-153-0020	Akron	Summit	800 Patterson Ave.	0.070	0.060	0.058	0.062
39-155-0009		Trumbull	Community Hall	0.076	0.062	0.065	0.067
39-155-0011		Trumbull	Trumbull Co. Sanitary Engineers	0.084	0.068	0.065	0.072
39-165-0007	Lebanon	Warren	416 Southeast St.	0.080	0.067	0.071	0.072
39-167-0004	Marietta	Washington	2000 Fourth St.	0.075	0.063	0.063	0.067
39-173-0003	Bowling Green	Wood	347 N. Dunbridge	0.077	0.065	0.063	0.068

Count of Ozone Exceedances in Each Year
And the Date Upon Which the First Occurred
The 8-Hour exceedance value used is 0.076 ppm

Year	1-Hr Data Date	Exceedances/Sites	8-Hr Data Date	Exceedances/Sites
1997	24 June	5/50	4 April	614/50
1998	13 May	15/49	13 April	1155/49
1999	30 May	14/50	8 April	1121/50
2000	9 June	1/48	29 April	326/48
2001	14 June	2/50	8 April	738/50
2002	20 June	22/50	23 May	1436/50
2003	23 June	22/50	15 April	458/50
2004	None	0/50	8 April	178/50
2005	8 June	5/49	10 April	688/49
2006	None	0/49	27 May	236/49
2007	None	0/49	22 April	541/49
2008	None	0/49	17 April	171/49
2009	None	0/49	20 May	31/49
2010	None	0/49	2 April	163/49
2011	None	0/49	4 June	215/49
2012	None	0/48	15 May	329/48
2013	None	0/48	15 May	14/48
2014	None	0/48	21 April	11/48

Last Ozone Exceedance Dates
1989-2014
One Hour Standard

Year	Date	Sites	Maximum Value
1989	8/14	1	129 ppb
1990	8/27	2	155
1991	8/29	1	125
1992	7/09	1	218
1993	8/27	1	137
1994	8/25	1	153
1995	8/26	1	125
1996	8/04	1	131
1997	8/01	1	125
1998	9/14	2	139
1999	7/30	1	130
2000	6/09	1	126
2001	8/06	1	125
2002	9/07	1	127
2003	6/25	4	136
2004	none	0	107
2005	8/02	1	161
2006	none	0	112
2007	none	0	112
2008	none	0	112
2009	none	0	101
2010	none	0	113
2011	none	0	112
2012	none	0	119
2013	none	0	98
2014	none	0	91

Last Ozone Exceedance Dates
1989-2014
Eight Hour Standard (0.075 ppm)

Year	Date	Sites	Maximum Value
1989	10/14	1	78 ppb
1990	10/17	1	84
1991	10/09	1	78
1992	9/17	6	89
1993	9/13	7	78
1994	10/07	1	77
1995	10/13	1	78
1996	10/16	1	76
1997	10/08	11	83
1998	10/17	3	77
1999	10/30	5	80
2000	9/20	1	78
2001	9/23	1	78
2002	9/13	10	87
2003	9/17	1	76
2004	9/24	2	78
2005	10/04	1	81
2006	8/26	4	80
2007	10/08	3	80
2008	9/21	1	78
2009	6/27	1	76
2010	10/10	3	80
2011	9/03	20	94
2012	8/25	4	82
2013	9/11	1	79
2014	7/12	1	77

Lead

Airborne lead in urban areas was once primarily caused by vehicles using leaded fuels. Sources of airborne lead now include lead smelting facilities, lead-acid storage battery manufacturing plants and other manufacturing operations.

In the period 1978-1991 lead concentrations at traffic oriented sites dropped by over 90%, reflecting the removal of lead from gasoline. In March 1999 the U.S. EPA promulgated new rules for lead monitoring that eliminated the requirement for traffic oriented sites and emphasizes monitoring at industrial sources. We discontinued monitoring at traffic oriented sites after the first calendar quarter of 1999.

In September 2008 the U.S. EPA changed the National Ambient Air Quality Standard for lead from 1.5 $\mu g/m^3$ as a calendar quarter average "not to be exceeded" to 0.15 $\mu g/m^3$ as a running three month average. This much stricter standard is designed to provide increased protection to the public, particularly children.

The new lead standard originally required increased monitoring at lead sources that reported emissions of greater than 1.0 ton per year. These source oriented sites were required to be in place and operating as of January 1, 2010. A revision to the lead standard promulgated on December 27, 2010 changed the level of emissions that required review for possible monitoring to 0.5 tons per year.

Lead monitoring is also required at NCore sites in Core based statistical areas (CBSAs) of 500,000 or more persons. There are three sites in Ohio: Cincinnati, Cleveland and Dayton.

Lead is a stable compound that can accumulate in the human body. Its health related effects include interference with the blood forming process and the normal functions of nervous and renal systems. Young children are the age group most susceptible to the adverse effects of lead.

Sampling and Analysis Method

Lead concentrations in ambient air are determined by the reference method promulgated by U.S. EPA. Lead samples are collected as total suspended particulate matter (TSP) on glass fiber filters according to 40 CFR Part 50, Appendix B, the EPA Reference method for the Determination of Suspended Particulate Matter in the Atmosphere. These filters are then analyzed by the manual Equivalent method: EQL-0710-192, "Heated Nitric Acid Hot Block Digestion and ICP/MS analysis for Lead (Pb) on TSP High-volume filters". In this method, one ¾"x 8" portion or strip, of the TSP filter is dissolved in a solution of nitric acid, heated on a hot block, on which the solution is reduced to final volume for analysis. The extracted solution is then analyzed by inductively coupled plasma-mass spectrometry, (ICP/MS) to determine the amount of lead collected on the original filter.

In the past a month's collection of filters was analyzed as a composite sample. Most sites collect so little lead that individual sampling days' analysis would have lead concentrations below the detection limit of the methods used at the time. Some sites' filters are still analyzed this way. Newer sites and sites that are being used to meet the new monitoring network requirements have individual sampling events (days) analyzed.

In 2012 the Hamilton County Environmental Services Division began sampling for lead with PM_{10} samplers at their NCore site (39-061-0040) on Taft Rd. Those data are in the attached table.

Concentrations are reported in micrograms per cubic meter of air ($\mu g/m^3$).

Lead (TSP) LC — Ohio — Micrograms/cubic meter (LC)

SITE ID	CITY	COUNTY	ADDRESS	YEAR	MAX 3MO AVG	MONTH OF MAX	VALID MONTHS	CRIT MET	EDT	CERT EVAL
39-017-0015	Middletown	Butler	3901 LEFFERSON	2014	.01	9	12	Y	5	M
39-029-0019	East Liverpool	Columbiana	1250 GEORGE, COLUMBIANA PORT AUTHORITY	2014	.01	1	12	Y	5	M
39-029-0020	East Liverpool	Columbiana	2220 MICHIGAN	2014	.02	1	12	Y	5	M
39-029-0022	East Liverpool	Columbiana	500 MARYLAND	2014	.01	1	12	Y	5	M
39-035-0038	Cleveland	Cuyahoga	2547 ST TIKHON	2014	.02	7	12	Y	5	M
39-035-0042	Cleveland	Cuyahoga	3136 LORAIN AVE., F.S. 4	2014	.01	2	12	Y	5	M
39-035-0049	Cleveland	Cuyahoga	E. 56TH ST.	2014	.02	8	12	Y	5	Y
39-035-0060	Cleveland	Cuyahoga	E. 14TH & ORANGE	2014	.03	8	12	Y	5	M
39-035-0061	Cleveland	Cuyahoga	W. SIDE OF WEST 3RD.	2014	.03	8	12	Y	5	M
39-035-0072	Warrensville Heights	Cuyahoga	26565 MILES ROAD	2014	.01	1	12	Y	5	M
39-049-0025	Columbus	Franklin	1700 ANN ST.	2014	.01	1	7	N	5	S
39-049-0039	Columbus	Franklin	580 E. WOODROW AVE.	2014	.01	10	3	N	5	M
39-051-0001	Delta	Fulton	200 VAN BUREN	2014	.09	11	12	Y	5	Y
39-091-0006	Bellefontaine	Logan	320 RICHARD	2014	0	1	12	Y	5	M
39-101-0003	Marion	Marion	HAWTHORNE AVE.	2014	.03	10	12	Y	5	M
39-101-0004	Marion	Marion	640 BELLEFONTAINE AVENUE	2014	.01	1	12	Y	5	M
39-113-7001	Moraine	Montgomery	2728 VIKING LANE	2014	.01	10	12	Y	5	M
39-151-0017	Canton	Stark	1330 DUEBER	2014	.02	9	10	N	5	S
39-155-0012	Not in a city	Trumbull	2600 ELMWOOD DRIVE EXT., HUBBARD	2014	.01	1	1	N	5	S
39-167-0008	Marietta	Washington	S.R. 676 WASHINGTON CAREER CENTER	2014	0	1	12	Y	5	M
39-167-0010	Marietta	Washington	115 VICTORY PLACE	2014	0	1	6	N	5	S

Note: These reported values do not reflect the combination of 14129 and 85129 and validation substitution tests utilized for Design Value Calculations

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
QUICK LOOK REPORT (AMP450)
Lead (TSP) LC

Lead PM10 LC FRM/FEM — Ohio — Micrograms/cubic meter (LC)

SITE ID	CITY	COUNTY	ADDRESS	YEAR	MAX 3MO AVG	MONTH OF MAX	VALID MONTHS	CRIT MET	EDT	CERT EVAL
39-061-0040	Cincinnati	Hamilton	250 WM. HOWARD TAFT	2014	.01	9	12	Y	5	M

Note: These reported values do not reflect the combination of 14129 and 85129 and validation substitution tests utilized for Design Value Calculations

VI. Air Toxics Monitoring 2014

AIR TOXICS MONITORING

INTRODUCTION

As part of its air quality monitoring program, Ohio EPA, Division of Air Pollution Control (DAPC) operates a network of air toxics monitors as part of a state wide Air Toxics Monitoring Program (ATMP). This Air Toxic sampling network is modeled after programs and methodologies recommended by U.S. EPA. The emphasis has been on urban toxics monitoring for volatile organic compounds and heavy metals. Brief sections describing the sampling and analytical procedures for the pollutants follow the introduction.

1.) Main focus of the ATMP is on urban monitoring, looking for major risk areas where people live. In this effort sampling has concentrated on groups of compounds.

volatile organic compounds (VOC), examples:
    benzene, chloroform, styrene, toluene etc.
heavy metals, examples:
    arsenic, cadmium

The majority of the sampling has been conducted at semi-permanent monitoring sites where monitoring extends beyond a 6 month period. The intermittent sampling stations at these types of sites have been dedicated to VOCs and heavy metals monitoring. See the list following the description of the volatile organic analysis method for the VOC target compounds. The list of target metals is included in the metals description section.

Semi-permanent monitoring projects have been conducted in:

- Cleveland - VOC - Urban, Metals - Urban
- Middletown - VOC - Source, Metals - Source
- Columbus - Metals - Urban, VOC - Urban
- Marietta - Metals - Source
- Delta - Metals - Source
- East Liverpool - Metals - Source
- Steubenville - VOC - Urban
- Marion - Metals - Urban
- Bellefontaine - Metals - Urban
- Elmore - Metals - Urban

2.) Throughout 2014 DAPC has worked to expand sampling at semi-permanent sites with an emphasis on smaller urban areas. Future sampling projects will involve additional sampling locations or reallocation of current resources to other locations. Expanded air toxics sampling will involve adding other parameters to existing sites. DAPC's efforts will also include more efficient use of short term sampling.

Past sampling efforts have included:

Cross Media pollution monitoring
Great Lakes deposition monitoring
Post-remediation Monitoring
Emergency Episode Monitoring
Urban air toxics
Source monitoring
Complaint investigation
Emissions verification

During 2014 DAPC was involved in several minor monitoring projects throughout the state. However, due to the limited scope of these short term and grab sampling projects they are not included in the data summaries for this year. However, due to significant development in Ohio Utica Shale formation, DAPC has established an air monitoring site in Muskingum County. Data from that study will be compiled and evaluated in a separate report.

The sampling and analytical methods for VOCs and heavy metals are described below.

VOLATILE ORGANIC COMPOUND SAMPLING AND ANALYSIS

SAMPLING

A major component of the Air Toxics Monitoring Program is ambient sampling for volatile organic compounds (VOCs). These are compounds that are generally found in the vapor state. Some organic compounds can be chlorinated, (contain chlorine) or just hydrocarbons, (contain just hydrogen and carbon atoms). Most of the VOC samples were collected using a whole air sampling system that pumped ambient air into a stainless steel canister. The canister, which is evacuated prior to use, is a storage container which allows an air sample to be maintained virtually unchanged until it is analyzed. In addition to the pumped sampling method, a number of samples were collected using the vacuum of the canister to draw in an air sample. These, vacuum-filled "grab" samples usually take only a few minutes to collect and were useful for collecting transient odors or potentially high concentration samples. DAPC is now capable of collecting specific samples for 1, 3, 8 and 24 hours using this grab sampling method.

Initially samples were collected sporadically, however as semi-permanent sites were established the sampling program has become more routine. With that, an attempt has been made to collect samples at least twice a month, with a sampling frequency consistent with the national air toxics monitoring schedule of once every 12^{th} day, over a 24 hour period. The specific procedures for this type of sampling can be found in the U.S. EPA Compendium of Methods for the Determination of Toxic Organic Compound in Ambient Air in the section TO-14

ANALYSIS

The volatile tendency of VOCs allows them to be vaporized when heated, (if not already in that form) and to be injected into an analytical device called a gas chromatograph (GC). As a sample passes through a GC column, the various compounds separate out of the sample mixture. As the individual compounds exit the column, a detector records a response. That response is illustrated on a chromatogram as a peak. The area of each peak indicates the concentration of the compound. Compound identification is accomplished by comparing the retention times of the peaks on a chromatogram with those from a chromatogram of a known mixture of compounds. Retention time is the time it takes for a particular compound to reach the detector. As long as the analytical conditions remain the same, a compound from one analysis to the next will have the same retention time.

The typical analytical system used for this study utilized a GC with a special detector called a mass spectrometer (MS). The combination, a GC/MS, can be used to analyze a sample by separating it into its individual components which are then broken down into mass fragments which form a fingerprint by which a compound can be identified.

All of DAPC’s canister analyses were conducted at the Ohio EPA Division of Environmental Services (DES). The analytical procedures performed by the laboratory targeted an list of over 60 VOCs for identification and quantitation. The following list includes the current parameters of the analytical target compounds list. Most of the target compounds have a detection limit of 0.2 ppbv. The Exceptions are Acetone, 2-Butanone, Carbon Disulfide, total m&p-Xylenes, which have limits 0.4 ppbv or higher depending of the sample concentration.

DES VOC Target Compound List
for TO-14A Analysis

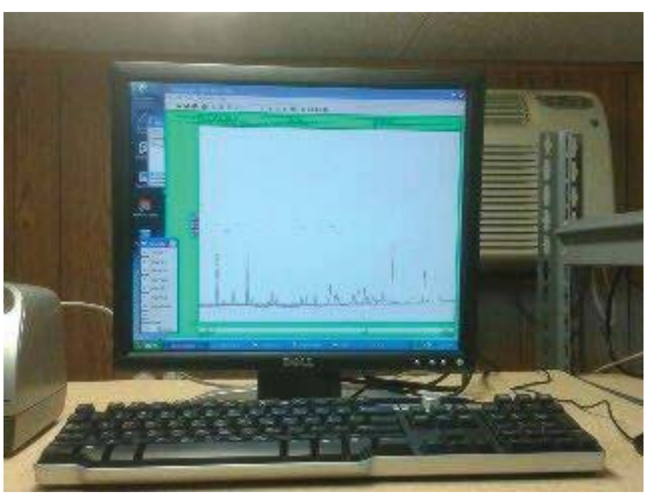
1	Acetonitrile
2	Acrylonitrile
3	Benzene
4	Benzyl chloride
5	Bromodichloromethane
6	Bromoform
7	Bromomethane
8	1,3-Butadiene
9	n-butane
10	2-Butanone
11	Carbon disulfide
12	Carbon tetrachloride
13	Chlorobenzene
14	Chlorodifluoromethane
15	Chloroethane
16	Chloroform
17	Chloromethane
18	3-Chloropropene
19	Cumene
20	Cyclohexane
21	Decane
22	Dibromochloromethane
23	1,2-ibromoethane
24	Dibromomethane
25	1,2-Dichlorobenzene
26	1,3-Dichlorobenzene
27	1,4-Dichlorobenzene
28	Dichlorodifluoromethane
29	1,1-ichloroethane
30	1,2-ichloroethane
31	1,1-ichloroethene
32	cis-1,2-Dichloroethene
33	trans-1,2-Dichloroethene
34	1,2-Dichloropropane
35	cis-1,3-Dichloropropene
36	trans-1,3-Dichloropropene
37	1,2-Dichloro-1,1,2,2-Tetrafluoroethane
38	Ethylbenzene
39	4-Ethyltoluene
40	n-Heptane
41	Hexachlorobutadiene
42	Hexane
43	Methyl-butyl ether
44	Methylene chloride
45	4-Methyl-2-pentanone
46	a-Methylstyrene
47	Naphthalene
48	n-Nonane
49	n-Octane
50	n-Pentane
51	Propylene
52	n-Propylbenzene
53	Styrene
54	1,1,2,2-Tetrachloroethane
55	Tetrachloroethylene
56	Toluene
57	1,2,4-Trichlorobenzene
58	1,1,1-Trichloroethane
59	1,1,2-Trichloroethane
60	Trichloroethene
61	Trichlorofluoromethane
62	1,1,2-Trichloro-1,2,2-Trifluoroethane
63	1,2,4-Trimethylbenzene
64	1,3,5-Trimethylbenzene
65	n-Undecane
66	Vinyl acetate
67	Vinyl chloride
68	o-Xylene
69	Total m&p-xylenes

Beyond this list of compounds, additional compounds can be detected and tentatively identified during the analysis of VOC samples. If during the analysis, an unidentified compound of significant quantity, (greater than 0.2 ppb) exist in a sample it can be identified during the MS analysis. However, due to the uncertainty involved with the identification of these additional, non-target compounds and the vast number of them detected they are not included in this report.

As the technology and the methods improve and new techniques are developed, it is expected that the target compounds list will be periodically modified. It is also expected that the list will change as U.S. EPA's emphasis on air toxics compounds changes. The following tables summarize the data from the routine canister samples collected during 2014. Throughout 2014 over 192, 24-hour samples were collected at 6 permanent VOC monitoring sites.

SITE IDENTIFICATION AND LOCATION

AQS # 39-	CITY	COUNTY	ADDRESS	TABLE
-017-0003	Middletown	Butler	Verity school 1900 St. John's Road	A
-035-0038	Cleveland	Cuyahoga	2547 St. Tikhon Ave.	B
-035-1002	Cleveland	Cuyahoga	16900 Holland Rd.	C
-049-0034	Columbus	Franklin	Korbel Ave.	D
-081-0017	Steubenville	Jefferson	618 Logan Street	E
	Near the Wilds	Muskingum	SR 284 / Paisley Rd.	F



2014
SUMMARY TABLE

Volatile Organic Compounds Detected			2014	
192 Samples Compiled				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile	0.20	0.24	0.35	30
Acrylonitrile	0.42	0.42	0.42	1
Benzene	0.20	0.77	11.00	101
n-Butane	0.22	1.79	8.00	192
2-Butanone	0.50	0.99	6.80	98
Chlorodifluoromethane	0.20	0.35	1.20	178
Chloroform	0.36	0.44	0.51	2
Chloromethane	0.21	0.52	0.87	191
3-Chloropropene	0.21	0.21	0.21	1
Cyclohexane	0.22	0.27	0.35	3
Decane	0.22	0.53	1.40	6
1,4-Dichlorobenzene	1.10	1.10	1.10	1
Dichlorodifluoromethane	0.26	0.50	0.74	189
1,2-Dichloropropane	0.48	0.56	0.63	2
Ethylbenzene	0.29	0.55	0.82	3
4-Ethyltoluene	0.32	0.32	0.32	1
n-Heptane	0.20	0.53	1.30	28
Hexane	0.20	0.57	3.20	68
Methylene chloride	0.24	0.26	0.29	6
4-Methyl-2-pentanone	0.20	0.20	0.20	1
Naphthalene	0.21	0.76	6.30	32
n-Nonane	0.20	0.70	1.20	2
n-Octane	0.20	0.27	0.47	14
n-Pentane	0.20	0.82	7.10	182
Propylene	0.48	1.51	5.00	15
Styrene	0.42	0.42	0.42	1
Toluene	0.20	1.44	98.00	113
Trichlorofluoromethane	0.20	0.26	0.44	179
1,2,4-Trimethylbenzene	0.20	0.44	1.00	7
n-Undecane	0.28	0.50	0.92	4
Vinyl acetate	0.20	0.58	2.50	121
o-Xylene	0.20	0.49	1.20	6
Total m&p-xylenes	0.43	1.00	3.70	13

Table A.

Volatile Organic Compounds Detected			2014	
Butler County - (AQS: 39-017-0003)				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile				
Acrylonitrile				
Benzene	0.21	0.25	0.29	3
n-Butane	0.22	0.93	2.80	22
2-Butanone	0.52	0.82	1.30	6
Chlorodifluoromethane	0.21	0.34	0.74	18
Chloroform				
Chloromethane	0.23	0.49	0.76	22
3-Chloropropene				
Cyclohexane				
Decane				
1,4-Dichlorobenzene	1.10	1.10	1.10	1
Dichlorodifluoromethane	0.28	0.50	0.73	21
1,2-Dichloropropane				
Ethylbenzene				
4-Ethyltoluene				
n-Heptane	0.30	0.30	0.30	1
Hexane	0.33	0.45	0.57	3
Methylene chloride	0.25	0.25	0.25	1
4-Methyl-2-pentanone				
Naphthalene				
n-Nonane				
n-Octane				
n-Pentane	0.23	0.55	1.30	18
Propylene				
Styrene				
Toluene	0.21	0.36	0.73	10
Trichlorofluoromethane	0.21	0.28	0.40	20
1,2,4-Trimethylbenzene				
n-Undecane				
Vinyl acetate	0.22	0.65	1.90	10
o-Xylene				
Total m&p-xylenes				

Table B.

Volatile Organic Compounds Detected			2014	
Cuyahoga County - (AQS: 39-035-0038)				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile	0.21	0.26	0.30	2
Acrylonitrile				
Benzene	0.20	0.27	0.40	10
n-Butane	0.59	1.57	3.00	27
2-Butanone	0.53	1.24	6.80	17
Chlorodifluoromethane	0.20	0.31	0.43	26
Chloroform				
Chloromethane	0.29	0.53	0.73	27
3-Chloropropene	0.21	0.21	0.21	1
Cyclohexane	0.35	0.35	0.35	1
Decane	0.26	0.76	1.40	3
1,4-Dichlorobenzene				
Dichlorodifluoromethane	0.26	0.49	0.70	27
1,2-Dichloropropane	0.48	0.48	0.48	1
Ethylbenzene				
4-Ethyltoluene				
n-Heptane	0.27	0.27	0.27	1
Hexane	0.20	0.35	0.62	8
Methylene chloride	0.24	0.26	0.28	3
4-Methyl-2-pentanone				
Naphthalene				
n-Nonane	1.20	1.20	1.20	1
n-Octane				
n-Pentane	0.27	0.84	3.50	26
Propylene	0.61	0.81	1.00	3
Styrene				
Toluene	0.21	6.52	98.00	16
Trichlorofluoromethane	0.22	0.25	0.31	25
1,2,4-Trimethylbenzene	0.54	0.54	0.54	1
n-Undecane	0.28	0.37	0.45	2
Vinyl acetate	0.21	0.60	2.50	16
o-Xylene				
Total m&p-xylenes				

Table C.

Volatile Organic Compounds Detected			2014	
Cuyahoga County - (AQS: 39-035-1002)				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile	0.20	0.22	0.23	3
Acrylonitrile				
Benzene	0.22	0.28	0.46	7
n-Butane	0.46	1.14	4.30	26
2-Butanone	0.50	1.07	2.90	17
Chlorodifluoromethane	0.23	0.36	0.66	23
Chloroform				
Chloromethane	0.41	0.53	0.71	25
3-Chloropropene				
Cyclohexane				
Decane				
1,4-Dichlorobenzene				
Dichlorodifluoromethane	0.38	0.52	0.74	25
1,2-Dichloropropane				
Ethylbenzene				
4-Ethyltoluene				
n-Heptane				
Hexane	0.27	0.30	0.32	3
Methylene chloride	0.25	0.27	0.29	2
4-Methyl-2-pentanone				
Naphthalene				
n-Nonane				
n-Octane				
n-Pentane	0.20	0.47	1.00	25
Propylene	0.91	1.14	1.30	3
Styrene				
Toluene	0.23	0.38	0.70	11
Trichlorofluoromethane	0.21	0.26	0.32	23
1,2,4-Trimethylbenzene				
n-Undecane				
Vinyl acetate	0.23	0.50	0.95	16
o-Xylene				
Total m&p-xylenes				

Table D.

Volatile Organic Compounds Detected			2014	
Franklin County - (AQS: 39-049-0034)				
Summary of Canister data	**Concentration ppbv**			**Frequency**
Compound list	**Minimum**	**Average**	**Maximum**	**Detected**
Acetonitrile	0.21	0.24	0.29	4
Acrylonitrile				
Benzene	0.20	0.33	1.00	13
n-Butane	0.46	1.60	5.90	30
2-Butanone	0.50	1.20	3.50	18
Chlorodifluoromethane	0.20	0.37	0.99	29
Chloroform	0.36	0.44	0.51	2
Chloromethane	0.34	0.51	0.70	30
3-Chloropropene				
Cyclohexane	0.25	0.25	0.25	1
Decane	0.25	0.25	0.25	1
1,4-Dichlorobenzene				
Dichlorodifluoromethane	0.32	0.50	0.73	30
1,2-Dichloropropane	0.63	0.63	0.63	1
Ethylbenzene	0.82	0.82	0.82	1
4-Ethyltoluene	0.32	0.32	0.32	1
n-Heptane	0.35	0.65	1.00	4
Hexane	0.23	0.86	3.20	9
Methylene chloride				
4-Methyl-2-pentanone				
Naphthalene	0.21	0.21	0.21	1
n-Nonane	0.20	0.20	0.20	1
n-Octane	0.22	0.30	0.45	3
n-Pentane	0.26	0.94	7.10	30
Propylene	0.48	0.74	0.99	2
Styrene				
Toluene	0.20	0.65	3.80	21
Trichlorofluoromethane	0.21	0.26	0.44	27
1,2,4-Trimethylbenzene	0.24	0.49	1.00	3
n-Undecane	0.35	0.35	0.35	1
Vinyl acetate	0.20	0.57	2.10	19
o-Xylene	0.28	0.74	1.20	2
Total m&p-xylenes	0.52	1.69	3.70	3

Table E.

Volatile Organic Compound Detected			2014	
Jefferson County - (AQS: 39-081-0017)				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile	0.21	0.24	0.35	18
Acrylonitrile				
Benzene	0.22	1.23	11.00	51
n-Butane	0.69	2.27	8.00	60
2-Butanone	0.51	0.72	1.30	26
Chlorodifluoromethane	0.23	0.34	0.54	55
Chloroform				
Chloromethane	0.21	0.50	0.77	60
3-Chloropropene				
Cyclohexane	0.22	0.22	0.22	1
Decane	0.22	0.22	0.22	1
1,4-Dichlorobenzene				
Dichlorodifluoromethane	0.39	0.49	0.69	59
1,2-Dichloropropane				
Ethylbenzene	0.29	0.29	0.29	1
4-Ethyltoluene				
n-Heptane	0.20	0.40	0.71	11
Hexane	0.22	0.42	1.10	25
Methylene chloride				
4-Methyl-2-pentanone	0.20	0.20	0.20	1
Naphthalene	0.22	0.80	6.30	30
n-Nonane				
n-Octane	0.21	0.21	0.21	1
n-Pentane	0.22	0.81	2.30	57
Propylene	1.10	1.73	4.00	6
Styrene	0.42	0.42	0.42	1
Toluene	0.20	0.68	4.30	41
Trichlorofluoromethane	0.20	0.24	0.40	57
1,2,4-Trimethylbenzene	0.20	0.26	0.32	2
n-Undecane				
Vinyl acetate	0.20	0.54	1.60	45
o-Xylene	0.20	0.27	0.41	3
Total m&p-xylenes	0.43	0.69	1.60	7

Table F.

Volatile Organic Compounds Detected			2014	
Wilds Locations VOC canister sampling Muskingum County				
Summary of Canister data	Concentration ppbv			Frequency
Compound list	Minimum	Average	Maximum	Detected
Acetonitrile	0.21	0.22	0.23	3
Acrylonitrile	0.42	0.42	0.42	1
Benzene	0.22	0.30	0.68	16
n-Butane	0.70	2.42	5.70	26
2-Butanone	0.53	0.87	1.40	14
Chlorodifluoromethane	0.22	0.36	1.20	26
Chloroform				
Chloromethane	0.41	0.56	0.87	26
3-Chloropropene				
Cyclohexane				
Decane	0.41	0.41	0.41	1
1,4-Dichlorobenzene				
Dichlorodifluoromethane	0.40	0.53	0.70	26
1,2-Dichloropropane				
Ethylbenzene	0.54	0.54	0.54	1
4-Ethyltoluene				
n-Heptane	0.36	0.67	1.30	11
Hexane	0.21	0.79	1.70	19
Methylene chloride				
4-Methyl-2-pentanone				
Naphthalene				
n-Nonane				
n-Octane	0.20	0.26	0.47	10
n-Pentane	0.24	1.17	2.60	26
Propylene	5.00	5.00	5.00	1
Styrene				
Toluene	0.20	0.69	4.80	13
Trichlorofluoromethane	0.21	0.26	0.33	26
1,2,4-Trimethylbenzene	0.53	0.53	0.53	1
n-Undecane	0.92	0.92	0.92	1
Vinyl acetate	0.26	0.78	1.40	14
o-Xylene	0.63	0.63	0.63	1
Total m&p-xylenes	0.46	1.03	1.70	3

HEAVY METALS SAMPLING AND ANALYSIS

SAMPLING

Ambient air toxic monitoring on a routine basis for heavy metals (other than lead), by Ohio EPA DAPC, was initiated in 1989 and has continued. Since that time all of DAPC's air filter samples have been analyzed by the Ohio EPA Division of Environmental Services (DES). A summary of the results can be found in the following tables. Sampling for heavy metals is conducted using a high volume total suspended particulate (TSP) sampler. With this sampler, particulate matter in the air is collected on a glass fiber filter. Sampling is done intermittently with 24-hour samples collected once every six days. The operating procedures for lead can be found in the Code of Federal Regulations, 40 CFR, Part 50, Appendix G. These basic procedures are also used for the other metals.

ANALYSIS

For this report filters collected at each site were analyzed as a monthly composite. Typically there are 5 sampling days in which a filter is collected. From these individual filters one strip is cut and combined from strips from all the filters collected that month and analyzed as one sample for the month.

These composite samples are acid extracted and then the resulting solution analyzed by the ICP/MS similar to the method used for the determination of Lead from TSP filters.

SUMMARY OF ICP METHOD: The method measures element - emitted light by optical spectrometry. Samples are nebulized into an aerosol and transported to the plasma by the nebulizer argon flow. The first function of the high temperature plasma is to remove the solvent from, or desoluate, the aerosol, usually leaving the sample as microscopic salt particles. The next steps involve decomposing the salt particles into a gas of individual molecules (vaporization) that are then dissociated into atoms (atomization). The next plasma functions are Excitation and Ionization. The light emitted by the excited atoms and ions in the plasma is measured to obtain information about the sample. For coupling to mass spectrometry, the ions from the plasma are extracted through a series of cones into a mass spectrometer, usually a quadrupole. The ions are separated on the basis of their mass-to-charge ratio and a detector receives an ion signal proportional to the concentration.

HEAVY METALS PARAMETERS

Historically lead was the NAAQS Criteria pollutant released from gasoline into the ambient air. Monitoring for it established the lead filter analysis monitoring program. Over the years DAPC added other metals to the filter analysis program. As lead was phased out of gasoline other metals have risen to greater concern. At one time it was cadmium and from one particular industry it was beryllium. But now Ohio is focused on manganese in several communities. However, trends continue to change and lead has once again become the driving pollutant for filter analysis. As the only metal that is Criteria Pollutant lead is the pollutant that drives the metals monitoring program. With the establishment of a new NAAQS for lead, 0.15 $\mu g/m^3$ from the previous standard of 1.5 $\mu g/m^3$ and the requirement to monitor near specific sources, lead has been re-established as a pollutant of concern. Since 2010 DACP has had all TSP sampler filters collected analyzed for lead.

For this particular section the data collected is from the monthly composite samples collected and analyzed. All monthly composite particulate filter samples collected by DAPC are routinely analyzed for eight metals.

arsenic	cadmium	chromium	beryllium
lead[1]	nickel	zinc	manganese

From each sample, most parameters are analyzed using a very sensitive ICPMS analytical system which significantly lowers the detection limit from the standard ICP instrument. The following parameters, which are typically detected in higher concentrations, are still analyzed with the older ICP method.

Iron	potassium	zinc	manganese

Particulate mercury that can be detected from a glass or quartz fiber filter has been added to the parameter list for a number of samples from sites in communities with specific concerns about potential mercury sources. Mercury analysis for each sample is performed separately from the other metals. Total mercury is determined using a cold vapor method developed by DES.

[1]Lead is the only parameter being monitored in the ATMP that has a National Ambient Air Quality Standard. See Section V, page 92, Lead.

The following locations identify the sites that were used for the routine metals monitoring program.

SITE IDENTIFICATION AND LOCATION

AQS #	CITY	COUNTY	ADDRESS	TABLE
39-017-0015	Middletown	Butler	3901 Lefferson Rd.	G
39-029-0019	E. Liverpool	Columbiana	1250 St. George St.	H
39-029-0020	E. Liverpool	Columbiana	2220 Michigan Ave.	I
39-029-0022	E. Liverpool	Columbiana	500 Maryland Ave.	J
39-035-0038	Cleveland	Cuyahoga	2547 Tikhon Ave.	K
39-035-0042	Cleveland	Cuyahoga	3136 Lorain Ave.	L
39-035-0049	Cleveland	Cuyahoga	4150 East 56th St.	M
39-035-0060	Cleveland	Cuyahoga	2650 East 14th Ave.	N
39-035-0061	Cleveland	Cuyahoga	West 3rd. St.	O
39-035-0072	Cleveland	Cuyahoga	26565 Miles Rd.	P
39-049-0025	Columbus	Franklin	1700 Ann St.	Q
39-051-0001	Delta	Fulton	200 Van Buren St.	R
39-101-0003	Marion	Marion	Hawthorne Ave.	S
39-101-0004	Marion	Marion	640 Bellefontaine	T
NA	Marion	Marion	363 West Fairgrounds	U
39-123-0012	Elmore	Ottawa	14244 W. St.Route 105	V
39-091-0006	Bellefontaine	Logan	320 Richard Ave.	W
39-151-0017	Canton	Stark	1330 Dueber Ave. SW	X
39-167-0008	Marietta	Washington	Lancaster Rd.	Y

Table G.

Middletown Heavy Metals Data - 2014 Ohio Bell 3901 Lefferson Rd. AQS: 39-017-0015 Butler - designated			Lat: N 39.4899 Elv. : 204 m Long: W -84.364067 Parameters units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.750	<0.069	0.223	2.590	2.30	0.800	32	30
FEBRUARY	0.750	0.074	0.545	6.060	6.73	0.920	82	88
MARCH	1.000	0.229	0.291	3.440	3.36	0.970	100	28
APRIL	1.110	0.091	0.288	2.620	3.35	0.860	51	35
MAY	3.030	<0.054	0.264	3.120	3.41	0.600	47	39
JUNE	1.080	0.102	0.278	5.450	3.56	0.830	85	59
JULY	2.950	<0.09	0.184	5.310	5.25	<0.9	40	25
AUGUST	2.740	<0.054	0.412	3.020	6.01	0.890	41	52
SEPTEMBER	2.410	<0.054	0.355	4.470	4.99	0.850	52	100
OCTOBER	2.250	0.125	0.291	5.530	4.66	1.280	110	60
NOVEMBER	0.670	0.071	0.609	3.380	5.64	0.740	72	100
DECEMBER	0.770	<0.046	0.675	2.540	6.52	0.620	50	100

Table H.

East Liverpool Heavy Metals Data - 2014 Port Authority 1250 St. George St. AQS: 39-029-0019 Columbiana - designated			Lat: N 40.631111 Elv. : 209 m Long: W -80.546944 Parameters units - - ng/m³						
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	1.400	<0.54	2.990	2.790	17.40	3.920	110	240	0.049
FEBRUARY	1.850	0.058	2.370	2.960	11.80	1.520	140	96	0.073
MARCH	1.030	<0.05	2.070	3.060	8.78	1.520	110	60	0.053
APRIL	2.190	0.139	0.482	3.610	7.70	1.650	130	35	0.060
MAY	2.190	0.151	0.569	3.170	10.50	1.540	130	38	0.052
JUNE	3.950	0.153	0.664	5.600	11.00	2.860	180	56	0.050
JULY	4.450	0.131	0.399	4.310	6.81	1.880	110	36	0.065
AUGUST	4.120	0.119	0.979	3.850	9.67	1.610	120	39	0.075
SEPTEMBER	5.460	0.213	0.824	6.530	16.60	3.360	360	59	0.097
OCTOBER	2.130	0.178	0.449	3.990	7.10	1.990	170	36	0.044
NOVEMBER	1.070	0.090	0.217	2.290	4.38	0.930	82	27	0.043
DECEMBER	0.790	<0.056	0.256	2.060	4.39	0.880	86	27	0.026

Table I.

East Liverpool Heavy Metals Data - 2014 Waterplant 2220 Michigan Ave. AQS: 39-029-0020 Columbiana - designated			Lat: N 40.639722 Elv. : 212 m Long: W -80.523889 Parameters units - - ng/m³						
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	1.720	<0.056	3.900	3.950	22.00	6.300	2000	300	0.050
FEBRUARY	2.160	<0.054	2.250	9.550	10.40	4.730	1800	93	0.084
MARCH	2.160	<0.054	2.620	11.500	10.40	4.440	1500	120	0.120
APRIL	1.240	<0.056	0.590	4.500	5.01	2.340	580	42	0.070
MAY	2.450	<0.054	0.516	3.900	4.73	2.110	590	42	0.049
JUNE	2.700	<0.055	0.589	10.100	7.92	3.530	770	52	0.045
JULY	1.260	<0.055	0.470	5.570	6.73	2.570	380	45	0.083
AUGUST	3.690	<0.058	0.984	46.500	7.71	3.760	580	49	0.110
SEPTEMBER	3.000	<0.054	0.508	22.200	12.10	7.520	8100	65	0.077
OCTOBER	1.620	<0.053	0.502	11.300	6.08	7.020	1900	52	0.033
NOVEMBER	1.900	<0.051	0.408	2.650	3.46	1.320	450	25	0.032
DECEMBER	1.250	<0.043	0.256	3.100	7.64	1.820	930	27	0.019

Table J.

East Liverpool Heavy Metals Data - 2014 500 Maryland Ave. AQS: 39-029-0022 Columbiana - designated			Lat: N 40.635 Elv. : 229 m Long: W -80.546667 Parameters units - - ng/m³						
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	1.470	<0.062	3.080	2.650	18.40	5.320	160	250	0.033
FEBRUARY	1.570	<0.049	1.890	2.570	9.64	1.000	110	79	0.072
MARCH	1.030	<0.05	2.070	3.060	8.78	1.520	110	60	0.053
APRIL	0.840	<0.051	0.417	2.010	5.52	0.860	67	28	0.028
MAY	1.720	<0.062	0.471	1.880	5.35	0.870	56	31	0.028
JUNE	3.590	<0.052	0.559	4.020	9.92	1.950	86	50	0.037
JULY	1.250	<0.052	0.263	3.240	4.64	1.620	55	32	0.031
AUGUST	2.620	<0.052	0.854	3.040	7.56	1.060	70	33	0.044
SEPTEMBER	4.560	<0.051	0.431	4.290	5.88	1.750	230	42	0.026
OCTOBER	7.050	<0.051	0.315	1.980	6.01	1.100	60	26	0.015
NOVEMBER	0.920	<0.049	0.158	1.100	3.36	0.510	27	23	0.012
DECEMBER	0.570	<0.04	0.229	1.100	3.15	0.500	37	20	0.013

Table K.

Cleveland Heavy Metals Data - 2014								
St. Theodosius Church				Lat: N 41.476944		Elv. : 202 m		
2547 St. Tikhon Ave.				Long: W -81.681944				
AQS: 39-035-0038			Parameters					
Cuyahoga	- designated		units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.670	<0.053	0.543	2.680	5.80	2.420	44	92
FEBRUARY	0.910	<0.052	0.388	4.020	14.60	3.170	67	97
MARCH	1.130	<0.065	0.809	6.030	11.00	4.750	110	120
APRIL	1.090	0.061	0.453	4.420	12.80	3.210	85	83
MAY	2.240	<0.051	0.329	3.370	13.00	2.450	52	77
JUNE	1.750	<0.05	0.423	5.440	15.00	3.410	82	110
JULY	1.290	<0.064	0.405	5.430	24.10	3.120	100	130
AUGUST	1.230	<0.063	0.247	1.930	14.60	1.200	26	110
SEPTEMBER	2.020	<0.051	0.581	5.930	13.80	4.110	110	150
OCTOBER	1.780	<0.053	0.381	8.660	14.80	2.970	190	140
NOVEMBER	0.550	<0.053	0.303	2.280	4.67	1.380	39	49
DECEMBER	<0.52	<0.052	0.124	1.330	3.54	1.340	16	27

Table L.

Cleveland Heavy Metals Data - 2014								
FIRE "4A"				Lat: N 41.482222		Elv. : 208 m		
3136 Lorain Ave.				Long: W -81.708889				
AQS: 39-035-0042			Parameters					
Cuyahoga	- designated		units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.620	<0.056	0.469	1.060	4.47	1.600	8.9	43
FEBRUARY	0.830	<0.056	0.423	2.090	8.80	2.670	27.0	75
MARCH	1.060	<0.069	0.663	3.820	11.60	3.630	49.0	71
APRIL	0.990	<0.055	0.414	2.670	8.06	2.200	25.0	48
MAY	2.140	<0.055	0.348	1.700	8.37	1.860	22.0	41
JUNE	1.930	<0.054	0.310	2.380	9.57	2.320	29.0	61
JULY	1.280	<0.054	0.308	2.260	12.90	1.790	22.0	45
AUGUST	1.830	<0.054	0.304	2.110	9.94	1.280	25.0	60
SEPTEMBER	1.660	<0.054	0.420	2.890	12.60	1.980	29.0	87
OCTOBER	1.280	<0.054	0.252	1.840	11.60	1.540	20.0	43
NOVEMBER	0.730	<0.069	0.248	1.020	4.27	1.310	10.0	31
DECEMBER	0.550	<0.046	0.180	1.030	4.00	1.040	8.5	25

Table M.

Cleveland Heavy Metals Data - 2014								
FERRO "A"				Lat: N 41.446667		Elv. : 213 m		
4150 EAST 56th STR.				Long: W -81.651111				
AQS: 39-035-0049			Parameters units - - ng/m³					
Cuyahoga - designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	1.370	<0.056	3.840	5.940	7.08	145.000	180.0	140
FEBRUARY	1.150	<0.057	2.000	4.950	10.50	55.300	110.0	260
MARCH	1.340	<0.07	0.954	4.840	8.19	19.000	78.0	74
APRIL	1.120	0.055	1.170	5.560	12.00	21.900	130.0	110
MAY	1.730	<0.055	0.460	3.360	9.04	12.400	91.0	73
JUNE	2.450	<0.055	1.000	4.870	16.00	25.700	130.0	160
JULY	1.830	<0.055	2.060	7.300	12.40	51.300	140.0	200
AUGUST	1.960	0.055	1.000	5.050	12.30	14.200	140.0	120
SEPTEMBER	1.820	<0.055	2.400	5.470	15.30	80.800	160.0	150
OCTOBER	1.780	<0.055	1.620	9.870	13.00	123.000	310.0	150
NOVEMBER	1.070	<0.07	2.620	6.400	7.92	126.000	200.0	120
DECEMBER	0.630	<0.047	0.869	4.720	5.63	20.900	110.0	83

Table N.

Cleveland Heavy Metals Data - 2014								
GT Craig				Lat: N 41.492117		Elv. : 206 m		
2650 E 14th Ave.				Long: W -81.678449				
AQS: 39-035-0060			Parameters units - - ng/m³					
Cuyahoga - designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.790	<0.07	1.400	3.010	7.41	3.490	49.0	84
FEBRUARY	1.120	0.066	1.060	5.090	14.90	4.110	77.0	99
MARCH	1.270	0.079	1.070	5.980	12.80	4.550	88.0	92
APRIL	1.610	0.132	1.110	8.550	16.30	5.360	140.0	110
MAY	2.050	<0.08	0.529	5.150	12.60	3.250	88.0	150
JUNE	2.070	0.098	0.881	7.720	21.00	4.420	150.0	220
JULY	1.380	0.109	0.480	11.200	15.50	6.130	230.0	110
AUGUST	1.660	0.072	0.355	6.620	34.70	3.080	150.0	200
SEPTEMBER	2.210	0.083	0.888	11.500	15.60	5.460	270.0	180
OCTOBER	2.070	0.118	1.150	12.900	21.70	4.460	280.0	200
NOVEMBER	0.940	0.061	0.367	3.440	11.30	1.690	71.0	120
DECEMBER	0.930	0.060	0.210	2.450	6.32	1.750	43.0	50

Table O.

Cleveland Heavy Metals Data - 2014								
Asphalt Plant "A"				Lat: N 41.475064		Elv. : 181 m		
West 3rd St.				Long: W -81.675962				
AQS: 39-035-0061			Parameters units - - ng/m³					
Cuyahoga - designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.700	<0.053	0.703	7.840	7.16	3.180	130.0	94
FEBRUARY	0.890	<0.053	0.430	4.000	14.00	3.540	69.0	99
MARCH	1.210	0.088	0.814	7.710	13.20	4.530	140.0	79
APRIL	1.160	0.073	0.517	7.640	12.60	3.420	150.0	73
MAY	1.900	<0.05	0.274	4.170	9.25	2.560	81.0	120
JUNE	1.890	0.065	0.575	7.150	14.40	4.710	150.0	130
JULY	1.430	<0.05	0.847	6.350	29.10	4.150	130.0	100
AUGUST	1.710	0.052	0.551	5.410	41.70	2.160	130.0	160
SEPTEMBER	2.040	0.085	0.662	15.800	17.00	5.380	340.0	190
OCTOBER	1.480	<0.052	0.477	8.870	11.10	4.130	170.0	110
NOVEMBER	0.680	<0.052	0.272	6.700	4.72	1.290	110.0	54
DECEMBER	0.590	<0.044	0.209	3.070	5.29	1.430	57.0	50

Table P.

Cleveland Heavy Metals Data - 2014								
Century				Lat: N 41.42585		Elv. : 332 m		
26565 Miles Rd.				Long: W -81.49078				
AQS: 39-035-0072			Parameters units - - ng/m³					
Cuyahoga - designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	1.320	<0.055	0.225	1.530	9.94	5.130	29.0	46
FEBRUARY	0.840	<0.056	0.322	1.680	5.02	3.010	28.0	46
MARCH	0.700	<0.055	0.436	1.110	4.16	1.670	12.0	32
APRIL	1.310	<0.054	0.351	3.090	5.95	4.130	43.0	55
MAY	1.170	<0.054	0.231	1.860	4.61	3.160	19.0	29
JUNE	1.530	<0.054	0.239	1.510	5.76	2.370	18.0	33
JULY	2.040	<0.054	0.230	2.330	7.94	7.680	150.0	50
AUGUST	1.270	<0.054	0.204	1.690	6.12	2.560	87.0	53
SEPTEMBER	1.930	<0.054	0.226	7.170	10.30	5.990	32.0	110
OCTOBER	1.420	<0.054	0.263	1.980	11.40	2.840	80.0	45
NOVEMBER	0.990	<0.055	0.184	1.870	6.47	2.680	93.0	37
DECEMBER	<0.46	<0.046	0.109	0.960	2.14	1.350	66.0	17

Table Q.

Columbus Heavy Metals Data - 2014 Woodrow 1700 Ann St. AQS: 39-049-0025/0039 Franklin - designated			Lat: N 39.928056 Elv. : 234 m Long: W -82.981111 Parameters units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.570	<0.054	0.248	1.490	4.81	0.870	9.3	45
FEBRUARY	0.890	<0.054	0.302	1.410	5.11	0.610	9.3	38
MARCH	0.800	<0.054	0.378	1.830	10.00	0.930	12.0	47
APRIL	0.760	<0.055	0.234	1.810	7.17	1.220	18.0	41
MAY	1.460	<0.055	0.149	1.300	4.35	0.990	10.0	28
JUNE	1.650	<0.056	0.513	2.260	7.90	1.470	18.0	80
JULY	1.550	<0.056	0.243	2.130	8.20	1.170	14.0	52
AUGUST	4.070	<0.094	0.345	2.260	9.87	1.070	15.0	47
SEPTEMBER	0.000	0.000	0.000	0.000	0.00	0.000	0.0	0
OCTOBER	1.600	<0.057	0.348	2.990	8.19	2.170	30.0	76
NOVEMBER	0.610	<0.055	0.149	1.500	3.84	1.270	15.0	46
DECEMBER	0.520	<0.045	0.134	0.860	3.03	0.630	6.1	24

Table R.

NWDO Heavy Metals Data - 2014 Delta 200 Van Buren St. AQS: 39-051-0001 Fulton - Designated			Lat: N 41.575278 Elv. : 220 m Long: W -83.996389 Parameters units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	<0.48	<0.048	0.268	1.110	49.40	0.500	7.7	160
FEBRUARY	0.540	<0.049	0.248	1.190	43.10	<0.49	9.8	230
MARCH	0.510	<0.05	0.198	1.320	40.00	0.680	7.5	110
APRIL	0.620	<0.051	0.188	1.180	31.80	0.690	9.8	95
MAY	2.180	<0.052	0.152	1.350	14.50	0.740	13.0	50
JUNE	1.360	<0.05	0.216	1.390	44.20	0.960	11.0	110
JULY	1.020	<0.05	0.190	1.490	34.60	0.980	10.0	93
AUGUST	0.970	<0.05	0.660	1.710	32.50	1.670	12.0	130
SEPTEMBER	1.850	<0.051	0.370	1.550	34.70	0.850	7.6	220
OCTOBER	0.850	<0.053	0.233	2.070	60.30	1.080	21.0	220
NOVEMBER	0.590	<0.053	0.959	1.420	162.00	0.840	11.0	1100
DECEMBER	0.750	<0.043	0.155	1.260	23.80	0.710	9.4	74

Table S.

NWDO Heavy Metals Data - 2014									
Prospect			Lat: N 40.571405		Elv. : 247 m				
Hawthorne Ave.			Long: W -83.135557						
AQS: 39-101-0003			Parameters units - - ng/m³						
Marion	- designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	2.140	<0.047	0.514	8.280	12.60	4.140	97	77	0.060
FEBRUARY	1.200	<0.046	0.329	5.130	12.40	3.150	58	60	0.039
MARCH	0.680	<0.047	0.306	4.610	10.70	1.950	53	57	0.035
APRIL	0.810	<0.047	0.219	4.640	9.88	2.340	52	43	0.027
MAY	1.260	<0.048	0.305	7.860	8.73	2.840	75	62	0.022
JUNE	2.050	<0.047	0.402	6.860	14.10	3.040	72	110	0.052
JULY	2.610	<0.044	0.580	11.700	15.90	3.760	110	130	0.048
AUGUST	1.320	<0.045	0.481	11.700	16.20	2.620	120	110	0.054
SEPTEMBER	1.810	<0.043	0.949	11.800	29.60	3.170	160	150	0.054
OCTOBER	2.100	<0.045	0.584	17.900	29.00	6.150	290	160	0.054
NOVEMBER	1.130	<0.047	0.472	8.550	16.90	3.420	140	97	0.062
DECEMBER	1.260	<0.038	0.490	5.680	25.20	3.660	110	130	0.027

Table T.

NWDO Heavy Metals Data - 2014									
Bellefontaine			Lat: N 40.576656		Elv. : 299 m				
640 Bellefontaine Ave.			Long: W -83.14024						
AQS: 39-101-0004			Parameters units - - ng/m³						
Marion	- designated								
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	0.530	<0.045	0.193	1.720	7.54	0.740	14	47	0.054
FEBRUARY	0.610	<0.046	0.322	2.350	5.27	0.980	18	64	0.038
MARCH	0.590	<0.046	0.172	2.410	4.13	1.110	18	30	0.028
APRIL	0.740	<0.046	0.178	3.380	5.89	1.430	31	39	0.018
MAY	1.070	<0.044	0.217	2.260	4.88	0.920	19	48	0.024
JUNE	1.390	<0.046	0.227	2.930	5.02	1.040	18	47	0.026
JULY	1.900	<0.044	0.277	2.170	5.58	0.940	14	52	0.019
AUGUST	1.160	<0.048	0.186	2.160	5.38	0.720	16	36	0.023
SEPTEMBER	1.750	<0.048	0.268	2.840	8.62	1.280	23	52	0.039
OCTOBER	1.990	<0.047	0.228	4.740	9.57	2.280	59	56	0.031
NOVEMBER	<0.48	<0.048	0.137	2.190	6.67	0.970	25	40	0.012
DECEMBER	<0.41	<0.041	0.123	1.300	3.08	0.520	10	48	0.010

Table U.

NWDO Heavy Metals Data - 2014									
Fairgrounds									
363 West Fairgrounds			Lat: N 41.599747						
Marion, Ohio			Long: W -83.136721						
AQS: 39- Marion	Left - Designated		Parameters units - - ng/m³						
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	iron	manganese	zinc
JANUARY	<2.63	<0.263	3.245	2.98	13.29	<2.63	414	20.8	808
FEBRUARY	<2.6	<0.26	1.108	3.06	8.33	<2.6	306	20.3	197
MARCH	<2.57	<0.257	0.516	3.29	6.76	<2.57	332	20.0	203
APRIL	<2.48	<0.248	0.817	3.89	8.72	3.01	282	15.7	242
MAY	<2.48	<0.248	2.204	3.40	20.43	<2.48	380	17.5	607
JUNE	<2.48	<0.248	4.347	3.74	23.81	<2.48	496	20.3	852
JULY	<2.54	<0.246	2.565	3.99	17.86	<2.46	516	24.0	818
AUGUST	<2.44	<0.244	2.470	3.70	24.37	<2.44	534	20.0	1131
SEPTEMBER	3.7	<0.259	2.388	5.63	30.32	<2.59	622	25.5	1488
OCTOBER	<2.53	<0.253	1.409	4.47	17.55	<2.53	446	19.8	1216
NOVEMBER	<2.49	<0.249	1.856	4.02	20.14	<2.49	698	26.5	3550
DECEMBER	<2.56	<0.256	1.190	8.43	26.41	<2.72	572	27.5	1829

Table V.

NWDO Heavy Metals Data - 2014								
Brush Wellman 32			Lat: N 41.495833 Elv. : 177 m					
14244 W. St. Route 105			Long: W -83.206944					
AQS: 39-123-0012 Ottawa	- Designated		Parameters units - - ng/m³					
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	0.280	0.086	0.056	0.300	1.680	0.290	2.9	11.000
FEBRUARY	0.300	0.036	0.067	0.370	1.940	0.250	3.1	11.000
MARCH	0.680	0.044	0.090	0.380	2.090	0.330	3.0	14.000
APRIL	0.690	0.094	0.127	0.400	2.600	0.380	3.8	12.000
MAY	0.760	0.068	0.077	0.760	2.530	0.650	4.4	12.000
JUNE	0.650	0.043	0.074	0.350	2.040	0.340	3.9	10.000
JULY	0.800	0.088	0.076	0.410	2.120	0.310	3.5	9.900
AUGUST	0.530	0.125	0.081	0.330	2.150	0.240	2.6	11.000
SEPTEMBER	0.740	0.051	0.074	0.270	1.820	0.240	2.0	8.000
OCTOBER	0.420	0.065	0.063	0.280	1.420	0.390	3.8	9.300
NOVEMBER	0.360	0.149	0.051	0.290	1.450	0.290	2.4	8.600
DECEMBER	0.440	0.030	0.074	0.260	2.110	0.160	2.5	14.000

Table W.

SWDO Heavy Metals Data - 2014								
Bellefontaine				Lat: N 40.341111		Elv. : 377 m		
320 Richard Ave.				Long: W -83.75778				
AQS: 39-091-0006			Parameters units - - ng/m³					
Logan	- Designated							
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	<0.43	<0.043	0.135	1.480	2.01	0.630	4	15
FEBRUARY	0.450	<0.041	0.175	1.060	2.94	0.530	4	17
MARCH	0.510	<0.041	0.173	0.870	2.42	0.550	4	15
APRIL	<0.41	<0.041	0.102	0.910	1.78	0.780	5	11
MAY	0.870	<0.041	0.098	0.850	2.49	0.590	5	13
JUNE	1.250	<0.052	0.135	0.880	2.92	0.660	5	15
JULY	0.680	<0.047	0.160	1.160	2.45	0.710	4	16
AUGUST	0.840	<0.044	0.129	0.950	2.57	0.820	5	16
SEPTEMBER	1.120	<0.043	0.161	1.000	2.84	0.750	6	15
OCTOBER	0.820	<0.043	0.098	1.180	2.15	1.520	8	13
NOVEMBER	<0.56	<0.056	0.110	0.710	1.37	0.640	<2.8	12
DECEMBER	<0.39	<0.039	0.102	1.050	2.54	0.520	4	15

Table X.

Canton APC Div.		Data - 2014						
Fire Station #8				Lat: N 40.786667		Elv. : 319 m		
1330 Dueber Avenue SW				Long: W -81.394444				
AQS: 39-151-0017			Parameters units - - ng/m³					
Stark	- designated							
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc
JANUARY	3.080	<0.053	0.244	3.070	5.94	2.410	38	80
FEBRUARY	1.240	<0.041	0.319	3.170	8.43	1.740	44	160
MARCH	1.550	<0.052	1.130	4.330	7.11	2.120	51	110
APRIL	1.290	<0.043	0.436	3.940	7.68	1.790	38	340
MAY	1.720	<0.043	0.374	3.390	8.42	1.840	44	130
JUNE	3.660	<0.055	0.414	3.740	14.20	2.020	49	210
JULY	3.350	<0.057	0.348	6.010	13.00	3.560	62	150
AUGUST	3.050	<0.046	0.440	4.630	11.20	2.270	53	140
SEPTEMBER	2.910	<0.045	0.542	5.560	29.90	3.310	70	210
OCTOBER	2.060	<0.044	0.368	5.020	9.26	2.830	76	380
NOVEMBER	shutdown							
DECEMBER								

Table Y.

SEDO Heavy Metals Data - 2014 Washington Co. Career Center Lancaster Rd.			Lat: N 39.433611 Long: W -81.5025		Elv. : 300 m				
AQS: 39-167-0008 Washington - designated			Parameters units - - ng/m³						
MONTH	arsenic	beryllium	cadmium	chromium	lead	nickel	manganese	zinc	mercury
JANUARY	<0.49	<0.049	0.322	2.060	2.87	<0.49	130	18	0.024
FEBRUARY	0.460	<0.041	0.208	0.880	2.55	<0.41	110	16	0.016
MARCH	0.530	<0.049	0.292	0.890	2.40	<0.49	29	13	0.013
APRIL	<0.51	<0.051	0.129	1.030	1.85	<0.51	41	12	0.016
MAY	0.650	<0.053	0.132	1.000	2.35	<0.53	39	14	0.015
JUNE	1.150	<0.051	0.421	0.780	3.27	<0.51	140	22	0.015
JULY	<0.65	<0.065	0.172	0.950	2.35	0.750	170	15	0.025
AUGUST	2.200	<0.053	0.228	0.920	3.47	<0.53	97	21	0.022
SEPTEMBER	0.540	<0.05	0.215	0.890	2.20	<0.5	61	16	0.010
OCTOBER	0.590	<0.049	0.212	0.920	3.05	<0.49	200	19	0.012
NOVEMBER	<0.48	<0.048	0.323	0.820	2.58	<0.48	120	17	0.007
DECEMBER	<0.47	<0.047	0.087	0.500	1.81	<0.47	10	11	0.008

FUTURE

The long term air toxics monitoring goals of DAPC will focus on the requirements of the Clean Air Act (CAA), particularly Section 112, and will support the development of EPA's Integrated Urban Air Toxics Strategy. In addition the air toxics monitoring efforts will incorporate relative elements of the mission and goals of DAPC to protect the environment for the benefit of all and to develop improved air toxics information.

The current strategy of urban based monitoring has evolved over the years and the number of sites and locations have changed depending on resources and priorities. The major emphasis of existing sampling projects is to develop and establish cost effective, routine sampling and analysis procedures. U.S. EPA has provided the Compendium of Recommended Methods for the Determination of Toxic Organic Compounds in Ambient Air. Methods have been updated to allow for more uniform approaches for sampling and analyzing various groups of compounds. New methods have been developed and added for compounds not previously targeted. There is even a Compendium of Methods for the Determination of Air Pollutants In Indoor Air. Ohio EPA's own air toxics monitoring capacity has been enhanced with the expansion of the air canister sample analysis capability by the Division of Environmental Services (DES).

Future Goals of the division will be modified to be compatible with the National Air Toxics Assessment Network activities. The intent of this network is to provide measurements of ambient concentrations of air toxics at monitoring sites throughout the nation for the estimation of human and environmental exposure to air toxics, and the assessment of risk due to air toxics.

As part of the current grant commitment to U.S. EPA, DAPC will continue its effort to submit future Air Toxics Data to the AQS Database. As part of that effort DAPC will compile all air toxics data collected in previous years so that it may eventually be submitted to AQS. DAPC has already made an effort to have all metals data submitted to AQS.

An intermediate effort of DAPC will be to conduct follow-up sampling efforts for the U.S. EPA School Air Toxics Program. Some of these areas were a high priority before the EPA study and will continue to be until the situation is mitigated. One development of this program was the expanded role of district and local air agencies into air toxics sampling.

In 2011 DAPC received a Great Lakes grant to establish a mercury monitoring site on Lake Erie. With that grant DAPC purchase a Tekran mercury monitoring system and deployed it at the Ohio State University Stone Laboratory Facility located on South Bass Island in Lake Erie. With a cooperative effort from OSU staff, who have been contracted to operate the system, and assistance from personnel from Ohio University, DAPC was able to make the system fully operational in 2012 and has begun to generate valid data. That data has been compiled and will be made available to The National Atmospheric Deposition Program for detailed evaluation and peer review.

Major Development

In response to the national and state wide interest in developing oil and natural gas reserves in the Utica shale region of Ohio, DAPC has established an air monitoring site in the vicinity of hydraulic fracturing facility in Muskingum County. After the data has been compiled and evaluated, DAPC will release a report summarizing those activities.

Modernization:

- DAPC has purchase and is evaluation a gas chromatography and has deployed it at fixed sampling location.
- DES has developed an ICP/MS method for lead filter analysis to be equivalent to Manual Equivalent Method: EQL-0710-192 and it is used to analyze all standard metals parameters, (except manganese, mercury and zinc), from single filters.
- Updates of the Compendium of Recommended Methods are available at the following: http://www.epa.gov/ttn/amtic/airtox.html and http://www.epa.gov/ttn/amtic/inorg.html and
- Modernizing the Stainless Steel Canister inventory
- Evaluate future training needs for Air Toxics Monitoring:
- sampling methods,
- analytical procedures,
- equipment

VII. AIR QUALITY INDEX (AQI)

There has been a daily reporting of ambient air quality in Ohio's major metropolitan areas in some form since 1971. A national Pollution Standards Index (PSI) was established in 1977 to report air quality. This index was adopted by Ohio EPA's District Offices and the local air agencies (LAA's) to inform the public of daily air quality.

In the summer of 1999 the PSI scale was revised and renamed the Air Quality Index (AQI). It was modified to add 2.5 micron particulate matter ($PM_{2.5}$) and to accommodate the 8-Hour ozone standard.

The AQI (see Table 13) is a uniform "scaling" of five pollutants: particulate (PM_{10} and $PM_{2.5}$), sulfur dioxide, ozone, nitrogen dioxide, and carbon monoxide. The concentration level of each of these is calculated every day to determine the AQI. The pollutant with the highest AQI is reported to the media.

When the AQI exceeds, or is expected to exceed, 100 in a major city, the agency concerned issues a "health advisory". When pollution levels exceed an AQI of 200 and are projected to persist, an "air pollution episode" exists and the Governor declares an "alert". This initiates mandatory cutbacks of emissions from specified facilities to alleviate the situation. If the AQI were to surpass 300, 400 or 500, progressively greater cutbacks would be implemented to reduce pollutants to an acceptable level.

The AQI trend shows that Ohio's air quality has improved significantly. Although alerts were commonplace in the early 1970's, none have happened in over twenty years, and the number of health advisories has been greatly reduced.

TABLE 13

Comparison Of AQI Values With Pollutant Concentrations, Descriptor Words And Associated Colors

INDEX VALUE	PM_{10} µg/m³	$PM_{2.5}$ µg/m³	CO ppm	SO_2 ppm	Ozone ppm[1]		NO_2 ppm	Color	Category
	24-Hour	24-Hour	8-Hour	24-Hour	8-Hour	1-Hour	1-Hour		
0-50	0-54	0.0-12.0	0.0-4.4	0-0.035	0.000-0.059		0-0.053	Green	Good
51-100	55-154	12.1-35.4	4.5-9.4	0.036-0.075	0.060-0.075		0.054-0.100	Yellow	Moderate
101-150	155-254	35.5-55.4	9.5-12.4	0.076-0.185	0.076-0.095	0.125-0.164	0.101-0.360	Orange	Unhealthy for Sensitive Groups
151-200	255-354	55.5-150.4	12.5-15.4	0.186-0.304	0.096-0.115	0.165-0.204	0.361-0.64	Red	Unhealthy
201-300	355-424	150.5-250.4	15.5-30.4	0.305-0.604	0.116-0.374	0.205-0.404	0.65-1.24	Purple	Very Unhealthy
301-	425-	250.5 -	30.5-	0.605	(2)	0.405-	1.25-	Maroon	Hazardous

[1] Areas are generally required to report the AQI based on 8-Hr ozone values. The maximum of the 8-Hr or 1-Hr is used.

[2] 8-Hr Ozone values do not define higher AQI values ($301). AQI values of 301 or higher are calculated with 1-Hr ozone concentrations.

AQI Chart

The accompanying table shows the AQI values for selected counties. It should be noted that the daily AQI values that are calculated and reported on a daily basis for cities in these counties may differ from those in the table. The daily AQI is based on a limited number of monitors (particularly PM_{10} and $PM_{2.5}$). This table uses data from all Federal Reference Monitors in the county. From those data the highest AQI value is chosen for each day.

The data in TABLE 14 is for the AQI in effect during 2014.

The table gives a general representation of the relative air quality in these counties. There were no readings in the "very unhealthy" or "hazardous" categories.

TABLE 14

County	Highest AQI Value	Days in each category:			
		Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
Butler	111	274	89	2	0
Clark	98	315	50	0	0
Cuyahoga	173	189	166	9	1
Franklin	102	230	134	1	0
Hamilton	122	176	181	8	0
Jefferson	150	185	175	5	0
Lake	157	310	49	5	1
Lawrence	103	332	32	1	0
Lucas	100	278	64	0	0
Mahoning	114	315	48	1	0
Montgomery	104	308	56	1	0
Stark	93	301	64	0	0
Summit	107	302	62	1	0
Trumbull	106	216	49	1	0

VIII. MONITORING SITES 2014

Explanation of AQS codes:

The first column is the AQS number which consists of:

39-the state code
NNN-the county code, alphabetical, odd numbers only
NNNN-the site code

The second column is the county in which the monitoring site is located

The third column is a street address or city name

The fourth column lists the pollutants monitored at the site.

The main (criteria pollutant) parameters monitored at sites are:

PB	Lead
PM10	Ten Micron Particulate Matter (PM_{10})
LC25	2.5 Micron Particulate Matter ($PM_{2.5}$)
PM25C	2.5 Micron Particulate Matter ($PM_{2.5}$) Continuous
PMSP	2.5 Micron Particulate Matter ($PM_{2.5}$) Speciation
PT	Total Suspended Particulate (TSP)
O3	Ozone (O_3)
SO2	Sulfur Dioxide
CO	Carbon Monoxide
NO2	Nitrogen Dioxide

Monitoring Network in 2014
Monitors that had data in any part of 2014

AQS Number	County	Site Location	Parameter(s)
39-001-0001	Adams	210 N. Wilson	SO2, PM25C
39-003-0009	Allen	2850 Bible Rd.	SO2, O3, PM25C, LC25
39-007-1001	Ashtabula	Conneaut	O3, SO2
39-009-0003	Athens	Gifford State Forest	LC25
39-013-3002	Belmont	E. 40 St., Shadyside	SO2
39-017-0003	Butler	Bonita & St. John	PM10, LC25
39-017-0004	Butler	Schuler & Bender	O3
39-017-0015	Butler	3901 Lefferson	PM10, PB, PT
39-017-0016	Butler	400 Nilles Rd.	LC25
39-017-0018	Butler	1701 Runway Dr.	O3
39-017-0019	Butler	1300 Oxford State Rd.	SO2, LC25, PM25C, PM10
39-017-0020	Butler	3350 Yankee Rd.	SO2, LC25, PM25C, PM10
39-017-0021	Butler	1491 Made Industrial Dr.	SO2
39-017-9991	Butler	Miami University	O3
39-023-0001	Clark	5171 Urbana Rd.	O3
39-023-0003	Clark	5400 Spangler Rd.	O3, SO2
39-023-0005	Clark	350 N. Fountain Ave.	LC25, PM25C
39-025-0022	Clermont	2400 Clermont Center Dr.	O3
39-027-1002	Clinton	62 Laurel Dr., Career Cntr	O3
39-029-0019	Columbiana	1250 George St.	PB, SO2
39-029-0020	Columbiana	2220 Michigan Ave.	PM10, PB, PT
39-029-0022	Columbiana	500 Maryland Ave.	PM10, PB
39-035-0034	Cuyahoga	891 E. 152 St.	O3, LC25
39-035-0038	Cuyahoga	2547 St. Tikhon Ave.	PB, SO2, PM10, LC25, PMSP, PT
39-035-0042	Cuyahoga	3136 Lorain	PB, PT
39-035-0045	Cuyahoga	45950 Broadway Ave.	SO2, PM10, LC25
39-035-0049	Cuyahoga	E. 56th St.	PB, PT
39-035-0051	Cuyahoga	E. 9th & St. Clair	CO
39-035-0060	Cuyahoga	E. 14th & Orange	O3, NO2, SO2, PM10, LC25, PM25C, PMSP, CO, PT, PB
39-035-0061	Cuyahoga	West 3rd St.	PB, PT
39-035-0064	Cuyahoga	Berea	O3
39-035-0065	Cuyahoga	4600 Harvard Ave.	SO2, PM10, LC25
39-035-0072	Cuyahoga	26565 Miles Rd.	PB, PT
39-035-0073	Cuyahoga	25609 Emery Rd.	CO, NO2
39-035-1002	Cuyahoga	16900 Holland Rd.	PM10, LC25
39-035-5002	Cuyahoga	6116 Wilson Mills Rd.	O3
39-041-0002	Delaware	359 Main St.	O3
39-047-9991	Fayette	Deer Creek	O3
39-049-0005	Franklin	Morse & Karl Rds	CO
39-049-0024	Franklin	Ohio State Fairgrounds	PM10, LC25
39-049-0025	Franklin	580 Woodrow Ave.	PB, LC25

AQS Number	County	Site Location	Parameter(s)
39-049-0029	Franklin	7600 Fodor Rd., New Albany	O3, PM25C
39-049-0034	Franklin	Korbel Ave.	PM25C, SO2
39-049-0037	Franklin	1777 E. Broad St.	O3, NO2
39-049-0038	Franklin	7560 Smokey Row Rd.	CO, NO2
39-049-0039	Franklin	580 E Woodrow Ave.	LC25, PB
39-049-0081	Franklin	5750 Maple Canyon Dr.	O3, LC25, PMSP
39-051-0001	Fulton	200 Van Buren St.	PB
39-055-0004	Geauga	13000 Auburn Rd.	O3
39-057-0005	Greene	100 Dayton St.	PM10, LC25, PM25C
39-057-0006	Greene	541 Ledbetter Rd.	O3
39-061-0006	Hamilton	11590 Grooms Rd.	O3, LC25, PM25C
39-061-0010	Hamilton	6950 Ripple Rd.	O3, SO2, LC25, PM25C
39-061-0014	Hamilton	18 E. Seymour	PM10, LC25
39-061-0040	Hamilton	250 Wm. Howard Taft Rd.	O3, NO2, PM10, LC25, PM25C, PMSP, CO, SO2, PB
39-061-0042	Hamilton	2101 W. Eighth St.	LC25
39-061-0048	Hamilton	3428 Colerain Ave.	CO, NO2, LC25
39-061-5001	Hamilton	101 Cooper Ave.	PM10
39-081-0001	Jefferson	1004 3rd St., Brilliant	PM10
39-081-0017	Jefferson	618 Logan	O3, SO2, PM10, LC25, PM25C
39-081-0018	Jefferson	3487 County Rd. 19	SO2
39-081-0020	Jefferson	1469 3rd St.	SO2
39-081-0021	Jefferson	110 Steuben St.	LC25
39-083-0002	Knox	Water Plant, SR 314	O3
39-085-0003	Lake	Jefferson Elementary School	O3, SO2
39-085-0006	Lake	8443 Mentor Ave.	CO
39-085-0007	Lake	177 Main	SO2, O3, LC25, PM25C
39-085-1001	Lake	325 Vine St.	PM10
39-087-0011	Lawrence	SR 775 & SR 141	O3
39-087-0012	Lawrence	450 Commerce Dr.	O3, SO2, PM25C, PM10, LC25, PMSP
39-089-0005	Licking	300 Licking View Dr., Heath	O3
39-091-0006	Logan	320 Richard Ave.	PB
39-093-0018	Lorain	4706 Detroit Rd.	O3
39-093-3002	Lorain	2180 Lake Breeze	PM10, LC25, PM25C, PMSP
39-095-0008	Lucas	600 Collins Park	SO2
39-095-0024	Lucas	348 S. Erie St.	O3, LC25, PM25C
39-095-0026	Lucas	4208 Airport Highway	LC25, PMSP
39-095-0027	Lucas	200 S. Byrne Rd., Waterville	O3
39-095-0028	Lucas	600 Collins Park	LC25
39-095-0034	Lucas	306 Yondota	O3
39-097-0007	Madison	9940 SR 38 SW	O3
39-099-0005	Mahoning	Fire Station 7	PM10, LC25
39-099-0006	Mahoning	Fire Station 5	PM10

AQS Number	County	Site Location	Parameter(s)
39-099-0013	Mahoning	345 Oakhill Ave.	O3, SO2
39-099-0014	Mahoning	Oakhill	LC25, PM25C, PMSP
39-101-0003	Marion	Hawthorne Ave.	PB
39-101-0004	Marion	640 Bellefontaine Ave.	PB
39-103-0004	Medina	Ballash Rd.	O3, LC25, PM25C
39-105-0003	Meigs	117 Memorial Dr.	SO2
39-109-0005	Miami	3825 N. SR 589	O3
39-113-0032	Montgomery	215 E. Third St.	LC25, PM25C, PMSP
39-113-0034	Montgomery	117 South Main St.	CO
39-113-0037	Montgomery	1401 Harshman Rd.	O3
39-113-0038	Montgomery	444 W. Third St.	LC25, PM25C
39-113-7001	Montgomery	2728 Viking Lane	PM10, PB
39-115-0004	Morgan	SR 83	SO2
39-121-9991	Noble	Quaker City	O3
39-133-0002	Portage	531 Washington Ave.	LC25
39-133-1001	Portage	1570 Ravenna Rd.	O3
39-135-1001	Preble	National Trails School	O3, LC25, PM25C, CO, SO2, PMSP
39-145-0013	Scioto	4862 Gallia St.,	SO2, PM10, LC25
39-145-0019	Scioto	605 Washington St.	PM10
39-145-0020	Scioto	2840 Back Rd.	SO2, PM10
39-145-0021	Scioto	2446 Gallia Pike	PM10
39-145-0022	Scioto	1740 Gallia Pike	SO2, PM10
39-151-0016	Stark	Malone College	O3
39-151-0017	Stark	1330 Dueber Ave.	LC25, PMSP, PB
39-151-0020	Stark	420 Market Ave.	CO, LC25, PM25C
39-151-0022	Stark	45 S. Wabash	O3
39-151-4005	Stark	1175 W. Vine St., Alliance	O3
39-153-0017	Summit	80 Brittain Rd.	SO2, LC25, PM25C
39-153-0020	Summit	800 Patterson Ave.	O3, CO
39-153-0022	Summit	177 S. Broadway	CO, SO2
39-153-0023	Summit	660 W. Exchange St.	LC25, PM25SP
39-155-0005	Trumbull	540 Laird Ave. SE Warren	PM10, LC25, PM25C
39-155-0006	Trumbull	2323 Main Ave.	PM10
39-155-0009	Trumbull	Community Hall, Kinsman	O3
39-155-0011	Trumbull	Vienna	O3
39-155-0012	Trumbull	2600 Elmore Dr.	PB
39-165-0007	Warren	416 Southeast St.	O3, PM25C
39-167-0004	Washington	2000 Fourth St., Marietta	O3
39-167-0008	Washington	Washington Career Center	PB
39-167-0010	Washington	115 Victory Place	PB
39-173-0003	Wood	347 Dunbridge Rd.	O3

Acronyms and Abbreviations

AA	Atomic Absorption
AIRS-AQS	Aerometric Information Retrieval System-Air Quality Subsystem (no longer used)
AQCR	Air Quality Control Region
AQI	Air Quality Index (replaced Pollutant Standard Index, PSI)
AQS	Air Quality System (replaced AIRS-AQS)
ATMP	Air Toxics Monitoring Program
CBSA	Core Based Statistical Area
CFR	Code of Federal Regulations
CO	Carbon Monoxide
DAPC	Division of Air Pollution Control
DES	Division of Environmental Services
DO	District Office
EDT	Exceptional Data Type
FR	Federal Register
GC	Gas Chromatograph or Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LAA	Local Air Agency
NAAQS	National Ambient Air Quality Standards
NADB	National Aerometric Databank
NAMS	National Ambient Monitoring Stations
NCore	National Core Monitoring Network
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
OASN	Ohio Air Sampling Network
Org Type	Organization Type
Pb	Lead
POC	Parameter Occurrence Code
ppb	parts per billion
ppm	parts per million
PQAO	Primary Quality Assurance Organization
PM_{10} also PM-10	ten micron particulate matter
$PM_{2.5}$ also PM-2.5	2.5 micron particulate matter
PSI	Pollutant Standard Index (replaced by Air Quality Index, AQI)
RADS	Remote Ambient-Air Data System
SLAMS	State/Local Ambient Monitoring Stations
SO_2	Sulfur Dioxide
TO-14A	Toxics analysis methods descriptions
TSP	Total Suspended Particulate
VOC	Volatile Organic Carbon
$\mu g/m^3$ also ug/m^3	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
ng/m^3	nanograms per cubic meter
# Obs	Number of observations/samples

Reporting Organizations/PQAO

PQAO	Agency Description
0012	Akron Regional Air Pollution Control Agency
0151	Canton City Health Department Air Pollution Control
0220	City of Toledo, Environmental Services Division
0229	Cleveland Air Pollution Control Agency
0287	Dayton Regional Air Pollution Control Agency
0595	Lake County Health Department Division Air Pollution
0634	Mahoning-Trumbull Air Pollution Control Agency
0805	Ohio EPA, Central District Office
0807	Ohio EPA, Northeast District Office
0808	Ohio EPA, Northwest District Office
0809	Ohio EPA, Southeast District Office
0810	Ohio EPA, Southwest District Office
0880	Portsmouth City Health Department Division of Air Pollution Control
1108	US EPA/OAQPS
1217	Research Triangle Institute RTP, NC
1259	Hamilton Co. Department of Environmental Services
1299	URS Corp, TX
1335	Ohio University, Athens, Ohio
1344	US EPA-Clean Air Markets Division
1373	Shell Engineering & Assoc., MO