CRITERIA POLLUTANTS

Air Quality Trend Analysis Report
(1980-2010)

NORTHEAST 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

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

Introduction

The Northeast Indiana area is composed of nine counties. The counties represented in the area shown in Figure 1 are: Adams, Allen, DeKalb, Huntington, LaGrange, Noble, Steuben, Wells, and Whitley. Two major interstates pass through the Northeast Indiana area, Interstate (I)-80 through LaGrange and Steuben counties and I-69 through Allen, DeKalb, Huntington, and Steuben counties. Allen County also has a loop (I-469) around the City of Fort Wayne.

There are currently 5 criteria pollutant monitoring sites in Northeast Indiana collecting data for carbon monoxide (CO), fine particles ($PM_{2.5}$), and ozone. The map in Figure 1 reflects only the monitors that are currently in operation. Monitoring data for the years 2000 through 2010 for Northeast 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 Northeast Indiana area include U.S. Mineral Products Company and Steel Dynamics Incorporated (SDI). Emission trend graphs and pie charts are included for the precursors for each regulated criteria pollutant. Emissions information by county is available upon request.

Figure 1: Map of Northeast Indiana Counties and Monitors

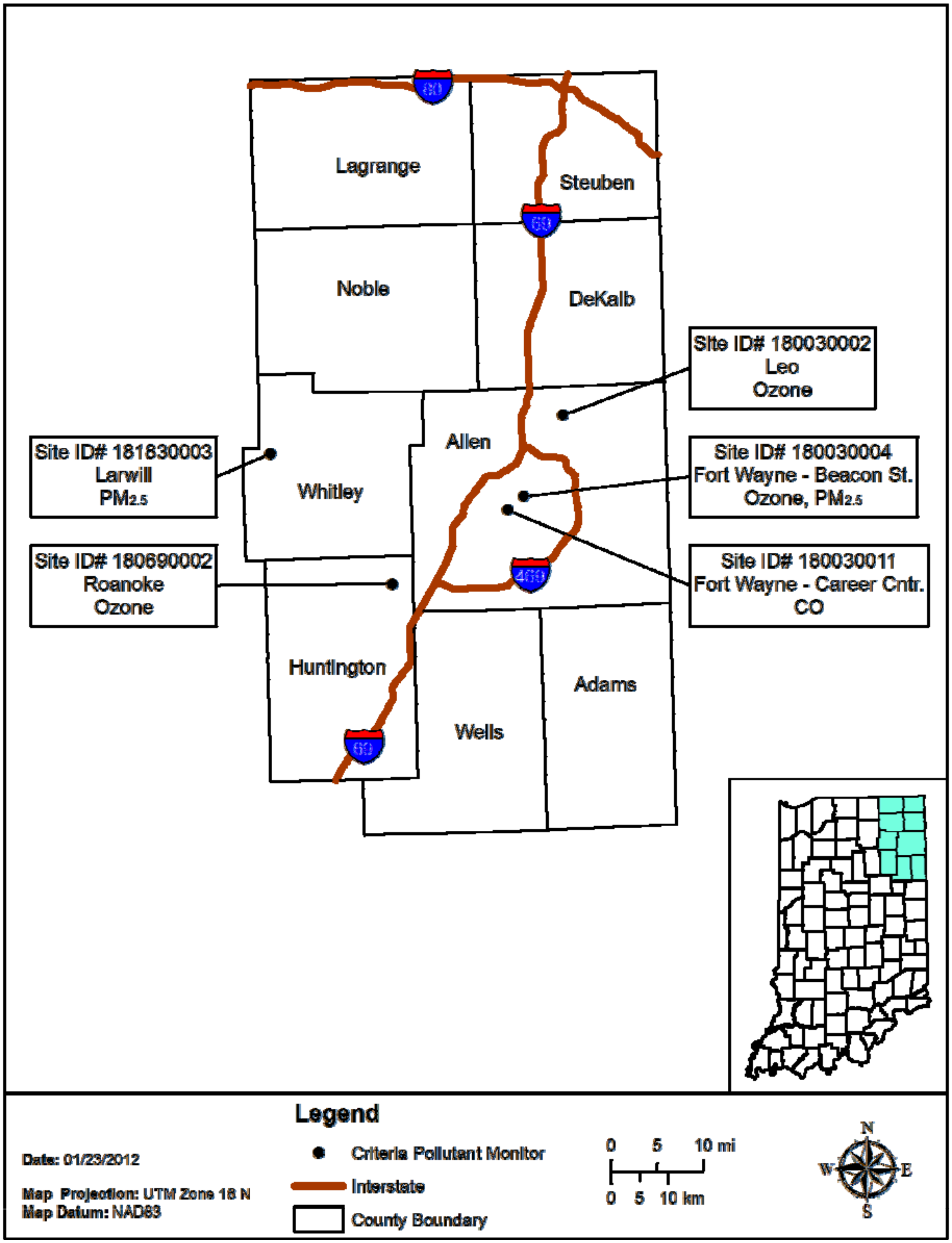

Table 1: Northeast Indiana County Population Information

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
ADAMS	DECATUR	DECATUR	13,014	29,619	31,095	33,625	34,387	16%
ALLEN	FORT WAYNE	FORT WAYNE	152,184	294,335	300,836	331,849	355,329	21%
DEKALB	AUBURN	AUBURN	17,558	33,606	35,324	40,285	42,223	26%
HUNTINGTON	HUNTINGTON	HUNTINGTON	15,805	35,596	35,427	38,075	37,124	4%
LAGRANGE	LAGRANGE	LAGRANGE	14,094	25,550	29,477	34,909	37,128	45%
NOBLE	ALBION	KENDALVILLE	20,109	35,443	37,877	46,275	47,536	34%
STEUBEN	ANGOLA	ANGOLA	19,377	24,694	27,446	33,214	34,185	38%
WELLS	BLUFFTON	BLUFFTON	11,659	25,401	25,948	27,600	27,636	9%
WHITLEY	COLUMBIA CITY	COLUMBIA CITY	14,281	26,215	27,651	30,707	33,292	27%

Table 1 shows that LaGrange County has had the highest percent growth in population between 1980 and 2010, increasing by 45%, while Allen County had the largest net growth of 60,994 people. The population for every county in the Northeast Indiana area had an increase in population from 1980 compared to 2010. An increase or decrease in population within the counties in the Northeast Indiana area can largely be attributed to changes in the job market and the location of jobs in the Northeast 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 in emissions from vehicle miles traveled (VMT), area sources, and the demand for electricity. Generally, increases or decreases in population will result in higher or lower area source and mobile emissions. Examples of area sources that increase with higher population include household paints, lawnmowers, and consumer solvents. In addition, higher or lower population figures indicate a secondary effect on increasing or decreasing VMT if that change in population occurs away from the employment centers.

Table 2: Northeast 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
ADAMS	886	32,590	696,225	789,000	13%
ALLEN	2,788	325,437	4,476,491	11,281,000	152%
DEKALB	988	47,579	899,282	1,597,000	78%
HUNTINGTON	989	40,135	1,251,879	1,662,000	33%
LAGRANGE	949	31,759	1,072,368	1,285,000	20%
NOBLE	1,043	49,942	1,052,535	1,114,000	6%
STEUBEN	861	39,366	1,168,304	1,831,000	57%
WELLS	895	32,445	779,076	739,000	-5%
WHITLEY	830	38,963	871,264	1,174,000	35%

Table 2 illustrates that Allen County has had the highest increase in daily VMT since 1980. The daily VMT for 8 of the 9 counties in the Northeast 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 2009 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 CO, $PM_{2.5}$, and ozone precursors (volatile organic compounds (VOCs) and nitrogen oxides (NO_x)). Generally, increases in VMT result in subsequent increases in emissions of CO, VOCs, and NO_x from mobile sources. These increases in VMT also result in increased evaporative emissions from more gasoline and diesel consumption. Each of these factors may be somewhat offset by fleet turn-over where newer, cleaner vehicles replace older, more polluting ones.

Table 3: 2009 Northeast 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
ALLEN	213,469	9,922	23,462	WHITLEY	4,451	DEKALB	1,934
DEKALB	21,545	5,574	4,963	ALLEN	1,934	ALLEN	2,923
HUNTINGTON	19,753	5,138	2,587	ALLEN	665	ALLEN	3,138
LAGRANGE	17,617	5,294	3,353	NOBLE	958	ELKHART	2,559
NOBLE	22,580	7,149	4,416	DEKALB	1,219	ALLEN	2,250
STEUBEN	19,253	3,586	3,289	STATE OF MICHIGAN	886	DEKALB	1,034
WELLS	14,230	4,730	2,791	ADAMS	780	ALLEN	3,062
WHITLEY	15,540	7,220	3,169	ALLEN	1,281	ALLEN	4,451

Information in Table 3 from 2009 demonstrates that the largest workforce in Northeast Indiana can be found in Allen County. Commuting patterns in Northeast Indiana center on the City of Fort Wayne in Allen County. Since Allen County has the highest population and the highest commuting patterns to and from the county, emissions within Allen County are expected to be higher than surrounding counties in the Northeast Indiana area. The Northeast Indiana area commuting patterns reflect that of many urban areas around the country. The largest employment county is Allen 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 Northeast Indiana 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 Northeast Indiana and across the state.

National Controls

Acid Rain Program

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

Tier II Emission Standards for Vehicles and Gasoline Sulfur Standards

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

Nonroad Spark-Ignition Engines and Recreational Engine Standards

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

Twenty-one other states have 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, 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).

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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.

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

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

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

Cross-State Air Pollution Rule (CSAPR)

On August 8, 2011, U.S. EPA published a 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 Northeast 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.

Northeast 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_2, 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 no EGUs in the Northeast Indiana area. Emissions data for each county in Northeast Indiana is available upon request.

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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

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.

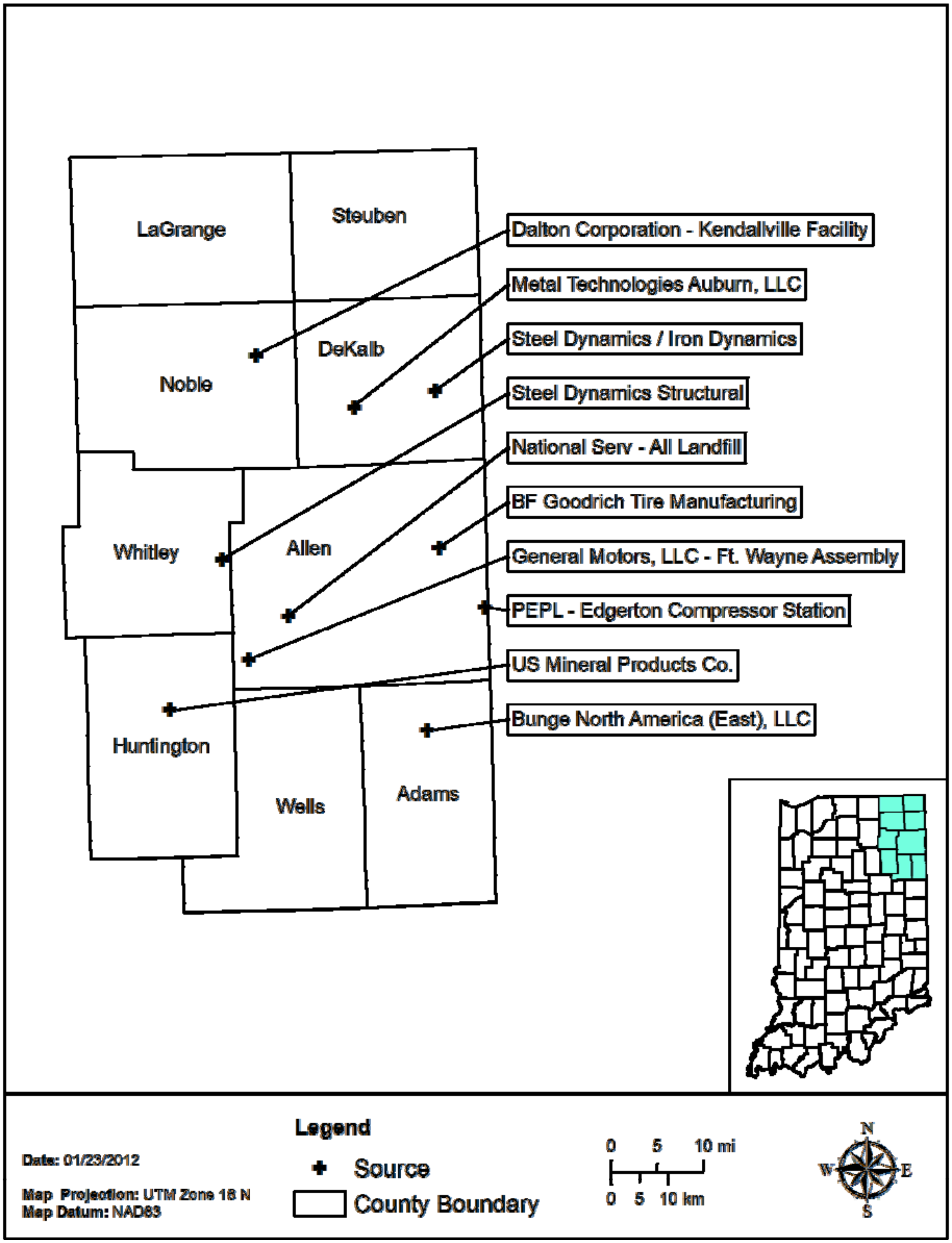
Top Ten Emission Sources

Table 4 represents the top ten sources in tons per year of emissions for the Northeast Indiana area. Some of the sources include steel manufacturing facilities, a natural gas compressor station, and a truck assembly plant. Dalton Corporation in Noble County is no longer in operation. Air quality in the Northeast 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 Northeast Indiana area.

Table 4: Northeast 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	HUNTINGTON	U.S. MINERAL PRODUCTS COMPANY	6,499.6	41.6	24.5	22.0	223.6	16.1	6,827.4
2010	DEKALB	STEEL DYNAMICS/IRON DYNAMICS	2,097.1	2,107.8	115.0	82.0	187.8	88.4	4,678.1
2010	ALLEN	PEPL - EDGERTON COMPRESSOR STATION	136.9	1,773.5	18.3	18.3	0.2	62.1	2,009.3
2010	ADAMS	BUNGE NORTH AMERICA (EAST), L.L.C.	63.5	255.2	65.9	23.4	962.0	326.3	1,696.3
2010	ALLEN	GENERAL MOTORS L.L.C. FORT	66.9	99.7	24.5	24.5	0.5	1,450.5	1,666.4
2008	NOBLE	DALTON CORP. KENDALLVILLE MFG. FACILITY	476.9	16.2	119.0	119.0	11.1	96.7	839.0
2010	WHITLEY	STEEL DYNAMICS STRUCTURAL	521.3	99.6	16.8	7.2	103.3	17.7	765.9
2009	DEKALB	METAL TECHNOLOGIES AUBURN L.L.C.	218.3	0.7	26.6	16.6	1.3	78.7	342.1
2009	ALLEN	NATIONAL SERV-ALL LANDFILL	161.9	29.8	14.9	7.8	6.9	14.8	236.0
2010	ALLEN	BF GOODRICH TIRE	27.0	32.1	17.9	7.1	0.2	120.0	204.3

Figure 2: Map of Northeast 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 Northeast Indiana area 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 across the state are well below the new 1-hour NO_2 NAAQS. There are no monitors in the Northeast Indiana area that measure NO_2 or SO_2.

Air Monitoring and Emissions Data

Not all counties in the Northeast Indiana area have an ambient air quality monitor located within the county boundaries. Monitoring data for the years 2000 through 2010 for Northeast 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 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 is one monitoring site within Northeast Indiana that measures CO. This site is located in Allen County. The trend data shown in Graphs 1 and 2 reflect the 2^{nd} highest concentration for 1-hour and 8-hour CO. The 2^{nd} high values are not the highest monitored concentration at a given monitoring location, rather the 2^{nd} highest measured value. These values (2^{nd} 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 and the 8-hour primary CO standards. CO monitoring data fluctuated between the years of 1986 and 2005 due to variability in 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 which is not to be exceeded more than once per year. 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 which is not to be exceeded more than once per year. There are no monitor violations in the Northeast Indiana area for the 1-hour or 8-hour CO reflected.

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

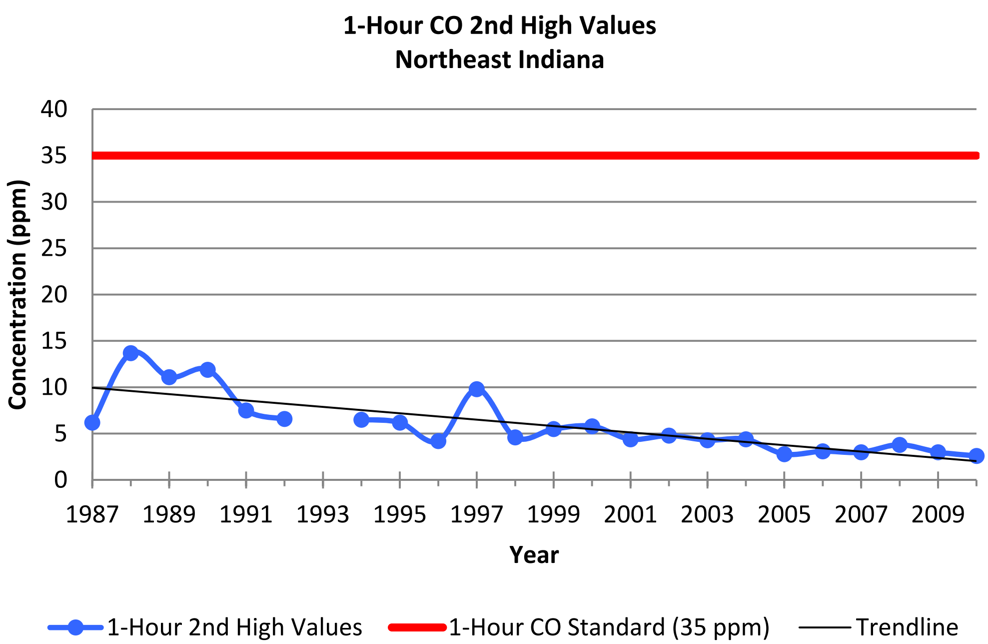


Table 5: Northeast Indiana 1-Hour CO 2nd High Value Monitoring Data Summary

County	Site #	Site Name	1-Hour 2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030011	Fort Wayne-203 E Douglas St	5.8	4.4	4.8	4.3	4.4	2.8	3.1	3.0	3.8	3.0	2.6
			Highlighted red numbers are above the 1-hour CO standard of 35 ppm										

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

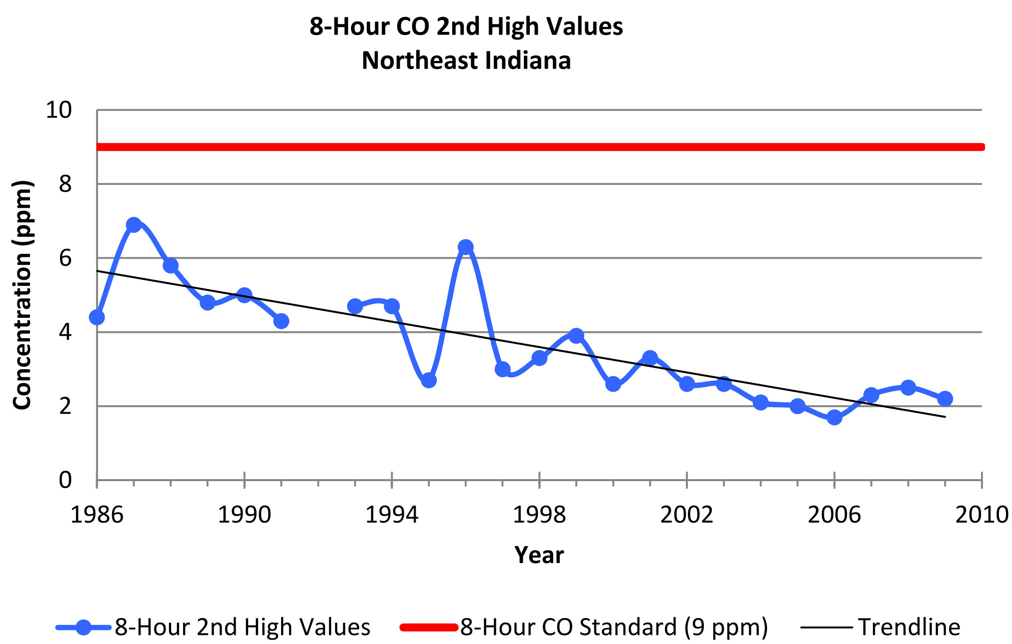


Table 6: Northeast Indiana 8-Hour CO 2nd High Value Monitoring Data Summary

County	Site #	Site Name	8-Hour 2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030011	Fort Wayne-203 E Douglas St	3.9	2.6	3.3	2.6	2.6	2.1	2.0	1.7	2.3	2.5	2.2
			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 Northeast Indiana and Chart 1 shows how the average emissions are distributed among the different source categories.

Graph 3: Northeast Indiana CO Emissions

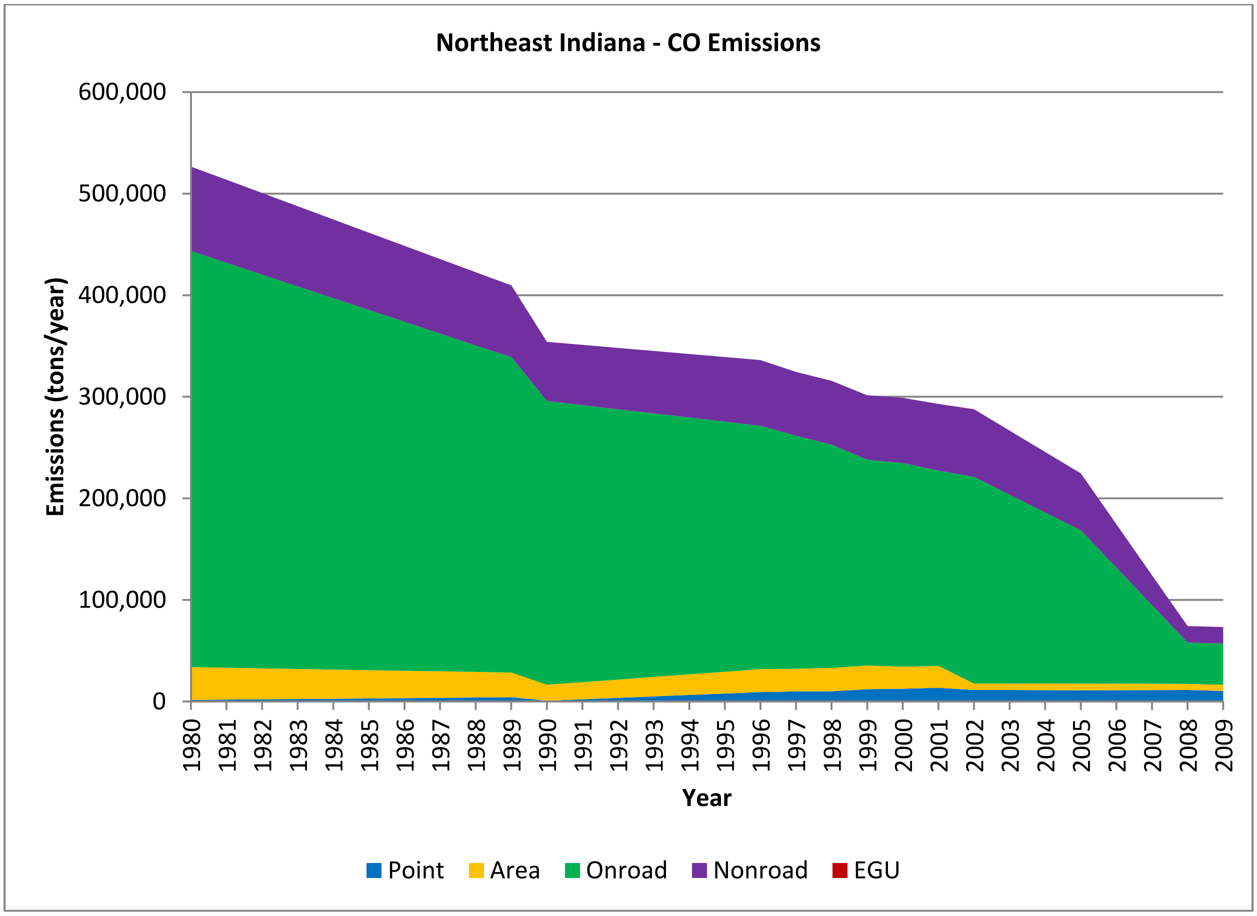
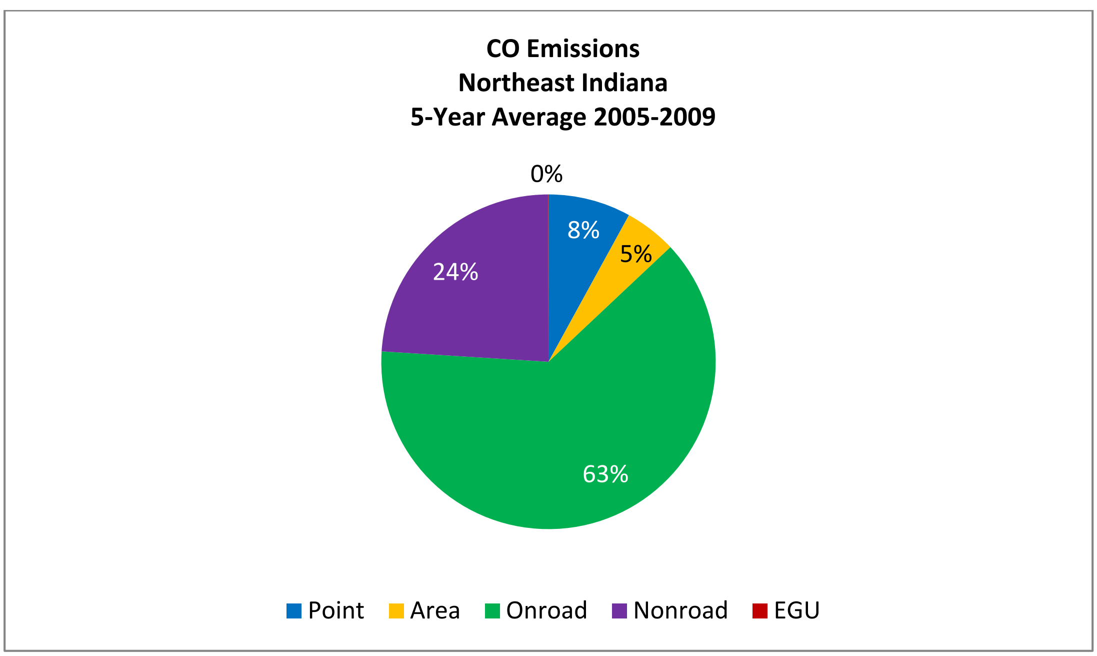


Chart 1: Northeast Indiana CO Emissions



National controls have led to a decrease in CO emissions in the Northeast Indiana area over time. As Graph 3 illustrates, CO emissions have decreased substantially by 86% within the Northeast Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. CO is a component of motor vehicle exhaust, which the U.S. EPA estimates to be the major source of CO emissions. Levels of CO have generally declined since the mid-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 are two monitoring sites within Northeast Indiana, located in Allen and Whitley counties currently measuring $PM_{2.5}$ levels. 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 98^{th} percentile (the method used to determine the value below which a certain percent of monitored observations fall) for 24-hour $PM_{2.5}$ for each year in the Northeast Indiana area for the years 2000 through 2010. The annual arithmetic mean values for annual $PM_{2.5}$ and 98^{th} percentile values for 24-hour $PM_{2.5}$ are not used to compare to the primary and secondary annual or 24-hour $PM_{2.5}$ standards. A three-year average, also known as the design value, is used to compare to both the primary and secondary annual $PM_{2.5}$ standards of 15.0 micrograms per cubic meter ($\mu g/m^3$), as well as the primary and secondary 24-hour $PM_{2.5}$ standards of 35 $\mu g/m^3$, but the annual arithmetic mean and 98^{th} percentile for each year do provide a good indication of annual and 24-hour $PM_{2.5}$ trends over time. The primary and secondary 24-hour $PM_{2.5}$ standards were first established in July 1997 of 65 $\mu g/m^3$. U.S. EPA revised the primary and secondary 24-hour $PM_{2.5}$ standards and lowered them to 35 $\mu g/m^3$ in October 2006.

For both annual and 24-hour $PM_{2.5}$, the secondary standard is the same as the primary standard. Attainment of the annual primary and secondary $PM_{2.5}$ standards is determined by evaluating the design value of the annual arithmetic mean from a single monitor, which must be less than or equal to 15.0 $\mu g/m^3$. An exceedance of the annual $PM_{2.5}$ standards occurs when an annual arithmetic mean value is equal to or greater than 15.0 $\mu g/m^3$. A violation of the annual $PM_{2.5}$ standards occurs when the design value of the annual arithmetic mean value is equal to or greater than 15.05 $\mu g/m^3$. A monitor can exceed the annual $PM_{2.5}$ standards without being in violation. Attainment of the 24-hour $PM_{2.5}$ standards is determined by evaluating the design value of the 98th percentile of the 24-hour concentrations at each population-oriented monitor within an area, which must not exceed 35 µg/m^3. An exceedance of the 24-hour $PM_{2.5}$ standards occurs when the 98th percentile is equal to or greater than 35.0 µg/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 µg/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 Northeast Indiana area for the years 2000 through 2010. The trend data in Graph 7 reflect the three-year design value of the 98th percentile values for 24-hour $PM_{2.5}$ for each year in the Northeast 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 µg/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 Northeast 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 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 98th percentile and the highest value from all of the monitors in the Northeast 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 Northeast 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: Northeast Indiana Annual Arithmetic Mean $PM_{2.5}$ Values

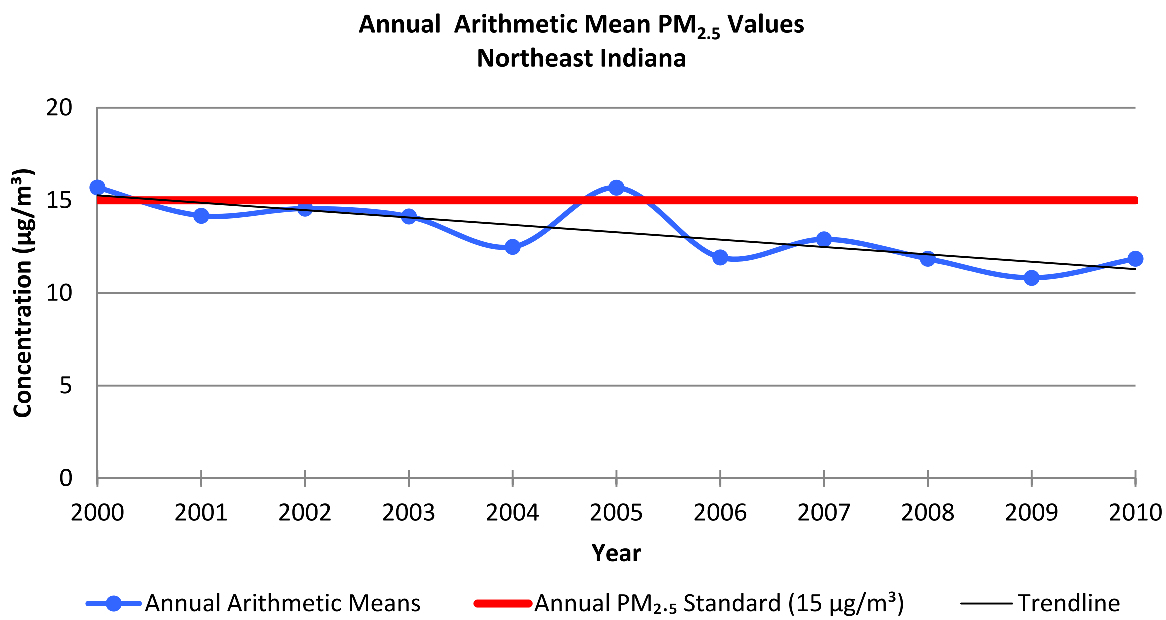


Table 7: Northeast Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary

			Annual Arithmetic Mean (µg/m^3)										
County	Site #	Site Name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030004	Fort Wayne - Beacon St	15.70	14.25	14.56	14.13	12.49	15.64	11.92	13.23	11.85	10.82	11.85
Allen	180030014	Fort Wayne - Taylor Univ	14.29	14.17	14.26	13.65	12.41	15.69	11.80	12.90			
Whitley	181830003	Larwill - Witko Middle Sch											10.56

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

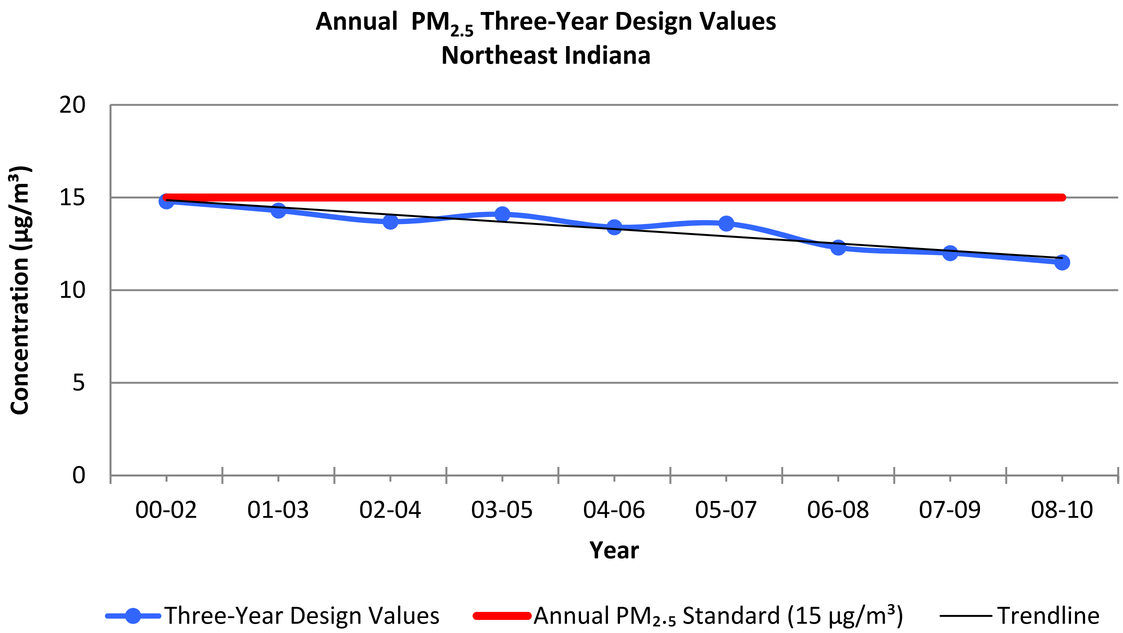


Table 8: Northeast Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

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
Allen	180030004	Fort Wayne - Beacon St	14.8	14.3	13.7	14.1	13.4	13.6	12.3	12.0	11.5
Allen	180030014	Fort Wayne - Taylor Univ	14.2	14.0	13.4	13.9	13.3	13.5			
Whitley	181830003	Larwill - Witko Middle Sch									10.6

Red highlighted numbers are above the annual $PM_{2.5}$ standard of 15.0 ug/m³

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

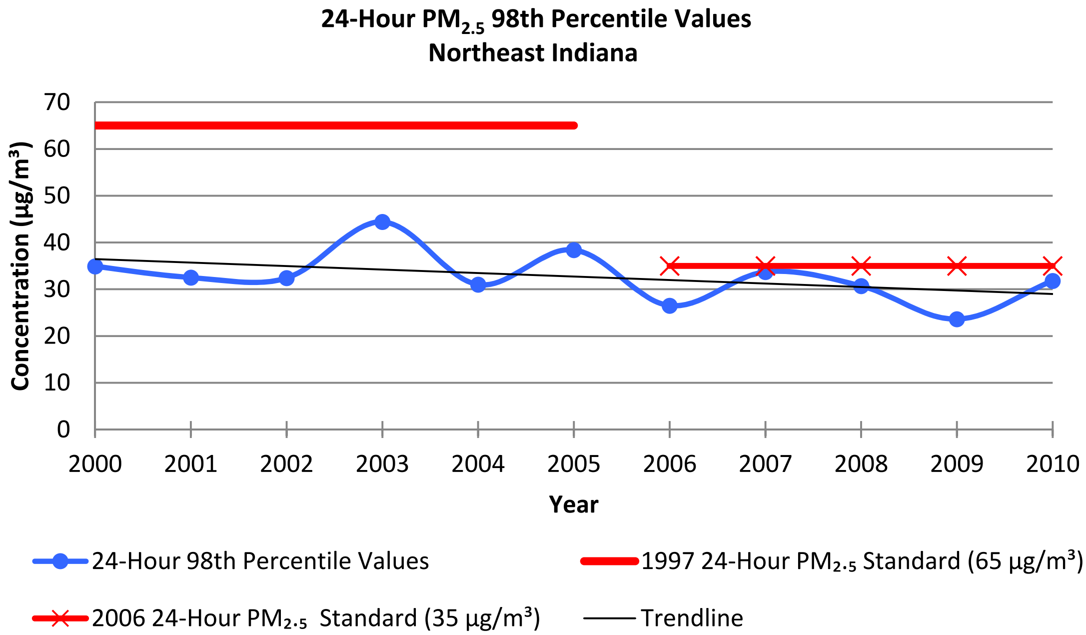


Table 9: Northeast Indiana 24-Hour 98th Percentile Value $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Daily 98th Percentile Values (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030004	Fort Wayne - Beacon St	34.5	32.0	32.1	34.6	31.0	38.4	26.2	33.7	30.7	23.6	30.5
Allen	180030014	Fort Wayne - Taylor Univ	34.9	32.5	32.4	44.4	28.3	34.9	26.5	32.0			
Whitley	181830003	Larwill - Witko Middle Sch											31.8

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

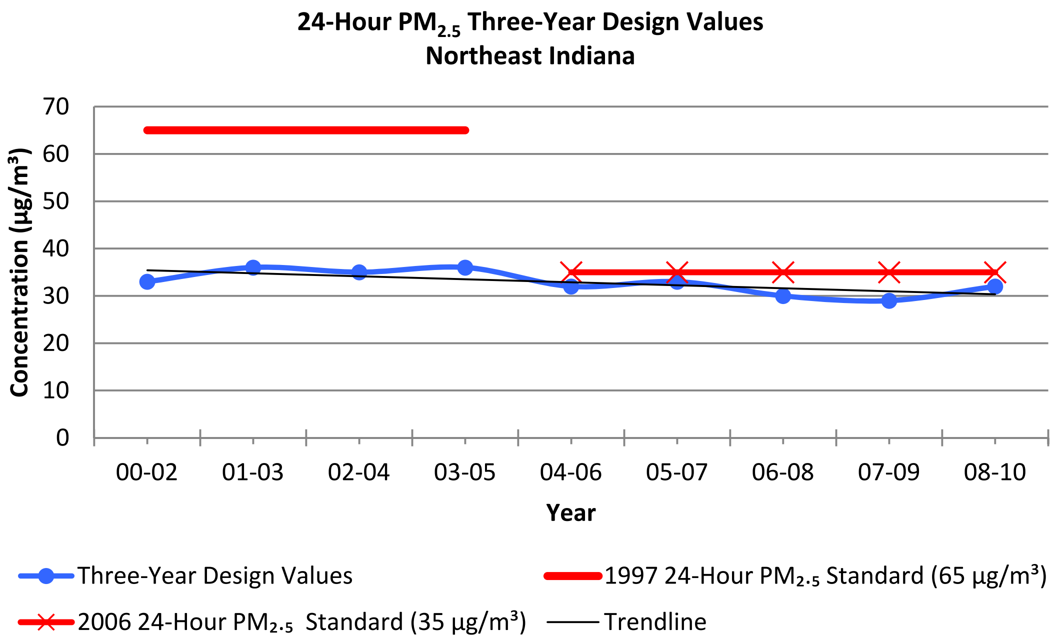


Table 10: Northeast Indiana 24-Hour Three-Year Design Value PM2.5 Monitoring Data Summary

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
Allen	180030004	Fort Wayne - Beacon St	33	33	33	35	32	33	30	29	28
Allen	180030014	Fort Wayne - Taylor Univ	33	36	35	36	30	31			
Whitley	181830003	Larwill - Witko Middle Sch									32

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 35.0 µg/m³

Tables 7, 8, 9, and 10 demonstrate that the annual and 24-hour $PM_{2.5}$ values for the Northeast Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the other two sites do also. Annual and 24-hour $PM_{2.5}$ design values in Northeast Indiana have always been below the primary and secondary annual $PM_{2.5}$ standards as well as the primary and secondary 24-hour $PM_{2.5}$ standards. The Fort Wayne Beacon Street $PM_{2.5}$ monitoring site has historically registered the highest $PM_{2.5}$ values in Northeast Indiana. This is expected since it is the downwind site for the Fort Wayne metropolitan area.

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 as 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 $PM_{2.5}$ daily 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. $PM_{2.5}$ is emitted directly into the air, but is also created by a chemical reaction between SO_2 and NO_x. 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 Northeast Indiana. Charts 2, 3, and 4 show how the average emissions are distributed among the different source categories.

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

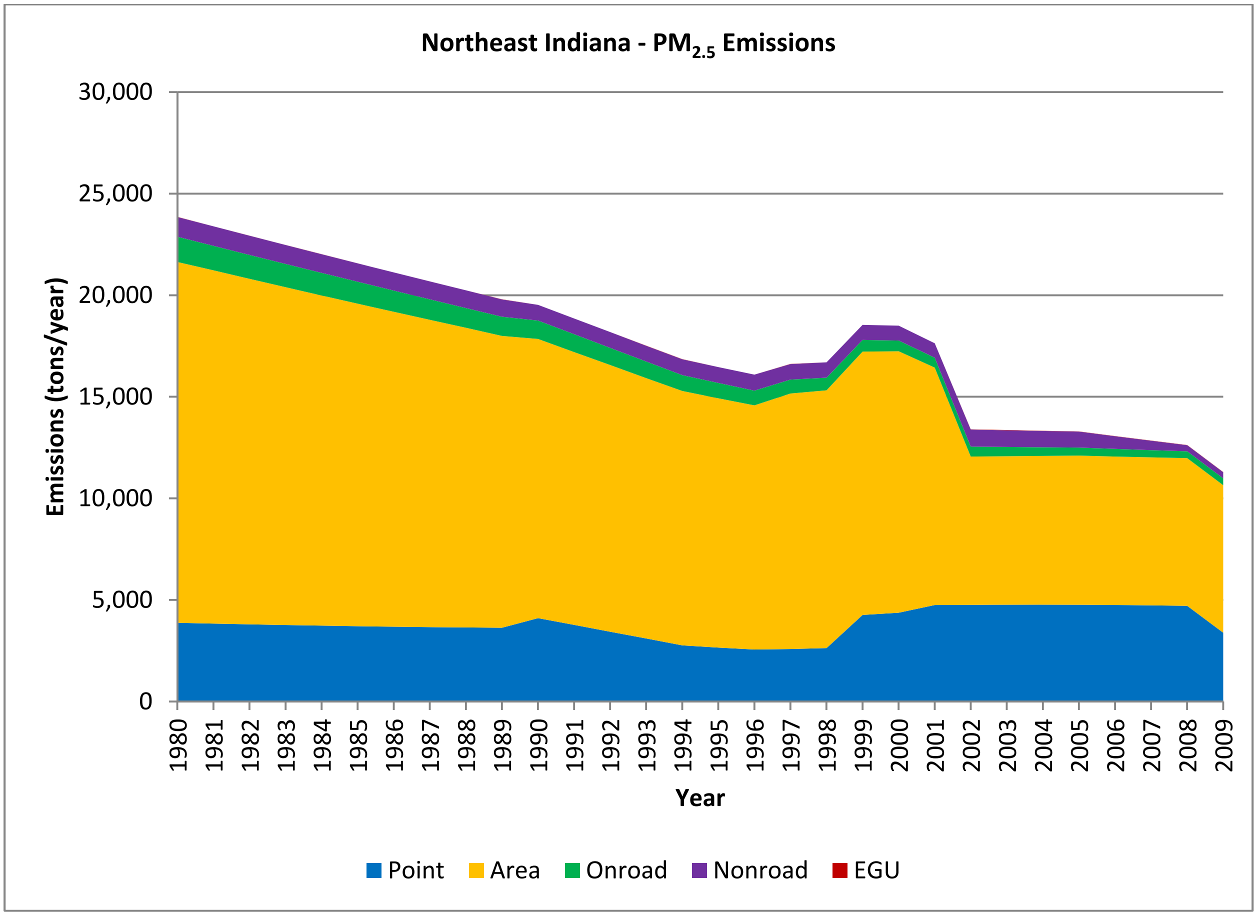
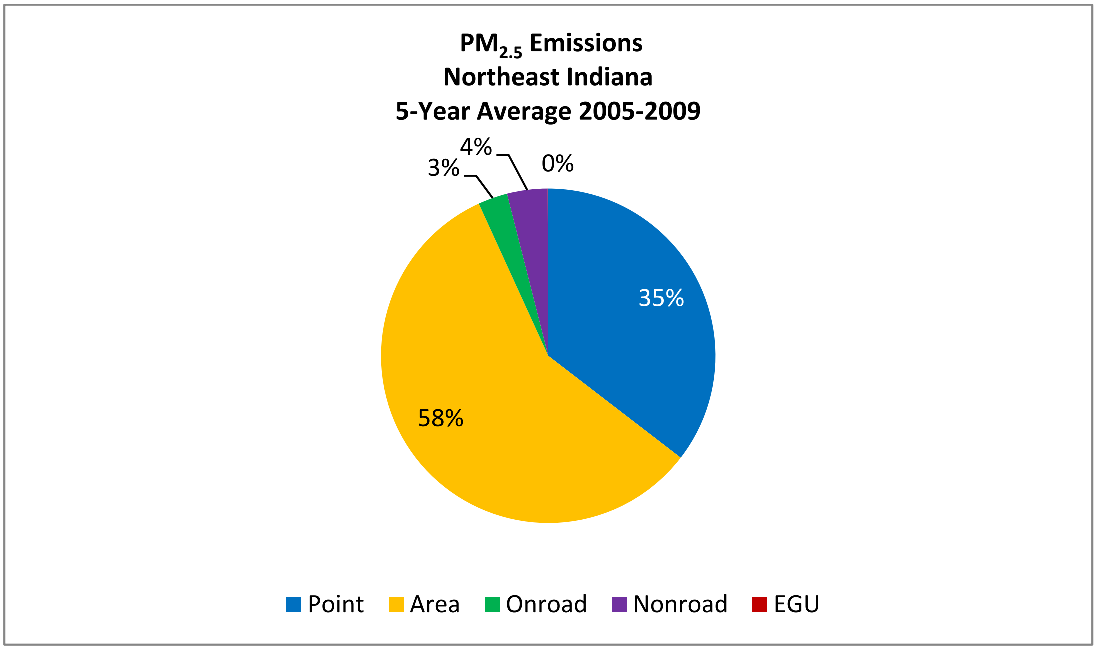


Chart 2: Northeast Indiana $PM_{2.5}$ Emissions



Graph 9: Northeast Indiana SO_2 Emissions

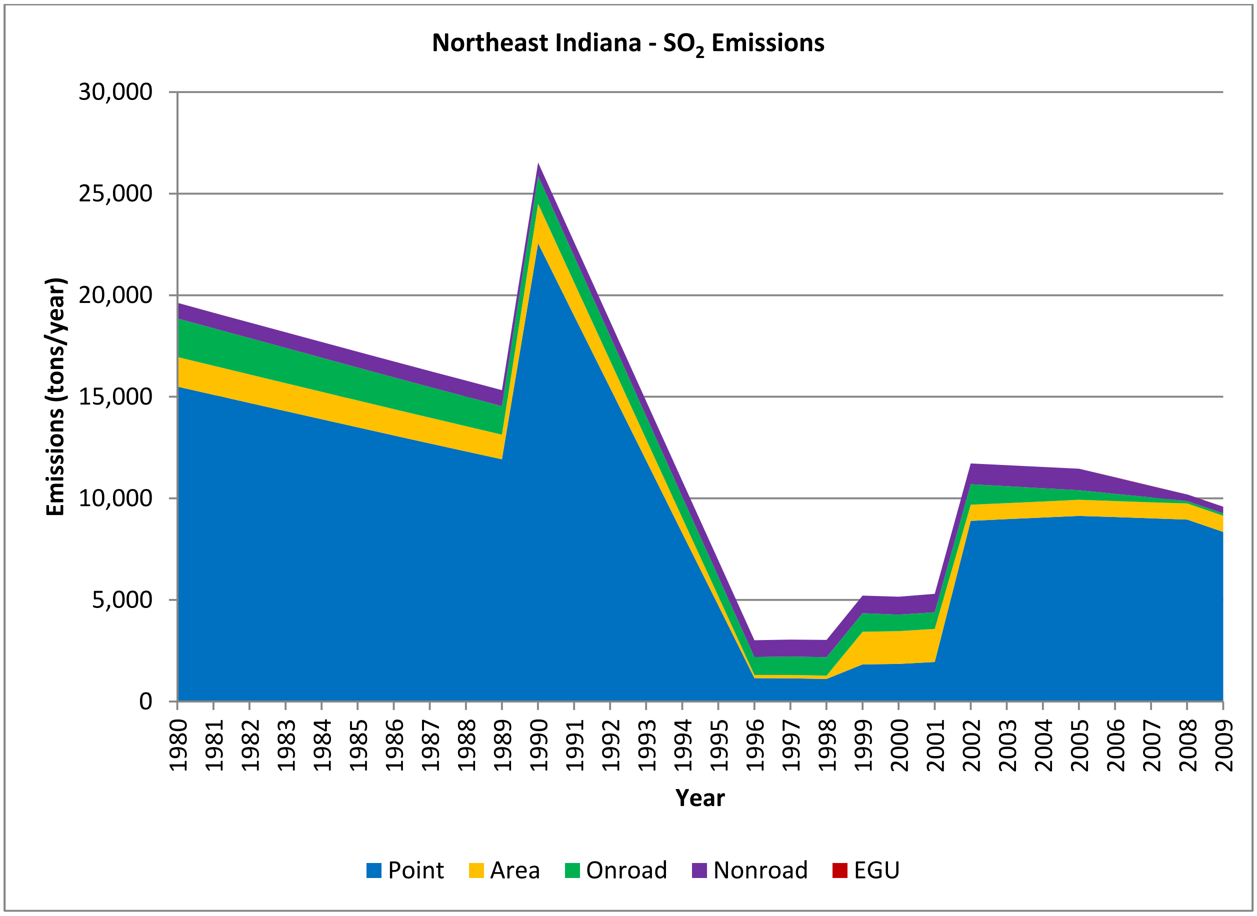
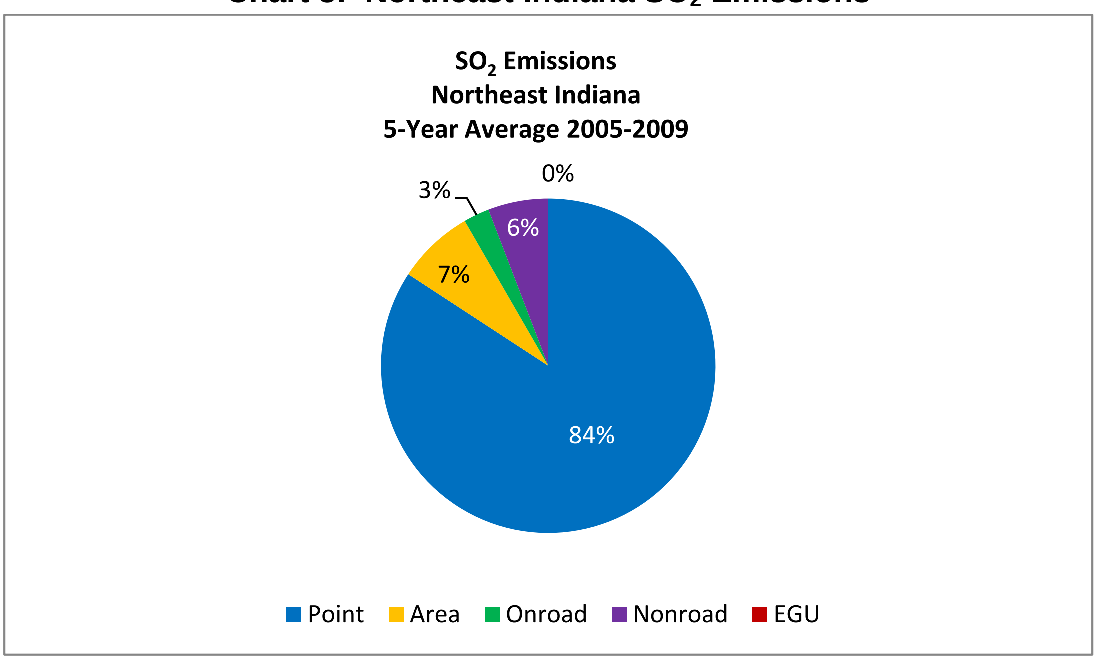


Chart 3: Northeast Indiana SO_2 Emissions



Graph 10: Northeast Indiana NO_x Emissions

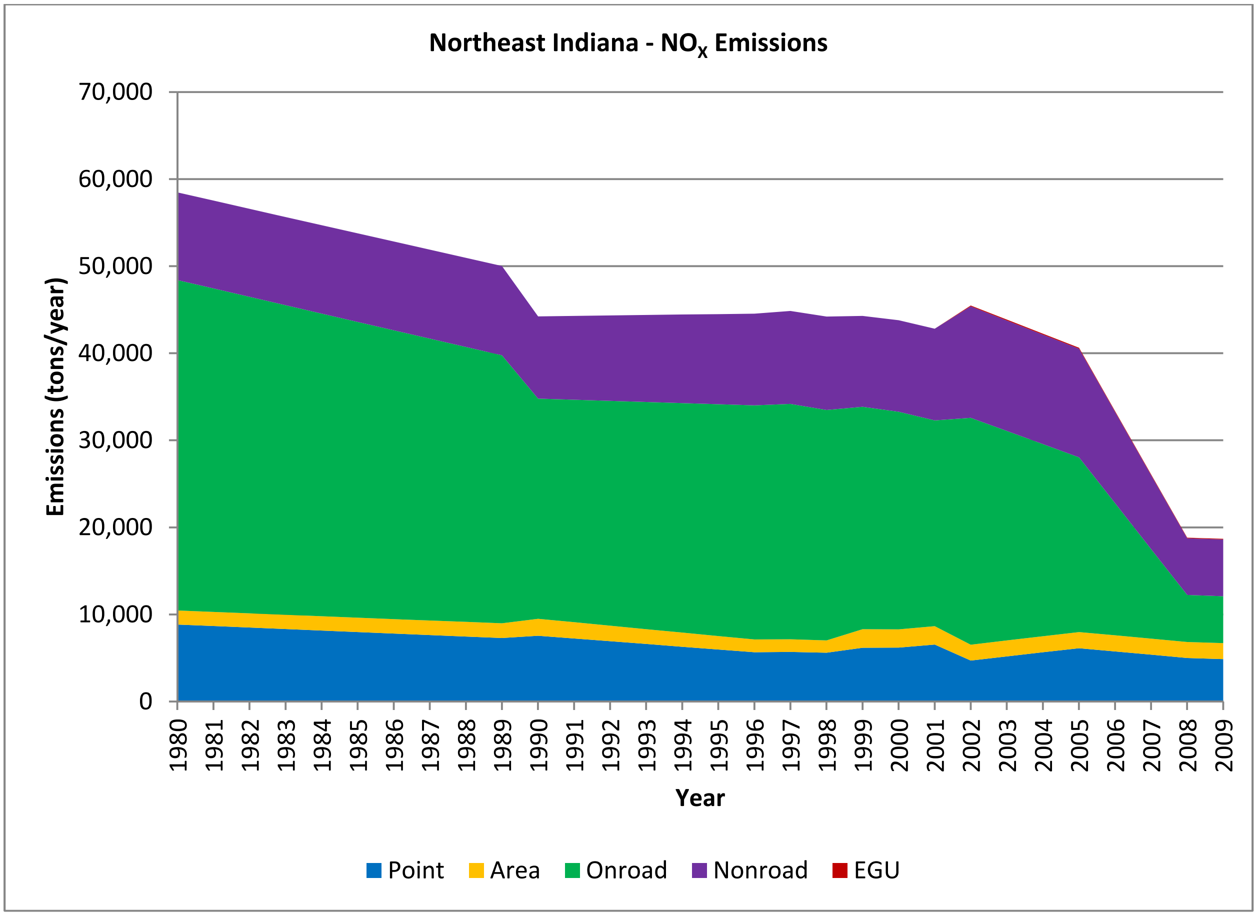
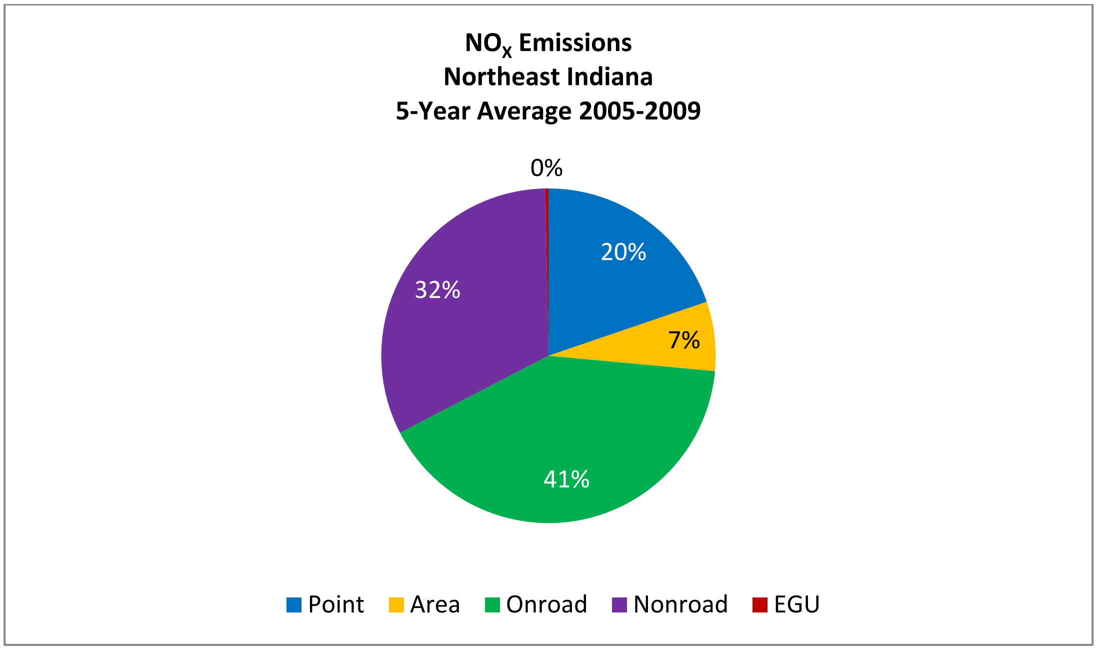


Chart 4: Northeast Indiana NO_x Emissions



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 53%, 51%, and 68%, respectively, within the Northeast 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.

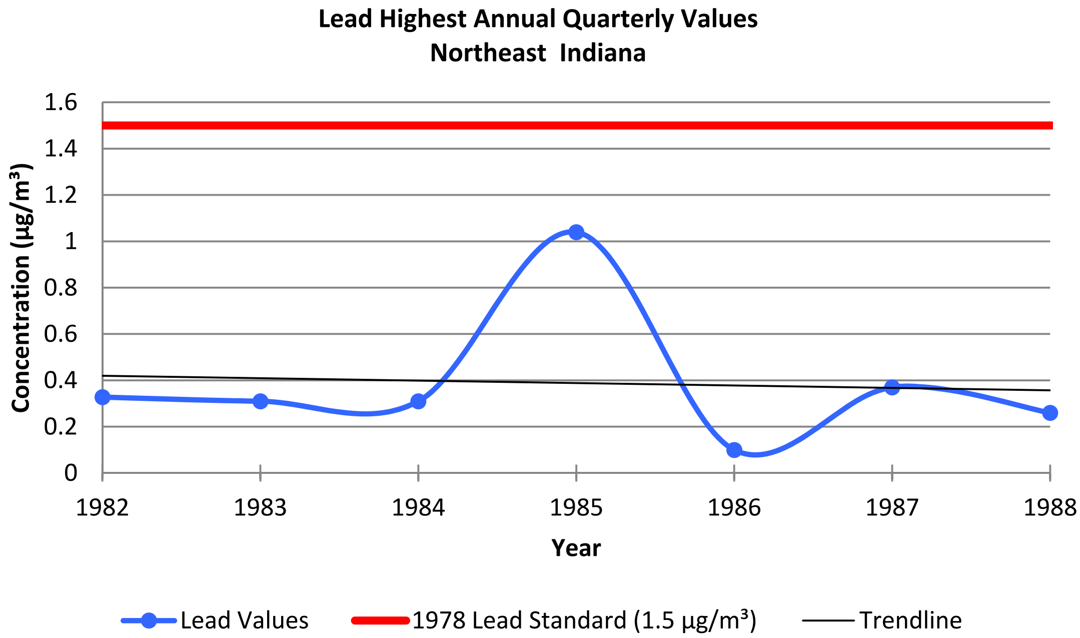
For information on $PM_{2.5}$ standards, sources, health effects, and programs to reduce $PM_{2.5}$, please see www.epa.gov/air/particlepollution.

Lead

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. Lead data are unavailable for some years. Lead monitoring sites were discontinued in the Northeast Indiana area in 1994; therefore, a table of current monitoring data for lead values are not included in this report. However, historical monitoring data for lead monitors in Northeast Indiana are available upon request. Since there is no lead data beyond 1994 for the Northeast Indiana region, monitoring data for the primary and secondary 2008 lead standards and a trend chart comparing the highest three-month rolling average for each year (which is used to compare to the primary and secondary 2008 lead standards) has not been provided.

Graph 11: Northeast Central Indiana Lead Highest Annual Quarterly Values



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 Graph 11, lead levels in Northeast Indiana are well below the current standard and will continue to be so as new federal controls are adopted.

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

Nitrogen Dioxide (NO_2)

There are no monitoring sites within the Northeast Indiana area that measure NO_2 levels. U.S. EPA's NEI contains emissions information for NO_x and is used for Graph 12 and Chart 5. NO_x emissions data are used as a surrogate for NO_2 in conjunction with the NO_2 NAAQS. Graph 12 illustrates the emissions trend for NO_x in Northeast Indiana and Chart 5 shows how the average emissions are distributed among the different source categories. NO_x emissions in the Northeast Indiana area have been trending downward over time. If monitoring data for NO_2 were available in the Northeast Indiana area, it is expected that monitor values would be trending downward as well.

Graph 12: Northeast Indiana NO_x Emissions

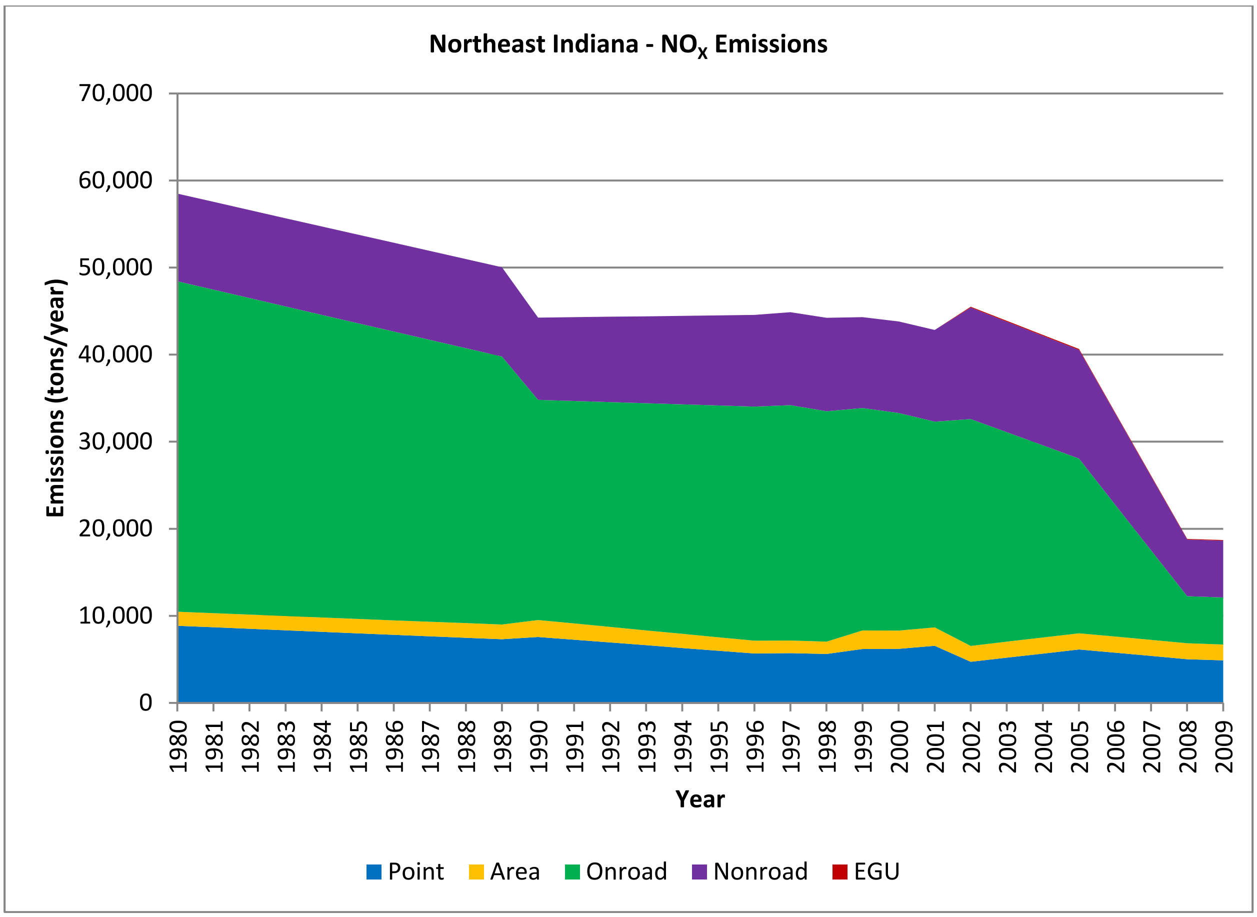
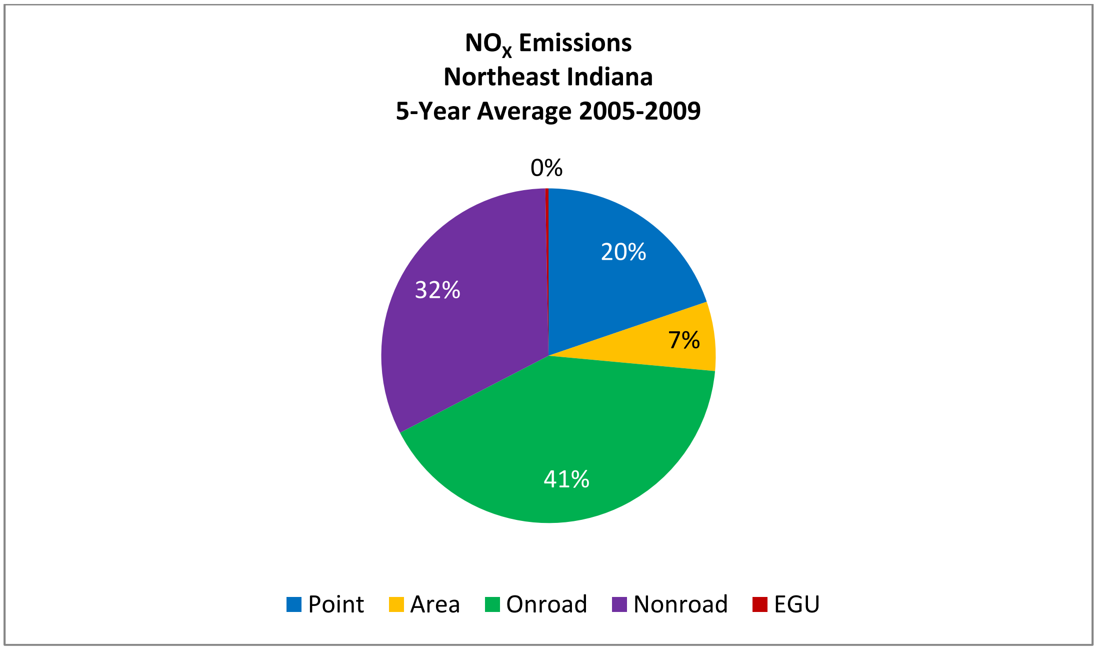


Chart 5: Northeast Indiana NO_x Emissions



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 12 illustrates, NO_x emissions have decreased by 68% within the Northeast 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 three monitoring sites within Northeast Indiana, two in Allen County and one in Huntington County currently measuring ozone. 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 13 reflect the 4th highest monitored concentration for 1-hour ozone within a given three-year period from all of the monitors in the Northeast 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 14 reflect the 4th high and the highest 4th high concentration for 8-hour ozone from all of the monitors in the Northeast Indiana area for each year. The design value of the three-year average of the 4th highest 8-hour ozone values is used for comparison to the 8-hour ozone standard; therefore, the one-year values in Graph 14 are not a true comparison to the primary and secondary 8-hour ozone standards. The values in Graph 15 reflect the design value of the three-year average of the 4th highest 8-hour ozone values from the monitors for each year.

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

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

			1-Hour Ozone Value (ppm)											
County	**Site #**	**Site Name**	**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**
Allen	180030002	Leo	0.105	0.099	0.098	0.094	0.100	0.098	0.096	0.092	0.108	0.107	0.103	0.100
Allen	180030004	Beacon St	0.093	0.087	0.086	0.086	0.084	0.084	0.083	0.082	0.113	0.113	0.111	0.104
Huntington	180690002	Roanoke	0.097	0.094	0.093	0.092	0.095	0.092	0.088	0.087	0.107	0.097	0.097	0.096
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**
Allen	180030002	Leo	0.109	0.103	0.100	0.098	0.094	0.093	0.080	0.078	0.100	0.095	0.095	0.093
Allen	180030004	Beacon St	0.106	0.101	0.098	0.093	0.097	0.085	0.080	0.076	0.086	0.084	0.082	0.081
Huntington	180690002	Roanoke	0.116	0.097	0.095	0.090	0.083	0.080	0.076	0.075	0.089	0.086	0.084	0.084
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**
Allen	180030002	Leo	0.086	0.082	0.079	0.079	0.088	0.087	0.086	0.082	0.077	0.075	0.074	0.072
Allen	180030004	Beacon St	0.081	0.079	0.077	0.076	0.094	0.092	0.091	0.086	0.078	0.078	0.077	0.074
Huntington	180690002	Roanoke	0.079	0.079	0.077	0.076	0.089	0.087	0.085	0.084	0.070	0.068	0.067	0.067
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**				
Allen	180030002	Leo	0.078	0.072	0.070	0.069	0.071	0.071	0.071	0.071				
Allen	180030004	Beacon St	0.075	0.071	0.070	0.068	0.080	0.075	0.075	0.072				
Huntington	180690002	Roanoke	0.070	0.069	0.068	0.068	0.070	0.069	0.068	0.068				

Graph 13: Northeast Indiana 1-Hour Ozone 4th Highest Value in Three-Year Period

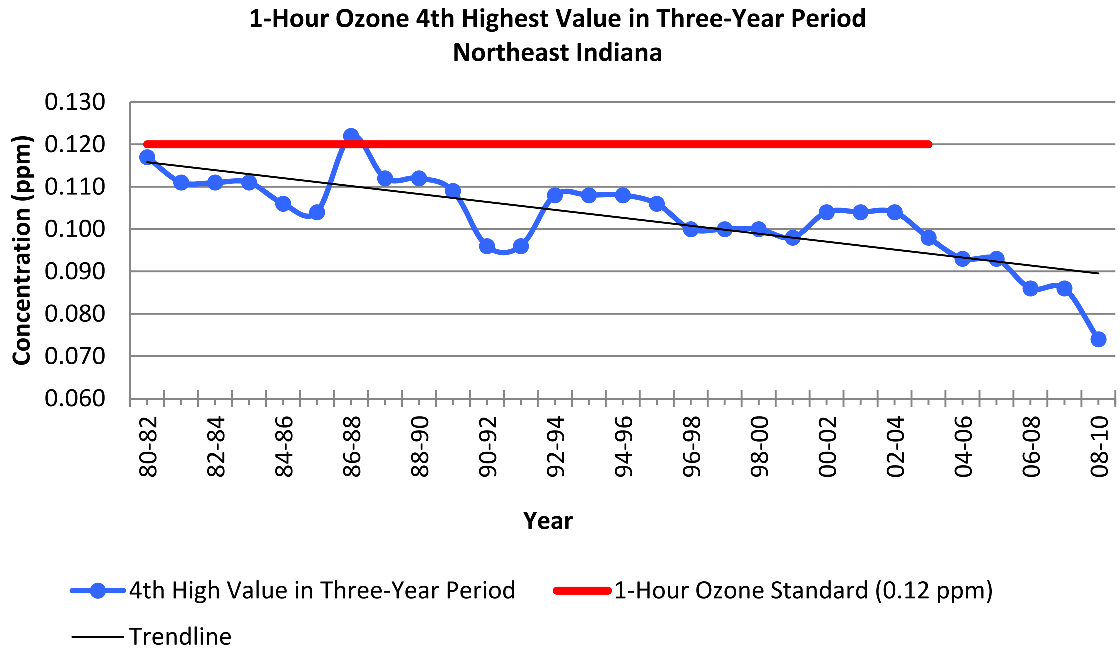


Table 12: Northeast Indiana 1-Hour Ozone 4th High Value in Three-Year Period Monitoring Data Summary

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**
Allen	180030002	Leo	0.100	0.100	0.100	0.098	0.093	0.093	0.082	0.082	0.072
Allen	180030004	Beacon St	0.104	0.104	0.104	0.093	0.081	0.086	0.086	0.086	0.074
Huntington	180690002	Roanoke	0.096	0.096	0.096	0.090	0.084	0.084	0.084	0.084	0.068

Graph 14: Northeast Indiana 8-Hour Ozone 4th High Values

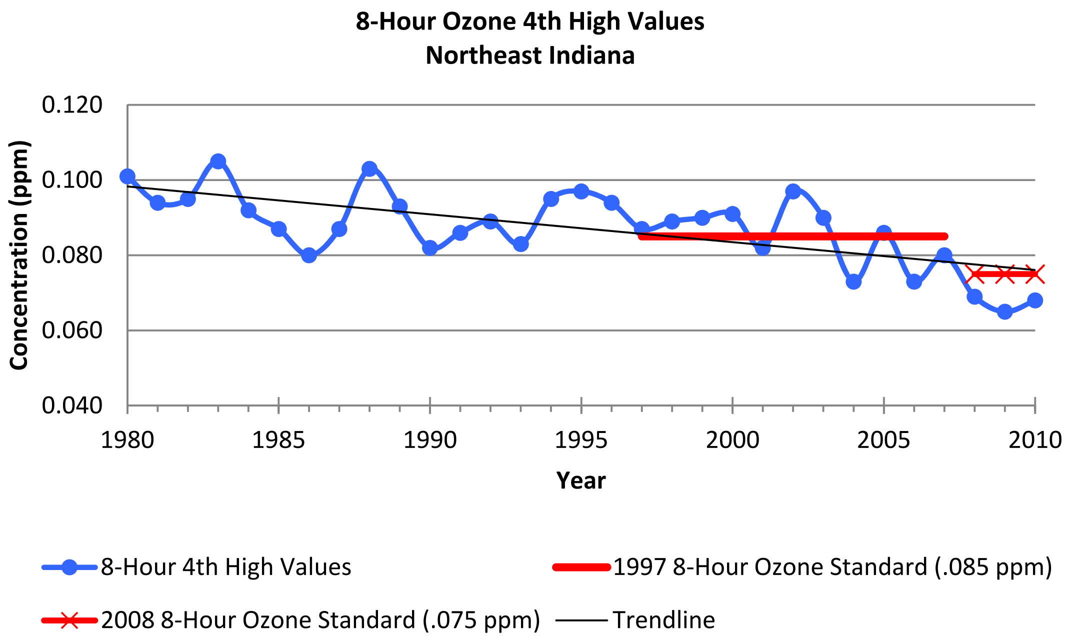


Table 13: Northeast Indiana 8-Hour 4th High Ozone Monitoring Data Summary

County	Site #	Site Name	4th Highest Ozone Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030002	Leo	0.091	0.082	0.093	0.090	0.073	0.086	0.073	0.077	0.066	0.065	0.065
Allen	180030004	Beacon St	0.081	0.074	0.097	0.084	0.069	0.076	0.071	0.080	0.069	0.065	0.068
Huntington	180690002	Roanoke	0.087	0.082	0.089	0.083	0.069	0.078	0.072	0.078	0.060	0.062	0.062

Graph 15: Northeast Indiana 8-Hour Ozone Three-Year Design Values

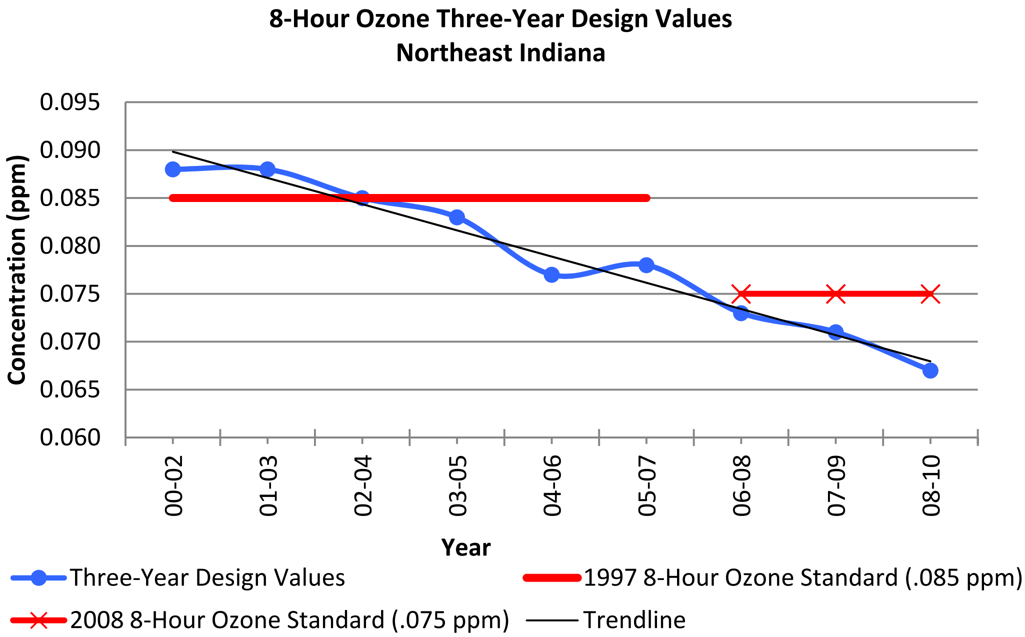


Table 14: Northeast Indiana 8-Hour Ozone Three-Year Design Value Monitoring Data Summary

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
Allen	180030002	Leo	0.088	0.088	0.085	0.083	0.077	0.078	0.072	0.069	0.065
Allen	180030004	Beacon St	0.084	0.085	0.083	0.076	0.072	0.075	0.073	0.071	0.067
Huntington	180690002	Roanoke	0.086	0.084	0.080	0.076	0.073	0.076	0.070	0.066	0.061
			Prior to 2008, highlighted red numbers are above the 8-hour O_3 standard of 0.085 ppm								
			Beginning in 2008, highlighted red numbers are above the 8-hour O_3 standard of 0.075 ppm								

While fluctuations in monitoring data can be seen in Graphs 13, 14, and 15, 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 Graphs 14 can be traced back to high temperatures and stagnant weather conditions during the ozone seasons of those years.

Tables 11, 12, 13, and 14 demonstrate that the 1-hour and 8-hour ozone values for the Northeast Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the others do as well. Monitor values for 8-hour ozone in Northeast Indiana were violation of the 8-hour ozone standard, but are now below the 8-hour ozone standard. The Leo 8-hour ozone monitoring site has historically registered the highest 8-hour ozone values in Northeast Indiana. This is expected since it is the downwind site for the Fort Wayne metropolitan area. Downwind monitors are usually are the last to attain the standard because ozone and ozone precursor 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 16 and 17 illustrate the emissions trend for the ozone precursors in Northeast Indiana and Charts 6 and 7 shows how the average emissions are distributed among the different source categories.

Graph 16: Northeast Indiana NO_x Emissions

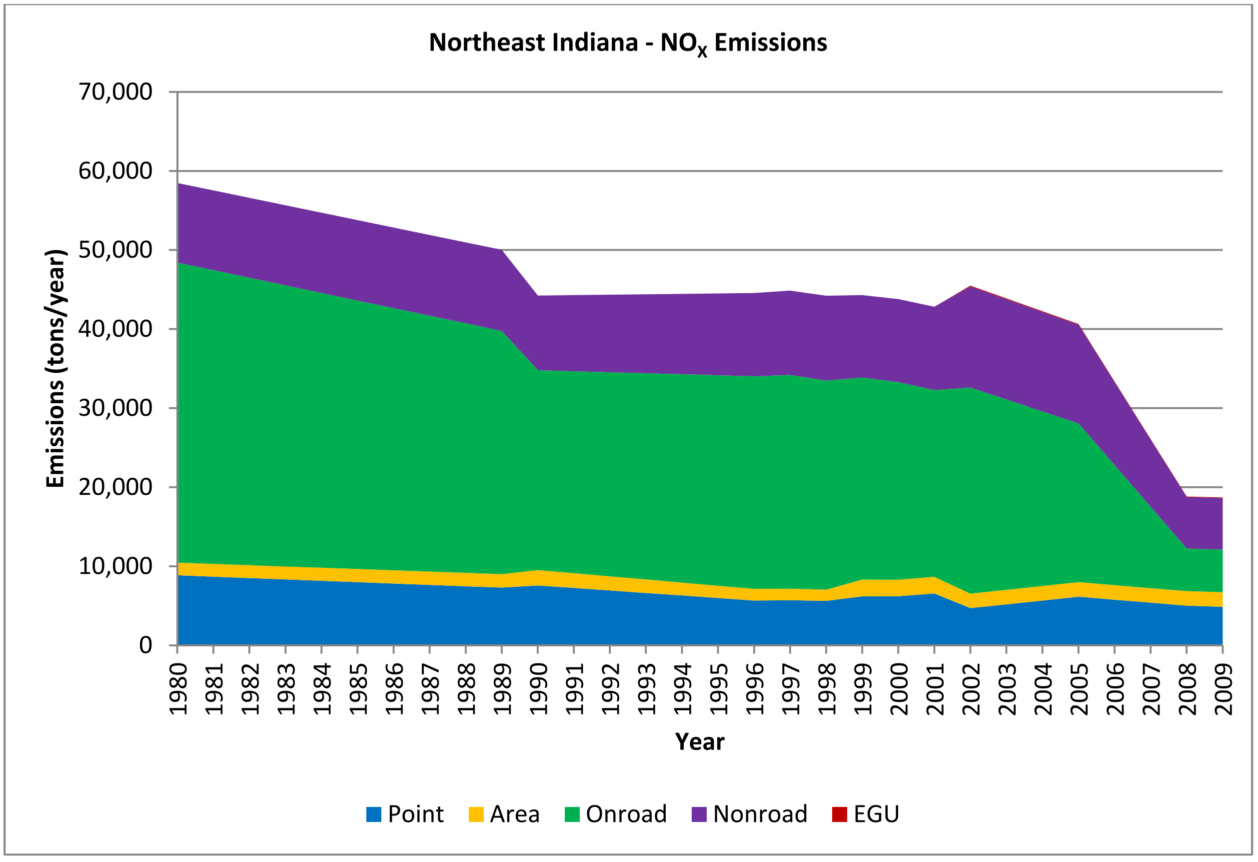
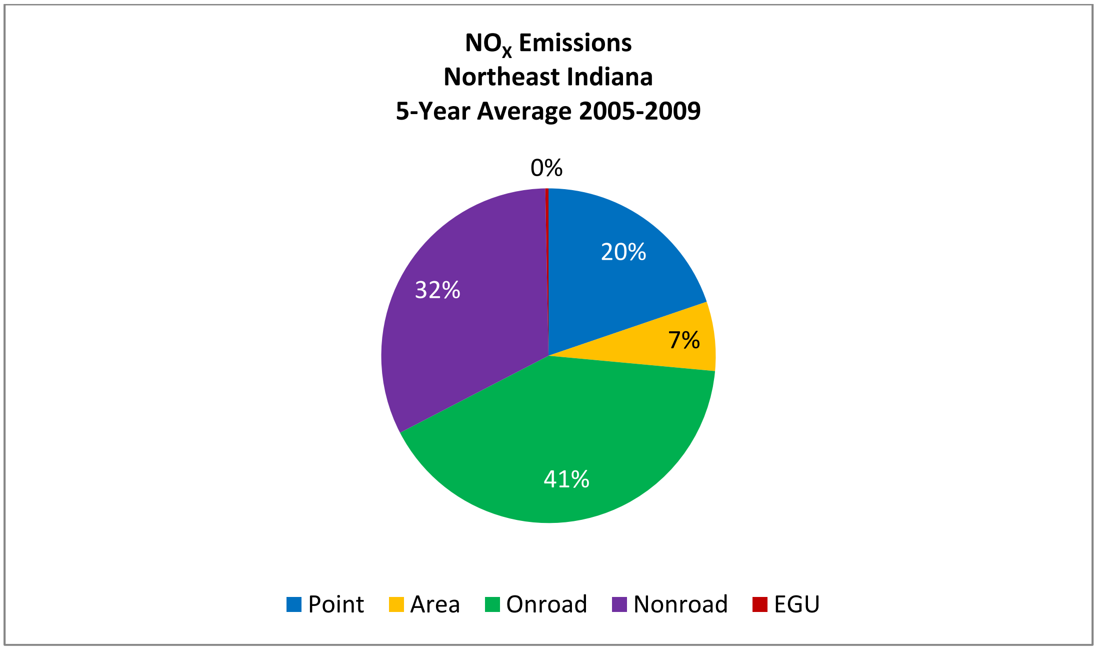


Chart 6: Northeast Indiana NO_x Emissions



Graph 17: Northeast Indiana VOC Emissions

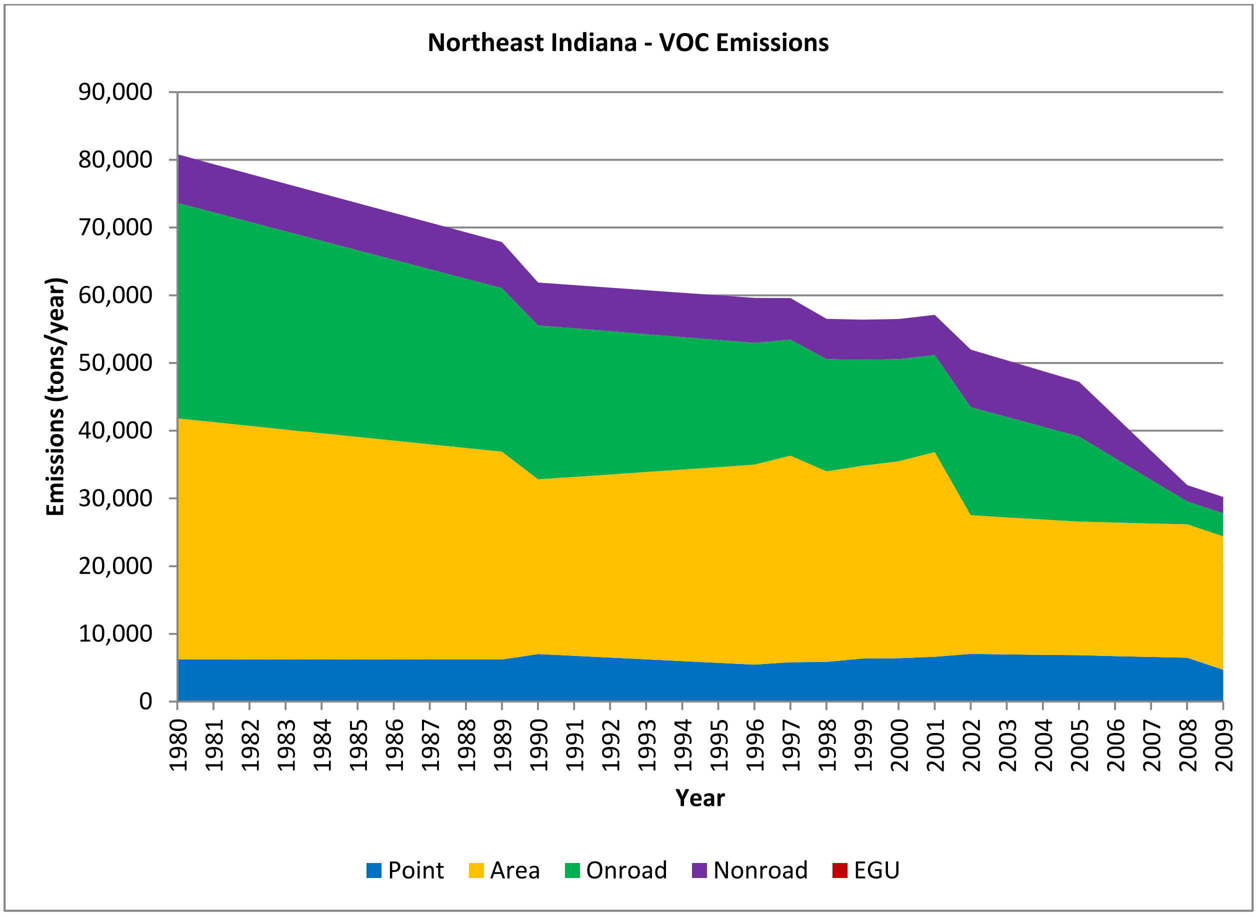
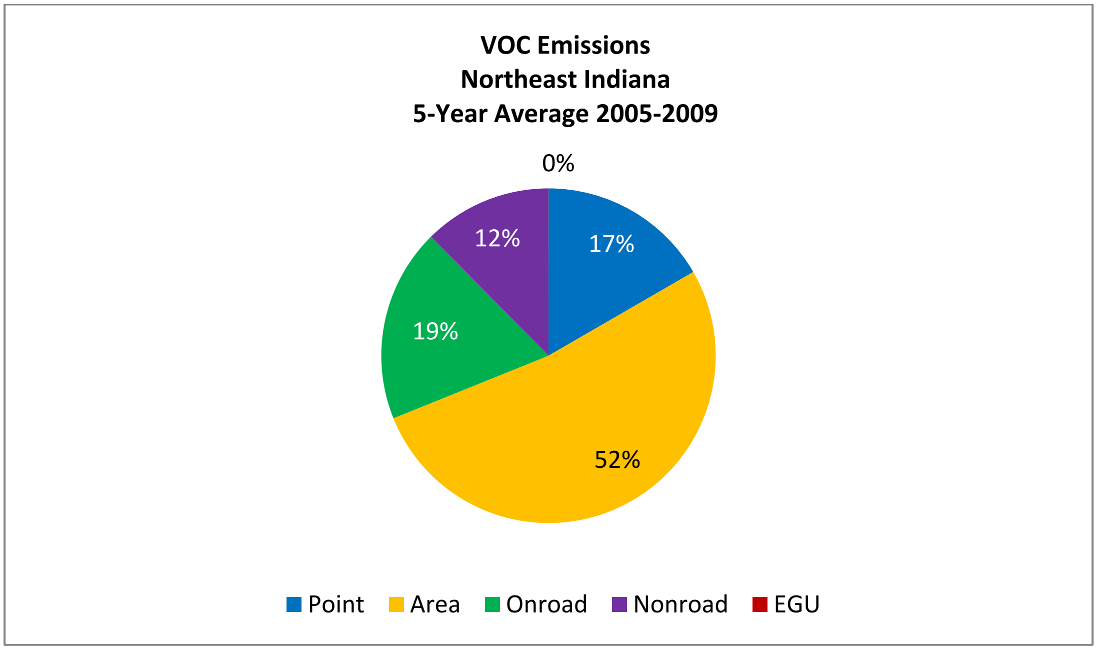


Chart 7: Northeast Indiana VOC Emissions



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 16 and 17 illustrate, NO_x and VOC emissions have decreased by 63% and 68%, respectively, within the Northeast 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 primarily 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 two monitoring sites within Northeast Indiana, located in Whitley County currently measuring PM_{10}. The trend data in Graph 18 reflect the annual arithmetic mean which is used to compare to the primary and secondary annual PM_{10} standards of 50 µg/m^3. The highest value from all of the monitors in the Northeast 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 19 reflect the 2nd highest 24-hour PM_{10} concentration, which is used to compare to the primary and secondary 24-hour PM_{10} standards of 150 µg/m^3. Attainment of the primary and secondary 24-hour PM_{10} standards is determined by evaluating the 2nd highest 24-hour concentrations and is attained when the number of days per year with a 24-hour average above 150 µg/m^3 is equal to or less than 1 per year in a three-year period. The highest 2nd high concentration from all of the monitors in the Northeast 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 18 and 19. The monitoring data in Northeast 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 15 and 16 include the monitoring sites that measured annual and 24-hour PM_{10} from 2000 through 2010. Monitoring data for both annual and 24-hour PM_{10} prior to the year 2000 are available upon request. Monitoring data in Table 15 are compared to the primary and secondary annual PM_{10} standards of 50 µg/m^3 and show that the Northeast Indiana area has always been below the standards. Monitoring data in Table 16 are compared to the primary and secondary 24-hour PM_{10} standards of 150 µg/m^3 and show that the Northeast Indiana area has always been below the standards.

Graph 18: Northeast Indiana Annual Arithmetic Mean PM_{10} Values

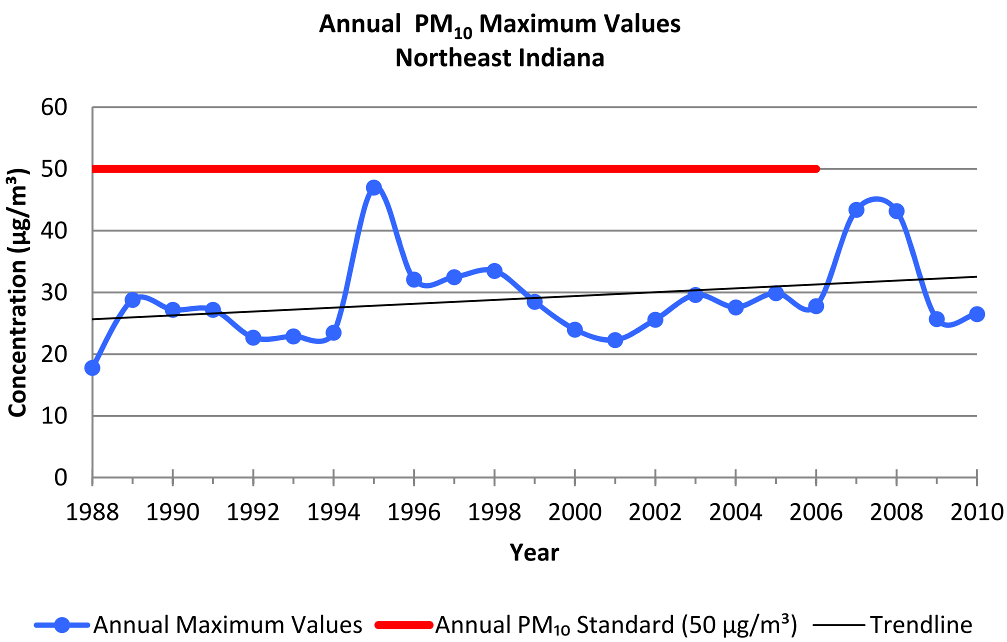


Table 15: Northeast Indiana Annual PM_{10} Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030004	Fort Wayne - Beacon St	20.2	18.0	17.9	18.8	16.7	24.0	17.5	19.6			
DeKalb	180330002	4500 CR 59	24.0	22.3									
DeKalb	180330003	4500 CR 59	21.5	20.4									
Whitley	181830001	SDI - West Site		18.6	25.6	25.2	22.8	29.9	27.8	41.9	35.6	21.2	22.0
Whitley	181830002	SDI - East Site		20.2	21.2	29.6	27.6	29.8	25.7	43.4	43.2	25.7	26.5

Highlighted red numbers are over the annual PM_{10} standard of 50 µg/m³

Graph 19: Northeast Indiana 24-Hour PM_{10} 2nd High Values

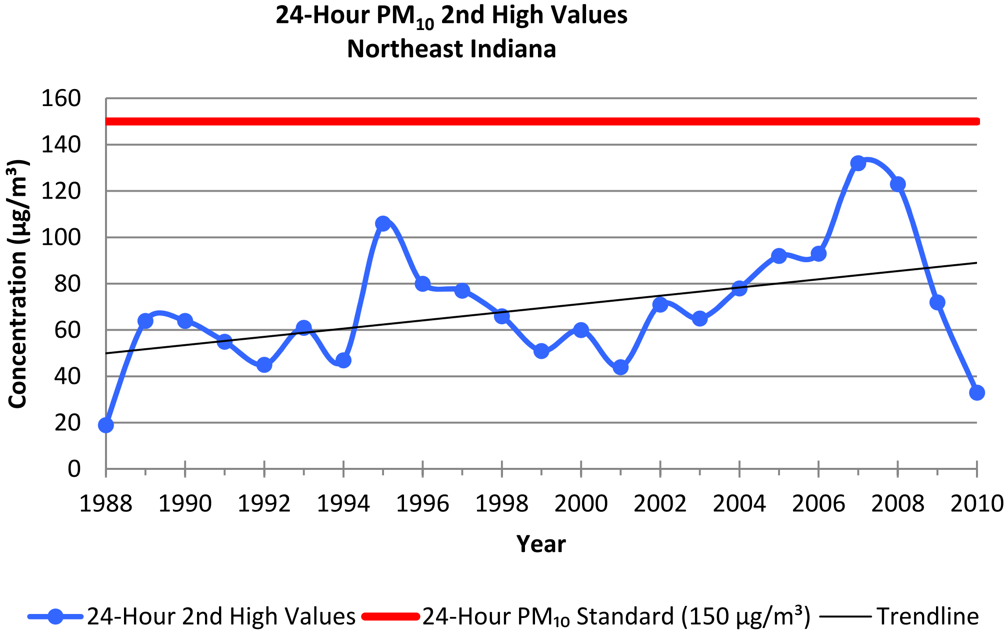


Table 16: Northeast Indiana 24-Hour 2nd High PM_{10} Monitoring Data Summary

County	Site #	Site Name	24-Hour 2nd High Value (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Allen	180030004	Fort Wayne - Beacon St	43	41	38	38	36	49	37	46			
DeKalb	180330002	4500 CR 59	60	44									
DeKalb	180330003	4500 CR 59	47	37									
Whitley	181830001	SDI - West Site		18	71	65	53	92	75	132	106	56	13
Whitley	181830001	SDI - East Site		25	45	54	78	73	93	111	123	72	33

Highlighted red numbers are over the 24-hour PM_{10} standard of 150 µg/m³

U.S. EPA's NEI contains emissions information for PM_{10} and is used in Graph 20 and Chart 8. Graph 20 illustrates the emissions trend for PM_{10} in Northeast Indiana and Chart 8 shows how the average emissions are distributed among the different source categories.

Graph 20: Northeast Indiana PM_{10} Emissions

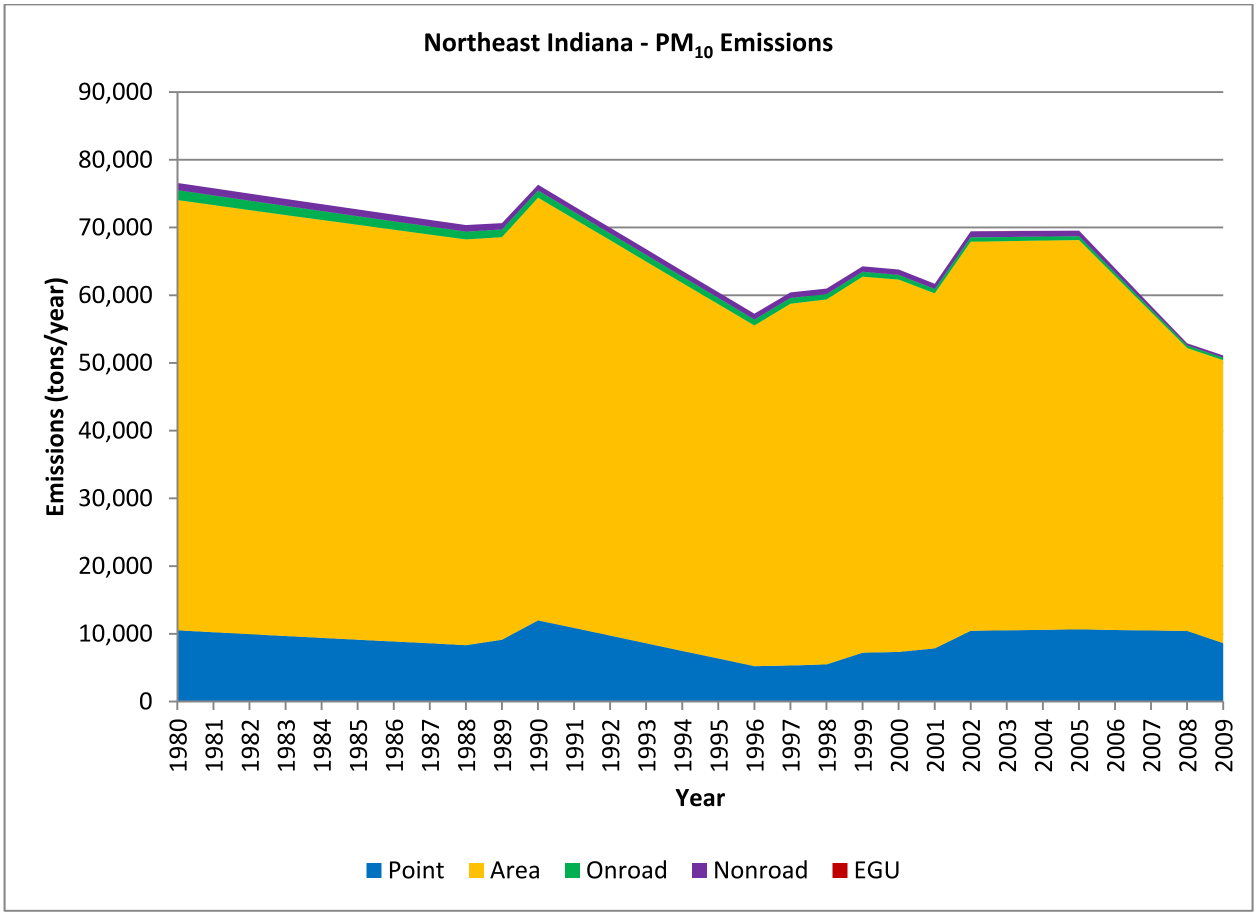
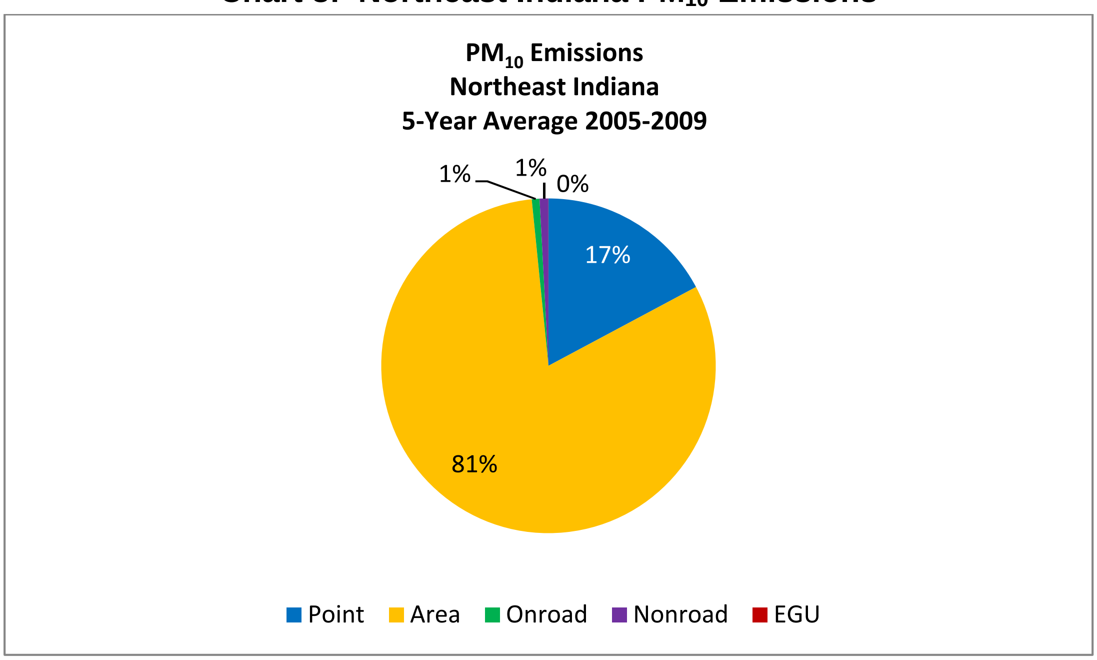


Chart 8: Northeast Indiana PM_{10} Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in PM_{10} values over time. As Graph 20 illustrates, total PM_{10} emissions have decreased by 33% within the Northeast Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. Reductions in PM_{10} are primarily due to better controls on local sources and secondary benefits from the implementation of federal programs to control other pollutants.

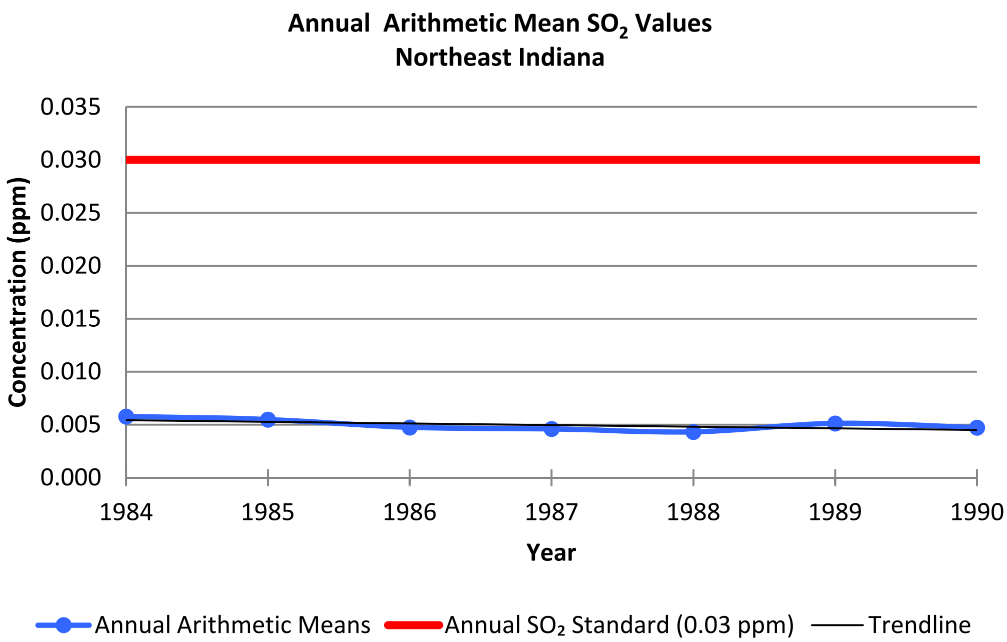
Sulfur Dioxide (SO_2)

One monitoring site in the Northeast Indiana area measured SO_2. This monitor was located in Allen County. The trend data in Graph 21 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 Northeast Indiana area is plotted on Graph 21 for each year.

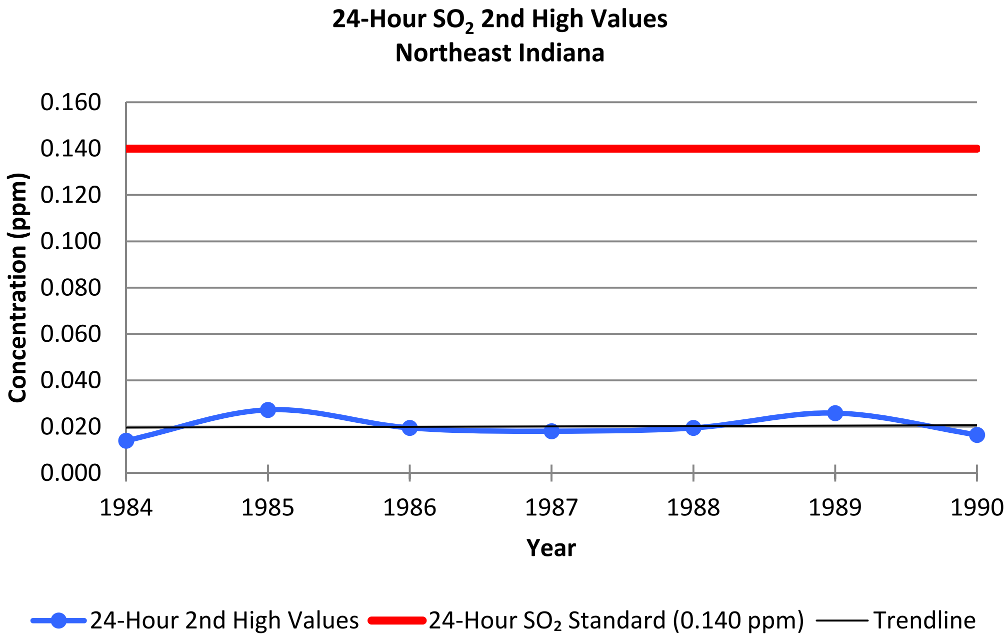
The trend data in Graph 22 reflect the 2nd highest 24-hour SO_2 concentrations, which were used to compare to the primary 24-hour SO_2 standard at 0.14 ppm. Attainment of the primary 24-hour SO_2 standard was determined by evaluating the 2nd highest 24-hour concentration, which could not exceed the standard. 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 Northeast Indiana area is plotted on Graph 22 for each year. The trend data in Graph 23 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 23 are not a true comparison to the primary 1-hour SO_2 standard. The values in Graph 23 reflect the highest 99th percentile from all of the monitors in the Northeast Indiana area which is plotted on the graph for each year. The 1-hour SO_2 standard at 75 ppb is not listed 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. 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.

SO_2 monitoring sites were discontinued in the Northeast Indiana area in 1990; therefore a table of current monitoring data for the annual, 24-hour, and 1-hour SO_2 values are not included in this report. However, historical monitoring data for annual, 24-hour, and 1-hour SO_2 from the monitoring site are available upon request.

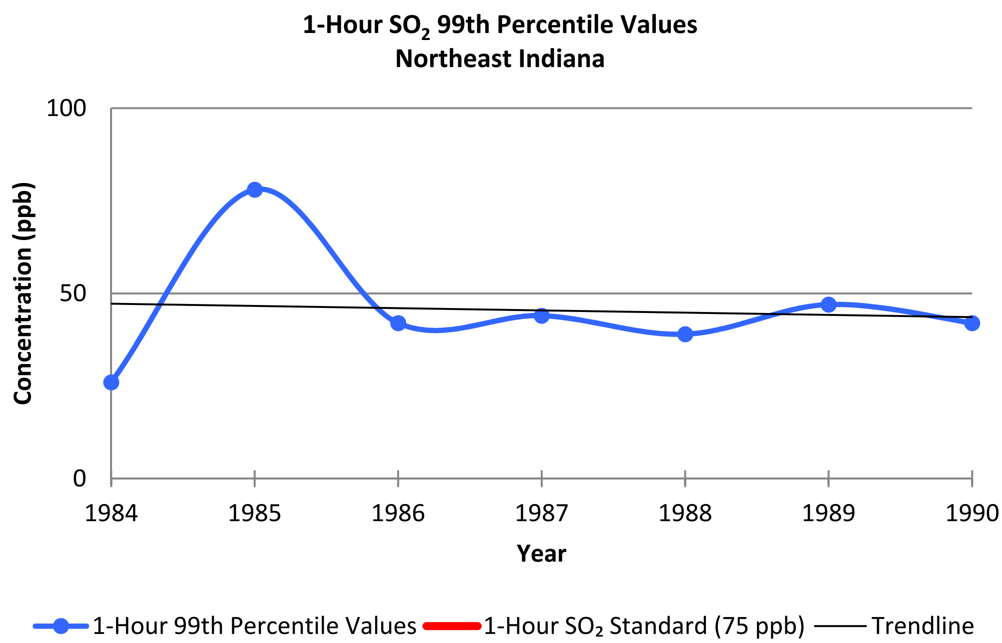
Graph 21: Northeast Indiana Annual Arithmetic Mean SO_2 Values



Graph 22: Northeast Indiana 24-Hour 2nd High SO_2 Values



Graph 23: Northeast Indiana 1-Hour SO_2 99th Percentile Values



While fluctuations in monitoring data are shown in Graphs 21, 22, and 23, monitoring data for SO_2 indicates a downward trend 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.

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

Graph 24: Northeast Indiana SO_2 Emissions

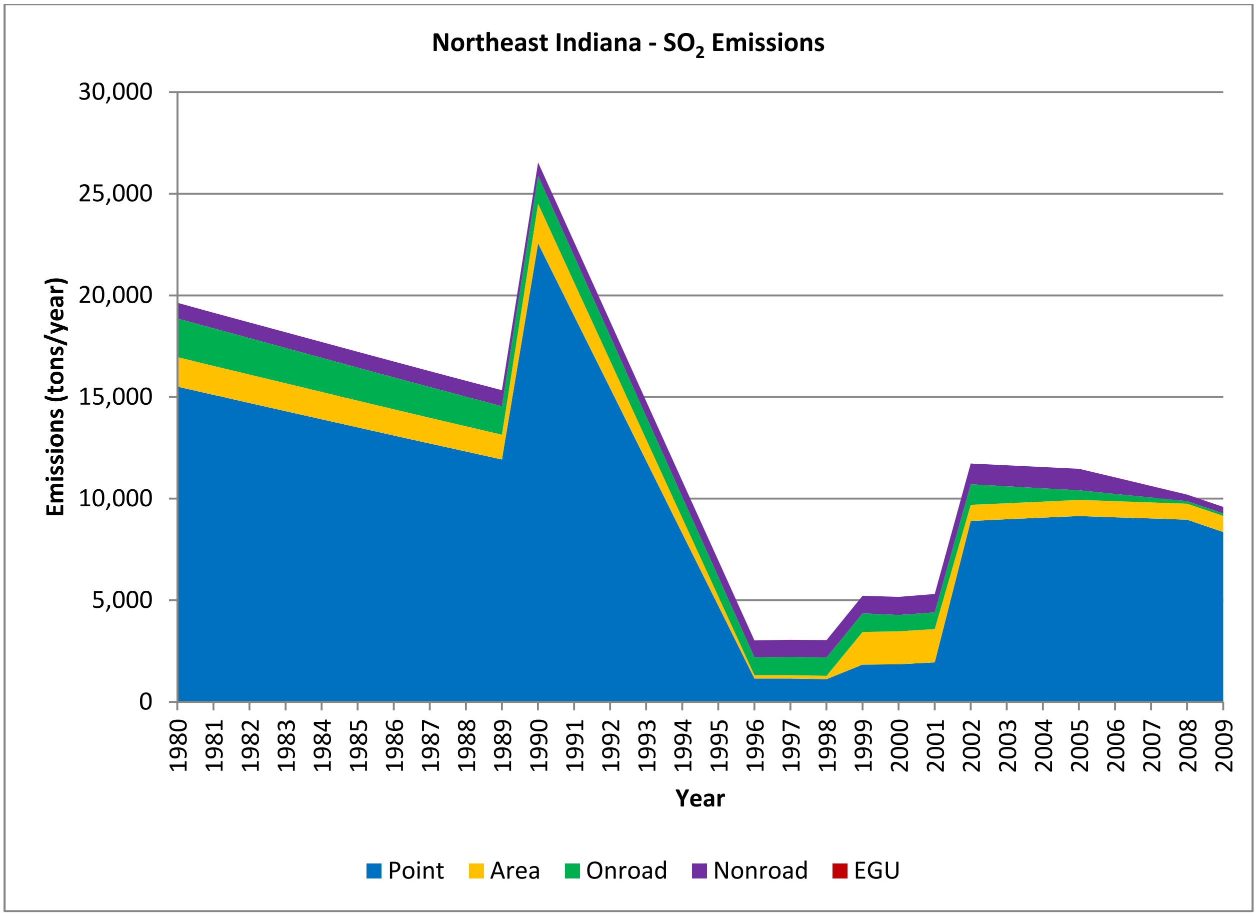
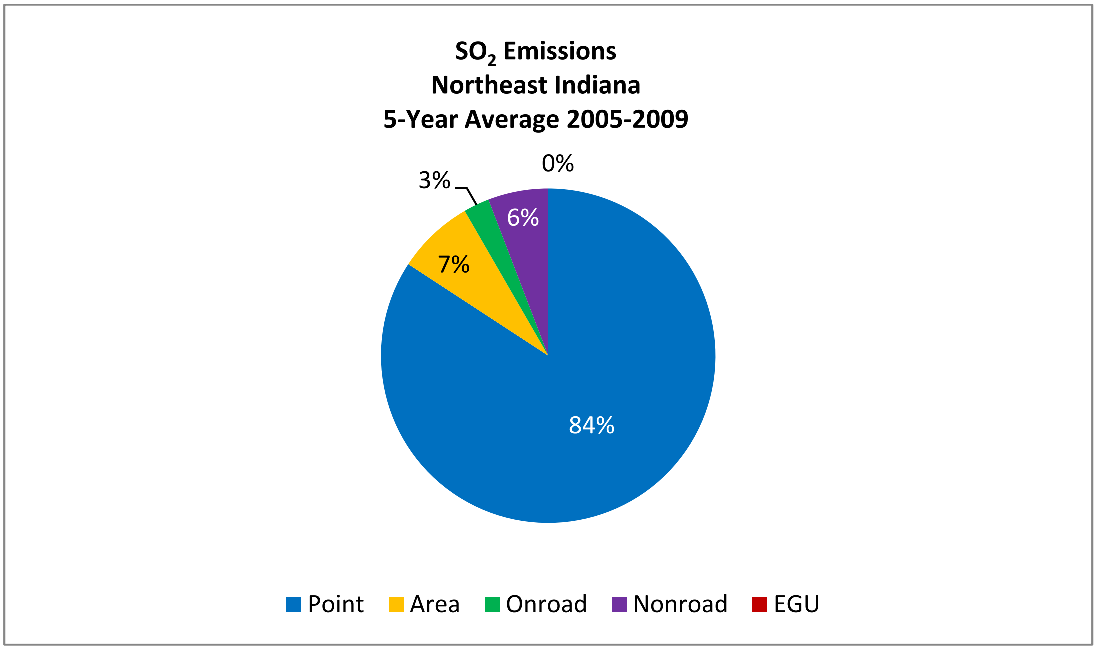


Chart 9: Northeast Indiana SO_2 Emissions



National and regional controls, such as the Acid Rain Program, engine and fuel standards, and the NO_x SIP Call have led to a decrease in SO_2 values over time. As Graph 24 illustrates, SO_2 emissions have decreased by 51% within the Northeast 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)

All available TSP data for Northeast Indiana are from monitors that were located in Allen County. The trend data in Graph 25 reflect the annual geometric mean values, which were used to compare to the primary and secondary annual TSP standards of 75 µg/m^3. The highest annual geometric mean from all of the monitors in the Northeast Indiana area is plotted on the graph for each year. The trend data in Graph 26 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 Northeast Indiana area is plotted on the graph for each year.

Both the primary and secondary annual TSP standards, as well as the primary and secondary 24-hour TSP standards, were revoked in 1987. TSP monitoring sites were discontinued across Indiana in 1995 because TSP was replaced by PM_{10}. Monitoring data for both annual and 24-hour TSP show a downward trend over time. Annual TSP monitoring values violated the primary and secondary annual TSP standards in 1980, but afterwards remained below the annual TSP standards for the Northeast Indiana area. While occasional spikes are seen in the 24-hour TSP values, the monitor values for Northeast Indiana have always been below the 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 17 and 18 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 Northeast 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 17 show the annual geometric mean for annual TSP for the years 1980 through 1991 which are compared to the primary and secondary annual $PM_{2.5}$ standards of 75 µg/m^3. Monitoring data in Table 18 show the 2^{nd} highest 24-hour TSP concentrations for the years 1980 through 1991, which are compared to the primary 24-hour TSP standard of 260 µg/m^3.

Graph 25: Northeast Indiana Annual Geometric Mean TSP Values

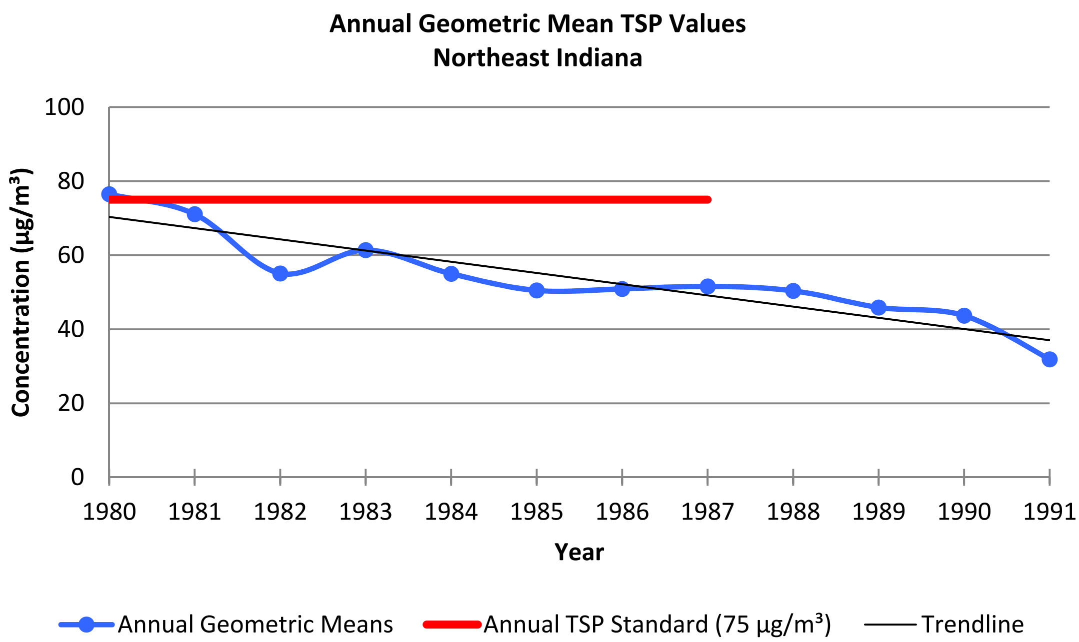


Table 17: Northeast Indiana Annual Geometric Mean TSP Values

County	Site #	Site Name	Annual Geometric Mean (µg/m^3)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Allen	180030003	Fort Wayne-Police Academy	77	71	55	61	55	51	49	52	50	46	44	32
Allen	180030004	Fort Wayne-Beacon Street	52	54	43	40	41	42	41	38	39			
Allen	180030004	Fort Wayne-Huntington & Kress Rd							51	45	43	42	39	

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

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

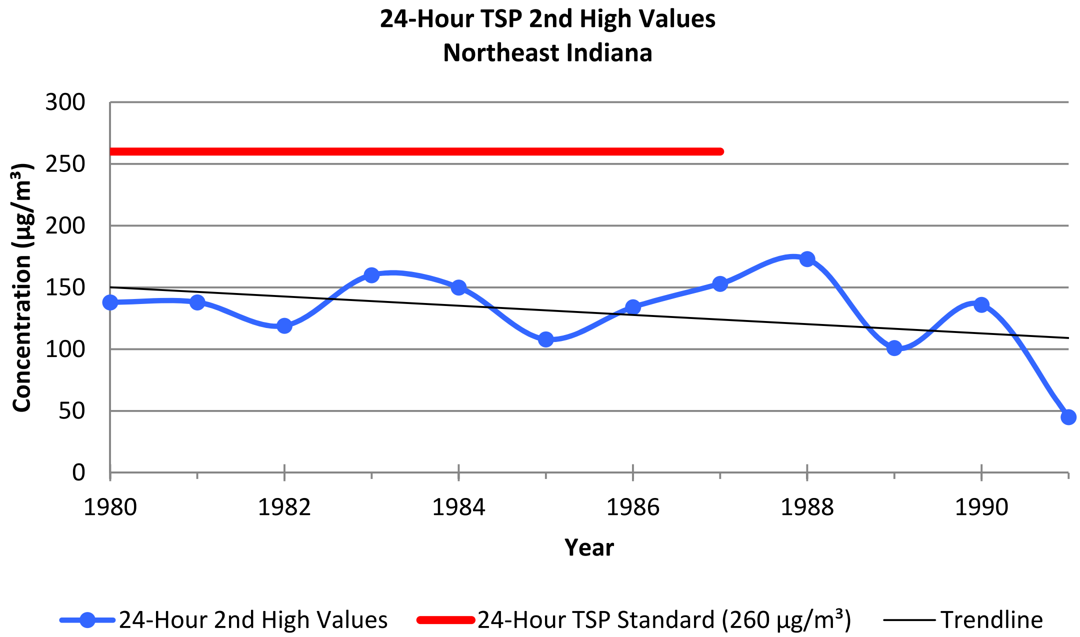


Table 18: Northeast Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	2nd High Values (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Allen	180030003	Fort Wayne-Police Academy	138	138	110	160	150	104	92	118	173	89	93	45
Allen	180030004	Fort Wayne-Beacon Street	97	103	119	100	114	108	85	88	99			
Allen	180030004	Fort Wayne-Huntington & Kress Rd							134	153	153	101	136	

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 is adequately protects public health. If a criteria pollutant standard is lowered in the future, the Northeast 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 Northeast 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 Northeast 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 Northeast 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).

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Appendix

Northeast Indiana County-Specific Emission Inventory Data

(1980-2009)

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Adams County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	22,356.78	3,057.71	2,215.66	10,355.96	1,694.12	4,808.40
1981	21,866.87	3,011.00	2,178.64	10,180.94	1,666.16	4,741.92
1982	21,376.97	2,964.28	2,141.61	10,005.92	1,638.20	4,675.44
1983	20,887.06	2,917.57	2,104.59	9,830.91	1,610.24	4,608.97
1984	20,397.15	2,870.85	2,067.57	9,655.89	1,582.29	4,542.49
1985	19,907.25	2,824.13	2,030.54	9,480.87	1,554.33	4,476.01
1986	19,417.34	2,777.42	1,993.52	9,305.85	1,526.37	4,409.54
1987	18,937.15	2,730.70	1,956.49	9,130.83	1,498.41	4,343.06
1988	18,458.74	2,683.99	1,919.47	8,955.81	1,470.45	4,276.58
1989	17,980.33	2,637.27	1,882.45	8,812.56	1,442.49	4,211.55
1990	15,009.42	2,461.88	1,877.95	10,736.22	2,028.04	4,676.96
1991	15,149.00	2,417.57	1,792.04	9,889.12	1,814.13	4,426.62
1992	15,288.58	2,373.26	1,706.14	9,042.02	1,600.22	4,176.29
1993	15,428.16	2,328.95	1,620.23	8,194.92	1,386.31	3,925.96
1994	15,567.74	2,284.63	1,534.33	7,347.82	1,172.40	3,675.62
1995	15,707.32	2,240.32	1,498.63	6,500.72	958.49	3,425.29
1996	15,846.90	2,196.01	1,464.04	5,653.62	744.58	3,174.95
1997	15,284.86	2,195.57	1,538.75	6,142.70	742.80	3,199.48
1998	14,762.46	2,143.25	1,537.66	6,153.46	729.74	3,008.74
1999	14,043.16	2,570.79	1,781.48	6,593.22	962.29	3,597.46
2000	13,949.17	2,539.16	1,794.71	6,581.45	943.01	3,646.15
2001	13,326.24	2,475.83	1,754.00	6,484.25	980.33	3,696.99
2002	14,869.77	2,387.14	1,307.50	7,266.82	1,264.09	3,737.45
2003	13,716.77	2,288.67	1,328.41	7,364.87	1,202.33	3,629.20
2004	12,563.77	2,190.21	1,349.33	7,462.93	1,140.58	3,520.95
2005	11,410.77	2,091.74	1,370.25	7,560.99	1,078.83	3,412.70
2006	8,843.02	1,721.37	1,332.15	6,957.83	1,097.24	3,162.71
2007	6,275.27	1,350.99	1,294.05	6,354.67	1,115.64	2,912.73
2008	3,707.52	980.62	1,255.95	5,751.52	1,134.04	2,662.75
2009	3,731.89	964.81	1,079.66	5,288.24	1,096.18	2,478.27
%Change 1980 to 2009	-83.31%	-68.45%	-51.27%	-48.94%	-35.30%	-48.46%

Allen County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	257,645.10	25,550.20	7,482.98	23,259.86	9,954.33	37,138.85
1981	250,877.55	25,095.90	7,305.27	22,916.27	9,655.47	36,402.32
1982	244,110.01	24,641.61	7,127.56	22,572.68	9,356.61	35,666.92
1983	237,342.47	24,187.31	6,949.85	22,229.09	9,057.75	34,934.59
1984	230,574.92	23,733.01	6,772.14	21,885.51	8,758.89	34,202.27
1985	223,807.38	23,278.72	6,594.43	21,541.92	8,460.03	33,469.94
1986	217,039.83	22,824.62	6,416.71	21,198.33	8,161.17	32,737.61
1987	210,272.29	22,371.14	6,239.00	20,854.74	7,862.30	32,005.28
1988	203,504.74	21,918.73	6,061.29	20,511.15	7,563.44	31,272.96
1989	196,737.20	21,466.33	5,883.58	20,697.59	7,264.58	30,540.63
1990	169,715.93	19,171.50	5,892.70	21,679.82	12,406.62	28,209.22
1991	167,742.05	19,104.16	5,727.49	20,811.40	10,512.58	27,801.11
1992	165,768.18	19,036.83	5,562.27	19,942.98	8,618.55	27,393.01
1993	163,794.30	18,969.49	5,397.06	19,074.56	6,724.51	26,984.91
1994	161,820.42	18,902.15	5,231.84	18,206.14	4,830.47	26,576.80
1995	159,846.55	18,834.82	5,128.09	17,337.72	2,936.44	26,168.70
1996	157,872.67	18,767.48	5,026.41	16,469.30	1,042.40	25,760.59
1997	151,465.74	18,889.14	5,240.11	17,619.01	1,050.01	25,448.29
1998	147,028.54	18,596.31	5,302.99	17,953.15	1,046.79	23,724.10
1999	139,530.07	17,839.79	5,414.94	18,389.72	1,421.71	25,058.60
2000	137,046.99	17,647.96	5,225.80	18,096.70	1,408.31	24,949.50
2001	134,276.33	17,251.44	4,778.14	17,120.69	1,441.38	25,195.11
2002	125,993.19	17,864.23	3,703.83	18,712.80	4,209.98	21,709.43
2003	116,097.89	17,300.37	3,682.57	18,685.53	4,161.82	20,960.13
2004	106,202.58	16,736.51	3,661.32	18,658.25	4,113.66	20,210.84
2005	96,307.28	16,172.65	3,640.06	18,630.97	4,065.50	19,461.54
2006	73,564.70	13,250.24	3,567.86	16,996.26	3,909.97	17,317.11
2007	50,822.12	10,327.83	3,495.66	15,361.55	3,754.44	15,172.68
2008	28,079.55	7,405.43	3,423.46	13,726.83	3,598.91	13,028.24
2009	28,052.42	7,385.58	3,143.57	12,935.78	3,598.91	12,458.50
%Change 1980 to 2009	-89.11%	-71.09%	-57.99%	-44.39%	-63.85%	-66.45%

DeKalb County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	39,213.77	5,445.11	2,017.79	6,081.75	719.70	6,167.67
1981	38,243.54	5,377.69	1,977.28	6,008.99	730.86	6,079.16
1982	37,273.30	5,310.27	1,936.78	5,936.23	742.03	5,990.65
1983	36,303.06	5,242.85	1,896.27	5,863.47	753.19	5,902.13
1984	35,332.82	5,175.43	1,855.77	5,790.71	764.35	5,813.62
1985	34,362.58	5,108.01	1,815.26	5,717.95	775.51	5,725.11
1986	33,392.34	5,040.59	1,774.75	5,645.19	790.97	5,637.71
1987	32,422.11	4,973.17	1,734.25	5,572.43	811.70	5,551.04
1988	31,451.87	4,905.75	1,693.74	5,499.67	832.44	5,464.36
1989	30,494.23	4,838.33	1,653.24	5,479.43	853.17	5,377.71
1990	27,119.68	4,176.11	1,652.94	5,865.86	1,801.82	5,225.45
1991	26,700.66	4,242.57	1,591.01	5,658.26	1,554.71	5,144.86
1992	26,281.64	4,309.03	1,529.08	5,450.67	1,307.61	5,064.27
1993	25,862.63	4,375.49	1,467.15	5,243.07	1,060.50	4,983.68
1994	25,443.61	4,441.95	1,413.81	5,035.47	813.39	4,903.08
1995	25,024.59	4,508.41	1,362.50	4,827.87	566.29	4,822.49
1996	24,605.57	4,574.87	1,314.15	4,620.28	319.18	4,741.90
1997	23,695.63	4,635.23	1,346.85	4,850.02	325.70	4,764.26
1998	23,047.00	4,617.56	1,356.76	4,953.55	323.63	4,555.83
1999	22,740.54	4,977.09	1,430.15	5,140.08	499.93	4,707.12
2000	22,508.93	4,926.49	1,451.09	5,150.59	498.88	4,740.56
2001	22,233.87	4,924.20	1,384.11	4,993.93	514.56	4,822.86
2002	22,523.27	5,209.89	1,512.96	6,021.41	1,531.92	4,812.13
2003	21,087.70	5,236.36	1,515.59	6,034.45	1,545.92	4,768.15
2004	19,652.13	5,262.82	1,518.21	6,047.49	1,559.91	4,724.17
2005	18,216.57	5,289.29	1,520.84	6,060.53	1,573.91	4,680.18
2006	14,238.18	4,481.57	1,499.29	5,661.80	1,512.65	4,185.35
2007	10,259.80	3,673.85	1,477.75	5,263.07	1,451.38	3,690.52
2008	6,281.41	2,866.13	1,456.20	4,864.34	1,390.12	3,195.68
2009	6,178.14	2,839.97	1,009.01	4,948.04	1,299.36	2,991.39
%Change 1980 to 2009	-76.49%	-47.84%	-49.99%	-18.64%	80.54%	-51.50%

Huntington County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	44,728.24	5,582.56	3,257.08	9,677.13	2,502.27	7,689.46
1981	43,814.67	5,471.10	3,190.39	9,523.52	2,417.49	7,507.13
1982	42,901.10	5,359.64	3,123.70	9,369.91	2,332.71	7,324.81
1983	41,987.53	5,248.18	3,057.00	9,216.30	2,247.93	7,142.49
1984	41,073.96	5,136.72	2,990.31	9,062.69	2,163.14	6,960.16
1985	40,160.39	5,025.26	2,923.62	8,909.09	2,078.36	6,777.84
1986	39,246.81	4,913.80	2,856.93	8,755.48	1,993.58	6,595.52
1987	38,333.24	4,802.34	2,790.24	8,601.87	1,908.79	6,413.19
1988	37,419.67	4,690.88	2,723.55	8,448.26	1,824.01	6,230.87
1989	36,506.10	4,579.42	2,656.85	8,490.40	1,739.23	6,048.54
1990	30,802.63	4,055.59	2,972.81	10,146.29	2,891.82	5,372.90
1991	31,065.84	4,020.99	2,732.23	9,365.79	2,439.19	5,310.15
1992	31,329.05	3,986.38	2,491.66	8,585.29	1,986.56	5,247.40
1993	31,592.26	3,951.78	2,251.08	7,804.78	1,533.94	5,184.66
1994	31,855.47	3,917.18	2,010.50	7,024.28	1,081.31	5,121.91
1995	32,118.68	3,882.57	1,898.88	6,243.77	628.68	5,059.16
1996	32,381.89	3,847.97	1,797.49	5,463.27	176.05	4,996.41
1997	32,106.55	3,882.15	1,909.00	6,056.81	179.21	5,062.38
1998	31,596.88	3,831.61	1,879.43	5,854.88	180.48	4,844.89
1999	29,092.95	3,810.84	1,913.82	6,054.61	585.68	4,486.26
2000	29,192.41	3,735.99	1,954.56	6,079.19	593.34	4,461.02
2001	29,377.71	3,685.77	1,909.48	5,939.29	619.44	4,543.11
2002	28,303.37	3,714.93	1,131.30	6,371.00	745.16	3,502.19
2003	26,420.24	3,506.05	1,122.11	6,360.51	798.51	3,377.20
2004	24,537.11	3,297.17	1,112.91	6,350.02	851.87	3,252.21
2005	22,653.97	3,088.28	1,103.72	6,339.52	905.23	3,127.22
2006	18,928.68	2,480.22	1,089.61	5,867.72	824.94	2,785.57
2007	15,203.39	1,872.15	1,075.51	5,395.92	744.64	2,443.91
2008	11,478.10	1,264.08	1,061.40	4,924.12	664.35	2,102.25
2009	10,676.06	1,223.08	1,037.78	4,865.63	596.02	1,814.43
%Change 1980 to 2009	-65.92%	-78.09%	-68.14%	-49.72%	-76.18%	-76.40%

Lagrange County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	41,118.29	4,182.38	1,972.39	5,941.57	550.03	5,189.15
1981	40,110.39	4,124.58	1,941.57	5,923.25	555.28	5,128.64
1982	39,102.49	4,066.78	1,910.75	5,904.93	560.52	5,068.13
1983	38,099.18	4,008.97	1,879.93	5,886.61	565.76	5,007.62
1984	37,096.86	3,951.17	1,849.11	5,868.29	571.00	4,947.10
1985	36,094.53	3,893.37	1,818.29	5,849.97	576.25	4,886.59
1986	35,099.68	3,835.57	1,787.47	5,831.65	581.49	4,826.08
1987	34,107.61	3,777.77	1,756.65	5,813.33	586.73	4,765.57
1988	33,115.54	3,719.96	1,725.83	5,795.00	591.98	4,705.06
1989	32,123.47	3,662.16	1,695.01	5,812.81	597.22	4,644.55
1990	27,533.68	3,201.38	1,568.63	5,632.89	1,082.24	4,142.74
1991	27,364.27	3,220.95	1,545.42	5,631.14	927.05	4,183.55
1992	27,194.86	3,240.52	1,522.21	5,629.39	771.86	4,224.36
1993	27,025.46	3,260.09	1,499.01	5,627.64	616.67	4,265.17
1994	26,856.05	3,279.66	1,475.80	5,625.89	461.48	4,305.97
1995	26,686.64	3,299.23	1,452.75	5,624.14	306.29	4,346.78
1996	26,517.23	3,318.80	1,429.73	5,622.39	151.10	4,387.59
1997	25,813.40	3,348.19	1,431.14	5,699.60	154.84	4,415.36
1998	25,282.59	3,302.63	1,450.59	5,807.90	156.63	4,292.32
1999	24,285.56	3,421.15	1,471.69	5,999.52	808.82	4,400.23
2000	24,164.87	3,347.60	1,492.79	5,999.22	801.51	4,429.63
2001	23,971.15	3,258.71	1,409.07	5,790.21	808.93	4,513.06
2002	21,966.98	3,730.17	1,135.36	6,354.60	808.79	4,259.95
2003	20,630.66	3,528.63	1,141.23	6,361.30	796.47	4,181.56
2004	19,294.35	3,327.09	1,147.10	6,367.99	784.14	4,103.16
2005	17,958.03	3,125.55	1,152.97	6,374.68	771.81	4,024.77
2006	13,879.41	2,536.07	1,127.27	5,816.88	748.35	3,533.36
2007	9,800.79	1,946.59	1,101.56	5,259.08	724.90	3,041.95
2008	5,722.17	1,357.11	1,075.86	4,701.27	701.44	2,550.54
2009	5,576.02	1,357.11	891.88	4,701.27	701.44	2,330.43
%Change 1980 to 2009	-79.50%	-67.55%	-54.78%	-20.87%	27.53%	-55.09%

Noble County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	28,212.09	4,368.00	2,038.09	6,897.94	1,923.37	5,442.47
1981	27,699.61	4,327.19	2,002.91	6,852.51	1,880.37	5,383.87
1982	27,187.14	4,286.37	1,967.73	6,807.08	1,837.37	5,325.28
1983	26,674.66	4,245.55	1,932.56	6,761.65	1,794.37	5,266.68
1984	26,162.19	4,204.99	1,897.38	6,728.42	1,751.38	5,208.09
1985	25,649.71	4,164.49	1,873.15	6,700.25	1,708.38	5,149.50
1986	25,137.24	4,124.00	1,854.65	6,672.08	1,665.38	5,092.72
1987	24,624.76	4,083.50	1,836.14	6,643.91	1,622.38	5,037.53
1988	24,112.29	4,043.00	1,817.64	6,615.74	1,579.38	4,982.33
1989	23,599.81	4,002.50	1,799.13	6,674.80	1,536.38	4,927.14
1990	18,542.73	3,384.90	1,578.86	6,944.22	2,840.19	4,297.50
1991	19,205.94	3,483.76	1,568.55	6,726.49	2,403.55	4,386.26
1992	19,869.15	3,582.62	1,558.25	6,508.75	1,966.91	4,475.01
1993	20,532.36	3,681.48	1,547.94	6,291.02	1,530.28	4,563.77
1994	21,195.56	3,780.33	1,537.64	6,073.29	1,093.64	4,652.52
1995	21,858.77	3,879.19	1,534.18	5,855.55	657.00	4,741.27
1996	22,521.98	3,978.05	1,530.90	5,637.82	220.36	4,830.03
1997	21,618.54	3,982.87	1,552.90	5,796.57	222.18	4,855.25
1998	20,943.88	3,916.23	1,532.60	5,716.57	220.87	4,615.19
1999	20,774.34	3,860.16	2,317.39	6,656.04	385.87	4,619.86
2000	21,421.73	3,925.02	2,371.49	6,695.43	384.34	4,731.88
2001	19,906.52	3,740.27	2,342.22	6,575.30	389.79	4,726.43
2002	22,724.83	4,097.24	1,563.94	7,292.42	1,311.20	4,665.27
2003	21,033.91	3,945.60	1,546.88	7,261.62	1,294.47	4,484.82
2004	19,343.00	3,793.97	1,529.82	7,230.81	1,277.74	4,304.37
2005	17,652.08	3,642.34	1,512.77	7,200.01	1,261.01	4,123.92
2006	13,824.06	3,100.98	1,505.62	6,642.59	1,224.19	3,737.91
2007	9,996.04	2,559.63	1,498.47	6,085.17	1,187.37	3,351.90
2008	6,168.01	2,018.28	1,491.31	5,527.75	1,150.55	2,965.89
2009	6,165.86	2,072.34	1,476.49	5,448.59	1,025.54	2,839.17
%Change 1980 to 2009	-78.14%	-52.56%	-27.55%	-21.01%	-46.68%	-47.83%

Steuben County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	46,526.39	4,629.46	1,496.47	4,410.07	1,459.39	6,300.75
1981	45,394.31	4,561.98	1,471.07	4,400.43	1,420.99	6,190.27
1982	44,262.24	4,494.49	1,445.67	4,390.79	1,382.60	6,079.79
1983	43,130.17	4,427.01	1,420.28	4,381.15	1,344.21	5,969.31
1984	41,998.10	4,359.53	1,394.88	4,371.51	1,305.81	5,858.82
1985	40,866.03	4,292.04	1,369.48	4,361.87	1,267.42	5,748.34
1986	39,733.96	4,224.56	1,344.09	4,352.23	1,229.02	5,637.86
1987	38,601.89	4,157.07	1,318.69	4,342.59	1,190.63	5,527.38
1988	37,469.81	4,089.59	1,293.29	4,332.95	1,152.24	5,416.89
1989	36,337.74	4,022.10	1,267.90	4,387.18	1,113.84	5,306.41
1990	31,841.77	3,381.34	1,135.40	4,338.67	2,008.49	4,511.85
1991	31,430.67	3,431.88	1,132.23	4,312.46	1,697.98	4,576.30
1992	31,019.57	3,482.43	1,129.06	4,286.24	1,387.48	4,640.76
1993	30,608.47	3,532.98	1,125.89	4,260.03	1,076.97	4,705.21
1994	30,197.37	3,583.52	1,122.72	4,233.82	766.46	4,769.66
1995	29,786.27	3,634.07	1,123.90	4,207.60	455.96	4,834.12
1996	29,375.17	3,684.61	1,126.06	4,181.39	145.45	4,898.57
1997	28,582.84	3,743.59	1,150.87	4,349.07	149.10	4,927.29
1998	27,930.94	3,708.70	1,161.44	4,453.88	150.76	4,760.06
1999	26,591.02	3,715.16	1,282.19	4,725.12	212.68	4,432.70
2000	26,414.42	3,613.42	1,284.84	4,646.20	199.64	4,418.59
2001	26,494.40	3,558.12	1,199.16	4,420.54	205.93	4,468.33
2002	25,896.24	4,141.72	941.62	5,107.31	829.50	4,082.95
2003	24,073.49	3,877.43	937.91	5,103.42	813.54	4,000.54
2004	22,250.75	3,613.13	934.20	5,099.53	797.59	3,918.13
2005	20,428.00	3,348.84	930.48	5,095.65	781.64	3,835.72
2006	15,619.34	2,598.92	913.10	4,677.75	755.64	3,259.43
2007	10,810.69	1,849.01	895.72	4,259.86	729.64	2,683.13
2008	6,002.04	1,099.09	878.33	3,841.96	703.64	2,106.84
2009	6,002.04	1,099.09	878.33	3,841.96	703.64	2,106.84
%Change 1980 to 2009	-87.10%	-76.26%	-41.31%	-12.88%	-51.79%	-66.56%

Wells County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	23,026.38	2,922.95	1,890.47	5,577.99	559.53	3,499.90
1981	22,352.95	2,858.54	1,861.73	5,598.98	548.38	3,435.94
1982	21,679.52	2,794.14	1,832.99	5,619.96	537.53	3,371.99
1983	21,006.09	2,729.73	1,804.26	5,640.95	526.67	3,308.03
1984	20,332.66	2,665.33	1,775.52	5,661.93	515.82	3,244.08
1985	19,659.24	2,600.92	1,746.78	5,682.92	504.96	3,180.12
1986	18,985.81	2,536.51	1,718.05	5,703.90	494.11	3,116.17
1987	18,312.38	2,472.11	1,689.31	5,724.89	483.26	3,052.21
1988	17,638.95	2,407.70	1,660.58	5,745.88	472.40	2,988.25
1989	16,965.52	2,343.29	1,631.84	5,792.76	461.55	2,924.30
1990	16,975.30	2,208.31	1,655.92	6,352.11	816.99	2,803.99
1991	16,019.12	2,146.87	1,593.95	6,202.83	697.75	2,748.34
1992	15,062.93	2,085.43	1,531.99	6,053.54	578.51	2,692.68
1993	14,106.75	2,024.00	1,470.02	5,904.26	459.28	2,637.03
1994	13,150.57	1,962.56	1,408.06	5,754.98	340.04	2,581.38
1995	12,194.38	1,901.12	1,348.19	5,605.69	220.80	2,525.72
1996	11,238.20	1,839.68	1,288.78	5,456.41	101.56	2,470.07
1997	10,780.53	1,837.94	1,323.55	5,665.23	103.22	2,477.37
1998	10,404.88	1,800.48	1,263.54	5,381.00	103.70	2,378.15
1999	10,640.76	1,780.20	1,377.01	5,614.16	173.49	2,305.49
2000	10,762.76	1,784.07	1,383.29	5,576.53	172.05	2,335.11
2001	10,274.22	1,714.80	1,343.33	5,462.79	174.87	2,340.32
2002	10,391.42	1,759.37	1,130.85	6,964.85	424.98	2,183.94
2003	9,642.73	1,682.36	1,127.23	6,961.05	419.01	2,120.45
2004	8,894.05	1,605.35	1,123.62	6,957.24	413.04	2,056.95
2005	8,145.36	1,528.34	1,120.00	6,953.44	407.07	1,993.46
2006	6,443.81	1,242.56	1,106.71	6,484.99	387.27	1,833.82
2007	4,742.26	956.79	1,093.41	6,016.54	367.47	1,674.19
2008	3,040.71	671.01	1,080.12	5,548.08	347.66	1,514.55
2009	3,165.66	650.77	1,038.57	5,439.75	281.12	1,512.75
%Change 1980 to 2009	-86.25%	-77.74%	-45.06%	-2.48%	-49.76%	-56.78%

Whitley County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	23,937.42	2,748.18	1,488.05	4,403.92	267.88	4,593.98
1981	23,389.28	2,718.50	1,470.80	4,412.11	273.98	4,516.29
1982	22,841.13	2,688.82	1,453.55	4,420.29	280.08	4,438.59
1983	22,292.98	2,659.14	1,436.30	4,428.48	286.19	4,360.90
1984	21,744.84	2,629.46	1,419.05	4,436.67	292.29	4,283.20
1985	21,196.69	2,599.77	1,401.80	4,444.86	298.40	4,205.51
1986	20,648.54	2,570.09	1,384.55	4,453.05	304.50	4,127.81
1987	20,100.40	2,540.41	1,367.30	4,461.24	310.60	4,050.12
1988	19,557.37	2,510.73	1,350.05	4,469.43	316.71	3,972.42
1989	19,015.53	2,481.05	1,332.80	4,514.38	322.81	3,894.73
1990	16,708.37	2,202.67	1,196.16	4,636.72	667.38	2,651.84
1991	16,583.74	2,229.24	1,177.81	4,560.30	577.35	2,935.38
1992	16,459.11	2,255.80	1,159.46	4,483.89	487.32	3,218.93
1993	16,334.48	2,282.37	1,141.11	4,407.47	397.29	3,502.48
1994	16,209.85	2,308.94	1,122.76	4,331.05	307.25	3,786.02
1995	16,085.22	2,335.50	1,120.29	4,254.64	217.22	4,069.56
1996	15,960.59	2,362.07	1,119.47	4,178.22	127.19	4,353.11
1997	15,302.73	2,358.36	1,129.22	4,260.72	128.48	4,442.21
1998	14,848.17	2,312.51	1,219.16	4,732.04	128.68	4,338.73
1999	13,983.59	2,330.14	1,557.63	5,124.72	173.25	2,807.37
2000	13,638.14	2,281.36	1,546.03	4,985.12	168.19	2,796.48
2001	13,207.74	2,227.20	1,523.79	4,915.77	171.65	2,805.52
2002	15,182.22	2,600.60	977.84	5,377.27	603.93	3,035.50
2003	14,109.73	2,519.36	968.08	5,366.35	610.99	2,883.66
2004	13,037.24	2,438.12	958.31	5,355.43	618.06	2,731.83
2005	11,964.75	2,356.88	948.54	5,344.50	625.12	2,579.99
2006	9,258.54	1,963.96	934.27	4,905.56	586.54	2,339.88
2007	6,552.33	1,571.04	920.00	4,466.62	547.96	2,099.77
2008	3,846.12	1,178.13	905.72	4,027.68	509.38	1,859.66
2009	3,910.32	1,107.57	743.39	3,663.69	293.12	1,692.09
%Change 1980 to 2009	-83.66%	-59.70%	-50.04%	-16.81%	9.42%	-63.17%