



# **Northeast Ohio Air Quality Programs**

**Ozone Action Day Program  
Fine Particle Pollution Program**

**2009 Annual Report**

June 2009

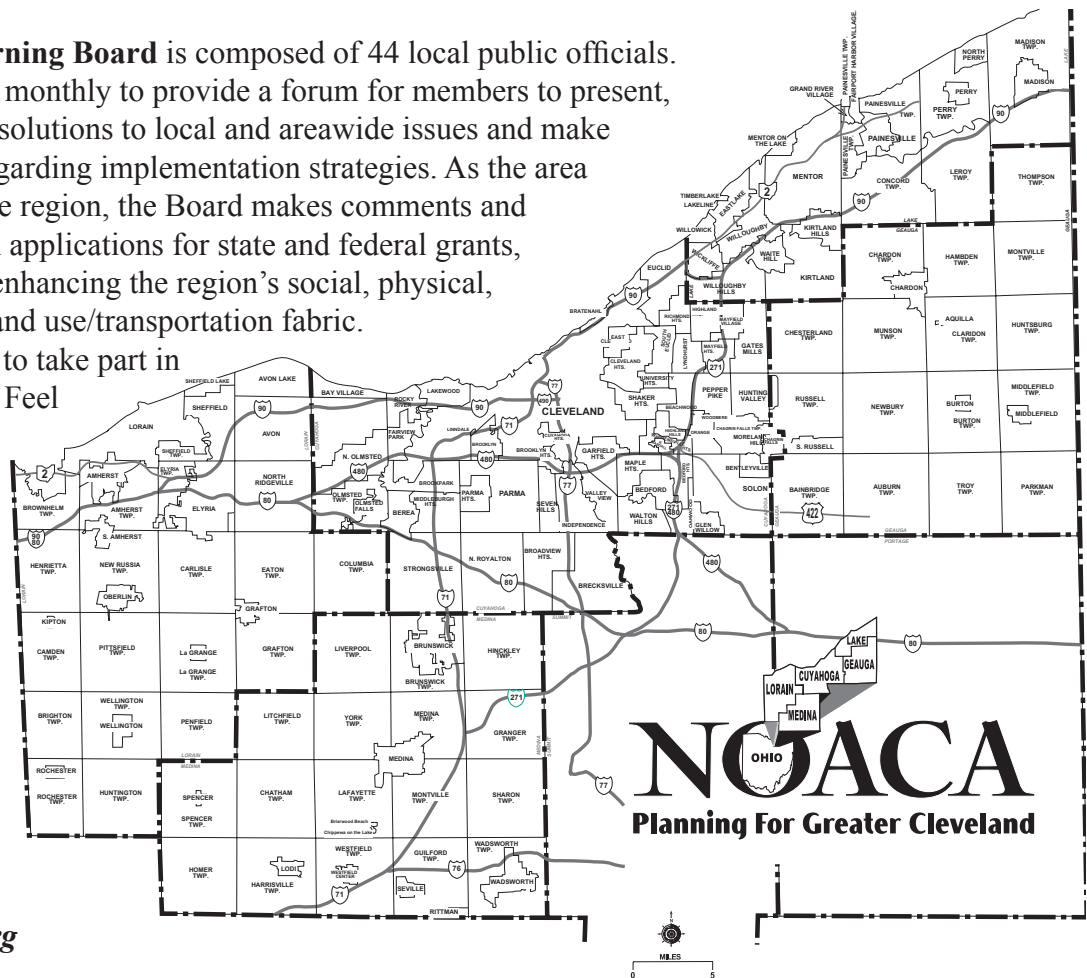
**The Northeast Ohio Areawide Coordinating Agency (NOACA)** is a public organization serving the counties of and municipalities and townships within Cuyahoga, Geauga, Lake, Lorain and Medina (covering an area with 2.1 million people). NOACA is the agency designated or recognized to perform the following functions:

- Serve as the Metropolitan Planning Organization (MPO), with responsibility for comprehensive, cooperative and continuous planning for highways, public transit, and bikeways, as defined in the current transportation law.
- Perform continuous water quality, transportation-related air quality and other environmental planning functions.
- Administer the area clearinghouse function, which includes providing local government with the opportunity to review a wide variety of local or state applications for federal funds.
- Conduct transportation and environmental planning and related demographic, economic and land use research.
- Serve as an information center for transportation and environmental and related planning.
- At NOACA Governing Board direction, provide transportation and environmental planning assistance to the 172 units of local, general purpose government.

**The NOACA Governing Board** is composed of 44 local public officials. The Board convenes monthly to provide a forum for members to present, discuss and develop solutions to local and areawide issues and make recommendations regarding implementation strategies. As the area clearinghouse for the region, the Board makes comments and recommendations on applications for state and federal grants, with the purpose of enhancing the region's social, physical, environmental and land use/transportation fabric.

NOACA invites you to take part in its planning process. Feel free to participate, to ask questions and to learn more about areawide planning.

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# **NOACA Air Quality Programs**

## **Ozone Action Day Program Fine Particle Pollution Program**

### **2009 Annual Report**

June 2010

Prepared by

#### **NORTHEAST OHIO AREAWIDE COORDINATING AGENCY**

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## Executive Summary

This report summarizes both of NOACA's Air Quality Programs for calendar year 2009: *Ozone Action Day (OAD) Program and Fine Particle Pollution Program (FP3)*.

Northeast Ohio is in nonattainment of the National Ambient Air Quality Standards (NAAQS) for fine particles, and it will shortly again be in nonattainment for ground-level ozone. Consequently, the behavior modifications encouraged by the two Programs are important. Voluntary reductions in air emissions can contribute to the eventual attainment of the NAAQS.

**Ozone Action Day (OAD):** The OAD Program's 15th season wrapped up October 31, 2009. Under contract to NOACA, Sonoma Technology Inc. (SonomaTech) forecasted ozone levels throughout the season, with limited success (only one-in-three exceedances were correctly forecasted). Low temperatures throughout the region contributed to lower ozone levels during the season. A total of 3 days exceeded the 75 parts per billion standard for at least one monitor in Northeast Ohio (May 20, May 21, June 25).

**Fine Particle Pollution Program (FP3):** The FP3 Program's third season concluded on December 31, 2009. Under contract to NOACA, SonomaTech forecasted fine particle levels throughout the season, with very little success (no exceedances were correctly forecasted). Only one day exceeded the 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) daily NAAQS (February 9).

**Contractor Status:** Forecasting air pollution levels is a very difficult task. SonomaTech was hired to forecast ozone and fine particles for CY2009 for \$45,000. SonomaTech's customer service focus was highly commendable, as was its accuracy rate for forecasting "Good" versus "Moderate" air pollution days. However, its accuracy rate for forecasting actual "Unhealthy For Sensitive Groups" days, triggering Air Quality Advisories, was only 25%. A new Request for Proposals issued in the fall of 2009 brought only a single response, from SonomaTech, with a rate of \$55,000 to continue forecasting services. The proposal was rejected, and the SonomaTech contract ended on December 31, 2009. NOACA will return to in-house forecasting using its own staff, with the assistance of the partners listed below.

**Partners:** The regional partnerships supporting the Air Quality Programs include the Ohio Environmental Protection Agency (Ohio EPA), the City of Cleveland Division of Air Quality (CDAQ), the Akron Regional Air Quality Management District (ARAQMD), the Akron Metropolitan Area Transportation Study (AMATS), the Lake County General Health District (LCGHD), and Ohio University (OU).

**Education:** The Programs continued to use radio, print, public events, and the Internet to educate the public on changing transportation-related behavior. In addition, several targeted campaigns were conducted: Cleveland Bicycle Week, Commuter Challenge, and the anti-idling campaign. Radio messages to the urban core communities were increased, as these communities often include the traditionally underserved and those who suffer most from air pollution.

**Email Notification and Live Monitor Maps:** The Programs continued to use the online signup and broadcasting tool, Constant Contact, to manage the growing participant list for free email

notification of Air Quality Advisories. Participants total 1,280. The NOACA subscription to Constant Contact costs \$21 per month. The online webpage showing live hourly air monitor readings was heavily utilized, with more than 43,000 "hits" in a 12-month period. The webpage is hosted by Ohio University, under contract to NOACA, for \$14,946.

**Funding:** The Air Quality Programs are funded by the Federal Highway Administration (FHWA) and the Ohio Department of Transportation (ODOT) through the federal Congestion Mitigation and Air Quality (CMAQ) program. The total budget, including staff, advertising, campaigns, websites, and events, is approximately \$225,000 per year.

The 2008 Final Guidance on the Congestion Mitigation and Air Quality Improvement (CMAQ) Program, 73 Fed.Reg. 62362, Oct. 20, 2008, for efforts such as NOACA's Air Quality Programs outlines the scope of the work. The entire quotes follow:

"8. Public Education and Outreach Activities

The goal of CMAQ-funded public education and outreach activities is to educate the public, community leaders, and potential project sponsors about connections among trip making and transportation mode choices, traffic congestion, and air quality. Public education and outreach can help communities reduce emissions and congestion by inducing drivers to change their transportation choices. More important, an informed public is likely to support larger regional measures necessary to reduce congestion and meet CAA requirements.

A wide range of public education and outreach activities is eligible for CMAQ funding, including activities that promote new or existing transportation services, developing messages and advertising materials (including market research, focus groups, and creative), placing messages and materials, evaluating message and material dissemination and public awareness, technical assistance, programs that promote the Tax Code provision related to commute benefits, transit "store" operations, and any other activities that help forward less-polluting transportation options.

Using CMAQ funds, communities have disseminated many transportation and air quality public education messages, including maintain your vehicle; curb SOV travel by trip chaining, telecommuting and using alternate modes; fuel properly; observe speed limits; don't idle your vehicle for long durations; eliminate "jack-rabbit" starts and stops, and others.

The It All Adds Up to Cleaner Air public education messages and materials (regarding vehicle maintenance, proper fueling, trip chaining, and alternate modes) have been successful in raising awareness, garnering funds and in-kind support, and building coalitions of diverse groups across the country. These commercial-quality materials, which were developed in response to requests by State and local transportation and air agencies, are free and communities are encouraged to use and build on them. More information is available at <http://www.italladdsup.gov/>.

Long-term public education and outreach can be effective in raising awareness that can lead to changes in travel behavior and ongoing emissions reductions; therefore, these activities may be funded indefinitely.

...

## 2. Qualitative Assessment

Although quantitative analysis of air quality impacts is expected for almost all project types, an exception will be made when it is not possible to accurately quantify emissions benefits. In these cases, qualitative assessments based on reasoned and logical determinations that the projects or programs will decrease emissions and contribute to attainment or maintenance of a NAAQS are acceptable.

Public education, marketing, and other outreach efforts, which can include advertising alternatives to SOV travel, employer outreach, and public education campaigns, may fall into this category. The primary benefit of these activities is enhanced communication and outreach that is expected to influence travel behavior, and thus air quality."

\*\*\*\*\*

**Conclusion:** NOACA's Air Quality Programs have attempted to combine many of the strategies outlined by the FHWA in its official guidance, and the Programs continue to modify and refine the various approaches and campaigns in hopes of achieving "*enhanced communication and outreach that is expected to influence travel behavior, and thus air quality.*"

## Ozone Action Day Program



**Background:** The NOACA Ozone Action Day (OAD) Program was established in 1995 in partnership with public and private agencies throughout the region who shared an interest in mobilizing voluntary action to reduce the levels of pollutants that contribute to the formation of ground-level ozone during the summer months.

The purpose of the OAD Program is twofold. The first is to notify the residents of Northeast Ohio that air quality conditions are forecasted to result in unhealthy levels of air pollution due to ground-level ozone formation. The second is to encourage individual citizens, businesses, local governments, and public agencies to undertake actions, with a special focus on transportation-related behavior, that help reduce pollution during April-October when harmful levels of ozone are likely to occur.

Ozone is forecasted and monitored from April 1 to October 31 each year.

**Nonattainment:** The eight counties of Northeast Ohio (Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, and Summit) were declared by the United States Environmental Protection Agency (USEPA) in 2004 to be in nonattainment of the 8-hour ozone National Ambient Air Quality Standards (NAAQS) of 85 parts per billion (ppb). That NAAQS was achieved by September 2009. The NAAQS has since been made more stringent and is now at 75 ppb, to be more protective of public health and, in August 2010, it will be lowered again by USEPA.

The OAD Program has played a role in encouraging voluntary reductions in personal contributions to air pollution, assisting the region to reach attainment. Vehicle emission reductions through voluntary behavior changes (such as driving less, using mass transit, driving more efficiently, carpooling, etc.) can reduce ozone formation through the reduction of the precursors, volatile organic compounds (VOCs) and oxides of nitrogen (NOx).

**Goals of the OAD/FP3 Programs:** The goals of the Air Quality Programs are to:

- Educate the public regarding voluntary changes in travel behavior that can lead to ongoing emissions reductions and encourage those changes.

- Educate the public on the connection between fuel conservation and improved air quality and encourage conservation.
- Educate the public on attainment of the National Ambient Air Quality Standards (NAAQS) for ozone and fine particulate matter, including the various causes of air pollution, and encourage reduction of the causes.

In addition, the Programs:

- Issue Air Quality Advisories to allow the public to take measures to protect their own health.

**MESSAGES of the OAD/FP3 Programs:** The Air Quality Programs use the following messages to carry out the goals:

- Reduce petroleum use. Take personal action.
- Ride public transit.
- Carpool, either informally or using NOACA’s OhioRideshare.
- Walk or bike whenever possible.
- Combine trips and eliminate unnecessary trips.
- Save fuel, money, and emissions by not idling.
- Save fuel, money, and emissions by changing driving behavior and increasing miles per gallon.
- Save fuel, money, and emissions by driving more efficient vehicles.
- Maintain your vehicle properly.
- Avoid driving by using telecommuting, flex-time, compressed work weeks, and “virtual” meetings and conference calls.
- Delay refueling and yard maintenance until after 7:00 PM on days when Air Quality Advisories are issued due to increased ozone levels.
- Avoid open burning on days when Air Quality Advisories are issued due to impact on fine particle pollution.
- Avoid vigorous physical activity on days when air quality is “unhealthy” according to the USEPA’s Air Quality Index.
- Sign up online to receive free Air Quality Advisories via email.
- Inform your family, friends, and neighbors when an Air Quality Advisory has been issued.
- Help the region to reach attainment of the National Ambient Air Quality Standards (NAAQS) for better quality of life.

**Advisories:** The declaration of an Air Quality Advisory for ozone notifies the public of the need to lower ozone precursors, which include but are not limited to vehicle emissions, lawn equipment emissions, and refueling station emissions. When ozone levels are high, individuals may experience shortness of breath and other respiratory difficulties. Older adults, children, and people with respiratory illness are especially susceptible. An Advisory is used when ozone levels are expected to reach levels that are “Unhealthy for Sensitive Groups,” according to the

USEPA's Air Quality Index, on the following day.

**2009 Ozone Season:** The 15th season of the OAD Program ended on October 31, 2009. Seven Air Quality Advisories were issued because ozone levels were expected to exceed the 75 ppb standard, which would represent an Air Quality Index (AQI) level of "Unhealthy for Sensitive Groups," but only 3 days actually exceeded the standard, those being May 20, May 21, and June 25, 2009.

The following table provides a summary of days on which ozone exceeded the 75 ppb standard or fine particle levels exceeded the 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) standard. (*Please see Appendices A and B for exceedance days over time.*) "False Alarm" means no exceedance.

### Ozone and Fine Particle Pollution 2009 Summary

\* Advisory issued

Date	Highest Reading in NE Ohio	# of Monitors with Exceedances in NE Ohio	Monitors with Exceedances and their High Readings
* February 9	37 $\mu\text{g}/\text{m}^3$ PM <sub>2.5</sub>	1	Cuyahoga (37)
* February 10	(False Alarm)		
May 20	79 ppb ozone	2	Lake (79), Ashtabula (76)
May 21	86 ppb ozone	4	Lake (86), Ashtabula (85), Cuyahoga (82), Lake (78)
* June 25	88 ppb ozone	3	Lake (88), Ashtabula (78), Lake (76)
* August 9	(False Alarm)		
* August 10	(False Alarm)		
* August 14	(False Alarm)		
* August 15	(False Alarm)		
* August 16	(False Alarm)		
* August 17	(False Alarm)		

Last year, during 2008, 10 Advisories were issued because one or more monitors were expected to exceed 75 ppb, only four of which matched an actual exceedance day.

SonomaTech provided daily forecasting, but the forecasts were biased high, resulting in "false alarms." In addition to the seven ozone Advisories that NOACA issued, SonomaTech recommended others for ozone, each of which would have resulted in a false alarm. And for the June 25<sup>th</sup> Advisory, NOACA staffed correctly forecasted the ozone exceedance without help

from SonomaTech, by using NOAA models available publicly for free. (SonomaTech did not change its forecast to “Unhealthy for Sensitive Groups” until June 25 itself, as the ozone monitors went over.)

**OAD Program Operation:** The basic structure of the OAD Program, continuously developed through the previous years, was again carried out in the 2009 season, blended with the FP3 Program.

Typically, season planning begins in late December. The basic funding needs for the various Program elements are identified, new efforts are outlined, and Board approval of the spending plan for the coming year is sought. An Air Quality Programs Communications Plan was developed to help in this process. (Available online at [www.noaca.org](http://www.noaca.org).) The Communications Plan was helpful in determining what assistance was needed from other NOACA groups, such as Communications and Support. It was also helpful in setting out long-term timelines so that work could be accomplished in an orderly manner.

Forecasting methodologies and procedures are also reviewed and updated throughout the season. NOACA contracted with Sonoma Technology, Inc. (SonomaTech) to provide daily forecasts after undergoing an open bidding process in an effort to achieve more accurate, more efficient forecasting. The service was provided throughout CY2009 for the sum of \$45,000.

Although SonomaTech produced very accurate forecasts for “Good” or “Moderate” days, the success rate for predicting “Unhealthy for Sensitive Groups,” triggering an Air Quality Advisory, was only 33% for ozone and only 25% for both pollutants together. The forecasting effort was re-bid in fall 2009, but only one bid was received, from SonomaTech. All bids were rejected. In 2010, NOACA Air Quality staff will again perform forecasting in-house, with the assistance of the local air agencies.

Forecasting is an important element of the OAD Program. Accurate forecasts allow the public to be notified so that they may take precautions to reduce their exposure to ozone. It also allows individuals and organizations to decrease emissions on those days. The technical aspects of the program are revisited each year in an effort to achieve the greatest possible accuracy in forecasting ozone events.

#### **Daily Ozone Forecasting in 2009:**

- A. NOACA staff reviewed daily forecasts and summaries from SonomaTech before 11:00 a.m., occasionally calling SonomaTech or receiving calls from them.
- B. If the forecast indicated a high-moderate to unhealthy level for the following day, meteorological data from a variety of sources was reviewed. This data includes forecasted temperatures, wind speeds, wind direction, and cloud cover.

- a. Ozone tends to occur in Northeast Ohio when temperatures are over 85 degrees, wind speed is low, wind direction is from the south or southwest, and cloud cover is nonexistent.
- C. NOACA staff checked the regional ozone forecasts provided by NOAA online, assessing each of the 11 ozone monitors for Northeast Ohio.
- D. NOACA staff checked existing ozone levels on the OU online mapping page.
- E. NOACA staff contacted all forecasting partners by email for input if an Advisory was a possibility, allowing two hours, if possible, for responses.
- F. If an Air Quality Advisory was issued, notification was provided to signed-up participants, plus the media, through a Constant Contact broadcast email before 3:00 p.m.
- G. Ozone forecasts were posted on USEPA's AIRNOW website (<http://www.airnow.gov>).
- H. Air Quality Advisories were also added to NOACA's Air Quality Programs' webpage (<http://www.noaca.org/aqprogram.html>) with corresponding "Wheezzer" animations.
- I. Staff responded to media inquiries, providing information for print articles and quotes for radio interviews.

## Fine Particle Pollution Program (FP3)



**Background:** The NOACA Fine Particle Pollution Program (FP3) was established in 2006 in partnership with Ohio University (OU), the Ohio EPA, the City of Cleveland Division of Air Quality (CDAQ), the Akron Regional Air Quality Management District (ARAQMD), the Akron Metropolitan Area Transportation Study (AMATS), the Lake County General Health District (LCGHD), and the National Weather Service (NWS).

The focus of the FP3 Program is threefold. The first is to notify the residents of Northeast Ohio when air quality conditions are forecasted to result in unhealthy levels of fine particle pollution (particulate matter smaller than 2.5 micrometers in diameters, or  $PM_{2.5}$ ). The second is to encourage individual citizens, businesses, local governments and public agencies to undertake actions, with a special focus on transportation-related behavior, that help reduce pollution. The third is to make the public aware of the direct relationship between fuel conservation and exhaust emissions reductions.

Fine particles are forecasted and monitored from January 1 to December 31 each year.

**Nonattainment:** The USEPA has declared six full counties and one partial county, all in Northeast Ohio, as in nonattainment of the annual NAAQS for fine particles, with 2010 as the compliance deadline. In 2008, the six counties (Cuyahoga, Lake, Lorain, Medina, Portage, and Summit) were also designated as in nonattainment of the new 24-hour NAAQS, and a deadline of April 2014 has been set for attainment of that standard. The FP3 Program was instituted to create public awareness of the nonattainment problem and to encourage voluntary behavior change, related to motor vehicles, which can reduce  $PM_{2.5}$  formation. Fine particles are caused, in part, by gasoline cars and by diesel trucks and buses. The FP3 Program encourages less driving, greater travel efficiency, mass transit, tune-ups for all types of vehicles, walking, bicycling, carpooling, and anti-idling practices.

**2009 Season Overview:** The fourth season saw only one  $PM_{2.5}$  exceedance, which occurred on February 9, 2010, even though the continuous  $PM_{2.5}$  monitors indicated that there would probably be exceedances on February 9, February 10, June 8, August 9, August 15, August 16, November 8, and November 9.

The following table provides a summary of days on which ozone exceeded the 75 parts per billion (ppb) standard or fine particle levels exceeded the 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) standard. (Please see Appendices A and B for exceedance days over time.) “False Alarm” indicates no exceedance.

### Ozone and Fine Particle Pollution 2009 Summary

\* Advisory issued

Date	Highest Reading in NE Ohio	# of Monitors with Exceedances in NE Ohio	Monitors with Exceedances and their High Readings
* February 9	37 $\mu\text{g}/\text{m}^3$ PM <sub>2.5</sub>	1	Cuyahoga (37)
* February 10	(False Alarm)		
May 20	79 ppb ozone	2	Lake (79), Ashtabula (76)
May 21	86 ppb ozone	4	Lake (86), Ashtabula (85), Cuyahoga (82), Lake (78)
* June 25	88 ppb ozone	3	Lake (88), Ashtabula (78), Lake (76)
* August 9	(False Alarm)		
* August 10	(False Alarm)		
* August 14	(False Alarm)		
* August 15	(False Alarm)		
* August 16	(False Alarm)		
* August 17	(False Alarm)		

Last year, during 2008, 18 Air Quality Advisories were issued because one or more monitors were expected to exceed 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) for a 24-hour period, which would represent an Air Quality Index (AQI) level of "Unhealthy for Sensitive Groups." None of the 18 days matched the actual fine particle exceedance days in 2008. In 2009, eight Advisories were issued for PM<sub>2.5</sub>, only one of which matched an actual exceedance day.

SonomaTech provided daily forecasting in both years, but the predictions for PM<sub>2.5</sub> exceedances remained biased too high, resulting in too many Air Quality Advisories that were “false alarms.” In addition to the eight Advisories that NOACA issued for PM<sub>2.5</sub> in 2009, SonomaTech recommended others, each of which would have resulted in a false alarm.

One of the greatest challenges realized by the forecasting group this season was the variation between the continuous monitor data and the federal reference method (FRM) data. Continuous monitor data are available to the forecasters and the public daily. These data are fed into the forecasting models and equations used to predict the air quality index (AQI) level for the next day. Therefore, Air Quality Advisories are also based on this data. FRM data goes through a process of quality assurance and becomes the official data used to determine a region’s

attainment status. The process of quality assurance takes up to three months, and only after that point do the forecasters or the public have access to that data. As a result, the forecasters are relying on a non-quality assured data set for the purposes of forecasting.

In light of the difficulties inherent in accurately calling FP3 Advisories, residents of Northeast Ohio were urged to make use of the online mapping feature by using the link on NOACA's web page to "Check Today's Air Quality." This allows residents to assess their own health risks in their individual counties, on a near-real-time basis.

#### **Daily Fine Particle (PM<sub>2.5</sub>) Forecasting in 2009:**

- A. NOACA staff reviewed daily forecasts and summaries from SonomaTech before 11:00 a.m., occasionally calling SonomaTech or receiving calls from them.
- B. If the forecast indicated a high-moderate to unhealthy level for the following day, meteorological data from a variety of sources was reviewed. This data includes forecasted temperatures, wind speeds, wind direction, relative humidity, and temperature inversions.
  - a. PM<sub>2.5</sub> tends to form in Northeast Ohio when temperatures are somewhat elevated, wind speeds are low, wind direction is from the south or southwest, relative humidity is high, and/or a temperature inversion exists. Fog or evaporating snow also contribute to exceedances.
- C. NOAA has no online forecasts for PM<sub>2.5</sub> so none were checked. However, Advisories from other parts of Ohio, particularly to the southwest, were investigated.
- D. NOACA staff checked existing PM<sub>2.5</sub> levels on the OU online mapping page.
- E. NOACA staff contacted all forecasting partners by email for input if an Advisory was a possibility, allowing two hours, if possible, for responses.
- F. If an Air Quality Advisory was issued, notification was provided to signed-up participants, plus the media, through a Constant Contact broadcast email before 3:00 p.m.
- G. Ozone forecasts were posted on USEPA's AIRNOW website (<http://www.airnow.gov>).
- H. Air Quality Advisories were also added to NOACA's Air Quality Programs' webpage (<http://www.noaca.org/aqprogram.html>) with corresponding "Wheezier" animations.
- I. Staff responded to media inquiries, providing information for print articles and quotes for radio interviews.

## Additional OAD and FP3 Program Details

**Staffing:** Staff coverage in calendar year 2009 included two staff, each devoting a different percentage of time to the Programs.

**Forecasting Partners:** The Programs' air pollution forecasting, air monitoring, and mapping partners include:

- Ohio Environmental Protection Agency (Ohio EPA)
- City of Cleveland Division of Air Quality (CDAQ)
- Lake County General Health District (LCGHD)
- Akron Regional Air Quality Management District (ARAQMD)
- Akron Metropolitan Area Transportation Study (AMATS)
- National Weather Service (NWS)
- National Oceanic & Atmospheric Administration (NOAA)
- Ohio University (OU)
- Sonoma Technologies, Inc. (SonomaTech)

**NOACA Internal Partners:** One group essential to the success of the Air Quality Programs is the internal partners:

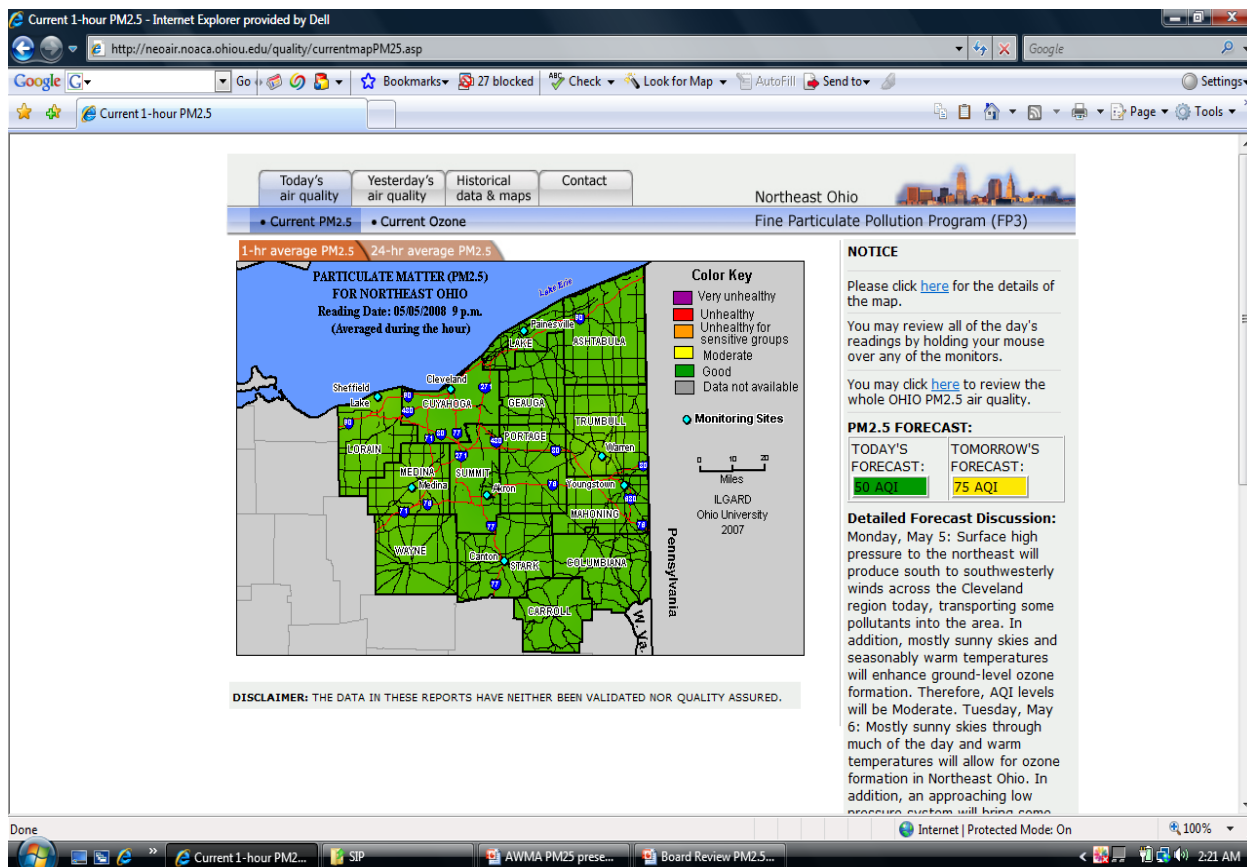
- NOACA OhioRideshare Program
- NOACA Bicycle Planning
- NOACA Support Group

**Funding:** The funding available for the Programs, provided through the Ohio Department of Transportation from Congestion Mitigation & Air Quality (CMAQ) federal funds and supplemented with the local match, totaled \$224,500. Not all funding was used.

**Email Advisories:** The Programs maintained a notification system that includes 1,280 email participants. Many of those participants also notify their own staff, post the Advisories, take personal action or require their employees to reduce emissions. For example, the Northeast Ohio Regional Sewer District locks down its vehicle refueling stations on an Air Quality Advisory Day. The Cleveland MetroParks reschedule employee work assignments to avoid emission-producing activities, e.g. no painting, mowing or welding.

The Programs continued to use Constant Contact to create professional emails, brochures, surveys, and press releases. The email service is offered for free to participants. The email system is not used for any other purpose or by any other organization. NOACA does not sell or lend its email list. The cost of Constant Contact is \$21 per month, paid in advance for a 12-month contract.

**Online Mapping:** Ohio University, under contract to NOACA for \$14,986, continued to host the website displaying the live monitor readings throughout the region. The map, found at <http://ohioair.info/quality/currentmappm25.asp>, displays the 1-hour and 8-hour ozone readings, as well as the 1-hour and 24-hour PM<sub>2.5</sub> data. (The 24-hour average is created using the USEPA-approved formula, taking into account the past 12 hours of data and the predicted next 12 hours of data.) The total number of hits exceeded 43,000.



**Audiences:** For the purposes of NOACA’s Air Quality Programs, all segments of the population are considered “target audiences” for the various campaigns, including drivers, consumers, the “LOHAS” group (Lifestyle of Health and Sustainability), low-income groups, and many others. Some subsets can also be more clearly defined. They are:

- Adults, especially drivers and commuters.
- Adults who are bus riders or bicyclists.
- Persons living in the inner city (urban core) or near heavily traveled freeways and intersections.
- Children, especially those in the elementary grades (still developing in terms of lung capacity) and those who have asthma.
  - Their day-care providers.
  - Their teachers.
- Senior citizens, especially those with respiratory diseases.

- Their senior centers.
- Persons having asthma, emphysema, chronic obstructive pulmonary disease (COPD), and other respiratory diseases.
  - Their family members and care-givers.
  - Their doctors, nurses, respiratory therapists, hospitals, and other health-care providers.
  - County and city health departments.
- NOACA Board members (cities, towns, counties, transit agencies).

### **Characteristics of Citizens of Northeast Ohio**

NOACA's Air Quality Programs cover the following eight counties in Northeast Ohio:

- Ashtabula
- Cuyahoga
- Geauga
- Lake
- Lorain
- Medina
- Portage
- Summit

The citizens of Northeast Ohio have the following characteristics, according to the American Community Survey (ACS) estimates for 2008 (most recent available as of June 2010).

**General Demographics:** A total of 2,895,729 people live within the eight counties. This figure can be broken down into 1,157,048 households, 738,673 of which are family households. The average median age of the area's population is 39 years old. The area's population is 51.8% female and 48.2% male.

**Sensitive Populations: Children and the Elderly:** When Air Quality Advisories are issued due to air pollution levels being "Unhealthy for Sensitive Groups," 32% of the population in the eight-county area is included in this group, according to data from the Census' 2008 American Community Survey. Of the 2.9 million people living in the area, just over 900,000—or almost one in three—are under the age of 18 or over the age of 65.

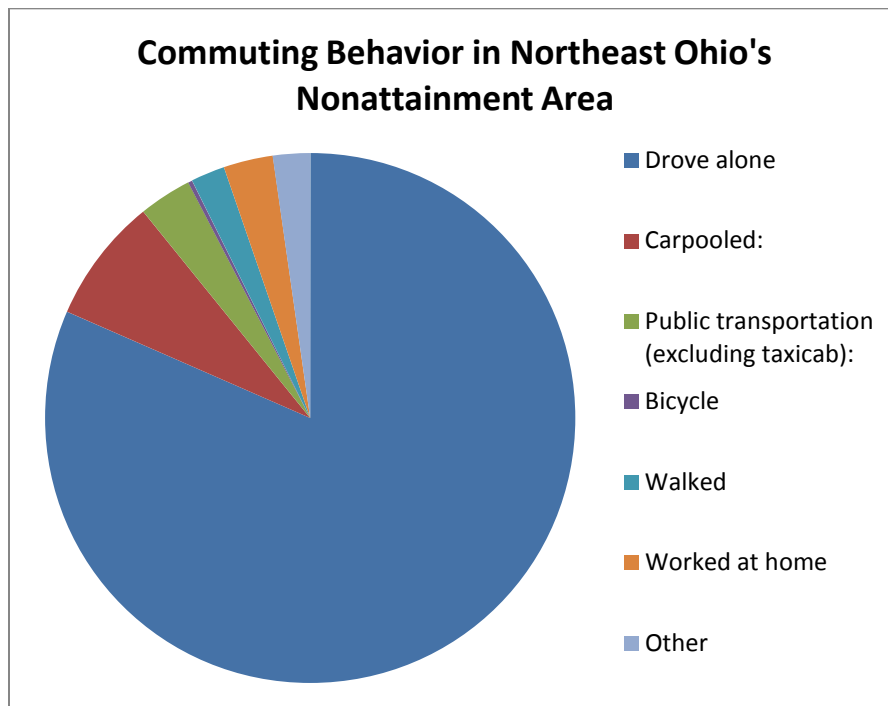
These two numbers are significant because they make up two of the three "sensitive" populations defined in the USEPA's National Ambient Air Quality Standards under the primary standard for which NOACA issues Air Quality Advisories.

**Asthma:** *A total of 10.4% of adults in the Cleveland-Elyria-Mentor Metropolitan Statistical Area currently have asthma.* (This area is made up of the counties of Cuyahoga, Geauga, Lake, Lorain, and Medina.) And 15.4% of adults have had asthma in their lifetimes, according to The Behavioral Risk Factor Surveillance Survey 2008. And *9% of children in the State of Ohio have asthma,* according to the National Center for Health Statistics' National Survey of Children's Health 2007.

**Schools and Education:** 754,415 people are enrolled in schools in Northeast Ohio's nonattainment area. 11.4% are children enrolled in preschool and kindergarten. 40.4% are children enrolled in grades 1-8. A total of 22.5% are children enrolled in high school, and 25.6% are people enrolled in college or graduate school.

According to ACS, 87.8% of the 8-county area's population has earned a high school diploma or a higher level of education, and 26% of the area's population has earned a bachelor's degree or a higher level of education.

**Commuting Behavior and Vehicle Availability:** Among workers over 16 years old, 97% have access to one or more vehicle. This is reflected in commuting behavior. Of the 1,356,049 total workers over the age of 16 in the area, 1,129,994 drive alone to work and 105,583 carpool. 44,525 people in the area ride public transit to work, 28,969 walk, and 41,770 work at home. The average mean commute time for workers in the 8-county area is 23.6 minutes. (*American Community Survey 2008.*)



**Languages:** According to the US Census Bureau's 2008 American Community Survey, 227,774 people age 5 and over in the eight-county area speak a language other than English in the home. 32% of this group are Spanish speakers, while 17% speak a Slavic language and another 17% speak another Indo-European language. 9% speak German or a Germanic language and 9% speak "other" languages. The Air Quality Programs should investigate having messages running on Spanish-language radio stations.

**Short-term trends:** Since the previous American Community Survey in 2006, the area has lost about 22,000 people, according to 2008 estimates. Over the two-year period, estimates show there are slightly fewer households with members 65 and older and slightly more households with members 18 and younger.

While there are slightly fewer workers in the region since the previous survey, about 3% more are driving to work alone. Public transit ridership has grown by about 3%, while carpooling has fallen by about 1.5%. Meanwhile, the number of people walking to work dropped slightly by about 3%, but the number of people working from home rose 9.5%. The average commuting time dropped about ½ minute during the two-year period, from 24.1 minutes to 23.6, according to estimates.

The 2007 National Survey of Children's Health showed childhood asthma rates had dropped from 10% to 9% statewide since 2003. Meanwhile, the Center for Disease Control's 2008 Behavior Risk Factor Surveillance Survey showed a 0.5% increase in adults with asthma for the 8-county area, compared with 2006.

**Conclusions Regarding Audiences:** It can be seen that, while the individual subsets of audiences described at the beginning of this chapter should receive attention, the entire group of citizens living in Northeast Ohio must still be part of the program audience. This is because (1) their access to single-occupancy vehicles (SOVs) is so high; (2) they all live within the nonattainment area; (3) 32% of family households in the nonattainment area are included in the sensitive group categories of children and the elderly; and (4) 10 times as many persons drive to work alone as carpool.

Consequently, strategies must be devised to reach both the individual subsets and the overall population of Northeast Ohio.

## **2009 Air Quality Program Accomplishments:**

### Campaigns

- Earth Day Events – April 2009
- Ozone Season Kick-Off / Cleveland Bicycle Week – May 2009
- Commuter Challenge – July 2009
- Anti-Idling Campaign – Year-round 2009

### Public Events / Display Tables

- Display at Cleveland City Hall for Cleveland Conserves. 1.23.09
- Display and presentation at the Northeast Ohio City Councils Association on the topic of anti-idling. 2.5.09.
- Lorain County Transportation Day – table display, brochures, decals. 4.3.09.
- Earth Day at Philips-Medical – table display, brochures. 4.16.09.
- Cleveland State University Green Event at Spring Fest. 4.29.09.
- Bike to Work Day at Cleveland YMCA and E.4 Street events – display table, brochures, handouts. 5.15.09.

- Cleveland Asthma Walk – table display, comic books, bubbles. 5.30.09.
- "Free Lunch" WDOK event at Mall C, Cleveland - table display, Commuter Challenge surveys and brochures, AQ brochures and paper bags. 7.15.09.
- Walk+Roll Old Brooklyn/Brooklyn Centre. 7.18.09.
- Family Unity in the Park at Luke Easter Park, Cleveland. 7.25.09.
- Walk+Roll Slavic Village, Cleveland. 7.26.09.
- Free Lunch event near City Hall. 8.19.09.
- ODOT Government Days, Lake FarmPark. 8.26.09.
- Orange Goes Green, Village of Orange. 9.6.09.
- Free Lunch event (last in series). 9.16.09.
- CSU Green Day. 10.21.09.

#### Public Outreach

- Distributed 200 anti-idling decals and 25 totes bags to Lakewood Green Advisory Group. 1.23.09.
- Distributed 25 totes bags to Cleveland Conserves. 1.23.09.
- Distributed 25 totes bags to Lakewood Lives Healthy. 1.24.09.
- Distributed 30 coloring books and comic books to Citizen's Academy Elementary School. 2.9.09.
- Distributed 25 tote bags to Broadview Heights Green Advisory Group. 3.11.09.
- Provided materials to members of Cleveland Industrial Air Pollution Advisory Council. 3.17.09.
- Distributed 25 tote bags to CWRU students. 3.31.09
- Provided materials to Cleveland Clean Air Century Campaign. 4.2.09.
- Distributed 100 Anti-idling decals to Lorain County Transit. 4.3.09.
- Distributed 600 Anti-idling decals to Cuyahoga County Dept. of Central Services. 4.8.09.
- Provided table display and outreach materials to Lake County General Health District for Earth Day events.
- Provided anti-idling materials to the City of Beachwood. 4.17.09 – including model ordinance and 100 Anti-idling decals.
- Provided materials at the NOACA Summit. 6.12.09.
- Delivered materials to Cleveland City Hall. 10.14.09.

#### Speaking Engagements

- Presentation on Air Quality and Idling at City of Broadview Heights Green Advisory Group. 3.11.09.
- Presentation on Air Quality and Idling at North Olmsted City Council. 3.24.09.
- Presentation at CWRU Environmental Policy class. 3.31.09.
- Answered quadrennial certification questions from FHWA and FTA along with other NOACA staff, highlighting Commuter Challenge 2008 and the contacts database. 4.7.09 and 4.8.09.
- Presentation on Air Quality to CSU environmental policy class. 4.22.09.
- Provided focus group input to CSU Masters of Environmental Science coordinator regarding air quality. 5.6.09.

- Gave testimony at the Cleveland City Council Safety Committee meeting on the proposed Anti-Idling Ordinance. 6.3.09.
- Spoke to Advancing Women In Transportation at GreenHouse Tavern. 8.25.09.
- Spoke at CSU Environment class. 11.2.09.
- Spoke at Fairview Park anti-idling meeting. 11.9.09.
- Neighborhood environmental meeting – Broadway Christian Church. 12.16.09.

**Mascot:** “Wheezer the Forecasting Groundhog” continued to be used as the mascot for the Air Quality Programs. Wheezer is portrayed as an asthmatic groundhog who can tell whether the air quality is healthy or unhealthy by sniffing the air. Wheezer appears on the Air Quality Programs webpage. An animation of Wheezer sneezing indicates unhealthy air and an Air Quality Advisory has been issued. No sneeze and a thumbs-up indicates healthy air, meaning levels are expected to remain in the “good” to “moderate” range according to the USEPA’s Air Quality Index. Wheezer (the cardboard display) has been exceptionally helpful in drawing children and their families to the Air Quality Programs' display table at public events.



### **Media Marketing:**

Print -- Staff provided information and quotes to The Plain Dealer, The News Herald and The Akron Beacon Journal for use in air pollution articles. The Cleveland Plain Dealer newspaper developed a simplified logo to print on the front of the Metro Section to alert the public to an Air Quality Advisory.

For Advisories, press releases to the major media outlets were the primary mechanism for reaching the media. Staff responded to media questions by telephone, suggested alternative forms of transportation, and explained the health effects of air pollution.

Press releases were sent out announcing Cleveland Bicycle Week and Commuter Challenge 2009. Releases contained information about events taking place during the campaigns and ways to participate. Releases also included events and promotions being run by area transit agencies. Releases were sent to large and small area publications including neighborhood newsletters. Additional notification was provided by adding the events to online community event calendars.

Radio -- NOACA contracted with WCLV for radio spots from April through October. The station also used radio personalities to record the spots and added sound effects at no extra

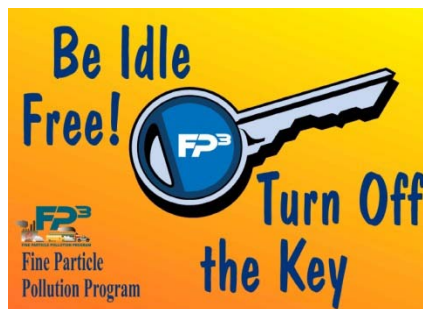
charge. NOACA also contracted with WNWV for spots during July and August, the months most prone to air pollution episodes. WZAK spots were employed in June, July, and August to embrace the urban core and carry an anti-idling message, as well as transit and health messages. Finally, WTAM was employed for Cleveland Bicycle Week and for the week of Commuter Challenge, in order to provide publicity. WTAM's per-spot price is significantly higher than any of the other stations; however, it has the highest listenership. (WZAK runs a close second, at a much more competitive rate.)

**Anti-Idling Message:**

The FP3 Program began to include the motto “Clean Air Zone – Turn Engines Off,” through a collaboration with the Earth Day Coalition, the Ohio Environmental Council, and the Cleveland Clean Air Century Campaign. Communities in Northeast Ohio were encouraged to adopt anti-idling ordinances, and in 2009 the list included the City of Cleveland, City of South Euclid, City of North Olmsted, and City of Maple Heights. Signage was provided to requesting communities with the following design:



The FP3 Program also continues to use the slogan “Be Idle Free – Turn Off the Key,” and pens were purchased (made of recycled tires) carrying the anti-idling slogan. Outreach efforts also involved speaking to Northeast Ohio residents about the dual benefits of anti-idling practices, in that they save fuel and improve air quality. In addition, the Program continued to distribute “cling-on” windshield decals to public service directors and fleet managers. Many packages were distributed to NOACA member communities.



For a complete review of the outreach efforts of NOACA’s Air Quality Programs, please read the “*Air Quality Programs Communication Plan FY10-FY11.*”

**Feedback from the Public:** The following are some of the unedited emails received from the public in 2009 (names removed), directed to NOACA's Air Quality Programs:

*"Thanks for the warning. I count on you advising me and appreciate knowing how to protect myself. Best to you on these beastly hot days. – H.A."*

*"Hi - I wanted to let you know that I really appreciate your information. It allows me and my elderly Mom who has very bad asthma to keep up on things. She does not have internet so I always call her when there is an advisory. Thanks for this service!! – K.C."*

*"Hi Amy, So glad to hear from you. Thought that I had lost my link to your organization, when no alerts were posted. Sincerely, L."*

*"Thank you for keeping me informed. – V."*

## CONCLUSIONS

Within Calendar Year 2009 the following occurred:

- Ozone forecasting was more difficult than in previous years, as SonomaTech struggled to learn how the Great Lakes affect ozone formation in Northeast Ohio and how the micro-scale is often more important than the macro-scale for this region.
- PM<sub>2.5</sub> forecasting continued to be difficult. Forecasted Air Quality Advisories and official exceedance days were not likely to match-up because they were generated from two different data sources (continuous monitors versus Federal Reference Method monitors, which can only provide data in arrears).
- A Request for Proposals for Air Quality Forecasting was issued, and all bids were rejected. NOACA's Air Quality Subcommittee recommended to the Governing Board that forecasting again be performed in-house, with help from the local air agencies. SonomaTech's contract expired on December 31, 2009.
- Public events continued to be popular venues for Air Quality staff to find out what the air quality concerns of the target audiences.
- The Online Air Quality Mapping Page became more attractive and user-friendly through Ohio University's redesign. NOACA's Air Quality Subcommittee recommended to the Governing Board that the annual contract be renewed.
- Radio advertising continued to provide the best method to reach the urban core, particularly through the use of WZAK, which was a new radio station for the Programs. WZAK has a very large listenership, all of whom are in the Cleveland urban core.
- Amy Coursen, as staff to the Air Quality Programs in 2009, provided the following analysis on how to maximize Program resources:

*“By communicating with public of Northeast Ohio, the Programs gain valuable insight into the nonattainment problem and its solutions. Elementary information for the delivery of an outreach program is learned such as:*

- *Who our partners are in solving the nonattainment problem.*
- *What barriers prevent citizens from taking actions to reduce air pollution.*
- *Where the need for further education is.*
- *How we can effectively bring the public to the resources available to them.*

*By hosting tables at events throughout the region, and other forms of outreach, the Programs have spoken one on one with people of the full range of education, interest, and concern on the issue of nonattainment.*

*While they are broad generalizations of the populations throughout the geography of Northeast Ohio, the following conclusions were made from conversations held at various events and through other communications:*

*Suburban population - while they are widely educated and show great concern on environmental issues, are not as interested in the topic of air quality likely because it is not a problem that they can see with the naked eye in their areas. They are more interested in the health effects of inactive lifestyles vs. bicycling and walking. The health effects of automobile transportation, on the region as a whole, may not be of top concern.*

*Leaders in these communities seek further information on the issue of nonattainment. They are interested in marketing their communities whether it is by having walkable communities, bike friendly communities, or a culture of healthy active lifestyles within their communities. The leaders in these communities do not yet fully understand all the economic concerns of nonattainment but are concerned about the difficulty of relocating/locating manufactures in the region. They do, however, understand congestion as it relates to development.*

*Inner-ring suburban population - are the champions of the nonattainment issue. They are educated on their choices for transportation likely because they live in communities that contain multiple safe options for commuting. Many of these communities are setup to be walkable causing the automobile to be not as heavily prevalent in their style of life.*

*Leaders in these communities are being brought ideas and demands for furthering their environmental initiatives from citizen groups while balancing other pressing economic demands.*

*Urban population – generates the most varying perspectives on air quality. People within this population range greatly in interest, education, and mostly concern about air quality. The parent of an asthmatic child may have actively researched indoor and outdoor air quality, have well formed opinions on the topic, and understand the resources that are available to them. Another citizen may be concerned about the in-cabin emissions of an RTA bus. This population has the strongest tendency to accept and request AQ educational materials. This population has the physical connection to air pollution and can describe it as the choking effects of a below grade truck or the sight of a smoke stack. The largest portion of the public transportation dependant population is contained within this population. They are also more likely to see air pollution and therefore have a greater concern about the health risks. This population has the most physical connection to air pollution and can describe it as the choking effects of a below grade truck or the sight of a smoke stack. Like the community leaders in these areas, their concerns and interests are further fragmented by even more pressing concerns about safety and economics. With problems such as urban blight, crime, and loss of businesses, even the most environmentally minded leaders cannot focus their attention on the issue of nonattainment.*

*Based on these assumptions, how can we best provide outreach throughout the region?*

*Suburban - While public events in these locations may be well attended, there is little use for the Programs to attend. The basic information offered by a display table is of little interest and cannot compete with the dynamic displays and giveaways offered by businesses who invest more strongly in these events. Clear and frank information on nonattainment, as a regional issue, should be directly delivered to leadership in these areas.*

*Inner-ring suburban – Partnership with the population of these areas leverages the air quality message. Attending inner-ring suburb events and working with citizens group can be of great benefit to educating the region. These areas can be the model communities of alternative transportation/commuting. They are able to participate in diversifying their commuting behavior, therefore creating momentum around the topic within the region. Information can be provided to citizen groups that can navigate the message to the leaders.*

*Urban – Air quality information should continue to be provided through events and through requests. Partnerships may be formed with interested citizens to take advantage of word-of-mouth marketing. Members of leadership should be strongly supported in their air quality efforts to create a more informed understanding of the issues.*

*All requests for speakers and presentations should be filled to the capacity that staff resources are available. A pre-packaged presentation should be created to assist staff in this goal. Should requests become greater than staff can provide, a separate evaluation will be conducted to determine where resources should be allocated. This evaluation could be comprised of a short survey requesting that listeners highlight what they have learned and what actions the new information will be translated into by the group or individual.*

NOACA's Air Quality Programs will attempt to achieve the targeted efficiencies suggested by the above remarks in the coming year. The Programs will also return to in-house forecasting and will create an updated forecasting protocol for both ozone and fine particles, with the help of many partners, to whom the Programs also extend their thanks.

**APPENDIX A - Ozone Exceedance Days 1997-2009**

**Ashtabula, Cuyahoga, Geauga, Lake, Lorain, Medina, Portage, & Summit Counties**

**(Data courtesy of Ohio EPA/USEPA.)**

Note: The NAAQS became an 8-hour standard of 0.08 ppm (85 ppb) in 1997, superseding a previous 1-hour standard.

The NAAQS then became an 8-hour standard of 0.075 ppm (75 ppb) for 2008 and 2009. It is again under review by USEPA as of January 2010.

<b>Year</b>	<b>8-Hour Ozone NAAQS</b>	<b>Exceedance Date</b>	<b>No. of Monitors Exceeding the NAAQS</b>	<b>Highest Monitor</b>
<b>1997</b>	<b>85 ppb</b>	June 11, 1997	1	88 ppb (Gauga)
		June 23, 1997	1	86 ppb (Gauga)
		June 24, 1997	7	105 ppb (Gauga)
		June 25, 1997	1	87 ppb (Ashtabula)
		June 28, 1997	2	93 ppb (Lake)
		June 29, 1997	2	88 ppb (Gauga)
		July 8, 1997	1	88 ppb (Lorain)
		July 11, 1997	1	90 ppb (Summit)
		July 12, 1997	7	98 ppb (Summit)
		July 13, 1997	8	108 ppb (Gauga)
		July 14, 1997	1	90 ppb (Ashtabula)
		July 18, 1997	2	104 ppb (Lake)
		August 1, 1997	1	86 ppb (Portage)
		August 2, 1997	3	88 ppb (Gauga)
		August 8, 1997	1	90 ppb (Medina)
		August 9, 1997	6	107 ppb (Lake)
	<b>Total</b>	<b>16 days</b>		
<b>1998</b>	<b>85 ppb</b>	May 14, 1998	3	97 ppb (Summit)
		May 15, 1998	6	116 ppb (Portage)
		May 19, 1998	9	113 ppb (Ashtabula)
		May 20, 1998	2	88 ppb (Summit)
		May 28, 1998	2	95 ppb (Ashtabula)
		June 24, 1998	6	103 ppb (Lake)

		June 25, 1998	4	93 ppb (Lake)
		June 26, 1998	2	92 ppb (Ashtabula)
		July 2, 1998	1	89 ppb (Summit)
		July 3, 1998	1	96 ppb (Ashtabula)
		July 13, 1998	4	97 ppb (Summit)
		July 14, 1998	4	102 ppb (Lake)
		July 16, 1998	1	86 ppb (Lake)
		August 3, 1998	2	90 ppb (Summit)
		August 4, 1998	2	89 ppb (Summit)
		August 6, 1998	6	95 ppb (Lake)
		August 7, 1998	10	117 ppb (Lake)
		August 8, 1998	3	100 ppb (Lake)
		August 15, 1998	1	88 ppb (Lake)
		September 6, 1998	2	89 ppb (Ashtabula)
		September 13, 1998	7	109 ppb (Geauga)
		September 14, 1998	7	105 ppb (Geauga)
	<b>Total</b>	<b>22 days</b>		
<b>1999</b>	<b>85 ppb</b>	May 30, 1999	9	118 ppb (Lake)
		June 5, 1999	2	91 ppb (Lake)
		June 6, 1999	1	86 ppb (Ashtabula)
		June 8, 1999	2	94 ppb (Lake)
		June 9, 1999	2	95 ppb (Summit)
		June 10, 1999	5	103 ppb (Lake)
		June 11, 1999	8	113 ppb (Lake)
		June 12, 1999	6	103 ppb (Lake)
		June 22, 1999	1	86 ppb (Portage)
		June 23, 1999	3	90 ppb (Portage)
		June 26, 1999	1	90 ppb (Portage)
		July 13, 1999	1	88 ppb (Geauga)
		July 14, 1999	4	97 ppb (Geauga)
		July 15, 1999	4	93 ppb (Geauga)
		July 16, 1999	7	96 ppb (Portage)
		July 17, 1999	3	92 ppb (Geauga)
		July 23, 1999	6	103 ppb (Geauga)
		July 27, 1999	3	98 ppb (Portage)
		August 16, 1999	1	95 ppb (Cuyahoga)
		August 17, 1999	3	94 ppb (Summit)
		September 2, 1999	2	95 ppb (Summit)
		September 3, 1999	5	95 ppb (Medina)
		September 13, 1999	1	107 ppb (Geauga)
		September 26, 1999	1	87 ppb (Lorain)
	<b>Total</b>	<b>24 days</b>		

<b>2000</b>	<b>85 ppb</b>	May 31, 2000	1	93 ppb (Ashtabula)
		June 1, 2000	1	89 ppb (Geauga)
		June 9, 2000	10	106 ppb (Ashtabula)
		June 10, 2000	9	101 ppb (Ashtabula)
		July 13, 2000	2	94 ppb (Summit)
		July 28, 2000	1	87 ppb (Lake)
	<b>Total</b>	<b>6 days</b>		
<b>2001</b>	<b>85 ppb</b>	May 3, 2001	5	99 ppb (Geauga)
		May 4, 2001	5	92 ppb (Geauga)
		June 13, 2001	5	91 ppb (Cuyahoga)
		June 14, 2001	7	100 ppb (Lake)
		June 15, 2001	1	87 ppb (Geauga)
		June 19, 2001	10	105 ppb (Ashtabula)
		June 26, 2001	1	86 ppb (Ashtabula)
		June 27, 2001	3	102 ppb (Ashtabula)
		June 28, 2001	6	103 ppb (Portage)
		June 29, 2001	4	105 ppb (Ashtabula)
		July 15, 2001	1	94 ppb (Ashtabula)
		July 16, 2001	1	89 ppb (Geauga)
		July 17, 2001	6	101 ppb (Geauga)
		July 18, 2001	4	108 ppb (Summit)
		July 19, 2001	2	87 ppb (Lorain)
		July 20, 2001	2	96 ppb (Geauga)
		July 22, 2001	1	87 ppb (Geauga)
		July 24, 2001	1	87 ppb (Geauga)
		July 31, 2001	3	100 ppb (Summit)
		August 1, 2001	9	102 ppb (Geauga)
		August 2, 2001	2	97 ppb (Geauga)
		August 6, 2001	1	90 ppb (Geauga)
		August 7, 2001	1	92 ppb (Geauga)
		August 9, 2001	1	91 ppb (Lake)
	<b>Total</b>	<b>24 days</b>		
<b>2002</b>	<b>85 ppb</b>	June 9, 2002	7	99 ppb (Summit)
		June 10, 2002	5	100 ppb (Portage)
		June 11, 2002	3	92 ppb (Ashtabula)
		June 20, 2002	7	104 ppb (Lake)
		June 21, 2002	6	108 ppb (Ashtabula)
		June 22, 2002	9	103 ppb (Lake)
		June 23, 2002	8	107 ppb (Ashtabula)
		June 24, 2002	6	105 ppb (Summit)

		June 25, 2002	8	114 ppb (Geauga)
		June 30, 2002	4	96 ppb (Ashtabula)
		July 1, 2002	5	100 ppb (Summit)
		July 4, 2002	1	92 ppb (Ashtabula)
		July 8, 2002	7	117 ppb (Geauga)
		July 13, 2002	3	101 ppb (Summit)
		July 14, 2002	9	103 ppb (Summit)
		July 15, 2002	9	112 ppb (Summit)
		July 17, 2002	10	115 ppb (Lake)
		July 18, 2002	7	103 ppb (Lake)
		July 21, 2002	2	101 ppb (Geauga)
		July 26, 2002	1	87 ppb (Geauga)
		July 31, 2002	3	94 ppb (Lake)
		August 1, 2002	7	115 ppb (Geauga)
		August 4, 2002	5	100 ppb (Lake)
		August 10, 2002	11	115 ppb (Geauga)
		August 11, 2002	9	122 ppb (Geauga)
		August 13, 2002	7	107 ppb (Geauga)
		August 21, 2002	1	90 ppb (Geauga)
		September 7, 2002	3	93 ppb (Lake)
		September 8, 2002	10	110 ppb (Geauga)
		September 9, 2002	9	113 ppb (Lake)
		September 10, 2002	8	104 ppb (Lake)
	<b>Total</b>	<b>31 days</b>		
<b>2003</b>	<b>85 ppb</b>	June 23, 2003	10	120 ppb (Geauga)
		June 24, 2003	7	123 ppb (Portage)
		June 25, 2003	9	112 ppb (Lake)
		July 3, 2003	8	99 ppb (Ashtabula)
		August 15, 2003	1	93 ppb (Geauga)
		August 20, 2003	1	95 ppb (Geauga)
		August 21, 2003	1	89 ppb (Ashtabula)
		August 25, 2003	1	91 ppb (Geauga)
	<b>Total</b>	<b>8 days</b>		
<b>2004</b>	<b>85 ppb</b>	May 12, 2004	1	88 ppb (Ashtabula)
		May 13, 2004	1	88 ppb (Ashtabula)
		July 2, 2004	1	87 ppb (Summit)
		July 3, 2004	1	87 ppb (Summit)
		August 2, 2004	2	87 ppb (Geauga)
		August 3, 2004	1	86 ppb (Portage)
	<b>Total</b>	<b>6 days</b>		

<b>2005</b>	<b>85 ppb</b>	June 7, 2005	2	89 ppb (Ashtabula)
		June 8, 2005	3	103 ppb (Lake)
		June 9, 2005	1	95 ppb (Lake)
		June 21, 2005	2	86 ppb (Geauga)
		June 24, 2005	5	94 ppb (Lake)
		June 25, 2005	2	104 ppb (Ashtabula)
		June 26, 2005	3	94 ppb (Medina)
		June 27, 2005	10	118 ppb (Lake)
		June 29, 2005	1	86 ppb (Portage)
		July 10, 2005	6	95 ppb (Ashtabula)
		July 11, 2005	5	101 ppb (Medina)
		July 12, 2005	3	95 ppb (Lake)
		July 20, 2005	2	90 ppb (Geauga)
		August 1, 2005	1	91 ppb (Lake)
		August 2, 2005	2	93 ppb (Portage)
		August 3, 2005	3	89 ppb (Geauga)
	<b>Total</b>	<b>16 days</b>		
<b>2006</b>	<b>85 ppb</b>	May 29, 2006	1	86 ppb (Ashtabula)
		May 30, 2006	2	99 ppb (Ashtabula)
		June 16, 2006	1	90 ppb (Cuyahoga)
		June 17, 2006	1	99 ppb (Ashtabula)
		July 16, 2006	1	90 ppb (Ashtabula)
	<b>Total</b>	<b>5 days</b>		
<b>2007</b>	<b>85 ppb</b>	April 22, 2007	1	87 ppb (Cuyahoga)
		May 23, 2007	1	103 ppb (Cuyahoga)
		May 24, 2007	4	95 ppb (Ashtabula)
		May 30, 2007	1	89 ppb (Summit)
		May 31, 2007	3	98 ppb (Ashtabula)
		June 17, 2007	1	90 ppb (Summit)
		June 18, 2007	1	89 ppb (Summit)
		July 10, 2007	1	90 ppb (Ashtabula)
		August 1, 2007	2	92 ppb (Summit)
		August 2, 2007	1	89 ppb (Summit)
		August 28, 2007	1	86 ppb (Summit)
		August 29, 2007	2	92 ppb (Ashtabula)
		September 6, 2007	1	92 ppb (Ashtabula)
	<b>Total</b>	<b>13 days</b>		
<b>2008</b>	<b>75 ppb</b>	April 18, 2008	5	82 ppb (Geauga)

	<b>NEW!</b>	April 19, 2008	1	78 ppb (Ashtabula)
		May 30, 2008	2	83 ppb (Geauga)
		June 12, 2008	5	83 ppb (Cuyahoga)
		July 7, 2008	1	76 ppb (Lake)
		July 18, 2008	2	81 ppb (Ashtabula)
		July 28, 2008	3	81 ppb (Ashtabula)
		July 29, 2008	5	88 ppb (Cuyahoga)
		August 21, 2008	5	85 ppb (Cuyahoga)
		September 2, 2008	4	80 ppb (Medina)
		September 3, 2008	8	92 ppb (Summit)
		September 4, 2008	7	85 ppb (Cuyahoga)
	<b>Total</b>	<b>12 days</b>		
<b>2009</b>	<b>75 ppb</b>	May 20, 2009	2	79 ppb (Lake)
		May 21, 2009	4	86 ppb (Lake)
		June 25, 2009	3	88 ppb (Lake)
	<b>Total</b>	<b>3 days</b>		

**APPENDIX B – PM<sub>2.5</sub> Exceedance Days 2007-2009**

**Cuyahoga, Lake, Lorain, Medina, Portage, & Summit Counties**

**(Data courtesy of Ohio EPA/USEPA)**

Note: The 24-Hour NAAQS was tightened to 35 micrograms per cubic meter (35 µg/m<sup>3</sup>) beginning in 2007, replacing a previous 24-Hour NAAQS of 65 µg/m<sup>3</sup>, for which the region had no exceedances.

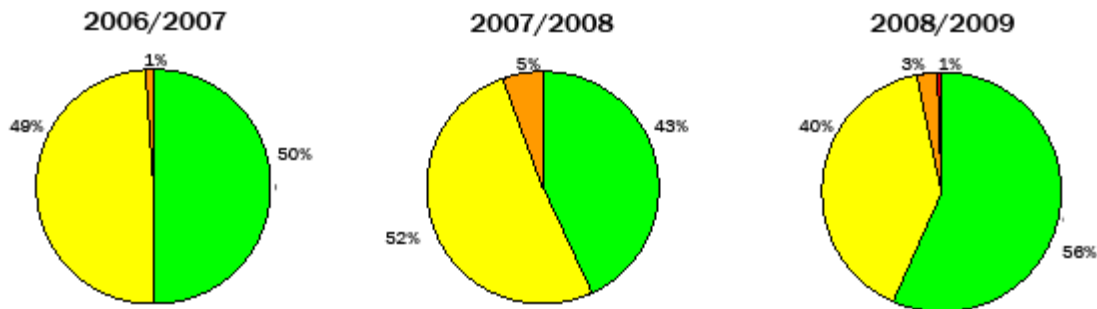
<b>Year</b>	<b>24-Hour PM<sub>2.5</sub> NAAQS</b>	<b>Exceedance Date</b>	<b>No. of Monitors Exceeding the NAAQS</b>	<b>Highest Monitor</b>
<b>2007</b>	<b>35 µg/m<sup>3</sup></b>	May 24, 2007	7	42 µg/m <sup>3</sup> (Cuyahoga)
		September 6, 2007	9	43 µg/m <sup>3</sup> (Lake)
		September 21, 2007	5	41 µg/m <sup>3</sup> (Lake)
		December 26, 2007	1	37 µg/m <sup>3</sup> (Cuyahoga)
		<b>Total</b>	<b>4 days</b>	
<b>2008</b>	<b>35 µg/m<sup>3</sup></b>	January 28, 2008	5	41 µg/m <sup>3</sup> (Cuyahoga)
		February 24, 2008	7	44 µg/m <sup>3</sup> (Summit)
		March 10, 2008	2	39 µg/m <sup>3</sup> (Cuyahoga)
		July 29, 2008	7	40 µg/m <sup>3</sup> (Cuyahoga)
		September 3, 2008	1	37 µg/m <sup>3</sup> (Cuyahoga)
		September 21, 2008	1	40 µg/m <sup>3</sup> (Summit)
		<b>Total</b>	<b>6 days</b>	
<b>2009</b>	<b>35 µg/m<sup>3</sup></b>	February 9, 2009	1	37 µg/m <sup>3</sup> (Cuyahoga)
		<b>Total</b>	<b>1 day</b>	

# Air Quality Summary

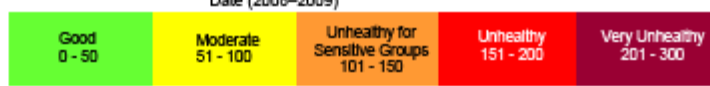
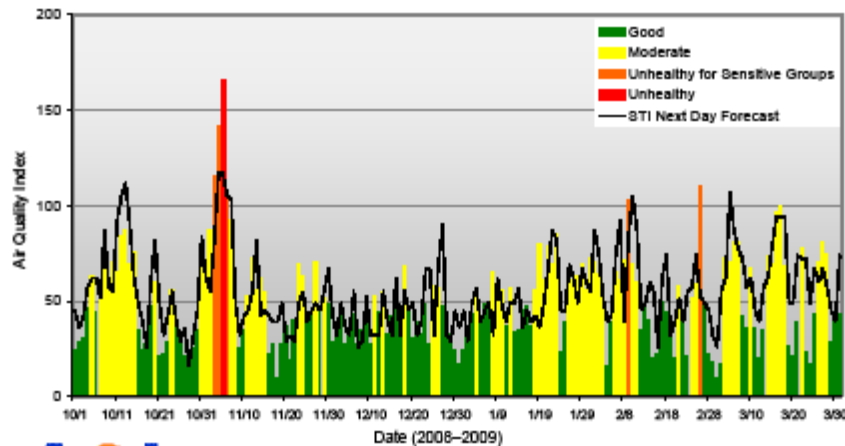
Northeast Ohio: October 1, 2008, through March 31, 2009

Between October 1, 2008, and March 31, 2009 (the 2008 winter season), five days reached Unhealthy for Sensitive Groups (USG) levels on the Air Quality Index (AQI) and one day reached Unhealthy AQI levels. In comparison, ten days in 2007/2008 and two in 2006/2007 reached USG levels during the same time period and none reached Unhealthy levels. In the past four years between October 1 and March 31, an average of eight days reached or exceeded USG levels, indicating that the air quality during the 2008 season was comparable to recent years. However, the number of Good AQI days increased from 43% in 2007/2008 to 56% in 2008/2009.

## Percent of PM<sub>2.5</sub> Days at Each AQI Level



## Daily Maximum AQI Values and Forecasts



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# Air Quality Summary

Northeast Ohio: April 1 through October 31, 2009

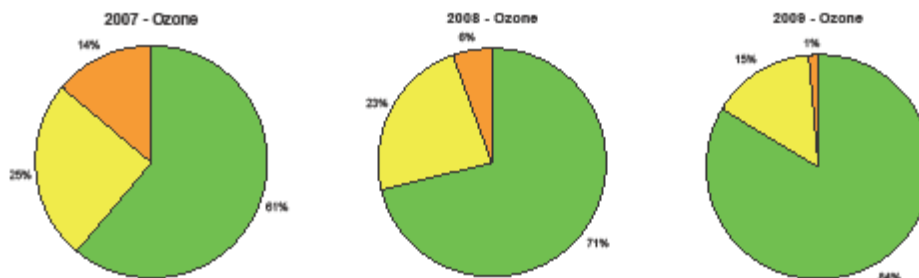
There were fewer Unhealthy for Sensitive Groups (USG) days for ozone during the 2009 April to October summer season compared with the summer seasons of the last two years in Northeast Ohio. Details are shown in the pie charts below.

During this period, as the maps on the next page illustrate, Northeast Ohio experienced near-normal temperatures and precipitation. However, a seven-month average does not adequately capture the day-to-day fluctuations in weather conditions that could account for improved air quality in 2009, including extended episodes of cooler-than-average temperatures that occurred during the mid-summer months. Those cooler periods may have contributed to the lower number of USG or higher ozone days this year.

This air quality summary offers a graphical look at the 2009 exceedance days, Air Quality Advisory days, performance statistics on STI's next-day forecasts, and an overview of the forecasting methodology as applied by STI's meteorologists.

Note: In early spring 2008, a more stringent ozone standard of .075 ppm replaced the previous .084 ppm standard. The data throughout this flyer are based on these new standards for all years so that previous years are comparable with 2008.

## Percent of Ozone Days at Each AQI Level for April through October



Good  
0 - 50

Moderate  
51 - 100

Unhealthy for  
Sensitive Groups  
101 - 150

Unhealthy  
151 - 200

Very Unhealthy  
201 - 300



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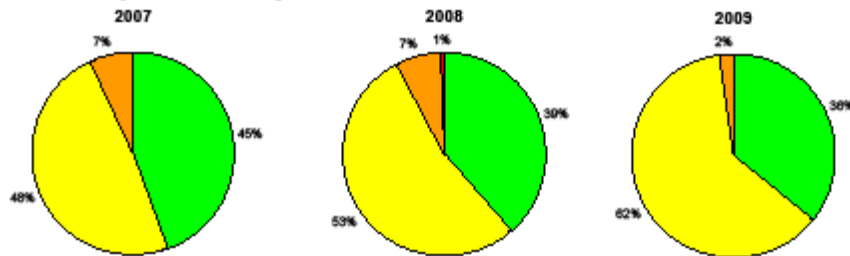


# Air Quality Summary

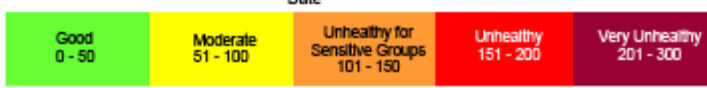
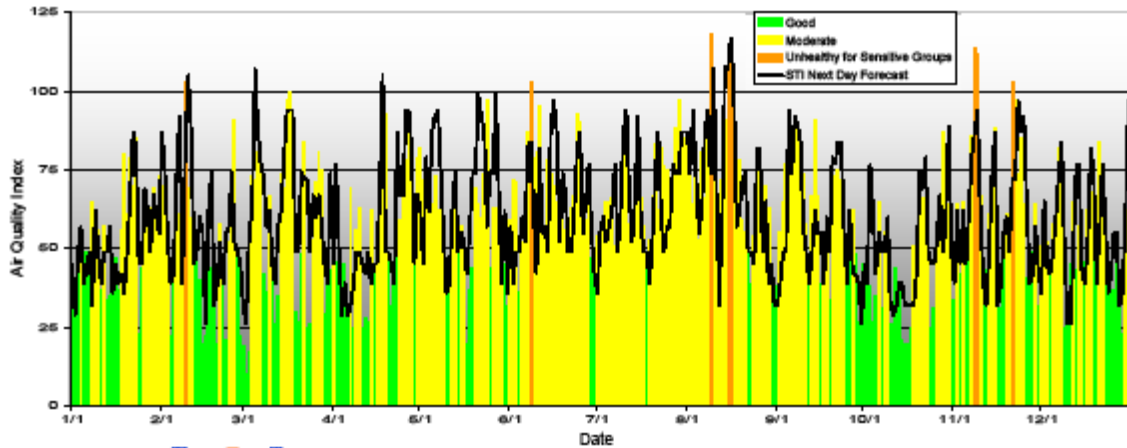
Northeast Ohio: January 1 through December 31, 2009

Between January 1 and December 31, 2009, 2% of total days reached Unhealthy for Sensitive Groups (USG) levels on the Air Quality Index (AQI) for PM<sub>2.5</sub>. In comparison, 8% of days in 2008 and 7% of days in 2007 reached USG levels and above. Meanwhile, the percentage of Moderate AQI days increased from 53% in 2008 to 62% in 2009, while the percentage of Good AQI days decreased slightly from 2008 to 2009. The graph at the bottom of the page indicates that the USG days occurred sporadically throughout the year, while the majority of Good AQI days occurred during the beginning and end of 2009. Because Federal Reference Method (FRM) PM<sub>2.5</sub> monitoring data were not available for the entire year, all observed AQI data shown in this summary are from continuous monitoring sites in Northeast Ohio, including Barr, East HS, G.T. Craig, Medina, Painesville-JFS, and Saint Theodos. STI meteorologists use data from these sites as the basis for their daily forecasts.

Percent of PM<sub>2.5</sub> Days at Each AQI Level



Daily Maximum PM<sub>2.5</sub> AQI Values and STI's Next-Day Forecasts



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