CRITERIA POLLUTANTS

Air Quality Trend Analysis Report
(1980-2010)

CENTRAL INDIANA

Indiana Department of Environmental Management

Office of Air Quality

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Central Indiana County-Specific Emissions Inventory Data (1980-2009)………..A1- A9

Acronyms/Abbreviation List

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 µg/m^3 or fine particles

PM_{10}...............particulate matter less than or equal to 10 µg/m^3 or particulate matter

ppb.................parts per billion

ppm.................parts per million

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

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Introduction

The Central Indiana area is composed of nine counties. The counties represented in the area shown in Figure 1 are: Boone, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, Putnam, and Shelby. Three major interstates pass through the Central Indiana area, Interstate (I)-69 through Hamilton and Marion counties and I-70 through Hancock, Hendricks, Marion, Morgan, and Putnam counties. Interstate 74 passes through Boone, Hendricks, Marion, and Shelby counties. Marion County also has a loop (I-465) around the City of Indianapolis.

There are currently 19 criteria pollutant monitors in Central Indiana collecting data for carbon monoxide (CO), fine particles ($PM_{2.5}$), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10}), 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 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 Central Indiana area are Indianapolis Power and Light's Harding Street Station and Eagle Valley Station, Citizens Energy's Perry K Steam Plant, as well as Lone Star Industries. 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 Central Indiana Counties and Monitors

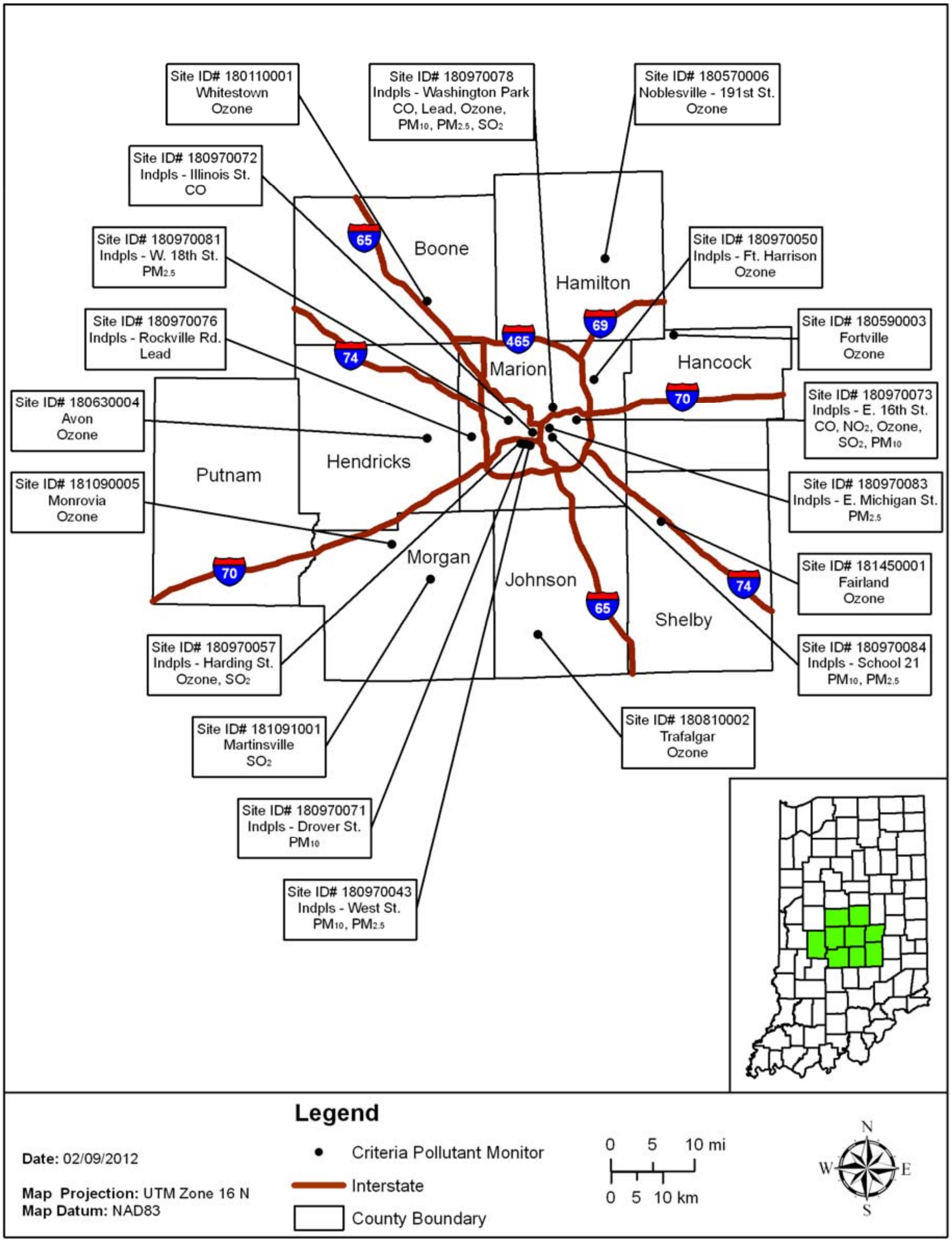

Table 1: Central Indiana County Population Information

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
BOONE	LEBANON	LEBANON	22,754	36,446	38,147	46,107	56,640	55%
HAMILTON	NOBLESVILLE	FISHERS	106,772	82,027	108,936	182,740	274,569	235%
HANCOCK	GREENFIELD	GREENFIELD	28,125	43,939	45,527	55,391	70,002	59%
HENDRICKS	DANVILLE	PLAINFIELD	55,454	69,804	75,717	104,093	145,448	108%
JOHNSON	FRANKLIN	GREENWOOD	56,649	77,240	88,109	115,209	139,654	81%
MARION	INDIANAPOLIS	INDIANAPOLIS	417,862	765,233	797,159	860,454	903,393	18%
MORGAN	MARTINSVILLE	MARTINSVILLE	27,754	51,999	55,920	66,689	68,894	32%
PUTNAM	GREENCASTLE	GREENCASTLE	14,706	29,163	30,315	36,019	37,963	30%
SHELBY	SHELBYVILLE	SHELBYVILLE	19,080	39,887	40,307	43,445	44,436	11%

Table 1 indicates that Hamilton County has had the highest percent difference in population between 1980 and 2010, increasing by 235%. Hendricks County also experienced a large percent difference in population between 1980 and 2010, increasing by 108%. The population for every county in the Central Indiana area had an increase in population from 1980 compared to 2010. While Hamilton and Hendricks counties are growing significantly, the population density in both counties is less than Marion County which has experienced moderate growth with a population increase of 138,160 people since 1980. 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 in emissions from vehicle miles traveled (VMT), area sources, and the demand for electricity. Generally, increases in population will result in higher area source and mobile emissions. Examples of area sources that increase with higher population include household paints, lawnmowers, and consumer solvents. In addition, higher population figures indicate a secondary effect on increasing VMT if the change in population occurs away from the employment centers.

Table 2: 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 1980 AND 2010 DAILY VMT
BOONE	1,135	59,061	1,426,700	2,755,000	93%
HAMILTON	1,977	258,012	398,332	5,184,000	1201%
HANCOCK	955	75,412	997,006	2,274,000	128%
HENDRICKS	1,353	140,500	265,145	3,548,000	1238%
JOHNSON	1,132	134,209	734,964	3,353,000	356%
MARION	3,710	778,830	14,892,969	35,081,000	136%
MORGAN	955	81,454	1,543,134	2,237,000	45%
PUTNAM	978	38,937	1,239,877	1,529,000	23%
SHELBY	952	49,860	1,437,737	1,815,000	26%

Table 2 illustrates that Hamilton and Hendricks counties had the highest increases in daily VMT since 1980. The daily VMT for all of the nine counties in the 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 calculate 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 CO, $PM_{2.5}$, and ozone precursors (volatile organic compounds (VOC's) 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 offset by fleet turn over where newer, cleaner vehicles replace older, more polluting ones.

Table 3: 2009 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
BOONE	23,282	14,338	5,828	MARION	1,407	MARION	9,843
HAMILTON	117,274	59,852	27,980	MARION	12,329	MARION	50,064
HANCOCK	27,218	19,871	5,845	MARION	1,452	MARION	15,586
HENDRICKS	54,451	38,694	14,621	MARION	7,481	MARION	32,656
JOHNSON	57,820	33,836	11,846	MARION	5,949	MARION	27,480
MARION	494,037	38,409	179,917	HAMILTON	50,064	HAMILTON	12,329
MORGAN	28,040	17,423	3,319	MARION	978	MARION	11,700
PUTNAM	16,827	5,408	3,226	CLAY	901	MARION	2,401
SHELBY	21,587	7,790	4,290	RUSH	1,008	MARION	4,507

Information in Table 3 from 2009 demonstrates that the largest workforce in Central Indiana can be found in Marion County. Commuting patterns in Central Indiana center on the City of Indianapolis in Marion County. Since Marion County has the highest population and the highest commuting pattern to and from the county, emissions within Marion County are expected to be higher than surrounding counties in the Central Indiana area. The Central Indiana area commuting patterns reflect that of many urban areas around the country. The largest employment county is Marion County 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 have stemmed from the national, regional, and local controls outlined below. These programs have been or are being implemented and have reduced monitored ambient air quality values in Central Indiana and across the state.

National Controls

Acid Rain Program

Congress created the Acid Rain Program under Title IV of the 1990 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 required 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 heavier 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 heavier 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 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 Rule

On October 27, 1998, U.S. EPA established the NO_x SIP Call, which required 22 states to adopt rules that would result in significant emission reductions from large electric generating units (EGUs)[1], industrial boilers, and cement kilns in the eastern United

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

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 these rules. 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, 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).

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). Indiana's rule included 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 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.

Local Controls

The City of Indianapolis has worked with the community to identify and implement a number of locally enforceable control measures via ordinance. These ordinances address the following subjects:

County	City	Subject
Chapter 511	Sections 511-701	Open Burning Prohibitions
Regulation 4	Section 3	Outdoor Wood-Fired Heating Devices
Regulation 5	Section 2	Vehicle or Engine Operations

The Central Indiana area has implemented a voluntary control measure known as the "Knozone Program" with the purpose of educating citizens on how they can help improve air quality. The City of Indianapolis has also implemented a diesel oxidation catalyst program to modify existing municipal diesel vehicles, as well as an idle reduction program.

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, 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].

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

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 five EGU facilities in the Central Indiana area, three of which are top ten emitters in the area. Emissions data for each county in Central Indiana is 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.

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

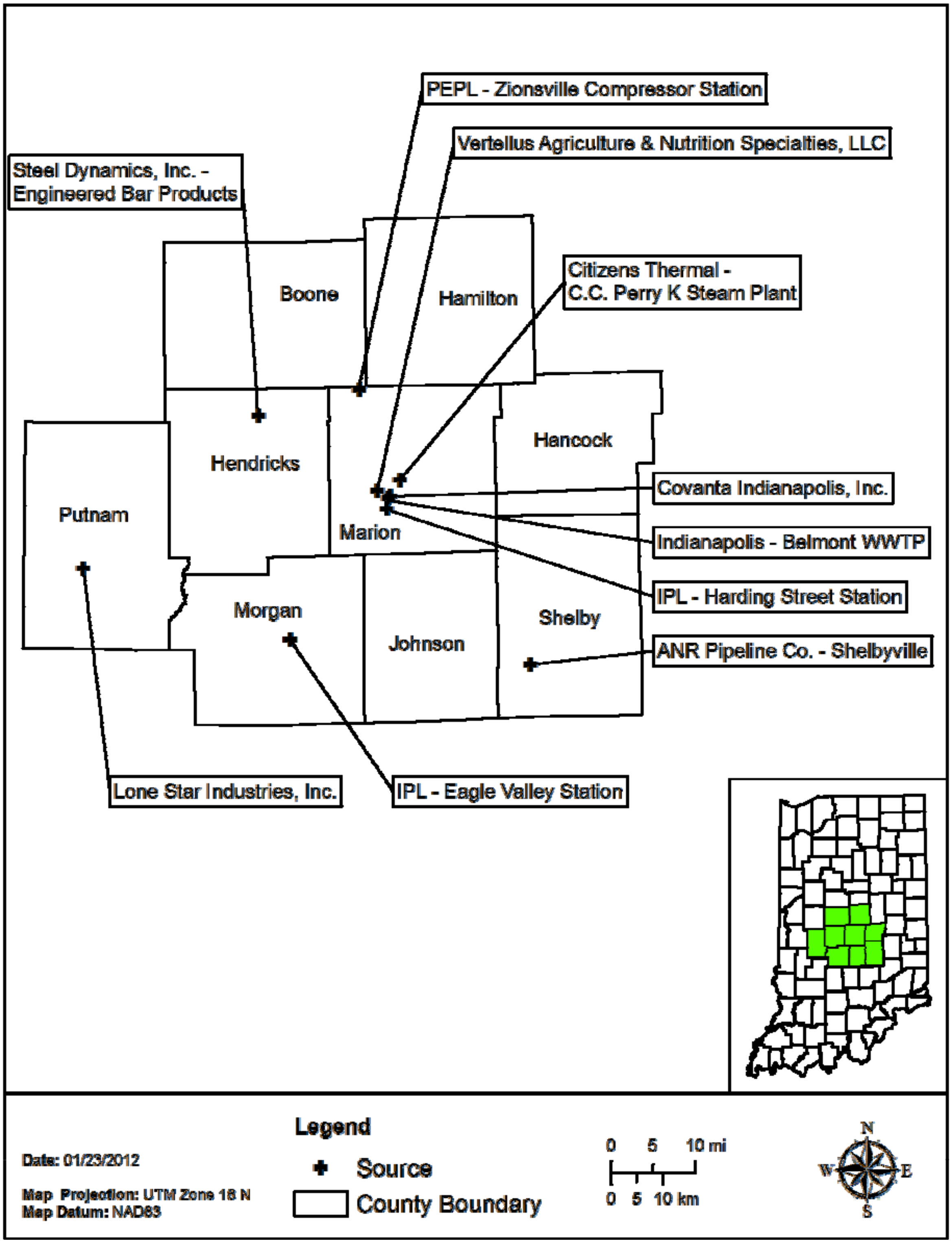
Table 4 represents the top ten sources in tons per year of emissions for the Central Indiana area. The top 2 sources on this list that have a large impact on emission in the Central Indiana area are EGUs, but with the regional controls explained previously, the emissions from the EGUs have been reduced over time and will continue to be reduced. Other large facilities in the Central Indiana area include a steel production facility, a municipal waste incinerator, and a sludge incinerator. Air quality in the Central Indiana area is partially influenced by the emissions from these top ten sources, but as new control measures are adopted, these emissions will continue to decrease. Figure 2 shows the location of these sources within the Central Indiana area.

Large sources of NO_x and SO_2 will have regional impacts on air quality due to their high stacks which will result in long range transport of their emissions. Some NO_x and SO_2 released from high stacks will fall out locally as well. Several sources have closed in Central Indiana that are not included in this list; they include the Chrysler Foundry (closed 2005), Citizens Gas and Coke (closed 2007), IVC Industrial Coatings (closed 2010), Meridian Automotive (closed 2009), and Collins and Aikman Automotive Interiors (closed 2007). Each of these closed sources emitted high levels of VOCs as their largest pollutant which is an ozone precursor. The Chrysler source alone contributed 522 tons per year in VOCs before it closed.

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

INVENTORY YEAR	COUNTY	FACILITY NAME	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	TOTAL
2010	MARION	IPL - HARDING STREET GENERATING STATION	381.4	2,662.8	116.9	36.1	21,668.6	46.6	24,912.5
2010	MORGAN	IPL - EAGLE VALLEY GENERATING STATION	163.4	1,772.2	87.1	25.4	12,266.2	18.8	14,333.1
2010	MARION	CITIZENS THEMRAL ENERGY - C.C. PERRY K. STEAM PLANT	266.2	1,569.6	40.3	13.5	4,824.5	9.3	6,723.3
2010	MARION	VERTELLUS AGRICULTURE & NUTRITION SPECIALTIES LLC	2,801.0	196.1	33.3	33.3	36.6	52.8	3,153.2
2010	PUTNAM	LONE STAR INDUSTRIES, INC	515.2	2,012.1	86.2	27.0	410.8	18.1	3,069.3
2010	HENDRICKS	STEEL DYNAMICS, INC (SDI) ENGINEERED BAR PRODUCTS	1,408.1	246.2	61.7	66.2	188.4	19.9	1,990.5
2010	MARION	PEPL - ZIONSVILLE COMPRESSOR STATION	334.5	1,349.3	22.4	22.5	0.3	113.9	1,842.9
2010	MARION	INDIANAPOLIS BELMONT WWTP	1,085.2	136.1	8.6	8.6	21.0	73.9	1,333.5
2010	MARION	COVANTA INDIANAPOLIS, INC.	89.2	1,072.5	2.3	1.9	114.0	8.5	1,288.3
2010	SHELBY	ANR PIPELINE CO - SHELBYVILLE STATION	247.0	488.5	13.8	13.8	0.2	45.4	808.6

Figure 2: Map of 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 the Central Indiana area currently meet the historic NAAQS. New 1-hour NAAQS were introduced in 2010 for NO_2 and SO_2. The 1-hour NO_2 monitoring data in Central Indiana, as well as elsewhere in the state, are well below the new 1-hour NO_2 NAAQS. There are two counties in Central Indiana with monitor violations of the new 1-hour SO_2 NAAQS in 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

All counties in the Central Indiana area, except Putnam County, currently have an ambient air quality monitor located within the county boundaries. Monitoring data for the years 2000 through 2010 for 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. A historical trend graph of all available data for the years 1980 through 2010 is 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 was 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)

Three monitors within Central Indiana currently measure CO levels. These monitors are all located in Marion County. The trend data shown in Graphs 1 and 2 reflect the 2nd highest concentration for 1-hour and 8-hour CO. The 2nd high values are not the highest monitored concentration at a given monitoring location, rather the 2nd highest measured value. These values (2nd highs) are used to determine attainment of the primary 1-hour CO standard at 35 ppm and the primary 8-hour CO standard at 9 ppm. The primary 1-hour and primary 8-hour CO standards were first established in April 1971. There are no secondary standards for 1-hour or 8-hour CO. While there are occasional spikes in the monitoring values for both 1-hour and 8-hour CO concentrations, a downward trend over time can be seen in Graphs 1 and 2. Monitoring values have historically been below the 1-hour primary CO standard. The 8-hour CO concentrations were once above the primary 8-hour CO standard, but have been below the standard since 1986. CO monitoring data fluctuated between the years of 1986 and 2005 due to variability in the motor vehicle fleet. CO correlates closely with vehicle traffic and emissions from motor vehicles which can lead to variability in the data.

The data shown in Tables 5 and 6 reflect the 2nd highest concentration values for 1-hour and 8-hour CO from 2000 to 2010. Historical data prior to the year 2000 are available upon request for both 1-hour and 8-hour CO. Monitoring data in Table 5 are compared to the primary 1-hour CO standard of 35 ppm. Attainment is determined by evaluating the 2nd highest 1-hour high concentration. Monitoring data in Table 6 are compared to the primary 8-hour CO standard of 9 ppm. Attainment is determined by evaluating the 2nd highest 8-hour concentration. There are no monitor violations in the Central Indiana area for the 1-hour or 8-hour CO reflected.

Graph 1: Central Indiana 1-Hour CO 2nd High Values

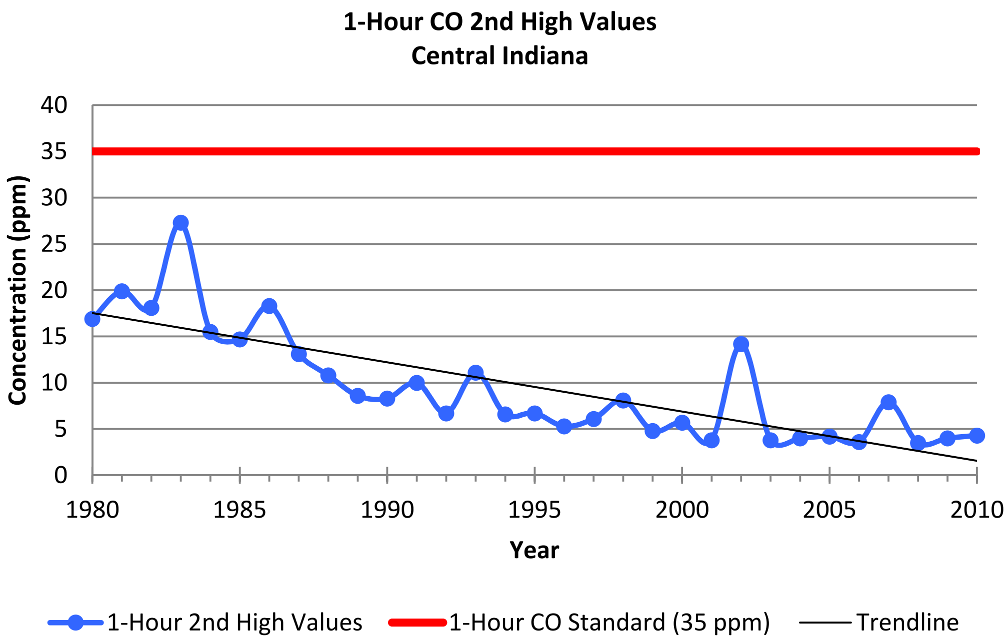


Table 5: Central Indiana 1-Hour CO 2nd High Value Monitoring Data Summary

County	Site #	Site Name	1-Hour 2nd High Value (ppm) 2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E	1.7			1.1	1.5	1.3	1.1	1.1			
Hendricks	180630002	Pittsboro-206 N Meridian St	3.5			1.7	1.5	1.3	1.5	1.3	1.2	1.4	
Hendricks	180630003	Lizton-Pittsboro HS	2.1			1.2	3.1	1.7	1.3	0.8			
Marion	180970072	Indianapolis-50 N Illinois St	5.7	3.8	14.2	3.6	4.0	4.2	3.6	7.9	3.5	4.0	4.3
Marion	180970073	Indianapolis-6125 E 16th St	4.9	3.5	4.6	3.8	3.2	3.1	2.8	2.5	2.2	1.9	2.0
Marion	180970078	Indianapolis-3120 E 30th St											2.0

Highlighted red numbers are above the 1-hour CO standard of 35 ppm

Graph 2: Central Indiana 8-Hour CO 2nd High Values

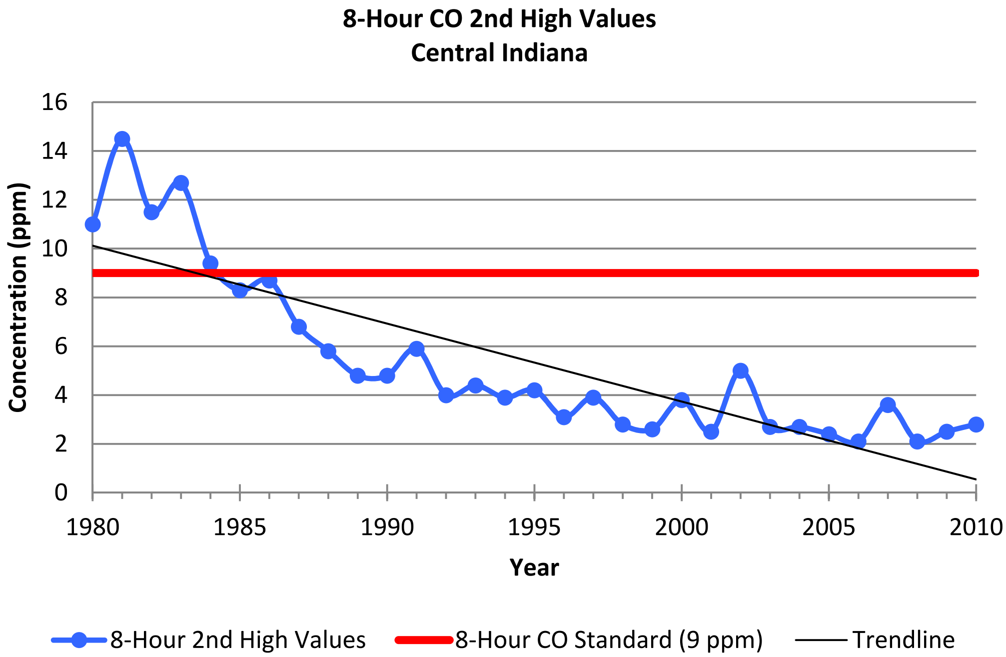


Table 6: Central Indiana 8-Hour CO 2nd High Value Monitoring Data Summary

County	Site #	Site Name	8-Hour 2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E	1.6			1.0	1.2	1.1	1.0	1.0			
Hendricks	180630002	Pittsboro-206 N Meridian St	1.5			1.3	1.3	1.2	1.4	1.2	0.8	0.7	
Hendricks	180630003	Lizton-Pittsboro HS	1.8			1.1	2.7	1.0	1.1	0.7			
Marion	180970072	Indianapolis-50 N Illinois St	2.8	2.2	5.0	2.7	2.2	2.4	2.0	3.6	2.1	2.5	2.8
Marion	180970073	Indianapolis-6125 E 16th St	3.8	2.5	1.6	2.3	1.8	1.8	2.1	2.0	1.6	1.3	1.3
Marion	180970078	Indianapolis-3120 E 30th St											1.4
			Highlighted red numbers are above the 8-hour CO standard of 9 ppm										

U.S. EPA's NEI contains emissions information for CO which is used for Graph 3 and Chart 1. Graph 3 illustrates the emissions trend for CO in Central Indiana and Chart 1 shows how the average emissions are distributed among the different source categories.

Graph 3: Central Indiana CO Emissions

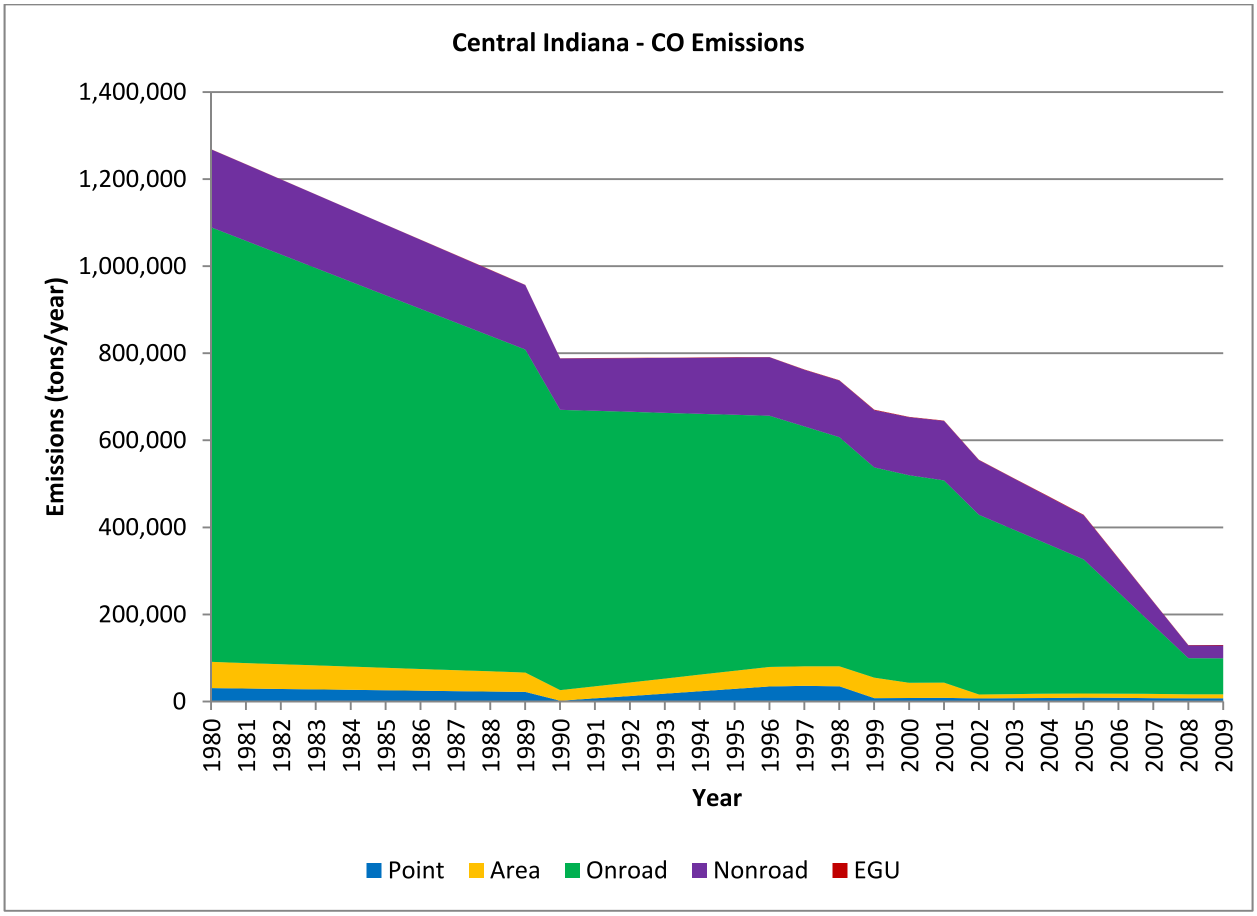
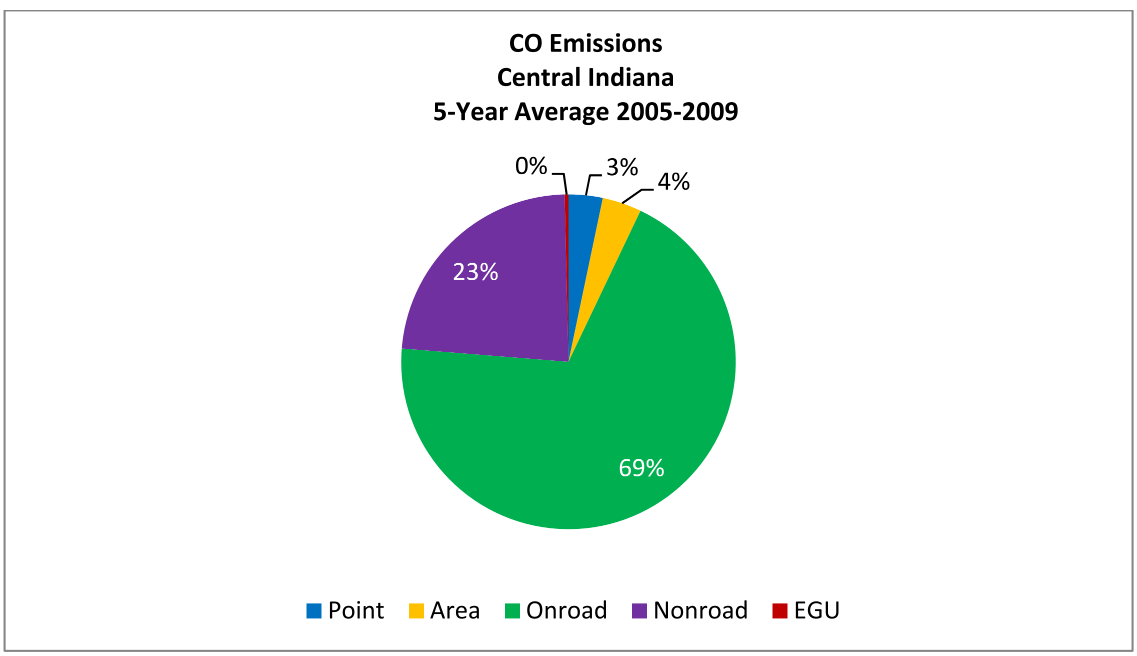


Chart 1: Central Indiana CO Emissions



National controls have led to a decrease in CO emissions in the Central Indiana area. As Graph 3 illustrates, CO emissions have decreased by 90% within the 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 primary source of CO emissions. Levels of CO have generally declined since the mid-1980s, primarily due to stricter emission standards for onroad and nonroad engines. A small portion of downtown Marion County is currently under a maintenance plan for CO in case monitored values increase above trigger levels. Another reason for such a steep decrease in monitored CO levels is that several large sources of CO in Marion County closed since 1997; these include Bridgeport Brass DBA Olin Brass, Chrysler LLC, and Citizens Gas & Coke. The total decrease in CO emissions from these closed sources was 22,679 tons per year.

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

Fine Particles ($PM_{2.5}$)

Five monitors within Central Indiana currently measure $PM_{2.5}$ levels. These monitors are all located in Marion County. Two of the monitors (West Street and English Avenue/School 21) are considered source oriented and are not compared to the primary and secondary annual standards, but the monitors are compared to the primary and secondary 24-hour $PM_{2.5}$ standards. The trend data in Graphs 4 and 6 reflect the annual arithmetic mean (the method used to derive the central tendency of the monitoring values) for annual $PM_{2.5}$ and the 98th 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 in the Central Indiana area for the years 2000 through 2010. The annual arithmetic mean values for annual $PM_{2.5}$ and 98th 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 98th 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 35.0 $\mu g/m^3$. 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 5 reflect the three-year design value of the annual arithmetic mean for annual $PM_{2.5}$ for each year in the Central Indiana area for the years 2000 through 2010. The trend data in Graph 7 reflect the three-year design value of the 98^{th} percentile values for 24-hour $PM_{2.5}$ for each year in the Central Indiana area 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 4, 5, 6, and 7. 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 $\mu g/m^3$; therefore, the one-year values shown in Graph 4 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 4 reflect the annual arithmetic mean and the highest value from all of the monitors in the Central Indiana area is plotted on the graph for each year.

The design value of the 98^{th} percentile is used for comparison to the 24-hour $PM_{2.5}$ standards; therefore, the one-year values shown in Graph 6 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 6 reflect the 98^{th} percentile and the highest value from all of the monitors in the Central Indiana area is plotted on the graph for each year.

The data in Tables 7, 8, 9, and 10 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 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 7 show the annual arithmetic mean for annual $PM_{2.5}$ for the years 2000 through 2010. Monitoring data in Table 8 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 9 show the 98th percentile for 24-hour $PM_{2.5}$ for the years 2000 through 2010. Monitoring data in Table 10 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 4: Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Values

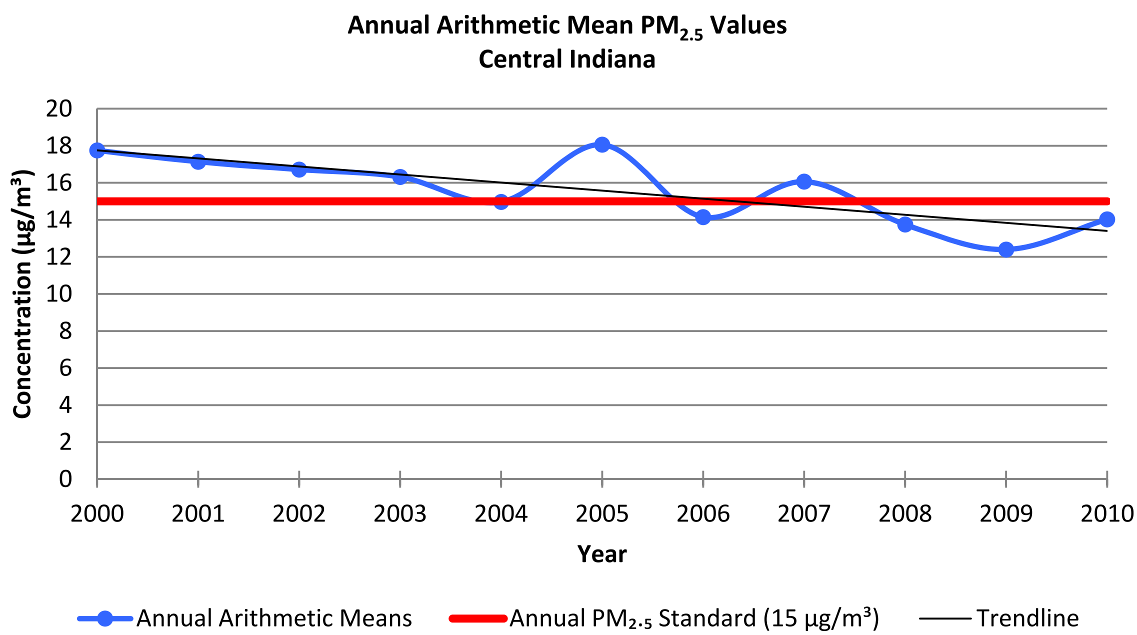


Table 7: Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Marion	180970042	Indianapolis - Mann Road	15.19	14.78	15.22	14.53	12.92	16.10	12.49	14.57			
Marion	180970078	Indianapolis - Washington Park	17.75	16.58	16.55	15.45	14.31	16.39	14.14	15.66	13.02	12.11	12.86
Marion	180970079	Indianapolis - E 75th St	16.36	16.25	15.68	14.67	13.44	16.88	12.75	14.76			
Marion	180970081	Indianapolis - W 18th St	16.78	17.14	14.24	16.21	14.96	18.06	14.12	16.07	13.75	12.96	14.03
Marion	180970083	Indianapolis - E Michigan St	17.00	17.09	16.72	16.32	14.97	17.54	14.15	15.93	13.17	12.40	13.91

Graph 5: Central Indiana Annual $PM_{2.5}$ Three-Year Design Values

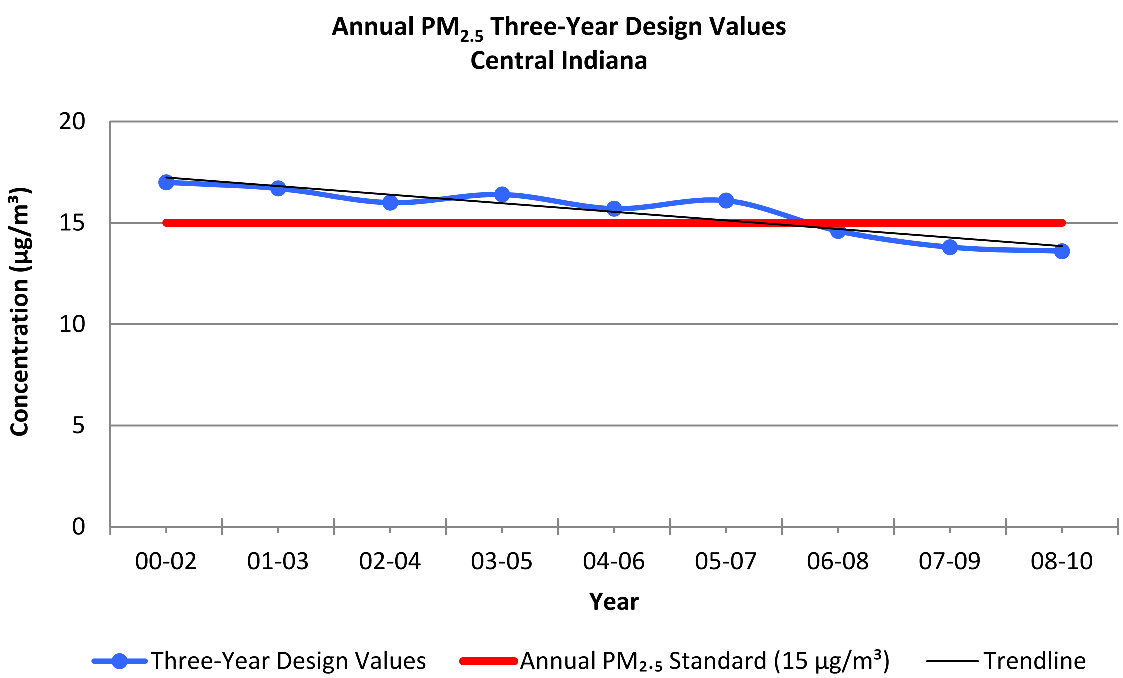


Table 8: Central Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

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
Marion	180970042	Indianapolis - Mann Road	15.1	14.8	14.2	14.5	13.8	14.4			
Marion	180970078	Indianapolis - Washington Park	17.0	16.2	15.4	15.4	15.0	15.4	14.3	13.6	12.7
Marion	180970079	Indianapolis - E 75th St	16.1	15.5	14.6	15.0	14.4	14.8			
Marion	180970081	Indianapolis - W 18th St	16.1	15.9	15.1	16.4	15.7	16.1	14.6	14.3	13.6
Marion	180970083	Indianapolis - E Michigan St	16.9	16.7	16.0	16.3	15.6	15.9	14.4	13.8	13.2
			Red highlighted numbers are above the annual $PM_{2.5}$ standard of 15.0 µg/m³								

Graph 6: Central Indiana 24-Hour $PM_{2.5}$ 98th Percentile Values

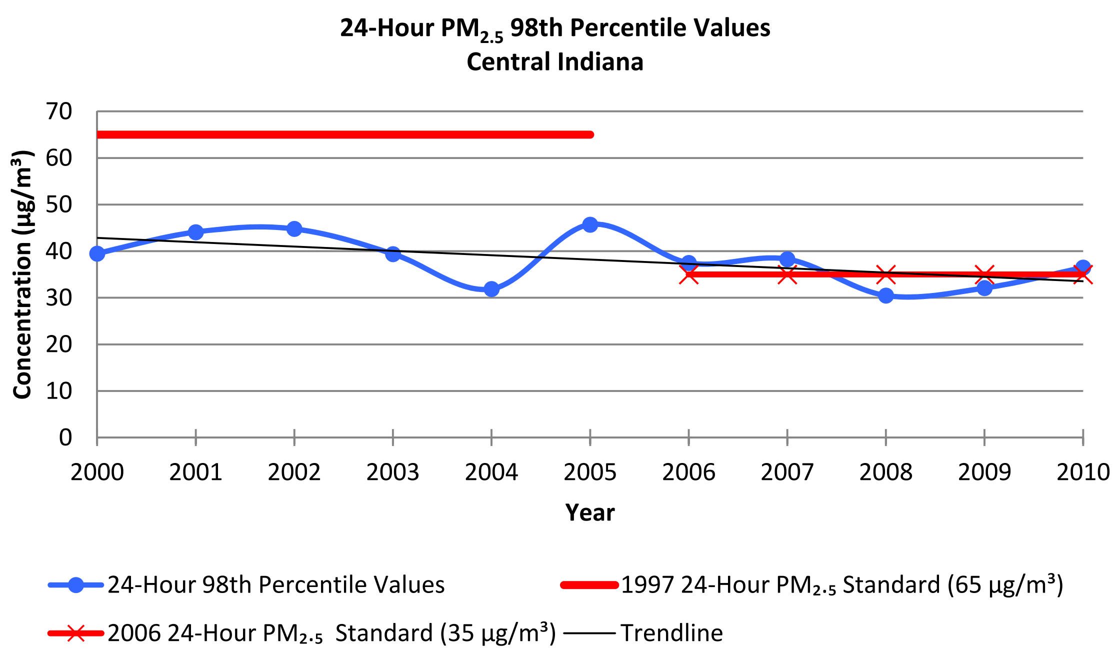


Table 9: Central Indiana 24-Hour $PM_{2.5}$ 98th Percentile Value Monitoring Data Summary

County	Site #	Site Name	24-Hour 98th Percentile Value (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Marion	180970042	Indianapolis - Mann Road	33.5	31.0	39.6	33.7	29.3	39.4	31.0	35.6			
Marion	180970043	Indianapolis - West Street	36.8	36.4	36.5	37.9	31.7	43.9	37.5	38.3	30.1	28.3	32.0
Marion	180970066	Indianapolis - English Avenue	39.5	44.1	44.8	39.4	31.1	44.0	36.2	37.2	28.2	32.1	
Marion	180970066/84	Indianapolis Combined (English Avenue & School 21)										24.1	
Marion	180970084	Indianapolis - School 21										23.5	35.1
Marion	180970078	Indianapolis - Washington Park	36.5	37.2	35.0	39.3	31.0	42.5	31.7	35.3	28.9	26.5	29.7
Marion	180970079	Indianapolis – East 75th Street	35.1	35.9	33.3	38.0	28.7	43.4	30.7	33.5			
Marion	180970081	Indianapolis - West 18th Street	36.3	38.5	26.8	36.2	31.9	45.7	34.8	37.1	30.5	27.1	32.0
Marion	180970083	Indianapolis - East Michigan Street	35.7	39.5	36.7	36.7	31.3	40.3	33.5	37.2	29.0	23.7	36.5

Graph 7: Central Indiana 24-Hour $PM_{2.5}$ Three-Year Design Values

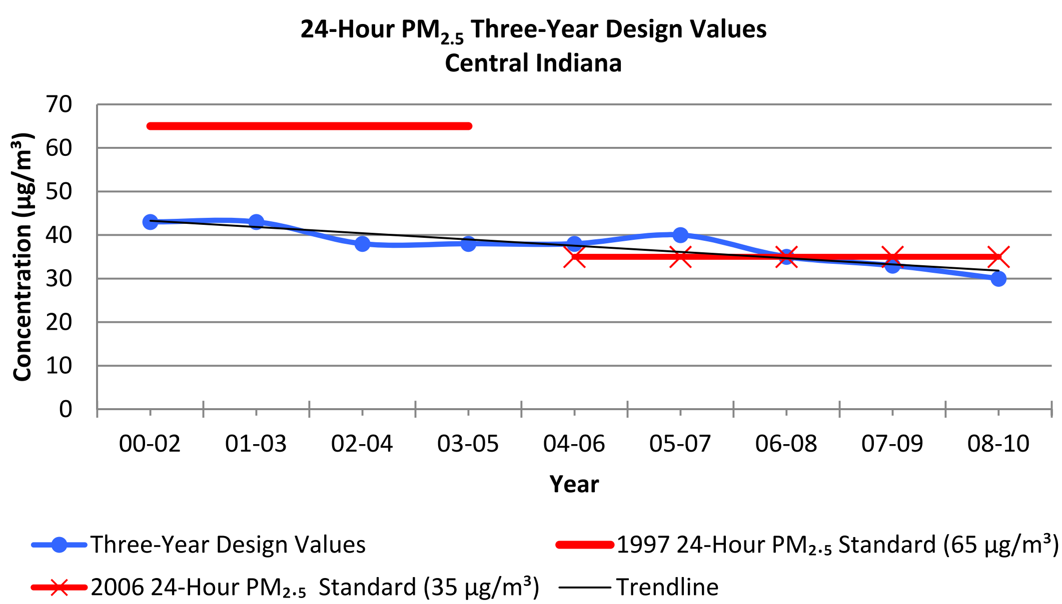


Table 10: Central Indiana 24-Hour $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (µg/m^3) 00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Marion	180970042	Indianapolis - Mann Road	35	35	34	34	33	35			
Marion	180970043	Indianapolis - West Street	37	37	35	38	38	40	35	32	30
Marion	180970066	Indianapolis - English Avenue	43	43	38	38	37	39	34	33	
Marion	180970066/84	Indianapolis Combined (English Avenue & School 21)								30	29
Marion	180970084	Indianapolis - School 21								24	29
Marion	180970078	Indianapolis - Washington Park	36	37	35	38	35	37	32	31	28
Marion	180970079	Indianapolis - East 75th Street	35	36	33	37	34	36			
Marion	180970081	Indianapolis - West 18th Street	34	34	32	38	37	39	34	32	30
Marion	180970083	Indianapolis - East Michigan Street	37	38	35	36	35	37	33	30	30

Prior to 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 65 µg/m^3

Beginning in 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 35 µg/m^3

Tables 7, 8, 9, and 10 demonstrate that the annual and 24-hour $PM_{2.5}$ values for the Central Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the other sites do also. Annual and 24-hour $PM_{2.5}$ values in Central Indiana were above the primary and secondary annual $PM_{2.5}$ standards and the primary and secondary 24-hour $PM_{2.5}$ standards until the end of 2007, but have remained below the standards since then. A recent upward trend in 2010 was observed at the School 21 monitor, which is a new site that resulted from the moving of the English Avenue site to the School 21 site and does not necessarily indicate a new upward trend. The West 18th Street $PM_{2.5}$ monitoring site has historically registered the highest $PM_{2.5}$ values in Central Indiana on average, excluding the source specific monitors. This is expected since it is located in an urban area near higher concentrations of traffic and industrial activity.

While fluctuations in monitoring data are shown in Graphs 4, 5, 6, and 7, 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 seen in 2005 (Graphs 4, 5, 6, and 7), 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 four 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 and 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 8, 9, and 10, and Charts 2, 3, and 4. Graphs 8, 9, and 10 illustrate the emissions trend for $PM_{2.5}$ and its precursors ($SO_{2,}$ and NO_x) in Central Indiana. Charts 2, 3, and 4 show how the average emissions are distributed among the different source categories.

Graph 8: Central Indiana $PM_{2.5}$ Emissions

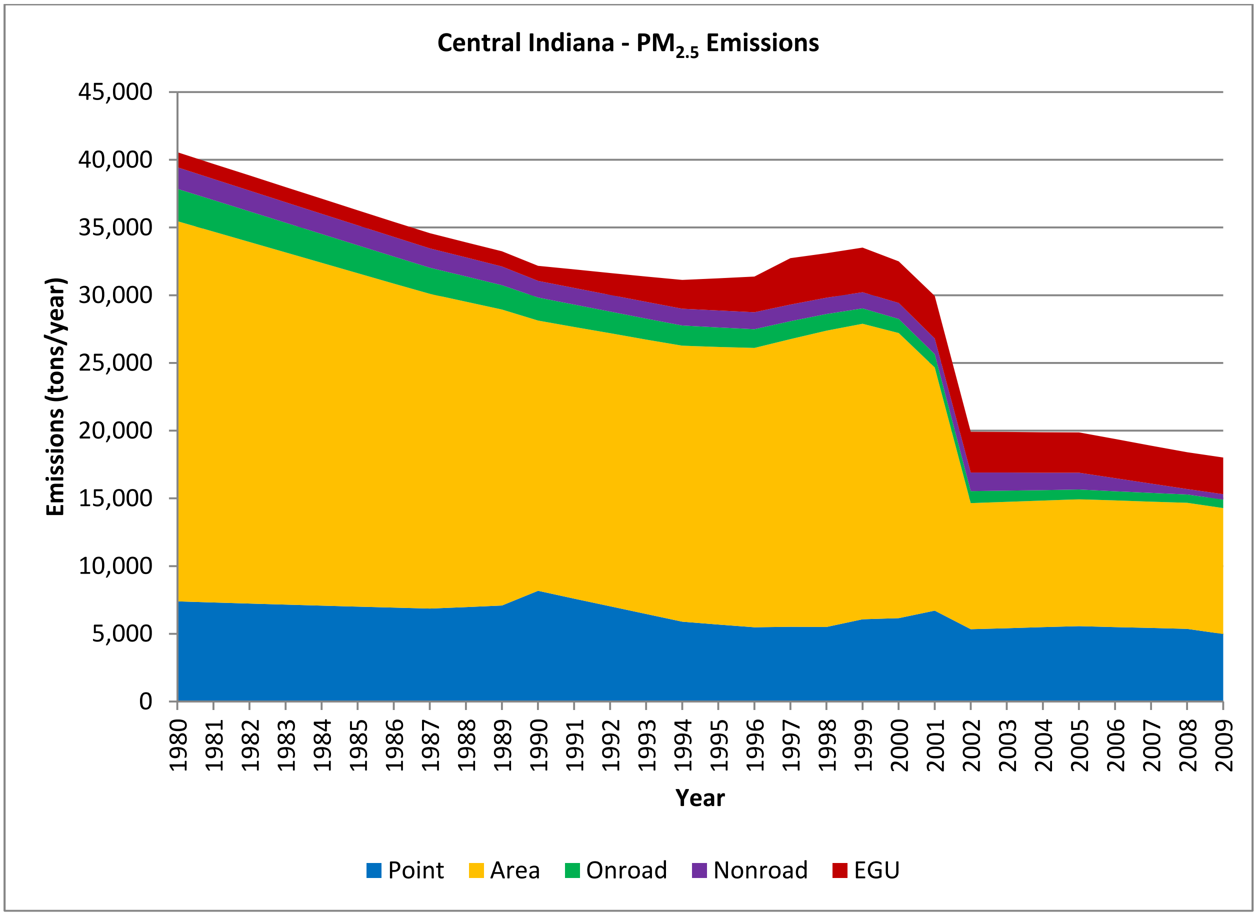
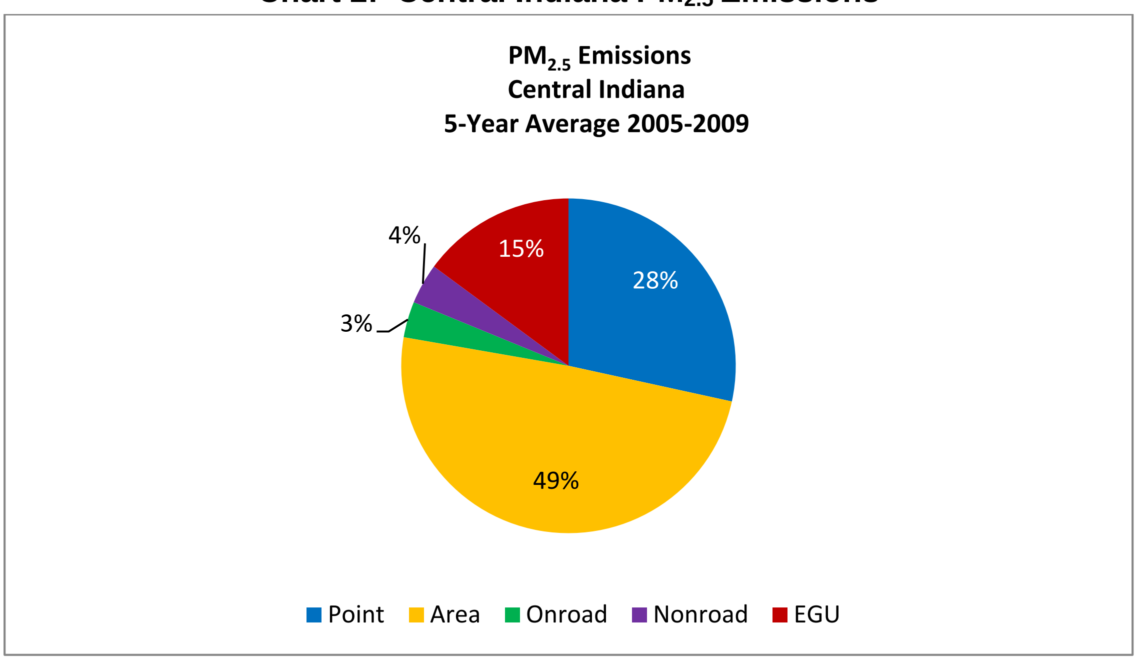


Chart 2: Central Indiana $PM_{2.5}$ Emissions



Graph 9: Central Indiana SO_2 Emissions

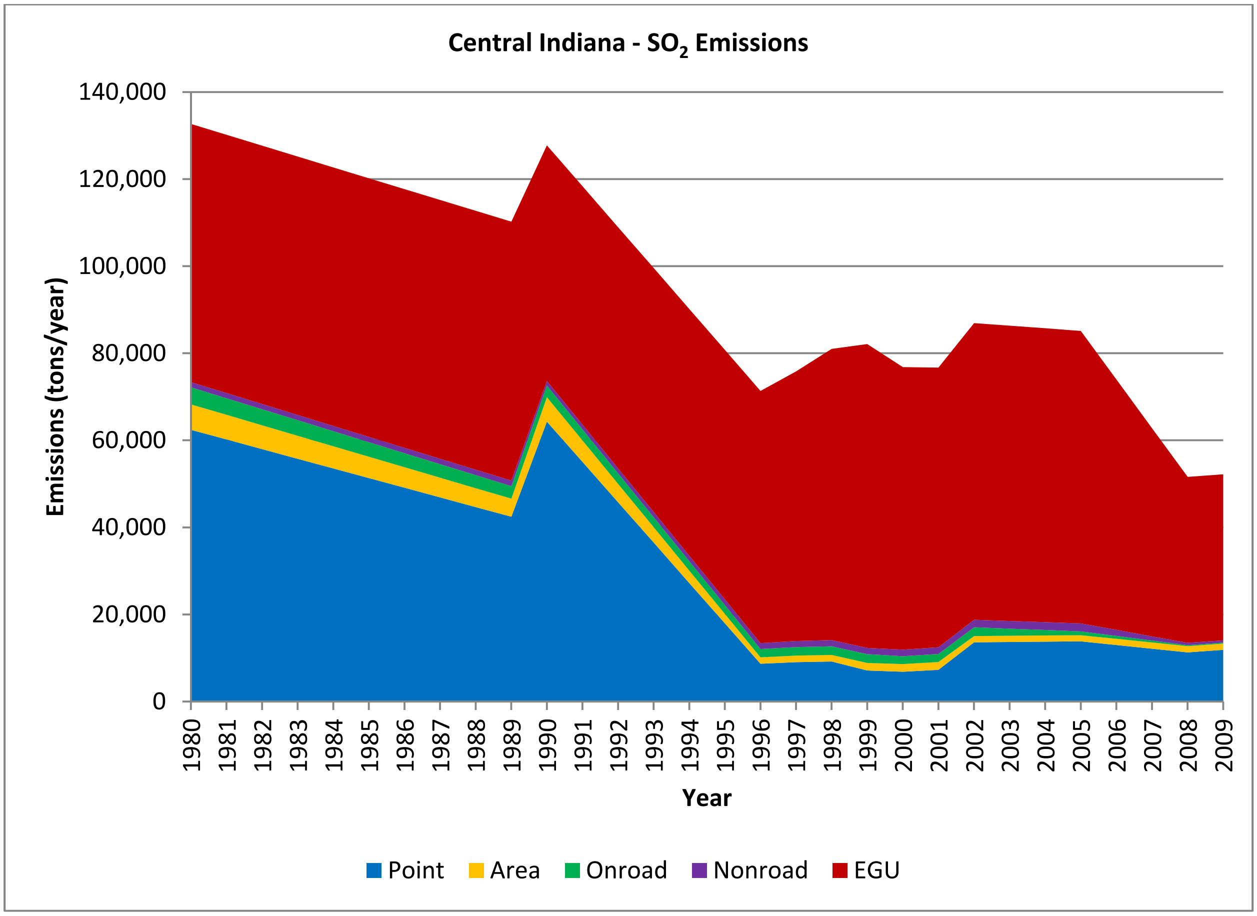
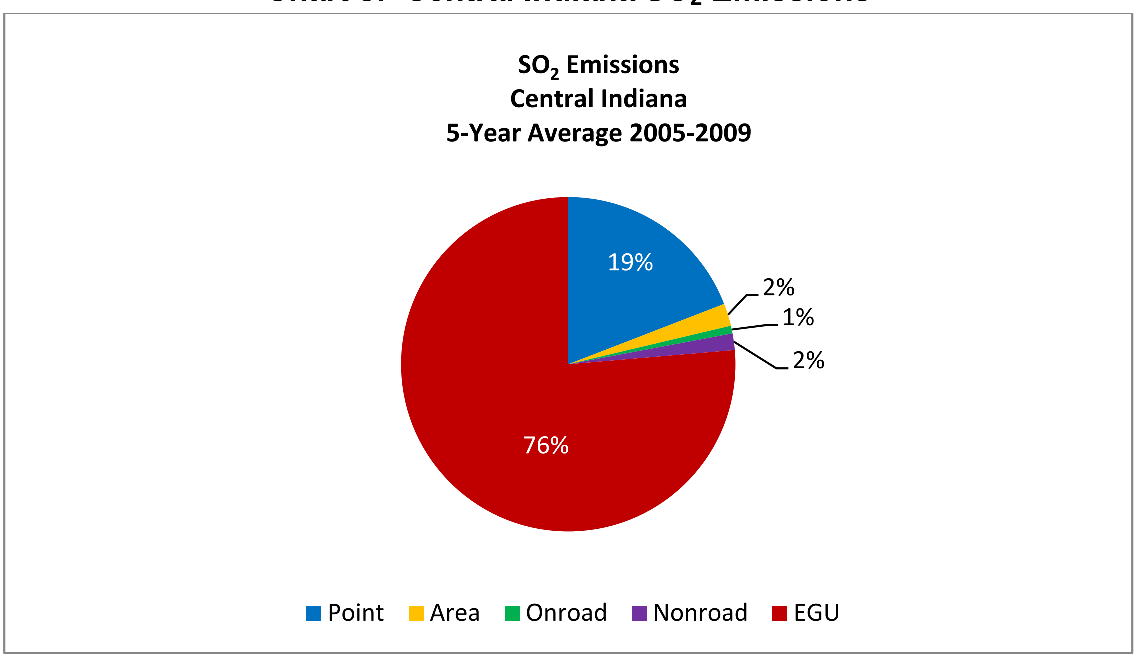


Chart 3: Central Indiana SO_2 Emissions



Graph 10: Central Indiana NO_x Emissions

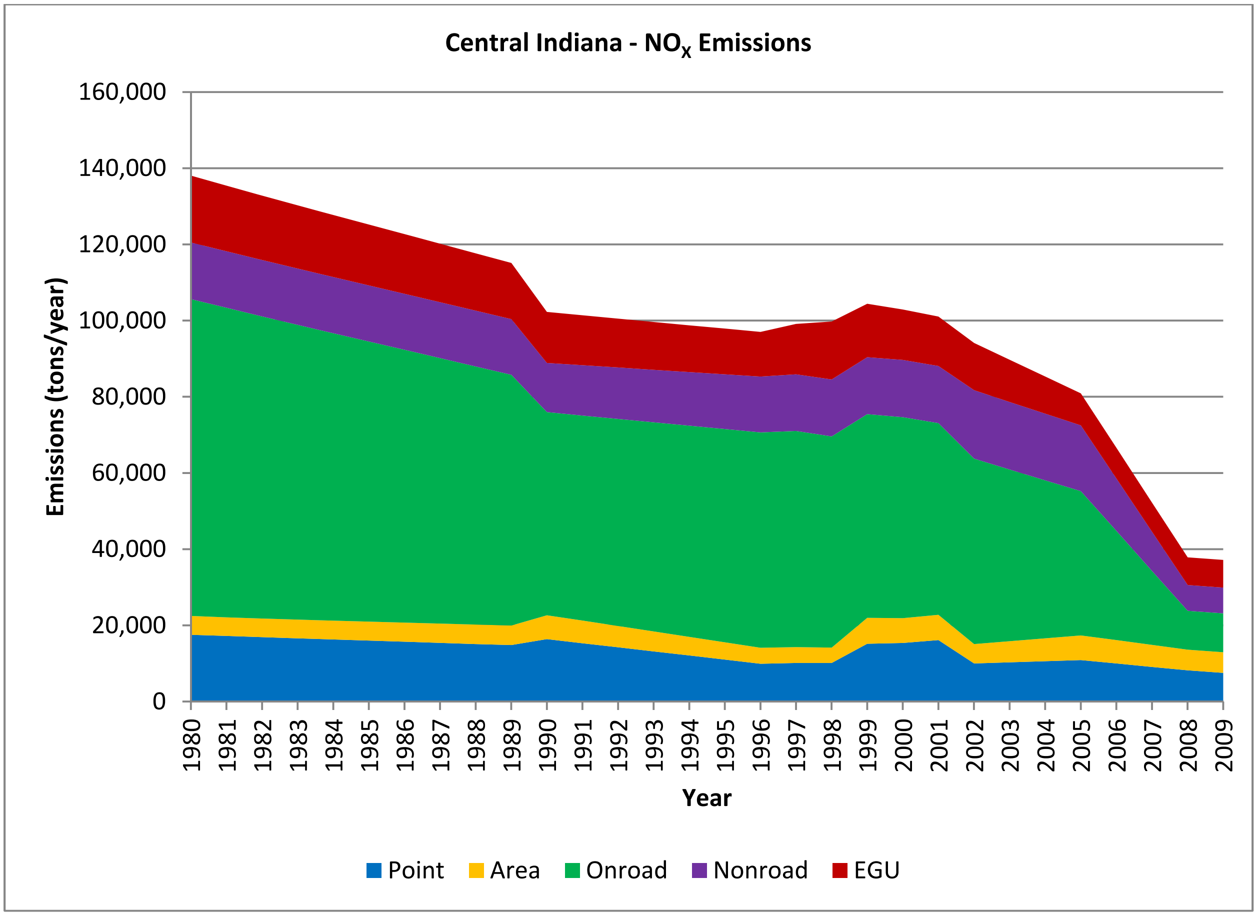
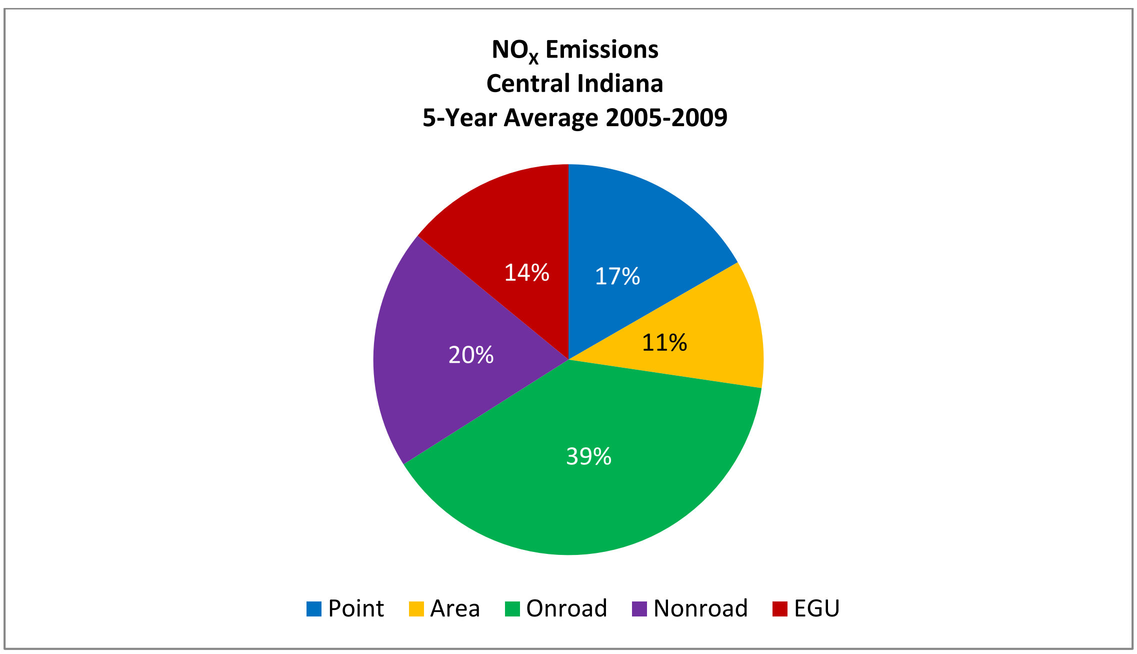


Chart 4: Central Indiana NO_x Emissions



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 8, 9, and 10 illustrate, $PM_{2.5}$, SO_2 and NO_x emissions have decreased by 56%, 61%, and 73%, respectively, within the 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

Three monitors within Central Indiana currently measure lead levels. These monitors are all located in Marion 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 11 reflect the highest annual quarterly arithmetic mean. The trend data in Graph 12 show the highest three-month rolling average.

While fluctuations in monitoring data are shown in Graph 11, monitoring data for lead indicates a downward trend over time. 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. In the mid-1980’s, Marion County violated the 1978 primary and secondary lead standards and had a small nonattainment area for lead in downtown Indianapolis, as well as two unclassified areas in Franklin and Wayne Townships. The areas were redesignated to attainment in 2000 and lead values have since remained well below the primary and secondary 1978 lead standards. The highest three-month rolling averages that are depicted in Graph 12 are well below the primary and secondary 2008 lead standards.

The data in Tables 11 and 12 are for the monitors that measured lead from 2000 to 2010. Historical lead data prior to the year 2000 are available upon request. Monitoring data in Table 11 are compared to the primary and secondary 1978 lead standards which were 1.5 µg/m³. Monitoring data in Table 12 are compared to the primary and secondary 2008 lead standards.

Graph 11: Central Indiana Lead Highest Annual Quarterly Values

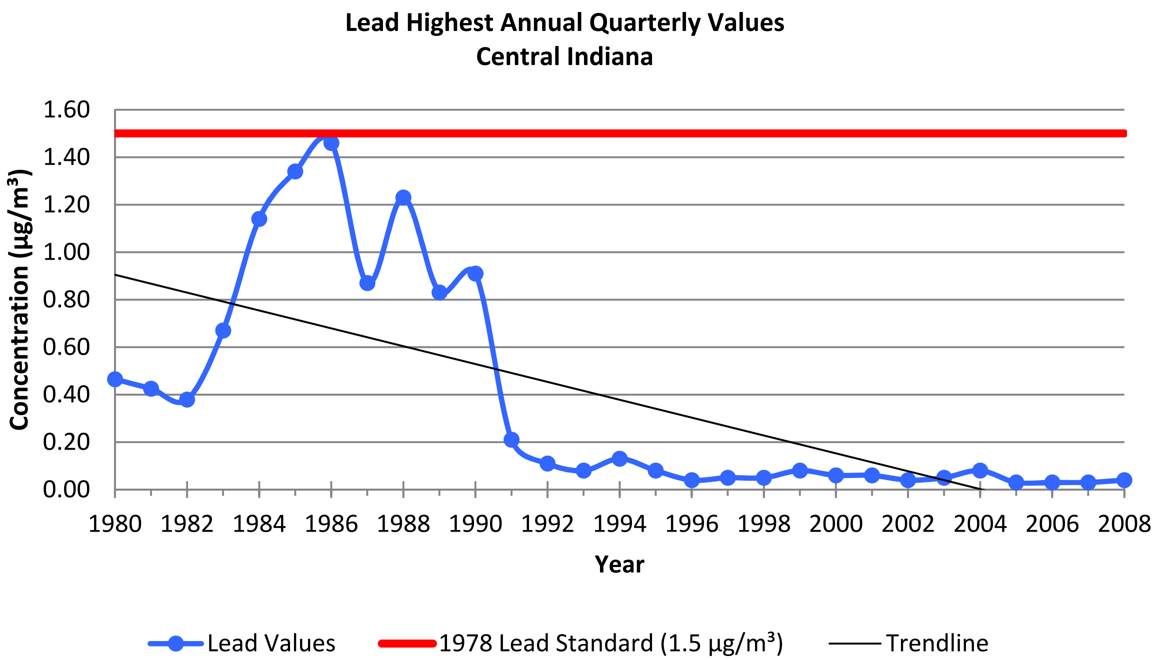


Table 11: Central Indiana Lead Quarterly Average Monitoring Data Summary

County	Site #	Site Name	Quarterly Average (μg/m³)											
			1Q 2000	2Q 2000	3Q 2000	4Q 2000	1Q 2001	2Q 2001	3Q 2001	4Q 2001	1Q 2002	2Q 2002	3Q 2002	4Q 2002
Marion	180970063	Indianapolis-Rockville Rd	0.07	0.02	0.02	0.12	0.03	0.07	0.01	0.01	0.04	0.02	0.03	0.02
Marion	180970076	Indianapolis-Quemetco	0.05	0.02	0.01	0.06	0.02	0.02	0.01	0.01	0.02	0.01	0.02	0.01
Marion	180970078	Indianapolis-Washington Park									0.01	0.01	0.01	0.01
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
Marion	180970063	Indianapolis-Rockville Rd	0.03	0.05	0.03	0.03	0.02	0.08	0.02	0.03	0.03	0.03	0.03	0.01
Marion	180970076	Indianapolis-Quemetco	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.03	0.01	0.01
Marion	180970078	Indianapolis-Washington Park	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.03	0.01
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
Marion	180970063	Indianapolis-Rockville Rd	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.04	0.03	0.03	0.02
Marion	180970076	Indianapolis-Quemetco	0.02	0.02	0.02	0.01	0.02	0.02	0.02	0.01	0.02	0.01	0.01	0.01
Marion	180970078	Indianapolis-Washington Park	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01

Highlighted red numbers are over the 1978 lead standard of 1.5 μg/m³

Graph 12: Central Indiana Lead Three-Month Rolling Average Values

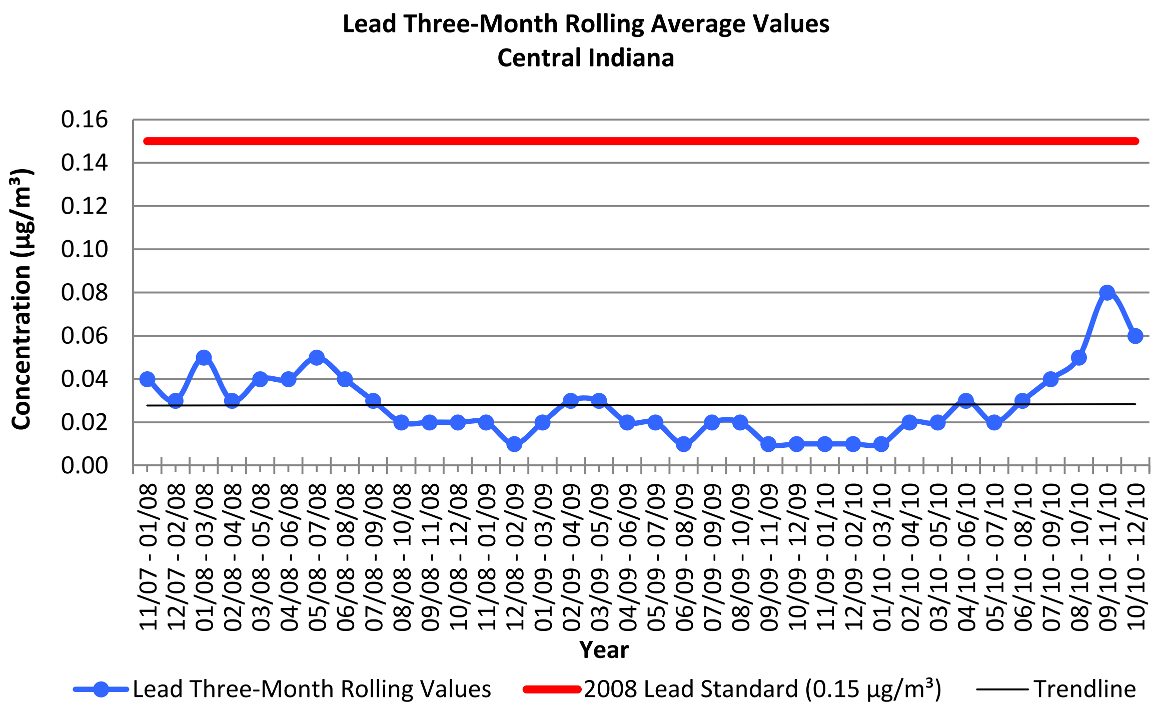


Table 12: Central Indiana Lead Three-Month Rolling Average Monitoring Data Summary

			Three-Month Rolling Average (μg/m^3)											
County	**Site #**	**Site Name**	**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**
Marion	180970063	Indianapolis-Rockville Rd	0.04	0.03	0.05	0.03	0.04	0.04	0.05	0.04	0.03	0.02	0.02	0.02
Marion	180970076	Indianapolis-Girls School Rd	0.01	0.01	0.02	0.03	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Marion	180970078	Indianapolis-Washington Park	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
			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**
Marion	180970063	Indianapolis-Rockville Rd	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.01	0.02	0.02	0.01	0.01
Marion	180970076	Indianapolis-Girls School Rd	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.01	0.01	0.01	0.01
Marion	180970078	Indianapolis-Washington Park	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
			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**
Marion	180970063	Indianapolis-Rockville Rd	0.01	0.01	0.01	0.02	0.02	0.03	0.02	0.03	0.04	0.05	0.08	0.06
Marion	180970076	Indianapolis-Girls School Rd	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Marion	180970078	Indianapolis-Washington Park	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01
			Highlighted red numbers are rolling three-month averages above the 2008 lead standard of 0.15 μg/m^3											

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. As can be seen in Graphs 11 and 12, lead levels in Central Indiana are well below the current standard and will continue to be so as new federal controls are adopted. In the Wayne Township Unclassified area in Marion County, Quemetco, Inc. operates a lead recycling and smelting business. This source is subject to the Indiana Lead Rule, 326 IAC 15-1, and the National Emissions Standards for Hazardous Air Pollutants from Lead Smelters found at 40 CFR 63, Subpart X. In addition, there are source specific controls that apply to Quemetco, Inc.

Another reduction resulted from the closing of Refined Metals, located in the Franklin Township Unclassified area, in 1997. Other closed sources of lead in Marion County include: Central Soya (closed 1994), Marathon Oil Company (closed 1996), Chrysler Corporation (closed 2005), and Conner Corporation (closed 1998). The total reduction in lead from these closed sources was 0.102 tons per year.

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 is one monitoring site within the Central Indiana area, located in Marion County that measures NO_2 levels. The trend data in Graph 13 reflect the annual arithmetic mean NO_2 values. The annual arithmetic mean is used to compare to the primary and secondary annual NO_2 standards at 53 parts per billion (ppb). The secondary annual NO_2 standard is the same as the primary NO_2 standard. Attainment of the annual NO_2 standards is determined by evaluating the annual arithmetic mean concentration in a calendar year, which must be less than or equal to 53 ppb. U.S. EPA added a primary 1-hour NO_2 standard in February 2010 at 100 ppb. Attainment of the 1-hour NO_2 standard is determined by evaluating the design value of the 98^{th} percentile of the daily maximum 1-hour averages at each monitor within an area, which must not exceed 100 ppb averaged over a three-year period.

The trend data in Graph 14 show the 98^{th} percentile of the 1-hour NO_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 98^{th} percentile is used for comparison to the primary 1-hour NO_2 standard; therefore, the one-year values shown in Graph 14 are not a true comparison to the primary 1-hour NO_2 standard. The values in Graph 14 reflect the highest 98^{th} percentile from all of the monitors in the Central Indiana area which is plotted on the graph for each year. The 1-hour NO_2 standard at 100 ppb is only listed for the year 2010 on this graph since it was not established until February 2010. Attainment of the primary 1-hour NO_2 standard is determined by evaluating the design value of the 98^{th} percentile values of the daily maximum 1-hour averages at each monitor within an area, which must not exceed 100 ppb averaged over a three-year period. An exceedance of the primary 1-hour NO_2 standard occurs when a 98^{th} percentile value is equal to or greater than 100 ppb. A violation of the primary 1-hour NO_2 standard occurs when the three-year design value of the 98th percentile is equal to or greater than 100 ppb. A monitor can exceed the standard without being in violation.

NO_2 data are presented from 2000 to 2010 in this report; however, historical monitoring data for annual NO_2 for all monitors in Central Indiana are available upon request. Monitoring data for annual NO_2 show a downward trend over time and the monitor values for Central Indiana have historically been below the primary and secondary annual NO_2 standards. While fluctuations in monitoring data are shown in Graphs 13, 14, and 15, monitoring data for both annual and 1-hour NO_2 indicate a downward trend over time. NO_2 monitors are located in close proximity to major sources in the area and data fluctuate based on variability in facility operations and meteorology.

The data in Tables 13, 14, and 15 are from the monitoring sites that measured NO_2 from 2000 to 2010. Historical data prior to the year 2000 are available upon request for both annual and 1-hour NO_2. Monitoring data in Table 13 are compared to the primary and secondary annual NO_2 standards at 53 ppb. Monitoring data in Table 14 show the 98th percentile of the 1-hour NO_2 values for the years 2000 through 2010. Monitoring data in Table 15 are compared to the primary 1-hour NO_2 standard at 100 ppb. The 1-hour NO_2 data prior to 2010 was not compared to any standard and the 98th percentile values and the design values from 2000 to 2007 are included for reference purposes only. NO_2 values in Central Indiana are well below both the annual and 1-hour NO_2 standards.

Graph 13: Central Indiana Annual Arithmetic Mean NO_2 Values

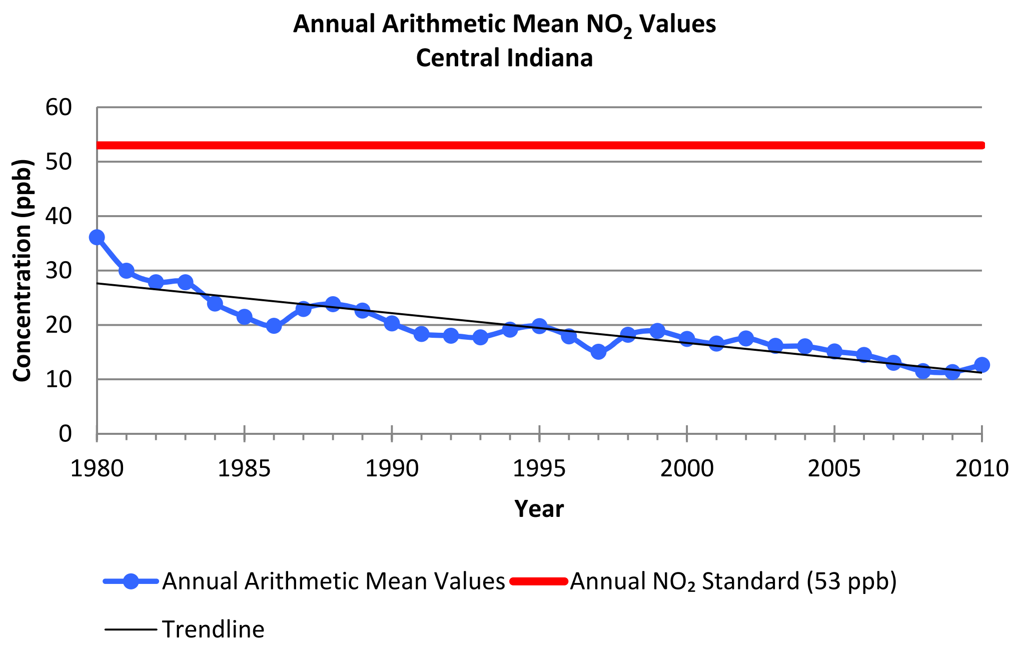


Table 13: Central Indiana Annual Arithmetic Mean NO_2 Values Monitoring Data Summary

County	Site #	Site Name	Annual Mean (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275					11	13	11	11			
Hendricks	180630002	Pittsboro-206 N Meridian St					8	9	7	8	7	7	
Hendricks	180630003	Lizton-Pittsboro HS					5	7	5	6			
Marion	180970073	Indianapolis-6125 E 16th	17	17	18	16	16	15	15	13	12	11	13
			Highlighted red numbers are above the annual NO_2 standard of 53 ppb										

Graph 14: Central Indiana 1-Hour NO_2 98th Percentile Values

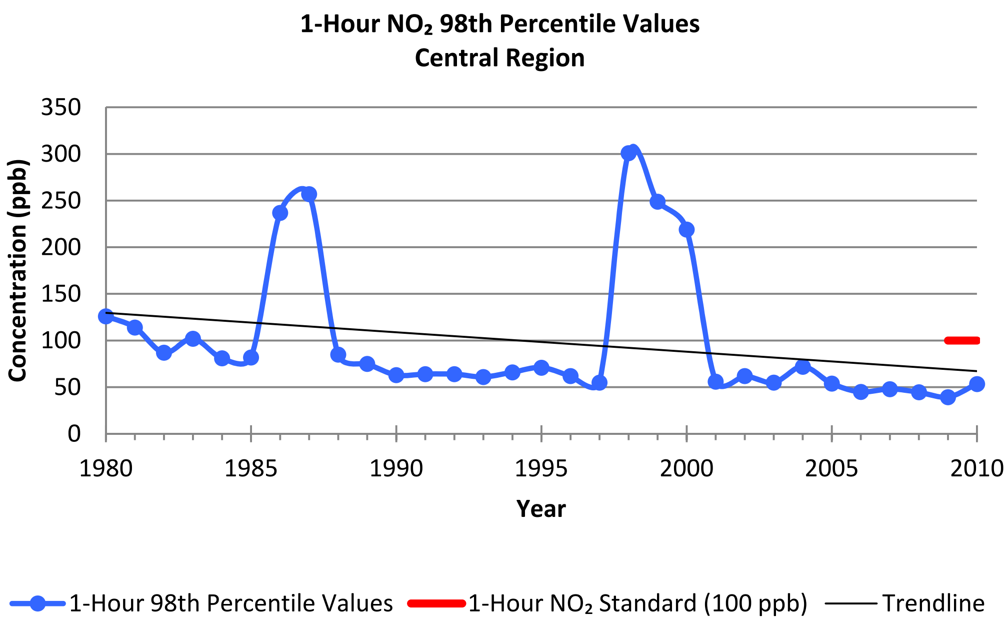


Table 14: Central Indiana 1-Hour NO_2 98th Percentile Values Monitoring Data Summary

County	Site #	Site Name	1-Hour 98th Percentile Value (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275					72	54	45	41			
Hendricks	180630002	Pittsboro-206 N Meridian St					57	42	38	42	35	37	
Hendricks	180630003	Lizton-Pittsboro HS					46	37	40	40			
Marion	180970073	Indianapolis-6125 E 16th St	58	56	62	55	52	53	42	48	45	39	54

Graph 15: Central Indiana 1-Hour NO_2 Three-Year Design Values

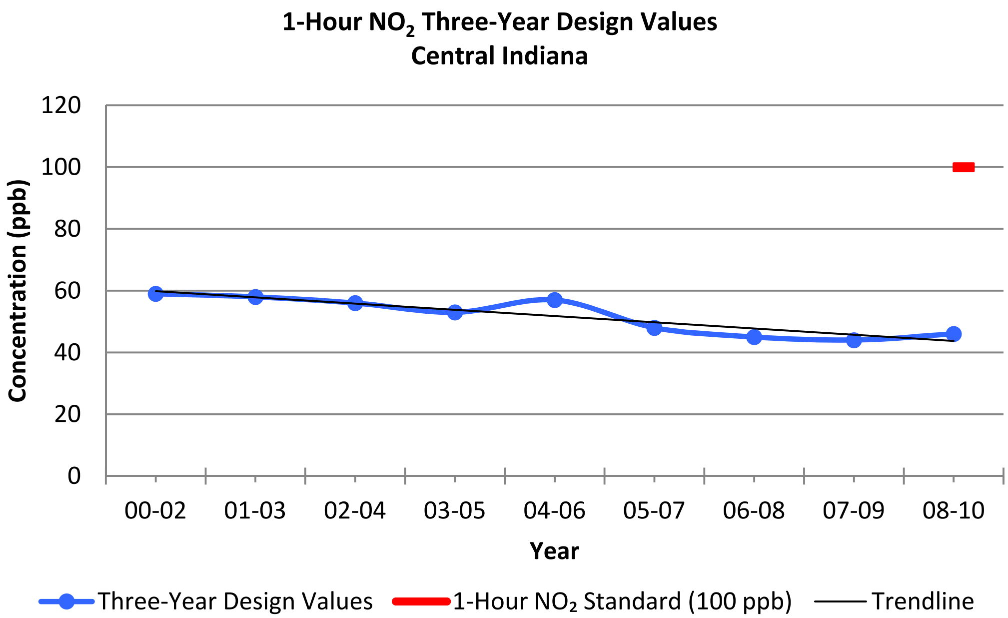


Table 15: Central Indiana 1-Hour Three-Year Design Value NO_2 Monitoring Data Summary

County	Site #	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
Hendricks	180630001	CR 800 N and CR 275					57	47			
Hendricks	180630002	Pittsboro-206 N Meridian St					46	41	38	38	
Hendricks	180630003	Lizton-Pittsboro HS					41	39	40	40	
Marion	180970073	Indianapolis-6125 E 16th St	59	58	56	53	49	48	45	44	46

Highlighted red numbers are above the 1-hour NO_2 standard of 100 ppb

U.S. EPA's NEI contains emissions information for NO_x and is used for Graph 16 and Chart 5. NO_x emissions data are used as a surrogate for NO_2 in conjunction with the NO_2 NAAQS. Graph 16 illustrates the emissions trend for NO_x in Central Indiana and Chart 5 shows how the average emissions are distributed among the different source categories.

Graph 16: Central Indiana NO_x Emissions

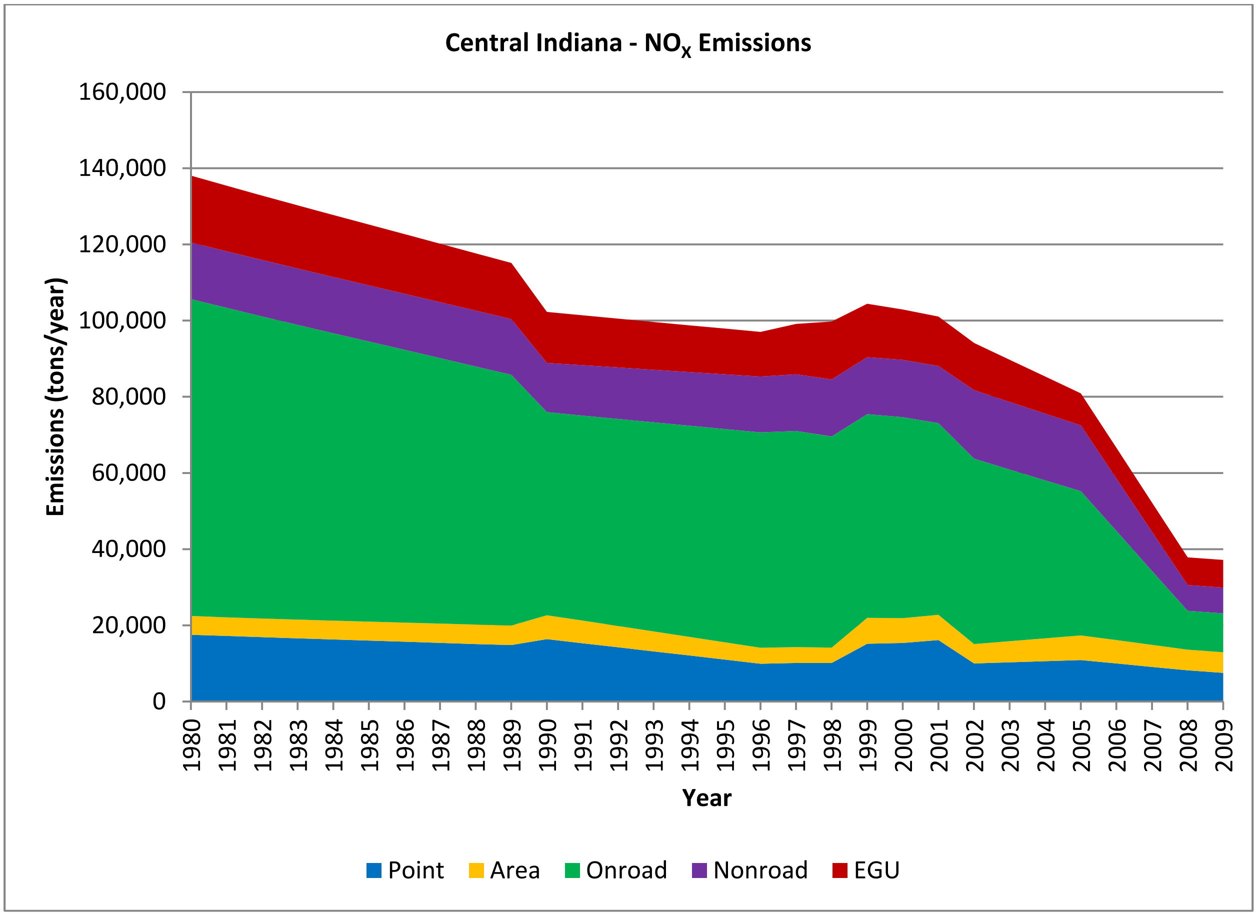
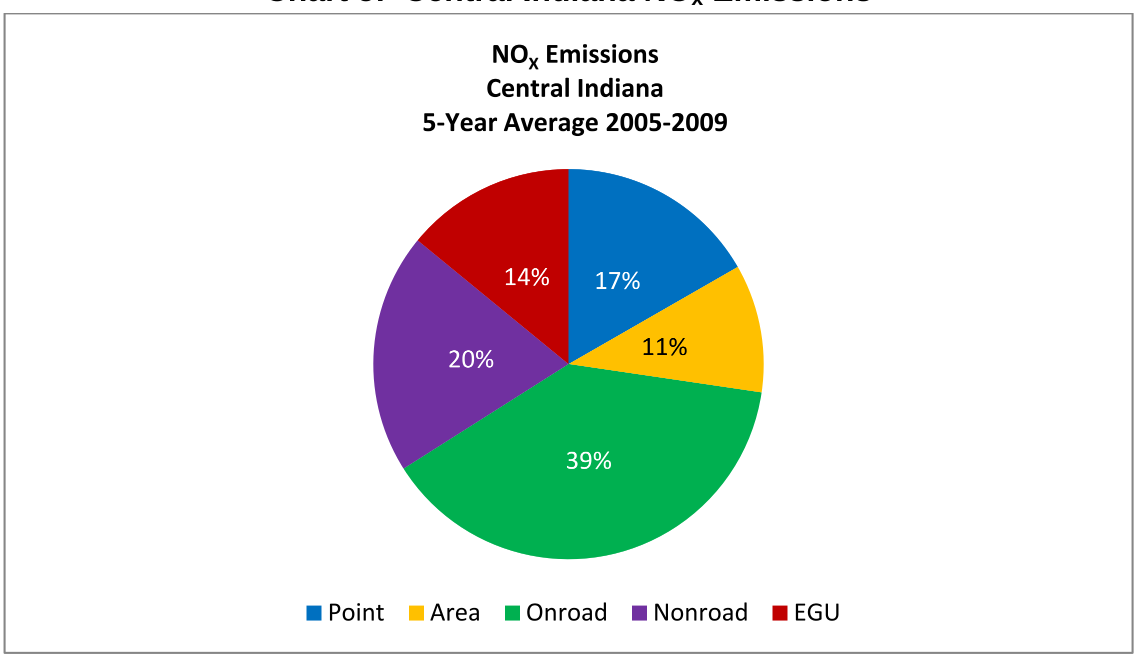


Chart 5: Central Indiana NO_x Emissions



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 16 illustrates, NO_x emissions have decreased by 73% within the 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

There are eleven monitoring sites within Central Indiana that measure ozone, four in Marion County and one each in Boone, Hamilton, Hancock, Hendricks, Johnson, Morgan, and Shelby 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 17 reflect the 4th highest monitored concentration for 1-hour ozone within a given three-year period from all of the monitors in the 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 18 reflect the 4th high and the highest 4th high concentration for 8-hour ozone from all of the monitors in the Central Indiana area. 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 18 are not a true comparison to the primary and secondary 8-hour ozone standards. The values in Graph 19 reflect the design value of the three-year average of the 4th highest 8-hour ozone values from the monitors.

The data in Tables 16 and 17 are from all of the monitoring sites in the Central Indiana area that measured 1-hour ozone from 2000 through 2010. Monitoring data in Table 16 show the four highest annual concentrations for 1-hour ozone for the years 2000 through 2010. Monitoring data in Table 17 show the 4th highest concentration for 1-hour ozone in a three-year period for the years 2000 through 2010. The data in Tables 18 and 19 are from all of the monitoring sites in the Central Indiana area that measured 8-hour ozone from 2000 through 2010. Monitoring data in Table 18 show the 4th highest concentration for 8-hour ozone in a three-year period for the years 2000 through 2010. Monitoring data in Table 19 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 16: 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
Boone	180110001	Whitestown	0.099	0.095	0.094	0.091	0.105	0.097	0.095	0.093	0.133	0.126	0.113	0.109
Hamilton	180570005/6	Noblesville	0.105	0.101	0.099	0.098	0.115	0.114	0.101	0.098	0.121	0.119	0.114	0.111
Hancock	180590003	Fortville	0.103	0.102	0.095	0.092	0.124	0.112	0.103	0.100	0.119	0.118	0.112	0.110
Hendricks	180630004	Avon	0.102	0.100	0.096	0.094	0.098	0.095	0.091	0.090	0.133	0.111	0.106	0.104
Johnson	180810002	Trafalgar	0.098	0.097	0.093	0.091	0.093	0.093	0.092	0.090	0.123	0.106	0.105	0.104
Marion	180970042	Mann Rd	0.099	0.092	0.090	0.088	0.088	0.087	0.086	0.086	0.113	0.111	0.109	0.100
Marion	180970050	Fort Harrison	0.106	0.100	0.097	0.090	0.113	0.102	0.101	0.099	0.129	0.115	0.114	0.111
Marion	180970057	Harding Street	0.098	0.096	0.094	0.088	0.096	0.094	0.092	0.090	0.131	0.130	0.110	0.106
Marion	180970073	E 16th St	0.104	0.098	0.093	0.091	0.111	0.090	0.090	0.090	0.142	0.121	0.120	0.119
Marion	180970078	Washington Park												
Morgan	181090005	Monrovia	0.102	0.098	0.097	0.097	0.101	0.093	0.093	0.090	0.112	0.110	0.109	0.104
Shelby	181450001	Fairland	0.106	0.100	0.095	0.095	0.116	0.109	0.106	0.099	0.138	0.120	0.115	0.110

County	Site #	Site Name	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
Boone	180110001	Whitestown	0.113	0.109	0.107	0.103	0.098	0.089	0.087	0.084	0.115	0.101	0.091	0.090
Hamilton	180570005/6	Noblesville	0.123	0.116	0.110	0.107	0.098	0.091	0.086	0.086	0.117	0.101	0.099	0.097
Hancock	180590003	Fortville	0.114	0.106	0.101	0.101	0.094	0.084	0.079	0.079	0.100	0.100	0.098	0.096
Hendricks	180630004	Avon	0.100	0.096	0.091	0.089	0.082	0.080	0.079	0.079	0.095	0.091	0.091	0.087
Johnson	180810002	Trafalgar	0.099	0.099	0.094	0.090	0.088	0.080	0.078	0.076	0.102	0.090	0.087	0.084
Marion	180970042	Mann Rd	0.103	0.098	0.084	0.083	0.088	0.076	0.075	0.073	0.091	0.091	0.088	0.087
Marion	180970050	Fort Harrison	0.117	0.104	0.102	0.102	0.090	0.087	0.087	0.079	0.098	0.096	0.096	0.092
Marion	180970057	Harding Street	0.110	0.103	0.091	0.087	0.083	0.078	0.075	0.073	0.099	0.093	0.090	0.089
Marion	180970073	E 16th St	0.113	0.095	0.095	0.094	0.088	0.084	0.083	0.082	0.091	0.091	0.089	0.089
Marion	180970078	Washington Park												
Morgan	181090005	Monrovia	0.096	0.096	0.090	0.088	0.085	0.080	0.079	0.077	0.094	0.094	0.090	0.089
Shelby	181450001	Fairland	0.110	0.102	0.100	0.098	0.088	0.087	0.085	0.079	0.096	0.089	0.088	0.087

County	Site #	Site Name	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
Boone	180110001	Whitestown	0.103	0.090	0.089	0.085	0.099	0.097	0.097	0.096	0.091	0.081	0.079	0.078
Hamilton	180570005/6	Noblesville	0.090	0.088	0.086	0.083	0.099	0.095	0.095	0.095	0.101	0.086	0.085	0.083
Hancock	180590003	Fortville	0.098	0.090	0.086	0.084	0.110	0.102	0.096	0.096	0.092	0.086	0.085	0.079
Hendricks	180630004	Avon	0.085	0.084	0.083	0.081	0.092	0.090	0.089	0.085	0.081	0.080	0.078	0.076
Johnson	180810002	Trafalgar	0.093	0.092	0.089	0.085	0.102	0.094	0.089	0.089	0.084	0.080	0.078	0.076
Marion	180970042	Mann Rd	0.085	0.084	0.084	0.080	0.098	0.091	0.088	0.087				
Marion	180970050	Fort Harrison	0.089	0.088	0.086	0.084	0.109	0.095	0.094	0.091	0.098	0.096	0.085	0.081
Marion	180970057	Harding Street	0.085	0.083	0.083	0.082	0.094	0.093	0.089	0.088	0.081	0.077	0.077	0.076
Marion	180970073	E 16th St	0.098	0.082	0.082	0.080	0.095	0.091	0.090	0.089	0.080	0.080	0.078	0.078
Marion	180970078	Washington Park												
Morgan	181090005	Monrovia	0.091	0.088	0.086	0.083	0.093	0.091	0.090	0.090	0.085	0.082	0.076	0.075
Shelby	181450001	Fairland	0.090	0.083	0.082	0.080	0.100	0.098	0.091	0.091	0.079	0.077	0.077	0.076

County	Site #	Site Name	1st High 2009	2nd High 2009	3rd High 2009	4th High 2009	1st High 2010	2nd High 2010	3rd High 2010	4th High 2010
Boone	180110001	Whitestown	0.082	0.078	0.077	0.076	0.085	0.083	0.082	0.081
Hamilton	180570005/6	Noblesville	0.080	0.079	0.077	0.076	0.083	0.082	0.078	0.077
Hancock	180590003	Fortville	0.086	0.082	0.076	0.076	0.080	0.080	0.079	0.079
Hendricks	180630004	Avon	0.091	0.083	0.079	0.077	0.081	0.077	0.076	0.075
Johnson	180810002	Trafalgar	0.087	0.083	0.079	0.077	0.081	0.078	0.077	0.076
Marion	180970042	Mann Rd								
Marion	180970050	Fort Harrison	0.094	0.089	0.085	0.080	0.095	0.084	0.083	0.080
Marion	180970057	Harding Street	0.080	0.080	0.077	0.073	0.085	0.083	0.080	0.077
Marion	180970073	E 16th St	0.084	0.084	0.075	0.073	0.087	0.077	0.074	0.074
Marion	180970078	Washington Park	0.079	0.078	0.074	0.072	0.089	0.079	0.074	0.071
Morgan	181090005	Monrovia	0.091	0.078	0.075	0.074	0.077	0.076	0.071	0.068
Shelby	181450001	Fairland	0.106	0.088	0.085	0.082	0.079	0.076	0.075	0.074

Graph 17: Central Indiana 1-Hour Ozone 4th Highest Value in Three-Year Period

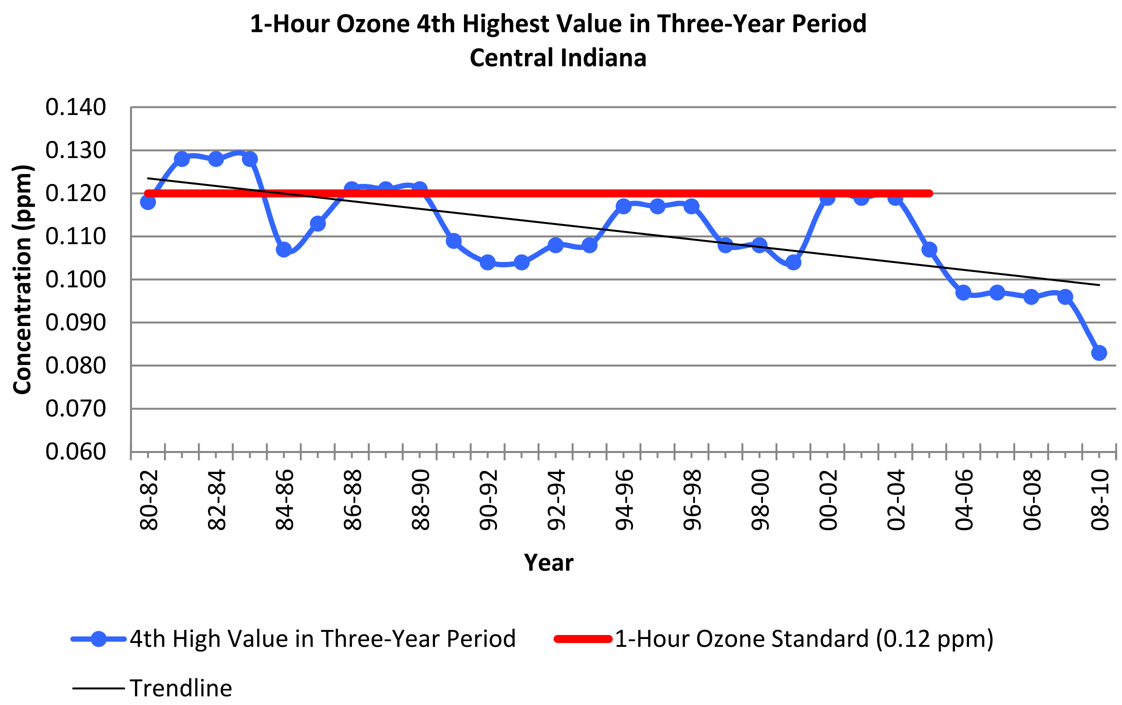


Table 17: Central Indiana 1-Hour Ozone 4th High Value in Three-Year Period Monitoring Data Summary

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
Boone	180110001	Whitestown	0.109	0.109	0.109	0.103	0.090	0.096	0.096	0.096	0.081
Hamilton*	180570005/6	Noblesville	0.111	0.111	0.111	0.107	0.097	0.097	0.095	0.095	0.083
Hancock	180590003	Fortville	0.110	0.110	0.110	0.101	0.096	0.096	0.096	0.096	0.079
Hendricks	180630004	Avon	0.104	0.104	0.104	0.089	0.087	0.087	0.085	0.085	0.077
Johnson	180810002	Trafalgar	0.104	0.104	0.104	0.090	0.085	0.089	0.089	0.089	0.077
Marion	180970042	Mann Rd	0.100	0.100	0.100	0.087	0.087	0.087			
Marion	180970050	Fort Harrison	0.111	0.111	0.111	0.102	0.092	0.092	0.091	0.091	0.081
Marion	180970057	Harding Street	0.106	0.106	0.106	0.089	0.089	0.089	0.088	0.088	0.077
Marion	180970073	E 16th St	0.119	0.119	0.119	0.094	0.089	0.089	0.089	0.089	0.078
Marion	180970078	Washington Park									
Morgan	181090005	Monrovia	0.104	0.104	0.104	0.089	0.089	0.090	0.090	0.090	0.075
Shelby	181450001	Fairland	0.110	0.110	0.110	0.098	0.087	0.091	0.091	0.091	0.082

*Hamilton County - Noblesville ozone monitor was moved from 10th Street to 191st Street on May 13, 2010. The 2008-2010 value is calculated from both monitoring sites.

Graph 18: Central Indiana 8-Hour Ozone 4th High Values

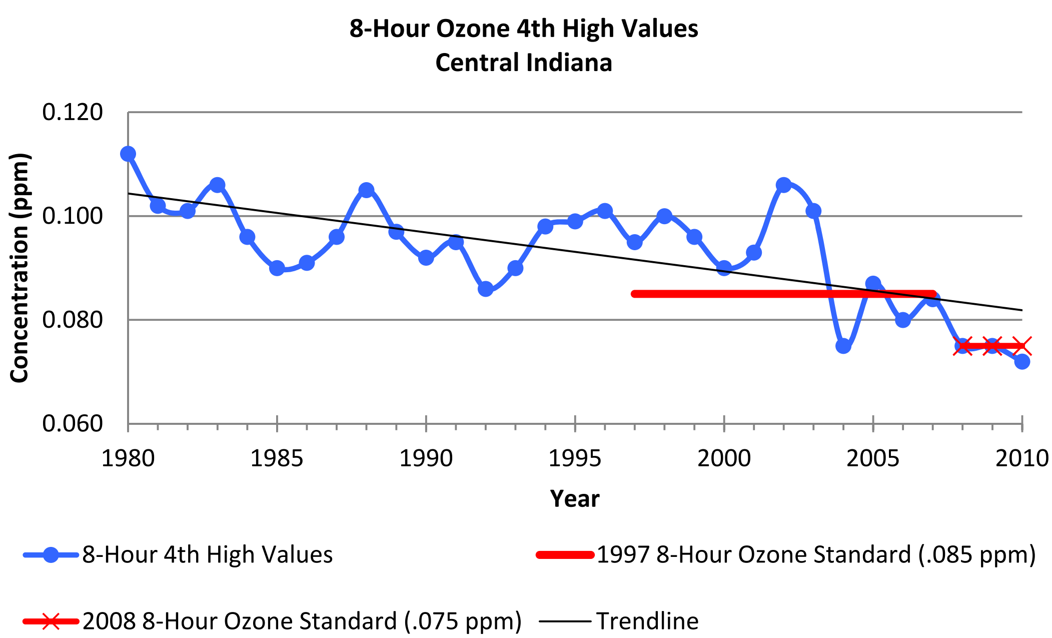


Table 18: Central Indiana 8-Hour Ozone 4th High Values Monitoring Data Summary

County	Site #	Site Name	4th Highest Ozone Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Boone	180110001	Whitestown	0.082	0.084	0.099	0.088	0.072	0.082	0.080	0.083	0.073	0.069	0.072
Hamilton	180570005/6	Noblesville	0.090	0.088	0.101	0.101	0.075	0.087	0.077	0.084	0.073	0.071	0.072
Hancock	180590003	Fortville	0.086	0.089	0.101	0.092	0.072	0.080	0.075	0.081	0.074	0.068	0.071
Hendricks	180630004	Avon	0.087	0.083	0.095	0.079	0.071	0.078	0.073	0.079	0.068	0.070	0.067
Johnson	180810002	Trafalgar	0.084	0.082	0.097	0.080	0.073	0.077	0.078	0.080	0.069	0.071	0.070
Marion	180970042	Mann Rd	0.082	0.078	0.093	0.074	0.065	0.076	0.074	0.080			
Marion	180970050	Fort Harrison	0.083	0.087	0.100	0.091	0.073	0.080	0.076	0.083	0.075	0.073	0.072
Marion	180970057	Harding Street	0.078	0.081	0.099	0.075	0.066	0.081	0.076	0.076	0.067	0.067	0.068
Marion	180970073	E 16th St	0.082	0.081	0.106	0.082	0.071	0.080	0.072	0.080	0.066	0.065	0.066
Marion	180970078	Washington Park										0.067	0.064
Morgan	181090005	Monrovia	0.088	0.082	0.094	0.081	0.072	0.078	0.077	0.084	0.069	0.069	0.063
Shelby	181450001	Fairland	0.087	0.093	0.101	0.089	0.071	0.080	0.073	0.082	0.070	0.075	0.067

Graph 19: Central Indiana 8-Hour Ozone Three-Year Design Values

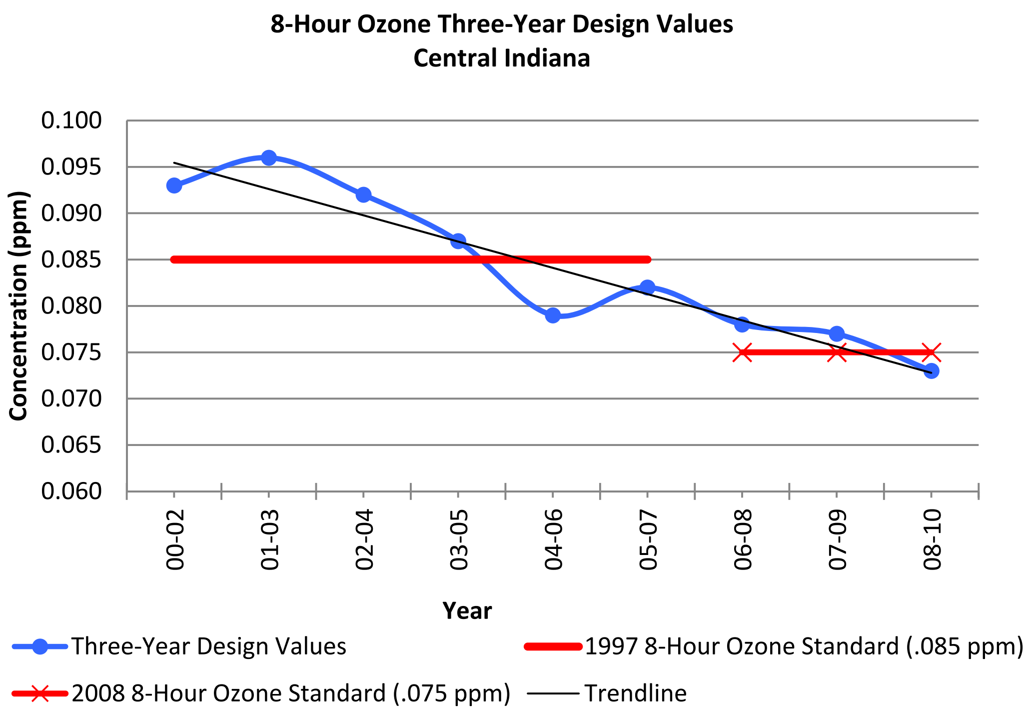


Table 19: Central Indiana 8-Hour Ozone Three-Year Design Value Monitoring Data Summary

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
Boone	180110001	Whitestown	0.088	0.090	0.086	0.080	0.078	0.081	0.078	0.075	0.071
Hamilton *	180570005/6	Noblesville	0.093	0.096	0.092	0.087	0.079	0.082	0.078	0.076	0.072
Hancock	180590003	Fortville	0.092	0.094	0.088	0.081	0.075	0.078	0.076	0.074	0.071
Hendricks	180630004	Avon	0.088	0.085	0.081	0.076	0.074	0.076	0.073	0.072	0.068
Johnson	180810002	Trafalgar	0.089	0.086	0.083	0.076	0.076	0.078	0.075	0.073	0.070
Marion	180970042	Mann Rd	0.084	0.081	0.077	0.071	0.071	0.076			
Marion	180970050	Fort Harrison	0.090	0.092	0.088	0.081	0.076	0.079	0.078	0.077	0.073
Marion	180970057	Harding Street	0.086	0.085	0.080	0.074	0.074	0.077	0.073	0.070	0.067
Marion	180970073	E 16th St	0.089	0.089	0.086	0.077	0.074	0.077	0.072	0.070	0.065
Marion	180970078	Washington Park								0.067	0.065
Morgan	181090005	Monrovia	0.088	0.085	0.082	0.077	0.075	0.079	0.076	0.074	0.067
Shelby	181450001	Fairland	0.093	0.094	0.087	0.080	0.074	0.078	0.075	0.075	0.070

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

*Hamilton County - Noblesville ozone monitor was moved from 10th Street to 191st Street on May 13, 2010. The 2008-2010 Design Value is calculated from both monitoring sites.

While fluctuations in monitoring data can be seen in Graphs 17, 18, and 19, 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 1983, 1988, 1995, 2002, 2005, and 2007 shown in Graph 18 can be traced back to high temperatures and stagnant weather conditions during the ozone seasons of those years.

Tables 16, 17, 18, and 19 demonstrate that the 1-hour and 8-hour ozone values for the 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 1-hour and 8-hour ozone in Central Indiana were in violation of the 1-hour and 8-hour ozone standards, but are now below the standards. The Noblesville and Fort Benjamin Harrison ozone monitoring sites have historically registered some of the highest ozone values in Central Indiana. This is expected since they are downwind sites for the Indianapolis metropolitan area. Downwind monitors are usually the last to attain the standard because ozone and ozone precursors from the most densely populated areas and emission sources have more time for photochemical reactions to build to peak levels.

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 20 and 21 illustrate the emissions trend for the ozone precursors in Central Indiana and Charts 6 and 7 show how the average emissions are distributed among the different source categories.

Graph 20: Central Indiana NO_x Emissions

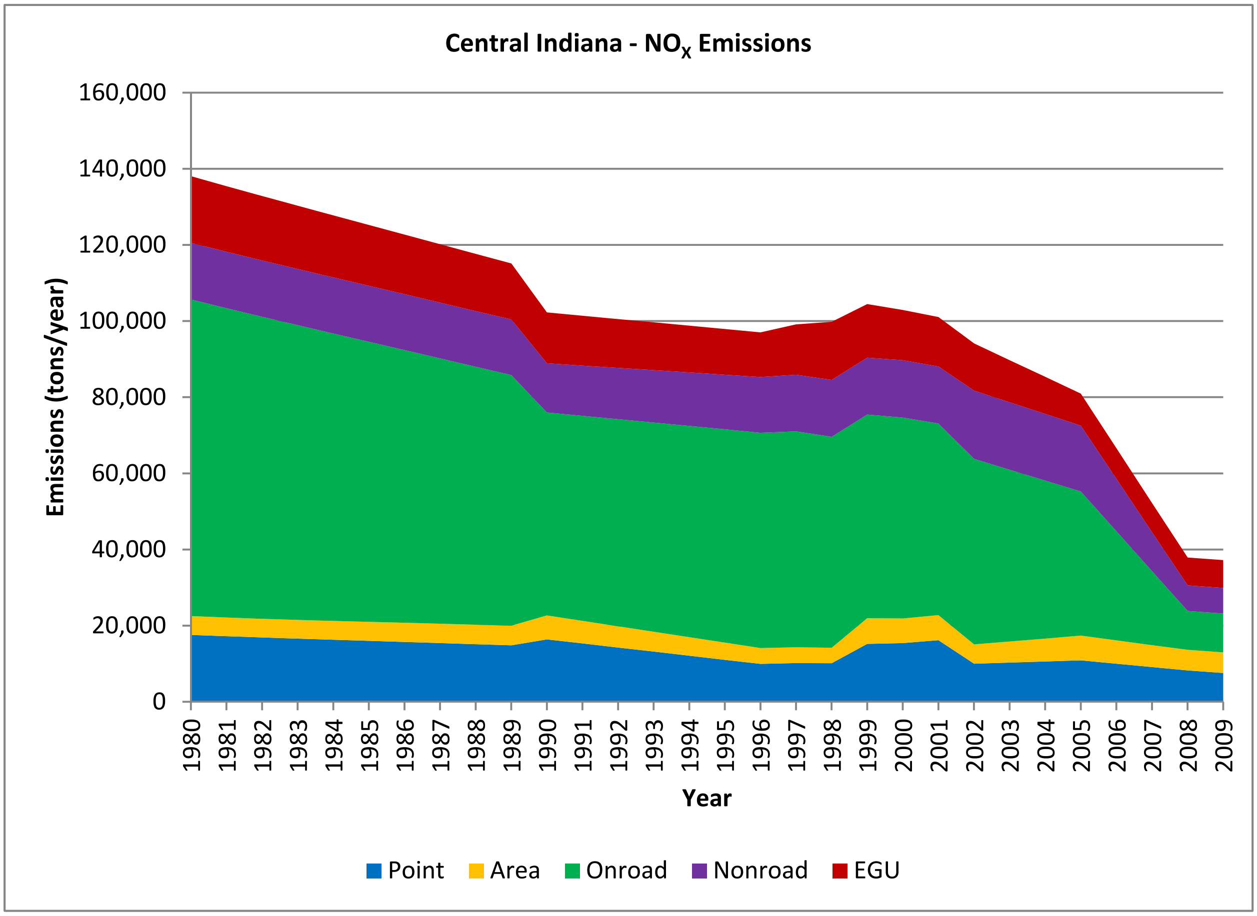
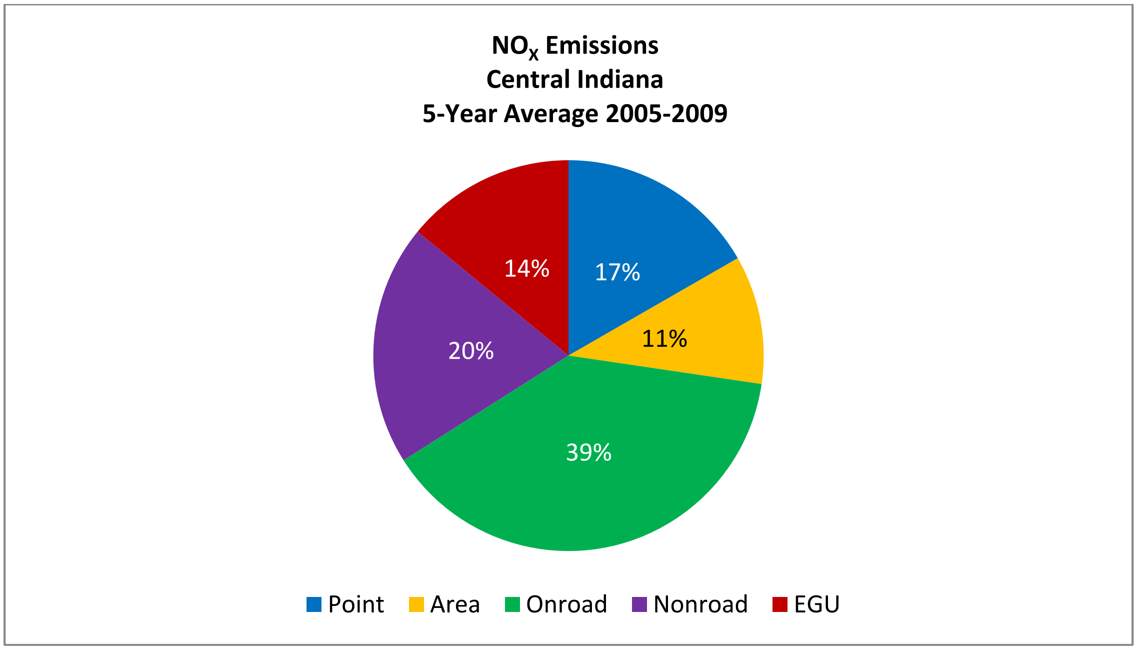


Chart 6: Central Indiana NO_x Emissions



Graph 21: Central Indiana VOC Emissions

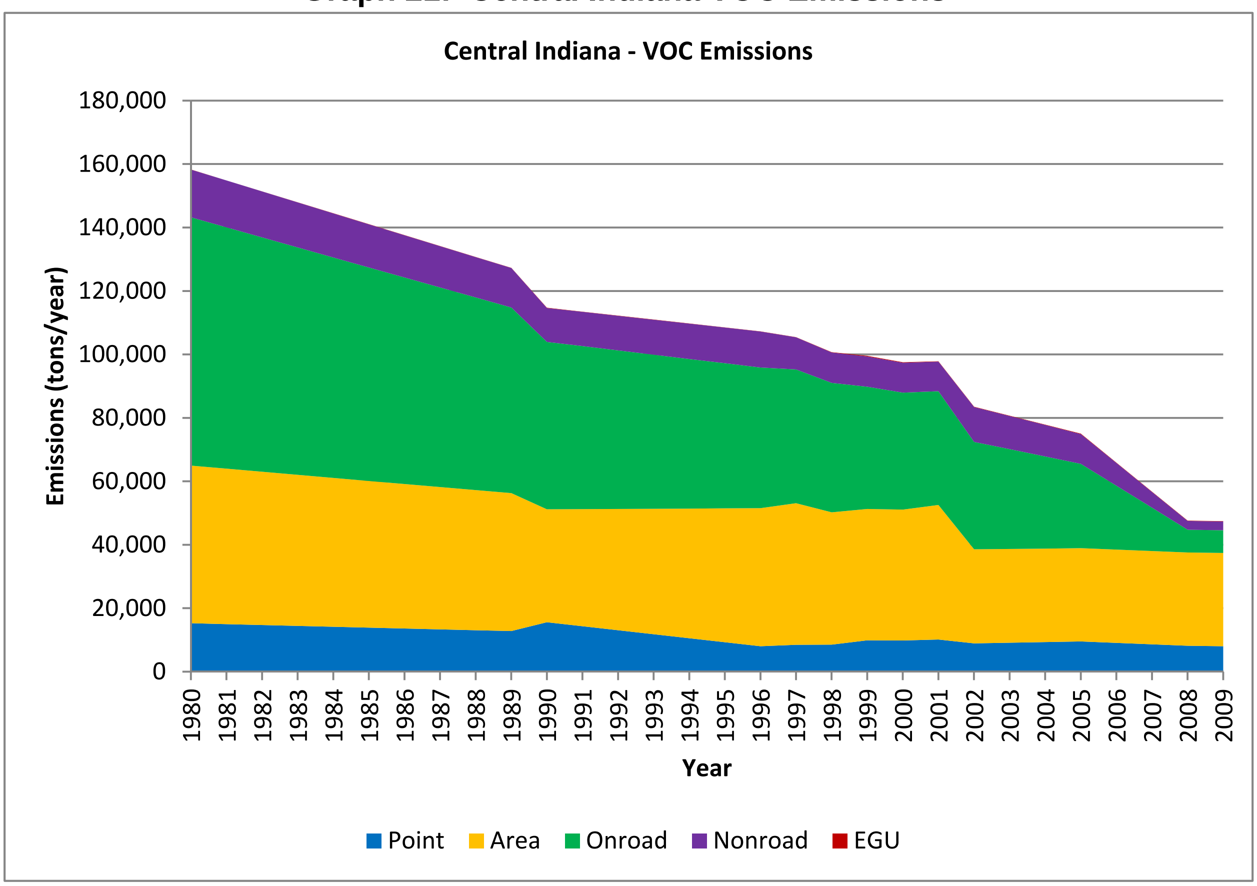
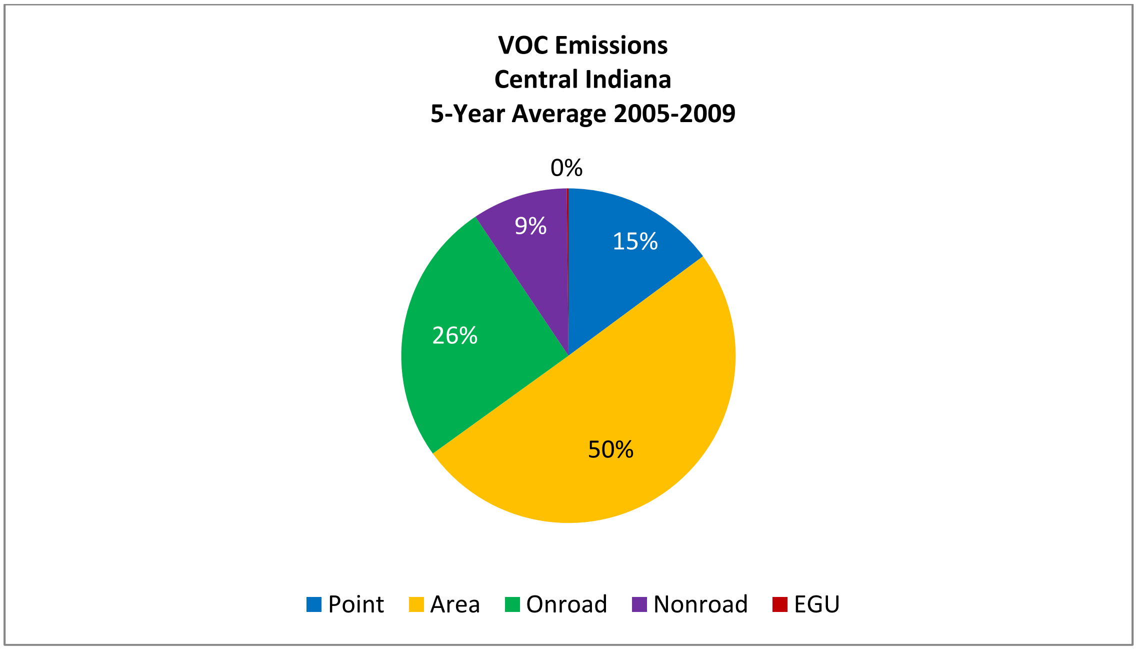


Chart 7: Central Indiana VOC Emissions



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 20 and 21 illustrate, NO_x and VOC emissions have decreased by 70% and 73%, respectively, within the 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, the NO_x SIP Call beginning in 2004, and to local controls that were necessary in reducing emissions in the Central Indiana area. 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})

Five monitors within Central Indiana currently measure PM_{10} levels. These monitors are all located in Marion County. The trend data in Graph 22 reflect the annual arithmetic mean which is used to compare to the primary and secondary annual PM_{10} standards of 50 $\mu g/m^3$. The highest value from all of the monitors in the 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 23 reflect the 2^{nd} highest 24-hour PM_{10} concentration, which is used to compare to the primary and secondary 24-hour PM_{10} standards of 150 $\mu g/m^3$. Attainment of the primary and secondary 24-hour PM_{10} standards is determined by evaluating the 2^{nd} highest 24-hour concentrations and is attained when the number of days per year with a 24-hour average above 150 $\mu g/m^3$ is equal to or less than 1 per year in a three-year period. The highest 2^{nd} high concentration from all of the monitors in the 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 22 and 23. The monitoring data in 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 are 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 20 and 21 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 20 are compared to the primary and secondary annual PM_{10} standards of 50 $\mu g/m^3$ and show that the Central Indiana area has always been below the standards. Monitoring data in Table 21 are compared to the primary and secondary 24-hour PM_{10} standards of 150 $\mu g/m^3$ and show that the Central Indiana area has always been below the standards.

Graph 22: Central Indiana Annual Arithmetic Mean PM_{10} Values

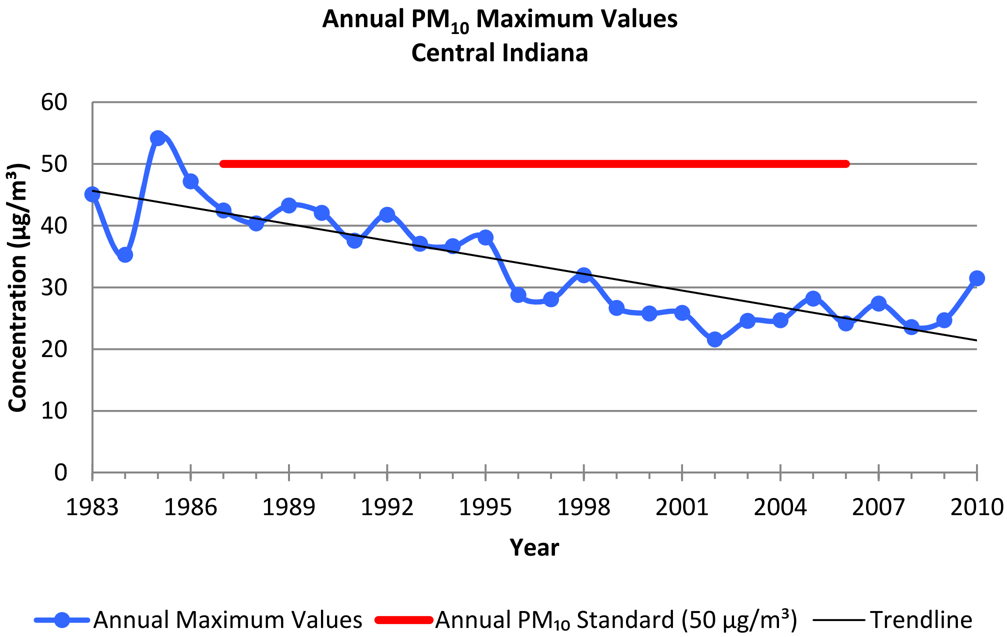


Table 20: Central Indiana Annual Arithmetic Mean PM_{10} Values Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E	25.2				22.0	22.9	22.0	22.8			
Hendricks	180630002	Pittsboro	21.9				17.4	18.8	16.3	20.6	21.0	14.1	
Hendricks	180630003	Lizton - Pittsboro High School	19.2				14.3	18.3	15.2	17.2			
Marion	180970042	Indianapolis - Mann Road	19.8	17.5	16.5	16.9	14.5	18.0	14.9	16.9			
Marion	180970043	Indianapolis - West St	25.8	24.4	21.0	24.6	24.7	28.2	24.2	27.4	23.6	24.7	31.5
Marion	180970060	Indianapolis - S Holt Rd	22.2	20.7	19.2								
Marion	180970066	Indianapolis - English Ave	24.8	23.4	19.8	24.5	21.1	24.7	20.1	22.5	17.6	16.0	
Marion	180970071	Indianapolis- Drover	25.1	25.9	21.6	23.9	22.0	26.0	22.5	23.9	20.5	23.6	30.5
Marion	180970073	Indianapolis - E 16th St	19.8	18.0	16.6	18.0	17.1	20.9	17.9	22.6	18.8	17.3	19.4
Marion	180970078	Indianapolis- Washington Park											22.3
Marion	180970083	Indianapolis - E Michigan St	22.7	20.8	19.4	21.7	19.7	22.2	17.6	20.1			
Marion	180970084	Indianapolis - IPS School 21										19.3	24.3
Putnam	181330001	Greencastle	25.3	23.7	21.0	22.7	20.7	21.5					
			Highlighted red numbers are over the annual PM_{10} standard of 50 µg/m³										

Graph 23: Central Indiana 24-Hour PM_{10} 2nd High Values

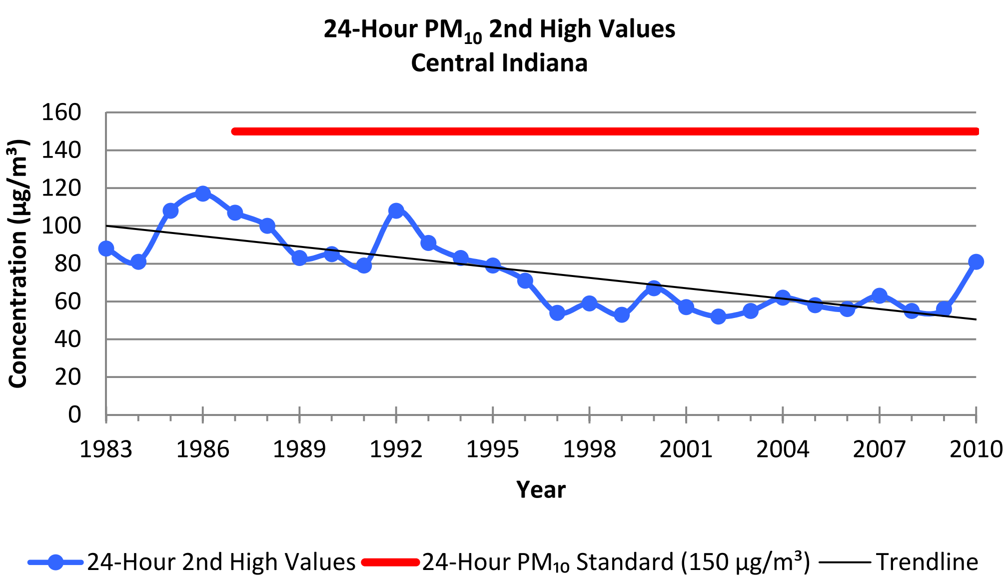


Table 21: Central Indiana 24-Hour PM_{10} 2nd High Values Monitoring Data Summary

County	Site #	Site Name	24-Hour 2nd High Value ($\mu g/m^3$)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E	67				58	53	56	63			
Hendricks	180630002	Pittsboro	36				41	46	32	48	44	23	
Hendricks	180630003	Lizton - Pittsboro High School	38				34	46	32	44			
Marion	180970042	Indianapolis - Mann Road	38	33	35	36	31	39	35	36			
Marion	180970043	Indianapolis - West St	54	53	47	46	61	58	56	59	55	56	75
Marion	180970060	Indianapolis - S Holt Rd	41	37	43								
Marion	180970066	Indianapolis - English Ave	55	52	39	55	44	51	40	53	39	23	
Marion	180970071	Indianapolis- Drover	49	50	42	51	50	57	53	51	49	51	81
Marion	180970073	Indianapolis - E 16th St	40	36	33	41	37	47	32	45	40	37	38
Marion	180970078	Indianapolis- Washington Park											48
Marion	180970083	Indianapolis - E Michigan St	44	40	39	46	39	49	39	43			
Marion	180970084	Indianapolis - IPS School 21										46	56
Putnam	181330001	Greencastle	38	57	52	44	62	50	40				

Highlighted red numbers are over the 24-hour PM_{10} standard of 150 $\mu g/m^3$

Tables 20 and 21 demonstrate that the annual and 24-hour PM_{10} values for the Central Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the other sites do also.

U.S. EPA's NEI contains emissions information for PM_{10} and is used in Graph 24 and Chart 8. Graph 24 illustrates the emissions trend for PM_{10} in Central Indiana and Chart 8 shows how the average emissions are distributed among different source categories.

Graph 24: Central Indiana PM_{10} Emissions

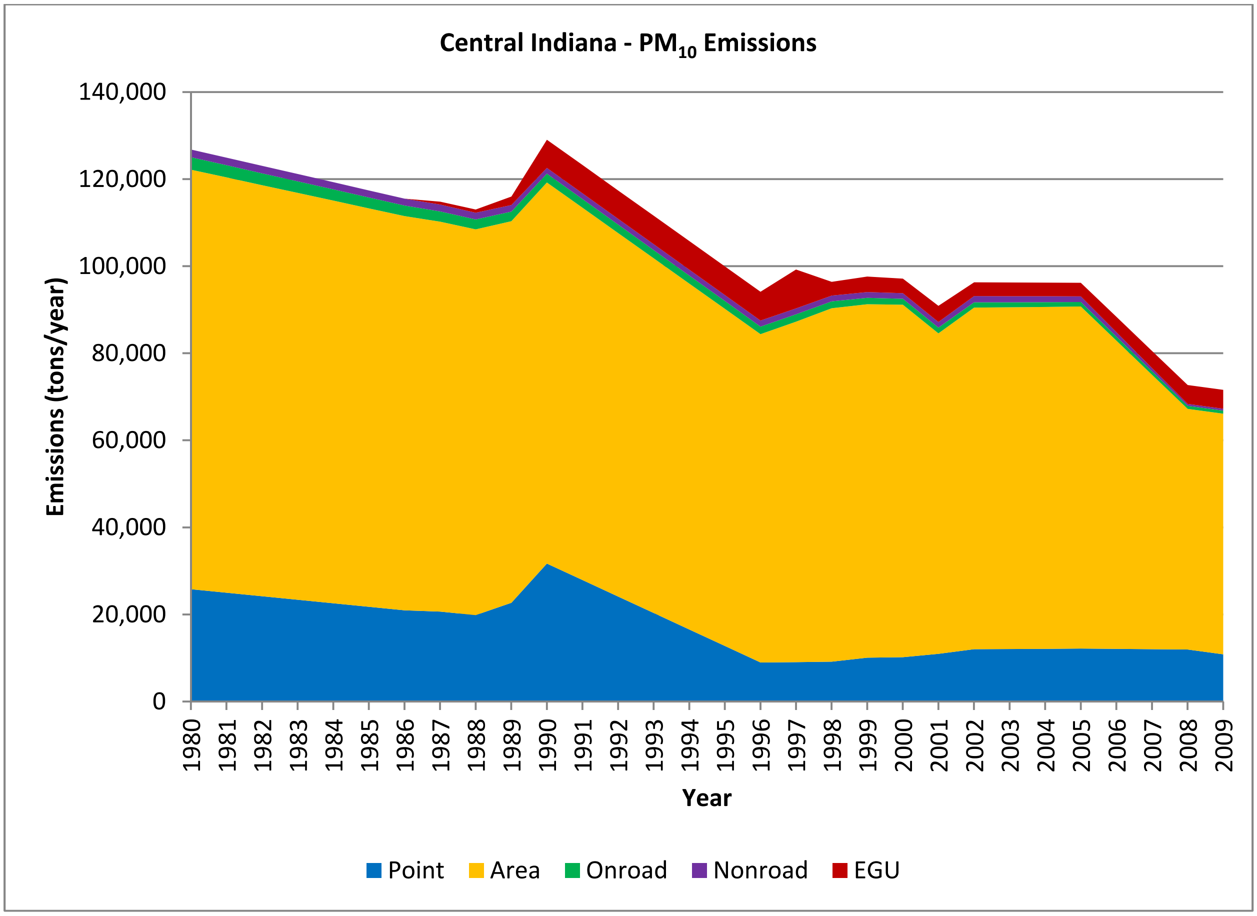
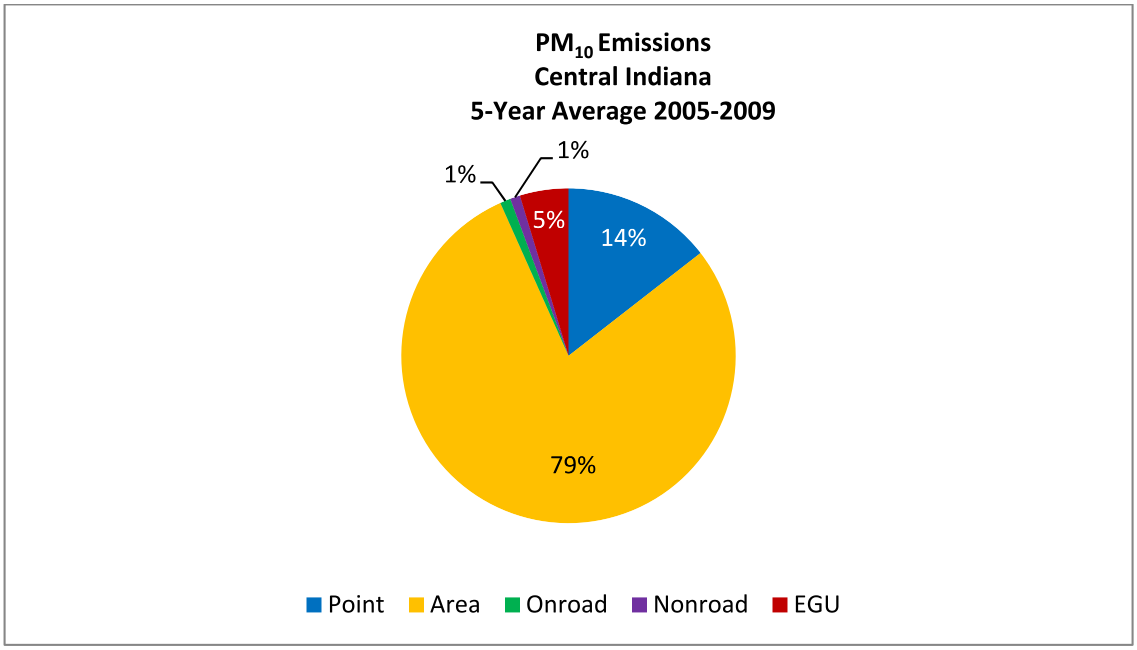


Chart 8: Central Indiana PM_{10} Emissions



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 annual and 24-hour PM_{10} values over time. As Graph 24 illustrates, PM_{10} emissions have decreased within the Central Indiana area since 2005. Total PM_{10} emissions in the Central Indiana area have decreased 44% 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

Four monitoring sites within Central Indiana currently measure SO_2 levels, three located in Marion County and one located in Morgan County. The trend data in Graph 25 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 Central Indiana area is plotted on Graph 25 for each year.

The trend data in Graph 26 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 Central Indiana area is plotted on Graph 26 for each year. The trend data in Graph 27 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 27 are not a true comparison to the primary 1-hour SO_2 standard. The values in Graph 27 reflect the highest 99th percentile from all of the monitors in the 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 28 reflect the 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 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 22, 23, 24, and 25 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 Central Indiana have always been historically below the primary annual and 24-hour SO_2 standards.

Monitoring data in Table 22 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 23 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 24 show the 1-hour 99th percentile values for the years 2000 through 2010. Monitoring data in Table 25 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 22, 23, and 25 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 25: Central Indiana Annual Arithmetic Mean SO_2 Values

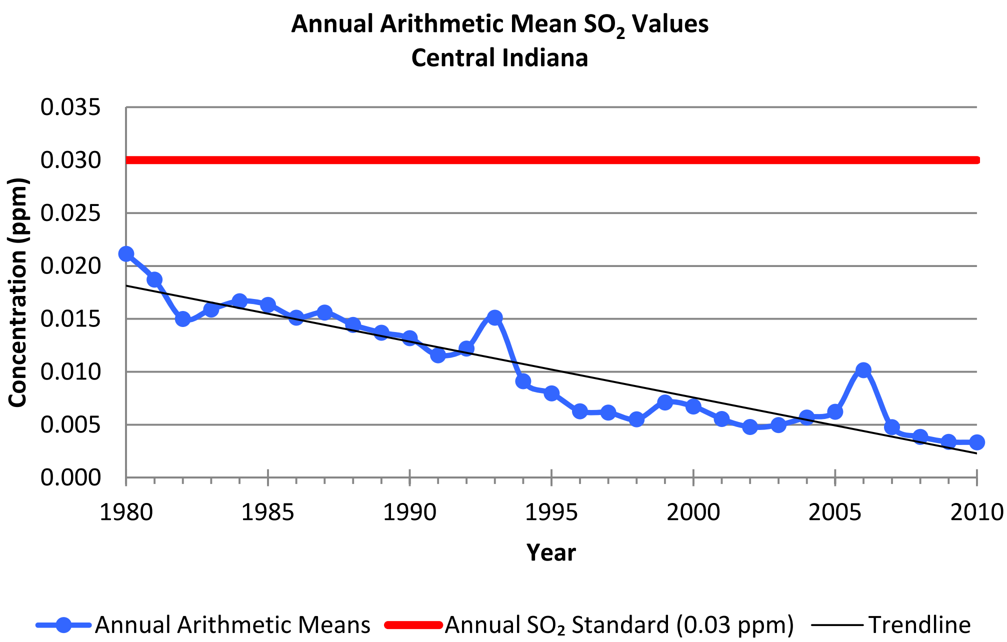


Table 22: Central Indiana Annual Arithmetic Mean SO_2 Values Monitoring Data Summary

County	Site ID	Site Name	Annual Arithmetic Mean (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E					0.003	0.003	0.001	0.002			
Hendricks	180630002	Pittsboro - N Meridian St					0.005	0.004	0.003	0.003	0.003	0.003	
Hendricks	180630003	Lizton - Pittsboro High Sch					0.005	0.003	0.004	0.005			
Marion	180970042	Indianapolis - Mann Rd	0.004	0.004	0.004	0.004	0.005	0.004	0.004	0.004			
Marion	180970057	Indianapolis - S Harding	0.006	0.006	0.005	0.005	0.006	0.005	0.005	0.005	0.003	0.002	0.003
Marion	180970073	Indianapolis - E 16th St	0.007	0.003	0.004	0.004	0.005	0.005	0.010	0.004	0.002	0.002	0.003
Marion	180970078	Indianapolis - Washington Park											0.003
Morgan	181091001	Martinsville - High Street					0.006	0.006	0.004	0.005	0.004	0.003	0.003

Highlighted red numbers are above the annual SO_2 standard of 0.03 ppm

Graph 26: Central Indiana 24-Hour SO_2 2nd High Values

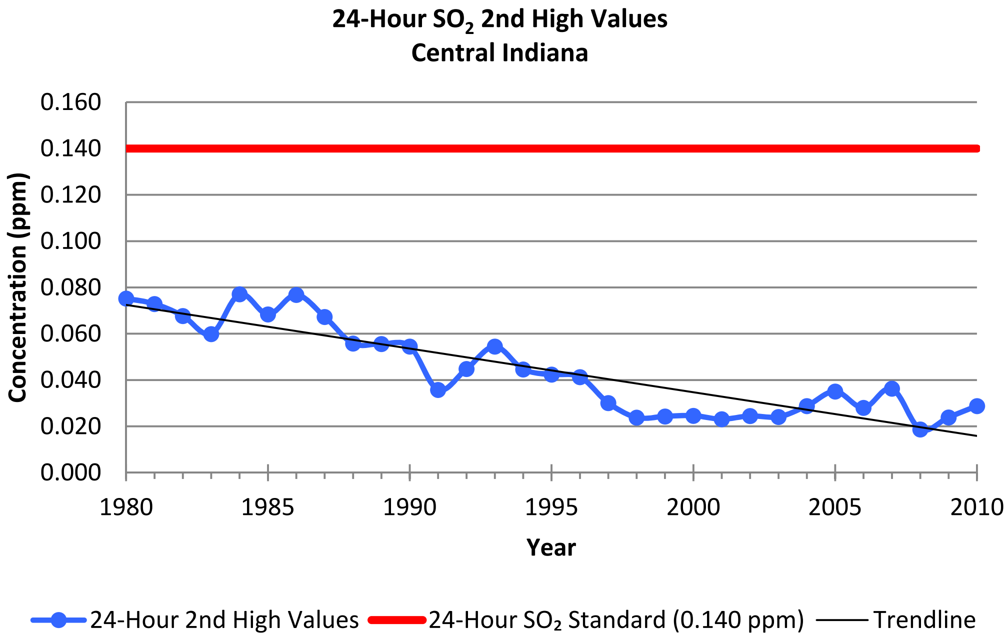


Table 23: Central Indiana 24-Hour SO_2 2nd High Values Monitoring Data Summary

County	Site ID	Site Name	2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E					0.022	0.017	0.007	0.003			
Hendricks	180630002	Pittsboro - N Meridian St					0.022	0.014	0.012	0.013	0.012	0.009	
Hendricks	180630003	Lizton - Pittsboro High Sch					0.022	0.016	0.013	0.018			
Marion	180970042	Indianapolis - Mann Rd	0.015	0.018	0.017	0.024	0.029	0.022	0.019	0.015			
Marion	180970057	Indianapolis - S Harding	0.019	0.023	0.022	0.021	0.028	0.021	0.023	0.028	0.016	0.020	0.023
Marion	180970073	Indianapolis - E 16th St	0.025	0.020	0.025	0.021	0.024	0.019	0.028	0.012	0.011	0.011	0.015
Marion	180970078	Indianapolis - Washington Park											0.004
Morgan	181091001	Martinsville - High Street					0.024	0.035	0.026	0.036	0.019	0.024	0.029

Highlighted red numbers are over the 24-hour SO_2 standard of 0.14 ppm

Graph 27: Central Indiana 1-Hour SO_2 99th Percentile Values

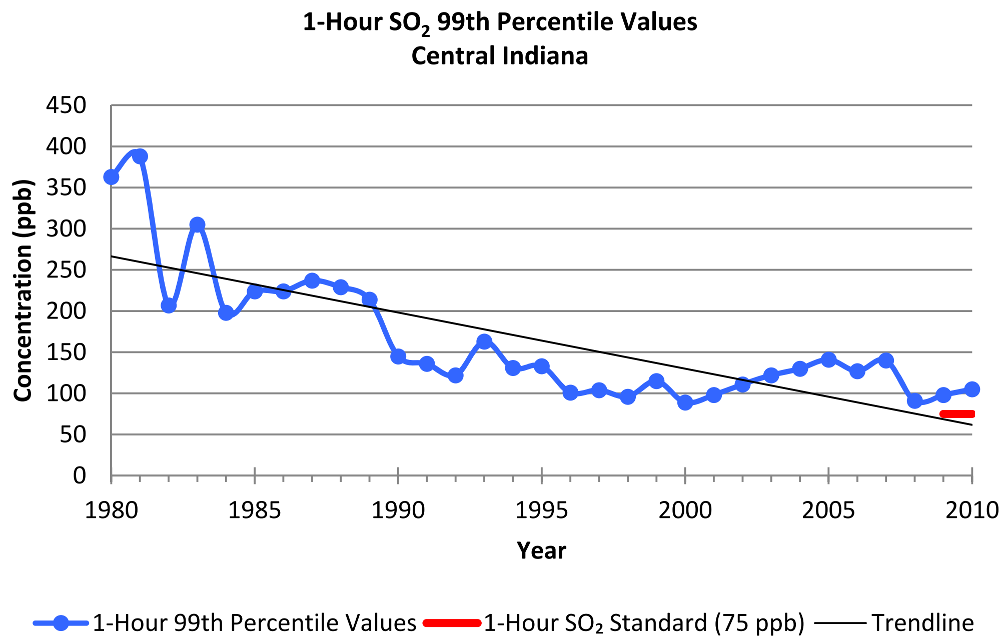


Table 24: Central Indiana 1-Hour 99th Percentile SO_2 Monitoring Data Summary

County	Site ID	Site Name	99th Percentile Values (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Hendricks	180630001	CR 800 N and CR 275 E					43	30	18	4			
Hendricks	180630002	Pittsboro - N Meridian St					49	40	37	46	32	34	
Hendricks	180630003	Lizton - Pittsboro High Sch					48	33	30	46			
Marion	180970042	Indianapolis - Mann Rd	67	72	61	89	71	117	92	68			
Marion	180970057	Indianapolis - S Harding	89	98	111	122	116	103	127	122	79	75	103
Marion	180970073	Indianapolis - E 16th St	66	73	82	78	92	79	69	51	29	61	48
Marion	180970078	Indianapolis - Washington Park											20
Morgan	181091001	Martinsville - High Street					130	141	108	140	91	98	105

Graph 28: Central Indiana 1-Hour SO_2 Three-Year Design Values

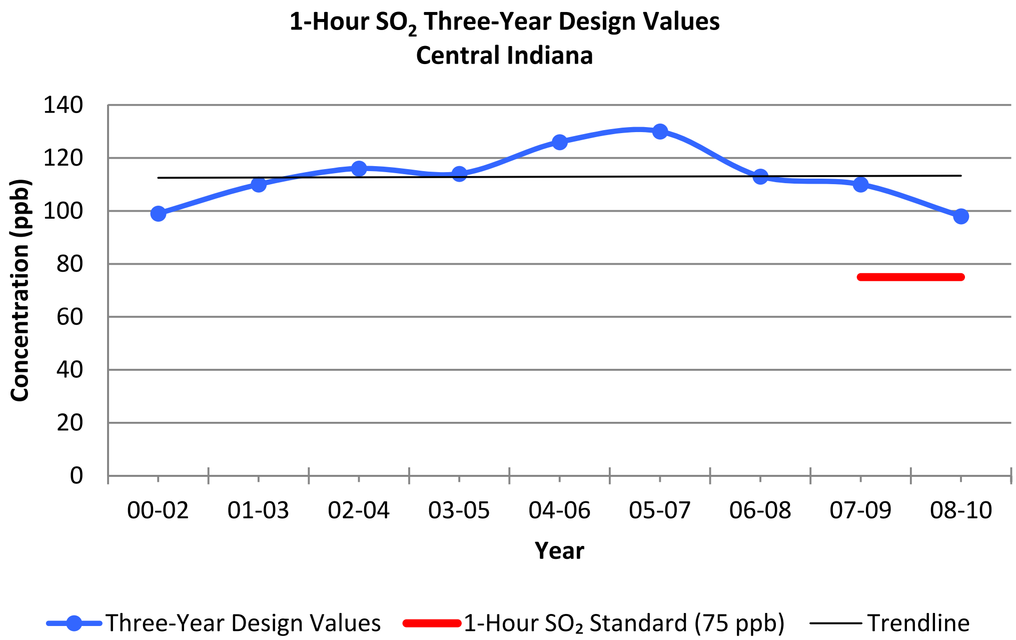


Table 25: Central Indiana 1-Hour SO_2 Three-Year Design Values Monitoring Data Summary

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
Hendricks	180630001	CR 800 N and CR 275 E					30	17			
Hendricks	180630002	Pittsboro - N Meridian St					42	41	38	37	33
Hendricks	180630003	Lizton - Pittsboro High Sch			16	27	37	36			
Marion	180970042	Indianapolis - Mann Rd	67	74	74	92	93	92			
Marion	180970057	Indianapolis - S Harding	99	110	116	114	115	117	109	92	**86**
Marion	180970073	Indianapolis - E 16th St	74	78	84	83	80	66	50	47	46
Marion	180970078	Indianapolis - Washington Park									20
Morgan	181091001	Martinsville - High Street					126	130	113	110	**98**

Beginning in 2010, highlighted red numbers are above the 1-hour SO_2 standard of 75 ppb

As shown in Graphs 25 and 26, both annual and 24-hour SO_2 values for the Central Indiana area have historically been below their respective standards. In addition, monitoring data shown in Graph 27 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 27 for the Central Indiana area have been trending downward over time, the area's three-year design value in Graph 28 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 Central Indiana area in the future and the area will comply with the 1-hour primary SO_2 standard when CSAPR or equivalent replacement rule is implemented.

U.S. EPA's NEI contains emissions information for SO_2 and is used in Graph 29 and Chart 9. Graph 29 illustrates the emissions trend for SO_2 in Central Indiana and Chart 9 shows how the average emissions are distributed among the different source categories.

Graph 29: Central Indiana SO_2 Emissions

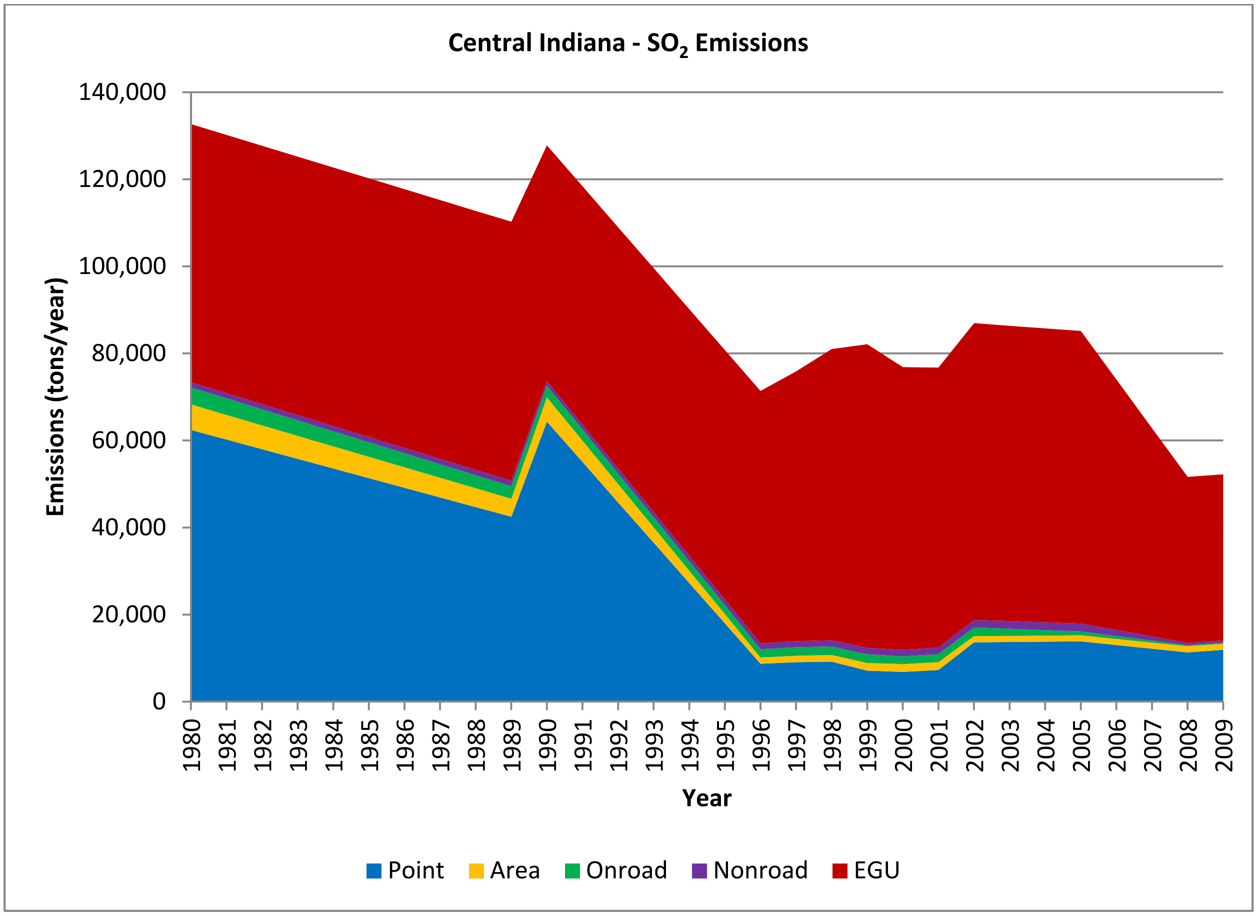
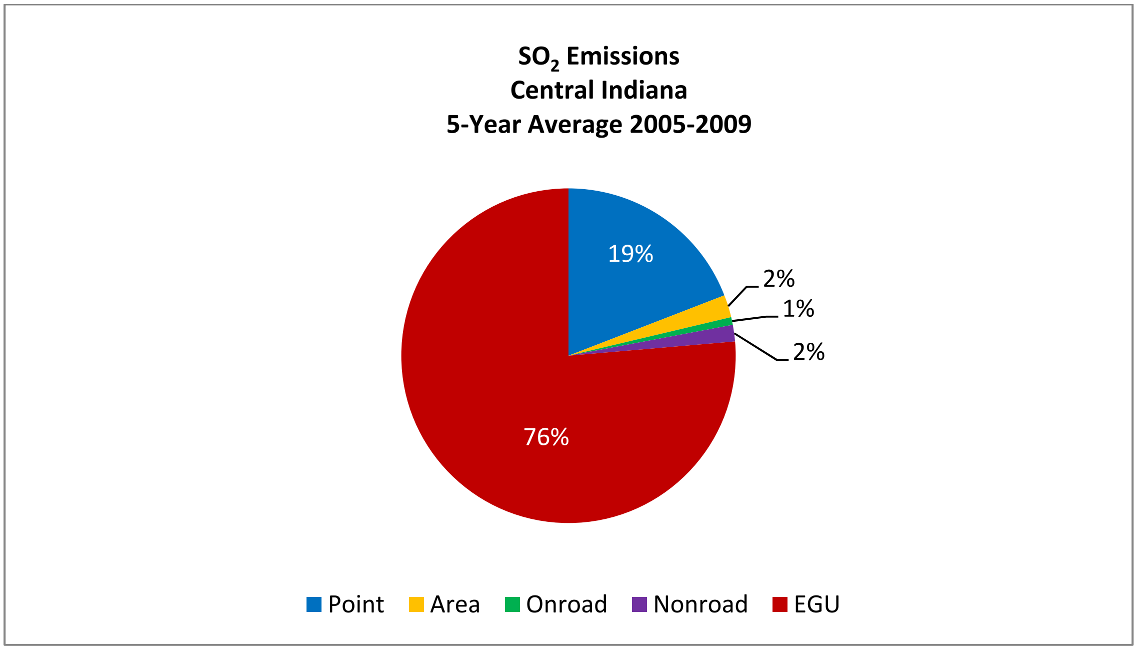


Chart 9: Central Indiana SO_2 Emissions



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 29 illustrates, SO_2 emissions have decreased by 61% within the 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 the 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

All available TSP data for Central Indiana are from monitors that were located in Marion County. The trend data in Graph 30 reflect the annual geometric mean values, which were used to compare to the primary and secondary annual TSP standards of 75 $\mu g/m^3$. The highest annual geometric mean from all of the monitors in the Central Indiana area is plotted on the graph for each year. The trend data in Graph 31 reflect the 2nd highest 24-hour TSP concentrations which were used to compare to the primary 24-hour TSP standard of 260 $\mu g/m^3$. The highest 2nd high 24-hour value from all of the monitors in the 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. TSP monitoring values violated the primary and secondary annual standards on a number of occasions from 1980 through 1987, but do show a downward trend over time. While occasional spikes can be seen in the 24-hour TSP values, the monitor values for Central Indiana have been below the primary 24-hour TSP standards with the exception of 1984. TSP monitors were located in close proximity to major sources in the area and data fluctuate based on variability in facility operations and meteorology.

The data in Tables 26 and 27 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 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 26 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 $\mu g/m^3$. Monitoring data in Table 27 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 $\mu g/m^3$.

Graph 30: Central Indiana Annual Geometric Mean TSP Values

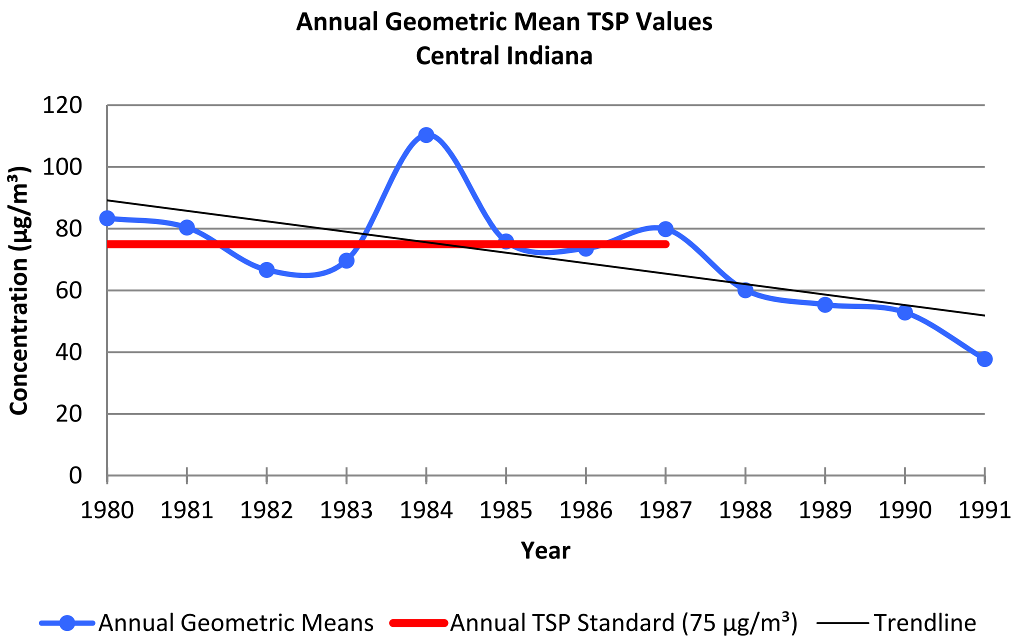


Table 26: Central Indiana Annual Geometric Mean TSP Values

County	Site #	Site Name	Annual Geometric Mean (µg/m^3)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Marion	180970002	N. Pennsylvania Street	73	74	58	62	58	57	62					
Marion	180970006	S. Sheridan Street	74	68	54	57	54	48	45	58	57	55		
Marion	180970008	E. 46th Street	70	69	57	52								
Marion	180970009	1445 W. Michigan Street	71	70	55	63	58	55	58					
Marion	180970011	S. State Street	81	80	62	61	61	54	57	67				
Marion	180970015	S. Holt Road	72	70	55	57	58	57	58	64				
Marion	180970021	1330 W. Michigan Street	71	63	54	50	55	55	57	56	60	52	53	38
Marion	180970024	56th Street	53	50	42	41	41	42	41					
Marion	180970026	Wanamaker	51	55	42	46	42	40	42					
Marion	180970030	N. Randolph	83	73	62	61	61	59						
Marion	180970035	W. 29th Street	70	77	57	64	64	51	50	53				
Marion	180970036	N. Keystone Avenue	75	71	57	61	58	58	53	60				
Marion	180970037	W. Washington Street	71	63	56	54	53	53	52	56				
Marion	180970042	Mann Road	50	50	40	43	42	39	39	43				
Marion	180970043	S. West Street	81	81	67	70	68	63	69	73				
Marion	180970049	Indianapolis International Airport	61	62	48	47	46	40	38					
Marion	180970050	Fort Harrison State Park	57	53	43	44	43	41	43	44	44			
Marion	180970057	S. Harding Street			61									
Marion	180970058	Hode School			55	59	60	58	59	67				
Marion	180970066	English Avenue						63	60	60				
Marion	180970070	N. Arlington Avenue						46	48	51	58			
Marion	180970071	Drover Street					110	76	74	80				
Marion	180971001	David Street	56	57	44	47	44	43	41					
Marion	180973001	N. Lynhurst Drive	67	60	47	50	47	44	46	52	53			

Highlighted red numbers through 1987 are above the Annual TSP Standard of 75 µg/m^3

Graph 31: Central Indiana 24-Hour TSP 2nd High Values

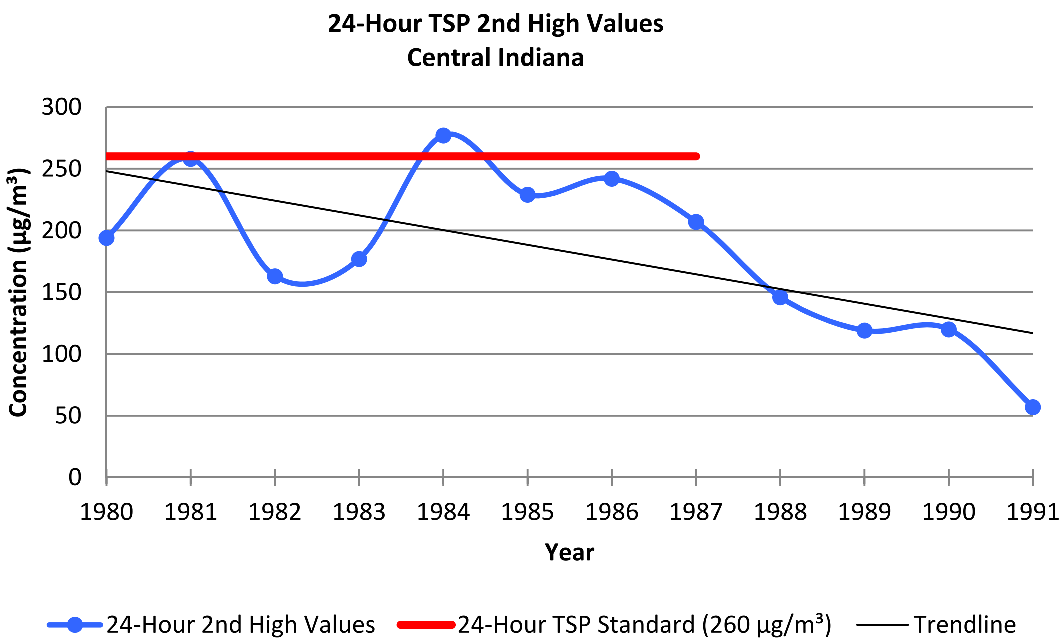


Table 27: Central Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	2nd High Values (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Marion	180970002	N. Pennsylvania Street	129	143	123	128	129	126	123					
Marion	180970006	S. Sheridan Street	126	116	128	124	131	113	106	149	124	119		
Marion	180970008	E. 46th Street	144	131	124	113	129	114	122	103	129			
Marion	180970009	1445 W. Michigan Street	134	134	139	155	126	127	75					
Marion	180970011	S. State Street	153	163	141	132	120	153	114	142				
Marion	180970015	S. Holt Road	161	130	119									
Marion	180970021	1330 W. Michigan Street	165	176	146	148	120	123	120	123	146	98	120	57
Marion	180970024	56th Street	121	97	95	101	94	129	82					
Marion	180970026	Wanamaker	112	103	100	112	107	107	91					
Marion	180970030	N. Randolph	163	124	144	132	133	130						
Marion	180970035	W. 29th Street	157	139	138	152	140	109	100	107				
Marion	180970036	N. Keystone Avenue	143	135	125	137	131	148	105	122				
Marion	180970037	W. Washington Street	133	117	163	122	122	125	104	122				
Marion	180970042	Mann Road	109	95	89	107	88	103	78	75				
Marion	180970043	S. West Street	194	258	160	177	190	146	206	207				
Marion	180970049	Indianapolis International Airport	133	122	107	111	131	103	56					
Marion	180970050	Fort Harrison State Park	111	95	102	99	100	115	88	84	118			
Marion	180970057	S. Harding Street			109									
Marion	180970058	Hode School			127	120	123	133	118	133				
Marion	180970066	English Avenue						150	175	174				
Marion	180970070	N. Arlington Avenue						84	98	104	134			
Marion	180970071	Drover Street					277	229	242	196				
Marion	180971001	David Street	115	104	95	99	101	109	47					
Marion	180973001	N. Lynhurst Drive	138	109	98	108	97	119	88	121	124			

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 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 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 population and VMT have been on the increase over time, the Central Indiana area's monitored air quality values have been trending downward and will continue to improve into the future. The overall decrease in emissions in the 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

Central Indiana County-Specific Emission Inventory Data

(1980-2009)

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Boone County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	61,051.36	5,377.83	2,167.00	7,254.83	376.61	6,894.95
1981	59,345.19	5,280.18	2,132.00	7,269.49	373.96	6,744.34
1982	57,639.03	5,182.54	2,097.01	7,284.15	371.32	6,593.76
1983	55,932.86	5,084.90	2,062.01	7,298.80	368.68	6,443.18
1984	54,226.92	4,987.25	2,027.01	7,313.46	366.03	6,292.59
1985	52,522.53	4,889.61	1,992.02	7,328.12	363.39	6,142.01
1986	50,818.14	4,791.97	1,957.02	7,342.78	360.75	5,991.43
1987	49,113.74	4,694.32	1,922.03	7,357.44	358.10	5,840.87
1988	47,409.35	4,596.68	1,887.03	7,372.10	355.46	5,690.43
1989	45,704.96	4,499.04	1,852.03	7,392.69	352.82	5,539.98
1990	43,640.92	4,237.81	1,854.74	8,163.90	540.24	5,375.15
1991	41,757.44	4,141.53	1,811.18	7,928.30	479.79	5,211.01
1992	39,873.97	4,045.24	1,767.63	7,692.70	419.34	5,046.88
1993	37,990.49	3,948.96	1,724.07	7,457.11	358.89	4,882.74
1994	36,107.01	3,852.68	1,680.52	7,221.51	298.43	4,718.60
1995	34,223.54	3,756.39	1,636.96	6,985.91	237.98	4,554.47
1996	32,340.06	3,660.11	1,593.41	6,750.31	177.53	4,390.33
1997	31,187.62	3,705.75	1,573.21	6,677.39	182.10	4,304.65
1998	30,465.01	3,671.18	1,647.91	7,068.81	185.18	4,184.12
1999	29,009.17	3,641.52	1,662.78	7,199.48	227.89	4,004.51
2000	28,908.02	3,564.20	1,682.50	7,239.00	218.11	3,959.11
2001	28,791.68	3,467.58	1,580.08	6,980.04	223.84	3,964.29
2002	27,230.88	4,173.90	1,356.01	8,712.60	445.26	3,735.82
2003	25,217.62	3,950.97	1,349.95	8,706.43	430.21	3,648.04
2004	23,204.37	3,728.03	1,343.90	8,700.25	415.17	3,560.26
2005	21,191.11	3,505.10	1,337.85	8,694.08	400.12	3,472.49
2006	16,173.70	2,732.30	1,315.80	8,058.71	360.25	3,013.48
2007	11,156.30	1,959.50	1,293.75	7,423.35	320.38	2,554.47
2008	6,138.89	1,186.71	1,271.71	6,787.98	280.51	2,095.46
2009	6,138.89	1,186.71	1,271.71	6,787.98	280.51	2,143.00
%Change 1980 to 2009	-89.94%	-77.93%	-41.31%	-6.43%	-25.52%	-68.92%

Hamilton County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	119,214.15	11,262.52	3,832.69	10,705.89	9,095.78	12,614.29
1981	116,520.65	11,111.83	3,766.05	10,721.39	8,864.23	12,450.67
1982	113,827.16	10,961.15	3,699.40	10,736.89	8,632.67	12,287.04
1983	111,133.73	10,810.46	3,632.75	10,752.39	8,401.11	12,123.43
1984	108,442.43	10,659.77	3,566.10	10,767.89	8,169.56	11,959.86
1985	105,751.13	10,509.08	3,499.46	10,783.38	7,938.00	11,796.28
1986	103,059.83	10,358.40	3,432.81	10,798.88	7,706.44	11,632.70
1987	100,368.53	10,207.71	3,366.16	10,814.38	7,474.89	11,469.12
1988	97,677.23	10,057.02	3,299.51	10,919.13	7,244.93	11,306.19
1989	94,985.93	9,906.33	3,232.86	10,990.86	7,015.17	11,146.22
1990	77,533.20	7,546.23	2,951.73	11,208.38	3,622.86	9,364.36
1991	78,559.73	7,859.23	2,981.65	11,088.51	4,058.67	9,649.93
1992	79,586.27	8,172.22	3,011.57	10,968.64	4,494.48	9,935.51
1993	80,612.80	8,485.22	3,041.49	10,848.77	4,930.29	10,221.08
1994	81,639.33	8,798.22	3,078.61	10,728.90	5,366.09	10,506.65
1995	82,665.87	9,111.21	3,117.49	10,609.03	5,801.90	10,792.23
1996	83,692.40	9,424.21	3,158.87	10,489.15	6,237.71	11,077.80
1997	80,581.04	9,988.23	3,416.92	11,465.70	7,619.86	10,814.07
1998	78,041.78	10,467.60	3,519.62	11,566.55	9,728.78	10,409.45
1999	74,276.27	10,300.32	3,590.88	11,865.20	10,145.77	9,941.54
2000	72,881.05	10,272.45	3,448.99	12,127.40	7,394.49	9,764.65
2001	70,379.77	9,251.17	3,037.26	11,367.30	5,215.15	9,626.37
2002	74,044.52	10,393.53	2,167.63	12,705.20	4,944.73	10,336.29
2003	68,548.67	9,581.31	2,179.51	12,718.58	3,675.52	9,957.85
2004	63,052.82	8,769.09	2,191.38	12,731.95	2,406.30	9,579.40
2005	57,556.97	7,956.88	2,203.25	12,745.33	1,137.09	9,200.95
2006	43,819.44	6,185.97	2,078.21	11,595.02	1,044.70	7,968.20
2007	30,081.92	4,415.06	1,953.17	10,444.70	952.32	6,735.46
2008	16,344.39	2,644.14	1,828.14	9,294.38	859.93	5,502.71
2009	16,344.39	2,546.81	1,697.11	9,005.77	635.74	5,478.39
%Change 1980 to 2009	-79.46%	-77.39%	-55.72%	-15.88%	-93.01%	-56.57%

Hancock County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	51,498.46	6,356.27	2,147.16	7,102.28	898.25	6,936.20
1981	50,122.80	6,215.14	2,110.07	7,112.27	875.27	6,785.04
1982	48,747.14	6,074.02	2,072.97	7,122.27	852.28	6,633.88
1983	47,371.49	5,932.89	2,035.88	7,132.26	829.30	6,482.71
1984	45,995.83	5,791.76	1,998.78	7,142.25	806.31	6,331.55
1985	44,620.18	5,650.64	1,961.69	7,152.25	783.32	6,180.39
1986	43,244.52	5,509.51	1,924.59	7,162.24	760.34	6,029.22
1987	41,868.86	5,368.38	1,887.50	7,172.24	737.35	5,878.06
1988	40,493.21	5,227.26	1,850.40	7,182.23	714.37	5,726.90
1989	39,117.55	5,086.13	1,813.31	7,222.06	691.38	5,575.73
1990	35,932.77	4,378.15	1,640.64	7,191.41	1,022.97	5,170.78
1991	34,870.05	4,357.60	1,664.69	7,183.07	891.33	5,069.24
1992	33,807.32	4,337.04	1,688.75	7,174.73	759.69	4,967.71
1993	32,744.60	4,316.49	1,712.80	7,166.38	628.05	4,866.17
1994	31,681.88	4,295.94	1,737.37	7,158.04	496.41	4,764.63
1995	30,619.15	4,275.38	1,761.96	7,149.70	364.77	4,663.10
1996	29,556.43	4,254.83	1,786.72	7,141.36	233.13	4,561.56
1997	28,410.41	4,277.58	1,791.67	7,226.65	236.91	4,525.95
1998	27,580.55	4,224.19	1,854.25	7,550.24	238.95	4,407.11
1999	25,994.27	4,104.77	1,827.91	7,463.27	336.06	4,222.69
2000	25,703.44	4,018.96	1,826.79	7,319.56	328.95	4,209.65
2001	25,359.38	3,935.71	1,718.97	7,065.22	337.70	4,244.78
2002	24,860.90	3,705.95	1,236.38	8,219.94	475.28	3,651.20
2003	23,053.65	3,517.13	1,231.01	8,214.83	460.21	3,559.88
2004	21,246.39	3,328.31	1,225.65	8,209.71	445.14	3,468.56
2005	19,439.14	3,139.49	1,220.29	8,204.59	430.08	3,377.24
2006	14,898.51	2,469.44	1,202.20	7,593.88	395.60	2,936.55
2007	10,357.88	1,799.38	1,184.11	6,983.18	361.11	2,495.87
2008	5,817.24	1,129.33	1,166.02	6,372.47	326.63	2,055.18
2009	5,817.24	1,131.88	1,166.90	6,168.92	332.09	2,072.37
%Change 1980 to 2009	-82.79%	-82.19%	-45.65%	-13.14%	-63.03%	-70.12%

Hendricks County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	72,272.11	7,268.37	2,797.76	8,439.29	2,173.00	7,752.27
1981	70,549.55	7,180.46	2,753.31	8,529.94	2,104.35	7,628.29
1982	68,828.10	7,092.55	2,711.65	8,620.58	2,035.70	7,504.35
1983	67,107.02	7,004.65	2,669.98	8,711.22	1,967.05	7,380.41
1984	65,385.95	6,916.74	2,628.32	8,801.87	1,898.96	7,256.47
1985	63,664.87	6,828.83	2,586.65	8,892.51	1,831.13	7,132.53
1986	61,943.80	6,740.92	2,546.30	8,983.15	1,763.29	7,008.59
1987	60,222.72	6,653.01	2,507.97	9,073.79	1,695.46	6,884.65
1988	58,501.64	6,565.11	2,469.63	9,164.44	1,627.63	6,760.71
1989	56,780.57	6,477.20	2,431.30	9,276.57	1,559.80	6,636.77
1990	46,912.60	5,367.19	2,051.92	8,959.88	1,881.07	5,540.01
1991	47,231.92	5,512.35	2,127.74	9,112.16	1,690.96	5,675.39
1992	47,551.24	5,657.51	2,203.57	9,264.43	1,500.86	5,810.77
1993	47,870.57	5,802.68	2,279.39	9,416.70	1,310.75	5,946.15
1994	48,189.89	5,947.84	2,355.21	9,568.98	1,120.64	6,081.52
1995	48,509.21	6,093.00	2,431.03	9,721.25	930.54	6,216.90
1996	48,828.53	6,238.16	2,506.86	9,873.52	740.43	6,352.28
1997	46,946.90	6,261.55	2,497.06	9,893.16	753.36	6,231.68
1998	45,491.77	6,157.20	2,600.41	10,424.64	777.84	6,066.99
1999	42,996.88	6,133.30	2,794.87	10,748.33	767.08	5,764.28
2000	43,745.32	6,155.42	2,892.81	10,957.38	763.03	5,771.39
2001	41,673.32	5,801.77	2,687.71	10,454.82	773.57	5,629.69
2002	40,979.92	6,775.92	1,729.62	11,825.85	672.39	5,493.98
2003	38,155.46	6,548.15	1,711.87	11,783.83	683.78	5,296.43
2004	35,331.00	6,320.38	1,694.13	11,741.82	695.16	5,098.89
2005	32,506.54	6,092.61	1,676.38	11,699.80	706.55	4,901.34
2006	24,928.96	4,795.34	1,642.76	10,860.83	601.23	4,238.44
2007	17,351.37	3,498.06	1,609.13	10,021.86	495.91	3,575.53
2008	9,773.79	2,200.79	1,575.51	9,182.89	390.60	2,912.63
2009	9,773.79	2,200.79	1,575.51	9,182.89	390.60	2,912.63
%Change 1980 to 2009	-86.48%	-69.72%	-43.69%	8.81%	-82.03%	-62.43%

Johnson County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	80,853.75	6,726.28	2,485.22	6,852.18	938.16	9,380.67
1981	78,808.52	6,625.58	2,441.42	6,860.27	928.83	9,258.82
1982	76,763.28	6,524.89	2,397.63	6,868.36	919.50	9,136.98
1983	74,721.08	6,424.20	2,353.83	6,876.45	910.17	9,015.13
1984	72,681.92	6,323.51	2,310.04	6,884.54	900.85	8,893.28
1985	70,642.76	6,222.82	2,266.25	6,892.63	892.06	8,771.44
1986	68,603.60	6,122.15	2,226.62	6,900.72	883.74	8,649.59
1987	66,564.44	6,021.63	2,186.99	6,908.81	875.43	8,527.75
1988	64,525.28	5,921.11	2,147.36	6,916.90	867.12	8,405.90
1989	62,486.12	5,820.59	2,107.73	7,018.94	858.80	8,284.05
1990	49,888.78	4,643.98	1,882.66	6,792.86	1,372.52	7,123.02
1991	50,610.11	4,796.45	1,871.68	6,848.33	1,215.69	7,270.94
1992	51,331.45	4,948.93	1,860.70	6,903.80	1,058.86	7,418.85
1993	52,052.78	5,101.40	1,849.72	6,959.27	902.04	7,566.77
1994	52,774.11	5,253.87	1,839.72	7,014.74	745.21	7,714.68
1995	53,495.45	5,406.35	1,861.83	7,070.21	588.38	7,862.59
1996	54,216.78	5,558.82	1,885.09	7,125.68	431.55	8,010.51
1997	52,006.72	5,590.39	1,823.09	6,855.68	447.91	7,910.44
1998	50,375.77	5,490.08	1,925.94	7,368.24	470.09	7,628.42
1999	47,249.58	5,445.95	1,912.28	7,376.77	346.27	7,701.21
2000	46,218.39	5,344.33	1,899.21	7,474.35	331.64	7,623.63
2001	45,429.92	5,165.28	1,699.12	7,005.75	338.45	7,664.62
2002	41,261.14	5,668.89	1,384.66	8,222.93	1,026.38	7,225.50
2003	38,133.43	5,348.65	1,389.98	8,230.18	1,000.09	7,011.83
2004	35,005.72	5,028.42	1,395.31	8,237.42	973.79	6,798.16
2005	31,878.01	4,708.18	1,400.63	8,244.67	947.50	6,584.48
2006	24,293.78	3,686.20	1,367.64	7,612.85	899.60	5,890.08
2007	16,709.55	2,664.21	1,334.65	6,981.03	851.70	5,195.67
2008	9,125.32	1,642.23	1,301.66	6,349.21	803.80	4,501.26
2009	9,125.46	1,642.32	1,302.19	6,350.45	804.44	4,489.41
%Change 1980 to 2009	-82.22%	-75.58%	-47.60%	-7.32%	-14.25%	-52.14%

Marion County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	738,035.25	77,237.45	20,050.64	63,232.48	94,264.39	98,150.03
1981	716,850.08	75,527.67	19,552.27	61,388.90	92,356.40	95,686.21
1982	695,664.93	73,837.86	19,053.91	59,545.32	90,448.42	93,222.39
1983	674,479.78	72,242.80	18,555.54	57,701.74	88,540.43	90,758.57
1984	653,294.63	70,647.75	18,057.18	55,858.16	86,632.44	88,294.75
1985	632,109.48	69,052.71	17,558.82	54,014.58	84,724.46	85,830.93
1986	610,924.33	67,457.66	17,060.45	52,171.00	82,816.47	83,367.11
1987	589,739.19	65,862.61	16,562.09	50,769.49	80,908.49	80,903.29
1988	568,554.04	64,267.57	16,063.72	48,925.91	79,000.50	78,439.47
1989	547,368.89	62,672.52	15,565.36	50,511.01	77,092.51	75,975.65
1990	434,559.07	57,194.51	15,817.29	59,516.30	92,275.12	69,405.51
1991	438,399.53	56,079.46	15,390.59	54,832.35	84,954.06	67,869.11
1992	442,240.00	54,964.42	14,963.89	50,148.40	77,633.01	66,332.71
1993	446,080.47	53,849.37	14,537.20	45,464.46	70,311.95	64,796.31
1994	449,920.93	52,734.32	14,110.50	40,780.51	62,990.89	63,259.91
1995	453,761.40	51,619.28	13,989.93	36,096.56	55,669.84	61,723.51
1996	457,601.86	50,504.23	13,878.03	31,412.62	48,348.78	60,187.11
1997	441,515.26	50,412.05	14,597.60	33,778.23	46,885.02	59,109.38
1998	426,523.74	50,540.30	14,462.45	30,733.89	49,887.66	55,796.54
1999	375,681.73	54,625.07	14,707.63	31,104.07	51,285.09	55,739.80
2000	362,667.73	52,883.03	13,674.98	30,606.46	46,499.39	54,155.51
2001	361,478.87	52,848.03	12,616.59	27,387.95	49,549.07	54,649.51
2002	275,471.16	44,810.84	7,500.18	22,911.28	59,365.09	41,607.30
2003	254,324.55	43,422.36	7,426.22	22,798.04	59,921.85	40,162.32
2004	233,177.95	42,033.89	7,352.27	22,684.80	60,478.62	38,717.34
2005	212,031.34	40,645.41	7,278.32	22,571.56	61,035.38	37,272.35
2006	163,211.35	33,446.06	7,146.92	20,811.29	51,387.82	32,740.74
2007	114,391.36	26,246.71	7,015.52	19,051.02	41,740.27	28,209.12
2008	65,571.37	19,047.36	6,884.13	17,290.76	32,092.71	23,677.51
2009	65,508.99	18,171.56	6,964.51	17,447.87	33,156.64	23,592.81
%Change 1980 to 2009	-91.12%	-76.47%	-65.27%	-72.41%	-64.83%	-75.96%

Morgan County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	59,750.25	6,482.32	2,648.41	7,394.59	9,403.16	6,756.19
1981	58,195.88	6,490.65	2,603.71	7,402.57	9,736.05	6,625.36
1982	56,641.50	6,498.98	2,559.01	7,410.56	10,068.94	6,494.53
1983	55,087.13	6,507.31	2,514.32	7,418.55	10,401.83	6,363.69
1984	53,532.75	6,515.64	2,469.62	7,426.54	10,734.72	6,233.61
1985	51,978.38	6,523.97	2,425.01	7,434.53	11,067.61	6,106.29
1986	50,424.00	6,532.30	2,380.40	7,442.52	11,400.51	5,978.97
1987	48,870.35	6,540.63	2,335.78	7,677.24	11,733.40	5,851.65
1988	47,324.37	6,553.25	2,291.17	7,686.25	12,066.29	5,724.33
1989	45,778.40	6,574.80	2,246.56	8,082.17	12,399.18	5,597.01
1990	40,039.51	6,272.04	1,978.04	8,913.23	14,390.39	5,156.96
1991	39,483.03	6,215.84	2,053.78	8,923.15	13,885.37	5,106.57
1992	38,926.55	6,159.63	2,129.51	8,933.07	13,380.36	5,056.18
1993	38,370.07	6,103.43	2,205.25	8,942.99	12,875.34	5,005.79
1994	37,813.59	6,047.22	2,280.99	8,952.91	12,370.32	4,955.39
1995	37,257.11	5,991.01	2,356.73	8,962.84	11,865.31	4,905.00
1996	36,700.63	5,934.81	2,432.46	8,972.76	11,360.29	4,854.61
1997	35,177.12	7,239.52	2,812.30	10,454.69	15,668.12	4,760.77
1998	34,137.37	7,627.43	2,795.13	8,461.89	15,549.71	4,613.20
1999	32,187.63	7,905.77	2,756.75	8,585.04	16,331.95	4,369.11
2000	31,352.31	8,404.43	2,896.89	8,688.32	18,532.37	4,234.84
2001	30,602.77	8,302.71	2,617.01	8,283.40	17,344.08	4,206.33
2002	30,111.45	8,209.21	1,991.18	9,335.65	18,478.77	4,349.88
2003	27,748.74	7,671.46	2,007.70	9,348.24	18,664.14	4,164.79
2004	25,386.03	7,133.70	2,024.22	9,360.83	18,849.51	3,979.71
2005	23,023.32	6,595.94	2,040.74	9,373.42	19,034.88	3,794.62
2006	17,801.19	6,164.58	1,990.37	8,377.81	17,893.96	3,337.08
2007	12,579.06	5,733.23	1,940.00	7,382.20	16,753.05	2,879.53
2008	7,356.93	5,301.87	1,889.63	6,386.59	15,612.14	2,421.99
2009	7,289.26	5,252.79	1,889.63	6,205.75	15,439.61	2,265.37
%Change 1980 to 2009	-87.80%	-18.97%	-28.65%	-16.08%	64.20%	-66.47%

Putnam County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	40,076.67	8,465.00	1,996.48	8,713.66	10,440.13	3,972.54
1981	39,025.59	8,303.39	1,951.42	8,559.04	10,052.00	3,914.56
1982	37,974.52	8,141.77	1,906.35	8,404.42	9,663.87	3,870.28
1983	36,923.45	7,980.15	1,861.29	8,249.80	9,275.74	3,826.00
1984	35,872.38	7,818.54	1,816.23	8,095.19	8,887.62	3,781.72
1985	34,823.17	7,656.92	1,771.17	7,940.57	8,499.49	3,737.43
1986	33,774.53	7,495.31	1,726.10	7,785.95	8,111.36	3,693.15
1987	32,725.89	7,333.69	1,681.04	7,631.33	7,723.23	3,648.87
1988	31,677.25	7,172.07	1,635.98	7,476.71	7,335.10	3,604.59
1989	30,628.62	7,010.46	1,590.92	7,337.93	6,946.98	3,560.30
1990	27,947.42	6,335.48	1,652.26	8,946.08	7,221.53	3,129.57
1991	27,208.51	6,253.65	1,563.15	8,230.90	6,629.10	3,182.39
1992	26,469.59	6,171.82	1,474.05	7,515.73	6,036.68	3,235.20
1993	25,730.68	6,089.99	1,384.95	6,800.55	5,444.25	3,288.02
1994	24,991.76	6,008.15	1,295.84	6,085.38	4,851.82	3,340.83
1995	24,252.84	5,926.32	1,238.76	5,370.21	4,259.40	3,393.64
1996	23,513.93	5,844.49	1,182.46	4,655.03	3,666.97	3,446.46
1997	22,676.46	5,997.86	1,221.64	4,900.34	3,888.66	3,414.99
1998	22,119.60	6,010.57	1,267.81	5,116.21	4,001.29	3,345.18
1999	20,754.35	5,938.31	1,254.57	5,152.69	2,356.17	3,309.28
2000	20,294.16	6,015.14	1,184.28	4,849.37	2,470.45	3,280.57
2001	19,773.67	6,115.93	1,097.83	4,667.68	2,642.74	3,284.07
2002	20,722.48	5,309.02	987.48	6,107.65	742.10	3,252.26
2003	19,085.86	5,107.91	986.27	6,107.56	727.82	3,174.12
2004	17,449.25	4,906.80	985.06	6,107.46	713.55	3,095.98
2005	15,812.63	4,705.69	983.85	6,107.36	699.27	3,017.83
2006	12,213.54	3,978.60	968.42	5,467.05	666.79	2,682.53
2007	8,614.44	3,251.51	953.00	4,826.73	634.30	2,347.24
2008	5,015.34	2,524.41	937.57	4,186.42	601.82	2,011.94
2009	5,025.72	2,731.15	914.30	4,124.74	508.06	2,076.26
%Change 1980 to 2009	-87.46%	-67.74%	-54.20%	-52.66%	-95.13%	-47.73%

Shelby County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	46,320.24	8,912.84	2,441.71	7,138.18	5,103.46	5,870.37
1981	45,026.08	8,713.81	2,397.82	7,110.51	4,908.07	5,773.61
1982	43,731.92	8,514.78	2,353.92	7,082.84	4,712.68	5,676.84
1983	42,437.77	8,315.75	2,310.03	7,055.17	4,517.29	5,580.07
1984	41,143.61	8,116.72	2,266.14	7,027.50	4,321.90	5,483.31
1985	39,849.45	7,917.69	2,222.24	6,999.83	4,126.51	5,386.54
1986	38,555.29	7,718.66	2,178.35	6,972.16	3,931.12	5,289.77
1987	37,261.14	7,519.63	2,134.46	7,449.51	3,735.73	5,193.01
1988	35,966.98	7,320.60	2,273.03	7,421.84	3,540.35	5,096.24
1989	34,672.82	7,121.57	2,411.60	8,194.00	3,344.96	4,999.47
1990	32,354.35	6,327.77	2,350.03	9,388.16	5,466.56	4,474.69
1991	31,170.86	6,212.60	2,450.56	9,110.81	4,584.94	4,467.77
1992	29,987.37	6,097.44	2,552.26	8,834.16	3,703.31	4,460.85
1993	28,803.88	5,982.27	2,653.96	8,557.51	2,821.69	4,453.94
1994	27,620.38	5,867.10	2,755.66	8,280.86	1,940.07	4,447.02
1995	26,436.89	5,751.94	2,857.70	8,004.21	1,058.44	4,440.10
1996	25,253.40	5,636.77	2,959.82	7,727.56	176.82	4,433.18
1997	24,411.33	5,673.73	3,009.06	7,999.38	181.76	4,430.99
1998	23,695.90	5,616.02	3,033.03	8,149.66	184.02	4,269.15
1999	22,644.41	6,367.21	3,020.94	8,154.98	330.79	4,543.42
2000	22,317.26	6,289.03	3,000.09	7,926.27	323.02	4,543.63
2001	22,150.39	6,212.02	2,908.07	7,706.69	329.59	4,608.27
2002	20,860.54	5,106.95	1,578.79	8,283.36	809.52	3,902.11
2003	19,206.50	4,605.60	1,631.67	8,382.55	799.89	3,745.93
2004	17,552.45	4,104.25	1,684.55	8,481.75	790.26	3,589.74
2005	15,898.41	3,602.89	1,737.44	8,580.94	780.63	3,433.55
2006	12,245.51	3,141.53	1,679.04	8,015.03	748.46	3,110.10
2007	8,592.61	2,680.17	1,620.65	7,449.12	716.29	2,786.66
2008	4,939.71	2,218.81	1,562.26	6,883.21	684.12	2,463.21
2009	5,024.05	2,356.28	1,250.18	6,354.93	684.12	2,453.38
%Change 1980 to 2009	-89.15%	-73.56%	-48.80%	-10.97%	-86.59%	-58.21%