CRITERIA POLLUTANTS

Air Quality Trend Analysis Report
(1980-2010)

EAST CENTRAL INDIANA

Indiana Department of Environmental Management

Office of Air Quality

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Table of Contents

Introduction 1

Improvements in Air Quality 6

National Controls.....6

Regional Controls.....7

State Emission Reduction Initiatives 10

East Central Indiana Emission Inventory Data.....11

Top Ten Emission Sources 12

Air Quality Trends.....14

Air Monitoring and Emissions Data 14

Carbon Monoxide (CO) 15

Fine Particles ($PM_{2.5}$) 17

Lead 27

Nitrogen Dioxide (NO_2).....33

Ozone.....35

Particulate Matter (PM_{10}).....43

Sulfur Dioxide (SO_2) 47

Total Suspended Particulate (TSP).....55

Future of Air Quality 58

Conclusions.....58

Figures

Figure 1: Map of East Central Indiana Counties and Monitors 2

Figure 2: Map of East Central Indiana Top Ten Sources 13

Figure 3: Muncie Area Designated Nonattainment for Lead.....32

Tables

Table 1: East Central Indiana County Population Information.....3

Table 2: East Central Indiana Vehicle Miles Traveled (VMT) Information 4

Table 3: 2009 East Central Indiana Commuting Patterns 5

Table 4: East Central Indiana Top Ten Sources Data (Tons per Year).....12

Table 5: East Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary 19

Table 6: East Central Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary.....20

Table 7: East Central Indiana 24-Hour 98^{th} Percentile Value $PM_{2.5}$ Monitoring Data Summary.....21

Table 8: East Central Indiana 24-Hour Three-Year Design Value $PM_{2.5}$ Monitoring Data Summary.....22

Table 9: East Central Indiana Lead Quarterly Average Monitoring Data Summary.....29

Table 10: East Central Indiana Three-Month Lead Monitoring Data Summary.....31

Table 11: East Central Indiana 1-Hour Ozone Annual 4^{th} High Value Monitoring Data Summary.....36

Table 12: East Central Indiana 1-Hour Ozone 4^{th} High Value in Three-Year Period Monitoring Data Summary 37

Table 13: East Central Indiana 8-Hour Ozone 4th High Values Monitoring Data Summary 38

Table 14: East Central Indiana 8-Hour Ozone Three-Year Design Value Monitoring Data Summary....39

Table 15: East Central Indiana Annual PM_{10} Monitoring Data Summary 44

Table 16: East Central Indiana 24-Hour 2nd High PM_{10} Monitoring Data Summary....45

Table 17: East Central Indiana Annual Arithmetic Mean SO_2 Values Monitoring Data Summary....49

Table 18: East Central Indiana 24-Hour SO_2 2nd High Values Monitoring Data Summary 50

Table 19: East Central Indiana 1-Hour 99th Percentile SO_2 Monitoring Data Summary....51

Table 20: East Central Indiana 1-Hour SO_2 Three-Year Design Values Monitoring Data Summary....52

Table 21: East Central Indiana Annual Geometric Mean TSP Values 56

Table 22: East Central Indiana 24-Hour TSP 2nd High Values 57

Graphs

Graph 1: East Central Indiana CO Emissions 15

Graph 2: East Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Values....19

Graph 3: East Central Indiana Annual $PM_{2.5}$ Three-Year Design Values 20

Graph 4: East Central Indiana 24-Hour $PM_{2.5}$ 98th Percentile Values....21

Graph 5: East Central Indiana 24-Hour $PM_{2.5}$ Three-Year Design Values 22

Graph 6: East Central Indiana $PM_{2.5}$ Emissions....24

Graph 7: East Central Indiana SO_2 Emissions 25

Graph 8: East Central Indiana NO_x Emissions 26

Graph 9: East Central Indiana Lead Highest Annual Quarterly Values 28

Graph 10: East Central Indiana Lead Three-Month Rolling Average Values 30

Graph 11: East Central Indiana NO_x Emissions 34

Graph 12: East Central Indiana 1-Hour Ozone 4th Highest Value in Three-Year Period 37

Graph 13: East Central Indiana 8-Hour Ozone 4th High Values 38

Graph 14: East Central Indiana 8-Hour Ozone Three-Year Design Values 39

Graph 15: East Central Indiana NO_x Emissions 40

Graph 16: East Central Indiana VOC Emissions 41

Graph 17: East Central Indiana Annual Arithmetic Mean PM_{10} Values 44

Graph 18: East Central Indiana 24-Hour PM_{10} 2nd High Values 45

Graph 19: East Central Indiana PM_{10} Emissions 46

Graph 20: East Central Indiana Annual Arithmetic Mean SO_2 Values 49

Graph 21: East Central Indiana 24-Hour SO_2 2nd High Values 50

Graph 22: East Central Indiana 1-Hour SO_2 99th Percentile Values 51

Graph 23: East Central Indiana 1-Hour SO_2 Three-Year Design Values 52

Graph 24: East Central Indiana SO_2 Emissions 53

Graph 25: East Central Indiana Annual Geometric Mean TSP Values 56

Graph 26: East Central Indiana 24-Hour TSP 2nd High Values 57

Charts

Chart 1: East Central Indiana CO Emissions 16

Chart 2: East Central Indiana $PM_{2.5}$ Emissions 24

Chart 3: East Central Indiana SO_2 Emissions 25

Chart 4: East Central Indiana NO_x Emissions 26

Chart 5: East Central Indiana NO_x Emissions 34

Chart 6: East Central Indiana NO_x Emissions 41

Chart 7: East Central Indiana VOC Emissions 42

Chart 8: East Central Indiana PM_{10} Emissions 46

Chart 9: East Central Indiana SO_2 Emissions 54

Appendix

East Central Indiana County-Specific Emissions Inventory Data
(1980-2009).....A1- A11

Acronyms/Abbreviation List

AQS..... Air Quality System

CAA..... Clean Air Act

CAIR..... Clean Air Interstate Rule

CO..... carbon monoxide

CSAPR..... Cross-State Air Pollution Rule

D.C..... District of Columbia

EGUs..... electric generating units

FR..... Federal Register

I	interstate
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
MWe	megawatt electrical
NAAQS	National Ambient Air Quality Standard
NEI	National Emissions Inventory
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSR	New Source Review
$PM_{2.5}$	particulate matter less than or equal to 2.5 $\mu g/m^3$ or fine particles
PM_{10}	particulate matter less than or equal to 10 $\mu g/m^3$ or particulate matter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
SIP	State Implementation Plan
SO_2	sulfur dioxide
SUVs	sport utility vehicles
TSP	total suspended particulate
U.S. EPA	United States Environmental Protection Agency
$\mu g/m^3$	micrograms per cubic meter
VOC	volatile organic compound
VMT	vehicle miles traveled

Introduction

The East Central Indiana area is composed of eleven counties. The counties represented in the area shown in Figure 1 are: Blackford, Delaware, Fayette, Grant, Henry, Jay, Madison, Randolph, Rush, Union, and Wayne. Two major interstates pass through the East Central Indiana area, Interstate (I)-70 through Henry and Wayne counties and I-69 through Delaware, Grant, and Madison counties. Interstate 74 also passes just outside of the southwest corner of the East Central Indiana area.

There are currently 7 criteria pollutant monitoring sites in East Central Indiana collecting data for fine particles ($PM_{2.5}$), lead, ozone, and sulfur dioxide (SO_2). The map in Figure 1 reflects only the monitors that are currently in operation. Monitoring data for the years 2000 through 2010 for East Central Indiana are included in the tables for each regulated criteria pollutant, if available. Monitoring data prior to the year 2000 are available upon request. Trend graphs of historical data for the years 1980 through 2010 are also provided.

The largest emission sources within the East Central Indiana area include Richmond Power & Light – Richmond Municipal Utility and Ball State University. Emission trend graphs and pie charts are included for the precursors for each regulated criteria pollutant. Emission information by county is available upon request.

Figure 1: Map of East Central Indiana Counties and Monitors

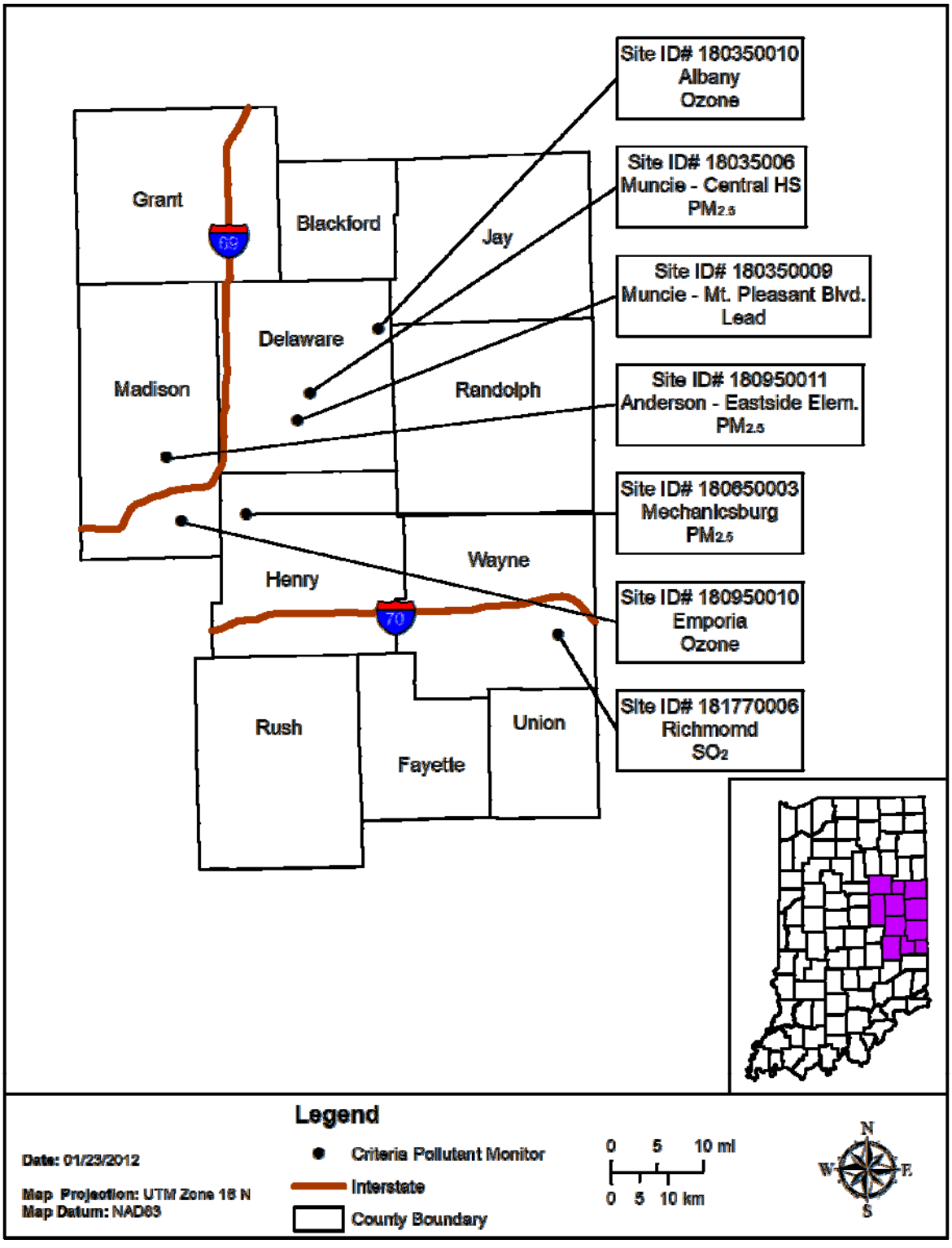


Table 1: East Central Indiana County Population Information

COUNTY	COUNTY SEAT	LARGEST CITY	2010 NUMBER OF HOUSE-HOLDS	1980 POPU-LATION	1990 POPU-LATION	2000 POPU-LATION	2010 POPU-LATION	POPULATION PERCENT DIFFERENCE BETWEEN 1980 AND 2010
BLACKFORD	HARTFORD CITY	HARTFORD CITY	6,051	15,570	14,067	14,048	12,766	-18%
DELAWARE	MUNCIE	MUNCIE	52,357	128,587	119,659	118,769	117,671	-8%
FAYETTE	CONNERSVILLE	CONNERSVILLE	10,898	28,272	26,015	25,588	24,277	-14%
GRANT	MARION	MARION	30,443	80,934	74,169	73,403	70,061	-13%
HENRY	NEW CASTLE	NEW CASTLE	21,288	53,336	48,139	48,508	49,462	-7%
JAY	PORTLAND	PORTLAND	9,221	23,239	21,512	21,806	21,253	-9%
MADISON	ANDERSON	ANDERSON	59,068	139,336	130,669	133,358	131,636	-6%
RANDOLPH	WINCHESTER	WINCHESTER	11,743	29,997	27,148	27,401	26,171	-13%
RUSH	RUSHVILLE	RUSHVILLE	7,508	19,604	18,129	18,261	17,392	-11%
UNION	LIBERTY	LIBERTY	2,239	6,860	6,976	7,349	7,516	10%
WAYNE	RICHMOND	RICHMOND	31,242	76,058	71,951	71,097	68,917	-9%

Table 1 shows that Blackford County has had the highest percent difference in population between 1980 and 2010, decreasing by 18%. The population for every county in the East Central Indiana area had a decrease in population from 1980 to 2010, except for Union County which had a 10% increase. The decrease in population for the East Central Indiana area can largely be attributed to changes in the job market and the location of jobs in the East Central Indiana area. Changes in population size, age, and distribution affect environmental issues ranging from basic needs such as food and water to atmospheric changes such as an increase or decrease in emissions from vehicle miles traveled (VMT), area sources, and the demand for electricity. Generally, increases or decreases in population will result in higher or lower area source and mobile emissions. Examples of area sources that decrease with lower population include household paints, lawnmowers, and consumer solvents. In addition, lower population figures indicate a secondary effect on decreasing VMT, if the change in population occurs away from the employment centers.

Table 2: East Central Indiana Vehicle Miles Traveled (VMT) Information

COUNTY	2010 NUMBER OF ROADWAY MILES	2009 NUMBER OF REGISTERED VEHICLES	Back Casted 1980 DAILY VMT	2010 DAILY VMT	PERCENT DIFFERENCE BEWTEEN 1992 AND 2010 DAILY VMT
BLACKFORD	430	14,966	433,099	410,000	-5%
DELAWARE	1,392	104,246	1,950,906	3,657,000	87%
FAYETTE	483	24,457	539,254	524,000	-3%
GRANT	1,260	68,888	1,697,249	2,227,000	31%
HENRY	1,087	51,908	1,369,449	1,853,000	35%
JAY	923	23,114	823,379	668,000	-19%
MADISON	1,592	130,449	2,560,363	4,061,000	59%
RANDOLPH	1,078	29,272	970,259	733,000	-24%
RUSH	881	20,735	671,435	621,000	-8%
UNION	321	9,046	246,746	233,000	-6%
WAYNE	1,131	67,136	2,124,460	2,209,000	4%

Table 2 illustrates that Delaware and Madison counties had the highest increases in daily VMT since 1980. The daily VMT for 5 of the 11 counties in the East Central Indiana area have increased over time. Daily VMT data are only available as far back as 1992. Prior to that year, data were not collected in a comparable manner. However, the annual change between 1992 and 2010 was applied for the years 1980 to 1992 to approximate the VMT for 1980. The United States Environmental Protection Agency (U.S. EPA) estimates that motor vehicle exhaust is a major source of emissions of carbon monoxide (CO), $PM_{2.5}$, and ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NO_x)). Generally, increases in VMT result in subsequent changes in emissions of CO, VOCs, and NO_x from mobile sources. These increases in VMT also result in increased evaporative emissions from more gasoline and diesel consumption. Each of these factors may be somewhat offset by fleet turnover where newer, cleaner vehicles replace older, more polluting ones.

Table 3: 2009 East Central Indiana Commuting Patterns

COUNTY	NUMBER WHO LIVE AND WORK IN THE COUNTY	NUMBER WHO LIVE IN COUNTY BUT WORK OUTSIDE THE COUNTY	NUMBER OF PEOPLE WHO LIVE IN ANOTHER COUNTY OR STATE BUT WORK IN COUNTY	TOP COUNTY OR STATE SENDING WORKERS INTO COUNTY	NUMBER OF PEOPLE FROM TOP COUNTY OR STATE SENDING WORKERS INTO COUNTY	TOP COUNTY OR STATE RECEIVING WORKERS FROM COUNTY	NUMBER OF PEOPLE FROM TOP COUNTY OR STATE RECEIVING WORKERS FROM COUNTY
ADAMS	19,365	3,526	2,722	ALLEN	631	ALLEN	1,978
BLACKFORD	6,174	2,522	914	DELAWARE	259	DELAWARE	803
DELAWARE	61,760	6,190	9,402	MADISON	1,764	MADISON	1,776
FAYETTE	12,388	2,745	1,419	WAYNE	383	WAYNE	681
GRANT	38,365	3,874	4,683	MADISON	665	HOWARD	550
HENRY	23,532	7,335	2,364	DELAWARE	479	MARION	1,713
JAY	10,941	2,569	1,657	RANDOLPH	467	DELAWARE	718
MADISON	65,247	16,161	7,557	DELAWARE	1,776	MARION	6,202
RANDOLPH	12,556	4,282	1,208	OHIO	329	DELAWARE	1,624
RUSH	8,017	3,613	1,480	FAYETTE	347	SHELBY	1,008
UNION	2,820	2,106	436	FAYETTE	127	STATE OF OHIO	971
WAYNE	39,348	3,473	4,234	STATE OF OHIO	851	STATE OF OHIO	788

Information in Table 3 from 2009 demonstrates that the largest workforce in East Central Indiana is found in Madison County. Commuting patterns in East Central Indiana center on the City of Anderson in Madison County and the City of Muncie in Delaware County. Since Madison and Delaware counties have the highest populations and are among the highest in commuting patterns to and from the counties, emissions within Madison and Delaware counties are expected to be higher than surrounding counties in the East Central Indiana area. The commuting patterns in East Central Indiana reflect that of many urban areas around the country. Madison and Delaware counties are the largest employment counties and many of those workers commute from the outlying counties. This type of commuting pattern results in longer trips from the place of residence to the employer. Longer commutes result in increased emissions.

Improvements in Air Quality

Indiana's air quality has improved significantly over the last 30 years. The majority of air quality improvements in the East Central Indiana area have stemmed from the national and regional controls outlined below. These programs have been or are being implemented and have reduced monitored ambient air quality values in East Central Indiana and across the state.

National Controls

Acid Rain Program

Congress created the Acid Rain Program under Title IV of the 1990 Clean Air Act (CAA). The overall goal of the program is to achieve significant environmental and public health benefits through reduction in emissions of SO_2 and NO_x, the primary causes of acid rain. To achieve this goal at the lowest cost to the public, this program employs both traditional and innovative, market-based approaches to controlling air pollution. Specifically, the program seeks to limit, or "cap," SO_2 emissions from power plants at 8.95 million tons annually starting in 2010, authorizes those plants to trade SO_2 allowances, and while not establishing a NO_x trading program, reduces NO_x emission rates. In addition, the program encourages energy efficiency and pollution prevention.

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light duty trucks, including sport utility vehicles (SUVs). This rule requires automakers to produce cleaner cars, and refineries to make cleaner, lower sulfur gasoline. This rule was phased in between 2004 and 2009 and resulted in a 77% decrease in NO_x emissions from passenger cars, an 86% decrease from smaller SUVs, light duty trucks, and minivans, and a 65% decrease from larger SUVs, vans, and heavy duty trucks. This rule also resulted in a 12% decrease in VOC emissions from passenger cars, an 18% decrease from smaller SUVs, light duty trucks, and minivans, and a 15% decrease from larger SUVs, vans, and heavy duty trucks.

Heavy-Duty Diesel Engines

In July 2000, U.S. EPA issued a final rule for Highway Heavy-Duty Engines, a program that includes low-sulfur diesel fuel standards. This rule applies to heavy-duty gasoline and diesel trucks and buses. This rule was phased in from 2004 through 2007 and resulted in a 40% decrease in NO_x emissions from diesel trucks and buses.

Clean Air Nonroad Diesel Rule

In May 2004, U.S. EPA issued the Clean Air Nonroad Diesel Rule. This rule applies to diesel engines used in industries such as construction, agriculture, and mining. It also contains a cleaner fuel standard similar to the highway diesel program. The engine standards for nonroad engines took effect in 2008 and resulted in a 90% decrease in SO_2 emissions from nonroad diesel engines. Sulfur levels were also reduced in nonroad diesel fuel by 99.5% from approximately 3,000 parts per million (ppm) to 15 ppm.

Nonroad Spark-Ignition Engines and Recreational Engine Standards

This standard, effective in July 2003, regulates NO_x, VOCs, and CO for groups of previously unregulated nonroad engines. This standard applies to all new engines sold in the United States and imported after the standards went into effect. The standard applies to large spark-ignition engines (forklifts and airport ground service equipment), recreational vehicles (off-highway motorcycles and all terrain vehicles), and recreational marine diesel engines. When all of the nonroad spark-ignition engines and recreational engine standards are fully implemented, an overall 72% reduction in VOC, 80% reduction in NO_x, and 56% reduction in CO emissions are expected by 2020.

Regional Controls

Nitrogen Oxides (NO_x) Rule

On October 27, 1998, U.S. EPA published the NO_x State Implementation Plan (SIP) Call in the Federal Register (FR), which required 22 states to adopt rules that would result in significant emission reductions from large electric generating units (EGUs)[1],

[1] An EGU is a fossil fuel fired stationary boiler, combustion turbine, or combined cycle system that sells any amount of electricity produced.

industrial boilers, and cement kilns in the eastern United States (63 FR 57356). The Indiana rule was adopted in 2001 at 326 Indiana Administrative Code (IAC) 10-1. Beginning in 2004, this rule accounted for a reduction of approximately 31% of all NO_x emissions statewide compared to previous uncontrolled years.

Twenty-one other states also adopted this rule. The result is that significant reductions have occurred within Indiana and regionally due to the number of affected units within the region. The historical trend charts show that air quality has improved due to the decreased emissions resulting from this program.

On April 21, 2004, U.S. EPA published Phase II of the NO_x SIP Call that established a budget for large (emissions of greater than one ton per day) stationary internal combustion engines (69 FR 21604). In Indiana, the rule decreased NO_x emissions statewide from natural gas compressor stations by 4,263 tons during May through September. The Indiana Phase II NO_x SIP Call rule became effective in 2006 and implementation began in 2007 (326 IAC 10-4).

Clean Air Interstate Rule (CAIR)

On May 12, 2005, the U.S. EPA published the following regulation: “Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (CAIR); Revisions to Acid Rain Program; Revisions to the NO_x SIP Call; Final Rule” (70 FR 25162). This rule established the requirement for states to adopt rules limiting the emissions of NO_x and SO_2 and provided a model rule for the states to use in developing their rules in order to meet federal requirements. The purpose of CAIR was to reduce interstate transport of $PM_{2.5}$, SO_2, and ozone precursors (NO_x).

Generally, CAIR applied to any stationary, fossil fuel-fired boiler or stationary, fossil fuel-fired combustion turbine, or a generator with a nameplate capacity of more than 25 megawatt electrical (MWe) producing electricity for sale. This rule provided annual state caps for NO_x and SO_2 in two phases, with Phase I caps for NO_x and SO_2 starting in 2009 and 2010, respectively. Phase II caps were to become effective in 2015. U.S. EPA allowed limits to be met through a cap and trade program if a state chose to participate in the program.

In response to U.S. EPA’s rulemaking, Indiana adopted a state rule in 2006 based on the model federal rule (326 IAC 24-1). IDEM’s rule includes annual and seasonal NO_x trading programs and an annual SO_2 trading program. This rule required compliance effective January 1, 2009.

SO_2 emissions from power plants in the 28 eastern states and the District of Columbia (D.C.) covered by CAIR were to be cut by 4.3 million tons from 2003 levels by 2010 and by 5.4 million tons from 2003 levels by 2015. NO_x emissions were to be cut by 1.7 million tons by 2009 and reduced by an additional 1.3 million tons by 2015. The D.C. Circuit court's vacatur of CAIR in July 2008, and subsequent remand without vacatur of CAIR in December 2008, directed U.S. EPA to revise or replace CAIR in order to address the deficiencies identified by the court. As of May 2012, CAIR remains in effect.

Cross-State Air Pollution Rule (CSAPR)

On August 8, 2011, U.S. EPA published a final rule that helps states reduce air pollution and meet CAA standards. The Cross-State Air Pollution Rule (CSAPR) replaces U.S. EPA's 2005 CAIR, and responds to the court's concerns (76 FR 48208).

CSAPR requires 27 states in the eastern half of the United States to significantly reduce power plant emissions that cross state lines and contribute to ground-level ozone and fine particle pollution in other states.

On December 30, 2011, the U.S. Court of Appeals for the D.C. Circuit stayed CSAPR prior to implementation pending resolution of a challenge to the rule. The court ordered U.S. EPA to continue the administration of CAIR pending resolution of the current appeal. This required U.S. EPA to reinstate 2012 CAIR allowances which had been removed from the allowance tracking system as part of the transition to CSPAR. The federal rule is on hold pending resolution of the litigation.

Reasonably Available Control Technology (RACT) and other State VOC Rules

As required by Section 172 of the CAA, Indiana has promulgated several rules requiring Reasonably Available Control Technology (RACT) for emissions of VOCs since the mid 1990's. In addition, other statewide rules for controlling VOCs have also been promulgated. The Indiana rules are found in 326 IAC 8. The following is a listing of statewide rules that assist with the reduction of VOCs in East Central Indiana:

326 IAC 8-1-6	Best Available Control Technology for Non-Specific Sources
326 IAC 8-2	Surface Coating Emission Limitations
326 IAC 8-3	Organic Solvent Degreasing Operations

326 IAC 8-4	Petroleum Sources
326 IAC 8-5	Miscellaneous Operation
326 IAC 8-6	Organic Solvent Emission Limitations
326 IAC 8-8.1	Municipal Solid Waste Landfills
326 IAC 8-10	Automobile Refinishing
326 IAC 8-14	Architectural and Industrial Maintenance Coatings
326 IAC 8-15	Standards for Consumer and Commercial Products

New Source Review (NSR) Provisions

Indiana has a longstanding and fully implemented NSR program. This is addressed in 326 IAC 2. The rule includes provisions for the Prevention of Significant Deterioration permitting program in 326 IAC 2-2, and emission offset requirements for nonattainment areas in 326 IAC 2-3 for new and modified sources.

State Emission Reduction Initiatives

Outdoor Hydronic Heater Rule

Rule 326 IAC 4-3, effective May 18, 2011, regulates the use of outdoor hydronic heaters (also referred to as outdoor wood boilers or outdoor wood furnaces) designed to burn wood or other approved renewable solid fuels and establishes a particulate emission limit for new units. The rule also includes a fuel use restriction, stack height requirements, and a limited summertime operating ban for existing units.

Reinforced Plastic Composites Fabricating and Boat Manufacturing Industries Rule

Rules 326 IAC 20-48, effective August 23, 2004 and 326 IAC 20-56, effective April 1, 2006, regulate styrene emissions from the boat manufacturing and fiberglass reinforced plastic industries. The state rules implement the federal NESHAP for each of these source categories with additional requirements that were carried over from the Indiana state styrene rule (326 IAC 20-25) adopted in 2000 and now repealed.

East Central Indiana Emission Inventory Data

Emission trend graphs and pie charts for each criteria pollutant are included in this report. Emission trend graphs and pie charts for any precursors that lead to the formation of a criteria pollutant are also included. Indiana's emission inventory data are available for 1980 through 2009 for CO, $PM_{2.5}$, NO_x, particulate matter (PM_{10}), SO_2, and VOC. These emission estimates are reflective of U.S. EPA methodologies found in the National Emissions Inventory (NEI) Air Pollutant Emissions Trends Data. Some of the fluctuations found in the trends inventory are due to U.S. EPA not incorporating state reported data until after the submission of the 1996 Periodic Emission Inventory[1]. Further, U.S. EPA acknowledges that changes over time may be attributable to changes in how inventories were compiled[2].

The emissions have been broken down into contributions from the following individual source categories: point sources (including electric generating units (EGUs)), area sources, onroad sources, and nonroad sources. There are six EGU facilities in the East Central Indiana area, one of which is a top ten emitter in the area. Emissions data for each county in East Central Indiana are available upon request.

Point Sources

Point sources include major and minor sources, including EGUs that report emissions through Indiana's emission reporting program. Examples include steel mills, manufacturing plants, surface coating operations, and industrial and commercial boilers.

Area Sources

Area sources are a collection of similar emission units within a geographic area that collectively represent individual sources that are small and numerous and have not been inventoried as a specific point, mobile, or biogenic source. Some of these sources include activities, such as dry cleaning, vehicle refueling, and solvent usage.

Onroad Sources

Onroad sources include cars and light and heavy duty trucks.

[1] http://www.epa.gov/ttn/chief/trends/trends98/trends98.pdf
[2] http://www.epa.gov/air/airtrends/2007/report/particlepollution.pdf

Nonroad Sources

Nonroad sources typically include construction equipment, recreational boating, outdoor power equipment, recreational vehicles, farm machinery, lawn care equipment, and logging equipment.

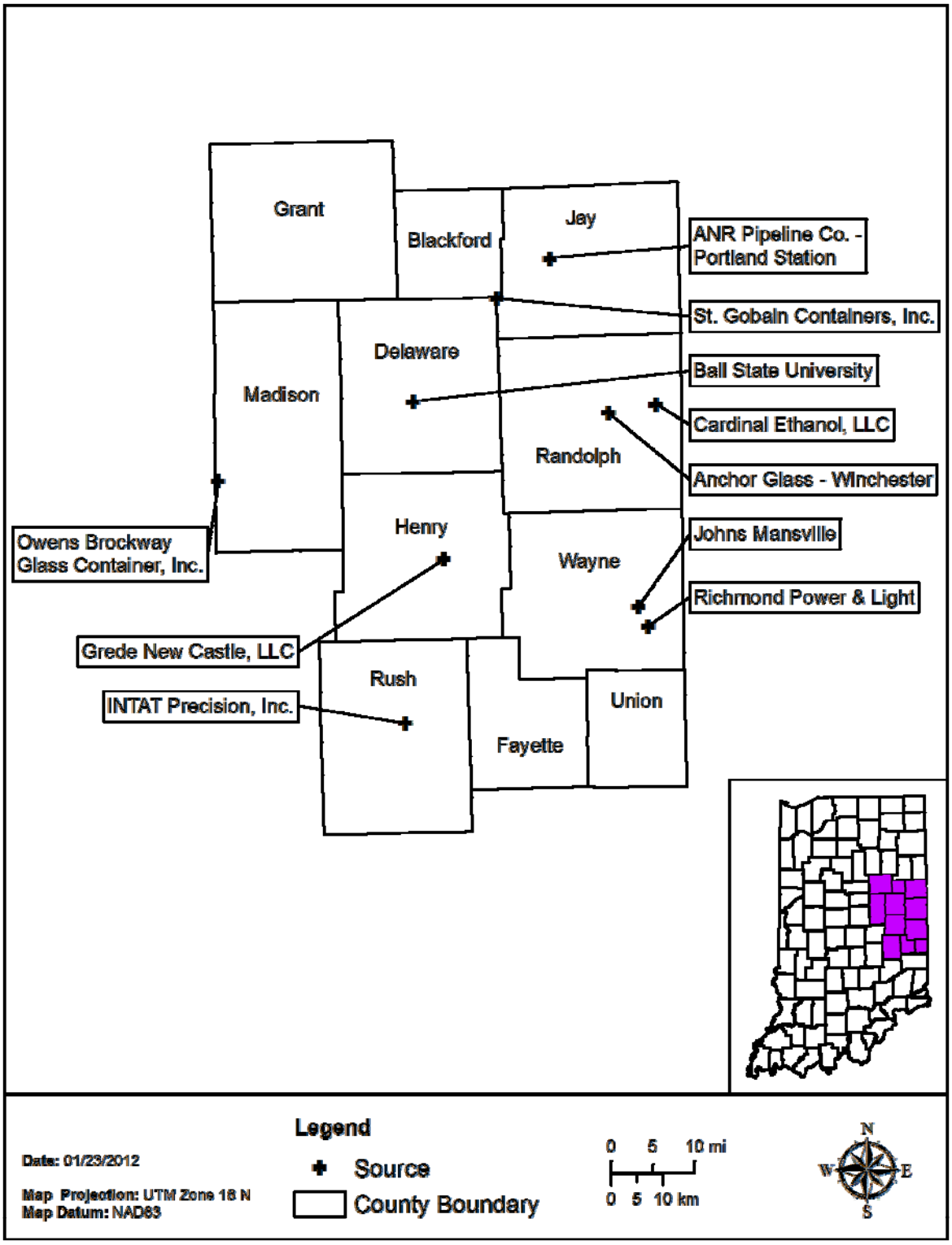
Top Ten Emission Sources

Table 4 represents the top ten sources in tons per year of emissions for the East Central Indiana area. The top source on this list that has a large impact on emissions in the East Central Indiana area is an EGU, but with the regional controls explained previously, the emissions from the EGU have been reduced over time and will continue to be reduced. Other large facilities in the East Central Indiana area include a university and two glass container manufacturers. Air quality in the East Central Indiana area is partially influenced by the emissions from these top ten point sources, but as new control measures are adopted, these emissions will continue to decrease. Figure 2 shows the location of these sources within the East Central Indiana area.

Table 4: East Central Indiana Top Ten Sources Data (Tons per Year)

INVENTORY YEAR	COUNTY	FACILITY NAME	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	TOTAL
2010	WAYNE	RICHMOND POWER & LIGHT	30.4	358.8	13.3	4.0	4,806.0	3.6	5,216.2
2010	DELAWARE	BALL STATE UNIV	82.0	233.0	191.2	54.5	1,519.0	1.1	2,080.8
2010	RANDOLPH	ANCHOR GLASS – WINCHESTER	21.9	678.4	144.4	142.2	372.0	21.9	1,380.9
2010	JAY	SAINT – GOBAIN CONTAINERS, INC.	35.8	272.7	133.3	128.8	312.3	35.8	918.5
2010	MADISON	OWENS BROCKWAY GLASS CONTAINER INC.	25.4	340.9	64.2	51.0	304.6	19.2	805.3
2010	WAYNE	JOHNS MANVILLE	67.0	20.9	159.4	159.4	1.0	16.2	423.8
2010	HENRY	GREDE NEW CASTLE, INC.	152.2	3.5	61.7	45.2	0.7	61.0	324.3
2010	JAY	ANR PIPELINE CO PORTLAND STATION	44.5	254.8	1.0	1.0	0.0	6.9	308.2
2010	RANDOLPH	CARDINAL ETHANOL LLC	75.8	75.3	24.4	23.1	5.0	34.4	237.8
2010	RUSH	INTAT PRECISION, INC.	115.3	0.5	45.5	15.5	0.9	30.2	207.9

Figure 2: Map of East Central Indiana Top Ten Sources



Air Quality Trends

An area meets the standard when the monitoring values for a regulated criteria pollutant meet the applicable National Ambient Air Quality Standard (NAAQS). All counties in East Central Indiana currently meet the historic NAAQS, with the exception of a small portion of Delaware County which has been designated as nonattainment for the lead standard. New 1-hour NAAQS were introduced in 2010 for NO_2 and SO_2. The 1-hour NO_2 monitoring data across the state are well below the new 1-hour NO_2 NAAQS. There are no monitors in the East Central Indiana area that measure NO_2. There is currently one county with a monitor violation of the new 1-hour SO_2 NAAQS in East Central Indiana at the close of 2010. States are required to develop SIPs to show attainment of the 1-hour SO_2 NAAQS by 2017.

Air Monitoring and Emissions Data

Not all counties in the East Central Indiana area have an ambient air quality monitor located within the county boundaries. Monitoring data for the years 2000 through 2010 for East Central Indiana are included in the tables in this report for each criteria pollutant, if available. Monitoring data prior to the year 2000 are available upon request. Historical trend graphs of all available data for the years 1980 through 2010 are also provided. The data were obtained from the U.S. EPA's Air Quality System.

Emission trend graphs and pie charts for the criteria pollutants and precursors that lead to the formation of a criteria pollutant are outlined in this report. Indiana's emission inventory data are available for 1980 through 2009 for CO, $PM_{2.5}$, NO_x, PM_{10}, SO_2, and VOC. The data were obtained from the U.S. EPA's National Emissions Inventory (NEI). An appendix is attached that includes county-specific emissions data for each county from 1980 through 2009.

Carbon Monoxide (CO)

There are no monitoring sites within the East Central Indiana area that measure CO levels. U.S. EPA's NEI contains emissions information for CO which is used for Graph 1 and Chart 1. Graph 1 illustrates the emissions trend for CO in East Central Indiana and Chart 1 shows how the average emissions are distributed among the different source categories. CO emissions in the East Central Indiana area have been trending downward over time. If monitoring data for CO were available in the East Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 1: East Central Indiana CO Emissions

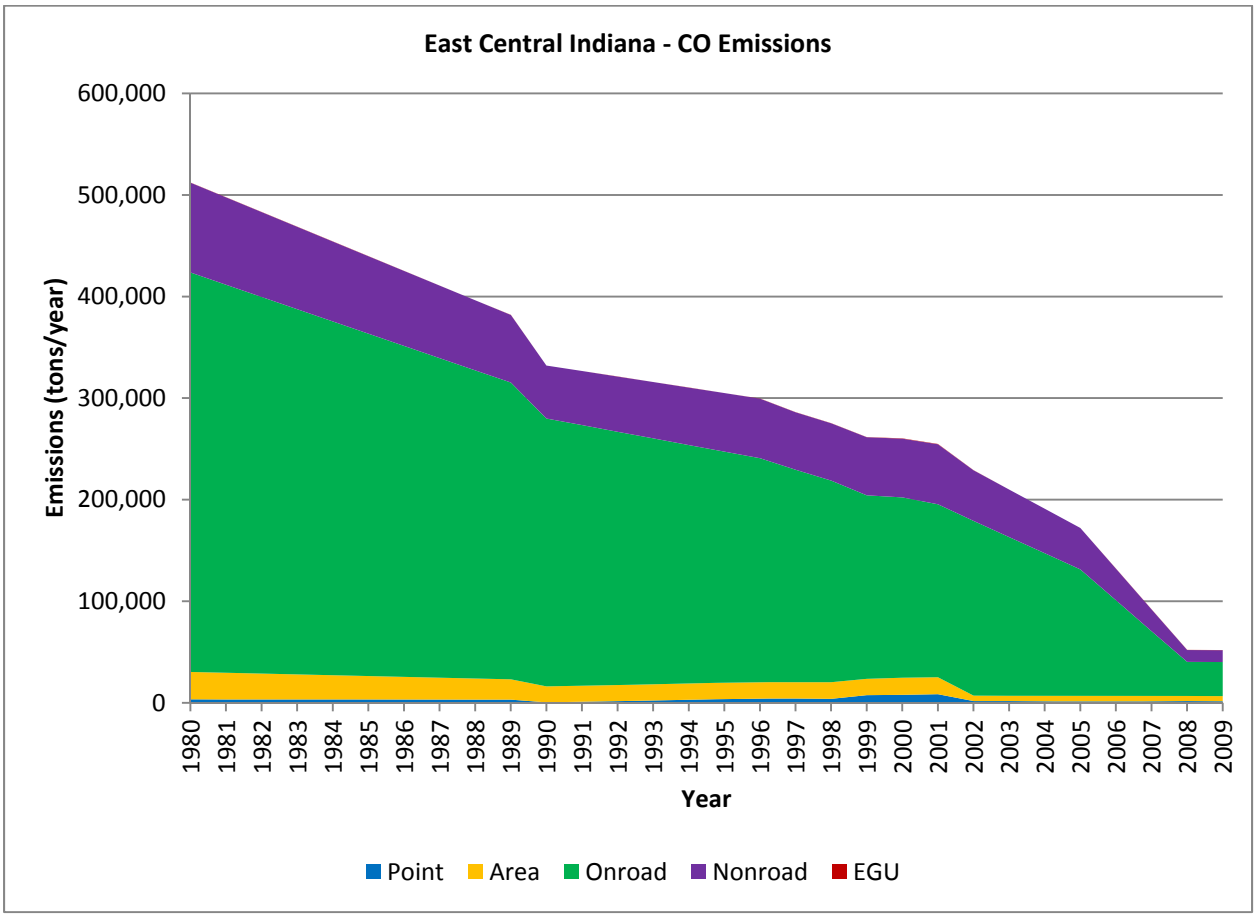
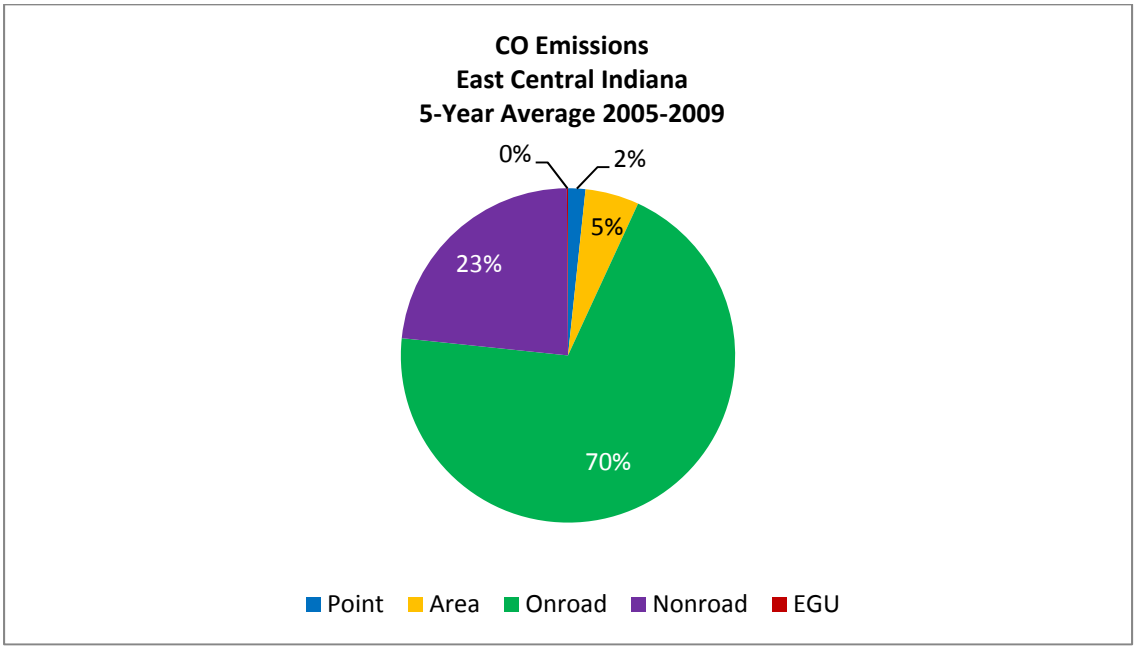


Chart 1: East Central Indiana CO Emissions



National controls have led to a decrease in CO emissions in the East Central Indiana area over time. As Graph 1 illustrates, CO emissions have decreased by 90% within the East Central Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. CO is a component of motor vehicle exhaust, which the U.S. EPA estimates to be the major source of CO emissions. Levels of CO have generally declined since the mid-1980's, primarily due to stricter emission standards for onroad and nonroad engines.

For information on CO standards, sources, health effects, and programs to reduce CO, please see www.epa.gov/airqualilty/carbonmonoxide.

Fine Particles ($PM_{2.5}$)

Three monitors within East Central Indiana measure $PM_{2.5}$ levels and are located in Delaware, Henry, and Madison counties. The trend data in Graphs 2 and 4 reflect the annual arithmetic mean (the method used to derive the central tendency of the monitoring values) for annual $PM_{2.5}$ and the 98^{th} percentile (the method used to determine the value below which a certain percent of monitored observations fall) for 24-hour $PM_{2.5}$ for each year for the years 2000 through 2010. The annual arithmetic mean values for annual $PM_{2.5}$ and 98^{th} percentile values for 24-hour $PM_{2.5}$ are not used to compare to the primary and secondary annual or 24-hour $PM_{2.5}$ standards. A three-year average, also known as the design value, is used to compare to both the primary and secondary annual $PM_{2.5}$ standards of 15.0 micrograms per cubic meter ($\mu g/m^3$), as well as the primary and secondary 24-hour $PM_{2.5}$ standards of 35 $\mu g/m^3$, but the annual arithmetic mean and 98^{th} percentile for each year do provide a good indication of annual and 24-hour $PM_{2.5}$ trends over time. The primary and secondary 24-hour $PM_{2.5}$ standards were first established in July 1997 of 65 $\mu g/m^3$. U.S. EPA revised the primary and secondary 24-hour $PM_{2.5}$ standards and lowered them to 35 $\mu g/m^3$ in October 2006.

For both annual and 24-hour $PM_{2.5}$, the secondary standard is the same as the primary standard. Attainment of the annual primary and secondary $PM_{2.5}$ standards is determined by evaluating the design value of the annual arithmetic mean from a single monitor, which must be less than or equal to 15.0 $\mu g/m^3$. An exceedance of the annual $PM_{2.5}$ standards occurs when an annual arithmetic mean value is equal to or greater than 15.0 $\mu g/m^3$. A violation of the annual $PM_{2.5}$ standards occurs when the design value of the annual arithmetic mean value is equal to or greater than 15.05 $\mu g/m^3$. A monitor can exceed the annual $PM_{2.5}$ standards without being in violation. Attainment of the 24-hour $PM_{2.5}$ standards is determined by evaluating the design value of the 98^{th} percentile of the 24-hour concentrations at each population-oriented monitor within an area, which must not exceed 35 $\mu g/m^3$. An exceedance of the 24-hour $PM_{2.5}$ standards occurs when the 98^{th} percentile is equal to or greater than 35 $\mu g/m^3$. A violation of the 24-hour $PM_{2.5}$ standards occurs when the design value of the 98^{th} percentile is equal to or greater than 35.5 $\mu g/m^3$. A monitor can exceed the 24-hour $PM_{2.5}$ standards without being in violation.

The trend data in Graph 3 reflect the three-year-design value of the annual arithmetic mean for annual $PM_{2.5}$ for each year for the years 2000 through 2010. The trend data in Graph 5 reflect the three-year design value of the 98th percentile values for 24-hour $PM_{2.5}$ for each year for the years 2000 through 2010.

While there is some variability in the monitoring values for both annual $PM_{2.5}$ and 24-hour $PM_{2.5}$, a downward trend over time can be seen in Graphs 2, 3, 4, and 5. The design value of the annual arithmetic mean is used for comparison to the primary and secondary annual $PM_{2.5}$ standards of 15.0 µg/m^3; therefore, the one-year values shown in Graph 2 are not a true comparison to the annual $PM_{2.5}$ standards and the values in the years that are above the red line are not a violation of the primary and secondary annual $PM_{2.5}$ standards. The values in Graph 2 reflect the annual arithmetic mean and the highest value from all of the monitors in the East Central Indiana area is plotted on the graph for each year.

The design value of the 98th percentile is used for comparison to the 24-hour $PM_{2.5}$ standards; therefore, the one-year values shown in Graph 4 are not a true comparison to the 24-hour $PM_{2.5}$ standards and the values in the years that are above the red line are not a violation of the primary and secondary 24-hour $PM_{2.5}$ standards. The values in Graph 4 reflect the 98th percentile and the highest value from all of the monitors in the East Central Indiana area is plotted on the graph for each year.

The data in Tables 5, 6, 7, and 8 are from the monitoring sites that measured annual and 24-hour $PM_{2.5}$ from 2000 to 2010. Statewide monitoring for $PM_{2.5}$ began in 2000; all available data for both annual and 24-hour $PM_{2.5}$ for the East Central Indiana area are shown in the tables. Monitoring data for both annual and 24-hour $PM_{2.5}$ show a downward trend over time.

Monitoring data in Table 5 show the annual arithmetic mean for annual $PM_{2.5}$ for the years 2000 through 2010. Monitoring data in Table 6 show the design value of the annual arithmetic mean for annual $PM_{2.5}$ for the years 2000 through 2010, which are compared to the primary and secondary annual $PM_{2.5}$ standards of 15.0 µg/m^3. Monitoring data in Table 7 show the 98th percentile for 24-hour $PM_{2.5}$ for the years 2000 through 2010. Monitoring data in Table 8 show the design value of the 98th percentile for 24-hour $PM_{2.5}$ for the years 2000 through 2010, which are compared to the primary and secondary 24-hour $PM_{2.5}$ standards of 35 µg/m^3.

Graph 2: East Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Values

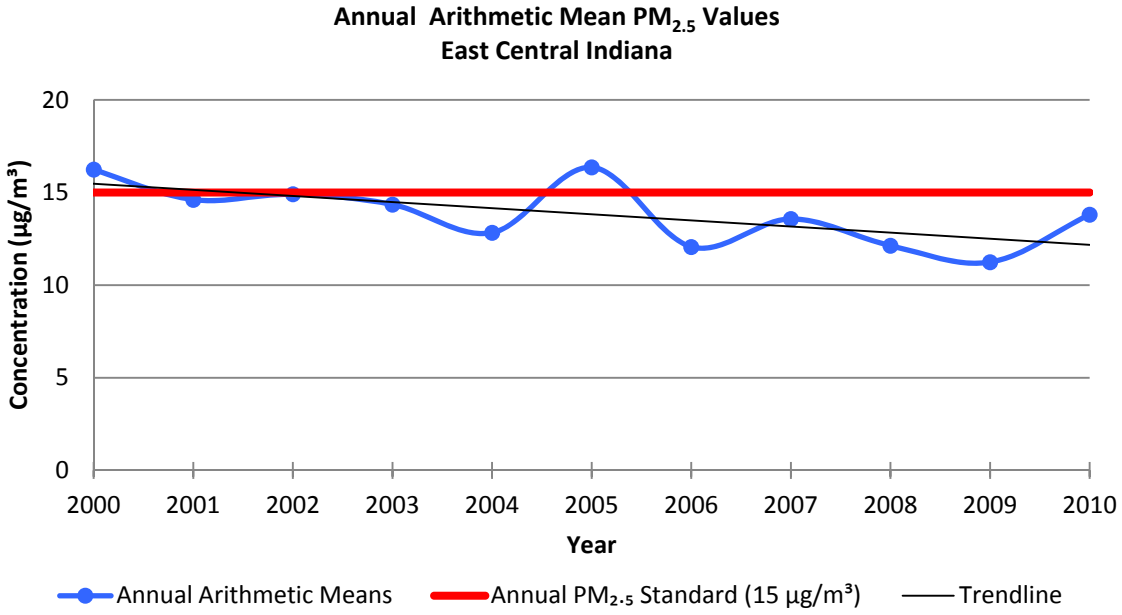


Table 5: East Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Delaware	180350006	Muncie - Central HS	16.24	14.49	14.51	14.03	12.26	16.36	11.93	13.16	11.68	11.09	12.79
Henry	180650003	Mechanicsburg	12.90	13.64	13.65	13.36	11.89	15.69	11.14	13.13	11.42	10.71	11.94
Madison	180950009	Anderson - W 5th St	15.55	14.61	14.91	14.35	12.83	16.06	12.06	13.57	12.13	11.24	13.81
Madison	180950009/11	Anderson Combined (5th St & Eastside)											12.11
Madison	180950011	Anderson - Eastside Elem Sch											11.25

Graph 3: East Central Indiana Annual $PM_{2.5}$ Three-Year Design Values

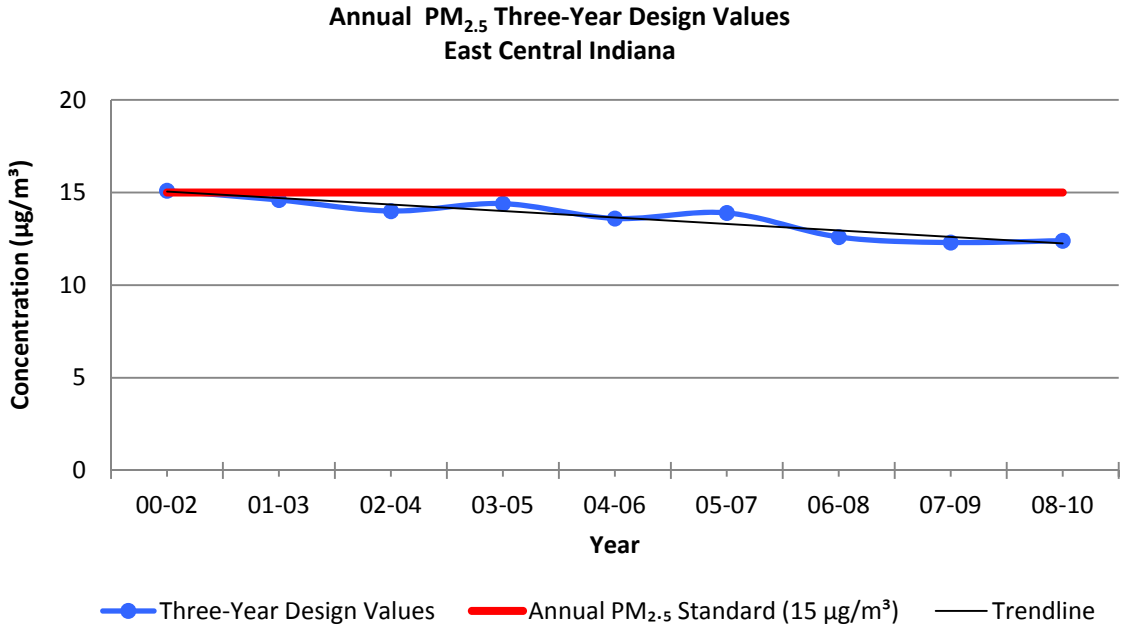


Table 6: East Central Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (µg/m³)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Delaware	180350006	Muncie - Central HS	15.1	14.3	13.6	14.2	13.5	13.8	12.3	12.0	11.9
Henry	180650003	Mechanicsburg	13.4	13.6	13.0	13.6	12.9	13.3	11.9	11.7	11.4
Madison	180950009	Anderson - W 5th St	15.0	14.6	14.0	14.4	13.6	13.9	12.6	12.3	12.4
Madison	180950009/11	Anderson Combined (5th St & Eastside)									11.8
Madison	180950011	Anderson - Eastside Elem Sch									11.3
			Red highlighted numbers are above the annual $PM_{2.5}$ standard of 15.0 µg/m³								

Graph 4: East Central Indiana 24-Hour $PM_{2.5}$ 98th Percentile Values

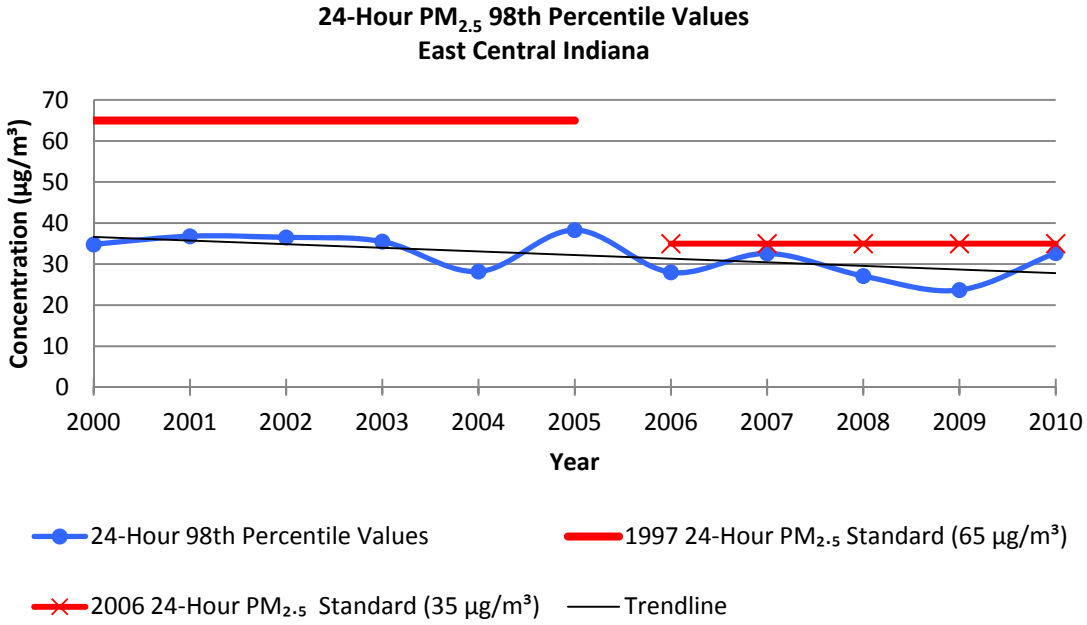


Table 7: East Central Indiana 24-Hour 98th Percentile Value $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Daily 98th Percentile Values (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Delaware	180350006	Muncie - Central HS	34.8	35.7	36.5	27.0	27.2	37.3	27.4	31.1	25.6	21.0	31.8
Henry	180650003	Mechanicsburg	19.8	30.7	29.7	31.4	26.9	37.3	27.2	32.4	24.8	21.0	30.6
Madison	180950009	Anderson - W 5th St	33.1	36.8	34.2	35.5	28.2	38.3	28.0	32.6	27.1	23.7	32.7
Madison	180950009/11	Anderson Combined (5th St & Eastside)											30.3
Madison	180950011	Anderson - Eastside Elem Sch											26.9

Graph 5: East Central Indiana 24-Hour $PM_{2.5}$ Three-Year Design Values

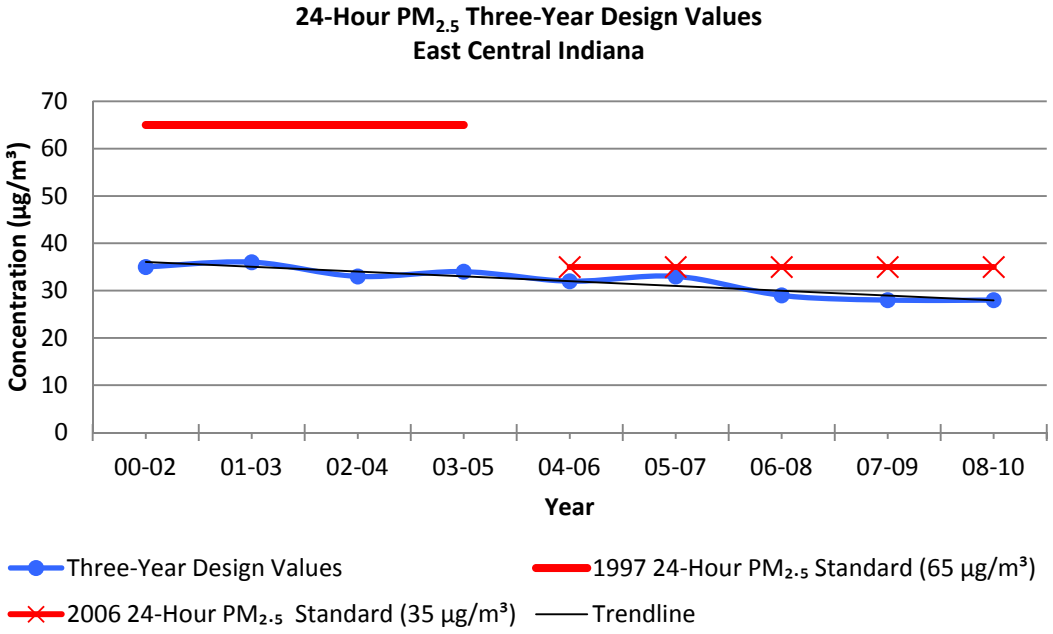


Table 8: East Central Indiana 24-Hour Three-Year Design Value $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (µg/m³)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Delaware	180350006	Muncie - Central HS	34	34	31	34	31	32	28	26	26
Henry	180650003	Mechanicsburg	27	31	29	32	30	32	28	26	25
Madison	180950009	Anderson - W 5th St	35	36	33	34	32	33	29	28	28
Madison	180950009/11	Anderson Combined (5th St & Eastside)									27
Madison	180950011	Anderson - Eastside Elem Sch									27

Prior to 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 65 µg/m³

Beginning in 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 35 µg/m³

Tables 5, 6, 7, and 8 demonstrate that the annual and 24-hour $PM_{2.5}$ values for the East Central Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the other two sites do also. Annual $PM_{2.5}$ values in East Central Indiana had been above the primary and secondary annual $PM_{2.5}$ standards until the end of 2002, but have remained below the standards since then.

While fluctuations in monitoring data are shown in Graphs 2, 3, 4, and 5, monitoring data for both annual $PM_{2.5}$ and 24-hour $PM_{2.5}$ indicate a downward trend over time. $PM_{2.5}$ is influenced by meteorology (wind speed, temperature, stagnant air, etc.). Meteorological conditions can have an episodic effect on $PM_{2.5}$ concentrations as in 2005 (Graphs 2, 3, 4, and 5), when three of the four quarters of the year had high $PM_{2.5}$ values which drove the annual $PM_{2.5}$ values higher for the year. The annual value is calculated from the average of the year's fourth quarterly averages. A quarterly average is the average of all available data from the respective quarter. The upper Midwest experienced several episodes of unusually high $PM_{2.5}$ concentrations in 2005 caused by unusual confluences of meteorological factors. Several times during 2005, high pressure systems were held in place by jet streams which lead to a persistent, highly stable atmosphere with calm winds. Atmospheric mixing was suppressed, pollutants that form $PM_{2.5}$ were trapped near the surface, and high values were measured. The longest and most wide spread episode happened during the first week of February 2005 which lasted for nine days and affected the upper Midwest and southern Ontario, where daily $PM_{2.5}$ values exceeded 70 $\mu g/m^3$.

Fine particulates are emitted directly into the air from combustion sources such as coal-fired power plants, motor vehicles, and open burning. In addition, fine particulate matter is formed in the air via chemical reactions. Gas pollutants, such as ammonia, SO_2, and NO_x, change chemically in the air to become either liquid or solid fine particulate matter. U.S. EPA's NEI contains emissions information for $PM_{2.5}$, SO_2, and NO_x and is used for Graphs 6, 7, and 8 and Charts 2, 3, and 4. Graphs 6, 7, and 8 illustrate the emissions trend for $PM_{2.5}$ and its precursors (SO_2 and NO_x) in East Central Indiana. Charts 2, 3, and 4 show how the average emissions are distributed among the different source categories.

Graph 6: East Central Indiana $PM_{2.5}$ Emissions

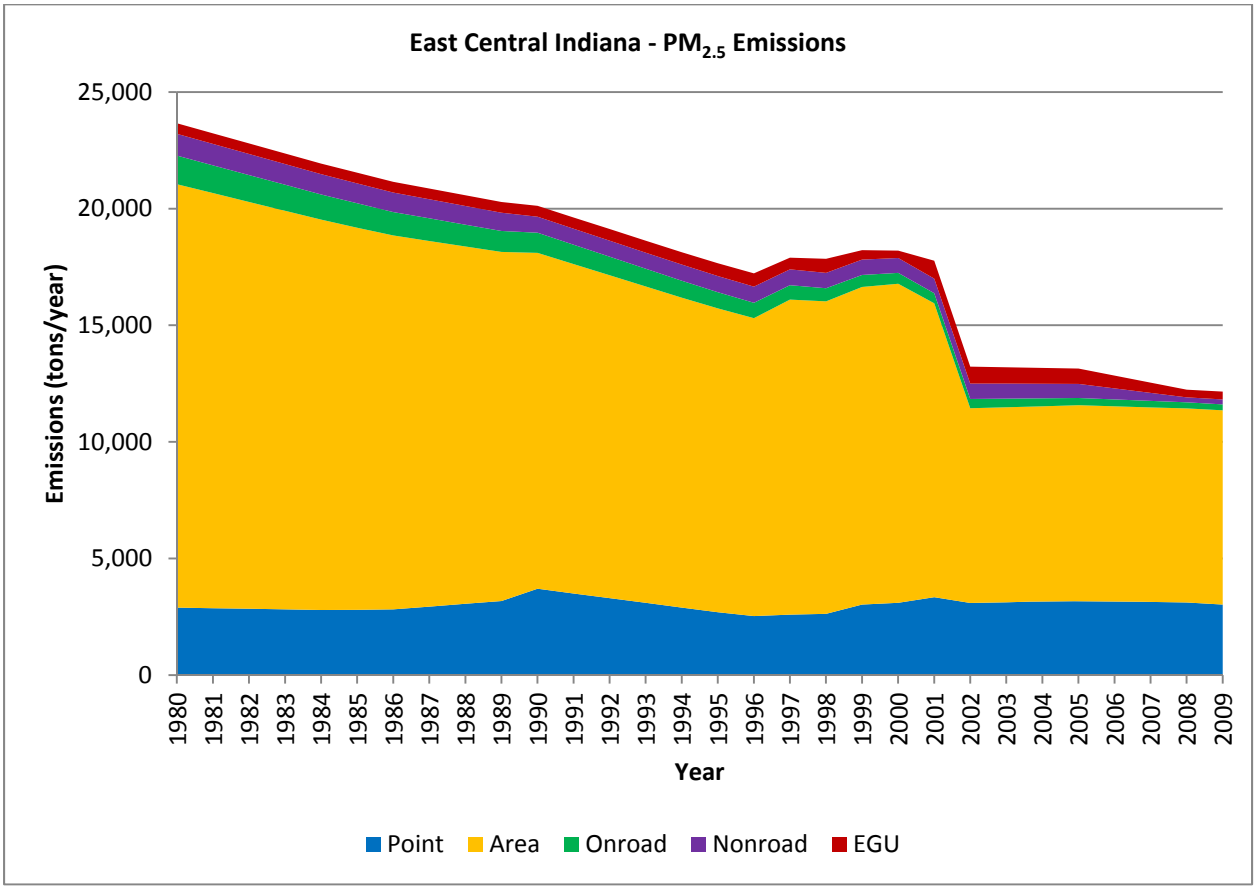
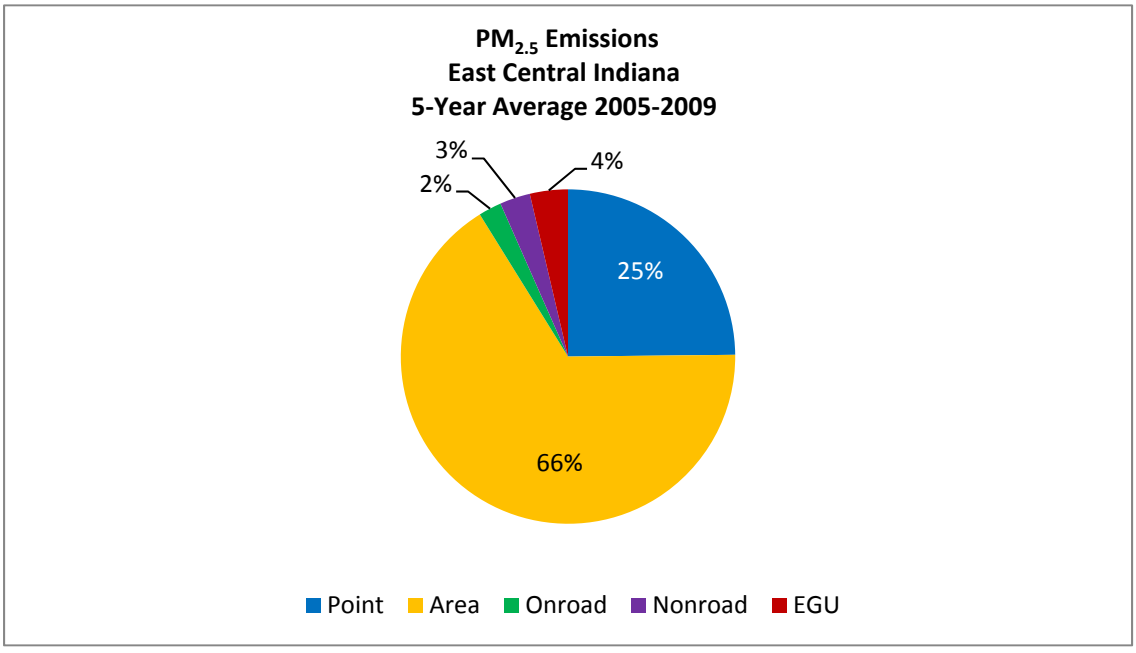


Chart 2: East Central Indiana $PM_{2.5}$ Emissions



Graph 7: East Central Indiana SO_2 Emissions

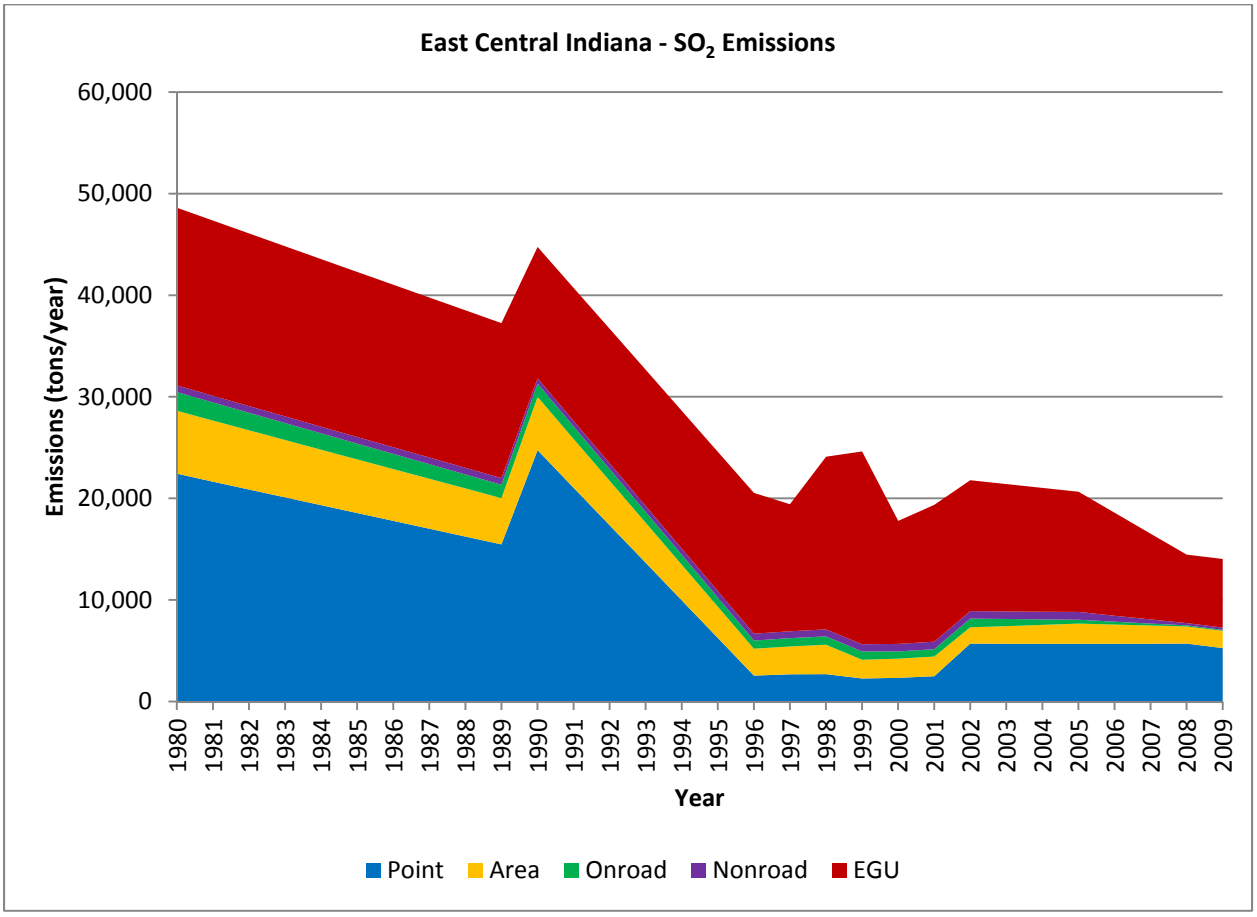
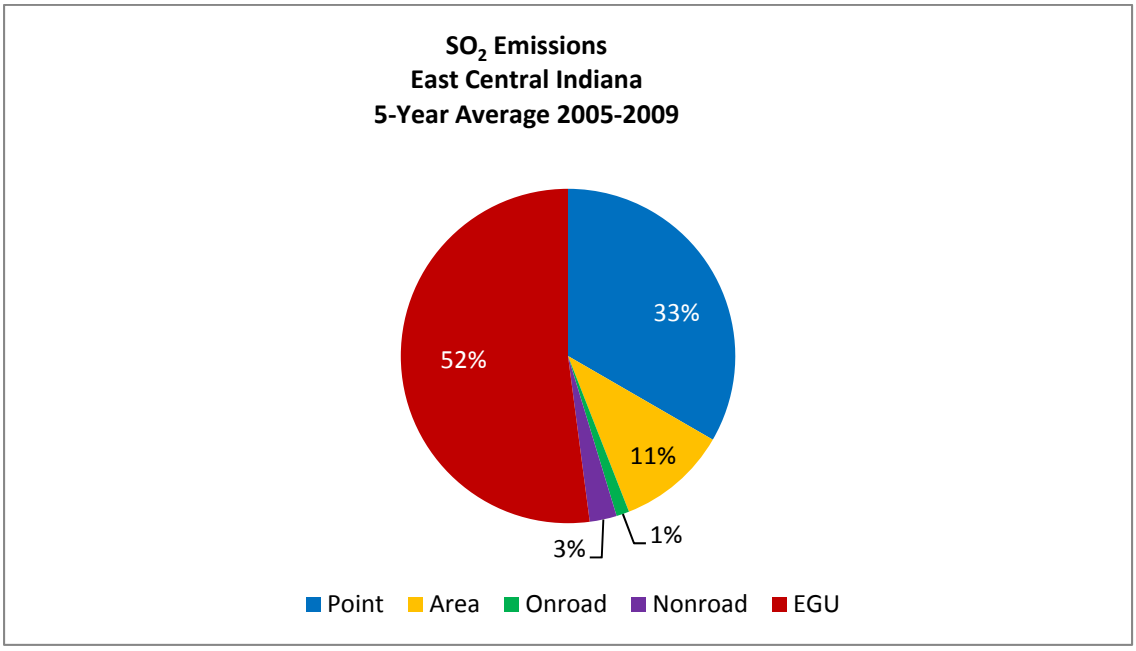


Chart 3: East Central Indiana SO_2 Emissions



Graph 8: East Central Indiana NO_x Emissions

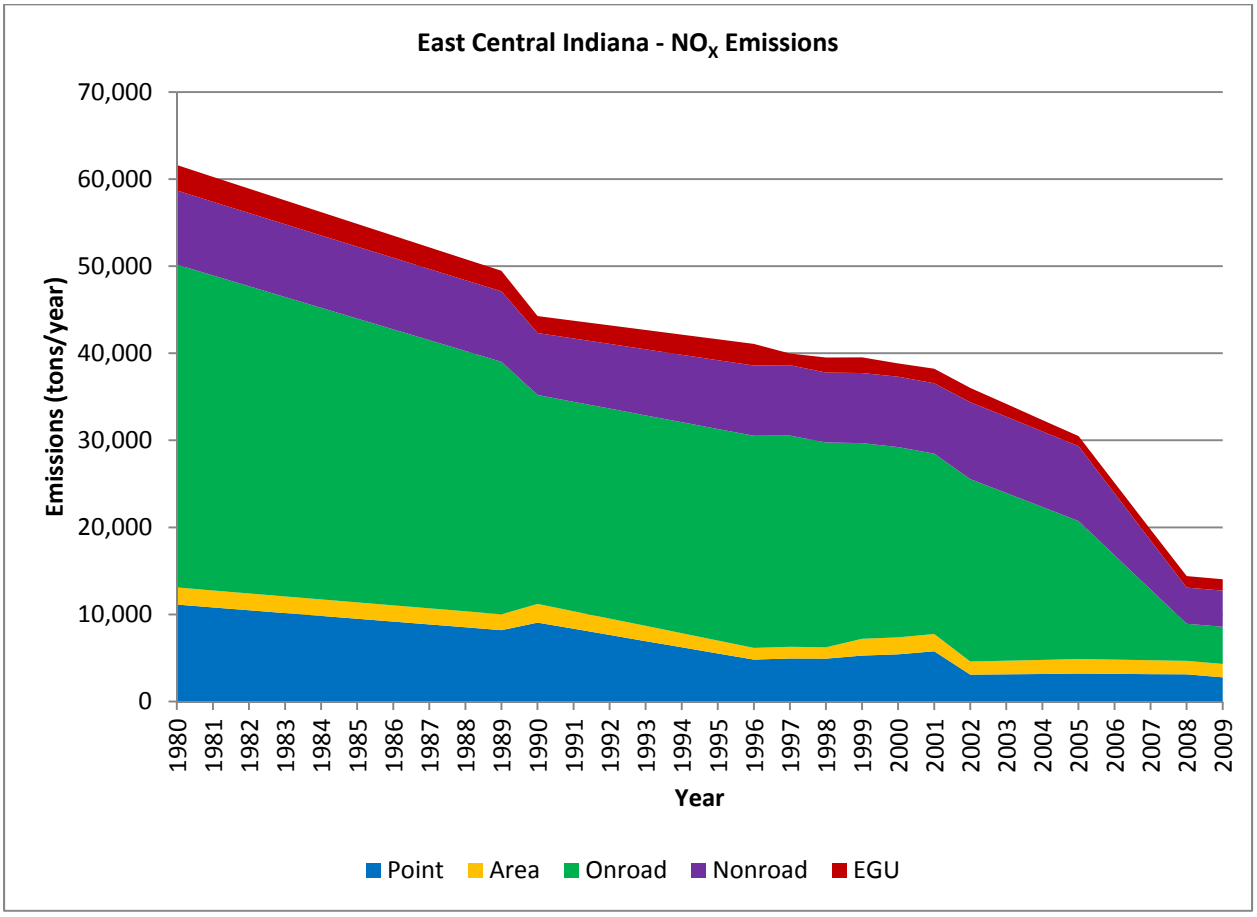
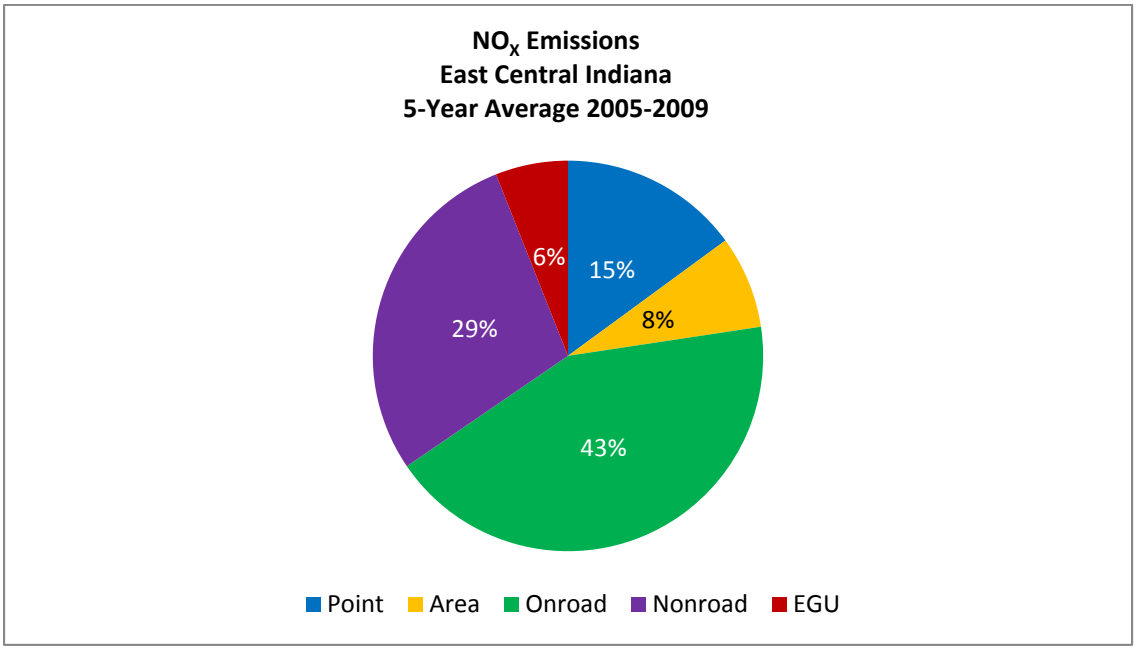


Chart 4: East Central Indiana NO_x Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in $PM_{2.5}$ values over time. As Graphs 6, 7, and 8 illustrate, $PM_{2.5}$, SO_2, and NO_x emissions have decreased by 49%, 71%, and 77%, respectively, within the East Central Indiana area since 1980. This trend is true for the key precursors of $PM_{2.5}$ throughout Indiana and the upper Midwest.

Nationally, average SO_2 concentrations have decreased by more than 70% since 1980 due to the implementation of the Acid Rain Program. Reductions in Indiana for SO_2 are primarily attributable to the implementation of the Acid Rain Program, as well as federal engine and fuel standards for onroad and nonroad vehicles and equipment.

For information on $PM_{2.5}$ standards, sources, health effects, and programs to reduce $PM_{2.5}$, please see www.epa.gov/air/particlepollution.

Lead

Two monitors currently measure lead levels in East Central Indiana and are located in Delaware County. The primary and secondary lead standards were first established in October 1978 at 1.5 $\mu g/m^3$. Attainment was determined by evaluating each calendar quarter arithmetic average, which must not exceed 1.5 $\mu g/m^3$ over a three-year period. U.S. EPA replaced the primary and secondary 1978 lead standards with new primary and secondary lead standards of 0.15 $\mu g/m^3$ in October 2008. Attainment of the primary and secondary 2008 lead standards is determined by evaluating the rolling three-month average. Any three consecutive monthly averages (January-March, February-April, March-May, etc.) must not exceed 0.15 $\mu g/m^3$ within a three-year period.

The trend data in Graph 9 reflect the highest annual quarterly arithmetic mean for each year, which was used to compare to the primary and secondary 1978 lead standards before they were revoked in 2008. The trend data in Graph 10 show the highest three-month rolling averages for each year, which is used to compare to the revised primary and secondary 2008 lead standards.

The data in Tables 9 and 10 are for the monitors that measured lead from 2000 through 2010. Historical lead data prior to the year 2000 are available upon request. Monitoring data in Table 9 are compared to the primary and secondary 1978 lead standards which were 1.5 µg/m^3. Monitoring data in Table 10 are compared to the primary and secondary 2008 lead standards. The Muncie-West Site monitor was replaced by the Muncie-Mt. Pleasant Boulevard monitor in January 2010.

Graph 9: East Central Indiana Lead Highest Annual Quarterly Values

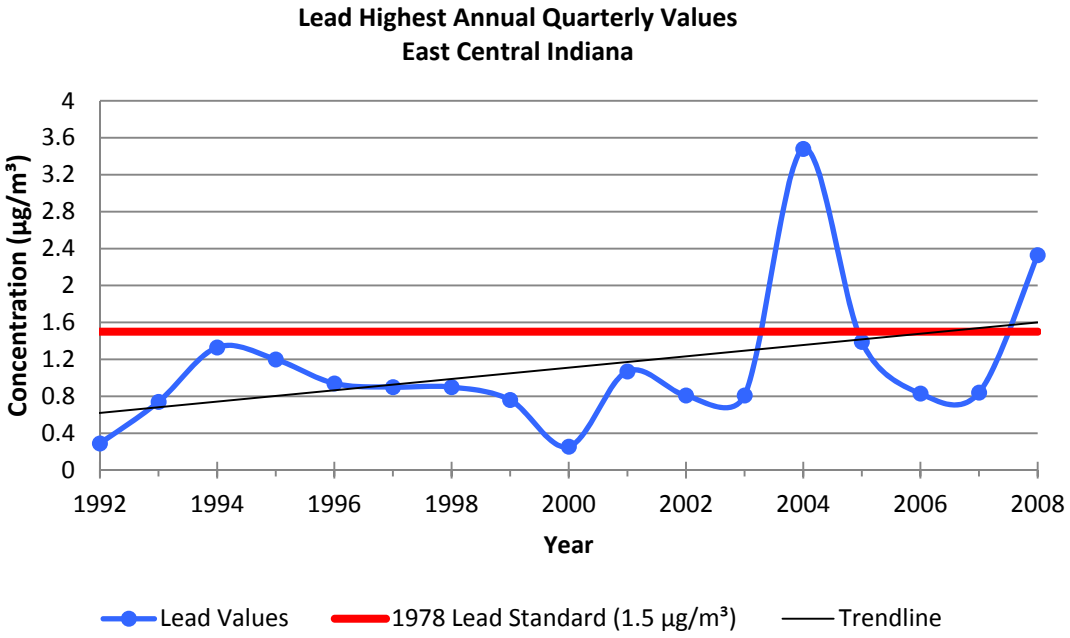


Table 9: East Central Indiana Lead Quarterly Average Monitoring Data Summary

County	Site #	Site Name	Quarterly Average (µg/m^3)											
			1Q 2000	2Q 2000	3Q 2000	4Q 2000	1Q 2001	2Q 2001	3Q 2001	4Q 2001	1Q 2002	2Q 2002	3Q 2002	4Q 2002
Delaware	180350008	Muncie-West Site	0.18	0.19	0.19	0.13	0.12	0.53	0.10	0.09	0.09	0.18	0.21	0.18
Delaware	180350009	Muncie-East Site	0.10	0.58	0.23	0.25	0.31	1.07	0.35	0.37	0.36	0.81	0.57	0.27
County	**Site #**	**Site Name**	**1Q 2003**	**2Q 2003**	**3Q 2003**	**4Q 2003**	**1Q 2004**	**2Q 2004**	**3Q 2004**	**4Q 2004**	**1Q 2005**	**2Q 2005**	**3Q 2005**	**4Q 2005**
Delaware	180350008	Muncie-West Site	0.10	0.22	0.23	0.20	0.47	0.29	0.30	0.25	0.34	0.46	0.40	0.26
Delaware	180350009	Muncie-East Site	0.23	0.68	0.81	0.60	1.12	3.48	2.23	1.30	0.80	1.39	0.94	0.72
County	**Site #**	**Site Name**	**1Q 2006**	**2Q 2006**	**3Q 2006**	**4Q 2006**	**1Q 2007**	**2Q 2007**	**3Q 2007**	**4Q 2007**	**1Q 2008**	**2Q 2008**	**3Q 2008**	**4Q 2008**
Delaware	180350008	Muncie-West Site	0.24	0.44	0.25	0.16	0.17	0.21	0.21	0.14	0.11	0.29	0.13	0.08
Delaware	180350009	Muncie-East Site	0.78	0.71	0.83	0.71	0.44	0.47	0.71	0.84	0.41	2.33	0.51	0.19
			Highlighted red numbers are over the 1978 lead standard of 1.5 µg/m^3											

Graph 10: East Central Indiana Lead Three-Month Rolling Average Values

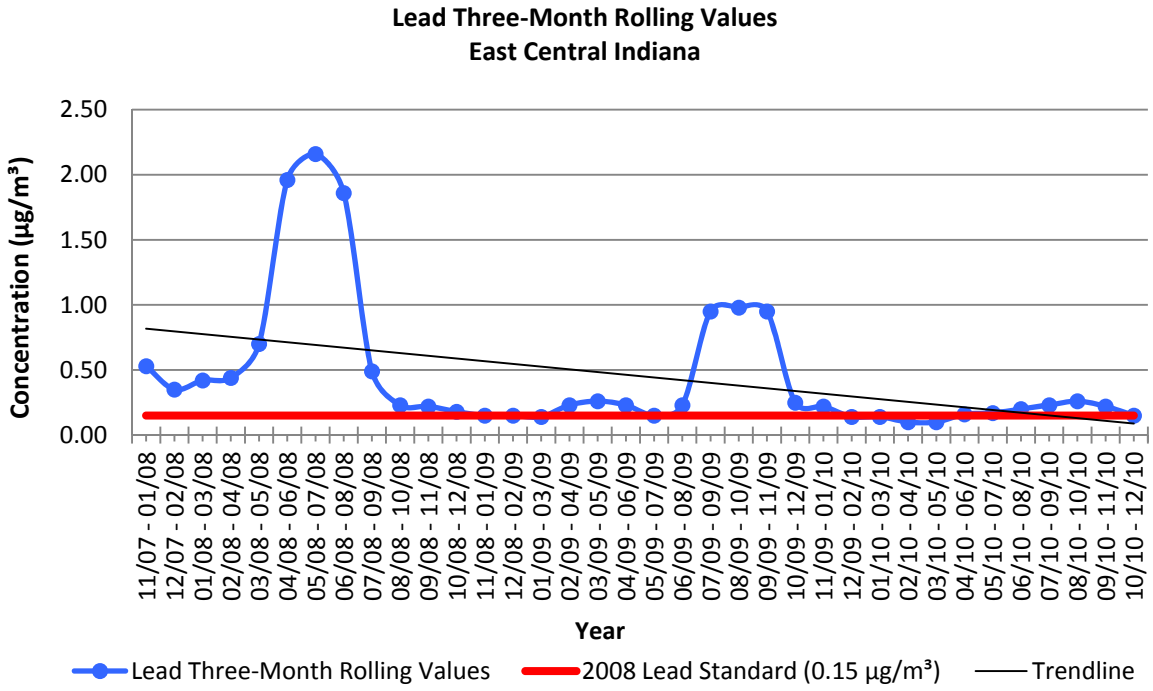


Table 10: East Central Indiana Three-Month Lead Monitoring Data Summary

County	Site #	Site Name	Three-Month Average (µg/m^3)											
			11/07-01/08	12/07-02/08	01/08-03/08	02/08-04/08	03/08-05/08	04/08-06/08	05/08-07/08	06/08-08/08	07/08-09/08	08/08-10/08	09/08-11/08	10/08-12/08
Delaware	180350008	Muncie-Exide West Site	0.09	0.06	0.11	0.33	0.34	0.28	0.07	0.06	0.12	0.14	0.12	0.07
Delaware	180350009	Muncie-Exide East Site	0.53	0.35	0.42	0.44	0.70	1.96	2.16	1.86	0.49	0.23	0.22	0.18
Delaware	180350009	Muncie-Mt. Pleasant Blvd												
County	**Site #**	**Site Name**	**11/08-01/09**	**12/08-02/09**	**01/09-03/09**	**02/09-04/09**	**03/09-05/09**	**04/09-06/09**	**05/09-07/09**	**06/09-08/09**	**07/09-09/09**	**08/09-10/09**	**09/09-11/09**	**10/09-12/09**
Delaware	180350008	Muncie-Exide West Site	0.06	0.05	0.07	0.08	0.08	0.08	0.08	0.10	0.11	0.10	0.09	0.06
Delaware	180350009	Muncie-Exide East Site	0.15	0.15	0.14	0.23	0.26	0.23	0.15	0.23	0.95	0.98	0.95	0.25
Delaware	180350009	Muncie-Mt. Pleasant Blvd												
County	**Site #**	**Site Name**	**11/09-01/10**	**12/09-02/10**	**01/10-03/10**	**02/10-04/10**	**03/10-05/10**	**04/10-06/10**	**05/10-07/10**	**06/10-08/10**	**07/10-09/10**	**08/10-10/10**	**09/10-11/10**	**10/10-12/10**
Delaware	180350008	Muncie-Exide West Site												
Delaware	180350009	Muncie-Exide East Site	0.22	0.14	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Delaware	180350009	Muncie-Mt. Pleasant Blvd			0.14	0.10	0.10	0.16	0.17	0.20	0.23	0.26	0.22	0.15

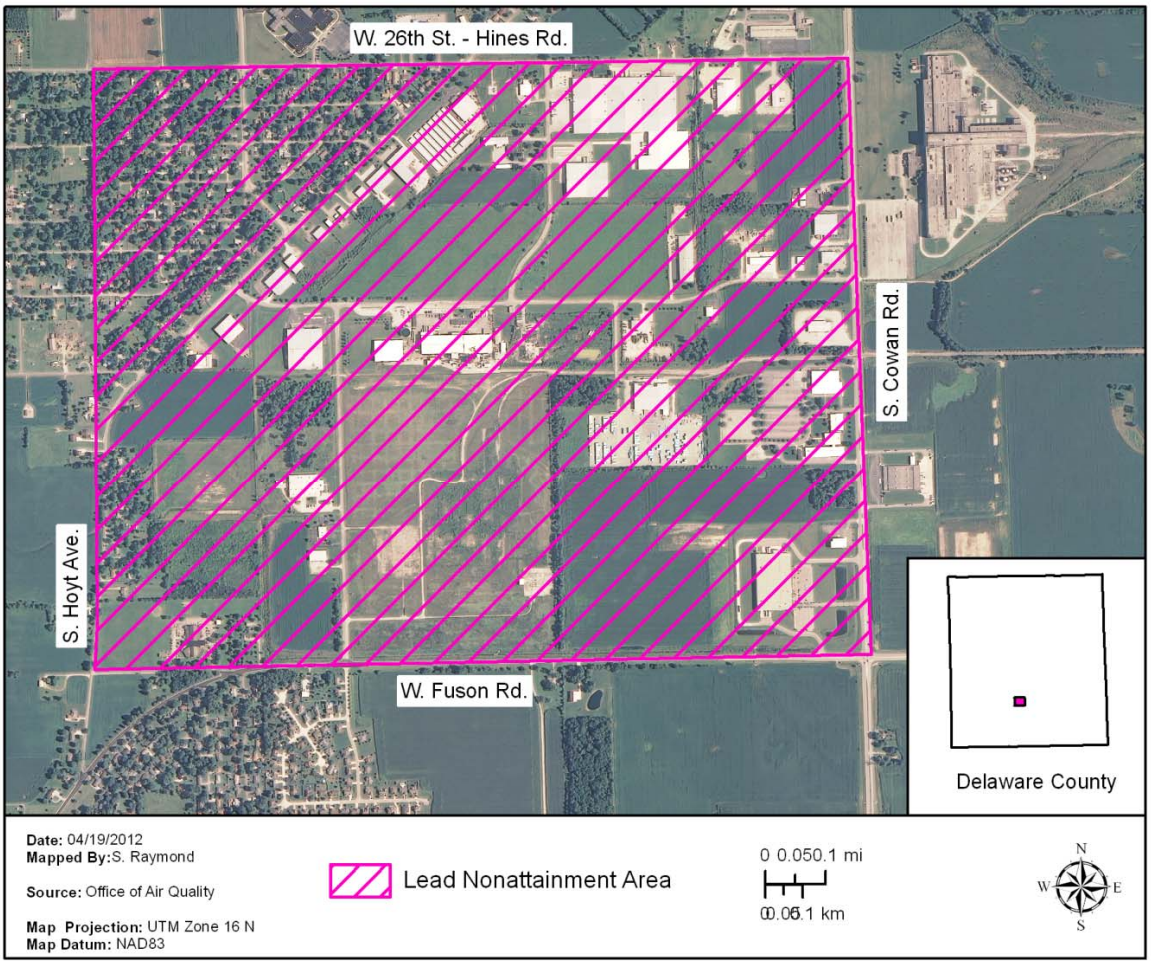
Highlighted red numbers are rolling three-month averages above the 2008 lead standard of 0.15 µg/m^3

Lead monitors are located in close proximity to major sources in the area and data will fluctuate based on variability in facility operations and meteorology. The two lead monitors in East Central Indiana are located in close proximity to the Exide Technologies facility in the City of Muncie in Delaware County. Exide Technologies is one of the world's largest producers and recyclers of lead-acid batteries, and the Exide Technologies' facility in Muncie is the largest source of lead emissions in the East Central Indiana area.

As Graph 9 illustrates, lead values in East Central Indiana were above the primary and secondary 1978 lead standards in 2004 and 2008. The high values in 2004 were due to a fire in the baghouse, and the high values in 2008 were due to an acute incident at the facility's rotary dryer. Exide Technologies has taken corrective action related to those incidents and has implemented steps to prevent recurrences. However, as a result of the high values in 2008, lead values in East Central Indiana are also above the primary and secondary 2008 lead standards as shown in Graph 10.

In November 2010, U.S. EPA designated a small portion of Delaware County as nonattainment for lead. As shown in Figure 3, the area includes the Exide Technologies facility and is bounded by the following city streets: West 26th Street/Hines Road to the north, Cowan Road to the east, West Fuson Road to the south, and South Hoyt Avenue (extended to West 26th Street and including the purple area in Figure 3) to the west.

Figure 3: Muncie Area Designated Nonattainment for Lead



The nonattainment area was established in the immediate vicinity of Exide Technologies because lead is a heavy metal and airborne lead emissions do not travel far from the source of the emissions. Therefore, population exposure to airborne lead is minimal beyond the small area surrounding the facility. Emissions from the Exide Technologies facility are from point sources and fugitive sources. Point source emissions at the facility are from a single, identifiable area, such as a stack or a vent. Point source emissions are minimized by pollution control devices and have not historically exceeded the permitted lead emission limits at the Exide Technologies facility. Fugitive source emissions are not released from a single point and are not minimized by pollution control technology. Exide Technologies continues to make improvements to their facility in order to minimize all potential fugitive lead emissions and, thereby, reduce monitored lead levels in the future.

Historically, the majority of lead emissions came from motor vehicle fuels. As a result of U.S. EPA's regulatory efforts to remove lead from motor vehicle gasoline, emissions of lead from the transportation sector declined by 95% between 1980 and 1999, and levels of lead in the air decreased by 94% between 1980 and 1999.

For information on lead standards, sources, health effects, and programs to reduce lead, please see www.epa.gov/air/lead.

Nitrogen Dioxide (NO_2)

There are no monitoring sites within the East Central Indiana area that measure NO_2 levels. U.S. EPA's NEI contains emissions information for NO_x and is used for Graph 11 and Chart 5. NO_x emissions data are used as a surrogate for NO_2 in conjunction with the NO_2 NAAQS. Graph 11 illustrates the emissions trend for NO_x in East Central Indiana and Chart 5 shows how the average emissions are distributed among the different source categories. NO_x emissions in the East Central Indiana area have been trending downward over time. If monitoring data for NO_2 were available in the East Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 11: East Central Indiana NO_x Emissions

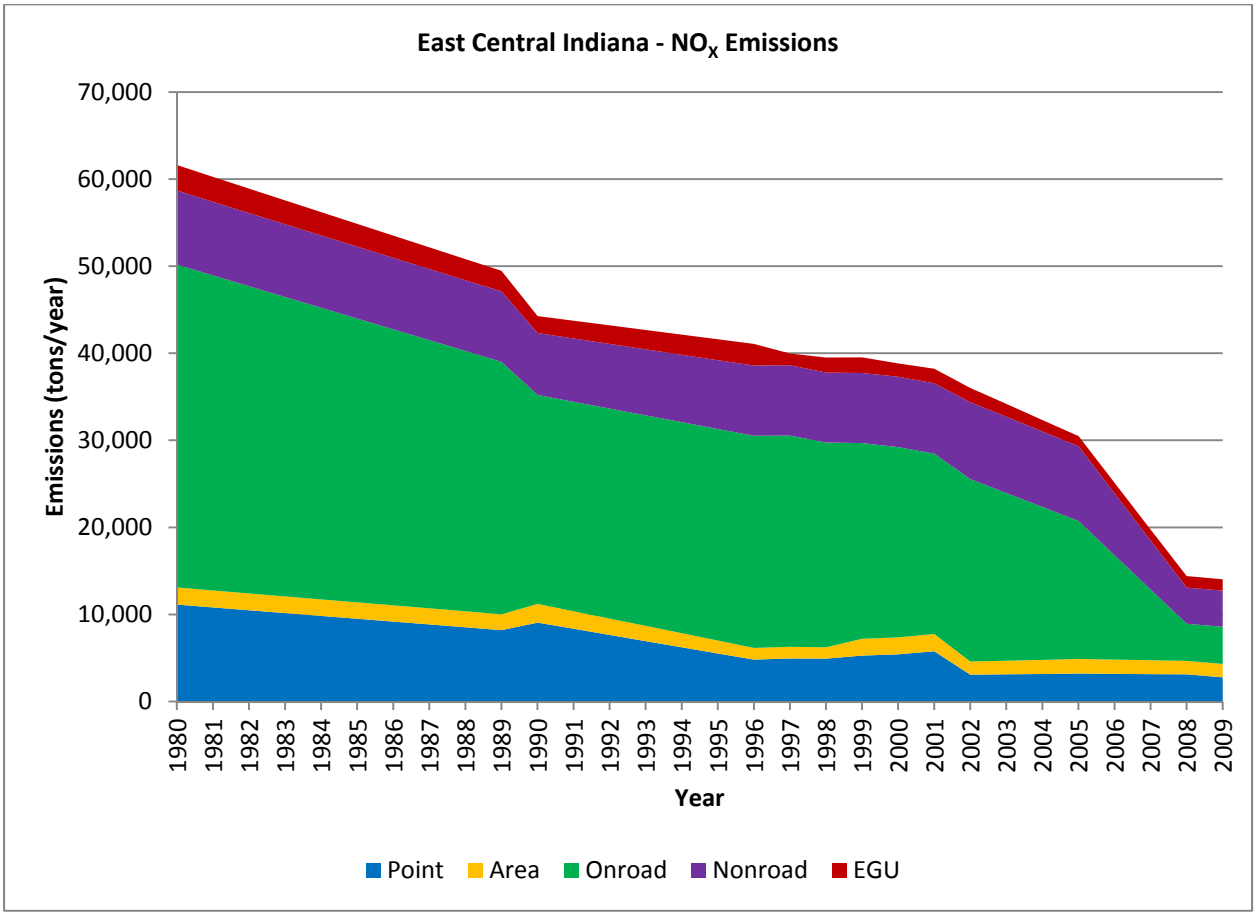
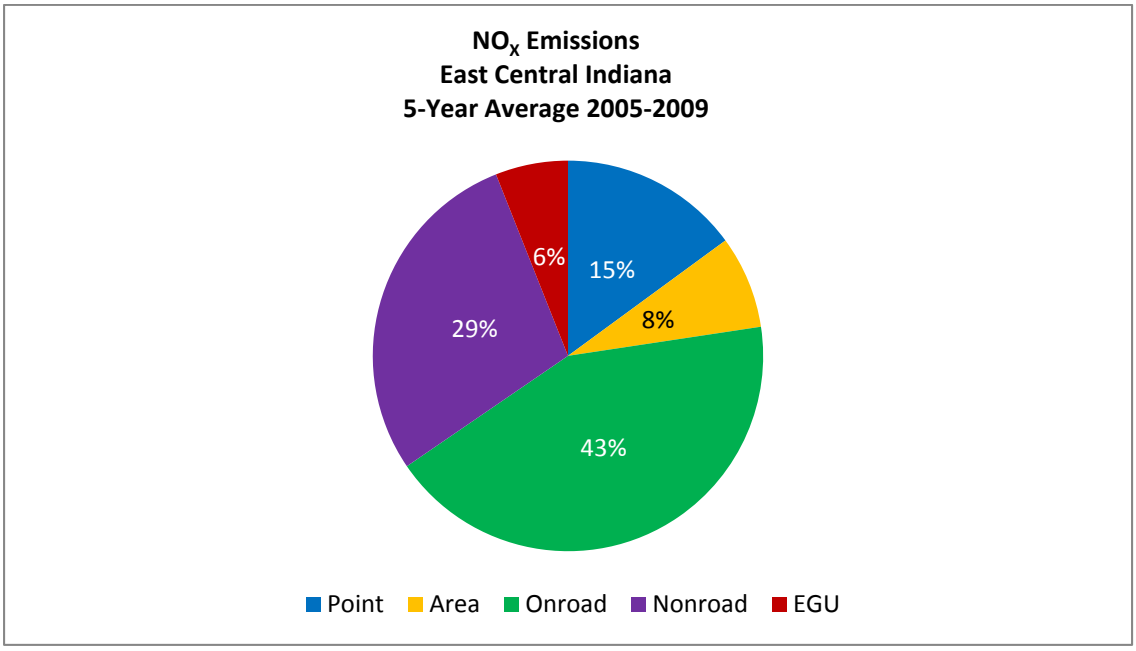


Chart 5: East Central Indiana NO_x Emissions



National and regional controls, such as the Acid Rain Program, engine and fuel standards, and the NO_x SIP Call have led to a decrease in NO_x values over time. As Graph 11 illustrates, NO_x emissions have decreased by 77% within the East Central Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. According to U.S. EPA, average NO_x concentrations have decreased by more than 40% nationally since 1980.

For information on NO_2 standards, sources, health effects, and programs to reduce NO_2, please see www.epa.gov/airquality/nitrogenoxides/.

Ozone

Two monitoring sites within East Central Indiana measure ozone levels and are located in Delaware and Madison counties. Primary and secondary ozone 1-hour ozone standards were first established in April 1979 at 0.12 ppm. Based on U.S. EPA's published data guidelines, values above 0.124 ppm were deemed to be in violation of the standard. The trend data in Graph 12 reflect the 4th highest monitored concentration for 1-hour ozone within a given three-year period from all of the monitors in the East Central Indiana area is plotted on the graph for each year. These values were used to determine attainment of the primary and secondary 1-hour ozone standards before they were revoked in June 2005.

In July 1997, U.S. EPA established the primary and secondary 8-hour ozone standards at 0.08 ppm. Based on the U.S. EPA's published data handling guidelines, values above 0.084 ppm were deemed to be in violation of the standard. U.S. EPA lowered the primary and secondary 8-hour ozone standards to 0.075 ppm in March 2008. Attainment of the primary and secondary 8-hour ozone standards is determined by evaluating the design value of the 4th highest 8-hour ozone concentration measured at each monitor within an area over each year, which must not exceed 0.075 ppm. An exceedance of the standards occurs when an 8-hour ozone value is equal to or greater than 0.075 ppm. A violation of the standards occurs when the design value of the three-year average of the 4th highest 8-hour ozone value is equal to or greater than 0.076 ppm. A monitor can exceed the standards without being in violation.

The trend data in Graph 13 reflect the 4th high and the highest 4th high concentration for 8-hour ozone from all of the monitors in the East Central Indiana area for each year. The design value of the three-year average of the 4th highest 8-hour ozone values is used for comparison to the 8-hour ozone standard; therefore, the one-year values in Graph 13 are not a true comparison to the primary and secondary 8-hour ozone standards. The values in Graph 14 reflect the design value of the three-year average of the 4th highest 8-hour ozone values from the monitors for each year.

The data in Tables 11 and 12 are from all of the monitoring sites in the East Central Indiana area that measured 1-hour ozone from 2000 through 2010. Monitoring data in Table 11 show the four highest annual concentrations for 1-hour ozone for the years 2000 through 2010. Monitoring data in Table 12 show the 4th highest concentration for 1-hour ozone in a three year period for the years 2000 through 2010. The data in Tables 13 and 14 are from all of the monitoring sites in the East Central Indiana area that measured 8-hour ozone from 2000 through 2010. Monitoring data in Table 13 show the 4th highest concentration for 8-hour ozone in a three-year period for the years 2000 through 2010. Monitoring data in Table 14 show the design value of the three-year average of the 4th highest 8-hour ozone values for the years 2000 through 2010, which are compared to the primary and secondary 8-hour ozone standards at 0.08 ppm.

Table 11: East Central Indiana 1-Hour Ozone Annual 4th High Value Monitoring Data Summary

County	Site #	Site Name	1-Hour Ozone Value (ppm)											
			1st High 2000	2nd High 2000	3rd High 2000	4th High 2000	1st High 2001	2nd High 2001	3rd High 2001	4th High 2001	1st High 2002	2nd High 2002	3rd High 2002	4th High 2002
Delaware	180350010	Albany					0.105	0.102	0.098	0.097	0.108	0.104	0.102	0.101
Madison	180950010	Emporia	0.095	0.089	0.088	0.087	0.125	0.109	0.104	0.104	0.121	0.114	0.114	0.112
			1st High 2003	2nd High 2003	3rd High 2003	4th High 2003	1st High 2004	2nd High 2004	3rd High 2004	4th High 2004	1st High 2005	2nd High 2005	3rd High 2005	4th High 2005
Delaware	180350010	Albany	0.106	0.097	0.095	0.095	0.089	0.088	0.085	0.082	0.108	0.096	0.090	0.087
Madison	180950010	Emporia	0.110	0.106	0.101	0.100	0.094	0.085	0.084	0.078	0.100	0.097	0.091	0.090
			1st High 2006	2nd High 2006	3rd High 2006	4th High 2006	1st High 2007	2nd High 2007	3rd High 2007	4th High 2007	1st High 2008	2nd High 2008	3rd High 2008	4th High 2008
Delaware	180350010	Albany	0.082	0.082	0.081	0.079	0.095	0.093	0.090	0.088	0.076	0.071	0.068	0.068
Madison	180950010	Emporia	0.094	0.093	0.086	0.083	0.093	0.090	0.090	0.087	0.081	0.078	0.076	0.072
			1st High 2009	2nd High 2009	3rd High 2009	4th High 2009	1st High 2010	2nd High 2010	3rd High 2010	4th High 2010				
Delaware	180350010	Albany	0.078	0.074	0.074	0.073	0.079	0.075	0.074	0.073				
Madison	180950010	Emporia	0.080	0.072	0.071	0.070	0.076	0.075	0.075	0.075				

Graph 12: East Central Indiana 1-Hour Ozone 4th Highest Value in Three-Year Period

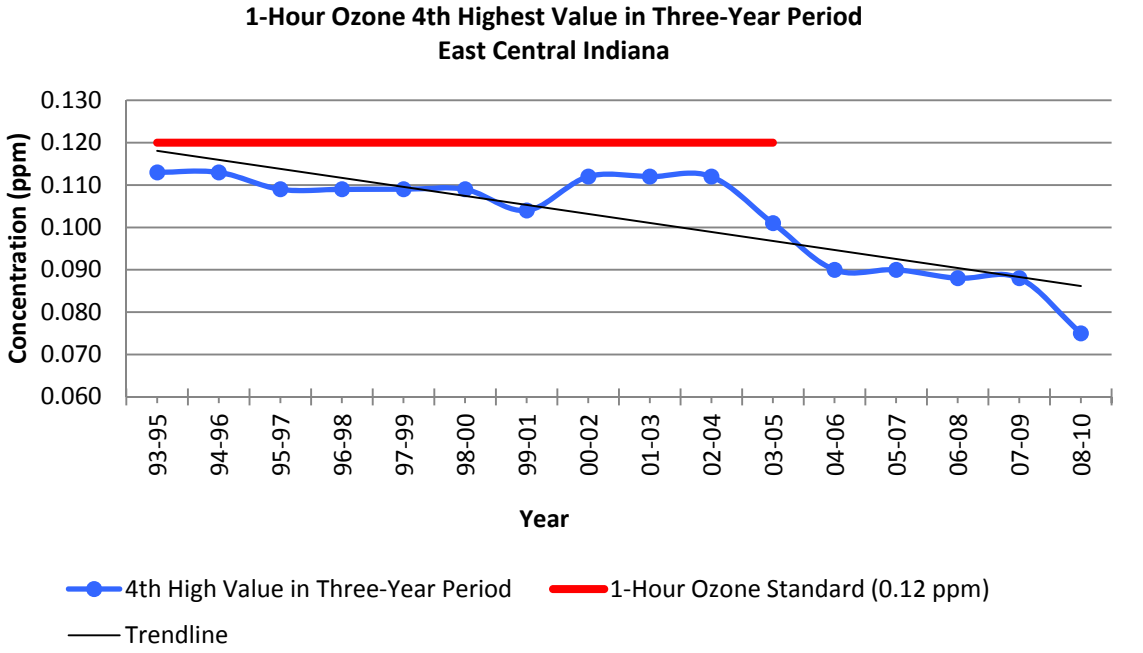


Table 12: East Central Indiana 1-Hour Ozone 4th High Value in Three-Year Period Monitoring Data Summary

County	Site #	Site Name	4th High Value in Three-Year Period (ppm)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Delaware	180350010	Albany		0.101	0.101	0.095	0.087	0.088	0.088	0.088	0.073
Madison	180950010	Emporia	0.112	0.112	0.112	0.100	0.090	0.090	0.087	0.087	0.079

Graph 13: East Central Indiana 8-Hour Ozone 4th High Values

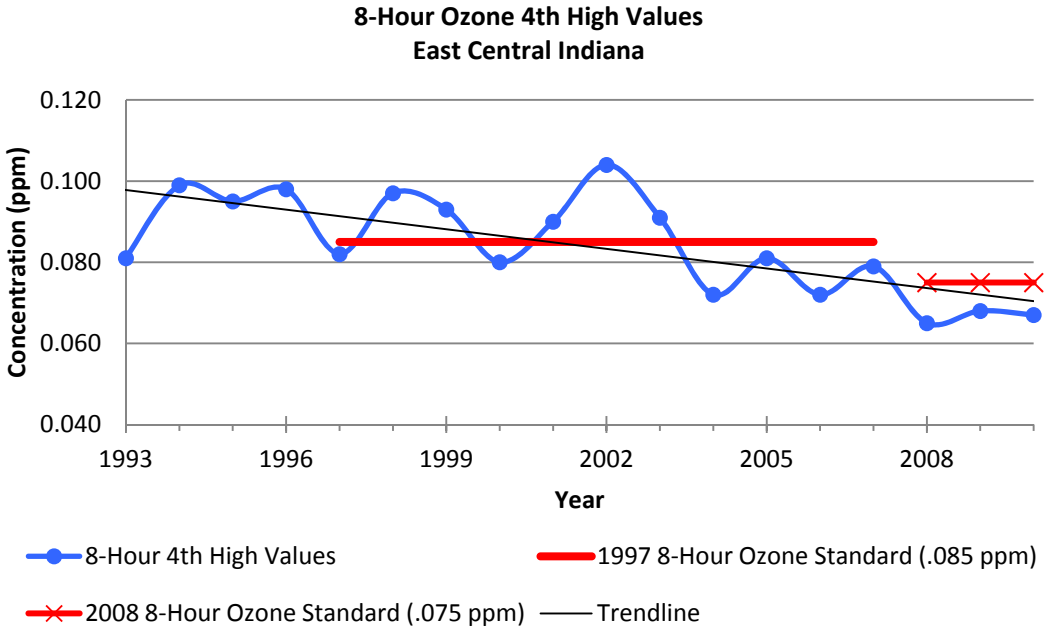


Table 13: East Central Indiana 8-Hour Ozone 4th High Values Monitoring Data Summary

County	Site #	Site Name	4th Highest Ozone Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Delaware	180350010	Albany		0.084	0.095	0.085	0.070	0.081	0.072	0.079	0.062	0.068	0.067
Madison	180950010	Emporia	0.08	0.090	0.104	0.091	0.072	0.078	0.072	0.078	0.065	0.064	0.065

Graph 14: East Central Indiana 8-Hour Ozone Three-Year Design Values

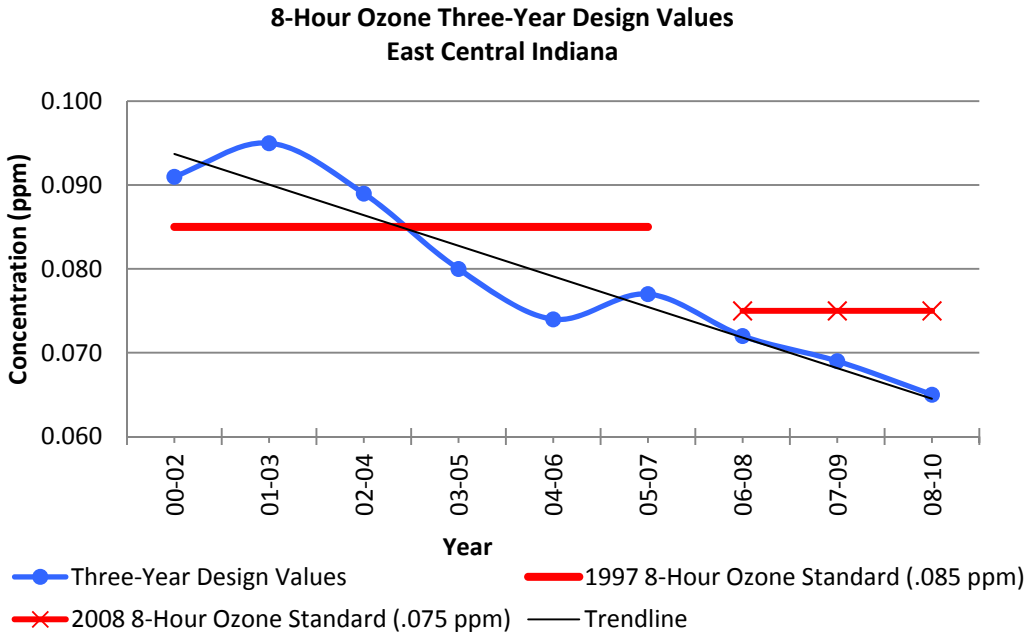


Table 14: East Central Indiana 8-Hour Ozone Three-Year Design Value Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (ppm)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Delaware	180350010	Albany		0.088	0.083	0.078	0.074	0.077	0.071	0.069	0.065
Madison	180950010	Emporia	0.091	0.095	0.089	0.080	0.074	0.076	0.072	0.069	0.064
			Prior to 2008, highlighted red numbers are above the 8-hour O_3 standard of 0.085 ppm								
			Beginning in 2008, highlighted red numbers are above the 8-hour O_3 standard of 0.075 ppm								

While fluctuations in monitoring data can be seen in Graphs 12, 13, and 14, monitoring data for both 1-hour and 8-hour ozone indicate a downward trend over time. Because ozone is formed by the secondary reaction of precursor pollutants, it is heavily influenced by meteorology (wind speed, temperature, stagnant air, etc.) and during an ozone season when peak meteorology conditions exist, it is not unusual to see an increase in ozone. The high spikes in ozone in 2002, 2005, and 2007 seen in Graph 13 can be traced back to high temperatures and stagnant weather conditions during the ozone seasons of those years.

Tables 11, 12, 13, and 14 demonstrate that the 1-hour and 8-hour ozone values for the East Central Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the others do as well. Monitor values for 8-hour ozone in East Central Indiana were in violation of the 8-hour ozone standard until the end of 2004, but are now well below the 8-hour ozone standard.

Ozone is not emitted directly into the air, but is created in the lower atmosphere. NO_x and VOC chemically react individually or collectively in the presence of sunlight to form ground-level ozone. U.S. EPA's NEI contains emissions information for NO_x and VOC and is used in the following graphs and charts. Graphs 15 and 16 illustrate the emission trends for the ozone precursors in East Central Indiana and Charts 6 and 7 show how the average emissions are distributed among the different source categories.

Graph 15: East Central Indiana NO_x Emissions

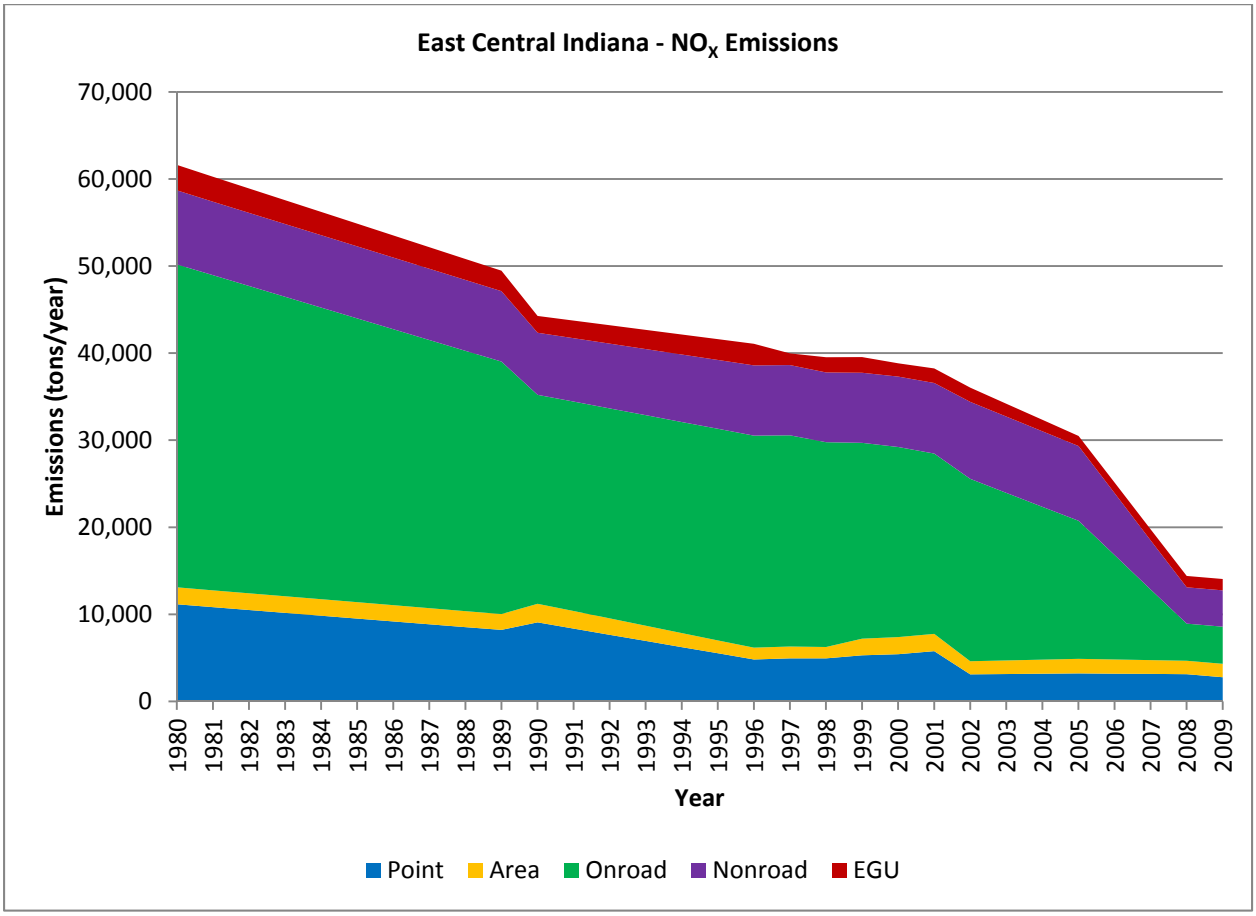
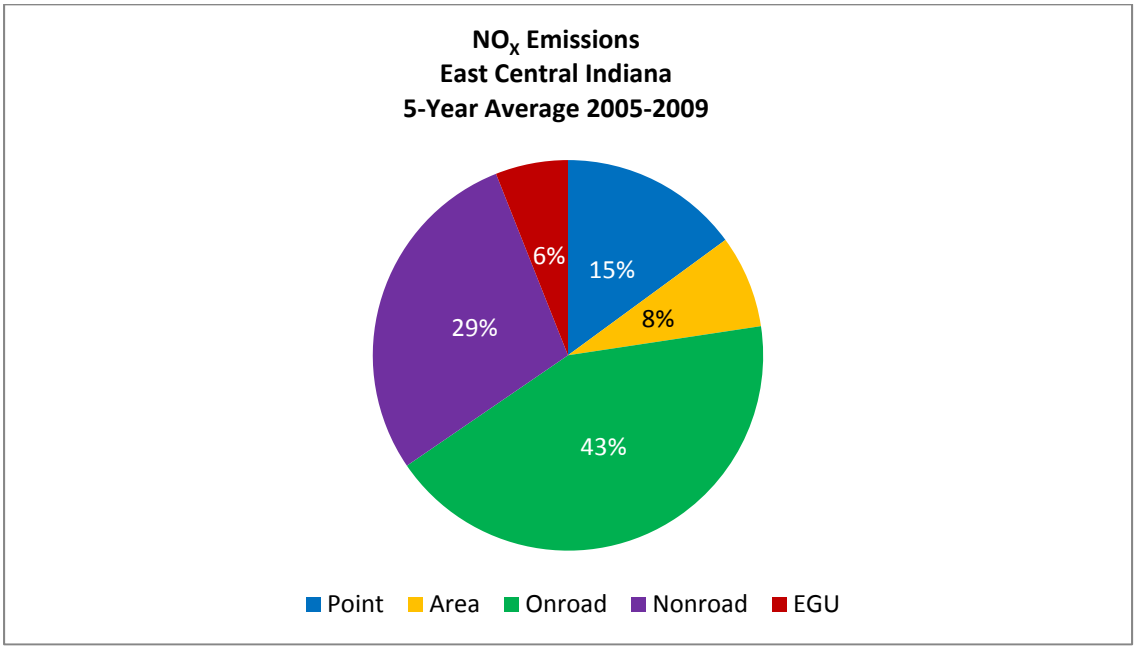


Chart 6: East Central Indiana NO_x Emissions



Graph 16: East Central Indiana VOC Emissions

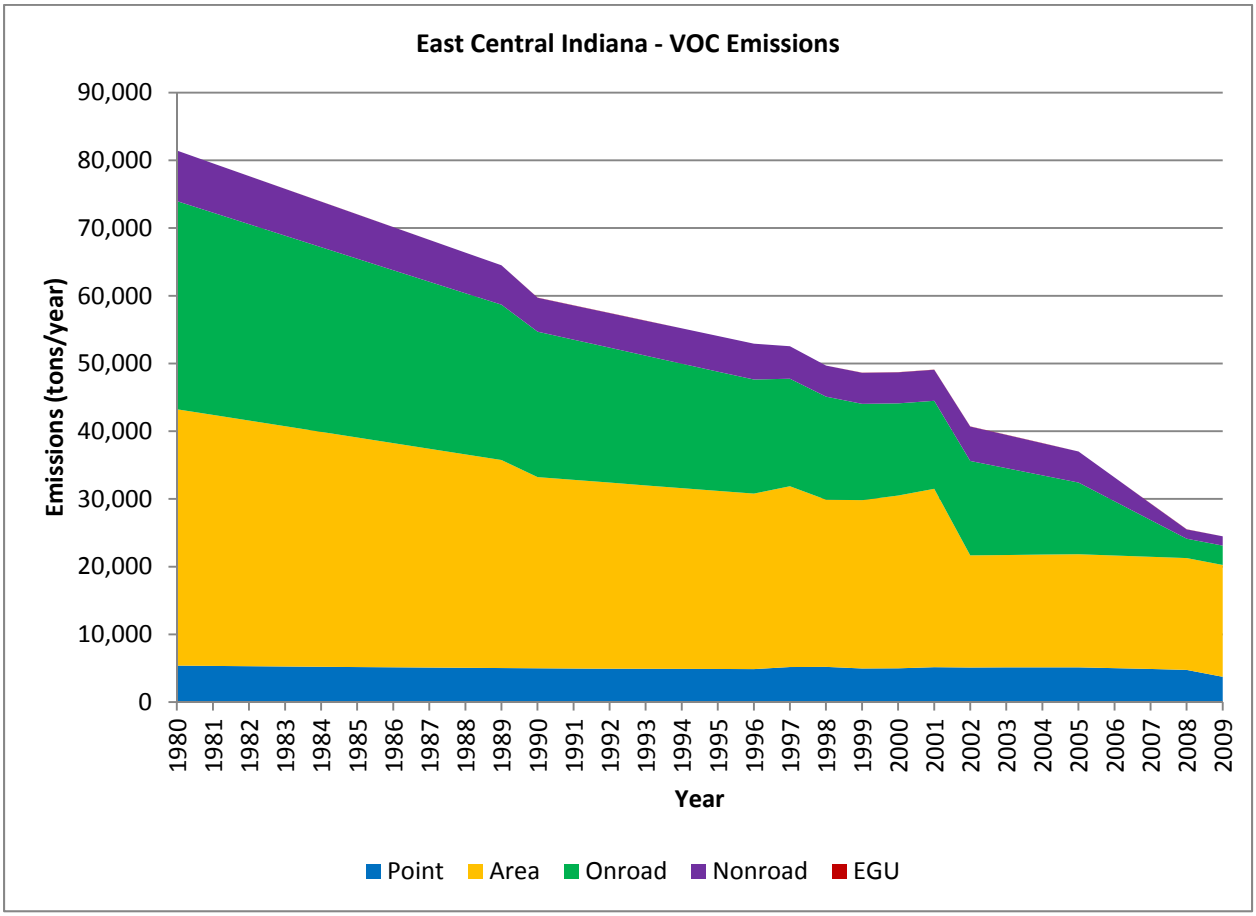
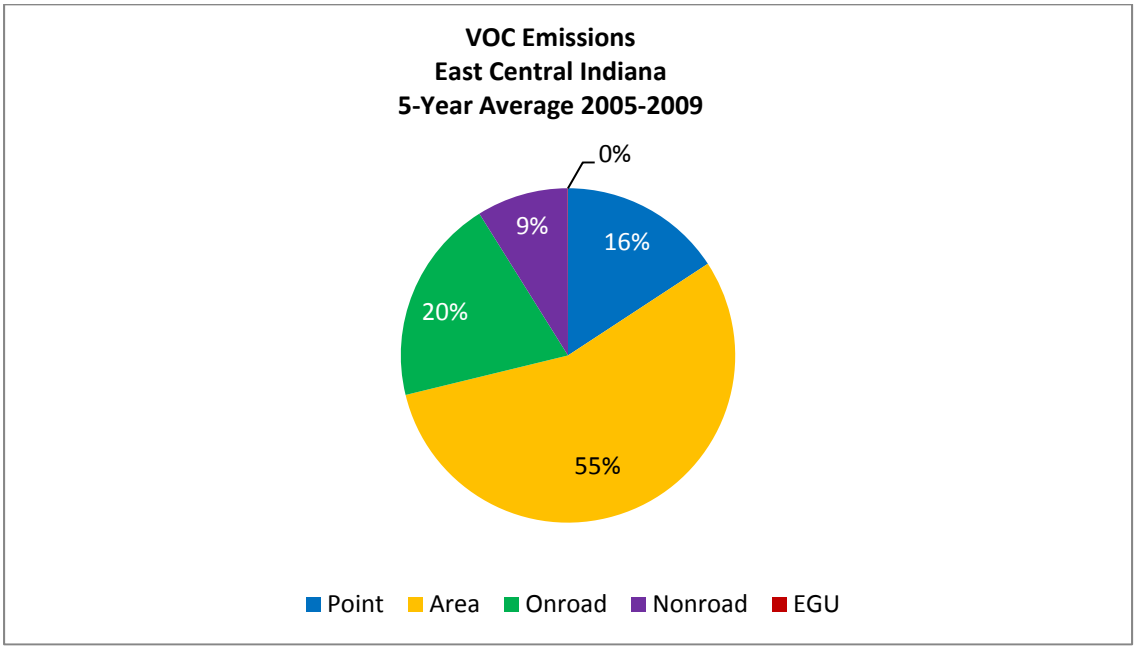


Chart 7: East Central Indiana VOC Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in ozone precursor emissions over time. As Graphs 15 and 16 illustrate, NO_x and VOC emissions have decreased by 77% and 70%, respectively, within the East Central Indiana area since 1980. This trend is true for the key precursors of ozone throughout Indiana and the upper Midwest. Reductions in NO_x and VOC emissions are also attributable to the implementation of the federal engine and fuel standards for onroad and nonroad vehicles and equipment, and the NO_x SIP Call beginning in 2004. Nationally, average ozone levels declined in the 1980's, leveled off in the 1990's, and showed a notable decline after 2004 with the implementation of the NO_x SIP Call.

For information on ozone standards, sources, health effects, and programs to reduce ozone, please see www.epa.gov/air/ozonepollution.

Particulate Matter (PM_{10})

Monitoring data for PM_{10} in East Central Indiana are available from monitors that were located in Madison and Wayne counties. The trend data in Graph 17 reflect the annual arithmetic mean which is used to compare to the primary and secondary annual PM_{10} standards of 50 µg/m^3. The highest value from all of the monitors in the East Central Indiana area is plotted on the graph for each year. The annual PM_{10} standard was revoked in October 2006. The trend data in Graph 18 reflect the 2nd highest 24-hour PM_{10} concentration, which is used to compare to the primary and secondary 24-hour PM_{10} standards of 150 µg/m^3. Attainment of the primary and secondary 24-hour PM_{10} standards is determined by evaluating the 2nd highest 24-hour concentrations and is attained when the number of days per year with a 24-hour average above 150 µg/m^3 is equal to or less than 1 per year in a three-year period. The highest 2nd high concentration from all of the monitors in the East Central Indiana area is plotted on the graph for each year.

While there is some variability in the monitoring data for both the annual and 24-hour PM_{10} values, a downward trend over time is demonstrated in Graphs 17 and 18. The monitoring data in East Central Indiana have been below both the primary and secondary annual PM_{10} standards, as well as the primary and secondary 24-hour PM_{10} standards. PM_{10} monitors were located in close proximity to major sources in the area and data will fluctuate based on variability in facility operations and meteorology.

The data shown in Tables 15 and 16 include the monitoring sites that measured annual and 24-hour PM_{10} from 2000 through 2010. Monitoring data for both annual and 24-hour PM_{10} prior to the year 2000 are available upon request. Monitoring data in Table 15 are compared to the primary and secondary annual PM_{10} standards of 50 µg/m^3 and show that the East Central Indiana area has always been below the standards. Monitoring data in Table 16 are compared to the primary and secondary 24-hour PM_{10} standards of 150 µg/m^3 and show that the East Central Indiana area has always been below the standards.

Graph 17: East Central Indiana Annual Arithmetic Mean PM_{10} Values

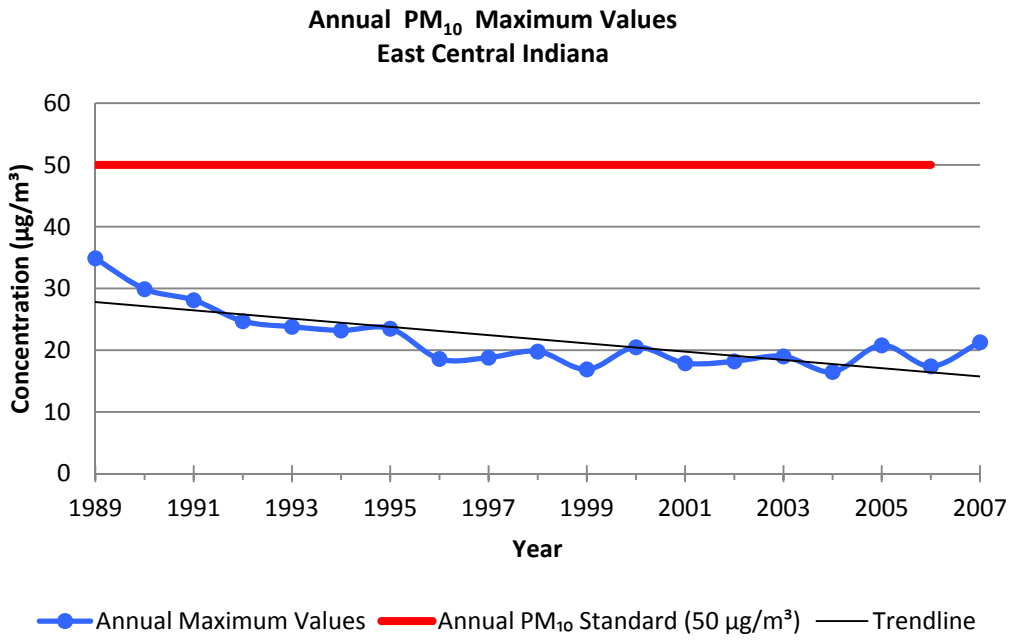


Table 15: East Central Indiana Annual PM_{10} Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Madison	180950009	Anderson - W 5th St	20.5	17.9	18.2	19.0	16.5	20.8	17.4	21.3			
Wayne	181770012	Richmond - West Side of Plant	23.7	17.5	18.8							14.1	
Wayne	181770012	Richmond - NE Side of Plant	23.4	16.5	18.0								
			Highlighted red numbers are over the annual PM_{10} standard of 50 µg/m³										

Graph 18: East Central Indiana 24-Hour PM_{10} 2nd High Values

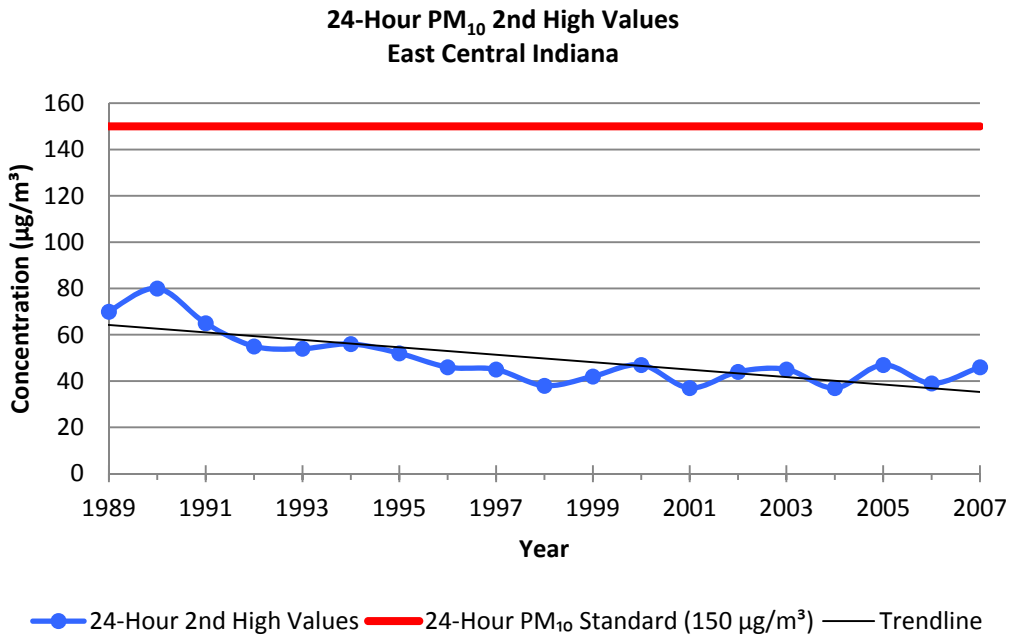


Table 16: East Central Indiana 24-Hour 2nd High PM_{10} Monitoring Data Summary

County	Site #	Site Name	24-Hour 2nd High Value (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Madison	180950009	Anderson - W 5th St	40	37	43	45	37	47	39	46			
Wayne	181770012	Richmond - West Side of Plant	45	36	44								
Wayne	181770012	Richmond - NE Side of Plant	47	36	37								
			Highlighted red numbers are over the 24-hour PM_{10} standard of 150 µg/m³										

U.S. EPA's NEI contains emissions information for PM_{10} and is used in Graph 19 and Chart 8. Graph 19 illustrates the emissions trend for PM_{10} in East Central Indiana and Chart 8 shows how the average emissions are distributed among the different source categories.

Graph 19: East Central Indiana PM_{10} Emissions

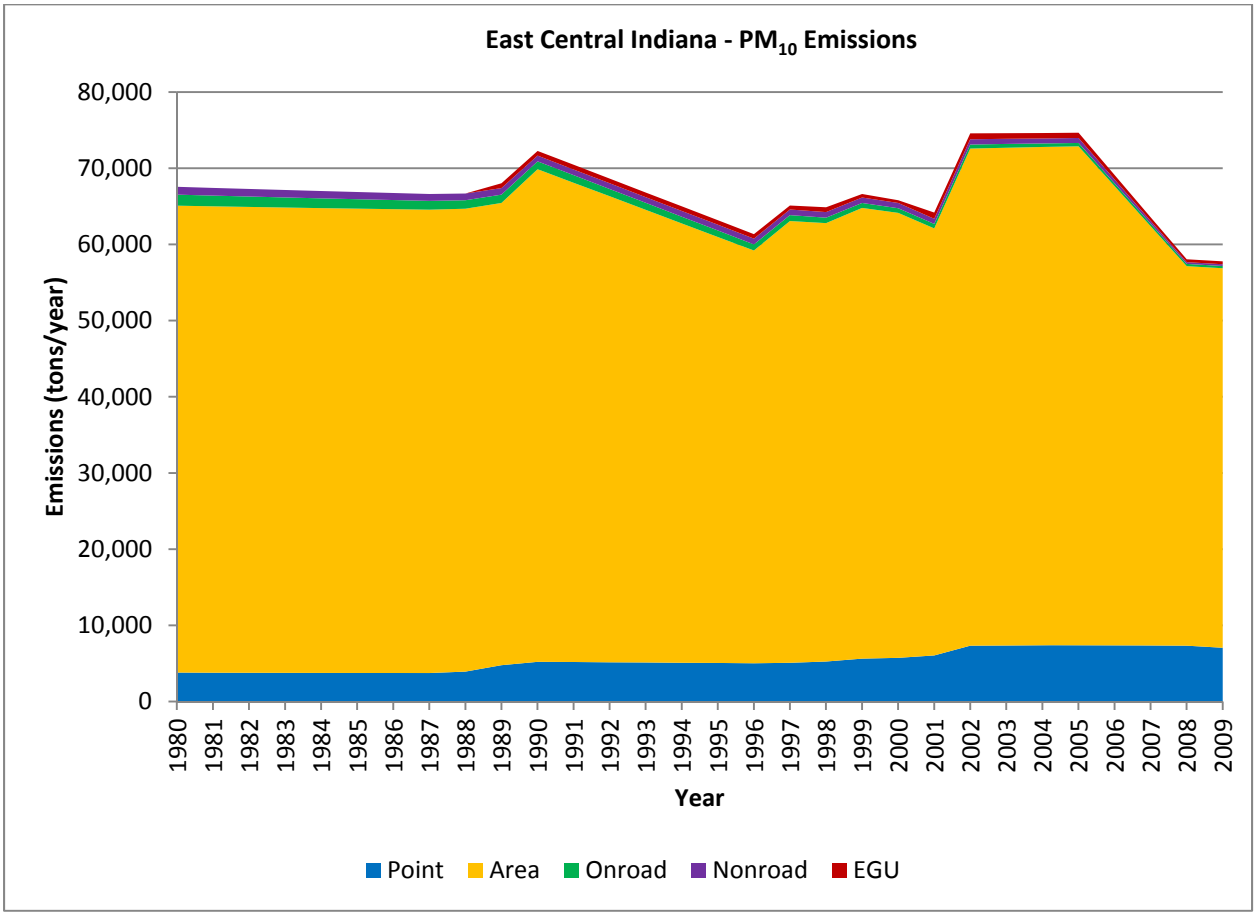
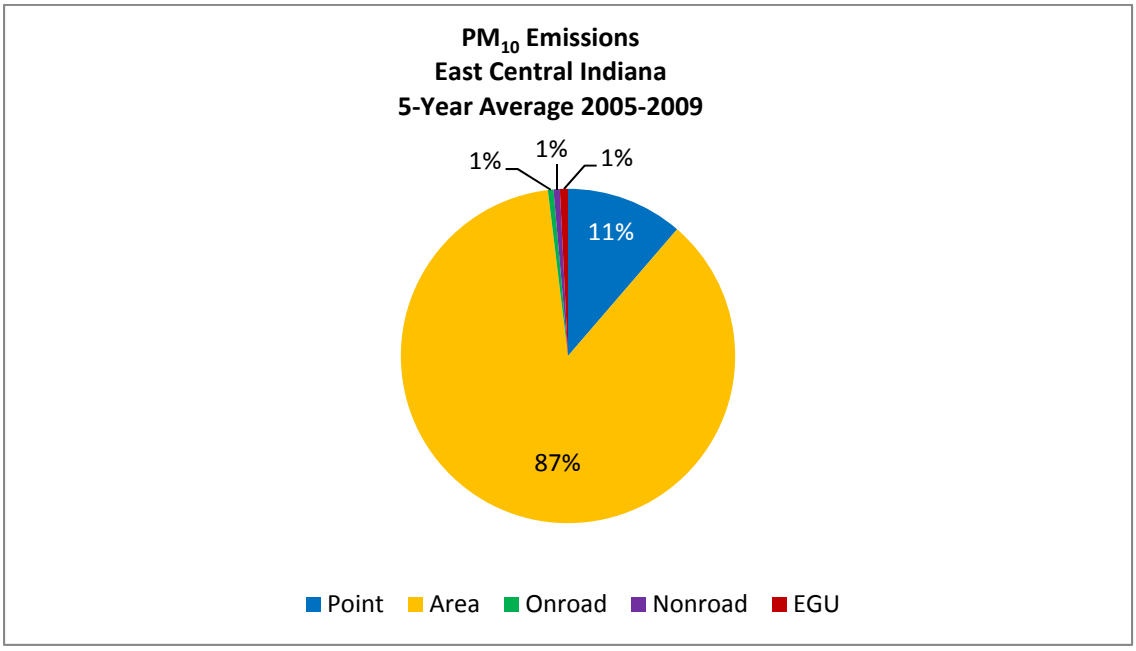


Chart 8: East Central Indiana PM_{10} Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in PM_{10} values over time. As Graph 19 illustrates, total PM_{10} emissions have decreased by 14% within the East Central Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. Reductions in PM_{10} are primarily due to better controls on local sources and secondary benefits from the implementation of federal programs to control other pollutants.

Sulfur Dioxide (SO_2)

One monitoring site within East Central Indiana currently measures SO_2 levels and is located in Wayne County. A second monitor in Wayne County also measured SO_2 levels until 2008. The trend data in Graph 20 reflect the annual arithmetic mean which was used to compare to the primary annual SO_2 standard at 0.03 ppm. Attainment of the primary annual SO_2 standard was determined by evaluating the annual arithmetic mean which could not exceed the standard. U.S. EPA revoked the primary annual SO_2 standard in June 2010 and replaced it with a 1-hour SO_2 standard. The highest annual arithmetic mean from all of the monitors in the East Central Indiana area is plotted on Graph 20 for each year.

The trend data in Graph 21 reflect the 2nd highest 24-hour SO_2 concentrations, which were used to compare to the primary 24-hour SO_2 standard at 0.14 ppm. Attainment of the primary 24-hour SO_2 standard was determined by evaluating the 2nd highest 24-hour concentration, which could not exceed the standard. U.S. EPA revoked the primary 24-hour SO_2 standard in June 2010 and replaced it with a 1-hour SO_2 standard. The highest of the 2nd high 24-hour values from all of the monitors in the East Central Indiana area is plotted on Graph 21 for each year. The trend data in Graph 22 show the 99th percentile of the 1-hour SO_2 values, which are provided for reference purposes only, because they were collected prior to the implementation of the current standard. The design value of the 99th percentile is used for comparison to the primary 1-hour SO_2 standard; therefore, the one-year values shown in Graph 22 are not a true comparison to the primary 1-hour SO_2 standard. The values in Graph 22 reflect the highest 99th percentile from all of the monitors in the East Central Indiana area which is plotted on the graph for each year. The 1-hour SO_2 standard at 75 ppb is only listed for the year 2010 on this graph since it was not established until June 2010. Attainment of the primary 1-hour SO_2 standard is determined by evaluating the design value of the 99th percentile values of the daily maximum 1-hour averages at each monitor within an area, which must not exceed 75 ppb averaged over a three-year period. The values in Graph

23 reflect the three-year design value of the 99th percentile of the daily maximum 1 hour average values for the years 2000 through 2010 from all of the monitors in the East Central Indiana area is plotted on the graph for each year. An exceedance of the primary 1-hour SO_2 standard occurs when a 99th percentile value is equal to or greater than 75 ppb. A violation of the primary 1-hour SO_2 standard occurs when the three-year design value of the 99th percentile is equal to or greater than 75.5 ppb. A monitor can exceed the standard without being in violation.

The data in Tables 17, 18, 19, and 20 include the monitoring sites that measured annual, 24-hour, and 1-hour SO_2 from 2000 through 2010. Monitoring data for SO_2 prior to the year 2000 are available upon request. Monitoring data for all graphs display a downward trend over time. The monitor values for East Central Indiana have always been historically below the primary annual and 24-hour SO_2 standards.

Monitoring data in Table 17 show the annual arithmetic mean for the years 2000 through 2010 which were compared to the primary annual SO_2 standard of 0.03 ppm. Monitoring data in Table 18 show the 2nd highest 24-hour value for the years 2000 through 2010 which was compared to the primary 24-hour SO_2 standard of 0.14 ppm.

Monitoring data in Table 19 show the 1-hour 99th percentile values for the years 2000 through 2010. Monitoring data in Table 20 show the design value of the 99th percentile for the years 2000 through 2010 which are compared to the new primary 1-hour SO_2 standard at 75 ppb. In Tables 17, 18, and 20 values above the standards have been highlighted. The 1-hour SO_2 data prior to the 2008-2010 design value were not compared to any standard and the 99th percentile and design values from 2000 to 2007 are included for reference purposes only.

Graph 20: East Central Indiana Annual Arithmetic Mean SO_2 Values

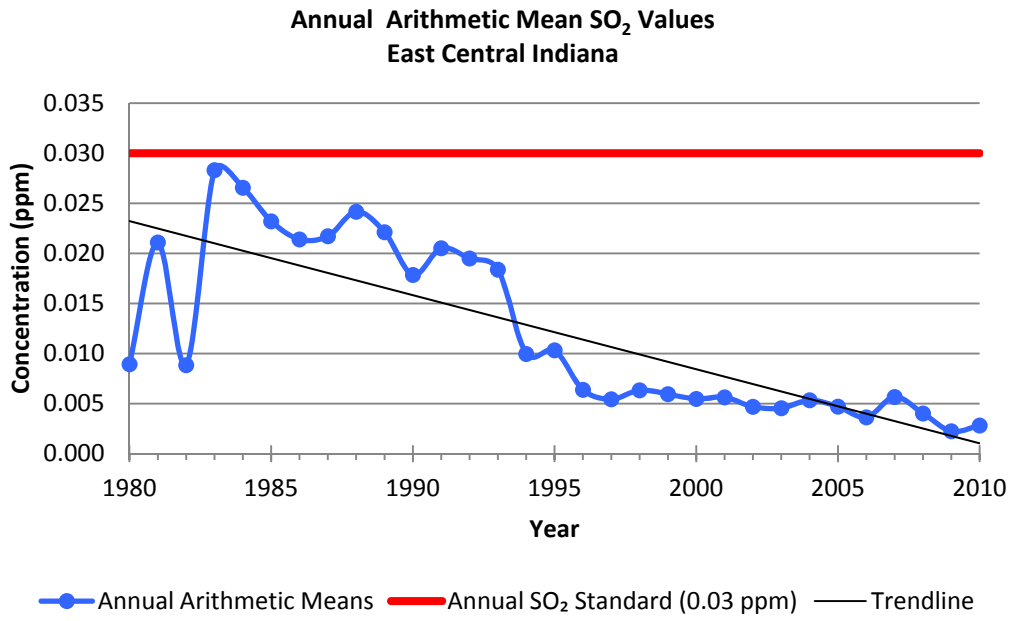


Table 17: East Central Indiana Annual Arithmetic Mean SO_2 Values Monitoring Data Summary

County	Site ID	Site Name	Annual Arithmetic Mean (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Wayne	181770006	Richmond - S 9th St	0.005	0.006	0.005	0.005	0.005	0.005	0.004	0.006	0.004	0.002	0.003
Wayne	181770007	Richmond - Boston Pike	0.005	0.005	0.004	0.004	0.005	0.004	0.003	0.003	0.004		
			Highlighted red numbers are above the annual SO_2 standard of 0.03 ppm										

Graph 21: East Central Indiana 24-Hour SO_2 2nd High Values

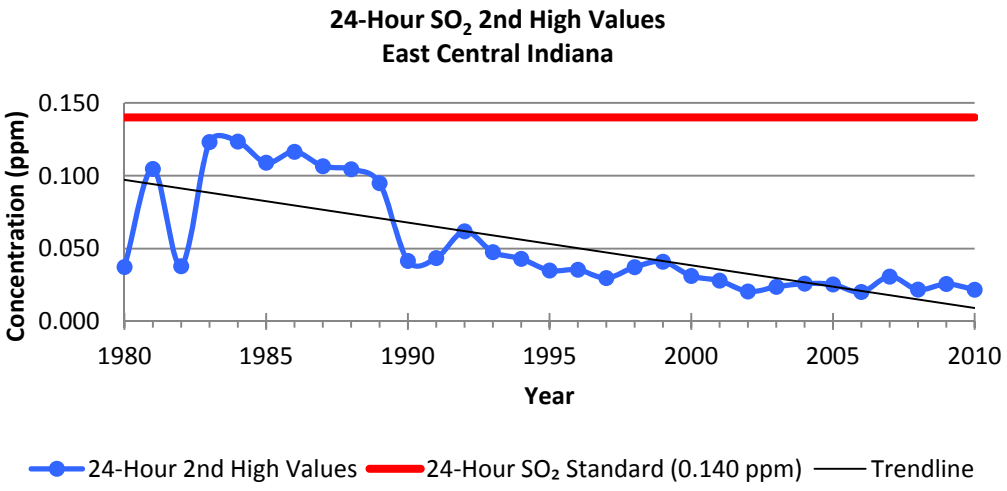


Table 18: East Central Indiana 24-Hour SO_2 2nd High Values Monitoring Data Summary

County	Site ID	Site Name	2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Wayne	181770006	Richmond - S 9th St	0.024	0.024	0.021	0.024	0.026	0.023	0.020	0.031	0.022	0.026	0.022
Wayne	181770007	Richmond - Boston Pike	0.031	0.028	0.018	0.022	0.026	0.025	0.013	0.021	0.016		
			Highlighted red numbers are over the 24-hour SO_2 standard of 0.14 ppm										

Graph 22: East Central Indiana 1-Hour SO_2 99th Percentile Values

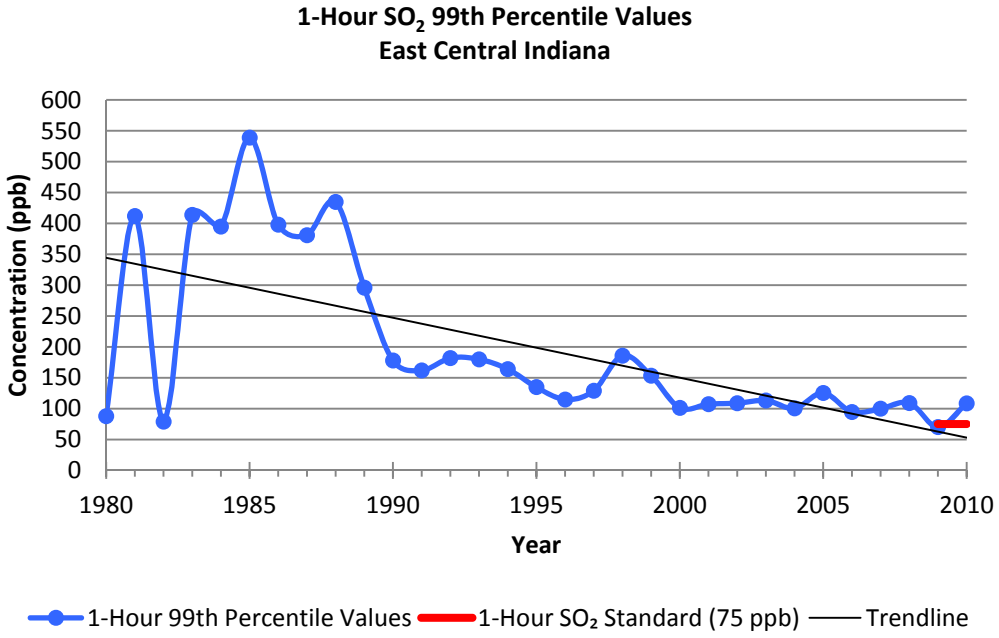


Table 19: East Central Indiana 1-Hour 99th Percentile SO_2 Monitoring Data Summary

County	Site ID	Site Name	99th Percentile Values (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Wayne	181770006	Richmond - S 9th St	101	107	109	96	101	126	95	100	109	70	109
Wayne	181770007	Richmond - Boston Pike	101	102	94	113	96	91	67	96	104		

Graph 23: East Central Indiana 1-Hour SO_2 Three-Year Design Values

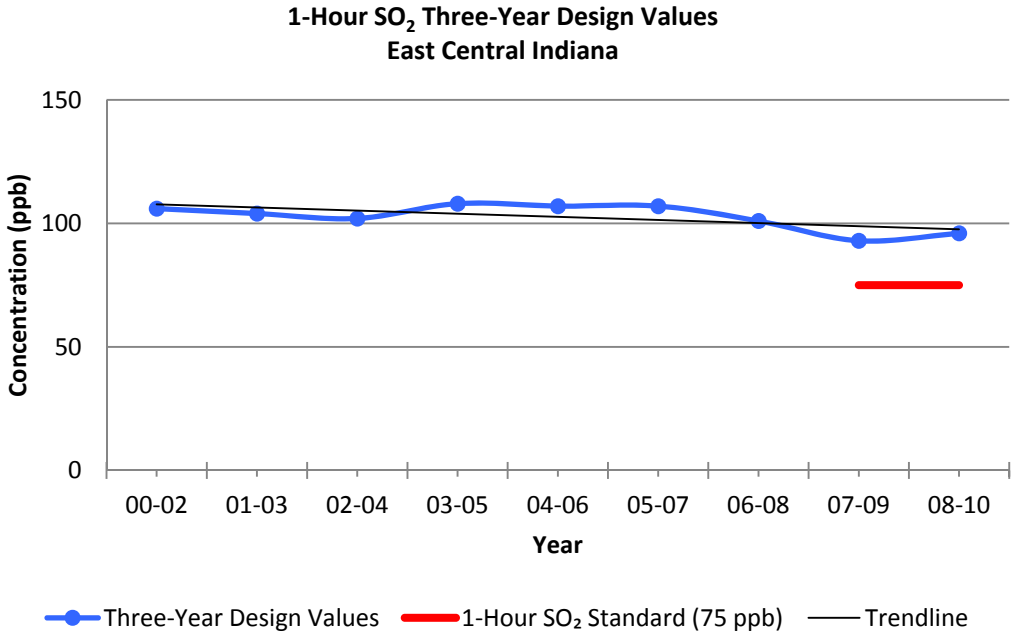


Table 20: East Central Indiana 1-Hour SO_2 Three-Year Design Values Monitoring Data Summary

County	Site ID	Site Name	Three-Year Design Value (ppb)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Wayne	181770006	Richmond - S 9th St	106	104	102	108	107	107	101	93	96
Wayne	181770007	Richmond - Boston Pike	99	103	101	100	85	85	89		
			Beginning in 2010, highlighted red numbers are above the 1-hour SO_2 standard of 75 ppb								

As shown in Graphs 20 and 21, both annual and 24-hour SO_2 values for the East Central Indiana area have historically been below their respective standards. In addition, monitoring data shown in Graph 22 indicate a downward trend in 1-hour SO_2 monitoring values over time. SO_2 monitors are located in close proximity to major sources in the area and data will fluctuate based on variability in facility operations and meteorology.

While 1-hour SO_2 values illustrated in Graph 22 for the East Central Indiana area have been trending downward over time, the area's three-year design value in Graph 23 is currently over the new 1-hour primary standard. It is expected that 1-hour, 24-hour, and annual SO_2 values will continue to decline in the East Central Indiana area in the future and the area will comply with the 1-hour primary SO_2 standard when CSAPR or an equivalent rule is implemented.

U.S. EPA's NEI contains emissions information for SO_2 and is used in Graph 24 and Chart 9. Graph 24 illustrates the emissions trend for SO_2 in East Central Indiana and Chart 9 shows how the average emissions are distributed among the different source categories.

Graph 24: East Central Indiana SO_2 Emissions

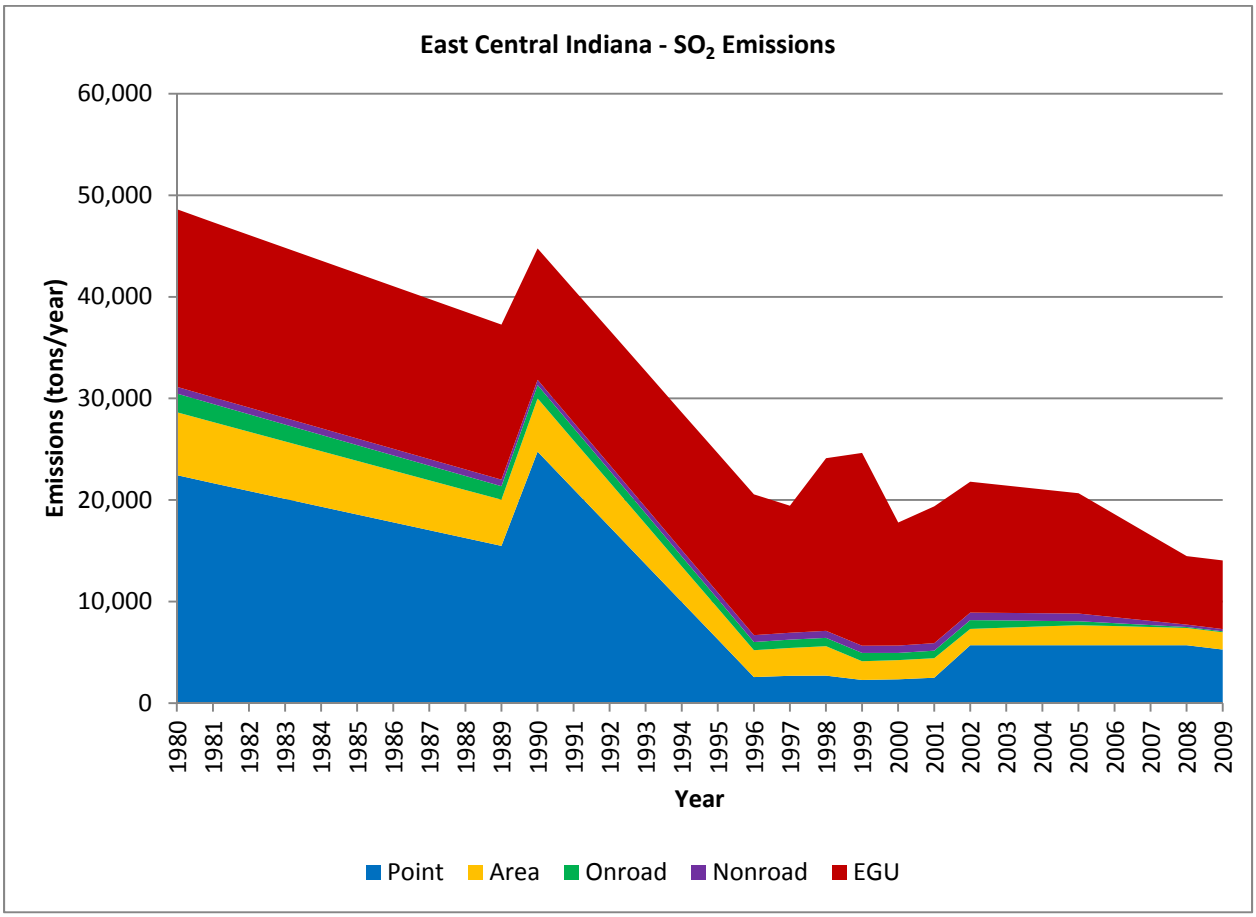
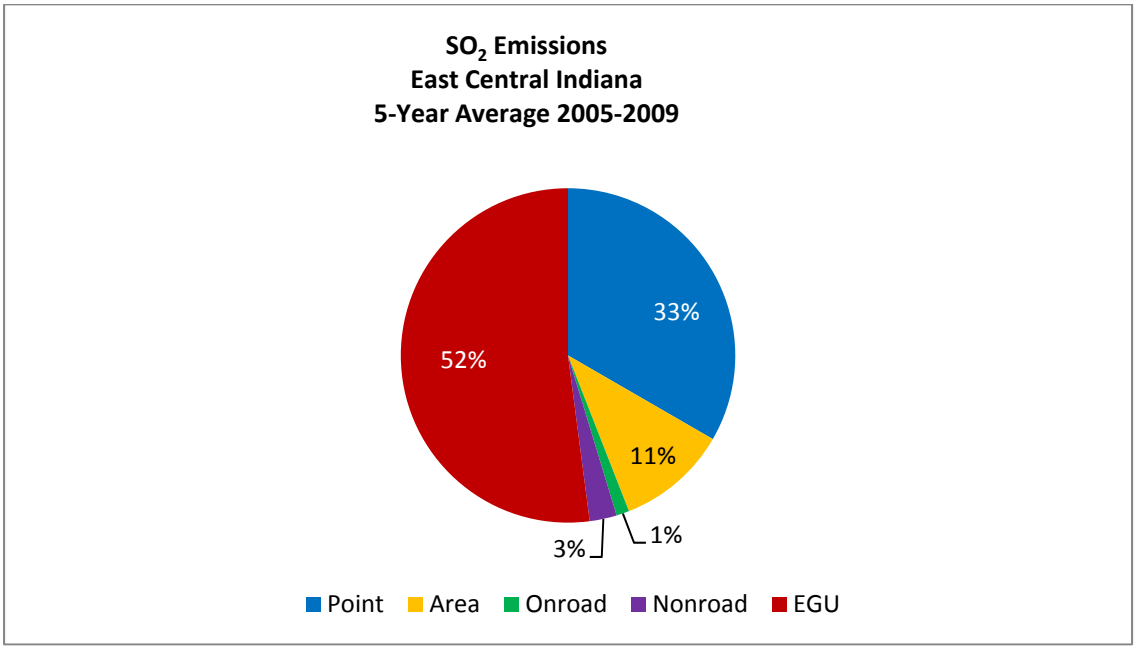


Chart 9: East Central Indiana SO_2 Emissions



National and regional controls, such as the Acid Rain Program, engine and fuel standards, and the NO_x SIP Call have led to a decrease in SO_2 values over time. As Graph 24 illustrates, SO_2 emissions have decreased by 71% within the East Central Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. Nationally, average SO_2 concentrations have decreased by more than 70% since 1980 due to implementation of the Acid Rain Program.

For information on SO_2 standards, sources, health effects, and programs to reduce SO_2, please see www.epa.gov/air/sulfurdioxide.

Total Suspended Particulate (TSP)

All available TSP data for East Central Indiana are from monitors that were located in Delaware, Grant, Madison, and Wayne counties. The trend data in Graph 25 reflect the annual geometric mean values, which were used to compare to the primary and secondary annual TSP standards of 75 µg/m^3. The highest annual geometric mean from all of the monitors in the East Central Indiana area is plotted on the graph for each year. The trend data in Graph 26 reflect the 2nd highest 24-hour TSP concentrations which were used to compare to the primary 24-hour TSP standard of 260 µg/m^3. The highest 2nd high 24-hour value from all of the monitors in the East Central Indiana area is plotted on the graph for each year.

Both the primary and secondary annual TSP standards, as well as the primary and secondary 24-hour TSP standards, were revoked in 1987. TSP monitoring sites were discontinued across Indiana in 1995 because TSP was replaced by PM_{10}. Monitoring data for both annual and 24-hour TSP show a downward trend over time. Annual TSP monitoring values violated the primary and secondary annual TSP standards in 1980 and 1982, but afterwards remained below the annual TSP standards for the East Central Indiana area. While occasional spikes can be seen in the 24-hour TSP values, the monitor values for East Central Indiana have been below the primary 24-hour TSP standard. TSP monitors were located in close proximity to major sources in the area and data fluctuated based on variability in facility operations and meteorology.

The data in Tables 21 and 22 are from the monitoring sites that measured annual and 24-hour $PM_{2.5}$ from 1980 through 1991. All available data for both annual and 24-hour TSP for the East Central Indiana area are shown in the tables. Monitoring data for both annual and 24-hour TSP show a downward trend over time.

Monitoring data in Table 21 show the annual geometric mean for annual TSP for the years 1980 through 1991 which are compared to the primary and secondary annual $PM_{2.5}$ standards of 75 µg/m^3. Monitoring data in Table 22 show the 2nd highest 24-hour TSP concentrations for the years 1980 through 1991, which are compared to the primary 24-hour TSP standard of 260 µg/m^3.

Graph 25: East Central Indiana Annual Geometric Mean TSP Values

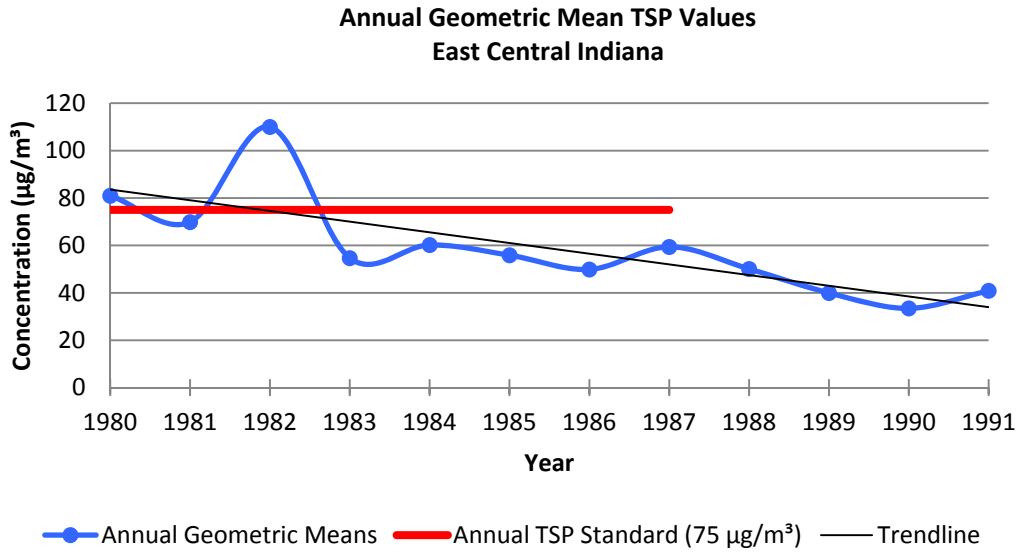


Table 21: East Central Indiana Annual Geometric Mean TSP Values

County	Site #	Site Name	Annual Geometric Mean (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Delaware	180350003	McCulloch Park	63	56	46	37								
Delaware	180350006	Muncie Central High School				52	42	44	41	42	44			
Grant	180530001	Central Fire Station	60	68	48	51	53	52	50	51				
Madison	180950002	25th Street School	50	51	44	41	40	47	41	37				
Madison	180950003	10th Street School	49	49	40	40	38	52	40	38	37	39	34	41
Madison	180950007	Northside Junior High School	53	53	45	45	43	49	42	42	40	40	23	
Madison	180950008	Madison Heights High School	61	60	45	46	42	56	47	43	40			
Madison	180950009	Anderson Fire Station	67	58	48	50	51	48	50	51	50			
Madison	180951001	Chesterfield Town Hall	55	62	110									
Wayne	181770001	City Hall Building	67	70	54	55	60	55	49	59				
Wayne	181770002	Richmond Fire Station	81	62										

Highlighted red numbers through 1987 are above the Annual TSP Standard of 75 µg/m³

Graph 26: East Central Indiana 24-Hour TSP 2nd High Values

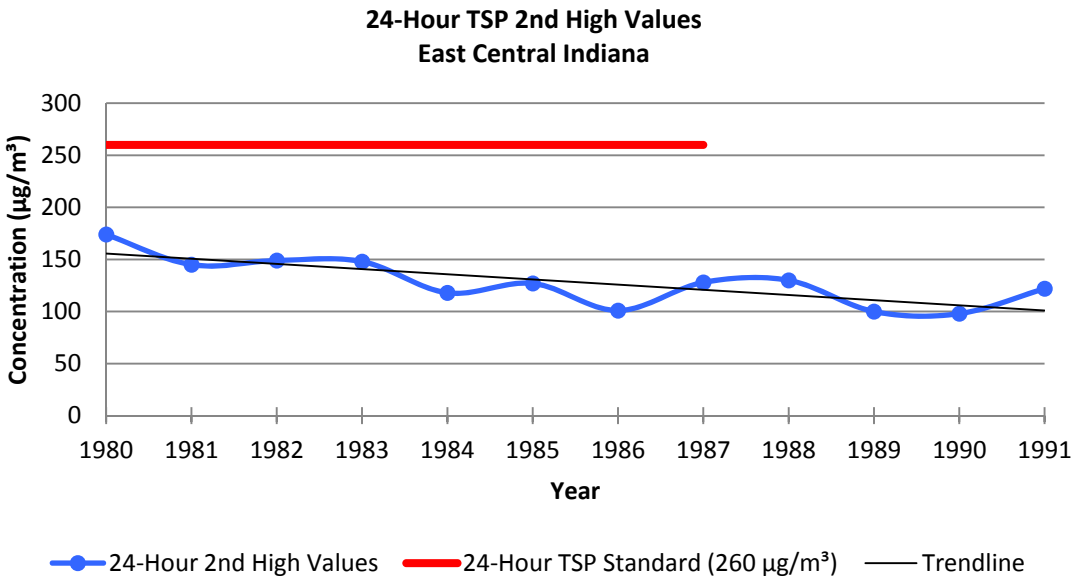


Table 22: East Central Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	2nd High Values (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Delaware	180350003	McCulloch Park	142	113	118	76								
Delaware	180350006	Muncie Central High School				95	99	92	80	90	115			
Grant	180530001	Central Fire Station	121	145	104	148	116	112	88	111				
Madison	180950002	25th Street School	111	93	149	88	85	78	90	85				
Madison	180950003	10th Street School	107	96	107	88	90	96	98	91	94	96	98	122
Madison	180950007	Northside Junior High School	119	100	101	104	96	81	97	90	108	100	37	
Madison	180950008	Madison Heights High School	142	107	107	122	104	115	95	117	107			
Madison	180950009	Anderson Fire Station	121	100	98	119	110	127	101	107	130			
Madison	180951001	Chesterfield Town Hall	106	143	109									
Wayne	181770001	City Hall Building	125	127	103	126	118	118	92	128				
Wayne	181770002	Richmond Fire Station	174	72										

Highlighted red numbers through 1987 are above the 24-Hour TSP Standard of 260 µg/m³

Future of Air Quality

U.S. EPA is required by the CAA to review each criteria pollutant standard to evaluate whether it adequately protects public health. If a criteria pollutant standard is lowered in the future, the East Central Indiana area may monitor violations of the new standard simply because the standard could be set lower than current monitored values. However, as new air programs are implemented in the future, the East Central Indiana area will continue to see declines in monitor and emission values, which will help it meet the threshold for any new criteria pollutant standards that are implemented.

Conclusions

Although overall VMT has been on the increase over time, the East Central Indiana area's monitored air quality and emission values have been trending downward and will continue to improve into the future. The overall decrease in emissions in the East Central Indiana area can be attributed to a variety of clean air programs put in place nationally (i.e. the Acid Rain Program, Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards, Heavy-Duty Diesel Engine Program, and the Clean Air Nonroad Diesel Rule), regionally (i.e. the NO_x SIP Call, CAIR, and state rules), and locally through local ordinances (i.e. open burning regulations, outdoor wood-fired heating devices, and vehicle or engine operations) over the past 30 years. It is expected that this downward trend will persist as existing clean air programs continue and new programs such as CSAPR and recently adopted state rules are implemented (e.g. the Outdoor Hydronic Heater Rule, the Consumer and Commercial Products Rule, the Architectural and Industrial Maintenance Coatings Rule, the Automobile Refinishing Operations Rule, and the Stage I Vapor Recovery Rule).

Appendix

East Central Indiana County-Specific Emission Inventory Data

(1980-2009)

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Blackford County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	10,354.75	1,616.10	922.28	2,657.42	1,347.39	4,729.13
1981	10,063.54	1,577.51	906.00	2,628.70	1,296.15	4,573.52
1982	9,773.91	1,538.92	889.71	2,599.98	1,244.91	4,417.91
1983	9,484.28	1,500.33	873.43	2,571.27	1,193.67	4,262.30
1984	9,194.65	1,461.74	857.14	2,542.55	1,142.44	4,106.69
1985	8,905.03	1,423.15	840.86	2,513.83	1,091.20	3,951.08
1986	8,615.40	1,384.56	824.58	2,485.11	1,039.96	3,795.47
1987	8,325.77	1,345.97	808.29	2,456.40	988.72	3,639.86
1988	8,036.14	1,307.38	792.01	2,427.68	937.48	3,484.25
1989	7,746.52	1,268.78	775.73	2,509.49	886.24	3,328.64
1990	7,619.41	1,228.60	727.77	2,537.59	1,449.74	4,206.97
1991	7,242.30	1,182.15	702.35	2,450.13	1,216.47	3,732.02
1992	6,865.18	1,135.70	676.93	2,362.68	983.20	3,257.07
1993	6,488.07	1,089.25	651.51	2,275.22	749.93	2,782.12
1994	6,110.96	1,042.79	626.09	2,187.77	516.65	2,307.17
1995	5,733.84	996.34	600.67	2,100.32	283.38	1,832.22
1996	5,356.73	949.89	575.25	2,012.86	50.11	1,357.27
1997	5,126.60	938.43	657.33	2,442.74	50.41	1,363.83
1998	4,945.42	911.93	626.66	2,316.90	50.51	1,317.68
1999	4,731.90	916.79	624.02	2,340.97	90.34	1,539.18
2000	4,743.37	914.55	625.07	2,308.29	90.22	1,564.48
2001	4,532.05	894.34	606.72	2,256.00	91.84	1,583.01
2002	4,734.13	841.60	381.62	2,122.05	230.34	1,192.82
2003	4,361.53	807.24	380.16	2,120.50	224.40	1,145.78
2004	3,988.93	772.88	378.71	2,118.95	218.47	1,098.74
2005	3,616.33	738.52	377.25	2,117.40	212.53	1,051.70
2006	2,803.50	608.20	371.41	1,967.96	205.40	989.18
2007	1,990.68	477.88	365.58	1,818.52	198.27	926.66
2008	1,177.85	347.56	359.74	1,669.08	191.14	864.14
2009	1,167.10	337.53	354.67	1,653.62	142.98	862.75
%Change 1980 to 2009	-88.73%	-79.11%	-61.54%	-37.77%	-89.39%	-81.76%

Delaware County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	135,262.71	10,058.01	3,134.67	8,940.98	5,919.77	18,774.53
1981	131,126.25	9,844.88	3,060.32	8,865.22	5,753.59	18,280.68
1982	126,989.79	9,631.76	2,985.96	8,789.46	5,587.41	17,786.84
1983	122,853.32	9,418.64	2,911.60	8,713.70	5,421.24	17,292.99
1984	118,716.86	9,205.51	2,837.24	8,637.94	5,255.06	16,799.14
1985	114,580.40	8,992.39	2,762.89	8,562.17	5,088.88	16,305.69
1986	110,443.94	8,779.27	2,688.53	8,486.41	4,922.70	15,813.95
1987	106,307.48	8,566.14	2,614.17	8,410.65	4,756.53	15,322.21
1988	102,171.02	8,353.02	2,539.81	8,334.89	4,590.35	14,830.47
1989	98,034.56	8,139.90	2,465.46	8,351.78	4,424.17	14,338.73
1990	79,188.67	7,032.11	2,498.83	9,053.87	6,472.64	12,189.09
1991	78,972.76	7,022.90	2,401.46	8,658.19	5,658.31	12,157.03
1992	78,756.86	7,013.69	2,304.08	8,262.51	4,843.98	12,124.98
1993	78,540.96	7,004.49	2,206.71	7,866.83	4,029.66	12,092.92
1994	78,325.05	6,995.28	2,111.07	7,471.15	3,215.33	12,060.86
1995	78,109.15	6,986.07	2,015.50	7,075.47	2,401.00	12,028.81
1996	77,893.24	6,976.86	1,920.52	6,679.78	1,586.67	11,996.75
1997	73,356.37	6,907.86	2,107.32	7,678.05	1,636.55	11,627.27
1998	70,390.91	6,679.71	2,129.49	7,856.00	1,717.13	10,985.38
1999	66,691.40	6,673.87	2,158.61	8,056.11	1,492.74	10,402.69
2000	66,770.83	6,587.12	2,173.08	7,985.99	1,508.10	10,367.02
2001	65,327.74	6,353.00	2,000.75	7,587.53	1,548.35	10,338.16
2002	38,863.82	5,963.57	1,433.03	8,276.11	2,235.76	6,879.71
2003	35,797.31	5,702.83	1,428.39	8,335.40	2,341.99	6,619.88
2004	32,730.80	5,442.10	1,423.75	8,394.68	2,448.23	6,360.05
2005	29,664.29	5,181.36	1,419.10	8,453.96	2,554.46	6,100.21
2006	22,743.07	4,197.66	1,395.18	7,780.96	2,409.68	5,495.79
2007	15,821.84	3,213.96	1,371.26	7,107.97	2,264.90	4,891.37
2008	8,900.62	2,230.26	1,347.34	6,434.97	2,120.11	4,286.95
2009	8,867.88	2,323.34	1,323.90	6,434.97	2,111.60	4,263.99
%Change 1980 to 2009	-88.74%	-76.90%	-57.77%	-28.03%	-64.33%	-77.29%

Fayette County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	15,168.32	1,650.42	987.34	2,993.04	282.62	4,914.14
1981	14,813.23	1,628.61	972.60	2,997.58	285.84	4,783.42
1982	14,458.13	1,606.80	957.85	3,002.12	289.06	4,652.71
1983	14,103.03	1,585.04	943.11	3,006.67	292.28	4,521.99
1984	13,747.94	1,564.04	928.37	3,011.21	295.50	4,391.28
1985	13,392.84	1,543.05	913.63	3,015.75	298.72	4,260.57
1986	13,037.74	1,522.05	898.88	3,020.29	301.93	4,129.85
1987	12,682.65	1,501.06	887.39	3,024.83	305.15	3,999.14
1988	12,327.55	1,480.06	875.90	3,029.37	308.37	3,868.43
1989	11,972.45	1,459.07	864.40	3,055.23	311.59	3,738.01
1990	9,732.26	1,158.31	815.23	3,104.33	661.86	3,284.48
1991	9,867.94	1,204.14	800.32	3,078.11	564.19	3,246.33
1992	10,003.62	1,249.97	785.40	3,051.90	466.52	3,208.18
1993	10,139.31	1,295.80	770.49	3,025.69	368.86	3,170.03
1994	10,274.99	1,341.62	755.58	2,999.47	271.19	3,131.88
1995	10,410.67	1,387.45	740.66	2,973.26	173.52	3,093.73
1996	10,546.35	1,433.28	725.75	2,947.05	75.85	3,055.58
1997	10,118.35	1,433.37	765.07	3,163.95	77.53	3,099.20
1998	9,780.21	1,400.34	770.48	3,225.24	78.20	2,707.51
1999	9,148.38	1,476.94	773.79	3,277.25	148.34	2,564.58
2000	8,960.57	1,446.47	768.84	3,221.54	146.37	2,555.09
2001	8,660.16	1,425.80	728.28	3,136.52	150.18	2,607.20
2002	8,843.50	1,379.32	687.51	3,808.47	502.08	1,818.80
2003	8,159.47	1,315.51	688.80	3,809.40	496.15	1,748.79
2004	7,475.44	1,251.71	690.10	3,810.32	490.22	1,678.77
2005	6,791.40	1,187.91	691.39	3,811.24	484.30	1,608.76
2006	5,259.79	984.83	682.40	3,474.24	472.26	1,464.60
2007	3,728.18	781.75	673.41	3,137.24	460.22	1,320.43
2008	2,196.57	578.67	664.42	2,800.24	448.19	1,176.27
2009	2,196.32	547.89	644.33	2,744.49	448.19	1,176.22
%Change 1980 to 2009	-78.04%	-66.80%	-34.74%	-8.30%	58.58%	-76.06%

Grant County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	61,679.68	9,013.36	2,888.67	8,464.04	7,528.67	8,998.20
1981	60,044.27	8,793.03	2,824.02	8,413.39	7,254.54	8,830.25
1982	58,425.40	8,572.70	2,759.37	8,362.74	6,980.40	8,663.07
1983	56,806.53	8,352.37	2,694.72	8,312.08	6,706.27	8,495.91
1984	55,187.67	8,132.04	2,630.07	8,261.43	6,432.13	8,328.75
1985	53,568.80	7,911.71	2,565.42	8,210.77	6,158.00	8,161.60
1986	51,949.93	7,691.39	2,500.77	8,160.12	5,883.86	7,994.44
1987	50,331.07	7,471.06	2,436.12	8,109.46	5,609.73	7,827.28
1988	48,712.20	7,250.73	2,371.46	8,058.81	5,335.59	7,660.12
1989	47,093.33	7,030.40	2,306.81	8,182.45	5,061.46	7,492.96
1990	41,341.31	5,990.25	2,150.45	8,597.83	6,396.36	6,618.84
1991	40,636.77	5,944.46	2,111.57	8,355.65	5,654.80	6,620.27
1992	39,932.23	5,898.67	2,072.70	8,113.46	4,913.24	6,621.69
1993	39,227.70	5,852.88	2,033.83	7,871.27	4,171.69	6,623.12
1994	38,523.16	5,807.08	1,995.26	7,629.08	3,430.13	6,624.55
1995	37,818.62	5,761.29	1,956.70	7,386.89	2,688.57	6,625.97
1996	37,114.08	5,715.50	1,918.24	7,144.70	1,947.01	6,627.40
1997	35,856.40	5,824.14	2,030.92	7,671.03	2,019.68	6,640.95
1998	34,689.35	5,769.05	1,989.34	7,504.10	2,014.50	6,277.67
1999	32,995.49	5,456.11	2,059.22	7,767.58	1,196.20	6,361.41
2000	32,923.05	5,431.45	2,067.15	7,674.14	1,201.15	6,404.38
2001	31,918.79	5,341.05	1,936.41	7,357.72	1,280.49	6,451.53
2002	30,892.81	4,576.90	1,425.91	8,527.17	1,203.60	5,494.86
2003	28,178.73	4,265.03	1,420.35	8,521.19	1,112.05	5,243.67
2004	25,464.64	3,953.15	1,414.79	8,515.21	1,020.49	4,992.49
2005	22,750.55	3,641.28	1,409.23	8,509.23	928.94	4,741.30
2006	17,529.45	2,901.76	1,391.13	7,937.74	948.71	4,310.46
2007	12,308.34	2,162.24	1,373.03	7,366.26	968.48	3,879.62
2008	7,087.24	1,422.72	1,354.93	6,794.77	988.25	3,448.78
2009	7,088.36	1,423.20	1,415.41	6,896.29	1,077.30	3,344.78
%Change 1980 to 2009	-82.25%	-84.21%	-51.00%	-18.52%	-85.69%	-62.83%

Henry County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	50,524.22	5,388.21	1,983.05	5,119.12	1,940.39	6,823.46
1981	49,121.77	5,284.26	1,956.99	5,232.51	1,875.12	6,680.59
1982	47,719.31	5,180.30	1,930.93	5,345.90	1,809.85	6,537.73
1983	46,316.86	5,076.35	1,904.87	5,459.28	1,744.58	6,396.10
1984	44,914.40	4,972.39	1,878.82	5,572.67	1,679.31	6,254.61
1985	43,511.95	4,868.44	1,852.76	5,686.06	1,614.03	6,113.12
1986	42,113.68	4,764.48	1,834.17	5,807.59	1,548.76	5,971.63
1987	40,717.93	4,660.53	1,913.85	5,931.98	1,483.49	5,830.14
1988	39,322.19	4,556.57	1,993.52	6,243.82	1,418.22	5,688.65
1989	37,926.45	4,457.93	2,073.19	6,369.08	1,352.95	5,547.16
1990	33,968.52	3,749.07	1,919.51	7,059.99	1,757.39	4,913.91
1991	33,112.95	3,799.85	1,964.61	7,069.08	1,558.61	4,892.33
1992	32,257.39	3,850.63	2,009.72	7,078.16	1,359.83	4,870.75
1993	31,401.83	3,901.42	2,054.82	7,087.24	1,161.05	4,849.17
1994	30,546.26	3,952.20	2,099.92	7,096.33	962.27	4,827.59
1995	29,690.69	4,002.98	2,145.03	7,105.41	763.49	4,806.01
1996	28,835.13	4,053.76	2,190.13	7,114.49	564.71	4,784.43
1997	27,821.47	4,083.67	2,237.72	7,349.47	588.63	4,781.88
1998	26,955.77	4,015.06	2,239.51	7,483.97	624.48	4,614.07
1999	25,288.38	4,091.59	2,571.28	7,917.23	296.63	4,438.49
2000	24,741.66	3,978.70	2,556.23	7,723.21	284.01	4,400.63
2001	24,394.31	3,913.10	2,474.65	7,517.89	290.95	4,430.84
2002	22,652.05	3,960.12	1,483.26	9,326.68	503.08	3,734.14
2003	20,773.13	3,764.47	1,493.58	9,338.08	492.19	3,591.49
2004	18,894.21	3,568.82	1,503.89	9,349.48	481.30	3,448.85
2005	17,015.28	3,373.16	1,514.20	9,360.87	470.41	3,306.20
2006	13,034.17	2,738.35	1,489.34	8,715.20	438.82	2,957.20
2007	9,053.06	2,103.55	1,464.47	8,069.52	407.23	2,608.21
2008	5,071.95	1,468.74	1,439.61	7,423.85	375.64	2,259.21
2009	5,035.46	1,214.46	1,354.99	7,242.73	274.73	2,039.86
%Change 1980 to 2009	-84.39%	-77.46%	-31.67%	41.48%	-85.84%	-70.11%

Jay County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	18,843.74	5,129.44	1,295.75	4,031.76	667.24	2,803.01
1981	18,327.46	4,970.21	1,276.82	4,070.22	650.14	2,759.20
1982	17,811.18	4,810.99	1,257.89	4,108.69	640.53	2,715.40
1983	17,294.90	4,651.76	1,238.97	4,147.15	637.36	2,671.60
1984	16,778.62	4,492.53	1,220.04	4,185.61	634.49	2,627.80
1985	16,262.34	4,333.30	1,237.40	4,224.08	631.68	2,584.00
1986	15,746.06	4,174.07	1,254.76	4,262.54	628.87	2,540.20
1987	15,229.78	4,014.85	1,272.12	4,301.01	626.07	2,496.40
1988	14,713.50	3,855.62	1,289.49	4,339.47	623.26	2,452.60
1989	14,197.22	3,696.39	1,306.85	4,420.45	620.45	2,408.80
1990	13,484.59	3,827.86	1,676.43	5,130.62	1,096.47	2,323.56
1991	12,964.49	3,578.28	1,578.85	4,949.79	948.10	2,290.52
1992	12,444.40	3,328.70	1,481.27	4,768.95	799.73	2,257.48
1993	11,924.31	3,079.13	1,383.68	4,588.12	651.36	2,224.44
1994	11,404.21	2,829.55	1,286.10	4,407.29	502.99	2,191.40
1995	10,884.12	2,579.97	1,188.52	4,226.46	354.62	2,158.36
1996	10,364.02	2,330.39	1,091.28	4,045.63	206.25	2,125.32
1997	9,954.09	2,331.26	1,139.79	4,324.14	218.08	2,129.14
1998	9,630.88	2,296.18	1,130.97	4,253.33	223.50	2,058.27
1999	8,878.08	1,755.13	1,148.30	4,401.59	440.39	1,985.21
2000	8,759.59	1,743.52	1,165.78	4,431.09	453.37	1,992.79
2001	8,394.23	1,712.09	1,132.51	4,356.08	473.07	1,999.02
2002	8,853.46	1,556.57	1,052.69	5,586.28	669.89	1,993.05
2003	8,201.48	1,498.66	1,054.72	5,583.14	699.09	1,991.38
2004	7,549.51	1,440.76	1,056.75	5,580.00	728.29	1,989.71
2005	6,897.54	1,382.85	1,058.78	5,576.87	757.50	1,988.04
2006	5,351.99	1,142.63	1,043.76	5,174.39	717.47	1,797.75
2007	3,806.45	902.41	1,028.74	4,771.91	677.45	1,607.46
2008	2,260.91	662.18	1,013.72	4,369.43	637.42	1,417.16
2009	2,297.06	662.18	1,013.72	4,369.43	637.42	1,355.94
%Change 1980 to 2009	-81.54%	-87.09%	-21.77%	8.38%	-4.47%	-51.63%

Madison County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	109,587.73	13,948.54	4,791.41	12,612.54	9,557.23	16,047.10
1981	106,485.80	13,597.70	4,688.81	12,514.79	9,198.01	15,692.20
1982	103,383.87	13,246.87	4,586.20	12,417.03	8,838.79	15,337.29
1983	100,281.93	12,896.03	4,483.60	12,319.28	8,479.56	14,982.39
1984	97,180.00	12,545.20	4,381.00	12,221.53	8,120.34	14,627.48
1985	94,078.07	12,194.36	4,278.39	12,123.78	7,761.11	14,272.58
1986	90,976.14	11,843.53	4,175.79	12,026.02	7,401.89	13,917.67
1987	87,874.21	11,492.69	4,073.19	11,928.27	7,042.67	13,562.77
1988	84,772.28	11,141.86	3,970.59	11,830.52	6,683.44	13,207.87
1989	81,670.35	10,791.02	3,867.98	11,998.45	6,324.22	12,852.96
1990	69,942.58	9,671.67	3,794.68	12,216.14	9,315.96	11,611.03
1991	68,832.58	9,457.47	3,686.53	11,910.25	7,973.94	11,491.80
1992	67,722.58	9,243.27	3,578.39	11,604.35	6,631.92	11,372.58
1993	66,612.58	9,029.07	3,470.25	11,298.46	5,289.91	11,253.35
1994	65,502.57	8,814.86	3,362.11	10,992.56	3,947.89	11,134.12
1995	64,392.57	8,600.66	3,253.96	10,686.67	2,605.87	11,014.90
1996	63,282.57	8,386.46	3,183.64	10,380.78	1,263.85	10,895.67
1997	60,143.27	8,383.34	3,232.67	10,628.49	1,293.76	10,805.46
1998	57,352.79	8,182.72	3,288.34	10,961.33	1,330.00	10,053.31
1999	58,078.63	8,181.64	3,222.98	11,044.96	884.44	9,577.99
2000	58,496.23	8,175.11	3,260.12	10,924.40	892.89	9,622.32
2001	58,218.02	8,106.01	3,059.18	10,460.06	934.04	9,730.17
2002	43,705.97	6,496.66	1,873.79	11,435.84	1,458.09	7,665.49
2003	39,948.64	6,146.76	1,874.12	11,433.30	1,437.71	7,679.96
2004	36,191.31	5,796.86	1,874.44	11,430.76	1,417.34	7,694.42
2005	32,433.98	5,446.96	1,874.77	11,428.22	1,396.96	7,708.89
2006	24,806.79	4,436.36	1,841.84	10,592.96	1,338.07	6,765.24
2007	17,179.60	3,425.77	1,808.90	9,757.70	1,279.18	5,821.58
2008	9,552.42	2,415.18	1,775.97	8,922.44	1,220.29	4,877.92
2009	9,509.09	2,402.36	1,777.24	8,913.79	1,271.90	4,571.20
%Change 1980 to 2009	-91.32%	-82.78%	-62.91%	-29.33%	-86.69%	-71.51%

Randolph County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	19,441.20	2,986.43	2,218.01	7,404.90	915.78	4,311.71
1981	18,922.37	2,959.40	2,193.25	7,363.37	902.53	4,214.14
1982	18,403.53	2,932.37	2,168.50	7,321.83	889.27	4,116.56
1983	17,884.70	2,905.35	2,143.75	7,280.29	876.02	4,018.98
1984	17,365.86	2,878.32	2,119.00	7,238.75	862.77	3,921.41
1985	16,847.03	2,851.29	2,094.25	7,197.22	849.51	3,823.83
1986	16,328.19	2,824.26	2,069.50	7,155.68	836.26	3,726.26
1987	15,809.36	2,797.23	2,044.74	7,114.14	823.01	3,628.68
1988	15,290.52	2,770.20	2,019.99	7,072.60	809.76	3,531.11
1989	14,771.69	2,743.17	1,995.24	7,061.88	796.50	3,442.16
1990	15,522.77	2,846.02	2,143.65	7,772.54	1,116.03	3,987.55
1991	15,223.64	2,745.57	2,038.23	7,466.91	1,003.65	3,782.11
1992	14,924.51	2,645.13	1,932.81	7,161.29	891.27	3,576.66
1993	14,625.39	2,544.68	1,827.39	6,855.66	778.89	3,371.22
1994	14,326.26	2,444.23	1,721.96	6,550.04	666.51	3,165.78
1995	14,027.13	2,343.79	1,621.61	6,244.41	554.13	2,960.33
1996	13,728.00	2,243.34	1,521.37	5,938.79	441.75	2,754.89
1997	13,175.61	2,225.61	1,546.00	6,054.66	469.65	2,762.87
1998	12,679.54	2,166.60	1,530.73	5,979.29	481.19	2,673.78
1999	11,911.53	2,756.77	1,572.94	6,272.73	460.04	2,937.48
2000	11,688.64	2,750.44	1,597.14	6,307.61	472.31	2,972.14
2001	11,281.61	2,731.17	1,559.82	6,217.68	494.39	3,023.88
2002	29,398.79	2,854.32	1,238.31	6,807.35	711.50	4,367.91
2003	26,996.02	2,784.67	1,237.45	6,806.17	711.21	4,117.37
2004	24,593.24	2,715.02	1,236.59	6,804.98	710.92	3,866.83
2005	22,190.47	2,645.37	1,235.72	6,803.79	710.63	3,616.29
2006	16,954.47	2,246.37	1,206.51	6,333.08	678.88	3,221.54
2007	11,718.47	1,847.36	1,177.30	5,862.36	647.12	2,826.78
2008	6,482.46	1,448.36	1,148.08	5,391.65	615.36	2,432.03
2009	6,482.51	1,451.76	1,149.34	5,394.31	617.90	2,167.65
%Change 1980 to 2009	-66.66%	-51.39%	-48.18%	-27.15%	-32.53%	-49.73%

Rush County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	16,354.11	1,939.50	1,663.71	5,988.34	405.15	2,653.46
1981	15,892.47	1,903.86	1,634.74	5,976.38	395.15	2,604.23
1982	15,430.84	1,868.21	1,605.78	5,964.41	385.15	2,555.00
1983	14,969.21	1,832.56	1,576.82	5,952.44	375.16	2,505.77
1984	14,507.58	1,796.92	1,547.85	5,940.48	365.16	2,456.53
1985	14,047.57	1,761.27	1,518.89	5,928.51	355.16	2,407.30
1986	13,587.79	1,725.63	1,489.93	5,916.54	345.17	2,358.07
1987	13,128.00	1,689.98	1,460.96	5,904.58	335.17	2,308.84
1988	12,668.22	1,654.34	1,432.00	5,892.61	325.18	2,259.61
1989	12,208.44	1,618.69	1,403.04	5,890.07	315.18	2,210.38
1990	11,168.93	1,457.20	1,327.11	6,050.78	505.54	2,085.75
1991	10,817.65	1,445.96	1,317.90	5,987.59	434.68	2,050.44
1992	10,466.37	1,434.71	1,308.69	5,924.40	363.83	2,015.13
1993	10,115.10	1,423.47	1,299.48	5,861.22	292.97	1,979.82
1994	9,763.82	1,412.23	1,290.27	5,798.03	222.11	1,944.50
1995	9,412.54	1,400.98	1,281.06	5,734.84	151.26	1,909.19
1996	9,061.26	1,389.74	1,271.84	5,671.65	80.40	1,873.88
1997	8,715.67	1,387.27	1,296.36	5,812.88	82.21	1,875.96
1998	8,421.21	1,359.85	1,202.13	5,360.90	83.35	1,819.08
1999	7,887.25	1,346.82	1,226.88	5,530.57	140.12	1,815.45
2000	7,779.63	1,321.52	1,251.11	5,613.17	138.16	1,827.54
2001	7,473.97	1,273.83	1,215.31	5,540.33	140.10	1,839.23
2002	7,092.53	1,359.10	1,062.14	6,609.94	232.34	1,637.50
2003	6,510.89	1,303.25	1,053.89	6,600.96	227.80	1,587.60
2004	5,929.26	1,247.40	1,045.64	6,591.97	223.26	1,537.70
2005	5,347.62	1,191.54	1,037.39	6,582.99	218.72	1,487.80
2006	4,115.31	967.02	1,030.49	6,130.67	201.40	1,381.15
2007	2,883.00	742.50	1,023.59	5,678.36	184.08	1,274.51
2008	1,650.69	517.99	1,016.69	5,226.05	166.77	1,167.86
2009	1,650.69	517.99	1,016.69	5,226.05	166.77	1,167.86
%Change 1980 to 2009	-89.91%	-73.29%	-38.89%	-12.73%	-58.84%	-55.99%

Union County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	6,079.49	553.62	514.08	1,676.37	55.14	749.50
1981	5,948.39	546.32	510.46	1,706.74	55.10	743.52
1982	5,817.30	549.37	506.84	1,737.11	55.25	737.54
1983	5,686.20	552.43	503.23	1,767.48	55.41	731.56
1984	5,555.10	555.49	499.61	1,797.85	55.56	725.58
1985	5,424.00	558.55	496.00	1,828.22	55.72	719.59
1986	5,292.91	561.61	492.38	1,858.59	55.88	713.61
1987	5,161.81	564.67	488.77	1,888.96	56.04	707.63
1988	5,030.71	567.73	485.15	1,919.33	56.19	701.65
1989	4,899.61	570.79	481.54	1,949.89	56.35	695.67
1990	4,135.28	511.06	469.15	2,130.30	79.51	581.36
1991	4,162.87	529.52	464.19	2,095.50	71.80	607.71
1992	4,190.45	547.98	459.23	2,060.69	64.09	634.06
1993	4,218.04	566.44	454.28	2,025.88	56.38	660.41
1994	4,245.63	584.89	449.32	1,991.07	48.66	686.76
1995	4,273.21	603.35	444.36	1,956.27	40.95	713.11
1996	4,300.80	621.81	439.41	1,921.46	33.24	739.46
1997	4,109.07	618.46	452.21	2,008.56	33.64	730.55
1998	3,992.34	605.15	496.74	2,233.11	33.80	728.63
1999	3,742.47	587.72	495.48	2,245.71	59.46	709.10
2000	3,666.45	574.40	485.24	2,183.61	57.97	707.47
2001	3,525.80	547.99	468.78	2,152.25	58.45	705.23
2002	4,109.68	804.97	415.20	2,763.19	80.19	765.30
2003	3,788.02	776.00	414.31	2,762.23	77.60	751.57
2004	3,466.36	747.03	413.42	2,761.26	75.01	737.84
2005	3,144.70	718.05	412.52	2,760.29	72.42	724.11
2006	2,424.97	605.91	407.14	2,499.76	62.44	626.00
2007	1,705.25	493.78	401.76	2,239.22	52.46	527.88
2008	985.52	381.64	396.38	1,978.68	42.47	429.76
2009	985.52	381.64	396.38	1,978.68	42.47	429.76
%Change 1980 to 2009	-83.79%	-31.07%	-22.89%	18.03%	-22.97%	-42.66%

Wayne County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	69,033.90	9,346.73	3,269.44	7,689.85	20,010.72	10,657.25
1981	67,081.43	9,164.08	3,212.25	7,671.87	19,688.77	10,413.00
1982	65,128.97	8,981.87	3,155.07	7,653.90	19,366.82	10,168.76
1983	63,176.50	8,799.66	3,097.88	7,635.93	19,044.87	9,924.51
1984	61,224.04	8,617.45	3,040.70	7,617.95	18,722.91	9,680.26
1985	59,275.78	8,435.23	2,983.51	7,599.98	18,400.96	9,436.02
1986	57,331.92	8,253.02	2,926.32	7,582.00	18,079.01	9,191.77
1987	55,388.06	8,070.81	2,869.14	7,564.03	17,757.06	8,947.53
1988	53,444.20	7,888.60	2,811.95	7,546.05	17,435.11	8,703.28
1989	51,500.35	7,706.38	2,754.77	8,245.78	17,113.16	8,459.03
1990	46,111.47	6,805.59	2,601.16	8,639.24	15,917.44	7,932.24
1991	44,966.12	6,834.44	2,560.92	8,451.89	15,649.11	7,731.48
1992	43,820.76	6,863.29	2,520.69	8,264.54	15,380.77	7,530.71
1993	42,675.41	6,892.14	2,480.45	8,077.19	15,112.44	7,329.95
1994	41,530.06	6,920.99	2,440.22	7,889.84	14,844.11	7,129.18
1995	40,384.70	6,949.84	2,416.79	7,702.49	14,575.77	6,928.41
1996	39,239.35	6,978.69	2,393.88	7,515.13	14,307.44	6,727.65
1997	37,941.77	5,849.22	2,437.51	7,983.05	12,967.23	6,743.58
1998	36,593.25	6,148.61	2,451.14	7,728.73	17,476.67	6,472.33
1999	32,445.73	6,309.56	2,374.66	7,778.75	19,427.08	6,326.75
2000	31,884.72	5,924.40	2,259.89	7,451.12	12,547.03	6,320.55
2001	31,181.06	5,950.69	2,594.11	7,628.34	13,918.68	6,396.76
2002	29,942.36	6,248.81	2,180.03	9,322.25	13,967.87	5,171.94
2003	27,446.94	5,830.97	2,161.06	9,303.38	13,598.19	5,011.56
2004	24,951.53	5,413.14	2,142.09	9,284.51	13,228.51	4,851.18
2005	22,456.12	4,995.30	2,123.12	9,265.64	12,858.83	4,690.81
2006	17,247.81	4,311.84	1,991.26	8,526.06	11,129.76	4,182.05
2007	12,039.51	3,628.38	1,859.40	7,786.47	9,400.69	3,673.30
2008	6,831.20	2,944.92	1,727.54	7,046.89	7,671.62	3,164.54
2009	6,776.35	2,801.50	1,712.93	6,936.44	7,255.87	3,116.39
%Change 1980 to 2009	-90.18%	-70.03%	-47.61%	-9.80%	-63.74%	-70.76%