CRITERIA POLLUTANTS

Air Quality Trend Analysis Report
(1980-2010)

LOWER NORTH CENTRAL INDIANA

Indiana Department of Environmental Management

Office of Air Quality

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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

IAC .... Indiana Administrative Code

IDEM .... Indiana Department of Environmental Management

MWe .... megawatt electrical

NAAQS .... National Ambient Air Quality Standard

NEI .... National Emissions Inventory

NO_2 .... nitrogen dioxide

NO_x .... nitrogen oxides

NSR .... New Source Review

$PM_{2.5}$ .... particulate matter less than or equal to 2.5 $\mu g/m^3$ or fine particles

PM_{10} .... particulate matter less than or equal to 10 $\mu g/m^3$ or particulate matter

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 Lower North Central Indiana area is composed of five counties. The counties represented in the area shown in Figure 1 are: Cass, Howard, Miami, Tipton, and Wabash counties.

There is currently one criteria pollutant monitor in the Lower North Central Indiana area collecting data for fine particles ($PM_{2.5}$), which is shown in Figure 1. Monitoring data for the years 2000 through 2010 for Lower North Central Indiana is 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 Lower North Central Indiana area include a fiber insulation manufacturing facility (Thermafiber Inc.) and a cement manufacturing facility (Essroc Cement Corporation). 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 Lower North Central Indiana Counties and Monitors

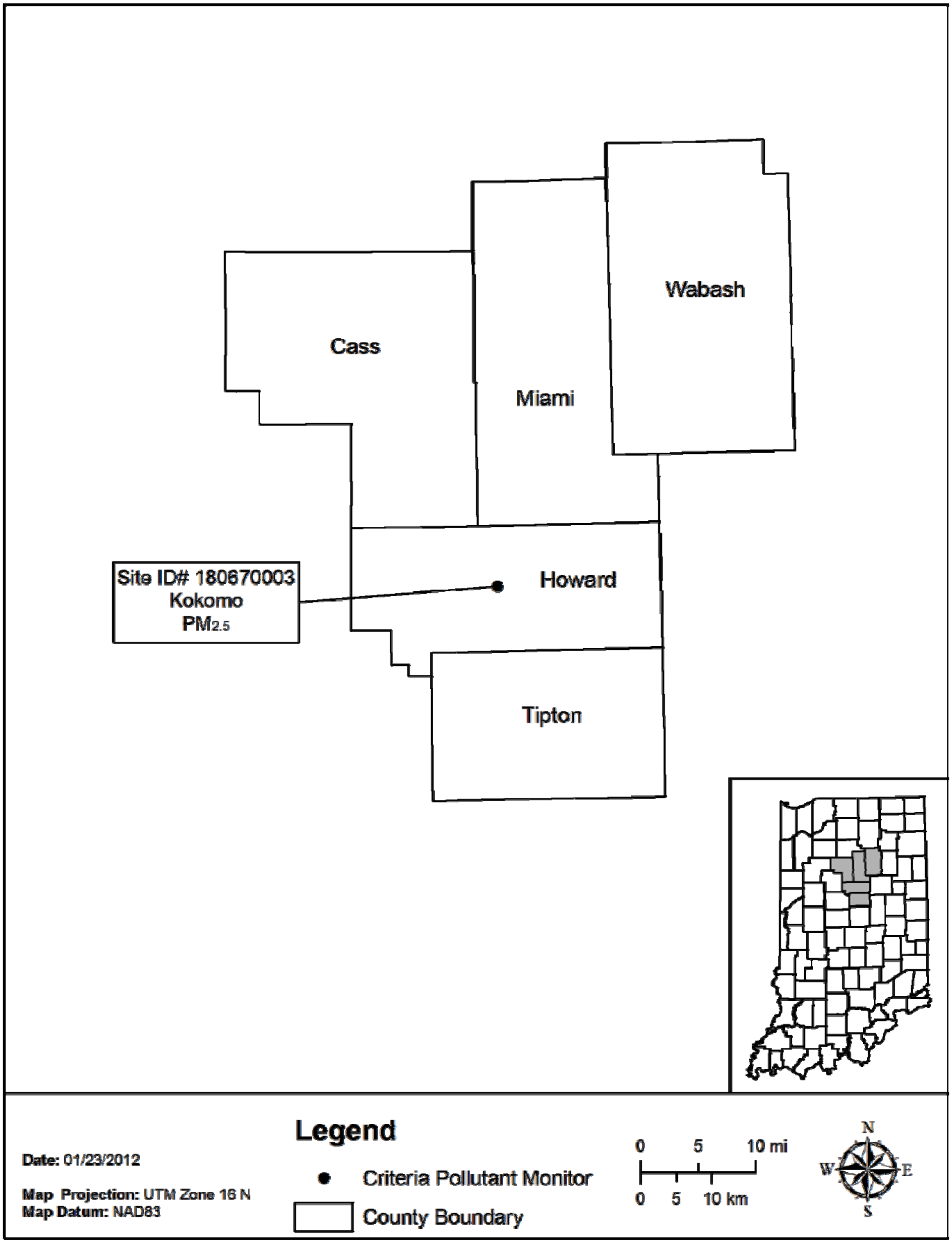


Table 1: Lower North Central Indiana County Population Information

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
CASS	LOGANSPORT	LOGANSPORT	16,474	40,936	38,413	40,930	38,966	-5%
HOWARD	KOKOMO	KOKOMO	38,679	86,896	80,827	84,964	82,752	-5%
MIAMI	PERU	PERU	15,479	39,820	36,897	36,082	36,903	-7%
TIPTON	TIPTON	TIPTON	6,998	16,819	16,119	16,577	15,963	-5%
WABASH	WABASH	WABASH	14,171	36,640	35,069	34,960	32,888	-10%

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

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

COUNTY	2010 NUMBER OF ROADWAY MILES	2009 NUMBER OF REGISTERED VEHICLES	Back Casted 1980 DAILY VMT	2010 DAILY VMT	PERCENT DIFFERENCE BEWTEEN 1992 AND 2010 DAILY VMT
CASS	1,131	39,964	912,675	1,060,000	16%
HOWARD	999	84,888	1,229,997	2,036,000	66%
MIAMI	1,007	38,257	1,121,087	1,148,000	2%
TIPTON	666	19,501	634,521	693,000	9%
WABASH	974	37,799	893,243	945,000	6%

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

Table 3: 2009 Lower North 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
CASS	21,631	3,720	2,782	MIAMI	649	HOWARD	1,463
HOWARD	50,872	4,025	9,435	MIAMI	2,116	HAMILTON	552
MIAMI	16,831	4,952	2,103	HOWARD	518	HOWARD	2,116
TIPTON	8,082	3,663	1,292	HOWARD	386	HOWARD	1,568
WABASH	18,513	3,159	2,125	MIAMI	581	KOSCIUSKO	857

Information in Table 3 from 2009 demonstrates that the largest workforce in Lower North Central Indiana can be found in Howard County. Commuting patterns in Lower North Central Indiana center on the City of Kokomo in Howard County. The Lower North Central Indiana area commuting patterns reflect that of many rural areas around the country. The largest employment county is Howard 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 in the Lower North Central Indiana area have stemmed from the national and regional controls outlined below. These programs have been or are being implemented and have reduced monitored ambient air quality values in Lower North Central Indiana and across the state.

National Controls

Acid Rain Program

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

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

In February 2000, U.S. EPA finalized a federal rule to significantly reduce emissions from cars and light duty trucks, including sport utility vehicles (SUVs). This rule requires automakers to produce cleaner cars, and refineries to make cleaner, lower sulfur gasoline. This rule was phased in between 2004 and 2009 and resulted in a 77% decrease in NO_x emissions from passenger cars, an 86% decrease from smaller SUVs, light duty trucks, and minivans, and a 65% decrease from larger SUVs, vans, and 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 standards. This rule applies to heavy duty gasoline and diesel trucks and buses. This rule was phased in from 2004 through 2007 and resulted in a 40% decrease in NO_x emissions from diesel trucks and buses.

Clean Air Nonroad Diesel Rule

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

Nonroad Spark-Ignition Engines and Recreational Engine Standards

This standard, effective in July 2003, regulates NO_x, VOCs, and CO for groups of previously unregulated nonroad engines. This standard applies to all new engines sold in the United States and imported after the standards went into effect. This 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 published the NO_x State Implementation Plan (SIP) Call in the Federal Register (FR), which required 22 states to adopt rules that would result in significant emission reductions from large electric generating units (EGUs)[1], industrial boilers, and cement kilns in the eastern United States (63 FR 57356). The Indiana rule was adopted in 2001 at 326 Indiana Administrative Code (IAC) 10-1. Beginning in 2004, this rule accounted for a reduction of approximately 31% of all NO_x emissions statewide compared to previous uncontrolled years.

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

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

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

Clean Air Interstate Rule (CAIR)

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

Generally, CAIR applied to any stationary, fossil fuel-fired boiler or stationary, fossil fuel-fired combustion turbine, or a generator with a nameplate capacity of more than 25 megawatt electrical (MWe) producing electricity for sale. This rule provides 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 includes annual and seasonal NO_x trading programs, and an annual SO_2 trading program. This rule required compliance effective January 1, 2009.

SO_2 emissions from power plants in the 28 eastern states and the District of Columbia (D.C.) covered by CAIR were to be cut by 4.3 million tons from 2003 levels by 2010 and by an additional 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 Lower North 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.

Lower North Central Indiana Emission Inventory Data

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

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

Point Sources

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

Area Sources

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

Onroad

Onroad sources include cars and light duty trucks.

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

Nonroad

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

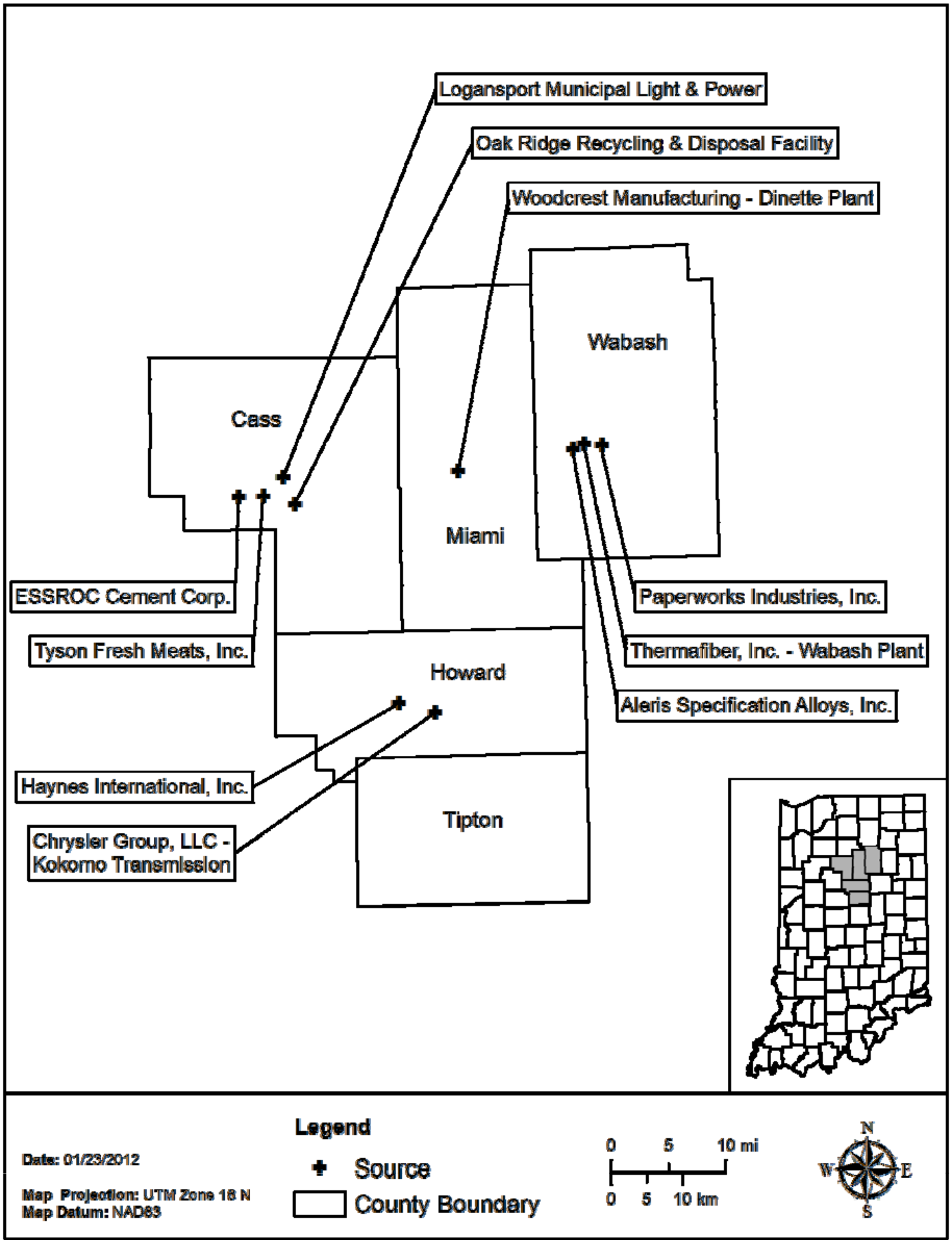
Top Ten Emission Sources

Table 4 represents the top ten sources in tons per year of emissions for the Lower North Central Indiana area. Large facilities in the area include an insulation manufacturing facility, a cement manufacturing facility, and a municipal EGU. Air quality in the Lower North Central Indiana area is partially influenced by the emissions from these top ten point sources, but as new control measures are adopted, these emissions will continue to decrease. Figure 2 shows the location of these sources within the Lower North Central Indiana area.

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

INVENTORY YEAR	COUNTY	FACILITY NAME	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	TOTAL
2010	WABASH	THERMAFIBER, INC. - WABASH PLANT	1,288.1	14.7	102.8	90.5	626.8	15.4	2,138.3
2010	CASS	ESSROC CEMENT CORP.	102.9	1,106.4	161.9	47.8	676.9	18.2	2,114.1
2010	CASS	LOGANSPORT MUNICIPAL LIGHT & POWER	200.5	352.8	0.6	0.2	664.6	2.0	1,220.6
2010	HOWARD	GENERAL MOTORS COMPONENTS HOLDINGS LLC	13.7	16.3	2.1	2.1	0.1	490.4	524.7
2009	WABASH	PAPERWORKS INDUSTRIES, INC.	45.4	151.2	0.8	0.8	0.3	53.9	252.5
2010	WABASH	ALERIS SPECIFICATION ALLOYS, INC.	48.9	50.2	19.8	19.8	11.3	37.1	187.1
2010	HOWARD	HAYNES INTERNATIONAL, INC.	91.0	60.2	11.7	11.3	3.6	3.7	181.5
2010	MIAMI	WOODCREST MANUFACTURING - DINETTE PLANT	0.0	0.0	10.5	4.0	0.0	162.5	177.0
2009	CASS	OAK RIDGE RECYCLING & DISPOSAL FACILITY	75.0	39.8	8.2	7.7	2.3	6.1	139.2
2009	CASS	TYSON FRESH MEATS, INC.	21.3	25.4	32.1	12.4	0.3	8.6	100.2

Figure 2: Map of Lower North 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 Lower North Central Indiana area currently meet the historic NAAQS. Current monitoring data for Lower North Central Indiana are only available for annual and 24-hour $PM_{2.5}$. A detailed explanation of $PM_{2.5}$ will be made in the pollutant specific section of this report. New 1-hour NAAQS were introduced in 2010 for NO_2 and SO_2. The 1-hour NO_2 monitoring data across the state are well below the new 1-hour NO_2 NAAQS. There are no monitors in the Lower North Central Indiana area that measure NO_2 or SO_2.

Air Monitoring and Emissions Data

Not all counties in the Lower North Central Indiana area have an ambient air quality monitor located within the county boundaries. Monitoring data for the years 2000 through 2010 for Lower North Central Indiana are included in the tables in this report for each criteria pollutant, if available. Monitoring data prior to the year 2000 is 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 (AQS).

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

Carbon Monoxide (CO)

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

Graph 1: Lower North Central Indiana CO Emissions

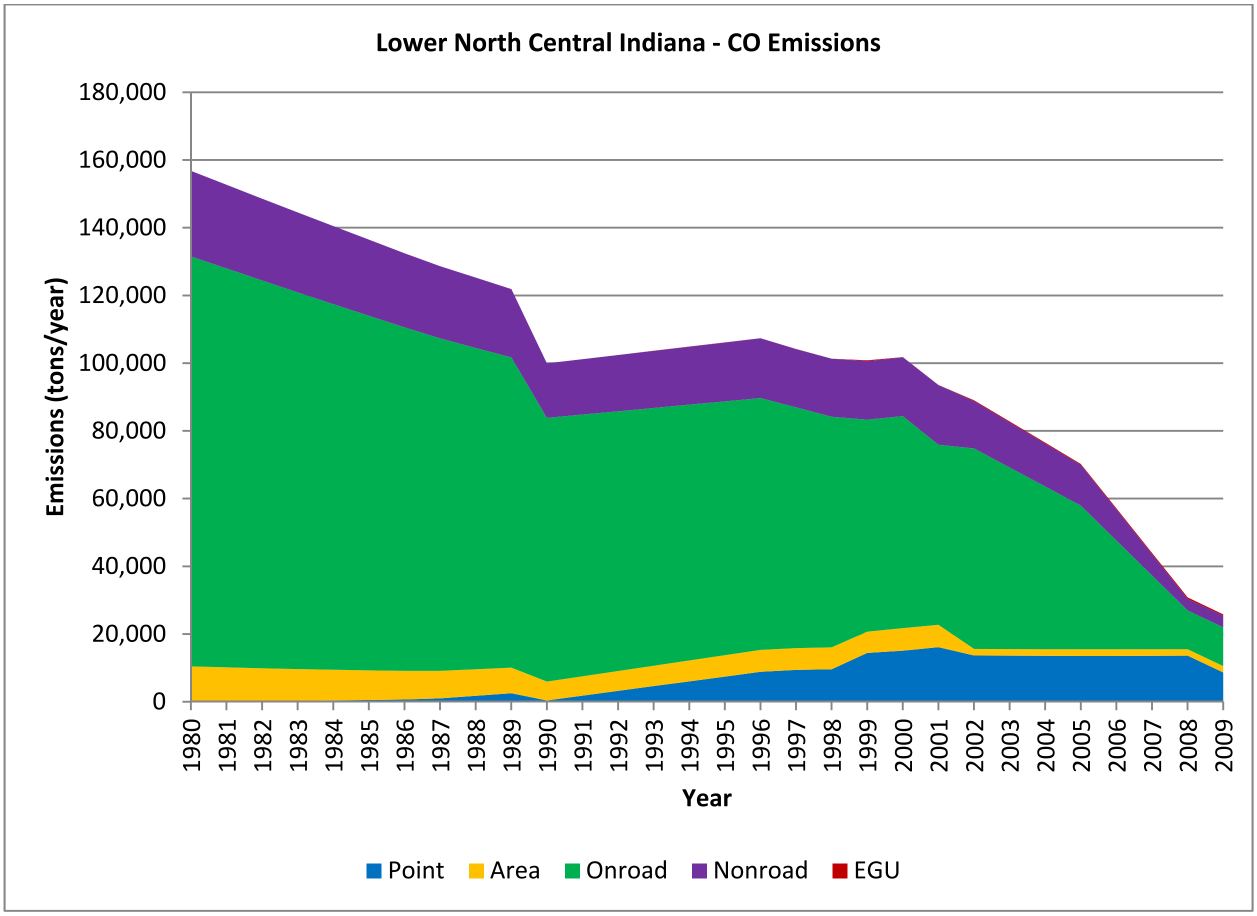
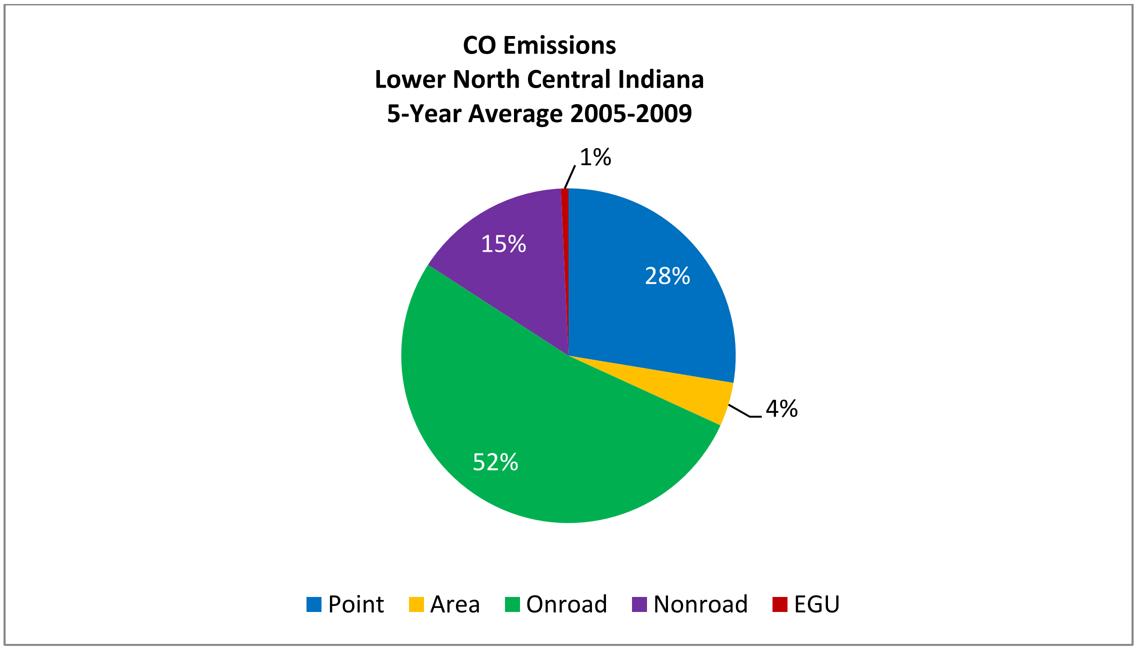


Chart 1: Lower North Central Indiana CO Emissions



National controls have led to a decrease in CO emissions in the Lower North Central Indiana area over time. As Graph 1 illustrates, CO emissions have decreased by 84% within the Lower North 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.

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

Fine Particles ($PM_{2.5}$)

There is one monitor within the Lower North Central Indiana area currently measuring $PM_{2.5}$ levels located in Howard County. The trend data in Graphs 2 and 4 reflect the annual arithmetic mean (the method used to derive the central tendency of the monitoring values) for annual $PM_{2.5}$ and the 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 Lower North 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 98th 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 98th percentile is equal to or greater than 35 $\mu g/m^3$. A violation of the 24-hour $PM_{2.5}$ standards occurs when the design value of the 98th percentile is equal to or greater than 35.5 $\mu g/m^3$. A monitor can exceed the 24-hour $PM_{2.5}$ standards without being in violation.

The trend data in Graph 3 reflect the three-year design value of the annual arithmetic mean for annual $PM_{2.5}$ for each year in the Lower North Central Indiana area for the years 2000 through 2010. The trend data in Graph 5 reflect the three-year design value of the 98th percentile values for 24-hour $PM_{2.5}$ for each year in the Lower North 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 2, 3, 4, and 5. The design value of the annual arithmetic mean is used for comparison to the primary and secondary annual $PM_{2.5}$ standards at 15.0 µg/m^3; therefore, the one-year values shown in Graph 2 are not a true comparison to the annual $PM_{2.5}$ standards and the values in the years that are above the red line are not a violation of the primary and secondary annual $PM_{2.5}$ standards. The values in Graph 2 reflect the annual arithmetic mean and the highest value from all of the monitors in the Lower North Central Indiana area is plotted on the graph for each year.

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

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

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

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

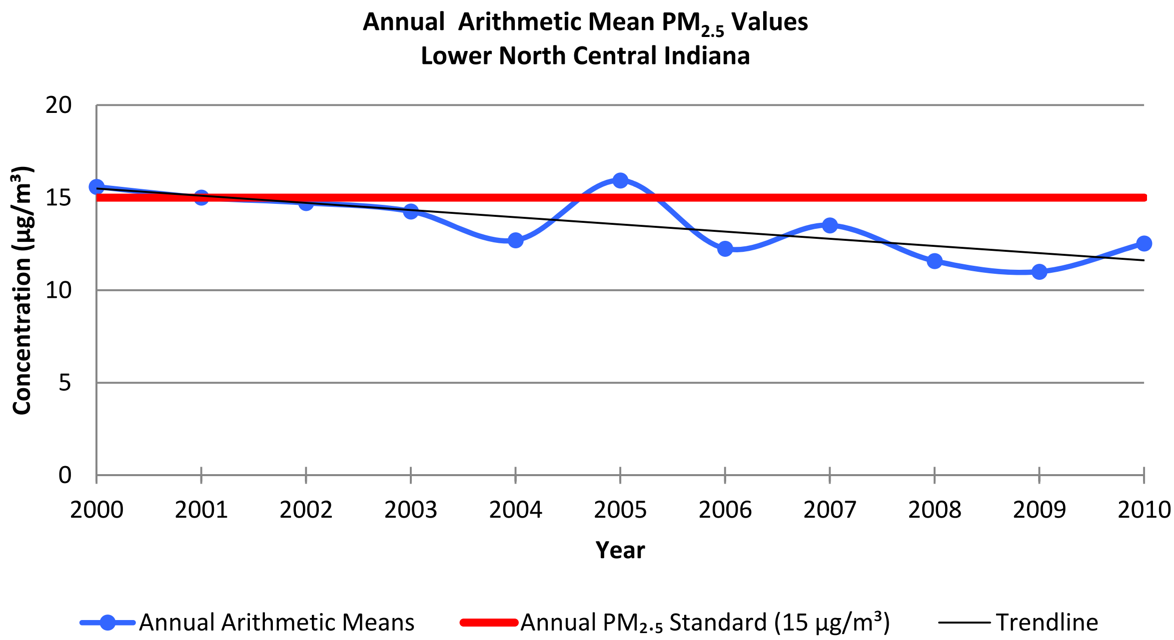


Table 5: Lower North Central Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Howard	180670003	Kokomo	15.59	15.01	14.72	14.26	12.70	15.93	12.25	13.51	11.58	11.00	12.53

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

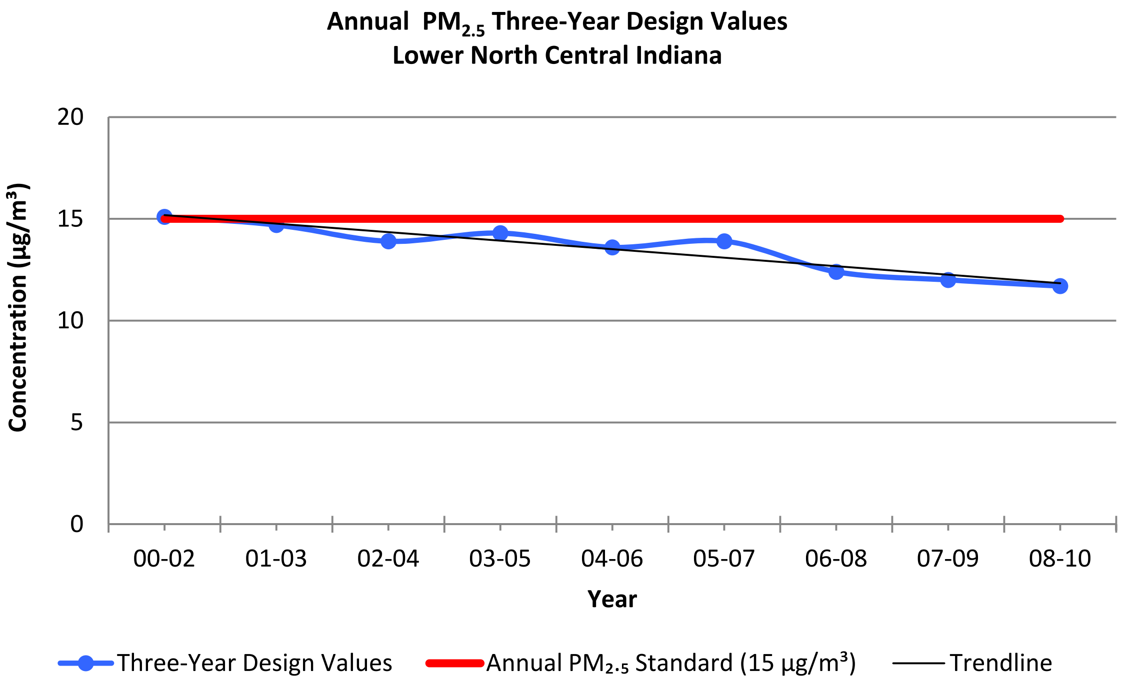


Table 6: Lower North Central Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

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
Howard	180670003	Kokomo	15.1	14.7	13.9	14.3	13.6	13.9	12.4	12.0	11.7

Red highlighted numbers are above the annual $PM_{2.5}$ standard of 15.0 µg/m^3

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

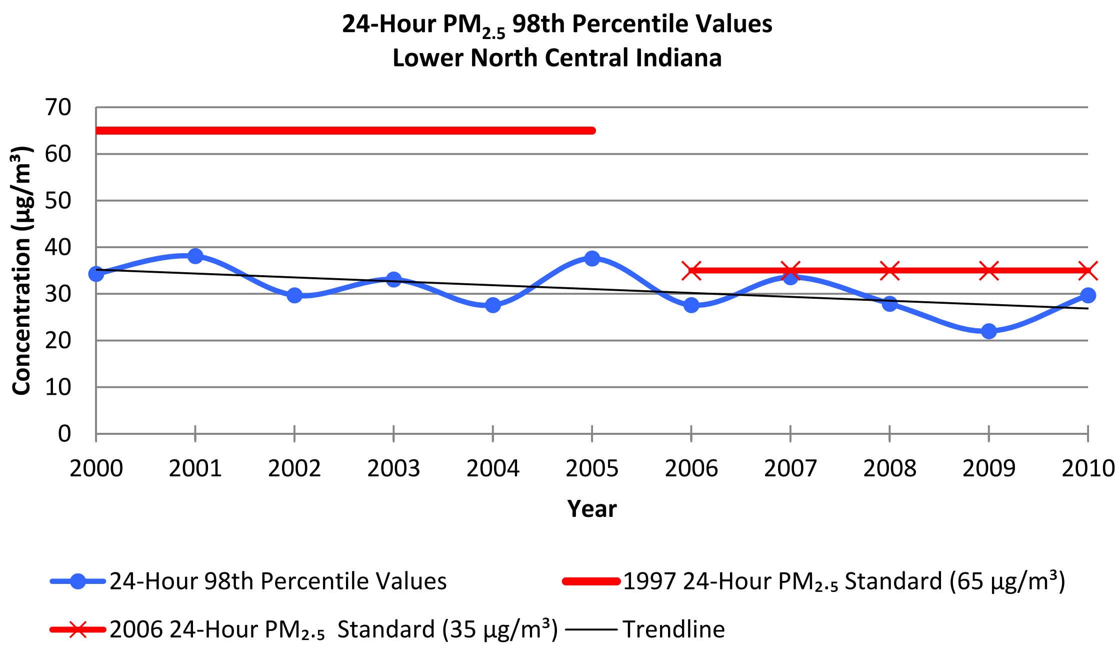


Table 7: Lower North Central Indiana 24-Hour $PM_{2.5}$ 98th Percentile Value Monitoring Data Summary

County	Site #	Site Name	24-Hour 98th Percentile Value (µg/m³)										
			2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Howard	180670003	Kokomo	34.3	38.1	29.7	33.1	27.6	37.6	27.6	33.6	27.9	22.0	29.7

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

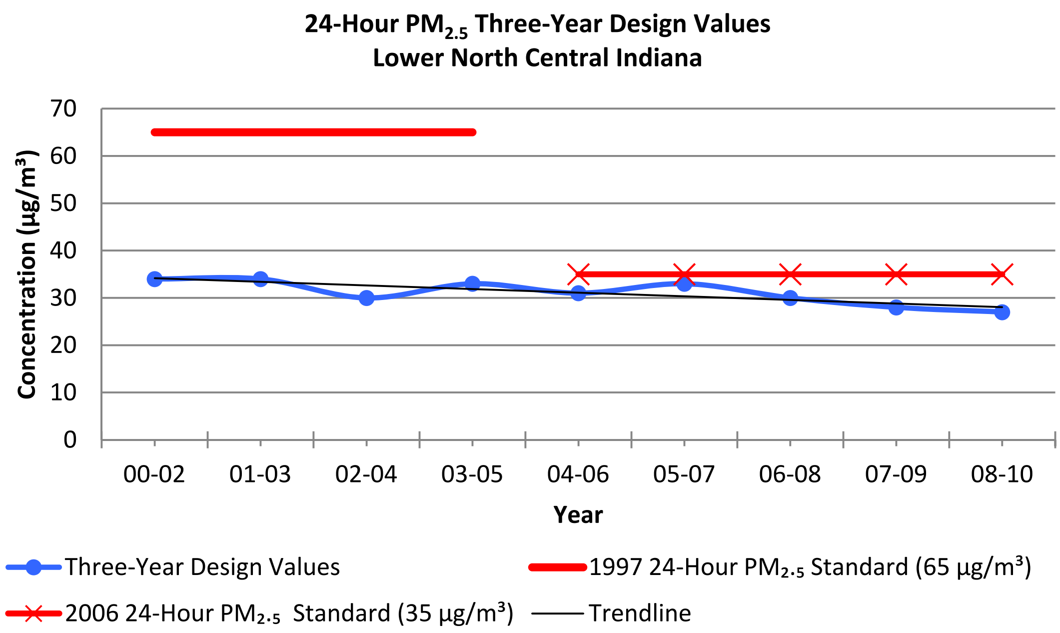


Table 8: Lower North Central Indiana 24-Hour Three Year Design Value $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (µg/m³)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Howard	180670003	Kokomo	34	34	30	33	31	33	30	28	27
			Prior to 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 65 µg/m³								
			Beginning in 2006, highlighted red numbers are above the 24-hour $PM_{2.5}$ standard of 35 µg/m³								

While fluctuations in monitoring data are shown in Graphs 2, 3, 4, and 5, monitoring data for both annual $PM_{2.5}$ and 24-hour $PM_{2.5}$ indicate a downward trend over time. $PM_{2.5}$ is influenced by meteorology (wind speed, temperature, stagnant air, etc.). Meteorological conditions can have an episodic effect on $PM_{2.5}$ concentrations as in 2005 (Graphs 2, 3, 4, and 5), when three of the four quarters of the year had high $PM_{2.5}$ values which drove the annual $PM_{2.5}$ values higher for the year. The annual value is calculated from the average of the year's 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 $PM_{2.5}$ daily values exceeded 70 µg/m^3.

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

Graph 6: Lower North Central Indiana $PM_{2.5}$ Emissions

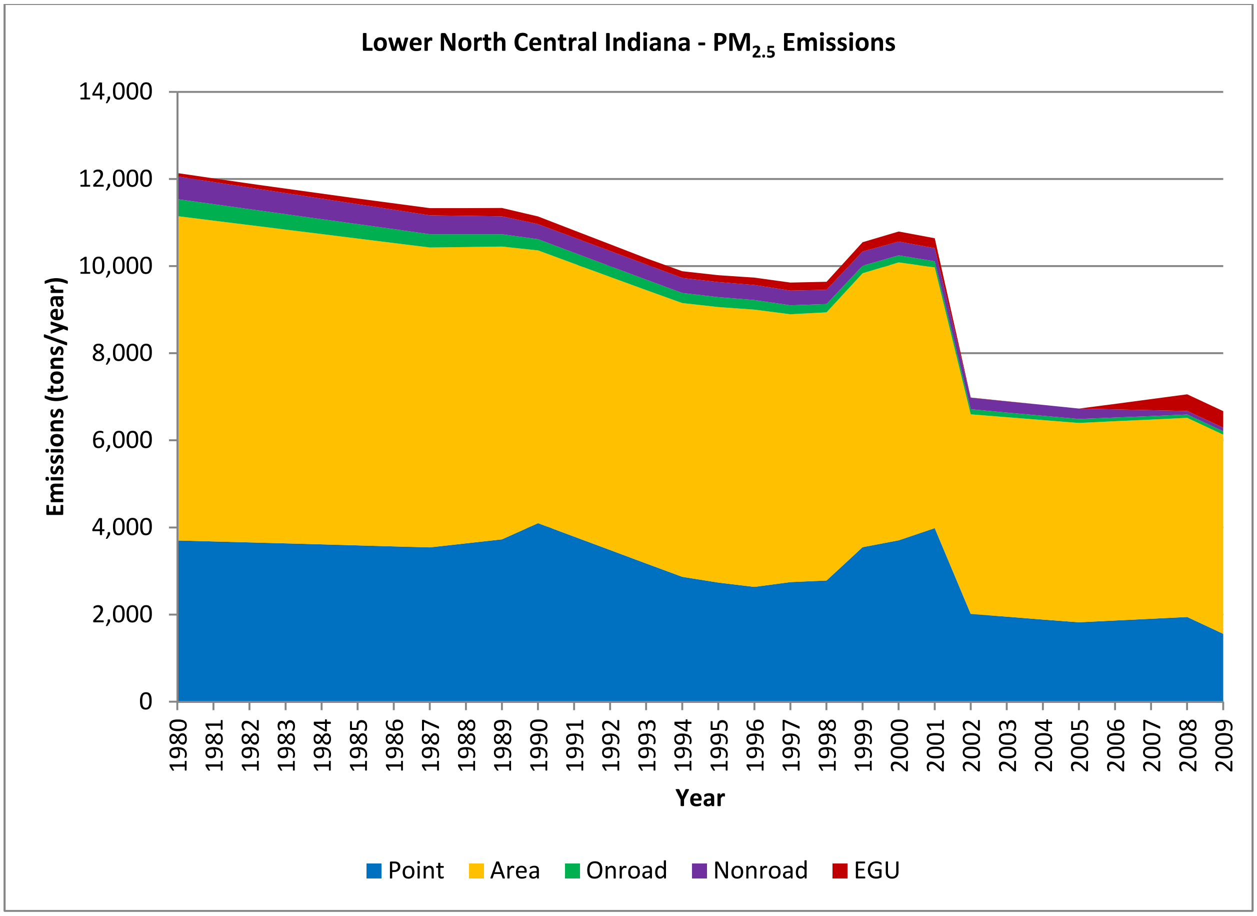
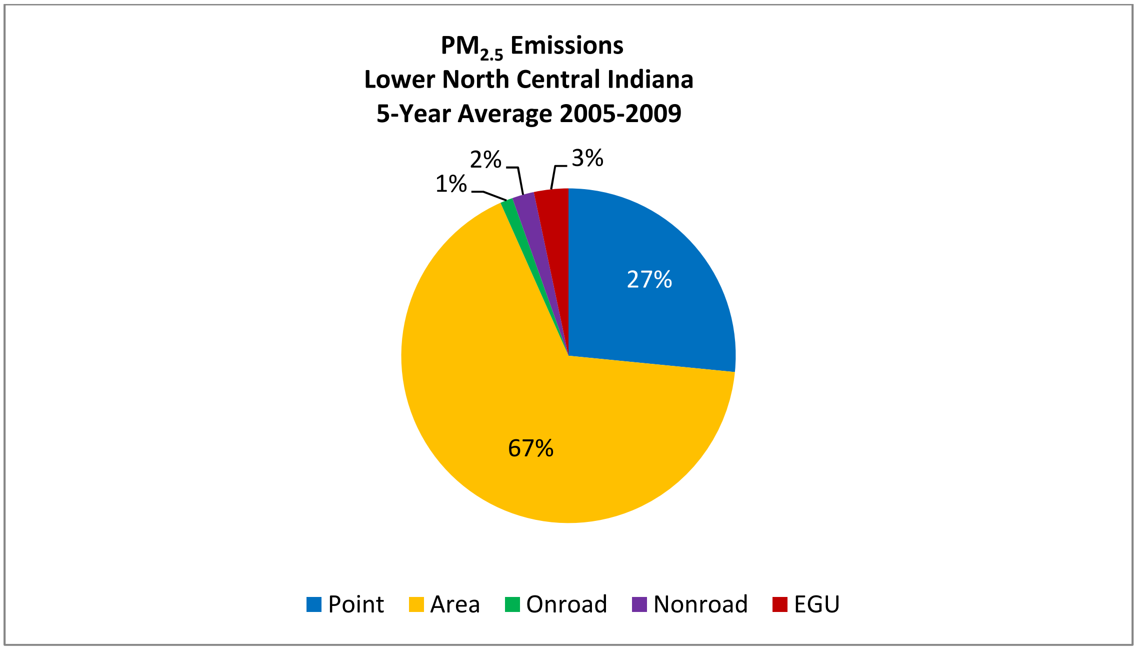


Chart 2: Lower North Central Indiana $PM_{2.5}$ Emissions



Graph 7: Lower North Central Indiana SO_2 Emissions

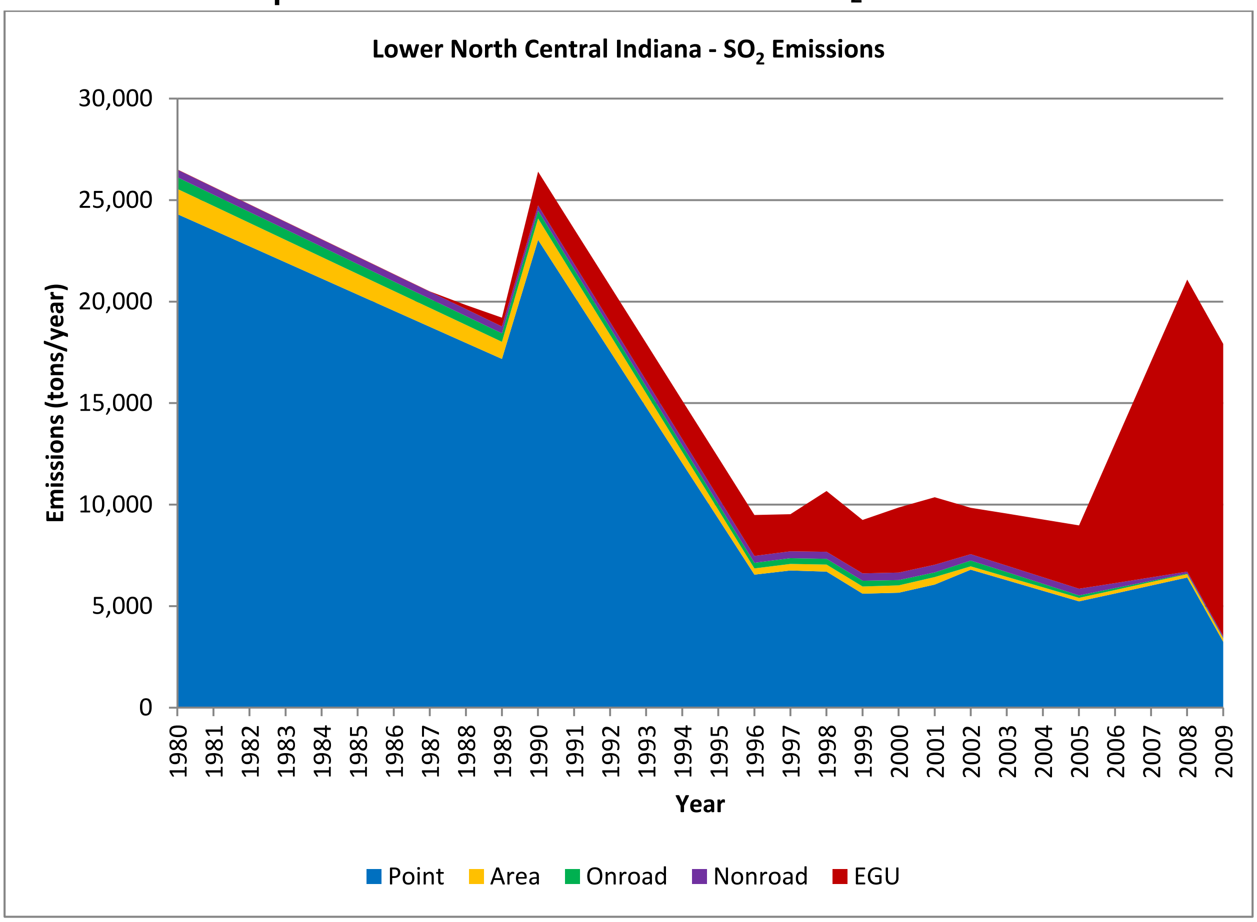
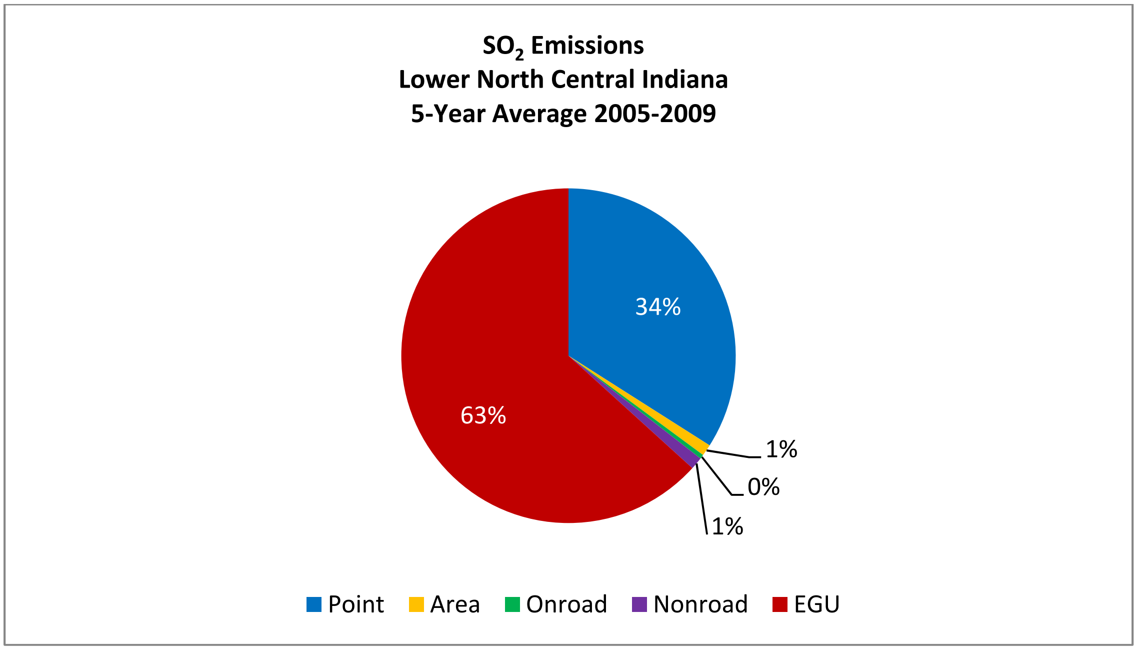


Chart 3: Lower North Central Indiana SO_2 Emissions



Graph 8: Lower North Central Indiana NO_x Emissions

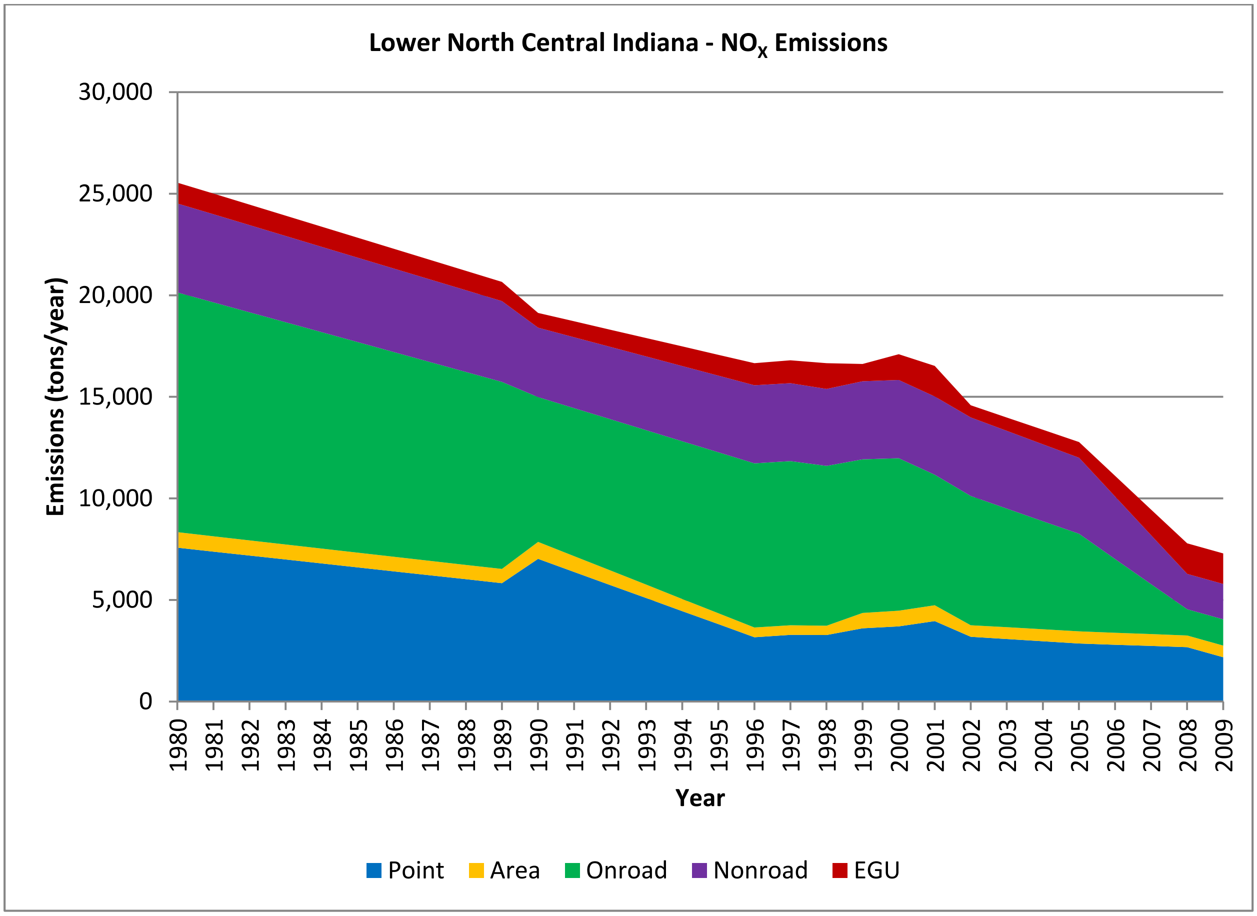
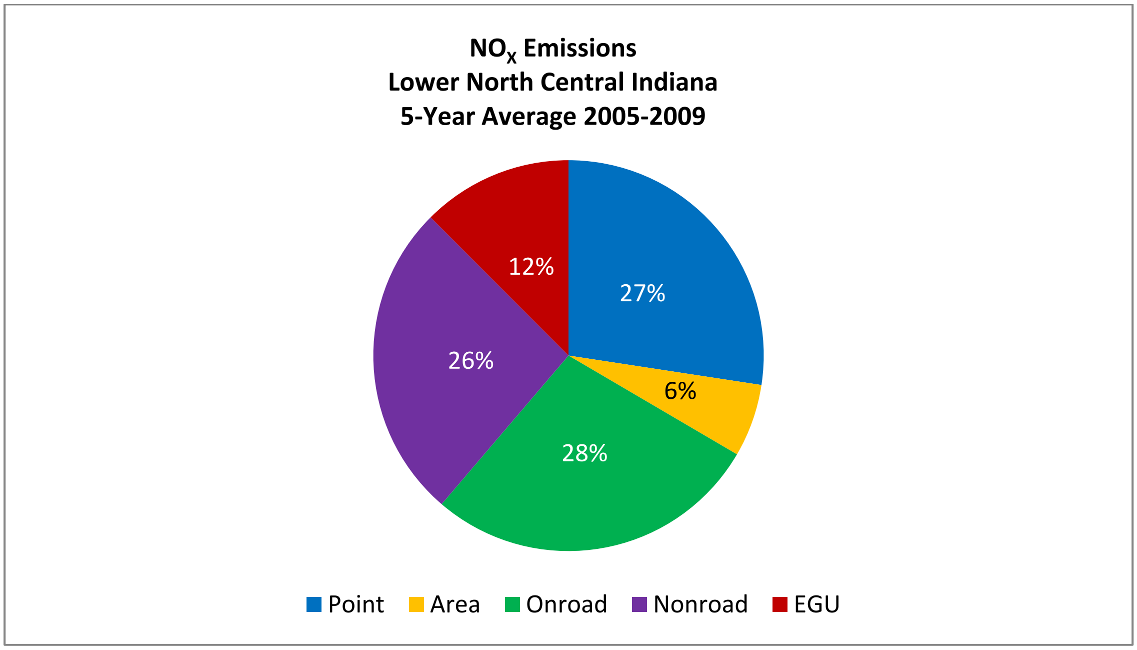


Chart 4: Lower North Central Indiana NO_x Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in $PM_{2.5}$ values over time. As Graphs 6, 7, and 8 illustrate, $PM_{2.5}$, SO_2, and NO_x emissions have decreased by 45%, 32%, and 71%, respectively, within the Lower North Central 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.

Nitrogen Dioxide (NO_2)

There are no monitoring sites within the Lower North Central Indiana area that measure NO_2 levels. U.S. EPA's NEI contains emissions information for NO_x and is used for Graph 9 and Chart 5. NO_x emissions data are used as a surrogate for NO_2 in conjunction with the NO_2 NAAQS. Graph 9 illustrates the emissions trend for NO_x in Lower North Central Indiana and Chart 5 shows how the average emissions are distributed among the different source categories. NO_x emissions in the Lower North Central Indiana area have been trending downward over time. If monitoring data for NO_2 were available in the Lower North Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 9: Lower North Central Indiana NO_x Emissions

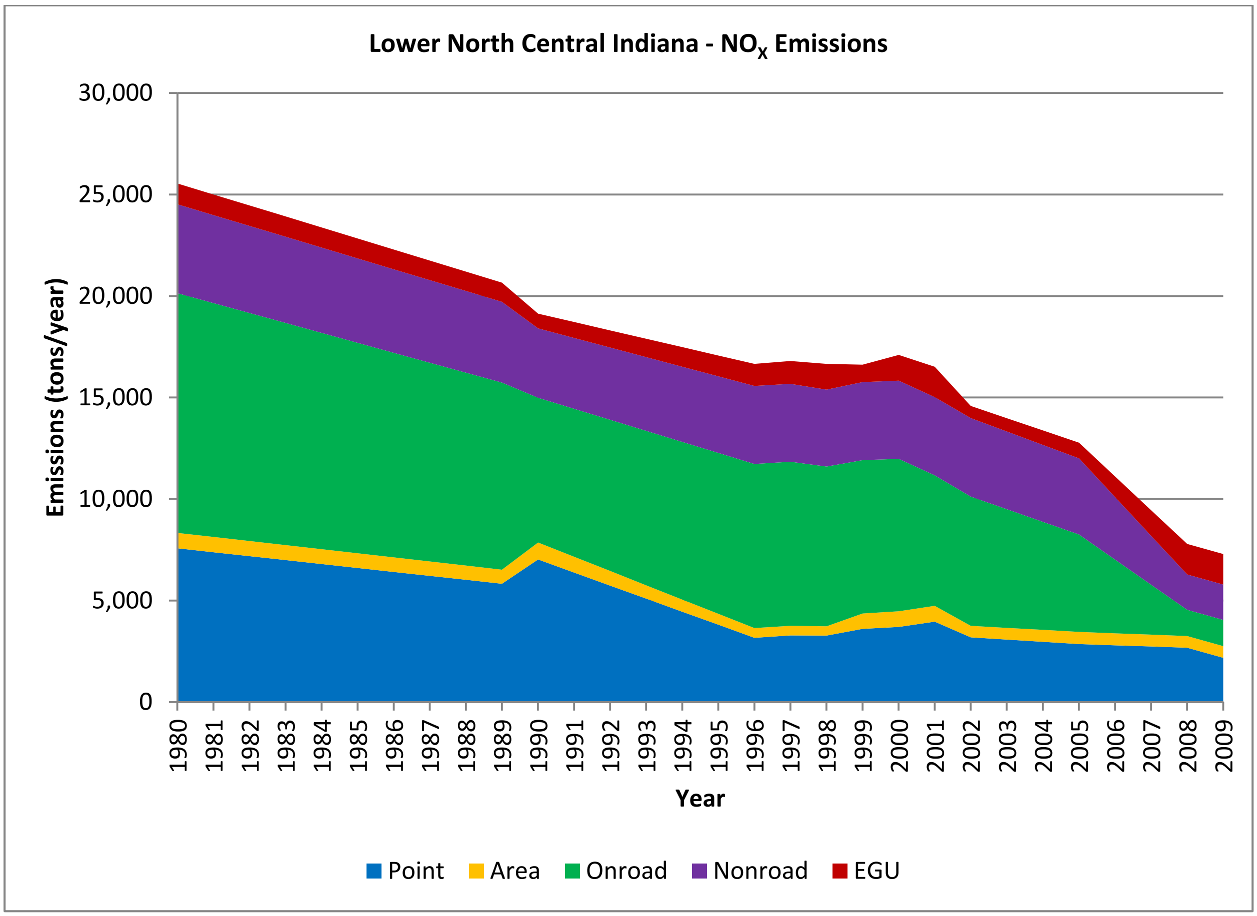
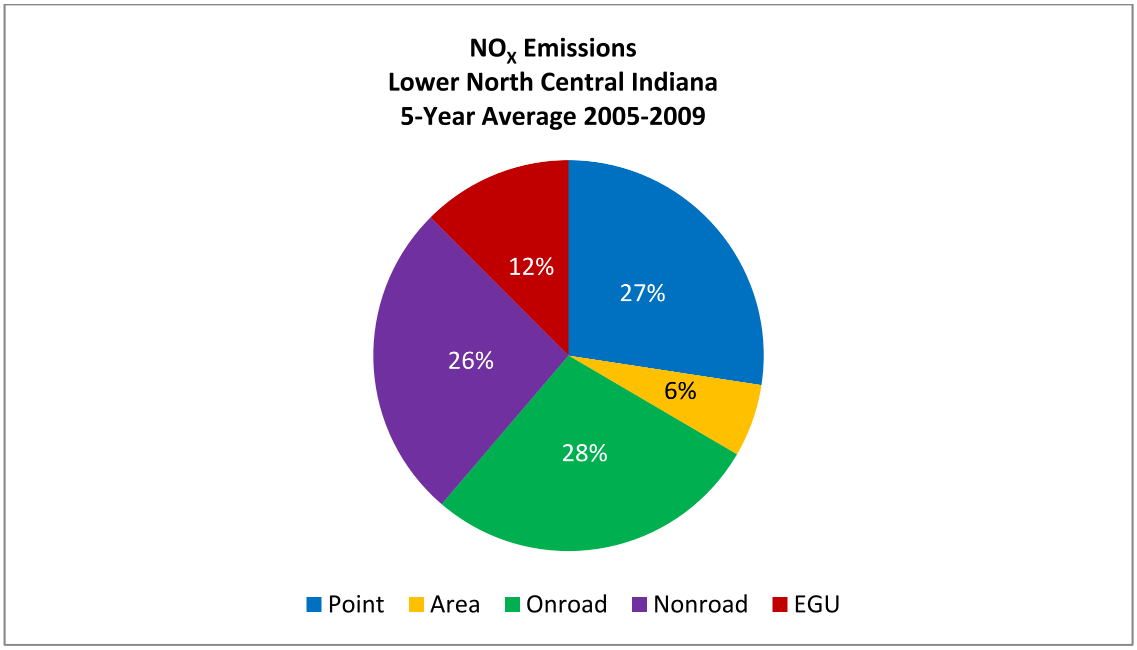


Chart 5: Lower North Central Indiana NO_x Emissions



National controls 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 9 illustrates, NO_x emissions have decreased by 71% within the Lower North 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 no monitoring sites within the Lower North Central Indiana area that measure ozone 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 VOC and NO_x and is used in the following graphs and charts. Graphs 10 and 11 illustrate the emissions trend for the ozone precursors in Lower North Central Indiana and Charts 6 and 7 show how the average emissions are distributed among the different source categories. Ozone precursor emissions in the Lower North Central Indiana area have been trending downward over time. If monitoring data for ozone were available in the Lower North Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 10: Lower North Central Indiana VOC Emissions

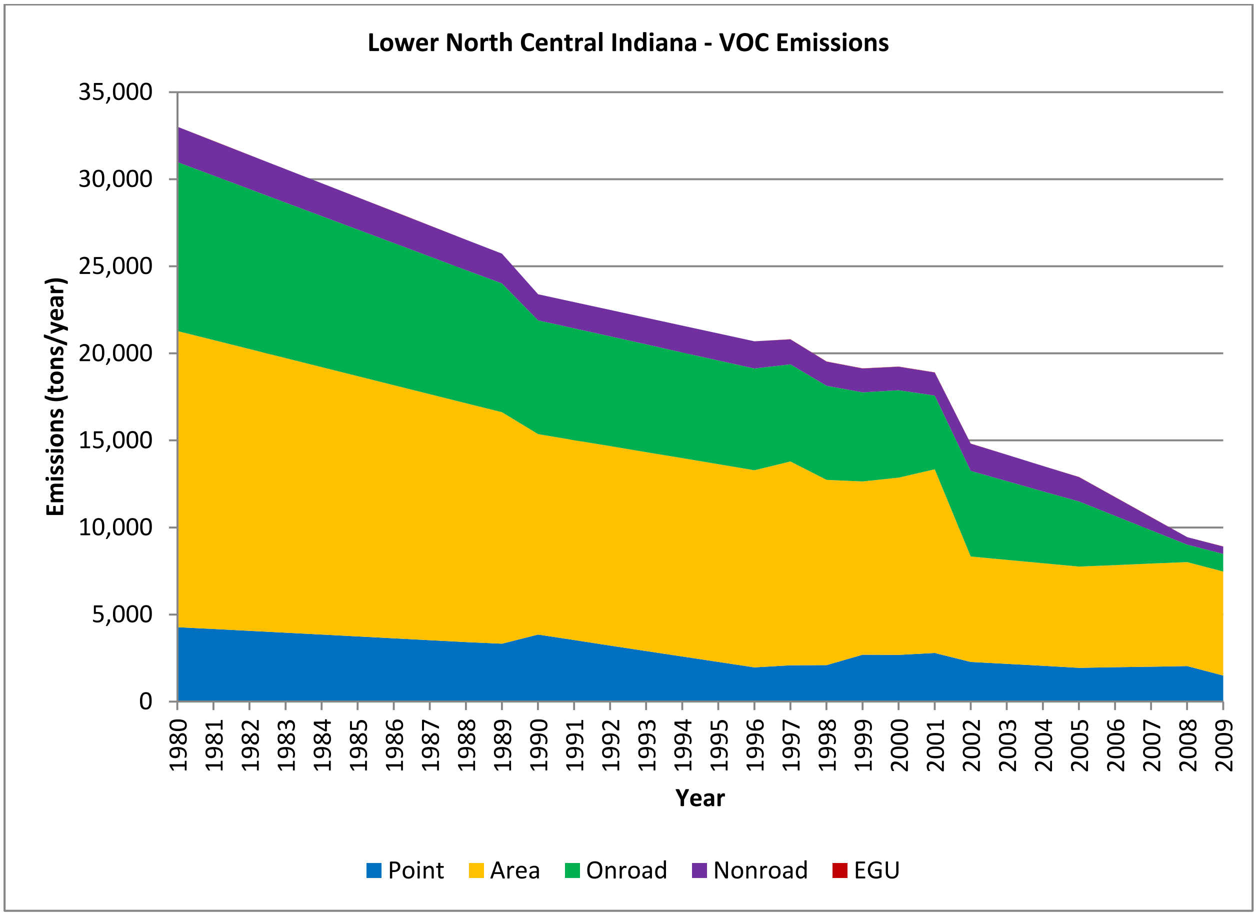
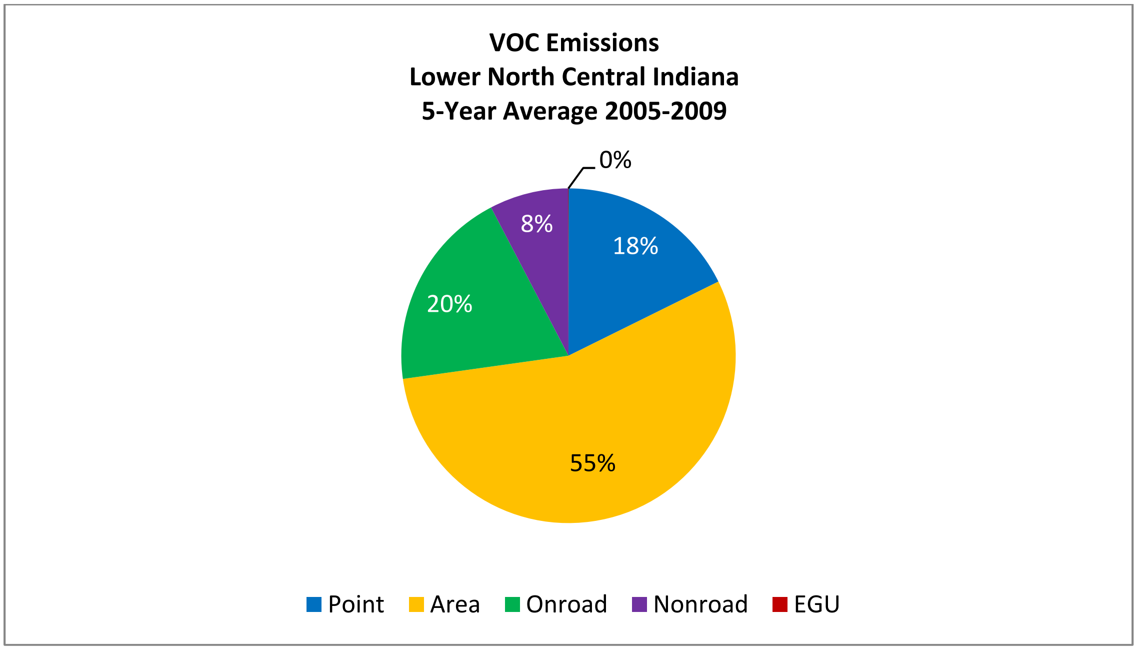


Chart 6: Lower North Central Indiana VOC Emissions



Graph 11: Lower North Central Indiana NO_x Emissions

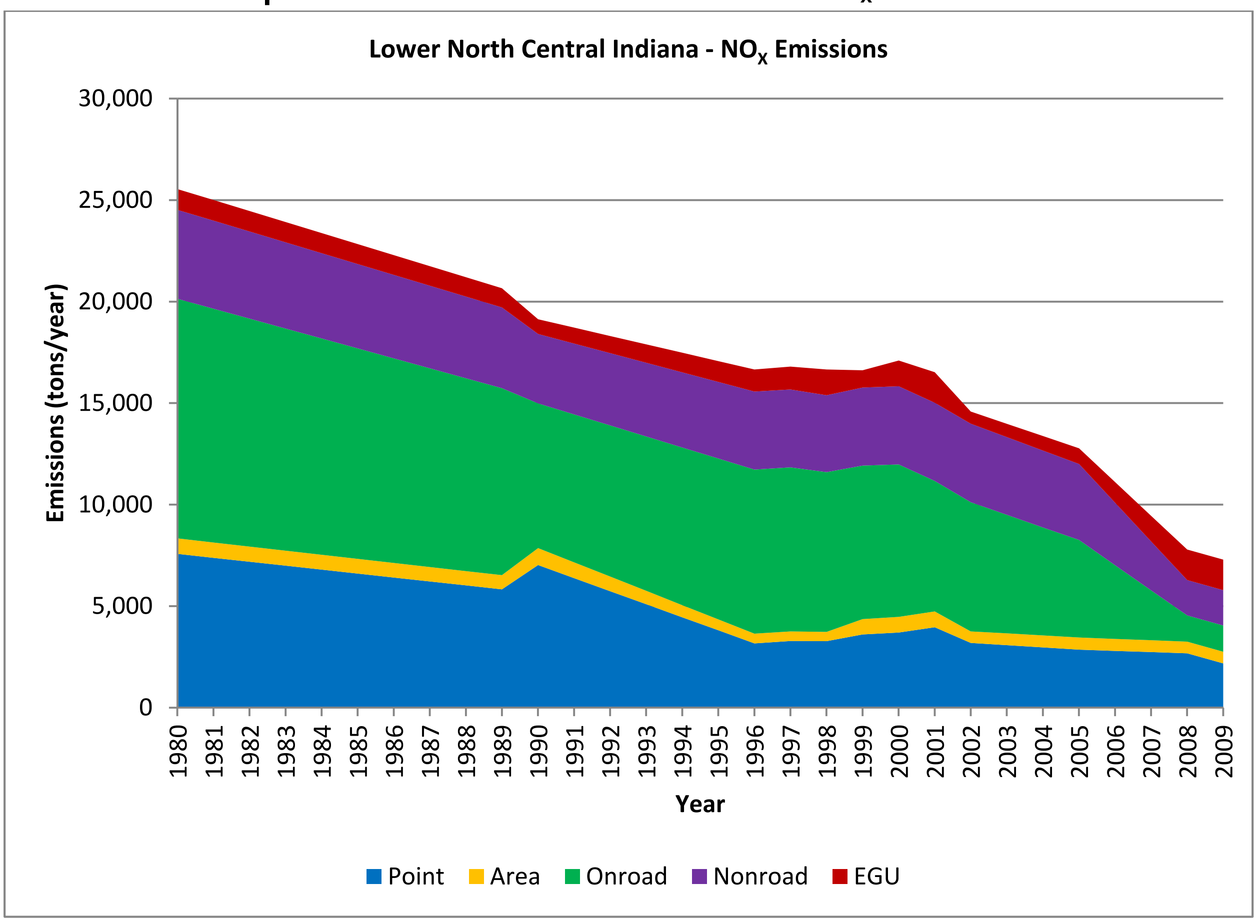
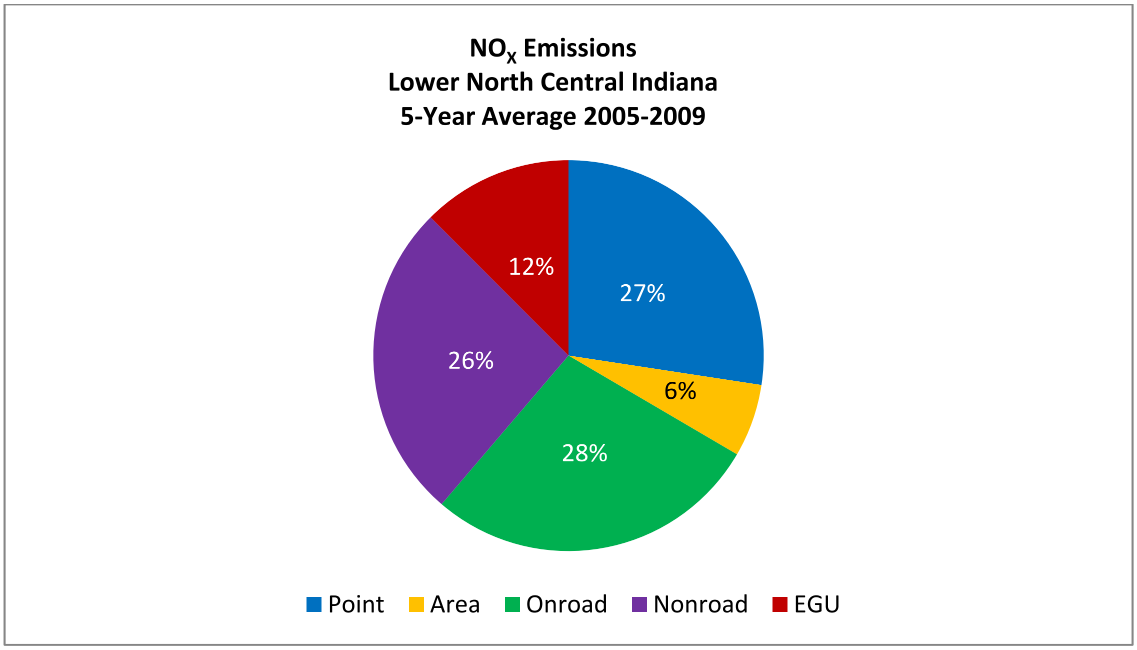


Chart 7: Lower North Central Indiana NO_x Emissions



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 ozone precursor emissions over time. As Graphs 10 and 11 illustrate, VOC and NO_x emissions have decreased by 71% and 73%, respectively, within the Lower North Central Indiana area since 1980. This trend is true for the key precursors of ozone throughout Indiana and the upper Midwest. Reductions in NO_x and VOC emissions are also attributable to the implementation of the federal engine and fuel standards for onroad and nonroad vehicles and equipment, and the NO_x SIP Call beginning in 2004. Nationally, average ozone levels declined in the 1980's, leveled off in the 1990's, and showed a notable decline after 2004 with the implementation of the NO_x SIP Call.

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

Particulate Matter (PM_{10})

There are no monitoring sites within the Lower North Central Indiana area that measure PM_{10} levels. U.S. EPA's NEI contains emissions information for PM_{10} and is used in Graph 12 and Chart 8. Graph 12 illustrates the emissions trend for PM_{10} in Lower North Central Indiana and Chart 8 shows how the average emissions are distributed among the different source categories. PM_{10} emissions in the Lower North Central Indiana area have been trending downward over time. If monitoring data for PM_{10} were available in the Lower North Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 12: Lower North Central Indiana PM_{10} Emissions

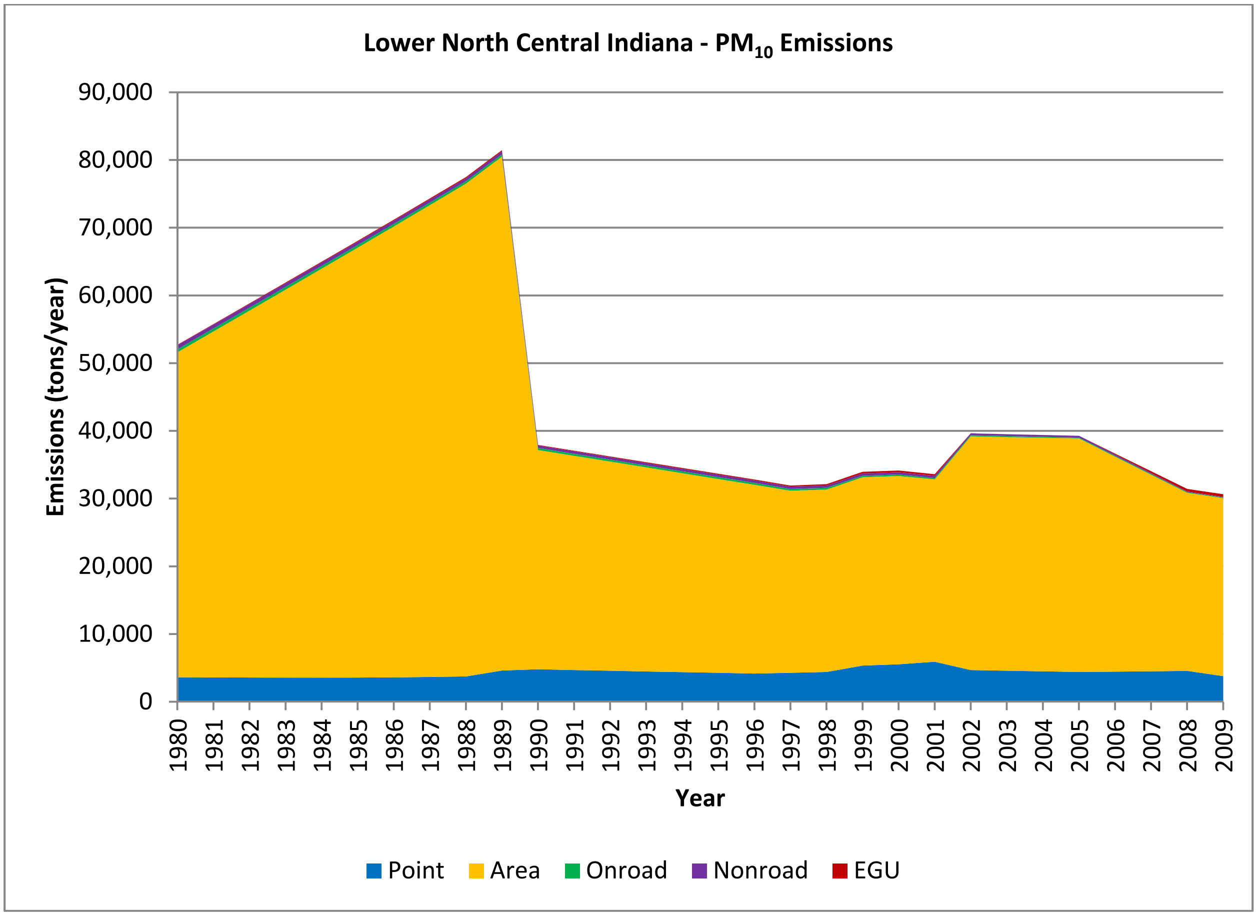
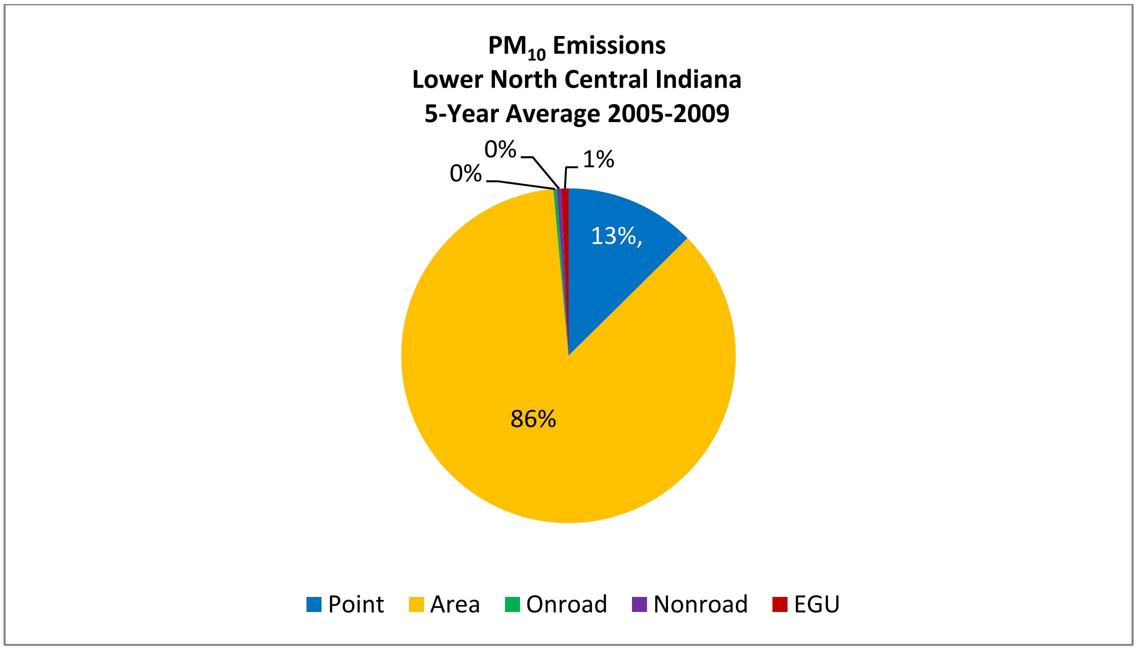


Chart 8: Lower North Central Indiana PM_{10} Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in PM_{10} emission values over time. As Graph 12 illustrates, total PM_{10} emissions have decreased by 42% within the Lower North Central Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. Reductions in PM_{10} are primarily due to better controls on local sources and secondary benefits from the implementation of federal programs to control other pollutants.

Sulfur Dioxide (SO_2)

There are no monitoring sites within the Lower North Central Indiana area that measure SO_2 levels. U.S. EPA's NEI contains emissions information for SO_2 used in Graph 13 and Chart 9. Graph 13 illustrates the emissions trend for SO_2 in Lower North Central Indiana and Chart 9 shows how the average emissions are distributed among the different source categories. SO_2 emissions in the Lower North Central Indiana area have been trending downward over time. If monitoring data for SO_2 were available in the Lower North Central Indiana area, it is expected that monitor values would be trending downward as well.

Graph 13: Lower North Central Indiana SO_2 Emissions

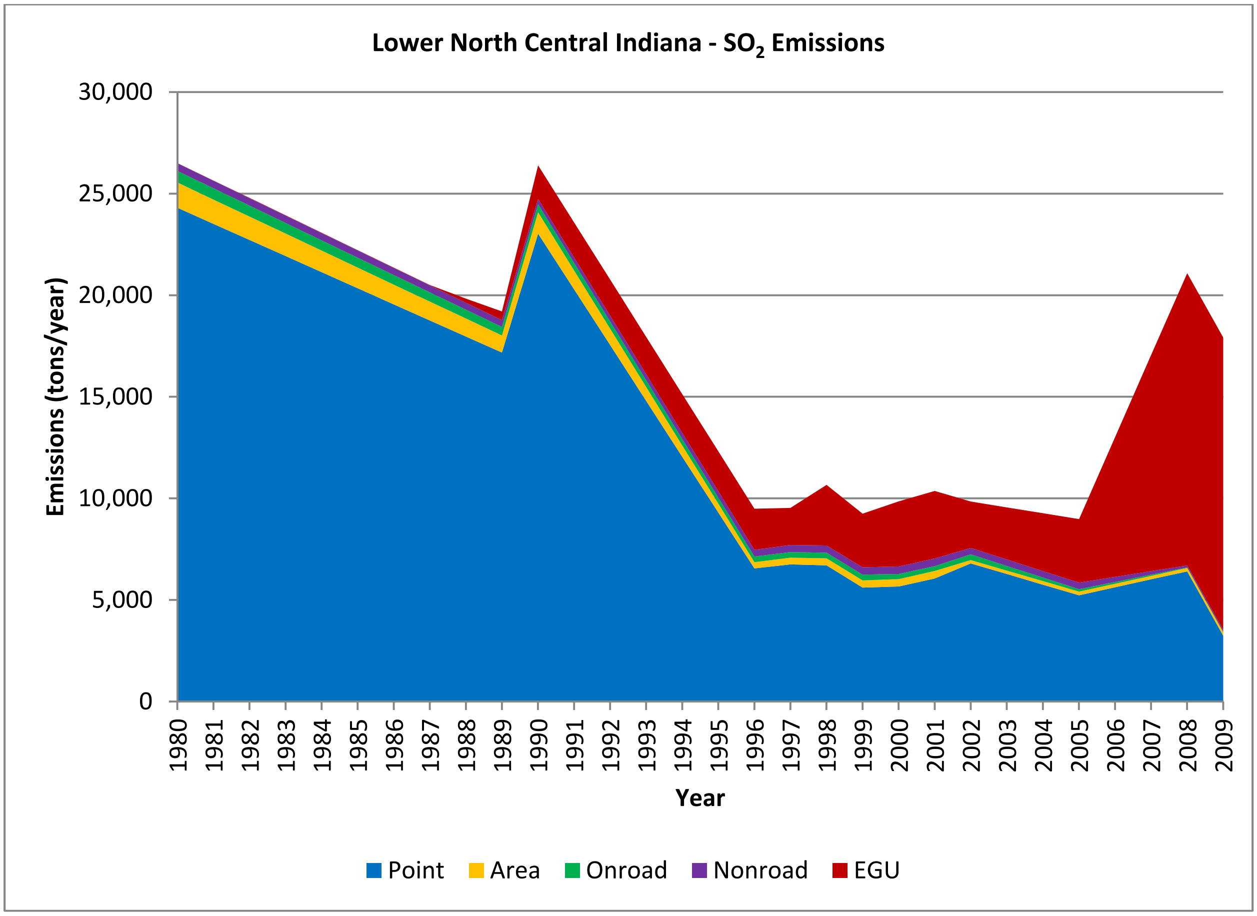
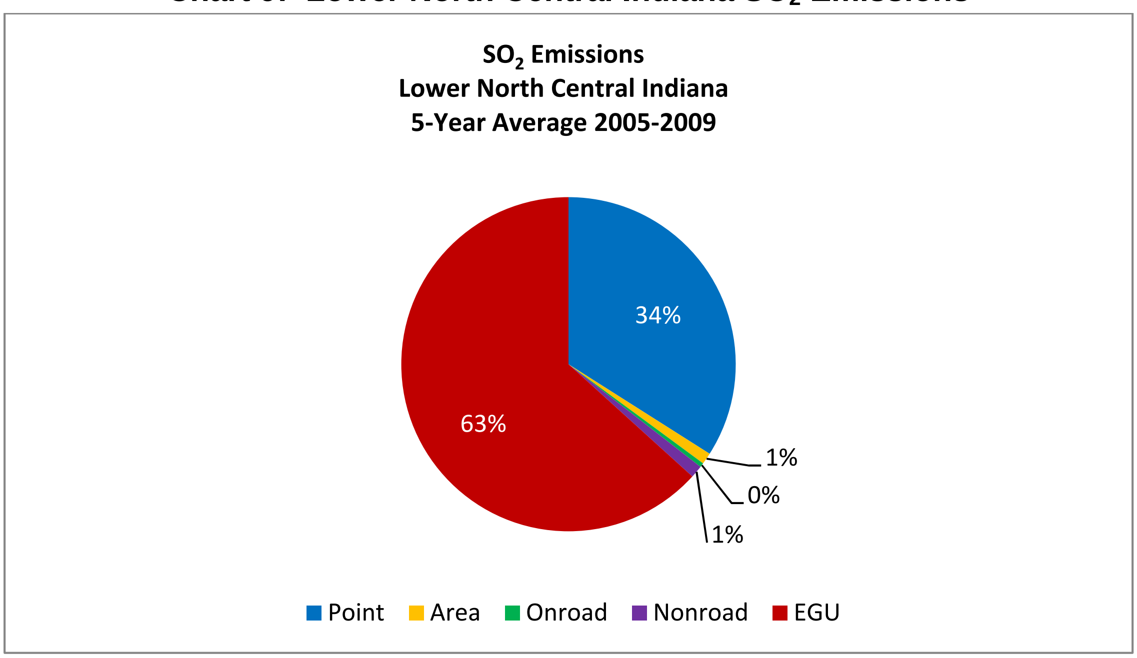


Chart 9: Lower North Central Indiana SO_2 Emissions



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 13 illustrates, SO_2 emissions have decreased by 32% within the Lower North 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 (TSP)

One monitor within the Lower North Central Indiana area measured TSP levels and was located in Howard County. The trend data in Graph 14 reflect the annual geometric mean values, which were used to compare to the primary and secondary annual TSP standards of 75 µg/m^3. The highest annual geometric mean from all of the monitors in the Lower North Central Indiana area is plotted on the graph for each year. The trend data in Graph 15 reflect the 2^{nd} highest 24-hour TSP concentrations which were used to compare to the primary 24-hour TSP standard of 260 µg/m^3. The highest 2^{nd} high 24-hour value from all of the monitors in the Lower North 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. While occasional spikes can be seen in the annual and 24-hour TSP values, the monitor values for Lower North Central Indiana have always been below the primary and secondary annual and primary 24-hour TSP standards. 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 9 and 10 are from the monitoring sites that measured annual and 24-hour $PM_{2.5}$ from 1980 through 1987. All available data for both annual and 24-hour TSP for the Lower North 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 9 show the annual geometric mean for annual TSP for the years 1980 through 1987 which are compared to the primary and secondary annual $PM_{2.5}$ standards of 75 µg/m^3. Monitoring data in Table 10 show the 2nd highest 24-hour TSP concentrations for the years 1980 through 1987, which are compared to the primary 24-hour TSP standard of 260 µg/m^3.

Graph 14: Lower North Central Indiana Annual Geometric Mean TSP Values

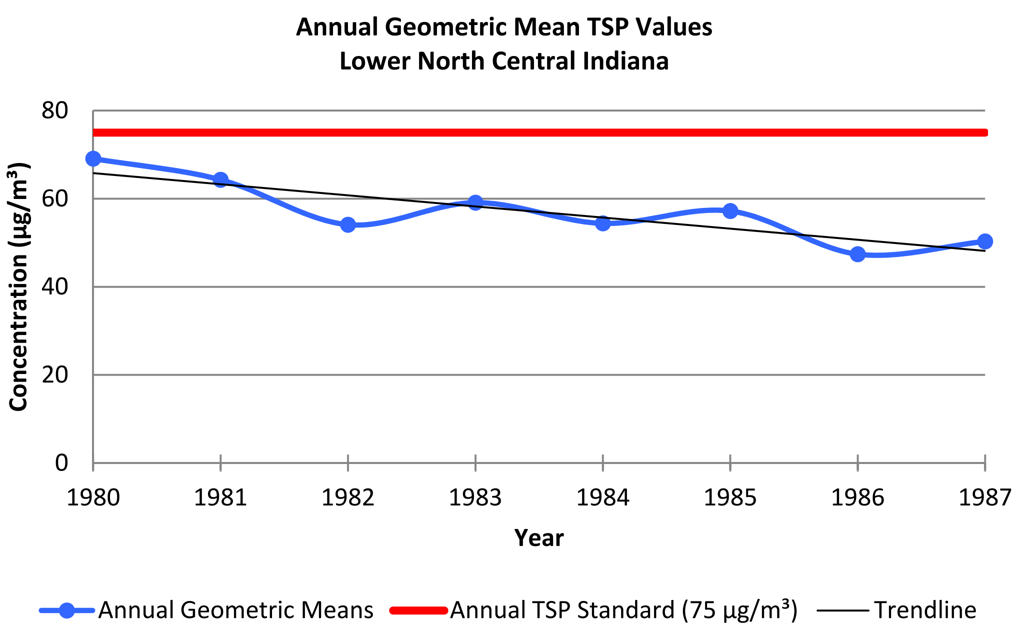


Table 9: Lower North Central Indiana Annual Geometric Mean TSP Values

County	Site #	Site Name	Annual Geometric Mean (µg/m^3)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Howard	180670002	West Park Street	69	64	54	60	54	57	48	50				
			Highlighted red numbers through 1987 are above the Annual TSP Standard of 75 µg/m^3											

Graph 15: Lower North Central Indiana 24-Hour 2nd High TSP Values

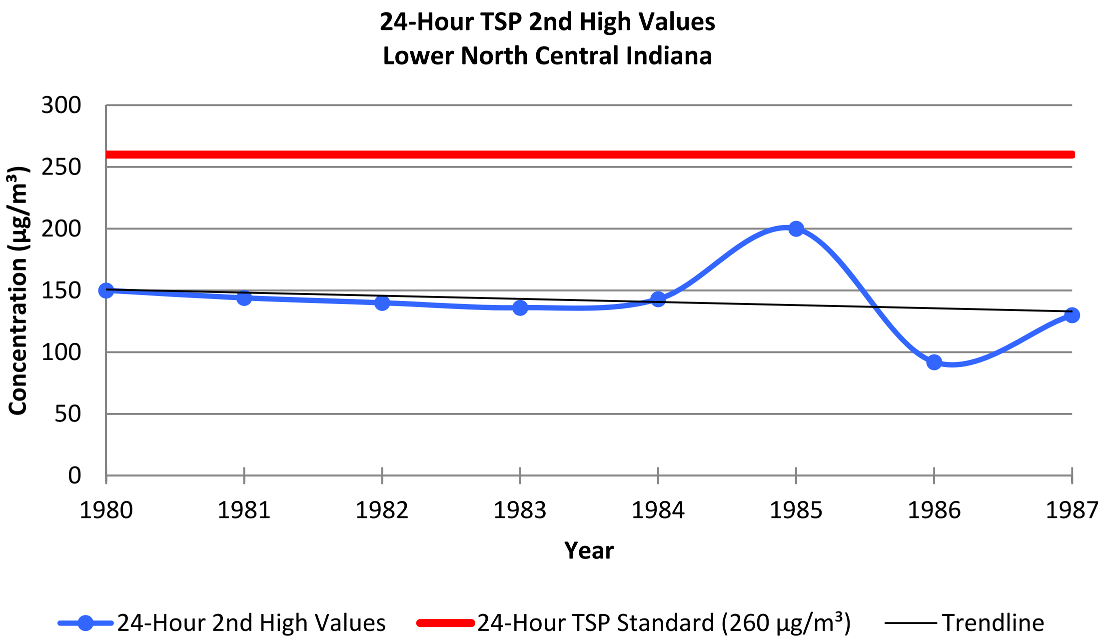


Table 10: Lower North Central Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	2nd High Values (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Howard	180670002	West Park Street	150	144	140	136	143	200	92	130				
			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 Lower North 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 Lower North Central Indiana area will continue to see declines in monitor and emission values, which will help it meet the threshold for any new criteria pollutant standards that are implemented.

Conclusions

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

Lower North Central Indiana County-Specific Emission Inventory Data

(1980-2009)

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Cass County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	30,266.48	6,674.86	2,455.42	7,014.31	6,798.01	5,107.56
1981	29,513.10	6,585.45	2,418.50	7,057.93	6,613.19	5,009.40
1982	28,759.71	6,496.04	2,381.59	7,101.56	6,428.37	4,911.24
1983	28,006.32	6,406.63	2,344.67	7,145.18	6,243.56	4,813.07
1984	27,345.28	6,317.23	2,316.31	7,188.81	6,058.74	4,714.91
1985	26,685.50	6,227.82	2,287.95	7,233.19	5,873.92	4,616.75
1986	26,025.71	6,138.41	2,259.59	7,277.67	5,689.10	4,518.58
1987	25,365.93	6,049.00	2,231.23	7,322.15	5,504.92	4,420.42
1988	24,706.14	5,959.60	2,202.87	7,366.64	5,504.12	4,322.26
1989	24,046.36	5,870.19	2,174.51	7,527.16	5,547.63	4,224.09
1990	19,603.03	5,225.65	1,858.42	7,180.54	8,055.47	3,715.40
1991	19,919.19	5,258.56	1,905.57	7,306.12	7,448.72	3,722.98
1992	20,235.35	5,291.47	1,952.73	7,431.69	6,841.97	3,730.56
1993	20,551.51	5,324.39	1,999.89	7,557.27	6,235.23	3,738.14
1994	20,867.66	5,357.30	2,049.26	7,682.84	5,628.48	3,745.71
1995	21,183.82	5,390.21	2,098.72	7,808.42	5,021.73	3,753.29
1996	21,499.98	5,423.12	2,148.93	7,933.99	4,414.98	3,760.87
1997	20,776.49	5,518.61	2,033.01	7,281.57	4,192.74	3,745.39
1998	20,151.64	5,569.95	2,052.52	7,416.44	5,288.60	3,591.89
1999	19,137.35	5,068.96	2,092.78	7,734.81	4,425.05	3,502.08
2000	19,367.20	5,545.40	2,152.13	7,756.55	4,907.13	3,561.06
2001	18,369.66	5,733.23	2,084.10	7,613.79	5,123.82	3,534.21
2002	18,538.86	4,868.01	1,533.68	8,893.66	4,841.32	3,284.58
2003	17,182.63	4,763.93	1,527.87	8,884.73	4,974.91	3,163.85
2004	15,826.40	4,659.86	1,522.07	8,875.79	5,108.51	3,043.13
2005	14,470.17	4,555.78	1,516.26	8,866.86	5,242.10	2,922.40
2006	11,636.57	4,109.84	1,517.56	8,257.74	6,941.31	2,656.84
2007	8,802.97	3,663.91	1,518.86	7,648.62	8,640.52	2,391.27
2008	5,969.37	3,217.97	1,520.16	7,039.51	10,339.73	2,125.71
2009	5,784.21	2,933.60	1,502.76	6,990.11	8,955.85	2,008.59
%Change 1980 to 2009	-80.89%	-56.05%	-38.80%	-0.35%	31.74%	-60.67%

Howard County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	58,830.90	9,679.73	3,727.18	29,546.99	6,416.75	13,087.29
1981	57,254.00	9,410.66	3,715.55	32,460.90	6,213.67	12,732.26
1982	55,677.09	9,141.60	3,703.93	35,374.80	6,010.58	12,377.23
1983	54,100.19	8,872.53	3,692.30	38,288.70	5,807.50	12,022.20
1984	52,523.28	8,603.46	3,680.67	41,202.61	5,604.41	11,667.17
1985	50,946.37	8,334.39	3,669.05	44,116.51	5,401.33	11,312.14
1986	49,369.47	8,065.33	3,657.42	47,030.42	5,198.24	10,957.11
1987	47,792.56	7,796.26	3,645.79	49,944.32	4,995.16	10,602.08
1988	46,215.66	7,527.19	3,634.17	52,858.22	4,792.07	10,247.05
1989	44,638.75	7,258.12	3,622.54	56,457.06	4,588.99	9,892.02
1990	33,490.19	7,043.86	3,588.53	12,276.04	7,376.75	7,864.64
1991	34,476.46	6,698.93	3,309.14	11,492.68	6,302.84	7,988.86
1992	35,462.73	6,354.00	3,029.74	10,709.31	5,228.93	8,113.08
1993	36,449.00	6,009.07	2,750.35	9,925.94	4,155.02	8,237.30
1994	37,435.26	5,664.13	2,470.96	9,142.58	3,081.11	8,361.51
1995	38,421.53	5,319.20	2,390.60	8,359.21	2,007.20	8,485.73
1996	39,407.80	4,974.27	2,316.22	7,575.85	933.29	8,609.95
1997	38,127.02	5,020.76	2,325.82	7,616.13	962.86	8,717.60
1998	37,075.58	4,936.39	2,364.64	7,850.39	961.33	7,919.93
1999	35,257.70	5,144.62	2,474.60	8,172.93	833.06	6,998.59
2000	35,041.73	5,093.29	2,550.39	8,283.67	839.38	7,037.77
2001	29,095.85	4,554.43	2,476.45	8,092.92	886.79	6,694.10
2002	25,024.54	3,749.15	1,874.39	9,909.72	2,434.01	4,311.68
2003	23,020.87	3,545.44	1,866.47	9,894.67	2,264.92	4,155.63
2004	21,017.21	3,341.73	1,858.56	9,879.62	2,095.82	3,999.58
2005	19,013.54	3,138.01	1,850.65	9,864.58	1,926.73	3,843.52
2006	14,678.97	2,601.37	1,837.61	9,247.97	2,015.80	3,447.31
2007	10,344.41	2,064.72	1,824.57	8,631.36	2,104.86	3,051.10
2008	6,009.84	1,528.08	1,811.53	8,014.76	2,193.92	2,654.88
2009	5,942.28	1,410.12	1,726.67	7,857.40	942.61	2,413.11
%Change 1980 to 2009	-83.24%	-85.43%	-53.67%	-73.41%	-85.31%	-81.56%

Miami County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	27,340.60	3,531.85	1,904.96	5,735.66	1,189.34	4,283.10
1981	26,624.91	3,454.18	1,873.02	5,760.41	1,150.17	4,219.65
1982	25,909.22	3,376.51	1,841.07	5,785.17	1,111.00	4,156.19
1983	25,193.54	3,298.84	1,809.13	5,809.92	1,071.84	4,092.73
1984	24,477.85	3,221.16	1,777.18	5,834.68	1,032.67	4,029.27
1985	23,762.16	3,143.49	1,745.24	5,859.44	993.50	3,965.82
1986	23,046.47	3,065.82	1,713.29	5,884.19	954.33	3,902.36
1987	22,330.78	2,988.15	1,681.34	5,908.95	915.17	3,838.90
1988	21,615.09	2,910.48	1,649.40	5,933.70	876.00	3,775.45
1989	20,899.40	2,832.80	1,618.22	5,990.13	836.83	3,711.99
1990	19,280.13	2,620.80	1,662.64	6,652.06	1,731.93	3,119.76
1991	18,715.40	2,569.33	1,623.56	6,524.52	1,477.17	3,181.46
1992	18,150.67	2,517.86	1,584.49	6,396.97	1,222.41	3,243.16
1993	17,585.94	2,466.39	1,545.42	6,269.42	967.65	3,304.86
1994	17,021.20	2,414.92	1,507.01	6,141.87	712.89	3,366.56
1995	16,456.47	2,363.45	1,473.20	6,014.32	458.13	3,428.26
1996	15,891.74	2,311.98	1,464.23	5,886.78	203.37	3,489.96
1997	15,234.14	2,333.83	1,294.26	5,075.10	395.69	3,509.18
1998	14,701.06	2,319.44	1,306.78	5,174.47	514.30	3,338.48
1999	13,726.10	2,276.93	1,358.44	5,351.02	280.82	3,679.03
2000	14,270.53	2,370.08	1,347.57	5,296.96	460.58	3,670.58
2001	13,043.64	2,215.47	1,273.01	5,120.73	484.63	3,675.59
2002	14,256.86	2,112.86	1,171.78	7,523.57	515.30	3,056.53
2003	13,053.84	2,056.99	1,166.47	7,516.45	645.82	2,873.22
2004	11,850.81	2,001.12	1,161.16	7,509.33	776.34	2,689.92
2005	10,647.79	1,945.24	1,155.86	7,502.21	906.86	2,506.61
2006	8,211.58	1,758.95	1,254.81	6,992.01	2,912.79	2,339.61
2007	5,775.37	1,572.66	1,353.75	6,481.81	4,918.72	2,172.61
2008	3,339.16	1,386.37	1,452.70	5,971.61	6,924.65	2,005.60
2009	3,312.48	1,350.46	1,372.52	5,766.24	6,764.93	2,044.11
%Change 1980 to 2009	-87.88%	-61.76%	-27.95%	0.53%	468.80%	-52.28%

Tipton County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	15,627.04	1,859.66	1,185.23	4,093.61	124.37	2,046.50
1981	15,160.65	1,815.57	1,174.13	4,150.13	121.60	2,006.27
1982	14,694.26	1,771.48	1,163.04	4,206.65	118.83	1,966.04
1983	14,227.88	1,727.39	1,151.94	4,263.18	116.07	1,925.82
1984	13,761.49	1,683.30	1,140.84	4,319.70	113.30	1,885.62
1985	13,295.10	1,639.21	1,129.74	4,376.22	110.53	1,845.42
1986	12,828.73	1,595.13	1,118.65	4,432.75	107.76	1,805.22
1987	12,363.40	1,551.04	1,107.55	4,489.27	105.78	1,765.02
1988	11,898.06	1,506.95	1,096.45	4,545.79	106.92	1,724.82
1989	11,432.73	1,462.86	1,085.36	4,604.25	108.06	1,684.62
1990	11,120.64	1,334.99	1,049.35	4,860.97	173.90	1,544.48
1991	10,557.04	1,304.19	1,050.76	4,841.68	155.72	1,526.03
1992	9,993.45	1,273.39	1,052.18	4,822.39	137.54	1,507.58
1993	9,429.85	1,242.60	1,053.60	4,803.11	119.37	1,489.13
1994	8,866.25	1,211.80	1,055.01	4,783.82	101.19	1,470.67
1995	8,302.66	1,181.00	1,056.43	4,764.53	83.01	1,452.22
1996	7,739.06	1,150.20	1,057.85	4,745.24	64.83	1,433.77
1997	7,425.57	1,145.15	1,099.61	4,978.90	66.15	1,428.15
1998	7,163.75	1,118.91	1,058.38	4,785.10	67.00	1,407.96
1999	6,695.55	1,108.34	1,082.96	4,941.85	81.92	1,360.52
2000	6,555.08	1,080.03	1,098.96	4,990.62	79.41	1,358.53
2001	6,313.14	1,039.97	1,068.64	4,925.28	80.71	1,359.36
2002	6,138.22	1,003.19	926.11	6,166.63	170.38	1,165.85
2003	5,620.67	957.72	927.05	6,167.42	167.04	1,132.77
2004	5,103.12	912.24	927.98	6,168.21	163.70	1,099.70
2005	4,585.57	866.76	928.91	6,169.00	160.36	1,066.62
2006	3,499.75	684.84	918.81	5,734.88	147.82	968.31
2007	2,413.93	502.92	908.71	5,300.76	135.29	870.00
2008	1,328.10	321.00	898.61	4,866.63	122.75	771.68
2009	1,328.10	321.00	898.61	4,866.63	122.75	771.68
%Change 1980 to 2009	-91.50%	-82.74%	-24.18%	18.88%	-1.30%	-62.29%

Wabash County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	24,743.58	3,802.20	2,862.60	6,314.62	11,983.60	8,493.05
1981	24,150.30	3,739.86	2,834.14	6,341.41	11,555.44	8,239.61
1982	23,557.02	3,677.51	2,805.67	6,368.21	11,127.28	7,986.18
1983	22,963.74	3,615.16	2,777.20	6,395.01	10,699.11	7,732.75
1984	22,370.46	3,552.82	2,748.73	6,441.97	10,270.95	7,479.31
1985	21,777.18	3,490.47	2,720.26	6,468.77	9,842.78	7,225.88
1986	21,183.90	3,428.12	2,691.79	6,568.78	9,414.62	6,972.44
1987	20,794.24	3,365.78	2,663.32	6,668.78	8,986.46	6,719.01
1988	20,834.66	3,303.43	2,748.91	6,768.79	8,558.29	6,465.58
1989	20,876.20	3,241.09	2,834.50	6,868.80	8,130.13	6,221.43
1990	16,457.81	2,911.48	2,980.97	6,959.52	9,062.97	7,152.82
1991	17,520.88	2,893.05	2,929.89	6,912.37	8,199.53	6,528.35
1992	18,583.95	2,874.62	2,881.29	6,865.71	7,336.08	5,903.87
1993	19,647.02	2,856.19	2,832.69	6,819.05	6,472.64	5,279.40
1994	20,710.09	2,837.75	2,799.07	6,772.39	5,609.19	4,654.92
1995	21,773.16	2,819.32	2,770.45	6,725.73	4,745.74	4,030.45
1996	22,836.23	2,800.89	2,747.94	6,679.07	3,882.30	3,405.97
1997	22,628.86	2,788.51	2,870.54	6,975.40	3,920.34	3,413.08
1998	22,240.84	2,717.55	2,857.07	6,907.50	3,842.60	3,278.91
1999	26,034.96	3,022.43	3,539.26	7,748.40	3,632.85	3,600.59
2000	26,557.21	3,014.17	3,645.72	7,818.34	3,577.56	3,616.61
2001	26,756.77	2,981.18	3,737.61	7,844.84	3,794.22	3,653.80
2002	25,097.95	2,854.20	1,477.75	7,150.63	1,889.66	3,005.69
2003	23,906.43	2,660.82	1,410.87	7,057.12	1,509.79	2,858.49
2004	22,714.91	2,467.43	1,343.99	6,963.61	1,129.93	2,711.30
2005	21,523.39	2,274.05	1,277.11	6,870.10	750.06	2,564.10
2006	19,066.49	1,963.89	1,309.10	6,426.42	1,002.69	2,342.25
2007	16,609.59	1,653.73	1,341.10	5,982.74	1,255.33	2,120.39
2008	14,152.69	1,343.57	1,373.10	5,539.06	1,507.96	1,898.54
2009	9,465.92	1,282.82	1,171.08	5,167.47	1,136.65	1,680.94
%Change 1980 to 2009	-61.74%	-66.26%	-59.09%	-18.17%	-90.51%	-80.21%