



## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

*Mitchell E. Daniels Jr.*  
Governor

*Thomas W. Easterly*  
Commissioner

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May 30, 2008

Mr. Bharat Mathur  
Acting Regional Administrator  
U.S. Environmental Protection Agency  
Region V  
77 West Jackson Boulevard  
Chicago, IL 60604-3950

Re: Recommendations Concerning Air Quality Designations for the  
24-hour Fine Particle (PM<sub>2.5</sub>) National Ambient Air Quality  
Standard

Dear Mr. Mathur:

On December 17, 2007, Indiana submitted preliminary recommendations responding to your July 9, 2007 letter to Governor Daniels concerning air quality designations for the revised 24-hour Fine Particle (PM<sub>2.5</sub>) National Ambient Air Quality Standard (NAAQS). Indiana's preliminary recommendations were based on 2004-2006 monitoring data. Please consider this letter, along with the attached support documents, our final submittal based on quality assured monitoring data from 2005-2007.

In October 2006, the U.S. EPA promulgated revised PM<sub>2.5</sub> standards with an effective date of December 18, 2006 for the new standard. Although the U.S. EPA retained the annual PM<sub>2.5</sub> standard, the 24-hour PM<sub>2.5</sub> standard was changed from 65 micrograms per cubic meters (µg/m<sup>3</sup>) to 35 µg/m<sup>3</sup>.

Enclosed you will find quality assured monitoring data from 2005-2007 for Indiana's PM<sub>2.5</sub> monitoring network. The PM<sub>2.5</sub> monitored concentrations have trended downward since 2002, resulting in just five Indiana counties (Knox, Lake, Marion, Tippecanoe and Vanderburgh) with average design values above the new 24-hour standard. Indiana expects this downward trend to continue over the next few years with the continued phase-in of recently implemented federal and state regulations.

Indiana firmly believes that the nonattainment boundaries for the 24-hour PM<sub>2.5</sub> standard should be limited to the Indiana counties that actually possess a three-year average ambient monitor-based design value above the standard. With the exception of the monitors in the largest urban area in Indiana (Indianapolis), monitor values in the other four counties exceed the standard by only 1 or 2 µg/m<sup>3</sup>. Limiting the designated nonattainment areas is further supported by the fact

that in Indiana, air quality in the counties adjacent to the larger urban areas does not significantly contribute to the exceeding monitors and air quality in those counties will be further improved by the continued phase-in of recently implemented national and state control measures.

To further emphasize this point, recent regional modeling (referred to as Round 5) conducted by the Lake Michigan Air Directors Consortium has demonstrated that every monitor in the state of Indiana will attain the 24-hour PM<sub>2.5</sub> standard by close of 2009. Current modeling is predicting 2009 reductions ranging from 5 to 8 µg/m<sup>3</sup> at Indiana monitors currently exceeding the standard.

The five Indiana counties that currently measure ambient concentrations above the new 24-hour standard for fine particles are Knox, Lake, Marion, Tippecanoe and Vanderburgh. More specifically, only the cities of East Chicago, Indianapolis, Lafayette and Evansville measure air quality above the standard. In the case of Northwest Indiana, five of the six monitors within the county measure air quality below the NAAQS, while only one monitor (East Chicago) measures air quality above the standard. There are two source oriented monitors in Northwest Indiana and only one of them (Gary-Burr St) is above the standard. The vast majority of the major stationary sources for fine particles and its precursors are located in the Chicago area northwest of the exceeding monitor. Therefore, limiting the nonattainment area boundary to Lake County will enable the State of Indiana to adequately address the standard and ensure that all monitors within Lake County attain the standard as expeditiously as possible.

The following enclosures are included with this letter:

- Enclosure 1 2005-2007 Monitoring Data
- Enclosure 2 List of Counties with Data and Recommendation
- Enclosure 3 Map of Recommended Counties
- Enclosure 4 Assessment of the Daily Fine Particulate (PM<sub>2.5</sub>) Standard and Technical Support Documents
- Appendix A 2004-2007 Exceptional Events Data
- Appendix B Incomplete Data Analysis
- Appendix C Unmonitored Data Analysis
- Appendix D Chicago Area Analysis
- Appendix E Growth Rates and Patterns
- Appendix F Commuting Patterns
- Appendix G Emissions Report

The current scenario is similar to the 8-hour ozone designations made in June 2004. At that time the U.S. EPA designated twenty-three counties and one township as nonattainment in Indiana under the 8-hour ozone standard. However, within four months of designation, six of those counties (five separate nonattainment areas) attained the standard and were thereby eligible for redesignation. Another six counties attained the standard by the close of the 2005 ozone season, and all twenty-three counties attained the standard within two years of being designated. This placed a significant burden on state and federal resources, and resulted in undue hardship on the economies of the affected communities. Though some areas met the criteria for a nonattainment designation for a total of four months, the nonattainment designation was effective for eighteen months or longer in some instances.

Monitoring data indicates that Indiana's air quality is improving. Because there is a public stigma associated with nonattainment designations, Indiana urges the U.S. EPA to carefully review data, as well as federal and regional modeling of the expected impact of promulgated state and national control measures prior to imposing undue economic hardship on areas that are adjacent to counties where monitoring data currently slightly exceeds the new 24-hour PM<sub>2.5</sub> standard. Federal and state control programs like the Clean Air Interstate Rule (CAIR) and cleaner engine and fuel standards are expected to reduce the precursors for fine particles as well as direct fine particle concentrations further over the next few years.

Although the Clean Air Act (CAA) requires the U.S. EPA to complete the designation process within two years of the effective date of the standard, it does allow EPA to take up to an additional year to issue designations (i.e., no later than three years after the effective date of the standard). In this case, that enables U.S. EPA to delay issuance of designations until December 18, 2009. Indiana urges U.S. EPA to take advantage of this CAA provision to fully realize the effects from some of the recently implemented federal and state control measures, prior to imposing an undue resource burden on states, U.S. EPA and the areas that will likely attain the standard by 2009.

Thank you for this opportunity to provide recommendations on this important matter. If you have any questions, please feel free to contact me at (317) 232-8611 or Dan Murray at (317) 232-8222.

Sincerely,



Thomas W. Easterly  
Commissioner

TWE/sad/pd  
Enclosures

cc: Cheryl L. Newton, U.S. EPA Region 5  
Steve Rothblatt, U.S. EPA Region 5  
John Mooney, U.S. EPA Region 5  
Dan Murray, IDEM-OAQ

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# Enclosure 1

## Indiana PM2.5 Summary (2005-2007)

Daily NAAQS = 35 ug/m3

County	Site #	City	Site Name	Daily 98th Percentile Values			Daily Site Design Value 05-07
				2005	2006	2007	
ALLEN	180030004	Fort Wayne	Beacon St	38.4	26.2	33.7	33
ALLEN	180030014	Fort Wayne	Taylor Univ	34.9	26.5	32.0	31
CLARK	180190006	Jeffersonville	Pfau	45.5	35.9	37	35
DELAWARE	180350006	Muncie	Muncie Central HS	37.3	27.4	32.9	33
DUBOIS	180370004	Jasper	Sports Complex	Site began 02/01/06	33.6	35.2	34 <sup>1</sup>
DUBOIS	180370005	Jasper	Golf Course	Site began 02/01/06	32.2	36.2	34 <sup>1</sup>
DUBOIS	180372001	Jasper	200 W 6th St	41.2	31.6	34.7	35
ELKHART	180390003	Elkhart	Pierre Moran School	36.2	25.5	34.6	34
FLOYD	180431004	New Albany	Green Valley School	40.1	28.2	35.4	35
HENRY	180650003		Shenandoah HS	37.3	27.2	32.4	32
HOWARD	180670003	Kokomo	215 W Superior St	37.6	27.6	33.6	33
KNOX	180830004		SW Purdue Ag Cntr	41.8	36.2	30.9	36
LAKE	180890006	East Chicago	Franklin School	39.9	29.4	37.2	36
LAKE	180890022	Gary	IITRI	40.4	28.5	35.2	35
LAKE	180890026	Gary	Burr St	43.7	30.4	36.8	37
LAKE	180890027	Highland	Eldon Ready School	37.1	25.8	34.1	32
LAKE	180890031		Water Plant, 650 Madison St.	39.6	27.1	36.2	34
LAKE	180891003	Gary	Ivanhoe School	39.0	25.8	33.8	33
LAKE	180892004	Hammond	Purdue	37.6	26.2	34.9	33
LAKE	180892010	Hammond	Robertsdale	40.9	27.9	35.2	35
LA PORTE	180910011	Michigan City	Marsh Elementary Sch	37.5	25.5	31.5	32
LA PORTE	180910012	LaPorte	1119 Lake St	36.5	24.7	31.0	31
MADISON	180950009	Anderson	44 W 5th St	38.3	28.0	34.3	34
MARION	180970042	Indianapolis	Mann Road	39.4	31.0	35.6	35
MARION	180970043	Indianapolis	S. West St	43.9	37.5	38.3	40
MARION	180970066	Indianapolis	English Ave	44.0	36.2	38.8	40
MARION	180970078	Indianapolis	Washington Park	42.5	31.7	38.8	38
MARION	180970079	Indianapolis	7250 E. 75th St	43.4	30.7	33.5	36
MARION	180970081	Indianapolis	W 18th St	45.7	34.8	38.4	40
MARION	180970083	Indianapolis	E. Michigan St.	40.3	33.5	37.2	37
PORTER	181270020		Dunes Natl Lakeshore	37.6	26.6	30.6	32
PORTER	181270024	Ogden Dunes	Water Treatment Plant	37.5	26.1	33.3	32
ST JOSEPH	181410014	South Bend	Nuner Elementary Sch	40.2	24.9	33.8	33
ST JOSEPH	181410015	South Bend	Shields Dr	Site began 06/06/06	24.9	30.8	28 <sup>1</sup>
ST JOSEPH	181410016	South Bend	Combined sites	37.3	24.7	30.8	31
ST JOSEPH	181412004	South Bend	LaSalle HS	35.8	24.1	31.3	30
SPENCER	181470009	Dale	David Turnham Sch	36.1	27.7	31.4	33
TIPPECANOE	181570008	Lafayette	3401 Greenbush St	49.3	27.0	34.2	37
VANDERBURGH	181630006	Evansville	Civic Center	42.5	30.5	33.6	36
VANDERBURGH	181630012	Evansville	W Mill Rd	41.5	27.9	29.9	33
VANDERBURGH	181630016	Evansville	Univ of Evansville	37.0	29.5	31.5	33
VIGO	181670018	Terre Haute	Lafayette St	43.1	31.0	31.0	35
VIGO	181670023	Terre Haute	Devaney School	42.5	29.1	32.2	35

Nonattainment

Updated : 2/14/2008

Incomplete Data: <sup>1</sup> Two years of Data



## Enclosure 2

### List of Indiana Counties with Recommendation

County	05-07 Design Value With All Monitored Values	05-07 Design Value With Exceptional Events Taken Out	Attainment Status for 1997 PM <sub>2.5</sub> NAAQS	Indiana Recommendation for 2006 PM <sub>2.5</sub> NAAQS	Reason For Recommendation for 2006 PM <sub>2.5</sub> NAAQS
Adams			Attainment/Unclassifiable	Attainment/Unclassifiable	
Allen (180030004)	33	31	Attainment	Attainment	Monitor Values Below Standard
Allen (180030014)	31	30			
Bartholomew			Attainment/Unclassifiable	Attainment/Unclassifiable	
Benton			Attainment/Unclassifiable	Attainment/Unclassifiable	
Blackford			Attainment/Unclassifiable	Attainment/Unclassifiable	
Boone			Attainment/Unclassifiable	Attainment/Unclassifiable	
Brown			Attainment/Unclassifiable	Attainment/Unclassifiable	
Carroll			Attainment/Unclassifiable	Attainment/Unclassifiable	
Cass			Attainment/Unclassifiable	Attainment/Unclassifiable	
Clark (180190006)	39	35	Nonattainment	Attainment	Monitor Value Below Standard with Exceptional Events Taken Out
Clay			Attainment/Unclassifiable	Attainment/Unclassifiable	
Clinton			Attainment/Unclassifiable	Attainment/Unclassifiable	
Crawford			Attainment/Unclassifiable	Attainment/Unclassifiable	
Daviess			Attainment/Unclassifiable	Attainment/Unclassifiable	
Dearborn			Lawrenceburg Township Nonattainment, Rest of County Attainment/Unclassifiable	Entire County Attainment/Unclassifiable	
Decatur			Attainment/Unclassifiable	Attainment/Unclassifiable	
Dekalb			Attainment/Unclassifiable	Attainment/Unclassifiable	
Delaware (180350006)	33	31	Attainment	Attainment	Monitor Value Below Standard
Dubois (180370004)	34	34	Nonattainment	Attainment	Monitor Value Below Standard with Exceptional Events Taken Out
Dubois (180370005)	34	34			
Dubois (180372001)	36	35			
Elkhart (180390003)	34	33	Attainment	Attainment	Monitor Value Below Standard
Fayette			Attainment/Unclassifiable	Attainment/Unclassifiable	
Floyd (180431004)	35	34	Nonattainment	Attainment	Monitor Value Below Standard
Fountain			Attainment/Unclassifiable	Attainment/Unclassifiable	
Franklin			Attainment/Unclassifiable	Attainment/Unclassifiable	
Fulton			Attainment/Unclassifiable	Attainment/Unclassifiable	
Gibson			Montgomery Township Nonattainment, Rest of County Attainment/Unclassifiable	Entire County Attainment/Unclassifiable	
Grant			Attainment/Unclassifiable	Attainment/Unclassifiable	
Greene			Attainment/Unclassifiable	Attainment/Unclassifiable	
Hamilton			Nonattainment	Attainment/Unclassifiable	
Hancock			Attainment/Unclassifiable	Attainment/Unclassifiable	
Harrison			Attainment/Unclassifiable	Attainment/Unclassifiable	
Hendricks			Nonattainment	Attainment/Unclassifiable	

<b>County/ Monitor ID</b>	<b>05-07 Design Value With All Monitored Values</b>	<b>05-07 Design Value With Exceptional Events Taken Out</b>	<b>Attainment Status for 1997 PM<sub>2.5</sub> NAAQS</b>	<b>Designation Recommendation for 2006 PM<sub>2.5</sub> NAAQS</b>	<b>Reason For Recommendation for 2006 PM<sub>2.5</sub> NAAQS</b>
Henry (180650003)	32	31	Attainment	Attainment	Monitor Value Below Standard
Howard (180670003)	33	33	Attainment	Attainment	Monitor Value Below Standard
Huntington			Attainment/Unclassifiable	Attainment/Unclassifiable	
Jackson			Attainment/Unclassifiable	Attainment/Unclassifiable	
Jasper			Attainment/Unclassifiable	Attainment/Unclassifiable	
Jay			Attainment/Unclassifiable	Attainment/Unclassifiable	
Jefferson			Madison Township Nonattainment, Rest of County Attainment/Unclassifiable	Entire County Attainment/Unclassifiable	
Jennings			Attainment/Unclassifiable	Attainment/Unclassifiable	
Johnson			Nonattainment	Attainment/Unclassifiable	
Knox (180830004)	36	36	Attainment	Nonattainment	Monitor Value Above Standard
Kosciusko			Attainment/Unclassifiable	Attainment/Unclassifiable	
LaGrange			Attainment/Unclassifiable	Attainment/Unclassifiable	
Lake (180890006)	36	36	Nonattainment	Nonattainment	Two Monitor Values Above Standard
Lake (180890022)	35	35			
Lake (180890026)	37	36			
Lake (180890027)	32	32			
Lake (180890031)	34	34			
Lake (180891003)	33	33			
Lake (180892004)	33	33			
Lake (180892010)	35	35			
LaPorte (180910011)	32	31	Attainment	Attainment	Monitor Values Below Standard
LaPorte (180910012)	31	30			
Lawrence			Attainment/Unclassifiable	Attainment/Unclassifiable	
Madison (180950009)	34	32	Attainment	Attainment	Monitor Value Below Standard
Marion (180970042)	35	35	Nonattainment	Nonattainment	Six Monitor Values Above Standard
Marion (180970043)	40	40			
Marion (180970066)	40	40			
Marion (180970078)	38	38			
Marion (180970079)	36	36			
Marion (180970081)	40	40			
Marion (180970083)	37	37			



County	05-07 Design Value With All Monitored Values	05-07 Design Value With Exceptional Events Taken Out	Attainment Status for 1997 PM <sub>2.5</sub> NAAQS	Designation Recommendation for 2006 PM <sub>2.5</sub> NAAQS	Reason For Recommendation for 2006 PM <sub>2.5</sub> NAAQS
Marshall			Attainment/Unclassifiable	Attainment/Unclassifiable	
Martin			Attainment/Unclassifiable	Attainment/Unclassifiable	
Miami			Attainment/Unclassifiable	Attainment/Unclassifiable	
Monroe			Attainment/Unclassifiable	Attainment/Unclassifiable	
Montgomery			Attainment/Unclassifiable	Attainment/Unclassifiable	
Morgan			Nonattainment	Attainment/Unclassifiable	
Newton			Attainment/Unclassifiable	Attainment/Unclassifiable	
Noble			Attainment/Unclassifiable	Attainment/Unclassifiable	
Ohio			Attainment/Unclassifiable	Attainment/Unclassifiable	
Orange			Attainment/Unclassifiable	Attainment/Unclassifiable	
Owen			Attainment/Unclassifiable	Attainment/Unclassifiable	
Parke			Attainment/Unclassifiable	Attainment/Unclassifiable	
Perry			Attainment/Unclassifiable	Attainment/Unclassifiable	
Pike			Washington Township Nonattainment, Rest of County Attainment/Unclassifiable	Entire County Attainment/Unclassifiable	
Porter (181270020)	32	32	Nonattainment	Attainment	Monitor Values Below Standard
Porter (181270024)	32	32			
Posey			Attainment/Unclassifiable	Attainment/Unclassifiable	
Pulaski			Attainment/Unclassifiable	Attainment/Unclassifiable	
Putnam			Attainment/Unclassifiable	Attainment/Unclassifiable	
Randolph			Attainment/Unclassifiable	Attainment/Unclassifiable	
Ripley			Attainment/Unclassifiable	Attainment/Unclassifiable	
Rush			Attainment/Unclassifiable	Attainment/Unclassifiable	
St. Joseph (181410014)	33	33	Attainment	Attainment	Monitor Values Below Standard
St. Joseph (181410015)	28	28			
St. Joseph (181410016)	31	31			
St. Joseph (181412004)	30	30			
Scott			Attainment/Unclassifiable	Attainment/Unclassifiable	
Shelby			Attainment/Unclassifiable	Attainment/Unclassifiable	
Spencer (181470009)	33	33	Ohio Township Nonattainment, Rest of County Attainment/Unclassifiable	Entire County Attainment	Monitor Value Below Standard
Starke			Attainment/Unclassifiable	Attainment/Unclassifiable	
Steuben			Attainment/Unclassifiable	Attainment/Unclassifiable	
Sullivan			Attainment/Unclassifiable	Attainment/Unclassifiable	
Switzerland			Attainment/Unclassifiable	Attainment/Unclassifiable	
Tippecanoe (181570008)	37	36	Attainment	Nonattainment	Monitor Value Above Standard
Tipton			Attainment/Unclassifiable	Attainment/Unclassifiable	
Union			Attainment/Unclassifiable	Attainment/Unclassifiable	
Vanderburgh (181630006)	36	36	Nonattainment	Nonattainment	One Monitor Value Above Standard
Vanderburgh (181630012)	33	33			
Vanderburgh (181630016)	33	33			
Vermillion			Attainment/Unclassifiable	Attainment/Unclassifiable	

<b>County</b>	<b>05-07 Design Value With All Monitored Values</b>	<b>05-07 Design Value With Exceptional Events Taken Out</b>	<b>Attainment Status for 1997 PM<sub>2.5</sub> NAAQS</b>	<b>Designation Recommendation for 2006 PM<sub>2.5</sub> NAAQS</b>	<b>Reason For Recommendation for 2006 PM<sub>2.5</sub> NAAQS</b>
Vigo (181670018)	35	35	Attainment/Unclassifiable	Attainment	Monitor Values Below Standard
Vigo (181670023)	35	34			
Wabash			Attainment/Unclassifiable	Attainment/Unclassifiable	
Warren			Attainment/Unclassifiable	Attainment/Unclassifiable	
Warrick			Nonattainment	Attainment/Unclassifiable	
Washington			Attainment/Unclassifiable	Attainment/Unclassifiable	
Wayne			Attainment/Unclassifiable	Attainment/Unclassifiable	
Wells			Attainment/Unclassifiable	Attainment/Unclassifiable	
White			Attainment/Unclassifiable	Attainment/Unclassifiable	
Whitley			Attainment/Unclassifiable	Attainment/Unclassifiable	

# Enclosure 3

## Map of Indiana 24-hr PM 2.5 Nonattainment Recommendations



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## **Enclosure 4**

### **IDEM's Assessment of the Daily Fine Particulate (PM<sub>2.5</sub>) Standard and Technical Support Documents**

Consistent with the United States Environmental Protection Agency's (U.S. EPA) June 8, 2007 guidance memorandum titled "Area Designations for the Revised 24-Hour Fine Particulate National Ambient Air Quality Standard", the Indiana Department of Environmental Management (IDEM) has conducted a thorough review of the affected areas in Indiana. IDEM's review focused on the following primary and secondary analysis criteria:

#### **Primary Analysis Criteria:**

1. Monitoring data.
  - ❑ The revised daily standard is 35 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) and attainment is determined by taking the 98<sup>th</sup> percentile of the PM<sub>2.5</sub> values over a three-year period. Due to rounding, values greater than 35.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) are considered to exceed the standard.
2. Existing Metropolitan Statistical Area (MSA)/Consolidated Metropolitan Statistical Area (CMSA) boundaries
  - ❑ Following the current June 2007 guidance, IDEM's core evaluation is based on the 2003 MSA boundary definitions.
  - ❑ The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Therefore, IDEM has done a cursory evaluation of the counties affected by the new definitions and has incorporated the relevant information into this evaluation, as appropriate.

#### **Secondary Analysis Criteria:**

1. Emissions and air quality in adjacent areas (including adjacent MSAs/CMSAs). Data are available for oxides of nitrogen (NO<sub>x</sub>), direct PM<sub>2.5</sub>, and sulfur dioxide (SO<sub>2</sub>). Ammonia emissions inventories are not available at this time.
2. Population density and degree of urbanization (including commercial development).
3. Monitoring data representing ozone or particulate matter concentrations in local areas and larger areas (urban or regional scale) as surrogate for PM<sub>2.5</sub> where we are not monitoring for PM<sub>2.5</sub>. Location of emission sources.
4. Traffic and commuting patterns
5. Growth rates and patterns
6. Meteorology (weather/transport patterns)
7. Jurisdictional boundaries (e.g., counties, air districts, Reservations, metropolitan planning organization (MPOs))
8. Level of control of emissions
9. Regional emission reductions (e.g., NO<sub>x</sub> SIP call or other enforceable regional strategies).

Table 1 outlines the MSAs/CMSAs and Indiana counties subjected to the analysis criteria. A map of the affected Indiana counties, titled Enclosure 2, accompanies this document. Enclosure 1 summarizes PM<sub>2.5</sub> monitoring information. IDEM's core analysis is based on the 2003 defined MSA/CMSA boundaries. As a result of the 2000 Census, the 2003 MSA/CMSA boundary definitions were published on June 6, 2003. IDEM has incorporated a cursory review of the counties affected by the new boundary definitions into our core analysis.

<b>Table 1</b>	
<b><u>Potentially Affected Large Metropolitan Areas</u></b>	<b><u>Other Potentially Affected Areas</u></b>
<b><u>Evansville Area</u></b> Gibson County <sup>1</sup> Posey County Vanderburgh County Warrick County	<b><u>Southwest Indiana</u></b> Dubois County <sup>5</sup> Knox County <sup>5</sup> Pike County <sup>5</sup> Spencer County <sup>5</sup>
<b><u>Louisville Area</u></b> Clark County Floyd County Harrison County Scott County <sup>2</sup> Washington County <sup>1</sup>	<b><u>Cincinnati Area</u></b> Dearborn County Franklin County <sup>1</sup> Ohio County
<b><u>Indianapolis/Central Indiana</u></b> Boone County Brown County <sup>1</sup> Hamilton County Hancock County Hendricks County Johnson County Madison County <sup>3</sup> Marion County Morgan County Putnam County <sup>1</sup> Shelby County	<b><u>Terre Haute Area</u></b> Clay County Sullivan County Vermillion County Vigo County
<b><u>South Bend/Elkhart/Goshen</u></b> Elkhart County <sup>3</sup> St. Joseph County <sup>3</sup>	<b><u>Muncie Area</u></b> Delaware County
<b><u>Northwest Indiana</u></b> Jasper County <sup>1</sup> Lake County LaPorte County <sup>4</sup> Newton County <sup>1</sup> Porter County	<b><u>East Central Indiana Area</u></b> Henry County <sup>5</sup>
	<b><u>Kokomo Area</u></b> Howard County Tipton County
	<b><u>Lafayette Area</u></b> Benton County <sup>1</sup> Carroll County <sup>1</sup> Clinton County <sup>2</sup> Tippecanoe County
	<b><u>Fort Wayne Area</u></b> Adams County <sup>2</sup> Allen county DeKalb County <sup>2</sup> Huntington County <sup>2</sup> Wells County Whitley County

<sup>1</sup> County added to MSA in June 2003 as a result of the 2000 Census.

<sup>2</sup> County removed from the MSA in June 2003 as a result of the 2000 Census.

<sup>3</sup> County redefined as a separate MSA in June 2003 as a result of the 2000 Census.

<sup>4</sup> County defined as its own MSA in June 2003 as a result of the 2000 Census.

<sup>5</sup> County not part of an MSA

As a result of thorough analysis, IDEM has developed the following evaluation of nonattainment area boundaries for designating areas under the revised 24-Hour NAAQS for fine particulate matter. This evaluation is based on 2004 through 2007 monitoring data. There were no areas within Indiana that exceeded the daily standard when it was 65 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ). The U.S. EPA promulgated a revised NAAQS for  $\text{PM}_{2.5}$  on October 17, 2006 with the effective date of December 18, 2006. The U.S. EPA retained the annual  $\text{PM}_{2.5}$  standard of  $15 \mu\text{g}/\text{m}^3$  and revised the 24-hour  $\text{PM}_{2.5}$  standard, changing it from  $65 \mu\text{g}/\text{m}^3$  to  $35 \mu\text{g}/\text{m}^3$ .

$\text{PM}_{2.5}$  is both emitted directly in particulate form by select sources and is formed in the atmosphere by precursor gases from a variety of sources. Direct emissions come from combustion sources, such as power plants, forest fires and vehicle emissions. Precursor gases include  $\text{NO}_x$ ,  $\text{SO}_2$  and ammonia. These gases come from a variety of sources including combustion sources, mobile sources, manufacturing that involves coatings and solvents, and agriculture. Precursor gases can condense into particles that are made up of varying amounts of  $\text{NO}_x$ ,  $\text{SO}_2$ , and ammonia. The  $\text{PM}_{2.5}$  direct inventory estimates referenced within this document pertain solely to emissions from stationary sources.

Although IDEM has been monitoring coarse particulates ( $\text{PM}_{10}$ ) for some time, only two relatively small geographic areas were affected by the previous particulate standard.  $\text{PM}_{2.5}$  and  $\text{PM}_{10}$  are very different and require separate monitoring equipment. IDEM established its  $\text{PM}_{2.5}$  monitoring network in 1999, following U.S. EPA guidance for site location, which focused primarily on densely populated urban areas. Much technical work needs to be done to better understand  $\text{PM}_{2.5}$ . States and the U.S. EPA are still working to identify the local and regional nature of  $\text{PM}_{2.5}$  formation, as well as its precursors and relative source contributions. Therefore, it is difficult to develop conclusions as to how the secondary evaluation criteria should apply to  $\text{PM}_{2.5}$  nonattainment area considerations. For example, it is difficult to assume that commuting from a county that monitors attainment to a county that monitors values above the standard significantly contributes to the  $\text{PM}_{2.5}$  concentrations in the county that has values above the standard.

Also, based on our data analysis, high  $\text{PM}_{2.5}$  concentrations appear to be more prominent in areas where there is high population density or where there is a strong industrial base. Current scientific evidence, including U.S. EPA's modeling for the Clean Air Interstate Rule (CAIR) and the Lake Michigan Air Directors' Consortium (LADCO) technical analysis, does show there is a large regional component to  $\text{PM}_{2.5}$ , in addition to a local component. Despite this regional component, Indiana's monitors do not show widespread violations of the annual or daily standard. Many of Indiana's urban and suburban counties monitor compliance. Regional controls, such as CAIR, should secure the compliance of these counties into the future.

As noted in this document, nine PM<sub>2.5</sub> monitoring sites produced data for 2005-2007 that is deemed incomplete due to missing data, meaning that the 2005-2007 average value cannot be truly determined. Four of those monitors (Jasper Sports Complex, Jasper Golf Course, Gary Water Plant and South Bend Shields Dr) have only been monitoring for a short amount of time and do not have three years of data to determine the 2005-2007 design value. The other five monitors (Shenandoah, Elkhart, Highland, Michigan City and Terre Haute-Lafayette Street) deemed incomplete have periods of missing data due to various reasons. U.S. EPA's monitoring guidance stipulates that a minimum of 75% of the data per quarter must be available in order to determine if the design value represents attainment. If less than 75% of the data is valid, then the maximum quarterly value for that given quarter over the three-year period is substituted for all missing samples for that quarter. This method is obviously a very conservative methodology for calculating an average value. In determining whether a monitor with incomplete data attains the daily PM<sub>2.5</sub> standard, U.S. EPA encourages states to explore alternative methods for evaluating the data. Although according to the *Guideline on Data Handling Conventions for the PM NAAQS*, issued April 1999, U.S. EPA states that the incomplete design value is still identified as the monitors true design value. An incomplete data analysis with alternate substitutions can be found in Appendix B for the five monitors (Shenandoah, Elkhart, Michigan City, Highland and Terre Haute-Lafayette Ave) with missing data.

As more PM<sub>2.5</sub> data is collected across the State of Indiana areas of the state were identified with essentially the same concentration, therefore seven PM<sub>2.5</sub> monitoring sites have been identified as not being necessary and were discontinued at the end of December 2007. Those sites are Fort Wayne-Taylor University (Allen County), Gary-Ivanhoe School (Lake County), LaPorte-Lake Street (LaPorte County), Indianapolis-Mann Road (Marion County), Indianapolis-75<sup>th</sup> Street (Marion County), Dunes National Lakeshore (Porter County), and South Bend-LaSalle HS (St. Joseph County).

There is one further thing to note about Indiana's PM<sub>2.5</sub> monitoring network. IDEM maintains four monitoring sites (Gary-IITRI, Gary-Burr St., Indianapolis-West St and Indianapolis-English Ave) that are intended to reflect air quality in a relatively small geographic area directly influenced by a specific source or sources of air pollution. U.S. EPA visited the four monitoring sites to determine if the monitors should be used in comparison of the daily standard. While the four monitors in Lake and Marion counties had population nearby they are largely influenced by nearby sources. These monitors are not used to determine attainment with the annual fine particles standard but U.S. EPA determined they could be compared to the daily standard. IDEM considers these to be hot spots and not reflective of the true air quality in the area. IDEM will work with the sources to address emissions that are contributing to the high annual values at these sites. IDEM also operates five other monitors (Jasper-Sports Complex, Jasper-Golf Course, Shenandoah, SW Purdue Ag Center, and Dale) in the PM<sub>2.5</sub> monitoring network that collect background fine particle concentrations. These monitors are not used to determine attainment with the annual fine particles standard but are compared to the daily fine particle standard.

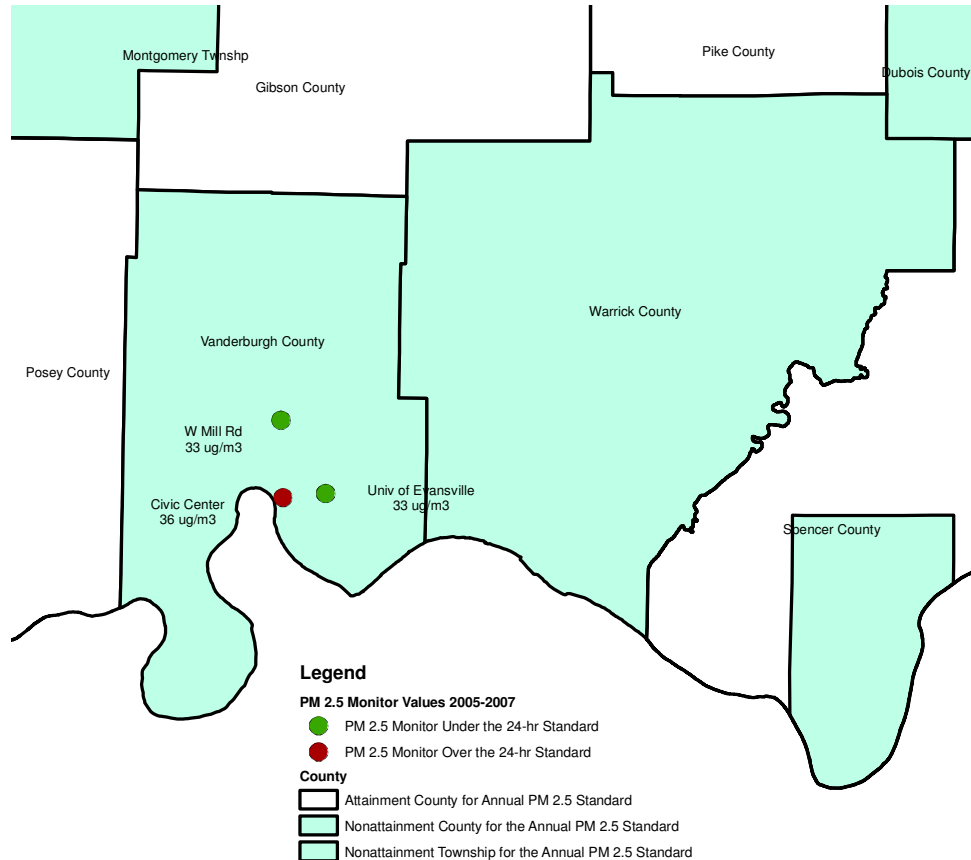


# IDEM Analysis by Region

## Evansville Area:

### Air Quality Data:

#### Evansville Indiana PM 2.5 Monitors



County	Monitor Location	Monitor Values ( $\mu\text{g}/\text{m}^3$ )					
		Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
		2004	2005	2006	2007		
Vanderburgh	Evansville-Civic Center	28.3	42.5	30.5	33.6	34 (33.767)	36 (35.533)
Vanderburgh	Evansville-W Mill Rd	27.5	41.5	27.9	29.9	32 (32.333)	33 (32.833)
Vanderburgh	Evansville-Univ of Evansville	28.3	37.0	29.5	31.5	32 (31.6)	33 (32.667)

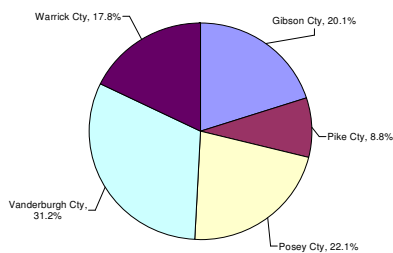
*Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$*

There are three PM<sub>2.5</sub> monitors within the Evansville MSA and they are all located in Vanderburgh County. Only one of the monitors in Vanderburgh County is above the standard.

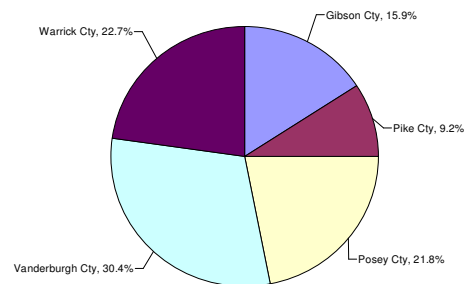
## Emissions Data:

	2001 Area Source Emissions (Tons Per Year)					
	PM <sub>2.5</sub>	% of Area	SO <sub>2</sub>	% of Area	NO <sub>x</sub>	% of Area
<b>Gibson County</b>	1331	20.1%	318	15.9%	2816	13.4%
<b>Pike County</b>	583	8.8%	185	9.2%	918	4.4%
<b>Posey County</b>	1467	22.1%	437	21.8%	4126	19.6%
<b>Vanderburgh County</b>	2074	31.2%	610	30.4%	8913	42.3%
<b>Warrick County</b>	1182	17.8%	456	22.7%	4281	20.3%
<b>Total</b>	<b>6637</b>		<b>2006</b>		<b>20154</b>	

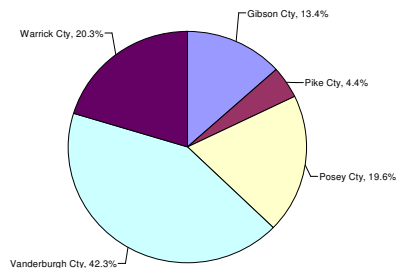
2001 PM 2.5 Emissions



2001 SO2 Emissions



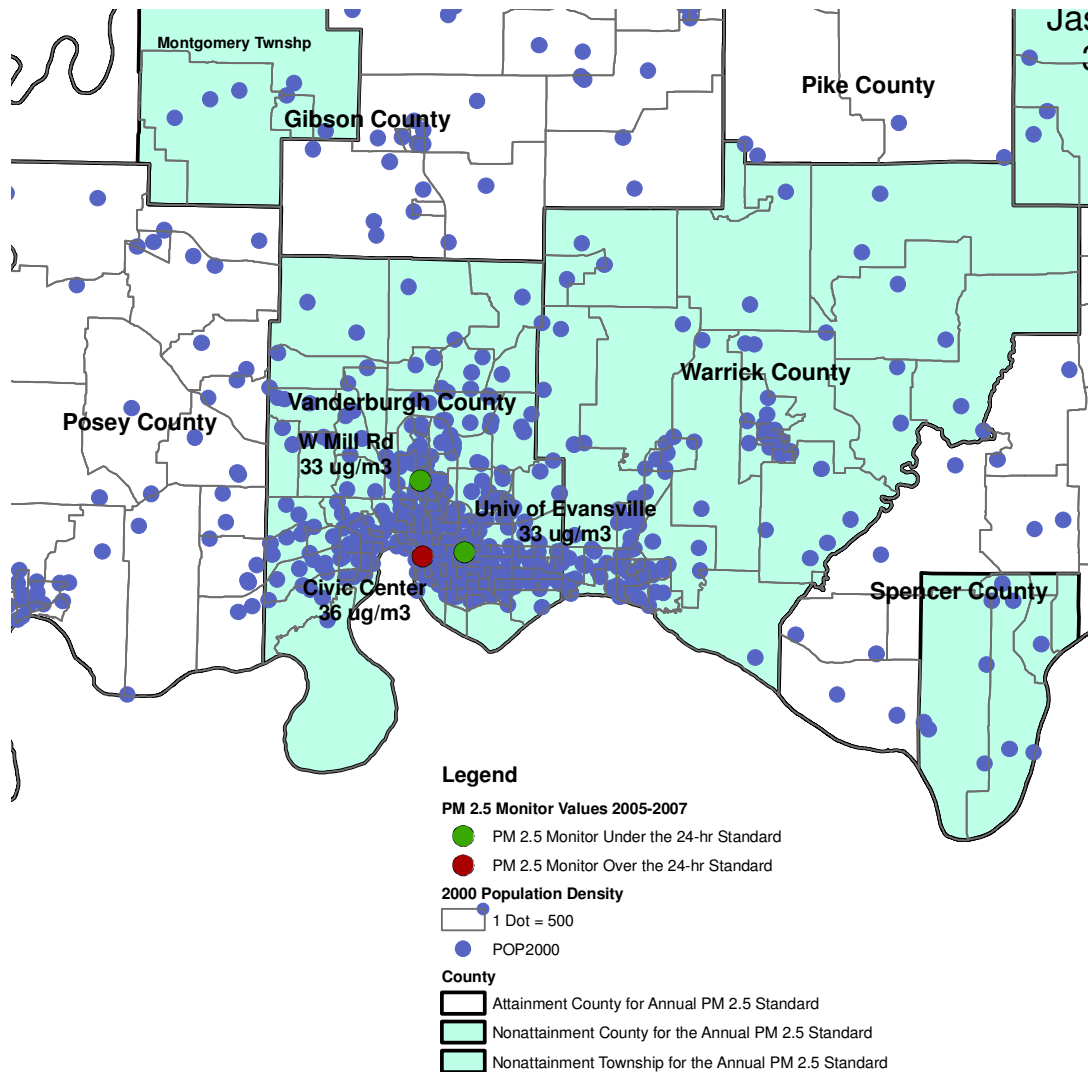
2001 NOx Emissions



31.2% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Vanderburgh County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from Vanderburgh (42.3%) and Warrick (20.3%) and Posey (19.6%) counties. The sulfur dioxide (SO<sub>2</sub>) emissions released by stationary sources within the Indiana's portion of the MSA are primarily from Vanderburgh (30.4%) and Warrick (20.3%) counties. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented. Henderson County, Kentucky, is also part of the Evansville MSA. Indiana has and will continue to communicate with the State of Kentucky concerning its status.

**Population Density:**

## Evansville Indiana PM 2.5 Monitors



Vanderburgh County maintains the highest concentration of population density, compared to the other counties within the MSA and southwest Indiana area. However, the density does extend into the neighboring counties, namely Warrick County.

## Traffic Patterns:

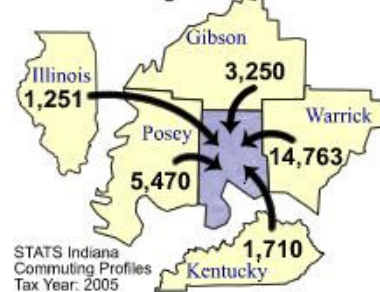
**2005 Commuting Patterns**

	<b>Total Workforce: Number of persons who live in County and work</b>	<b>Number of persons who live AND work in County</b>	<b>Number of persons who live in County and work in another County</b>	<b>Percent In County</b>	<b>Percent Out of County</b>
<b>Gibson County</b>	22,549	17,602	4,947	78.1%	21.9%
<b>Pike County</b>	8,810	5,355	3,455	60.8%	39.2%
<b>Posey County</b>	18,251	11,775	6,476	64.5%	35.5%
<b>Vanderburgh County</b>	112,618	104,410	8,208	92.7%	7.3%
<b>Warrick County</b>	38,704	20,449	18,255	52.8%	47.2%

**Top five counties sending workers  
INTO Vanderburgh County:**

Warrick County	14,763
Posey County	5,470
Gibson County	3,250
Kentucky	1,710
Illinois	1,251
Total of above	26,444 workers
( 19.7% of Vanderburgh County work force)	

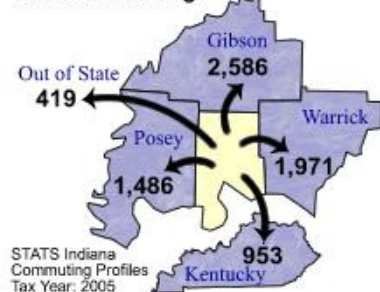
**Into Vanderburgh**



**Top five counties receiving workers  
FROM Vanderburgh County:**

Gibson County	2,586
Warrick County	1,971
Posey County	1,486
Kentucky	953
Out of State	419
Total of above	7,415 workers
( 6.6% of Vanderburgh County labor force)	

**Out of Vanderburgh**



Vanderburgh County maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to the other Indiana counties within the area. Although urban growth in Indiana is occurring in Warrick and Gibson counties, the majority of the region's (including Kentucky) vehicle miles traveled and traffic congestion is generated within the core urban area of Evansville in Vanderburgh County. Vanderburgh County has the highest population density and maintains an in-county workforce ratio of 92.7%. Posey County maintains a low population density and has less of an emissions base than the other counties within the region.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
<b>Gibson County</b>	31,913	32,500	1.8%	33,396	2.8%	32,904	1.2%	35,004	7.7%
<b>Pike County</b>	12,509	12,837	2.6%	12,855	0.1%	13,317	3.7%	12,986	1.2%
<b>Posey County</b>	25,968	27,061	4.2%	26,765	-1.1%	26,605	-1.7%	26,053	-3.7%
<b>Vanderburgh County</b>	165,058	171,922	4.2%	173,356	0.8%	174,355	1.4%	174,827	1.7%
<b>Warrick County</b>	44,920	52,383	16.6%	57,090	9.0%	56,631	8.1%	62,845	20.0%

### **Meteorology:**

Based on a south westerly predominant prevailing wind direction throughout the year, Vanderburgh and Warrick counties are considered upwind of Dubois County.

### **Geography:**

Aside from the Ohio River the Southwest Indiana Area does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### **2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Gibson County was incorporated as part of the Evansville MSA.

#### **Indiana Counties within the Metropolitan Statistical Area (MSA):**

Gibson, Posey, Vanderburgh and Warrick Counties

#### **U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:**

Dubois County, Montgomery Township in Gibson County, Washington Township in Pike County, Ohio Township in Spencer County, Vanderburgh County and Warrick County

#### **Local Air Quality Agency Jurisdiction**

Evansville Environmental Protection Agency within Vanderburgh County.

### **Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Vanderburgh County are subject to the NO<sub>x</sub> SIP Call

and CAIR. See “Southwest Indiana Major Stationary Source Controls” and Exhibit 1 and 2 after the assessment for Knox County, Indiana within this enclosure.

**Evaluation for the Southwest Indiana Area:**

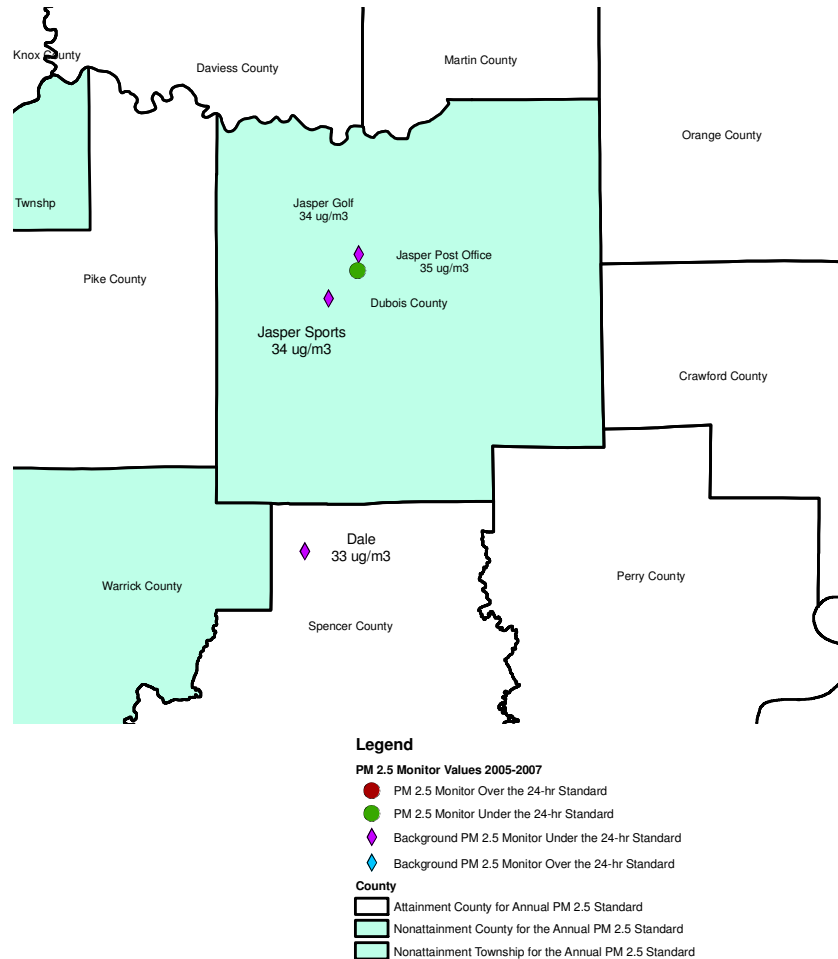
May 30, 2008 Designation Recommendations for the Evansville Indiana Area:

Gibson County	Attainment/Unclassifiable
Posey County	Attainment/Unclassifiable
Vanderburgh County	Nonattainment
Warrick County	Attainment/Unclassifiable

## Dubois County, Indiana:

### Air Quality Data:

#### Dubois County Indiana PM 2.5 Monitors



Monitor Values ( $\mu\text{g}/\text{m}^3$ )							
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Values 2004-2006	Daily Site Design Values 2005-2007
		2004	2005	2006	2007		
Dubois	Jasper Sports Complex	Site Began Operating 02/01/06		33.6	35.2	34* (33.6)	34* (34.0)
Dubois	Jasper Golf Course	Site Began Operating 02/01/06		32.2	36.2	32* (32.2)	34* (34.2)
Dubois	Jasper Post Office (Exceptional Events Left In)	30.0	41.2	31.6	34.7	34 (34.267)	36 (35.833)
Dubois	Jasper Post Office (Exceptional Events Taken Out)	30.0	41.2	31.6	31	34 (34.267)	35 (34.6)
Spencer	Dale	25.2	36.1	27.7	31.4	31 (30.867)	33 (32.933)

*\*Background Monitor*

*Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$*

*Red text indicates that the data is incomplete. See Appendix B..*

There are three monitors in Dubois County, Indiana. Two of these monitors are background monitors (Jasper-Sports Complex and Jasper-Golf Course). These background monitors are intended to reflect ambient air quality from regional transport. The background monitors were sited based on U.S. EPA criteria with the monitoring objectives of population oriented and aiding in determining the transport of fine particulates downwind of a large metropolitan area. Although these two monitors are background monitors the data from the monitors can be used to determine attainment status for the daily PM<sub>2.5</sub> standard.

The data from the two background monitors (Jasper-Sports Complex and Jasper-Golf Course) are deemed incomplete due to missing data, meaning that the 2005-2007 average value cannot be truly determined. These two monitors have incomplete data since they have only been monitoring for a short amount of time and do not have three years of data to determine the 2005-2007 design value. Both of the background monitors started operating on February 1, 2006.

As part of the data review and certification process, IDEM performs a thorough review of all data that exceed an ambient air quality standard. This review is conducted to insure the data are correct and not influenced by an exceptional event. Exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable by state and local agencies. Data which are affected by these events are “flagged” meaning the high monitored values are not the norm and were influenced by an exceptional event. IDEM has identified one exceptional event from a wildfire that occurred during the 2007 monitoring period. After the removal of the exceptional events that occurred during the years 2007 the 2005-2007 design value for the daily PM<sub>2.5</sub> NAAQS value at the Dubois Post Office monitor drops from 36 (35.833) µg/m<sup>3</sup> to 35 (34.6) µg/m<sup>3</sup>. The exceptional event data exclusions results in a 2005-2007 design value below the daily PM<sub>2.5</sub> NAAQS at the Post Office monitor in Dubois County. A detailed description of the exceptional events is outlined in Appendix 2.

### **Emissions Data:**

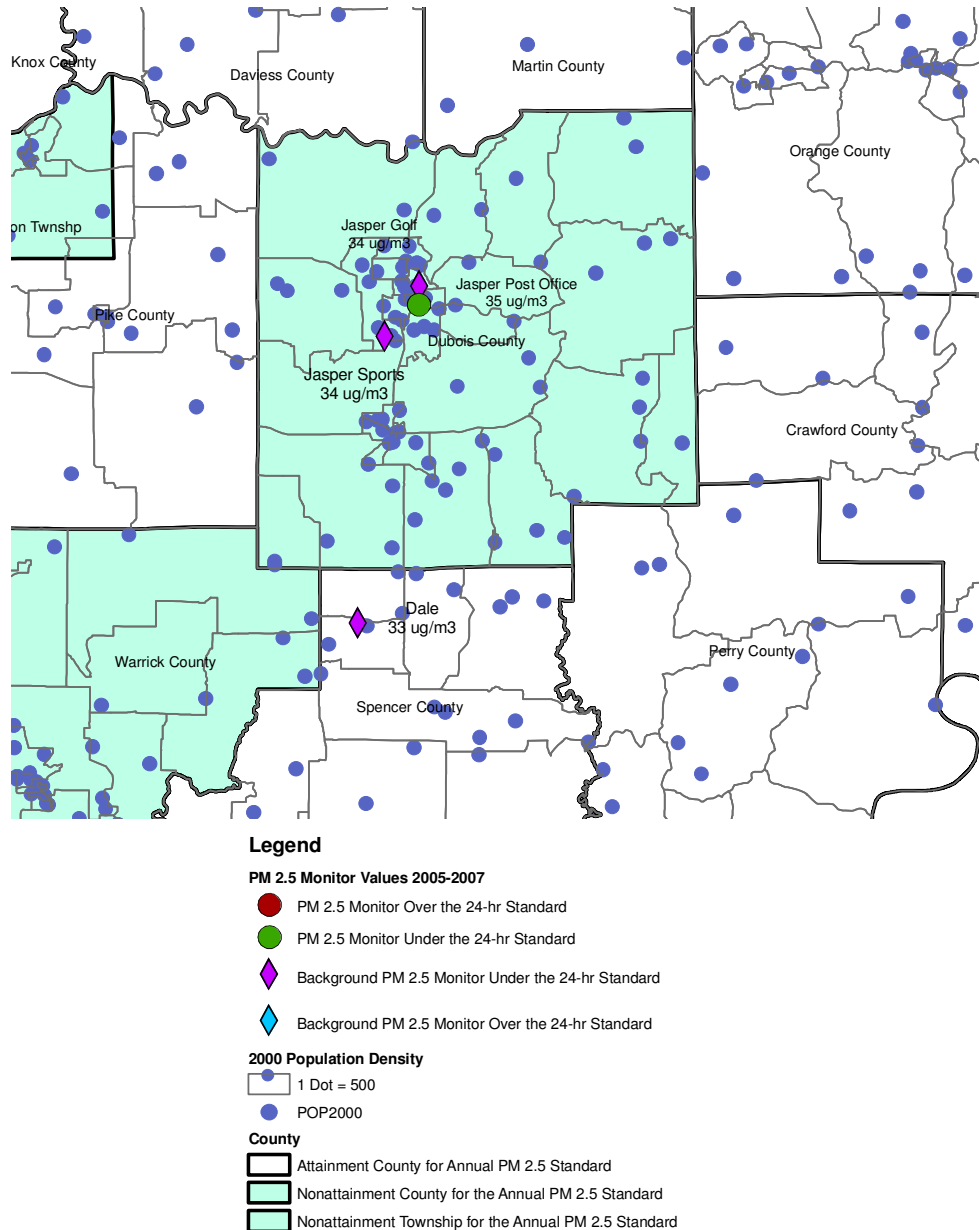
	<b>2001 Area Source Emissions (Tons Per Year)</b>		
	<b>PM<sub>2.5</sub></b>	<b>SO<sub>2</sub></b>	<b>NO<sub>x</sub></b>
<b>Dubois County</b>	1290	337	3016
<b>Spencer County</b>	1162	519	3422
<b>Total</b>	<b>2452</b>	<b>856</b>	<b>6438</b>

Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented.



## Population Density:

### Dubois County Indiana PM 2.5 Monitors



Dubois County maintains the highest concentration of population density, compared to surrounding counties. Overall Dubois County is rural and maintains a very low population density compared to other counties in Indiana.

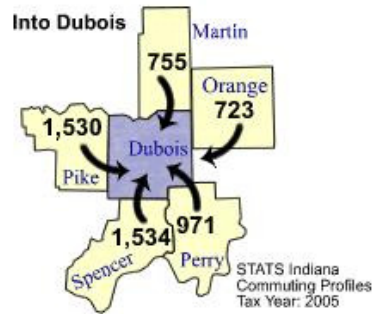
## Traffic Patterns:

2005 Commuting Patterns					
	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
Dubois County	29,793	27,867	1,926	93.5%	6.5%
Spencer County	14,400	9,323	5,077	64.7%	35.3%

### Top five counties sending workers

#### INTO Dubois County:

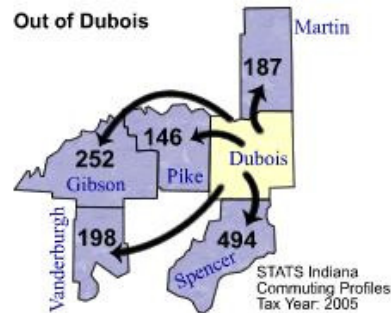
Spencer County	1,534
Pike County	1,530
Perry County	971
Martin County	755
Orange County	723
Total of above	5,513 workers
( 15.5% of Dubois County work force)	



### Top five counties receiving workers

#### FROM Dubois County:

Spencer County	494
Gibson County	252
Vanderburgh County	198
Martin County	187
Pike County	146
Total of above	1,277 workers
( 4.3% of Dubois County labor force)	



Dubois County maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to surrounding counties. Although urban growth is occurring in the nearby Evansville area (Vanderburgh and Warrick counties), the majority of Dubois County's vehicle miles traveled and traffic congestion is generated within the core urban area of Jasper, Indiana. Dubois County maintains an in-county workforce ratio of 93.5%.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Dubois County	36,616	39,674	8.4%	41,212	3.9%	39,987	0.8%	42,736	7.7%
Spencer County	19,490	20,391	4.6%	20,596	1.0%	20,241	-0.7%	20,337	-0.3%

### **Meteorology:**

Based on a south westerly predominant prevailing wind direction throughout the year, Vanderburgh and Warrick counties are considered upwind of Dubois County.

### **Geography:**

Dubois County does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### 2003 MSA Boundary Definition:

Dubois County is not part of an MSA.

#### Nearby Indiana Counties within a Metropolitan Statistical Area (MSA):

Gibson, Posey, Vanderburgh and Warrick Counties

#### U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:

Dubois County, Montgomery Township in Gibson County, Washington Township in Pike County, Ohio Township in Spencer County, Vanderburgh County and Warrick County

### **Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Dubois County are subject to the NO<sub>x</sub> SIP Call and CAIR. See "Southwest Indiana Major Stationary Source Controls" and Exhibit 1 and 2 after the assessment for Knox County, Indiana within this enclosure.

### **Evaluation for the Southwest Indiana Area:**

May 30, 2008 Designation Recommendations for Dubois County, Indiana:

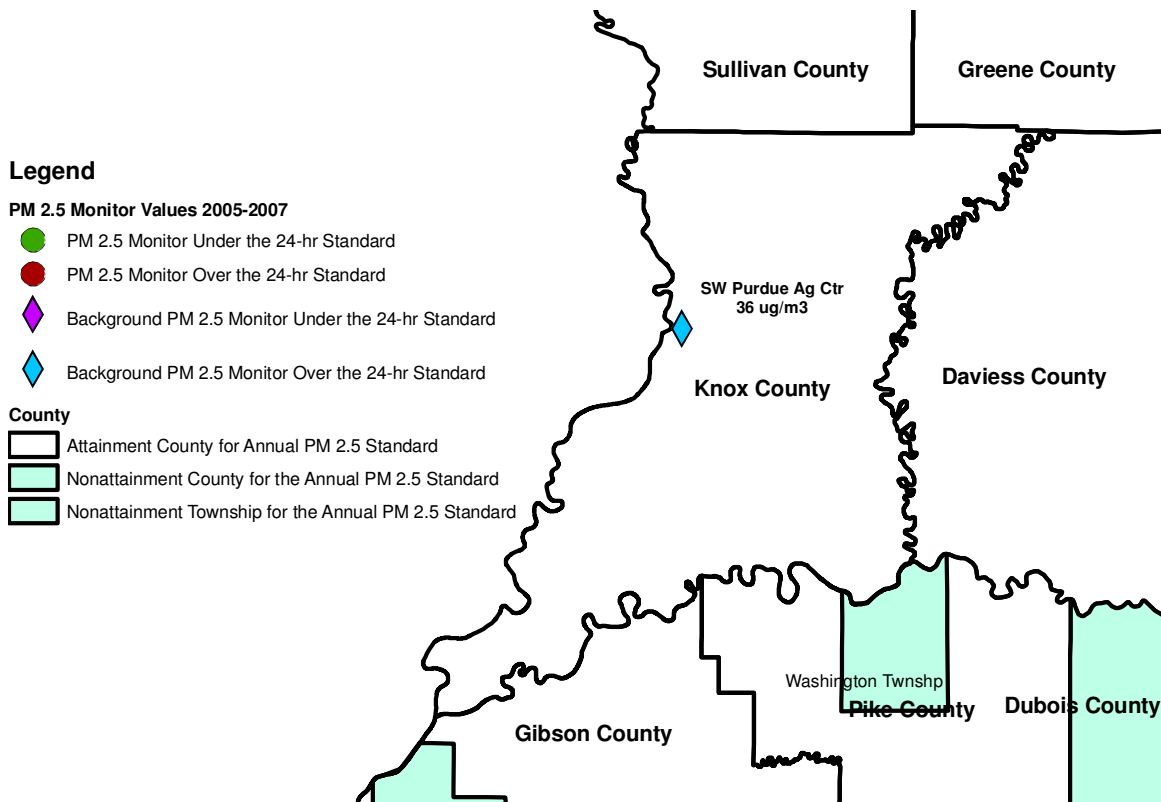
Dubois County

Attainment

## Knox County, Indiana:

### Air Quality Data:

## Knox County Indiana PM 2.5 Monitors



Monitor Values (µg/m³)						Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values					
		2004	2005	2006	2007		
Knox	SW Purdue Ag Center	29.9	41.8	36.2	30.9	36* (35.967)	36* (36.3)

*\*Background Monitor*

*Highlighted values are values that are over the 24-hr standard of 35 µg/m<sup>3</sup>*

There is only one monitor in Knox County, Indiana and it is a background monitor. This background monitor is intended to reflect ambient air quality from regional transport. The monitor was sited based on U.S. EPA criteria with the monitoring objectives of population oriented and aiding in determining the transport of fine particulates downwind of a large metropolitan area. Although this monitor is a background monitor the data from the monitor can be used to determine attainment status for the daily PM<sub>2.5</sub> standard. The monitor in Knox County is over the standard.

Knox County is a rural area located Northeast of the Evansville area and is not downwind of any major metropolitan area. Knox County is not part of an MSA in Indiana. This monitor, to a significant degree, receives air masses that have just crossed the state line and is affected by regional transport of PM<sub>2.5</sub> from the neighboring State of Illinois and the Ohio River Valley. Knox County is also not upwind of Vanderburgh County. Thus, it is not likely to contribute significantly to PM<sub>2.5</sub> values in Vanderburgh County.

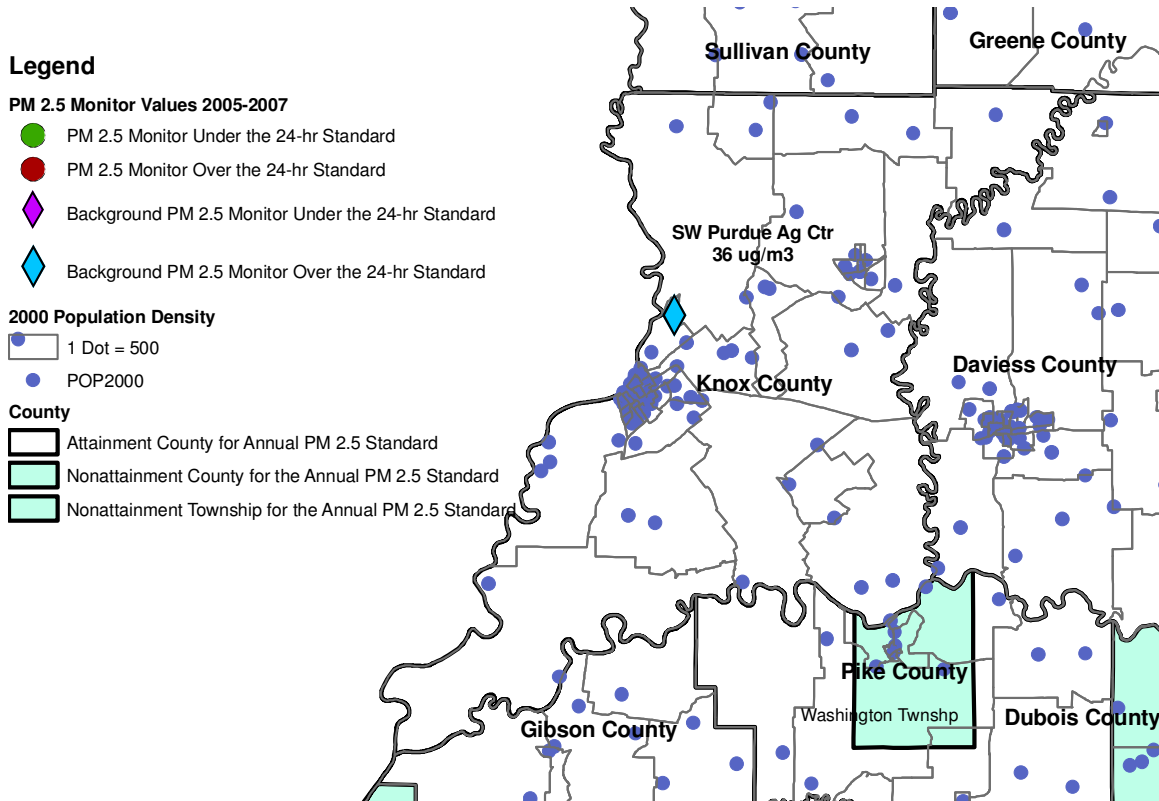
**Emissions Data:**

	2001 Area Source Emissions (Tons Per Year)		
	PM <sub>2.5</sub>	SO <sub>2</sub>	NO <sub>x</sub>
Knox County	1454	261	2610

Knox County has a lower emissions base than the other counties in the region which further illustrates that the monitor violation in Knox County is an isolated event for the Southwest Indiana area. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented.

**Population Density:**

## Knox County Indiana PM 2.5 Monitors



Knox County maintains the highest concentration of population density, compared to the other surrounding counties.

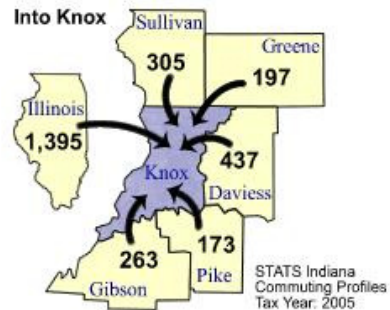
## Traffic Patterns:

**2005 Commuting Patterns**

	<b>Total Workforce: Number of persons who live in County and work</b>	<b>Number of persons who live AND work in County</b>	<b>Number of persons who live in County and work in another County</b>	<b>Percent In County</b>	<b>Percent Out of County</b>
<b>Knox County</b>	24,052	21,289	2,763	88.5%	11.5%

**Top five counties sending workers  
INTO Knox County:**

Illinois	1,395
Daviess County	437
Sullivan County	305
Gibson County	263
Greene County	197
Total of above	2,597 workers
( 10.5% of Knox County work force)	



**Top five counties receiving workers  
FROM Knox County:**

Gibson County	651
Daviess County	411
Illinois	370
Sullivan County	239
Pike County	176
Total of above	1,847 workers
( 7.7% of Knox County labor force)	



Knox County maintains a high concentration for employment, and vehicle miles traveled (VMT) compared to surrounding counties. Although urban growth is occurring in the nearby Evansville area (Vanderburgh and Warrick counties), the majority of the Knox County's vehicle miles traveled and traffic congestion is generated within the core urban area of Vincennes. Knox County has a high population density and maintains an in-county workforce ratio of 88.5%.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Knox County	39,884	39,256	-1.6%	38,241	-2.6%	39,399	0.4%	37,886	-3.5%

### **Meteorology:**

Based on a south westerly predominant prevailing wind direction throughout the year, there are no Indiana counties upwind of Knox County.

### **Geography:**

Knox County does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### 2003 MSA Boundary Definition:

Knox County is not part of an MSA and designated attainment/unclassifiable under the annual PM<sub>2.5</sub> standard.

#### Nearby Indiana Counties within a Metropolitan Statistical Area (MSA):

Gibson, Posey, Vanderburgh and Warrick Counties

#### U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:

Dubois County, Montgomery Township in Gibson County, Washington Township in Pike County, Ohio Township in Spencer County, Vanderburgh County and Warrick County

### **Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Knox County are subject to the NO<sub>x</sub> SIP Call and CAIR. See “Southwest Indiana Major Stationary Source Controls” and Exhibit 1 and 2 after the assessment for Knox County, Indiana within this enclosure.

### **Evaluation for Knox County, Indiana:**

May 30, 2008 Designation Recommendations for Knox County, Indiana:

Knox County

Nonattainment



## **Southwest Indiana Major Stationary Source Controls**

The vast majority of the primary stationary sources within the Southwest Indiana region are already subject to federal control programs, including the Clean Air Interstate Rule (CAIR) or Best Available Control Technology (BART). Since CAIR and BART are considered equivalent to Reasonably Available Control Technology (RACT), these sources would not be subject to RACT requirements for nonattainment areas under the implementation rule for PM 2.5. As a result, the inclusion of counties beyond those where monitored violations occur will not achieve additional emission reductions or advance the attainment date under the 24-hour PM 2.5 standard.

Exhibit 1, attached hereto, outlines the emissions controls for all major coal-combustion sources located in the Southwest Indiana Region and the expected timeframe for implementation. In addition to those listed as being subject to CAIR (and settlement agreements), Alcoa (Warrick County) and GE (Posey County) are subject to BART. Indiana, in conjunction with the Lake Michigan Air Directors Consortium (LADCO), has conducted extensive photochemical modeling to predict future year concentrations based on the control programs already in place. Exhibit 2 demonstrates that all PM 2.5 monitors within the Greater Southwest Indiana Area are predicted to meet the 24-hour PM 2.5 standard in an expedient fashion. Regardless of the effective date of designations under the 24-hour PM 2.5 standard (early 2009 being the soonest), the entire region is predicted to reattain the standard well in advance of the earliest possible attainment deadline (2012).

The designation of counties that measure air quality that meets the standard (i.e., Dubois and Spencer), or counties or portions of counties with major stationary sources would serve no purpose. Additional emission reductions will not be achieved, currently violating counties will achieve compliance in advance of the applicable deadline, and the attainment date will not move forward or backward as a result.

## Exhibit 1

**2007 Data, April 11, 2008, not all units reporting 12 months**

FACILITY_NAME	County	ORISPL_CODE	UNITID	ASSOC_STACKS	SUM_OP_TIME	MONTHS_REPORTED	SO2_MASS	SO2 Rate (approx)	NOX_RATE	NOX_MASS	PRIMARY_FUEL_INFO	SO2_CONTROL_INFO	NOX_CONTROL_INFO	PART_CONTROL_INFO
A B Brown Generating Station	Posey	6137	1		8072	12	5294	0.675	0.289	2272	Coal	FGD	SCR	Baghouse
A B Brown Generating Station		6137	2		8349	12	3449	0.400	0.282	2472	Coal	FGD	SCR	ESP
A B Brown Generating Station		6137	3		243	12	1	0.010	0.124	9	Pipeline Natural Gas			
A B Brown Generating Station		6137	4		345	12	0	0.001	0.031	3	Pipeline Natural Gas			
Alcoa Allowance Management Inc	Warrick	6705	1	CS012	8657	12	16543	2.758	0.324	1942	Coal	FGD Scheduled 2008	Low NOx Burner Technology w/ Overfire Air	Electrostatic Precipitator
Alcoa Allowance Management Inc		6705	2	CS012, CS023	8433	12	16612	2.825	0.329	1925	Coal	FGD Scheduled 2008	Low NOx Burner Technology w/ Overfire Air	Electrostatic Precipitator
Alcoa Allowance Management Inc		6705	3	CS023	8518	12	16879	2.838	0.331	1971	Coal	FGD Scheduled 2008	Low NOx Burner Technology w/ Overfire Air	Electrostatic Precipitator
Alcoa Allowance Management Inc		6705	4		7814	12	28790	2.320	0.284	3576	Coal	FGD Scheduled 2009	Low NOx Cell Burner Selective Catalytic Reduction	Electrostatic Precipitator
Edwardsport	Knox	1004	1-Jun		37	12	1	0.164	0.204	1	Diesel Oil	IGCC Scheduled 2012		
Edwardsport		1004	1-Jul		2777	12	2040	3.452	0.628	375	Coal	IGCC Scheduled 2012		Electrostatic Precipitator
Edwardsport		1004	2-Jul		2572	12	1848	3.397	0.541	306	Coal	IGCC Scheduled 2012		Electrostatic Precipitator
Edwardsport		1004	1-Aug		3027	12	2298	3.644	0.575	370	Coal	IGCC Scheduled 2012		Electrostatic Precipitator
F B Culley Generating Station	Warrick	1012	2	CS023, MS2	8593	12	1048	0.269	0.158	627	Coal	Wet Limestone FGD	Low NOx Burner Technology (Dry Bottom only)	Electrostatic Precipitator
F B Culley Generating Station		1012	3	CS023	8588	12	2629	0.214	0.148	1815	Coal	Wet Limestone FGD	Low NOx Burner Technology (Dry Bottom only) Selective Catalytic Reduction	Baghouse
Frank E Ratts	Pike	1043	1SG1		7933	12	10274	2.338	0.597	2618	Coal		Low NOx Burner Technology (Dry Bottom only)	Electrostatic Precipitator
Frank E Ratts		1043	2SG1		8521	12	11012	2.301	0.460	2211	Coal		Low NOx Burner Technology (Dry Bottom only)	Electrostatic Precipitator
Gibson	Gibson	6113	1	CS0003	8019	12	34350	1.531	0.230	4972	Coal	Wet Limestone (Began Oct 01, 2007)	Low NOx Burner Technology w/ Overfire Air Selective Catalytic Reduction	Electrostatic Precipitator (Retired Sep 30, 2007)
Gibson		6113	2	CS0003	7069	12	13124	0.672	0.288	5424	Coal	Wet Limestone (Began Apr 01, 2007)	Low NOx Burner Technology w/ Overfire Air Selective Catalytic Reduction	Electrostatic Precipitator (Retired Jun 30, 2007)
Gibson		6113	3		8501	12	2224	0.088	0.293	7443	Coal	Wet Limestone	Low NOx Burner Technology w/ Overfire Air Selective Catalytic Reduction	Electrostatic Precipitator

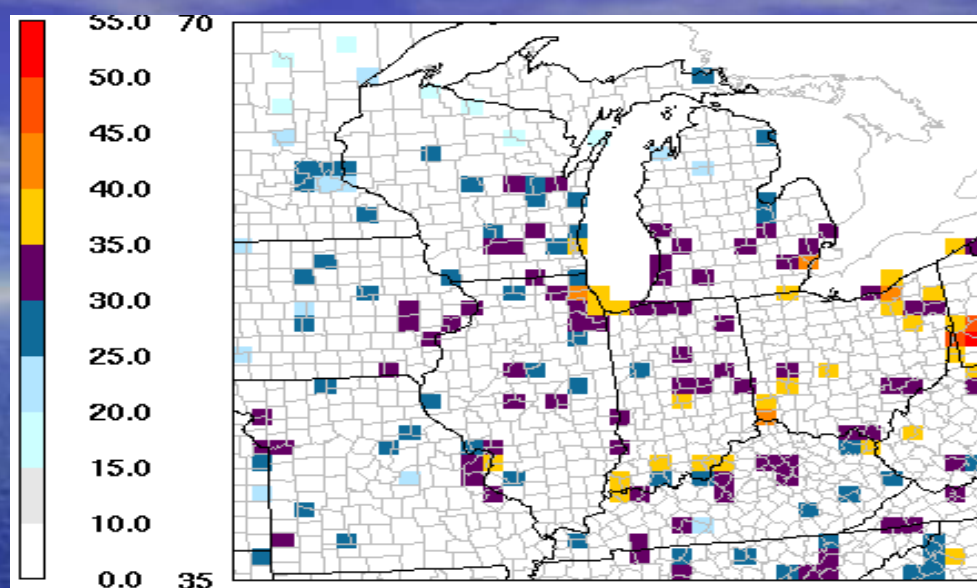
2007 Data, April 11, 2008, not all units reporting 12 months

FACILITY_NAME	County	ORISPL_CODE	UNITID	ASSOC_STACKS	SUM_OP_TIME	MONTHS_REPORTED	SO2_MASS	SO2 Rate (approx)	NOX_RATE	NOX_MASS	PRIMARY_FUEL_INFO	SO2_CONTROL_INFO	NOX_CONTROL_INFO	PART_CONTROL_INFO
Gibson		6113	4		8384	12	4353	0.195	0.283	6424	Coal	Wet Limestone	Low NOx Burner Technology w/ Overfire Air Selective Catalytic Reduction	Electrostatic Precipitator
Gibson		6113	5		8248	12	18896	0.956	0.292	5760	Coal	Wet Limestone	Low NOx Burner Technology w/ Overfire Air Selective Catalytic Reduction	Electrostatic Precipitator
Petersburg	Pike	994	1	MS1B, MS1S	7926	12	597	0.072	0.265	2244	Coal	Wet Limestone	Low NOx Burner Technology w/ Closed-coupled/Separated OFA	Electrostatic Precipitator
Petersburg		994	2	MS2B, MS2S	7738	12	1144	0.085	0.250	3486	Coal	Wet Limestone	Low NOx Burner Technology w/ Closed-coupled/Separated OFA Selective Catalytic Reduction	Electrostatic Precipitator
Petersburg		994	3		8520	12	4042	0.179	0.256	5852	Coal	Wet Limestone	Selective Catalytic Reduction Low NOx Burner Technology w/ Closed-coupled OFA	Electrostatic Precipitator
Petersburg		994	4		8068	12	16717	0.858	0.252	4948	Coal	Wet Limestone	Low NOx Burner Technology w/ Closed-coupled OFA	Electrostatic Precipitator
Rockport	Spencer	6166	AB1		93	6	0		0.121	3	Diesel Oil			
Rockport		6166	AB2		96	6	0		0.121	4	Diesel Oil			
Rockport		6166	MB1	CS012	6509	12	23093	0.650	0.246	8900	Coal	(EPA settlement - FGD 12-31-17)	Low NOx Burner Technology (Dry Bottom only) (EPA settlement - SCR 12-31-17)	Electrostatic Precipitator
Rockport		6166	MB2	CS012	7007	12	25740	0.644	0.256	10392	Coal	(EPA settlement - FGD 12-31-19)	Low NOx Burner Technology (Dry Bottom only) (EPA settlement - SCR 12-31-19)	Electrostatic Precipitator

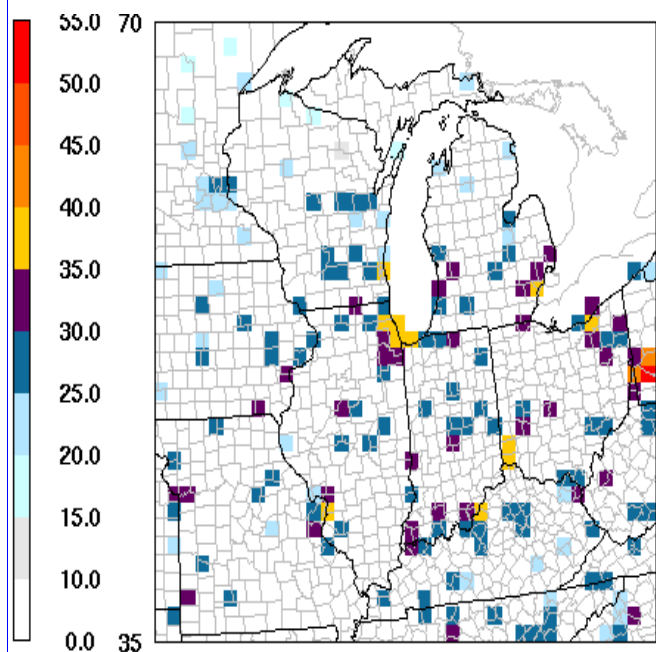
Exhibit 2 – LADCO Round 5  
Modeling

# Effects of New $PM_{2.5}$ Standard (24-hour)

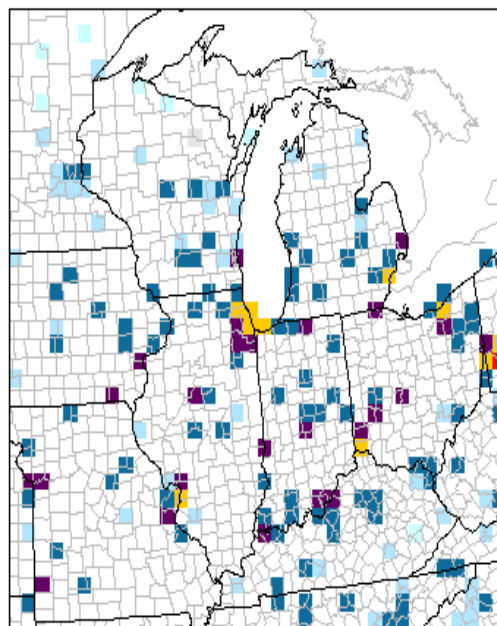
2005



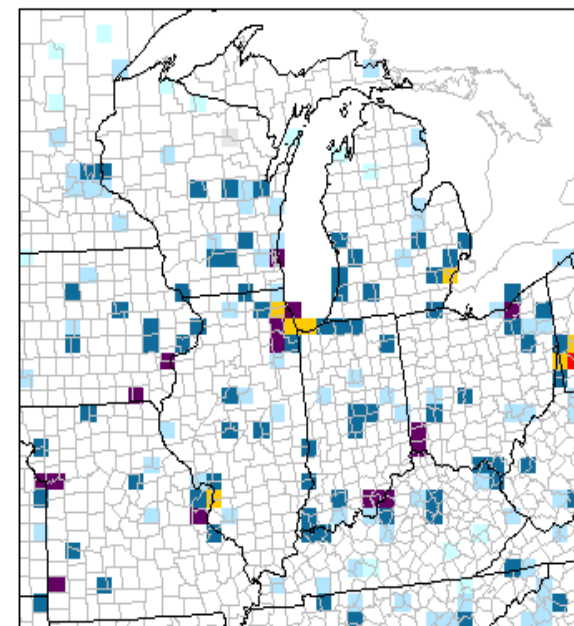
2009



2012



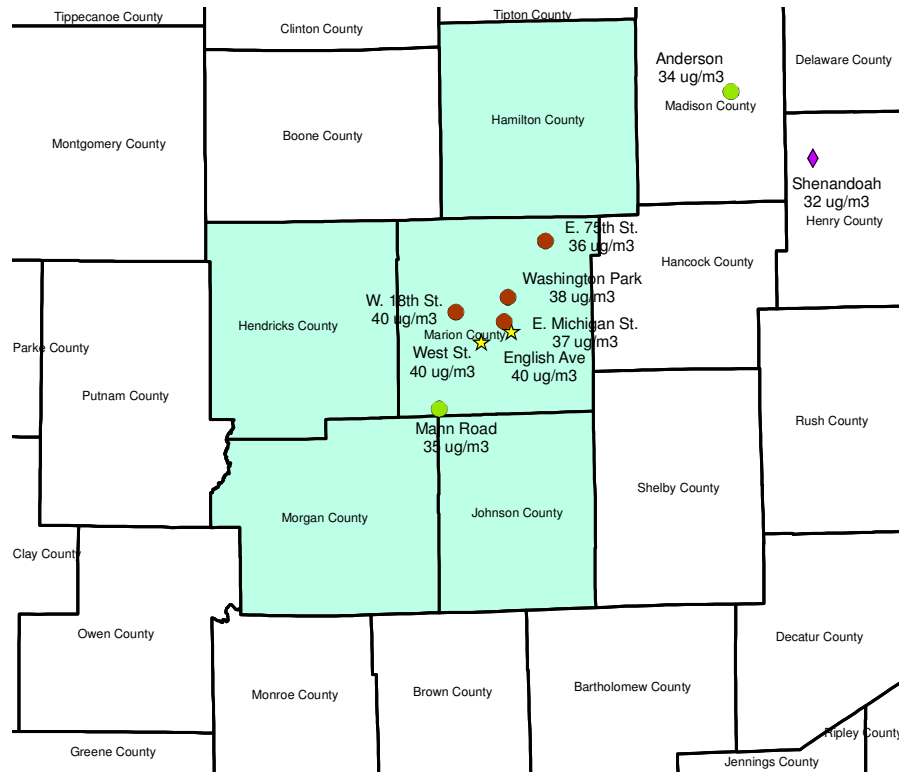
2018



## Central Indiana Area:

### Air Quality Data:

#### Central Indiana PM 2.5 Monitors



#### Legend

##### PM 2.5 Monitor Values 2005-2007

- PM 2.5 Monitor Over the 24-hr Standard
- PM 2.5 Monitor Under the 24-hr Standard
- ★ Source Oriented PM 2.5 Monitor Over the 24-hr Standard
- ◆ Background PM 2.5 Monitor Under the 24-hr Standard

##### County

- Attainment County for Annual PM 2.5 Standard
- Nonattainment Area for the Annual PM 2.5 Standard

Monitor Values ( $\mu\text{g}/\text{m}^3$ )							
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
		2004	2005	2006	2007		
Madison	Anderson-W 5 <sup>th</sup> St.	28.2	38.3	28.0	34.3	32 (31.50)	34 (33.533)
Marion	Indianapolis-Mann Rd.	29.3	39.4	31.0	35.6	33 (33.23)	35 (35.333)
Marion	Indianapolis-Washington Park	31.0	42.5	31.7	38.8	35 (35.067)	38 (37.667)
Marion	Indianapolis-75 <sup>th</sup> St.	28.7	43.4	30.7	33.5	34 (34.267)	36 (35.867)
Marion	Indianapolis-W 18 <sup>th</sup> St.	31.9	45.7	34.8	38.4	37 (37.467)	40 (39.633)
Marion	Indianapolis-Michigan St.	31.3	40.3	33.5	37.2	35 (35.033)	37 (37.0)
Marion	Indianapolis-West St.	31.7	43.9	37.5	38.3	38** (37.70)	40** (39.9)
Marion	Indianapolis-English Ave	31.1	44.0	36.2	38.8	37** (37.10)	40** (39.667)

\*\*Source Oriented Monitor

Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$

There are seven monitors in the Indianapolis MSA and one monitor in the Anderson MSA. Of the seven monitors in the Indianapolis MSA six of them (including four attainment and two source oriented monitors) are over the standard. The only monitor in the Indianapolis MSA that is not over the standard is the Mann Road monitor. The monitor located in the Anderson MSA is below the standard.

The Indianapolis-West St and Indianapolis-English Ave monitors located in Marion County are source oriented monitors. These source oriented monitors are intended to reflect air quality in a relatively small geographic area directly influenced by a specific source or sources of air pollution. These two monitors were sited based on U.S. EPA criteria with the monitoring objectives of high concentration, population and source impact; they have population nearby and are largely influenced by nearby sources. The source oriented monitors are not used to determine attainment status with the annual fine particles standard but U.S. EPA determined they could be used to determine attainment status for the daily PM<sub>2.5</sub> standard. IDEM considers these source oriented monitors to be hot spots and not reflective of the true air quality in the area. IDEM will work with the sources to address emissions that are contributing to the high annual values at these sites.

As more PM<sub>2.5</sub> data is collected across the State of Indiana areas were identified with essentially the same concentration, therefore seven PM<sub>2.5</sub> monitoring sites have been identified as not being necessary and were discontinued at the end of December 2007. Two of those sites (Mann Road and 75<sup>th</sup> Street) are located in Indianapolis in Marion County. The Indianapolis-Mann Road monitoring site was originally set up as a background site for the Indianapolis area. It has been consistently lower than the other sites in the city. The Indianapolis-75<sup>th</sup> Street monitoring site is generally lower than the remainder of the sites in the more urbanized area of Indianapolis. The site will be relocated farther northeast of the city in neighboring Hamilton County in 2008.

Unlike ozone, PM<sub>2.5</sub> monitoring values indicate that PM<sub>2.5</sub> values decrease further away from the core of the Indianapolis urban area into the suburban area. This is represented by the lower values registered at the Mann Road monitor which is southwest of the core urban area and by the 75<sup>th</sup> Street monitor which is northeast of the core urban area. Both the Mann Road and the 75<sup>th</sup> Street monitor were discontinued at the end of 2007. The Madison County monitor, also northeast of the core urban area, registers values below the standard. The monitor locations are aligned such that their readings describe the profile of PM<sub>2.5</sub> levels from the urban edges through the urban center. Recent analysis by the Lake Michigan Air Directors Consortium (LADCO) indicates a common “cone-shaped” profile of PM<sub>2.5</sub> values in densely populated urban areas with the peak value at the urban center (core) and values decreasing gradually based on distance from the urban core (both upwind and downwind). The Indianapolis urban area appears to follow this profile, with the peak value being represented at the W. 18<sup>th</sup> Street monitor at 40 µg/m<sup>3</sup> (close to the center or core of the urban area). The Michigan Street monitor is just southeast of the W. 18<sup>th</sup> Street monitor and it follows this “cone-shape” profile as well, at 37 µg/m<sup>3</sup>. Starting from the urban center, the W. 18<sup>th</sup> Street monitor in this instance, the following table illustrates that the actual monitor values indeed follow a “cone-shaped” curve.

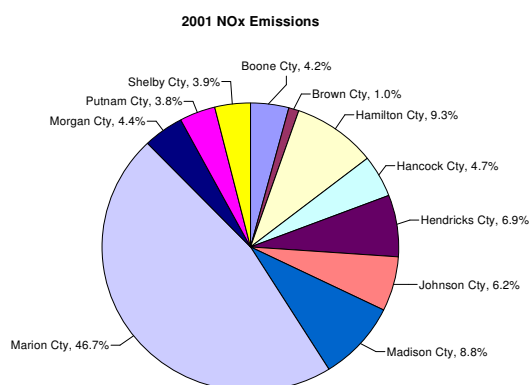
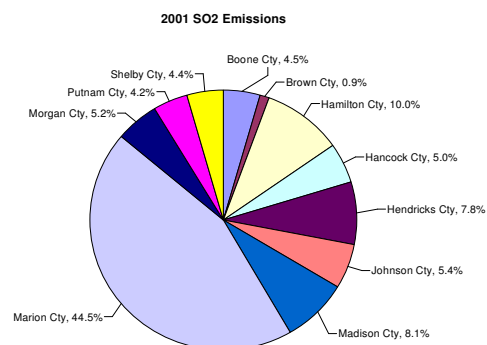
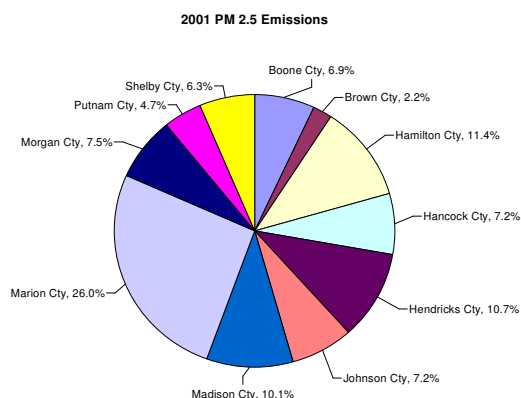
Location	Miles	Actual Design Value 04-06 ( $\mu\text{g}/\text{m}^3$ )	Actual Design Value 05-07 ( $\mu\text{g}/\text{m}^3$ )
W. 18 <sup>th</sup> Street	0	37	40
Michigan Street	5.0	35	37
Washington Park	5.6	35	38
Mann Road	10.0	33	35
75 <sup>th</sup> Street	11.8	34	36
Anderson	36.1	32	34

U.S. EPA has recommended, in its “*Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM<sub>2.5</sub> and Regional Haze*” (EPA-454/B-07-002, April 2007), an “unmonitored area analysis” for areas without monitors that could potentially exceed the NAAQS if monitors existed in those areas. The “unmonitored area analysis” uses a combination of ambient data to provide spatial fields for monitored and unmonitored areas and model output for predicted concentrations throughout a region. Hamilton, Hendricks, Johnson and Morgan counties were designated as nonattainment for the annual fine particle standard despite the fact that there are no fine particle monitors in those counties. These four counties are adjacent to Marion County, which has monitors in the southwest, central, and northeastern portions of the county. See Appendix C for the unmonitored area analysis for these counties.

The only monitored violations of the standard within the Metropolitan Statistical Area (MSA) occurs in Indianapolis (Marion County). Not including the source oriented monitors, four out of the five ambient monitors within the MSA exceed the standard.

### **Emissions Data:**

	2001 Area Source Emissions (Tons Per Year)					
	PM <sub>2.5</sub>	% of MSA	SO <sub>2</sub>	% of MSA	NO <sub>x</sub>	% of MSA
<b>Boone County</b>	1580	6.9%	224	4.5%	3468	4.2%
<b>Brown County</b>	505	2.2%	46.3	0.9%	828	1.0%
<b>Hamilton County</b>	2594	11.4%	497	10.0%	7645	9.3%
<b>Hancock County</b>	1643	7.2%	248	5.0%	3838	4.7%
<b>Hendricks County</b>	2443	10.7%	386	7.8%	5699	6.9%
<b>Johnson County</b>	1635	7.2%	269	5.4%	5145	6.2%
<b>Madison County</b>	2301	10.1%	405	8.1%	7282	8.8%
<b>Marion County</b>	5947	26.0%	2216	44.5%	38462	46.7%
<b>Morgan County</b>	1705	7.5%	261	5.2%	3637	4.4%
<b>Putnam County</b>	1064	4.7%	208	4.2%	3163	3.8%
<b>Shelby County</b>	1437	6.3%	220	4.4%	3216	3.9%
<b>Total</b>	<b>22854</b>		<b>4980.3</b>		<b>82383</b>	



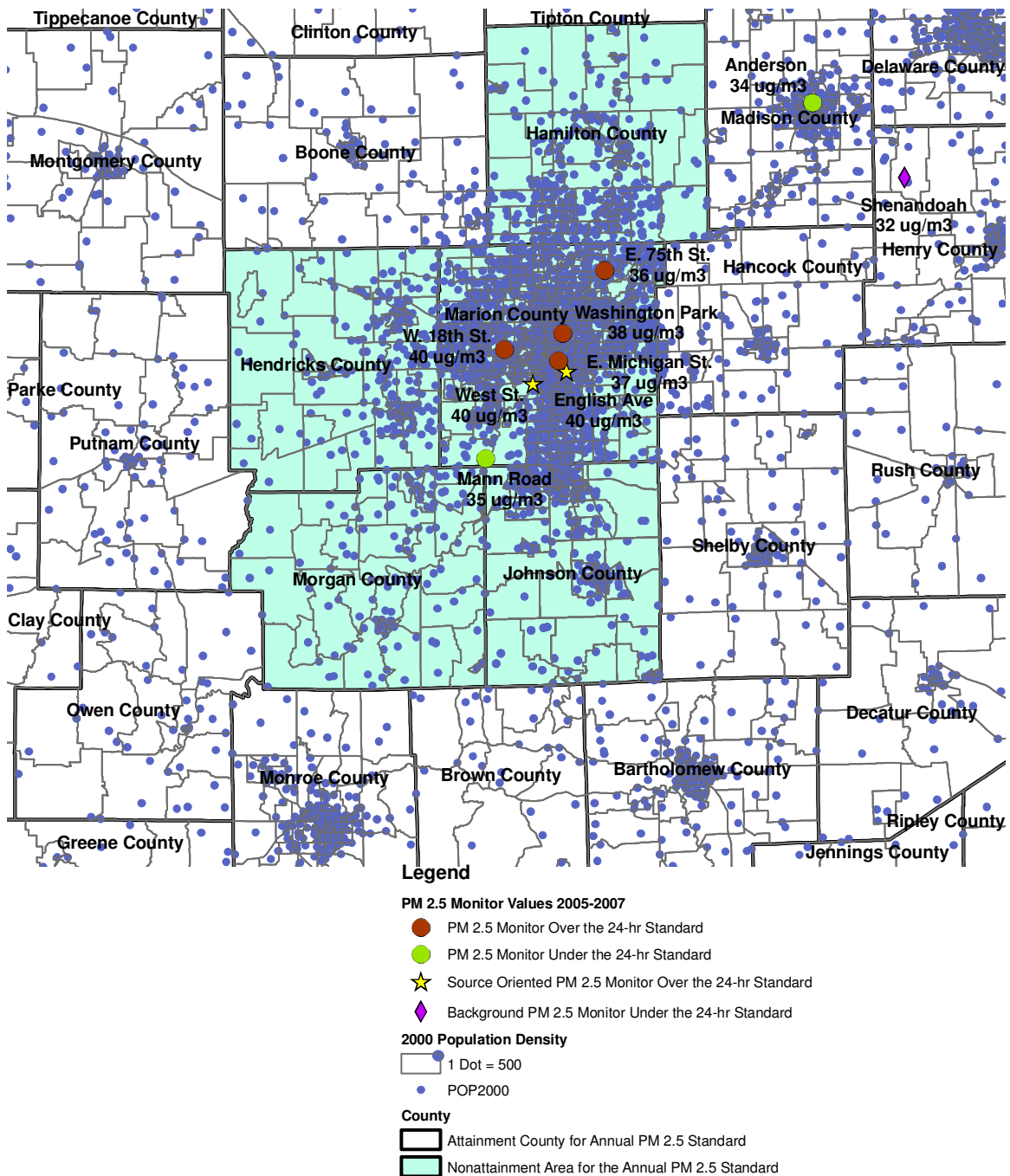
Mobile source emissions represent the largest portion of the total 2005 VOC and NO<sub>x</sub> emissions for Marion County, as well as the MSA as a whole. Mobile sources are an insignificant contributor of SO<sub>2</sub>, and PM<sub>2.5</sub> direct in most cases. Stationary sources within Marion County account for a quarter (26.0%) of the direct PM<sub>2.5</sub> emissions from stationary sources within Central Indiana and the next closest is Hamilton County with 11.4%. Sources within Marion County also account for 44.5% of the SO<sub>2</sub> emissions and 46.7% of the NO<sub>x</sub> emissions from stationary sources within the Central Indiana Area. It is worth noting that despite its large geographic size, the total direct PM<sub>2.5</sub> and SO<sub>2</sub> emissions inventories for stationary sources within Central Indiana are relatively small in comparison with other MSAs within the state (e.g., NW Indiana and Evansville).

As noted previously, Marion County accounts for the majority of the PM<sub>2.5</sub> direct and precursor emissions. Morgan County does account for a small portion of the PM<sub>2.5</sub> and SO<sub>2</sub> emissions within the MSA, however, IDEM believes that these emissions have little to no effect on the PM<sub>2.5</sub> values in Marion County. This is supported by the fact that the closest downwind monitor to Morgan County (Mann Road) has the lowest PM<sub>2.5</sub> value in Marion County.



## Population Density:

# Central Indiana Population Density



Marion County (Indianapolis, the core of the urban area) maintains the highest concentration of population density, compared to the other counties within the MSA. However, the density does extend into the outer fringe of the collar counties, namely Hamilton, Hendricks, and Johnson counties.

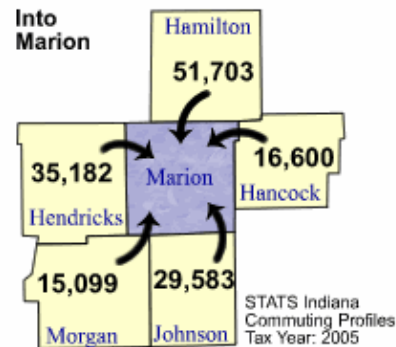
## Traffic Patterns:

**2005 Commuting Patterns**

	<b>Total Workforce: Number of persons who live in County and work</b>	<b>Number of persons who live AND work in County</b>	<b>Number of persons who live in County and work in another County</b>	<b>Percent In County</b>	<b>Percent Out of County</b>
<b>Boone County</b>	34,668	19,662	15,006	56.7%	43.3%
<b>Brown County</b>	10,541	6,028	4,513	57.2%	42.8%
<b>Hamilton County</b>	153,555	92,215	61,340	60.1%	39.9%
<b>Hancock County</b>	44,125	23,464	20,661	53.2%	46.8%
<b>Hendricks County</b>	82,878	42,363	40,515	51.1%	48.9%
<b>Johnson County</b>	84,147	48,675	35,472	57.8%	42.2%
<b>Madison County</b>	83,093	66,277	16,816	79.8%	20.2%
<b>Marion County</b>	526,530	492,379	34,151	93.5%	6.5%
<b>Morgan County</b>	45,434	24,955	20,479	54.9%	45.1%
<b>Putnam County</b>	22,366	15,927	6,439	71.2%	28.8%
<b>Shelby County</b>	29,050	20,578	8,472	70.8%	29.2%

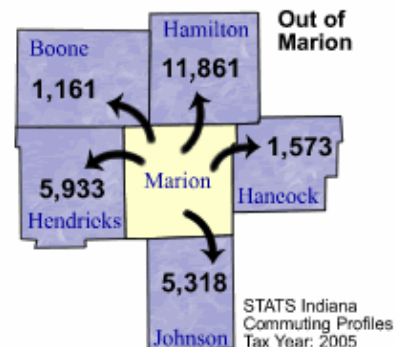
### **Top five counties sending workers INTO Marion County:**

Hamilton County	51,703	<b>34.90%</b>
Hendricks County	35,182	<b>23.74%</b>
Johnson County	29,583	<b>19.97%</b>
Hancock County	16,600	<b>11.20%</b>
Morgan County	15,099	<b>10.19%</b>
Total of above	148,167 workers	
(21.4% of Marion County work force)		



### **Top five counties receiving workers FROM Marion County:**

Hamilton County	11,861	<b>45.89%</b>
Hendricks County	5,933	<b>22.96%</b>
Johnson County	5,318	<b>20.58%</b>
Hancock County	1,573	<b>6.09%</b>
Boone County	1,161	<b>4.49%</b>
Total of above	25,846 workers	
(4.9% of Marion County labor force)		



Marion County (Indianapolis, the core of the urban area) maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to the other counties within the MSA. The majority of the traffic congestion occurs in Marion County. A significant level of commuting occurs from the surrounding counties to Marion County, meaning that a fairly large portion of Marion County's VMT originates

from the surrounding counties. The Indianapolis MSA's population density is spreading well beyond Marion County, but Marion County maintains the highest population and an in-county workforce ratio of 93.5%.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Boone County	38,147	46,107	20.9%	53,526	16.1%	56,319	22.1%	50,906	10.4%
Brown County	14,080	14,957	6.2%	15,071	0.8%	16,419	9.8%	18,627	24.5%
Hamilton County	108,936	182,740	67.7%	250,979	37.3%	298,642	63.4%	227,506	24.5%
Hancock County	45,527	55,391	21.7%	65,050	17.4%	67,426	21.7%	65,698	18.6%
Hendricks County	75,717	104,093	37.5%	131,204	26.0%	146,966	41.2%	123,561	18.7%
Johnson County	88,109	115,209	30.8%	133,316	15.7%	140,736	22.2%	136,408	18.4%
Madison County	130,669	133,358	2.1%	130,575	-2.1%	129,019	-3.3%	134,210	0.6%
Marion County	797,159	860,454	7.9%	865,504	0.6%	866,409	0.7%	846,190	-1.7%
Morgan County	55,920	66,689	19.3%	70,290	5.4%	71,862	7.8%	81,716	22.5%
Putnam County	30,315	36,019	18.8%	36,978	2.7%	38,484	6.8%	38,450	6.7%
Shelby County	40,307	43,445	7.8%	44,114	1.5%	43,934	1.1%	48,363	11.3%

### **Meteorology:**

Based on a southerly prevailing wind direction throughout the year, Shelby, Johnson, Morgan, and Hendricks Counties are considered upwind of Marion County. However, the predominant wind direction is southwest on average, therefore Morgan county is considered most directly upwind of Marion County. However, with regard to non-mobile source categories, the monitor within Marion County closest to and likely to be impacted the most by emissions originating from sources within Morgan, Hendricks, and Johnson Counties measures air quality below the standard.

### **Geography:**

The Central Indiana Area does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### **2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Brown and Putnam Counties were incorporated as part of the Indianapolis MSA and Madison County was excluded from the Indianapolis MSA and defined as the Anderson MSA.

Indiana Counties within the Indianapolis Metropolitan Statistical Area (MSA): Boone, Brown, Hamilton, Hancock, Hendricks, Johnson, Marion, Morgan, Putnam and Shelby Counties.

Indiana Counties within the Anderson Metropolitan Statistical Area (MSA):  
Madison County

U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard: Hamilton, Hendricks, Johnson, Marion, and Morgan

Local Air Quality Agency Jurisdiction for Central Indiana  
City of Indianapolis within Marion County.

**Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. The only major stationary source located outside of Marion County is subject to the NO<sub>x</sub> SIP Call and CAIR.

**Evaluation for Central Indiana:**

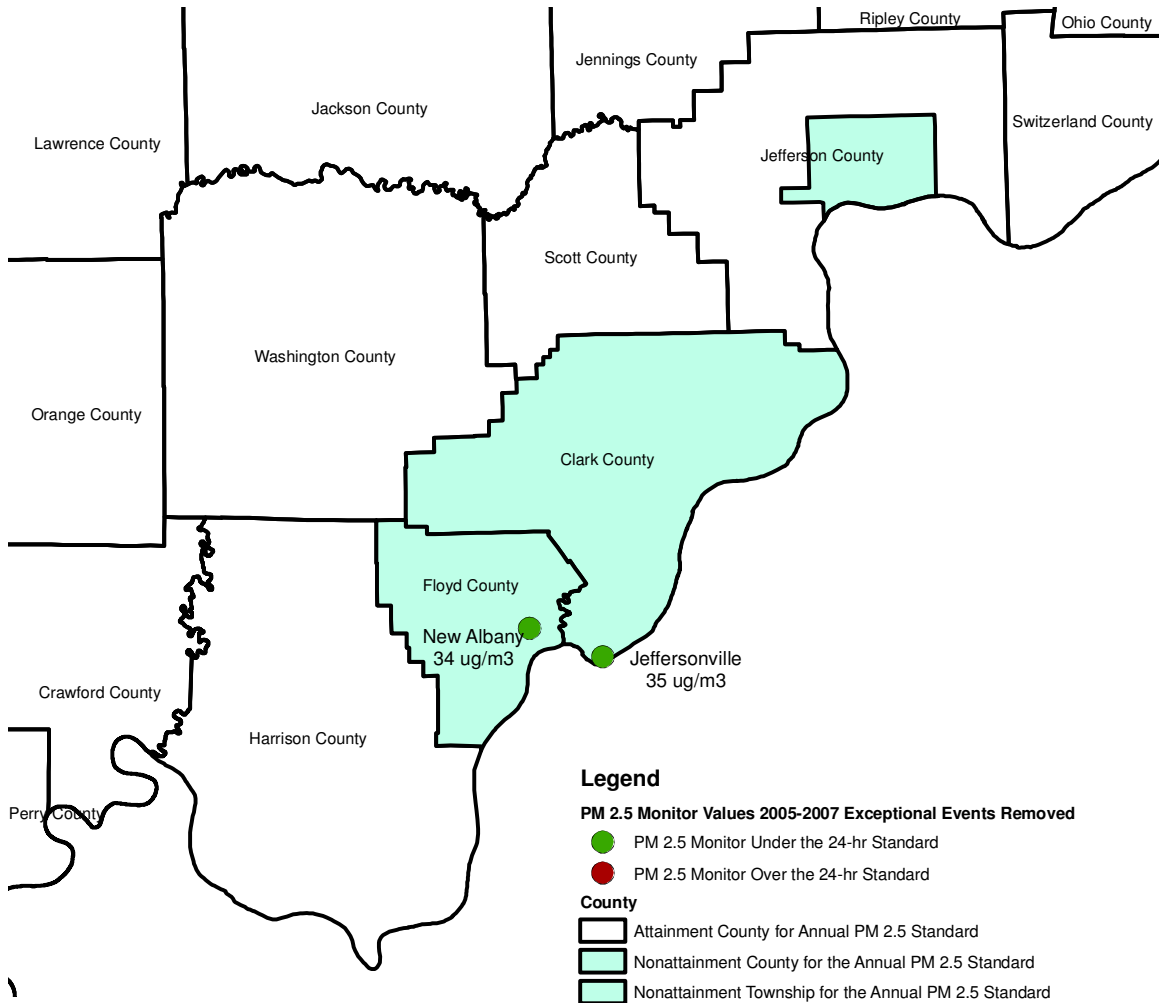
May 30, 2008 Designation Recommendations for Central Indiana:

Boone County	Attainment/Unclassifiable
Brown County	Attainment/Unclassifiable
Hamilton County	Attainment/Unclassifiable
Hancock County	Attainment/Unclassifiable
Hendricks County	Attainment/Unclassifiable
Johnson County	Attainment/Unclassifiable
Madison County	Attainment
Marion County	Nonattainment
Morgan County	Attainment/Unclassifiable
Putnam County	Attainment/Unclassifiable
Shelby County	Attainment/Unclassifiable

## Louisville Area:

### Air Quality Data:

## Southeast Indiana PM 2.5 Monitors



Monitor Values ( $\mu\text{g}/\text{m}^3$ )							
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Values 2004-2006	Daily Site Design Values 2005-2007
		2004	2005	2006	2007		
Clark	Jeffersonville (Exceptional Events Left In)	28.4	45.5	35.9	38.1	37 (36.6)	40 (39.833)
Clark	Jeffersonville (Exceptional Events Taken Out)	27.9	35.1	32.2	38.1	32 (31.733)	35 (35.133)
Floyd	New Albany (Exceptional Events Left In)	26.7	40.1	28.2	35.4	32 (31.667)	35 (34.567)
Floyd	New Albany (Exceptional Events Taken Out)	26.6	39.0	27.4	35.4	31 (31.0)	34 (33.933)

*Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$*

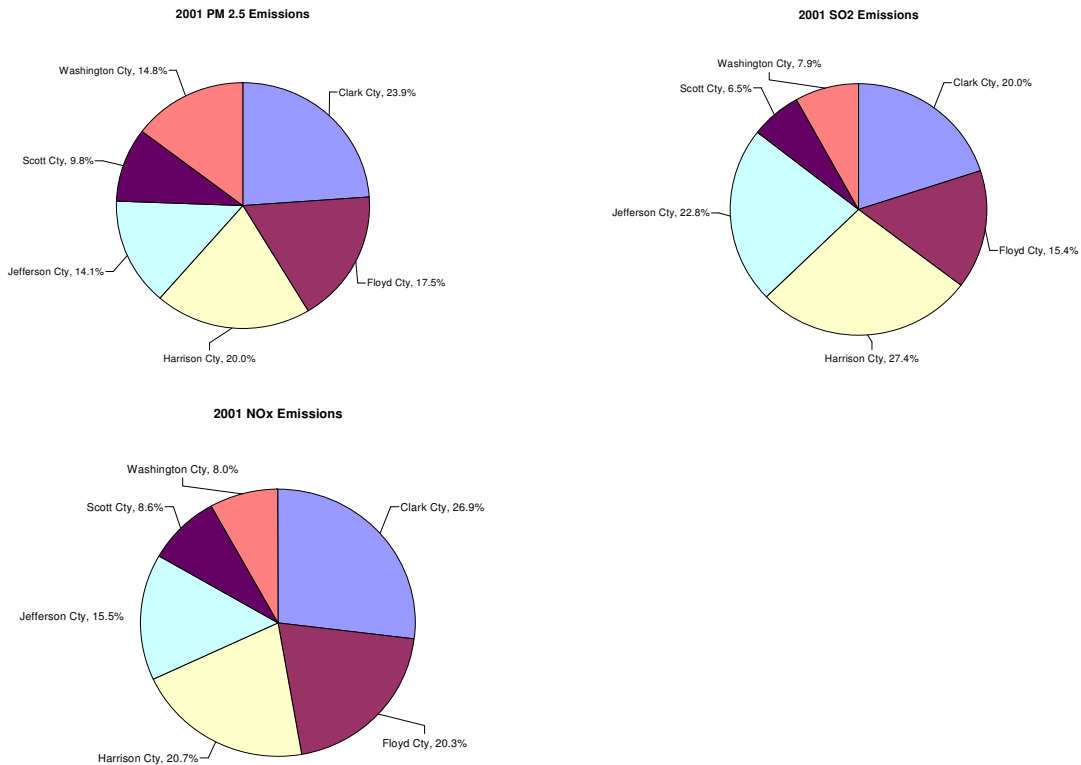
There are two PM<sub>2.5</sub> monitors within the Louisville MSA, one located in Jeffersonville in Clark County and one located in New Albany in Floyd County. Both monitors are under the 24-hr standard. The difference between the monitor values at the Jeffersonville (Clark County) site and the New Albany (Floyd County) site is not that large but does suggest a geographically isolated spike in PM<sub>2.5</sub> concentrations in Clark County. This is further exemplified by the slightly lower PM<sub>2.5</sub> monitor values recorded within the urban core of Louisville, as it is unusual for the highest value within the urban area to be outside of the core county (Jefferson County, Kentucky). This seems to indicate the possibility that isolated spikes associated with the Clark County monitor may be affected by a local source or sources within Clark County.

As part of the data review and certification process, IDEM performs a thorough review of all data that exceed an ambient air quality standard. This review is conducted to insure the data are correct and not influenced by an exceptional event. Exceptional events are unusual or naturally occurring events that can affect air quality but are not reasonably controllable by state and local agencies. Data which are affected by these events are “flagged” meaning the high monitored values are not the norm and were influenced by an exceptional event. IDEM has identified six exceptional events from wildfires and fireworks that occurred during the 2004-2006 monitoring period. After the removal of the exceptional events that occurred during the years 2004-2006 the 2004-2006 design value for the daily PM<sub>2.5</sub> NAAQS drops from 32 (31.7) µg/m<sup>3</sup> to 31 (31.0) µg/m<sup>3</sup> at New Albany and from 37 (36.6) µg/m<sup>3</sup> to 32 (31.7) µg/m<sup>3</sup> at Jeffersonville. After the removal of the exceptional events that occurred during the years 2004-2006 the 2005-2007 design value for the daily PM<sub>2.5</sub> NAAQS drops from 35 (34.6) µg/m<sup>3</sup> to 34 (33.9) µg/m<sup>3</sup> at New Albany and from 40 (39.8) µg/m<sup>3</sup> to 35 (35.1) µg/m<sup>3</sup> at Jeffersonville. The exceptional event data exclusions results in a 2005-2007 design value below the daily PM<sub>2.5</sub> NAAQS at the Jeffersonville monitor in Clark County. A detailed description of the exceptional events is outlined in Appendix A.

There is a power plant in Floyd County. However, it is not known whether the power plant is a significant contributor to the Jeffersonville monitor value. Additionally this source is subject to the NO<sub>x</sub> SIP Call and the Clean Air Interstate Rule (CAIR). According to recent U.S. EPA modeling, the entire Louisville region will attain the PM<sub>2.5</sub> standard when CAIR has been fully implemented.

### **Emissions Data:**

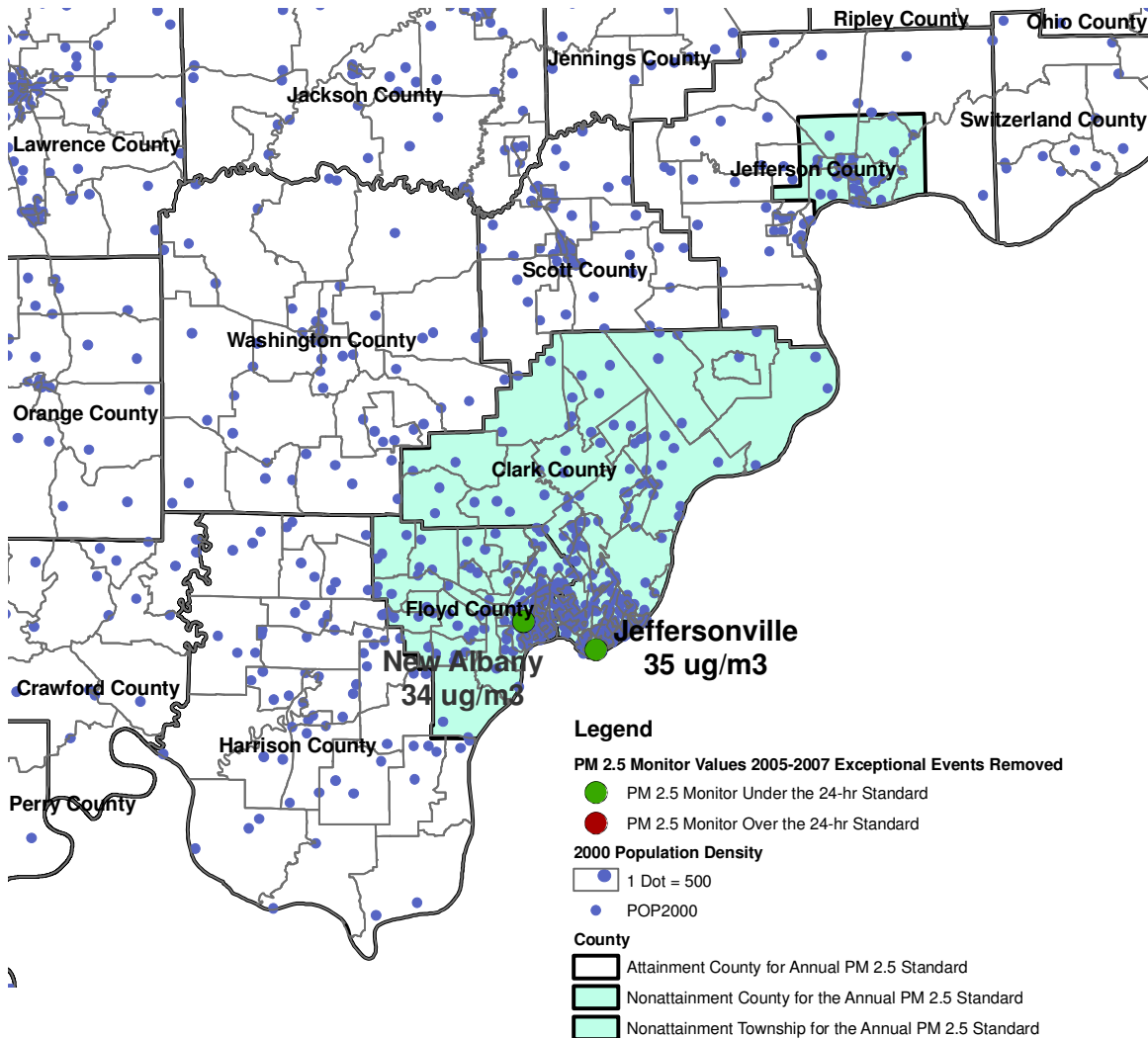
	2001 Area Source Emissions (Tons Per Year)					
	PM <sub>2.5</sub>	% of Area	SO <sub>2</sub>	% of Area	NO <sub>x</sub>	% of Area
<b>Clark County</b>	1336	23.9%	300	20.0%	4738	26.9%
<b>Floyd County</b>	976	17.5%	231	15.4%	3572	20.3%
<b>Harrison County</b>	1117	20.0%	411	27.4%	3652	20.7%
<b>Jefferson County</b>	786	14.1%	343	22.8%	2730	15.5%
<b>Scott County</b>	545	9.8%	97.1	6.5%	1510	8.6%
<b>Washington County</b>	827	14.8%	119	7.9%	1406	8.0%
<b>Total</b>	<b>5587</b>		<b>1501.1</b>		<b>17608</b>	



Because the majority of Clark and Floyd counties are urban, the two counties account for 47.2 % of the area's total NO<sub>x</sub> emissions. Sources within Clark and Floyd counties account for 41.4% of the direct PM<sub>2.5</sub> emissions from stationary sources, and 35.4% of the SO<sub>2</sub> emissions from stationary sources. 23.9% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Clark County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from the Indiana counties of Clark (26.9%), Harrison (20.7%) and Floyd (20.3%). The sulfur dioxide (SO<sub>2</sub>) emissions released by stationary sources within the Indiana's portion of the MSA are primarily from the Indiana counties of Harrison (27.4%), Jefferson (22.8%) and Clark (20.0%). There are no major stationary sources in Indiana located within Harrison or Scott counties. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented. Louisville, Kentucky is also part of the MSA and Indiana has and will continue to communicate with the state of Kentucky concerning its status.

**Population Density:**

## Southeast Indiana PM 2.5 Monitors



Both Clark and Floyd counties maintain high concentrations of population density, compared to the other counties within the MSA and Southeastern Indiana area. Harrison, Jefferson, Scott and Washington counties are predominantly rural in nature, with low to moderate population density.



## Traffic Patterns:

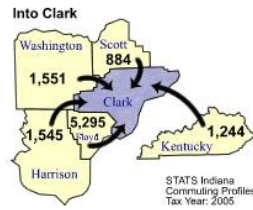
### 2005 Commuting Patterns

	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
<b>Clark County</b>	65,436	41,174	24,262	62.9%	37.1%
<b>Floyd County</b>	47,821	27,161	20,660	56.8%	43.2%
<b>Harrison County</b>	25,340	15,113	10,227	59.6%	40.4%
<b>Jefferson County</b>	20,946	17,871	3,075	85.3%	14.7%
<b>Scott County</b>	14,924	10,464	4,460	70.1%	29.9%
<b>Washington County</b>	17,418	11,516	5,902	66.1%	33.9%

#### Top five counties sending workers INTO Clark County:

Floyd County	5,295
Washington County	1,551
Harrison County	1,545
Kentucky	1,244
Scott County	884
Total of above	10,519 workers

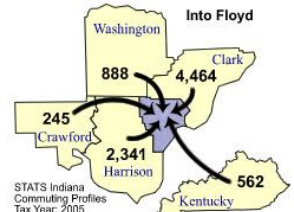
( 19.9% of Clark County work force)



#### Top five counties sending workers INTO Floyd County:

Clark County	4,464
Harrison County	2,341
Washington County	888
Kentucky	562
Crawford County	245
Total of above	8,500 workers

( 23.5% of Floyd County work force)



#### Top five counties receiving workers FROM Clark County:

Kentucky	15,964
Floyd County	4,464
Out of State	1,197
Jefferson County	914
Harrison County	498
Total of above	23,037 workers

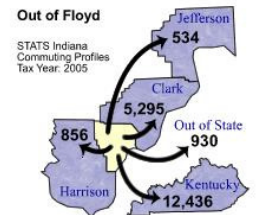
( 35.2% of Clark County labor force)



#### Top five counties receiving workers FROM Floyd County:

Kentucky	12,436
Clark County	5,295
Out of State	930
Harrison County	856
Jefferson County	534
Total of above	20,051 workers

( 41.9% of Floyd County labor force)



In the Southeastern Indiana Area the highest concentrations for employment and vehicle miles traveled (VMT) is split between Clark and Floyd counties. Although urban growth is occurring in neighboring counties, the majority of the region's vehicle miles traveled and traffic congestion is generated within the core urban areas of Jeffersonville (Clark County) and New Albany (Floyd County). Jefferson County maintains the highest concentration for employment (85.3%) compared to the other counties within the area, meaning that there is not much commuting occurring between Jefferson County residents and the remainder of the MSA. Jefferson County also has a lower population density than the other counties within the region. Growth in Harrison and Scott Counties has not been significant, although there is potential for new growth in Harrison County due to recent commercial development.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Clark County	87,774	96,472	9.9%	103,569	7.4%	101,969	5.7%	111,310	15.4%
Floyd County	64,404	70,823	10.0%	72,570	2.5%	71,992	1.7%	73,569	3.9%
Harrison County	29,890	34,325	14.8%	36,992	7.8%	38,203	11.3%	41,185	20.0%
Jefferson County	29,797	31,705	6.4%	32,668	3.0%	33,293	5.0%	34,209	7.9%
Scott County	20,991	22,960	9.4%	23,704	3.2%	24,947	8.7%	25,850	12.6%
Washington County	23,717	27,223	14.8%	28,062	3.1%	29,613	8.8%	30,015	10.3%

### **Meteorology:**

Based on a south westerly predominant prevailing wind direction throughout the year, Clark and Floyd counties are considered upwind of Jefferson County.

### **Geography:**

Aside from the Ohio River the Southeast Indiana Area does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### **2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. As a result Scott County is no longer part of the Louisville MSA, however Washington County has been incorporated into the revised boundary definition for the Louisville MSA.

#### **Indiana Counties within the Metropolitan Statistical Area (MSA):**

Clark, Floyd, Harrison, and Washington Counties

#### **U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:**

Clark County, Floyd County and Madison Township in Jefferson County

#### **Local Air Quality Agency Jurisdiction**

Louisville Air Pollution Control Division in Louisville, Kentucky

### **Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Clark and Floyd Counties are subject to the NO<sub>x</sub> SIP Call and CAIR.

**Evaluation for the Southeast Indiana Area:**

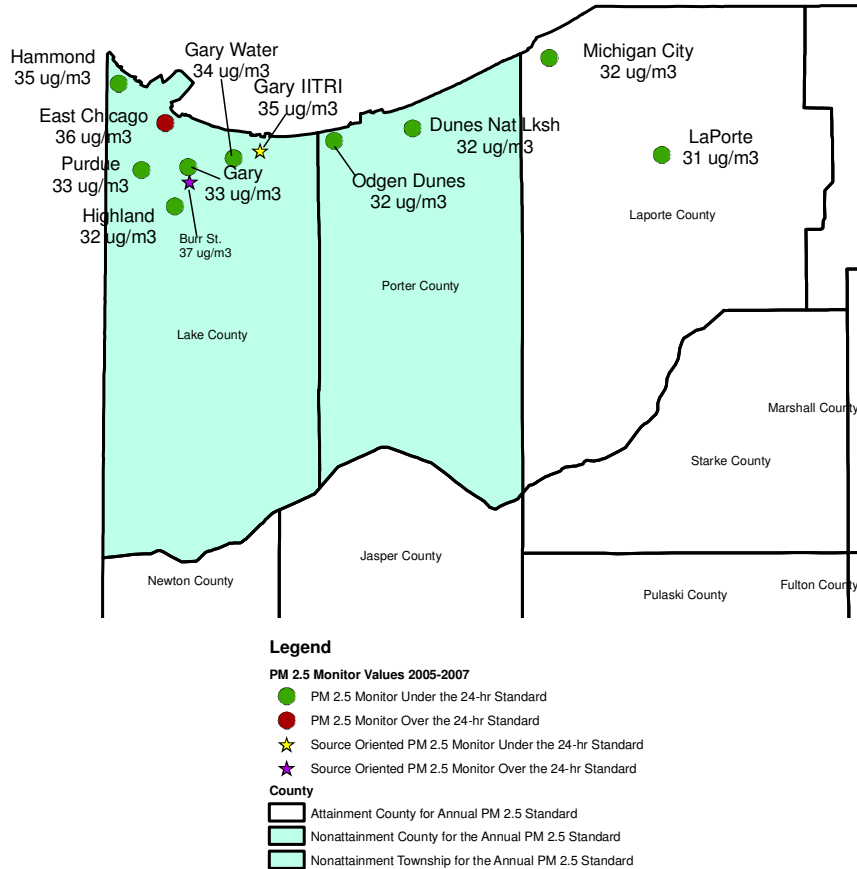
May 30, 2008 Designation Recommendations for the Southeast Indiana Area:

Clark County	Attainment
Floyd County	Attainment
Harrison County	Attainment/Unclassifiable
Jefferson County	Attainment/Unclassifiable
Scott County	Attainment/Unclassifiable
Washington County	Attainment/Unclassifiable

# Northwest Indiana Area:

## Air Quality Data:

### Northwest Indiana PM 2.5 Monitors



Monitor Values ( $\mu\text{g}/\text{m}^3$ )							
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
		2004	2005	2006	2007		
Lake	East Chicago-Franklin Sch	33.0	39.9	29.4	37.2	34 (34.1)	36 (35.5)
Lake	Highland-Eldon Ready Sch	30.1	37.1	25.8	34.1	31 (31.0)	32 (32.333)
Lake	Gary-Water Trmt Plant	Monitor Began operation in 2005	39.6	27.1	36.2	33 (32.9)	34 (34.3)
Lake	Gary	30.5	39.0	25.8	33.8	32 (31.767)	33 (32.867)
Lake	Gary-ITTRI	45.8	40.4	28.5	35.2	38** (38.233)	35** (34.7)
Lake	Gary-Burr St	38.6	43.7	30.4	36.8	38** (37.567)	37** (36.967)
Lake	Hammond-Purdue	31.9	37.6	26.2	34.9	32 (31.9)	33 (32.9)
Lake	Hammond	28.4	40.9	27.9	35.2	32 (32.4)	35 (34.667)
LaPorte	Michigan City	31.6	37.5	25.5	31.5	32 (31.533)	32 (31.5)
LaPorte	LaPorte	26.6	36.5	24.7	31.0	29 (29.267)	31 (30.733)
Porter	Dunes Natl Lakeshore	29.7	37.6	26.6	30.6	31 (31.3)	32 (31.6)
Porter	Ogden Dunes	29.1	37.5	26.1	33.3	31 (30.9)	32 (32.3)

\*\*Source Oriented Monitor

Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$

Red text indicates that the data is incomplete. See Appendix B.

There are ten monitors in the Chicago MSA (for Indiana: Lake and Porter Counties) and two monitors in the Michigan City (LaPorte County) MSA. Of the ten monitors in the Chicago MSA two of them (including one attainment and one source oriented monitor) are over the standard. The other monitors in Lake and Porter Counties are below the standard. The two monitors located in the LaPorte County are below the standard.

The Gary-IITRI and Gary-Burr Street monitors located in Lake County are source oriented monitors. These source oriented monitors are intended to reflect air quality in a relatively small geographic area directly influenced by a specific source or sources of air pollution. These two monitors were sited based on U.S. EPA criteria with the monitoring objectives of high concentration, population and source impact; they have population nearby and are largely influenced by nearby sources. The source oriented monitors are not used to determine attainment status with the annual fine particles standard but U.S. EPA determined they could be used to determine attainment status for the daily PM<sub>2.5</sub> standard. IDEM considers these source oriented monitors to be hot spots and not reflective of the true air quality in the area. IDEM will work with the sources to address emissions that are contributing to the high annual values at these sites.

As more PM<sub>2.5</sub> data is collected across the State of Indiana areas were identified with essentially the same concentration, therefore seven PM<sub>2.5</sub> monitoring sites have been identified as not being necessary and were discontinued at the end of December 2007. Three of those sites are located in Northwest Indiana, one each in Lake (Gary-Ivahoe Sch), LaPorte (LaPorte-Lake Street) and Porter (Dunes Natl Lakeshore) Counties. Data collected from these three monitors is duplicative of the other monitors in those counties.

Three monitors in Northwest Indiana have been deemed incomplete due to missing data. The Gary-Water Treatment Plant has only been monitoring for a short amount of time and does not have three years of data to determine the 2005-2007 design value. The monitor began operation on July 1, 2005. The Highland and Michigan City monitors are deemed incomplete and have periods of missing data due to various reasons. U.S. EPA's monitoring guidance stipulates that a minimum of 75% of the data per quarter must be available in order to determine if the design value represents attainment. If less than 75% of the data is valid, then the maximum quarterly value for that given quarter over the three-year period is substituted for all missing samples for that quarter. This method is obviously a very conservative methodology for calculating an average value. In determining whether a monitor with incomplete data attains the daily PM<sub>2.5</sub> standard, U.S. EPA encourages states to explore alternative methods for evaluating the data. Although according to the Guideline on Data Handling Conventions for the PM NAAQS, issued April 1999, U.S. EPA states that the incomplete design value is still identified as the monitors true design value. An incomplete data analysis for the Highland and Michigan City monitors with alternate substitutions can be found in Appendix B.

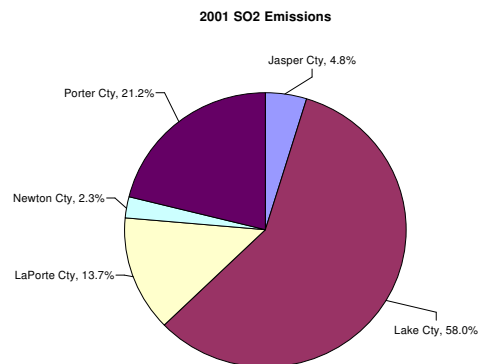
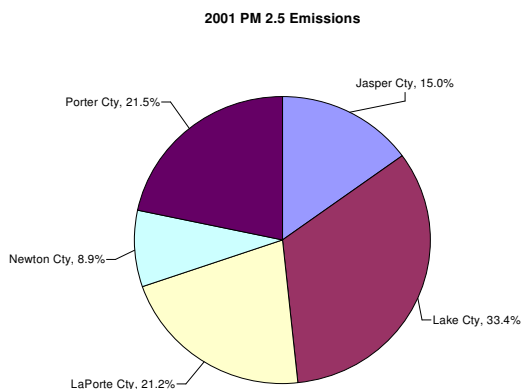
Indiana has four counties (Jasper, Lake, Newton and Porter) that are part of the Chicago MSA. Indiana does not have any PM<sub>2.5</sub> monitors in Jasper or Newton County. Within the Indiana portion of the MSA, Lake and Porter counties account for the majority of the emissions, population, and vehicle miles traveled (VMT). Lake County is the only

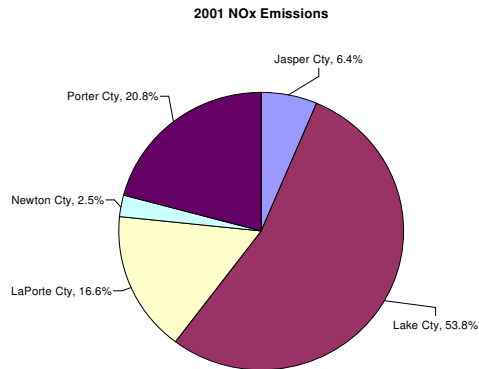
Indiana County in Northwest Indiana that is over the 24-Hr fine particulate standard. Porter County does not significantly impact monitored violations in Lake County or the Chicago area. Indiana has conducted an evaluation to determine the impacts Porter County sources on fine particle monitors in Lake County, Indiana and the Chicago area. As a result, Indiana has determined that emissions Porter County do not affect the downwind area's ability to attain the 24-hour standard. Therefore Porter County should be designated separately from Lake County, Indiana and the rest of the Chicago MSA. There are 18 total monitors in the Chicago nonattainment area. Of those monitors only 7 of them (including five attainment and two source oriented monitors) are violating the 24-hour fine particles standard. A detailed analysis of Lake and Porter Counties impact on the Chicago area can be found in Appendix D.

The only monitored violations of the standard in Indiana that occur within the Chicago MSA and Michigan City MSA are in Lake County. Not including the source oriented monitors, there is only one monitor (East Chicago) that exceeds the standard. Therefore it is unnecessary to extend the restrictions of a nonattainment area to anything other than Lake County, the county that has a violation.

#### **Emissions Data:**

	<b>2001 Area Source Emissions (Tons Per Year)</b>					
	<b>PM<sub>2.5</sub></b>	<b>% of MSA</b>	<b>SO<sub>2</sub></b>	<b>% of MSA</b>	<b>NO<sub>x</sub></b>	<b>% of MSA</b>
<b>Jasper County.</b>	1635	15.0%	180	4.8%	3319	6.4%
<b>Lake County</b>	3637	33.4%	2187	58.0%	27950	53.8%
<b>LaPorte County</b>	2307	21.2%	515	13.7%	8610	16.6%
<b>Newton County</b>	967	8.9%	87	2.3%	1314	2.5%
<b>Porter County</b>	2345	21.5%	801	21.2%	10787	20.8%
<b>Total</b>	<b>10891</b>		<b>3770</b>		<b>51980</b>	

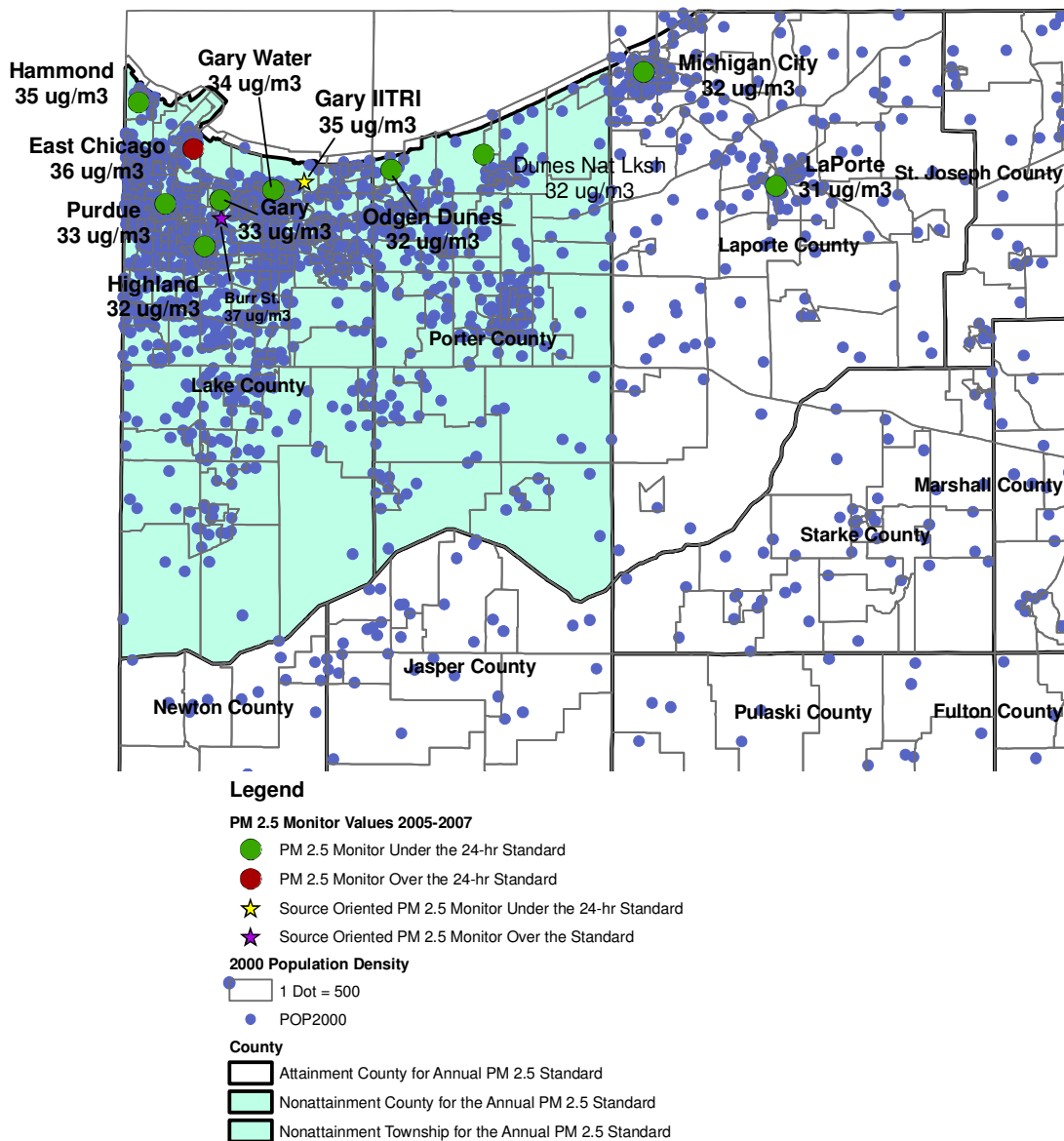




Because the majority of Lake and Porter Counties are urban, the two counties account for 74.6% of the area's total NO<sub>x</sub> emissions. Sources within Lake and Porter counties account for 54.9% of the direct PM<sub>2.5</sub> emissions from stationary sources, and 79.2% of the SO<sub>2</sub> emissions from stationary sources. 33.4% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Lake County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from Lake (53.8%) and Porter (20.8%) Counties. The sulfur dioxide (SO<sub>2</sub>) emissions released by stationary sources within the Indiana's portion of the MSA are primarily from Lake (58.0%) and Porter (21.2%) Counties. There are no major stationary sources located within Jasper or Newton counties. It does not appear that the emissions from Jasper or Newton Counties have a significant impact on air quality within the MSA. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented. Chicago, Illinois, which is also part of the MSA, and Indiana has and will continue to communicate with the State of Illinois concerning its status.

## Population Density:

### Northwest Indiana PM 2.5 Monitors



Lake and Porter counties maintain the highest concentration of population density, compared to the other counties within the MSA. However, the density does extend into the outer fringe of the collar counties, namely LaPorte County.

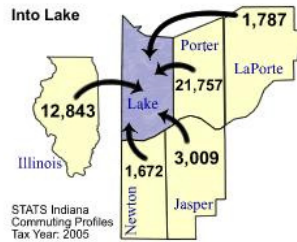


## Traffic Patterns:

2005 Commuting Patterns					
	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
<b>Jasper County</b>	21,011	14,832	6,179	70.6%	29.4%
<b>Lake County</b>	292,153	234,039	58,114	80.1%	19.9%
<b>LaPorte County</b>	68,408	57,393	11,015	83.9%	16.1%
<b>Newton County</b>	9,548	5,805	3,743	60.8%	39.2%
<b>Porter Cty</b>	102,586	68,058	34,528	66.3%	33.7%

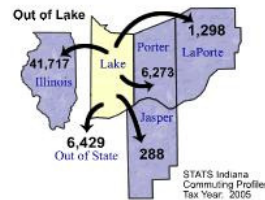
### Top five counties sending workers INTO Lake County:

Porter County	21,757
Illinois	12,843
Jasper County	3,009
LaPorte County	1,787
Newton County	1,672
Total of above	41,068 workers
( $\approx 14.8\%$ of Lake County work force)	



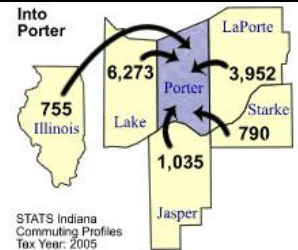
### Top five counties receiving workers FROM Lake County:

Illinois	41,717
Out of State	6,429
Porter County	6,273
LaPorte County	1,298
Jasper County	288
Total of above	56,005 workers
( $\approx 19.2\%$ of Lake County labor force)	



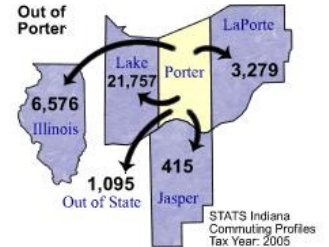
### Top five counties sending workers INTO Porter County:

Lake County	6,273
LaPorte County	3,952
Jasper County	1,035
Starke County	790
Illinois	755
Total of above	12,805 workers
( $\approx 15.6\%$ of Porter County work force)	



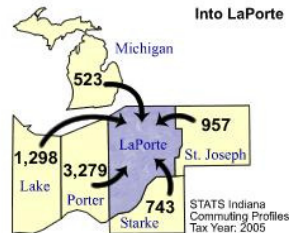
### Top five counties receiving workers FROM Porter County:

Lake County	21,757
Illinois	6,576
LaPorte County	3,279
Out of State	1,095
Jasper County	415
Total of above	33,122 workers
( $\approx 32.3\%$ of Porter County labor force)	



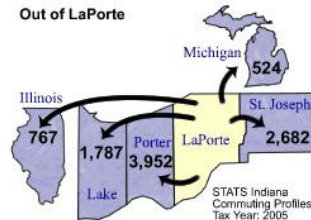
### Top five counties sending workers INTO LaPorte County:

Porter County	3,279
Lake County	1,298
St Joseph County	957
Starke County	743
Michigan	523
Total of above	6,800 workers
( $\approx 10.4\%$ of LaPorte County work force)	



### Top five counties receiving workers FROM LaPorte County:

Porter County	3,952
St Joseph County	2,682
Lake County	1,787
Illinois	767
Michigan	524
Total of above	9,712 workers
( $\approx 14.2\%$ of LaPorte County labor force)	



Within Northwest Indiana LaPorte County maintains the highest concentration (83.9%) for employment, compared to the other counties within the area. Lake (80.1%) and Porter (66.3%) counties are also high. The majority of the traffic congestion occurs in Lake County. A significant level of commuting occurs from the surrounding counties to Lake and Porter counties. In fact Lake, LaPorte and Porter Counties have the largest level of commuting to and from each other.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Jasper County	24,823	30,043	21.0%	32,296	7.5%	32,534	8.3%	35,206	17.2%
Lake County	475,594	484,564	1.9%	494,202	2.0%	483,183	-0.3%	503,203	3.8%
La Porte County	107,066	110,106	2.8%	110,479	0.3%	110,376	0.2%	110,656	0.5%
Newton County	13,551	14,566	7.5%	14,293	-1.9%	14,444	-0.8%	14,097	-3.2%
Porter County	128,932	146,798	13.9%	160,105	9.1%	156,755	6.8%	175,175	19.3%

### **Meteorology:**

Based on a south westerly predominant prevailing wind direction throughout the year, no Indiana counties are considered upwind of Northwest Indiana.

### **Geography:**

Aside from Lake Michigan, the Northwest Indiana Area does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### **2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Jasper and Newton counties were incorporated as part of the Chicago MSA and LaPorte County was excluded from the Chicago MSA and defined as its own MSA.

#### **Indiana Counties within the Chicago Metropolitan Statistical Area (MSA):**

Jasper, Lake, Newton and Porter counties.

#### **Indiana Counties within the LaPorte Metropolitan Statistical Area (MSA):**

LaPorte County

#### **U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:**

Lake and Porter counties

Local Air Quality Agency Jurisdiction for Northwest Indiana

Gary Department of Environmental Affairs in Lake County and Hammond Department of Environmental Management in Lake County

**Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. Major stationary source located within and outside of the Chicago MSA are subject to the NO<sub>x</sub> SIP Call and CAIR.

**Evaluation for the Northwest Indiana Area:**

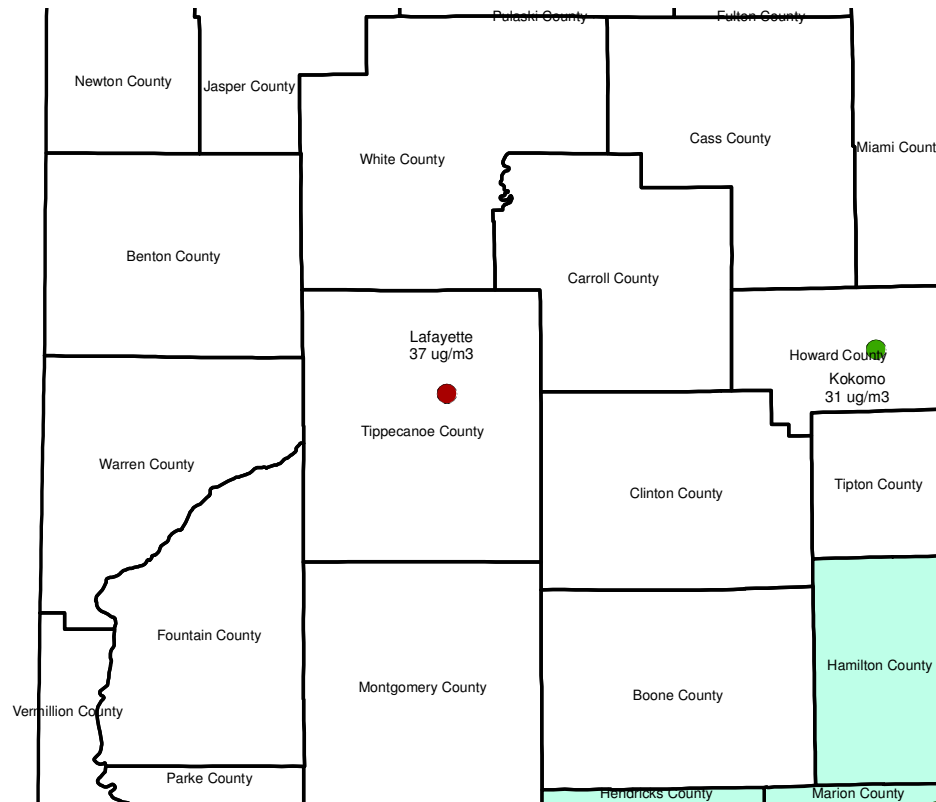
May 30, 2008 Designation Recommendations for Northwest Indiana:

Jasper County	Attainment/Unclassifiable
Lake County	Nonattainment
LaPorte County	Attainment
Newton County	Attainment/Unclassifiable
Porter County	Attainment

## Lafayette Area:

### Air Quality Data:

#### Lafayette Indiana PM 2.5 Monitors



#### Legend

##### PM 2.5 Monitor Values 2005-2007

- PM 2.5 Monitor Under the 24-hr Standard
- PM 2.5 Monitor Over the 24-hr Standard; PFAU

##### County

- Attainment County for Annual PM 2.5 Standard
- Nonattainment County for the Annual PM 2.5 Standard
- Nonattainment Township for the Annual PM 2.5 Standard

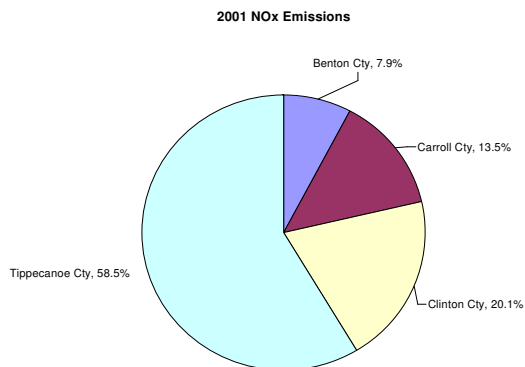
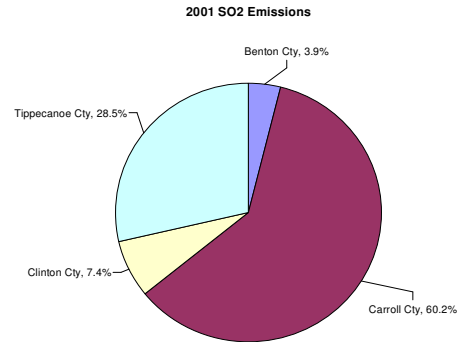
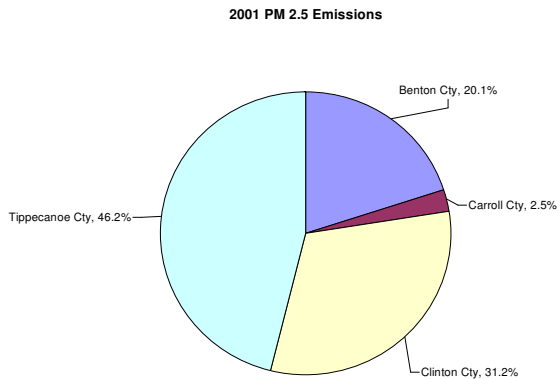
Monitor Values (µg/m <sup>3</sup> )						Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
County	Monitor Location	Daily 98 <sup>th</sup> Percentile Values					
		2004	2005	2006	2007		
Tippecanoe	Lafayette	26.4	49.3	27.0	34.2	34 (34.233)	37 (36.833)

*Highlighted values are values that are over the 24-hr standard of  $35 \mu\text{g}/\text{m}^3$*

There is only one monitor located within the Lafayette MSA and it violates the standard.

## Emissions Data:

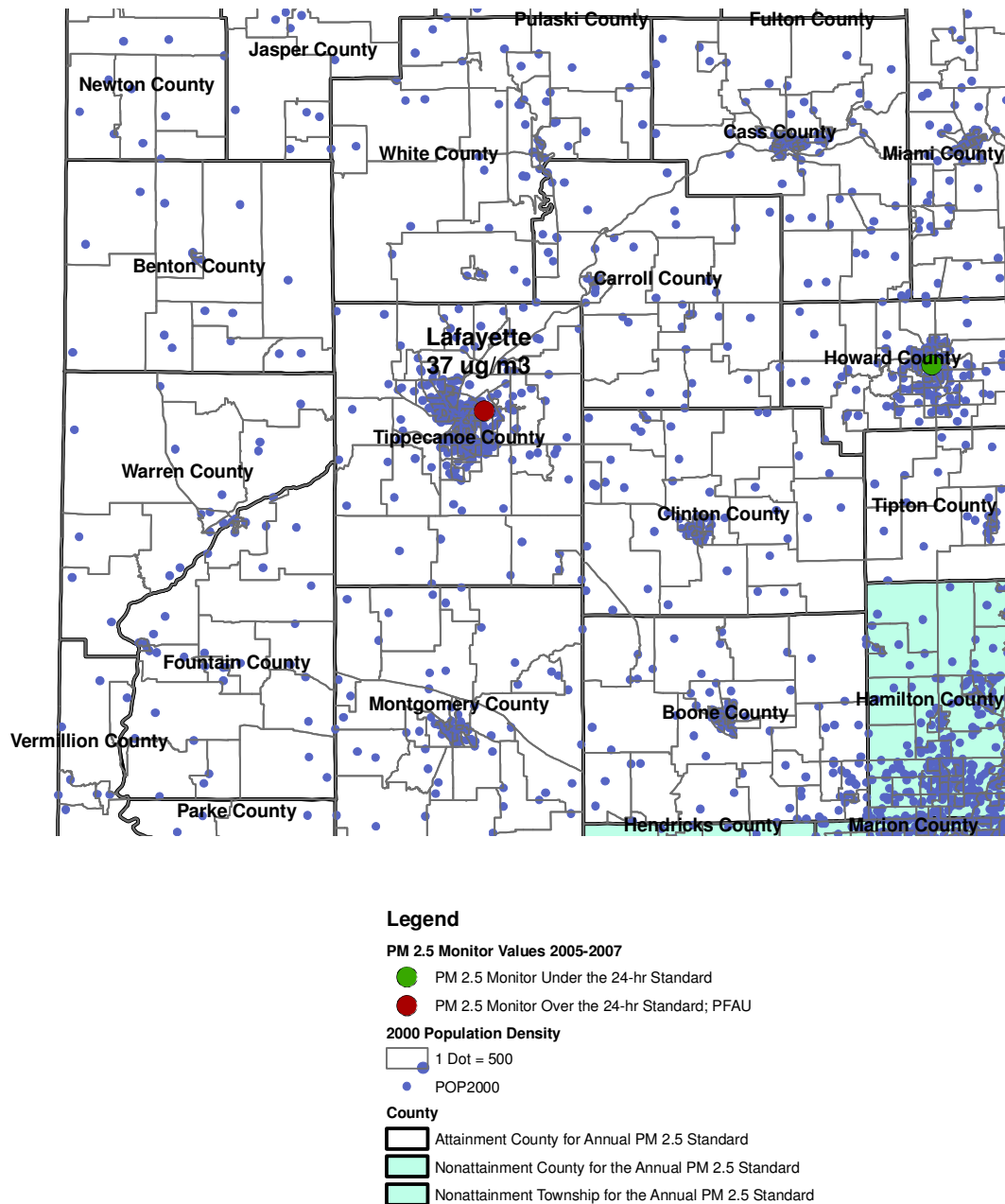
	2001 Area Source Emissions (Tons Per Year)					
	PM <sub>2.5</sub>	% of MSA	SO <sub>2</sub>	% of MSA	NO <sub>x</sub>	% of MSA
<b>Benton County</b>	963	20.1%	87.6	3.9%	958	7.9%
<b>Carroll County</b>	122	2.5%	1348	60.2%	1639	13.5%
<b>Clinton County</b>	1495	31.2%	166	7.4%	2434	20.1%
<b>Tippecanoe County</b>	2216	46.2%	638	28.5%	7100	58.5%
<b>Total</b>	<b>4796</b>		<b>2239.6</b>		<b>12131</b>	



46.2% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Tippecanoe County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from Tippecanoe (58.5%) and Clinton (20.1%) counties. The sulfur dioxide (SO<sub>2</sub>) emissions released by stationary sources within the MSA are primarily from Carroll (60.2%) and Tippecanoe (28.5%) counties. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented.

**Population Density:**

## Lafayette Indiana PM 2.5 Monitors



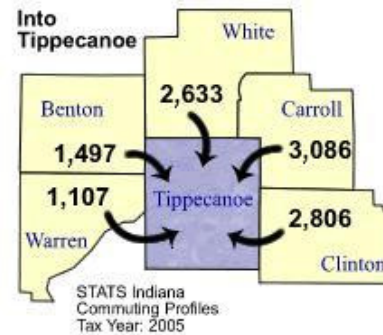
Tippecanoe County (Lafayette, the core of the urban area) maintains the highest concentration of population density, compared to the other counties within the MSA.

## Traffic Patterns:

2005 Commuting Patterns					
	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
Benton County	6,041	3,864	2,177	64.0%	36.0%
Carroll County	13,625	7,956	5,669	58.4%	41.6%
Clinton County	21,608	15,709	5,899	72.7%	27.3%
Tippecanoe County	91,685	87,073	4,612	95.0%	5.0%

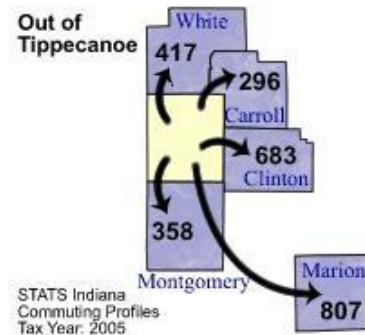
### Top five counties sending workers INTO Tippecanoe County:

Carroll County	3,086
Clinton County	2,806
White County	2,633
Benton County	1,497
Warren County	1,107
Total of above	11,129 workers
( 10.4% of Tippecanoe County work force)	



### Top five counties receiving workers FROM Tippecanoe County:

Marion County	807
Clinton County	683
White County	417
Montgomery County	358
Carroll County	296
Total of above	2,561 workers
( 2.8% of Tippecanoe County labor force)	



Tippecanoe County (Lafayette, the core of the urban area) maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to the other counties within the MSA. The majority of the traffic congestion occurs in the core urban area of Lafayette in Tippecanoe County which has the highest population and an in-county workforce ratio of 95.0%.

### **Growth Rates and Patterns:**

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Benton County	9,441	9,421	-0.2%	9,050	-3.9%	8,979	-4.7%	8,140	-13.6%
Carroll County	18,809	20,165	7.2%	20,526	1.8%	20,614	2.2%	20,705	2.7%
Clinton County	30,974	33,866	9.3%	34,217	1.0%	33,176	-2.0%	34,203	1.0%
Tippecanoe County	130,598	148,955	14.1%	156,169	4.8%	164,012	10.1%	164,589	10.5%

### **Meteorology:**

The Lafayette MSA does not have any geographical features that make it unique in regards to its air shed.

### **Geography:**

The Central Indiana Area does not have any geographical features that make it unique in regards to its air shed.

### **Jurisdictional Boundaries:**

#### **2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Benton and Carroll counties were incorporated as part of the Lafayette MSA and Clinton County was excluded from the Lafayette MSA.

#### **Indiana Counties within the Lafayette Metropolitan Statistical Area (MSA):**

Benton, Carroll, Tippecanoe counties.

### **Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Tippecanoe County are subject to the NO<sub>x</sub> SIP Call and CAIR.

### **Evaluation for Lafayette, Indiana:**

May 30, 2008 Designation Recommendations for Lafayette, Indiana:

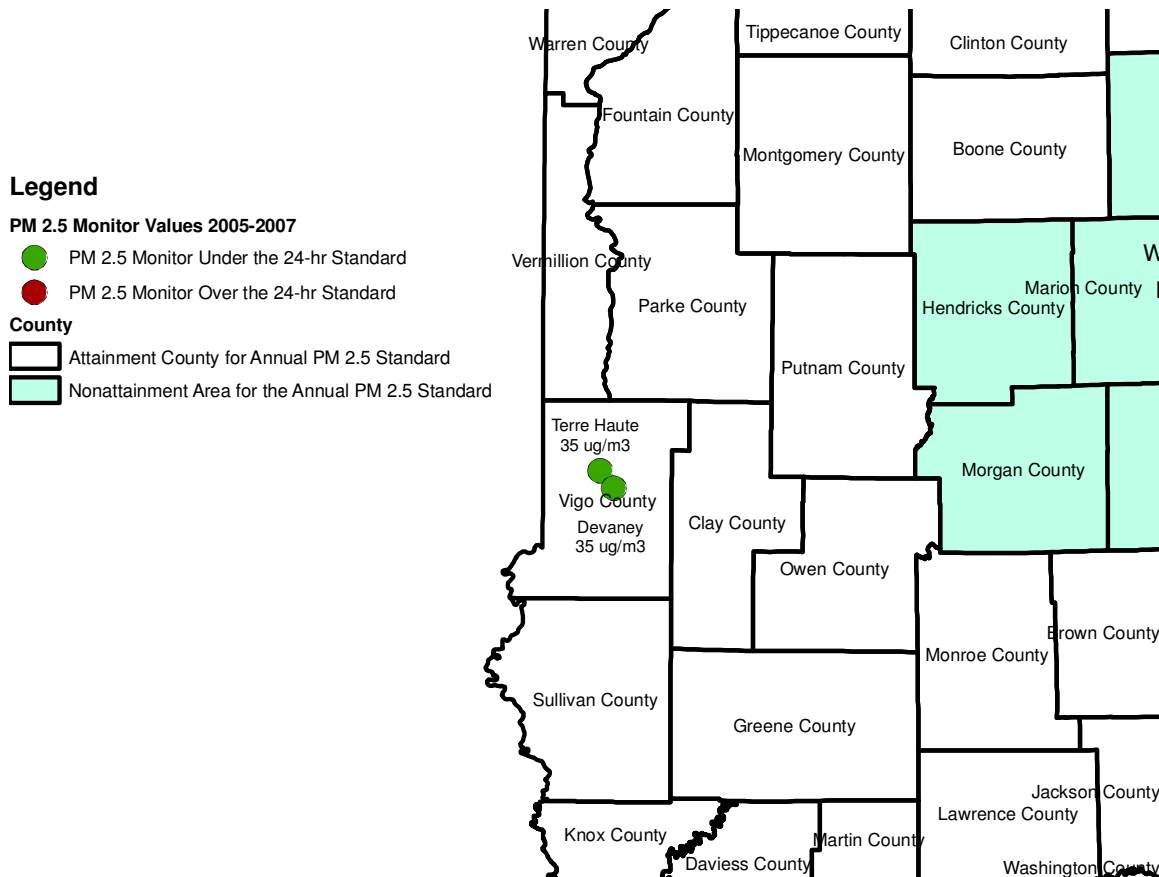
Benton County	Attainment/Unclassifiable
Carroll County	Attainment/Unclassifiable
Clinton County	Attainment/Unclassifiable
Tippecanoe County	Nonattainment



## Terre Haute Area:

### Air Quality Data:

## Terre Haute Indiana PM 2.5 Monitors



County	Monitor Location	Monitor Values ( $\mu\text{g}/\text{m}^3$ )					
		Daily 98 <sup>th</sup> Percentile Values				Daily Site Design Value 2004-2006	Daily Site Design Value 2005-2007
		2004	2005	2006	2007		
Vigo	Terre Haute-Lafayette St	26.9	43.1	31.0	31.0	34 (33.667)	35 (35.033)
Vigo	Terre Haute-Devaney Sch	30.4	42.5	29.1	32.2	34 (34.0)	35 (34.6)

*Red text indicates that the data is incomplete. See Appendix B.*

There are two monitors within the Terre Haute MSA and both monitors attain the 24-hr  $\text{PM}_{2.5}$  standard.

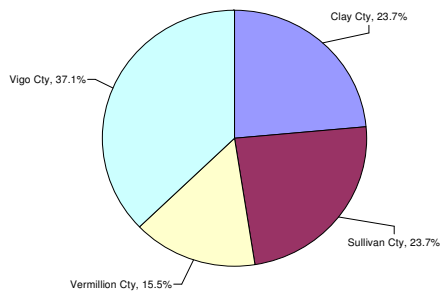
The Terre Haute-Lafayette Street monitor in Vigo County is deemed incomplete since it has periods of missing data due to various reasons. U.S. EPA's monitoring guidance stipulates that a minimum of 75% of the data per quarter must be available in order to determine if the design value represents attainment. If less than 75% of the data is valid, then the maximum quarterly value for that given quarter over the three-year period is substituted for all missing samples for that quarter. This method is obviously a very

conservative methodology for calculating an average value. In determining whether a monitor with incomplete data attains the daily PM<sub>2.5</sub> standard, U.S. EPA encourages states to explore alternative methods for evaluating the data. Although according to the *Guideline on Data Handling Conventions for the PM NAAQS*, issued April 1999, U.S. EPA states that the incomplete design value is still identified as the monitors true design value. An incomplete data analysis with alternate substitutions can be found in Appendix B for the Terre Haute-Lafayette Street monitor with missing data.

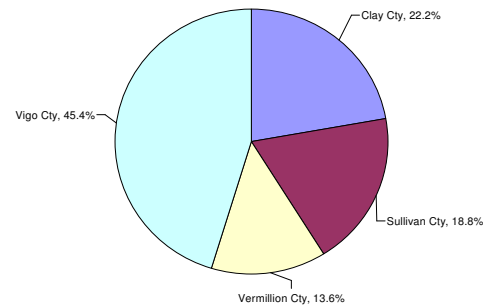
### **Emissions Data:**

	<b>2001 Area Source Emissions (Tons Per Year)</b>					
	<b>PM<sub>2.5</sub></b>	<b>% of MSA</b>	<b>SO<sub>2</sub></b>	<b>% of MSA</b>	<b>NO<sub>x</sub></b>	<b>% of MSA</b>
<b>Clay County</b>	1161	23.7%	243	22.2%	2058	18.8%
<b>Sullivan County</b>	1160	23.7%	205	18.8%	1499	13.7%
<b>Vermillion County</b>	759	15.5%	149	13.6%	1609	14.7%
<b>Vigo County</b>	1820	37.1%	496	45.4%	5782	52.8%
<b>Total</b>	<b>4900</b>		<b>1093</b>		<b>10948</b>	

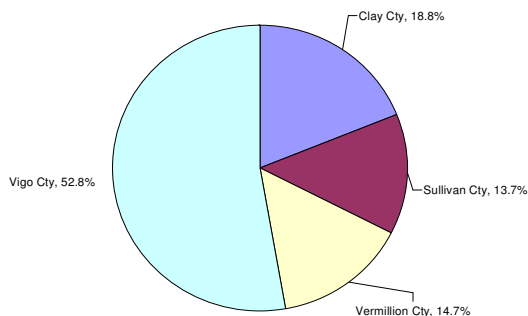
2001 PM 2.5 Emissions



2001 SO2 Emissions



2001 NOx Emissions

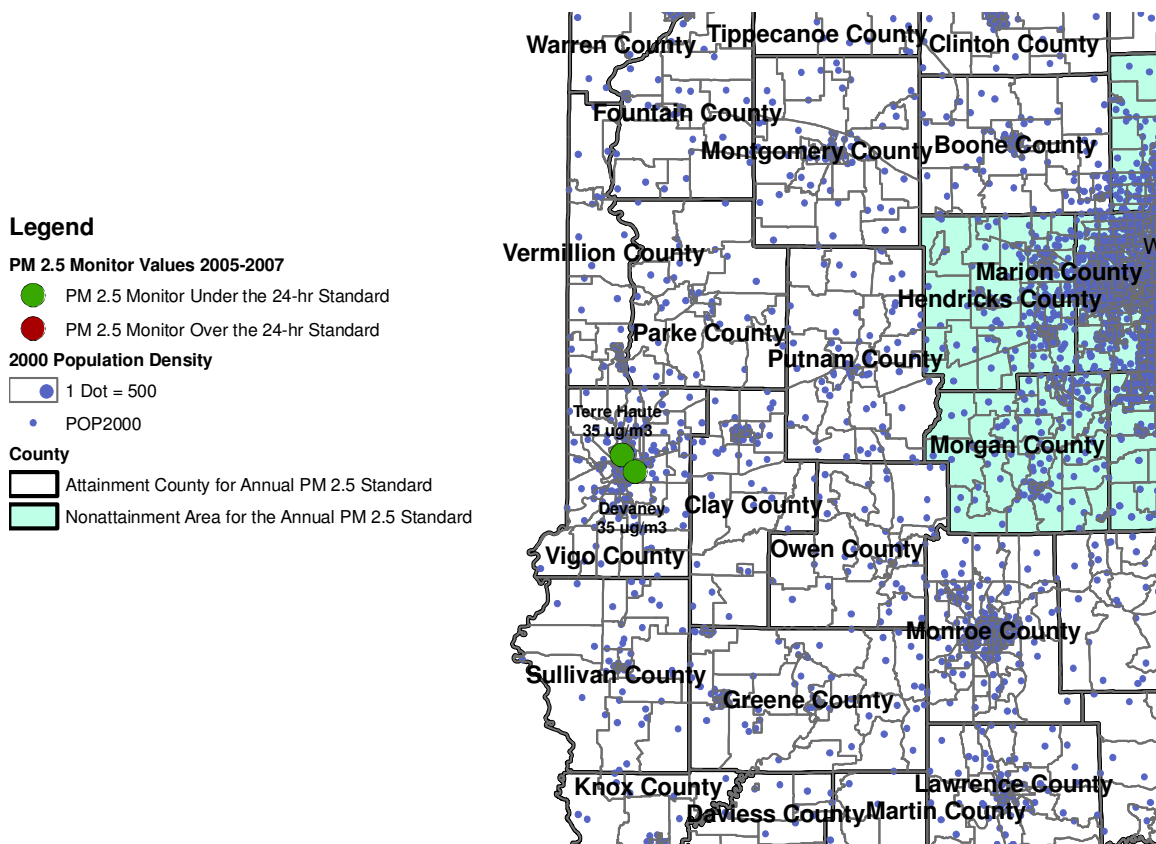


37.1% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Vigo County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from Vigo (52.8%) and Clay (18.8%) counties. The sulfur dioxide (SO<sub>2</sub>) emissions released by

stationary sources within the MSA are primarily from Vigo (45.4%) and Clay (22.2%) counties. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented.

### Population Density:

## Terre Haute Indiana PM 2.5 Monitors



Vigo County (Terre Haute, the core of the urban area) maintains the highest concentration of population density, compared to the other counties within the MSA.

## Traffic Patterns:

2005 Commuting Patterns					
	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
Clay County	17,853	11,856	5,997	66.4%	33.6%
Sullivan County	13,129	8,858	4,271	67.5%	32.5%
Vermillion County	11,040	6,897	4,143	62.5%	37.5%
Vigo County	63,225	59,545	3,680	94.2%	5.8%

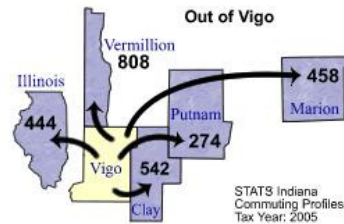
### Top five counties sending workers INTO Vigo County:

Clay County	3,287
Sullivan County	2,737
Illinois	2,488
Vermillion County	2,158
Parke County	1,337
Total of above	12,007 workers
(16.1% of Vigo County work force)	



### Top five counties receiving workers FROM Vigo County:

Vermillion County	808
Clay County	542
Marion County	458
Illinois	444
Putnam County	274
Total of above	2,526 workers
(4.0% of Vigo County labor force)	



Vigo County (Terre Haute, the core of the urban area) maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to the other counties within the MSA. The majority of the traffic congestion occurs in Terre Haute in Vigo County and has the highest population and an in-county workforce ratio of 94.2%.

## Growth Rates and Patterns:

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Clay County	24,705	26,556	7.5%	27,021	1.8%	26,587	0.1%	28,485	7.3%
Sullivan County	18,993	21,751	14.5%	21,542	-1.0%	22,637	4.1%	21,318	-2.0%
Vermillion County	16,773	16,788	0.1%	16,645	-0.9%	16,225	-3.4%	16,129	-3.9%
Vigo County	106,107	105,848	-0.2%	103,009	-2.7%	107,185	1.3%	103,582	-2.1%

**Meteorology:**

The Terre Haute Area does not have any meteorological features that make it unique in regards to its air shed.

**Geography:**

The Terre Haute Area does not have any geographical features that make it unique in regards to its air shed.

**Jurisdictional Boundaries:****2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. The boundary definitions did not change for the Terre Haute Area.

**Indiana Counties within the Terre Haute Metropolitan Statistical Area (MSA):**

Clay, Sullivan, Vermillion, and Vigo counties.

**Local Air Quality Agency Jurisdiction for Central Indiana**

Vigo County Air Pollution Control within Vigo County.

**Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary sources located outside of Vigo County are subject to the NO<sub>x</sub> SIP Call and CAIR.

**Evaluation for Terre Haute Indiana:**

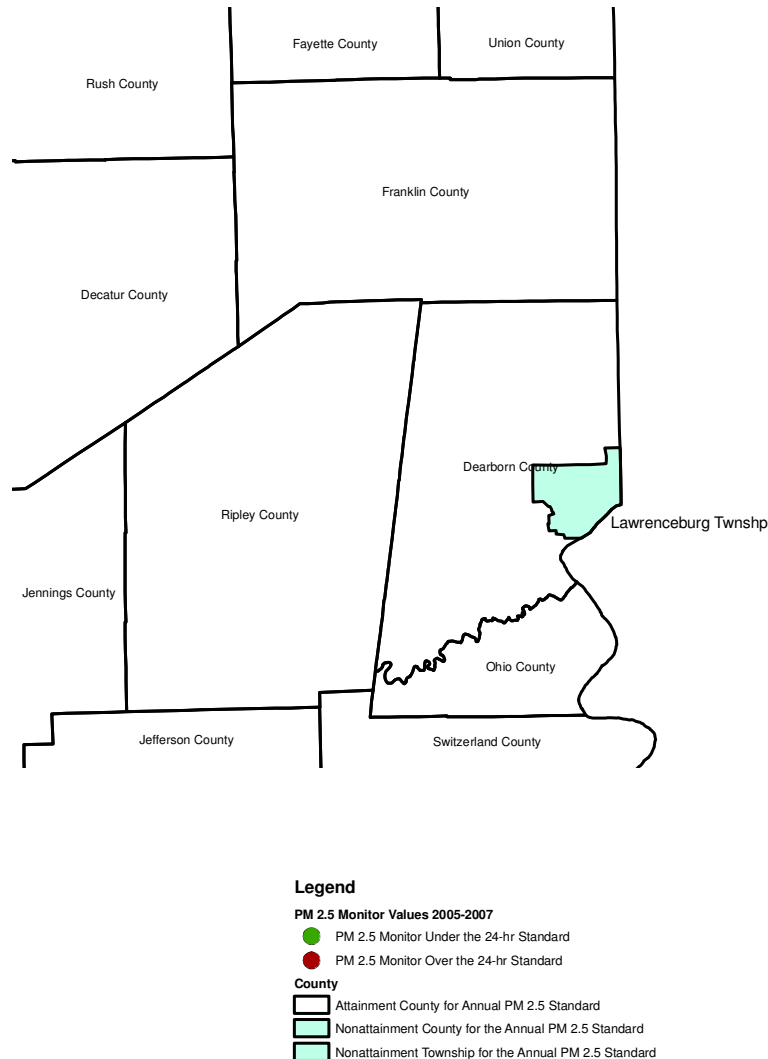
May 30, 2008 Designation Recommendations for Terre Haute Indiana:

Clay County	Attainment/Unclassifiable
Sullivan County	Attainment/Unclassifiable
Vermillion County	Attainment/Unclassifiable
Vigo County	Attainment

## Dearborn County, IN:

### Air Quality Data:

#### Dearborn County Indiana PM 2.5 Monitors

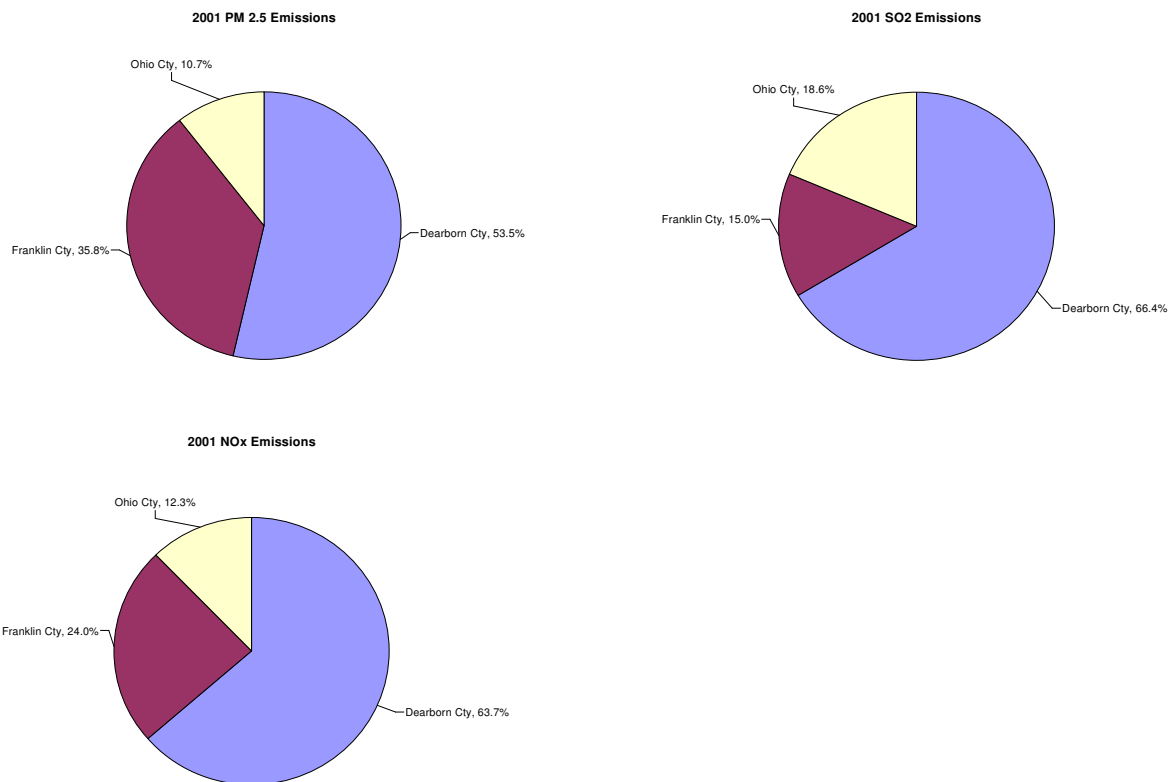


There are no monitors located within the Indiana portion of the Cincinnati Metropolitan Statistical Area (MSA). If monitors were located in the Indiana portion of the MSA it is reasonable to assume that the values would be consistent with background values elsewhere in the state and Midwest. Therefore, IDEM does not believe the PM<sub>2.5</sub> concentrations in this area exceed the standard in Indiana. Additionally, based on analysis of similar urban areas, IDEM does not believe that emissions from Dearborn and surrounding counties contribute significantly to PM<sub>2.5</sub> values elsewhere in the Cincinnati MSA. For example, Morgan County is an upwind county within the Indianapolis MSA and it contains a power plant. The closest downwind monitor within the core county (Marion) maintains a value below the standard, illustrating that emissions from Morgan

County are unlikely contributing to the values in Marion County. IDEM feels it reasonable to assume that the same would stand true with regard to Dearborn, Franklin and Ohio counties' impact on values within the Cincinnati MSA.

### **Emissions Data:**

	<b>2001 Area Source Emissions (Tons Per Year)</b>					
	<b>PM<sub>2.5</sub></b>	<b>% of MSA</b>	<b>SO<sub>2</sub></b>	<b>% of MSA</b>	<b>NO<sub>x</sub></b>	<b>% of MSA</b>
<b>Dearborn County</b>	1097	53.5%	406	66.4%	3544	63.7%
<b>Franklin County</b>	735	35.8%	91.7	15.0%	1335	24.0%
<b>Ohio County</b>	219	10.7%	114	18.6%	682	12.3%
<b>Total</b>	<b>2051</b>		<b>611.7</b>		<b>5561</b>	

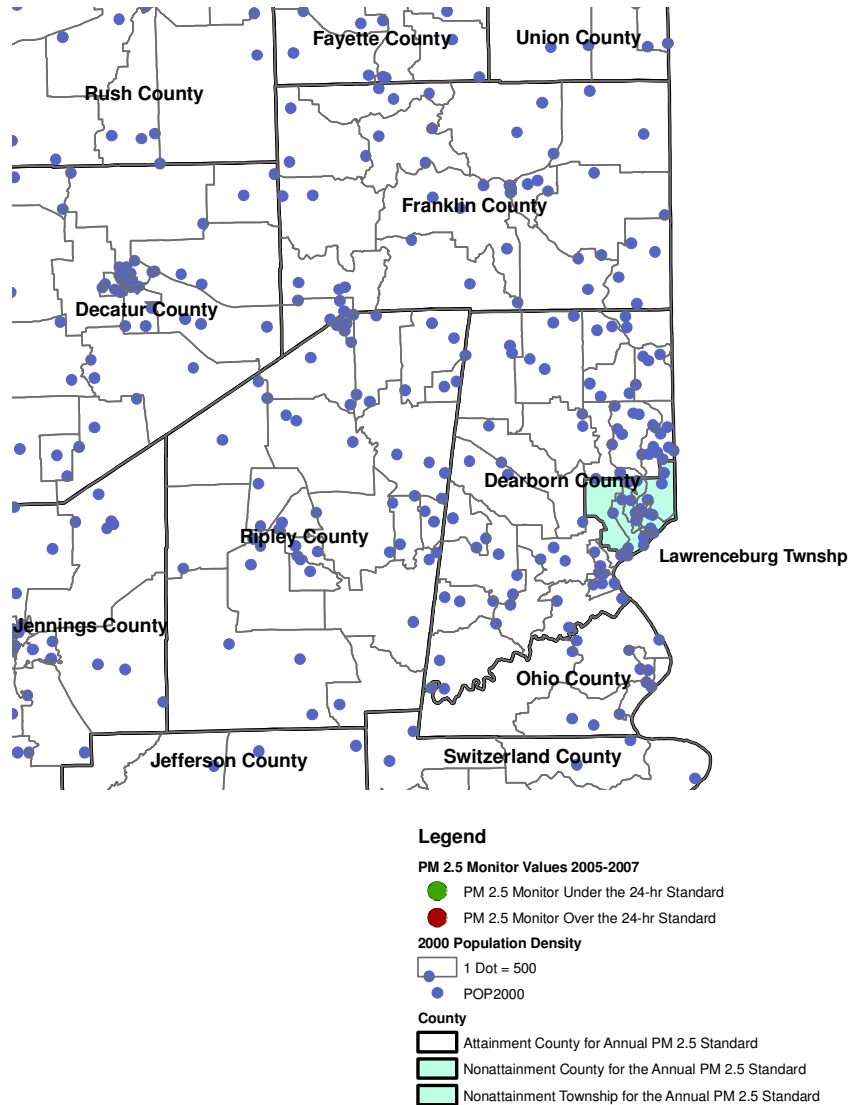


53.5% of the area's direct PM<sub>2.5</sub> emissions from stationary sources originate in Dearborn County. The total nitrogen oxide (NO<sub>x</sub>) emissions of the area derive primarily from Dearborn (63.7%) and Franklin (24.0%) counties. The sulfur dioxide (SO<sub>2</sub>) emissions released by stationary sources within the MSA are primarily from Dearborn (66.4%) and Ohio (18.6%) counties. Overall PM<sub>2.5</sub> values have continued to drop and NO<sub>x</sub> and SO<sub>2</sub> emissions are expected to decrease throughout the Midwest over the next few years when CAIR has been fully implemented. There is only one significant stationary source in Indiana's portion of the Cincinnati MSA, which is the Tanners Creek power plant. The Tanners Creek power plant has reduced its emissions in recent years by installing

permanent combustion controls to address requirements associated with Title IV and the NO<sub>x</sub> SIP Call. This facility has installed low-NO<sub>x</sub> burners on three of its four units, and over-fire air on the fourth, largest unit. From 1999 to 2002, annual NO<sub>x</sub> emissions from this facility have been reduced by over 20,000 tons (60% decrease). The Tanners Creek power plant is also subject to CAIR.

**Population Density:**

**Dearborn County Indiana PM 2.5 Monitors**



Hamilton County, Ohio (Cincinnati, the core of the urban area) maintains the highest concentration of population density, compared to the other counties within the MSA.



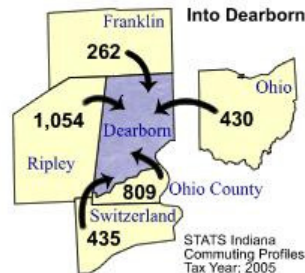
## Traffic Patterns:

### 2005 Commuting Patterns

	Total Workforce: Number of persons who live in County and work	Number of persons who live AND work in County	Number of persons who live in County and work in another County	Percent In County	Percent Out of County
Dearborn County	33,085	19,014	14,071	57.5%	42.5%
Franklin County	15,381	8,335	7,046	54.2%	45.8%
Ohio County	4,093	2,128	1,965	52.0%	48.0%

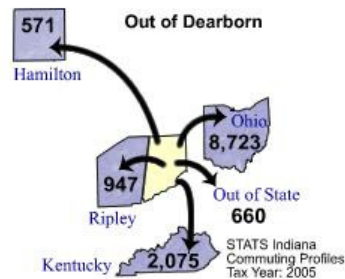
#### Top five counties sending workers INTO Dearborn County:

Ripley County	1,054
Ohio County	809
Switzerland County	435
Ohio (State)	430
Franklin County	262
Total of above	2,990 workers
( 13.3% of Dearborn County work force)	



#### Top five counties receiving workers FROM Dearborn County:

Ohio (State)	8,723
Kentucky	2,075
Ripley County	947
Out of State	660
Hamilton County	571
Total of above	12,976 workers
( 39.2% of Dearborn County labor force)	



Hamilton County, Ohio (Cincinnati, the core of the urban area) maintains the highest concentration for employment, and vehicle miles traveled (VMT) compared to the other counties within the MSA. Within the Indiana portion of the Cincinnati MSA Dearborn County maintains the highest population and an in-county workforce ratio of 57.5%.

## Growth Rates and Patterns:

	Population 1990	Population 2000	Percent Change from 1990 to 2000	Population Estimate 2006	Percent Change from 2000 to 2006	Population Estimate 2010	Percent Change from 2000 to 2010	Population Estimate 2020	Percent Change from 2000 to 2020
Dearborn County	38,835	46,109	18.7%	49,663	7.7%	50,855	10.3%	54,017	17.2%
Franklin County	19,580	22,151	13.1%	23,373	5.5%	24,035	8.5%	24,413	10.2%
Ohio County	5,315	5,623	5.8%	5,826	3.6%	6,092	8.3%	6,220	10.6%

**Meteorology:**

The Cincinnati MSA does not have any meteorological features that make it unique in regards to its air shed.

**Geography:**

Aside from the Ohio River, the Cincinnati MSA does not have any geographical features that make it unique in regards to its air shed.

**Jurisdictional Boundaries:****2003 MSA Boundary Definition:**

The U.S. Office of Management and Budget published revised MSA boundary definitions on June 6, 2003. Franklin County was incorporated as part of the Cincinnati MSA.

**Indiana Counties within the Indianapolis Metropolitan Statistical Area (MSA):**

Dearborn, Franklin and Ohio counties.

**U.S. EPA Designated PM<sub>2.5</sub> Nonattainment Area for the Annual Standard:**

Lawrenceburg Township in Dearborn County

**Local Air Quality Agency Jurisdiction for Central Indiana**

Hamilton County Environmental Services within Hamilton County, Ohio.

**Level of Control of Emission Sources:**

Most of the major PM<sub>2.5</sub> precursor sources within the area are subject to the NO<sub>x</sub> SIP Call, the Clean Air Interstate Rule (CAIR) or RACT requirements. All of the major stationary source located within and outside of the Cincinnati MSA are subject to the NO<sub>x</sub> SIP Call and CAIR.

**Evaluation for the Indiana Portion of the Cincinnati MSA:**

May 30, 2008 Designation Recommendations for the Indiana portion of the Cincinnati MSA:

Dearborn County	Attainment/Unclassifiable
Franklin County	Attainment/Unclassifiable
Ohio County	Attainment/Unclassifiable