CRITERIA POLLUTANTS

Air Quality Trend Analysis Report
(1980-2010)

NORTHWEST 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

RVP .... reid vapor pressure

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 Northwest Indiana area is composed of seven counties. The counties represented in the area shown in Figure 1 are: Jasper, Lake, LaPorte, Newton, Porter, Pulaski, and Starke. Four major interstates pass through the Northwest Indiana area, Interstate (I)-65 through Jasper, Lake, and Newton counties; I-80 through Lake, LaPorte, and Porter counties; I-90 through Lake County; and I-94 through Lake, LaPorte, and Porter counties.

There are currently 21 criteria pollutant monitoring sites in Northwest Indiana collecting data for carbon monoxide (CO), fine particles ($PM_{2.5}$), lead, nitrogen dioxide (NO_2), ozone, particulate matter (PM_{10}), and sulfur dioxide (SO_2). The map in Figure 1 reflects only the monitors that are currently in operation. Monitoring data for the years 2000 through 2010 for Northwest 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 Northwest Indiana area include United States Steel Corporation-Gary Works, Arcelor Mittal Burns Harbor Incorporated, Arcelor Mittal Indiana Harbor East, and the Northern Indiana Public Service Company-Schahfer Generating Station. 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 Northwest Indiana Counties and Monitors

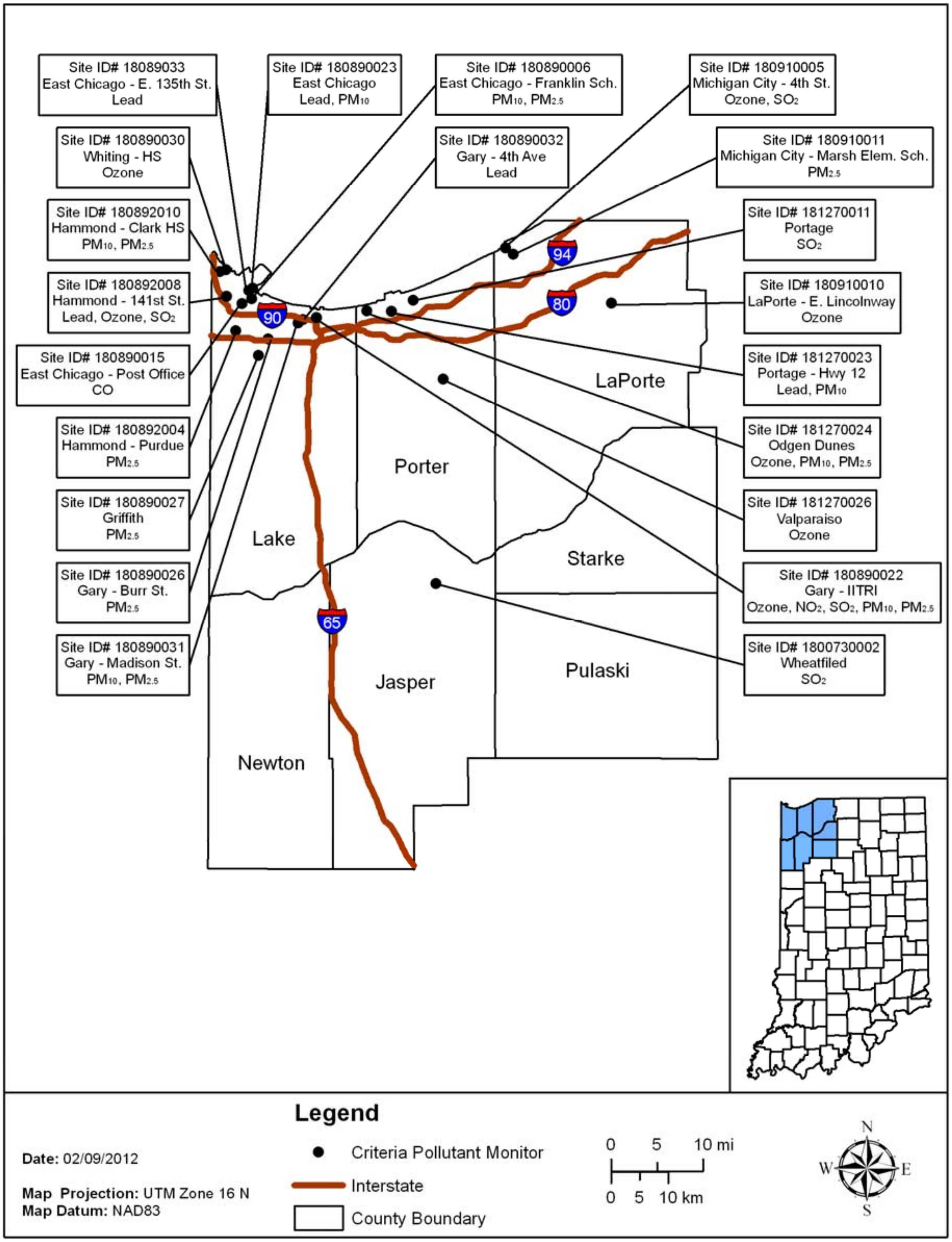

Table 1: Northwest Indiana County Population Information

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
JASPER	RENSSELAER	RENSSELAER	13,168	26,138	24,960	30,043	33,478	28%
LAKE	CROWN POINT	CROWN POINT	208,750	522,917	475,594	484,564	496,005	-5%
LAPORTE	LAPORTE	MICHIGAN CITY	48,448	108,632	107,066	110,106	111,467	3%
NEWTON	KENTLAND	KENTLAND	6,030	14,844	13,551	14,566	14,244	-4%
PORTER	VALPARAISO	PORTAGE	66,179	119,816	128,932	146,798	164,343	37%
PULASKI	WINAMAC	WINAMAC	6,060	13,258	12,643	13,755	13,402	1%
STARKE	KNOX	KNOX	10,962	21,997	22,747	23,556	23,363	6%

Table 1 shows that Porter County has had the highest percent growth in population between 1980 and 2010, increasing by 37%. While Porter County is growing significantly, the population density is much less than Lake County which experienced a moderate population decrease of 26,912 people since 1980. Jasper, LaPorte, Pulaski, and Starke counties also experienced an increase in population between 1980 and 2010. Newton County experienced a moderate decrease in population between 1980 and 2010. An increase or decrease in population within the counties in the Northwest Indiana area can largely be attributed to changes in the job market and the location of jobs in the Northwest 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 the change in population occurs away from the employment centers.

Table 2: Northwest 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
JASPER	1,194	40,214	881,445	1,976,000	124%
LAKE	2,815	406,680	6,778,807	11,801,000	74%
LAPORTE	1,651	117,241	2,431,740	3,937,000	62%
NEWTON	831	18,296	606,249	673,000	11%
PORTER	1,504	157,802	2,310,296	4,621,000	100%
PULASKI	1,001	17,191	573,793	517,000	-10%
STARKE	835	27,728	519,237	645,000	24%

Table 2 illustrates that Lake and Porter counties had the highest increase in daily VMT since 1980. The daily VMT for 6 of the 7 counties in the Northwest 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 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 turnover where newer, cleaner vehicles replace older, more polluting ones.

Table 3: 2009 Northwest Indiana Commuting Patterns

COUNTY	PEOPLE WHO LIVE AND WORK IN THE COUNTY	PEOPLE WHO LIVE IN COUNTY BUT WORK OUTSIDE THE COUNTY	PEOPLE WHO LIVE IN ANOTHER COUNTY OR STATE BUT WORK IN COUNTY	TOP COUNTY OR STATE SENDING WORKERS INTO COUNTY	PEOPLE FROM TOP COUNTY OR STATE SENDING WORKERS INTO COUNTY	TOP COUNTY OR STATE RECEIVING WORKERS FROM COUNTY	PEOPLE FROM TOP COUNTY OR STATE RECEIVING WORKERS FROM COUNTY
JASPER	16,107	5,366	2,753	NEWTON	727	LAKE	2,561
LAKE	244,291	52,366	38,199	PORTER	19,162	STATE OF ILLINOIS	36,626
LAPORTE	58,262	9,975	6,866	PORTER	3,230	PORTER	3,527
NEWTON	6,177	3,188	1,109	JASPER	314	LAKE	1,371
PORTER	76,079	30,311	13,159	LAKE	6,227	LAKE	19,162
PULASKI	6,830	1,756	1,084	STARKE	293	JASPER	275
STARKE	9,726	4,630	848	PULASKI	255	MARSHALL	1,400

Information in Table 3 from 2009 demonstrates that the largest workforce in Northwest Indiana is found in Lake County. Commuting patterns in Northwest Indiana also center around Lake County. Since Lake County has the highest population and the highest commuting pattern to and from the county, emissions within Lake County are expected to be higher than surrounding counties in the Northwest Indiana area. The Northwest Indiana area commuting patterns reflect that of many urban areas around the country. The largest employment county is Lake 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 Northwest Indiana have stemmed from the national, regional, and local controls outlined below. These programs have been or are being implemented and have reduced monitored ambient air quality values in Northwest 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 56% reduction in CO emissions are expected by 2020.

Regional Controls

Nitrogen Oxides (NO_x) Rule

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

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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.

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

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

Clean Air Interstate Rule (CAIR)

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

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

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

SO_2 emissions from power plants in the 28 eastern states and the District of Columbia (D.C.) covered by CAIR were to be cut by 4.3 million tons from 2003 levels by 2010, and by 5.4 million tons from 2003 levels by 2015. NO_x emissions were to be cut by 1.7 million tons by 2009 and reduced by an additional 1.3 million tons by 2015. The D.C.

Circuit court’s vacatur of CAIR in July 2008, and subsequent remand without vacatur of CAIR in December 2008, directed U.S. EPA to revise or replace CAIR in order to address the deficiencies identified by the court. As of May 2012, CAIR remains in effect.

Cross-State Air Pollution Rule (CSAPR)

On August 8, 2011, U.S. EPA published a 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 Northwest 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 8-10	Automobile Refinishing
326 IAC 8-14	Architectural and Industrial Maintenance Coatings
326 IAC 8-15	Standards for Consumer and Commercial Products

New Source Review (NSR) Provisions

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

State Emission Reduction Initiatives

Outdoor Hydronic Heater Rule

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

Reinforced Plastic Composites Fabricating and Boat Manufacturing Industries Rule

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

Local Controls

Local control measures, including some RACT rules specific to Lake and Porter counties, have helped reduce VOC emissions and other types of emissions in Northwest Indiana. These measures include:

326 IAC 8-7	Specific VOC Reduction Requirements
326 IAC 8-8	Municipal Solid Waste Landfills
326 IAC 8-9	Volatile Organic Liquid Storage Vessels
326 IAC 8-11	Wood Furniture Coatings
326 IAC 8-12	Shipbuilding or Ship Repair Operations
326 IAC 8-13	Sinter Plants
326 IAC 8-16	Offset Lithographic Printing and Letterpress Printing
326 IAC 8-17	Industrial Solvent Cleaning Operations
326 IAC 8-18	Synthetic Organic Chemical Manufacturing Industry Air Oxidation, Distillation, and Reactor Processes
326 IAC 8-19	Control of Volatile Organic Compound Emissions from Process Vents in Batch Operations
326 IAC 8-20	Industrial Wastewater
326 IAC 8-21	Aerospace Manufacturing and Rework Operations
326 IAC 8-22	Miscellaneous Industrial Adhesives
326 IAC 13	Motor Vehicle Emission and Fuel Standards (including a motor vehicle inspection and maintenance program for Lake and Porter counties) (See Page 51 for more information)
326 IAC 4-1-4.1(c)	Ban on residential burning in Lake and Porter counties
40 CFR 80.70(f)(3)	Federal requirement for the use of federal reformulated gasoline (RFG) in Lake and Porter counties (See Page 51 for more information)

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

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

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.

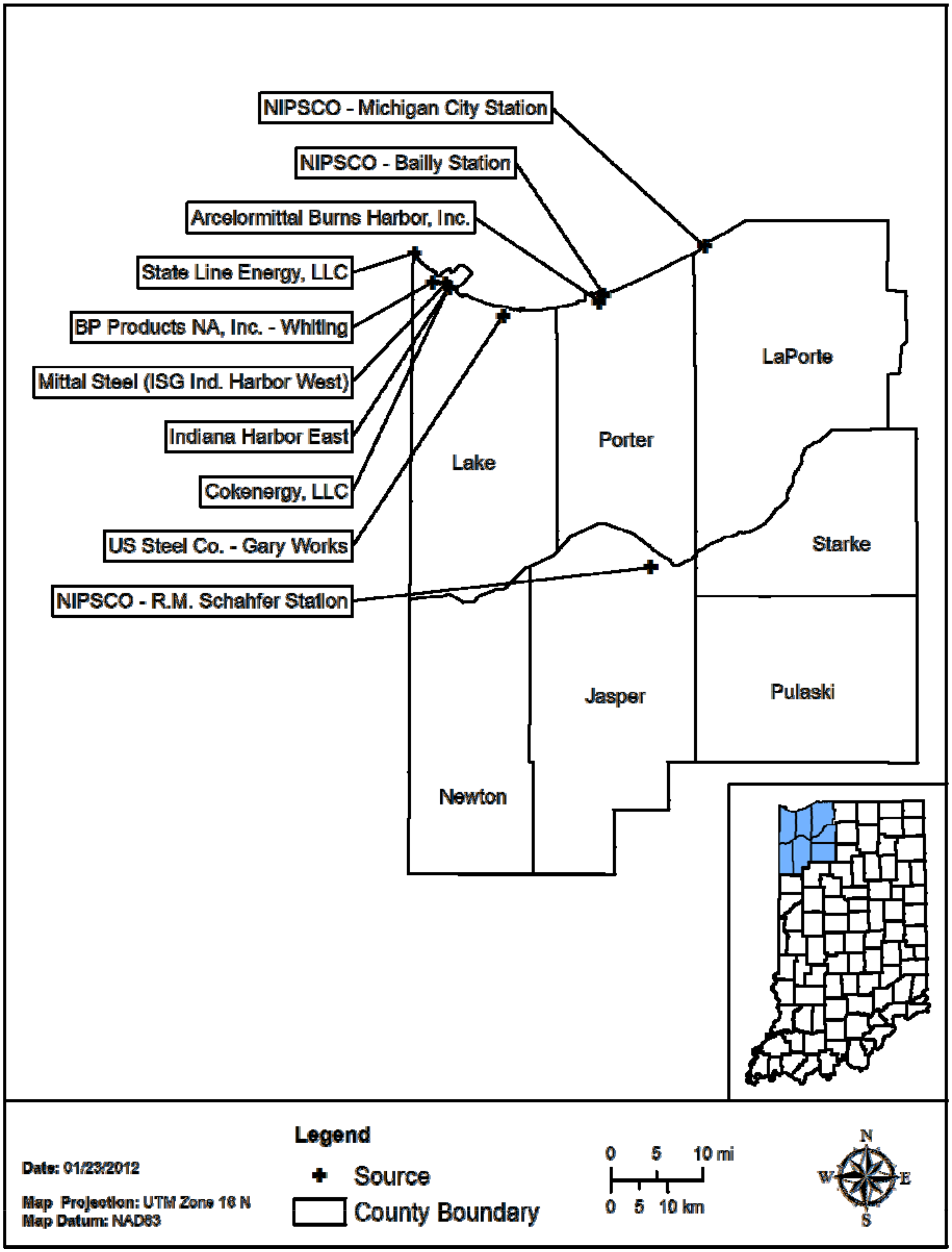
Top Ten Emission Sources

Table 4 represents the top ten sources in tons per year of emissions for the Northwest Indiana area. Two of the top 5 sources on this list that have a large impact on emissions in the Northwest Indiana area are EGUs, but with the regional controls explained previously, the emissions from the EGUs have been reduced over time and will continue to be reduced. Other large facilities in the Northwest Indiana area include steel manufacturing facilities and an oil refinery. State Line Energy, LLC in Lake County is scheduled to close for business in early-to-mid 2012. Air quality in the Northwest 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 Northwest Indiana area.

Table 4: Northwest 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	LAKE	U .S. STEEL CO. GARY WORKS	76,167.3	4,190.4	1,463.2	1,247.4	4,030.3	1,113.8	88,212.5
2010	PORTER	ARCELORMITTAL BURNS HARBOR, INC.	52,564.2	6,626.2	2,250.0	1,141.9	12,620.0	402.2	75,604.6
2010	LAKE	INDIANA HARBOR EAST	58,661.8	5,663.8	1,168.9	490.2	4,758.3	1,372.3	72,115.3
2010	JASPER	NIPSCO - R.M. SCHAHFER GENERATING STATION	1,374.9	9,611.6	1,458.2	800.8	27,064.9	201.9	40,512.3
2010	LAKE	DOMINION RESOURCES - STATE LINE ENERGY, LLC	498.1	8,241.2	536.0	509.8	10,567.3	88.7	20,441.1
2010	PORTER	NIPSCO - BAILLY GENERATING STATION	258.8	2,725.8	391.5	170.2	9,161.9	55.1	12,763.3
2010	LAPORTE	NIPSCO - MICHIGAN CITY GENERATING STATION	319.6	1,161.6	653.9	296.7	9,730.2	68.4	12,230.4
2010	LAKE	BP PRODUCTS NORTH AMERICA, INC.	1,277.2	2,974.7	368.9	368.9	622.5	1,763.1	7,375.2
2010	LAKE	COKENERGY, INC.	0.0	0.0	189.3	85.2	5,214.0	0.0	5,488.5
2010	LAKE	MITTAL STEEL (ISG INDIANA HARBOR	2,011.5	1,091.5	514.4	347.1	428.1	52.6	4,445.1

Figure 2: Map of Northwest 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 Standards (NAAQS). All counties in the Northwest Indiana area meet the historic NAAQS. As noted below, new 1-hour NAAQS were introduced in 2010 for NO_2 and SO_2. The 1-hour NO_2 monitoring data in Northwest Indiana, as well as elsewhere in the state, are well below the new 1-hour NO_2 NAAQS. The 1-hour SO_2 monitoring data in Northwest Indiana are also well below the new 1-hour SO_2 NAAQS.

Air Monitoring and Emissions Data

Not all counties in the Northwest Indiana area have an ambient air quality monitor located within the county boundaries. Monitoring data for the years 2000 through 2010 for Northwest 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 VOCs. The data were obtained from the U.S. EPA's National Emission 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 Northwest Indiana, located in Lake County that measures CO levels. The trend data shown in Graphs 1 and 2 reflect the 2nd highest concentration for 1-hour and 8-hour CO. The 2nd high values are not the highest monitored concentration at a given monitoring location, rather the 2nd highest measured value. These values (2nd highs) are used to determine attainment of the primary 1-hour CO standard at 35 ppm and the primary 8-hour CO standard at 9 ppm. The primary 1-hour and primary 8-hour CO standards were first established in April 1971. There are no secondary standards for 1-hour or 8-hour CO. While there are occasional spikes in the monitoring values for both 1-hour and 8-hour CO concentrations, a downward trend over time can be seen in Graphs 1 and 2. Monitoring values have historically been below the 1-hour primary CO standard. The 8-hour CO concentrations were once above the primary 8-hour CO standard, but have been below the standard since 1986. CO monitoring data fluctuated between the years of 1986 and 2005 due to variability in the motor vehicle fleet. CO correlates closely with vehicle traffic and emissions from motor vehicles which can lead to variability in the data.

The data shown in Tables 5 and 6 reflect the 2nd highest concentration values for 1-hour and 8-hour CO from 2000 to 2010. Historical data prior to the year 2000 are available upon request for both 1-hour and 8-hour CO. Monitoring data in Table 5 are compared to the primary 1-hour CO standard of 35 ppm. Attainment is determined by evaluating the 2nd highest 1-hour high concentration 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 Northwest Indiana area for the 1-hour or 8-hour CO reflected.

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

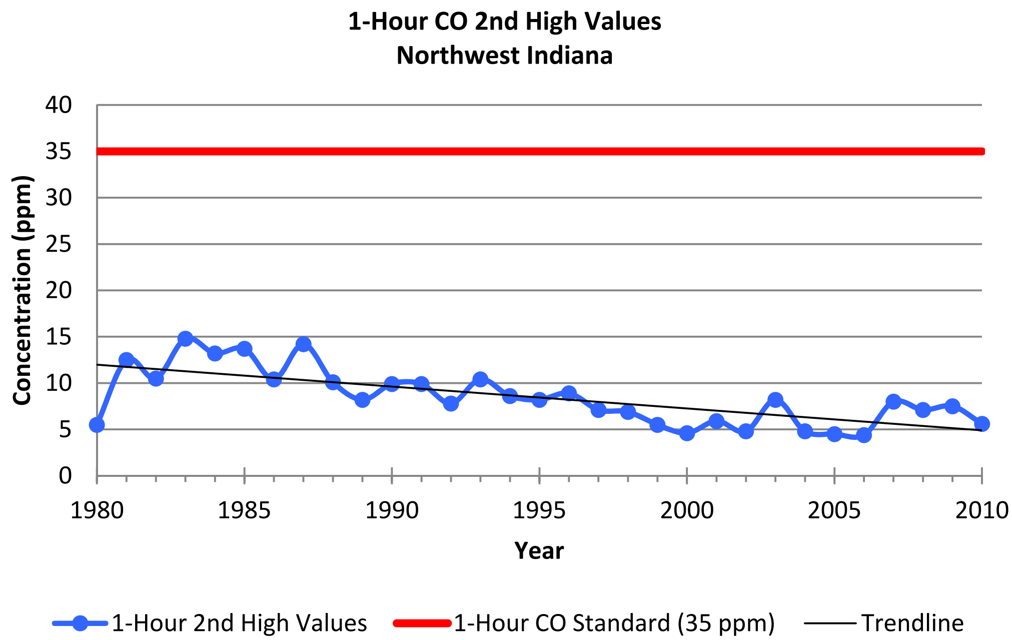


Table 5: Northwest Indiana 1-Hour CO Monitoring Data Summary

County	Site #	Site Name	1-Hour 2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890015	East Chicago-901 East Chicago Ave	4.6	5.9	4.8	8.2	4.8	4.5	4.4	8.0	7.1	7.5	5.6

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

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

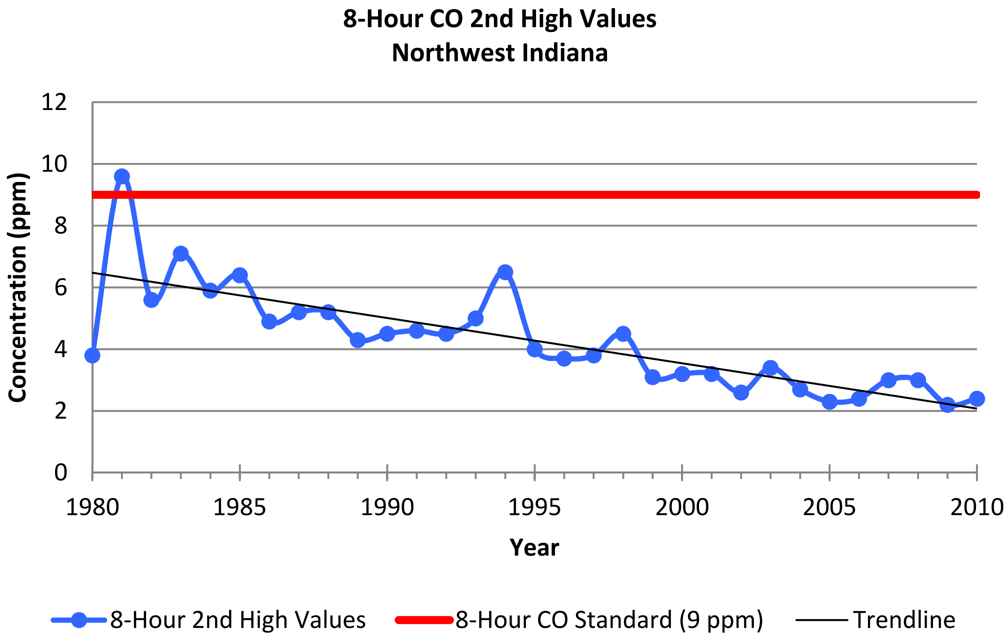


Table 6: Northwest Indiana 8-Hour CO 2nd High Value Monitoring Data Summary

County	Site #	Site Name	8-Hour 2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890015	East Chicago-901 East Chicago Ave	3.2	3.2	2.6	3.4	2.7	2.3	2.4	3.0	3.0	2.2	2.4

Highlighted red numbers are above the 8-hour CO standard of 9 ppm

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

Graph 3: Northwest Indiana CO Emissions

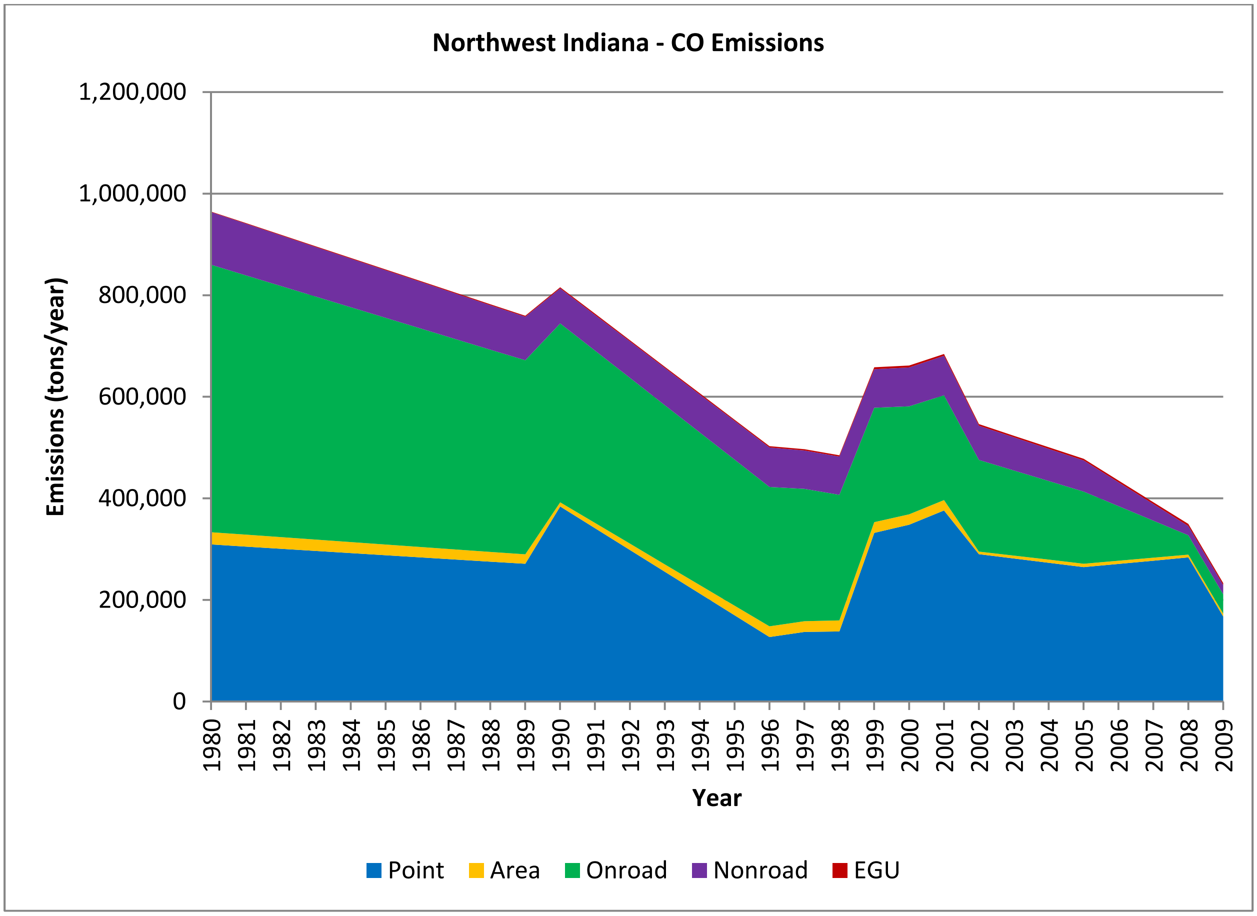
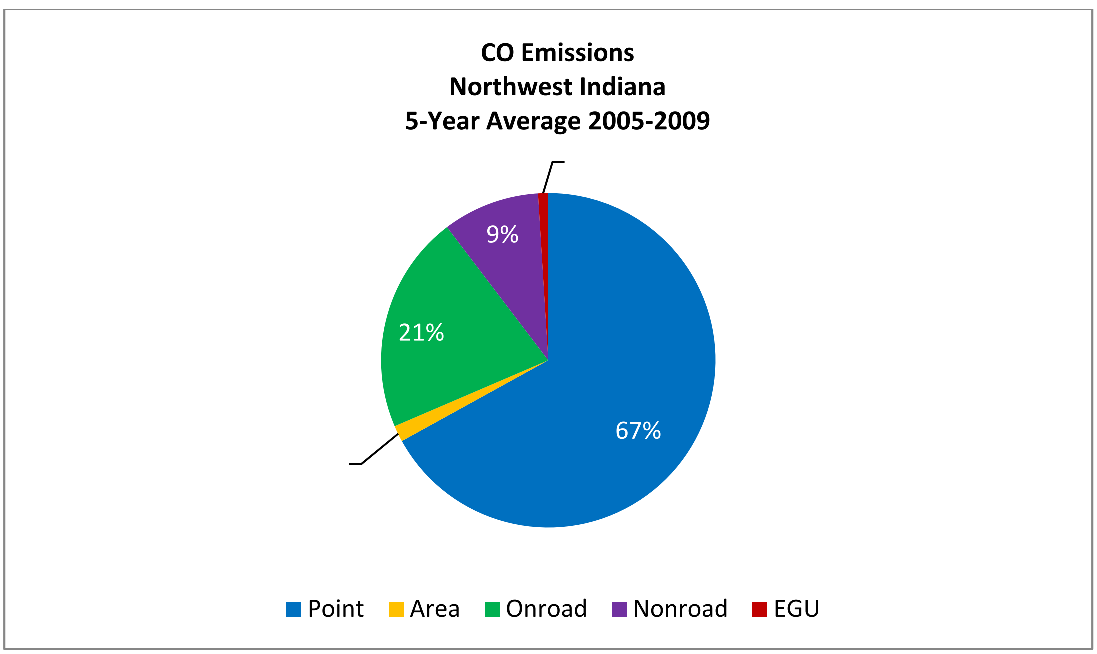


Chart 1: Northwest Indiana CO Emissions



National controls have led to a decrease in CO emissions in the Northwest Indiana area over time. As Graph 3 illustrates, CO emissions have decreased by 76% within the Northwest 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 are nine monitors within Northwest Indiana currently measuring $PM_{2.5}$ levels. Seven monitors are located in Lake County, and LaPorte and Porter counties each have one monitor. Two of the monitors in Lake County (Gary IITRI and Gary Burr Street) are considered source oriented and are not compared to the primary and secondary annual standards, but the monitors are compared to the primary and secondary 24-hour $PM_{2.5}$ standards. The trend data in Graphs 4 and 6 reflect the annual arithmetic mean (the method used to derive the central tendency of the monitoring values) for annual $PM_{2.5}$ and the 98th percentile (the method used to determine the value below which a certain percent of monitored observations fall) for 24-hour $PM_{2.5}$ for each year in the Northwest Indiana area for the years 2000 through 2010. The annual arithmetic mean values for annual $PM_{2.5}$ and 98th percentile values for 24-hour $PM_{2.5}$ are not used to compare to the primary and secondary annual or 24-hour $PM_{2.5}$ standards. A three-year average, also known as the design value, is used to compare to both the primary and secondary annual $PM_{2.5}$ standards of 15.0 micrograms per cubic meter ($\mu g/m^3$), as well as the primary and secondary 24-hour $PM_{2.5}$ standards of 35 $\mu g/m^3$, but the annual arithmetic mean and 98th percentile for each year do provide a good indication of annual and 24-hour $PM_{2.5}$ trends over time. The primary and secondary 24-hour $PM_{2.5}$ standards were first established in July 1997 of 65 $\mu g/m^3$. U.S. EPA revised the primary and secondary 24-hour $PM_{2.5}$ standards and lowered them to 35 $\mu g/m^3$ in October 2006.

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

The trend data in Graph 5 reflect the three-year design value of the annual arithmetic mean for annual $PM_{2.5}$ for each year in the Northwest Indiana area for the years 2000 through 2010. The trend data in Graph 7 reflect the three-year design value of the 98^{th} percentile values for 24-hour $PM_{2.5}$ for each year in the Northwest Indiana area for the years 2000 through 2010.

While there is some variability in the monitoring values for both annual $PM_{2.5}$ and 24-hour $PM_{2.5}$, a downward trend over time can be seen in Graphs 4, 5, 6, and 7. The design value of the annual arithmetic mean is used for comparison to the primary and secondary annual $PM_{2.5}$ standards of 15.0 $\mu g/m^3$; therefore, the one-year values shown in Graph 4 are not a true comparison to the annual $PM_{2.5}$ standards and the values in the years that are above the red line are not a violation of the primary and secondary annual $PM_{2.5}$ standards. The values in Graph 4 reflect the annual arithmetic mean and the highest value from all of the monitors in the Northwest Indiana area is plotted on the graph for each year.

The design value of the 98^{th} percentile is used for comparison to the 24-hour $PM_{2.5}$ standards; therefore, the one-year values shown in Graph 6 are not a true comparison to the 24-hour $PM_{2.5}$ standards and the values in the years that are above the red line are not a violation of the primary and secondary 24-hour $PM_{2.5}$ standards. The values in Graph 6 reflect the 98^{th} percentile and the highest value from all of the monitors in the Northwest 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 Northwest 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: Northwest Indiana Annual Arithmetic Mean $PM_{2.5}$ Values

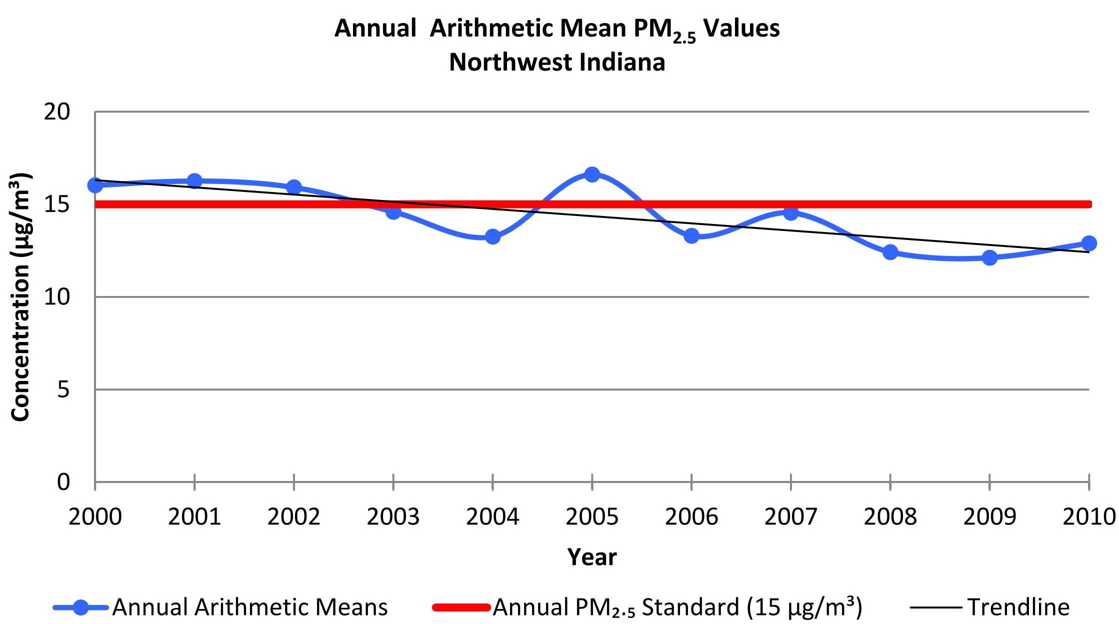


Table 7: Northwest Indiana Annual Arithmetic Mean $PM_{2.5}$ Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890006	East Chicago - Franklin Sch	15.76	16.11	14.92	14.60	13.18	15.76	13.18	14.44	11.95	11.34	12.48
Lake	180890027	Griffith	14.04	15.18	14.60	14.10	12.82	15.46	12.29	13.17	11.69	11.00	12.39
Lake	180890031	Gary - Madison St						16.61	13.30	14.55	12.27	12.12	12.90
Lake	180891003	Gary - Ivanhoe School	15.33	14.98	15.22	14.14	12.92	15.71	12.57	14.01			
Lake	180891016	Gary - Federal Bldg	16.03	16.26	15.92								
Lake	180892004	Hammond - Purdue	14.96	15.38	14.70	14.55	13.26	15.40	12.67	13.80	11.66		12.30
Lake	180892010	Hammond - Clark HS	14.34	15.55	14.88	14.26	12.47	15.59	12.79	13.68	12.42	10.80	11.90
LaPorte	180910011	Michigan City - Marsh Sch	13.37	14.25	13.24	12.81	12.07	13.64	11.12	12.29	11.17	10.13	10.72
LaPorte	180910012	LaPorte - Lake St	12.56	14.17	13.47	13.20	11.92	14.10	11.39	12.09			
Porter	181270020	Dunes Natl Lakeshore	13.53	13.62	13.24	13.19	11.84	14.00	11.02	13.04			
Porter	181270024	Ogden Dunes	14.55	14.18	14.20	12.94	12.38	14.59	11.81	13.79	10.89	11.29	11.56

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

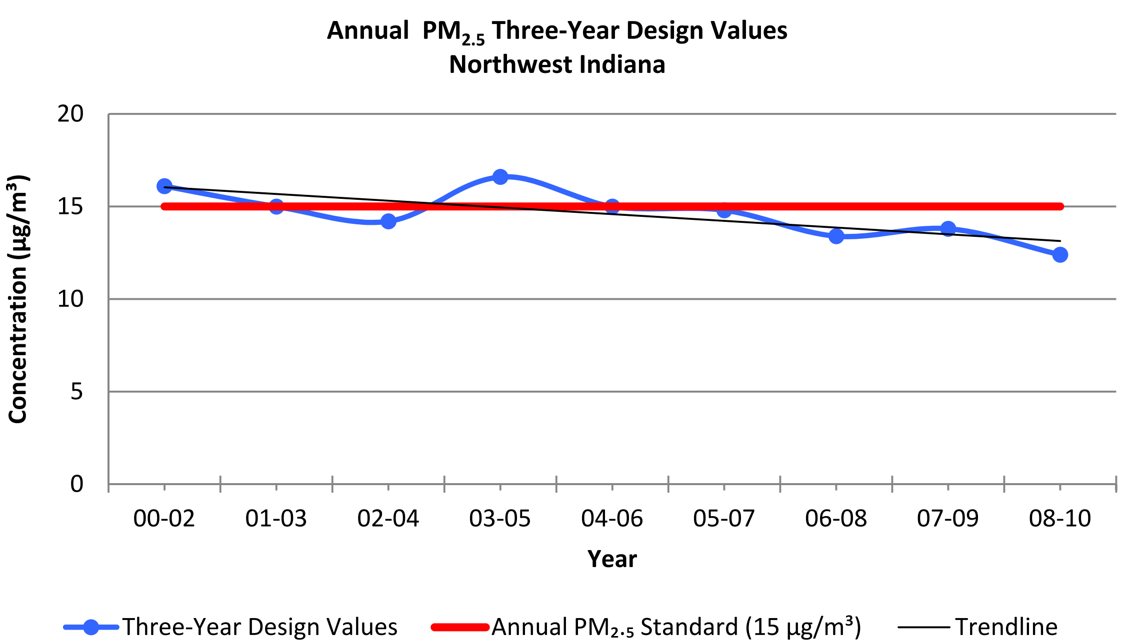


Table 8: Northwest Indiana Annual $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

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
Lake	180890006	East Chicago - Franklin Sch	15.6	15.2	14.2	14.5	14.0	14.5	13.2	12.6	11.9
Lake	180890027	Griffith	14.6	14.6	13.8	14.1	13.5	13.6	12.4	12.0	11.7
Lake	180890031	Gary - Madison St				16.6	15.0	14.8	13.4	13.0	12.4
Lake	180891003	Gary - Ivanhoe School	15.2	14.8	14.1	14.3	13.7	14.1			
Lake	180891016	Gary - Federal Bldg	16.1								
Lake	180892004	Hammond - Purdue	15.0	14.9	14.2	14.4	13.8	14.0	12.7	13.8	8.0
Lake	180892010	Hammond - Clark HS	14.9	14.9	13.9	14.1	13.6	14.0	13.0	12.3	11.7
LaPorte	180910011	Michigan City - Marsh Sch	13.6	13.4	12.7	12.8	12.3	12.4	11.5	11.2	10.7
LaPorte	180910012	LaPorte - Lake St	13.4	13.6	12.9	13.1	12.5	12.5			
Porter	181270020	Dunes Natl Lakeshore	13.5	13.4	12.8	13.0	12.3	12.7			
Porter	181270024	Ogden Dunes	14.3	13.8	13.2	13.3	12.9	13.4	12.2	12.0	11.2
			Red highlighted numbers are above the annual $PM_{2.5}$ standard of 15.0 µg/m³								

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

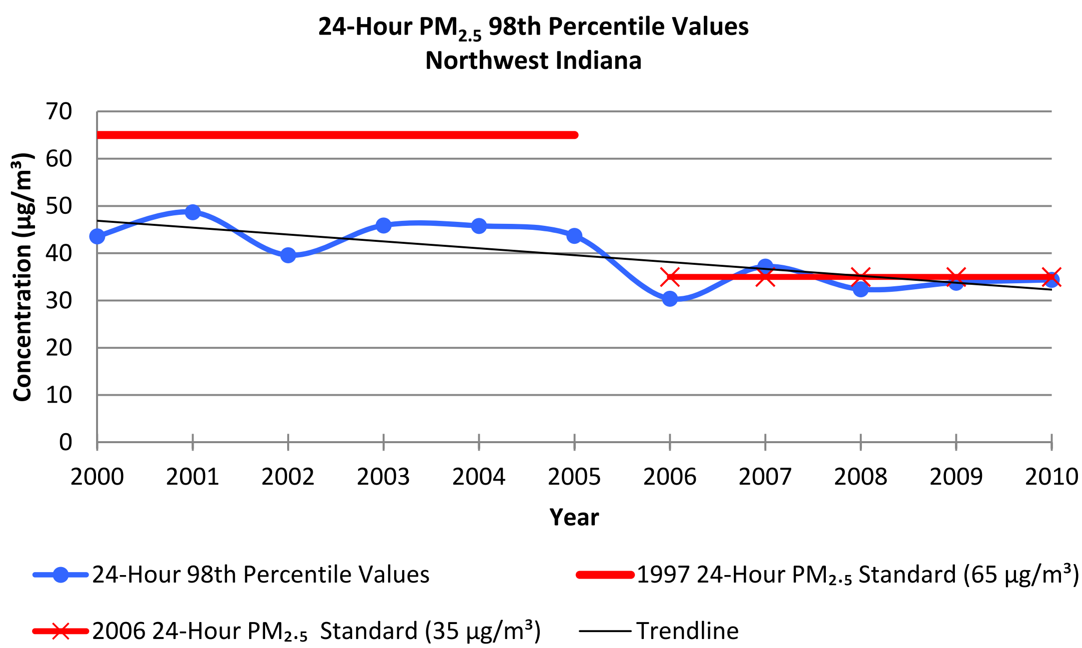


Table 9: Northwest Indiana 24-Hour $PM_{2.5}$ 98th Percentile Value Monitoring Data Summary

County	Site #	Site Name	24-Hour 98th Percentile Value (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890006	East Chicago - Franklin Sch	34.2	39.8	37.4	33.1	33.0	39.9	29.4	37.2	26.6	25.8	29.5
Lake	180890022	Gary - IITRI	43.6	48.7	39.5	45.9	45.8	40.4	28.5	35.2	28.9	30.3	33.6
Lake	180890026	Gary - Burr St	33.8	42.0	38.7	41.7	38.6	43.7	30.4	35.0	32.4	33.8	31.7
Lake	180890027	Griffith	31.9	37.3	31.6	35.6	30.1	37.1	25.8	34.1	26.5	29.8	28.8
Lake	180890031	Gary - Madison St						38.7	27.1	36.2	29.4	30.0	34.4
Lake	180891003	Gary - Ivanhoe School	33.1	37.0	32.7	31.0	30.5	39.0	25.8	33.8			
Lake	180891016	Gary - Federal Bldg	35.0	40.7	39.6								
Lake	180892004	Hammond - Purdue	32.8	36.0	33.9	32.3	31.9	37.6	26.2	34.9	28.4	32.7	28.9
Lake	180892010	Hammond - Clark HS	33.9	37.9	36.2	37.6	28.4	40.9	27.9	35.2	28.2	25.8	30.0
LaPorte	180910011	Michigan City - Marsh Sch	28.5	33.7	31.3	31.8	31.6	37.5	28.1	31.5	27.7	24.2	29.4
LaPorte	180910012	LaPorte - Lake St	29.7	36.1	31.5	32.4	26.6	36.5	24.7	31.0			
Porter	181270020	Dunes Natl Lakeshore	27.3	35.2	30.5	31.7	29.7	37.6	26.6	30.6			
Porter	181270024	Ogden Dunes	32.0	34.8	32.9	30.7	29.1	37.5	26.1	33.3	28.3	27.1	29.0

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

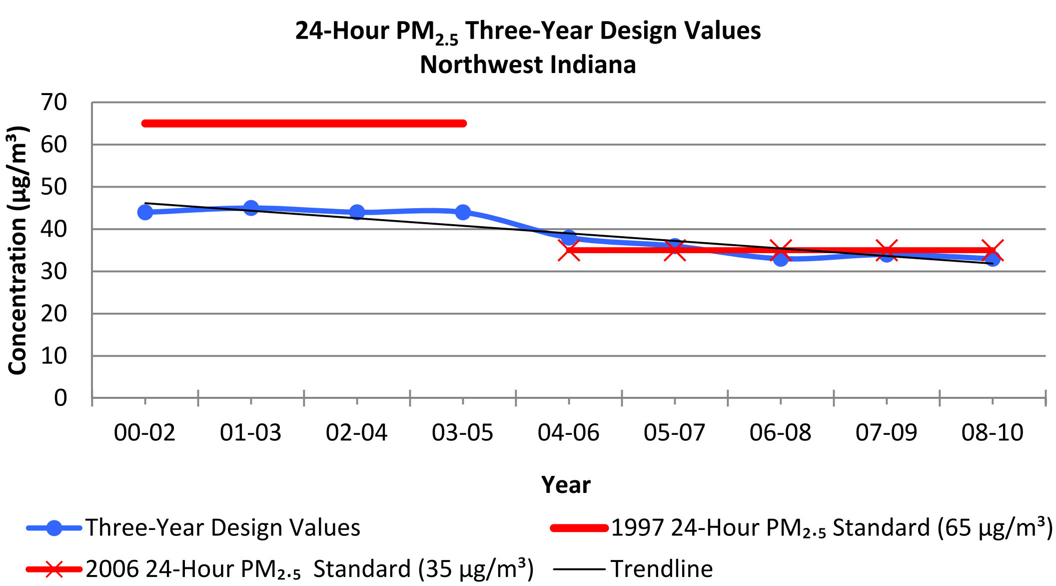


Table 10: Northwest Indiana 24-Hour $PM_{2.5}$ Three-Year Design Value Monitoring Data Summary

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
Lake	180890006	East Chicago - Franklin Sch	37	37	35	35	34	36	31	30	27
Lake	180890022	Gary - IITRI	44	45	44	44	38	35	31	31	31
Lake	180890026	Gary - Burr St	38	41	40	41	38	36	33	34	33
Lake	180890027	Griffith	34	35	32	34	31	32	29	30	28
Lake	180890031	Gary - Madison St				39	33	34	31	32	31
Lake	180891003	Gary - Ivanhoe School	34	34	31	34	32	33			
Lake	180891016	Gary - Federal Bldg	38								
Lake	180892004	Hammond - Purdue	34	34	33	34	32	33	30	32	30
Lake	180892010	Hammond - Clark HS	36	37	34	36	32	35	30	30	28
LaPorte	180910011	Michigan City - Marsh Sch	31	32	32	34	32	32	29	28	27
LaPorte	180910012	LaPorte - Lake St	32	33	30	32	29	31			
Porter	181270020	Dunes Natl Lakeshore	31	32	32	33	31	32			
Porter	181270024	Ogden Dunes	33	33	31	32	31	32	29	30	28

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

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

Tables 7, 8, 9, and 10 demonstrate that the annual and 24-hour $PM_{2.5}$ values for the Northwest Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the other sites do also. Annual $PM_{2.5}$ values in Northwest Indiana had been above the primary and secondary annual $PM_{2.5}$ standards until the end of 2005, but have remained below the standards since then. The 24-hour $PM_{2.5}$ values in Northwest Indiana had been above the primary and secondary 24-hour $PM_{2.5}$ standards at the end of 2007, but have remained below since then.

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 daily $PM_{2.5}$ 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 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 Northwest Indiana. Charts 2, 3, and 4 show how the average emissions are distributed among the different source categories.

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

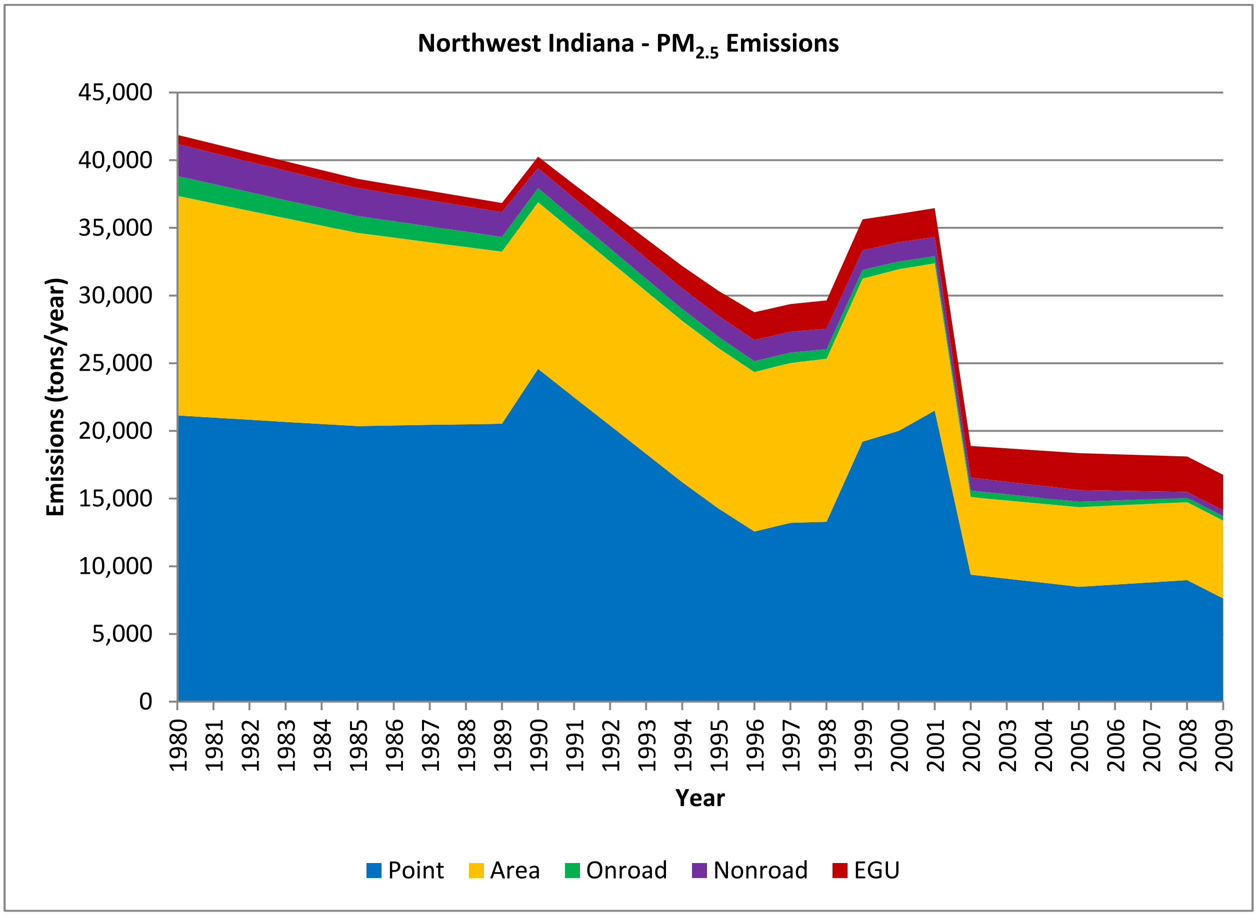
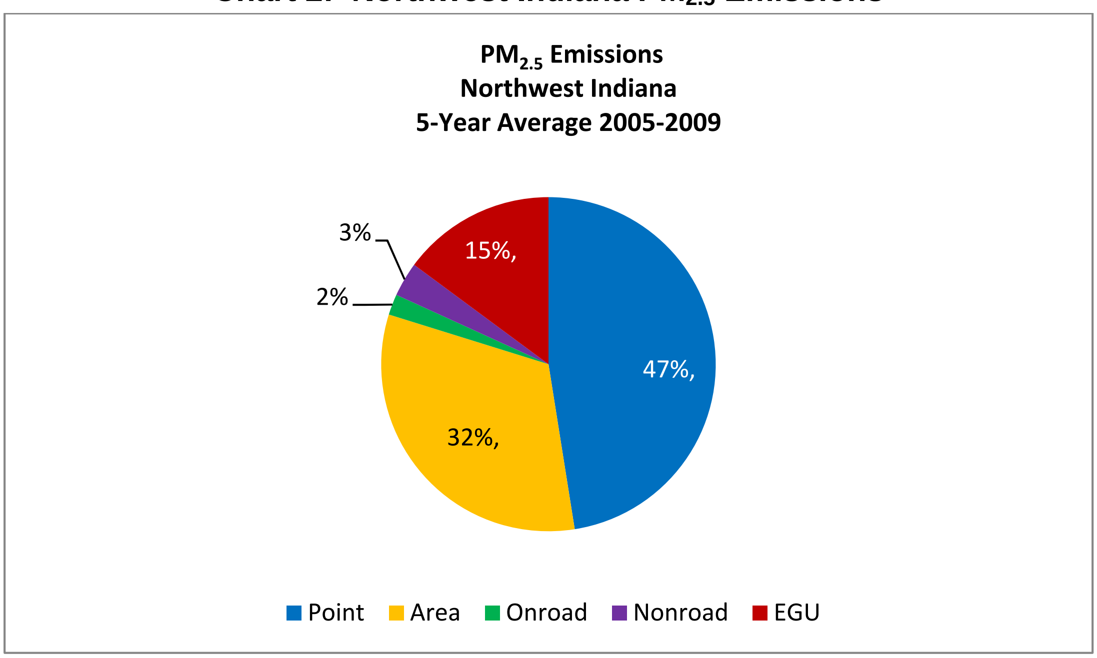


Chart 2: Northwest Indiana $PM_{2.5}$ Emissions



Graph 9: Northwest Indiana SO_2 Emissions

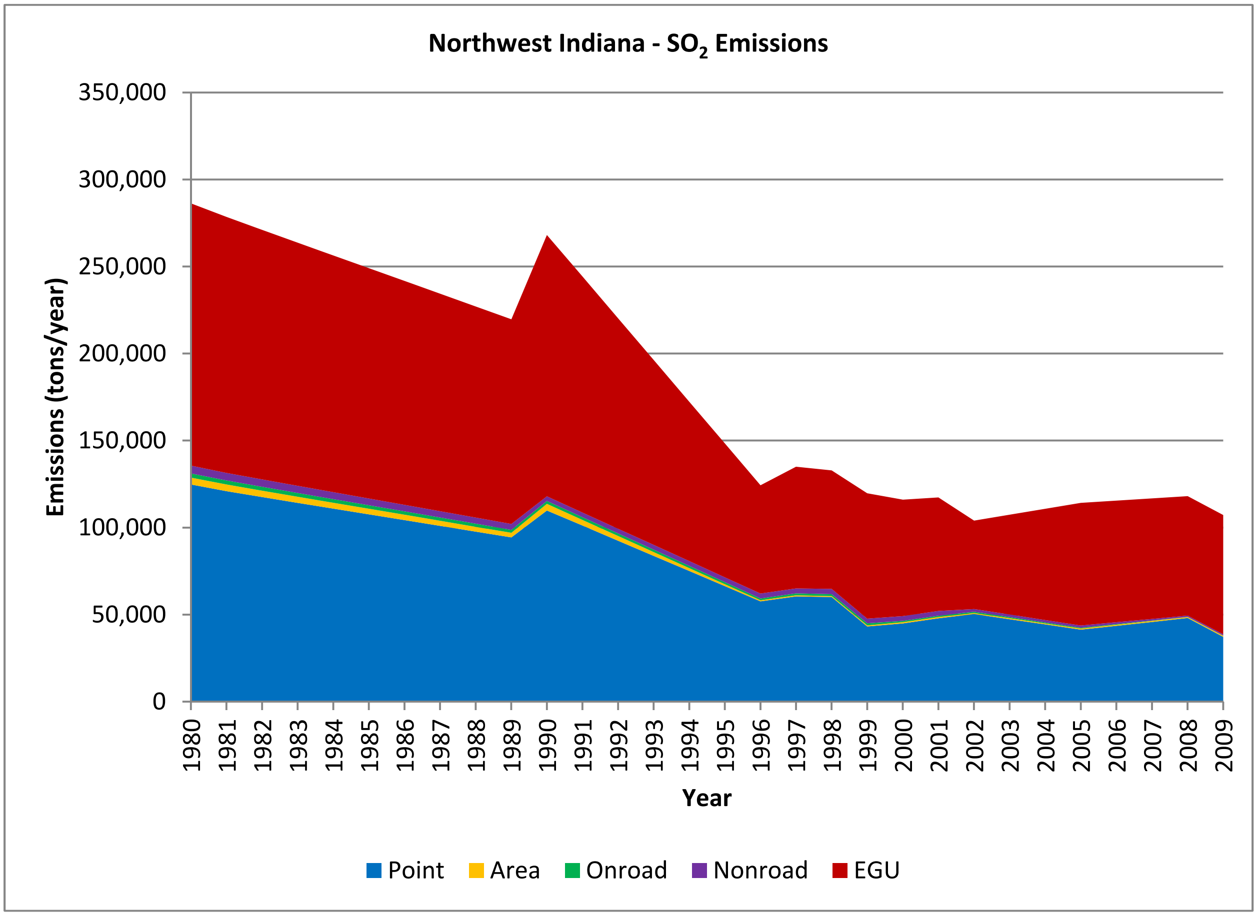
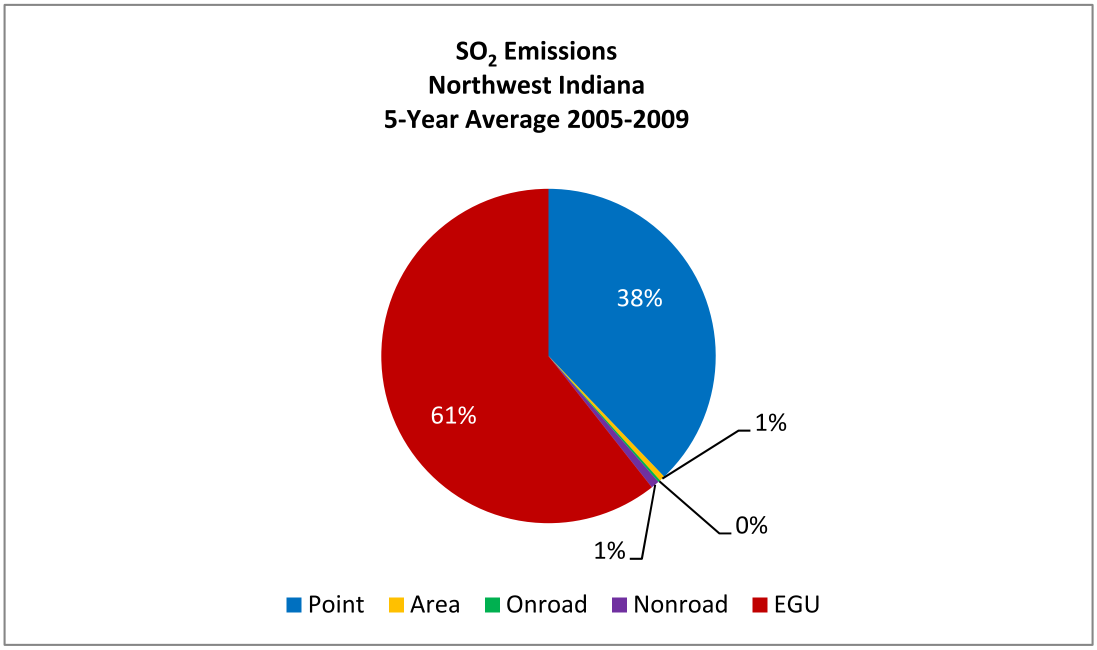


Chart 3: Northwest Indiana SO_2 Emissions



Graph 10: Northwest Indiana NO_x Emissions

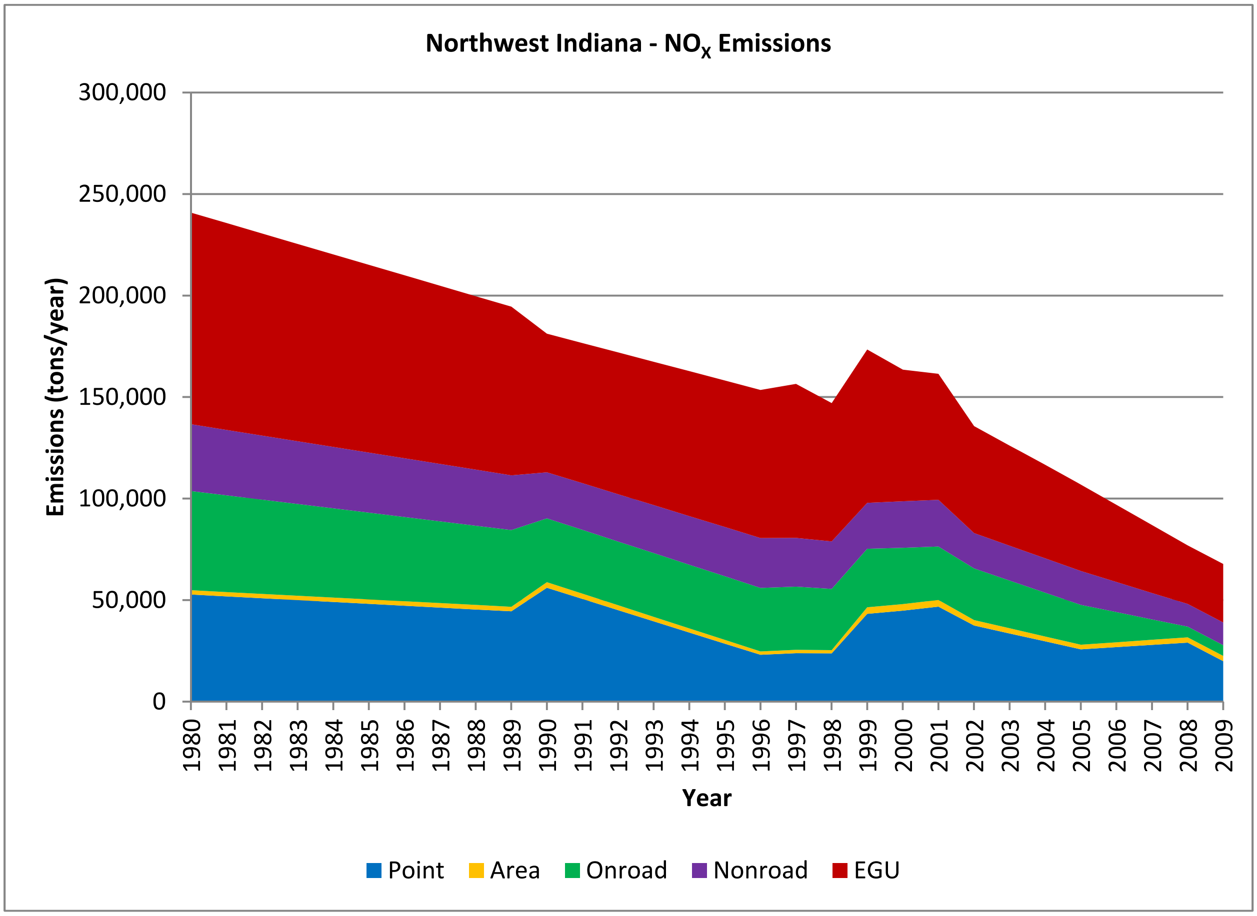
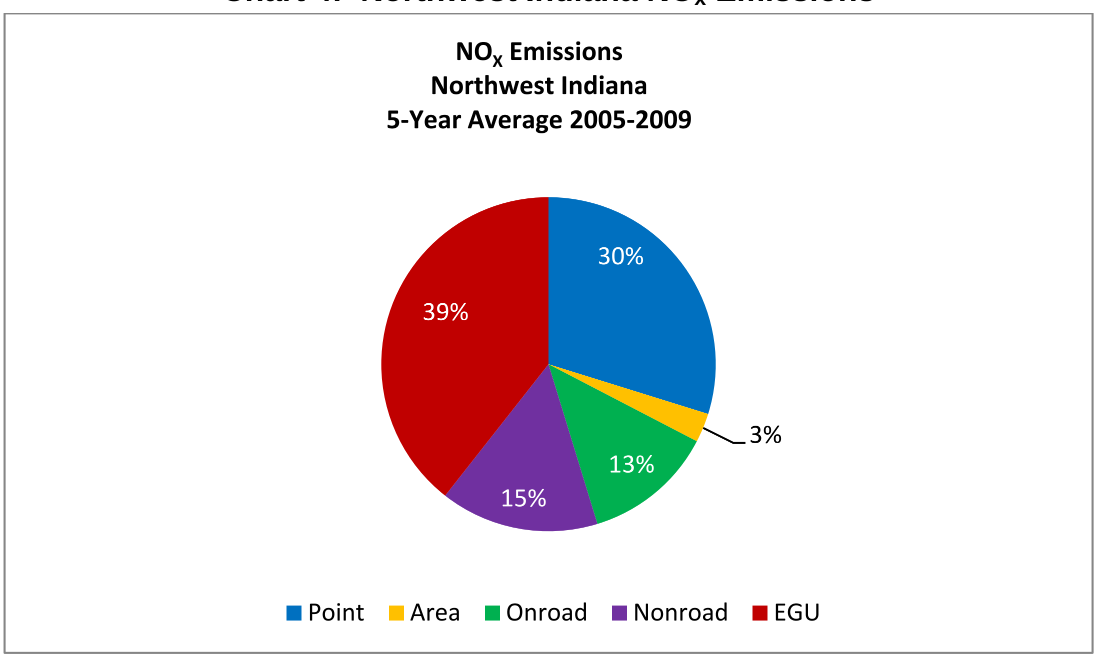


Chart 4: Northwest Indiana NO_x Emissions



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 60%, 63%, and 72%, respectively, within the Northwest 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

There are five monitoring sites within Northwest Indiana, four in Lake County and one in Porter County that measure lead levels. The primary and secondary lead standards were first established in October 1978 at 1.5 µg/m^3. Attainment was determined by evaluating each calendar quarter arithmetic average, which must not exceed 1.5 µg/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 µg/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 µg/m^3 within a three-year period. The trend data in Graph 11 reflect the highest annual quarterly arithmetic mean. The trend data in Graph 12 show the highest three-month rolling average.

While fluctuations in monitoring data are shown in Graph 11, monitoring data for lead indicates a downward trend over time. Lead monitors are located in close proximity to major sources in the area and data will fluctuate based on variability in facility operations and meteorology. The highest three-month rolling averages that are depicted in Graph 12 are well below the primary and secondary 2008 lead standards.

The data in Tables 11 and 12 are for the monitors that measured lead from 2000 to 2010. Historical lead data prior to the year 2000 are available upon request. Monitoring data in Table 11 are compared to the primary and secondary 1978 lead standards which were 1.5 µg/m^3. Monitoring data in Table 12 are compared to the primary and secondary 2008 lead standards.

Graph 11: Northwest Indiana Lead Highest Annual Quarterly Values

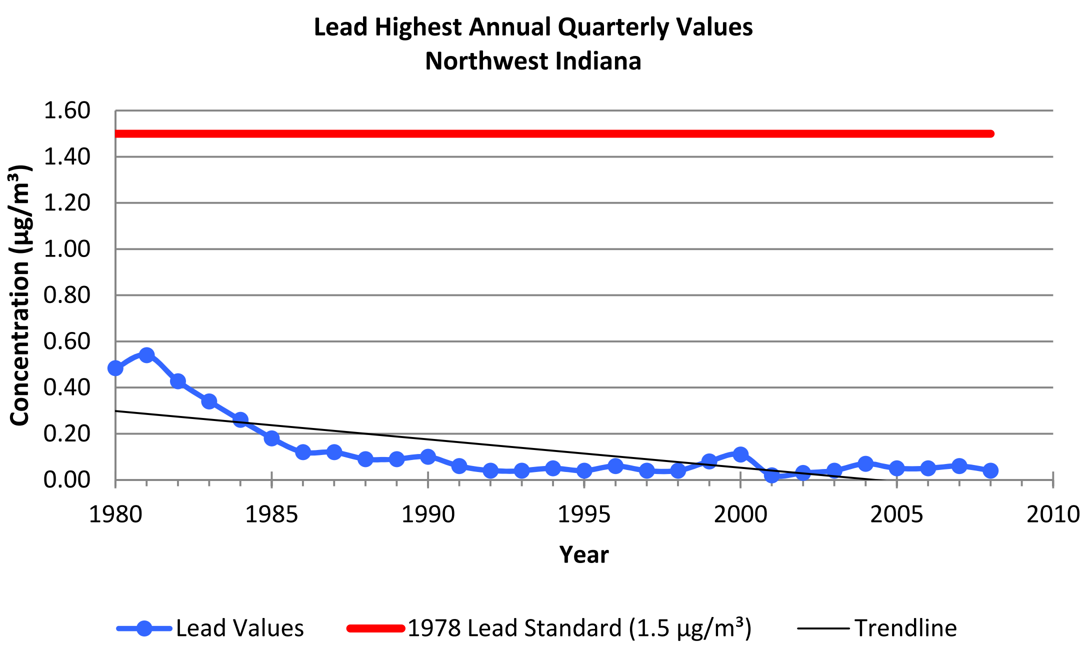


Table 11: Northwest Indiana Lead Quarterly Average Monitoring Data Summary

County	Site #	Site Name	Quarterly Average (µg/m^3)											
			1Q 2000	2Q 2000	3Q 2000	4Q 2000	1Q 2001	2Q 2001	3Q 2001	4Q 2001	1Q 2002	2Q 2002	3Q 2002	4Q 2002
Lake	180890023	East Chicago-Water Filtration Plant	0.07	0.05	0.03	0.06	0.03	0.02	0.01	0.01	0.03	0.02	0.02	0.03
Lake	180896000	East Chicago-East Chicago HS										0.01	0.02	0.02
Lake	180892008	Hammond-141st St	0.05	0.04	0.02	0.11	0.01	0.02	0.01	0.00	0.01	0.02	0.03	0.02
Lake	180892011	Hammond-167th St	0.02	0.04	0.02	0.03	0.03	0.04	0.01	0.00	0.02	0.02	0.03	0.02
County	**Site #**	**Site Name**	**1Q 2003**	**2Q 2003**	**3Q 2003**	**4Q 2003**	**1Q 2004**	**2Q 2004**	**3Q 2004**	**4Q 2004**	**1Q 2005**	**2Q 2005**	**3Q 2005**	**4Q 2005**
Lake	180890023	East Chicago-Water Filtration Plant	0.03	0.04	0.01	0.02	0.04	0.07	0.05	0.04	0.04	0.03	0.03	0.05
Lake	180896000	East Chicago-East Chicago HS	0.01	0.04	0.02	0.02	0.03	0.02	0.02	0.01	0.02	0.02	0.02	0.01
Lake	180892008	Hammond-141st St	0.02	0.03	0.01	0.01	0.00	0.03	0.03	0.02	0.02	0.02	0.03	0.02
Lake	180892011	Hammond-167th St	0.02	0.04	0.01	0.01	0.02	0.03	0.04	0.02	0.04	0.03	0.13	0.03
County	**Site #**	**Site Name**	**1Q 2006**	**2Q 2006**	**3Q 2006**	**4Q 2006**	**1Q 2007**	**2Q 2007**	**3Q 2007**	**4Q 2007**	**1Q 2008**	**2Q 2008**	**3Q 2008**	**4Q 2008**
Lake	180890023	East Chicago-Water Filtration Plant	0.05	0.04	0.04	0.04	0.03	0.05	0.06	0.04	0.03	0.03	0.04	0.02
Lake	180896000	East Chicago-East Chicago HS	0.01	0.02	0.02	0.01	0.01	0.04	0.02	0.01	0.01	0.02	0.02	0.01
Lake	180892008	Hammond-141st St	0.02	0.02	0.02	0.01	0.01	0.02	0.03	0.01	0.01	0.02	0.02	0.02
Lake	180892011	Hammond-167th St	0.05	0.04	0.03	0.01	0.03	0.10	0.06	0.02				

Highlighted red numbers are over the 1978 lead standard of 1.5 µg/m^3

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

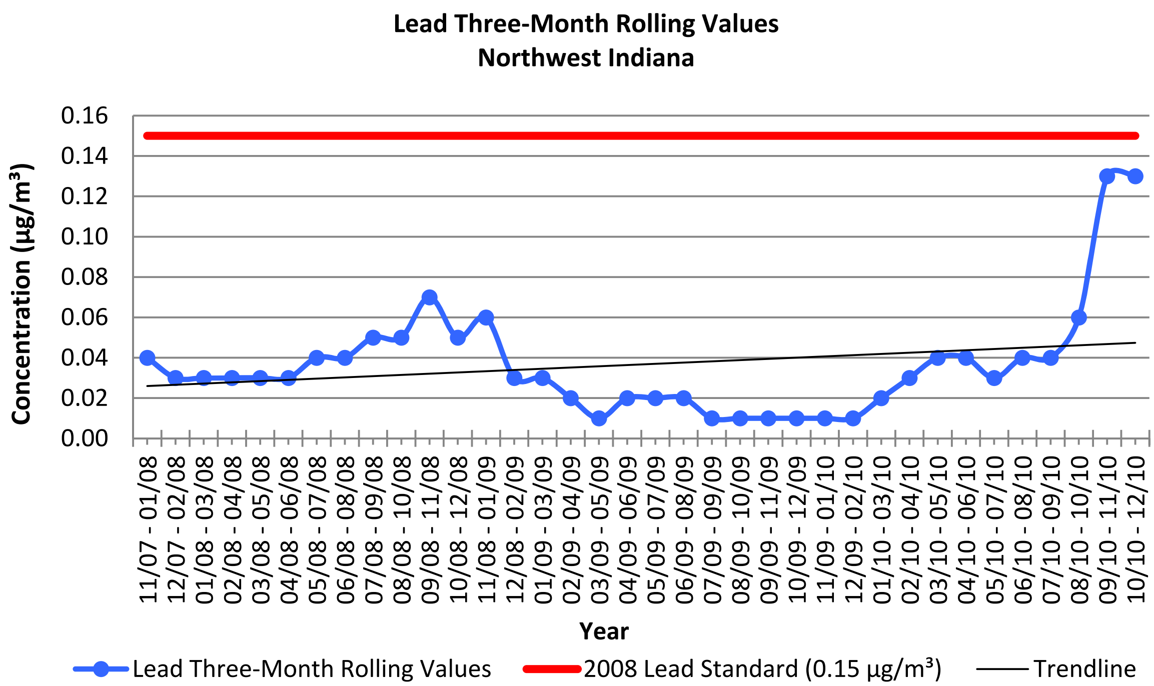


Table 12: Northwest Indiana Three-Month Lead Monitoring Data Summary

County	Site #	Site Name	Three-Month Average (µg/m³)											
			11/07-01/08	12/07-02/08	01/08-03/08	02/08-04/08	03/08-05/08	04/08-06/08	05/08-07/08	06/08-08/08	07/08-09/08	08/08-10/08	09/08-11/08	10/08-12/08
Lake	180890023	East Chicago-Aldis St	0.04	0.03	0.03	0.03	0.03	0.03	0.04	0.04	0.05	0.05	0.07	0.05
Lake	180890032	Gary-4th Ave												
Lake	180890033	East Chicago-E. 135th St												
Lake	180892008	Hammond-141st St	0.01	0.01	0.01	0.03	0.03	0.03	0.02	0.03	0.03	0.02	0.02	0.02
Porter	181270023	Portage-Hwy 12												

County	Site #	Site Name	11/08-01/09	12/08-02/09	01/09-03/09	02/09-04/09	03/09-05/09	04/09-06/09	05/09-07/09	06/09-08/09	07/09-09/09	08/09-10/09	09/09-11/09	10/09-12/09
Lake	180890023	East Chicago-Aldis St	0.06	0.03	0.03	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Lake	180890032	Gary-4th Ave												
Lake	180890033	East Chicago-E. 135th St												
Lake	180892008	Hammond-141st St	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Porter	181270023	Portage-Hwy 12												
County	**Site #**	**Site Name**	**11/09-01/10**	**12/09-02/10**	**01/10-03/10**	**02/10-04/10**	**03/10-05/10**	**04/10-06/10**	**05/10-07/10**	**06/10-08/10**	**07/10-09/10**	**08/10-10/10**	**09/10-11/10**	**10/10-12/10**
Lake	180890023	East Chicago-Aldis St	0.01	0.01	0.02	0.03	0.04	0.04	0.03	0.02	0.01	0.03	0.03	0.03
Lake	180890032	Gary-4th Ave			0.01	0.02	0.02		0.03	0.03	0.02	0.01	0.06	0.06
Lake	180890033	East Chicago-E. 135th St			0.01	0.03	0.03	0.04	0.03	0.04	0.04	0.06	0.13	0.13
Lake	180892008	Hammond-141st St	0.01	0.01	0.01	0.02	0.03	0.04	0.03	0.02	0.01	0.02	0.02	0.02
Porter	181270023	Portage-Hwy 12			0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
			Highlighted red numbers are rolling three-month averages above the 2008 lead standard of 0.15 µg/m^3											

Historically, the majority of lead emissions came from motor vehicle fuels. As a result of U.S. EPA's regulatory efforts to remove lead from motor vehicle gasoline, emissions of lead from the transportation sector declined by 95% between 1980 and 1999, and levels of lead in the air decreased by 94% between 1980 and 1999. As can be seen in Graphs 11 and 12, lead levels in Northwest 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 is one monitoring site within the Northwest Indiana area, located in Lake County that measures NO_2 levels. Data for the years 1986 through 1988 are incomplete and, therefore, not included on Graphs 13 and 14. The trend data in Graph 14 reflect the annual arithmetic mean NO_2 values. The annual arithmetic mean is used to compare to the primary and secondary annual NO_2 standards at 53 parts per billion (ppb). The secondary annual NO_2 standard is the same as the primary NO_2 standard. Attainment of the annual NO_2 standards is determined by evaluating the annual arithmetic mean concentration in a calendar year, which must be less than or equal to 53 ppb. U.S. EPA added a primary 1-hour NO_2 standard in February 2010 at 100 ppb. Attainment of the 1-hour NO_2 standard is determined by evaluating the design value of the 98th percentile of the daily maximum 1-hour averages at each monitor within an area, which must not exceed 100 ppb averaged over a three-year period.

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

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

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

The design value of the 98^{th} percentile is used for comparison to the primary 1-hour NO_2 standard; therefore, the one-year values shown in Graph 12 are not a true comparison to the primary 1-hour NO_2 standard. The trend data in Graph 12 illustrate the 98^{th} percentile. Graph 12 is provided for reference purposes only because the 98^{th} percentile of the 1-hour NO_2 values were collected prior to the implementation of the current standard. Data for the years 1986 through 1988 is incomplete and, therefore, not included on the graphs. The data in Tables 13, 14, and 15 are from the monitoring site that measured NO_2 from 2000 to 2010. Historical data prior to the year 2000 are available upon request for both annual and 1-hour NO_2. Monitoring data in Table 13 are compared to the primary and secondary annual NO_2 standards at 53 ppb. Monitoring data in Table 14 show the 98^{th} percentile of the 1-hour NO_2 values for the years 2000 through 2010. Monitoring data in Table 15 are compared to the primary 1-hour NO_2 standard at 100 ppb. The 1-hour NO_2 data prior to 2010 was not compared to any standard and the 98^{th} percentile values and the design values from 2000 to 2007 are included for reference purposes only. NO_2 values in Northwest Indiana are well below both the annual and 1-hour NO_2 standards.

Graph 13: Northwest Indiana Annual Arithmetic Mean NO_2 Values

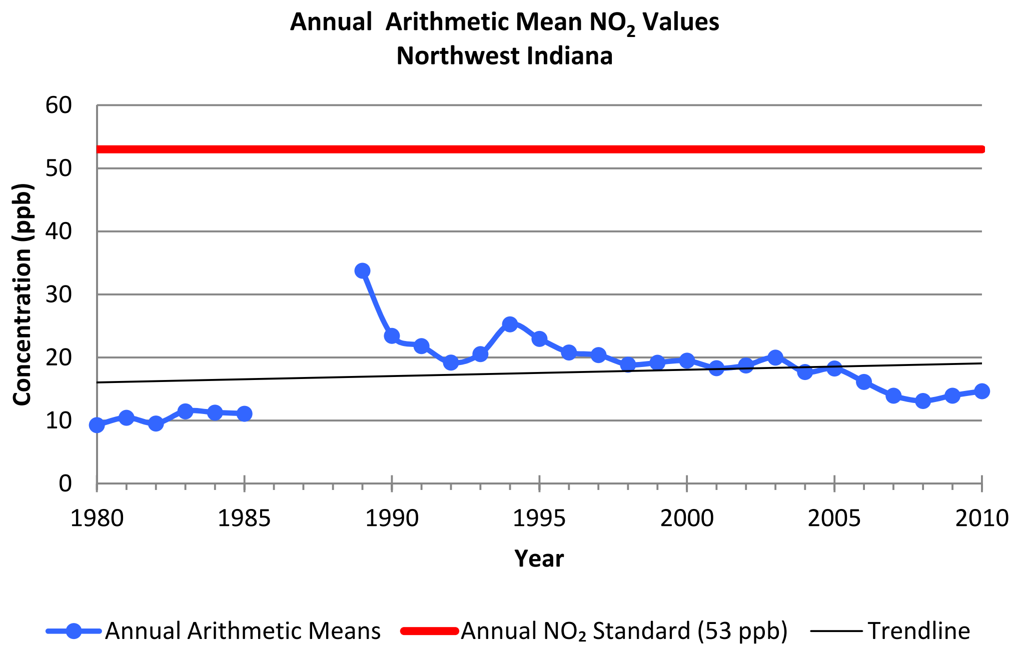


Table 13: Northwest Indiana Annual Arithmetic Mean NO_2 Values Monitoring Data Summary

County	Site #	Site Name	Annual Mean (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890022	Gary IITRI Bunker	20	18	19	20	18	18	16	14	13	14	15
			Highlighted red numbers are above the annual NO_2 standard of 53 ppb										

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

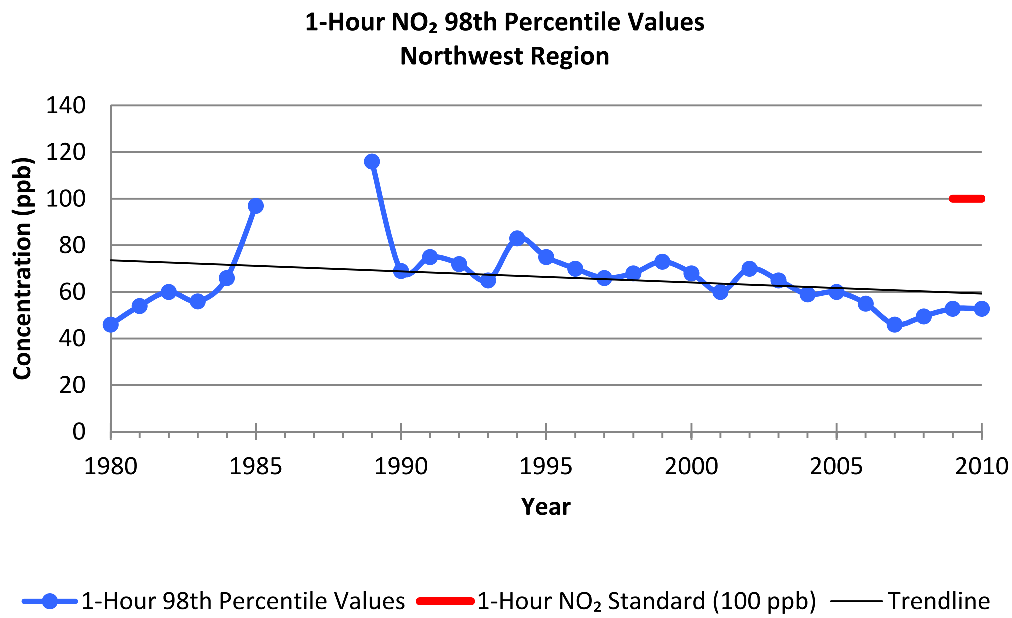


Table 14: Northwest Indiana 1-Hour NO_2 98th Percentile Values Monitoring Data Summary

County	Site #	Site Name	1-Hour 98th Percentile Value (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890022	Gary IITRI Bunker	68	60	70	65	59	60	55	46	50	53	53

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

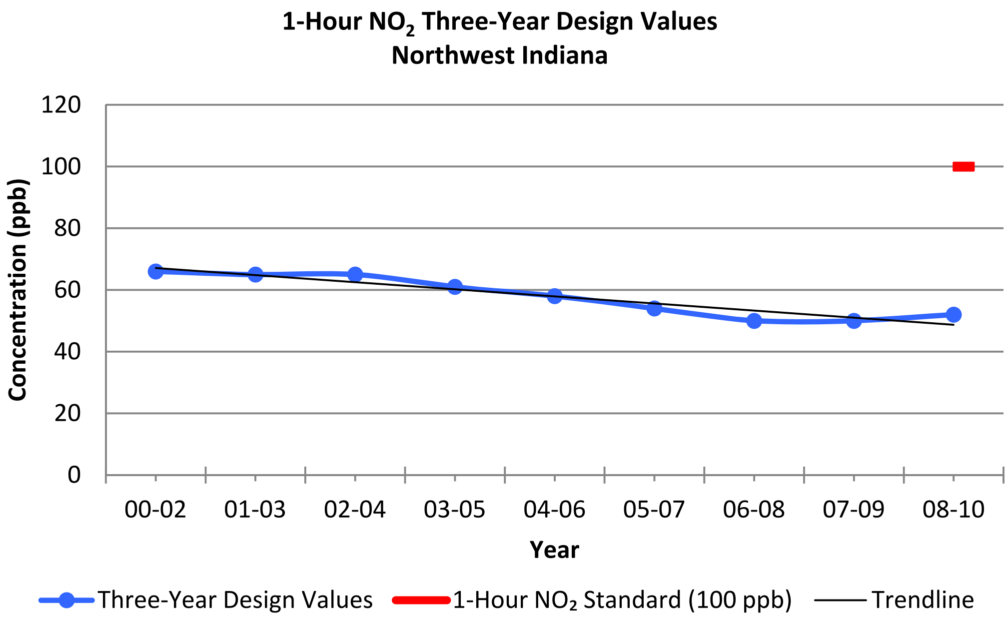


Table 15: Northwest Indiana 1-Hour Three-Year Design Value NO_2 Monitoring Data Summary

County	Site #	Site Name	Three-Year Design Value (ppb)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Lake	180890022	Gary IITRI Bunker	66	65	65	61	58	54	50	50	52

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

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

Graph 16: Northwest Indiana NO_x Emissions

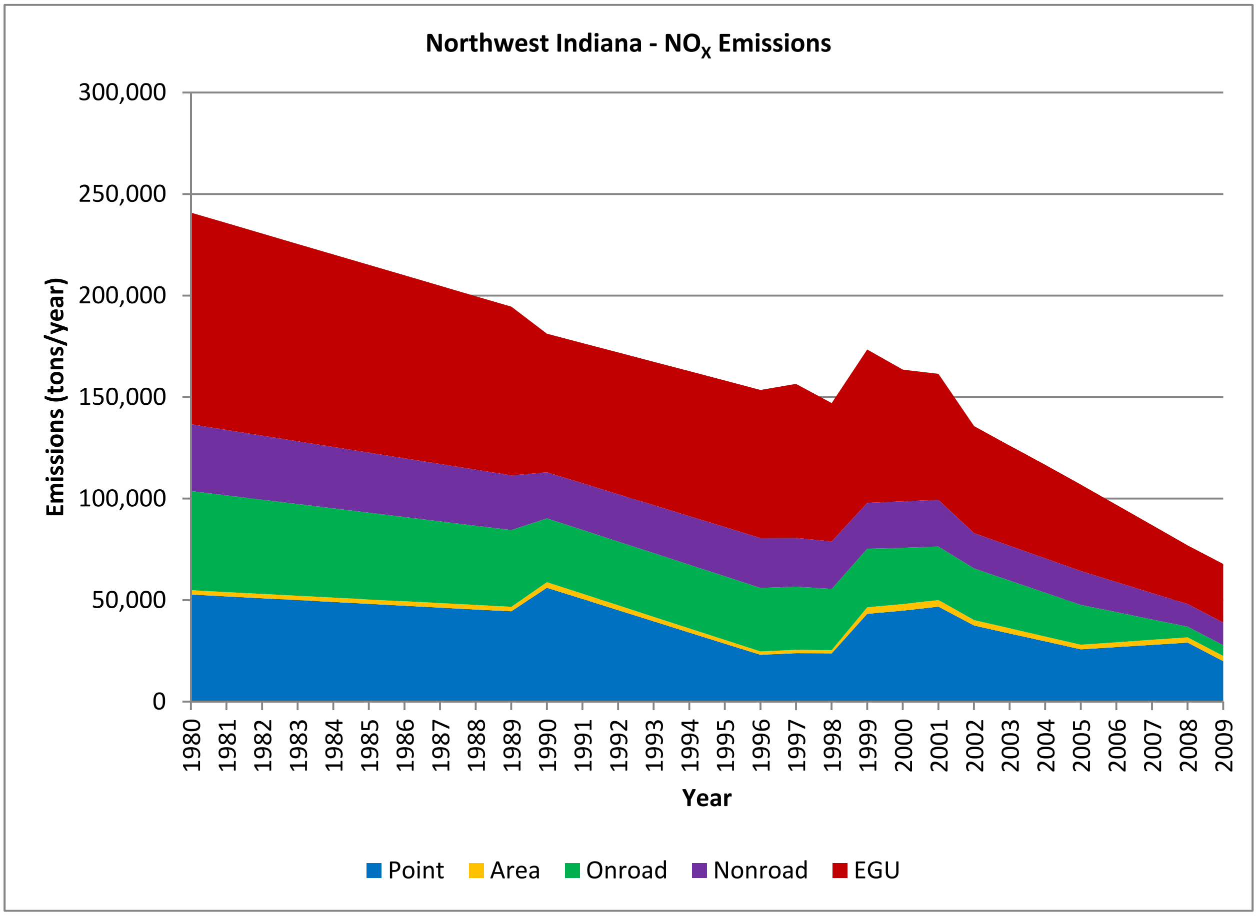
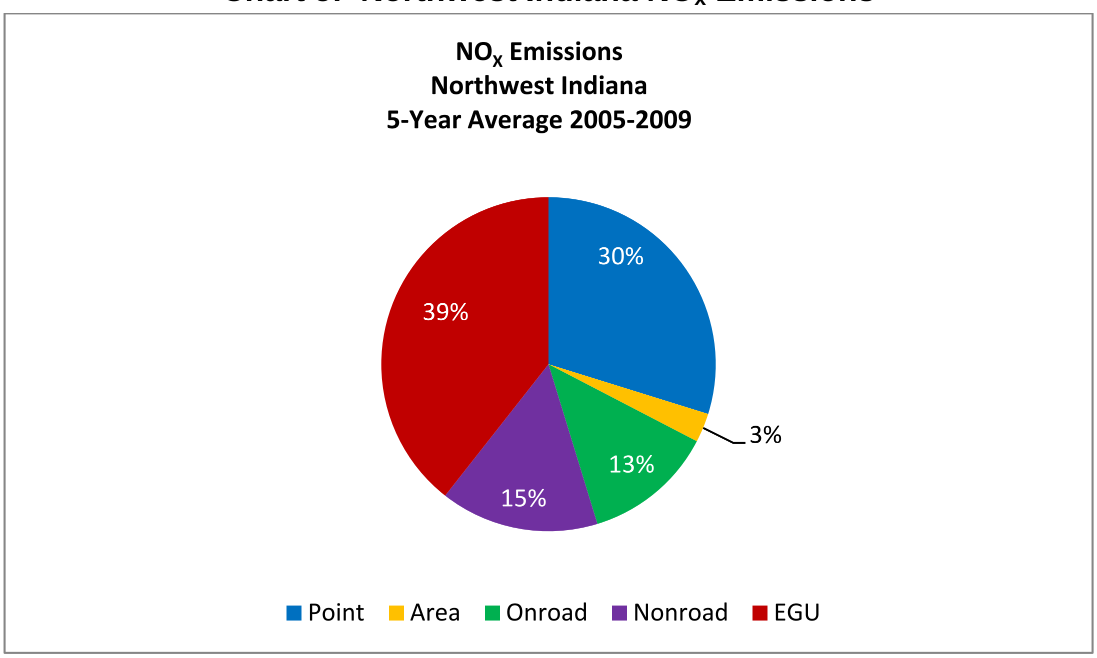


Chart 5: Northwest Indiana NO_x Emissions



National and regional controls, such as the Acid Rain Program, engine and fuel standards, and the NO_x SIP Call have led to a decrease in NO_x values over time. As Graph 16 illustrates, NO_x emissions have decreased by 72% within the Northwest 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 seven monitoring sites within Northwest Indiana, three in Lake County, two in LaPorte County, and two in Porter County that measure ozone levels. Primary and secondary ozone 1-hour ozone standards were first established in April 1979 at 0.12 ppm. Based on U.S. EPA's published data guidelines, values above 0.124 ppm were deemed to be in violation of the standard. The trend data in Graph 17 reflect the 4^{th} highest monitored concentration for 1-hour ozone within a given three-year period from all of the monitors in the Northwest 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 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 4^{th} 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 4^{th} highest 8-hour ozone value is equal to or greater than 0.076 ppm. A monitor can exceed the standards without being in violation.

The trend data in Graph 18 reflect the 4th high and the highest 4th high concentration for 8-hour ozone from all of the monitors in the Northwest 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 18 are not a true comparison to the primary and secondary 8-hour ozone standards. The values in Graph 19 reflect the design value of the three-year average of the 4th highest 8-hour ozone values from the monitors for each year.

The data in Tables 16 and 17 are from all of the monitoring sites in the Northwest Indiana area that measured 1-hour ozone from 2000 through 2010. Monitoring data in Table 16 show the four highest annual concentrations for 1-hour ozone for the years 2000 through 2010. Monitoring data in Table 17 show the 4th highest concentration for 1-hour ozone in a three year period for the years 2000 through 2010. The data in Tables 18 and 19 are from all of the monitoring sites in the Northwest Indiana area that measured 8-hour ozone from 2000 through 2010. Monitoring data in Table 18 show the 4th highest concentration for 8-hour ozone in a three-year period for the years 2000 through 2010. Monitoring data in Table 19 show the design value of the three-year average of the 4th highest 8-hour ozone values for the years 2000 through 2010, which are compared to the primary and secondary 8-hour ozone standards at 0.08 ppm.

Table 16: Northwest Indiana 1-Hour Ozone Annual 4th High Value Monitoring Data

			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**
Lake	180890022	Gary IITRI	0.104	0.091	0.090	0.084	0.011	0.106	0.104	0.101	0.129	0.125	0.120	0.113
Lake	180890024	Lowell	0.099	0.091	0.090	0.084	0.108	0.094	0.089	0.088	0.111	0.098	0.094	0.094
Lake	180890030	Whiting												
Lake	180892008	Hammond	0.098	0.096	0.095	0.095	0.106	0.105	0.103	0.102	0.127	0.119	0.118	0.108
LaPorte	180910005	Michigan City	0.113	0.098	0.097	0.093	0.139	0.113	0.111	0.109	0.137	0.136	0.135	0.135
LaPorte	180910010	LaPorte	0.104	0.093	0.092	0.090	0.109	0.100	0.091	0.087	0.133	0.128	0.118	0.118
Porter	181270020	Dunes National Lakeshore	0.105	0.099	0.090	0.086	0.108	0.107	0.105	0.096	0.130	0.124	0.123	0.119
Porter	181270024	Ogden Dunes	0.110	0.098	0.094	0.092	0.111	0.109	0.105	0.103	0.136	0.132	0.127	0.122
Porter	181270026	Valparaiso	0.104	0.102	0.097	0.091	0.093	0.092	0.088	0.085	0.124	0.012	0.115	0.115

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
Lake	180890022	Gary IITRI	0.106	0.094	0.090	0.086	0.078	0.078	0.076	0.075	0.129	0.114	0.112	0.111
Lake	180890024	Lowell	0.126	0.102	0.093	0.092								
Lake	180890030	Whiting					0.088	0.083	0.078	0.074	0.121	0.116	0.104	0.098
Lake	180892008	Hammond	0.104	0.099	0.092	0.092	0.085	0.082	0.081	0.078	0.118	0.107	0.100	0.099
LaPorte	180910005	Michigan City	0.102	0.095	0.095	0.094	0.092	0.085	0.083	0.083	0.117	0.102	0.102	0.101
LaPorte	180910010	LaPorte	0.103	0.102	0.099	0.096	0.083	0.083	0.083	0.083	0.109	0.104	0.101	0.097
Porter	181270020	Dunes National Lakeshore	0.098	0.096	0.094	0.089								
Porter	181270024	Ogden Dunes	0.101	0.095	0.094	0.089	0.089	0.089	0.086	0.084	0.144	0.119	0.114	0.110
Porter	181270026	Valparaiso	0.100	0.097	0.096	0.095	0.093	0.092	0.091	0.088	0.097	0.094	0.093	0.091

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
Lake	180890022	Gary IITRI	0.090	0.086	0.082	0.080	0.105	0.102	0.095	0.089	0.082	0.077	0.074	0.069
Lake	180890024	Lowell												
Lake	180890030	Whiting	0.109	0.092	0.089	0.087	0.103	0.102	0.101	0.094	0.081	0.072	0.072	0.072
Lake	180892008	Hammond	0.089	0.082	0.082	0.078	0.105	0.103	0.094	0.089	0.082	0.079	0.078	0.076
LaPorte	180910005	Michigan City	0.095	0.083	0.083	0.082	0.099	0.092	0.090	0.085	0.077	0.071	0.071	0.067
LaPorte	180910010	LaPorte	0.081	0.079	0.074	0.074	0.094	0.091	0.087	0.086	0.078	0.073	0.073	0.072
Porter	181270020	Dunes National Lakeshore												
Porter	181270024	Ogden Dunes	0.094	0.085	0.084	0.082	0.109	0.100	0.099	0.093	0.093	0.084	0.080	0.080
Porter	181270026	Valparaiso	0.088	0.081	0.078	0.078	0.099	0.093	0.093	0.091	0.069	0.067	0.066	0.066

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
Lake	180890022	Gary IITRI	0.065	0.065	0.064	0.063	0.086	0.077	0.076	0.075
Lake	180890024	Lowell								
Lake	180890030	Whiting	0.079	0.076	0.072	0.071	0.084	0.080	0.078	0.076
Lake	180892008	Hammond	0.083	0.075	0.074	0.070	0.084	0.082	0.081	0.080
LaPorte	180910005	Michigan City	0.085	0.078	0.076	0.073	0.096	0.095	0.081	0.079
LaPorte	180910010	LaPorte	0.092	0.082	0.067	0.067	0.088	0.076	0.075	0.074
Porter	181270020	Dunes National Lakeshore								
Porter	181270024	Ogden Dunes	0.083	0.082	0.080	0.074	0.090	0.085	0.079	0.076
Porter	181270026	Valparaiso	0.091	0.086	0.080	0.066	0.071	0.070	0.066	0.066

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

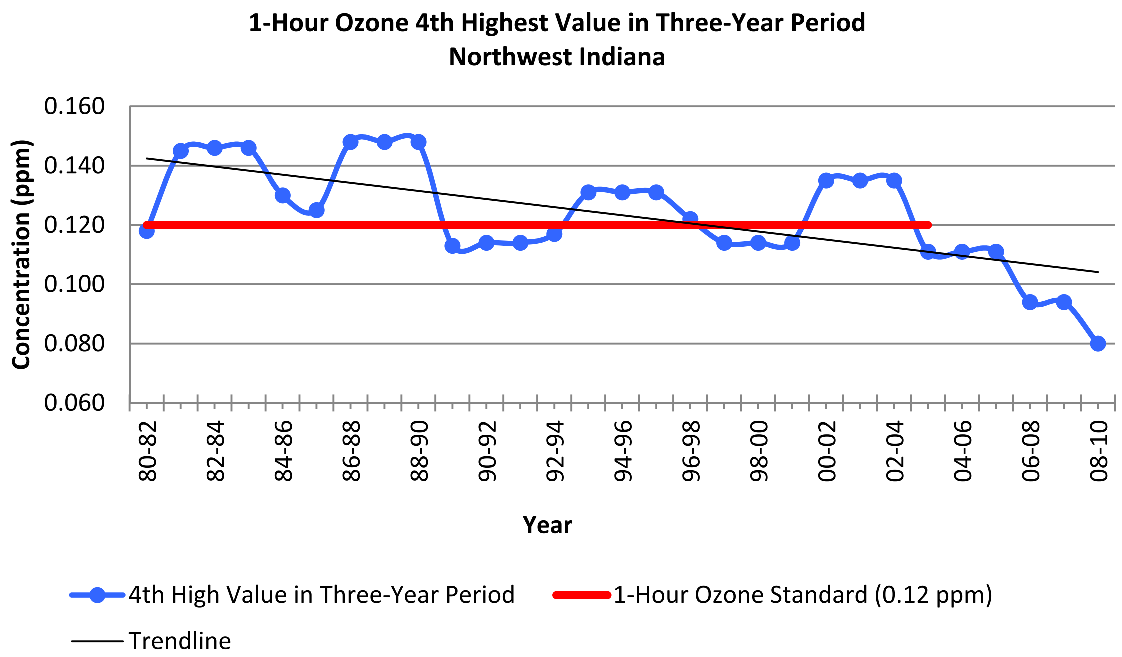


Table 17: Northwest Indiana 1-Hour Ozone 4th High Value in Three-Year Period Monitoring Data Summary

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
Lake	180890022	Gary IITRI	0.113	0.113	0.113	0.111	0.111	0.111	0.089	0.089	0.075
Lake	180890024	Lowell	0.094	0.094							
Lake	180890030	Whiting				0.098	0.098	0.098	0.094	0.094	0.076
Lake	180892008	Hammond	0.108	0.108	0.108	0.099	0.099	0.099	0.089	0.089	0.080
LaPorte	180910005	Michigan City	0.135	0.135	0.135	0.101	0.101	0.101	0.085	0.085	0.079
LaPorte	180910010	LaPorte	0.118	0.118	0.118	0.097	0.097	0.097	0.086	0.086	0.074
Porter	181270020	Dunes National Lakeshore	0.119	0.119							
Porter	181270024	Ogden Dunes	0.122	0.122	0.122	0.110	0.110	0.110	0.093	0.093	0.080
Porter	181270026	Valparaiso	0.115	0.115	0.115	0.095	0.091	0.091	0.091	0.091	0.066

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

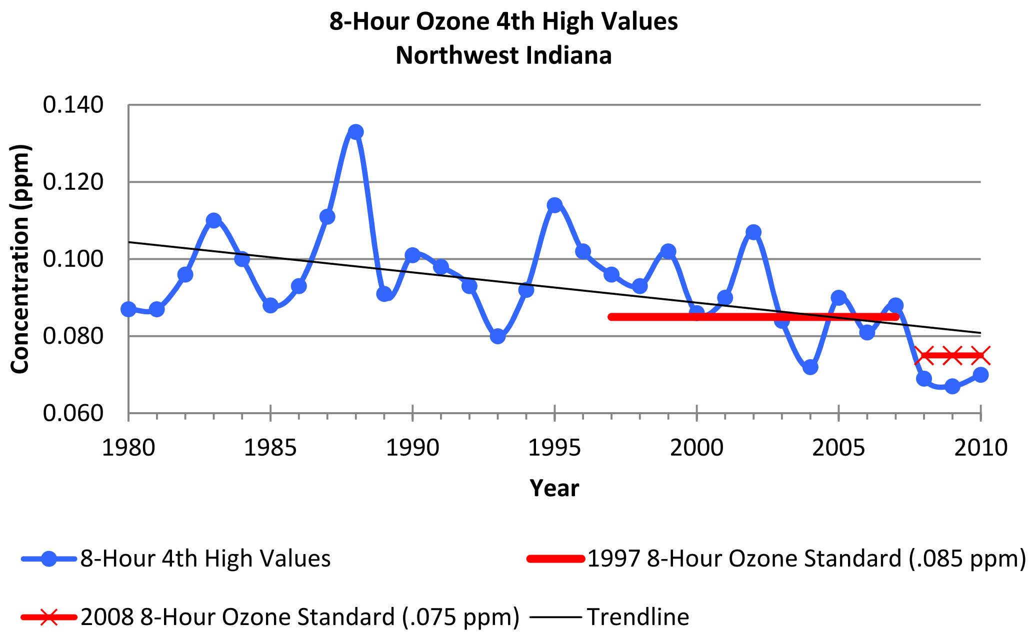


Table 18: Northwest Indiana 8-Hour Ozone 4th High Values Monitoring Data Summary

County	Site #	Site Name	4th Highest Ozone Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Lake	180890022	Gary IITRI	0.075	0.083	0.094	0.076	0.064	0.089	0.073	0.085	0.062	0.058	0.064
Lake	180890024	Lowell	0.075	0.077	0.086	0.081							
Lake	180890030	Whiting					0.064	0.088	0.081	0.088	0.062	0.062	0.069
Lake	180892008	Hammond	0.086	0.090	0.101	0.081	0.067	0.087	0.075	0.077	0.068	0.065	0.069
LaPorte	180910005	Michigan City	0.080	0.090	0.107	0.082	0.070	0.084	0.075	0.073	0.059	0.066	0.070
LaPorte	180910010	LaPorte	0.074	0.079	0.100	0.084	0.068	0.089	0.069	0.078	0.065	0.063	0.067
Porter	181270020	Dunes National Lakeshore	0.071	0.082	0.097	0.079							
Porter	181270024	Ogden Dunes	0.085	0.085	0.101	0.077	0.069	0.090	0.070	0.084	0.069	0.067	0.067
Porter	181270026	Valparaiso	0.082	0.077	0.100	0.082	0.072	0.078	0.071	0.080	0.061	0.064	0.061

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

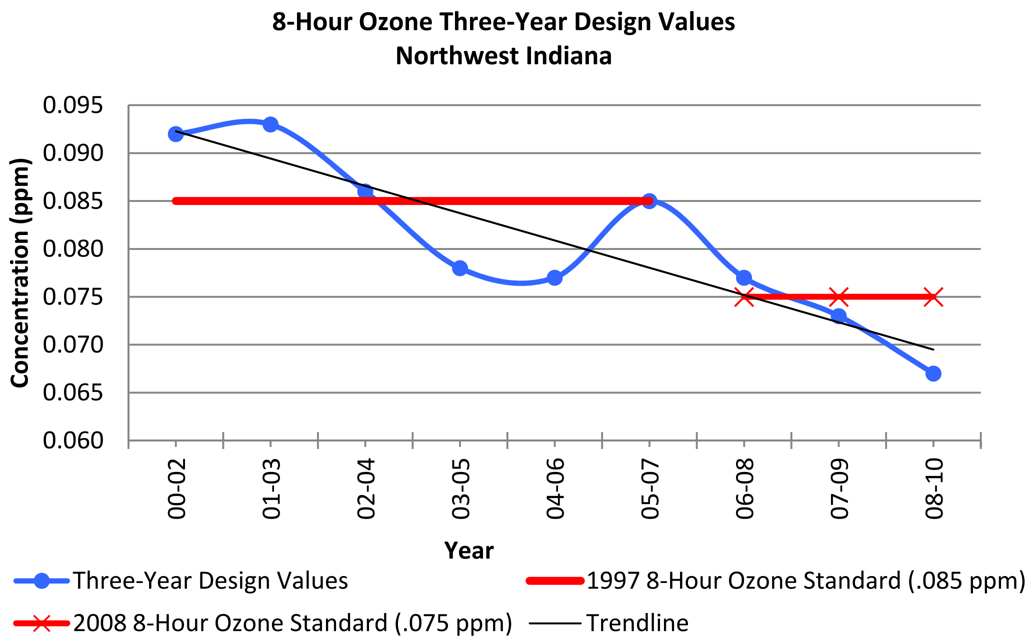


Table 19: Northwest Indiana 8-Hour Ozone Three-Year Design Value Monitoring Data Summary

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
Lake	180890022	Gary IITRI	0.084	0.084	0.078	0.076	0.075	0.082	0.073	0.068	0.061
Lake	180890024	Lowell	0.079	0.081							
Lake	180890030	Whiting			0.064	0.076	0.077	0.085	0.077	0.070	0.064
Lake	180892008	Hammond	0.092	0.090	0.083	0.078	0.076	0.079	0.073	0.070	0.067
LaPorte	180910005	Michigan City	0.092	0.093	0.086	0.078	0.076	0.077	0.069	0.066	0.065
LaPorte	180910010	LaPorte	0.084	0.087	0.084	0.080	0.075	0.078	0.070	0.068	0.065
Porter	181270020	Dunes National Lakeshore	0.083	0.086							
Porter	181270024	Ogden Dunes	0.090	0.087	0.082	0.078	0.076	0.081	0.074	0.073	0.067
Porter	181270026	Valparaiso	0.086	0.086	0.084	0.077	0.073	0.076	0.070	0.068	0.062

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 17, 18, and 19, monitoring data for both 1-hour and 8-hour ozone indicate a downward trend over time. Because ozone is formed by the secondary reaction of precursor pollutants, it is heavily influenced by meteorology (wind speed, temperature, stagnant air, etc.) and during an ozone season, when peak meteorology conditions exist, it is not unusual to see an increase in ozone. The high spikes in ozone in 1983, 1988, 1995, 2002, 2005, and 2007 shown in Graphs 18 can be traced back to high temperatures and stagnant weather conditions during the ozone seasons of those years.

Tables 16, 17, 18, and 19 demonstrate that the 1-hour and 8-hour ozone values for the Northwest Indiana area correlate with each other over time, meaning that when one monitoring site trends upward or downward, the others do as well. Monitor values for 1-hour and 8-hour ozone in Northwest Indiana were in violation of the 1-hour and 8-hour ozone standards, but are now below the standards. The Michigan City 8-hour ozone monitoring site has historically registered some of the highest 8-hour ozone values in Northwest Indiana. This is expected since it is the downwind site for Lake and Porter counties. Downwind monitors are usually the last to attain the standard because ozone and ozone precursors from the most densely populated areas and emission sources have more time for photochemical reactions to build to peak levels.

Ozone is not emitted directly into the air, but is created in the lower atmosphere. NO_x and VOC chemically react individually or collectively in the presence of sunlight to form ground-level ozone. U.S. EPA's NEI contains emissions information for NO_x and VOC and is used in the following graphs and charts. Graphs 20 and 21 illustrate the emissions trend for the ozone precursors in Northwest Indiana and Charts 6 and 7 show how the average emissions are distributed among the different source categories.

Graph 20: Northwest Indiana NO_x Emissions

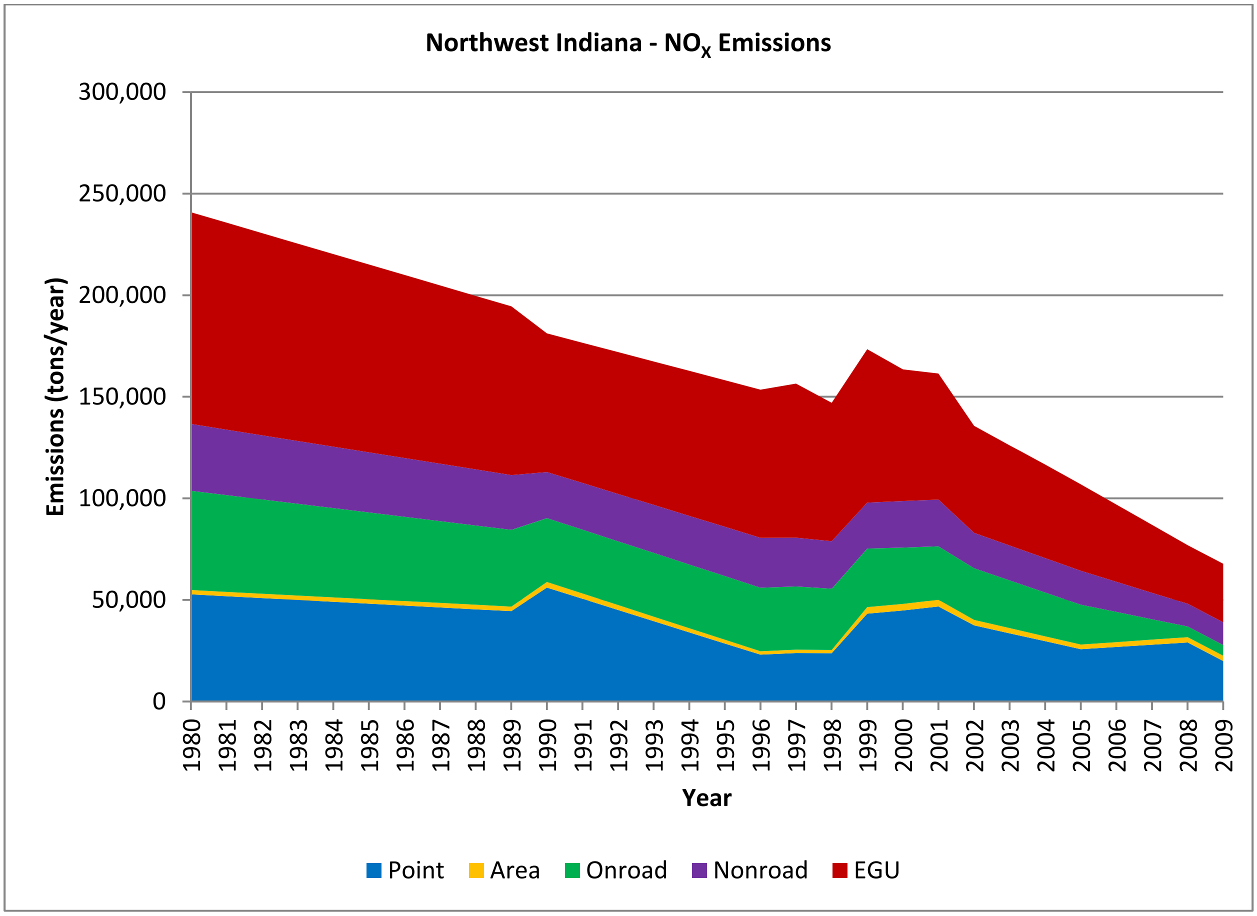
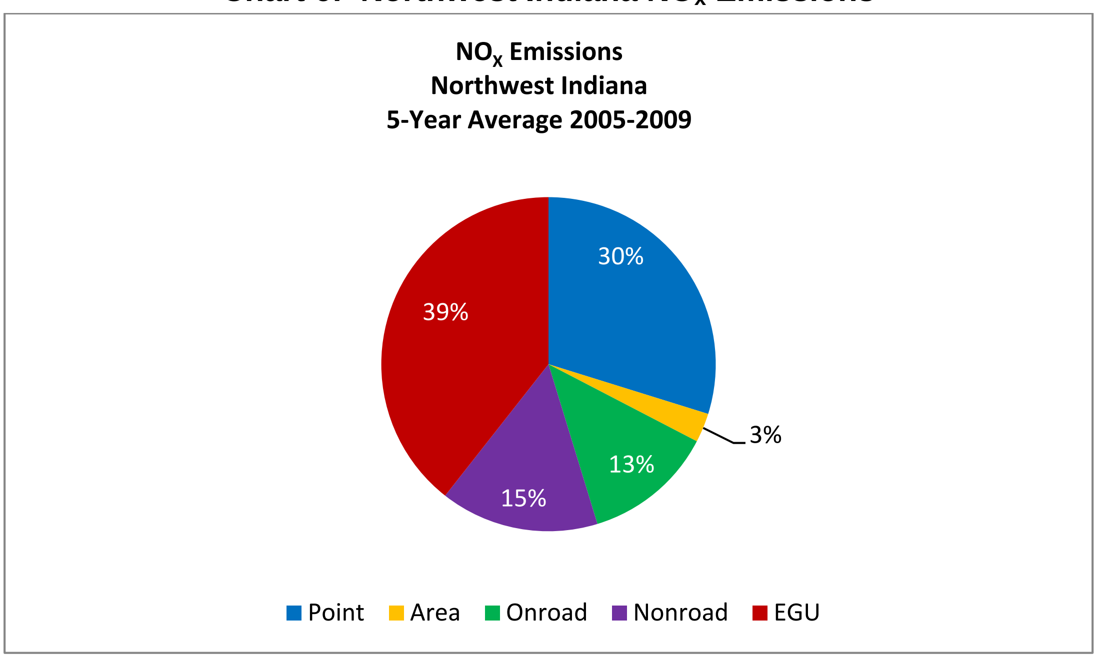


Chart 6: Northwest Indiana NO_x Emissions



Graph 21: Northwest Indiana VOC Emissions

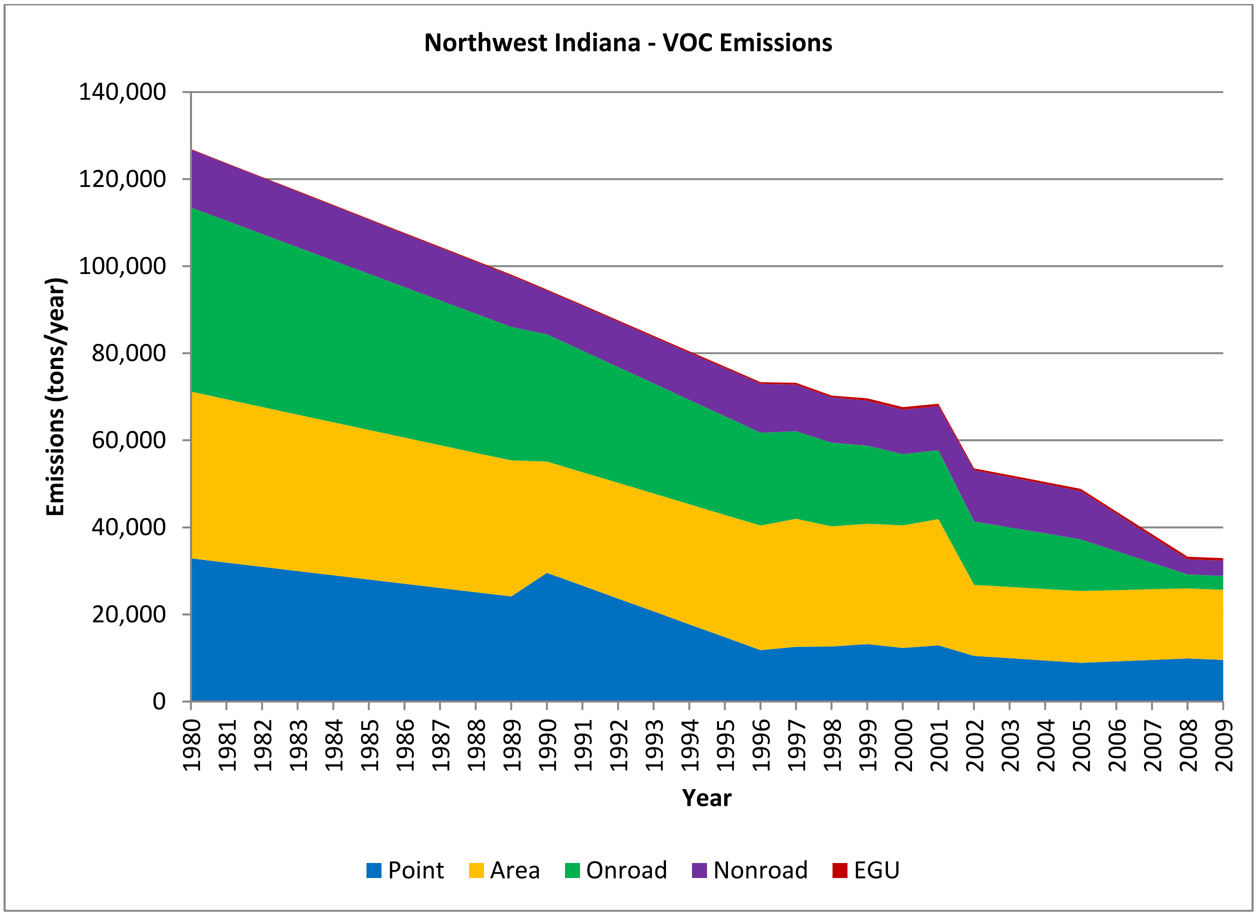
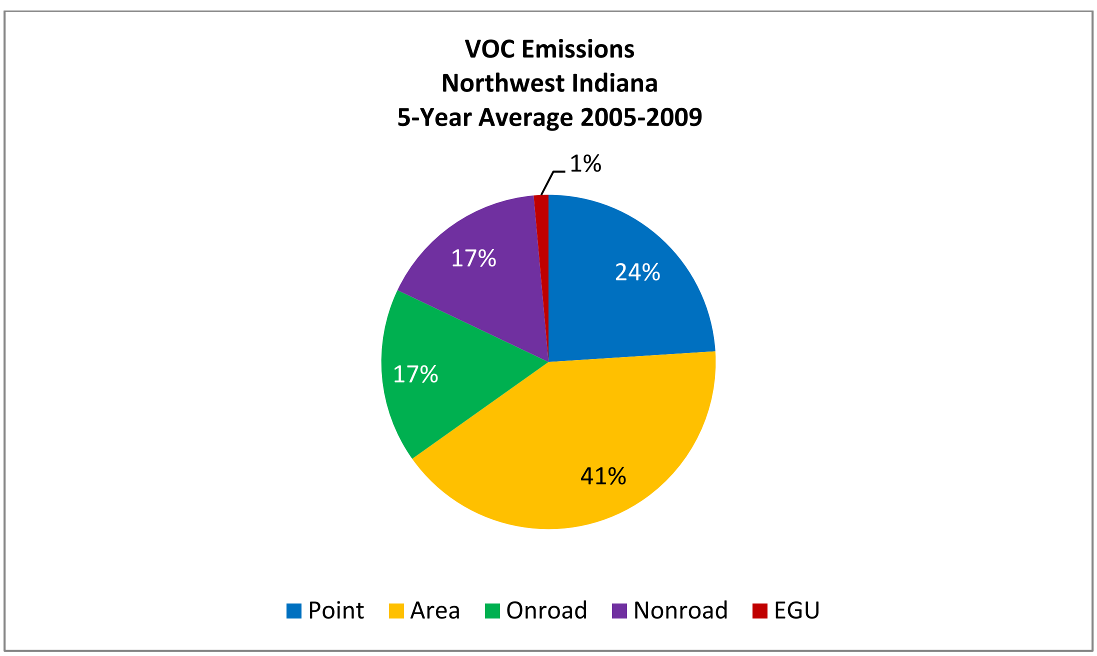


Chart 7: Northwest Indiana VOC Emissions



National controls, such as engine and fuel standards, as well as regional controls, such as the NO_x SIP Call, have led to a decrease in ozone precursor emissions over time. As Graphs 20 and 21 illustrate, NO_x and VOC emissions have decreased by 74% and 72%, respectively, within the Northwest Indiana area since 1980. This trend is true for the key precursors of ozone throughout Indiana and the upper Midwest. Reductions in NO_x and VOC emissions are also attributable to the implementation of the federal engine and fuel standards for onroad and nonroad vehicles and equipment, the NO_x SIP Call beginning in 2004, and to local controls that were necessary in reducing emissions in the Northwest Indiana area. Specific to Lake and Porter counties, significant mobile source sector reductions of NO_x and VOC have been achieved from the implementation of the vehicle inspection and maintenance program and reformulated gasoline. For example, the vehicle inspection and maintenance program, otherwise known as Clean Air Car Check, has been in place since 1984 and is estimated to achieve a reduction of 1,400 tons of VOC and 650 tons of NO_x per year today. 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 seven monitoring sites within Northwest Indiana, five in Lake County and two in Porter County that measure PM_{10} in Northwest Indiana. The trend data in Graph 22 reflect the annual arithmetic mean which is used to compare to the primary and secondary annual PM_{10} standards of 50 µg/m^3. The highest value from all of the monitors in the Northwest Indiana area is plotted on the graph for each year. The annual PM_{10} standard was revoked in October 2006. The trend data in Graph 23 reflect the 2^{nd} highest 24-hour PM_{10} concentration, which is used to compare to the primary and secondary 24-hour PM_{10} standards of 150 µg/m^3. Attainment of the primary and secondary 24-hour PM_{10} standards is determined by evaluating the 2^{nd} highest 24-hour concentrations and is attained when the number of days per year with a 24-hour average above 150 µg/m^3 is equal to or less than 1 per year in a three-year period. The highest 2^{nd} high concentration from all of the monitors in the Northwest Indiana area is plotted on the graph for each year.

While there is some variability in the monitoring data for both the annual and 24-hour PM_{10} values, a downward trend over time is demonstrated in Graphs 22 and 23. The monitoring data in Northwest Indiana were above the primary and secondary annual PM_{10} standards but have remained below since 1988. Monitoring data in Northwest Indiana were above the primary and secondary 24-hour PM_{10} standards but have remained below since 2006. PM_{10} monitors are located in close proximity to major sources in the area and data will fluctuate based on variability in facility operations and meteorology.

The data shown in Tables 20 and 21 include the monitoring sites that measured annual and 24-hour PM_{10} from 2000 through 2010. Monitoring data for both annual and 24-hour PM_{10} prior to the year 2000 are available upon request. Monitoring data in Table 20 are compared to the primary and secondary annual PM_{10} standards of 50 µg/m^3 and show that the Northwest Indiana area has always been below the standards. Monitoring data in Table 21 are compared to the primary and secondary 24-hour PM_{10} standards at 150 µg/m^3 and show that the Northwest Indiana area has been below the standards since 2006.

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

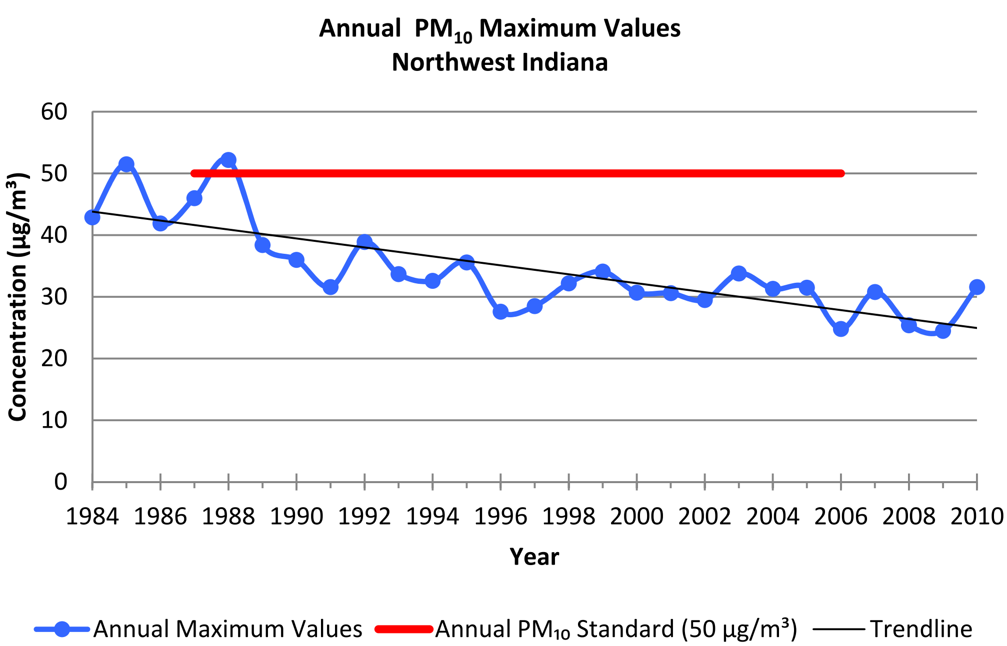


Table 20: Northwest Indiana Annual Arithmetic Mean PM_{10} Values Monitoring Data Summary

County	Site #	Site Name	Annual Arithmetic Mean (µg/m^3)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jasper	180730002	Wheatfield	17.5	17.0	15.6								
Jasper	180730003	Asphaltum Substation	17.8	15.9	16.2								
Lake	180890006	East Chicago - Franklin Sch	20.3	18.8	15.8	17.0	23.7	28.9	24.3	30.8	22.7	19.0	24.0
Lake	180890022	Gary - IITRI	30.7	30.6	29.5	33.8	31.3	31.5	24.3	28.0	25.4	22.6	24.8
Lake	180890023	East Chicago - Water Filtration Plant	28.6	25.3	23.8	24.6	24.7	28.1	23.8	27.5	24.8	24.5	31.6
Lake	180890031	Gary - Madison St						31.4	24.8	28.4	22.2	22.0	24.5
Lake	180891016	Gary - Federal Building	22.7	20.6	19.2								
Lake	180892010	Hammond - Clark HS	22.5	19.1	16.3	16.1	15.7	19.3	13.8	17.2	17.8	17.2	20.8
Porter	181270023	Portage – Hwy 12	21.6	21.5	21.9	22.1	24.9	25.2	23.5	23.2	22.2	18.0	20.9
Porter	181270024	Ogden Dunes	17.1	17.2	16.1	14.8	14.8	16.3	15.3	22.4	17.7	18.3	18.6
Porter	181270025	Bethlehem Steel-Headquarters	17.4										

Highlighted red numbers are over the annual PM_{10} standard of 50 µg/m^3

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

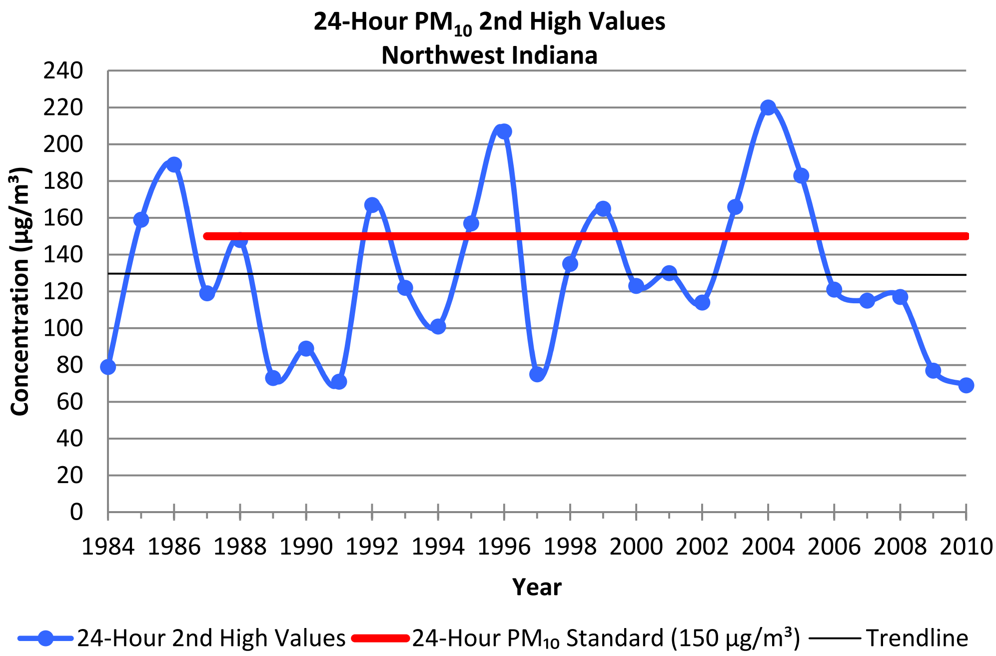


Table 21: Northwest Indiana 24-Hour PM_{10} 2nd High Values Monitoring Data Summary

County	Site #	Site Name	24-Hour 2nd High Value (µg/m³)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jasper	180730002	Wheatfield	31	34	38								
Jasper	180730003	Asphaltum Substation	34	38	39								
Lake	180890006	East Chicago - Franklin Sch	40	38	35	32	45	60	42	72	44	38	51
Lake	180890022	Gary - IITRI	123	130	114	166	177	183	90	115	117	77	67
Lake	180890023	East Chicago - Water Filtration Plant	50	43	48	44	46	59	40	49	42	50	69
Lake	180890031	Gary - Madison St						53	46	65	58	46	60
Lake	180891016	Gary - Federal Building	42	41	31								
Lake	180892010	Hammond - Clark HS	41	38	35	36	31	50	29	36	42	41	49
Porter	181270023	Portage – Hwy 12	54	73	78	63	220	133	121	78	97	50	66
Porter	181270024	Ogden Dunes	29	35	37	33	29	41	29	45	40	36	43
Porter	181270025	Bethlehem Steel-Headquarters	38										

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

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

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

Graph 24: Northwest Indiana PM_{10} Emissions

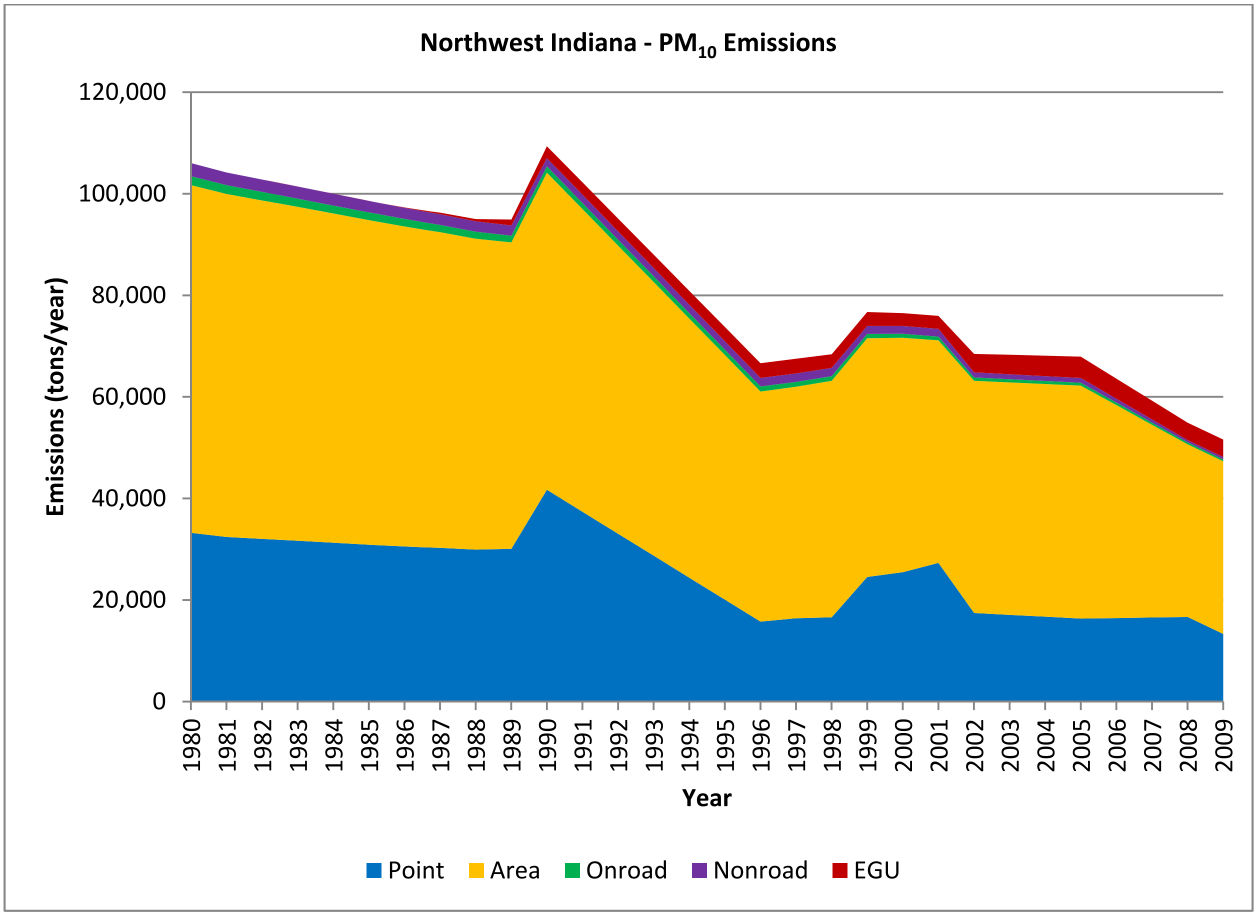
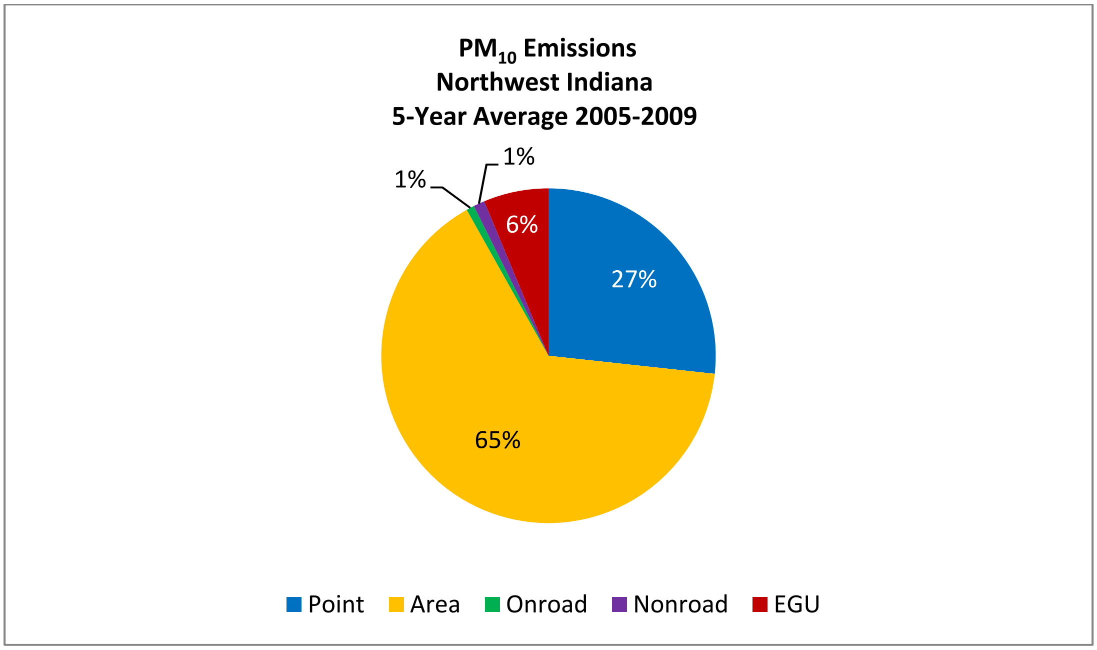


Chart 8: Northwest Indiana PM_{10} Emissions



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 24 illustrates, total PM_{10} emissions have decreased by 51% 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)

Five monitoring sites within Northwest Indiana measure SO_2 levels, one each in Jasper, LaPorte, and Porter counties, and two in Lake County. The trend data in Graph 25 reflect the annual arithmetic mean which was used to compare to the primary annual SO_2 standard at 0.03 ppm. Attainment of the primary annual SO_2 standard was determined by evaluating the annual arithmetic mean which could not exceed the standard. U.S. EPA revoked the primary annual SO_2 standard in June 2010 and replaced it with a 1-hour SO_2 standard. The highest annual arithmetic mean from all of the monitors in the Northwest Indiana area is plotted on Graph 25 for each year.

The trend data in Graph 26 reflect the 2nd highest 24-hour SO_2 concentrations, which were used to compare to the primary 24-hour SO_2 standard at 0.14 ppm. Attainment of the primary 24-hour SO_2 standard was determined by evaluating the 2nd highest 24-hour concentration, which could not exceed the standard. U.S. EPA revoked the primary 24-hour SO_2 standard in June 2010 and replaced it with a 1-hour SO_2 standard. The highest of the 2nd high 24-hour values from all of the monitors in the Northwest Indiana area is plotted on Graph 26 for each year. The trend data in Graph 27 show the 99th percentile of the 1-hour SO_2 values, which are provided for reference purposes only, because they were collected prior to the implementation of the current standard. The design value of the 99th percentile is used for comparison to the primary 1-hour SO_2 standard; therefore, the one-year values shown in Graph 27 are not a true comparison to the primary 1-hour SO_2 standard. The values in Graph 27 reflect the highest 99th percentile from all of the monitors in the Northwest Indiana area which is plotted on the graph for each year. The 1-hour SO_2 standard at 75 ppb is only listed for the year 2010 on this graph since it was not established until June 2010. Attainment of the primary 1-hour SO_2 standard is determined by evaluating the design value of the 99th percentile values of the daily maximum 1-hour averages at each monitor within an area, which must not exceed 75 ppb averaged over a three-year period. The values in Graph 28 reflect the design value of the 99th percentile of the daily maximum 1 hour average values for the years 2000 through 2010 from all of the monitors in the Northwest Indiana area is plotted on the graph for each year. An exceedance of the primary 1-hour SO_2 standard occurs when a 99th percentile value is equal to or greater than 75 ppb. A violation of the primary 1-hour SO_2 standard occurs when the three-year design value of the 99th percentile is equal to or greater than 75.5 ppb. A monitor can exceed the standard without being in violation.

The data in Tables 22, 23, 24, and 25 include the monitoring sites that measured annual, 24-hour, and 1-hour SO_2 from 2000 through 2010. Monitoring data for SO_2 prior to the year 2000 are available upon request. Monitoring data for all graphs display a downward trend over time. The monitor values for Northwest Indiana have always been historically below the primary annual and 24-hour SO_2 standards.

Monitoring data in Table 22 show the annual arithmetic mean for the years 2000 through 2010 which were compared to the primary annual SO_2 standard of 0.03 ppm. Monitoring data in Table 23 show the 2nd highest 24-hour value for the years 2000 through 2010 which was compared to the primary 24-hour SO_2 standard of 0.14 ppm.

Monitoring data in Table 24 show the 1-hour 99th percentile values for the years 2000 through 2010. Monitoring data in Table 25 show the design value of the 99th percentile for the years 2000 through 2010 which are compared to the new primary 1-hour SO_2 standard at 75 ppb. In Tables 22, 23, and 25 values above the standards have been highlighted. The 1-hour SO_2 data prior to the 2008-2010 design value were not compared to any standard and the 99th percentile and design values from 2000 to 2007 are included for reference purposes only.

Graph 25: Northwest Indiana Annual Arithmetic Mean SO_2 Values

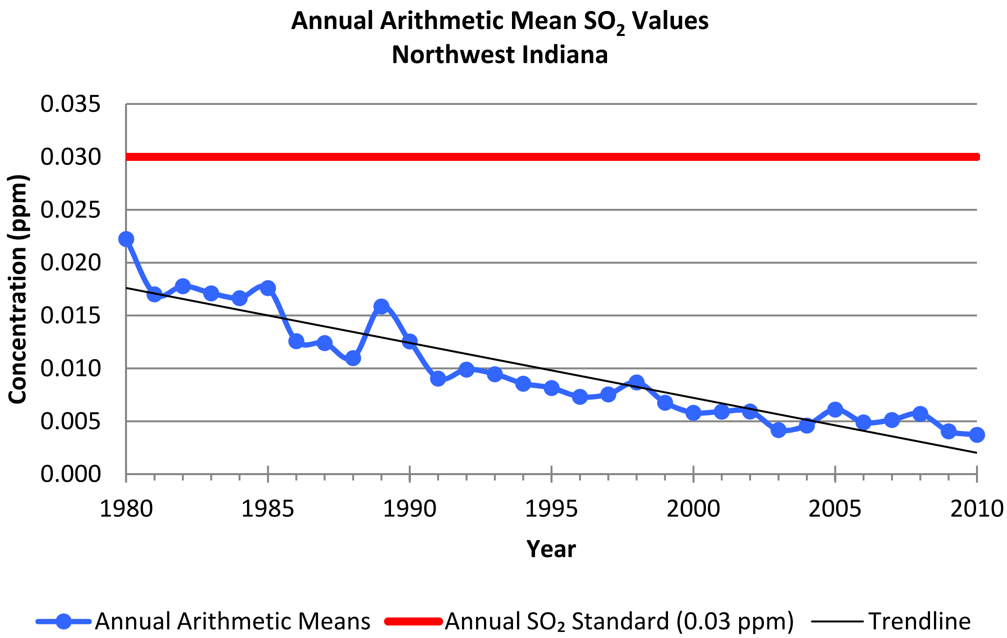


Table 22: Northwest Indiana Annual Arithmetic Mean SO_2 Values Monitoring Data Summary

County	Site ID	Site Name	Annual Arithmetic Mean (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jasper	180730002	Wheatfield - Center St	0.003	0.003	0.003	0.003	0.004	0.006	0.005	0.002	0.003	0.003	0.002
Jasper	180730003	Asphaltum Substation	0.003	0.002	0.003								
Lake	180890022	Gary - IITRI	0.006	0.005	0.006	0.004	0.005	0.004	0.003	0.003	0.003	0.002	0.002
Lake	180892008	Hammond - 141st St	0.006	0.006	0.004	0.003	0.004	0.003	0.004	0.005	0.004	0.003	0.002
LaPorte	180910005	Michigan City - 341 W 4th St	0.003	0.004	0.003	0.004	0.002	0.003	0.003	0.002	0.003	0.002	0.002
LaPorte	180910007	Michigan City - Cool Spring Substation	0.004	0.004	0.003								
Porter	181270011	Dune Acres Substation	0.005	0.005	0.004	0.004	0.004	0.006	0.005	0.003	0.006	0.004	0.004
			Highlighted red numbers are above the annual SO_2 standard of 0.03 ppm										

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

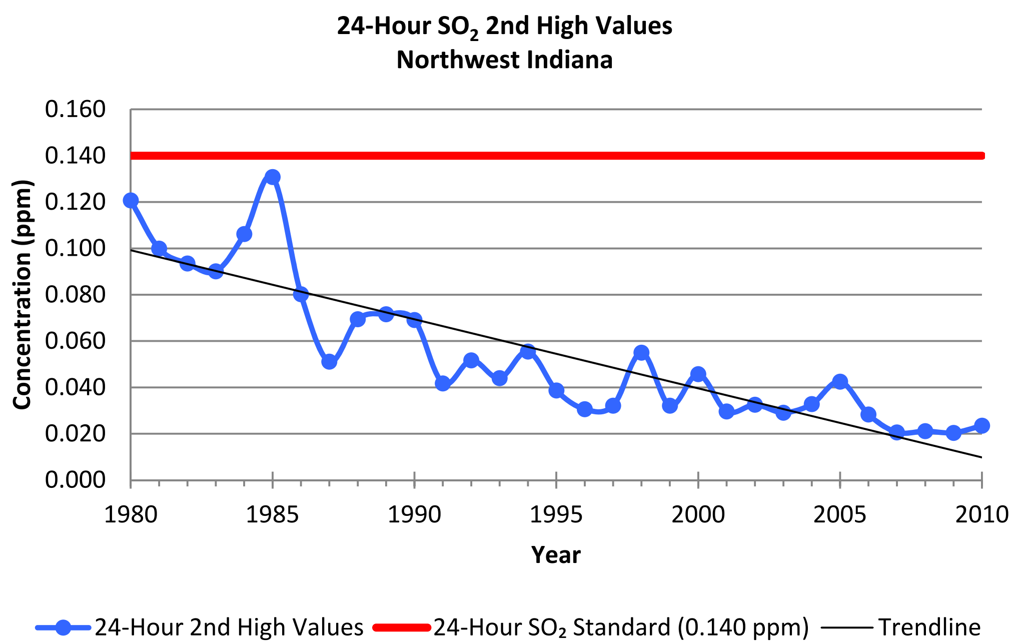


Table 23: Northwest Indiana 24-Hour SO_2 2nd High Values Monitoring Data Summary

County	Site ID	Site Name	2nd High Value (ppm)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jasper	180730002	Wheatfield - Center St	0.014	0.011	0.009	0.011	0.023	0.017	0.014	0.012	0.011	0.013	0.010
Jasper	180730003	Asphaltum Substation	0.012	0.009	0.017								
Lake	180890022	Gary - IITRI	0.046	0.029	0.033	0.029	0.033	0.043	0.028	0.021	0.017	0.016	0.024
Lake	180892008	Hammond - 141st St	0.025	0.030	0.013	0.019	0.015	0.016	0.016	0.017	0.010	0.009	0.010
LaPorte	180910005	Michigan City - 341 W 4th St	0.013	0.014	0.015	0.012	0.016	0.016	0.010	0.010	0.009	0.010	0.011
LaPorte	180910007	Michigan City - Cool Spring Substation	0.016	0.012	0.015								
Porter	181270011	Dune Acres Substation	0.020	0.019	0.019	0.021	0.021	0.018	0.017	0.016	0.021	0.020	0.017

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

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

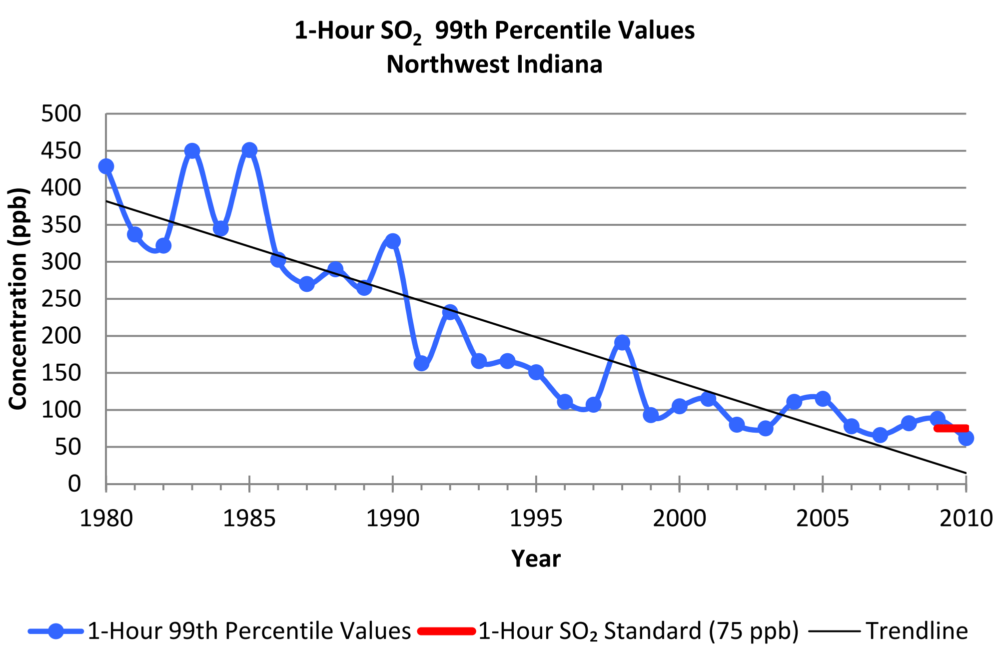


Table 24: Northwest Indiana 1-Hour 99th Percentile SO_2 Monitoring Data Summary

County	Site ID	Site Name	99th Percentile Values (ppb)										
			2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Jasper	180730002	Wheatfield - Center St	74	60	44	66	44	58	64	49	61	88	39
Jasper	180730003	Asphaltum Substation	31	47	44								
Lake	180890022	Gary - IITRI	79	87	80	75	111	115	78	66	67	59	57
Lake	180892008	Hammond - 141st St	105	115	53	72	39	42	36	50	37	37	34
LaPorte	180910005	Michigan City - 341 W 4th St	32	37	33	31	31	29	27	26	29	23	30
LaPorte	180910007	Michigan City - Cool Spring Substation	45	29	28								
Porter	181270011	Dune Acres Substation	62	53	57	53	59	74	55	62	82	51	62

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

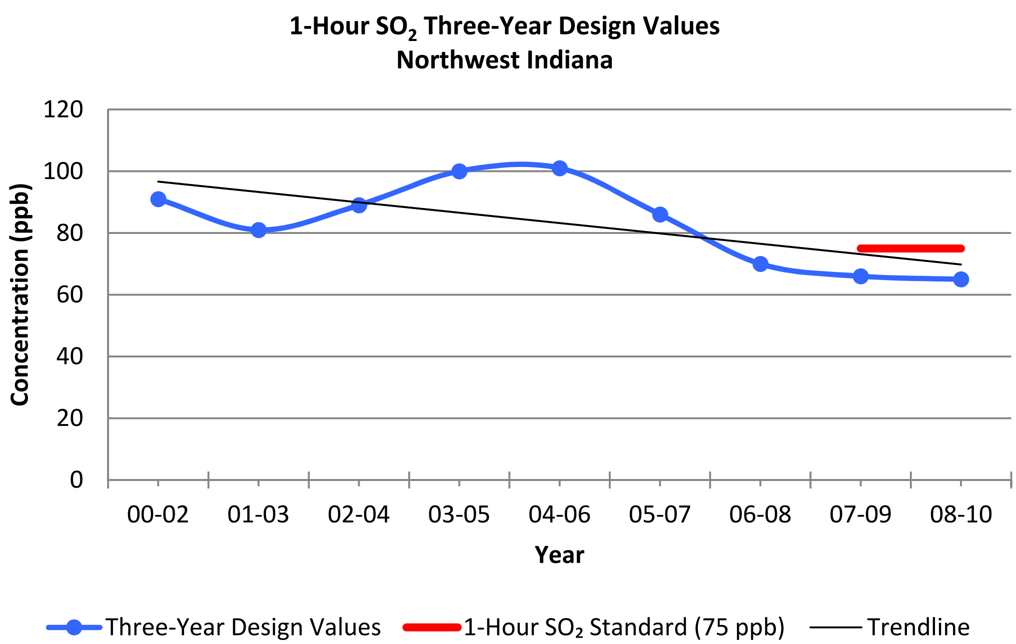


Table 25: Northwest Indiana 1-Hour SO_2 Three-Year Design Values Monitoring Data Summary

County	Site ID	Site Name	Three-Year Design Value (ppb)								
			00-02	01-03	02-04	03-05	04-06	05-07	06-08	07-09	08-10
Jasper	180730002	Wheatfield - Center St	59	57	51	56	55	57	58	66	63
Jasper	180730003	Asphaltum Substation	41								
Lake	180890022	Gary - IITRI	82	81	89	100	101	86	70	64	61
Lake	180892008	Hammond - 141st St	91	80	55	51	39	43	41	41	36
LaPorte	180910005	Michigan City - 341 W 4th St	34	34	32	30	29	27	27	26	27
LaPorte	180910007	Michigan City - Cool Spring Substation	34								
Porter	181270011	Dune Acres Substation	57	54	56	62	63	64	66	65	65
			Beginning in 2010, highlighted red numbers are above the 1-hour SO_2 standard of 75 ppb								

As shown in Graphs 25 and 26, both annual and 24-hour SO_2 values for the Northwest Indiana area have historically been below their respective standards. In addition, monitoring data shown in Graph 27 indicate a downward trend in 1-hour SO_2 monitoring values over time. The three-year design values for the Northwest Indiana area are currently below the new 1-hour primary standard. 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 29 and Chart 9. Graph 29 illustrates the emissions trend for SO_2 in Northwest Indiana and Chart 9 shows how the average emissions are distributed among the different source categories.

Graph 29: Northwest Indiana SO_2 Emissions

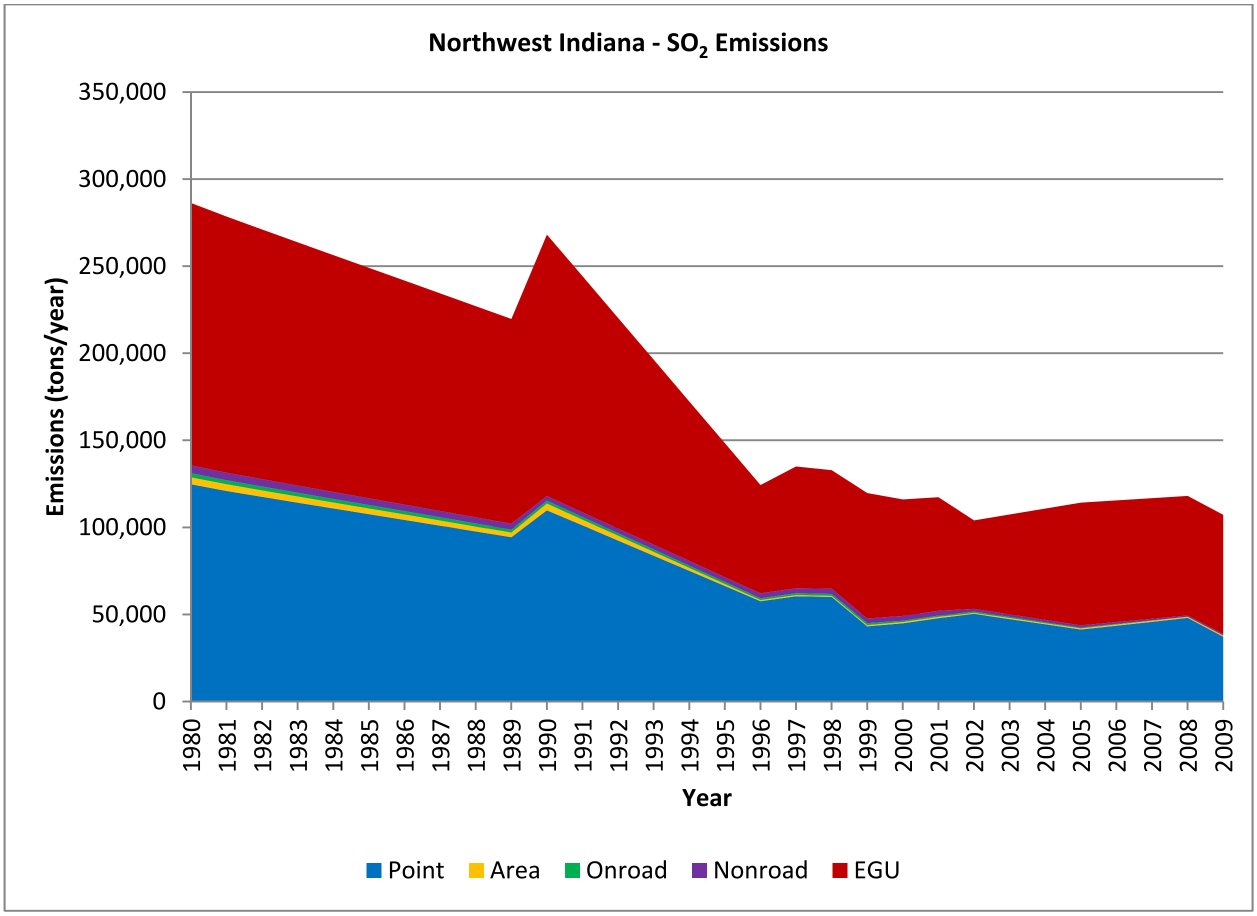
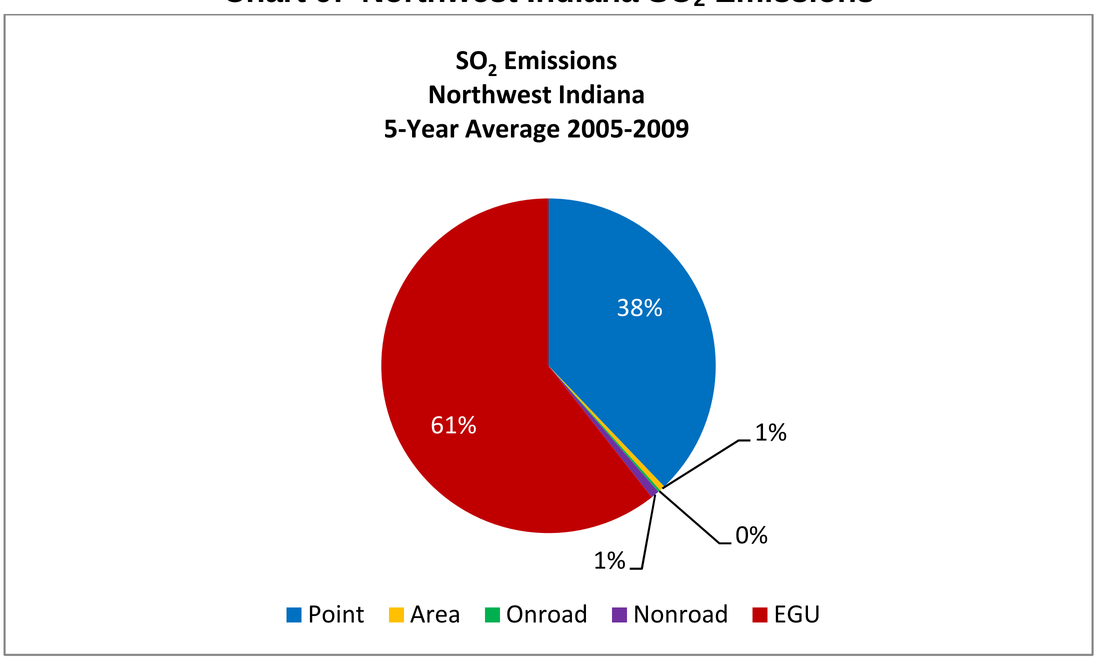


Chart 9: Northwest Indiana SO_2 Emissions



National and regional controls, such as the Acid Rain Program, engine and fuel standards, and the NO_x SIP Call have led to a decrease in SO_2 values over time. As Graph 29 illustrates, SO_2 emissions have decreased by 63% within the Northwest Indiana area since 1980. This trend is true throughout Indiana and the upper Midwest. Nationally, average SO_2 concentrations have decreased by more than 70% since 1980 due to implementation of the Acid Rain Program.

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

Total Suspended Particulate (TSP)

All available TSP data for Northwest Indiana are from monitors that were located in Lake County. The trend data in Graph 30 reflect the annual geometric mean values, which were used to compare to the primary and secondary annual TSP standards of 75 $\mu g/m^3$. The highest annual geometric mean from all of the monitors in the Northwest Indiana area is plotted on the graph for each year. The trend data in Graph 31 reflect the 2^{nd} highest 24-hour TSP concentrations which were used to compare to the primary 24-hour TSP standard of 260 $\mu g/m^3$. The highest 2^{nd} high 24-hour value from all of the monitors in the Northwest Indiana area is plotted on the graph for each year.

Both the primary and secondary annual TSP standards, as well as the primary and secondary 24-hour TSP standards, were revoked in 1987. TSP monitoring sites were discontinued across Indiana in 1995 because TSP was replaced by PM_{10}. Monitoring data for both annual and 24-hour TSP show a downward trend over time. TSP monitoring values violated the primary and secondary annual and primary 24-hour standards on a number of occasions from 1980 through 1987, but do show a downward trend over time. TSP monitors were located in close proximity to major sources in the area and data fluctuate based on variability in facility operations and meteorology.

The data in Tables 26 and 27 are from the monitoring sites that measured annual and 24-hour $PM_{2.5}$ from 1980 through 1991. All available data for both annual and 24-hour TSP for the Northwest Indiana area are shown in the tables. Monitoring data for both annual and 24-hour TSP show a downward trend over time.

Monitoring data in Table 26 show the annual geometric mean for annual TSP for the years 1980 through 1991 which are compared to the primary and secondary annual $PM_{2.5}$ standards of 75 µg/m^3. Monitoring data in Table 27 show the 2nd highest 24-hour TSP concentrations for the years 1980 through 1991, which are compared to the primary 24-hour TSP standard of 260 µg/m^3.

Graph 30: Northwest Indiana Annual Geometric Mean TSP Values

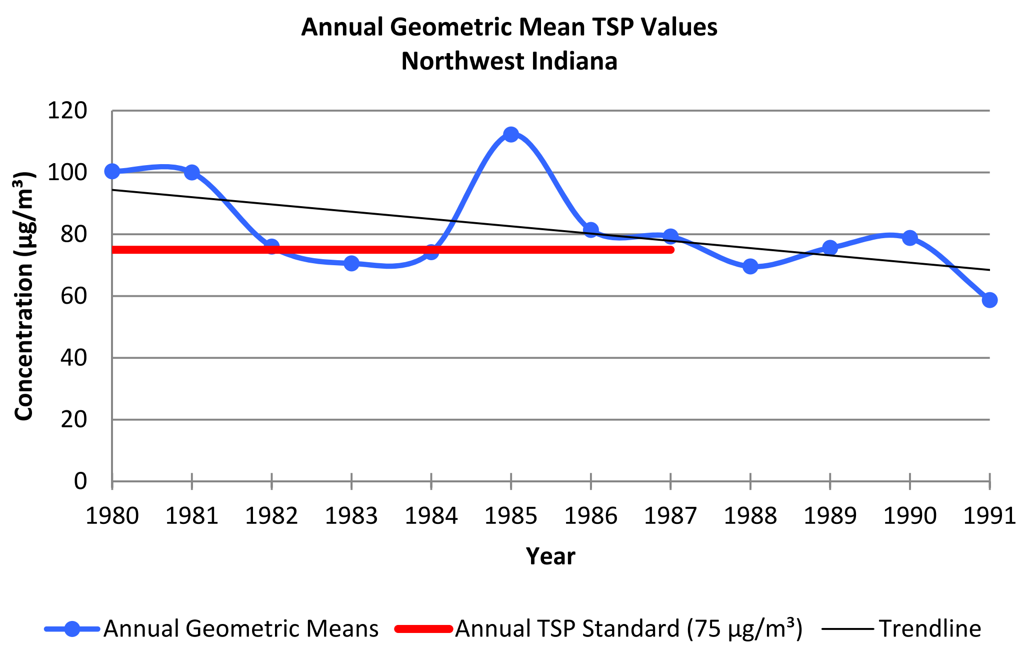


Table 26: Northwest Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	Annual Geometric Mean (µg/m^3)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Jasper	180730002	Wheatfield	43	45	44	40	37	37	33	37	34			
Lake	180890005	Wirt School	82	69	47	45	47	42	42					
Lake	180890006	Benjamin Franklin Elementary School	95	86	61	66	62	56	57	63	59			
Lake	180890015	East Chicago Post Office					65	112	81	79				
Lake	180891001	Central Fire Station	100	100	68	71	74	64						
Lake	180891002	Gary Municipal Airport	80	88	65	66								
Lake	180891003	Ivanhoe School	68	80	60	51	60	55	52	49	66			
Lake	180891008	Kuny School	60	63	57									

County	Site #	Site Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Lake	180891009	Borman Expressway			75									
Lake	180891014	Douglass School	76	41	57	60	55	57						
Lake	180891016	Federal Building	79	96	76	57	65	72	60	62	68	76	79	59
Lake	180892001	Third Avenue	70	83	72	66	67	73	64	66				
Lake	180892002	Hammond City Hall	80	72	53	58	53	49	50	51				
Lake	180892004	Purdue University Calumet	73	68	51	48	50	49	46	46	60			
Lake	180892007	General Services Administration Building	81	68	53	56	57	48	57	52				
Lake	180892008	E. 141st Street	82	71	59	60	57	55	56	63	70			
Lake	180892010	Clark High School	92	81	55	61	56	49	49	51	55			
Lake	180893001	Goldblatt Brothers Department Store	89	73										
LaPorte	180910001	First National Bank	57	53	42	46	45	56						
LaPorte	180911001	Central School	56	53	41	45	41	48						
Porter	181270001	Sewage Treatment Plant		50	46	45	41	43	41	39	61			
Porter	181270006	Dune Acres		45	35	39	38	34	36	32	39			
Porter	181270007	Ogden Dunes		41	46	46	44	46	38	41				
Porter	181270008	Morgan Township School		52	41	42								
Porter	181270009	South Haven School		48	43	45	49	43	41	46	57			
Porter	181270019	Penna Hill		41	37	38								
Porter	181270024	Water Treatment Plant					39	38	35	38	38			
Porter	181271004	Valparaiso University		48	44	43	51	37	40	38	47			
Porter	181273002	Valparaiso Water Pumping Station		45	46	39								
			Highlighted red numbers through 1987 are above the Annual TSP Standard of 75 μg/m^3											

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

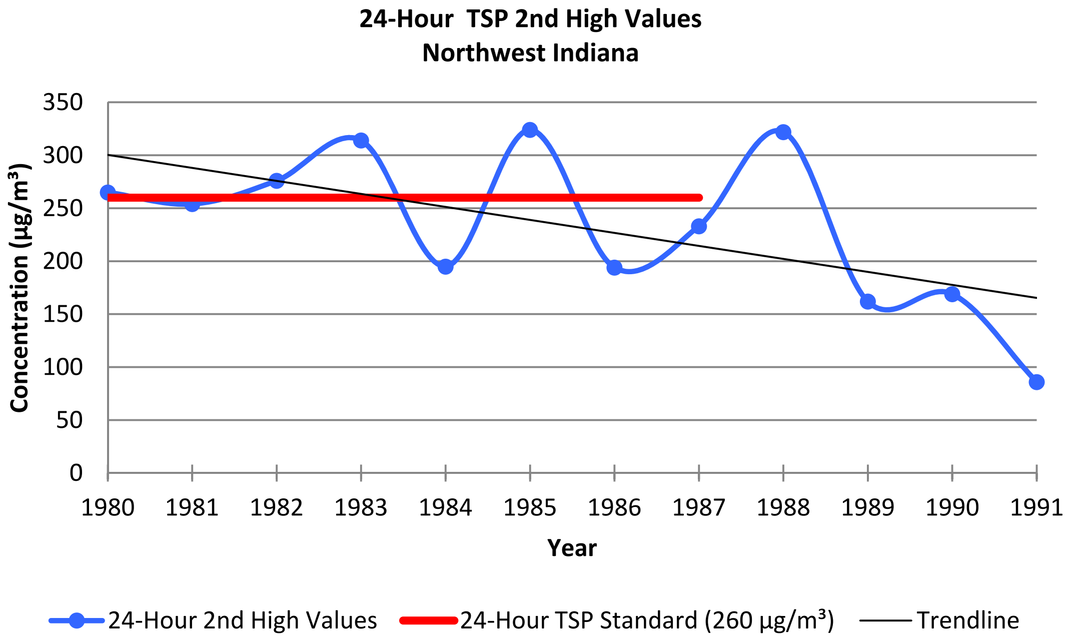


Table 27: Northwest Indiana 24-Hour TSP 2nd High Values

County	Site #	Site Name	2nd High Values (µg/m³)											
			1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Jasper	180730002	Wheatfield	132	254	276	114	195	194	126	152	105			
Lake	180890005	Wirt School	155	153	113	111	128	97	55					
Lake	180890006	Benjamin Franklin Elementary School	180	176	177	238	137	191	136	150	146			
Lake	180890015	East Chicago Post Office					121	324	194	233				
Lake	180891001	Central Fire Station	265	213	135	202	183	218						
Lake	180891002	Gary Municipal Airport	135	186	154	314								
Lake	180891003	Ivanhoe School	137	184	154	121	144	220	106	120	135			
Lake	180891008	Kuny School	141	146	126									
Lake	180891009	Borman Expressway			233									

County	Site #	Site Name	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Lake	180891014	Douglass School	86	68	120	137	163	130						
Lake	180891016	Federal Building	139	213	224	81	190	304	159	141	322	162	169	86
Lake	180892001	Third Avenue	79	194	172	238	174	264	129	126				
Lake	180892002	Hammond City Hall	195	128	151	195	110	121	105	96				
Lake	180892004	Purdue University Calumet	205	145	128	140	122	157	108	92	123			
Lake	180892007	General Services Administration Building	155	122	137	204	147	160	118	116				
Lake	180892008	E. 141st Street	195	130	169	214	135	141	116	123	153			
Lake	180892010	Clark High School	170	145	133	271	137	114	89	113	113			
Lake	180893001	Goldblatt Brothers Department Store	225	113										
LaPorte	180910001	First National Bank	104	166	102	122	111	155						
LaPorte	180911001	Central School	117	140	114	127	111	126						
Porter	181270001	Sewage Treatment Plant		149	146	108	108	100	91	74	179			
Porter	181270006	Dune Acres		105	113	123	138	103	102	82	126			
Porter	181270007	Ogden Dunes		98	113	196	107	114	87	59				
Porter	181270008	Morgan Township School		164	116	121								
Porter	181270009	South Haven School		114	101	179	115	154	98	83	115			
Porter	181270019	Penna Hill		92	126	103								
Porter	181270024	Water Treatment Plant					103	108	82	81	105			
Porter	181271004	Valparaiso University		123	111	117	115	152	83	73	126			
Porter	181273002	Valparaiso Water Pumping Station		118	148	162								
			Highlighted red numbers through 1987 are above the 24-Hour TSP Standard of 260 $\mu g/m^3$											

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 Northwest 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 Northwest 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 Northwest 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 Northwest 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

Northwest Indiana County-Specific Emission Inventory Data

(1980-2009)

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Jasper County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	45,092.83	36,097.59	3,043.57	8,522.05	21,319.94	5,234.94
1981	43,946.19	35,449.62	3,001.43	8,522.29	21,931.95	5,153.39
1982	42,799.54	34,801.66	2,959.29	8,522.52	22,543.95	5,071.84
1983	41,652.89	34,153.69	2,917.16	8,522.76	23,155.96	4,990.29
1984	40,506.25	33,505.73	2,875.02	8,523.00	23,767.96	4,908.74
1985	39,359.60	32,857.76	2,832.88	8,523.24	24,379.97	4,827.19
1986	38,212.95	32,209.80	2,790.74	8,523.47	24,991.97	4,745.64
1987	37,066.30	31,561.83	2,748.60	8,754.15	25,603.98	4,664.63
1988	35,919.66	30,913.87	2,706.64	8,768.37	26,215.98	4,583.63
1989	34,773.01	30,265.91	2,665.74	9,021.94	26,827.98	4,502.63
1990	31,407.73	25,440.11	2,484.04	8,898.66	24,922.35	3,776.68
1991	30,703.42	25,586.33	2,561.23	8,883.74	25,972.21	3,857.27
1992	29,999.11	25,732.55	2,638.43	8,868.82	27,022.08	3,937.86
1993	29,294.81	25,878.77	2,715.62	8,853.91	28,071.94	4,018.45
1994	28,590.50	26,024.98	2,798.71	8,838.99	29,121.80	4,099.04
1995	27,886.19	26,171.20	2,886.07	8,824.07	30,171.67	4,179.63
1996	27,181.88	26,317.42	2,975.53	8,809.15	31,221.53	4,260.22
1997	26,488.24	29,943.08	2,884.67	8,499.89	35,222.67	4,282.10
1998	25,910.70	31,250.31	3,027.16	9,093.80	36,829.03	4,193.03
1999	24,942.97	33,026.53	3,317.01	9,567.04	42,043.18	4,176.44
2000	24,224.59	24,694.67	3,208.91	9,470.00	35,300.59	4,138.13
2001	24,179.14	23,020.06	3,030.27	9,195.28	34,434.97	4,164.48
2002	22,798.53	21,353.55	2,490.35	9,489.43	27,928.06	3,498.92
2003	21,435.49	20,940.59	2,620.26	9,685.52	32,196.17	3,464.15
2004	20,072.45	20,527.62	2,750.18	9,881.60	36,464.27	3,429.39
2005	18,709.41	20,114.66	2,880.09	10,077.69	40,732.38	3,394.62
2006	14,679.91	17,718.15	2,841.60	9,466.82	38,428.74	2,984.75
2007	10,650.41	15,321.64	2,803.12	8,855.94	36,125.10	2,574.87
2008	6,620.91	12,925.12	2,764.64	8,245.07	33,821.45	2,165.00
2009	6,609.15	12,884.56	2,510.74	7,885.86	33,799.03	2,095.61
%Change 1980 to 2009	-77.97%	-64.31%	-17.51%	-7.47%	58.53%	-59.97%

Lake County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	595,842.52	97,417.43	22,745.02	57,162.36	127,870.63	72,503.77
1981	580,758.29	95,422.47	22,464.76	55,555.88	124,285.39	70,532.26
1982	565,709.24	93,427.51	22,184.49	54,383.13	120,700.15	68,560.75
1983	550,705.78	91,432.54	21,904.23	53,210.37	117,114.91	66,589.24
1984	535,702.31	89,437.58	21,623.97	52,037.62	113,529.67	64,617.73
1985	520,698.84	87,442.62	21,343.70	50,864.87	109,944.44	62,646.23
1986	505,695.38	85,447.66	21,063.44	49,784.96	106,359.20	60,674.72
1987	490,691.91	83,452.70	20,783.18	48,612.21	102,773.96	58,703.21
1988	475,689.06	81,458.94	20,502.91	47,542.50	99,188.73	56,731.70
1989	460,688.72	79,466.57	20,222.65	46,472.79	95,603.50	54,760.19
1990	504,647.24	83,456.60	24,186.94	59,889.14	94,492.32	53,464.93
1991	468,727.18	78,731.80	22,371.66	53,443.21	90,497.17	51,140.89
1992	432,807.12	74,007.01	20,556.38	46,997.27	86,502.03	48,816.86
1993	396,887.07	69,282.22	18,741.10	40,551.33	82,506.88	46,492.82
1994	360,967.01	64,557.42	16,925.82	34,105.40	78,511.73	44,168.78
1995	325,046.95	59,832.63	15,274.12	27,659.46	74,516.59	41,844.75
1996	289,126.89	55,107.83	13,843.90	21,213.52	70,521.44	39,520.71
1997	287,495.45	56,419.08	14,431.26	22,132.30	75,706.52	39,408.09
1998	280,189.28	49,898.33	14,411.83	21,958.16	70,864.16	37,532.26
1999	329,194.62	71,831.61	16,520.90	24,652.39	48,904.32	36,143.80
2000	329,119.84	73,647.82	16,821.56	25,055.44	49,245.30	34,304.22
2001	339,285.42	72,140.90	17,275.05	25,216.71	50,110.04	34,721.00
2002	266,977.53	57,299.77	7,436.89	17,636.09	40,062.33	26,515.15
2003	255,415.09	52,513.37	7,407.15	17,469.71	36,731.64	25,536.81
2004	243,852.65	47,726.98	7,377.42	17,303.33	33,400.94	24,558.47
2005	232,290.21	42,940.58	7,347.68	17,136.95	30,070.24	23,580.13
2006	212,613.99	41,790.63	7,347.97	16,532.02	35,473.46	21,474.63
2007	192,937.77	40,640.67	7,348.26	15,927.09	40,876.68	19,369.13
2008	173,261.54	39,490.72	7,348.56	15,322.15	46,279.90	17,263.63
2009	144,495.85	35,786.24	6,585.29	13,756.42	41,403.26	17,545.92
%Change 1980 to 2009	-66.61%	-63.27%	-71.05%	-75.93%	-67.62%	-75.80%

LaPorte County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	115,311.00	43,845.15	4,074.48	10,830.83	54,187.05	17,513.28
1981	111,832.06	42,575.03	3,999.41	10,806.68	52,455.52	17,073.66
1982	108,353.11	41,304.95	3,924.35	10,782.53	50,724.00	16,634.04
1983	104,874.17	40,034.87	3,856.36	10,758.38	48,992.48	16,194.42
1984	101,395.22	38,764.79	3,788.37	10,734.23	47,260.96	15,754.80
1985	97,916.27	37,494.72	3,720.38	10,710.31	45,529.43	15,315.18
1986	94,437.33	36,224.64	3,652.39	10,686.16	43,797.91	14,875.56
1987	90,958.38	34,954.56	3,584.40	10,662.87	42,066.39	14,442.41
1988	87,479.43	33,684.49	3,516.41	10,639.58	40,334.87	14,011.38
1989	84,000.49	32,414.41	3,449.80	11,108.63	38,603.34	13,580.35
1990	74,028.48	27,269.34	2,974.25	10,433.21	51,878.07	11,782.98
1991	72,023.05	27,343.96	3,014.40	10,630.53	45,830.65	11,667.08
1992	70,017.62	27,418.59	3,094.95	10,827.86	39,783.22	11,551.19
1993	68,012.19	27,493.21	3,175.51	11,025.18	33,735.80	11,435.30
1994	66,006.75	27,567.83	3,256.06	11,222.51	27,688.38	11,319.40
1995	64,001.32	27,642.46	3,336.65	11,419.84	21,640.95	11,203.51
1996	61,995.89	27,717.08	3,417.24	11,617.16	15,593.53	11,087.61
1997	59,722.73	25,090.17	3,344.72	11,435.51	16,024.44	11,090.19
1998	58,058.57	20,631.07	3,288.98	11,138.77	17,449.54	10,723.14
1999	54,915.45	16,567.25	3,324.93	11,209.49	11,202.88	10,831.60
2000	53,987.70	16,937.98	3,275.22	10,811.38	11,973.02	10,843.60
2001	53,217.75	19,680.97	3,072.92	10,352.22	10,973.96	10,971.45
2002	36,853.05	17,787.68	2,502.25	12,624.46	10,534.92	6,930.63
2003	34,234.29	15,863.95	2,503.10	12,648.32	13,023.17	6,726.29
2004	31,615.53	13,940.22	2,503.96	12,672.18	15,511.41	6,521.94
2005	28,996.76	12,016.49	2,504.82	12,696.04	17,999.66	6,317.59
2006	22,469.01	9,940.06	2,402.45	11,630.17	16,271.59	5,680.05
2007	15,941.25	7,863.62	2,300.08	10,564.31	14,543.53	5,042.50
2008	9,413.49	5,787.18	2,197.72	9,498.45	12,815.46	4,404.96
2009	9,421.68	5,554.35	2,050.46	9,267.48	12,683.87	4,361.24
%Change 1980 to 2009	-86.54%	-87.33%	-49.68%	-14.43%	-76.59%	-75.10%

Newton County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	19,937.50	2,283.23	1,551.68	5,459.71	261.80	2,616.64
1981	19,390.70	2,231.63	1,522.82	5,428.06	256.93	2,594.10
1982	18,843.91	2,180.04	1,493.96	5,396.41	252.06	2,571.55
1983	18,297.11	2,128.44	1,465.10	5,364.76	247.19	2,549.01
1984	17,750.31	2,076.85	1,436.24	5,333.12	242.32	2,526.47
1985	17,203.51	2,025.25	1,407.37	5,301.47	237.45	2,503.92
1986	16,656.72	1,973.66	1,378.51	5,269.82	232.57	2,481.38
1987	16,109.92	1,922.07	1,349.65	5,238.17	227.70	2,458.83
1988	15,563.12	1,870.47	1,320.79	5,206.52	222.83	2,436.29
1989	15,016.33	1,818.88	1,291.93	5,183.16	217.96	2,413.74
1990	14,854.34	1,667.73	1,340.46	5,770.74	349.98	2,273.37
1991	14,119.41	1,630.61	1,285.10	5,548.53	304.70	2,268.01
1992	13,384.47	1,593.50	1,229.75	5,326.32	259.42	2,262.66
1993	12,649.54	1,556.38	1,174.39	5,104.12	214.14	2,257.30
1994	11,914.61	1,519.26	1,119.04	4,881.91	168.86	2,251.94
1995	11,179.67	1,482.15	1,063.68	4,659.71	123.58	2,246.59
1996	10,444.74	1,445.03	1,008.32	4,437.50	78.30	2,241.23
1997	10,102.74	1,444.08	981.67	4,334.15	79.81	2,247.26
1998	9,821.21	1,415.99	1,015.18	4,517.74	80.83	2,219.96
1999	9,323.44	1,404.18	1,018.43	4,562.81	90.63	2,312.64
2000	9,050.92	1,350.80	1,003.39	4,458.78	86.27	2,313.02
2001	8,961.68	1,321.27	971.06	4,401.82	88.64	2,349.87
2002	9,409.31	1,338.79	836.21	5,287.65	208.89	2,322.63
2003	9,068.26	1,280.18	859.20	5,315.15	206.23	2,396.86
2004	8,727.22	1,221.56	882.20	5,342.65	203.57	2,471.09
2005	8,386.17	1,162.94	905.20	5,370.15	200.90	2,545.32
2006	6,391.83	914.05	872.27	4,987.37	183.88	2,158.49
2007	4,397.50	665.15	839.34	4,604.59	166.85	1,771.65
2008	2,403.16	416.25	806.41	4,221.81	149.83	1,384.82
2009	2,403.16	416.25	806.41	4,221.81	149.83	1,350.86
%Change 1980 to 2009	-87.95%	-81.77%	-48.03%	-22.67%	-42.77%	-48.37%

Porter County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	156,633.27	56,825.36	6,926.69	11,886.48	82,184.17	24,009.12
1981	154,819.38	55,698.14	6,786.76	11,916.96	79,036.91	23,369.84
1982	153,005.49	54,570.92	6,646.83	11,947.44	76,328.23	22,736.86
1983	151,191.59	53,443.69	6,506.90	11,977.93	73,718.66	22,105.92
1984	149,377.70	52,316.47	6,367.72	12,008.41	71,109.09	21,474.98
1985	147,563.81	51,189.25	6,228.54	12,038.90	68,499.52	20,844.05
1986	145,749.91	50,062.03	6,289.21	12,069.38	65,889.95	20,213.11
1987	143,936.02	48,934.81	6,349.88	12,257.12	63,280.39	19,582.17
1988	142,122.13	47,807.59	6,410.55	12,287.60	60,670.82	18,951.23
1989	140,308.24	46,680.36	6,471.23	12,746.82	58,061.25	18,320.30
1990	169,751.90	40,710.12	6,757.41	14,620.62	95,858.65	19,575.31
1991	157,033.60	40,373.78	6,524.81	14,084.47	81,018.53	18,287.60
1992	144,315.30	40,037.43	6,293.72	13,551.33	66,178.41	16,999.88
1993	131,597.00	39,701.09	6,062.62	13,018.19	51,338.30	15,712.17
1994	118,878.69	39,364.75	5,831.53	12,485.06	36,498.18	14,424.46
1995	106,160.39	39,028.40	5,601.44	11,951.92	21,658.06	13,136.74
1996	93,442.09	38,692.06	5,371.38	11,418.78	6,817.94	11,849.03
1997	93,319.55	39,327.31	5,631.00	12,141.73	7,866.92	11,752.91
1998	91,717.71	39,676.28	5,767.01	12,542.06	7,536.85	11,273.09
1999	221,219.36	46,406.43	9,320.80	17,497.32	17,339.08	11,929.68
2000	226,857.17	42,756.76	9,623.62	17,681.28	19,316.35	11,774.37
2001	240,934.71	41,315.32	10,078.82	17,923.18	21,601.48	11,914.12
2002	193,750.40	34,969.95	4,460.06	15,846.67	24,971.58	10,380.66
2003	187,881.77	32,410.07	4,148.34	15,566.69	24,959.32	9,972.33
2004	182,013.15	29,850.18	3,836.63	15,286.71	24,947.07	9,563.99
2005	176,144.52	27,290.30	3,524.91	15,006.72	24,934.81	9,155.65
2006	168,742.07	23,785.91	3,652.94	13,956.86	24,884.75	7,995.42
2007	161,339.63	20,281.52	3,780.96	12,906.99	24,834.69	6,835.19
2008	153,937.19	16,777.13	3,908.99	11,857.13	24,784.63	5,674.96
2009	66,378.91	11,604.04	3,747.91	10,685.05	19,037.05	5,208.71
%Change 1980 to 2009	-57.62%	-79.58%	-45.89%	-10.11%	-76.84%	-78.31%

Pulaski County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	14,594.45	1,803.32	2,036.42	6,910.06	251.19	2,528.21
1981	14,220.31	1,766.05	1,982.27	6,771.80	246.33	2,495.88
1982	13,846.17	1,728.79	1,928.12	6,633.54	241.47	2,463.55
1983	13,472.04	1,691.53	1,873.97	6,495.28	236.61	2,431.22
1984	13,097.90	1,654.26	1,819.82	6,357.03	231.74	2,398.89
1985	12,723.77	1,617.00	1,765.67	6,218.77	226.88	2,366.56
1986	12,349.63	1,579.78	1,711.52	6,080.51	222.02	2,334.23
1987	11,976.85	1,542.62	1,657.36	5,942.25	217.15	2,301.90
1988	11,607.43	1,505.46	1,603.21	5,803.99	212.29	2,269.57
1989	11,238.02	1,468.30	1,549.06	5,693.50	207.43	2,237.24
1990	10,069.70	1,260.89	1,517.93	5,401.31	322.50	1,927.04
1991	9,853.40	1,259.84	1,445.90	5,290.09	281.04	1,964.04
1992	9,637.11	1,258.79	1,373.87	5,178.88	239.58	2,001.04
1993	9,420.81	1,257.75	1,301.84	5,067.66	198.12	2,038.04
1994	9,204.51	1,256.70	1,229.81	4,956.45	156.65	2,075.04
1995	8,988.22	1,255.65	1,164.39	4,845.23	115.19	2,112.04
1996	8,771.92	1,254.60	1,116.56	4,734.02	73.73	2,149.04
1997	8,457.71	1,250.14	1,064.53	4,504.29	75.23	2,155.48
1998	8,218.53	1,223.56	1,116.14	4,793.44	76.39	2,114.71
1999	8,284.61	1,259.64	1,112.80	4,818.01	112.61	2,076.19
2000	8,213.54	1,240.91	1,103.58	4,735.07	109.97	2,093.15
2001	7,898.17	1,187.11	1,077.03	4,682.29	111.28	2,107.13
2002	7,311.89	1,105.48	576.80	3,607.10	184.94	1,897.43
2003	6,881.40	1,062.33	580.95	3,612.33	181.94	1,893.61
2004	6,450.92	1,019.18	585.11	3,617.56	178.94	1,889.78
2005	6,020.43	976.03	589.27	3,622.79	175.94	1,885.96
2006	4,621.41	772.83	570.35	3,350.59	159.80	1,641.48
2007	3,222.39	569.63	551.43	3,078.39	143.65	1,397.00
2008	1,823.37	366.42	532.51	2,806.18	127.50	1,152.52
2009	1,821.79	364.48	494.62	2,806.18	120.15	1,157.21
%Change 1980 to 2009	-87.52%	-79.79%	-75.71%	-59.39%	-52.17%	-54.23%

Starke County Emissions (Tons per Year)

Year	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_2	VOC
1980	17,625.12	2,624.58	1,502.70	5,271.73	343.45	2,526.11
1981	17,194.92	2,610.40	1,468.59	5,209.63	334.91	2,498.31
1982	16,764.72	2,596.22	1,434.49	5,147.53	326.37	2,470.55
1983	16,334.52	2,582.04	1,400.38	5,085.42	317.83	2,442.80
1984	15,904.33	2,567.95	1,366.27	5,023.32	309.29	2,415.06
1985	15,476.66	2,553.89	1,332.17	4,961.22	300.74	2,387.31
1986	15,051.84	2,539.83	1,298.06	4,899.11	292.20	2,359.57
1987	14,627.03	2,525.77	1,263.96	4,837.01	283.66	2,331.93
1988	14,202.22	2,511.71	1,229.85	4,774.91	275.12	2,304.80
1989	13,777.41	2,497.65	1,195.74	4,723.57	266.58	2,277.67
1990	11,214.00	1,487.74	1,007.86	4,343.20	413.37	1,887.44
1991	11,346.97	1,752.41	1,013.80	4,355.58	358.50	1,956.02
1992	11,479.95	2,017.08	1,019.73	4,367.96	303.63	2,024.61
1993	11,612.93	2,281.75	1,025.67	4,380.34	248.77	2,093.20
1994	11,745.90	2,546.41	1,031.61	4,392.72	193.90	2,161.78
1995	11,878.88	2,811.08	1,037.55	4,405.10	139.03	2,230.37
1996	12,011.85	3,075.75	1,043.48	4,417.48	84.16	2,298.95
1997	11,540.35	3,062.52	1,045.97	4,472.95	85.06	2,293.34
1998	11,188.47	3,008.92	1,024.88	4,381.64	85.29	2,254.27
1999	10,473.60	2,968.29	1,021.86	4,426.73	103.95	2,201.62
2000	10,261.99	2,927.78	1,006.03	4,290.90	99.10	2,205.17
2001	9,918.39	2,851.68	962.85	4,199.83	100.16	2,214.53
2002	9,345.59	1,931.15	593.65	3,997.34	201.63	2,057.76
2003	8,769.07	2,128.95	601.01	4,006.07	196.35	2,033.39
2004	8,192.56	2,326.75	608.37	4,014.80	191.08	2,009.03
2005	7,616.04	2,524.55	615.73	4,023.53	185.81	1,984.66
2006	5,888.06	2,109.20	599.38	3,679.81	169.98	1,741.15
2007	4,160.09	1,693.86	583.02	3,336.10	154.16	1,497.64
2008	2,432.11	1,278.51	566.66	2,992.38	138.33	1,254.12
2009	2,432.11	1,278.51	566.66	2,992.38	138.33	1,254.12
%Change 1980 to 2009	-86.20%	-51.29%	-62.29%	-43.24%	-59.72%	-50.35%