Kentucky Division for Air Quality Fiscal Year 2010 Annual Report

Commonwealth of Kentucky
Energy and Environment Cabinet
Department for Environmental Protection
Division for Air Quality
air.ky.gov

FROM THE DIRECTOR

It is my pleasure to share with you the Kentucky Division for Air Quality's annual report for fiscal year 2010. This report identifies the division's goals and achievements over the past year, summarizes the current state of Kentucky's air quality, and highlights challenges that the agency will face in the next year and beyond.

Kentucky has seen continued economic development and population growth over the course of the last four decades, making it all the more remarkable that our air quality has improved in the same time frame. This fact demonstrates the effectiveness of the Clean Air Act, signed by Congress in 1963. Our improved air quality is a significant achievement considering that economic and population growth results in additional pollution sources from expanded industry, more traffic, and greater energy demand in a state that obtains roughly 94% of its electricity from coal.

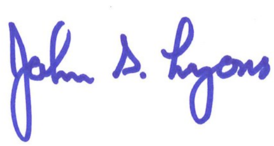
Additional regulations and continuous strengthening of air quality standards required by the Act ensure that although our air quality is better than ever, there is always more work to be done. The United States Environmental Protection Agency reviews and revises the health-based National Ambient Air Quality Standards as necessary to reflect increased scientific understanding about the impacts of air quality on human health and the environment. Simply put, many of the standards have been made more stringent in the past year, and more changes are on the horizon. This means that many counties who have never been charged with poor air quality before may suddenly find themselves out of compliance with the new standards.

Air is a fascinating media that literally knows no boundaries. While many people consider air quality to be an industrial issue, we all make simple choices every day that impact our air quality, from driving our cars to turning on our lights. Every Kentuckian has the ability to help keep Kentucky's air clean, and there are many ways to be involved:

- Learn about air quality and the simple ways that you can make a difference at air.ky.gov;
- Start by making one small change that reduces air pollution;
- Spread the word about what you are doing;
- Organize locally to reduce air pollution;
- Report suspected air pollution concerns to your local regional office.

We all have a valuable role to play in protecting our resources for future generations. Remember, it all adds up to cleaner air!

Sincerely,



John S. Lyons, Director

Kentucky Division for Air Quality
Annual Report
Fiscal Year 2010

TABLE OF CONTENTS

Selected Figures	**iii**
Executive Summary	**1**
Introduction	**4**
Climate Change	**7**
Environmental Education	**11**
Field Operations	**15**
Permit Review	**24**
Program Planning	**34**
Technical Services (Ambient Air Monitoring)	**45**
Appendix A: Field Office Map	**108**
Appendix B: Glossary of Terms	**109**
Appendix C: Glossary of Abbreviations	**110**
Acknowledgements	**111**

Cover photo of Pine Mountain by Barry Howard.

SELECTED FIGURES

1. Air Quality Trends: 1980-2009 3

2. Environmental Education Program Audience 12

3. Major Facility Inspections 16

4. Minor Facility Inspections 17

5. Compliance Rate of Stationary Sources 17

6. Total DAQ Complaints Received (excluding asbestos) 18

7. Open Burn Complaints Received 19

8. Percentage of Open Burn Violations per Complaint Received 19

9. Fugitive Emissions Complaints Received 20

10. Percentage of Fugitive Emissions Violations per Complaint Received 20

11. Odor Complaints Received 21

12. Percentage of Odor Violations per Complaint Received 21

13. Asbestos Statistics and Trends 22

14. Number of Permits Drafted by Section 25

15. Air Permits Pending: 2006 - 2010 26

16. New Applications vs. Completed Reviews 27

17. Backlog as a Percentage of Pending Permits 28

18. Hazardous Air Pollutant (HAP) Emissions by Industrial Classification 29

19. Total Toxic Air Pollutant Emissions by Chemical, 2004 - 2008 30

20. Total HAP Releases in Kentucky, 2004 - 2008 31

21. Total HAP Releases in Kentucky (excluding Electric Generating Facilities) 32

22. Title V Emission Fees Collected 35

23. FY 2010 Receipts 36

24. 2008 Actual Emissions 38

25. Regional Haze and Visibility 43

26. VISTAS Class 1 Areas 44

27. Air Quality Index 48

SELECTED FIGURES

28. National Ambient Air Quality Standards 49

29. 2009 KYDAQ/LMAPCD Ambient Air Monitoring Network Map 51

30. LMAPCD 2009 Carbon Monoxide Air Monitoring Network 53

31. Statewide Averages for Carbon Monoxide 54

32. 2010 Lead Ambient Air Monitoring Network 56

33. 2009 Nitrogen Dioxide Ambient Air Monitoring Network 57

34. Statewide Averages for Nitrogen Dioxide 58

35. Ozone Ambient Air Monitoring Network 60

36. Statewide Averages for Ozone 61

37. 2009 Particulate Matter ($PM_{2.5}$) Ambient Air Monitoring Network 65

38. Statewide Averages for Particulate Matter ($PM_{2.5}$) 66

39. 2009 Particulate Matter ($PM_{2.5}$) Speciation Ambient Air Monitoring Network 70

40. Speciation Trends Network Data, Ashland 72

41. Speciation Trends Network Data, Covington 72

42. Speciation Trends Network Data, Grayson Lake 73

43. Speciation Trends Network Data, Lexington 73

44. Speciation Trends Network Data, Louisville 74

45. Particulate Matter (PM_{10}) Ambient Air Monitoring Network 75

46. Statewide Averages for Particulate Matter (PM_{10}) 76

47. 2009 Sulfur Dioxide Ambient Air Monitoring Network 78

48. Statewide Averages for Sulfur Dioxide 79

49. Mercury (Ambient Air & Wet Deposition) Air Monitoring Network 81

50. Grayson Lake Mercury Wet Deposition 82

51. Total Mercury Wet Deposition, 2008 83

52. Hydrogen Ion Concentration Map 86

53. Hazardous Air Pollutant Air Monitoring Network 87

EXECUTIVE SUMMARY

The mission of the Division for Air Quality (DAQ) is to protect human health and the environment by achieving and maintaining acceptable air quality through:

- *Operation of a comprehensive air monitoring network;*
- *Creating effective partnerships with air pollution sources and the public;*
- *Timely dissemination of accurate and useful information;*
- *The judicious use of program resources; and*
- *Maintenance of a reasonable and effective compliance assurance program.*

The third largest division in the Department for Environmental Protection with 178 staff positions, DAQ oversees a diverse air quality program that encompasses monitoring, regulation development, compliance with federal air quality standards, permitting regulated facilities and environmental education.

Selected achievements and challenges for Fiscal Year 2010

- A broad assessment of air quality over time (1980-2009) for six federally regulated air pollutants shows a trend of reduced air pollution (Figure 1). Air quality continues to improve statewide, as evidenced by the entire state being designated by the United States Environmental Protection Agency (EPA) as meeting the 2006 daily standard for fine particle pollution. Better quality air in Kentucky is due to a combination of regulatory and voluntary programs put in place by local, state, and federal governments.

- These pollution reductions, while wonderful news for public health, do have fiscal impacts. In calendar year 2009, emissions of sulfur dioxide and nitrogen oxides were reduced by 27,000 billable tons, in large part due to controls placed on power plants. This drop in emissions will reduce the amount of Title V fees the agency expected to collect for its FY11 budget, and has resulted in an approximately $1.1 million shortfall.

Air Monitoring

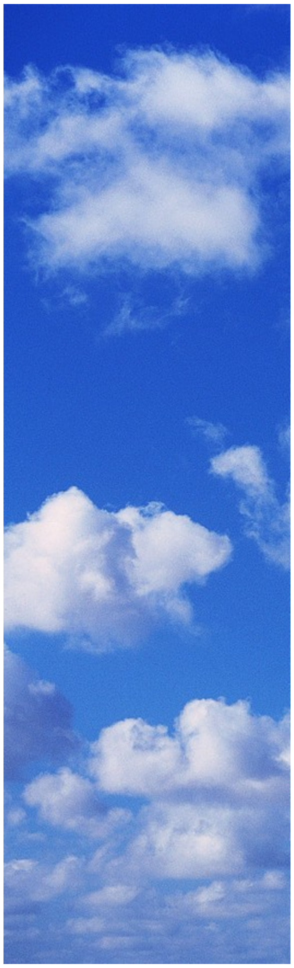
The Technical Services Branch (TSB) continues to successfully operate a network of 113 ambient air quality monitors and 13 meteorological data towers, report on the Air Quality

"We face a new age in air quality. The federal government has finalized rules that will regulate greenhouse gas emissions of both automobiles, and industry. Simultaneously, revised health-based standards and monitoring requirements have been promulgated at the federal level for a number of criteria air pollutants, including lead, nitrogen dioxide and sulfur dioxide. These new rules will have significant impacts on staff time and the agency's budget.

Despite the fact that our air quality is better than ever, the state will face new challenges in the years ahead to meet more stringent air quality rules. Industry may in many cases be required to install additional controls, and control of emissions from motor vehicles will likely increase. More counties than ever will be faced with the possibility of not meeting the revised national standards. As a result, counties may need to look for innovative ways to reduce air pollution locally.

Division for Air Quality staff are happy to work with counties to help them find strategies to reduce local air emissions. Examples of voluntary reduction strategies include: strengthening of bicycle, pedestrian, and public transit networks; increasing community recycling infrastructure and passing local burn bans; utilizing biofuels; and installing solar panels or geothermal systems. In addition to offering technical support, the Division also has a free education and outreach program available to all audiences to help raise awareness of and participation in these kinds of programs."

John S. Lyons,
DAQ Director



Index, observe compliance demonstrations at permitted facilities, and collaborate with the EPA and the Program Planning and Administration Branch on exceptional event data.

- In FY 2010, TSB personnel added three lead samplers to the monitoring network, and continued collaboration with the EPA on their special study on air toxics at schools. The branch also completed a 5-year monitoring network assessment to determine where new monitors need to be placed, and which monitors are no longer needed in certain areas.

Environmental Education

The environmental education (EE) program has reached thousands of students, teachers, and citizens across the Commonwealth through a combination of presentations, exhibitions, and workshops, along with serving in a number of collaborative groups that work to improve air quality.

∗ Environmental education staff made direct contact with more than 5800 Kentuckians in FY 2010, educating about a variety of air quality topics including open burning, air quality and health, and energy conservation.

∗ The EE program initiated a statewide media campaign to educate Kentuckians about the legal, health, and environmental concerns of open burning.

Field Operations

The Field Operation Branch (FOB) continues to respond to the needs of the public and regulated community by investigating complaints and routinely inspecting facilities via the division’s network of eight regional offices.

- FOB has maintained and completed a high level of compliance inspections despite the loss of experienced staff due to high retirement levels in 2008.

Permit Review

The Permit Review Branch (PRB) has substantially reduced the long-standing permit back log, dropping the number of applications that went beyond the allotted Regulatory Time Frame from a high of 524 in June 2006, to 25 at the close of fiscal year 2010.

- One of the biggest challenges for the PRB is to issue permits within the regulatory time frames by state regulations and time frames set by the EPA with the increasing complexity in regulations and litigation. PRB has maintained the number of permits issued past the regulatory time frame to 15%, and will continue striving to reduce that percentage.

Program Planning and Administration

The Program Planning and Administration Branch (PPAB) helped several counties to attain Clean Air Act ambient air quality standards, while simultaneously preparing for more stringent standards that may impact the ability of several counties to maintain compliance.

- In November of 2009, the EPA announced at all Kentucky counties met the 2006 standard for 24-hour fine particle pollution.

- PPAB submitted a designation recommendation to the EPA for the 1997 8-hour ozone standard. The EPA proposed the approval of all Kentucky counties to attainment for that standard in the spring of 2010 and the division was awaiting final approval at the end of the fiscal year.

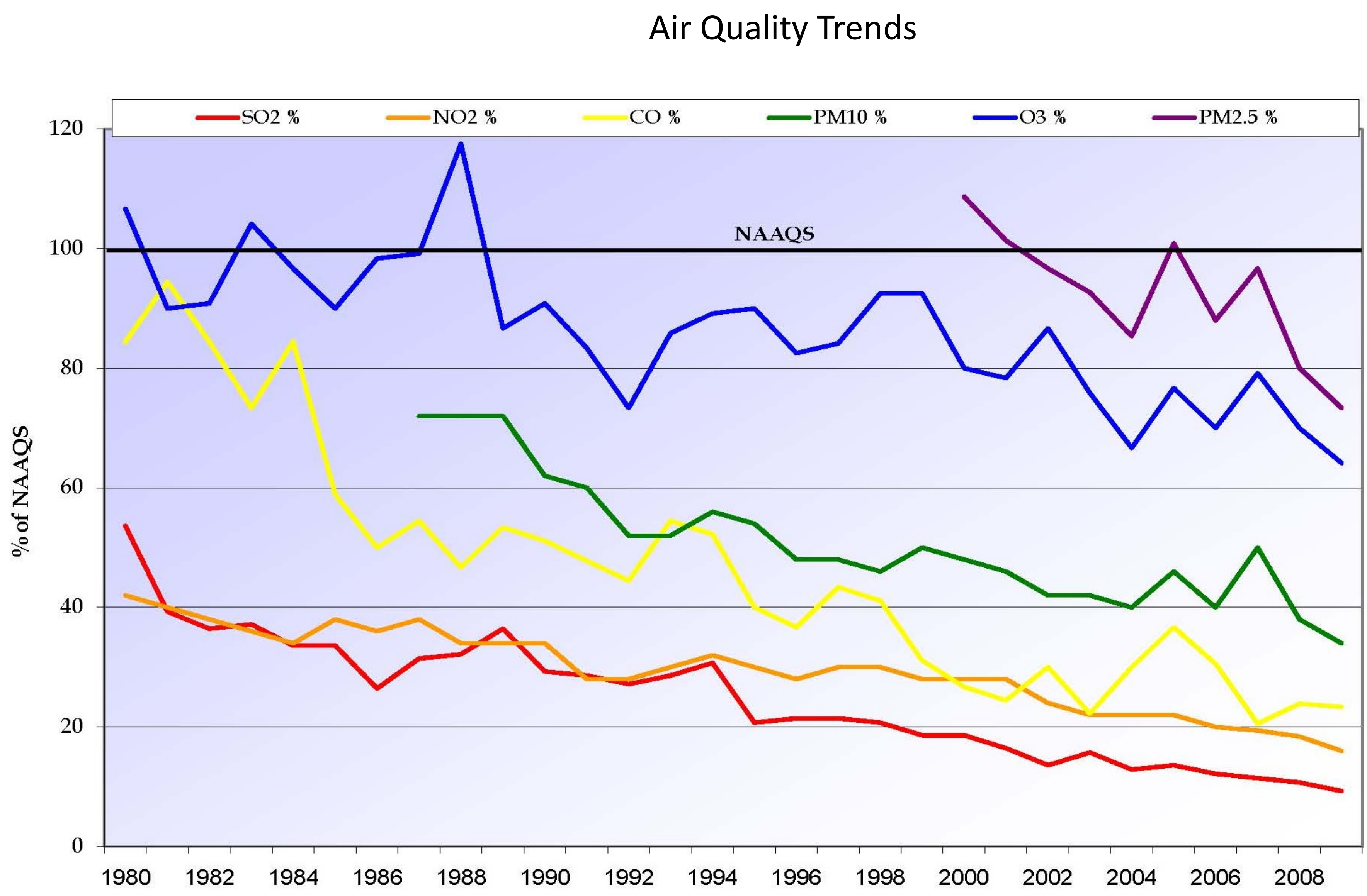
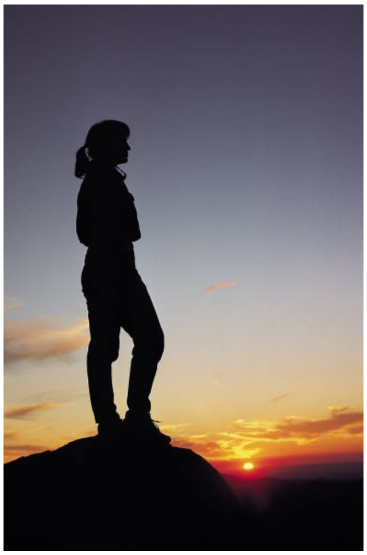


Figure 1: Air Quality Trends from 1980-2009. This chart shows trends in individual pollution levels over time. While individual pollutants may spike certain years, overall the trend shows a decline in pollution levels. The pollutants are shown in terms of percentage of the National Ambient Air Quality Standard (NAAQS) because the different pollutants are measured in different scales, which makes direct comparison difficult. For a key of pollution abbreviations, see the Glossary of Abbreviations on page 110.

INTRODUCTION

The Division for Air Quality (DAQ) is one of six divisions in the Department for Environmental Protection, which is housed in the Energy and Environment Cabinet. The Cabinet has developed a set of objectives to be implemented by each department in Fiscal Year 2010. The objectives and tactics relevant to DAQ are included in this section.

Creating effective partnerships with air pollution sources and the public enables DAQ to carry out its goal of protecting human health and the environment by achieving and maintaining acceptable air quality. DAQ strives to assist Kentucky's citizens and businesses in a satisfactory manner by responding to complaints, requests, and permit actions quickly and thoroughly. In addition to serving individuals and businesses, the division works to ensure that the federal Clean Air Act is met by working with county and city governments to ensure local compliance with (attainment of) the National Ambient Air Quality Standards (NAAQS), which are set by the EPA.



Cabinet Objective 1.0: Eliminate DAQ permit backlog.

In order to better accomplish this objective, the Division for Air Quality has established the following tactics and measures to help us track our progress:

Tactic 1.1: Continue execution of the permit backlog reduction plan originally implemented on July 15, 2006.

Measures for **Permit Backlogs**:

- The total number of permits pending (pg. 26, Fig. 15)
- The total number of permits pending that exceed regulatory time frames (pg. 26, Fig. 15)
- The percentage of permit reviews completed within regulatory time frames (pg. 28, Fig. 17)
- The percentage of permit reviews completed that exceed regulatory time frames (pg. 28, Fig. 17)

Cabinet Objective 2.0: Protect and enhance Kentucky's air quality.

The division has established a number of tactics and measures to meet this second objective:

Originally operating out of the state health department, the Kentucky Air Pollution Control Commission was the state's first air pollution control program, in operation as early as the 1940s. Kentucky's environmental cabinet was first formed in the early 1970s, in part due to national legislation which brought the Environmental Protection Agency (and the Clean Air Act) into being. Today, as in its beginning, air pollution control is divided among a hierarchy of state, federal, and local programs.

Federal Programs

The Clean Air Act (CAA) authorizes two permitting programs at the federal level. The New Source Review (NSR) program has been around since 1975 and requires extensive review of applications for major new or modified air contaminant sources prior to issuance of construction permits. Title V of the 1990 CAA Amendments authorized for the first time a federally enforceable operating permit program.

Local Authority

KRS 224 recognizes the right of counties to develop their own air pollution control districts, if they wish. Jefferson County (Louisville Metro Air Pollution Control District) has maintained a local air pollution control program since the late 1940s, while activities in the rest of Kentucky counties are covered by DAQ. The Air Pollution Control District may choose to make subtle changes or be more stringent than state and federal regulations, but it must be at least as stringent as the state and federal programs.

Tactic 2.1: Continue implementation of the air toxics program to evaluate and address any risks to public health associated with hazardous and toxic air pollutant emissions.

Measures for **hazardous air pollutant reductions**:

- The total number of air toxics assessments reviewed and/or performed (pg. 30, text)
- The total number of hazardous air pollutant related complaint investigations (pg. 30, text)
- The total tons of hazardous air pollutants reduced (pp. 31-32, Figs. 18-19)

Tactic 2.2: Implement measures contained in the June 2008 annual fine particle attainment demonstration State Implementation Plan (SIP).

Measure for **demonstrating attainment of the annual fine particle standard**:

- The number of counties remaining in nonattainment (pg. 42, text)

Tactic 2.3: Continue implementation of federal programs and requirements contained in the 1997 8-hour ozone attainment demonstration SIP, submitted to the U.S. EPA in December 2007.

Measure for **designation of the 1997 8-hour ozone standard**:

- The number of counties remaining in nonattainment (pg. 41, text)

Tactic 2.4: Continue implementation of federal programs and requirements contained in the December 2007 Regional Haze SIP.

Measure for **implementation of the Regional Haze State Implementation Plan**:

- Improved visibility at Class I areas, in cluding Mammoth Cave National Park (pg. 43, text)

Tactic 2.5: Enter a negotiating dialogue with the U.S. EPA in November 2009 regarding the recommendations for areas not meeting the 2008 8-hour ozone standard, which were submitted in March 2009. This will result in the official nonattainment designations for this standard in March 2010.

Measure for **recommendations for ozone nonattainment:**

- The number of counties in non-attainment (pg. 41, text)

Tactic 2.6: Determine mercury deposition and impacts resulting from emissions of mercury by Kentucky sources.

Measure for **reducing emissions of mercury from stationary sources:**

- The number of streams with fish consumption advisories (pg. 83, text)

Tactic 2.7: Track U.S. EPA's development and implementation of their Greenhouse Gas Reporting Rule and determine what requirements may be applicable to Kentucky.

Measure for **reducing greenhouse gas emissions from various Kentucky sectors:**

- Total tons of greenhouse gas emissions from various Kentucky sectors (pg. 9, text)

Tactic 2.8: Submit recommendations for areas not meeting the new 2009 lead standard to U.S. EPA by October 15, 2009

Measure for **recommendations for lead nonattainment:**

- The number of areas in nonattainment (pg. 43, text)

Tactic 2.9: Operate an extensive, statewide ambient air monitoring network in order to ascertain the status of Kentucky's ambient air quality.

Measures for **determining the status of Kentucky's ambient air quality:**

- Number of air monitors in network based on population estimates (pg. 45, text)
- Number of locations selected to represent population exposure (pg. 45, text)
- Number of locations selected to represent background concentration levels (pg. 47, link in text)
- Number of locations selected to represent regional transport of ambient air pollution (pg. 47, link in text)
- Number of monitors and locations to represent source impacts (pg. 47, link in text)
- Hours of continuous ambient air monitoring data collected (pg. 47, link in text)
- Number of particulate matter, lead, and air toxics samples collected (pp. 45-107)
- Concentrations of pollutants for which national ambient air quality standards have been established (pp. 45-80)
- Concentrations of pollutants for which health-based risk standards have been determined (pp. 81 - 107)

Tactic 2.10: Conduct quality measurement checks and data quality assessments on the ambient air monitoring network in order to ensure data accuracy and integrity.

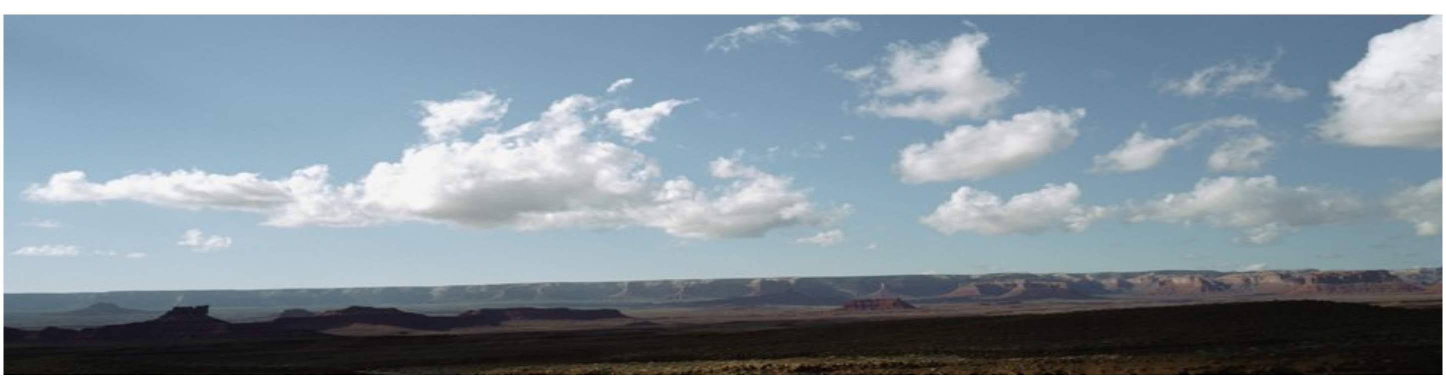
Measures for **assessing data accuracy and integrity:**

- Number of complete and current Quality Assurance Project Plans (pg. 47, text)
- Number of complete and current Standard Operating Procedures (pg. 47, text)
- Percentage of valid, quality-assured continuous ambient air monitoring data collected (pg. 47, text)
- Percentage of valid, quality-assured particulate matter, lead, and air toxics samples collected (pg. 47, text)
- Number of quality control checks performed on ambient air monitors (pg. 47, text)
- Number of ambient air monitoring performance evaluations conducted (pg. 47, text)

Tactic 2.11: Assure compliance with air quality regulations and standards.

Measures for **compliance with air quality regulations and standards:**

- Number of major stationary source inspections conducted (pg.16, Fig. 3)
- Number of minor stationary source inspections conducted (pg. 17, 4)
- Number of routine (non-complaint) asbestos National Emission Standard for Hazardous Air Pollutants (NESHAP) and Asbestos Hazard Emergency Response Act (AHERA) inspections conducted (pg. 22, Fig. 13)
- Number of NESHAP and AHERA complaint investigations conducted (pg. 22, Fig. 13)
- Number of asbestos NESHAP notification investigations for existing Agency Interests (pg. 22, Fig. 13)
- Number of asbestos NESHAP notification investigations for non-Agency Interests (pp. 22-23)
- Number of routine non-asbestos complaint investigations conducted (pg. 18, Fig. 6)
- Compliance rate of stationary source inspections (pg. 17, Fig. 5)
- Compliance rate of all incident investigations (pg. 18, text)
- Compliance rate with 401 KAR 63:005 — open burning, 401 KAR 63:010 — fugitive emissions, and 401 KAR 53:010 — odor (pp. 19-21)
- Compliance rate of NESHAP and AHERA-related inspections and investigations (pg. 23, text)



Regulating Greenhouse Gases: A Summary of Federal Actions to Date

Greenhouse gases (GHGs) are gases that have the ability to trap heat in the atmosphere. Without greenhouse gases, the earth would be a spinning ball of ice. With a very thick layer of greenhouse gases, the earth would have a very hot climate, like Venus. While a number of gases have heat-trapping potential, six key gases, including carbon dioxide, are considered to be well-mixed in the atmosphere and are thought to be key culprits in a warming climate here on earth. Thus, greenhouse gases have been targeted for reductions by the federal Environmental Protection Agency (EPA) and other entities as one strategy to combat global climate change.

Greenhouse gases covered by Environmental Protection Agency rules are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons (HFC)
- Perfluorochemicals (PFC)
- Sulfur Hexafluoride (SF_6)

The reduction of greenhouse gas emissions could be accomplished through voluntary, legislative, or regulatory action. While a number of bills aimed at legislating carbon and other greenhouse gas reductions have been proposed, nothing has been promulgated by the federal legislature. Meanwhile, the EPA has moved down a regulatory path, which could happen in lieu of or alongside federal legislation, should legislation move forward. Legislative measures, if enacted, could also prohibit the regulation of greenhouse gases by the EPA at some point in the future. The following paragraphs summarize federal actions chronologically through June 2010 that relate to the regulation of greenhouse gases.

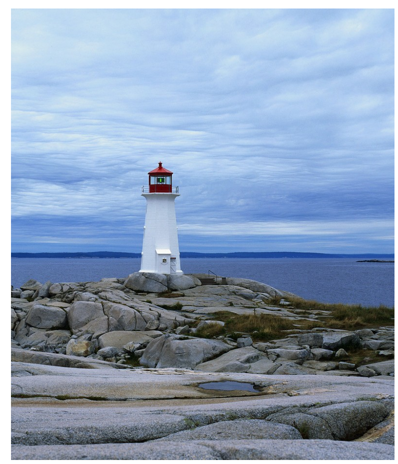
Each of these steps has laid the groundwork for superseding regulatory authority and language. First, the results of the *Massachusetts v. U.S. EPA* Supreme Court case in 2007 found that green-

house gases could be covered as pollutants under the Clean Air Act, and required the EPA to investigate whether or not greenhouse gas emissions pose a threat to human health and welfare. EPA Administrator Lisa Jackson's findings in this case laid the groundwork for the issue of the Light Duty Vehicle Rule, under which greenhouse gases became a pollutant regulated under the Clean Air Act for the first time. Upon finalization of the Light Duty Vehicle Rule, the Tailoring Rule became necessary as a means to reduce the permitting burden for stationary sources of GHGs under current statutory authority.

Massachusetts v. U.S. EPA

This lawsuit was petitioned by twelve states (California, Connecticut, Illinois, Maine, Massachusetts, New Jersey, New Mexico, New York, Oregon, Rhode Island, Vermont, and Washington) and several cities (New York, Baltimore, and Washington, D.C.) along with the territory of American Samoa, and a number of non-governmental agencies including the Center for Biological Diversity, the Natural Resources Defense Council, Sierra Club, Union of Concerned Scientists, and the U.S. Public Interest Research Group. Respondents to the law suit included the U.S. Environmental Protection Agency, the states of Michigan, Alaska, Idaho, Kansas, Nebraska, North Dakota, Ohio, South Dakota, Texas, and Utah, and other non-governmental organizations including the Alliance of Automobile Manufacturers, National Automobile Dealers Association, Engine Manufacturers Association, Truck Manufacturers Association, and the CO_2 Litigation Group.

In *Massachusetts v. EPA*, decided in April 2007, the Supreme Court found that "Because greenhouse gases fit well within the Act's capacious definition of 'air pollutant,' EPA has statutory authority to regulate emission of such gases from new motor vehicles," (*Massachusetts v. EPA*, p. 4). The Court held that the EPA must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. This requirement led to EPA Administrator Lisa Jackson's Endangerment Finding (see page 9).



Mandatory Reporting Rule

The Mandatory Reporting Rule does not regulate emissions of greenhouse gases, but rather it requires that entities emitting over 25,000 metric tons per year of carbon dioxide equivalent ($mtCO_2e$) must report those emissions to the federal government. There are six greenhouse gases covered by the rule, and all have different levels of heat-trapping potential and life span. Carbon dioxide equivalency provides a unit of common measure for these different gases. This rule allows the EPA to begin gathering data on the quantity of emissions generated by many sectors of the U.S. economy. Reporters submit data directly to the EPA; the state is not involved in collecting reports or enforcing the rule. Entities covered under the rule – primarily fossil fuel suppliers, industrial gas suppliers, manufacturers of vehicles and engines outside of the light-duty sector, and certain large industrial facilities – were required to begin collecting data in January of 2010, and are required to submit their first report in March of 2011. The rule was made final on September 22, 2009 (*74 FR 56259*).

The Kentucky Division of Compliance Assistance held a 3-hour workshop in partnership with Division for Air Quality staff to inform the regulated community of the requirements of the new rule and provide some resources to help entities determine if they were required to report under the rule. The training had a full roster, with 80 attendees who appreciated the chance to better understand the rule and how to determine applicability. Although the state is not required to report on behalf of facilities via this rule, the Emissions Inventory section has begun collecting GHG data when available through existing AP42 emission factors, which are the numbers that industry and air quality agencies use to calculate emission rates in cases where other data are not available. The data was collected for carbon dioxide (104,104,546 tons annual emissions reported), methane (41,814 tons annual emissions reported), and nitrous oxide (4,063 tons annual emissions reported). In sum, there were 96,381,271 metric tons of CO_2 equivalent reported in calendar year 2009. However, this data represents an initial gathering of information and does not cover every facility that emits GHGs in the state, as AP42 factors are not available for all greenhouse gases in all industrial sectors.

Endangerment and Cause or Contribute Findings

U.S. EPA Administrator Lisa Jackson was required by court action to investigate whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health and welfare, or whether the science is too uncertain to make a reasoned decision. The EPA conducted a thorough, 30-month review of the scientific literature, including the observed and projected effects of greenhouse gases in the atmosphere, their effect on climate, and the public health and public welfare risks and impacts associated with climate change. More than 380,000 public comments were submitted by June of 2009, 60 days after the proposed findings were published in the federal register in April of 2009. There were two distinct findings:

1) The “Endangerment Finding” states that the mix of atmospheric concentrations of six key, well-mixed greenhouse gases threatens both the public health and the public welfare of current and future generations.
2) The “Cause or Contribute Finding” says that the combined greenhouse gas emissions from new motor vehicles and motor vehicle engines contribute to the atmospheric concentrations of the six greenhouse gases and therefore contribute to climate change.

The final Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act was signed by Administrator Jackson on December 7, 2009 (*74 FR 66495*). While this finding did not in itself place regulatory requirements, it did set the stage for the EPA to finalize proposed greenhouse gas emission standards for light-duty vehicles, which were proposed in September of 2009 in partnership with the federal Department of Transportation and the Corporate Annual Fuel Economy (CAFE) Standard. Finding that greenhouse gases threaten public health and welfare required the EPA to take action to reduce those air emissions.

Light Duty Vehicle Rule

The Light Duty Vehicle Rule was finalized on May 7, 2010 (*75 FR 25323*). The rule applies to the light-duty, or passenger vehicle, fleet. It does not pertain to the heavy-duty (i.e. freight truck) sector. The rule sets a specific carbon dioxide limit of 250 grams of carbon dioxide per vehicle mile traveled for model year 2016 vehicles. The rule also raises the fuel economy standard, which would incrementally raise the average fuel economy of the nation’s light duty fleet to 35.5 miles per gallon by 2016. Setting these standards under section 202(a) of the Clean Air Act meant that greenhouse gases became a regulated pollutant under the Clean Air Act for the first time. In a separate action, EPA’s Reconsideration of the Johnson Memorandum (*75 FR 17003*), the EPA determined that the permitted sector would be required to be permitted for greenhouse gases once the first vehicles regulated by the new vehicles standards are released on the market, which will be in January of 2011. This means that air quality permits for certain stationary facilities will be required beginning January 2, 2011.

Tailoring Rule

On June 3, 2009, the EPA released its final version of the Tailoring Rule (*75 FR 31513*). It received over 400,000 comments on the proposed rule (*74 FR 55291*). The rule will ultimately cover 70% of the nation's GHG emissions from stationary sources, such as power plants, refineries, and cement production facilities. Emissions from small farms, restaurants, and all but the largest commercial facilities are not covered under the rule as it currently stands.

The goal of the tailoring rule is to "tailor" the thresholds that are applicable to greenhouse gases in air quality permits for facilities that pollute. Before greenhouse gases became regulated pollutants under the Clean Air Act, specific emission limits were set for a variety of pollutants. The threshold limits for these pollutants are defined in state regulations, 401 KAR 51:001 and 401 KAR 52:001. Now that greenhouse gases are considered by the EPA to be regulated pollutants, the problem with the statutory thresholds currently in state regulation is that carbon dioxide in particular is a pollutant commonly emitted in much larger quantities than other permitted pollutants. The current pollutant thresholds, if applied to greenhouse gases, would overwhelm permitting agencies by increasing the demand for Title V permits, at a national level, from 15,000 to 6 million permits. Applications for Prevention of Significant Deterioration permits would increase from the 300 held today, to over 80,000, due to a combination of permits required for new construction or major facility modifications (p. 31538). Therefore, the Tailoring Rule is designed to "tailor" these thresholds to prevent the kinds of "absurd results" (p. 55295) that would result from applying current pollutant thresholds to greenhouse gases. The rule is designed to be phased in, in three steps. Step 1 will take effect on January 2, 2011, through June 30, 2011. Step 2 will begin on July 1, 2011, and be in effect until June 30, 2013. In Step 3, the EPA will undertake another rulemaking that will begin in 2011 and conclude by July 1, 2012.

Kentucky and many other states must now adopt the Tailoring Rule into our state regulations or face potential loss of air permitting programs. If Kentucky refuses to adopt this rule on any grounds, then the EPA must determine if the state is still in compliance with its State Implementation Plan (SIP). If the state is found to have a deficient SIP, then the federal government may take over, in full or in part, Kentucky's air permitting program. If the EPA chose to take over only the GHG portion of Kentucky's permitting program, facilities located in the state would be required to receive the GHG component of their permit from the federal government, leading to a bifurcated permitting process. This approach, or a full takeover of the state's air permitting program, would likely result in significant delays in turn around time for permit issuance and could result in federal sanctions.

Links to Federal Greenhouse Gas Regulatory and Judicial Actions
http://www.epa.gov/climatechange/initiatives/index.html

Massachusetts v. EPA
http://www.law.cornell.edu/supct/html/05-1120.ZS.html

Mandatory Reporting Rule
Web Page: http://www.epa.gov/climatechange/emissions/ghgrulemaking.html
Fact Sheet: http://www.epa.gov/climatechange/emissions/downloads09/FactSheet.pdf

Endangerment and Cause or Contribute Findings
Web Page: http://www.epa.gov/climatechange/endangerment.html
Fact Sheet: http://www.epa.gov/climatechange/endangerment/downloads/EndangermentFinding_FAQs.pdf

Light-Duty Vehicle Rule
Web Page: http://epa.gov/otaq/climate/regulations.htm
Fact Sheet: http://www.epa.gov/oms/climate/regulations/420f10014.pdf

Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule
Web Page: http://www.epa.gov/NSR/actions.html#may10
Fact Sheet: http://www.epa.gov/NSR/documents/20100413fs.pdf

ENVIRONMENTAL EDUCATION

The goal of environmental education (EE) is to give individuals the tools and information needed to think critically and independently about the world around them. Environmental education focuses on the interactions between society and the environment. Air quality is a fitting arena for such a focus, because so much of what people do in their daily lives impacts air quality. The division's environmental education program emphasizes experiential education, with the philosophy that the best way for students to learn is to become actively engaged in whatever it is that they seek to learn.

DAQ's EE program reaches a diverse audience across the Commonwealth including students, teachers, and a variety of special-interest groups such as school bus drivers (idle reduction), school nurses (indoor air quality), homeowners (energy conservation), and firefighters (open burning). In addition to the division's full-time EE Specialist, field office staff assist with regional outreach programs as requested. DAQ's air quality curriculum is correlated to state and national learning standards, and formulated primarily for grades 4-8.

The DAQ EE program includes:

- Teacher training
- Classroom and camp programs
- Public events and festivals
- Fire fighter education
- School bus driver trainings (idle reduction)
- Community groups, forums, and conferences
- Media outreach

Air Quality EE program topic areas include:

- Air pollution sources & monitoring
- Open burning and waste reduction
- Clean school buses (idle reduction and retrofit technology)
- Fuel economy and alternative fuels
- Energy conservation and alternative energy sources
- Alternative modes of transit: walking, biking, vanpooling, etc.
- Climate change

Environmental Education Outreach in Fiscal Year 2010

DAQ's Environmental Education program reached over 5800 Kentuckians in Fiscal Year 2010. More than half of these contacts occurred in April and May, when DAQ staff set up displays at a dozen different festivals around Kentucky. People visiting the DAQ display learned about a variety of air quality issues including open burning, air quality and health, and energy conservation. EE staff also presented experiential programs to K-12 students and to teachers in professional development workshops. Figure 2 shows the audience and numbers for each category of program offered. In addition to these efforts, DAQ EE staff presented at the annual meetings of the North American Association for Environmental Education, the KY Association for Environmental Education, and the Center for Community Partnerships Sustainability conference.

DAQ Assistant Director Sean Alteri and teachers Laura Zimmerman and Lea Hammond examine climatological data during a professional development workshop for educators. Photo courtesy of Amy Wallot, Kentucky Department of Education.

Open Burning Media Campaign

In the spring of 2010, DAQ conducted a statewide media campaign to educate Kentuckians about the issue of open burning. The campaign utilized original radio spots, audio news releases, and

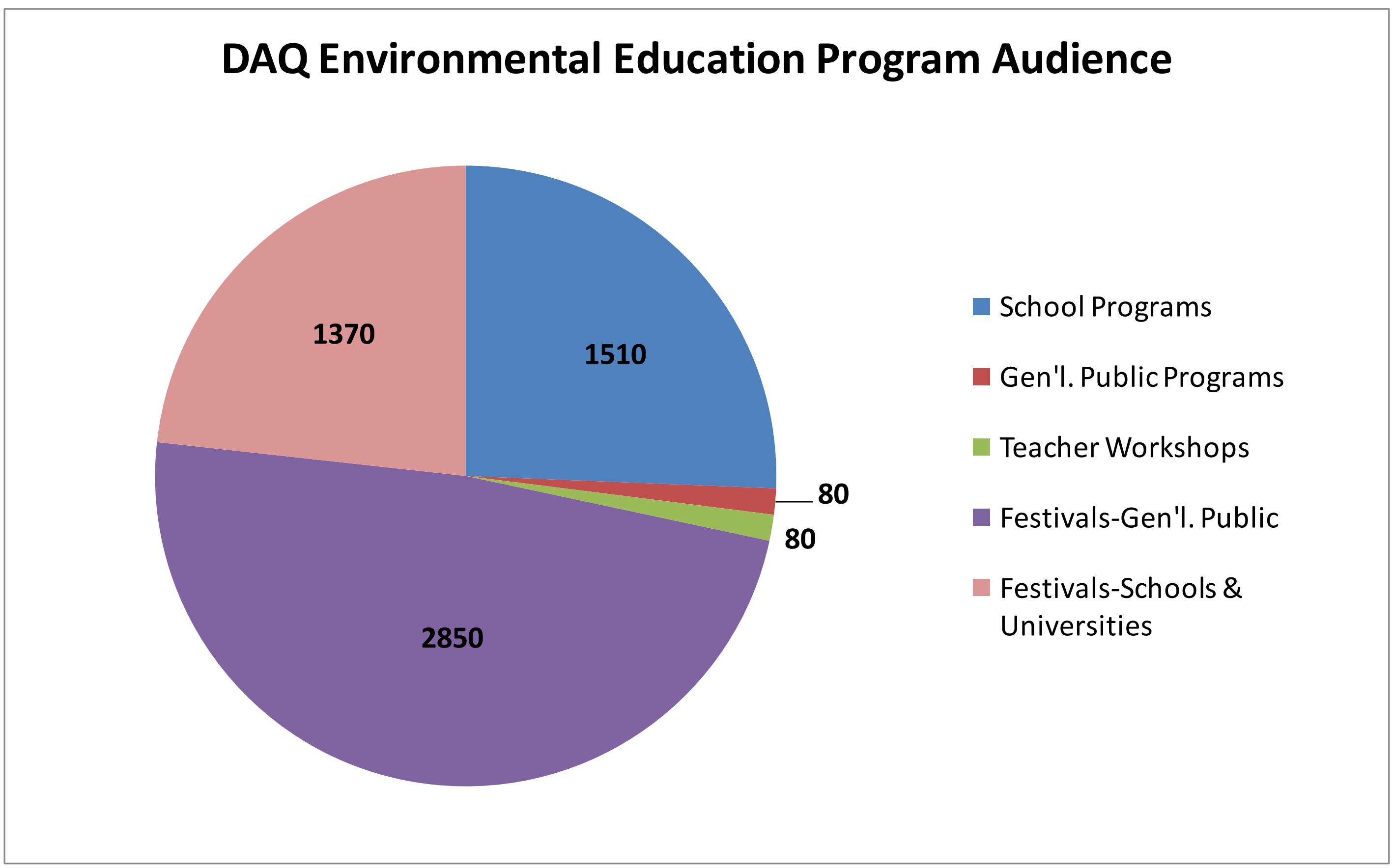


Figure 2: This chart shows the numbers of people reached by the Division for Air Quality's Environmental Education programs in FY 2010.

NPR underwriting. All of these encouraged listeners to "learn before you burn" and to call DAQ's open burning hotline (888-BURN-LAW) for more information about the open burning regulation. Radio spots, news releases, and underwriting announcements aired a total of 11,391 times across the Commonwealth between late April and mid-May.

Southeast Diesel Collaborative

The Southeast Diesel Collaborative (SEDC) is a regional organization that brings together partners from federal, state and local government, non-governmental organizations, and business to reduce emissions from diesel engines. A wide variety of strategies are utilized by SEDC partners to achieve these reductions, including idle reduction, alternative fuels, and engine retrofits, replacements and repowers. Federal funds, authorized by the Diesel Emissions Reduction Act (DERA), help SEDC partners employ the above strategies in the multiple diesel sectors involved.

DAQ staff maintain an active presence in the SEDC. This year, DAQ Environmental Technologist Shea Hogan was invited by EPA Region 4 staff to take a prominent role in the future development of the Collaborative by sitting on the 2010-2011 SEDC Strategic Planning Committee. The Strategic Planning Committee is responsible for developing the overarching goals and priorities for the SEDC, as well as providing support for the completion of the actions needed to achieve these goals and priorities.

Kentucky Clean Diesel Collaborative

In the fall of 2009, DAQ coordinated a one-day event to celebrate recent clean diesel initiatives in Kentucky, and to share information about upcoming grant programs and initiatives to reduce diesel emissions. A diverse group of stakeholders participated in the collaborative meeting, which included representatives from the freight industry (trucking, rail, air, and ports), school districts, non-profit organizations, and government (at the city, state, and federal level).

Recent initiatives highlighted at the meeting included idle-reduction policy development in Louisville, gate electrification at the UPS World Port facility (to reduce emissions of freight loading equipment), and involving students in scientific inquiry relating to vehicle idling.

Kentucky Clean School Bus Grant Program

Through the Kentucky Clean School Bus Grant Program, DAQ has awarded nearly $2 million in DERA funds to 27 school districts across the state to help reduce emissions from their school buses. Over $1.73 million of this funding was authorized by the 2009 American Recovery and Reinvestment Act (ARRA). These school districts are reducing emissions by installing pollution control devices on their school buses and implementing idle reduction policies in their bus fleets. The funded districts include Bell County, Boone County, Fayette County, Franklin County, Jefferson County, and Paducah Independent (utilizing $196,000 in DERA funds), and Ashland Independent, Corbin Independent, Daviess County, Elizabethtown Independent, Floyd County, Frankfort Independent, Franklin

Greg Grimes and Chris Montgomery install a diesel particulate filter on a Franklin County school bus. Photo courtesy of the Division for Air Quality.

County, Gallatin County, Grayson County, Jefferson County, Lincoln County, Livingston County, Madison County, Marion County, Montgomery County, Owsley County, Pike County, Pulaski County, Somerset Independent, Spencer County, Taylor County, Trigg County, and Warren County (utilizing $1.73 Million in ARRA DERA funds).

In the past fiscal year, $1,014,872 of the $2 million available was spent by the 27 participating school districts to retrofit 577 school buses with emission control devices. Upon completion of the grant program, 773 total school buses will be retrofitted, resulting in a reduction of 5.7 tons of particulate matter, 54.1 tons of hydrocarbons, and 106.8 tons of carbon monoxide. While school buses are the safest way to get students to and from school, DAQ is working to ensure that school buses are also the cleanest way to transport students.

In addition to the bus retrofits performed, each school district also implemented an idle reduction policy in their school bus fleet. The division encouraged this action as a component of participation in the Clean School Bus Grant Program, and DAQ staff provided educational materials, templates, and support for the adoption and implementation of these policies. By eliminating unnecessary idling in their fleets, schools are able to save money while reducing student and driver exposure to harmful diesel emissions.

Kentucky Clean Diesel Grant Program

In addition to the funds dispersed through the Clean School Bus Program, DAQ also used continuing DERA funds to expand the DERA grant program beyond school buses to include diesel vehicles from all sectors across the state. A Request for Proposals for the Kentucky Clean Diesel Grant Program was issued in December 2009 for the $235,000 that was available through this round of funding, and 3 funding requests were received by the close of the application period. As a result, one truck replacement project with an Independent Owner-Operator long-haul trucking operation is now underway and a retrofit project with a local government agency's refuse hauler fleet is in the development stages.

The Independent Owner-Operator project has received recognition and praise by EPA staff, and this recognition culminated in an invitation to speak to the members of the SEDC during the 2010 Annual Partner's Meeting in Atlanta, GA. Paul and Lynne Fouts used this opportunity to share their perspective as Independent Owner-Operators working to reduce diesel emissions in long-haul trucking operations, and their presentation was one of the most well received and applauded of the 4-day Partner's Meeting.

Kentucky Clean Fuels Coalition

The Kentucky Clean Fuels Coalition, with support from DAQ, the Kentucky Department for Energy Development and Independence, and numerous other stakeholders, wrote and received a grant from the US Dept. of Energy to bring the largest hybrid school bus fleet in the nation to Kentucky. When complete, the $13 million grant will facilitate the purchase of 213 hybrid school buses that will be distributed widely across the Commonwealth.

Kentucky Association for Environmental Education

DAQ is an active member of the Kentucky Association for Environmental Education (KAEE), sponsoring the organization's annual conference and maintaining a presence on www.EEinKentucky.org. This year, DAQ Policy Analyst Elizabeth Robb Schmitz served on KAEE's Executive Committee. DAQ also sponsored a KAEE professional development workshop for teachers about air quality and climate science.

FIELD OPERATIONS

The Field Operations Branch (FOB) is the largest branch of the division and is currently staffed by 71 employees that include supervisors, administrative staff, air source inspectors, asbestos inspectors, field support staff, and air monitoring specialists. FOB field staff are located in eight regional offices, and have the following primary duties:

"The higher inspection numbers in 2009 are a direct result of either fully staffed offices or an actual numerical increase of inspectors in some regional offices. While not yet fully trained on the complexities of air quality regulations, the new staff have risen to the demands of a rigorous inspection schedule. Regional office staff should be commended for maintaining high productivity levels during these economically challenging times."

Kevin Flowers, FOB Branch Manager

1) Complete unscheduled inspections to ensure that permitted facilities and non-permitted entities maintain compliance with federal and/or state air quality regulations;

2) Operate and maintain 113 air monitoring units located at 34 stations scattered throughout the state to measure ambient air quality and determine whether pollutant concentrations remain within EPA established limits; and

3) Investigate, within five business days, air quality complaints received from the general public and other sources each year.

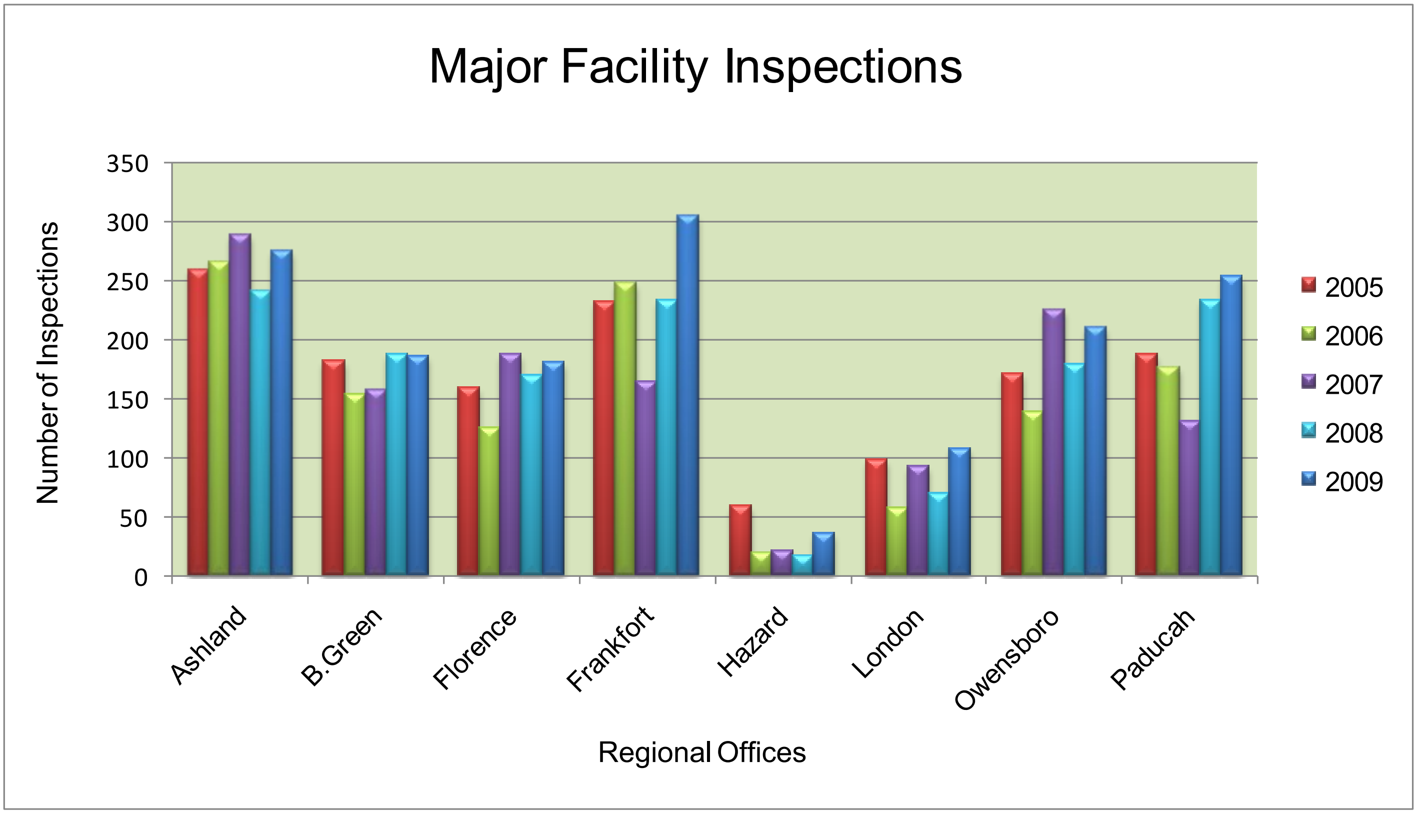


Figure 3: Number of major stationary facility inspections in Kentucky (all types of inspections excluding complaint investigations).

Inspections

One of the primary duties of the FOB is to inspect sources of air pollution for compliance with air quality regulations and if applicable, permit conditions. The measures for the success of FOB's compliance-monitoring program are:

- Number of major stationary source inspections conducted (Figure 3);
- Number of minor stationary source inspections conducted (Figure 4);
- Number of asbestos inspections conducted (Figure 13);
- Compliance rate of stationary source inspections (Figure 5);
- Rate of compliance with 401 KAR 63:005—open burning (Figure 8);
- Rate of compliance with 63:010—fugitive emissions (Figure 10); and
- Rate of compliance with 401 KAR 53:010—odor (Figure 12).

In calendar year 2009, FOB staff completed 3734 compliance inspections of various types at either non-permitted or permitted sources (major Title V, minor). Types of inspections included full compliance evaluations, partial compliance evaluations, records reviews, compliance demonstrations (stack tests), asbestos inspections, follow-up inspections of documented violations, and self-initiated inspections of suspected violators.

The regional offices with more inspections for major facilities (Figure 3) are located in areas of the state with a higher number of major permitted facilities, which include power plants, manufacturing facilities and chemical processing plants. The regional offices with more inspections for minor sources tend to be located in areas of the state with a larger population base, leading to more minor pollution sources, such as auto body/paint shops and dry cleaners (Figure 4).

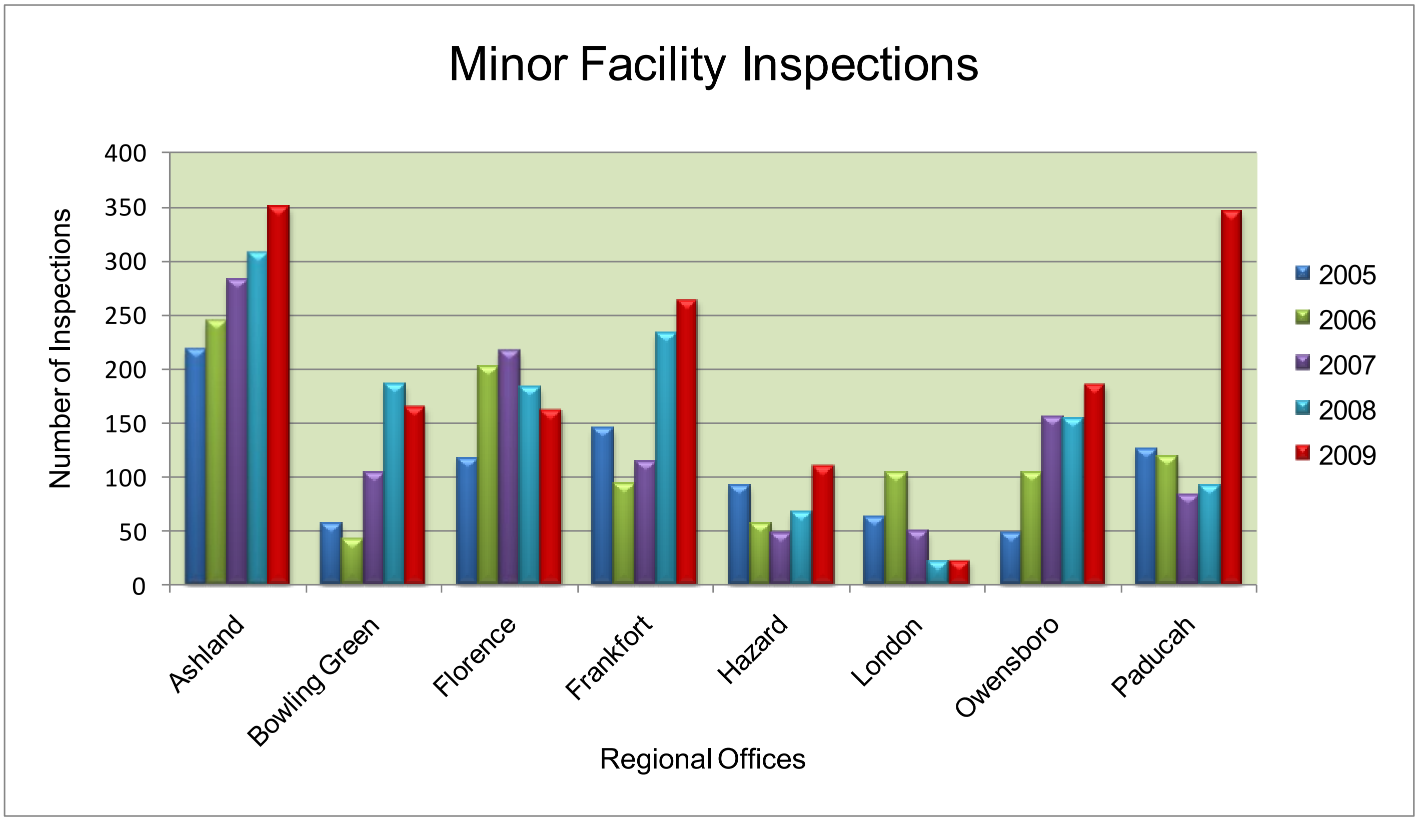


Figure 4: Number of minor stationary source inspections, 2005-2009.
**Inspection Types = state plant classifications of Minor (x), Registered Source (R), and 52:080 (Z)*

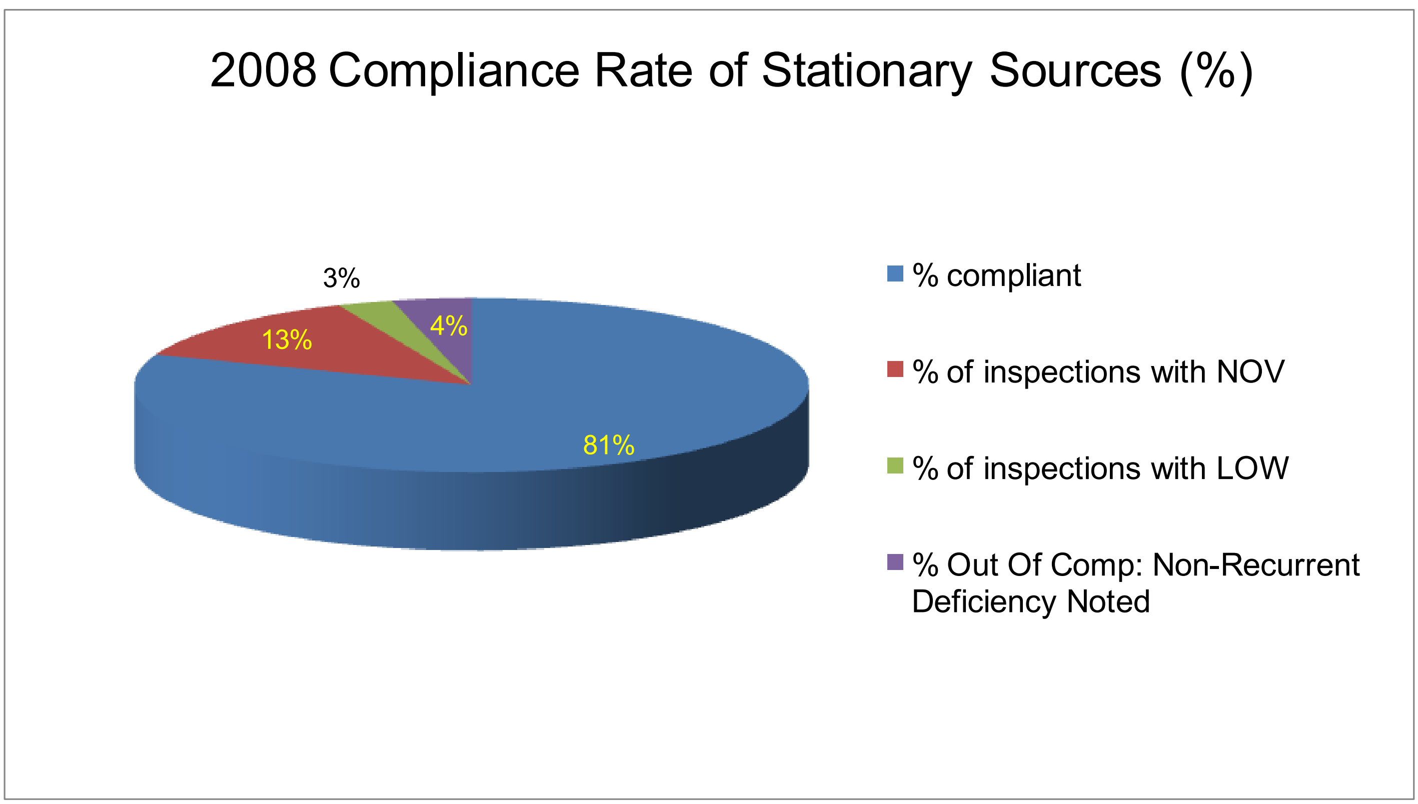


Figure 5: The compliance rate of regulated stationary sources inspected by field office staff in 2009 was 87%. Notices of Violation were issued to 7% of Kentucky's stationary sources, while 1% received Letters of Warning. Five percent of violations were considered minor or were quickly corrected, eliminating the need for any formal enforcement action.

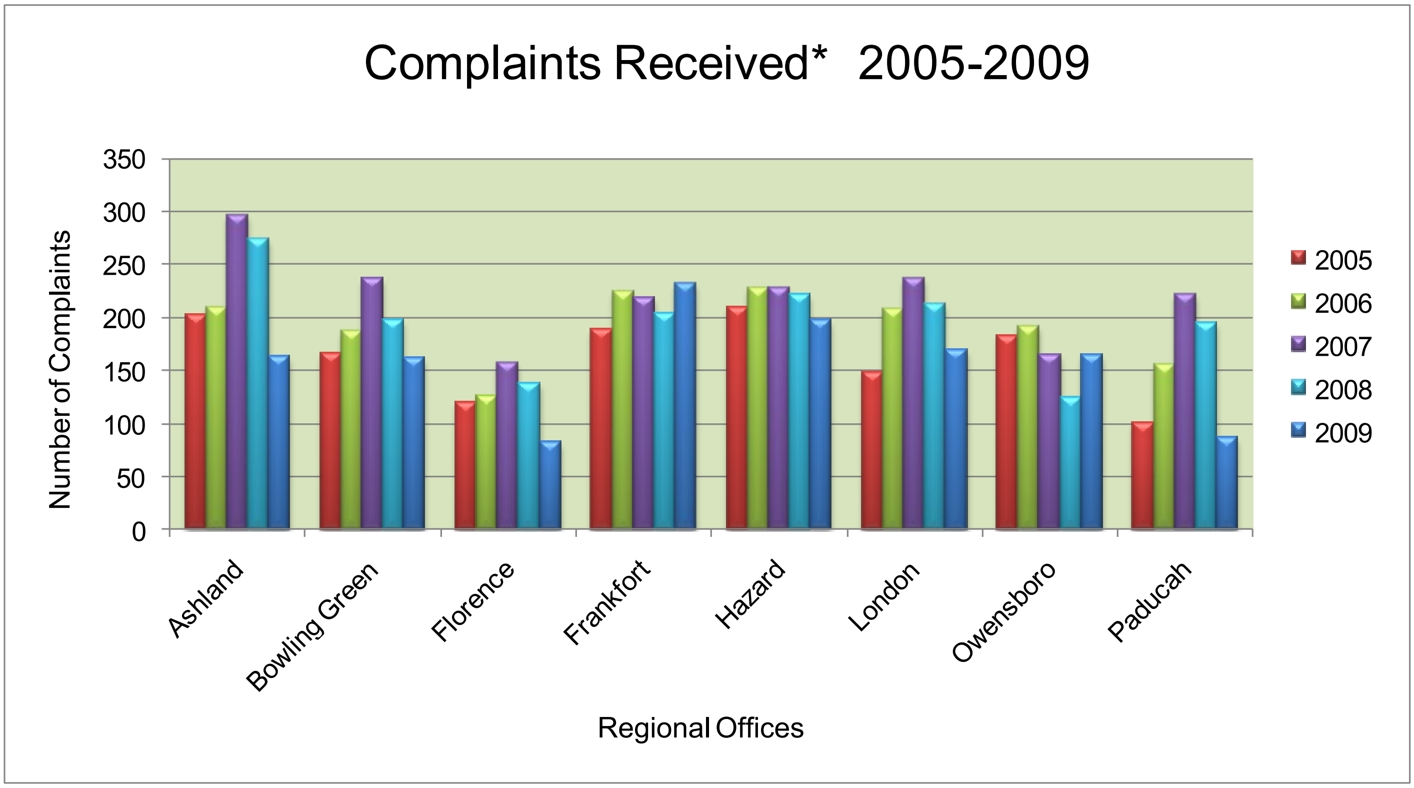


*Figure 6 : *All complaints **except** asbestos complaints.*

Complaint Investigations

Investigating complaints consumes a significant portion of field office staff time. In 2009, field office inspectors received a total of 1255 complaints resulting in 1129 field investigations.

The combined 4863 inspections and complaint investigations resulted in the issuance of 542 Notices of Violation and 72 referrals to the Division of Enforcement for additional enforcement. Data on the rates of violations resulting from investigations are included in figures 8, 10, & 12. The violation rates for open burning are necessarily high, since we only respond to citizen complaints of open burning or as we discover them in the course of other duties. Kentucky does not have a statewide open burn permit program, so total number of actual open burns is unknown. Slightly more than half of all complaints are found to be legal open burning.

The Fugitive Emissions violations rate has been fairly low over the years with violations occurring at a high of almost 16% of all investigations in 2007 to a current low of about 4.5% of the investigations in 2009. The 2007 drought in Kentucky is likely a major contributing factor in both the number of complaints received and the number of violations discovered.

The Odor rates have varied though the years, with the number of odor complaints peaking in 2008. The actual total number of odor violations and the rate of violations per odor complaint received both peaked in 2007 but have been trending downward through 2009.

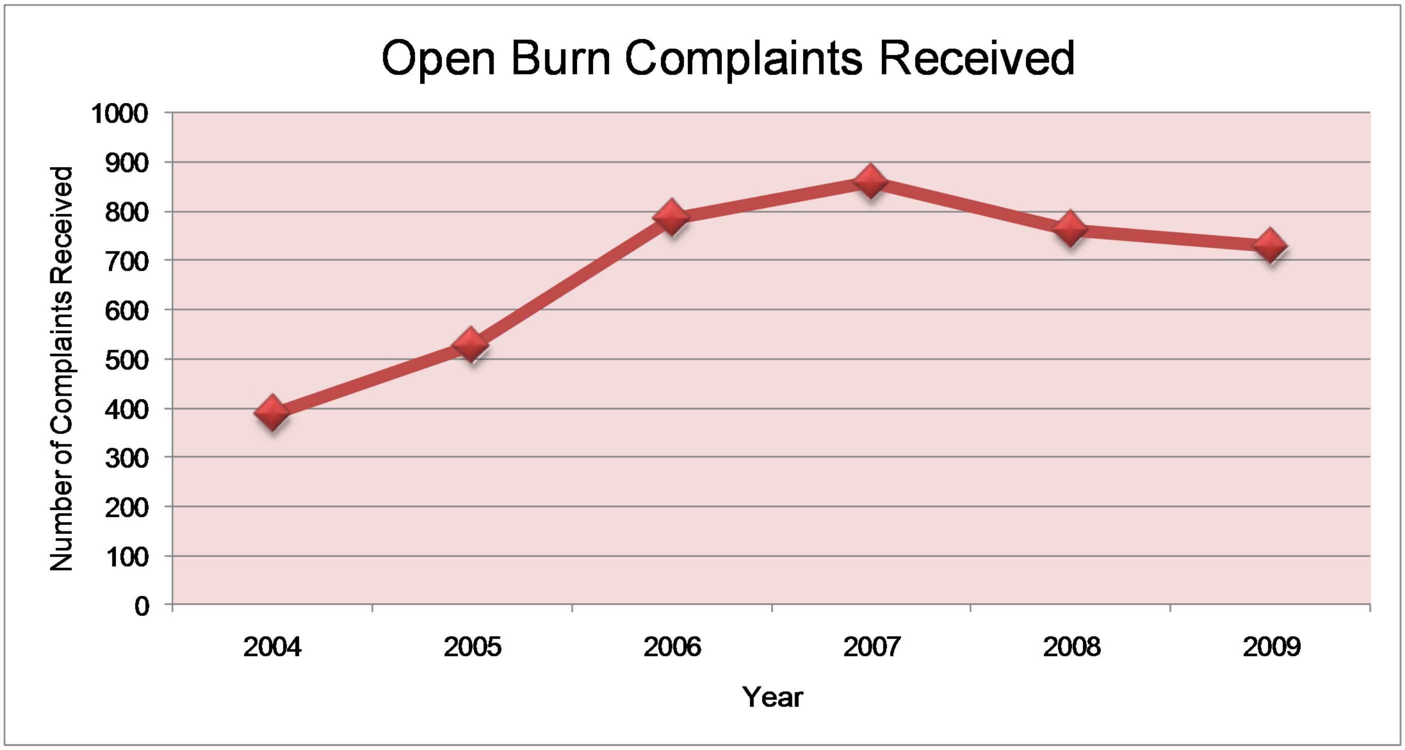


Figure 7: Complaints received about open burning. Education and outreach campaigns targeting illegal open burning may be driving the increase in open burning complaints and associated violations in recent years.

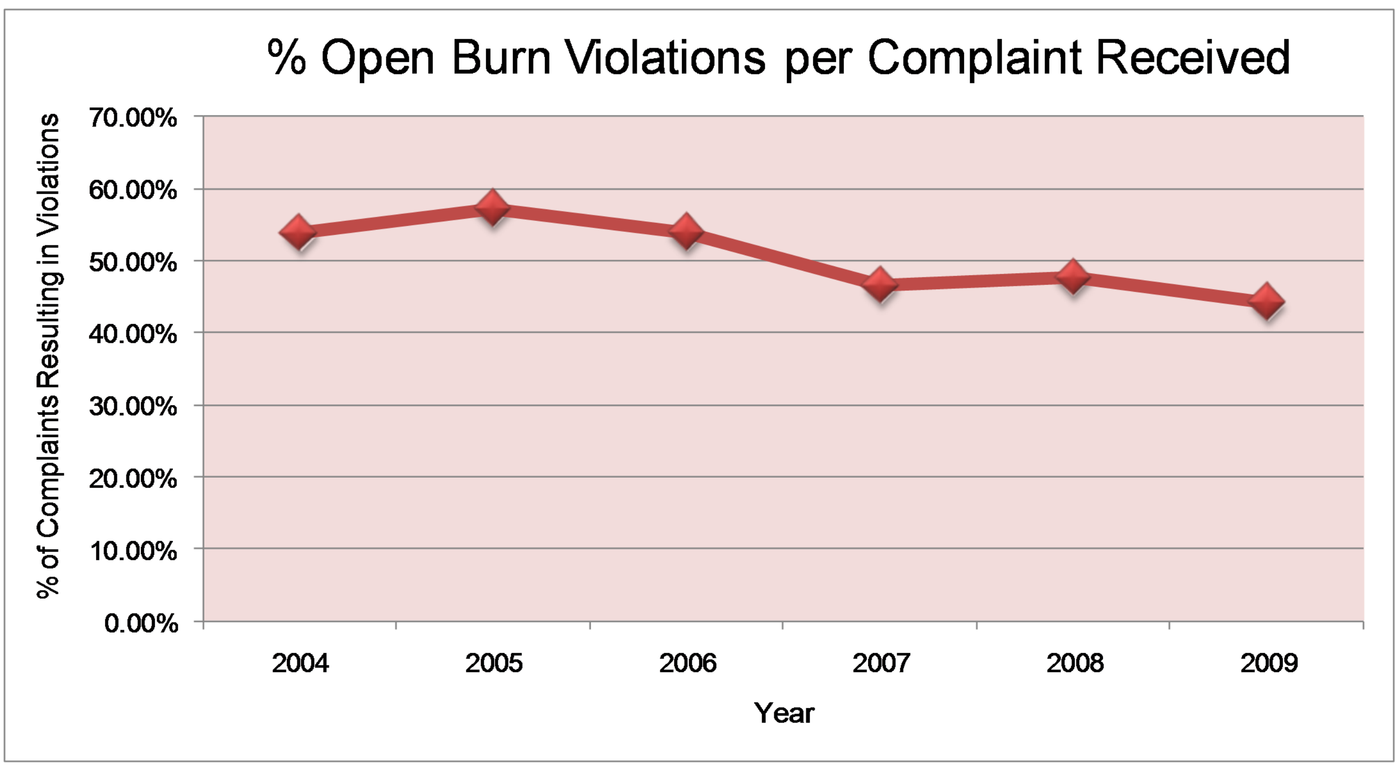


Figure 8: Compliance with the open burn regulation. The increase in open burning citizen complaints means we actually observe more open burns, yet many of these burns are determined to be legal open burning. This may account for the percentage reduction while the number of complaints received dropped only slightly. The 42% of open burning violations documented in 2009 continued an overall gradual reduction in violations as compared to a high of 58% in 2005.

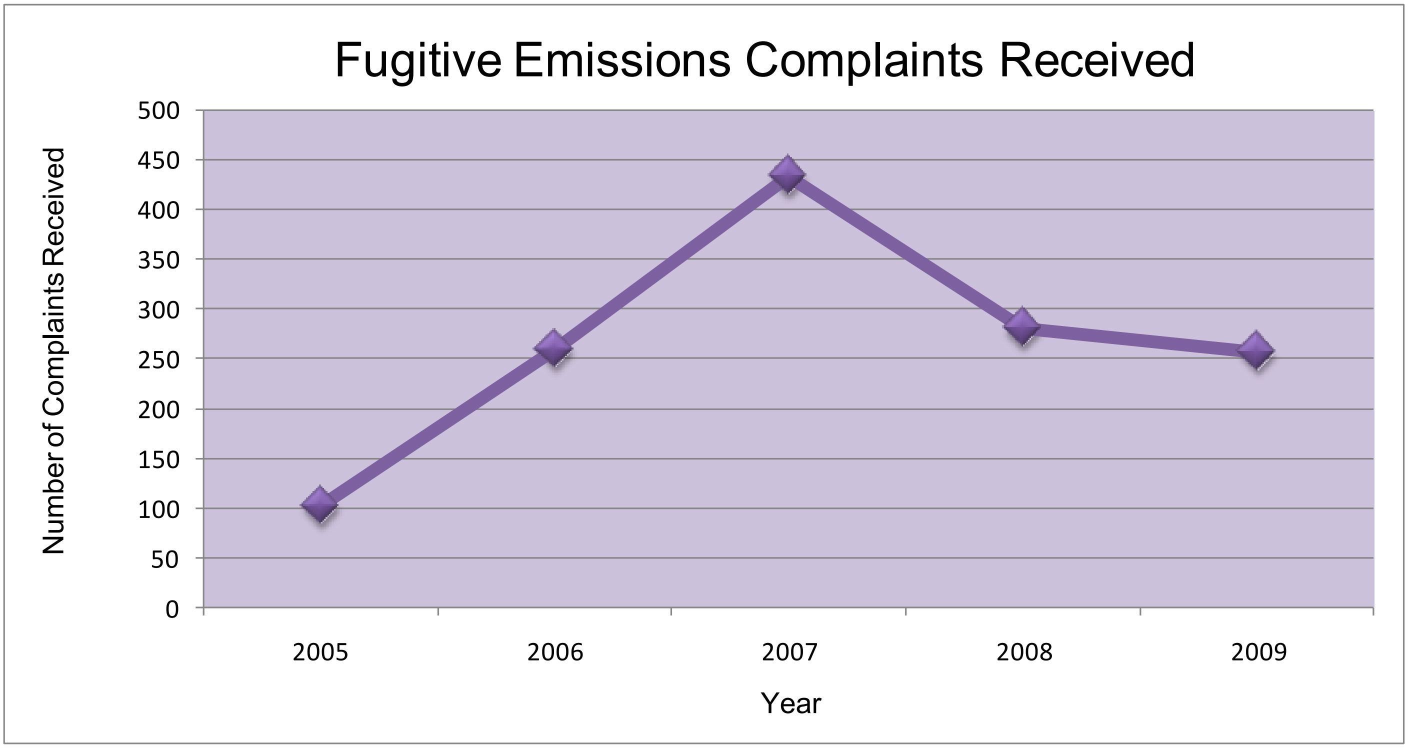


Figure 9: Complaints received about fugitive emissions. Fugitive emissions are those that do not come from a stack. Common fugitive emissions are dust from haul roads, quarries, conveyor systems, etc. Complaints often result in a finding of non-compliance.

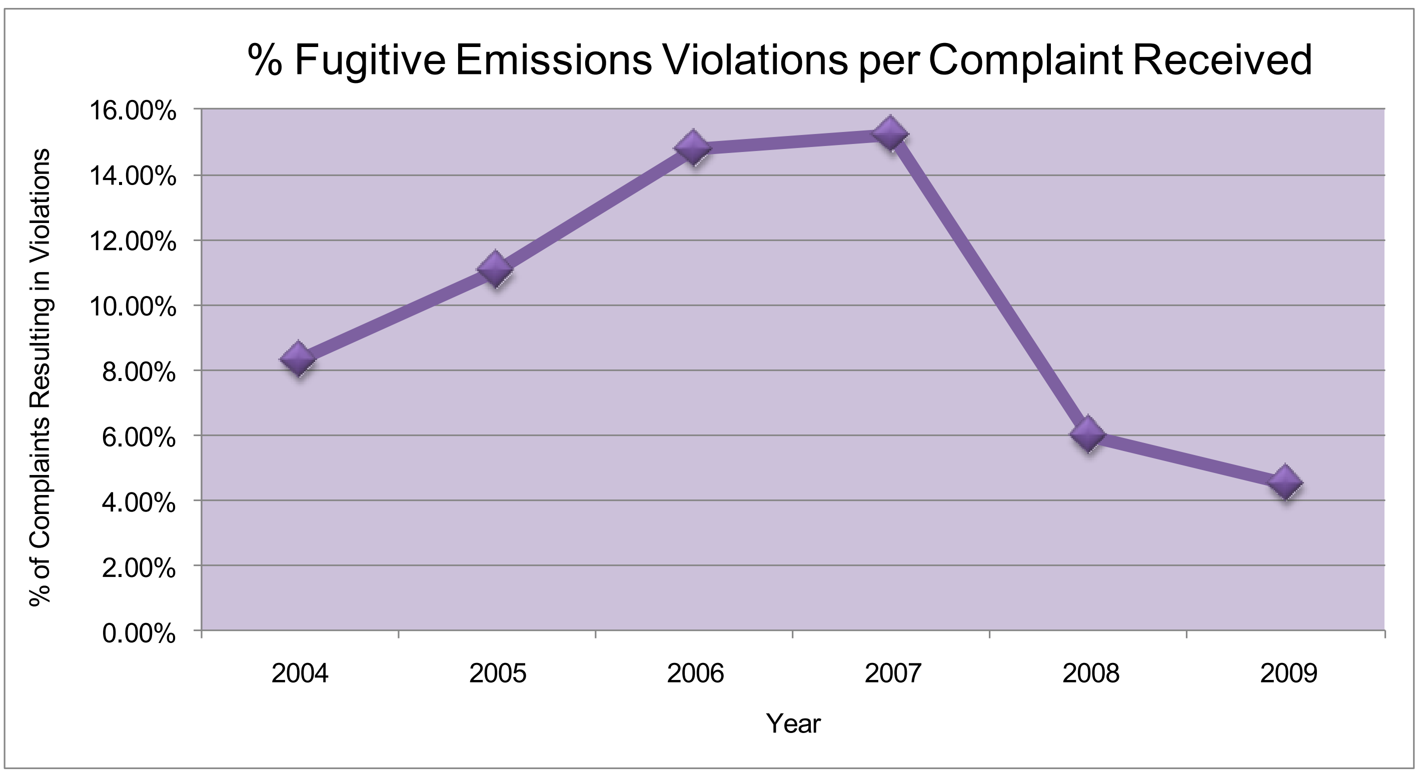


Figure 10: The rate of fugitive emission violations peaked in 2007 and has fallen since then. The drought of 2007 may have contributed to the spike in fugitive emission complaints received in that year. Dry conditions contribute to the formation of fugitive dust and limit the use of water available to control it.

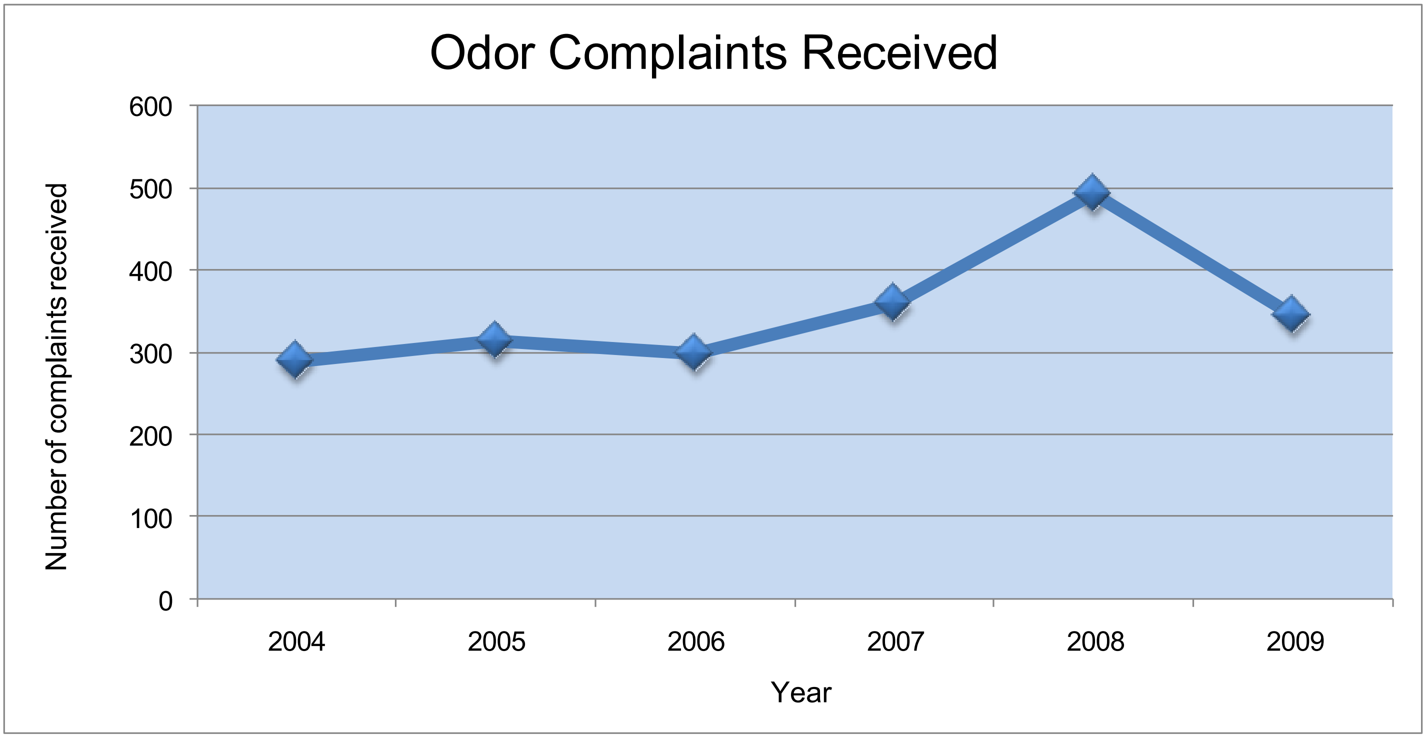


Figure 11: The number of odor complaints and subsequent violations peaked in 2008 and have fallen since. Odor violations occur when an inspector can smell the odor through a "scentometer," which dilutes the ambient air at a ratio of seven.

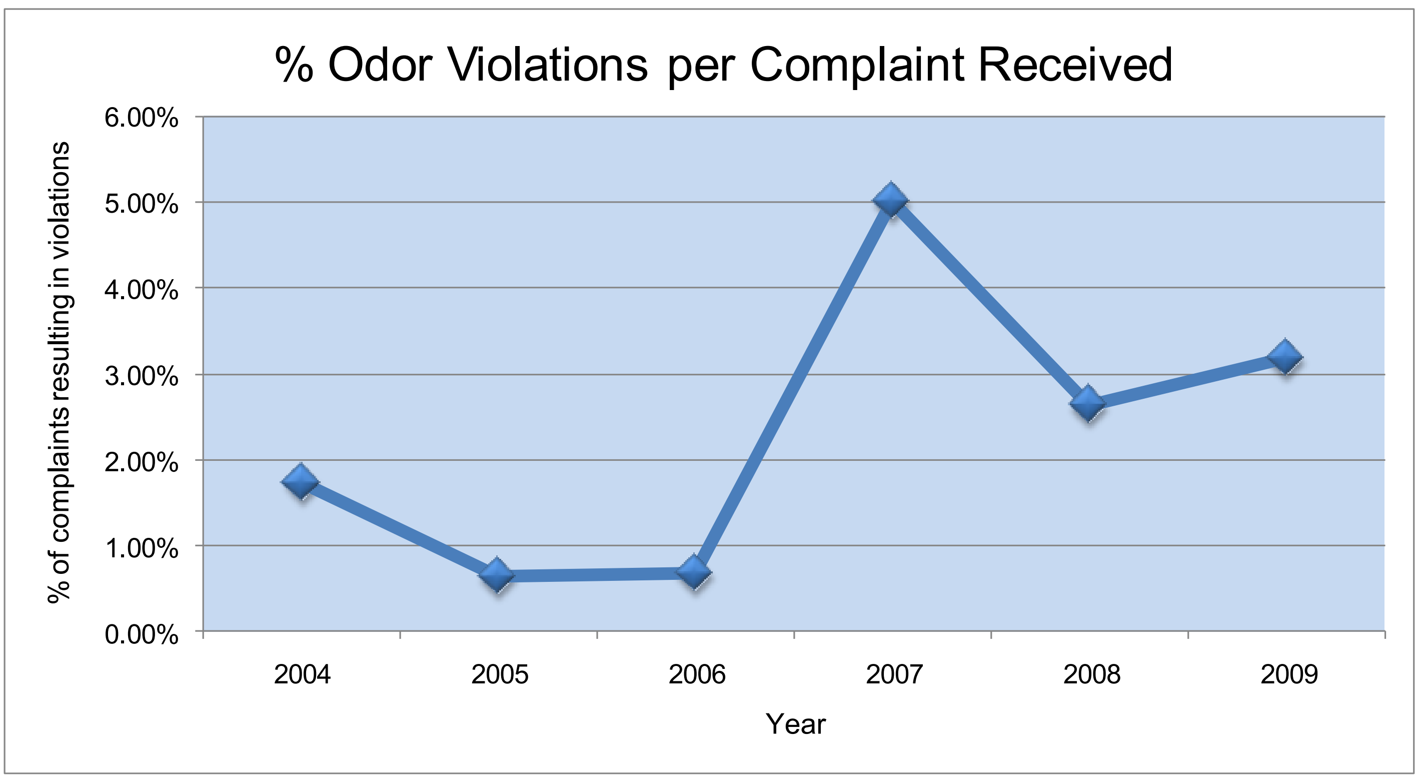


Figure 12: Though no steady trend is notable, the overall violation rate is very low. Strong and steady odors are often required to document a violation of the Kentucky odor standard. Many odors not rising to the level of a violation are, nevertheless, corrected through cooperative efforts between the inspector and responsible party.

Asbestos

Asbestos is a mineral fiber that is used in thousands of consumer products, many of them building materials. Breathing asbestos fibers can cause lung cancer and other respiratory diseases. The U.S. EPA has banned some uses of asbestos but has been unsuccessful in its efforts to expand the ban to most other asbestos-containing products.

Without proper precautions, renovations, demolitions, and even routine maintenance can cause asbestos-containing materials to release microscopic asbestos fibers into the air we breathe. Undisturbed asbestos materials can be safely maintained if they are kept in good condition. Before renovating or demolishing a structure, it should be checked for asbestos by a qualified professional. If at least 160 square, 260 linear, or 35 cubic feet of friable asbestos will be removed over a year's time, the removal must be done by a certified contractor using state-of-the-art work practices.

Asbestos removals associated with renovations and demolitions are regulated by the division under the National Emission Standards for Hazardous Air Pollutants (NESHAP). Division regulations also require schools to have their buildings thoroughly checked for asbestos under the Asbestos Hazard Emergency Response Act (AHERA). The surveyed results must be documented in a management plan that describes how all asbestos materials in the school's buildings will be managed safely. Compliance with the asbestos regulations is overseen by the Field Support Section and inspectors from the regional offices.

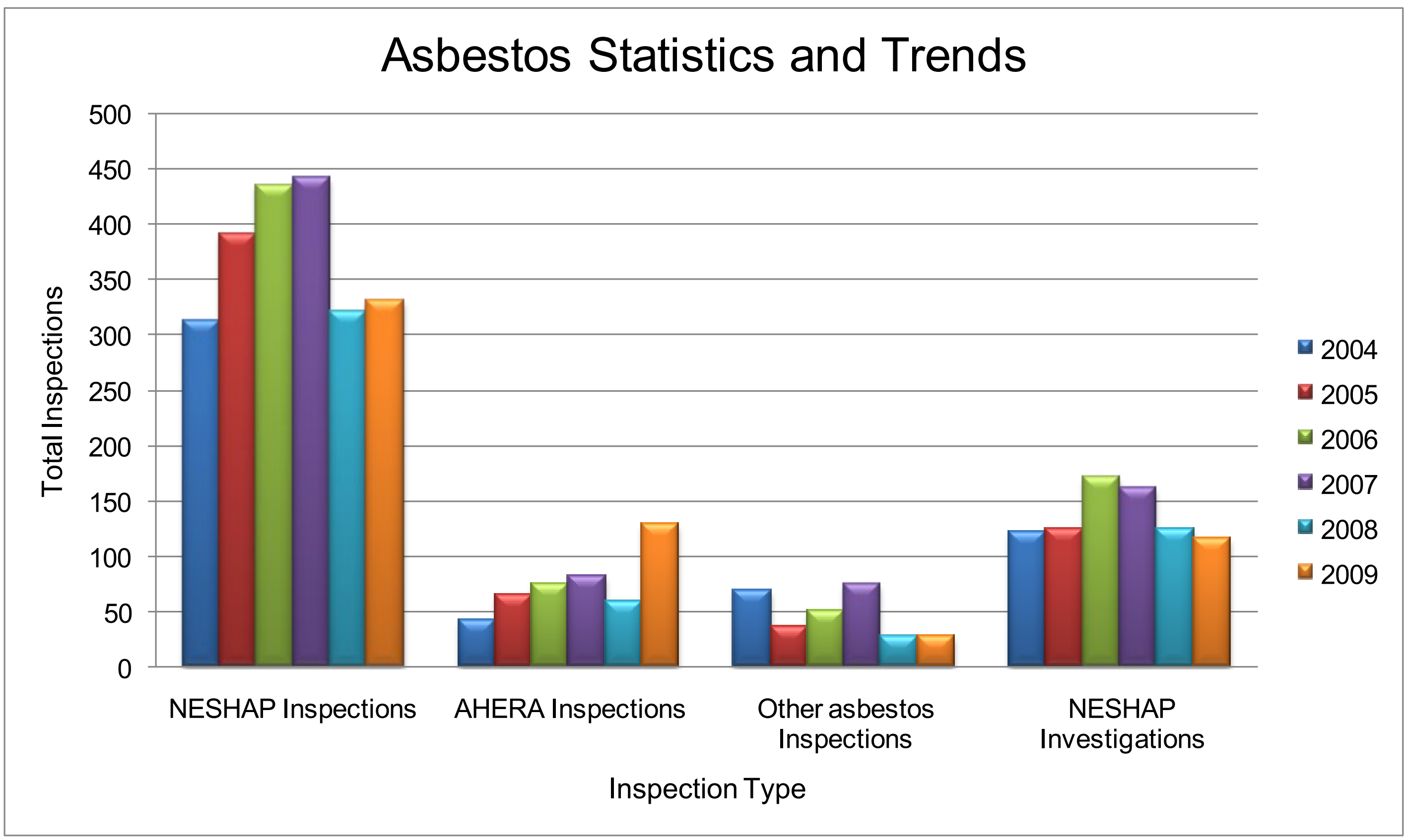


Figure 13: From 2005 to 2009, the number of asbestos inspections and investigations have grown with a slight drop in 2008 attributed to higher staff turnover that year. Routine AHERA inspections increased in 2009 as emphasis was placed on this program. While AHERA investigations resulting from complaints are a measure for the program, AHERA-related complaints are rare (averaging one per year), so the numbers are not shown in the above chart.

Measures tracked by the division to evaluate the asbestos program's success are as follows:

- Number of asbestos NESHAP and AHERA inspections conducted;
- Number of NESHAP, non-NESHAP and AHERA complaint investigations conducted; and
- Compliance rate of NESHAP and AHERA related inspections and investigations.

The above measures are reflected in Figure 13. In that figure, "Other Asbestos Investigations" refers to inspections of asbestos-related activities that are covered by state rule 401 KAR 58:040 and are otherwise exempt from the federal NESHAP program due to the relatively small quantity of asbestos involved. The state rule addresses smaller operations that may still pose a risk to the public even though they are exempt under federal regulations.

In the case of AHERA inspections, the division's compliance oversight strategy has evolved from a records review approach to an actual site inspection/records verification process. NESHAP inspections have grown due to a combination of increased renovation/demolition projects and increased awareness. Awareness has increased within the regulated community with respect to notifying the division about asbestos removals that need to be inspected, and within the general public, who file complaints about potential violations of the regulatory program. The compliance rate for NESHAP is 88 percent, while the compliance rate for AHERA is 67 percent.

PERMIT REVIEW

The Permit Review Branch is divided into several specialized sections:

Chemical Section - Chemical Plants (Organic and Inorganic), Petroleum Refineries, Coal to Liquids, Bulk Terminals, Brake Manufacturing, Plastic Products and Resins, Paper Mills/Pulp Mills, Electronic Components, Nonwoven Fabrics, Rubber Products, Paperboard Mills, Pharmaceuticals, Paint and Allied Products, Carbon and Graphite Products, and Battery Manufacturers.

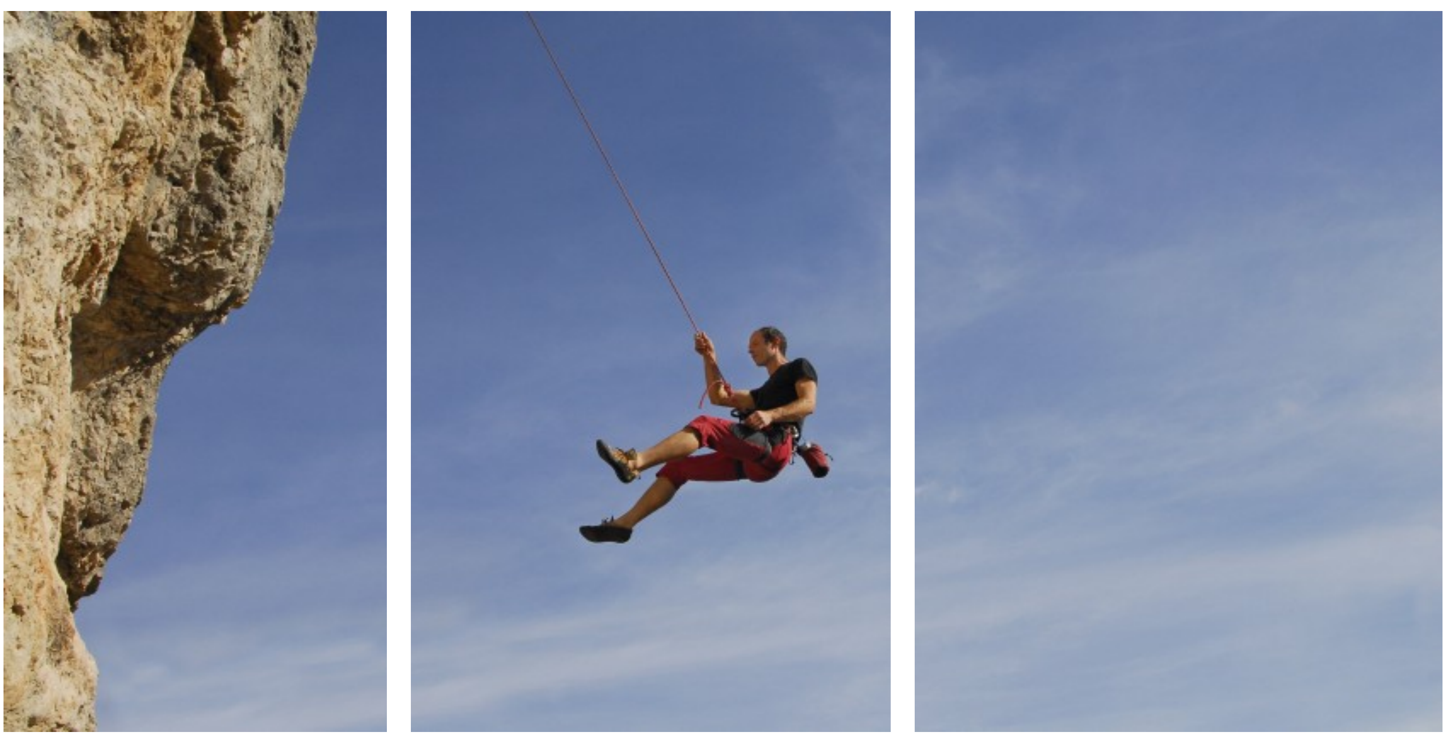
Combustion Section - Brick and Tile Manufacturing, Charcoal Manufacturing, Combustion (Boilers), Distilleries, Glass Manufacturing, Incineration, Natural Gas Transmission Stations, Power Plants, Sawmills, Soil Remediation Units, Tobacco Processing Plants, Electric Utilities.

Minerals Section - Asphalt Plants (Portable and Stationary), Cement Storage Operations, Chicken Feed Manufacturing Plants, Coal Preparation Plants (Portable and Stationary), Coal Tipples (Portable and Stationary), Coal Terminals, Concrete Block Plants, Edible Oil Plants, Fertilizer Operations (Including Blending), Flour Mills, Grain Elevators, Lime Manufacturing Plants, Limestone Crushing Operations (Portable and Stationary), Limestone Terminals, Pet Food Manufacturers, Prestress Concrete Plants, Ready Mix Concrete Plants, Sandstone Crushing Operations, Sand and Gravel Operations (Portable and Stationary), Slag Coal Operations, Soybean Extraction Plants.

Surface Coating Section - Automobile and Light-Duty Trucks, Beverage Cans, Fabric, Vinyl and Paper, Flat Wood Paneling, Flexible Vinyl and Urethane, Large Appliances, Magnet Wire, Magnetic Tape, Metal Coil, Metal Furniture, Miscellaneous Metal Parts and Products, Plastic Parts for Business Machines, Polymeric Coating, Pressure Sensitive Tape and Labels, Publication Rotogravure and Flexography Printing.

Metallurgy Section - Primary Steel And Aluminum Producers, Mini-Steel Mills, Secondary Metal Plants, and Various Surface Treatments Of Metals

Air Toxics Section - Any industry that has an air toxics component.



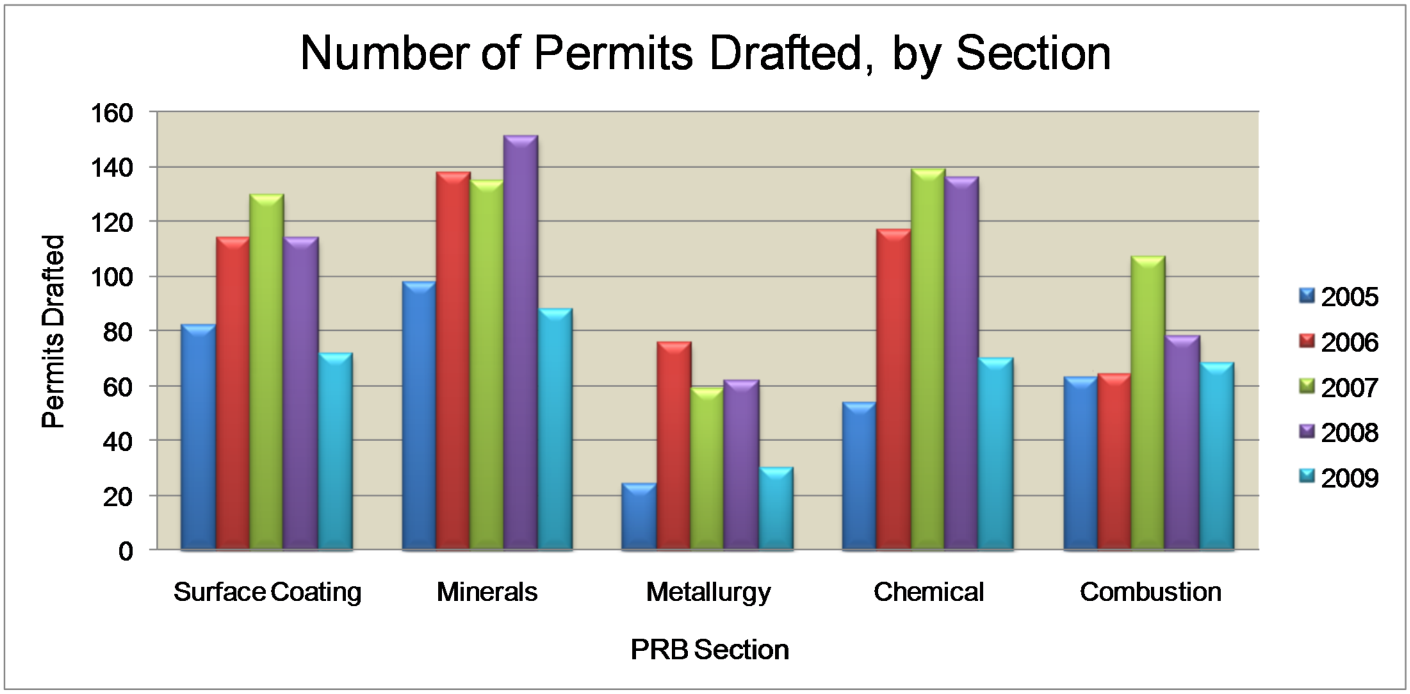


Figure 14: In calendar year 2009, the Division drafted 328 permits, depicted here by section category. The minerals section had the highest number of permits issued, followed by surface coating and chemical section permits.

PRB Goals and Objectives

In order to achieve the Cabinet objective of improving regulatory procedures and implementation, and making Kentucky's regulatory program rational, reasonable and user-friendly, the Division has successfully implemented the permit backlog reduction plan originally implemented on June 15, 2006.

At the close of Fiscal Year 2010, PRB had 161 pending applications in house. Twenty-five of the applications were beyond regulatory time frames (RTF). It is projected that the majority of the remaining applications beyond RTF will be issued by December 2010.

Figure 15 depicts the division's accomplishment in reducing the backlog since June 2006, at which time the division had 719 applications in house. The current number of pending applications represents an 84% reduction since that time.

The surrounding charts highlight DAQ success in the following measures for permit backlogs:

- The total number of permits pending (Figure 15).
- The total number of permits pending that exceed regulatory time frames (Figure 15).
- A comparison between the numbers of new applications versus completed reviews (Figure 16).
- The percentage of permit reviews completed within regulatory time frames (Figure 17).
- The percentage of permit reviews completed that exceed regulatory time frames (Figure 17).

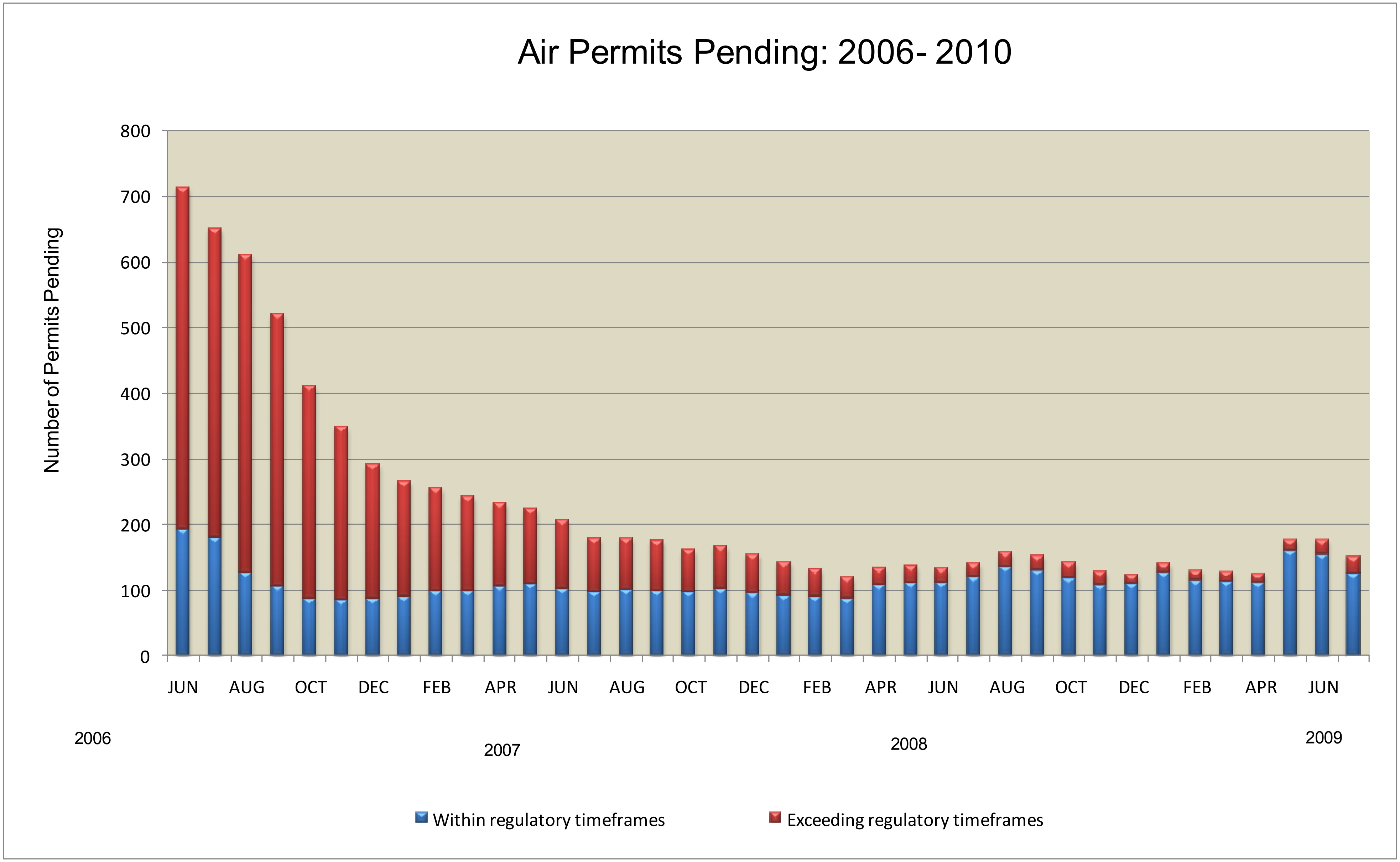


Figure 15: From June 2006 to June 2010, the Permit Review Branch has greatly reduced the amount of permit applications pending a final permit issuance as well as the percent of air permit applications that are beyond the Regulatory Time Frame (RTF), the allotted time for the complete permitting process. In June 2006, 73% of the 719 permits in progress were beyond RTF compared to 15% of 161 permits in June 2010.

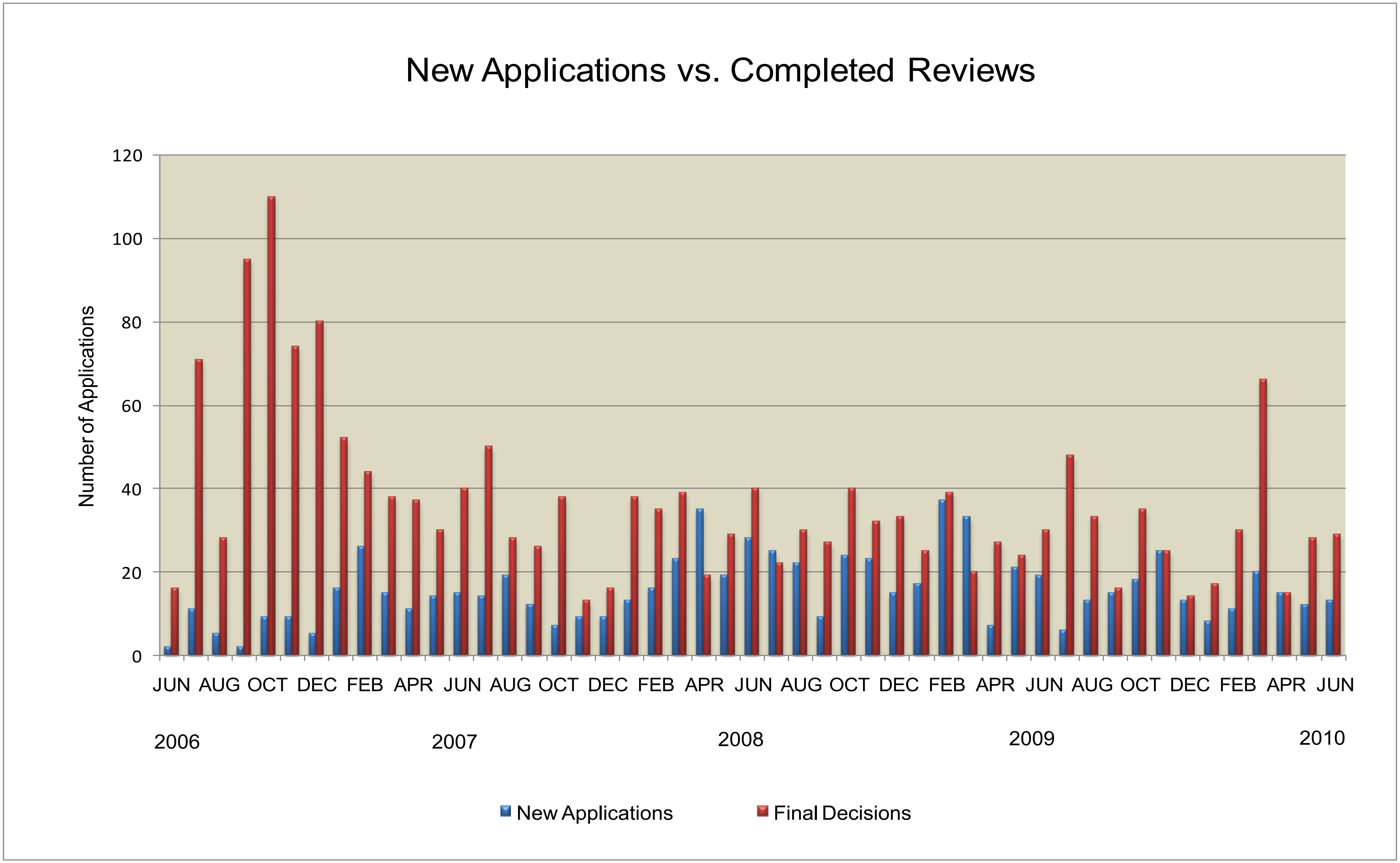


Figure 16: Over the past three years the number of completed reviews have exceeded the number of new applications received by the division. Consistent efficiency has led to a dramatic reduction in the backlog.

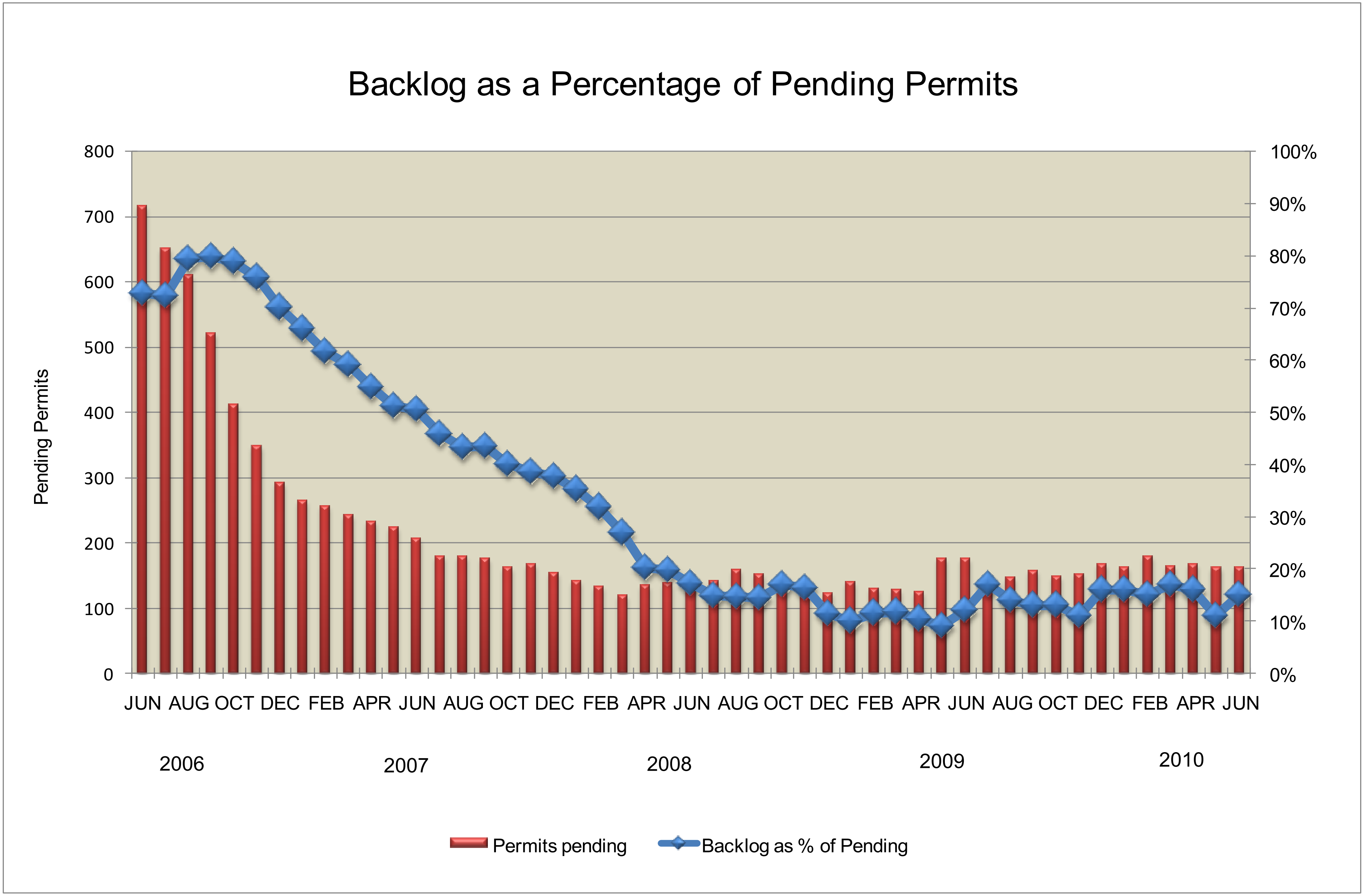


Figure 17: In June 2006, only 192 of 719 pending permits were within the Regulatory Time Frame (RTF). By June of 2010, only 25 of the 161 pending permit applications were beyond RTF.

Air Toxics Program

The division established the Air Toxics Section in the fiscal year of 2008. The section's main objective is to provide the division with expertise in airborne toxic pollutants, by means of risk assessment, ambient air monitoring, and air dispersion modeling.

Air toxics are chemicals emitted from industry and transportation sources such as cars, trucks, and buses. The Clean Air Act lists 187 of these pollutants (also known as Hazardous Air Pollutants, or HAPS), which have the potential to harm human health over long-term exposure, and have been linked to increased risk of cancer along with other effects including respiratory and neurological effects. Risk levels for these pollutants are based on health impacts over 70 years of continuous exposure.

At the national level, from 1990 to 2005 levels of toxic air emissions declined by 41%. While this decline is demonstrative of the work of state and federal agencies, levels of air toxics in a local area can vary due to weather patterns and proximity to sources of the pollutants.

Exercising the authority granted under KRS 224 and operating within the scope of 401 KAR 63:020, the Air Toxics Section is specifically charged with identifying air emissions which pose an unaccept-

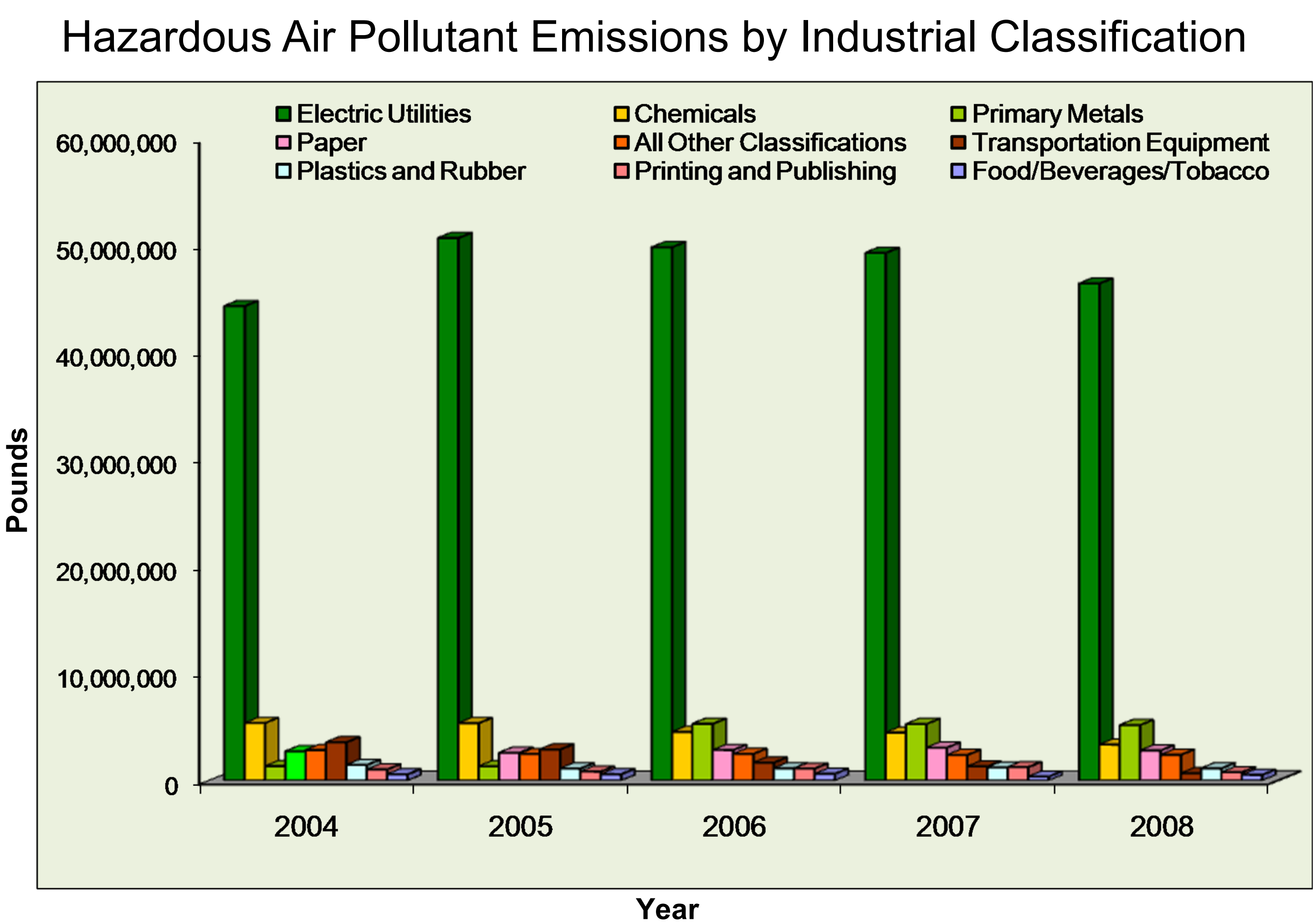


Figure 18: HAP emissions in Kentucky from 2004 through 2008 by industrial classification. Electric utilities (power plants) are the largest emitters in the state, and are responsible for the majority of the hydrochloric acid, sulfuric acid and hydrogen fluoride emitted. Data Source: EPA Toxic Release Inventory

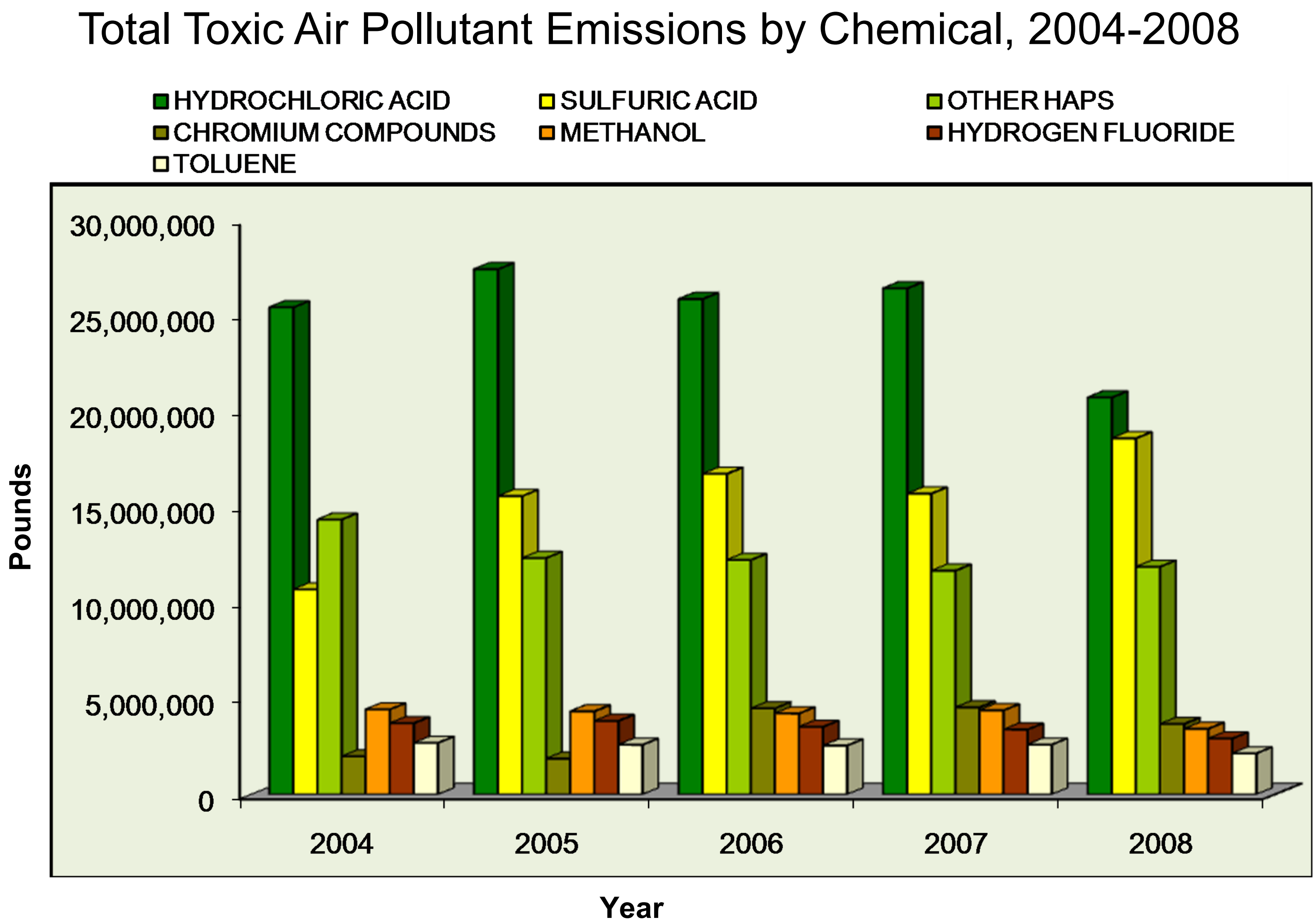


Figure 19: Emissions for selected individual chemicals. Hydrochloric and sulfuric acids are emitted in the largest quantities, with hydrochloric acid decreasing and sulfuric acid showing an increasing trend over this time period. Data source: EPA Toxic Release Inventory

able risk to human health and the environment. The regulatory authority primarily relied on by the air toxics section is found in 401 KAR 63:020, which states that “No owner or operator shall allow any affected facility to emit potentially hazardous matter or toxic substances in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants.” Risk assessment and risk based analysis are the standard means by which the section quantifies how harmful a toxic substance may be and the associated impact to human health.

The EPA’s Toxic Release Inventory database provides a means of tracking emissions of toxics, including HAPs. Figures 18 - 19 represent the trends in hazardous air pollutant emissions over the 2004-2008 period. It should be noted that while sulfuric acid is reported in figure 19, it is not considered a HAP under the Clean Air Act. Figure 20 shows the total statewide HAP releases in Kentucky from 2004 through 2008. In comparison to the 2009 Annual Report, the values reported for this year are drastically lower. This is due to the metric used in calculating emissions for the 2009 Annual Report, which included sulfuric acid along with HAPs in the toxics section. Sulfuric acid is not included as a HAP in this year’s emissions. More information can be found at http://www.epa.gov/TRI/.

In fiscal year 2010, the Air Toxics Section completed 21 air toxics assessments and 5 HAP-related complaint investigations. The section is capable of sampling both for volatile and semi-volatile organic compounds. The data collected from these sampling events has been used to verify modeled impacts on human health, make permitting recommendations, and in some cases, trigger enforcement actions.

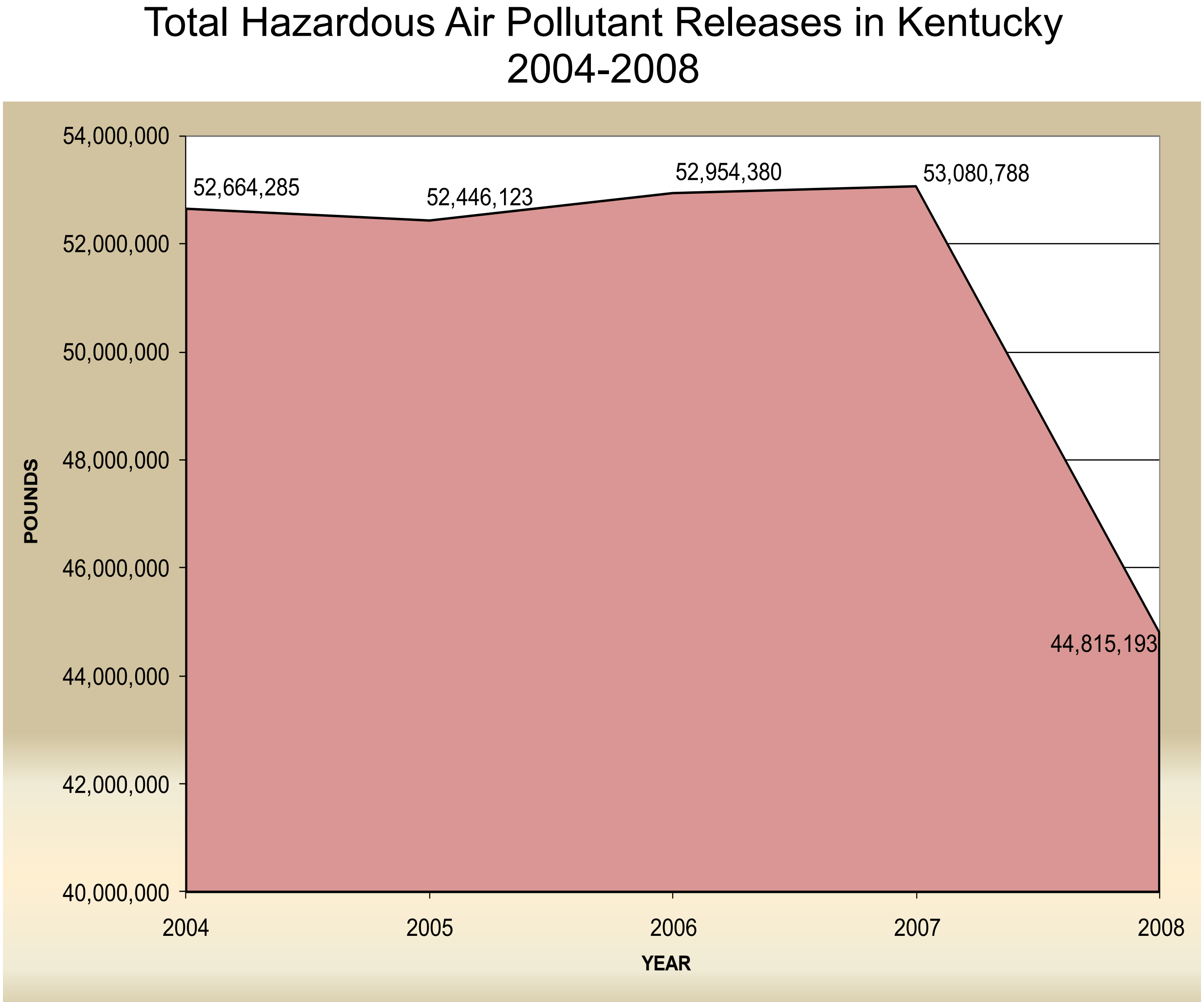


Figure 20: Total HAP releases in Kentucky, 2004-2008. Data source: EPA Toxic Release Inventory

Further, the section frequently uses modeling to refine the initial estimates from screening analyses performed by the permit review branch. These refined modeling runs have yielded data which has been used to verify, adjust or establish limits in permits, justify permit conditions, and improve the air quality. For example, a hexavalent chromium plating facility in central Kentucky was modeled at a concentration which posed an unacceptable carcinogenic risk. The facility changed operating procedures and limited their emissions to reduce the risk to acceptable levels.

In another example, a facility in western Kentucky emitting ethylbenzene and formaldehyde modeled an ambient concentration which posed an unacceptable risk. In this situation, the facility also limited their emissions to reduce the risk to acceptable levels.

Air Toxics and Kentucky Schools

In the wake of a number of media stories concerning air toxics and the potential for high levels of them in the air outside schools, EPA Administrator Lisa Jackson has made monitoring for air toxics outside of schools a priority for the nation.

Total Hazardous Air Pollutant Releases in Kentucky, 2004-2008 (minus Electric Generating Facilities)

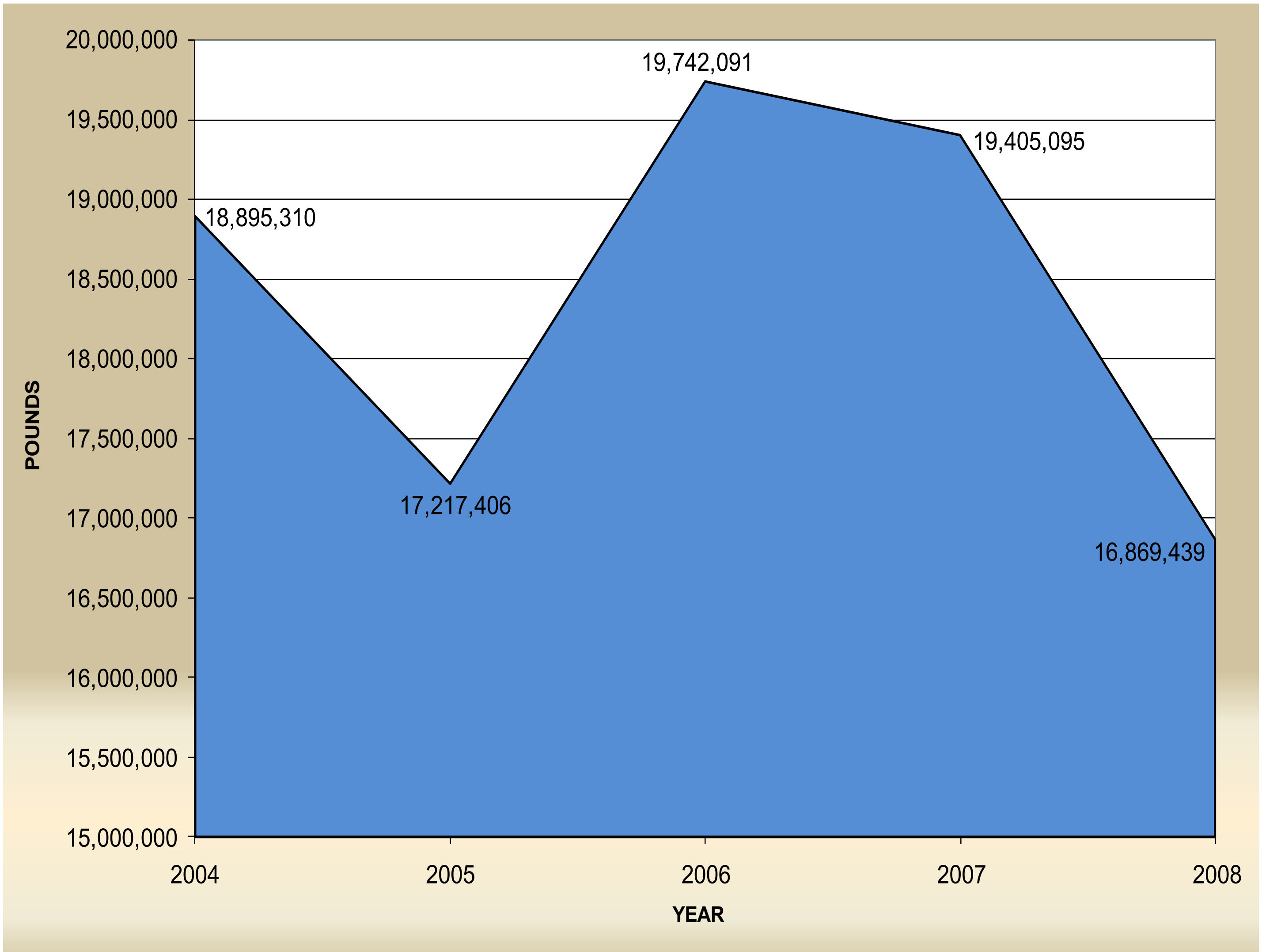


Figure 21: With the influence of electric generation facilities removed, a downward trend in emissions from all other HAP emitting sectors is clearly evident, dropping from over 25 million pounds in 2001 to under 17 million pounds in 2008. Data Source: EPA Toxic Release Inventory

In January 2009, the EPA announced a list of 62 schools in 22 states across the country to be monitored for air toxics in the coming months. These schools were chosen based on information that included the mix of pollution sources in the area, scientific information about certain pollutants and their health effects, results of computer modeling, stories from the newspaper series that looked at outdoor air surrounding schools, and information from the Kentucky Division for Air Quality. Monitoring the air outside these schools and measuring the actual concentrations of these pollutants will help the DAQ and the EPA understand if health could be impacted in these areas.

DAQ staff placed monitors at three Kentucky schools during the summer of 2009. A 60-day sampling period began on July 30, and was completed on September 28, 2009. Due to technical problems with some of the equipment used in the program nationwide, EPA requested agencies to resample in 2010. DAQ completed its final round of sampling in April 2010 and have shut 2 of the 3 sites down. The third site will continue to collect meteorological data through the end of summer 2010.

The EPA is currently analyzing the results of the study and will issue a report on Kentucky's schools when they have completed it. Preliminary data indicates that pollution levels do not pose a health concern. However, should DAQ find anything unexpected, the agency would immediately inform school and community officials. Working with concerned stakeholders, the division would locate the exact source(s) of these chemicals that pose an unacceptable health risk and mitigate those exposures. If it becomes apparent that after an initial round of sampling, more data is needed to make an informed decision, sampling will continue until the DAQ and EPA have enough data to be certain of the risks involved.

DAQ staff from the Technical Services Branch install air toxics monitors at one of three elementary schools in Boyd County. The project is a collaborative effort involving the school district, EPA, and DAQ.

PROGRAM PLANNING and ADMINISTRATION

The Program Planning and Administration Branch (PPAB) is the planning and implementation cornerstone of the Division for Air Quality. This branch has the responsibility of ensuring that:

"In state fiscal years 2011 and 2012, State Government is facing some challenging obstacles in light of the current budget deficit. The Division for Air Quality will continue to be frugal in our spending while monitoring expenditures and making every effort to ensure our programs are maintained at the level that the citizens of the Commonwealth have come to expect. We have reviewed operating costs and have made reductions as necessary to stay within our allotted amounts."

Nina Hockensmith,
Administrative Section Supervisor

- The agency has adequate budget and staffing resources to meet federal and state requirements for the operation of an air quality control program;

- A comprehensive emissions inventory is performed annually on sources within Kentucky, both to ensure the best information is used to develop and evaluate air quality plans and for use in determining air emission fees required under the federal Clean Air Act;

- Appropriate regulations are researched and promulgated within Kentucky to meet federal and state mandates to control air pollution; and

- Comprehensive plans to attain and maintain the National Ambient Air Quality Standards (NAAQS) are developed and submitted to the EPA for approval. These plans are part of Kentucky's State Implementation Plan (SIP).

Fiscal Management

The Division for Air Quality operates primarily on Title V emissions fees and federal grant funds.

Funding under the Title V program (mandated by the 1990 Clean Air Act Amendments) is through emission fees assessed to air pollution sources in the state that meet specific criteria. Further authorized in Kentucky by state statute in KRS 224.20-050, and regulation KAR 50:038, the division is mandated to charge fees sufficient to cover the cost of implementing and carrying out the requirements of the Title V program.

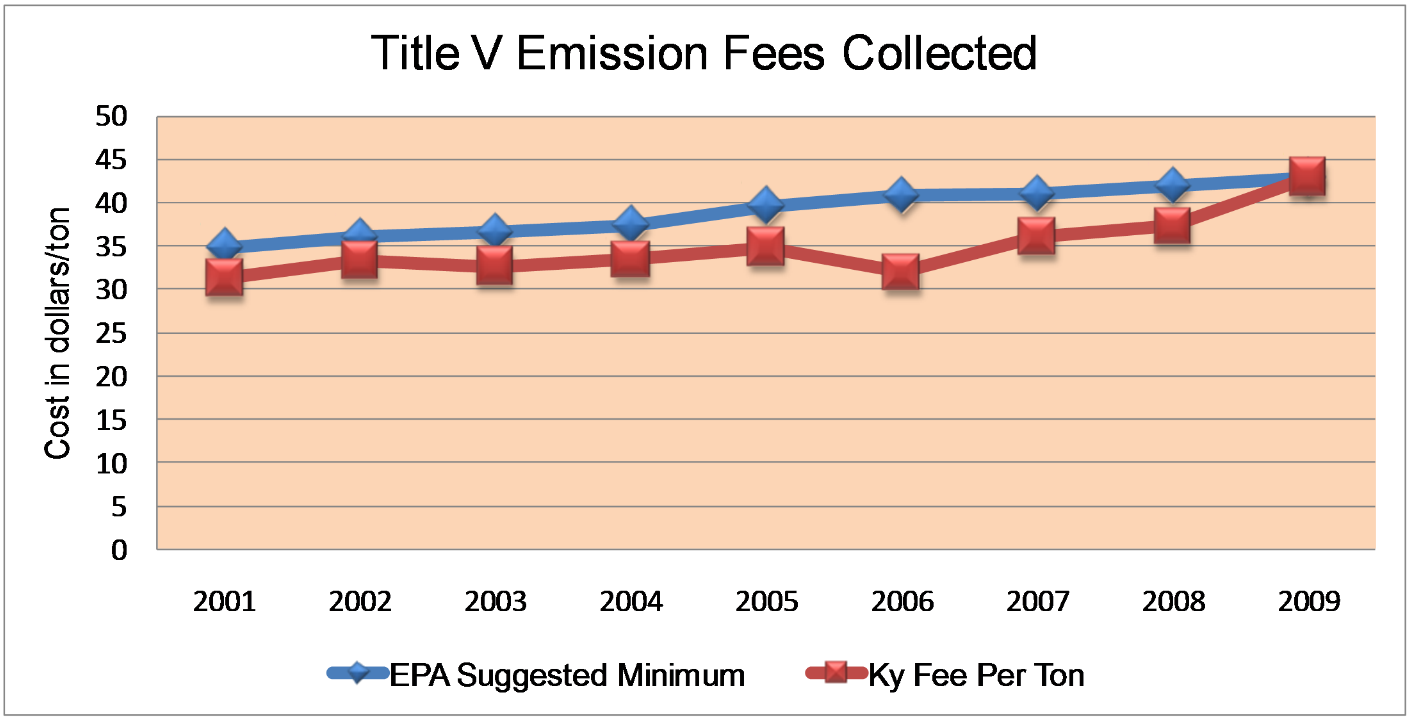


Figure 22: Title V Emission Fees Collected. DAQ surveys regulated entities to determine actual tons emitted by those sources, and charges them a standard Cost per Ton (CPT), according to Clean Air Act and state statute protocol.

The division surveys permitted sources subject to the Title V fee program each year. Once the agency has determined the overall cost of the program for the fiscal year, the number of tons of pollutants that will be emitted in Kentucky will be divided into the projected operating costs to develop a per ton cost. Each source within the Title V program will then be issued a bill based on that per ton cost (Figure 22).

The agency also receives federal grants in support of the air quality program. The "general" air quality grant, known as the 105 grant, is in support of the general air quality program and covers such activities as minor (or smaller emitting) source inspections and permitting. It also covers such vital activities as public outreach and transportation coordination in relation to air quality issues. Additionally, the agency also receives specific grants for the operation of the $PM_{2.5}$ monitoring network (103 grant) and asbestos activities (Asbestos Hazard Emergency Response Act) within the state.

A smaller portion of the agency's funding comes from direct fees used to offset the cost of specific agency activities. The agency collects a fee for the issuance of gasoline tank truck stickers, to ensure that gasoline delivery tanks meet vapor tightness and do not leak harmful gasoline vapors. Asbestos fees are assessed for the review of asbestos abatement plans in our schools and to certify and accredit asbestos contractors and professionals who remove asbestos in the state (Figure 23).

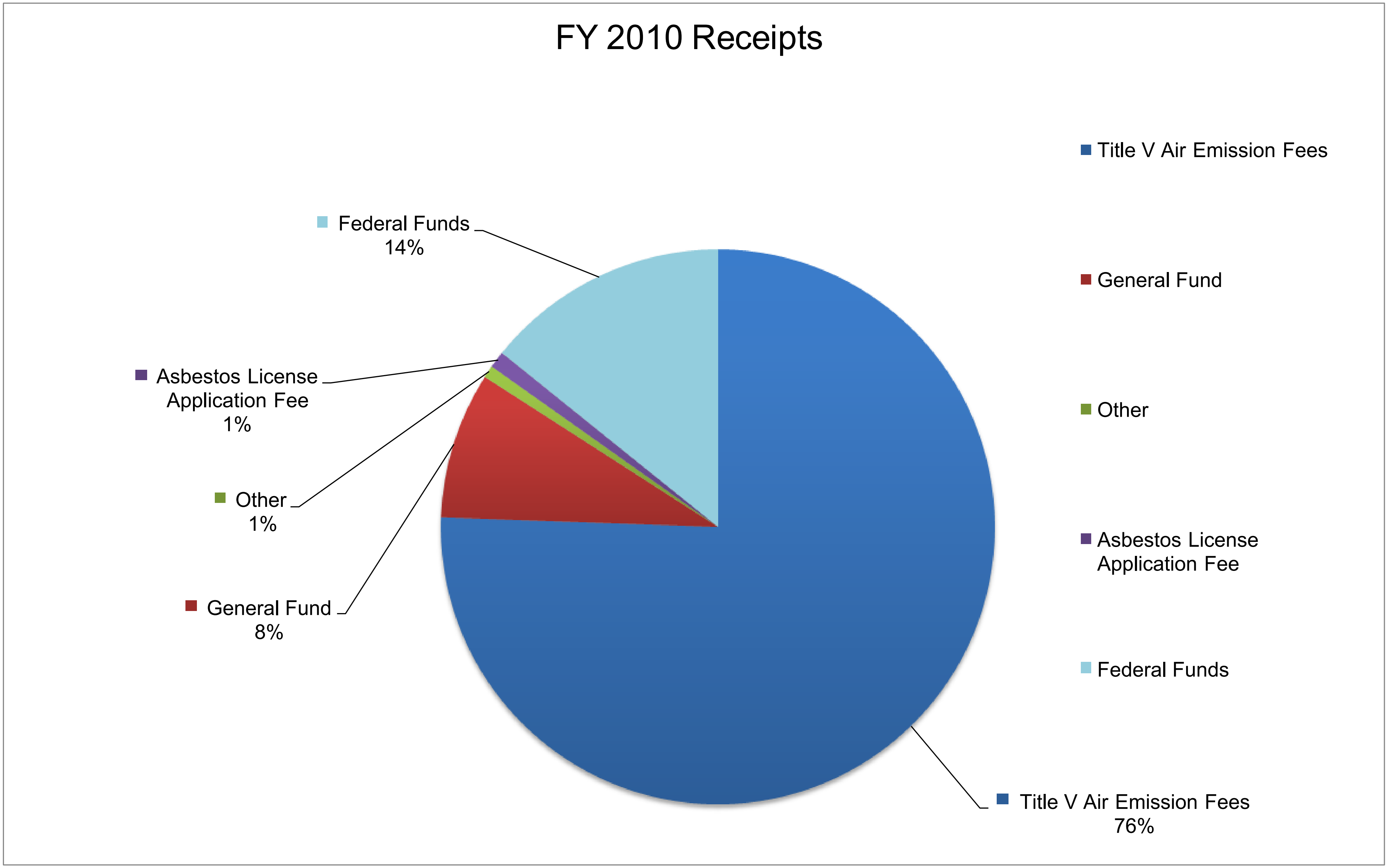


Figure 23: DAQ Fiscal Year 2010 Receipts. The division operates primarily on Title V emission fees and federal grant funds. Other funds are derived from tank truck fees, asbestos inspection fees, and general fund dollars.

Emissions Inventory

The main thrust of an air quality program is the effort to achieve or secure desired standards of air quality though controlling emissions of contaminants in the air. Clearly, management of these programs must be based on knowledge of actual air quality and actual pollutant emissions. The ambient air monitoring program is designed to measure the quality of the air our citizens breathe, and use it to gauge whether that air meets the federal standards. The emissions inventory systems are designed to document and track actual and potential air pollutant emissions and those data are used to develop air quality improvement programs when necessary.

In its most basic form, an emissions inventory is a list of sources of air pollutants, and for each source, or source type, the amount of each pollutant emitted, or has the potential to be emitted. Kentucky's emissions inventory is maintained in three parts:

"The emissions inventory section surveyed 1184 plants this year. Based on feedback from both staff and facility users, adjustments were made to the Internet-based survey system. We had a 99.2% response rate for our second year using the new system. Both staff and facility users are pleased with the system."

-Melissa Duff,
Emissions Inventory Supervisor

- The point source inventory includes all actual and potential emissions from industrial sources at fixed locations;
- An area source inventory includes information on other pollution causing activities in a given area and documents the contribution of emissions from numerous small entities, or human activities. These include activities such as home heating, small print shops, agricultural activities, structure fires, road striping, and consumer products consumption;
- The third sector of the emissions inventory includes information on emissions from mobile sources. This sector is then broken down even further by estimating the contributions by on-highway vehicles and off-highway mobile sources such as construction equipment, lawn equipment, airplanes and locomotives.

The point source emissions inventory is performed and maintained by the Emissions Inventory Section. The main function of this section is to continue to improve the comprehensiveness and accuracy of point source emissions information and ensure the information is up to date and useable by the Administration Section for billing calculations; the Program Evaluation Section for developing and evaluating control programs; and the Permit Review Branch for permitting additional large sources within a given geographic area.

As mentioned previously, point sources in Kentucky are surveyed annually to determine actual air pollutant emissions for the previous year (Figure 24). This process begins in January and continues through October. The emissions inventory section surveys nearly 1200 plants per year using the following survey criteria, used to determine the sources that are surveyed in the state:

- Any major source (potential to emit 100 tons or more of a criteria pollutant – criteria pollutants are CO, NO2, PM, SO2, VOC (as a precursor for ozone);
- Any conditional major source (a source that has taken permitted limits to keep it below the 100 tons potential noted above);
- Any source subject to a federal regulation such as a NSPS (New Source Performance Standard), NESHAP (New Emission Source of Hazardous Air Pollutant), or MACT (Maximum Achievable Control Technology – for hazardous air pollutants);
- Any source of Volatile Organic Compounds (VOCs) in areas of the state not meeting the federal ozone standards or that had previously been designated as not meeting those standards. (Boone, Boyd, Campbell, Christian, Daviess, Edmonson, Fayette, Greenup, Hancock, Kenton, Livingston, Marshall, or Scott);
- All sources where the actual or potential emissions of an individual hazardous air pollutant is equal

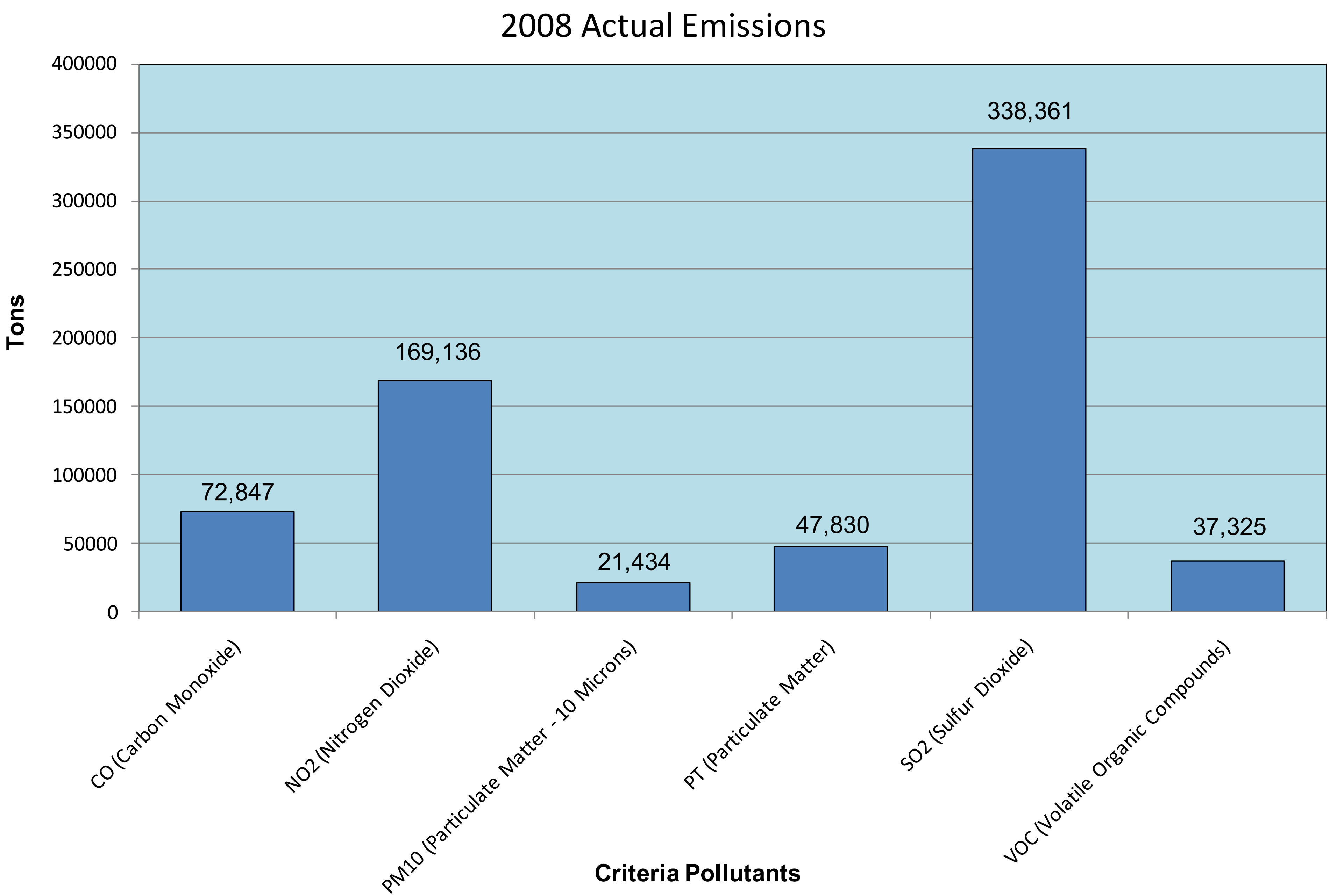


Figure 24: Actual tons of pollutants emitted by surveyed, regulated entities in Kentucky for the calendar year 2008. DAQ receives inventory emission data at the beginning of each calendar year; it takes approximately nine months to verify and complete the inventory.

to or greater than 10 tons per year;
• All sources where the actual or potential emissions of combined hazardous air pollutants are equal to or greater than 25 tons per year.

The responsibility for assembling the other portions of the emission inventory for specific areas falls in the Evaluation Section.

These inventories are typically performed for areas that are not meeting a federal air quality standard for a particular pollutant or when a control program has been put in place for a particular pollutant and the overall effectiveness of that control program is being evaluated.

For area sources (those smaller businesses or human activities) typically federally supplied emissions factors are used and adjusted based on population data for a given area.

For mobile source related emissions, mathematical models are used to determine emissions contributions. For on-road mobile emissions, data gathered by the Kentucky Transportation Cabinet is used to determine “vehicle miles traveled” for a given area. This information is used in conjunction with any mobile controls, such as fuel programs, or gasoline pump controls to determine the mobile source contribution in an area. For off-highway mobile emissions such as airplanes, another mathematical model is used, with flight landing and take-off data used to calculate emissions.

Regulation Development

The Regulation Development Section drafts and adopts regulations to control air pollution in the state. This section is responsible for reviewing federally adopted regulations and recommending whether or not to adopt and/or request delegation of those regulations in Kentucky.

Regulations can either be drafted in response to:
• Federal mandates to control air pollution or specific air pollution sources;
• A state mandate made by either the governor or the legislature to control air pollution within the commonwealth; or
• An action identified by the cabinet as necessary to protect human health and the environment. Regulations can be adopted for specific controls to address specific air quality concerns within the state.

While the agency receives its authority to draft and adopt air quality regulations under KRS Chapter 224, it is also governed on the drafting of those regulations by KRS 13A, which specifies regulatory drafting procedures as well as public participation in the regulatory promulgation process.

After the need for a new regulation or a regulatory amendment has been identified, it becomes the responsibility of the Regulation Development Section to compile all input and policy decisions into a regulatory draft and guide the process through promulgation. The promulgation process could include gaining inter-agency and EPA input into the regulation content, advertising the regulation or regulatory amendment for public comment, responding to those comments and making any subsequent changes found necessary, and tracking the regulation through final legislative approval.

Several regulations were adopted or revised in Kentucky from June 2009 through June 2010:

401 KAR 60:005, 40 CFR Part 60, Standards of Performance for New Stationary Sources; and 60:671, the repeal of 401 KAR 60:670, 40 CFR 60, Standards of Performance for Nonmetallic Mineral Processing Plants.

On April 28, 2009, the EPA promulgated a final New Source Performance Standard (NSPS) rule for nonmetallic mineral processing plants, such as quarries (Subpart O). In Kentucky's regulations, Subpart O was not initially adopted in 60:005, but separately under 60:670 due to safety concerns with regards to facilities enclosed inside a building. Therefore, in order to make Kentucky's regulations as stringent as the federal regulations, 60:005 was amended to include Subpart O, and 60:670 was repealed by 60:671. This became effective on November 6, 2009.

401 KAR 51:001, Definitions for 401 KAR Chapter 51; 51:017, Prevention of Significant Deterioration of Air Quality; 51:052, Review of New Sources In or Impacting Upon Nonattainment Areas

These amendments revised the list of exempted major stationary sources codified in 40 C.F.R Part 51, and the list of major sources codified in 40 C.F.R. Part 70, as they relate to PSD, NSR, and Title V applicability. These amendments also removed the existing standards and requirements for clean units (CU) and pollution control projects (PCP) that were vacated at the federal level in a D.C. Court of Appeals decision. In addition , these amendments require major sources emitting more than 100 tons per year of nitrogen oxides (NOx) to conduct an ambient air quality analysis for ozone. The effective date for these amendments was February 5, 2010.

401 KAR 59:015, New Indirect Heat Exchangers

This regulation, which was last amended on April 3, 2009, has been re-opened to clarify certain issues that were brought to light after becoming effective in early 2009. The proposed amendment was filed on May 12, 2010, and the public hearing was held on June 29, 2010.

State Implementation Plan

The State Implementation Plan (SIP) is a federally mandated plan to ensure attainment and maintenance of the various National Ambient Air Quality Standards (NAAQS) within a state or region. Once regulations or programs are adopted into the SIP, they become federally enforceable. This means that if for some reason a state cannot or will not enforce the regulations included in a respective SIP, the EPA can step in and enforce those provisions.

Overall, the framework and components of the SIP are designed to ensure that states continue to move forward in achieving air quality that meets the national standards, and once achieved, that air quality continues to maintain those standards. In short, the SIP is the mechanism for air resource management. Air resource management begins with:

- A determination of existing conditions – air quality, meteorological conditions, and an inventory of emissions;
- Development of goals or objectives for an area (typically air quality standards that must be met or maintained); and
- Development of control strategies that may include emission reduction measures or measures to ensure no further degradation of air quality occurs.

Ozone damage on black cherry leaves. Photo courtesy of Susan Sachs, NPS.

A key component of air resource management, or SIP development, is coordination with the local communities who have a stake in how a plan is to be implemented.

Of notable mention during the last fiscal year are issues and submittals pertaining to both the changes in the ozone, fine particulate, and lead standards, as well as, conclusion of the regional haze plan designed to improve visibility conditions at our national parks and recreation areas.

Ozone

For the first time since the 1997 8-hour ozone standard was promulgated, the state was on track at the end of the fiscal year to have all counties meeting the national standard for ground-level ozone pollution, a significant achievement for the Commonwealth.

"The U.S. EPA announced that the entire Commonwealth met the 2006 24-hour fine particle standard this year, and proposed final designation for all counties to be listed as meeting the 1997 8-hour ozone standard as well. While this is a significant achievement for Kentucky and demonstrates gains in air quality, more work remains ahead as the EPA is currently revising the national air quality standard for ozone to a more stringent standard, and has recently revised the standard for a number of other pollutants, such as lead, sulfur dioxide, and nitrogen dioxide as well. Additional rules promulgated by the EPA, such as the pending Clean Air Transport Rule, will continue to ratchet down pollution levels in the state."

John Gowins,
Evaluation Supervisor

Ozone is a secondary, man-made pollutant. Secondary pollutants are not emitted directly from a stack, but rather are formed when two primary pollutants mix in the atmosphere. In this case, ground-level ozone is formed when Volatile Organic Compounds (VOCs) and Nitrogen Oxides (NO_x) combine in the presence of heat and strong sunlight. This makes ozone a summertime pollutant.

In 2004, the EPA designated areas as not meeting (in nonattainment of) the 1997 8-hour ozone NAAQS. These designations were based on 2001, 2002, and 2003 monitoring data and were the first designations made under this revised standard. Effective June 2004, Bullitt, Jefferson, Boone, Campbell, Kenton, Boyd and Christian counties were designated as not meeting this standard. By 2005, monitoring data showed that several Kentucky counties came back into compliance with the 8-hour ozone standard. Kentucky requested that the EPA re-designate those areas as meeting the 1997 standard, and the EPA redesignated Bullitt, Jefferson, Boyd and Christian counties as in attainment (compliance) with the standard. The plans submitted to the EPA, with the request to re-designate those counties, documented that the areas should continue to have emission levels that would allow them to remain in compliance. On May 12, 2010, the EPA published a proposal in the Federal Register to redesignate Boone, Kenton, and Campbell counties as meeting the 1997 8-hour ozone standard.

However, on March 12, 2008, the EPA significantly strengthened the NAAQS for ground-level ozone, the primary component of smog, to better protect public health. The previous standard was set at .08 ppm (parts per million). The new standard is set at .075 ppm. On September 16, 2009 the EPA announced they would reconsider the 2008 0.075 ozone standard. On January 6, 2010, the EPA proposed to take comments on a primary 8-hour ozone standard in the range of 0.060 – 0.070 ppm and a secondary standard in the range of 7-15 ppm-hours. These primary standards use three years of monitoring data and the 4th highest recorded 8-hour average to determine compliance. A final rule is expected in late 2010.

The EPA proposes to make designations under the new 8-hour standard by mid to late 2011. Kentucky will analyze data—such as emission contributions, changes in monitoring levels from one year to another, population density differences, emission impacts from down-wind sources and transportation impacts on areas, to develop recommendations for nonattainment counties. The EPA intends to make designation decisions using monitoring data from 2008, 2009 and 2010.

Fine Particulate Matter

In addition to Kentucky's great news about reduced ozone levels across the state, in November of 2009 the EPA confirmed that all Kentucky counties met the requirements of the 2006 daily fine particle standard.

In 2006, the EPA strengthened the NAAQS for the 24-hour fine particle standard ($PM_{2.5}$) from 65 ug/m^3 to 35 ug/m^3. Kentucky and all other states were required to submit recommendations to the EPA in December, 2007 for areas to be designated as meeting or not meeting the newly revised 24-hour standard. Kentucky proposed that no counties should be listed as nonattainment for the newly revised standard. This recommendation was based on a combination of 2004-2006 monitoring data, and an exceptional events package that was submitted to the EPA. The exceptional events package is a request from the division to the federal agency that they not use certain air monitoring data, due to impacts from forest fires and other exceptional events.

The monitoring data for 2005-2007 indicated that no areas in Kentucky were in violation of the 24-hour standard, and Kentucky provided documentation to the EPA of this fact. In November of 2009 the EPA made final designations for this standard, and currently all counties in Kentucky meet this standard.

There are actually two standards set for fine particulate matter. In addition to the 24-hour average, there is a 1997 standard for an annual average, set at 15 ug/m^3,which was not changed in 2006. However, EPA indicates that they intend to issue a Notice of Proposed Rulemaking in November of 2010 that will suggest changes in the annual standard to the range of 10-13 µ/m^3, with a final rulemaking by July 2011. In June 2008 the division submitted an attainment demonstration that relied on projected changes from the court-remanded Clean Air Interstate Rule (CAIR). The EPA is not acting on any PM 2.5 attainment demonstration submittals until the issues surrounding the CAIR remand are fully resolved.

Nitrogen Dioxide

On January 22, 2010, the EPA strengthened the standard for Nitrogen Dioxide (NO_2). The new standard is set at a 1-hour level of 100 parts per billion (ppb). This level will protect against the health effects associated with short-term exposure of NO_2. The standard is based on a 3-year average of the 98th percentile of the annual distribution of daily maximum 1-hour average concentrations. The EPA is also keeping the current annual average standard for NO_2 at 53 ppb.

The EPA is establishing new ambient air monitoring and reporting requirements for NO_2. These requirements will require a shift in the division's current monitoring network. For example, monitors will now be required near major roads in urban areas, where currently there are no monitors in these areas. The Program Planning and Administration Branch and the Technical Services Branch are working together to address these new requirements. Meeting the new requirements of the NO_2 standard will require additional monitors and other expenditures as the monitoring network is shifted to accommodate the rule.

Sulfur Dioxide

On June 22, 2010, the EPA strengthened the National Ambient Air Quality Standard for sulphur dioxide (SO_2). This standard has not been changed since 1971 and the EPA was required under a judicial consent decree to review the primary standard. The EPA is addressing the secondary standard, which addresses public welfare, in a separate review.

The new primary standard, similar to the NO_2 standard, is a 1-hour standard of 75 ppb. This new standard will protect public health by reducing exposure to high short-term levels of SO_2. The standard is based on the 3-year average of the 99th percentile of the annual distribution of the daily maximum 1-hour average concentrations. The EPA revoked the two existing primary standards of 140 ppb evaluated over 24 hours, and the annual standard of 30 ppb, because the newer standard is more stringent than the older standard and current health evidence indicated little association between long-term exposure to SO_2 and health effects. As in the NO_2 rule, the new SO_2 rule will require the division to site new monitors and make other network adjustments by January 1, 2013.

Lead

The EPA revised the National Ambient Air Quality Standard to 0.15 μg/m^3 in November of 2008, and simultaneously established the current monitoring threshold for lead of 1.0 tpy. However, before monitors were put in place to comply with this new monitoring threshold by the state, the EPA issued a proposal to lower the monitoring threshold for lead to 0.5 tpy. This proposal was issued December 23, 2009 but has not yet been made final. Air quality monitoring agencies would use this threshold to determine if an air quality monitor is required to be placed near a facility emitting lead. The EPA also requested comments on alternative emission thresholds. The current emissions threshold is 1.0 tpy and three monitors in Kentucky began collecting data in 2010 at facilities emitting lead at that level. The EPA has not finalized recommendations for lead designations due to the lack of available monitoring data. On October 5, 2009, the division submitted a letter to the EPA indicating that we did not have sufficient data to determine designations for lead. The division made a recommendation of unclassifiable with a request that EPA extend the deadline up to one year for issuing designations due to insufficient information.

Figure 25: Regional Haze and Visibility. Hazy (left photo, visibility range less than 10 miles) and clear (right photo, visibility range less than 190 miles) days at Mammoth Cave National Park. Historical and real time images from this and other national parks can be viewed by clicking the Webcam link at www.airnow.gov. Photos Courtesy of National Park Service Air Resources Division, Denver, CO.

Visibility

Regional haze is pollution that impairs visibility over a large region, including national parks, forests, and wilderness areas (many termed “Class I” areas). An easily understood measure of visibility to most people is visual range. Visual range is the greatest distance, in kilometers or miles, at which a dark object can be viewed against the sky (see Figure 25). As part of the Clean Air Act Amendments and further regulations adopted by the EPA, states must develop plans to restore natural visibility conditions in the 156 Class I areas throughout the nation. Kentucky’s Mammoth Cave National Park is included in the list of areas.

Although the goal to achieve natural visibility conditions is slated for 2064, states had to develop the first phase of the plan and demonstrate reasonable progress toward meeting the national goal. In addition, states also had to determine if emissions from within their boundaries were having an adverse impact on other Class I areas. Figure 26 depicts the Class I areas in the southeast as well

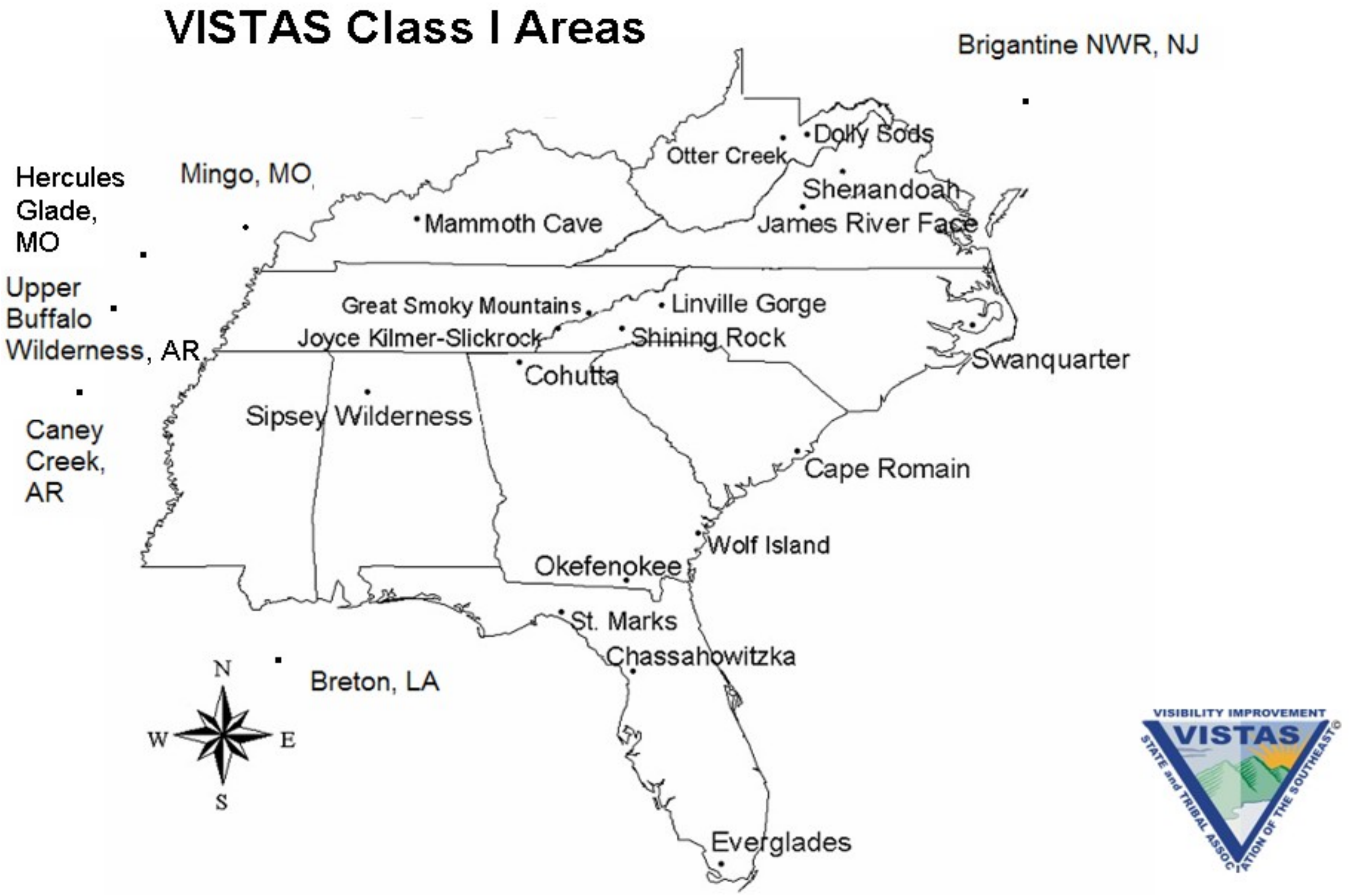


Figure 26: The Clean Air Act seeks to prevent significant deterioration of air quality. Areas of special natural, scenic, or historic importance are known as "Class I Areas," and are protected to maintain long distance, panoramic views.

as others in nearby states.

Regional haze is typically caused by sources and activities emitting fine particles and their precursors, often transported over large regions. Particles affect visibility through the scattering and absorption of light. Reducing fine particles in the atmosphere is an effective method of improving visibility.

The development of these regional haze plans was accomplished through coordinating information and modeling conducted by a regional planning organization (RPO). VISTAS was the organizational means for performing the modeling and emissions analysis that allowed the states to develop these plans. VISTAS included representation from Kentucky, Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginia, and the eastern band of the Cherokee Indians (Figure 26).

As federally required, DAQ submitted Kentucky's draft plan to the Federal Land Managers and the EPA for review in December, 2007. After receiving comments on the draft document and making necessary revisions, the division posted the proposed plan for public comment and submitted it to EPA in March, 2008. The public hearing on the proposed plan was held in April 2008. After addressing comments received during the public comment period in the statement of consideration, the division submitted for approval the final Kentucky Regional Haze SIP to the EPA in June, 2008. The June, 2008 SIP package remains under review by the EPA. After public notice, DAQ submitted to EPA a formal SIP revision in May 2010 to amend the June 2008 Regional Haze SIP on two technical issues. The May, 2010 SIP package is also under review by the EPA.

In addition to operating the division's ambient air monitoring network, the Technical Services Branch (TSB) is also responsible for ensuring that facilities demonstrate compliance through the review and observation of source stack tests.

Since July 1967, the state has operated an air quality monitoring network. The calendar year 2009 network included 44 monitoring stations in 29 counties (this total includes monitors operated by the Louisville Metro Air Pollution Control District [LMAPCD] and the National Park Service [NPS] at Mammoth Cave).

The monitoring station locations are selected in accordance with EPA regulations (40 CFR 58, Appendix D) and, in general, are established near high population areas or air pollution sources. Each year the site locations are reviewed to ensure that adequate coverage is being provided and regulatory requirements are met.

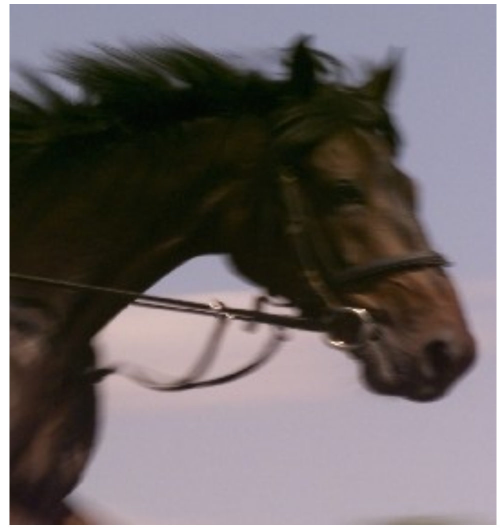
Many staff hours are devoted to the operation of the monitoring network. Division staff routinely visit our sites to calibrate and maintain the monitoring equipment, collect samples, and verify and document data from the continuous monitors. Because it is imperative that the air monitoring data be accurate and precise, the Division for Air Quality has an extensive quality assurance program. Staff members audit every air monitor quarterly to ensure that each is operating properly. This audit process includes monitors operated by the LMAPCD, the NPS, and industrial networks.

Monitoring data is used in several ways. The data is utilized to demonstrate compliance with, or progress made toward meeting, ambient air quality standards and to identify pollution trends. The data also assists in evaluating public health impacts and the possible need to initiate emergency control procedures.

The public has access to the monitoring data on a daily basis through the Air Quality Index (AQI) message on our website (air.ky.gov) or toll free (1-800-AIR-IN-KY). The AQI is a 24-hour report on Kentucky's air quality. The public can access daily ozone and particulate matter reports through EPA's AIRNOW website at www.epa.gov/airnow.

Prior to 2008, the TSB published information about the ambient air monitoring network separately in the Surveillance Network Report. However, since 2008, detailed monitoring information has been published annually via this report.

TSB is staffed by 16 employees that include managers, supervisors, administrative staff, technicians, and engineers. The branch is comprised of three specialized sections: Quality Assurance, Technical Support, and Source Sampling.



Quality Assurance Section

The Quality Assurance Section conducts performance and systems audits of all air monitoring stations within Kentucky's air monitoring network, as well as 4 industrial sites within Kentucky. The section is responsible for validating all data generated from the air monitors located throughout the state's network. Data audits ensure that all data is in compliance with the state and federal monitoring regulations, particularly 40 CFR Part 58, Appendix A. The section is also responsible for certifying all equipment used within the network.

Technical Support Section

The Technical Support Section repairs, modifies, and maintains instrumentation and equipment associated with the Kentucky air monitoring network, which includes continuously operating monitors for particulates, sulfur dioxide, oxides of nitrogen, ozone, and mercury, as well as intermittent particulate and air toxic samplers. The section also maintains a statewide computerized data acquisition network that automatically retrieves air monitoring data and makes information available to the public in the form of an Air Quality Index, which is regularly posted on the division's website. They also maintain a $PM_{2.5}$ weigh-lab operation which has the responsibility of handling and conditioning sample filters, weighing $PM_{2.5}$ filters, and reporting the analytical results.

Source Sampling Section

The Source Sampling Section provides technical guidance to the division and facilities through the review of compliance and Relative Accuracy Test Audit (RATA) test protocol forms, observation of compliance and RATA tests, and technical review of compliance and RATA test reports. The Source Sampling Section insures approved EPA test methods are used and proper engineering principles are followed for source tests throughout the Commonwealth. A facility may be required to test their emissions at a source based on regulation, permit requirements, or upon a division request.

Air Monitoring Network

According to federal regulation (40 CFR Part 58, Appendix D), the ambient air monitoring network must be designed to meet three basic air monitoring objectives:

- The network must provide air pollution data to the general public in a timely manner.
- The network must support compliance with ambient air quality standards and emissions strategy development.
- The network must support air pollution research studies.

In order to meet these three basic monitoring objectives, the network must be designed with a variety of types of monitoring sites. In essence, the network design must be capable of illustrating the peak air pollution levels, typical levels in populated areas, air pollution transported into and outside of a city or region, and air pollution levels near specific emissions sources.

In 2010, TSB completed two extensive documents that detail Kentucky's air monitoring network in these terms. The Kentucky Ambient Air Monitoring Network Plan and the Kentucky Ambient Air Monitoring Five-Year Network Assessment both describe the network in terms of scales of representativeness and specific designations (e.g., monitors sited for source impacts, regional transport, background, and so forth). Both of these documents are available for review on the division's website at http://air.ky.gov/Pages/DivisionReports.aspx

Pages 52-108 of this annual report contain tables and graphs that summarize the concentrations of pollutants measured in Kentucky during the 2009 year, as well as summary statistics for the 2007-2009 time period.

Data Quality Assurance

TSB quality-assures and validates all ambient data collected by the monitors and samplers in the network. Upon completing its review of 2009 data, the division submitted its annual data certification request to EPA prior to the May 1 regulatory deadline. This data certification package includes reports that summarize all the hours of valid data collected, as well as the quality control measures taken to ensure the accuracy of that data, and the number of annual performance evaluations completed. The information obtained in the annual data certification request is available to the public through Freedom of Information Act (FOIA) request.

TSB maintains a library of Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs) for each instrument operated in the monitoring network. In 2010, there are 4 active QAPPs, two of which are currently under revision. There are also 24 SOPs in the DAQ library, several of which are under currently revision.

AIR QUALITY INDEX (AQI)

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0-50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51-100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101-150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151-200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201-300	Health alert: everyone may experience more serious health effects.
Hazardous	> 300	Health warnings of emergency conditions. The entire population is more likely to be affected.

Figure 27: Understanding the Air Quality Index (AQI). The purpose of the AQI is to help you understand what local air quality means to your health.

The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. The EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health.

How does the AQI work?

Think of the AQI as a yardstick that runs from 0 to 500. The higher the AQI value, the greater the level of air pollution and the greater the health concern. For example, an AQI value of 50 represents good air quality with little potential to affect public health, while a value over 300 signifies hazardous air quality.

An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy; at first for certain sensitive groups of people, then for everyone as AQI values get higher.

Where can I find out about the AQI?

The Division for Air Quality reports nearly real-time AQI values on our website, at air.ky.gov, and via a toll-free telephone number, 1-800-AIR-IN-KY. Forecasted AQI data can be viewed at EPA's website, www.airnow.gov. Forecasted AQI data is generated using a combination of forecasted weather data and known pollution emission values. DAQ does not forecast for air pollution. In Kentucky, the Louisville Air Pollution Control District forecasts due to its population size as required by the CAA.

National Ambient Air Quality Standards (NAAQS)		
Pollutant	**MAXIMUM CONCENTRATION**	
	Primary Standard	Secondary Standard
Carbon Monoxide		
8-Hour Average	9 ppm (1)	None
1-Hour Average	35 ppm (1)	
Lead		
Rolling 3-Month Average	0.15 µg/m^3	Same as primary
Nitrogen Dioxide		
Annual Average	0.053 ppm	Same as primary
1-Hour Average	100 ppb (2)	
Ozone		
8-Hour Average	0.075 ppm (2008 std) (6)	Same as primary
	0.08 ppm(3) (1997 std) (7)	
Particulate Matter (measured as $PM_{2.5}$)		
Annual Average	15.0 µg/m^3 (4)	Same as primary
24-Hour Average	35 µg/m^3 (5)	
Particulate Matter (measured as PM_{10})		
24-Hour Average	150 µg/m^3 (3)	Same as primary
Sulfur Oxides		
3-Hour Average	-------	0.5 ppm (1)
1-Hour Average	75 ppb (8)	------

Figure 28: The National Ambient Air Quality Standard determines what levels of each pollutant are acceptable in terms of protecting human health (primary standard) and public welfare (secondary standard).

Understanding the National Ambient Air Quality Standard

The federal Clean Air Act (42 U.S.C. 7401-7671), as amended by the U.S. Congress in 1970, 1977 and 1990, directs the U.S. Environmental Protection Agency to establish NATIONAL AMBIENT AIR QUALITY STANDARDS defining maximum allowable ambient (outdoor) concentrations for criteria pollutants. The term "criteria pollutants" derives from the requirement that EPA must set criteria or standards for each pollutant in the table at left.

There are two standard goal levels for each of the criteria pollutants. The PRIMARY STANDARD is designed to protect the public health. The SECONDARY STANDARD is designed to protect public welfare. Welfare includes damage to plants and animals, impairment of visibility, and property damage.

Units of measure in the chart are micrograms of pollutants per cubic meter of air (μg/m^3), parts of pollutants per million (ppm) parts of air, and parts per billion (ppb) parts of air.

Footnotes:

(1) Not to be exceeded more than once per year.

(2) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb. (Effective January 22, 2010.)

(3) Not to be exceeded more than once per year on average over 3 years.

(4) To attain this standard, when the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 μg/m3.

(5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 μg/m^3. (Effective December 17, 2006.)

(6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (Effective May 27, 2008.)

(7) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm. (b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard. (c) EPA is in the process of reconsidering the standards set in March 2008.

(8) To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. (Final rule signed June 2, 2010.)

2009 KYDAQ/LMAPCD NETWORK MAP

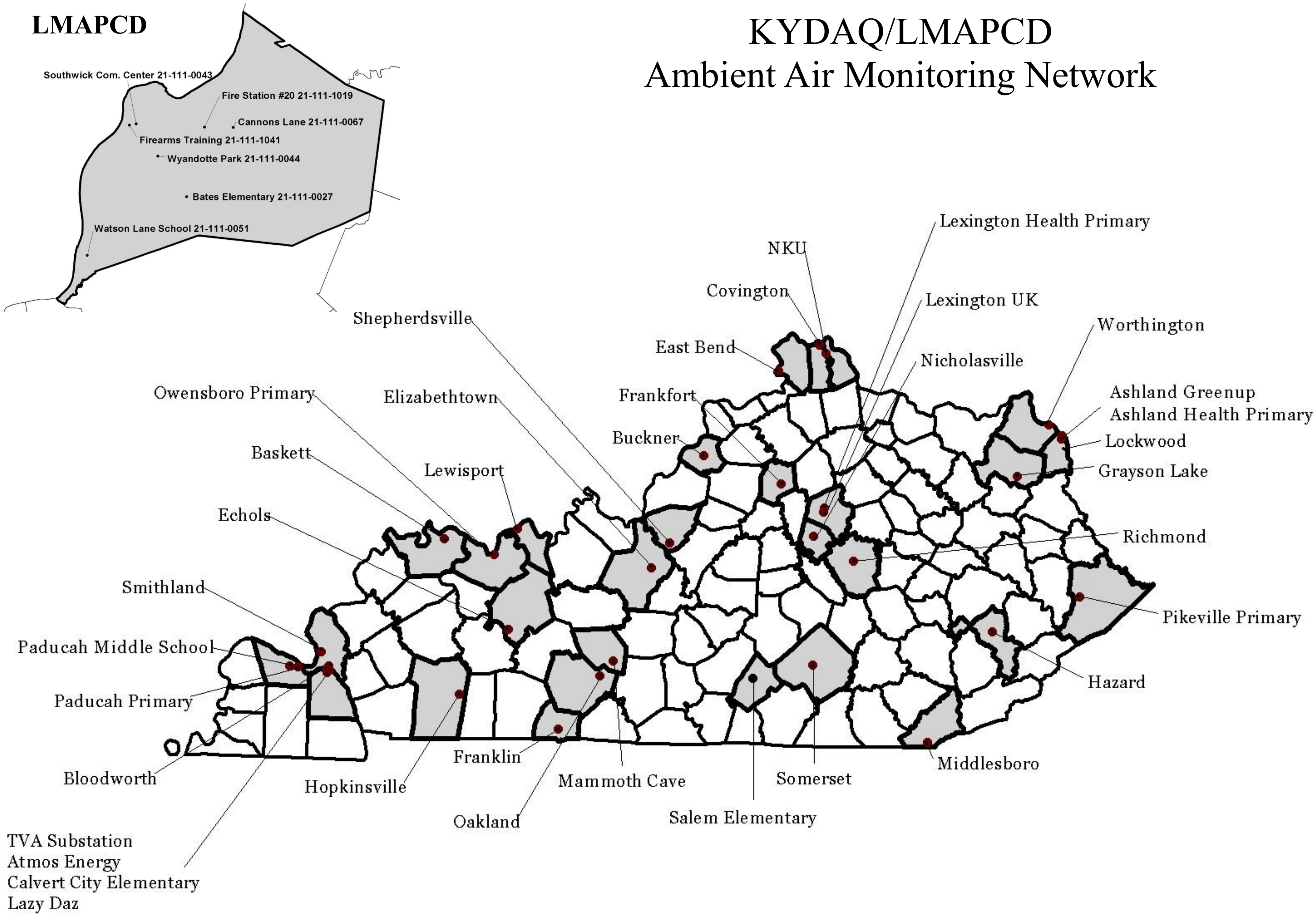


Figure 29: The Kentucky Division for Air Quality monitoring network. Inset is the Louisville Metropolitan Air Pollution Control District monitoring network.

2009 MONITORS BY MSA

Metropolitan Statistical Area	Number of Sites	$PM_{2.5}$	PM_{10}	PM_{coarse}	SO_2	NO_2	NO_y	CO	O_3	Pb/ Metals	Hg	Wet Dep	VOC	Carbonyl	Speciation	MET
Bowling Green, KY	2	4 CT	0	0	1	1	0	1	2	0	1	0	0	0	0	1
Cincinnati-Middletown, OH-KY-IN	3	4 T	0	0	1	1	0	0	3	0	1	1	1	1	1	2
Clarksville, TN-KY	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Elizabethtown, KY	1	3 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Evansville, IN-KY	1	2 T	1	0	1	0	0	0	1	0	0	0	0	0	0	0
Huntington-Ashland, WV-KY-OH	3	2 T	2 C* *	0	2	1	0	0	2	3 C	0	0	1	1	1	1
Lexington-Fayette, KY	3	3 T	1 **	0	2	1	0	0	2	1	1	1	1	1	1	1
Louisville-Jefferson County, KY-IN	10	12 CT	4 C* *	1	3	1	1	2	5	0	0	0	0	0	1	3
Owensboro, KY	2	2 CT	0	0	1	1	0	0	2	0	0	0	0	0	0	1
Micorpolitan Statistical Area																
Paducah, KY-IL	4	2 T	1	0	2	1	0	0	2	0	1	1	1	0	0	1
Somerset, KY	1	1 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Middlesborough, KY	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Richmond-Berea, KY	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Frankfort, KY	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Not in a MSA																
Carter County	1	1	2 C	0	0	0	0	0	1	2 C	1	2	2	2	1	1
Marshall County	4	0	1	0	0	0	0	0	0	1	0	0	5	0	0	1
Ohio County	1	2 T	1 **	0	0	0	0	0	0	1	1	1	0	0	0	1
Perry County	1	1 T	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Pike County	1	3 T	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Russell County	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Simpson County	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTALS	43	46	13	1	13	7	1	3	27	10	6	6	11	5	5	16

C=Collocated monitors; D=Duplicate monitors; T= Continuous PM2.5 monitors or continuous PM10 monitors; **=Multiple analysis: PM10 Teflon filters used for PM10 monitoring, Metals monitoring, and PM coarse

Louisville Metro Air Pollution Control District: 2009 Carbon Monoxide Ambient Air Monitoring Network

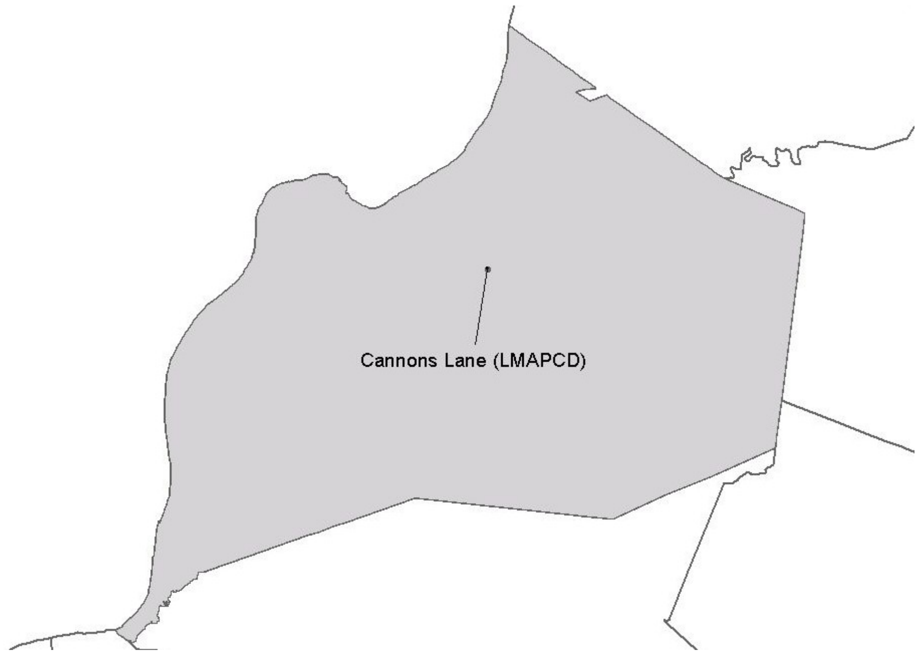


Figure 30: Carbon monoxide monitoring in Kentucky is currently conducted only in the Louisville Metro region due to statewide compliance; Jefferson County historically has had higher levels of CO than elsewhere in the state, perhaps due to the high levels of vehicle traffic in the area.

Carbon monoxide (CO) is an odorless, colorless, poisonous gas that is produced by the incomplete combustion of carbon containing fuels. The primary source of carbon monoxide is the exhaust from motor vehicles that includes highway and off-road vehicles, such as construction equipment. Other sources include industrial processes, and kerosene or wood burning stoves in homes.

Environmental Impacts

The main health effect of carbon monoxide is its tendency to reduce the oxygen carrying capacity of blood. Carbon monoxide enters the bloodstream in the lungs where it binds chemically with the hemoglobin in red blood cells. Hemoglobin normally carries oxygen to organs and tissues but because CO binds with the hemoglobin over 200 times more readily than oxygen, the amount of oxygen absorbed into the bloodstream is greatly reduced when CO is present.

Depending on the level of exposure, CO can cause fatigue and headaches and can impair vision and reflexes. Unconsciousness and even death may occur at high concentrations. The severity of the effects is related to the length of exposure and concentration level of CO.

How is CO Monitored?

Carbon monoxide is monitored continuously by analyzers that operate using the non-dispersive infrared photometry method. In this method, ambient air is drawn into a sample cell and a beam of infrared light is passed through the sample. Carbon monoxide absorbs infrared light and any decrease in the intensity of the beam is due to the presence of CO. The decrease is directly related to the concentration of CO in the ambient air. A detector measures the difference between the sample cell beam and a duplicate beam passing through a reference cell with no CO present.

The difference is translated into a measure of the CO present in the ambient air. Data from the analyzer is transmitted, by telemetry, for entry into an automated data storage system. In 2009, the Louisville Metro Air Pollution Control District operated one CO monitor in Jefferson County.

Results

There were no exceedances of the CO standards in 2009. The last exceedance of a standard occurred on January 7, 1998, in Ashland when an 8-hour average of 11.7 ppm was recorded. All Kentucky counties are currently in attainment of the standards for carbon monoxide.

Statewide and regional carbon monoxide levels have declined substantially since 1980, primarily due to improved emission controls on motor vehicles. Due to the substantial drop in monitored levels, carbon monoxide monitoring was discontinued statewide in 2003, except for Jefferson County. The 2003 statewide discontinuation of CO monitors accounts for the dramatic uptrend from 2003 to 2004, because since 2004 the annual average has been based on data only from Jefferson County. Jefferson County has historically had higher CO levels than the rest of the state.

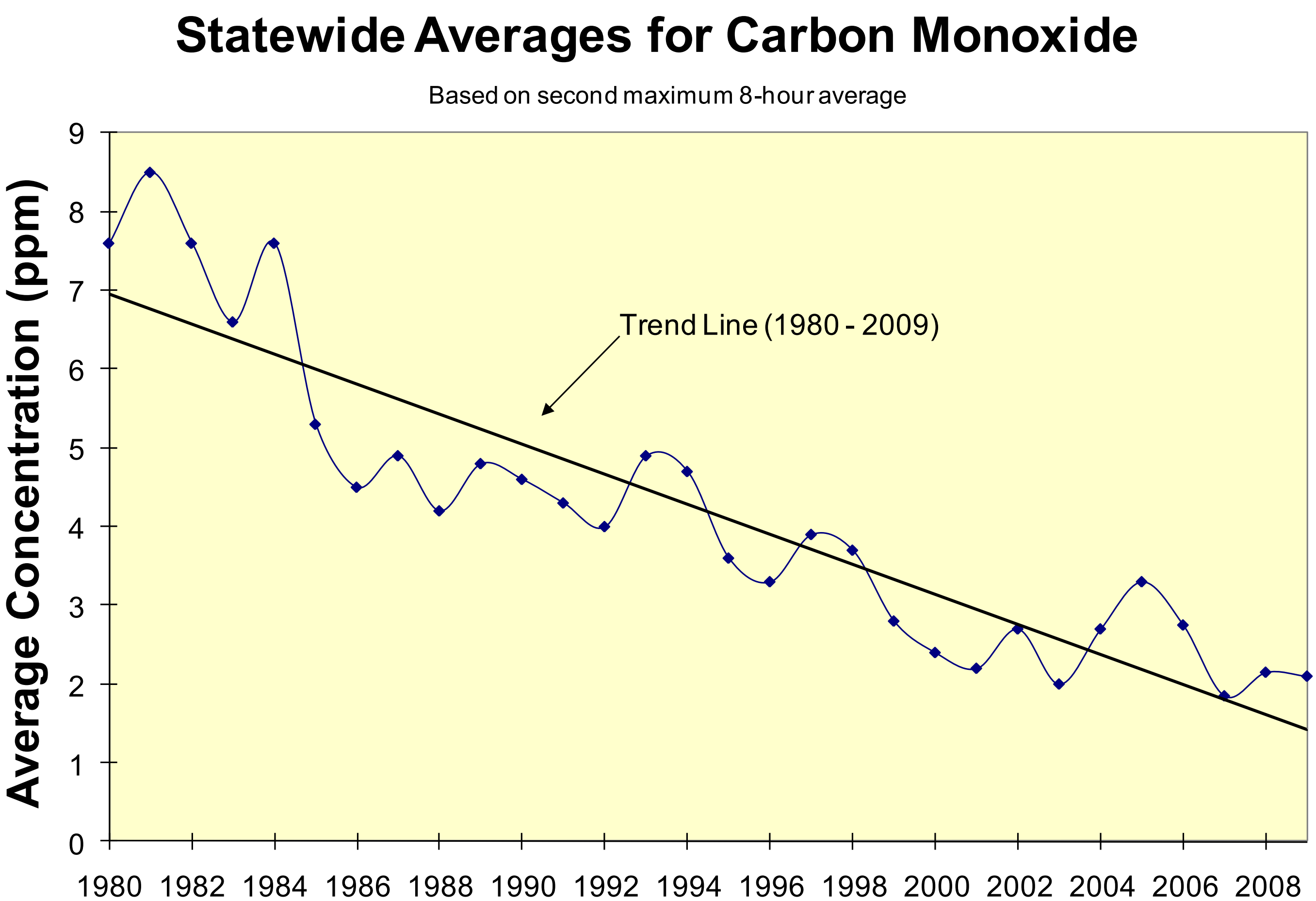


Figure 31: Statewide averages for CO monitoring indicate pollution reductions.

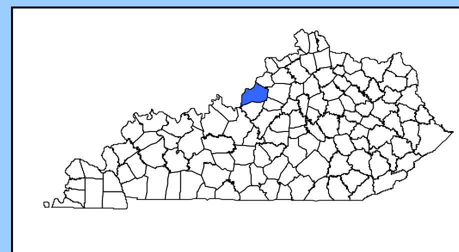
National Ambient Air Quality Standards for Carbon Monoxide

Primary NAAQS: **8-hour average not to exceed 9 ppm more than once per year**
1-hour average not to exceed 35 ppm more than once per year

Secondary NAAQS: **None**

Criteria Pollutant Summary Report – 2009

Pollutant: **Carbon Monoxide**
Method: Instrumental/Non-Dispersive Infrared Photometry
Data Interval: Hourly
Units: Parts-per-million (ppm)



County	Site Address	AQS-ID	# Obs	1-Hr Averages			8-Hr Averages		
				1st max	2nd max	Obs> 35.0	1st max	2nd max	Obs > 9.0
Jefferson	1735 Bardstown Road Louisville	21-111-1019	8662	2.8	2.8	0	2.2	2.1	0

Carbon monoxide monitors located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

2010 Lead Ambient Air Monitoring Network

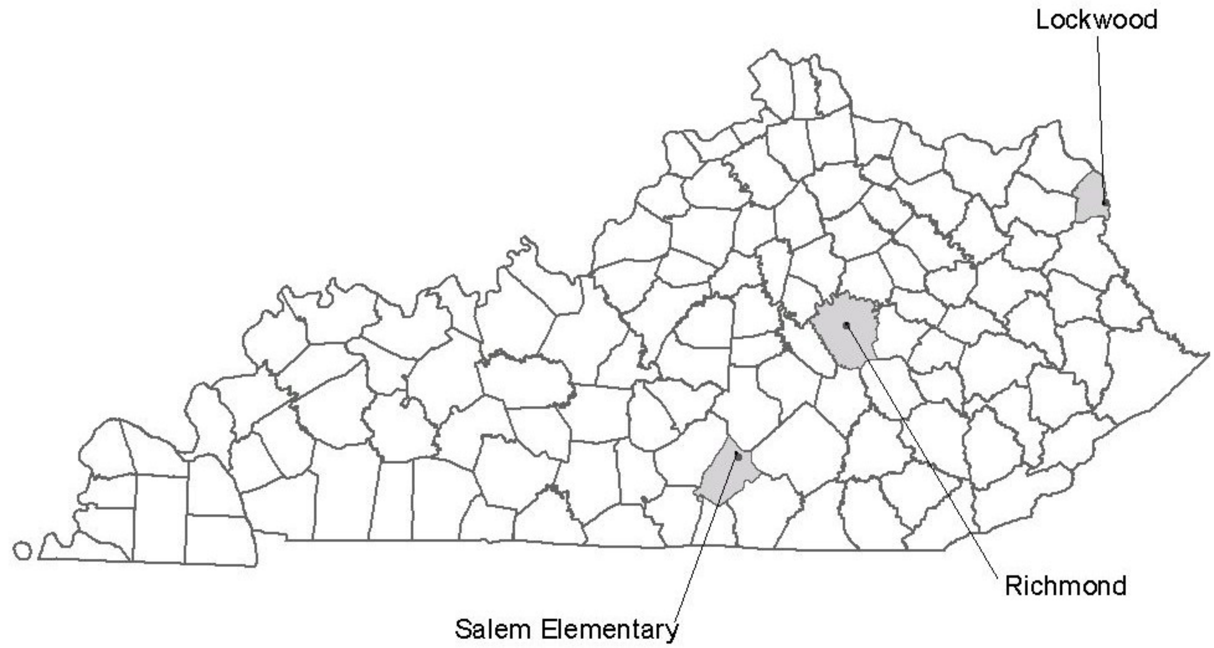


Figure 32: Lead monitoring locations in Kentucky.

Lead is a soft, blue-gray metal that occurs naturally. However, the historical use of lead in gasoline, paint, and plumbing, along with modern use in batteries, bridge paint, and plastic has caused lead to accumulate in the environment. The accumulation of lead in the environment is the reason lead can be found in everyone's body today.

On November 12, 2008, the NAAQS for lead was lowered from 1.5 $\mu g/m^3$ to 0.15 $\mu g/m^3$. The new NAAQS also required State, Tribal and Local agencies to monitor near sources that emit one or more tons of lead each year. The division identified three sources that emitted over one ton of lead annually and began monitoring near the sources in January 2010.

Environmental Impacts

Injestion of lead is the first major pathway of exposure. Inhalation is the second leading pathway of exposure for lead. Only 20 percent to 70 percent of injested lead is absorbed into the body whereas almost all of the lead inhaled is absorbed into the body. Children absorb lead into their system faster than an adult.

Lead can accumulate in soil, water, and sediments through deposition from air sources. The accumulation can damage ecosystems through the loss of biodiversity, community composistion, and decreased growth and reproductive rates in plants and animals.

Lead contamination can cause nervous system and kidney damage, learning disabilities, poor muscle coordination, decreased bone and muscle growth, and hearing damage in children. Lead can also effect adult nervous systems. However, most adults require a much large exposure dose than a child to have a negative health impact.

2009 Nitrogen Dioxide Ambient Air Monitoring Network

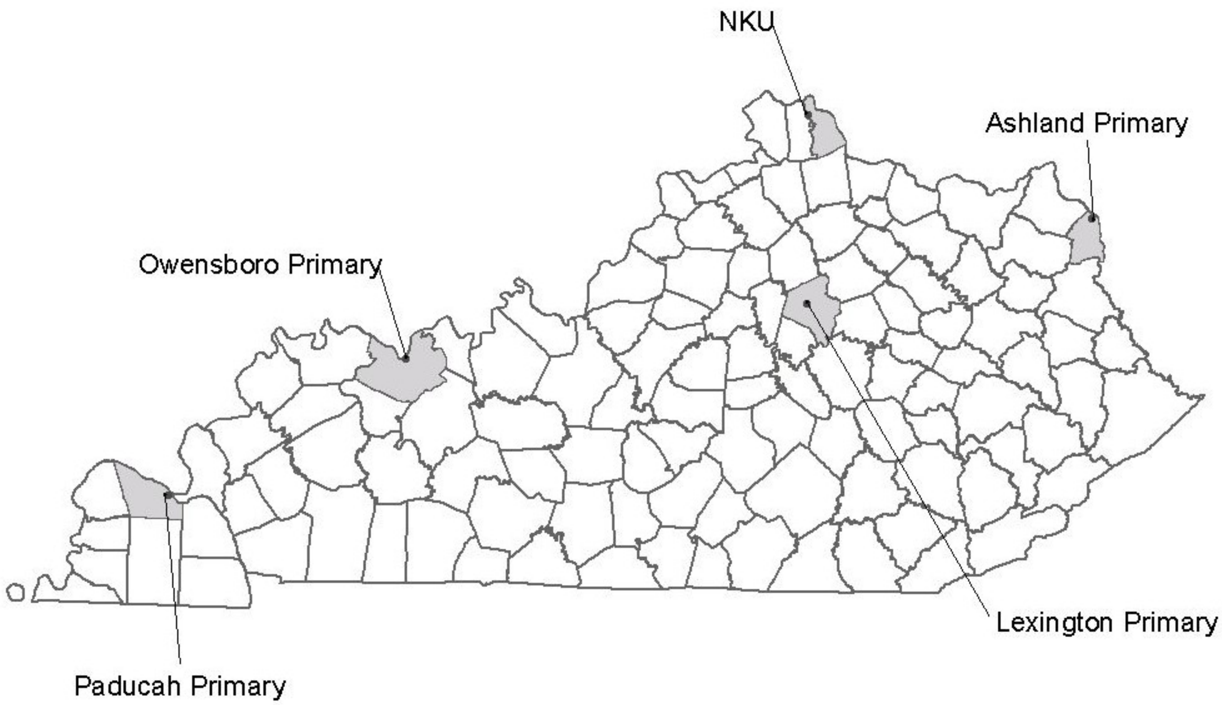


Figure 33: Nitrogen dioxide monitoring locations in Kentucky.

Nitrogen dioxide is a reddish brown gas that is produced during high temperature combustion. During combustion, nitrogen and oxygen are combined, or oxidized, to form a family of highly reactive gases called nitrogen oxides (NOx), which includes nitrogen dioxide (NO_2) and nitrogen oxide (NO). In addition to the NO_2 produced during combustion, the NO produced may, in the presence of sunlight, undergo a photochemical reaction that will also form NO_2. The rate of reaction is dependent upon the intensity of the sunlight.

Major combustion or oxidation sources that produce NO_2 include motor vehicles, power plants, incinerators, boilers, and chemical processes.

Environmental Impacts

The primary health effect of NO_2 is as a lung irritant, which can cause an increase in respiratory rate, a decrease in lung function, and an increase the susceptibility of the respiratory system to infection. Nitrogen oxides are also considered detrimental to human health due to their association in the formation of ozone and the resulting health effects caused by that pollutant.

NO_2 is a contributor to the formation of acid precipitation, which can damage plant life, aquatic life, cause the deterioration of stone/masonry-type buildings, and deteriorate statues.

Nitrogen oxides also react with ammonia to form ammonium nitrate, a component of $PM_{2.5}$. Nitrates are also a key component in regional haze that has been attributed to poor visibility in the southeast region of the United States.

How is NO_2 monitored?

Nitrogen dioxide is monitored continuously by analyzers that utilize the principle of photometric detection of the chemiluminescence (light) resulting from the gas phase reaction of nitric oxide (NO) and ozone. When these two gases react, light at a specific wavelength is produced. In operation, sample air is drawn into the analyzer and split into two streams.

The first air stream reacts directly with ozone (which is produced by a generator in the analyzer) and the light energy produced is proportional to the NO in the sample. Since NO_2 does not react with ozone, the second stream of air passes through a catalytic converter that converts the NO_2 in the sample to NO. The second air stream then reacts with ozone, providing a total measurement of nitrogen oxides (NOx) in the sample.

The assumption is that the majority of the NOx value is not NO_2. By subtracting the first air stream NOx concentration from the second stream NOx concentration, a NO_2 value is obtained. Data from the analyzer is transmitted into an automated data storage system. In 2009, the DAQ and the LMAPCD operated seven nitrogen dioxide monitors in Kentucky.

Results

There were no exceedances of the NO_2 standard in 2009, and there have been no recorded exceedances of the NAAQS since the inception of sampling in 1970. Statewide nitrogen dioxide levels show a steady downward trend, primarily due to the use of pollution control devices on motor vehicles, power plants and industrial boilers.

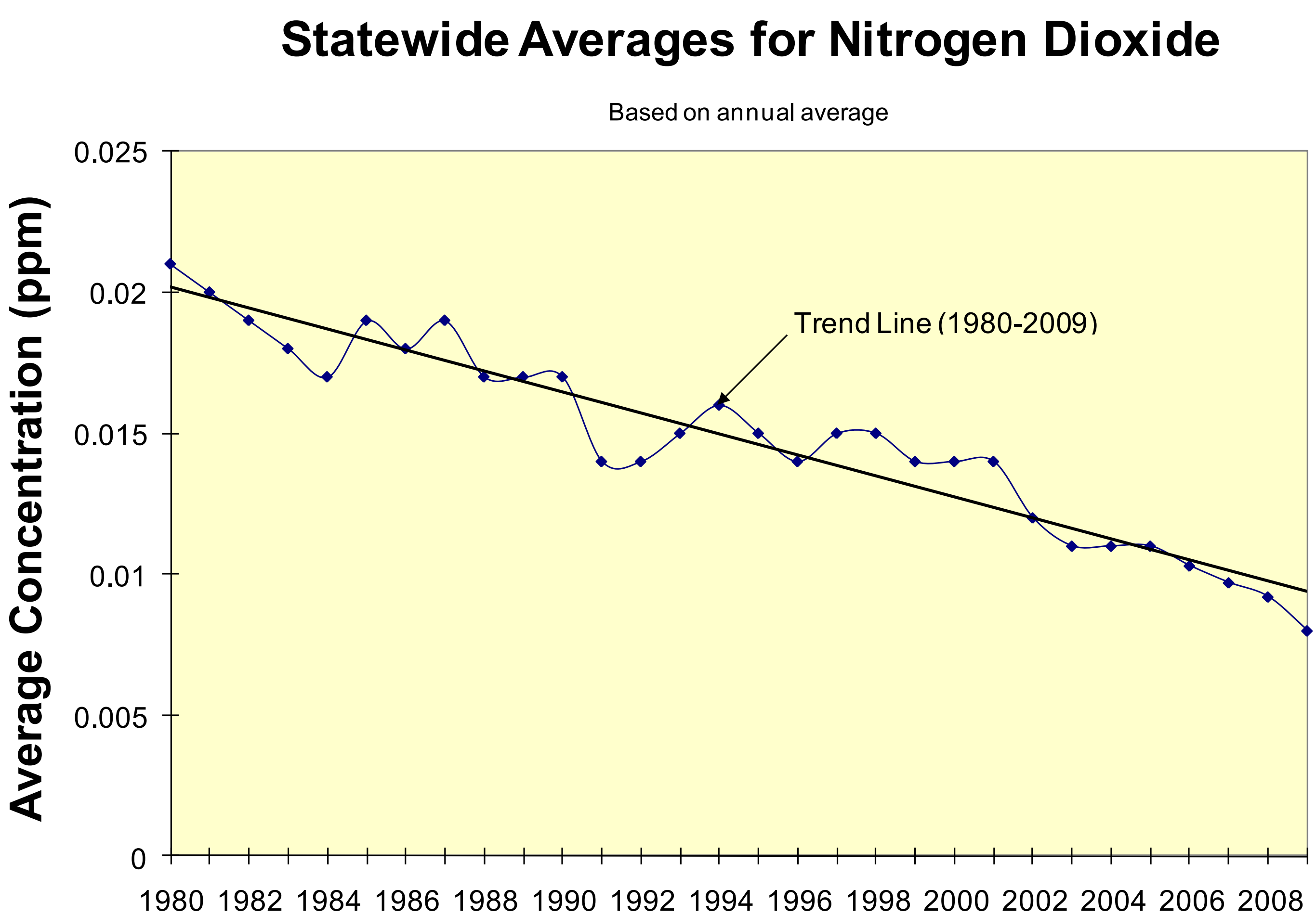


Figure 34: Statewide averages for nitrogen dioxide monitoring indicate pollution reductions.

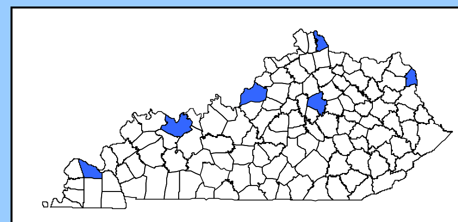
National Ambient Air Quality Standards for Nitrogen Dioxide

Primary NAAQS: **Annual Arithmetic Mean 0.53 ppm**
1-Hour Average 100 ppb

Secondary NAAQS: **Same as Primary Standard**

Criteria Pollutant Summary Report – 2009

Pollutant: **Nitrogen Dioxide**
Method: Instrumental/Gas-Phase Chemiluminescence
Data Interval: Hourly
Units: Parts-per-million (ppm)



County	Site Address	AQS-ID	# Obs	Mean	1-Hr Average	
					1st max	2nd max
Boyd	2924 Holt Street Ashland	21-019-0017	8309	.0087	.052	.041
Campbell	524A John Hill Road Highland Heights	21-037-3002	8118	.0058	.037	.037
Daviess	US 60 and Pleasant Valley Road Owensboro	21-059-0005	8261	.0062	.049	.045
Fayette	650 Newtown Pike Lexington	21-067-0012	8301	.0084	.050	.050
Jefferson	1918 Mellwood Avenue Louisville	21-111-1021	8691	.0136	.067	.065
McCracken	2901 Powell Street Paducah	21-145-1024	8134	.0057	.077	.047

Nitrogen dioxide monitors located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

OZONE (O_3)

Ozone Ambient Air Monitoring Network

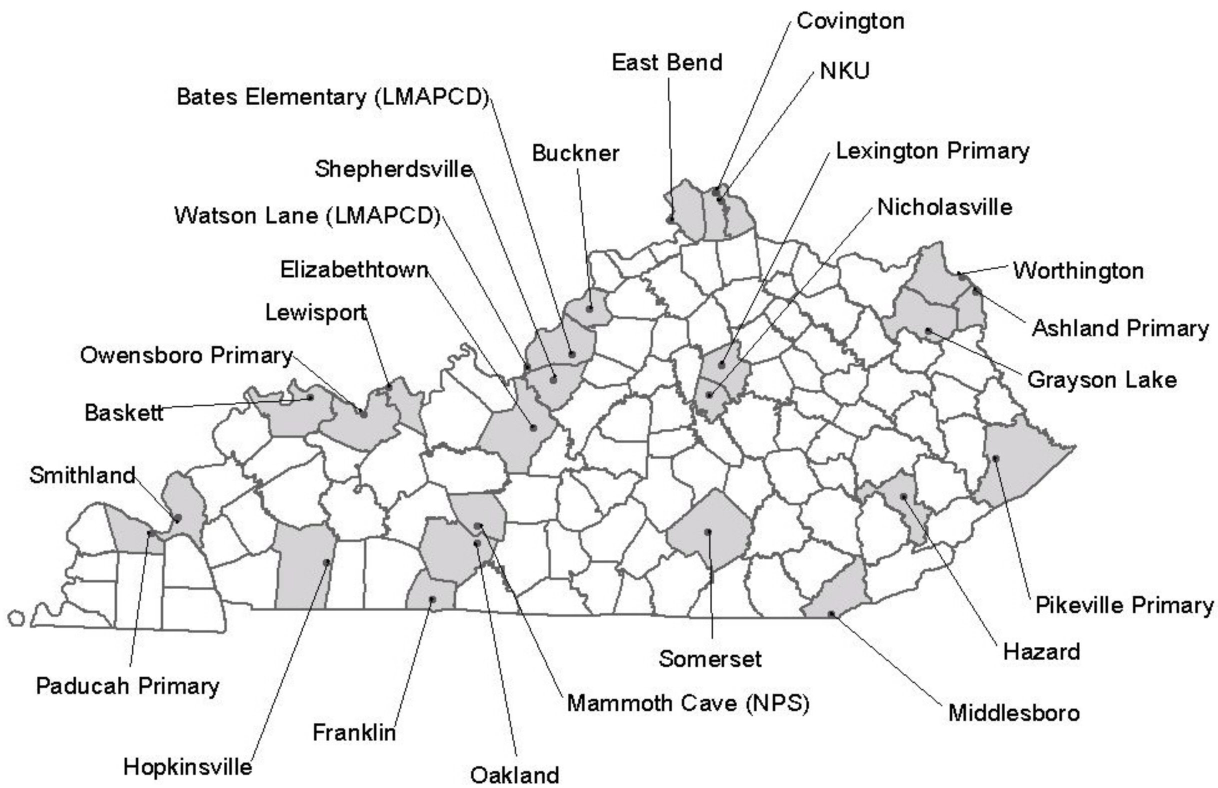


Figure 35: Ozone monitoring locations in Kentucky.

Ozone is a colorless gas that is not emitted directly into the atmosphere from sources but forms in the atmosphere from a photochemical reaction between volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the presence of sunlight. Sources of VOCs include motor vehicle exhaust, dry cleaning, paint solvents, and evaporation of gasoline from storage and fuel transfer facilities. Sources of NOx include emissions from motor vehicles, boilers, and power plants.

Environmental Impacts

In the upper atmosphere, naturally occurring stratospheric ozone (commonly called the ozone layer) shields the earth's surface from the sun's harmful ultraviolet rays. However, tropospheric ozone, also known as ground-level ozone, can trigger health problems at low level exposure, cause permanent lung damage after long term exposure, and damage ecosystems.

How is O_3 monitored?

Ozone is monitored from March 1st through October 31st each year, when meteorological conditions are most conducive to the formation of ozone. Analyzers, which operate continuously, monitor ozone by using the ultraviolet photometry method. In this method, ambient air is drawn into a sample cell and a beam of ultraviolet light is passed through the cell.

Ozone absorbs ultraviolet light and a decrease in the intensity of the light indicates the presence of ozone. The intensity of the light is first measured with no ozone present to determine a reference value. An ambient sample is then introduced and the intensity of the resultant light is measured by an ultraviolet detector. The amount of light absorbed by the sample indicates the level of ozone present. Data from the analyzers are transmitted into an automated data storage system. In 2009, DAQ, the National Park Service at Mammoth Cave, and the Louisville Metro Air Pollution Control District operated a total of 27 ozone monitors in Kentucky.

Results

In November, 1997 the EPA adopted an eight-hour ozone standard based on scientific and medical research, which indicated that extended exposure to lower levels of ozone might be as harmful as short-term exposure to elevated levels. The eight-hour standard was set at 0.08 ppm and was exceeded when the average level of ozone over an eight hour period was 0.085 ppm or greater. On May 27, 2008, the EPA adopted a new 8-hour standard set at .075 ppm.

The standard is attained when the fourth highest daily 8-hour average for each of the three most recent years are averaged and that average is less than 0.075 ppm. In 2009, there were seven exceedances of the current 8-hour standard, statewide.

Generally, there has been a decline in ozone levels over the past twenty-five years based on one-hour data. This downward trend is the result of emission controls on vehicles and a regional strategy controlling of NOx emissions from large stationary internal combustion engines, large boilers and turbines used in power plants and other industrial applications.

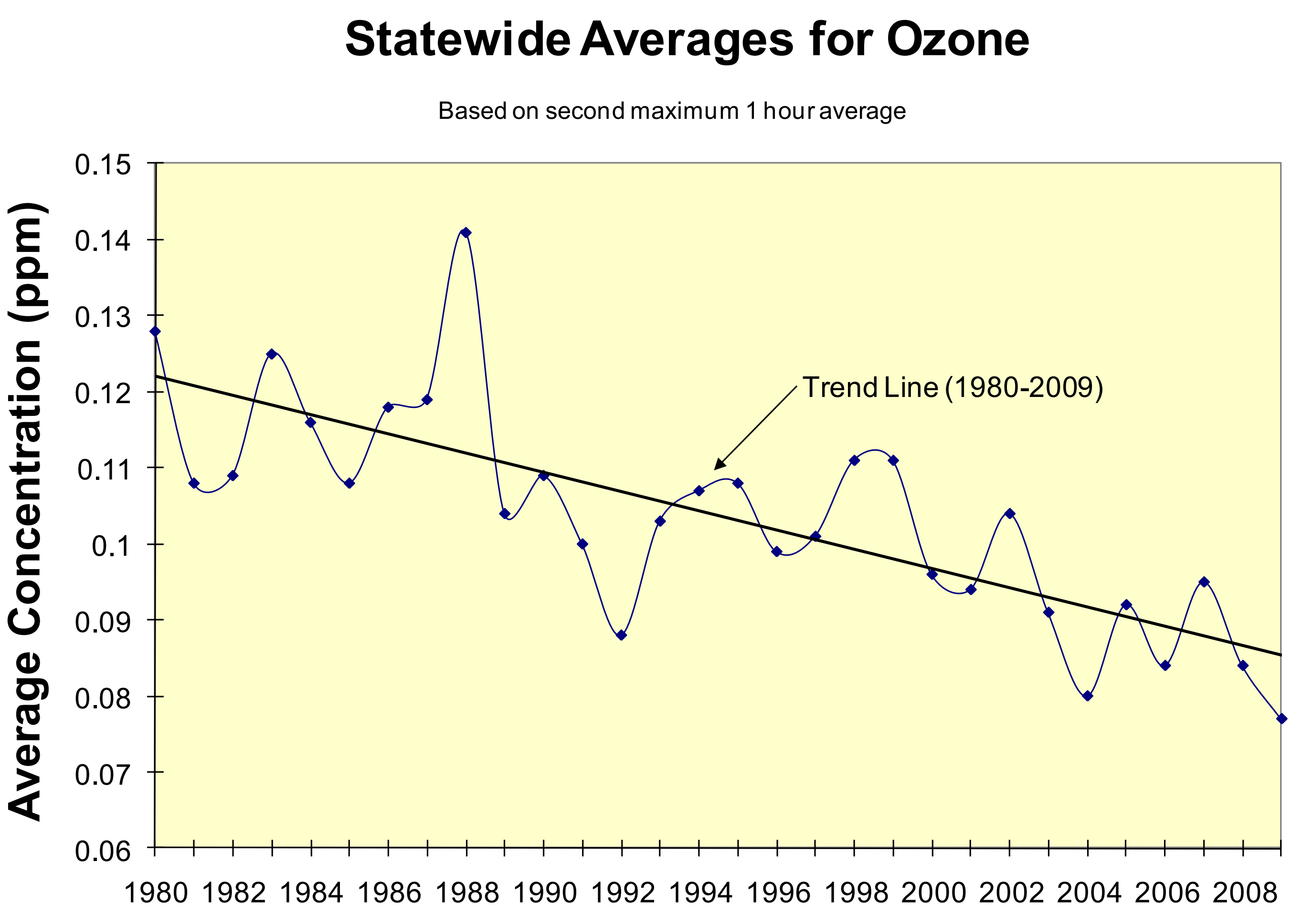


Figure 36: Statewide averages for ozone monitoring indicate pollution reductions.

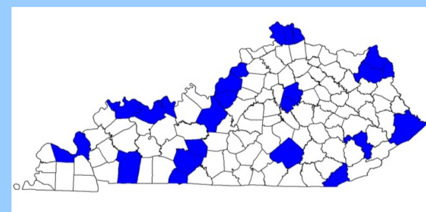
National Ambient Air Quality Standards for Ozone

Primary NAAQS: **8-Hour Concentration (3 year avg. of 4th max.) not to exceed 0.075 ppm**

Secondary NAAQS: **Same as Primary Standard**

Criteria Pollutant Summary Report – 2009

Pollutant: **Ozone**
Method: Ultra-Violet Photometry
Data Interval: Hourly
Units: Parts-per-million (ppm)



County	Site Address	AQS-ID	Valid Days Meas.	8-Hr Average				
				Obs> 0.075	1st max	2nd max	3rd max	4th max
Bell	34th & Dorchester Middlesboro	21-013-0002	245	0	.065	.063	.061	.060
Boone	KY 338 & Lower River East Bend	21-015-0003	241	0	.069	.067	.065	.064
Boyd	2924 Holt Street Ashland	21-019-0017	245	0	.069	.068	.067	.066
Bullitt	2nd & Carpenter St Shepherdsville	21-029-0006	245	0	.070	.068	.065	.064
Campbell	524A John Hill Rd Highland Heights	21-037-3002	245	0	.075	.072	.070	.068
Carter	Camp Webb Grayson Lake	21-043-0500	244	0	.068	.067	.066	.063
Christian	10800 Pilot Rock Hopkinsville	21-047-0006	244	1	.081	.068	.067	.066
Daviess	US 60 and Pleasant Valley Owensboro	21-059-0005	241	0	.072	.070	.069	.067
Edmonson[1]	Alfred Cook Road Mammoth Cave	21-061-0501	237	0	.069	.067	.066	.065
Fayette	650 Newtown Pike Lexington	21-067-0012	243	0	.068	.065	.065	.063
Greenup	Scott & Center St Worthington	21-089-0007	244	0	.067	.064	.064	.063
Hancock	2nd & Caroline Lewisport	21-091-0012	241	0	.072	.070	.069	.069
Hardin	801 North Miles St Elizabethtown	21-093-0006	245	0	.071	.067	.067	.066
Henderson	Baskett Fire Dept. Baskett	21-101-0014	238	0	.073	.072	.072	.071
Jefferson[2]	7601 Bardstown Rd Louisville	21-111-0027	243	2	.084	.076	.075	.068
Jefferson[2]	7201 Watson Lane Louisville	21-111-0051	239	4	.085	.080	.080	.078
Jefferson[2]	1918 Mellwood Ave Louisville	21-111-1021	244	0	.068	.065	.065	.065

Ozone Criteria Pollutant Summary Report – 2009 Continued

County	Site Address	AQS-ID	Valid Days Meas.	8-Hr Average				
				Obs> 0.075	1st max	2nd max	3rd max	4th max
Jessamine	KYDOT, Etter Drive Nicholasville	21-113-0001	240	0	.067	.066	.065	.065
Kenton	1401 Dixie Highway Covington	21-117-0007	242	1	.076	.075	.075	.074
Livingston	KYDOT 811 US 60E Smithland	21-139-0003	245	1	.079	.069	.069	.066
McCracken	2901 Powell Street Paducah	21-145-1024	245	0	.075	.075	.067	.066
Oldham	DOT Garage, 3995 Morgan Buckner	21-185-0004	236	0	.071	.069	.068	.068
Perry	Perry Co Horse Park Hazard	21-193-0003	241	0	.065	.064	.063	.062
Pike	101 North Mayo Trail Pikeville	21-195-0002	243	0	.066	.064	.062	.062
Pulaski	Clifty Street Somerset	21-199-0003	245	0	.065	.062	.061	.061
Simpson	KYDOT, HWY 1008 Franklin	21-213-0004	243	1	.076	.072	.069	.066
Warren	Oakland Elementary School Oakland	21-227-0008	233	0	.069	.066	.064	.058

[1] Monitor operated by the National Park Service at Mammoth Cave.
[2] Ozone monitors located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

Ozone Criteria Pollutant Multi-year Summary Report – 2009
8-hour 4th Maximum 3 Year Average

County	Site Address	AQS-ID	2007 4th max	2008 4th max	2009 4th max	3 year Avg. 4th max
Bell	34th & Dorchester Middlesboro	21-013-0002	0.071	0.070	0.060	**0.067**
Boone	KY 338 & Lower River Road East Bend	21-015-0003	0.078	0.064	0.064	**0.068**
Boyd	2924 Holt Street Ashland	21-019-0017	0.072	0.073	0.066	**0.070**
Bullitt	2nd & Carpenter Streets Shepherdsville	21-029-0006	0.078	0.069	0.064	**0.070**
Campbell	524A John Hill Highland Heights	21-037-3002	0.086	0.075	0.068	**0.076**
Carter	Camp Webb Grayson Lake	21-043-0500	0.072	0.072	0.063	**0.069**
Christian	10800 Pilot Rock Rd Hopkinsville	21-047-0006	N/A	0.069	0.066	**0.067**
Daviess	US 60 & Pleasant Valley Rd Owensboro	21-059-0005	0.086	0.072	0.067	**0.075**
Edmonson[1]	Alfred Cook Road Mammoth Cave	21-061-0501	0.082	0.070	0.065	**0.072**
Fayette	650 Newtown Pike Lexington	21-067-0012	0.077	0.070	0.063	**0.070**
Greenup	Scott & Center Streets Worthington	21-089-0007	0.079	0.074	0.063	**0.072**
Hancock	2nd & Caroline Streets Lewisport	21-091-0012	0.081	0.072	0.069	**0.074**
Hardin	801 North Miles Street Elizabethtown	21-093-0006	0.083	0.074	0.066	**0.074**
Henderson	Baskett Fire Dept Baskett	21-101-0014	0.083	0.074	0.071	**0.076**
Jefferson[2]	7601 Bardstown Road Louisville	21-111-0027	0.086	0.072	0.068	**0.075**
Jefferson[2]	7201 Watson Lane Louisville	21-111-0051	0.085	0.075	0.078	**0.079**
Jefferson[2]	1918 Mellwood Avenue Louisville	21-111-1021	0.079	0.068	0.065	**0.070**
Jessamine	KYDOT, Etter Drive Nicholasville	21-113-0001	0.080	0.069	0.065	**0.071**
Kenton	1401 Dixie Highway Covington	21-117-0007	0.085	0.073	0.074	**0.077**
Livingston	KYDOT, 811 US 60 East Smithland	21-139-0003	0.078	0.065	0.066	**0.069**
McCracken	2901 Powell Street Paducah	21-145-1024	0.079	0.071	0.066	**0.072**
Oldham	DOT Garage, 3995 Morgan Rd. Buckner	21-185-0004	0.084	0.077	0.068	**0.076**
Perry	Perry County Horse Park Hazard	21-193-0003	0.076	0.073	0.062	**0.070**
Pike	101 North Mayo Trail Pikeville	21-195-0002	0.079	0.071	0.062	**0.070**
Pulaski	Clifty Street Somerset	21-199-0003	0.076	0.066	0.061	**0.067**
Simpson	KYDOT, Hwy 1008 Franklin	21-213-0004	0.081	0.071	0.066	**0.072**
Warren	Oakland Elementary School Oakland	21-227-0008	0.077	0.068	0.058	**0.067**

[1] Monitor operated by the National Park Service. [2] Monitors operated by the Louisville Metro Air Pollution Control District.
Values in blue are incomplete data sets. The mean does not satisfy summary criteria.
Values in red are a visual representation of an exceedance of the NAAQS.

2009 Particulate Matter ($PM_{2.5}$) Ambient Air Monitoring Network

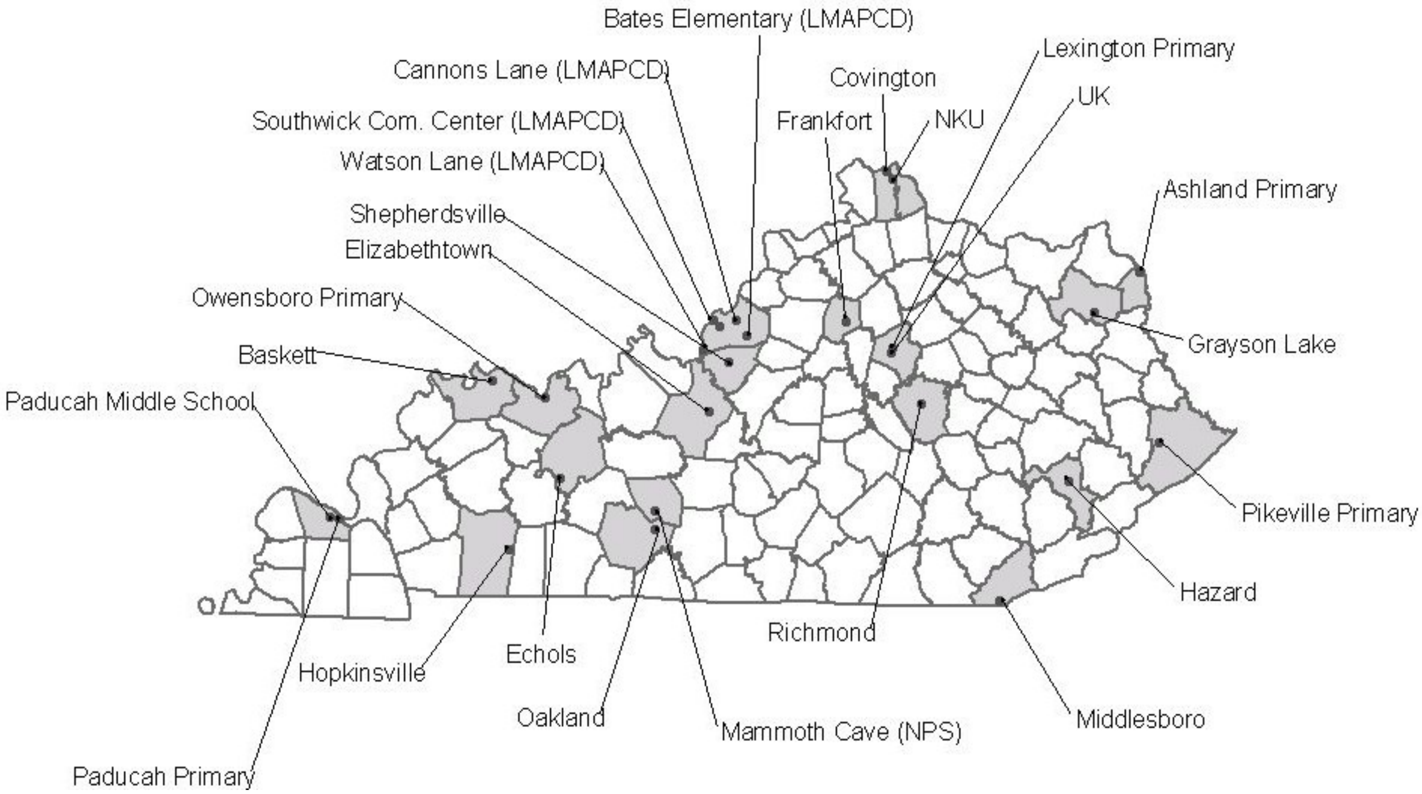


Figure 37: $PM_{2.5}$ monitoring locations in Kentucky.

Particulate Matter ($PM_{2.5}$) is a mixture of solid particles and liquid droplets that are 2.5 microns or smaller in size. Sources of $PM_{2.5}$ include power plants, wood burning, industrial processes, and fuel combustion. Fine particulates are also formed in the atmosphere when gases are transformed through chemical reactions. Sulfur dioxide, nitrogen oxides, and VOCs are all examples of gases that can transform by chemical reactions.

Environmental Impacts

Particulate matter of 2.5 microns or less has the ability to penetrate into the deepest parts of the lungs, causing chronic respiratory symptoms in sensitive populations and premature deaths in the elderly. $PM_{2.5}$ also affects the environment by reducing visibility (up to 70% in some areas of the U.S.) and contributing to acid rain.

How is $PM_{2.5}$ monitored?

Federal Reference Method (FRM) or Federal Equivalent Method (FEM) monitors must be used for NAAQS comparisons. FRM, FEM, or continuous Tapered Element Oscillating Microbalance (TEOM) monitors may be used for daily $PM_{2.5}$ Air Quality Index (AQI) results. TEOM samplers determine sample weights electronically and transmit results into an automated data storage system. Currently, TEOM monitors are not FRM or FEM equivalent. FRM and FEM $PM_{2.5}$ is monitored by an intermittent type sampler and the continuous 24-hour, 1-hour average measurement, FEM Beta Attenuation Mass Monitor (BAM-1020).

The intermittent-type monitors collect a sample over a 24-hour run cycle. While most samplers operate every third day, some operate every sixth day, while others operate every day. These samplers operate by drawing a measured volume of air through a pre-weighed filter. Before reaching the filter, the air passes through an impaction chamber where larger particles fall out of the air stream while particles smaller than 2.5 microns pass on to the sample filter where they are collected.

After completion of the sample run, the filter is removed from the sampler and reweighed to determine the mass of the particulates collected. In 2009, the DAQ, the NPS at Mammoth Cave, and the LMAPCD operated a network of 46 continuous and intermittent samplers.

Results

There were two exceedances of the 24-hour $PM_{2.5}$ standard and zero exceedances of the annual standard in 2009.

Additionally, no sampler exceeded either the three year 24-hour (2007-2009) standard or the three year (2007-2009) annual standard. This is a significant accomplishment.

Generally, statewide $PM_{2.5}$ levels have declined from 2000-2009 time period with a slight increase in 2005 and 2007.

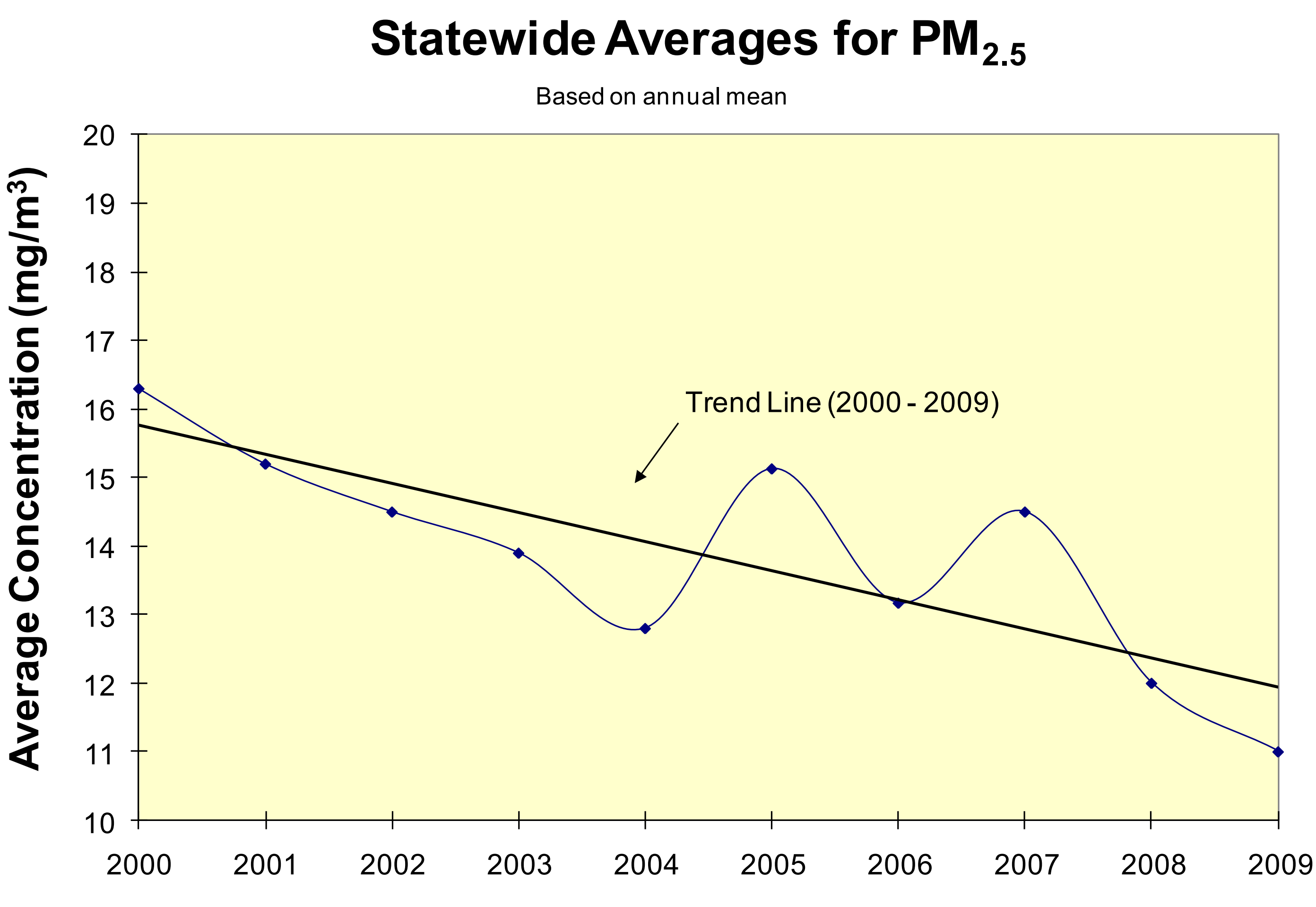


Figure 38: Statewide averages for $PM_{2.5}$ monitoring indicate pollution reductions.

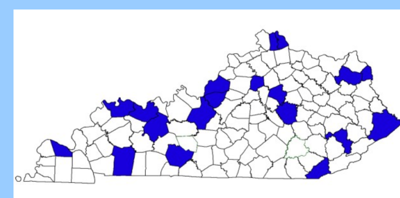
National Ambient Air Quality Standards for Particulate Matter $PM_{2.5}$

Primary NAAQS: **Annual Arithmetic Mean not to exceed 15.0 ug/m^3 (based on a three-year avg.)**
24-hour Concentration not to exceed 35 ug/m^3 (based on a three-year average of the 98th percentiles)

Secondary NAAQS: **Same as Primary Standard**

Criteria Pollutant Summary Report – 2009

Pollutant: **Particulate Matter $PM_{2.5}$**
Method: Gravimetric
Data Interval: 24-hour
Units: Micro-grams per cubic meter (mg/m^3)



County	Site	AQS-ID	# Obs	Mean	24-Hour Average				
					Obs >35	1st max	2nd max	3rd max	4th max
Bell	34th & Dorchester Middlesboro	21-013-0002	59	10.40	0	29.5	23.1	19.8	18.7
Boyd	2924 Holt Street Ashland	21-019-0017	118	10.94	0	26.8	24.6	23.5	21.7
Bullitt	2nd & Carpenter Street Shepherdsville	21-029-0006	117	11.81	0	25.7	23.5	23.1	22.7
Campbell	524A John Hill Rd Highland Heights	21-037-3002	114	11.34	0	24.5	22.7	22.5	21.4
Carter	Camp Webb Grayson Lake	21-043-0500	120	8.77	0	22.2	19.5	16.9	15.5
Christian	10800 Pilot Rock Hopkinsville	21-047-0006	103	10.71	0	28.6	28.5	24.0	21.3
Daviess	US 60 and Pleasant Val-ley Rd Owensboro	21-059-0014	116	11.86	0	34.0	28.3	25.4	24.2
Fayette	650 Newtown Pike Lexington	21-067-0012	118	11.11	0	23.7	22.0	21.4	21.3
Fayette	533 South Limestone Lexington	21-067-0014	114	11.05	0	21.2	20.2	20.0	19.7
Franklin	803 Schenkel Lane Frankfort	21-073-0006	122	10.41	0	22.7	22.0	19.6	18.5
Hardin	801 North Miles Street Elizabethtown	21-093-0006	118	10.92	0	25.3	23.2	22.3	20.6

PM2.5 Criteria Pollutant Multi-year Summary Report – 2009
24-hour 98th Percentile, 3 Year Average

County	Site	AQS-ID	2007 98th %	2008 98th %	2009 98th %	3 year Avg. 98th %
Bell	34th & Dorchester Middlesboro	21-013-0002	29.5	24.4	23.1	**26**
Boyd	2924 Holt Street Ashland	21-019-0017	**38.5**	24.3	23.5	**29**
Bullitt	2nd & Carpenter Streets Shepherdsville	21-029-0006	**35.1**	25.4	23.1	**28**
Campbell	524A John Hill Highland Heights	21-037-3002	34.0	26.1	22.5	**28**
Carter	Camp Webb Grayson Lake	21-043-0500	30.9	22.6	16.9	**23**
Christian	10800 Pilot Rock Road Hopkinsville	21-047-0006	**35.5**	27.2	24.0	**29**
Daviess	US 60 and Pleasant Valley Rd Owensboro	21-059-0005	34.9	24.4	25.4	**28**
Fayette	650 Newtown Pike Lexington	21-067-0012	33.7	23.5	21.4	**26**
Fayette	533 South Limestone Lexington	21-067-0014	32.0	22.7	20.0	**25**
Franklin	803 Schenkel Lane Frankfort	21-073-0006	**35.3**	23.2	19.6	**26**
Hardin	801 North Miles Street Elizabethtown	21-093-0006	**38.4**	25.2	22.3	**29**
Henderson	Baskett Fire Dept Baskett	21-101-0014	31.4	24.3	26.2	**27**
Jefferson[1]	37th & Southern Avenue Louisville	21-111-0043	34.1	28.7	24.3	**29**
Jefferson[1]	1032 Beecher Avenue Louisville	21-111-0044	33.5	29.5	25.7	**30**
Jefferson[1]	7201 Watson Lane Louisville	21-111-0051	32.5	28.6	24.7	**29**
Jefferson[1]	2730 Cannons Lane Louisville	21-111-0048	**NA**	**NA**	24.1	**24**
Kenton	1401 Dixie Highway Covington	21-117-0007	31.6	25.2	23.1	**27**
McCracken	342 Lone Oak Road Paducah	21-145-1004	33.9	25.3	25.1	**28**
Madison	Mayfield School Richmond	21-151-0003	31.9	23.5	18.5	**25**
Ohio	Keytown Rd. Echols	21-183-0032	**38.6**	25.4	25.6	**30**
Pike	101 North Mayo Trail Pikeville	21-195-0002	33.0	21.2	23.5	**26**
Warren	Oakland Elementary Oakland	21-227-0008	**37.5**	28.6	21.0	**29**

[1] PM2.5 samplers located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

Values in blue are incomplete data sets. There is not enough data for an annual or three year average.

Values in red are a visual representation of an exceedance of the 24-hour, 98th percentile.

$PM_{2.5}$ Criteria Pollutant Multi-year Summary Report – 2009
Annual Weighted Mean, 3 Year Average

County	Site	AQS-ID	2007 mean	2008 mean	2009 mean	3 year avg.
Bell	34th & Dorchester Middlesboro	21-013-0002	16.5	12.5	10.4	**13.2**
Boyd	2924 Holt Street Ashland	21-019-0017	14.3	12.1	10.9	**12.4**
Bullitt	2nd & Carpenter Streets Shepherdsville	21-029-0006	15.3	12.8	11.8	**13.3**
Campbell	524A John Hill Highland Heights	21-037-3002	14.4	11.8	11.3	**12.5**
Carter	Camp Webb Grayson Lake	21-043-0500	12.8	10.3	8.8	**10.6**
Christian	10800 Pilot Rock Road Hopkinsville	21-047-0006	14.0	11.9	10.7	**12.2**
Daviess	US 60 and Pleasant Valley Rd Owensboro	21-059-0005	14.2	12.0	11.9	**12.7**
Fayette	650 Newtown Pike Lexington	21-067-0012	14.6	12.1	11.1	**12.6**
Fayette	533 South Limestone Lexington	21-067-0014	14.4	12.1	11.0	**12.5**
Franklin	803 Schenkel Lane Frankfort	21-073-0006	13.5	11.5	10.4	**11.8**
Hardin	801 North Miles Street Elizabethtown	21-093-0006	14.4	12.2	10.9	**12.5**
Henderson	Baskett Fire Dept Baskett	21-101-0014	14.2	12.0	11.6	**12.6**
Jefferson[1]	37th & Southern Avenue Louisville	21-111-0043	15.1	13.2	12.2	**13.5**
Jefferson[1]	1032 Beecher Avenue Louisville	21-111-0044	14.9	13.4	12.5	**13.6**
Jefferson[1]	7201 Watson Lane Louisville	21-111-0051	15.7	12.8	11.6	**13.4**
Jefferson[1]	2730 Cannons Lane Louisville	21-111-0048	**NA**	**NA**	11.7	**11.7**
Kenton	1401 Dixie Highway Covington	21-117-0007	14.2	12.0	11.0	**12.4**
McCracken	342 Lone Oak Road Paducah	21-145-1004	14.1	11.8	11.5	**12.5**
Madison	Mayfield School Richmond	21-151-0003	13.3	10.4	9.7	**11.2**
Ohio	Keytown Rd. Echols	21-183-0032	14.4	12.1	11.1	**12.5**
Pike	101 North Mayo Trail Pikeville	21-195-0002	14.4	10.5	9.3	**11.4**
Warren	Oakland Elementary Oakland	21-227-0008	12.5	12.1	10.7	**11.8**

[1] PM2.5 samplers located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

Values in blue are incomplete data sets. There is not enough data for an annual or three year average.

Values in red are a visual representation of an exceedances of the 24-hour, 98th percentile.

PARTICULATE MATTER ($PM_{2.5}$): SPECIATION

2009 Particulate Matter ($PM_{2.5}$) Speciation Ambient Air Monitoring Network

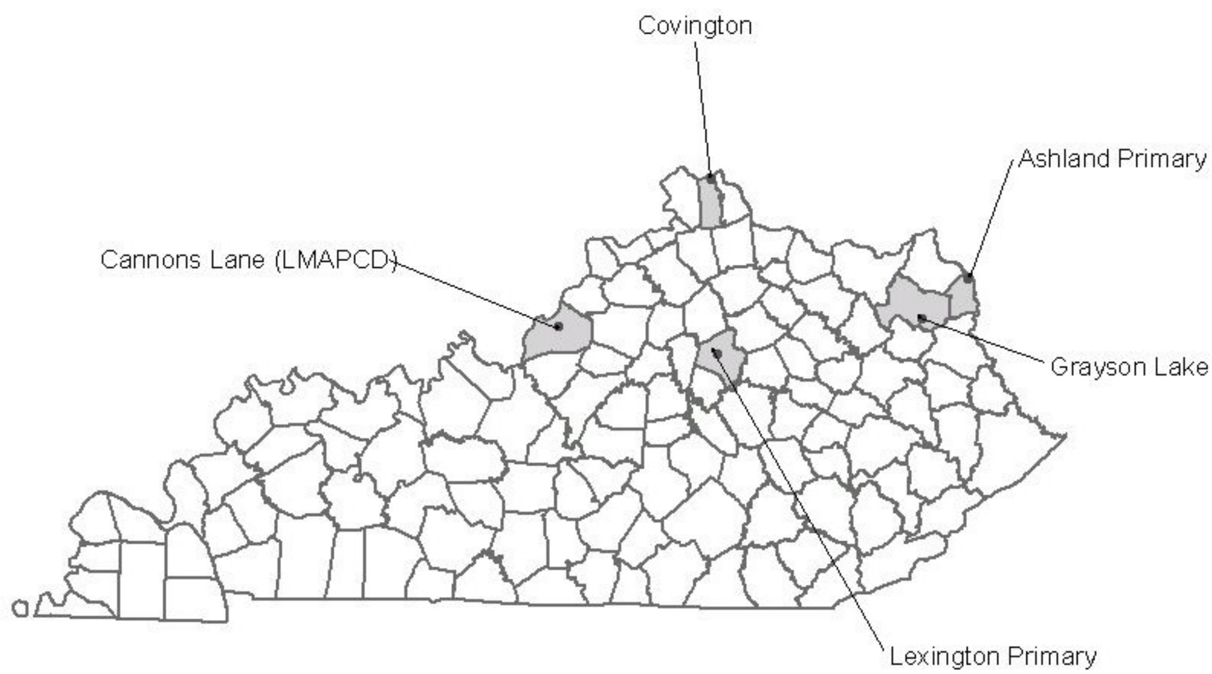


Figure 39: $PM_{2.5}$ speciation monitoring locations in Kentucky.

The promulgation of the new $PM_{2.5}$ standards may require all future areas not meeting the standards to reduce emissions of fine particulates and their precursors. Efficient air quality management requires knowing which sources contribute to the problem and estimating how much. However, determining $PM_{2.5}$ source contributions is complicated due to the fact that often half or more of the $PM_{2.5}$ mass is composed of secondarily formed species, therefore hiding their point of origin. In addition, $PM_{2.5}$ may remain in the atmosphere for several days enabling sources several hundred miles away to affect an area. Realizing this, the EPA established the Speciation Trends Network designed to assist in identifying the compounds associated with fine particulates. The network is used to provide data on a target group of chemical species known to be significant contributors to $PM_{2.5}$ mass. The data provided by the network can be used to support several areas that include:

- Assisting the implementation of the $PM_{2.5}$ standard by using speciated data as input to air quality modeling analyses and as indicators to track progress of controls.
- Aiding the interpretation of health studies by linking effect to $PM_{2.5}$ constituents.
- Understanding the effect of atmospheric constituents on visibility impairment.
- Using the speciated particulate data to aid in monitoring network design and siting adjustment.

How is $PM_{2.5}$ speciation monitored?

The approach to be used for chemical speciation involves both sampling and analysis components. The target groups of chemical species include a list of analytes that consist of an array of cations, anions, carbon species, and trace elements. Because no one sample media is capable of providing the appropriate sample collection for all of the target analytes, each series of analytes requires sample collection on the appropriate media and utilization of the appropriate analytical techniques.

Listed below are the target analytes and the analytical techniques used:

- **Trace Elements** -X-ray fluorescence and particle induced X-ray emission
- **Anion and Cations** -Ion chromatography
- **Carbon** -Controlled-combustion/thermal optical

Once analysis is complete, the analytes are grouped into the target chemical species listed below. These species in turn can be linked to source categories that ultimately can be used to assist in understanding $PM_{2.5}$ and developing control strategies needed to reduce ambient levels.

- Nitrate (total)
- Sulfate
- Ammonium
- Organic Carbon
- Elemental Carbon
- Crustal Component (trace elements, fine soil)
- Other (PM2.5 mass unaccounted for by analytical methods)

Results

In 2009, the Kentucky Division for Air Quality operated a network of four Speciation Trends Network monitors and the Louisville Metro Air Pollution Control District operated one monitor (Figures 40-44). The sites are strategically located to address different types of land use ranging from heavy industrial, urban, and rural. The charts on the following pages provide a visual representation of speciation data collected at each site during 2009. The data suggests that sulfate and organic carbon are the primary contributors to $PM_{2.5}$ in Kentucky. Sulfates are formed from sulfur dioxide emissions with the major sources of those emissions being coal-fired power plants. Organic carbon comes from a combination of mobile and stationary combustion sources.

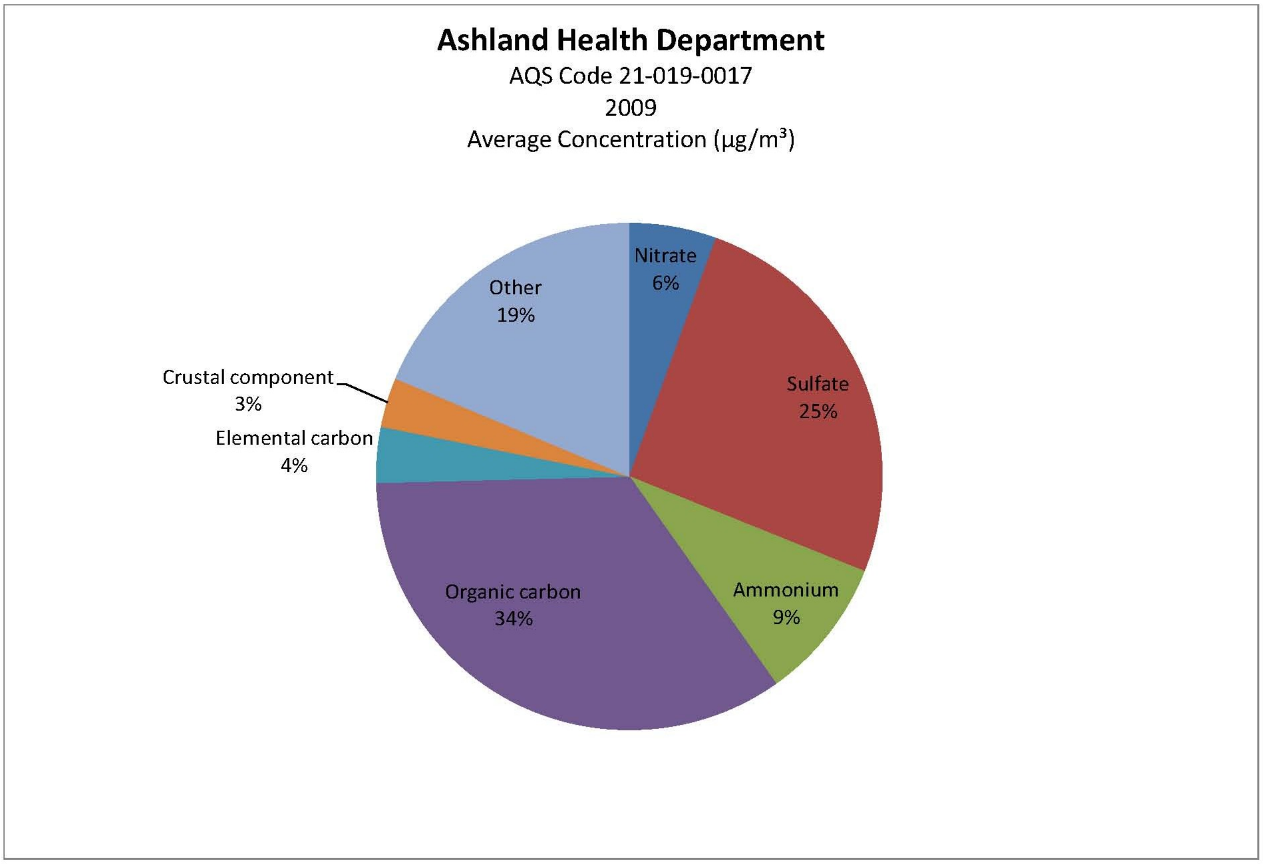


Figure 40: Speciation trends network data, Ashland Health Department monitor.

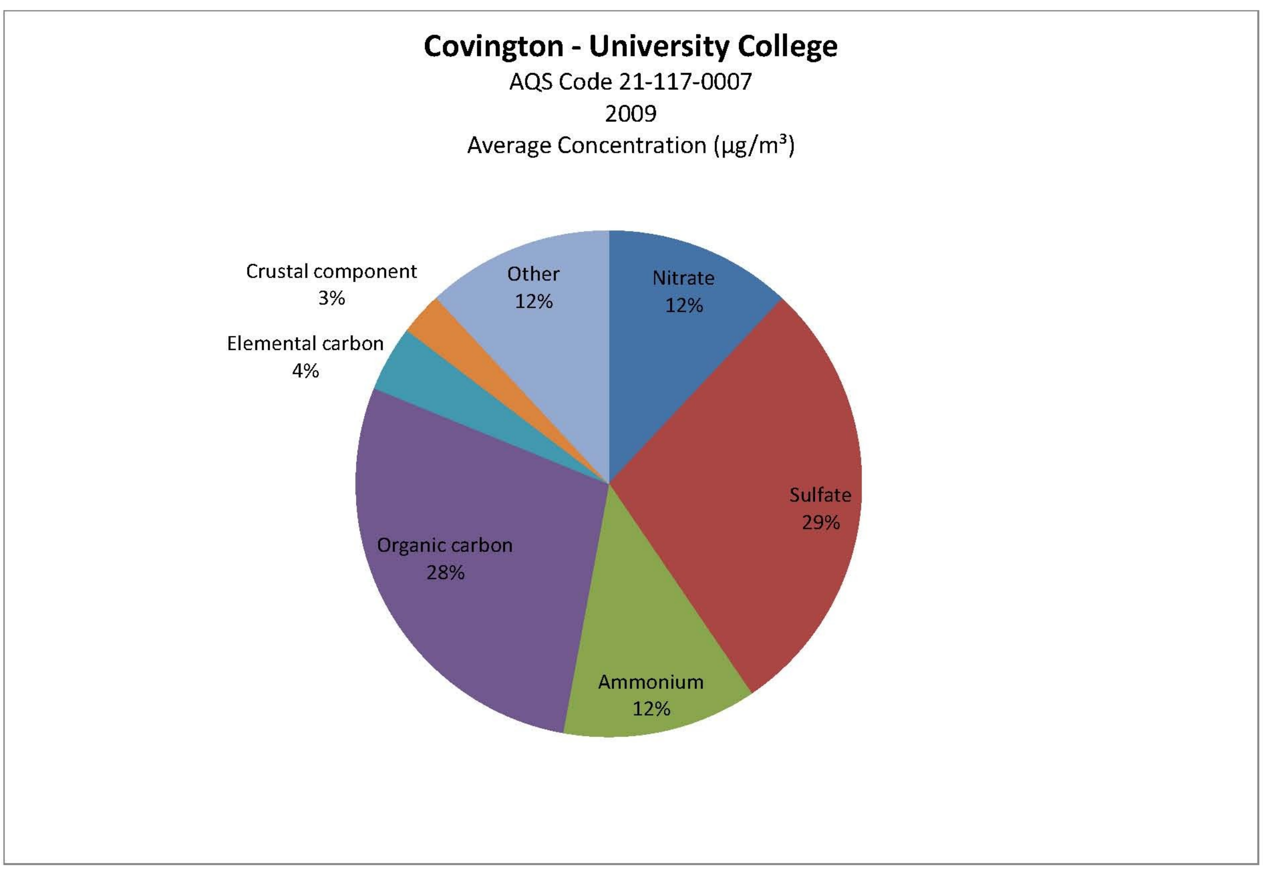


Figure 41: Speciation trends network data, Covington-University College monitor.

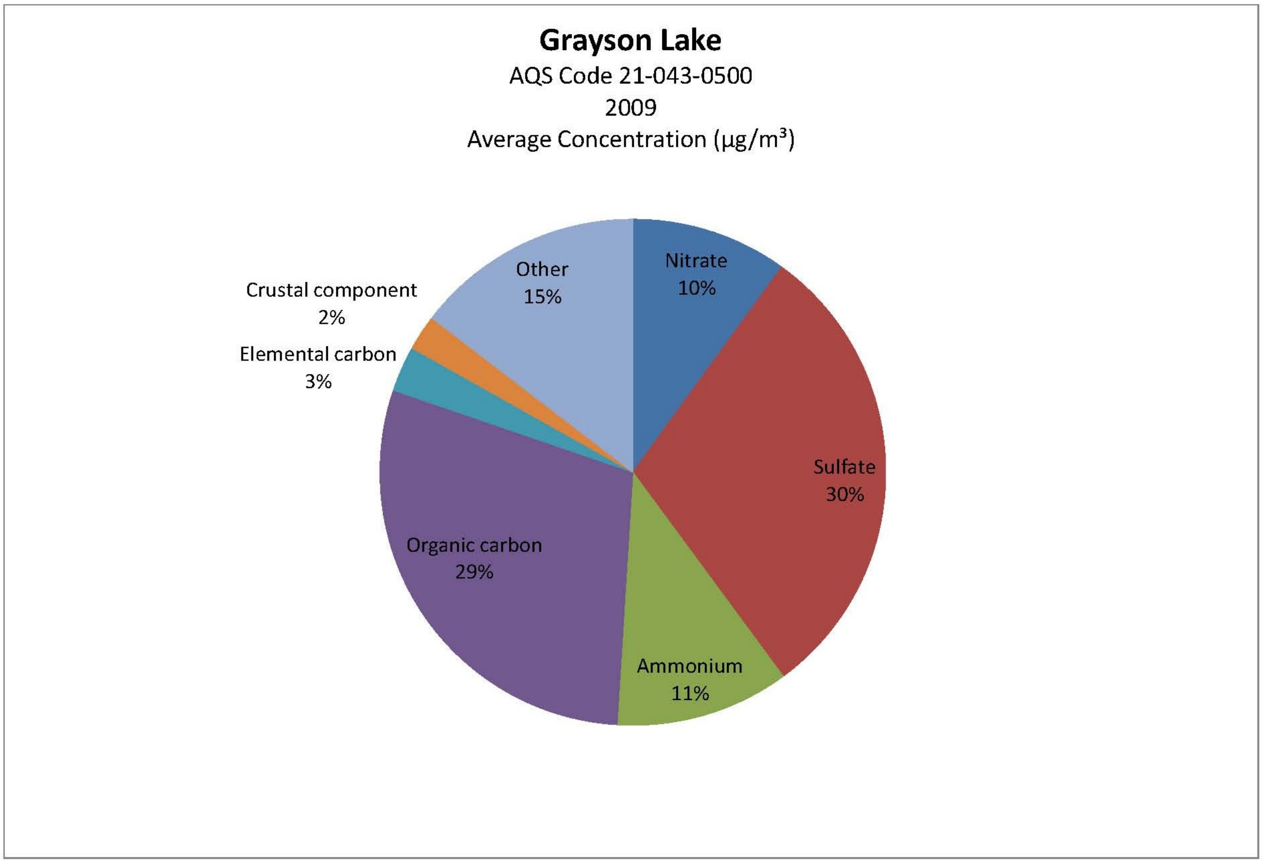


Figure 42: Speciation trends network data, Grayson Lake monitor.

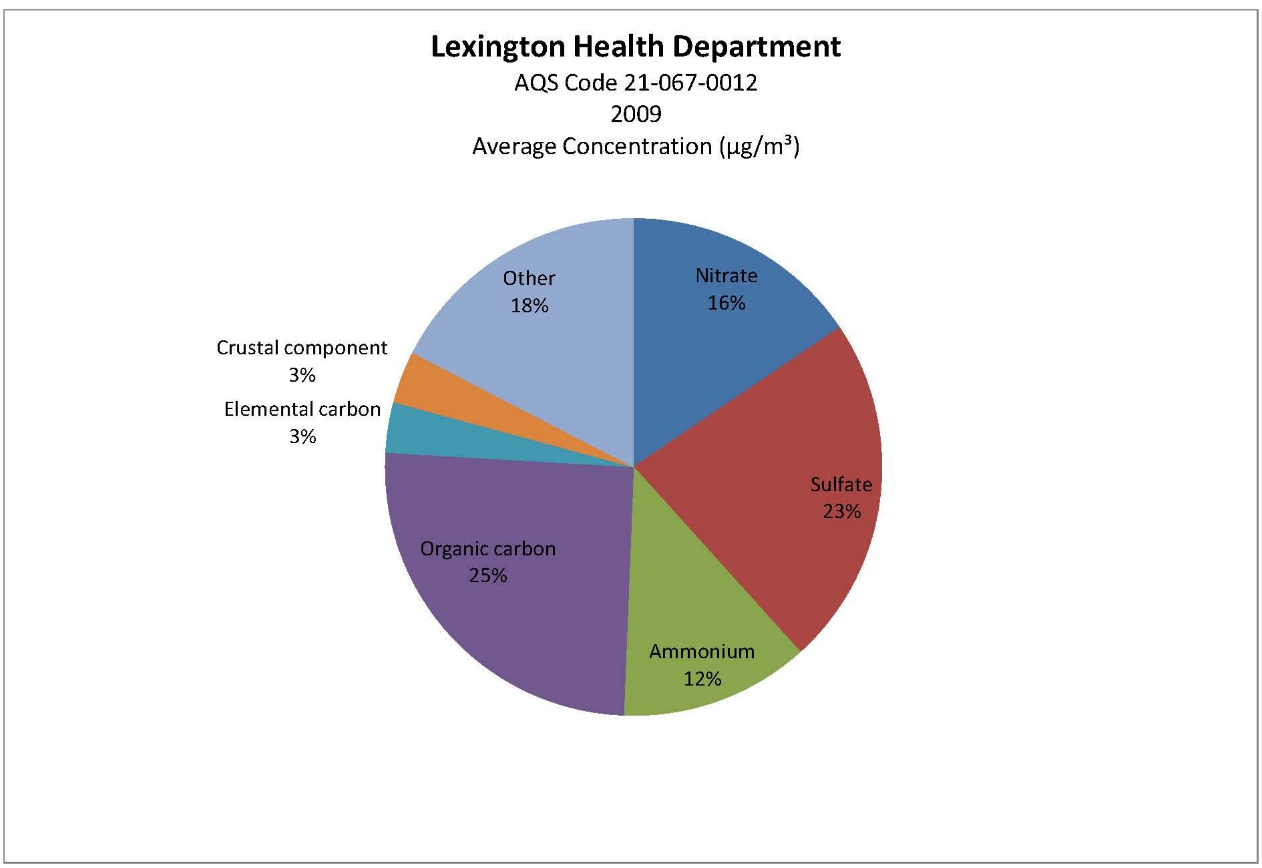


Figure 43: Speciation trends network data, Lexington Health Department monitor.

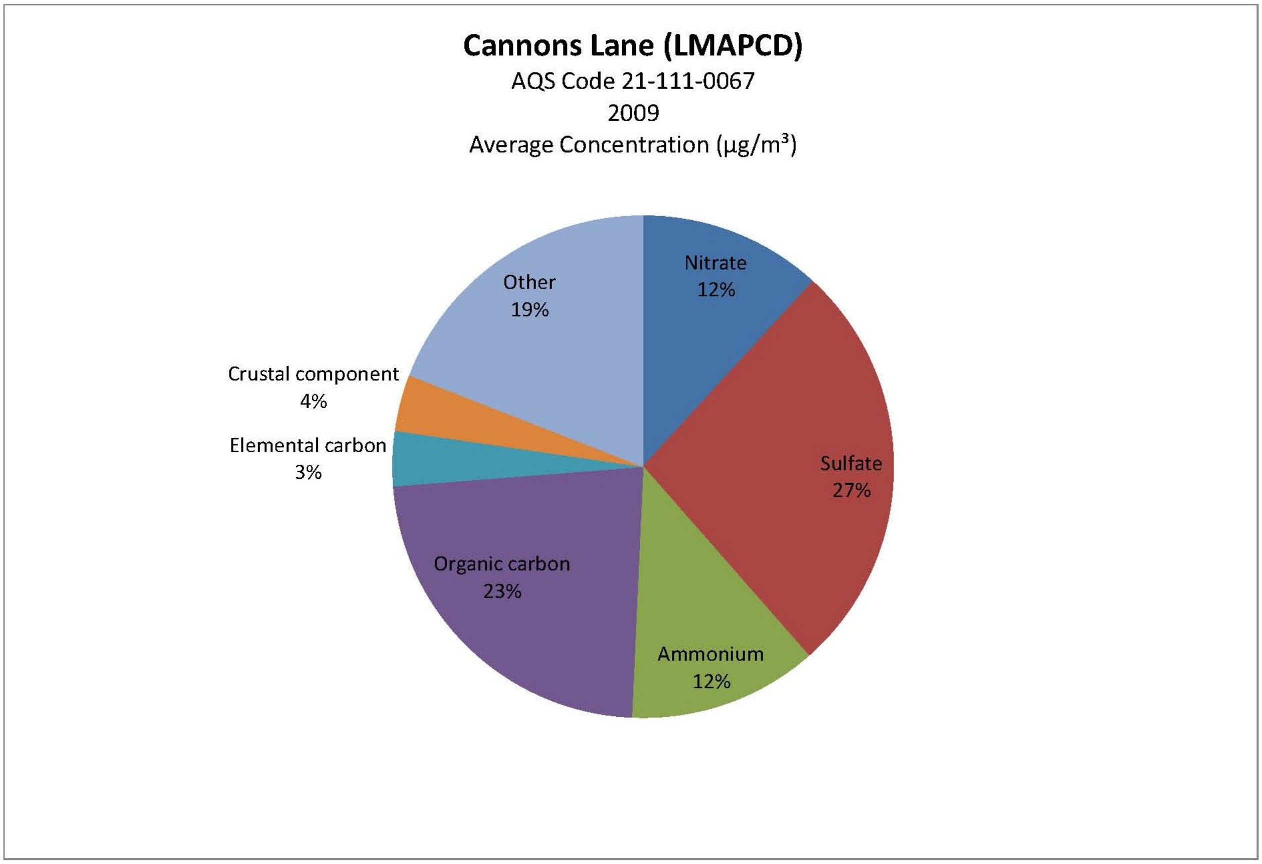


Figure 44: Speciation trends network data, Louisville Metro Air Pollution Control District monitor.

Particulate Matter (PM_{10}) Ambient Air Monitoring Network

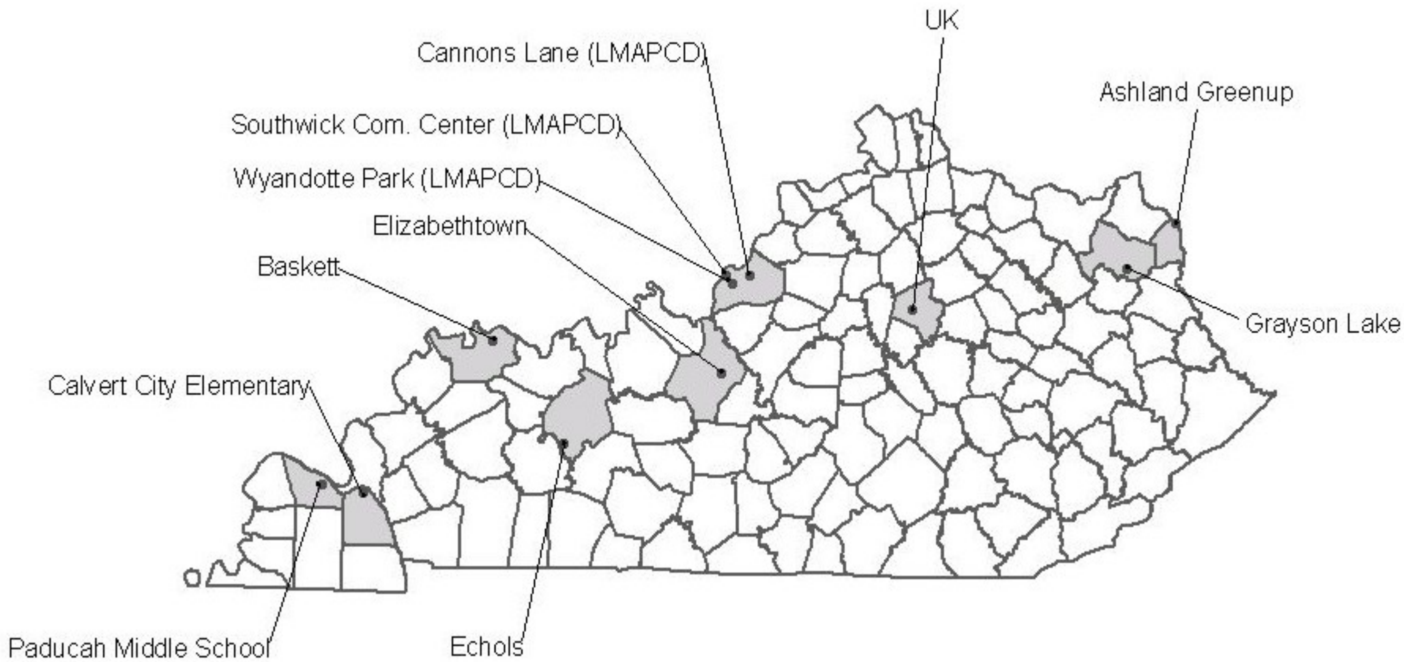


Figure 45: PM_{10} monitoring locations in Kentucky.

Particulate Matter of 10 microns or less in diameter (PM_{10}) is a mixture of solid particles and liquid droplets. Some common sources of PM_{10} are prescribed fires, construction activities, agricultural practices, and smokestacks.

Environmental Impacts

The primary health effects of particulates are that they aggravate respiratory and cardiovascular disease, and large amounts can increase the death rates of sufferers. The elderly, children, and people with chronic lung disease are especially sensitive to particulate matter.

Particulate matter can soil and damage a wide range of man-made items such as building surfaces. PM_{10} damages vegetation by interfering with plant photosynthesis due to the formation of a film on leaves that reduces exposure to sunlight.

Particulate pollution can also produce haze, which diminishes visibility and the amount of sunlight reaching the earth.

How is PM_{10} monitored?

For PM_{10} NAAQS comparison, both intermittent and continuous monitor types may be used because they are FRM or FEM equivalent. Most PM_{10} samplers are the intermittent type that operates for 24 hours, every sixth day. These samplers operate by drawing a measured volume of air through a pre-weighed filter over a 24-hour period. Before reaching the filter, the air passes through an impaction chamber where larger particles fall out of the air stream while particles smaller than ten microns pass on to the sample filter where they are collected.

After completion of the sample run, the filter is removed from the sampler and reweighed to determine the mass of the particulates collected. Sample results are entered manually into a data storage system. The network also includes five continuously operating PM_{10} samplers that provide results daily. These samplers determine sample weights electronically and transmit results by telemetry into an automated data storage system. In 2009, the DAQ and the LMAPCD operated a combined network of 13 PM_{10} intermittent and continuous samplers in Kentucky.

Results

There were no exceedances of the annual PM_{10} standard in 2009. The last PM_{10} exceedance occurred on January 7, 2000, at a Louisville site (21-111-0043) where a 24-hour sample measured 152 µg/m^3. The only other exceedance of a PM_{10} standard occurred on August 27, 1990, in Ashland, where a 24-hour value measured 182 µg/m^3.

All Kentucky counties are currently in attainment with the PM_{10} standard. Statewide and regional PM_{10} levels have shown declining trends. This downward trend is the result of controls on industrial sources for particulate matter.

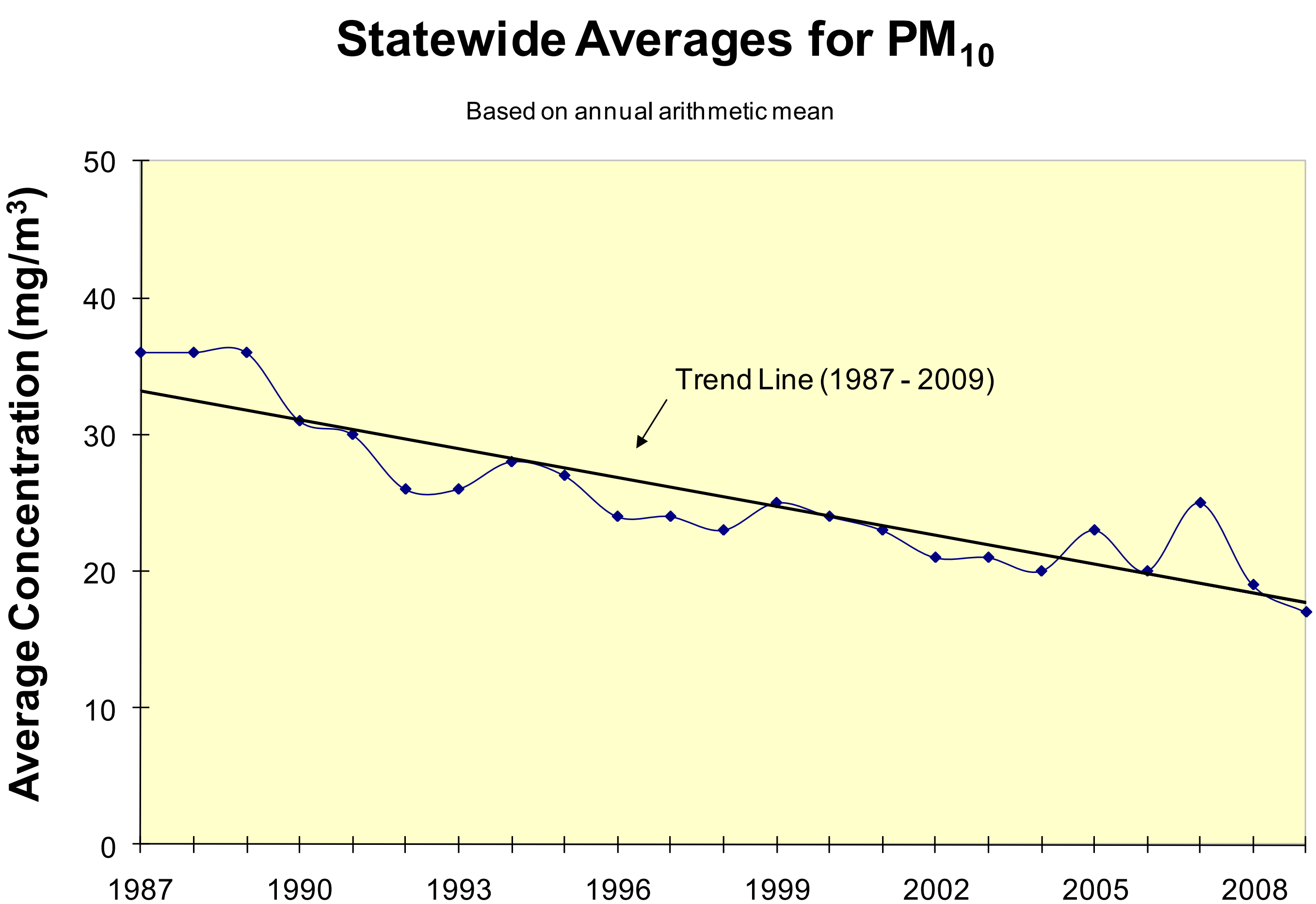


Figure 46: Statewide averages for PM_{10} monitoring indicate pollution reductions.

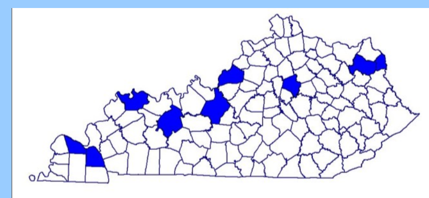
National Ambient Air Quality Standards for Particulate Matter (PM_{10})

Primary NAAQS: **Maximum 24-hour concentration of 150 ug/m^3 (average number of expected exceedances per year not to exceed 1 over last 3 years)**

Secondary NAAQS: **Same as Primary Standard**

Criteria Pollutant Summary Report – 2009

Pollutant: **Particulate Matter PM_{10}**
Method: Gravimetric
Data Interval: 24-hour
Units: Micro-grams per cubic meter (μg/m^3) (25°C)



County	Site	AIRS-ID	# Obs	Mean	24-hour Average				
					Obs >150	1st max	2nd max	3rd max	4th max
Boyd	122 22nd Street Ashland	21-019-0002	57	24.0	0	100	49	47	46
Carter	Camp Webb Grayson Lake	21-043-0500	60	11.6	0	22	22	20	19
Fayette	533 South Limestone Lexington	21-067-0014	55	16.7	0	32	30	27	27
Henderson	Baskett Fire Dept. Baskett	21-067-0014	5	17.4	0	38	16	14	11
Jefferson[1]	37th & Southern Ave Louisville	21-111-0043	8497	18.9	0	50	47	43	42
Jefferson[1]	1032 Beecher Avenue Louisville	21-111-0044	8672	18.1	0	52	47	47	39
McCracken	342 Lone Oak Road Paducah	21-145-1004	55	16.3	0	38	33	32	31
Marshall	24 Main Street Calvert City	21-157-0018	55	15.9	0	33	33	32	30
Ohio	Keytown Road Echols	21-183-0032	56	15.8	0	34	32	28	26

[1] PM_{10} samplers located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.

Values in blue are incomplete data sets. The mean does not satisfy summary criteria.

SULFUR DIOXIDE (SO_2)

2009 Sulfur Dioxide Ambient Air Monitoring Network

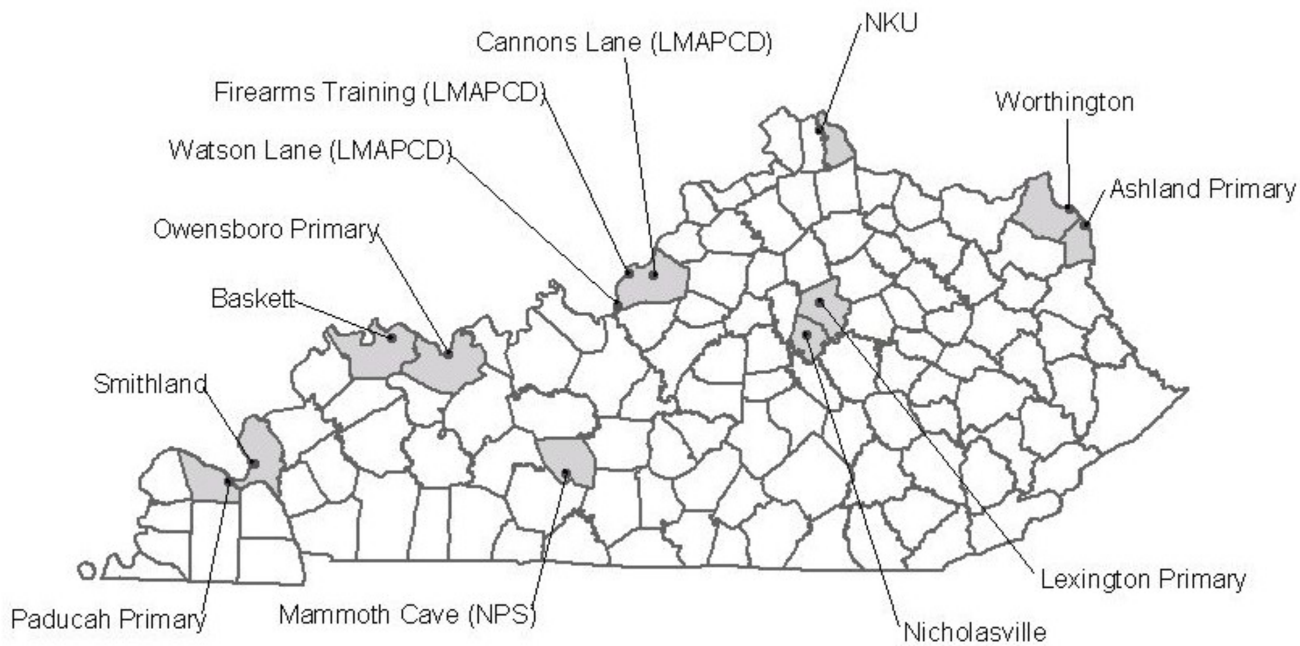


Figure 47: Sulfur dioxide monitoring locations in Kentucky

Sulfur dioxide (SO_2) is a colorless gas that has a pungent odor at concentrations exceeding 0.5 ppm. SO_2 is produced by the combustion of sulfur containing fuels, ore smelting, petroleum processing and the manufacture of sulfuric acid. Nationwide, coal-fired power plants are the largest sources of SO_2. Other industrial sources include petroleum refineries and paper mills.

Environmental Impacts

The primary health effect of exposure to SO_2 is the aggravation of pre-existing respiratory, cardiovascular, and pulmonary disease. Asthmatics, children, and the elderly are especially susceptible to the effects of SO_2 pollution. SO_2 can also damage the foliage of trees and agricultural crops.

Moisture in the atmosphere combines with SO_2 to form sulfuric acid (H_2SO_4), which is a component of acid precipitation. Acid precipitation causes acidification of soil and water that can deteriorate plant life, animal life, and structural surfaces.

SO_2 may also be converted into sulfates. Sulfates are significant components of $PM_{2.5}$ and regional haze. Regional haze has been attributed to poor visibility at many of the vistas in our national parks, including Mammoth Cave National Park in Kentucky and the Great Smoky Mountains in Tennessee.

How is SO_2 monitored?

Analyzers continuously monitor SO_2 by using the ultraviolet (UV) fluorescence method. Fluorescent analyzers irradiate an ambient air sample with ultraviolet light. SO_2 molecules absorb a portion of this energy and then re-emit the energy at a characteristic wavelength of light. The light energy emitted by the SO_2 molecules is proportional to the concentration of SO_2 present in the sample. A photo multiplier cell measures the light emitted and converts it to a parts per million measurement.

Data from the analyzer is transmitted into an automated data storage system. In 2009, the DAQ and the LMAPCD operated 12 SO_2 monitors in Kentucky.

Results

There were no exceedances of any of the SO_2 standards in 2009. The last exceedance of an SO_2 standard occurred in November 1981, when the monitor at a Louisville site (21-111-0032) recorded a 24-hour average of 0.159 ppm. Statewide and regional sulfur dioxide levels have declined over the past twenty years.

The SO_2 allowances component of the Acid Rain Program provides an opportunity for electrical utilities to participate in a market-based trade of SO_2 emissions. An electric utility, that is participating in the trading program, is required to continually monitor emissions for SO_2, NO_x and any other pollutants. The continuous monitoring of the emissions provides compliance data and credibility to the trading program. The trading allowances in the Acid Rain program have directly contributed to the decline in ambient SO_2 concentrations.

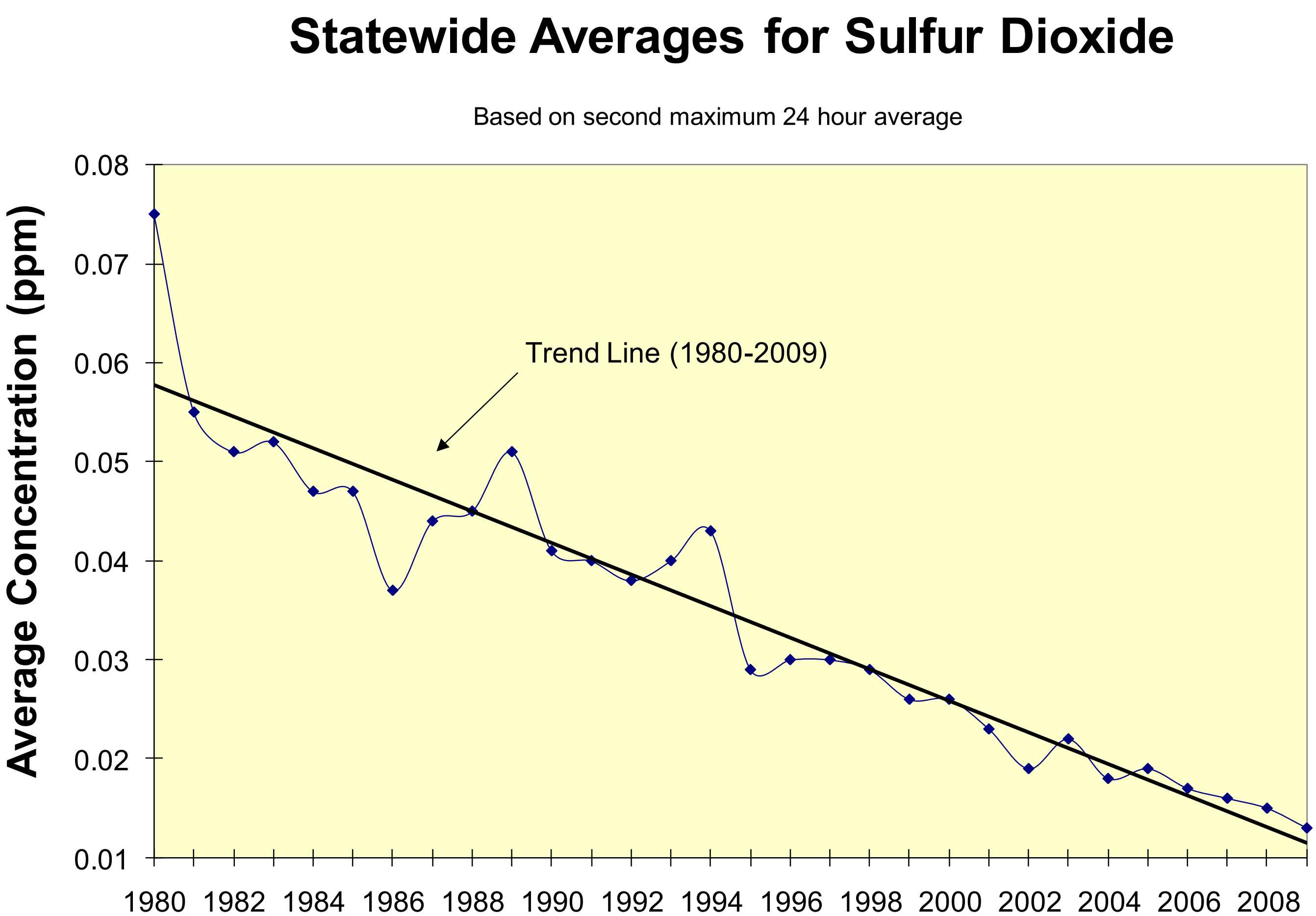


Figure 48: Statewide averages for SO_2 monitoring indicate pollution reductions.

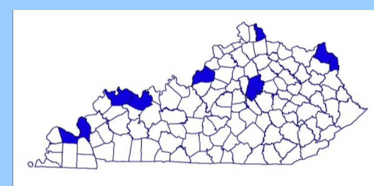
National Ambient Air Quality Standards for Sulfur Dioxide

Primary NAAQS: **Annual Arithmetic Mean not to exceed 0.03 ppm**
24-hour concentrations not to exceed 0.14 ppm more than once per year
3-year average of the 99th percentile of the daily maximum 1-hour average not to exceed 75 ppb

Secondary NAAQS: **3-hour concentrations not to exceed 0.50 ppm more than once per year**

Criteria Pollutant Summary Report – 2009

Pollutant: **Sulfur Dioxide**
Method: Instrumental
Ultra-Violet Fluorescence
Data Interval: Hourly
Units: Parts-per-million (ppm)



County	Site Address	AQS-ID	# Obs	Annual Mean	24-Hr Average			3-Hr Average		
					1st max	2nd max	Obs >.14	1st max	2nd max	Obs > .50
Boyd	**2924 Holt Street Ashland**	**21-019-0017**	8710	.0027	.012	.011	0	.029	.020	0
Campbell	**524A John Hill Rd Highland Heights**	**21-037-3002**	8714	.0026	.021	.018	0	.089	.061	0
Daviess	**US 60 and Pleasant Valley Rd, Owensboro**	**21-059-0005**	8715	.0022	.009	.008	0	.040	.028	0
Fayette	**650 Newtown Pike Lexington**	**21-067-0012**	8633	.0028	.013	.011	0	.052	.035	0
Greenup	**Scott & Center Streets Worthington**	**21-089-0007**	8523	.0024	.014	.013	0	.051	.027	0
Henderson	**Baskett Fire Dept Baskett**	**21-101-0014**	8497	.0018	.008	.007	0	.020	.017	0
Jefferson[1]	**7201 Watson Lane Louisville**	**21-111-0051**	8591	.0034	.032	.031	0	.106	.096	0
Jefferson[1]	**4201 Algonquin Pkwy Louisville**	**21-111-1041**	8360	.0033	.038	.015	0	.200	.055	0
Jessamine	**KYDOT, Etter Drive Nicholasville**	**21-113-0001**	8722	.0033	.012	.011	0	.047	.034	0
Livingston	**DOT Garage, US 60 Smithland**	**21-139-0003**	8286	.0015	.007	.031	0	.015	.013	0
McCracken	**2901 Powell Street Paducah**	**21-145-1024**	8701	.0020	.007	.007	0	.025	.019	0

[1]**Sulfur dioxide monitors located in Jefferson County are operated by the Louisville Metro Air Pollution Control District.**

Mercury (Ambient Air and Wet Deposition) Monitoring Network

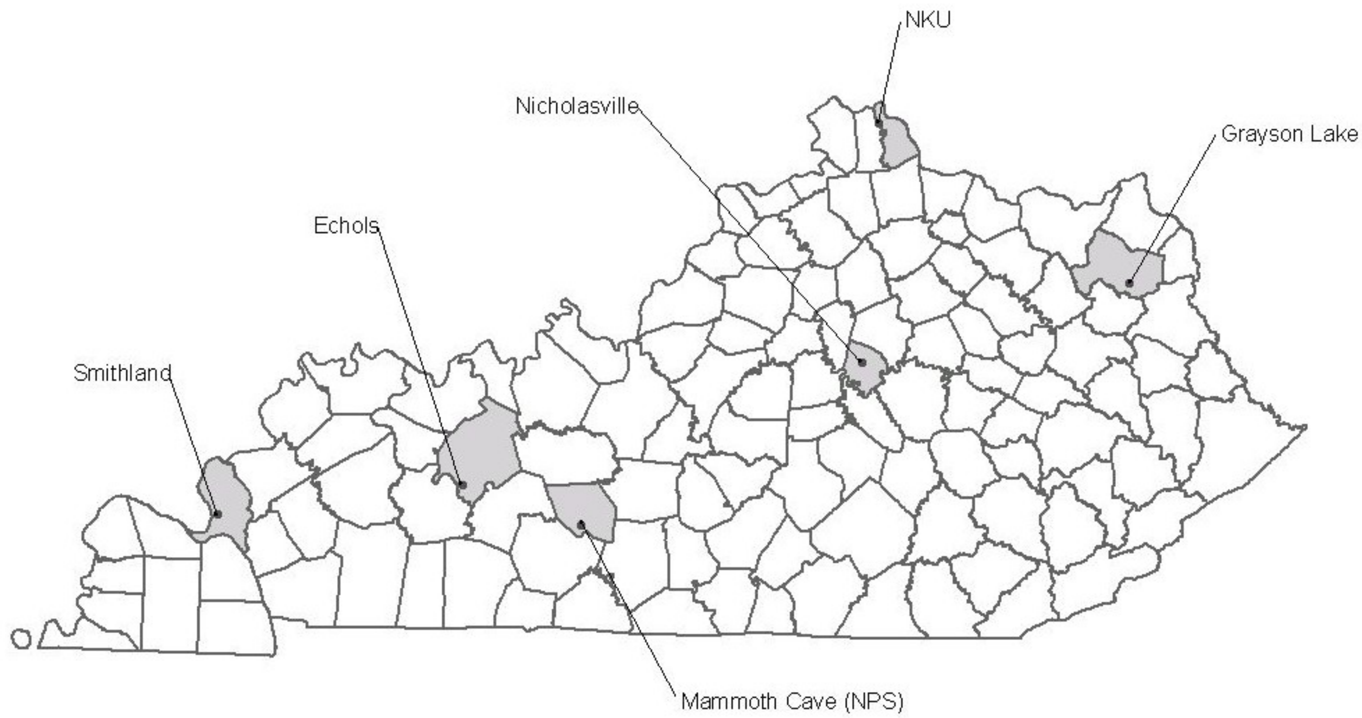


Figure 49: Mercury monitoring locations in Kentucky.

Mercury (Hg) is a naturally occurring element that is found in air, water, and soil. Mercury exists in several different forms: elemental, inorganic, and organic. Elemental mercury is a shiny, silver-white metal that is in a liquid state at room temperature. Elemental mercury is used in thermometers, florescent lights and electrical switches. Exposed elemental mercury can become an invisible, odorless toxic gas at room temperature.

Inorganic Hg compounds are mercury salts with a white powder or crystal appearance except for mercuric sulfide (cinnabar), which is red. Inorganic Hg compounds are used in fungicides, antiseptics, disinfectants, skin lightening creams, and traditional medicines.

Organic mercury compounds are formed when mercury combines with carbon. The most common organic mercury compound found in the environment is methyl-mercury, a highly toxic form that builds up in fish, shellfish, and animals that eat fish. Methyl-mercury is formed when inorganic mercury, released into the air from the combustion of coal, settles into water or onto land where it can be washed into water and converted into organic mercury by microorganisms. Fish and shellfish are the main sources of methyl-mercury exposure to humans.

Environmental Impacts

Mercury exposure at high levels can harm the brain, heart, kidneys, lungs, and immune system of people of all ages. Research has shown that most fish consumption does not cause an exposure to high levels of mercury in adults. However, it has been demonstrated that high levels of methylmercury in the bloodstream of unborn babies and young children may harm the developing nervous system.

Kentucky is one of 31 states that have issued a statewide fish consumption advisory due to unsafe levels of mercury. The advisory is for women of childbearing age and children 6 years and younger.

How is Hg monitored?

Mercury is monitored in Kentucky by two different collection methods. The first collection method is wet deposition monitoring. Wet deposition monitoring stations operate on a weekly sampling schedule. Cumulative precipitation events, occurring during a seven day period, are collected in one container to represent a one-week sample. An automatic wet precipitation collector is used to collect the sample. At the end of each weekly sampling period, the wet container is removed and replaced with a new, clean container for the next sampling period. After the sample is removed, field measurements of pH and conductivity are made and recorded. The remaining sample is then shipped to Frankfort where laboratory analysis is conducted to determine levels of mercury in the sample.

A second method of Hg collection is by the use of analyzers, which operate continuously, using Cold Vapor Atomic Fluorescence Spectrometry (CVAFS). The analyzer traps Hg vapor, from an air sample, into a cartridge containing an ultra-pure gold adsorbent. The amalgamated mercury is then thermally desorbed and detected using CVAFS.

Mercury is not a criteria pollutant—that is, DAQ is not currently required to monitor for mercury as part of the Clean Air Act. However, mercury is considered a Hazardous Air Pollutant, and out of concern for citizens of the Commonwealth, DEP and DAQ are monitoring deposition levels.

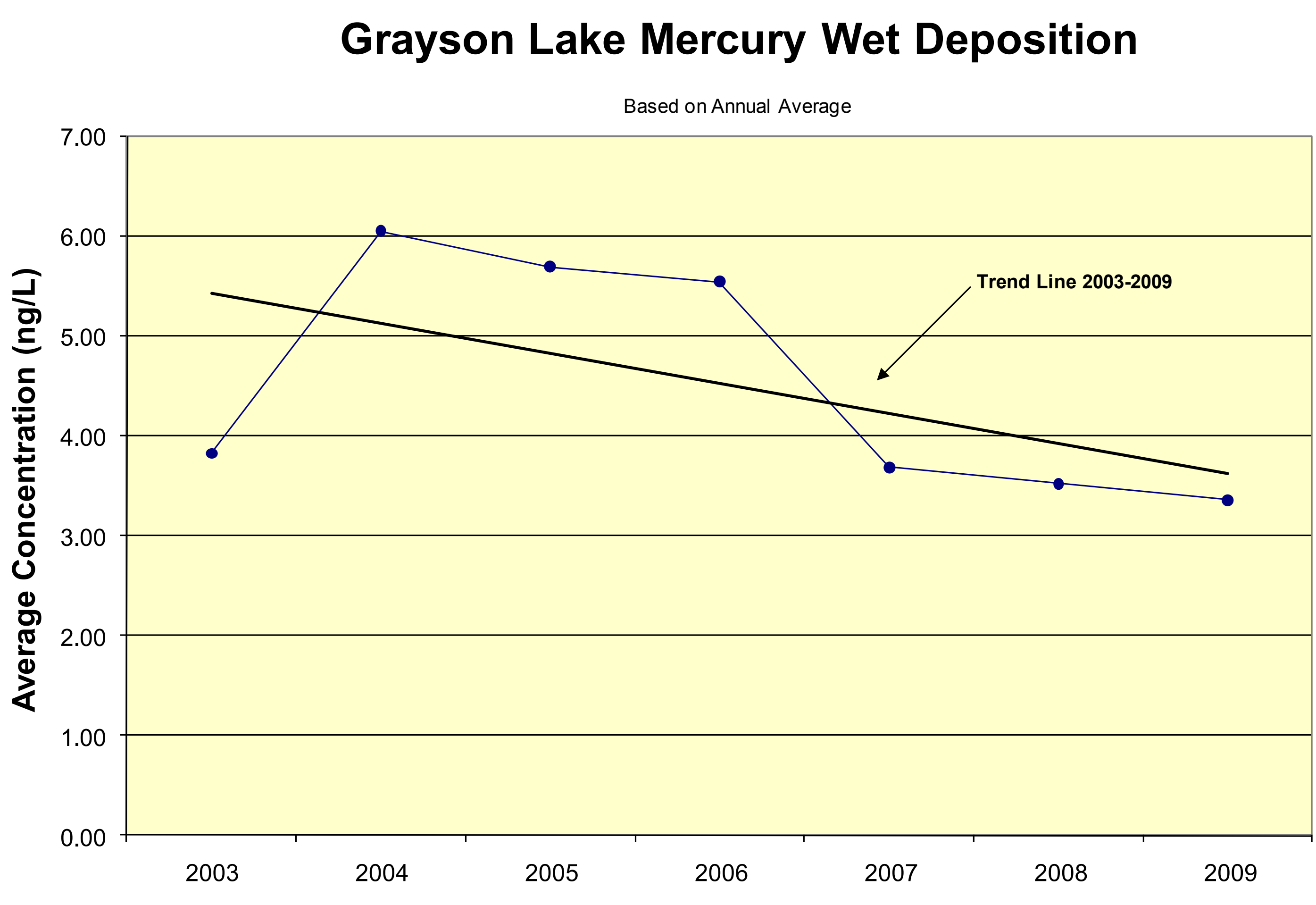


Figure 50: Grayson Lake averages for Hg monitoring indicate pollution reductions.

Results

Ambient air background levels of mercury range from 1-3 ng/m^3. CVAFS analyzer results do not indicate concentrations above background levels.

Wet deposition monitoring works in concert with ambient (CVFAS) monitoring. Although the National Atmospheric Deposition Program has collected wet deposition data at Mammoth Cave as part of its Mercury Deposition Network for years, DAQ has only been tracking wet deposition at the Grayson Lake monitoring station since 2003. Therefore trends analysis is only available for this site. DAQ established three additional sites in 2008 and 2009, but trends data is not yet available.

As mentioned earlier in this section, there are no federally established standards for comparative analysis of statewide mercury levels. In the future, the division hopes to correlate wet deposition and ambient data with fish tissue samples from around the state.

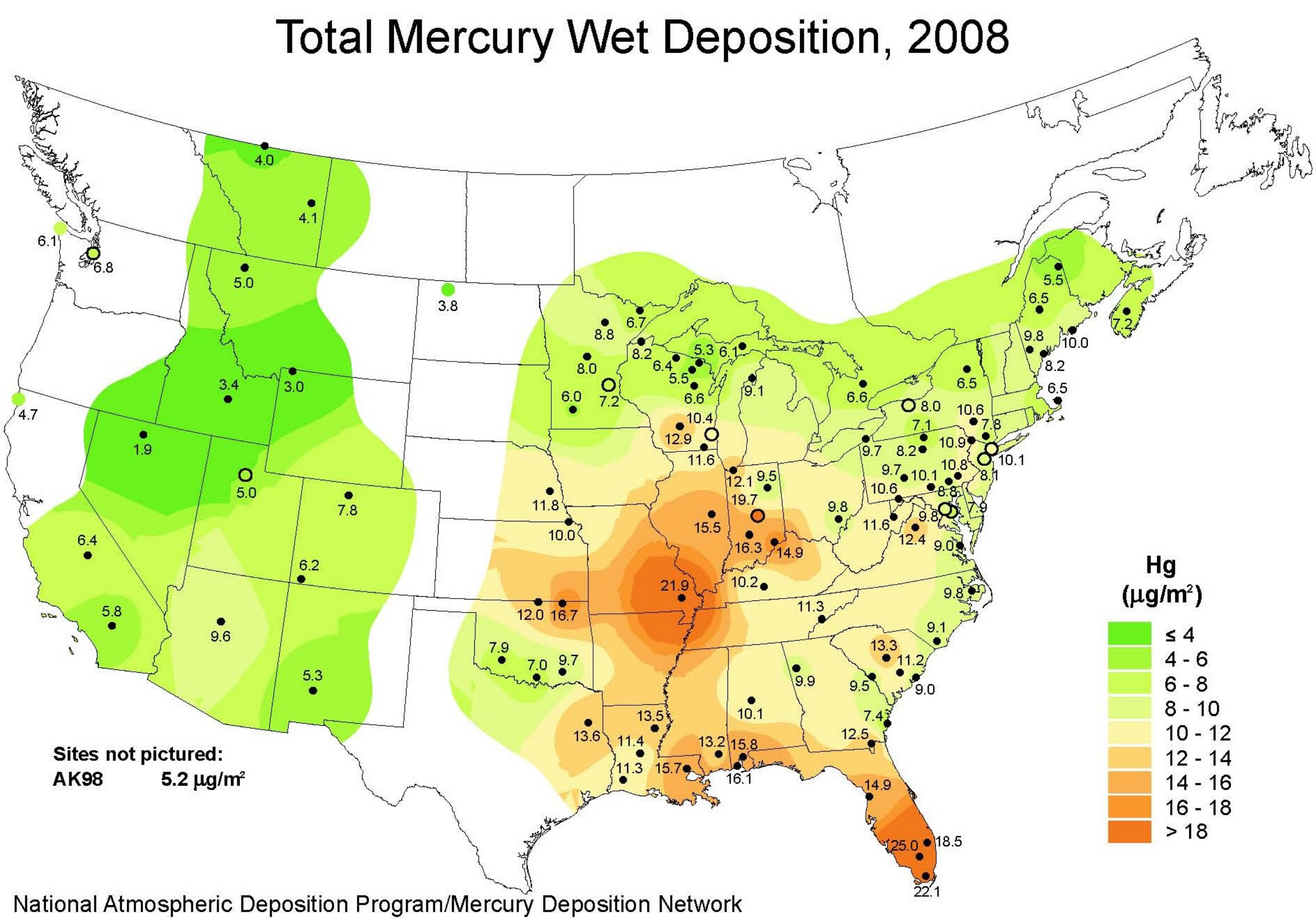
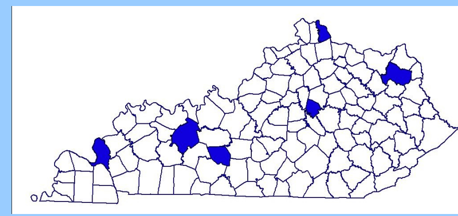


Figure 51: The mercury isopleth map indicates that mercury deposition concentrations in Kentucky are at moderate levels compared to the South and North East regions of the United States. Map courtesy of the National Atmospheric Deposition Program.

Wet Deposition Total Mercury Pollutant Summary Report – 2009

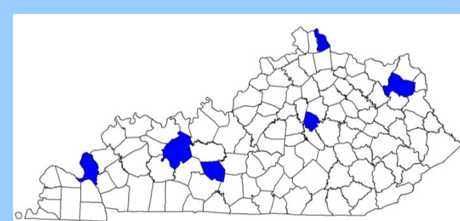
Pollutant: **Mercury**
Method: Wet Deposition
Data Interval: Weekly
Units: Nano-grams per liter (ng/L)



County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Campbell	**524A John Hill Highland Heights**	**21-037-3002**	17	4.16	12.20	7.96	6.68	4.38
Carter	**Camp Webb Grayson Lake**	**21-043-0500**	25	3.36	9.06	7.34	6.26	5.85
Jessamine	**KYDOT, Etter Drive Nicholasville**	**21-113-0001**	58	2.87	9.44	8.46	5.69	5.64
Ohio	**Keytown Road Echols**	**21-183-0032**	38	3.67	9.30	8.46	8.39	8.17

Continuous Total Mercury Pollutant Summary Report – 2009

Pollutant: **Mercury**
Method: Cold Vapor Atomic Fluorescence Spectrometry
Data Interval: Hourly
Units: Nano-grams per cubic meter (ng/m^3)



County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Campbell	**524A John Hill Highland Heights**	**21-037-3002**	6723	1.2	3.9	3.8	3.4	3.4
Carter	**Camp Webb Grayson Lake**	**21-043-0500**	8003	0.9	2.6	2.5	2.1	2.0
Edmonson	**Alfred Cook Road Mammoth Cave**	**21-059-0005**	7483	0.9	1.9	1.7	1.6	1.6
Jessamine	**KYDOT, Etter Drive Nicholasville**	**21-113-0001**	7989	1.1	5.0	4.7	4.6	4.5
Livingston	**DOT Garage, US 60 Smithland**	**21-139-0003**	8137	1.0	2.2	2.2	2.2	2.2
Ohio	**Keytown Road Echols**	**21-183-0032**	7884	1.1	2.5	2.4	2.3	2.3

Wet deposition (sometimes referred to as “acid rain”) is a classification of pollutants that are precipitation borne. Snow, sleet, hail, rain, or fog can combine with pollutants in the atmosphere and fall to earth as harmful acidic compounds. Acidified rainwater may contain combinations of sulfuric and nitric acids that form when water vapor, sulfur dioxide, and nitrogen oxides react.

Major sources of sulfur dioxide include power plants, paper and wood pulp processing plants, and facilities with coal fired boilers. Nitrogen oxides are produced primarily from the combustion of fossil fuels in the engines of cars and trucks, as well as from power plant emissions.

Aquatic life appears to be most sensitive to the effects of acidic precipitation. Small changes in the pH levels of lakes and streams may prevent some fish species and other aquatic life forms from reproducing. Many insects cannot survive in acidic waters; therefore, birds and mammals that depend on insects for food may suffer abnormally high mortality rates.

Acidic precipitation can also alter soil chemistry and nutrient availability, in turn weakening trees and shrubs and causing them to be more vulnerable to insects, diseases, and fungus infestations. Acid precipitation may also damage agricultural crops and has been blamed for deterioration of monuments and building surfaces.

Wet deposition monitoring stations operate on a weekly sampling schedule. Cumulative precipitation events occurring during a seven day period are collected in one container to represent a one-week sample. An automatic wet/dry precipitation collector is used to collect the sample. The sampler consists of two collection containers. The “wet” container is fitted with a clean plastic sample bag for collection of precipitation. The “dry” container, designed for dry particulate collection is not presently utilized for sample collection. The sampler employs a moisture sensor, which activates an electrically driven movable container lid that covers the wet container during dry periods and then moves to cover the dry container when precipitation occurs.

At the end of each weekly sampling period, the wet container is removed and replaced with a new, clean container for the next sampling period. After the sample is removed, field measurements of pH and conductivity are made and recorded. The remaining sample is then shipped to Frankfort where laboratory analysis is conducted to determine levels for pH, conductivity, acidity, sulfates, nitrates, phosphates, ammonia, and metal ions.

In 2009, the DAQ operated one acid rain site at Grayson Lake State Park. The NPS at Mammoth Cave also operated a wet deposition sampler.

Results

Annual pH averages for both sites have shown modest upward trends since 1986.

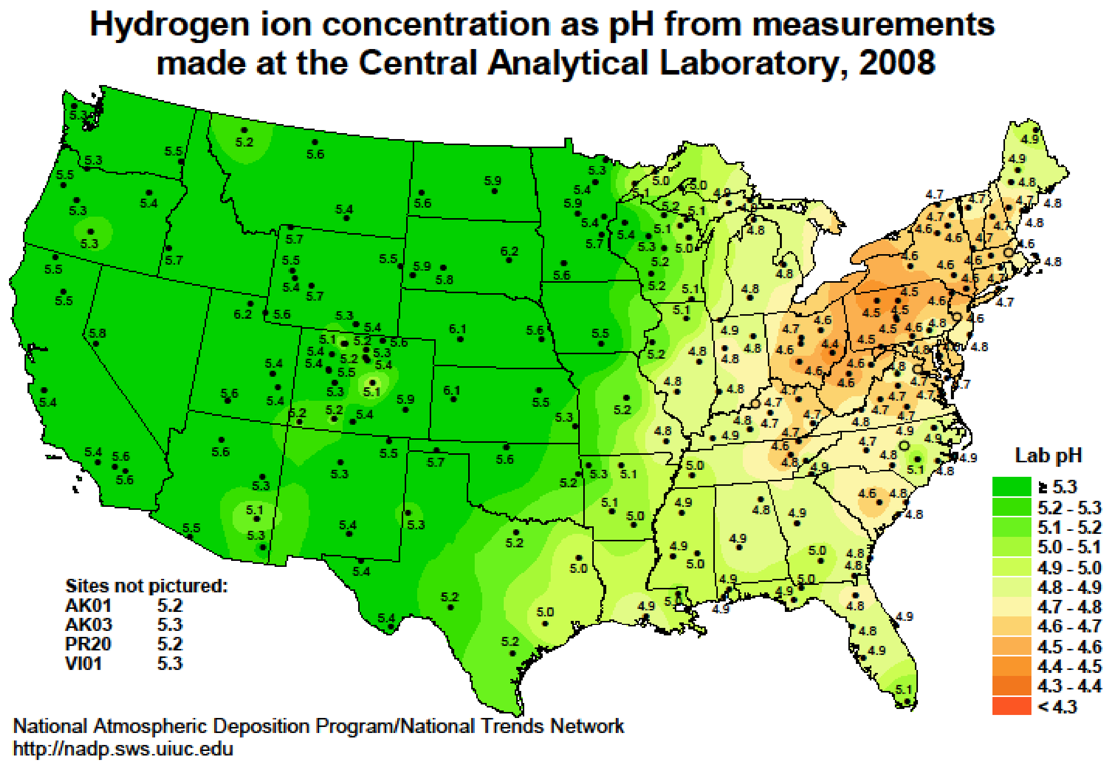
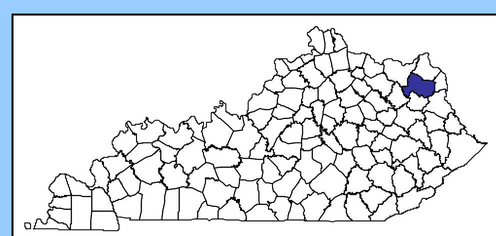


Figure 52: The pH isopleth map indicates that rainfall is more acidic in the East and Northeast regions of the United States, but monitoring has shown a decrease in acidity levels over time due to reductions in sulfur dioxide and nitrogen oxides. Map courtesy of the National Atmospheric Deposition Program.

Kentucky Division for Air Quality
Wet Deposition Pollutants Summary Report - 2009



Location: **Grayson Lake, KY** – Camp Webb
Site Id: 21-043-0500
County: Carter
Method: Wet/Dry Collector, Laboratory Analytical

Parameter	Units	# Obs	Arithmetic Mean	1st Max	2nd Max	3rd Max	4th Max
Acidity	**Mg/L**	11	5.50	5.86	5.70	5.70	5.61
Ammonium	**Mg/L**	32	0.23	0.75	0.67	0.47	0.41
Calcium	**Mg/L**	24	0.27	1.18	1.14	0.38	0.38
Chloride	**Mg/L**	35	0.17	1.15	0.44	0.38	0.37
Conductivity	**US/cm**	29	11.14	24.60	18.40	17.90	17.60
Magnesium	**Mg/L**	12	0.08	0.28	0.25	0.14	0.06
Nitrate	**Mg/L**	35	0.77	2.00	1.74	1.36	1.31
Potassium	**Mg/L**	6	0.12	0.29	0.16	0.13	0.12
Sodium	**Mg/L**	23	0.19	0.67	0.43	0.30	0.29
Sulfate	**Mg/L**	35	1.20	3.18	2.79	2.51	2.45

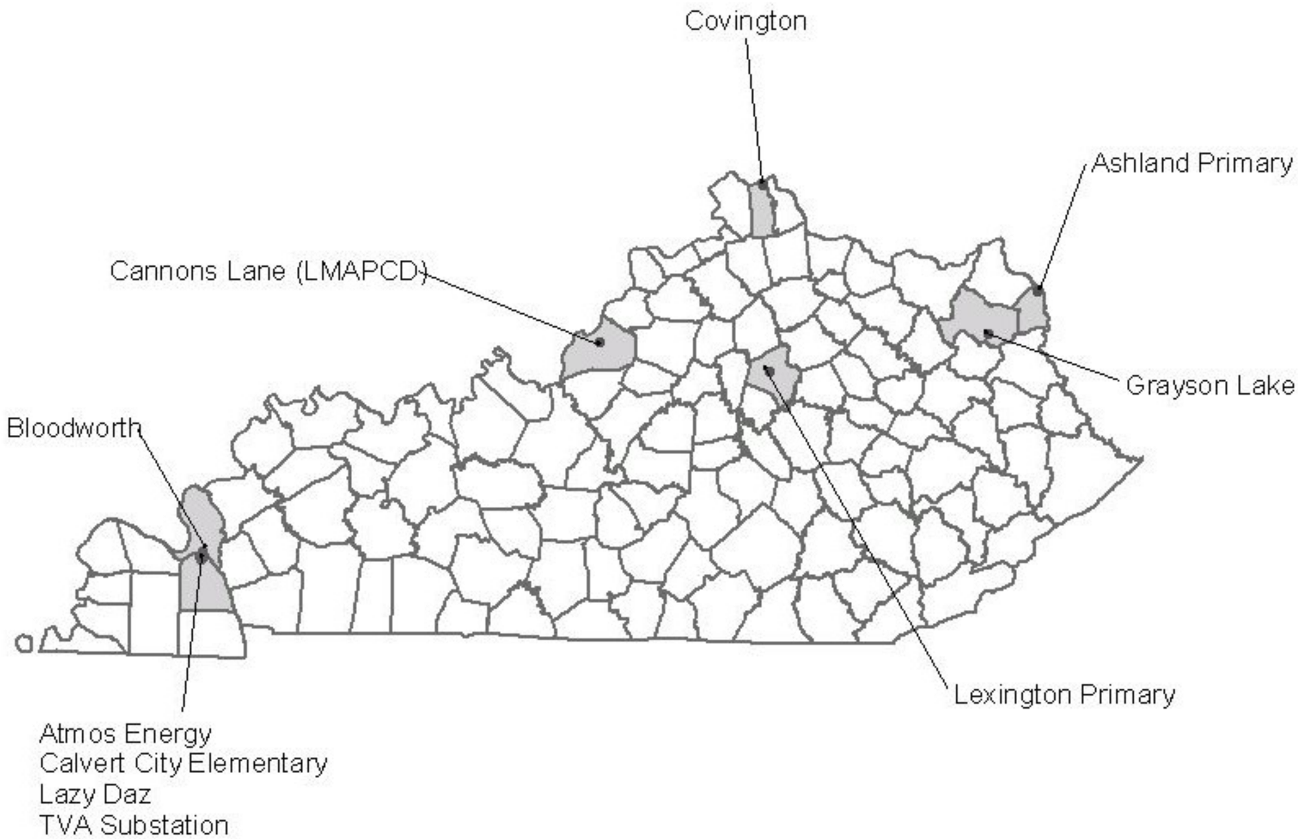


Figure 53: Hazardous air pollutant monitoring locations in Kentucky.

Hazardous air pollutants (HAPs) include 188 substances known or suspected to cause neurological, immunological, reproductive, and respiratory disorders, as well as known or suspected human carcinogens. The ultimate goal of the EPA is to eliminate unacceptable risks of cancer, other significant health problems from exposures to air toxics emissions and to substantially reduce or eliminate adverse effects on our natural environment. To provide a basis for decision-making with respect to these matters, the EPA developed the National Air Toxics Trends Stations (NATTS) monitoring network.

In 2003, the EPA designated the Division for Air Quality's Hazard air monitoring site part of that network. The Hazard site is in the Rural Trends Network, and along with its Urban Trends counterpart, has been established to provide toxics trends data on a national basis. Data generated by these monitors are needed to understand the behavior of air toxics in the atmosphere and to develop control strategies.

In June 2008 the Hazard NATTS monitoring station was discontinued and moved to Carter County, Kentucky. The new NATTS site is located at the division's Grayson Lake site. Grayson Lake is in a rural setting and meets the criteria for a rural NATTS location.

In 2009, the division operated a total of 17 hazardous air pollutant monitors through out the Commonwealth using the NATTS monitoring objectives; however, only samplers operated at Grayson Lake are a part of the NATTS network. The EPA has identified six required hazardous air pollutants that are to be monitored in the National Air Toxics Trends study.

In addition to the six required by the EPA, the agency monitors an extra 17, for a total of 23 monitored hazardous air pollutants at all of the air toxic monitoring sites. These pollutants can be subdivided into three monitoring groups: carbonyls, metals, and VOCs. The compounds are sampled using carbonyl samplers with DNPH cartridges, low-volume PM_{10} samplers, and passivated summa canisters. The samplers operate for 24-hours on every sixth day, after which the samples are collected and sent to the Division of Environmental Program Support laboratory in Frankfort for analysis.

Results

DAQ is currently establishing a baseline for future trends analysis of HAPs. The data indicates that several of the monitored twenty-three hazardous air pollutants are present in Kentucky's ambient air.

Potential sources may be large industrial sources in the immediate area, mobile emissions (cars, trucks and school buses), and small local source emissions such as those from fueling stations, body shops/painting, dry cleaners, asphalt plants, etc.

For more information about air toxics in Kentucky, see the Permit Review Branch section of this report.

Carbonyl

Air Toxics Summary Report - 2009

Pollutant: Acetaldehyde

Method: TO-11A; Carbonyl sampler with DPNH cartridges

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	1.84	5.35	5.19	5.05	3.92
Carter	Camp Webb Grayson Lake	21-143-0500	59	0.72	2.32	2.18	1.85	1.65
Fayette	650 Newtown Pike Lexington	21-067-0012	58	1.74	4.18	3.92	3.87	3.82
Kenton	1401 Dixie Highway Covington	21-117-0007	61	1.65	5.09	4.55	3.89	3.40

Air Toxics Summary Report - 2009

Pollutant: Formaldehyde

Method: TO-11A; Carbonyl sampler with DPNH cartridges

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	1.97	4.86	3.96	3.90	3.88
Carter	Camp Webb Grayson Lake	21-143-0500	59	1.03	3.32	2.86	2.75	2.18
Fayette	650 Newtown Pike Lexington	21-067-0012	58	1.84	4.47	4.42	4.37	4.33
Kenton	1401 Dixie Highway Covington	21-117-0007	61	2.14	6.82	6.69	5.51	5.44

Metals

Air Toxics Summary Report - 2009

Pollutant: Antimony

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Carter	Camp Webb Grayson Lake	21-043-0500	60	0.5	4.34	2.42	1.74	1.67

Air Toxics Summary Report - 2009

Pollutant: Arsenic

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	1.4	7.01	5.09	4.93	4.06
Carter	Camp Webb Grayson Lake	21-143-0500	60	0.4	1.44	1.41	1.13	1.09
Fayette	533 South Limestone Lexington	21-067-0014	52	1.1	7.33	4.46	2.69	2.20
Marshall	24 Main St Calvert City	21-157-0018	52	0.4	3.51	1.40	1.24	1.02
Ohio	Keytown Road Echols	21-183-0032	56	0.6	2.58	1.99	1.47	1.28

Air Toxics Summary Report - 2009

Pollutant: Beryllium

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-143-0500	60	ND	ND	ND	ND	ND
Fayette	533 South Limestone Lexington	21-067-0014	55	ND	0.43	ND	ND	ND
Marshall	24 Main St Calvert City	21-157-0018	55	ND	ND	ND	ND	ND
Ohio	Keytown Road Echols	21-183-0032	57	ND	ND	ND	ND	ND

Air Toxics Summary Report - 2009

Pollutant: Cadmium

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	0.30	4.01	1.57	1.56	1.43
Carter	Camp Webb Grayson Lake	21-143-0500	60	ND	ND	ND	ND	ND
Fayette	533 South Limestone Lexington	21-067-0014	55	ND	ND	ND	ND	ND
Marshall	24 Main St Calvert City	21-157-0018	55	ND	ND	ND	ND	ND
Ohio	Keytown Road Echols	21-183-0032	57	ND	0.53	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Chromium

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	1.25	6.11	4.02	3.41	2.82
Carter	Camp Webb Grayson Lake	21-143-0500	60	0.10	0.74	0.65	0.53	0.50
Fayette	533 South Limestone Lexington	21-067-0014	54	0.55	2.65	2.26	1.57	1.34
Marshall	24 Main St Calvert City	21-157-0018	55	0.22	1.86	1.61	0.79	0.52
Ohio	Keytown Road Echols	21-183-0032	57	0.24	3.97	0.91	0.88	0.69

Air Toxics Summary Report - 2009

Pollutant: Lead

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	10.08	73.60	42.0	29.10	25.40
Carter	Camp Webb Grayson Lake	21-143-0500	60	1.78	7.40	5.69	4.55	3.47
Fayette	533 South Limestone Lexington	21-067-0014	47	3.99	23.20	10.20	10.20	8.42
Marshall	24 Main St Calvert City	21-157-0018	50	2.11	7.29	5.95	4.17	3.78
Ohio	Keytown Road Echols	21-183-0032	51	1.80	6.10	3.63	3.48	3.31

Air Toxics Summary Report - 2009

Pollutant: Manganese

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	16.30	109.0	36.50	36.40	34.70
Carter	Camp Webb Grayson Lake	21-143-0500	60	2.36	11.70	9.45	8.51	7.29
Fayette	533 South Limestone Lexington	21-067-0014	47	4.92	21.90	12.60	10.90	9.77
Marshall	24 Main St Calvert City	21-157-0018	48	3.92	21.90	14.10	9.72	8.77
Ohio	Keytown Road Echols	21-183-0032	50	2.73	13.50	8.16	7.22	6.27

Air Toxics Summary Report - 2009

Pollutant: Nickel

Method: IO-3.5; Metals low volume PM_{10} monitor

Data Interval: 24-hour

Units: Nano-grams per cubic meter (ng/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	21st & Greenup Ashland	21-019-0002	56	1.20	8.19	5.70	4.20	3.52
Carter	Camp Webb Grayson Lake	21-143-0500	60	ND	0.63	0.54	0.36	0.34
Fayette	533 South Limestone Lexington	21-067-0014	54	0.60	7.23	4.71	2.34	1.91
Marshall	24 Main St Calvert City	21-157-0018	55	0.10	1.25	0.54	0.51	0.41
Ohio	Keytown Road Echols	21-183-0032	57	0.10	0.79	0.53	0.47	0.42

ND=Non detect

Volatile Organic Compounds

Air Toxics Summary Report - 2009

Pollutant: Benzene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter ($\mu g/m^3$)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	60	0.7	4.85	3.74	3.29	2.77
Carter	Camp Webb Grayson Lake	21-043-0500	62	0.1	0.93	0.78	0.73	0.66
Fayette	650 Newtown Pike Lexington	21-067-0012	55	0.3	2.63	2.19	1.56	1.13
Kenton	1401 Dixie Highway Covington	21-117-0007	61	0.2	1.55	1.53	1.41	1.15
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	0.1	1.81	1.01	0.96	0.86
Marshall	TVA Substation Calvert City	21-157-0014	54	0.6	6.26	4.82	3.35	3.29
Marshall	Atmos Energy Calvert City	21-157-0016	50	1.5	52.40	2.33	1.49	1.11
Marshall	24 Main Street Calvert City	21-157-0018	56	0.2	1.61	1.47	1.38	1.23
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	1.1	28.30	1.60	1.53	1.39

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: 1,3-Butadiene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter ($\mu g/m^3$)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	0.1	2.12	1.73	0.88	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	0.1	3.56	2.23	1.54	0.75
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	6.23	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Carbon tetrachloride

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	0.2	3.73	3.60	2.21	1.58
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Chloroform

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	0.2	5.90	1.77	1.49	1.28
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: 1,2 dichloropropane

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: cis-1,3 dichloropropene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter ($\mu g/m^3$)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	55	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	50	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	56	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: trans-1,3 dichloropropene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	1.62	1.05	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road Off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	0.1	5.44	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	1.93	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Ethylene dibromide

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Ethylene dichloride

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	NND
Carter	Camp Webb Grayson Lake	21-043-0500	62	0.1	3.24	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	0.1	4.09	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	1.5	18.30	12.40	10.70	3.74
Marshall	TVA Substation Calvert City	21-157-0014	54	10.3	112.00	98.30	77.30	63.90
Marshall	Atmos Energy Calvert City	21-157-0016	50	1.8	34.70	16.60	15.20	6.15
Marshall	24 Main Street Calvert City	21-157-0018	56	0.4	4.41	3.58	3.00	2.79
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	1.7	16.90	7.69	6.67	6.07

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Methylene chloride

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	0.3	4.17	2.68	1.67	1.11
Carter	Camp Webb Grayson Lake	21-043-0500	62	0.3	2.85	2.11	1.82	1.47
Fayette	650 Newtown Pike Lexington	21-067-0012	55	1.3	47.90	7.78	3.18	2.18
Kenton	1401 Dixie Highway Covington	21-117-0007	61	1.8	28.70	21.80	17.60	10.70
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	0.1	1.25	0.99	0.98	0.75
Marshall	TVA Substation Calvert City	21-157-0014	54	0.1	1.31	1.08	0.95	0.88
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	1.18	0.83	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	0.97	0.96	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	0.94	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Tetrachloroethylene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter ($\mu g/m^3$)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	1.57	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	1.76	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street ND	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: 1,1,2,2 tetrachloroethane

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Trichloroethylene

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter ($\mu g/m^3$)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	ND	ND	ND	ND	ND
Marshall	TVA Substation Calvert City	21-157-0014	54	ND	ND	ND	ND	ND
Marshall	Atmos Energy Calvert City	21-157-0016	50	ND	ND	ND	ND	ND
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	ND	ND	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	ND	ND	ND	ND	ND

ND=Non detect

Air Toxics Summary Report - 2009

Pollutant: Vinyl chloride

Method: TO-15; Passivated SUMMA Canister

Data Interval: 24-hour

Units: Micro-grams per cubic meter (µg/m^3)

County	Site	AQS-ID	# Obs	Annual Mean	1st max	2nd max	3rd max	4th max
Boyd	2924 Holt Street Ashland	21-019-0017	61	ND	ND	ND	ND	ND
Carter	Camp Webb Grayson Lake	21-043-0500	62	ND	ND	ND	ND	ND
Fayette	650 Newtown Pike Lexington	21-067-0012	55	ND	ND	ND	ND	ND
Kenton	1401 Dixie Highway Covington	21-117-0007	61	ND	ND	ND	ND	ND
Livingston	763 Bloodworth Road off KY 453	21-139-0004	43	0.3	4.37	2.81	2.03	1.65
Marshall	TVA Substation Calvert City	21-157-0014	54	0.7	13.70	6.18	5.75	2.91
Marshall	Atmos Energy Calvert City	21-157-0016	50	2.0	19.10	17.70	13.50	11.40
Marshall	24 Main Street Calvert City	21-157-0018	56	ND	2.13	0.67	ND	ND
Marshall	4237 Gilbertsville Hwy Calvert City	21-157-0019	43	0.3	5.98	3.73	0.95	0.78

ND=Non detect

APPENDIX A: REGIONAL FIELD OFFICE MAP

Division for Air Quality
Regional Office Boundaries

air.ky.gov

Environmental Emergency, 24-hour; (502) 564-2380 or (800) 928-2380
Open burn complaints: 888-BURNLAW (888-287-6529)

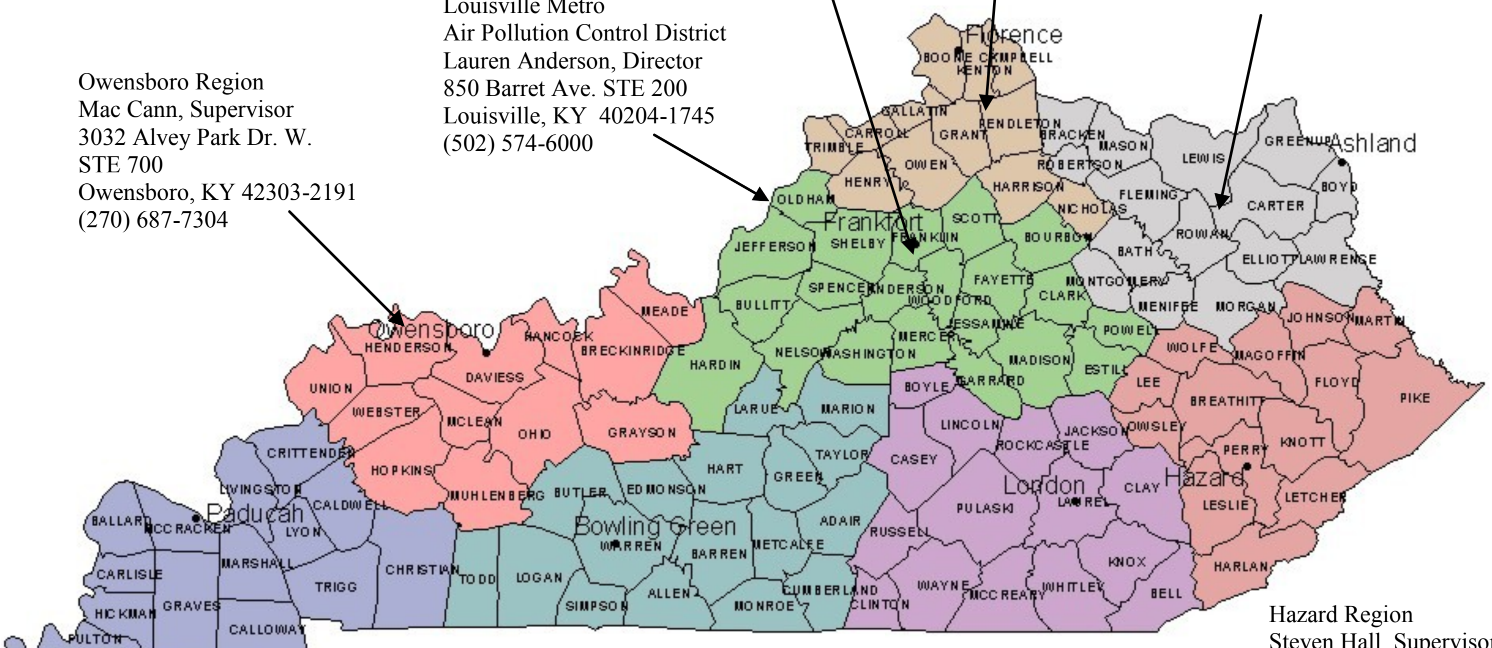
Florence Regional
Clay Redmond, Supervisor
8020 Veterans Memorial Dr.
Suite 110

Frankfort Region
Connie Coy, Supervisor
200 Fair Oaks Ln., 3rd FL
Frankfort, KY 40601-1134
(502) 564-3358
Fax: (502) 564-

Ashland Region
Karen Deskins, Supervisor
1550 Wolohan Drive, Suite 1
Ashland, KY 41102-8942
(606) 929-5285
Fax: (606) 928-1267

Louisville Metro
Air Pollution Control District
Lauren Anderson, Director
850 Barret Ave. STE 200
Louisville, KY 40204-1745
(502) 574-6000

Owensboro Region
Mac Cann, Supervisor
3032 Alvey Park Dr. W.
STE 700
Owensboro, KY 42303-2191
(270) 687-7304



Hazard Region
Steven Hall, Supervisor
233 Birch Street, STE 2
Hazard, KY 41701-2179
(606) 435-6022
Fax: (606) 435-6230

Paducah Region
Betsy Ryan, Supervisor
130 Eagle Nest Drive
Paducah, KY 42003
(270) 898-8468
Fax: (270) 898-8640

Bowling Green Region
Troy Tabor, Supervisor
1508 Westen Avenue
Bowling Green, KY 42104-3356
(270) 746-7475
Fax: (270) 746-7865

London Region
David Shivel, Supervisor
875 S. Main Street
London, KY 40741
(606) 330-2080
Fax: (606) 330-2097

Revised: 03/01/10

APPENDIX B: GLOSSARY OF TERMS

Analyte A chemical substance that is the subject of chemical analysis.

Asbestos Hazard Emergency Response Act AHERA requires schools to inventory their asbestos materials and document strategies for dealing with these materials.

Air Toxics See Toxic Air Pollutant.

Ambient air quality The level of pollution present in the air outside.

Attainment When an area meets the national air quality standard set by the federal EPA for a particular pollutant.

Clean Air Act Federal clean air program established by Congress in 1963.

Class I Area Areas of special natural, scenic, or historic importance are known as "Class 1 Areas," and are protected to maintain long distance, panoramic views.

Criteria Pollutant A regulated air pollutant. Currently, there are six criteria pollutants under the Clean Air Act. They are carbon monoxide, lead, ozone, particulate matter, nitrogen oxides and sulfur dioxide.

Emissions Inventory A list of sources of air contaminants, containing for each source the amount of each contaminant emitted.

Hazardous Air Pollutant Any pollutant listed in Subsection B of Section 112 of the Clean Air Act.

Inspection A *scheduled* determination of compliance with an existing regulation.

Investigation A *complaint driven* determination of compliance with an existing regulation.

National Emissions Standards for Hazardous Air Pollutants NESHAP, with respect to asbestos, governs renovation and demolition activities and requires safe handling, removal (when applicable), and disposal of asbestos from facilities (everything except for single private homes).

Nonattainment When an area does not meet the national air quality standard set by the federal EPA for a particular pollutant.

Notification Required reporting by facilities of regulated activities. For example, facilities are required to notify DAQ of certain air emission releases or upcoming asbestos disturbance (removal/ demolition activities).

Synthetic Minor A facility that has the PTE that could exceed major Title V thresholds, but they have agreed to control emissions below major threshold. Synthetic minors includes conditional major facilities.

Title V Any source that has the PTE of greater than 100 Tons of criteria pollutants or 10/25 TPY of a single HAP or any combined HAP.

Toxic Air Pollutant A subset of the pollutants listed as Hazardous Air Pollutants by the U.S. EPA.

APPENDIX C: GLOSSARY OF ABBREVIATIONS

AHERA Asbestos Hazard Emergency Response Act

BACT Best Available Control Technology

CAA Clean Air Act

CO Carbon Monoxide

CPT Cost per Ton

DAQ Division for Air Quality

DEP Department for Environmental Protection

DERA Diesel Emissions Reduction Act

EEC Energy and Environment Cabinet

EGU Electric Generating Unit

EPA Environmental Protection Agency

GHG Greenhouse Gas

HAP Hazardous Air Pollutant

HPV High Priority Violation

LOW Letter of Warning

MACT Maximum Achievable Control Technology

NAAQS National Ambient Air Quality Standard

NESHAP National Emission Standard for Hazardous Air Pollutants

NO_x Nitrogen Oxides

NOV Notice of Violation

O_3 Ozone

Pb Lead

PM_{10} Particulate Matter, also known as course particles, measure between 2.5-10 microns in diameter

$PM_{2.5}$ Fine Particulate Matter, also known as fine particles, measure 2.5 microns in diameter

PTE Potential to Emit

SEDC Southeast Diesel Collaborative

SIP State Implementation Plan

SO_2 Sulfur Dioxide

TEMPO Tools for Environmental Management and Protection Organizations

TRI Toxics Release Inventory

VISTAS Visibility Improvement State and Tribal Association of the Southeast

VOC Volatile Organic Compound

ACKNOWLEDGMENTS

Governor Steven L. Beshear **Secretary Leonard K. Peters**

This Annual Report is intended to provide a concise set of facts and measurements to support environmental decision-making. We welcome your questions and comments to the contacts below:

Kentucky Division for Air Quality
200 Fair Oaks Lane, 1st Floor
Frankfort, KY 40601
Phone: 502-564-3999
Fax: 502-564-4666
Web site: air.ky.gov

Director: John S. Lyons

Kentucky Department for Environmental Protection
300 Fair Oaks Lane
Frankfort, KY 40601
Phone: 502-564-2150
Fax: 502-564-4245
Web site: www.dep.ky.gov

Commissioner: R. Bruce Scott, P.E.
Deputy Commissioner: Valerie Hudson, P.E.

We acknowledge the contributions of the staff and management of the Division for Air Quality.

Director's Office	John Lyons, Roberta Burnes, Elizabeth Schmitz
Program Planning and Administration	Andrea Smith, Melissa Duff, John Gowins, Lora Gowins, Nina Hockensmith, Shea Hogan, Martin Luther, Jackee Rosen
Field Operations	Kevin Flowers and Jarrod Bell
Permit Review	Rick Shewekah and Taimur Shaikh
Technical Services	Stephanie McCarthy and Jennifer Miller

Printed with state funds on recycled paper
September 2010