



State of Ohio Environmental Protection Agency
Division of Air Pollution Control

Ohio's
PM_{2.5}
Recommended Designations

Prepared by:
The Ohio Environmental Protection Agency
Division of Air Pollution Control

December 2007

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Acknowledgement

The Ohio EPA, Division of Air Pollution Control would like to express appreciation for the extensive efforts, guidance and expertise provided by the Ohio Department of Development, Office of Strategic Research staff, especially Ed Simmons. The level of detailed county-specific information provided in this document would not have been possible without Mr. Simmons efforts and timely assistance. Appreciation is also extended to Greg Stella at Alpinegeophysics, Inc. and to Mark Janssen at Midwest RPO for their assistance with the emissions data included in this submittal.

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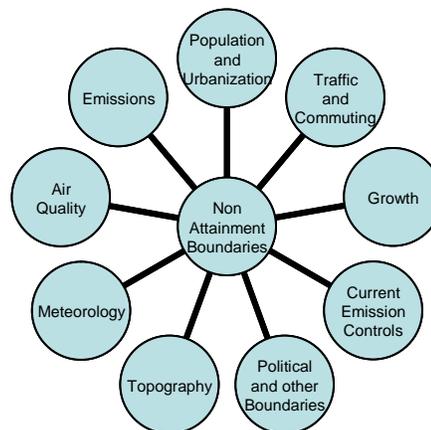
Designation Area	Current PM_{2.5} Nonattainment Designation Counties	Ohio EPA Recommended Nonattainment Counties
(1) Canton-Massillon, OH	Stark	Stark
(2) Cincinnati-Hamilton, OH-KY-IN	Butler Clermont Hamilton Warren	Butler Clermont Hamilton Warren
(3) Cleveland-Akron-Lorain, OH	Cuyahoga Lake Lorain Medina Portage Summit Ashtabula (P)	Cuyahoga Lake Lorain Medina Portage Summit
(4) Columbus, OH	Delaware Fairfield Franklin Licking Coshocton (P)	Delaware Fairfield Franklin Licking
(5) Dayton-Springfield, OH	Clark Greene Montgomery	Greene Montgomery
(6) Huntington-Ashland, WV-KY-OH	Lawrence Scioto Adams (P) Gallia (P)	
(7) Parkersburg-Marietta, WV-OH	Washington	Washington
(8) Steubenville-Weirton, OH-WV	Jefferson	Jefferson
(9) Toledo, OH		
(10) Wheeling, WV-OH	Belmont	
(11) Youngstown-Warren-Sharon, OH-PA		Mahoning Trumbull

An Explanation of Ohio EPA's Nine-Factor Analysis

U.S. EPA guidance (June 2007) states that each area evaluated for attainment should be assessed on a case-by-case basis. A nonattainment area must include not only the area that is violating the standard but also nearby areas that contribute to the violation. Boundary recommendations should be based on an evaluation of the nine factors used in the prior PM_{2.5} designations process, as well as any other relevant factors or circumstances specific to a particular area.

The nine designation factors used to determine nearby areas of influence for 24-hour NAAQS violations are:

- Air quality
- Emissions
- Population and urbanization
- Traffic & commuting
- Growth
- Current emission controls
- Political and other boundaries
- Topography
- Meteorology



Ohio EPA has included all of the nine factors for each area however two are combined, population/urbanization and growth. Meteorology information is not included with each respective area's discussion but is provided as one document in Appendix E.

Factor 1: Air quality data

The air quality analysis looks at the 24-hour 98th percentile and annual average values for each county based on data for 2004 to 2006. The 24-hour revised standard is 35 µg/m³ and the annual standard is 15.0 µg/m³. Counties without monitors are not listed. Data is retrieved from the U.S. EPA's Air Quality System (AQS) at <http://www.epa.gov/ttn/airs/airsaqs/> and is presented in micrograms per cubic meter (µg/m³) in all tables. The three-year averages for monitors that are violating the standard are highlighted with red. Monitoring sites that have less than 75 percent capture in at least one quarter are highlighted with yellow. AQS data retrieval sheets and Ohio EPA summary sheets for 2004, 2005, 2006 and 2007 (not complete) are provided in Appendix A and B respectively. The state and local air monitoring stations (SLAMS) data certification report for calendar year 2006 is provided in Appendix C.

Ohio EPA operates a large network of Federal Reference Method (FRM) PM_{2.5} monitors, primarily located in the expected high PM_{2.5} concentration areas with additional attention to more highly populated areas as well. Included in the FRM network is a subset of monitor sites which also monitor PM_{2.5} species (sulfate,

nitrate, organic carbon, elemental carbon and 'crustal' or 'other'). The majority of the speciation monitors are co-located with the highest reading FRM monitors. In some cases, though, the speciation monitor is located in a more rural or less industrialized area. It is the comparison of the speciation monitoring from the two types of sites (higher reading nonattainment sites and those currently reading attainment) which provides insight into the species and source types that contribute to the urban/industrial 'excess'. Data included in factor 2 are also provided by the Web site below.

<http://vista.cira.colostate.edu/views/Web/Data/DataWizard.aspx>

This Web site provides access to a wide variety of data resources, including metadata from several networks of monitoring sites, an integrated aerosol database, graphical summaries of data analyses and extensive catalogs of air quality information. Detailed information and graphs on speciation is provided in Appendix D.

Factor 2: Emissions data

The analysis for factor 2 looks at emissions of sulfur dioxide (SO₂), nitrogen dioxide (NO_x) and particulate matter (PM_{2.5}). Emissions data are derived from:

Mid-West RPO <http://www.ladco.org/tech/emis/index.html>,
(2005 and 2009 SO₂, NO_x and PM_{2.5} emissions, except 2005 on-road)

Alpine Geophysics <http://www.alpinegeophysics.com/>, and
(2009 WV and KY on-road)

U.S. EPA http://www.epa.gov/ttn/naaqs/pm/pm25_2006_techinfo.html.
(2005 on-road)

The data are for 2005 (base year) and 2009 (attainment demonstration year). The counties in **bold** font are currently designated as nonattainment.

Tables presented under factor 2 show 2005 and 2009 SO₂, NO_x and PM_{2.5} emissions for each county. Also included in this factor are tables showing the major employers for each county.

Emissions data indicate the potential for a county to contribute to observed violations, often making the emissions data one of the most important factors in assessing a county to be designated as nonattainment for PM_{2.5}.

Factor 3: Population and projected growth

Tables presented under factor 3 show the past, present and projected population for each county. Population data and expected growth indicate the likelihood of population-based emissions that may contribute to violations. The counties in

bold are currently designated as nonattainment. The population data are provided by the Ohio Department of Development, Office of Strategic Research <http://www.odod.state.oh.us/research/>. Appendix H provides population data for all 88 counties in Ohio.

Factor 4: Traffic and commuting patterns

The traffic and commuting analysis looks at the number of commuters in each county who drive to another county, the number of total commuters in each county who commute to other counties, as well as the estimated daily vehicle miles traveled (kDVMT) for each county in thousands of miles. Commuting information is provided by the Ohio Department of Development, Office of Strategic Research <http://www.odod.state.oh.us/research/> and the kDVMT data estimates are provided by the Ohio Department of Transportation, Office of Technical Services. Appendix H provides traffic and commuting data for all 88 counties in Ohio.

A county with a significant amount of traffic commuting to an area with a violating monitor is generally an integral part of the area, and would be an appropriate part of the domain of some mobile source strategies, thus may warrant inclusion in the nonattainment area. In this document, counties that have a high level of commuting into a county with a violating monitor is identified a “contributing county”. Ohio EPA also took the level of emissions, population and growth into consideration for determining whether a county is “contributing”.

Factor 5: Meteorology

The meteorology review looks at wind data gathered at stations in and near Ohio by the National Weather Service (NWS). Figures presented for factor 5 indicate the annual average winds by for each NWS site. These data may also suggest that emissions in some directions relative to the violation may be more prone to contribute than emissions in other directions. A discussion of relevant meteorological factors is discussed in Appendix E rather than for the individual areas.

Factor 6: Topography and land use/land cover

The topography and land use/land cover analysis looks at physical features and land use or cover that might have an effect on the airshed, and therefore, the distribution of particulate matter over an area. Ohio does not have significant topographic features that significantly influence the regional transport of pollutants within the multi-county study areas. Tables presented under factor 6 show the land use/land cover for each county in percentage of urban (residential, commercial, industrial, transportation, grasses), cropland, pasture, forest and wetlands (all types). Maps for this section are provided in Appendix F. The sources for the information provided in this section are:

Ohio EPA, Division of Surface Water

ftp://ftp-gis.epa.state.oh.us/gisdepot/gisdata/dsw/LandCover/Statewide_Land_Cover_DSW_pub_2005.pdf

Ohio Department of Natural Resources, Division of Soil and Water

<http://www.dnr.state.oh.us/default/soils/surveysupplements/tabid/17839/Default.aspx>

Ohio Department of Development, Office of Strategic Research

<http://www.odod.state.oh.us/research/files/s0.htm>

Factor 7: Jurisdictional boundaries

The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in the cohesive manner. Although MSA boundaries were not considered for these recommendations, a map showing the MSA's in Ohio and an MPO map is provided in Appendix G. For information on the metropolitan planning organizations referenced in this document, please see: <http://www.odotnet.net/Planning/ACCESS%20OHIO/Final/AppendixB.pdf>.

Factor 8: Level of control of emission sources

The level of control analysis looks at what controls are currently implemented in each area. Emission reductions which have recently occurred or are expected to occur in the near future affects both the current PM_{2.5} design values, the potential future design values and, ultimately, attainment of the standards. In Ohio, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road motor vehicle control program
- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- NO_x Reasonably Available Control Technology (RACT) [Cleveland/Akron nonattainment only]
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities (e.g., Mittal Steel)

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal). In Ohio, all of the major utilities located along the Ohio River Valley (Miami Fort, Zimmer (previously controlled), Killen, Stuart, Gavin, Keiger Creek, Burger, Cardinal and Sammis) and the largest units within the interior of Ohio (Muskingum River and Conesville) will be controlling both SO₂ and NO_x. The units along Lake Erie have not committed to sulfur dioxide controls, but are partially controlled for NO_x. There are similar Electric

Generating Unit control programs in all of the states bordering Ohio as well. These control programs will reduce PM_{2.5} concentrations statewide, and in many cases, sufficiently to attain both the annual and the revised 24-hour PM_{2.5} standards by the initial attainment date of April 15, 2010.

Given these controls, there is justification for not including certain 'power plant' partial counties (townships) in the current recommendations for the revised PM_{2.5} standard. The counties with power plants which will be controlled under CAIR include Adams, Gallia and Coshocton. These partial counties, which are currently designated nonattainment for the initial PM_{2.5} standards, should not be included as nonattainment under the revised standards.

Mobile source control measures (on-road and off-road) provide emission reductions proportional to the vehicle miles traveled and levels of construction and other major industrial activities. As such, areas nearest the highest reading urban/industrial ambient monitors will benefit from these controls. These areas, though, will continue to have the highest emission levels for these source categories.

In some cases, enforcement activities may provide partial relief of the hot spot monitored concentrations. The potential reductions are not yet quantified, nor the ambient impact estimated. There are no instances where we can currently identify where reductions in emissions from enforcement activities would result in an area becoming insignificant as a source area for PM_{2.5} or its precursors.

Another area where Ohio is placing significant effort is in clean diesel programs. These programs can accelerate the turnover of the dirtiest portions of the diesel fleet by several years by controlling emissions from units that otherwise would not be replaced for several years. The benefits of these programs can be magnified when specific fleets are targeted which are located and operate primarily in the highest monitored areas. These programs will not result in an area becoming insignificant for emissions contributing to high PM_{2.5} concentrations, but they are valuable nonetheless.

Factor Analysis for Current and Recommended PM_{2.5} Nonattainment Counties in Ohio

Canton-Massillon, OH

Current county nonattainment: Stark County

 Current nonattainment counties  Current partial nonattainment

Recommended county nonattainment: Stark County



Source: Office of Strategic Research, Ohio Department of Development

Discussion

There is one county in this existing PM_{2.5} nonattainment area, Stark County. Ohio EPA recommends retaining Stark County as nonattainment for the Canton-Massillon area. After considering the nine factors, Ohio EPA does not recommend adding any contributing counties to this one-county nonattainment area. Stark County contains two monitors, one of which is violating both the annual and the 24-hour revised standard. There are six counties that are adjacent to Stark County; Wayne, Holmes, Tuscarawas, Carroll, Columbiana and Mahoning counties. Columbiana and Mahoning counties are discussed in the Youngstown-Warren section.

The three-year average of the 98th percentile and the three-year annual average concentration at site 39-151-0017 is not attaining the 24-hour revised standard and the monitor also violates the annual standard. Emissions in Stark County and the adjacent counties are not significant. Wayne County 2005 SO₂ emissions are notable but are forecasted to decrease by 2009.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County	2004	2005	2006	24-Hour Average
		39-151-0017	36.3	51.0	33.1
39-151-0020		32.8	39.3	26.1	33

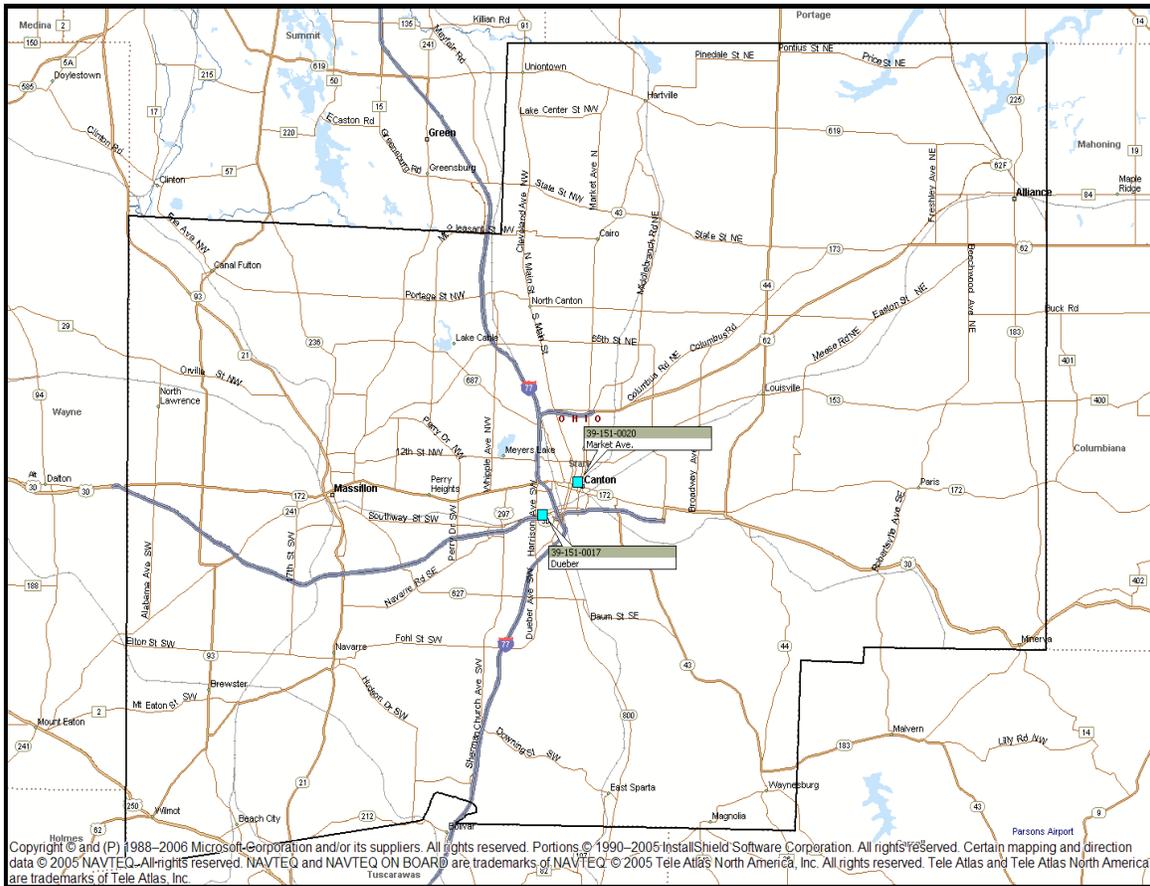
Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County	2004	2005	2006	Annual Average
		39-151-0017	15.5	17.8	14.6
39-151-0020		14.1	16.4	11.9	14.1

Sites with less than 75% capture

Stark County PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions Data (tons per day)

2005			
County	SO ₂	NO _x	PM _{2.5}
STARK	3.31	36.74	3.19
Wayne	68.67	24.35	2.01
Holmes	0.26	4.72	0.72
Tuscarawas	8.99	14.81	0.93
Carroll	0.23	3.62	0.36

2009			
County	SO ₂	NO _x	PM _{2.5}
STARK	2.31	33.27	3.05
Wayne	52.17	21.19	3.78
Holmes	0.11	4.47	0.69
Tuscarawas	14.88	13.90	1.46
Carroll	0.16	3.95	0.35

Major Employers

Source: Ohio Department of Development, 2007

Most of the major employers in Stark County and the surrounding counties are in the categories of manufacturing, service and government as shown below.

Stark County

Aultman Hospital	Service
Canton City Bd of Ed	Government
Fisher Food Inc	Trade
General Electric Co	Finance
Mercy Medical Center	Service
Precision Castparts Corp	Manufacturing
Republic Engineered Products	Manufacturing
Timken Co	Manufacturing
Wal-Mart Stores Inc	Trade

Wayne

College of Wooster	Service
Frito-Lay Inc	Manufacturing
JM Smucker Co	Manufacturing
LuK Inc	Manufacturing
State of Ohio	Government
Will-Burt Co	Manufacturing
Wooster Brush Co	Manufacturing
Wooster City Bd of Ed	Government
Wooster Community Hospital	Service
Worthington Ind/Gerstenslager Co	Manufacturing

Holmes County

Case Foods Inc	Manufacturing
Collins & Aikman Corp	Manufacturing
East Holmes Local Bd of Ed	Government
Owens-Illinois Inc	Manufacturing
Pomerene Hospital	Service
Sperry & Rice Mfg Co LLC	Manufacturing
Wayne-Dalton Corp	Manufacturing
Weaver Leather Goods Inc	Manufacturing
West Holmes Local Bd of Ed	Government
Robin Industries	Manufacturing

Tuscarawas County

Alamo Group/Gradall Industries	Manufacturing
Allied Machine & Engineering	Manufacturing
Dover City Bd of Ed	Government
New Philadelphia City Bd of Ed	Government
Sanwa Shutter Corp/Genie Co	Manufacturing
Smurfit-Stone Container Corp	Manufacturing
Union Hospital	Service
Wal-Mart Stores Inc	Trade
Zimmer Holdings Inc	Manufacturing

Carroll County

American Axle & Manufacturing Holding	Manufacturing
Ashi Tec Corp/Metaldyne Corp	Service
Atwood Lake Resort	Service
Carroll Health Care Center Inc	Service
Carrollton Exempted Village Bd of Ed	Government
GBS Corporation	Manufacturing
Summitville Tiles Inc	Manufacturing

Factor 3: Population and Projected Growth

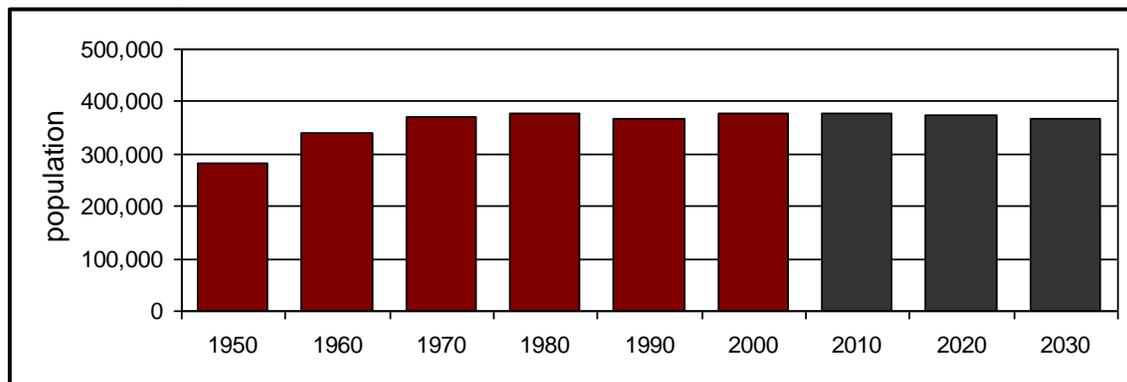
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Stark County are Canton, Massillon, and Alliance; in Wayne County, Wooster, Rittman and Orrville; in Holmes County, Millersburg; in Tuscarawas County, New Philadelphia, Dover, Uhrichsville and Sugarcreek; in Carroll County, Carrollton.

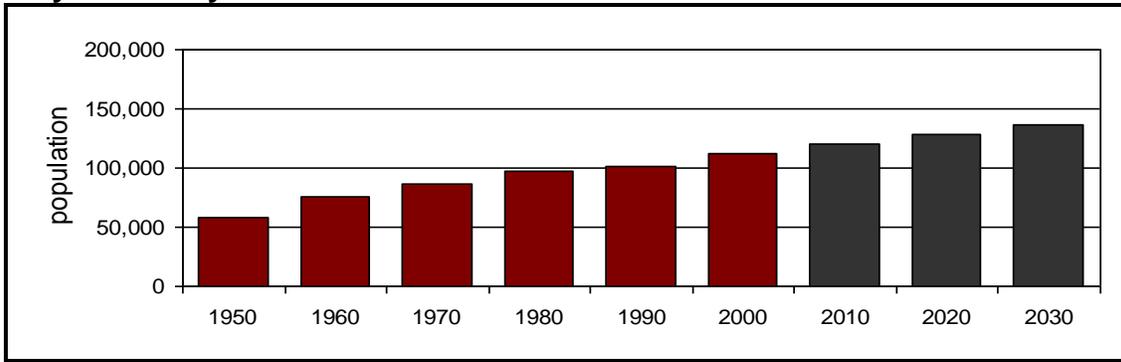
As indicated in the following table and graphs, Stark County has the highest population in this area and it is projected to steadily decrease. The population in the surrounding counties is projected to gradually increase.

County	2004	2005	2006	2010	2020	2030
Stark	380,421	380,275	380,575	376,470	372,490	368,900
Wayne	113,086	113,496	113,950	119,850	128,670	136,690
Holmes	41,165	41,424	41,574	43,440	47,010	49,690
Tuscarawas	91,956	91,791	91,766	93,160	96,080	98,220
Carroll	29,448	29,252	29,189	31,820	34,170	35,720

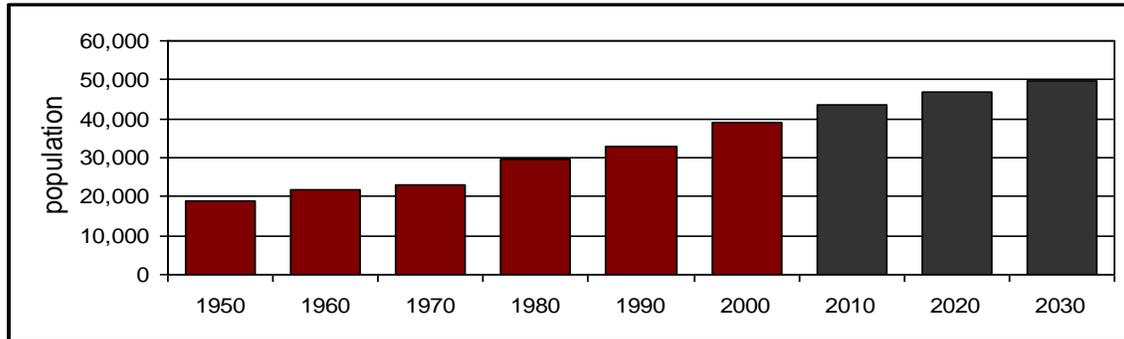
Stark County



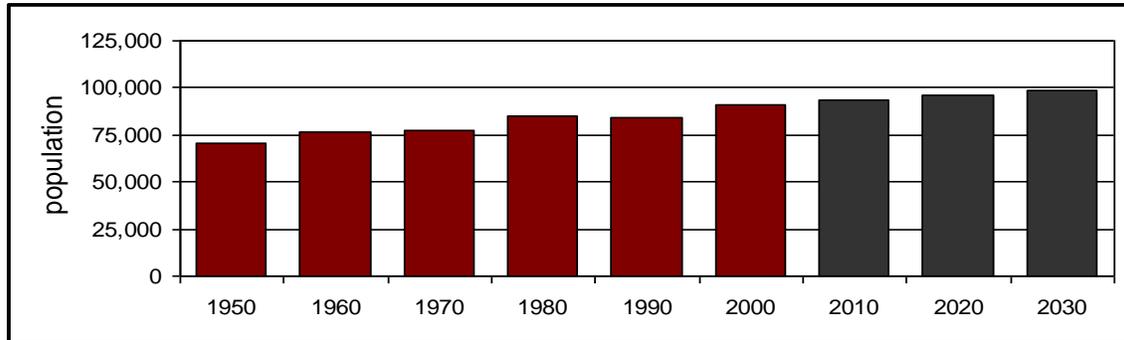
Wayne County



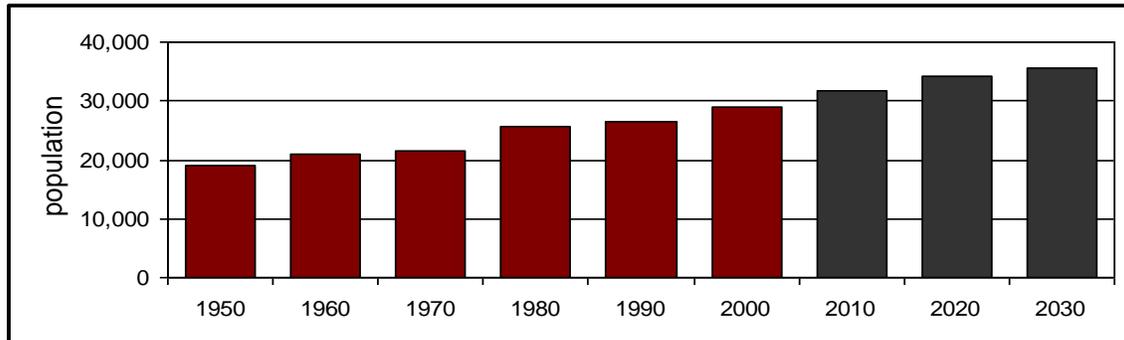
Holmes County



Tuscarawas County



Carroll County

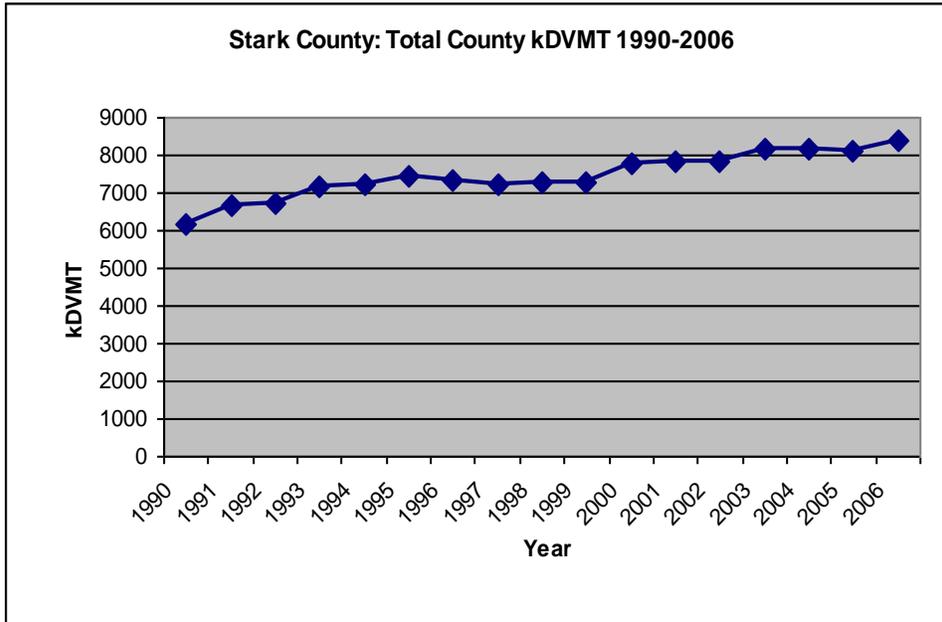


Factor 4: Traffic and commuting patterns

While the kDVT in Stark County have had upward trend, the surrounding counties have experienced a downward trend in kDVT between 2004 and 2006, as shown in the graphs below.

Estimated Daily Vehicle Miles Traveled (kDVT =in thousands)

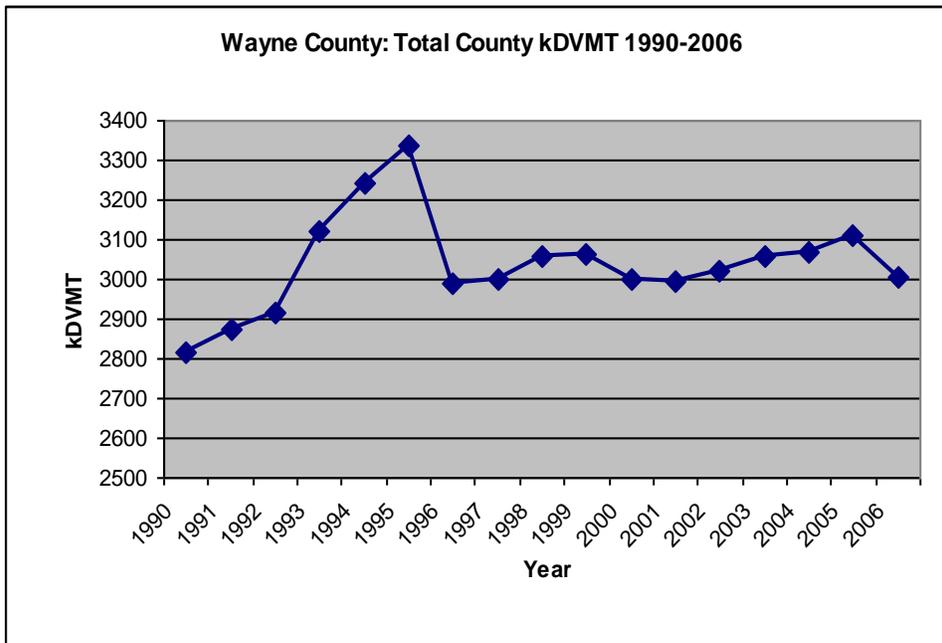
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 8191.93

2005 = 8136.66

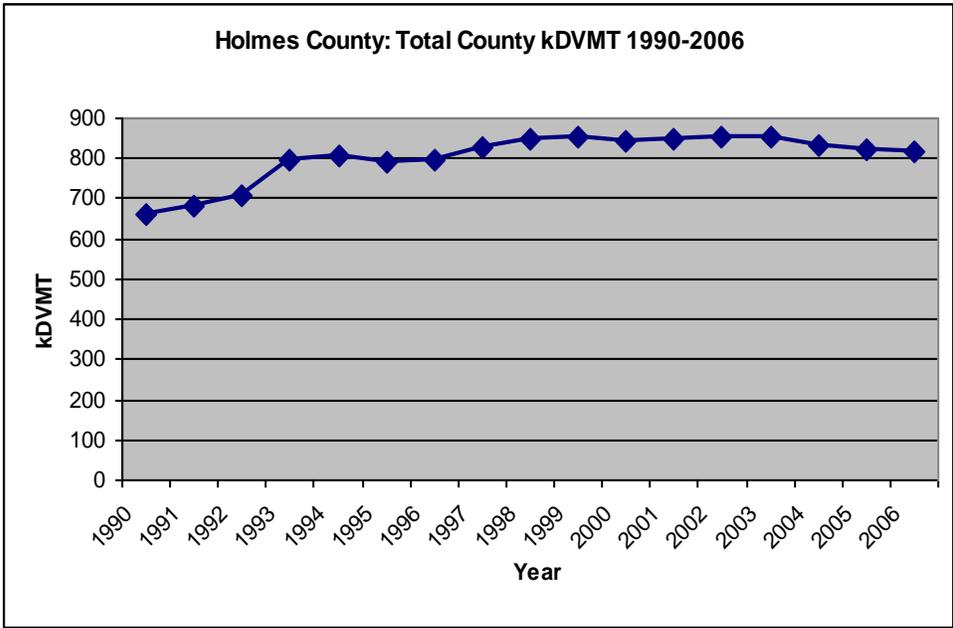
2006 = 8405.65



2004 = 3065.97

2005 = 3111.7

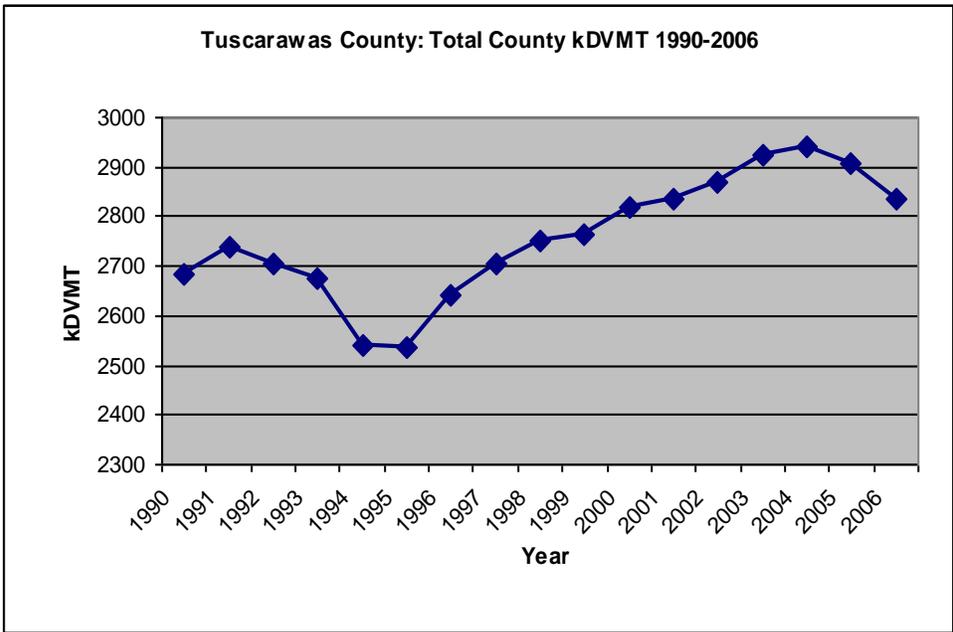
2006 = 3003.18



2004 = 832.95

2005 = 824.54

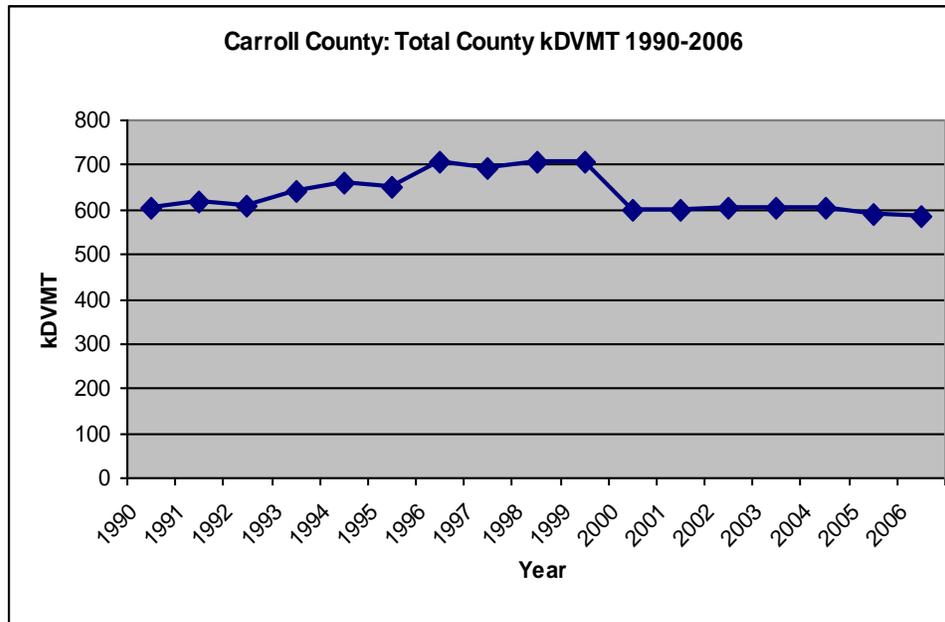
2006 = 816.84



2004 = 2940.02

2005 = 2907.78

2006 = 2835.37



2004 = 602.15

2005 = 588.35

2006 = 586.54

Commuting Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Over 5,000 workers from Tuscarawas County and Carroll County commute to Stark County. The majority of Stark County workers commuting outside the county, travel to Summit County. The largest portion of Wayne County workers commuting outside the county, travel to Medina and Summit counties. Most of the commuting workers from Holmes County drive to Wayne County.

Stark			Percent of workers that work outside the county		20.7%
			Average commute time in minutes -		21.3
Number of workers 16+ years of age living in Stark County			177,234		
Commute Out To	Number	Percent			
Summit Co. OH	21,094	11.9%			
Wayne Co. OH	3,026	1.7%			
Cuyahoga Co. OH	2,443	1.4%			
Portage Co. OH	2,256	1.3%			
Tuscarawas Co. OH	1,679	0.9%			
Mahoning Co. OH	1,158	0.7%			
Carroll Co. OH	956	0.5%			
Medina Co. OH	770	0.4%			
Columbiana Co. OH	640	0.4%			
Holmes Co. OH	480	0.3%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Stark County			171,642		
Commute In From	Number	Percent			
Summit Co. OH	7,665	4.5%			
Tuscarawas Co. OH	5,707	3.3%			
Carroll Co. OH	5,125	3.0%			
Columbiana Co. OH	3,306	1.9%			
Mahoning Co. OH	2,548	1.5%			
Wayne Co. OH	1,672	1.0%			
Portage Co. OH	1,578	0.9%			
Cuyahoga Co. OH	565	0.3%			
Medina Co. OH	445	0.3%			
Harrison Co. OH	292	0.2%			
Percent is of workers working in county.					

Wayne	Percent of workers that work outside the county		27.1%
	Average commute time in minutes -		19.4
Number of workers 16+ years of age living in Wayne County			54,487
Number of workers 16+ years of age working in Wayne County			52,259
Commute Out To	Number	Percent	Commute In From
Medina Co. OH	4,667	8.6%	Stark Co. OH
Summit Co. OH	3,948	7.2%	Holmes Co. OH
Stark Co. OH	1,672	3.1%	Medina Co. OH
Holmes Co. OH	1,247	2.3%	Ashland Co. OH
Cuyahoga Co. OH	1,193	2.2%	Summit Co. OH
Ashland Co. OH	565	1.0%	Tuscarawas Co. OH
Richland Co. OH	297	0.5%	Richland Co. OH
Lorain Co. OH	145	0.3%	Coshocton Co. OH
Tuscarawas Co. OH	125	0.2%	Cuyahoga Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Holmes	Percent of workers that work outside the county		26.1%
	Average commute time in minutes -		21.6
Number of workers 16+ years of age living in Holmes County			16,456
Number of workers 16+ years of age working in Holmes County			17,493
Commute Out To	Number	Percent	Commute In From
Wayne Co. OH	2,411	14.7%	Tuscarawas Co. OH
Tuscarawas Co. OH	538	3.3%	Wayne Co. OH
Ashland Co. OH	352	2.1%	Coshocton Co. OH
Stark Co. OH	200	1.2%	Stark Co. OH
Summit Co. OH	104	0.6%	Ashland Co. OH
Carroll Co. OH	76	0.5%	Knox Co. OH
Medina Co. OH	72	0.4%	Richland Co. OH
Knox Co. OH	70	0.4%	Summit Co. OH
Coshocton Co. OH	68	0.4%	Harrison Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Tuscarawas	Percent of workers that work outside the county		26.8%
	Average commute time in minutes -		21.6
Number of workers 16+ years of age living in Tuscarawas County			42,093
Number of workers 16+ years of age working in Tuscarawas County			37,247
Commute Out To	Number	Percent	Commute In From
Stark Co. OH	5,707	13.6%	Stark Co. OH
Holmes Co. OH	1,983	4.7%	Harrison Co. OH
Coshocton Co. OH	709	1.7%	Carroll Co. OH
Wayne Co. OH	688	1.6%	Coshocton Co. OH
Summit Co. OH	606	1.4%	Holmes Co. OH
Carroll Co. OH	289	0.7%	Guernsey Co. OH
Harrison Co. OH	182	0.4%	Summit Co. OH
Guernsey Co. OH	153	0.4%	Wayne Co. OH
Cuyahoga Co. OH	128	0.3%	Jefferson Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Carroll	Percent of workers that work outside the county		57.0%
	Average commute time in minutes -		27.5
Number of workers 16+ years of age living in Carroll County			12,882
Commute Out To	Number	Percent	
Stark Co. OH	5,125	39.8%	
Tuscarawas Co. OH	840	6.5%	
Columbiana Co. OH	297	2.3%	
Summit Co. OH	271	2.1%	
Jefferson Co. OH	178	1.4%	
Harrison Co. OH	160	1.2%	
Cuyahoga Co. OH	73	0.6%	
Wayne Co. OH	73	0.6%	
Mahoning Co. OH	47	0.4%	
Portage Co. OH	37	0.3%	
Percent is of workers living in county.			
Number of workers 16+ years of age working in Carroll County			7,947
Commute In From	Number	Percent	
Stark Co. OH	956	12.0%	
Columbiana Co. OH	453	5.7%	
Tuscarawas Co. OH	289	3.6%	
Jefferson Co. OH	265	3.3%	
Harrison Co. OH	188	2.4%	
Holmes Co. OH	76	1.0%	
Mahoning Co. OH	44	0.6%	
Mercer Co. PA	16	0.2%	
Clark Co. OH	13	0.2%	
Geauga Co. OH	12	0.2%	
Percent is of workers working in county.			

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Canton-Massillon area.

Factor 6: Topography/Land use/Land cover

Stark County is in the Appalachian Plateau Physiographic Province (see Appendix F). The northern two-thirds of the county are located in the glacial part of the Appalachian Plateau, and the rest of the county is in the unglaciated part. Elevations range from a little less than 900 feet above sea level to about 1,350 feet above sea level. The topography of the unglaciated portion of the county is hilly and steep and variations in relief average about 200 feet within one-half mile. The glaciated part of the county is undulating and rolling, with an average relief varying less than 100 feet within a mile.

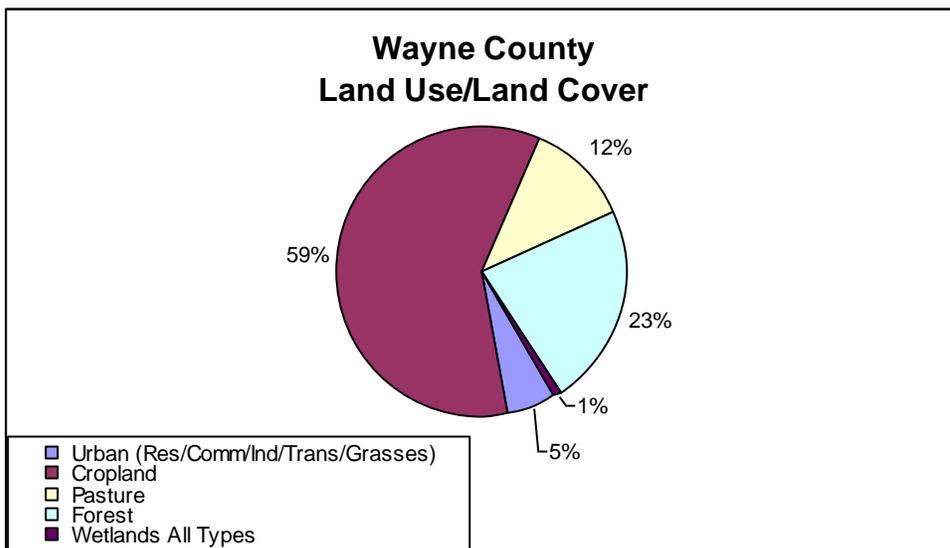
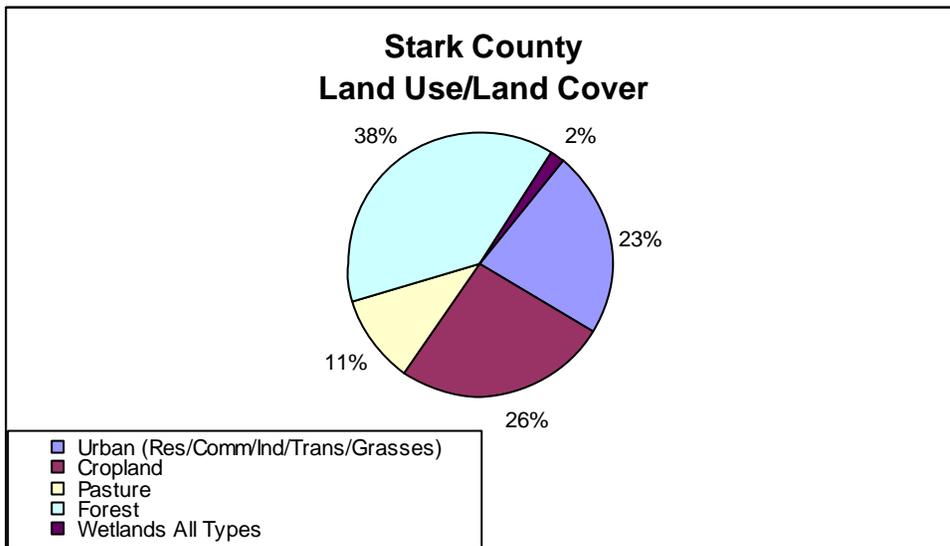
Wayne County is a county of contrasts. Although the entire area has been glaciated, the landforms are very diverse including flat wetlands, steep slopes and hilly areas. The elevation ranges from about 850 feet to 1260 feet above sea level.

Holmes County lies in the Appalachian Plateau Province, both the glaciated and unglaciated sections. The northern glaciated landscape is gently rolling while the southern unglaciated portion retains its rough, bedrock relief. The highest elevation is 1,410 feet and the lowest is 790 feet above sea level.

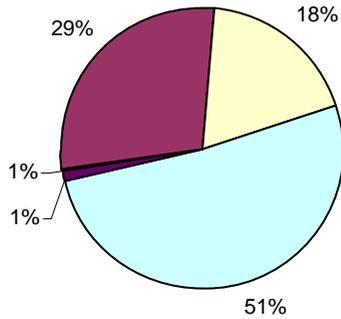
Tuscarawas County is in the unglaciated part of the Allegheny Plateau region except for the northwest corner. Most areas in the southern and eastern parts of the county have deep valleys and narrow ridgetops while the western part of the county, the hills are not as steep. The elevation ranges from 795 feet to 1,340 feet above sea level.

Carroll County is on the unglaciated, dissected Allegheny Plateau. The highest point in the county is near the northern border at 1,375 feet and the lowest point 900 feet.

As shown in the following pie charts, the land use/land cover in Stark County and all the surrounding counties except for Wayne County is predominately classified as forest. Wayne County is nearly 60 percent cropland. As expected, in comparison to the surrounding counties, Stark County has the largest percentage of urbanized area at 23 percent.

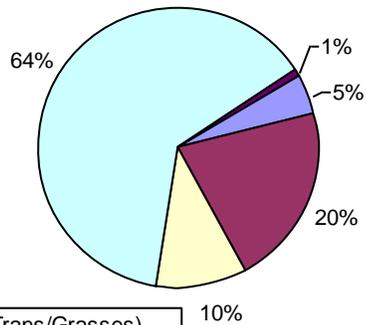


Holmes County Land Use/Land Cover



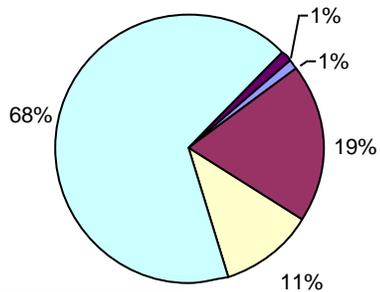
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Tuscarawas County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Carroll County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Factor 7: Jurisdictional boundaries

The Canton-Massillon, OH Metropolitan Statistical Area includes Stark and Carroll counties and the principal cities of Canton and Massillon.

The Stark County Transportation Study (SCATS) is the planning agency designated as the Metropolitan Planning Organization (MPO) for Stark County. The SCATS region is composed of Stark County.

The surrounding counties; Wayne, Holmes, Tuscarawas and Carroll are not part of an MPO. Columbiana and Mahoning counties also border Stark County however they are discussed in the Youngstown-Warren section.

Factor 8: Level of control of emission sources

In Stark County, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) resulting in air quality improvements in Stark County.

Cincinnati-Hamilton, OH-KY-IN

Current county nonattainment: Butler, Clermont, Hamilton and Warren



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment: Butler, Clermont, Hamilton and Warren



Source: Office of Strategic Research, Ohio Department of Development

Discussion

There are four Ohio counties in this existing PM_{2.5} nonattainment area: Butler, Clermont, Hamilton, and Warren counties. Ohio EPA recommends retaining these four counties as nonattainment for the Cincinnati-Hamilton area. There are violating monitors in Butler and Hamilton counties. Hamilton County also has high 2005 SO₂ emissions and significant NO_x emissions. Clermont County also has high 2005 SO₂ emissions. Warren County has insignificant emissions but has high a commuting pattern into Hamilton County and therefore is considered a contributing county in this area. Currently, there is not sufficient data to determine if the monitor in Clermont County is violating the standards. Toward the latter part of 2007, more data will be available in order to make this determination. The surrounding counties of Brown, Highland and Clinton counties are excluded due to very low emissions and population. Preble County is also an adjacent county but it is discussed in the Dayton-Springfield area section.

The three-year average of the 98th percentile and the three-year annual average concentration at sites in Butler and Hamilton counties are not attaining the revised 24-hour or the annual standards.

Factor 1: Air quality

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-017-0003	Butler	37.2	47.6	30.2	38
39-017-0016		32.2	43.4	35.2	37
39-017-0017		34.3	44.9		
39-017-1004		31.6	45.4	32.7	37
39-025-0022	Clermont		38.3	31.6	
39-061-0006	Hamilton		45.0	33.3	
39-061-0014		42.0	38.5	35.2	39
39-061-0040		30.5	45.8	32.8	36
39-061-0041		32.2	37.4		
39-061-0042		31.9	44.4	34.5	37
39-061-0043		31.4	39.9	34.9	35
39-061-7001		34.6	47.1	34.0	39
39-061-8001		33.9	51.4	36.1	40

 Sites with less than 75% capture

AQS: Annual Average ($\mu\text{g}/\text{m}^3$)

Site	County				Annual Average
		2004	2005	2006	
39-017-0003	Butler	14.1	19.0	14.1	15.7
39-017-0016		14.7	17.9	14.0	15.5
39-017-0017		14.2	17.2		
39-017-1004		13.6	16.9	13.4	14.6
39-025-0022	Clermont		15.7	12.7	
39-061-0006	Hamilton		16.6	13.3	
39-061-0014		15.9	19.8	15.5	17.1
39-061-0040		14.6	17.5	13.6	15.2
39-061-0041		14.6	15.8		
39-061-0042		16.0	19.1	14.9	16.7
39-061-0043		14.9	16.9	14.5	15.4
39-061-7001		15.3	18.4	14.4	16.0
39-061-8001		16.4	20.0	15.9	17.4

Sites with less than 75% capture

Kentucky

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile ($\mu\text{g}/\text{m}^3$)

Site	County				24- Hour Average
		2004	2005	2006	
21-037-0003	Campbell	27.5	38.0	25.2	30
21-117-0007	Kenton	29.4	42.1	32.6	35

Sites with less than 75% capture

AQS: Annual Average ($\mu\text{g}/\text{m}^3$)

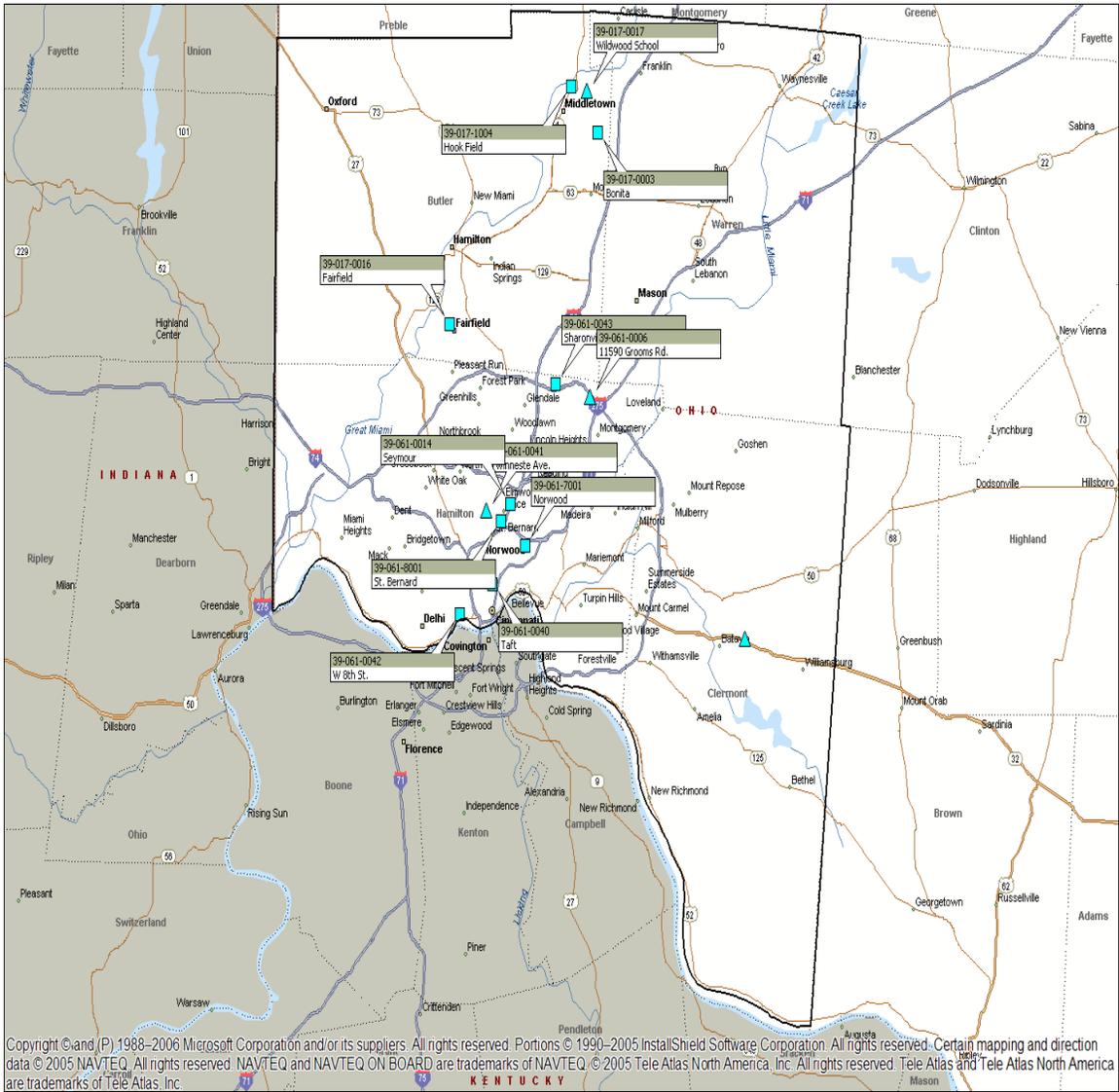
Site	County				Annual Average
		2004	2005	2006	
21-037-0003	Campbell	12.8	14.8	11.5	13.1
21-117-0007	Kenton	13.4	15.9	13.3	14.2

Sites with less than 75% capture

Indiana

There are no monitors in applicable areas of Indiana

Cincinnati-Hamilton Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data
(tons per day)

2005			
County	SO₂	NO_x	PM_{2.5}
HAMILTON	254.17	93.16	5.09
BUTLER	27.47	45.30	4.09
WARREN	1.30	20.20	1.36
CLERMONT	267.41	59.67	2.96
Brown	0.38	5.23	0.44
Clinton	0.44	6.75	0.38

2009			
County	SO₂	NO_x	PM_{2.5}
HAMILTON	90.74	87.53	7.44
BUTLER	17.79	38.36	3.85
WARREN	0.59	21.91	1.27
CLERMONT	144.09	58.77	9.94
Brown	0.22	5.31	0.41
Clinton	0.18	7.33	0.33

Indiana

2005			
County	SO₂	NO_x	PM_{2.5}
DEARBORN	214.14	36.91	0.61
Franklin	0.23	3.17	0.13
Ohio	0.06	0.91	0.03
Switzerland	0.13	1.84	0.07
Union	0.13	1.33	0.08

2009			
County	SO₂	NO_x	PM_{2.5}
DEARBORN	69.79	36.14	8.60
Franklin	0.12	2.91	12.47
Ohio	0.05	0.73	0.81
Switzerland	0.07	1.74	0.55
Union	0.08	0.59	1.08

Kentucky

2005			
County	SO ₂	NO _x	PM _{2.5}
Boone	14.05	18.59	2.27
Campbell	1.64	6.52	0.89
Kenton	3.50	11.25	1.30
Gallatin	0.83	3.37	0.69
Grant	0.14	2.78	0.41
Ohio	26.78	3.7	0.88
Pendleton	1.59	8.86	0.60

2009			
County	SO ₂	NO _x	PM _{2.5}
Boone	10.50	29.02	4.02
Campbell	1.60	6.43	0.87
Kenton	3.40	11.05	1.28
Gallatin	0.82	3.37	0.69
Grant	0.12	2.75	0.40
Ohio	20.26	4.34	1.77
Pendleton	1.58	8.83	0.60

Major Employers

Source: Ohio Department of Development 2007

Most of the major employers in the greater Cincinnati area the surrounding counties (in Ohio) are in the categories of manufacturing, government and service as shown in the following tables.

Butler County

AK Steel Holding Corp	Manufacturing
Amylin Pharmaceuticals Inc	Manufacturing
Armor Holdings Inc	Manufacturing
Butler County Government	Government
Cincinnati Financial Corp	Insurance
Cornerstone Brands Inc	Trade
Fairfield City Bd of Ed	Government
Ft Hamilton Memorial Hospital	Service
Hamilton City Bd of Ed	Government
Lakota Local Bd of Ed	Government
Liberty Mutual/Ohio Casualty Corp	Insurance
Mercy regional Hospital	Service
Miami University	Government
Middletown regional Health System	Service

Clermont County

Clermont County Government	Government
Duke Energy Corp	Utility
Fifth Third Bank	Finance
International Paper Co	R&D
Meijer Inc	Trade
Mercy Health Partners	Service
Midland Co/American Modern Ins	Insurance
Milacron Inc	Manufacturing
Milford Exempted Village Bd of Ed	Government
Siemens AG/UGS Corp	Service
Total Quality Logistics	Service
West Clermont Local Bd of Ed	Government

Hamilton County

American Financial Group Inc	Insurance
Chiquita Brands International Inc	Trade
Convergys Corp	Service
Duke Energy Corp	Utility
Fifth Third Bancorp	Finance
Ford Motor Co	Manufacturing
General Electric Co	Manufacturing
Health Alliance of Greater Cincinnati	Service
Johnson & Johnson/Ethicon	Manufacturing
Kroger Co	Trade
Macy's Inc	Trade
Mercy Health Partners	Service
Procter & Gamble Co	Manufacturing
TriHealth Inc	Service
University of Cincinnati	Government

Warren County

Aisin Seiki/ADVICS Co Ltd	Manufacturing
Blackhawk Automotive Plastics Inc	Manufacturing
Cedar Fair/Kings Island	Service
Cintas Corp	Manufacturing
HJ Heinz/Portion Pac Inc	Manufacturing
Luxottica Group SpA	Manufacturing
Macy's Inc	Trade
Mason Local Bd of Ed	Government
Procter & Gamble Co	R&D
State of Ohio	Government
Sumco Phoenix	Manufacturing
WellPoint Inc/Anthem	Insurance

Factor 3: Population and Projected Growth

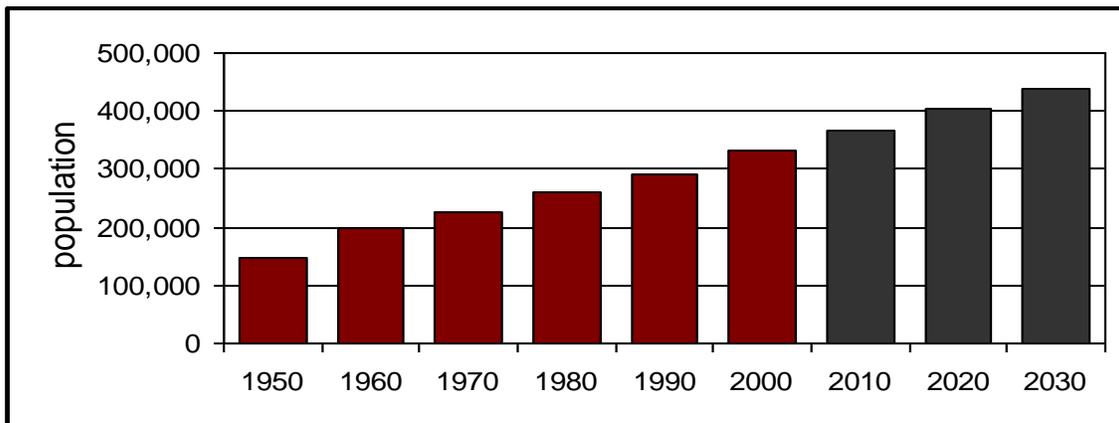
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Cincinnati-Hamilton area are; the greater Cincinnati area in Hamilton County; Hamilton, Fairfield and Middletown in Butler County; Lebanon, Mason, Franklin and Springboro in Warren County; Batavia, Milford and New Richmond in Clermont County.

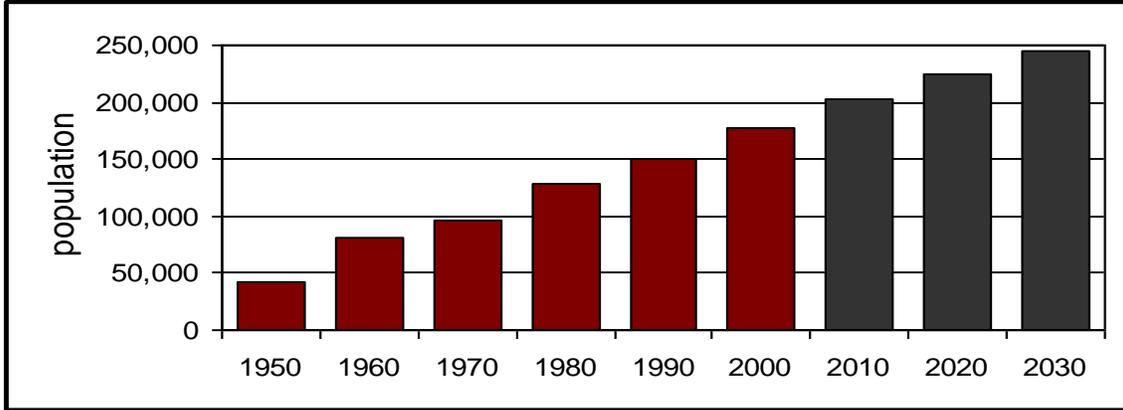
As indicated in the following table and graphs, Hamilton County has the highest population in this area, however it is projected steadily decrease. The population in the surrounding counties is projected to increase.

COUNTY	2004	2005	2006	2010	2020	2030
Butler	345,755	349,966	354,992	367,670	403,860	439,740
Clermont	188,025	190,329	192,706	202,830	225,340	245,000
Hamilton	832,250	828,487	822,596	807,560	771,540	730,570
Warren	189,823	196,793	201,871	215,020	276,250	338,350
Brown	44,106	44,255	44,423	48,050	53,290	56,580
Clinton	42,177	42,561	43,399	45,470	49,810	53,730

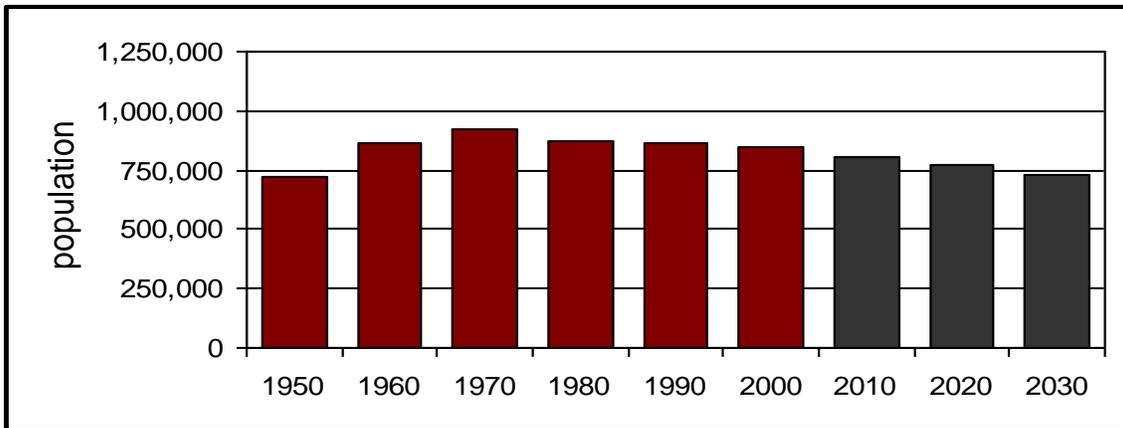
Butler County



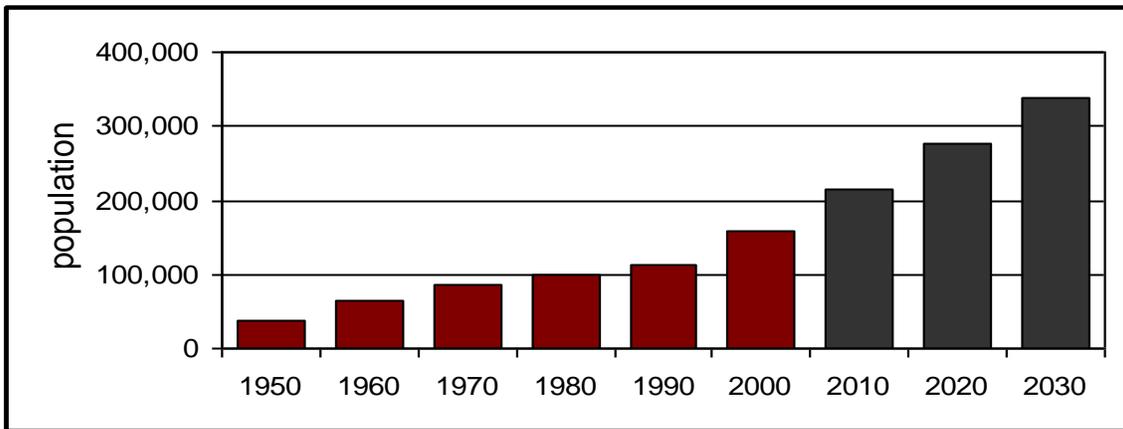
Clermont County



Hamilton County



Warren County

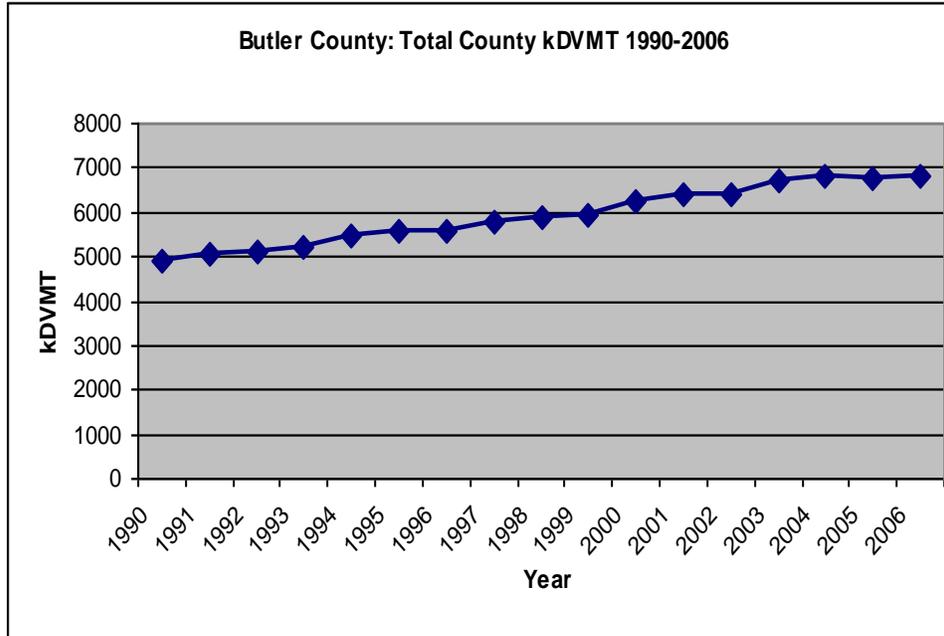


Factor 4: Traffic and commuting patterns

All four of the counties in the Cincinnati-Hamilton area have shown an upward trend in the kDVMT as shown in the following graphs. Hamilton County has the highest level of KDVT in the 21,000 range and Warren County experienced the most significant increase in kDVMT of 368 miles from 2005 to 2006.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

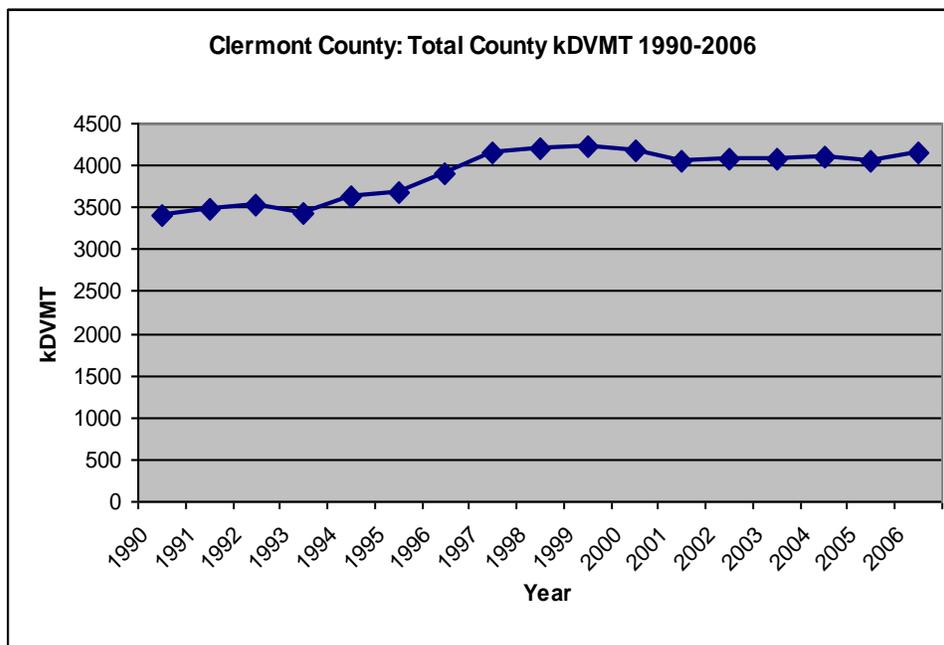
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 6828.95

2005 = 6757.61

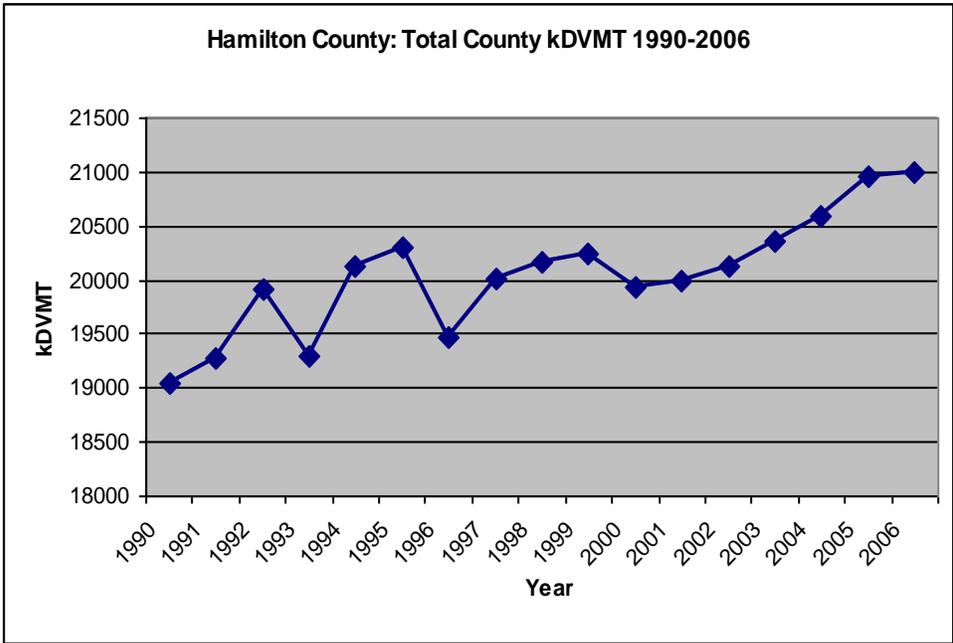
2006 = 6820.28



2004 = 4099.71

2005 = 4054.08

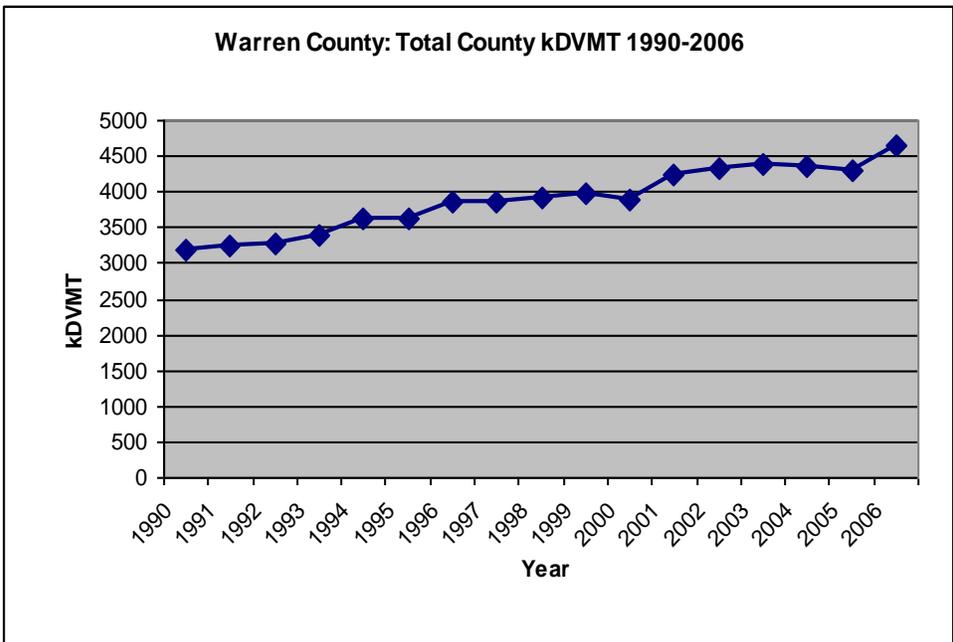
2006 = 4140.62



2004 = 20588.43

2005 = 20957.26

2006 = 21006.83



2004 = 4355.41

2005 = 4292.77

2006 = 4660.34

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

The vast majority of workers (traveling out of county) from Butler, Warren and Clermont counties commute to Hamilton County. Approximately 15 percent of Hamilton County workers commute outside the county, the majority traveling to Butler County, with Warren and Clermont coming in second and third.

Butler			Percent of workers that work outside the county		43.6%
			Average commute time in minutes -		23.0
Number of workers 16+ years of age living in Butler County			160,314		
Number of workers 16+ years of age working in Butler County			133,727		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Hamilton Co. OH	47,984	29.9%	Hamilton Co. OH	18,452	13.8%
Warren Co. OH	11,133	6.9%	Warren Co. OH	8,586	6.4%
Montgomery Co. OH	4,635	2.9%	Clermont Co. OH	2,912	2.2%
Clermont Co. OH	1,072	0.7%	Montgomery Co. OH	2,622	2.0%
Boone Co. KY	857	0.5%	Preble Co. OH	2,575	1.9%
Kenton Co. KY	696	0.4%	Kenton Co. KY	908	0.7%
Greene Co. OH	400	0.2%	Dearborn Co. IN	750	0.6%
Campbell Co. KY	318	0.2%	Union Co. IN	698	0.5%
Preble Co. OH	239	0.1%	Franklin Co. IN	677	0.5%
Clinton Co. OH	209	0.1%	Campbell Co. KY	652	0.5%
Percent is of workers living in county.			Percent is of workers working in county.		

Clermont			Percent of workers that work outside the county		59.9%
			Average commute time in minutes -		28.2
Number of workers 16+ years of age living in Clermont County			88,372		
Number of workers 16+ years of age working in Clermont County			55,884		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Hamilton Co. OH	40,090	45.4%	Hamilton Co. OH	8,240	14.7%
Warren Co. OH	3,269	3.7%	Brown Co. OH	4,802	8.6%
Butler Co. OH	2,912	3.3%	Warren Co. OH	1,448	2.6%
Kenton Co. KY	1,630	1.8%	Butler Co. OH	1,072	1.9%
Boone Co. KY	1,422	1.6%	Kenton Co. KY	761	1.4%
Campbell Co. KY	744	0.8%	Campbell Co. KY	579	1.0%
Brown Co. OH	529	0.6%	Adams Co. OH	527	0.9%
Montgomery Co. OH	433	0.5%	Clinton Co. OH	483	0.9%
Clinton Co. OH	403	0.5%	Highland Co. OH	427	0.8%
Dearborn Co. IN	154	0.2%	Boone Co. KY	350	0.6%
Percent is of workers living in county.			Percent is of workers working in county.		

Hamilton	Percent of workers that work outside the county		15.6%
	Average commute time in minutes -		23.0
Number of workers 16+ years of age living in Hamilton County			398,465
Number of workers 16+ years of age working in Hamilton County			519,981
Commute Out To	Number	Percent	Commute In From
Butler Co. OH	18,452	4.6%	Butler Co. OH
Warren Co. OH	9,303	2.3%	Clermont Co. OH
Clermont Co. OH	8,240	2.1%	Warren Co. OH
Kenton Co. KY	7,937	2.0%	Kenton Co. KY
Boone Co. KY	6,505	1.6%	Campbell Co. KY
Campbell Co. KY	2,739	0.7%	Boone Co. KY
Montgomery Co. OH	1,747	0.4%	Dearborn Co. IN
Dearborn Co. IN	1,335	0.3%	Brown Co. OH
Franklin Co. OH	472	0.1%	Montgomery Co. OH
Ripley Co. IN	295	0.1%	Franklin Co. IN
Percent is of workers living in county.			Percent is of workers working in county.

Warren	Percent of workers that work outside the county		61.5%
	Average commute time in minutes -		24.0665
Number of workers 16+ years of age living in Warren County			76,548
Number of workers 16+ years of age working in Warren County			62,714
Commute Out To	Number	Percent	Commute In From
Hamilton Co. OH	21,347	27.9%	Butler Co. OH
Montgomery Co. OH	11,325	14.8%	Hamilton Co. OH
Butler Co. OH	8,586	11.2%	Montgomery Co. OH
Clermont Co. OH	1,448	1.9%	Clermont Co. OH
Greene Co. OH	1,321	1.7%	Clinton Co. OH
Clinton Co. OH	1,038	1.4%	Greene Co. OH
Boone Co. KY	337	0.4%	Brown Co. OH
Franklin Co. OH	286	0.4%	Preble Co. OH
Kenton Co. KY	249	0.3%	Campbell Co. KY
Clark Co. OH	125	0.2%	Kenton Co. KY
Percent is of workers living in county.			Percent is of workers working in county.

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Cincinnati-Hamilton area.

Factor 6: Topography/Land use/Land cover

The eastern portion of Hamilton County lies in the Till Plains section of the Central Lowland physiographic Province while the western portion of the county lies in the Bluegrass section of the Interior Low Plateau (see Appendix F). The landscape of the county is characterized by wide terraces, flood plains, steep

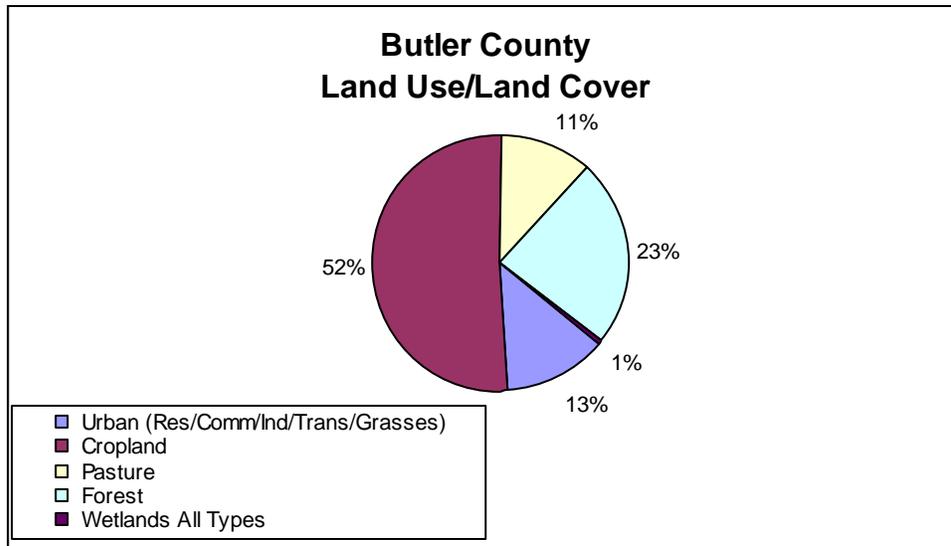
hillsides along the major rivers and tributary stream valleys, and gently rolling glacial till plains. The altitude varies from about 962 feet down to 455 feet above sea level.

Butler County lies in the Till Plains section of the Central Lowland Province. The topography of the county is rolling hills, river terraces and outwash plains.

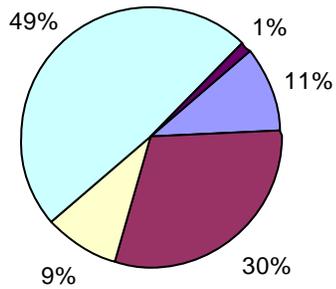
Like Butler County, Warren County is located in the Till Plains section of the Central Lowland Province. The western and northern parts of the county are nearly level to gently rolling hills. In the southern and southeastern parts of the county the topography is gently sloping but highly dissected due to numerous streams that are narrow and deeply entrenched.

Clermont County lies in the Till Plains section of the Central Lowland Province. The surface of the county is characterized by deep, narrow valleys and by level interstream areas. From the Ohio River, along the East Fork of the Little Miami River the surface is very broken and hilly.

As shown in the following pie charts, the land use/land cover in Butler and Warren counties is predominately characterized as cropland. Clermont County is nearly 50 percent forest while Hamilton County is split between urban and forest. As expected, Hamilton County has the highest percentage of urban area at 41 percent.

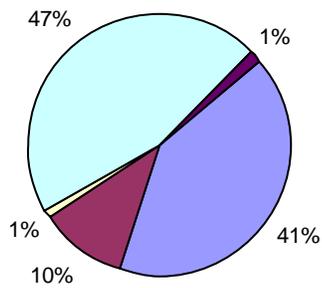


Clermont County Land Use/Land Cover



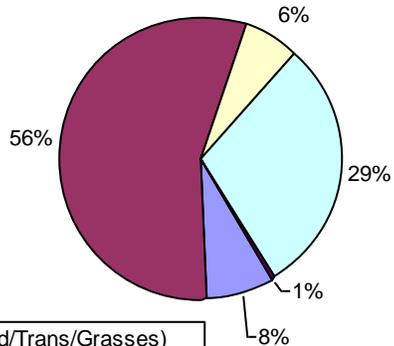
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Hamilton County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Warren County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Factor 7: Jurisdictional boundaries

The Cincinnati-Middletown, OH-KY-IN Metropolitan Statistical Area includes the following counties in Indiana: Dearborn, Franklin and Ohio, in Kentucky: Boone, Bracken, Campbell, Gallatin, Grant, Kenton and Pendleton, and in Ohio: Brown, Butler, Clermont, Hamilton and Warren. The principal cities are Cincinnati and Middletown, Ohio.

The Ohio-Kentucky-Indiana regional Council of Governments (OKI) is the planning agency designated as the Metropolitan Planning Organization for the greater Cincinnati area. The OKI region is composed of eight counties in three states: Butler, Clermont, Hamilton and Warren counties in Ohio; Boone, Campbell and Kenton counties in Kentucky; and Dearborn County in Indiana. *Please note that the cities of Franklin and Carlisle in Warren County are part of the Miami Valley regional Planning Commission (MVRPC) planning area.*

Factor 8: Level of control of emission sources

In Cincinnati-Hamilton area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) resulting in air quality improvements in these counties. This region is bounded on the south by the Ohio River. There are coal fired utility plants located along the river with several of them making significant reductions in NO_x and SO₂ as a result of the NO_x SIP call and CAIR.

Cleveland-Akron-Lorain, OH

Current county nonattainment:

Ashtabula (P), Cuyahoga, Lake, Lorain, Medina, Portage and Summit



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment:

Cuyahoga, Lake, Lorain, Medina, Portage and Summit



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There are seven counties in this existing PM_{2.5} nonattainment area: Ashtabula (partial), Cuyahoga, Lake, Lorain, Medina, Portage, and Summit counties. Geauga County is part of this metropolitan area but is not included in the existing PM_{2.5} nonattainment area due to very low emissions. Ohio EPA recommends retaining six of the seven counties as nonattainment for the Cleveland-Akron-Lorain area; Cuyahoga and Summit counties have violating monitors, Lake and Lorain counties have high 2005 SO₂ emissions and a high commuting pattern into Cuyahoga, Medina also has a high commuting pattern into Cuyahoga County while Portage County has a high number of commuters traveling to Summit County, thus, Ohio EPA considers four of the six counties contributing counties. Ohio EPA recommends excluding Ashtabula County from this nonattainment area. The coal fired utility located in this county has only operated one unit since 2002 and actual emissions are currently 11 tons per day (t/d) whereas allowable emissions (SIP allowable are over 417 t/d). The projections for this area are that this plant will be a source of reductions under CAIR. In addition, Ashtabula County has insignificant emissions, low population and commuting. Ohio EPA believes the above factors demonstrate that Ashtabula is not contributing to the PM_{2.5} problems in this nonattainment area.

Currently, there is not sufficient data to determine if the monitors in Lake or Medina counties are violating the standards. Toward the latter part of 2007, more data will be available in order to make this determination. In addition to Geauga County, the counties of; Erie, Huron, Ashland, Wayne, Columbiana, Mahoning and Trumbull counties are adjacent to this nonattainment area. Mahoning, Trumbull and Columbiana are discussed in the Youngstown-Warren section. Wayne is included within this section and in the Stark County section.

The three-year average of the 98th percentile is being exceeded at five monitors in Cuyahoga County and at both monitors in Summit County. The three-year annual average concentration is being exceeded at five monitors in Cuyahoga County as shown in the tables below.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile ($\mu\text{g}/\text{m}^3$)

Site	County				24-Hour Average
		2004	2005	2006	
39-035-0027	Cuyahoga	39.5	35.7	31.5	36
39-035-0034		32.9	43.8	29.1	35
39-035-0038		42.5	51.2	36.1	43
39-035-0045		36.1	46.2	29.5	37
39-035-0060		42.2	49.5	31.0	41
39-035-0065		36.1	47.9	27.8	37
39-035-0066		32.0			
39-035-1002		30.5	41.6	27.7	33
39-085-1001	Lake	31.8	43.5		
39-085-3002				32.9	
39-093-0016	Lorain	30.0	39.7	24.9	32
39-093-3002		31.1	33.9	27.4	31
39-103-0003	Medina		38.8	28.5	
39-133-0002	Portage	29.8	42.2	30.5	34
39-153-0017	Summit	36.9	45.2	31.5	38
39-153-0023		37.0	42.3	30.4	37

 Sites with less than 75% capture

AQS: Annual Average ($\mu\text{g}/\text{m}^3$)

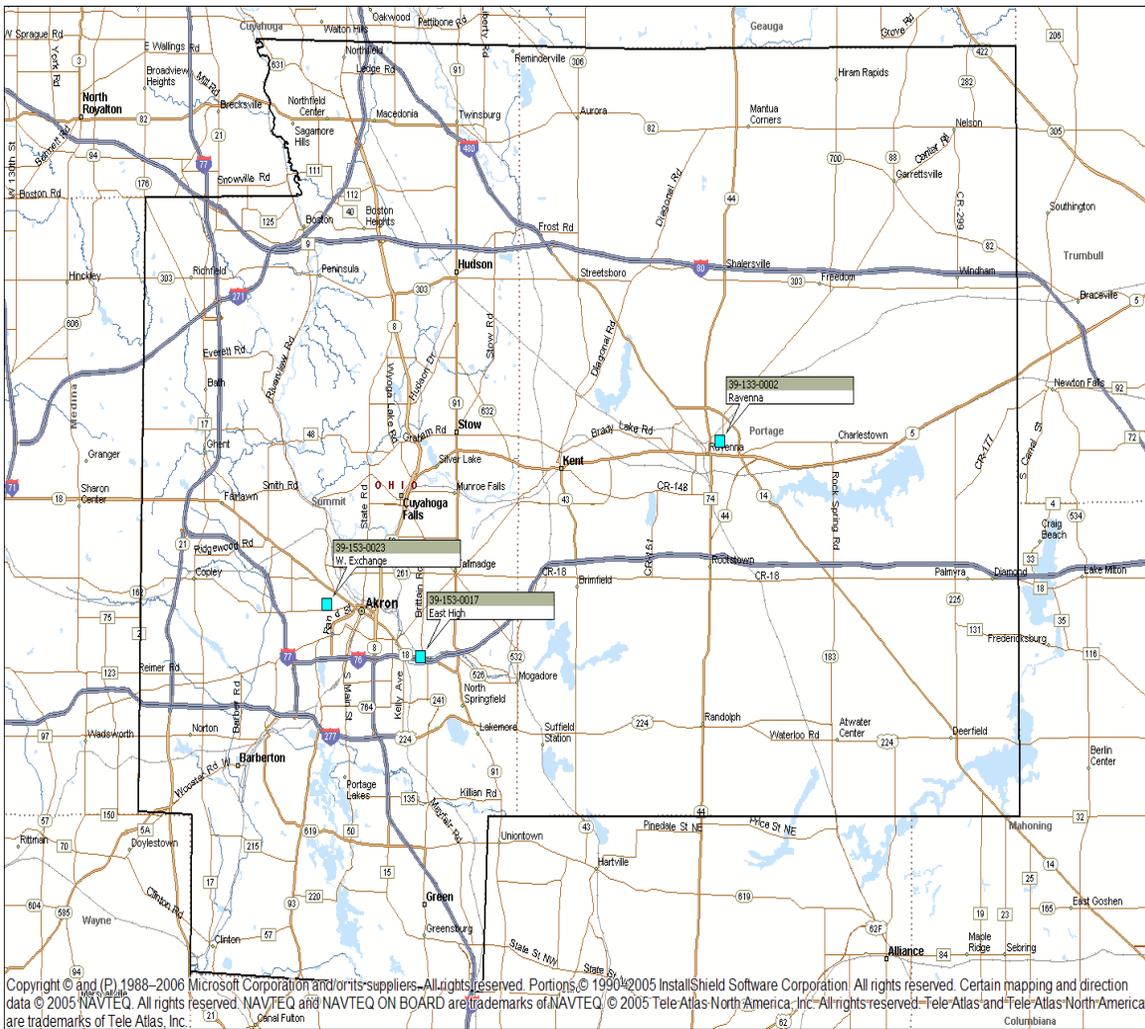
Site	County				Annual Average
		2004	2005	2006	
39-035-0027	Cuyahoga	15.6	17.3	13.0	15.3
39-035-0034		12.6	16.3	11.5	13.5
39-035-0038		17.5	19.2	14.9	17.2
39-035-0045		15.3	19.3	14.1	16.2
39-035-0060		16.4	19.4	15.0	16.9
39-035-0065		15.2	18.6	13.1	15.6
39-035-0066		11.7			
39-035-1002		13.2	16.8	11.6	13.9
39-085-1001	Lake	11.6	15.0		
39-085-3002				11.5	
39-093-0016	Lorain	12.9	16.4	11.5	13.6
39-093-3002		11.8	14.7	11.4	12.6
39-103-0003	Medina		15.2	11.9	
39-133-0002	Portage	12.5	15.0	12.0	13.2
39-153-0017	Summit	15.0	16.4	13.5	15.0
39-153-0023		13.9	15.7	12.8	14.1

 Sites with less than 75% capture

Cleveland-Akron-Lorain PM_{2.5} Monitor Locations and Site ID Numbers



Akron Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data
(tons per day)

2005			
County	SO₂	NO_x	PM_{2.5}
CUYAHOGA	23.97	63.47	6.31
LORAIN	152.82	42.34	3.46
MEDINA	1.19	6.91	1.45
SUMMIT	32.08	19.05	1.64
PORTAGE	1.02	8.03	1.26
LAKE	252.71	48.41	1.61
Ashtabula (P)	13.75	13.27	1.98
Geauga	0.64	3.75	1.51
Erie	1.17	8.53	0.83
Huron	0.57	6.19	0.79
Ashland	0.52	5.62	1.05
Wayne	68.69	17.22	1.87

2009			
County	SO₂	NO_x	PM_{2.5}
CUYAHOGA	49.21	65.30	6.96
LORAIN	8.64	20.19	4.82
MEDINA	0.53	6.05	1.36
SUMMIT	31.32	16.79	1.51
PORTAGE	0.67	7.20	1.17
LAKE	95.77	40.48	4.05
Ashtabula (P)	14.12	13.85	2.56
Geauga	0.45	3.14	1.47
Erie	0.63	8.19	0.73
Huron	0.38	5.75	0.73
Ashland	0.29	4.89	1.00
Wayne	52.12	13.47	3.65

Major Employers

Source: Ohio Department of Development 2007

Most of the major employers in the Cleveland-Akron area are in the categories of manufacturing, government and service as shown below.

Ashtabula County

Ashtabula Area City Bd of Ed	Government
Ashtabula County Govt	Government
Ashtabula County Medical Center	Service
General Aluminum Mfg Co	Manufacturing
Kennametal Inc	Manufacturing
Lyondell Chemical Co	Manufacturing
Masco/KraftMaid Cabinetry	Manufacturing
Molded Fiber Glass Companies	Manufacturing
Premix Inc	Manufacturing

Cuyahoga County

American Greetings Corp	Manufacturing
Case Western Reserve University	Service
Cleveland Clinic Health System	Service
Continental Airlines	Transportation
Ford Motor Co	Manufacturing
General Motors Corp	Manufacturing
KeyCorp	Finance
Lincoln Electric Holding Inc	Manufacturing
National City Corp	Finance
Parker Hannifin Corp	Manufacturing
Progressive Corp	Insurance
Sherwin-Williams Co	Manufacturing
University Hospitals Health System	Service

Lake County

ABB Inc	Manufacturing
Avery Dennison Corp	Manufacturing
Cleveland Clinic Health System	Service
FirstEnergy Corp	Utility
Lake County Government	Government
Lake Hospital System	Service
Lubrizol Corp	Manufacturing
Mentor Exempted Village Bd of Ed	Government
STERIS Corp	Manufacturing
Willoughby-Eastlake City Bd of Ed	Government

Lorain County

Community Health Partners	Service
Elyria City Bd of Ed	Government
Emerson Electric/Ridge Tool	Manufacturing
EMH regional Medical Center	Service
Ford Motor Co	Manufacturing
Invacare Corp	Manufacturing
Lorain City Bd of Ed	Government
Lorain County Government	Government
Nordson Corp	Manufacturing
Oberlin College	Service
PolyOne Corp	Manufacturing
Republic Engineered Products Inc	Manufacturing
State of Ohio	Government

Portage County

East Manufacturing Corp	Manufacturing
General Electric Co	Manufacturing
Kent City Board of Education	Government
Kent State University	Government
McMaster-Carr Supply Co	Trade
Ravenna City Bd of Ed	Government
Robinson Memorial Hospital	Service
State of Ohio	Government
Step2 Company	Manufacturing

Summit County

Akron City Bd of Ed	Government
Akron General Health System	Service
Children's Hospital Medical Center	Service
Chrysler LLC	Manufacturing
Diebold Inc	Manufacturing
FirstEnergy Corp	Utility
Goodyear Tire & Rubber Co	Manufacturing
Jo-Ann Stores Inc	Trade
McDermott Int'l/Babcock & Wilcox	Manufacturing
Signet Group plc/Sterling Inc	Trade
Summa Health System	Service
University of Akron	Government

Factor 3: Population and Projected Growth

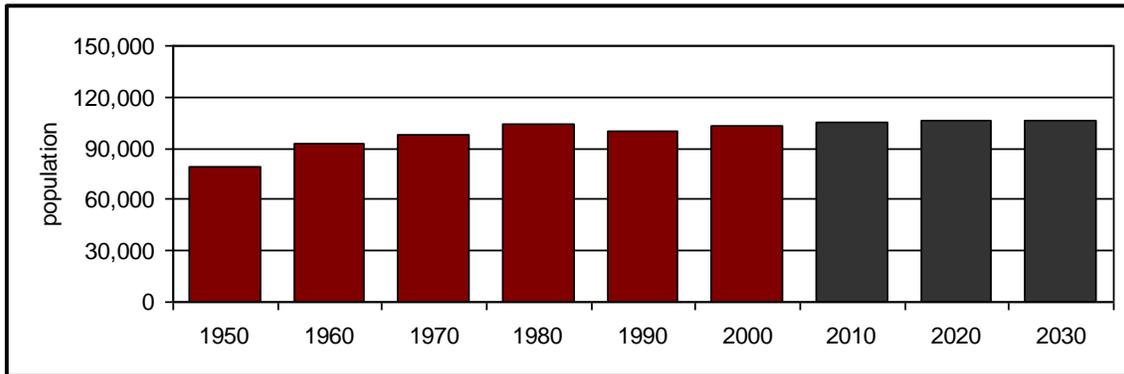
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Cleveland-Akron-Lorain area are; the greater Cleveland area in Cuyahoga County; Elyria, Avon and North Ridgeville in Lorain County; Medina, Brunswick and Wadsworth in Medina County; Akron, Barberton, Cuyahoga Falls and Stow in Summit County; Kent and Ravenna in Portage County; Chardon and Middlefield in Geauga County; Mentor, Willoughby and Eastlake in Lake County; and Conneaut and Ashtabula in Ashtabula County.

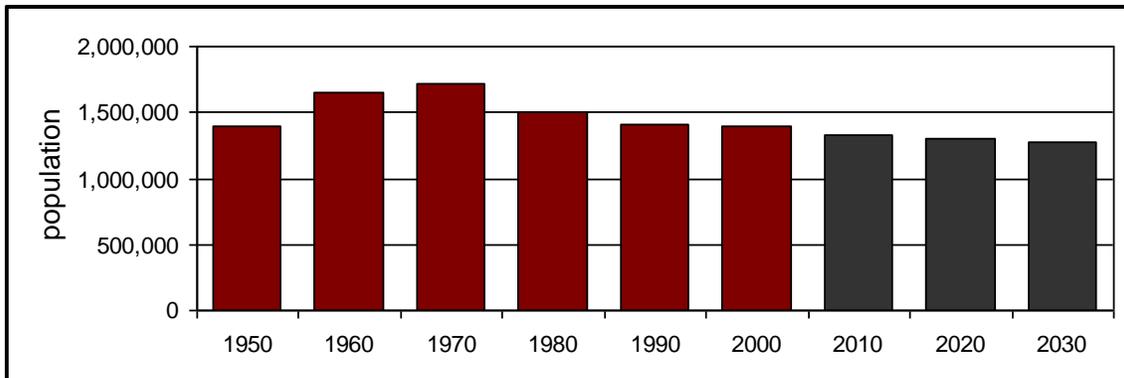
As indicated in the following table and graphs, Cuyahoga County has the highest population in this area, however it is projected steadily decrease. The population in the surrounding counties is remaining generally constant with slight trends upward with Medina County having the most significant upward trend.

COUNTY	2004	2005	2006	2010	2020	2030
Cuyahoga	1,346,194	1,330,428	1,314,241	1,332,540	1,301,870	1,274,020
Lake	232,059	232,416	232,892	233,890	234,520	232,350
Lorain	296,717	300,266	301,993	290,840	299,630	312,540
Medina	164,644	166,968	169,353	173,760	191,850	206,770
Portage	155,079	155,150	155,012	158,160	161,660	161,880
Summit	546,366	546,285	545,931	557,660	564,810	564,210
Ashtabula (P)	102,960	103,044	102,703	104,970	106,090	106,420
Geauga	94,379	95,060	95,676	98,820	104,810	109,180
Erie	78,830	78,374	78,116	81,420	82,400	83,060
Huron	60,129	60,291	60,313	62,040	63,430	64,020
Ashland	53,848	54,184	54,727	56,160	59,010	61,050
Wayne	113,086	113,496	113,950	119,850	128,670	136,690

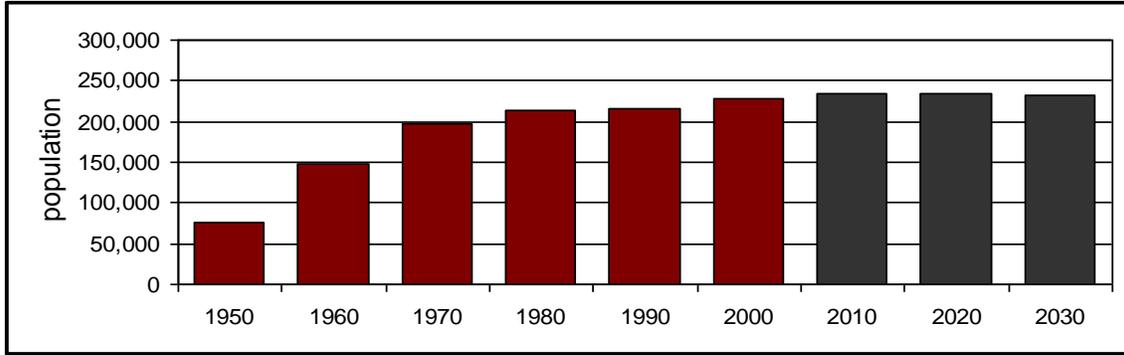
Ashtabula County



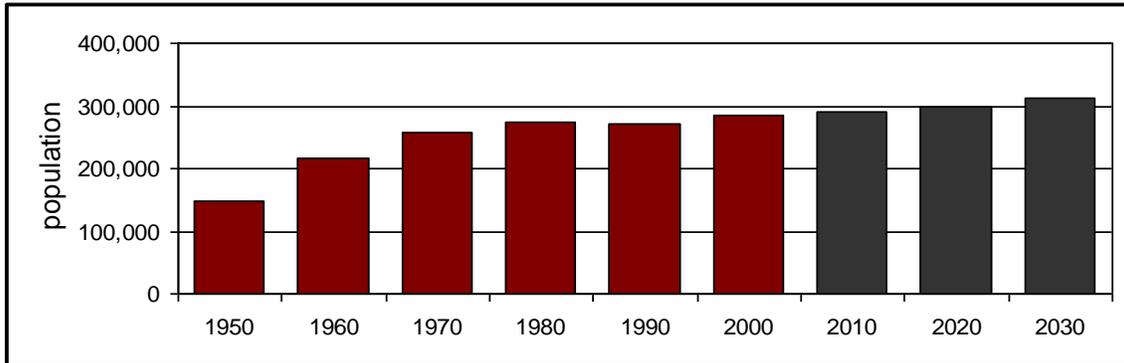
Cuyahoga County



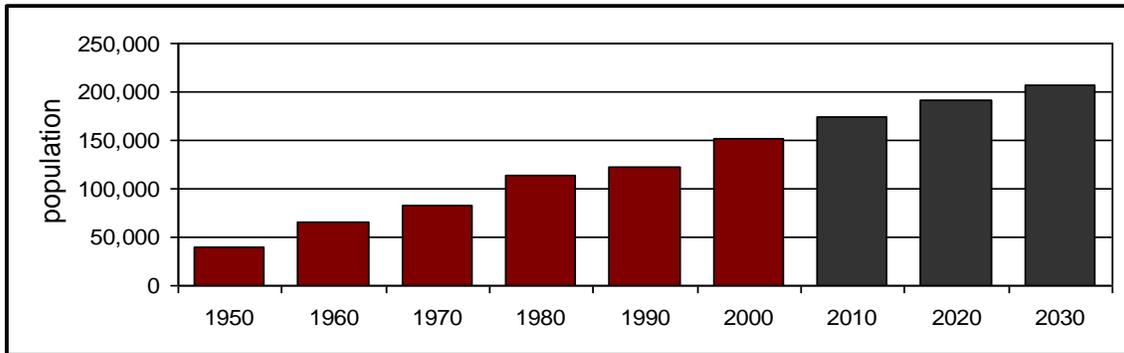
Lake County



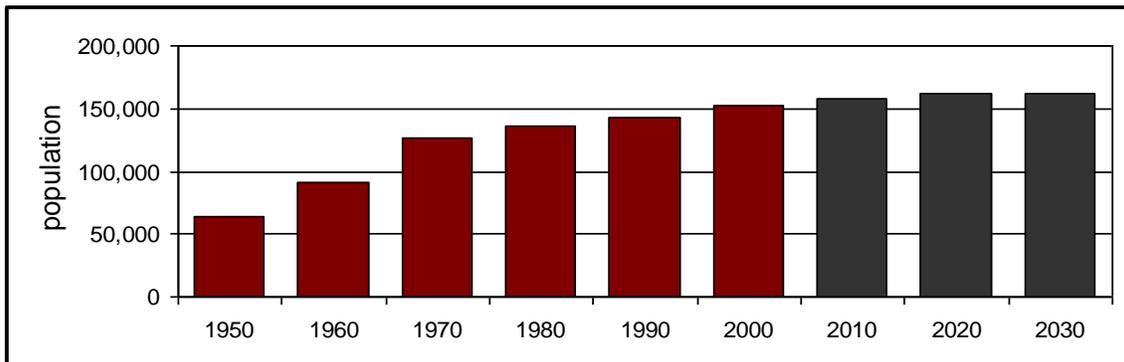
Lorain County



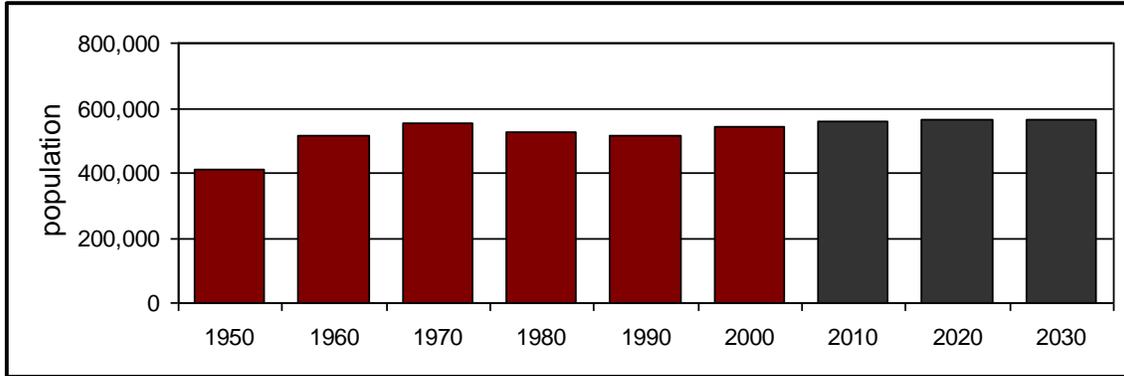
Medina County



Portage County



Summit County

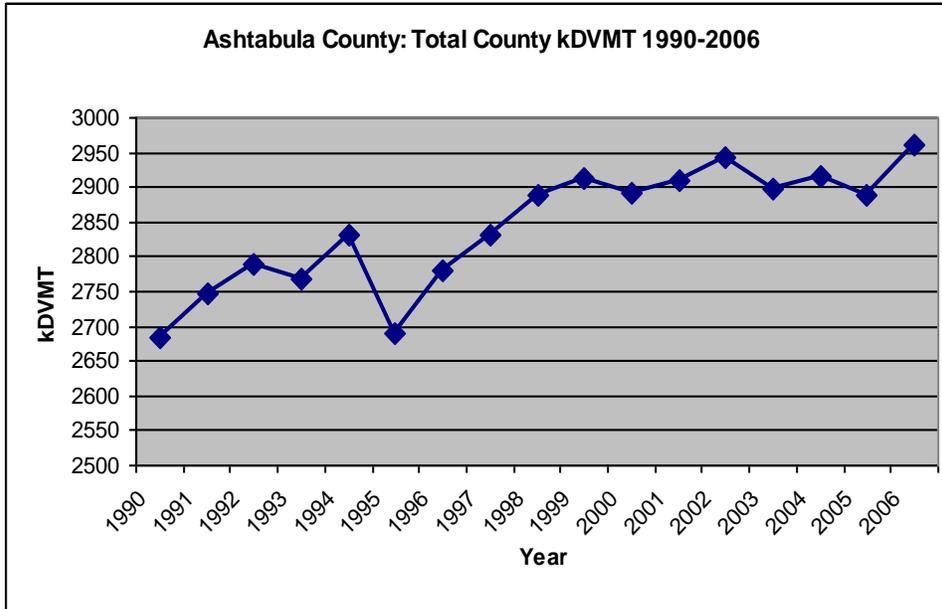


Factor 4: Traffic and commuting patterns

The kDVMT within the Cleveland-Akron-Lorain area have had an upward trend with the exception of Lorain County that has had a slight downward trend. Ashtabula experienced the most increase between 2005 and 2006 with 71.76 kDVMT. As expected, Cuyahoga has the overall highest kDVMT in the 28,000 range and Ashtabula has the lowest kDVMT in the 2,900 range as shown in the following graphs.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

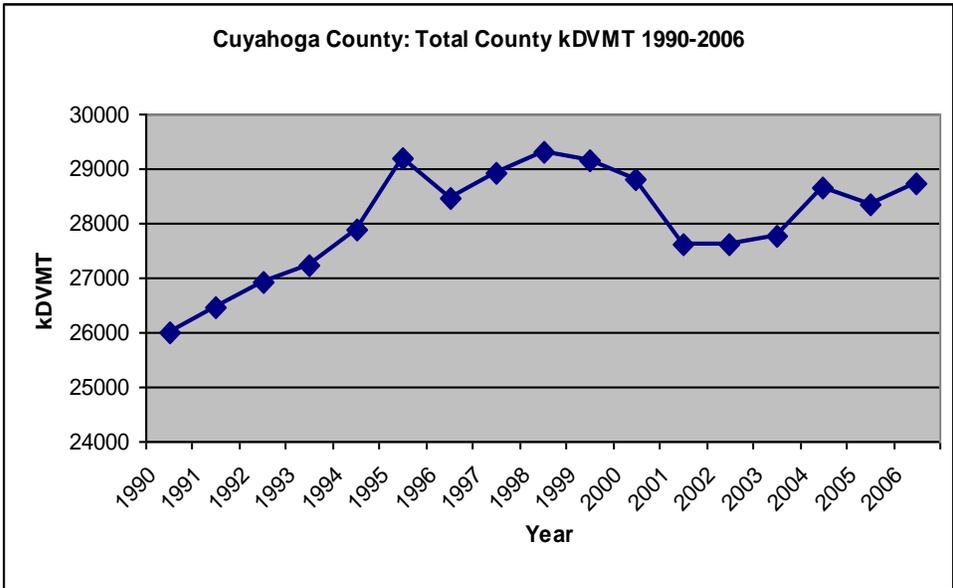
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 2914.48

2005 = 2887.77

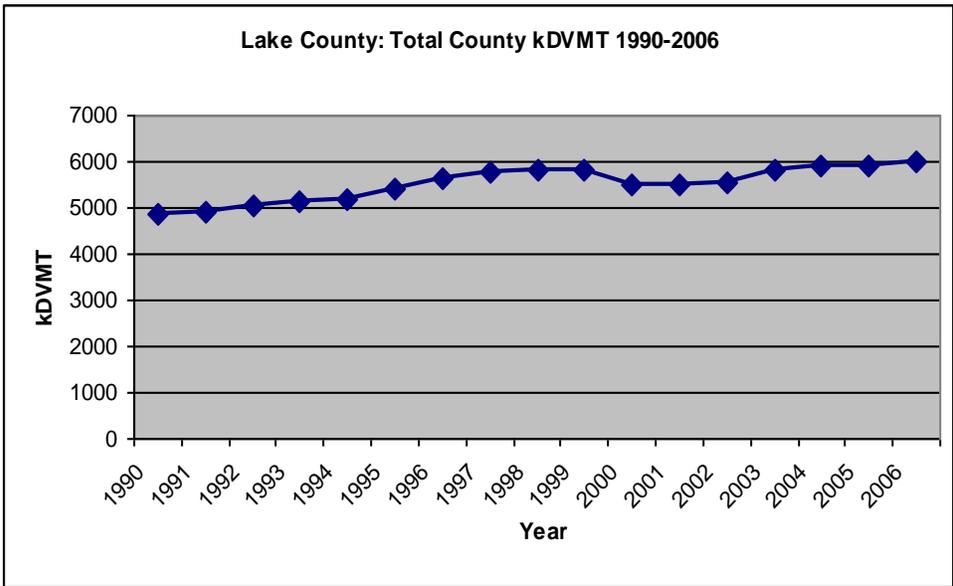
2006 = 2959.53



2004 = 28660.23

2005 = 28333.57

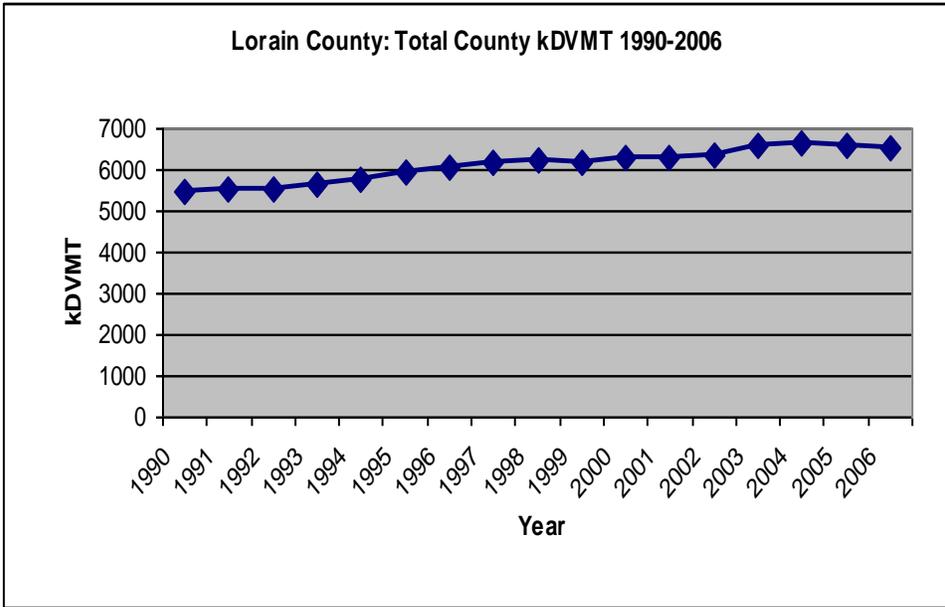
2006 = 28744.18



2004 = 5911.07

2005 = 5903.28

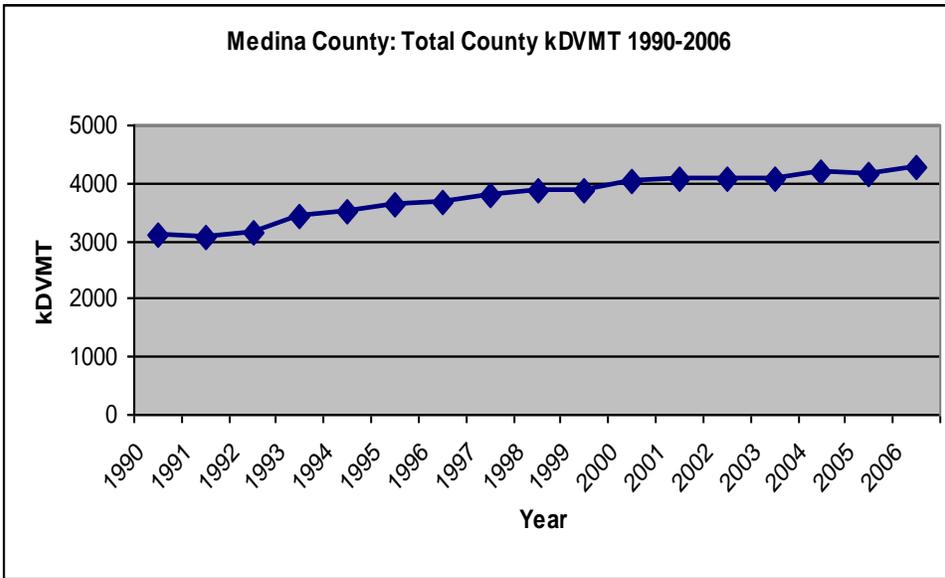
2006 = 5980.35



2004 = 6657.44

2005 = 6568.15

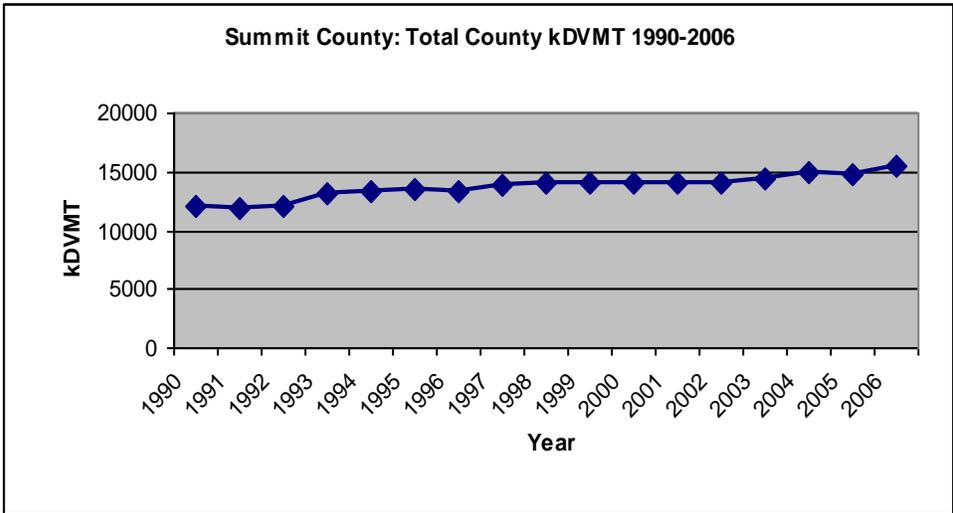
2006 = 6514.41



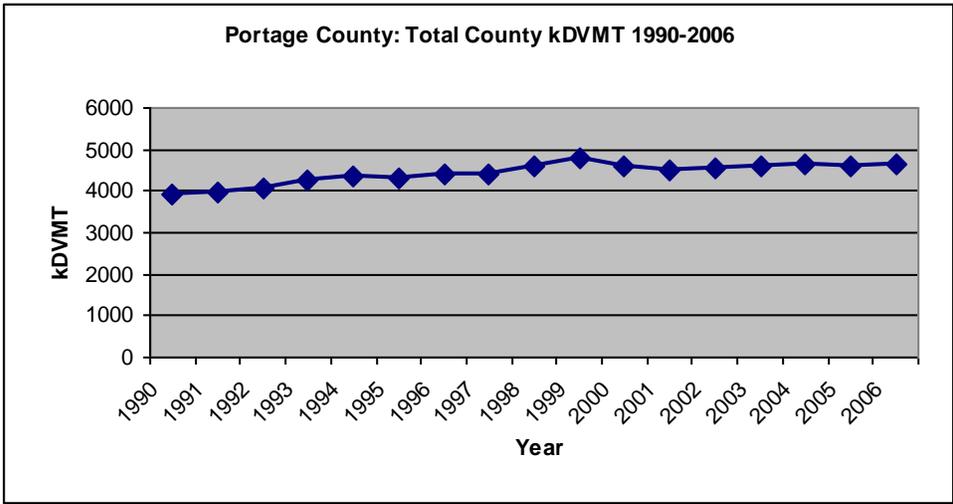
2004 = 4212.94

2005 = 4146.97

2006 = 4289.86



2004 = 14898.72 2005 = 14751.41 2006 = 15549.13



2004 = 4654.36 2005 = 4609.22 2006 = 4644.6

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Cuyahoga County receives the most of its work-commuters from Lorain, Lake and Summit counties and the least from Wayne County. Portage and Cuyahoga counties provide the most commuters to Summit County and Ashtabula has the least as shown in the tables below.

Ashtabula			Percent of workers that work outside the county		27.9%
			Average commute time in minutes -		23.9
Number of workers 16+ years of age living in Ashtabula County			45,689		
Number of workers 16+ years of age working in Ashtabula County			37,925		
Commute Out To			Number	Percent	
Lake Co. OH	5,775	12.6%			
Cuyahoga Co. OH	2,683	5.9%			
Geauga Co. OH	2,265	5.0%			
Trumbull Co. OH	485	1.1%			
Erie Co. PA	412	0.9%			
Mahoning Co. OH	151	0.3%			
Lorain Co. OH	134	0.3%			
Summit Co. OH	113	0.2%			
Portage Co. OH	100	0.2%			
Crawford Co. PA	91	0.2%			
Commute In From			Number	Percent	
Lake Co. OH	1,200	3.2%			
Trumbull Co. OH	892	2.4%			
Crawford Co. PA	644	1.7%			
Erie Co. PA	569	1.5%			
Cuyahoga Co. OH	397	1.0%			
Geauga Co. OH	257	0.7%			
Summit Co. OH	196	0.5%			
Mercer Co. PA	146	0.4%			
Lorain Co. OH	138	0.4%			
Portage Co. OH	127	0.3%			
Percent is of workers living in county.			Percent is of workers working in county.		

Cuyahoga			Percent of workers that work outside the county		9.1%
			Average commute time in minutes -		24.4
Number of workers 16+ years of age living in Cuyahoga County			622,876		
Number of workers 16+ years of age working in Cuyahoga County			748,630		
Commute Out To			Number	Percent	
Lake Co. OH	15,692	2.5%			
Summit Co. OH	14,207	2.3%			
Lorain Co. OH	9,289	1.5%			
Medina Co. OH	4,795	0.8%			
Geauga Co. OH	2,973	0.5%			
Portage Co. OH	2,632	0.4%			
Stark Co. OH	565	0.1%			
Franklin Co. OH	524	0.1%			
Ashtabula Co. OH	397	0.1%			
Cook Co. IL	298	0.0%			
Commute In From			Number	Percent	
Lorain Co. OH	36,888	4.9%			
Lake Co. OH	36,741	4.9%			
Summit Co. OH	34,476	4.6%			
Medina Co. OH	26,572	3.5%			
Geauga Co. OH	16,676	2.2%			
Portage Co. OH	11,934	1.6%			
Ashtabula Co. OH	2,683	0.4%			
Stark Co. OH	2,443	0.3%			
Trumbull Co. OH	1,976	0.3%			
Wayne Co. OH	1,193	0.2%			
Percent is of workers living in county.			Percent is of workers working in county.		

Geauga	Percent of workers that work outside the county		57.2%
	Average commute time in minutes -		27.0
Number of workers 16+ years of age living in Geauga County			44,499
Number of workers 16+ years of age working in Geauga County			34,417
Commute Out To	Number	Percent	Commute In From
Cuyahoga Co. OH	16,676	37.5%	Trumbull Co. OH
Lake Co. OH	5,276	11.9%	Lake Co. OH
Summit Co. OH	1,130	2.5%	Cuyahoga Co. OH
Portage Co. OH	1,002	2.3%	Ashtabula Co. OH
Trumbull Co. OH	310	0.7%	Portage Co. OH
Ashtabula Co. OH	257	0.6%	Summit Co. OH
Mahoning Co. OH	105	0.2%	Mahoning Co. OH
Stark Co. OH	82	0.2%	Lorain Co. OH
Lorain Co. OH	68	0.2%	Mercer Co. PA
Percent is of workers living in county.			Percent is of workers working in county.

Lake	Percent of workers that work outside the county		37.6%
	Average commute time in minutes -		22.9
Number of workers 16+ years of age living in Lake County			116,830
Number of workers 16+ years of age working in Lake County			102,913
Commute Out To	Number	Percent	Commute In From
Cuyahoga Co. OH	36,741	31.4%	Cuyahoga Co. OH
Geauga Co. OH	3,147	2.7%	Ashtabula Co. OH
Ashtabula Co. OH	1,200	1.0%	Geauga Co. OH
Summit Co. OH	1,157	1.0%	Summit Co. OH
Portage Co. OH	307	0.3%	Portage Co. OH
Lorain Co. OH	277	0.2%	Lorain Co. OH
Trumbull Co. OH	119	0.1%	Medina Co. OH
Stark Co. OH	108	0.1%	Stark Co. OH
Medina Co. OH	65	0.1%	Trumbull Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Lorain	Percent of workers that work outside the county		33.2%
	Average commute time in minutes -		22.8
Number of workers 16+ years of age living in Lorain County.			132,895
Number of workers 16+ years of age working in Lorain County			108,001
Commute Out To	Number	Percent	Commute In From
Cuyahoga Co. OH	36,888	27.8%	Cuyahoga Co. OH
Medina Co. OH	1,874	1.4%	Erie Co. OH
Erie Co. OH	1,594	1.2%	Huron Co. OH
Summit Co. OH	970	0.7%	Medina Co. OH
Huron Co. OH	421	0.3%	Ashland Co. OH
Lake Co. OH	342	0.3%	Summit Co. OH
Portage Co. OH	182	0.1%	Lake Co. OH
Ashtabula Co. OH	138	0.1%	Portage Co. OH
Franklin Co. OH	135	0.1%	Wayne Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Medina	Percent of workers that work outside the county		53.4%
	Average commute time in minutes -		26.4
Number of workers 16+ years of age living in Medina County			76,548
Number of workers 16+ years of age working in Medina County			55,311
Commute Out To	Number	Percent	Commute In From
Cuyahoga Co. OH	26,572	34.7%	Summit Co. OH
Summit Co. OH	8,647	11.3%	Cuyahoga Co. OH
Wayne Co. OH	1,726	2.3%	Wayne Co. OH
Lorain Co. OH	1,418	1.9%	Lorain Co. OH
Stark Co. OH	445	0.6%	Stark Co. OH
Portage Co. OH	322	0.4%	Ashland Co. OH
Ashland Co. OH	307	0.4%	Portage Co. OH
Lake Co. OH	307	0.4%	Huron Co. OH
Richland Co. OH	148	0.2%	Richland Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Portage	Percent of workers that work outside the county		49.6%
	Average commute time in minutes -		25.1
Number of workers 16+ years of age living in Portage County			78,023
Number of workers 16+ years of age working in Portage County			60,123
Commute Out To	Number	Percent	Commute In From
Summit Co. OH	19,049	24.4%	Summit Co. OH
Cuyahoga Co. OH	11,934	15.3%	Cuyahoga Co. OH
Geauga Co. OH	1,989	2.5%	Stark Co. OH
Stark Co. OH	1,578	2.0%	Trumbull Co. OH
Trumbull Co. OH	1,449	1.9%	Mahoning Co. OH
Mahoning Co. OH	603	0.8%	Geauga Co. OH
Lake Co. OH	436	0.6%	Medina Co. OH
Medina Co. OH	314	0.4%	Columbiana Co. OH
Columbiana Co. OH	182	0.2%	Lake Co. OH
Lorain Co. OH	152	0.2%	Lorain Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Summit	Percent of workers that work outside the county		25.0%
	Average commute time in minutes -		22.4
Number of workers 16+ years of age living in Summit County			258,414
Number of workers 16+ years of age working in Summit County			270,431
Commute Out To	Number	Percent	
Cuyahoga Co. OH	34,476	13.3%	
Portage Co. OH	9,702	3.8%	
Stark Co. OH	7,665	3.0%	
Medina Co. OH	5,248	2.0%	
Lake Co. OH	1,148	0.4%	
Wayne Co. OH	1,095	0.4%	
Lorain Co. OH	588	0.2%	
Geauga Co. OH	563	0.2%	
Mahoning Co. OH	460	0.2%	
Percent is of workers living in county.			
Commute In From	Number	Percent	
Stark Co. OH	21,094	7.8%	
Portage Co. OH	19,049	7.0%	
Cuyahoga Co. OH	14,207	5.3%	
Medina Co. OH	8,647	3.2%	
Wayne Co. OH	3,948	1.5%	
Lake Co. OH	1,157	0.4%	
Geauga Co. OH	1,130	0.4%	
Mahoning Co. OH	1,096	0.4%	
Trumbull Co. OH	1,038	0.4%	
Percent is of workers working in county.			

Wayne	Percent of workers that work outside the county		27.1%
	Average commute time in minutes -		19.4
Number of workers 16+ years of age living in Wayne County			54,487
Number of workers 16+ years of age working in Wayne County			52,259
Commute Out To	Number	Percent	
Medina Co. OH	4,667	8.6%	
Summit Co. OH	3,948	7.2%	
Stark Co. OH	1,672	3.1%	
Holmes Co. OH	1,247	2.3%	
Cuyahoga Co. OH	1,193	2.2%	
Ashland Co. OH	565	1.0%	
Richland Co. OH	297	0.5%	
Lorain Co. OH	145	0.3%	
Percent is of workers living in county.			
Commute In From	Number	Percent	
Stark Co. OH	3,026	5.8%	
Holmes Co. OH	2,411	4.6%	
Medina Co. OH	1,726	3.3%	
Ashland Co. OH	1,712	3.3%	
Summit Co. OH	1,095	2.1%	
Tuscarawas Co. OH	688	1.3%	
Richland Co. OH	443	0.8%	
Coshocton Co. OH	178	0.3%	
Percent is of workers working in county.			

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Cleveland-Akron area.

Factor 6: Topography/Land use/Land cover

Cuyahoga County is one of the most highly urbanized counties in Ohio. It is located within two physiographic Provinces: the glaciated Allegheny Plateau of the Appalachian Plateaus Province on the south and east and the Huron-Erie Lake Plains and Till Plains sections of the Central Lowland Province on the west and north (see Appendix F). The shore of Lake Erie is 569 feet above sea level. The city of Cleveland lies on a series of irregular bluffs lying roughly parallel to the lake. The land rises quickly from the lakeshore with an elevation of 791 feet above sea level at the Hopkins Airport five miles inland from the lake.

Lorain County is located on the eastern fringe of the till plain area of the Great Central Lowlands. The topography is generally flat to gently rolling. Exceptions to the nearly flat topography are the gorges of the Black River near Elyria and the Vermillion River at Mill Hollow.

Medina County includes parts of two physiographic Provinces; the Great Central Lowlands and the glaciated part of the Appalachian Plateau, each making up about half the county. The topography is generally level to sloping along stream valleys. The elevation ranges from 765 to 1,325 feet above sea level.

Summit County lies entirely within the glaciated Allegheny Plateau region. In the southern portion of the county, the topography is made up of a series of glacial till-covered plateaus and outwash-filled valleys. Elevations of the plateau are between 1,100 and 1,200 feet above sea level and the valleys are about 950 to 1,000 feet. The northern portion of the county has greater elevation because the old valley fill has been dissected by the Cuyahoga River and its tributaries. The highest point in Summit County is 1,320 feet near West Richfield. The lowest point is about eight miles away, along the Cuyahoga River where the river leaves the county.

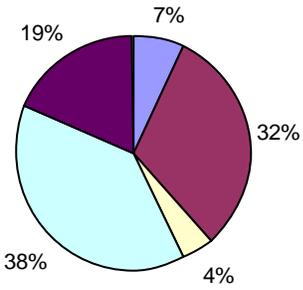
Portage County is located in the northwestern part of the glaciated Allegheny Plateau and lies on the divide between the Lake Erie and the Ohio River basins. The relief of the county is generally level with gently rolling plateaus. Elevation ranges from 910 feet to 1,340.

Geauga County is part of the Appalachian Plateau region. The relief of the county is primarily gently sloping and steeper slopes along streams. The lowest elevation is 770 feet along the Chagrin River at the Geauga-Lake County line, and the highest elevation is 1,396 feet at Sugarloaf Mountain in the south-central part of the county.

Ashtabula County is in two contrasting major physiographic Provinces. The northern part of the county is in the Eastern Lake Section of the Central Lowland Province while the southern part of the county is in the Southern New York Section of the Appalachian Plateau Province. The relief of the county is primarily level and gently undulating in the northern, western and south central parts of the county. Elevation ranges from 572 feet to 1,100 feet above sea level, with steep areas along the streams.

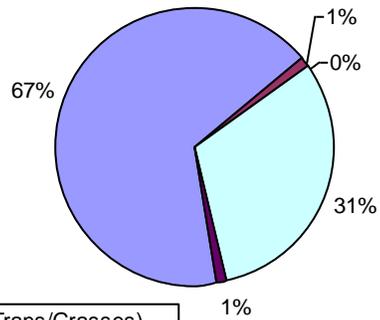
As shown in the following pie charts, the land use/land cover in Cuyahoga and Summit counties, as expected is predominately residential, commercial and industrial. However, both have fairly large percentages of forest areas like Portage, Lake and Ashtabula counties. Lorain County has the largest percentage of cropland with Ashtabula and Portage coming in a close second and third.

Ashtabula County Land Use/Land Cover



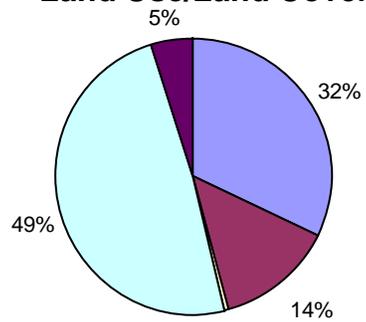
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Cuyahoga County Land Use/Land Cover



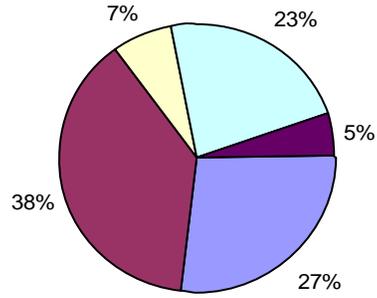
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Lake County Land Use/Land Cover



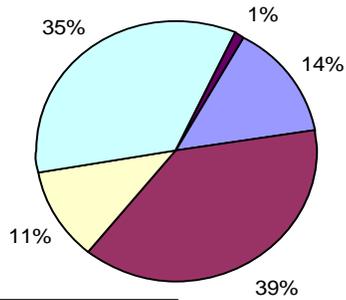
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

**Lorain County
Land Use/Land Cover**



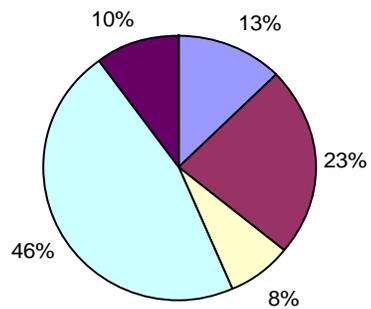
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

**Medina County
Land Use/Land Cover**

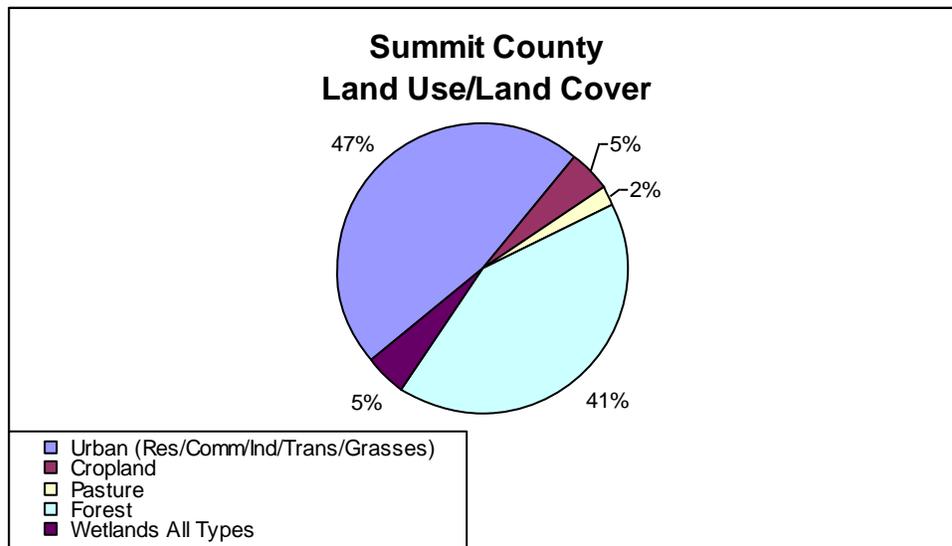


- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

**Portage County
Land Use/Land Cover**



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types



Factor 7: Jurisdictional boundaries

The Cleveland-Elyria-Mentor, OH Metropolitan Statistical Area includes Cuyahoga, Geauga, Lake, Lorain and Medina counties in Ohio. The principal cities are Cleveland, Elyria and Mentor.

The Northeast Ohio Areawide coordinating Agency (NOACA) is the planning agency designated as the Metropolitan Planning Organization for the greater Cleveland area. The NOACA region is composed of five counties: Cuyahoga, Geauga, Lake, Lorain and Medina.

The Akron Metropolitan Area Transportation Study (AMATS) is the planning agency designated as the MPO for the Akron area. The AMATS region is composed of two counties: Summit and Portage.

Factor 8: Level of control of emission sources

In the Cleveland-Akron-Lorain area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road motor vehicle control program
- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- NO_x RACT
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) affecting this area.

Columbus, OH

Current county nonattainment:

Delaware, Fairfield, Franklin, Licking, Coshocton



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment:

Delaware, Fairfield, Franklin, Licking



Source: Office of Strategic Research, Ohio Department of Development

Discussion

There are three total monitors in the Columbus area, all located in Franklin County. Franklin County contains two violating monitors. Delaware, Fairfield and Licking counties are included in the nonattainment area due to the current significant population, projected upward trend in growth and significant commuting into Franklin County. As a result they are considered contributing counties. The exception is Coshocton County which is included as a partial county in the nonattainment area. The Conesville power plant is located in Coshocton County and is a source of significant emissions. However, the facility is installing additional scrubbers and has installed NO_x controls in response to the CAIR and NO_x trading programs, respectively. Ohio EPA does not believe the emissions from the Conesville power plant will contribute to future violations at the monitors located in Franklin County and therefore is recommending that Coshocton County be excluded from this nonattainment area. The adjacent counties of Marion, Union, Madison, Pickaway, Hocking, Perry, Muskingum, and Knox have low emissions, low population and insignificant commuting into Franklin County and do not warrant further discussion.

The three-year average of the 98th percentile is being exceeded at two monitors in Franklin County. The three-year annual average concentration is not being exceeded at any of the monitors in Franklin County as shown in the tables below.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-049-0024	Franklin	35.1	45.0	34.0	 38
39-049-0025		35.5	44.9	34.0	 38
39-049-0081		34.1	34.7	 31.2	33

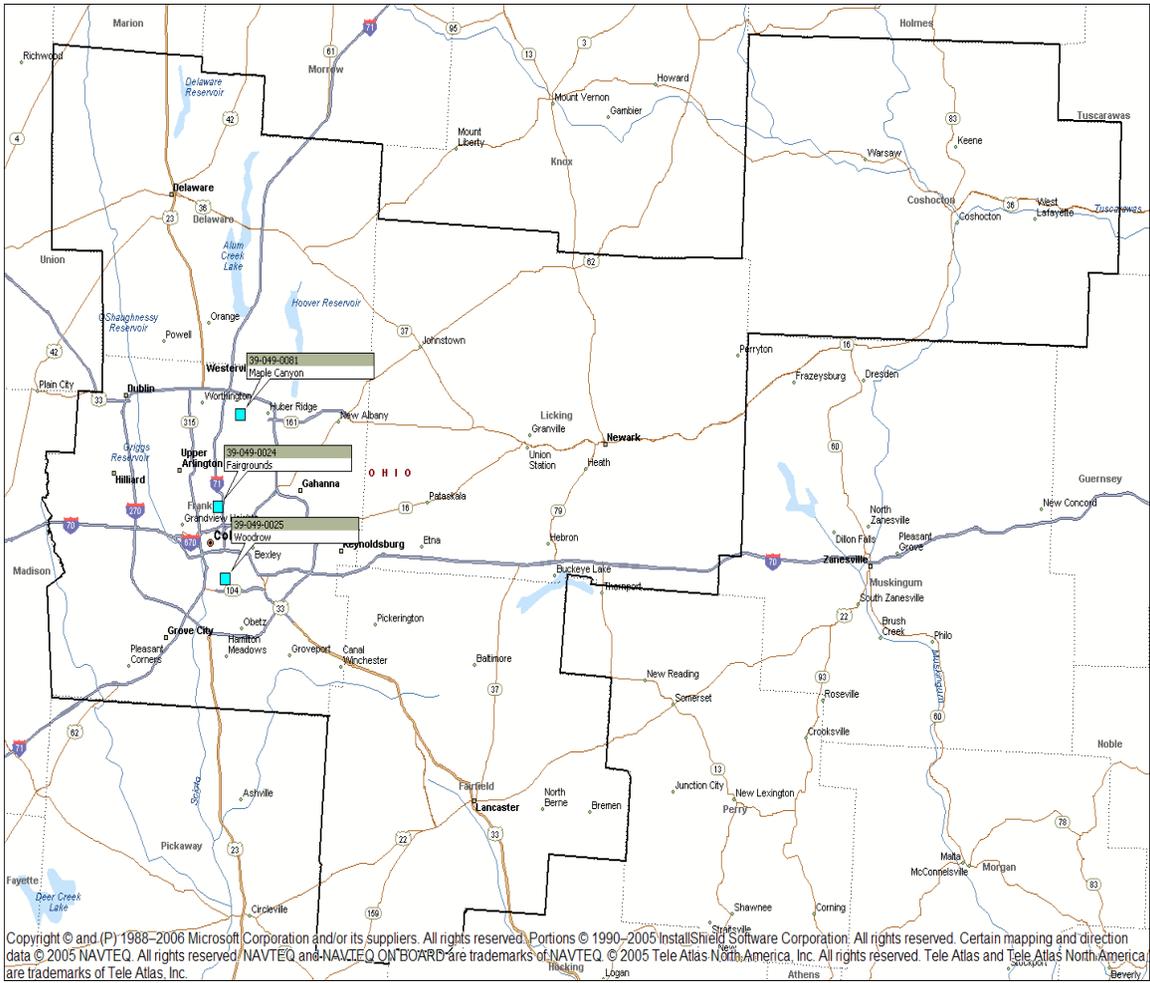
 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
39-049-0024	Franklin	15.0	16.4	13.6	15.0
39-049-0025		14.6	16.5	13.8	15.0
39-049-0081		13.6	14.6	 12.9	13.7

 Sites with less than 75% capture

Columbus PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emission data
(tons per day)

2005			
County	SO₂	NO_x	PM_{2.5}
FRANKLIN	6.52	105.67	4.44
DELAWARE	1.34	18.64	1.22
FAIRFIELD	1.42	16.89	1.46
LICKING	1.23	20.30	3.54
Coshocton (P)	364.00	55.98	2.75
Knox	0.38	5.86	0.68
Morrow	0.40	6.81	0.54
Marion	1.59	9.82	1.17
Union	0.72	6.73	0.49
Madison	0.53	9.08	0.47
Fayette	0.37	5.97	0.41
Pickaway	33.08	12.19	0.89
Ross	64.54	17.99	1.16
Hocking	0.28	5.46	0.57
Muskingum	1.74	12.01	1.30
Perry	0.19	3.89	0.48

2009			
County	SO₂	NO_x	PM_{2.5}
FRANKLIN	3.35	107.23	4.10
DELAWARE	0.57	19.19	1.11
FAIRFIELD	0.90	15.49	1.37
LICKING	0.67	19.52	3.44
Coshocton (P)	103.71	17.80	6.73
Knox	0.15	5.06	0.64
Morrow	0.21	6.73	0.49
Marion	1.33	11.31	1.16
Union	0.37	8.05	0.45
Madison	0.19	8.71	0.39
Fayette	0.14	6.26	0.37
Pickaway	0.35	9.99	0.80
Ross	64.33	19.16	1.16
Hocking	0.22	5.40	0.56
Muskingum	1.49	11.17	1.25
Perry	0.10	4.12	0.47

Major Employers

Source: Ohio Department of Development 2007

Most of the major employers in the Columbus area are in the categories of manufacturing, government, service and trade as shown below.

Delaware County

Delaware City Bd of Ed	Government
JP Morgan Chase & Co	Finance
Kroger Co	Trade
McGraw Hill Companies	Manufacturing
Ohio Wesleyan University	Service
OhioHealth/Grady Memorial Hospital	Service
Olentangy Local Bd of Ed	Government
PPG Industries Inc	Manufacturing
Showa Corp/American Showa Inc	Manufacturing
State of Ohio	Government

Fairfield County

Anchor Hocking Corp	Manufacturing
Cyril-Scott Co	Manufacturing
Fairfield Medical Center	Service
Kroger Co	Trade
Lancaster City Bd of Ed	Government
McDermott Int'l/Diamond Power	Manufacturing
Meijer Inc	Trade
Pickerington Local Bd of Ed	Government
Ralcorp/Ralston Foods	Manufacturing
State of Ohio	Government

Franklin County

Abbott Laboratories/Ross Products	Manufacturing
American Electric Power Co	Utility
Battelle Memorial Institute	R&D
Cardinal Health Inc	Trade
Huntington Bancshares Inc	Finance
JP Morgan Chase & Co	Finance
Limited Brands Inc	Trade
National City Corp	Finance
Nationwide Mutual Insurance Co	Insurance
Ohio State University	Government
OhioHealth	Service
Schottenstein Stores Corp	Trade
State of Ohio	Government
Wendy's International Inc	Trade

Licking County

Anomatic Corp	Manufacturing
ArvinMeritor Inc	Manufacturing
Boeing Co	Service
Denison University	Service
Kroger Co	Trade
Licking Memorial Health Systems	Service
Newark City Bd of Ed	Government
Owens-Corning	Manufacturing
State Farm Mutual Automobile Ins Co	Insurance

Coshocton County

AK Steel Holding Corp	Manufacturing
American Electric Power Co	Utility
Coshocton City Bd of Ed	Government
Coshocton County Government	Government
Coshocton County Memorial Hospital	Service
Kraft Foods Inc	Manufacturing
McWane Corp/Clow Water Systems	Manufacturing
Riverview Local Bd of Ed	Government
Smurfit-Stone Container Corp	Government

Factor 3: Population and Projected Growth

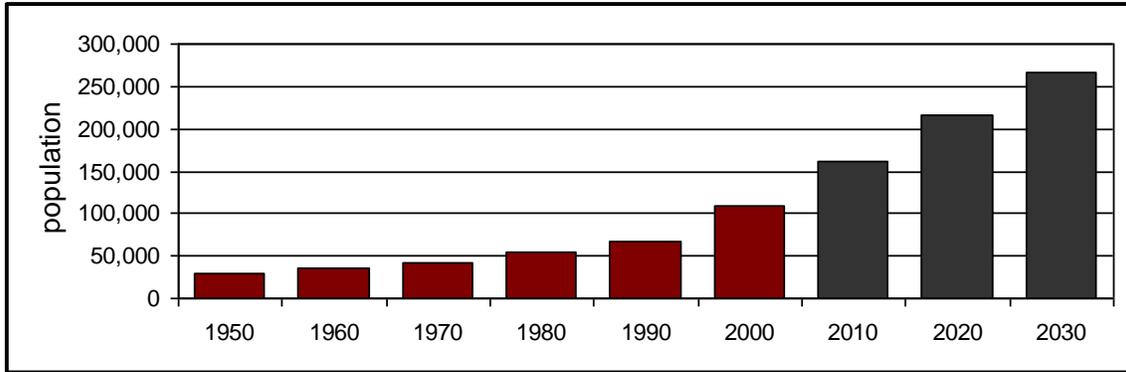
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The largest populated places in the Columbus area are; the greater Columbus area in Franklin County; Delaware, Powell and Sunbury in Delaware County; Lancaster and Canal Winchester and Pickerington in Fairfield County; Newark, Pataskala, Heath and Hebron in Licking County; Coshocton in Coshocton County.

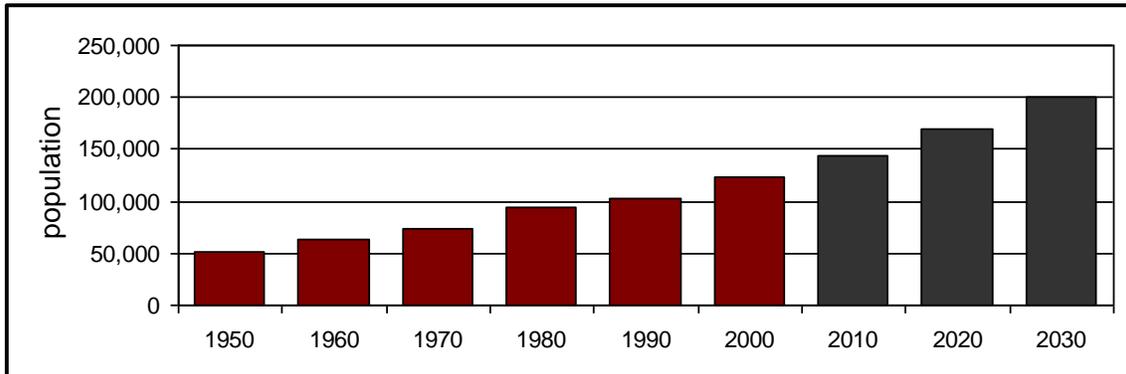
As expected, Franklin County has the highest population in this area. All of the surrounding counties are projected to experience an upward trend in population as shown in the table below.

COUNTY	2004	2005	2006	2010	2020	2030
Delaware	142,849	150,496	156,697	161,730	215,480	266,200
Fairfield	135,857	138,403	140,591	143,860	169,540	201,010
Franklin	1,086,152	1,089,365	1,095,662	1,155,910	1,238,250	1,326,180
Licking	152,699	154,683	156,287	161,280	179,050	198,760
Coshocton (P)	37,070	36,969	36,976	37,070	37,700	37,610
Knox	57,676	58,207	58,561	60,600	65,940	69,890
Morrow	34,080	34,309	34,529	34,410	36,890	38,650
Marion	66,031	65,834	65,583	66,210	67,190	68,200
Union	44,689	45,600	46,702	50,740	64,570	85,190
Madison	40,927	41,220	41,496	43,130	45,190	46,520
Fayette	28,044	28,193	28,305	28,680	29,570	30,290
Pickaway	52,010	52,837	53,606	55,680	58,200	59,980
Ross	74,749	75,135	75,556	78,380	82,930	87,430
Hocking	28,864	28,927	28,973	29,840	31,000	31,500
Muskingum	85,419	85,606	86,125	87,300	91,140	94,560
Perry	35,033	35,106	35,313	36,920	39,500	41,990

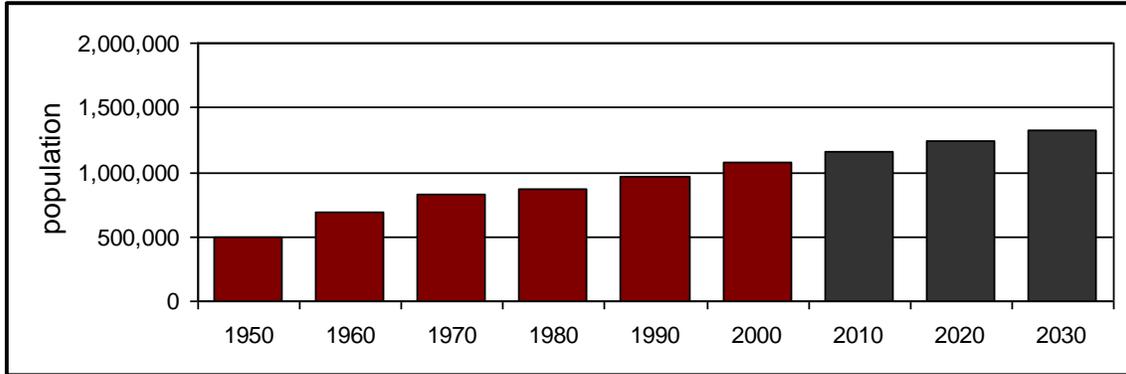
Delaware County



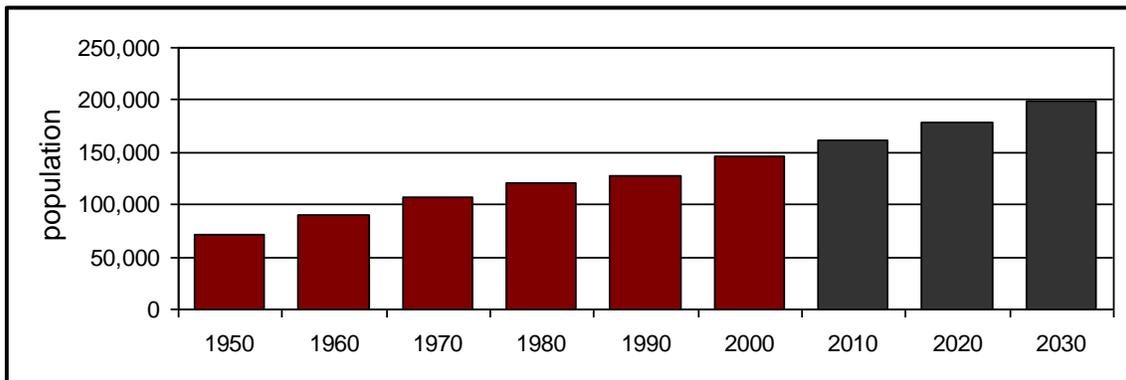
Fairfield County



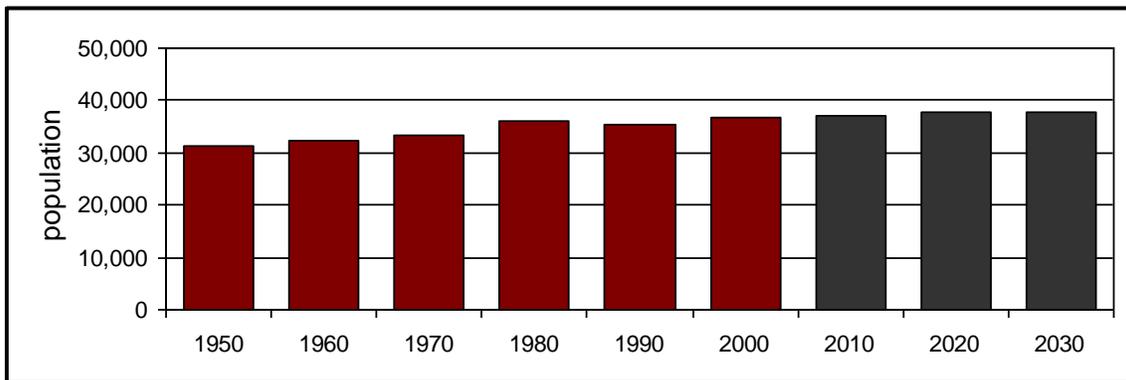
Franklin County



Licking County



Coshocton County

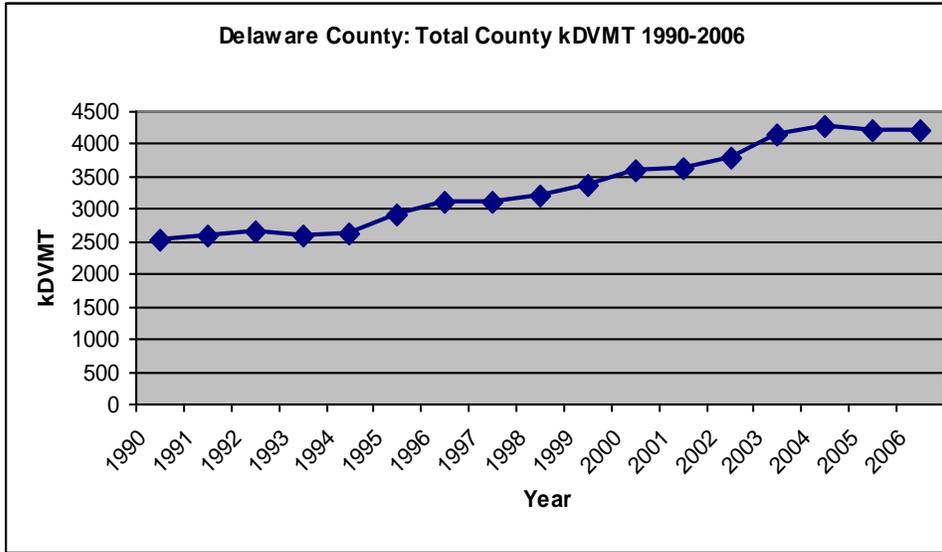


Factor 4: Traffic and commuting patterns

The kDVMT between 2004 and 2006 in the Columbus area have remained fairly constant as shown in the graphs below. Franklin County has the highest level of kDVMT and Coshocton has the lowest. Franklin County was the only county in this area to have an increase in kDMVT between 2005 and 2006.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

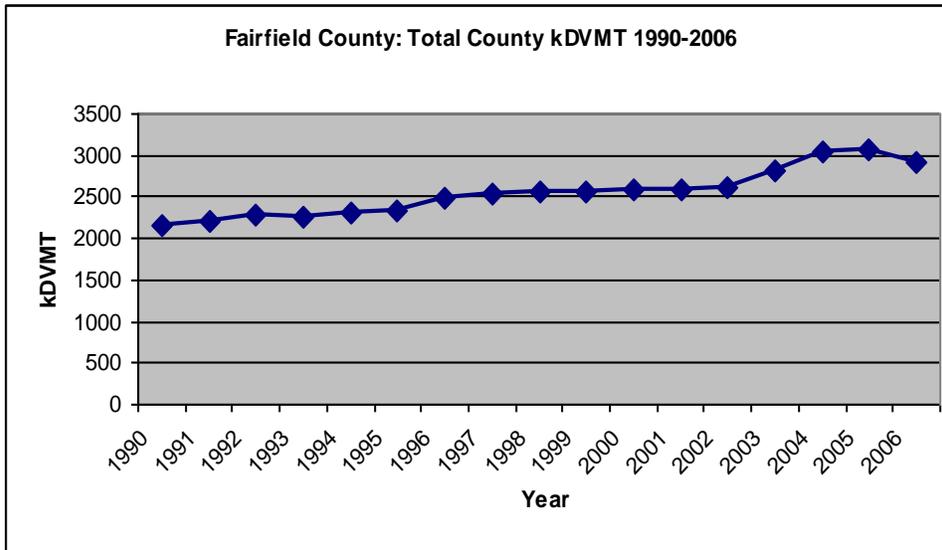
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 4264.16

2005 = 4211.03

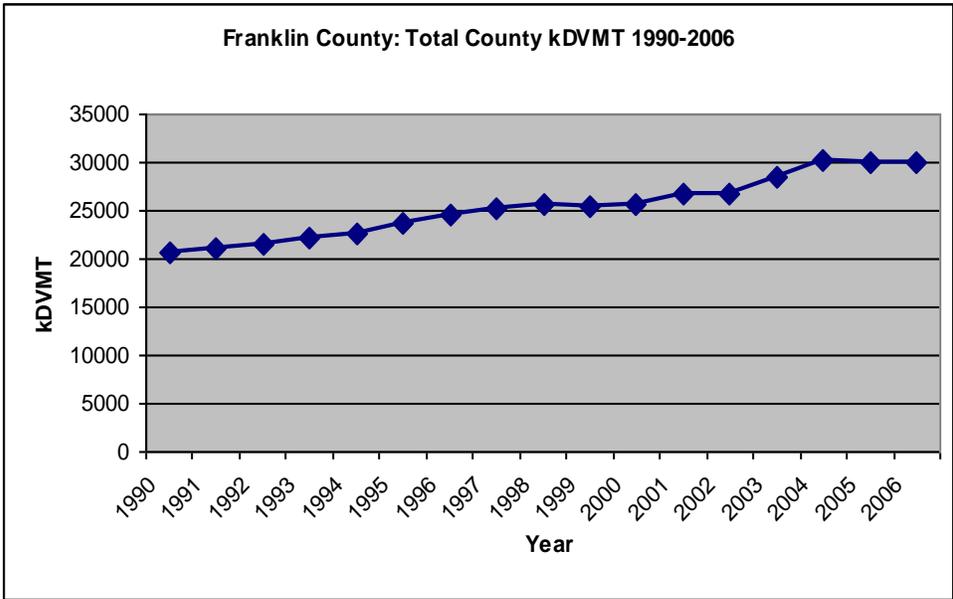
2006 = 4207.91



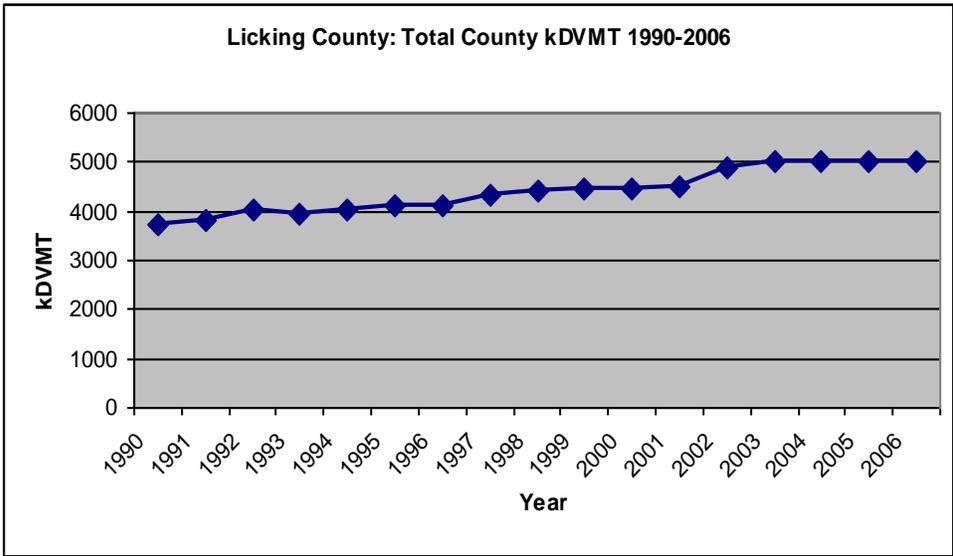
2004 = 3045.87

2005 = 3060.66

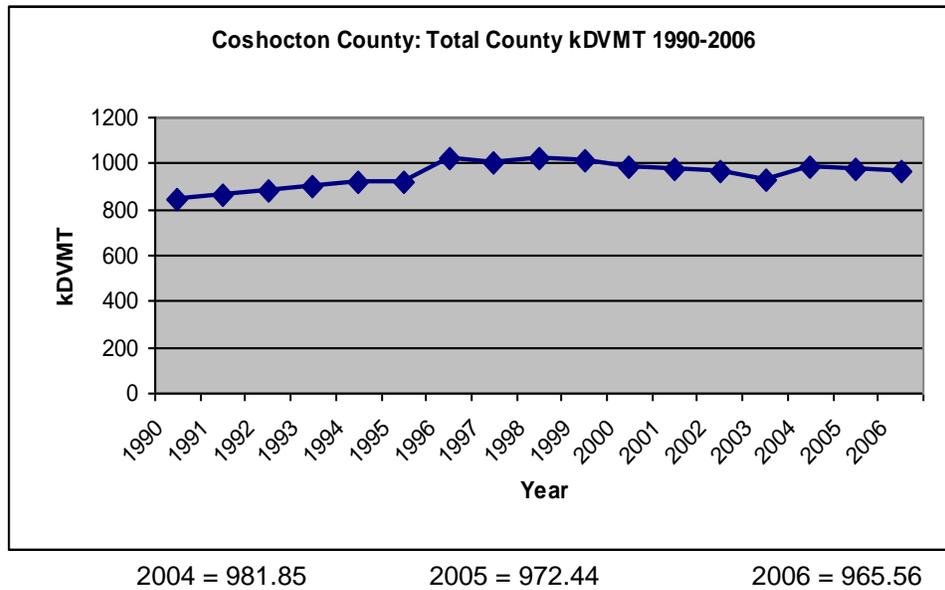
2006 = 2916.9



2004 = 30154.82 2005 = 29924.29 2006 = 30097.22



2004 = 5009.4 2005 = 5030.04 2006 = 4994.54



Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Delaware, Fairfield and Licking counties each have a high level of commuters traveling into Franklin County. The majority of Franklin County workers commuting outside the county, travel to Delaware County. Coshocton County has a low level of commuting and a very insignificant number traveling to Franklin County.

Delaware		Percent of workers that work outside the county		63.5%	
		Average commute time in minutes -		26.5	
Number of workers 16+ years of age living in Delaware County			57,840		
Commute Out To	Number	Percent			
Franklin Co. OH	31,708	54.8%			
Union Co. OH	1,782	3.1%			
Marion Co. OH	839	1.5%			
Licking Co. OH	374	0.6%			
Knox Co. OH	218	0.4%			
Logan Co. OH	200	0.3%			
Morrow Co. OH	172	0.3%			
Madison Co. OH	111	0.2%			
Fairfield Co. OH	102	0.2%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Delaware County			43,463		
Commute In From	Number	Percent			
Franklin Co. OH	14,222	32.7%			
Morrow Co. OH	1,983	4.6%			
Marion Co. OH	1,609	3.7%			
Licking Co. OH	900	2.1%			
Union Co. OH	890	2.0%			
Knox Co. OH	831	1.9%			
Fairfield Co. OH	395	0.9%			
Madison Co. OH	174	0.4%			
Richland Co. OH	129	0.3%			
Percent is of workers working in county.					

Fairfield	Percent of workers that work outside the county		55.8%
	Average commute time in minutes -		27.7
Number of workers 16+ years of age living in Fairfield County			60,465
Number of workers 16+ years of age working in Fairfield County			36,957
Commute Out To	Number	Percent	Commute In From
Franklin Co. OH	28,259	46.7%	Franklin Co. OH
Licking Co. OH	1,563	2.6%	Perry Co. OH
Pickaway Co. OH	1,289	2.1%	Hocking Co. OH
Delaware Co. OH	395	0.7%	Licking Co. OH
Hocking Co. OH	361	0.6%	Athens Co. OH
Perry Co. OH	273	0.5%	Pickaway Co. OH
Ross Co. OH	255	0.4%	Muskingum Co. OH
Muskingum Co. OH	158	0.3%	Ross Co. OH
Athens Co. OH	142	0.2%	Delaware Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Franklin	Percent of workers that work outside the county		7.3%
	Average commute time in minutes -		21.9
Number of workers 16+ years of age living in Franklin County			548,655
Number of workers 16+ years of age working in Franklin County			652,261
Commute Out To	Number	Percent	Commute In From
Delaware Co. OH	14,222	2.6%	Delaware Co. OH
Union Co. OH	4,527	0.8%	Fairfield Co. OH
Licking Co. OH	4,089	0.7%	Licking Co. OH
Fairfield Co. OH	3,261	0.6%	Pickaway Co. OH
Madison Co. OH	1,903	0.3%	Madison Co. OH
Pickaway Co. OH	1,517	0.3%	Union Co. OH
Montgomery Co. OH	612	0.1%	Morrow Co. OH
Marion Co. OH	590	0.1%	Knox Co. OH
Hamilton Co. OH	552	0.1%	Perry Co. OH
Logan Co. OH	506	0.1%	Ross Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Licking	Percent of workers that work outside the county		40.4%
	Average commute time in minutes -		24.8
Number of workers 16+ years of age living in Licking County			71,213
Number of workers 16+ years of age working in Licking County			56,215
Commute Out To	Number	Percent	Commute In From
Franklin Co. OH	23,755	33.4%	Franklin Co. OH
Muskingum Co. OH	1,100	1.5%	Muskingum Co. OH
Fairfield Co. OH	915	1.3%	Perry Co. OH
Delaware Co. OH	900	1.3%	Fairfield Co. OH
Knox Co. OH	744	1.0%	Knox Co. OH
Perry Co. OH	107	0.2%	Coshocton Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Coshocton			Percent of workers that work outside the county		27.2%
			Average commute time in minutes -		22.4
Number of workers 16+ years of age living in Coshocton County			16,585		
Number of workers 16+ years of age working in Coshocton County			13,993		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Muskingum Co. OH	1,393	8.4%	Tuscarawas Co. OH	709	5.1%
Tuscarawas Co. OH	780	4.7%	Muskingum Co. OH	464	3.3%
Holmes Co. OH	774	4.7%	Guernsey Co. OH	210	1.5%
Licking Co. OH	536	3.2%	Licking Co. OH	92	0.7%
Franklin Co. OH	271	1.6%	Knox Co. OH	71	0.5%
Wayne Co. OH	178	1.1%	Holmes Co. OH	68	0.5%
Knox Co. OH	100	0.6%	Franklin Co. OH	34	0.2%
Percent is of workers living in county.			Percent is of workers working in county.		

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Columbus area.

Factor 6: Topography/Land use/Land cover

Delaware County is in the Central Lowland Province (see Appendix F). The highest elevation is 1,239 feet and the lowest is 754 feet above sea level. The western and central parts of the county consist of an almost level plain at about 950 feet. The eastern part of the county rises to about 1,200 feet.

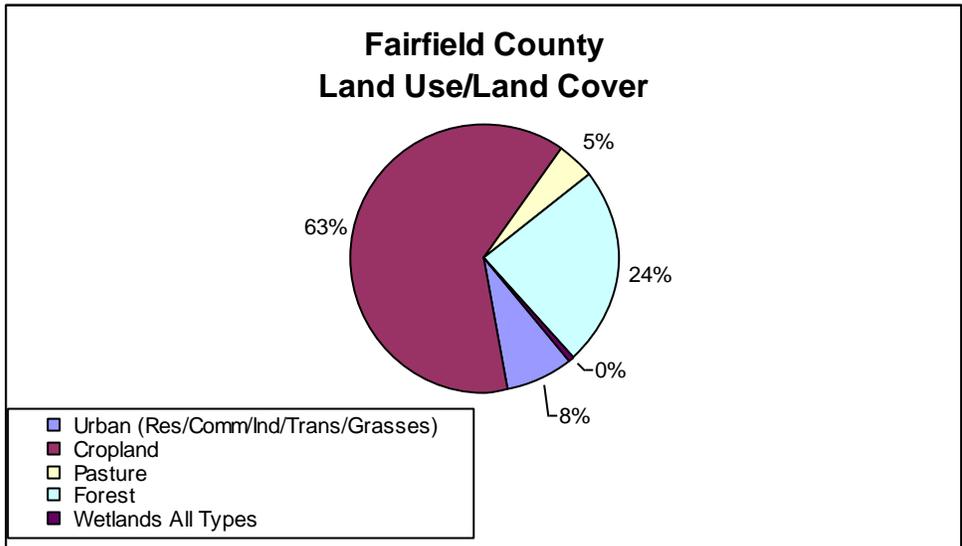
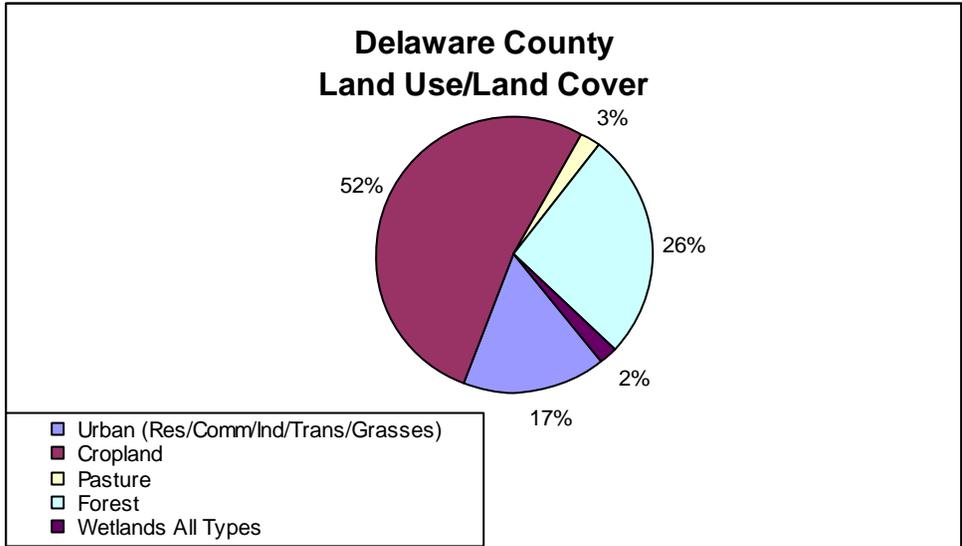
Fairfield County is in the Allegheny Plateau and the Central Lowland Provinces. Relief of the county can be nearly level to strongly undulating with steep-sided ridges and very rugged. In the southeastern part of the county, in the unglaciated section of the Allegheny Plateau, the relief from the ridgetops to the flood plains can be about 250 to 300 feet.

Franklin County is within the glaciated till plains of the Central Lowland Province. The elevation in the county ranges from 1,130 feet in the northeast corner to about 670 feet along the southern border where the Scioto River leave the county. The relief is nearly level to gently rolling.

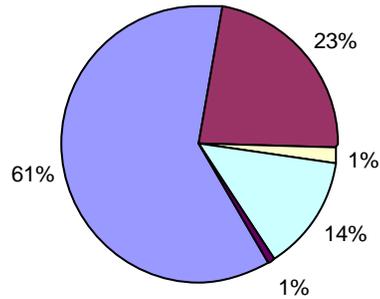
Licking County is in two physiographic Provinces. The eastern third is part of the Allegheny Plateau Province, and the rest is on the eastern edge of the glaciated section of the Central Lowlands Province. The elevation ranges from about 1,360 feet to 740 feet above sea level. Relief throughout the west-central part of the county is gently undulating and rolling to moderately steep to very steep. The eastern part of the county has hilly topography with a relief of about 200 feet between ridgetops and flood plains.

Coshocton County is primarily located within the Western Allegheny Plateau area. A very small area along the west-central edge of the county is in the Eastern Ohio Till Plain area. The unglaciated portion of the county is characterized by steep or very steep hillsides and narrow valleys. Relief is generally high. Elevation ranges from 1,300 feet to 720 feet above sea level.

As shown in the following pie charts, the land use/land cover in as expected Franklin County has the highest percentage of urban area. Coshocton County has the largest percentage of forest area while Delaware, Fairfield and Licking counties have a significant percentage of cropland.

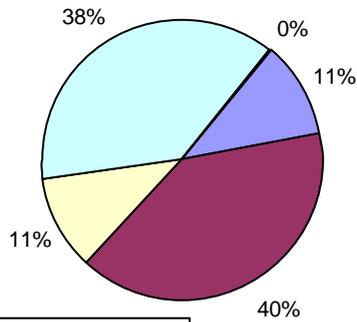


Franklin County Land Use/Land Cover



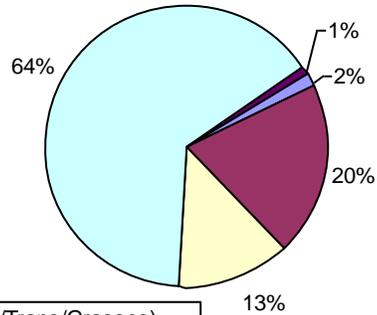
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Licking County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Coshocton County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Factor 7: Jurisdictional boundaries

The Columbus, OH Metropolitan Statistical Area includes: Delaware, Fairfield, Franklin, Licking, Madison, Morrow, Pickaway and Union counties. The principal city is Columbus.

The Mid-Ohio regional Planning Commission (MORPC) is the planning agency designated as the Metropolitan Planning Organization for the greater Columbus area. The MORPC region is composed of two counties: Delaware and Franklin.

The Licking County Area Transportation Study (LCATS) is the planning agency designated as the MPO for Licking County.

Factor 8: Level of control of emission sources

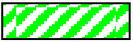
In the Columbus area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR and local on-road and off-road reductions are the programs which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal).

Dayton-Springfield, OH

Current county nonattainment: Clark, Greene, Montgomery

 Current nonattainment counties  Current partial nonattainment

Recommended county nonattainment: Greene, Montgomery



Source: Office of Strategic Research, Ohio Department of Development

Discussion

There are three counties in this existing PM_{2.5} nonattainment area; Clark, Greene and Montgomery. Ohio EPA recommends retaining Greene and Montgomery counties as nonattainment for the Dayton-Springfield area. Montgomery County has a violating monitor and significant population. Greene County has a high level of commuting into Montgomery County Ohio EPA is recommending attainment for Clark County due to no monitor violations, low emissions and low level of commuting into Montgomery County. There are four adjacent counties that are discussed in this section; Preble, Darke, Miami and Champaign. Madison, Fayette and Clinton are also adjacent counties but they are included in the Columbus and Cincinnati sections respectively. The 2005 SO₂ and NO_x emissions in Montgomery County are not high but are forecasted to remain relatively constant into 2009. Clark, Greene and the adjacent counties have low emissions.

The three-year average of the 98th percentile and the three-year annual average concentration at site 39-113-0032 in Montgomery County are not attaining the 24-hour revised standard or the annual standard.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-023-0005	Clark	32.1	41.6	30.5	35
39-057-0005	Greene	27.7	40.0	26.5	31
39-113-0031	Montgomery	31.5	42.9	28.9	34
39-113-0032		32.5	45.0	30.3	36
39-135-1001	Preble	27.7	39.0	28.7	32

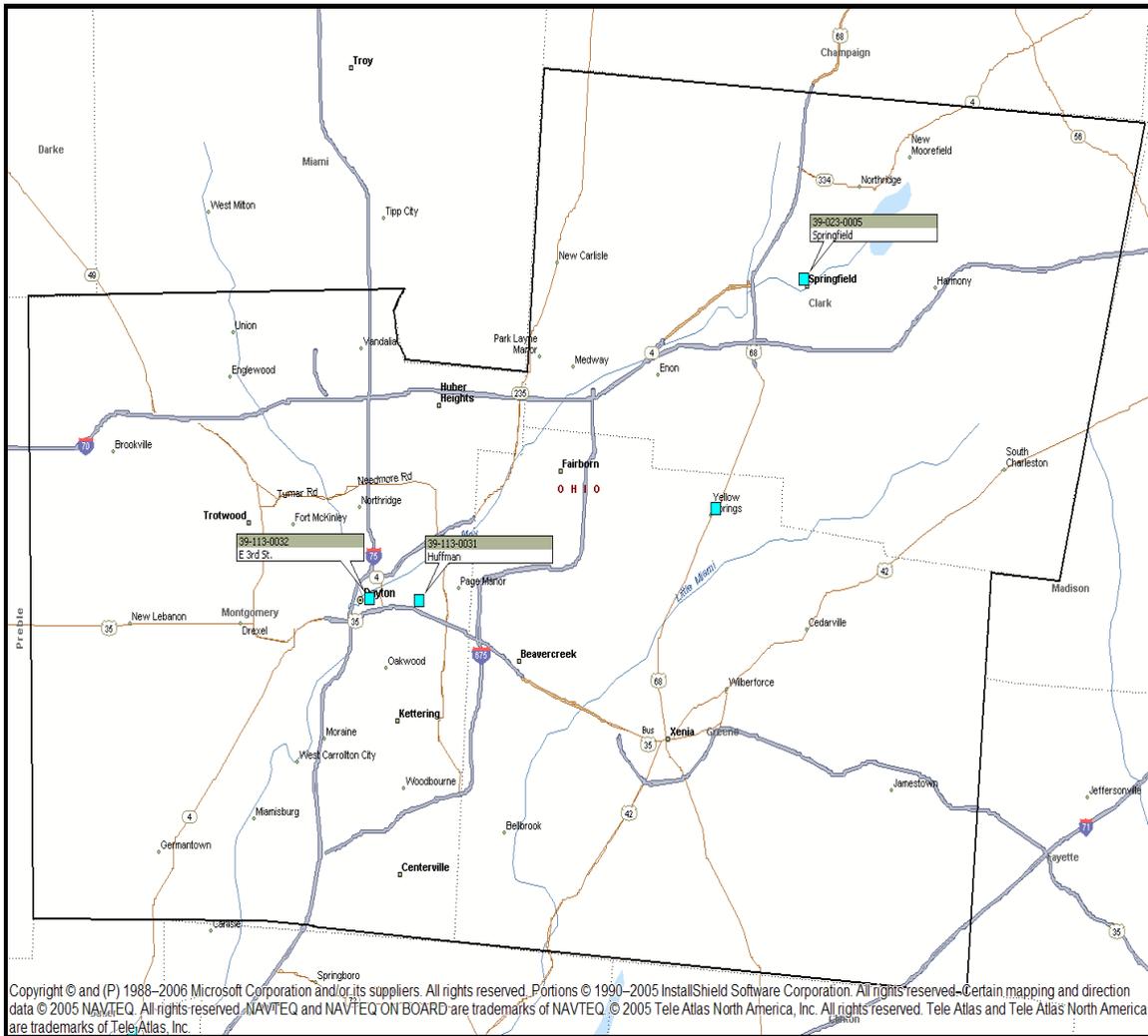
 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
39-023-0005	Clark	13.5	16.7	13.1	14.4
39-057-0005	Greene	12.1	15.5	11.9	13.2
39-113-0031	Montgomery	13.9	16.8	13.1	14.6
39-113-0032		14.5	17.4	13.6	15.2
39-135-1001	Preble	12.5	15.6	12.5	13.5

 Sites with less than 75% capture

Dayton-Springfield Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data
(tons per day)

2005			
County	SO₂	NO_x	PM_{2.5}
MONTGOMERY	40.69	65.88	3.72
CLARK	0.91	15.94	0.81
GREENE	3.60	20.63	1.11
Preble	0.50	7.80	0.47
Darke	0.54	7.30	0.47
Miami	0.70	11.80	0.77
Champaign	0.60	4.79	0.34

2009			
County	SO₂	NO_x	PM_{2.5}
MONTGOMERY	45.39	58.52	3.35
CLARK	0.49	14.22	0.73
GREENE	3.11	18.46	1.03
Preble	0.26	6.65	0.40
Darke	0.23	6.83	0.41
Miami	19.33	14.59	1.73
Champaign	0.41	4.59	0.30

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Dayton-Springfield area are in the categories of service, government and manufacturing as shown below.

Clark County

Assurant Inc	Insurance
Community Mercy Health Partners	Service
Dole Fresh Vegetables	Manufacturing
Gordon Food Service	Trade
International Truck and Engine Corp	Manufacturing
Marathon/Speedway SuperAmerica LLC	Trade
Mercy Medical Center	Service
Ohio Masonic Home	Service
Springfield City Bd of Ed	Government
Wittenberg University	Service

Greene County

Beavercreek Local Bd of Ed	Government
Cedarville University	Service
Fairborn City Bd of Ed	Government
Fifth Third Bank	Finance
General Electric Co/Unison Industries	Manufacturing
Greene Memorial Hospital	Service
SAIC Inc	Service
Supervalu Inc	Trade
US Federal Govt/Wright Patterson AFB	Government
Wright State University	Government
Xenia Community City Board of Education	Government

Montgomery County

Behr Dayton Thermal Products LLC	Manufacturing
Dayton City Bd of Ed	Government
DPL Inc/Dayton Power & Light Co	Utility
General Motors Corp	Manufacturing
Kettering Medical Center	Service
NCR Corp	Manufacturing
Premier Health Partners Inc	Service
Reed Elsevier/LexisNexis	Service
Reynolds & Reynolds Co Inc	Manufacturing
University of Dayton	Service
US Federal Government	Government

Factor 3: Population and Projected Growth

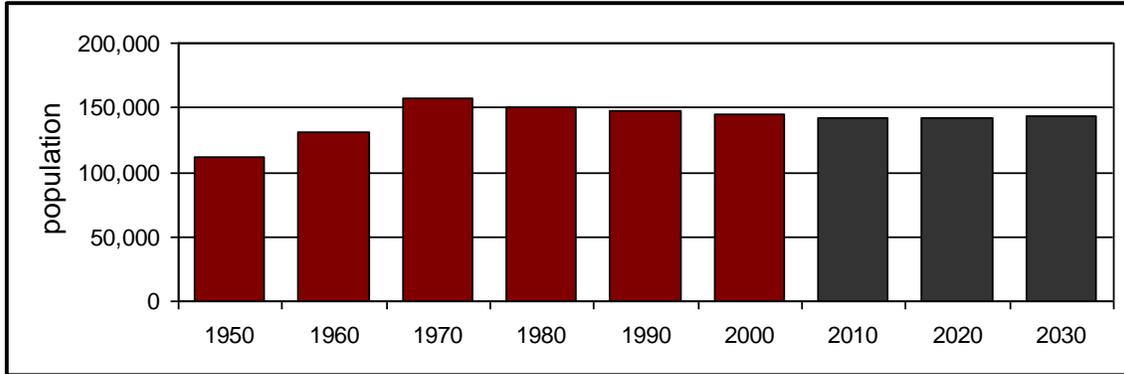
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Dayton-Springfield area are; Springfield and Enon in Clark County; Xenia, Beavercreek and Fairborn in Greene County; Dayton and Kettering in Montgomery County.

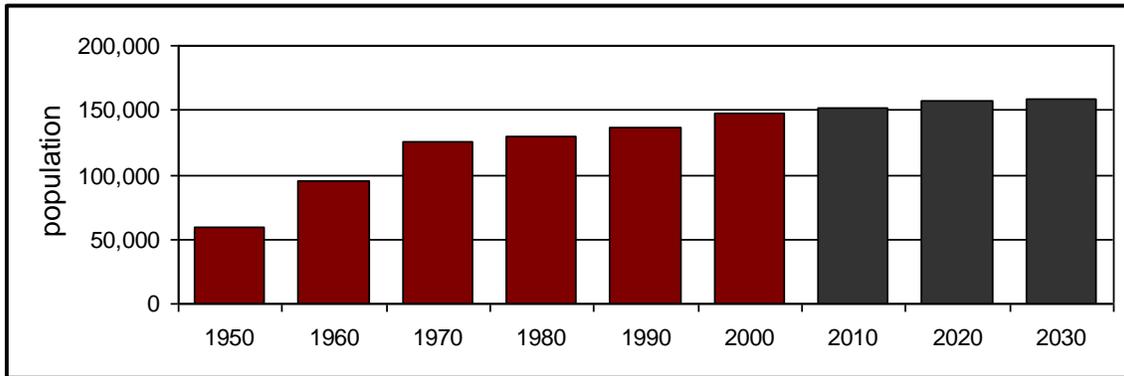
As indicated in the following table and graphs, Montgomery County has the highest population in this area and it is projected to steadily decrease. The population in Clark, Preble and Darke counties is projected remain fairly constant with only slight increases. Greene, Miami and Champaign are projected to experience gradual increases.

COUNTY	2004	2005	2006	2010	2020	2030
Clark	142,230	141,908	141,872	142,300	141,660	143,960
Greene	151,892	151,823	152,298	151,760	156,590	158,860
Montgomery	548,561	545,603	542,237	540,420	528,800	524,060
Preble	42,423	42,400	42,491	44,200	45,070	45,380
Darke	53,074	52,967	52,780	52,730	52,550	52,710
Miami	100,670	101,414	101,914	103,460	106,770	107,930
Champaign	39,540	39,692	39,921	41,270	44,050	47,020

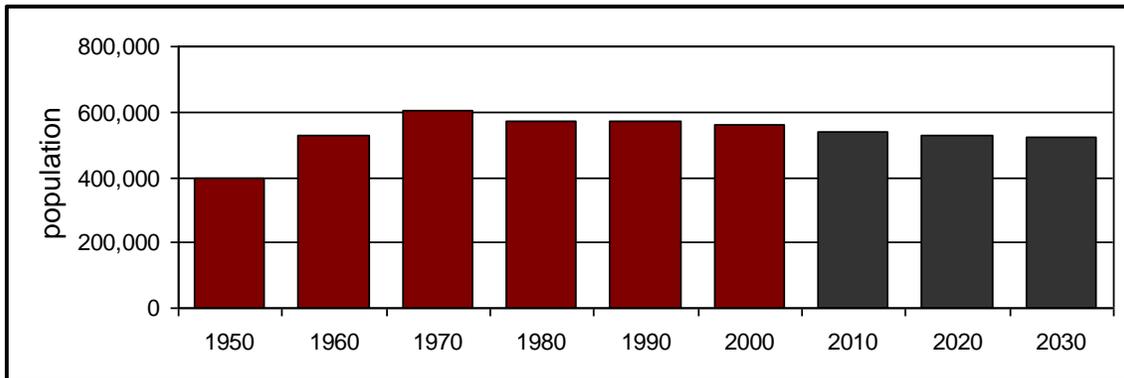
Clark County



Greene County



Montgomery County

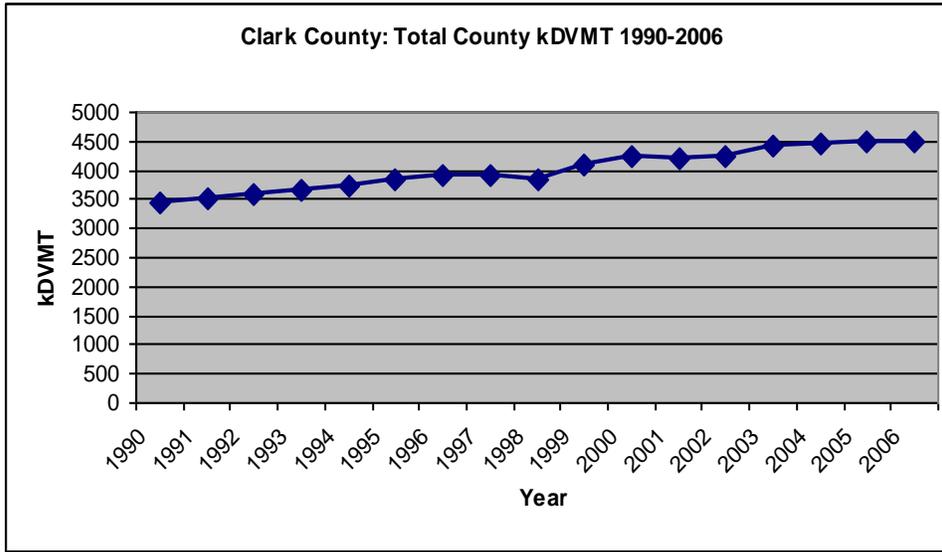


Factor 4: Traffic and commuting patterns

The kDVMT in the Dayton-Springfield area have had remained generally constant with only minor variations from 2004 to 2006. Montgomery and Greene counties had slight increases in kDVMT between 2005 and 2006 while Clark County had a slight decrease as shown in the graphs below.

Estimated Vehicle Miles Traveled (kDVMT = in thousands)

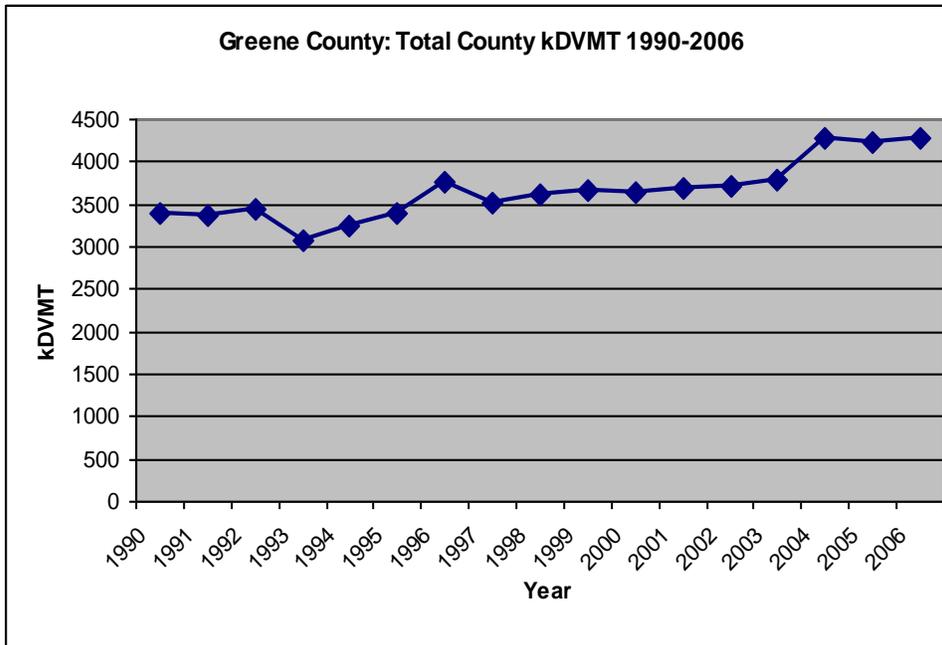
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 4453.71

2005 = 4498.94

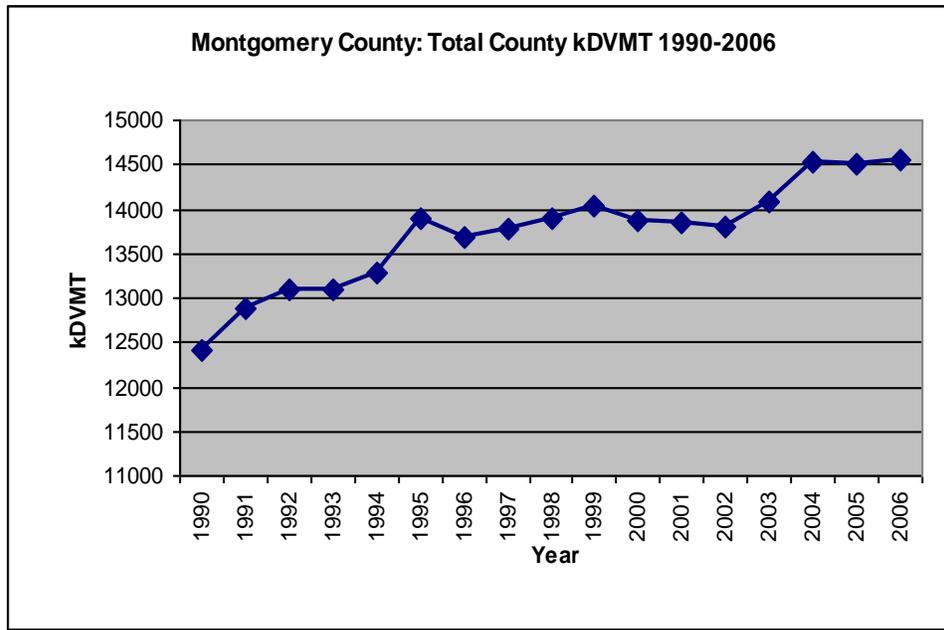
2006 = 4475.04



2004 = 4276.57

2005 = 4238.33

2006 = 4281.29



2004 = 14537.46

2005 = 14506.09

2006 = 14541.39

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Montgomery receives a high number of commuters from Greene County and in turn, Greene County receives a similar number of commuters from Montgomery County. Clark County commuters travel to Montgomery and Greene counties but in lower numbers as shown in the following tables.

Clark		Percent of workers that work outside the county		31.5%
		Average commute time in minutes -		21.6
Number of workers 16+ years of age living in Clark County				65,887
Commute Out To	Number	Percent		
Montgomery Co. OH	7,856	11.9%		
Greene Co. OH	5,508	8.4%		
Franklin Co. OH	1,437	2.2%		
Champaign Co. OH	1,299	2.0%		
Miami Co. OH	1,240	1.9%		
Madison Co. OH	1,092	1.7%		
Union Co. OH	775	1.2%		
Hamilton Co. OH	205	0.3%		
Logan Co. OH	186	0.3%		
Shelby Co. OH	132	0.2%		
Percent is of workers living in county.				
Number of workers 16+ years of age working in Clark County				57,637
Commute In From	Number	Percent		
Champaign Co. OH	3,493	6.1%		
Montgomery Co. OH	2,517	4.4%		
Greene Co. OH	2,516	4.4%		
Miami Co. OH	882	1.5%		
Franklin Co. OH	446	0.8%		
Madison Co. OH	373	0.6%		
Logan Co. OH	256	0.4%		
Preble Co. OH	142	0.2%		
Warren Co. OH	125	0.2%		
Fayette Co. OH	124	0.2%		
Percent is of workers working in county.				

Greene	Percent of workers that work outside the county		44.5%
	Average commute time in minutes -		20.3
Number of workers 16+ years of age living in Greene County			72,958
Number of workers 16+ years of age working in Greene County			76,312
Commute Out To	Number	Percent	Commute In From
Montgomery Co. OH	24,925	34.2%	Montgomery Co. OH
Clark Co. OH	2,516	3.4%	Clark Co. OH
Clinton Co. OH	808	1.1%	Miami Co. OH
Warren Co. OH	797	1.1%	Warren Co. OH
Hamilton Co. OH	610	0.8%	Clinton Co. OH
Miami Co. OH	522	0.7%	Butler Co. OH
Franklin Co. OH	441	0.6%	Hamilton Co. OH
Butler Co. OH	358	0.5%	Champaign Co. OH
Fayette Co. OH	350	0.5%	Franklin Co. OH
Champaign Co. OH	121	0.2%	Preble Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Montgomery	Percent of workers that work outside the county		18.6%
	Average commute time in minutes -		21.2
Number of workers 16+ years of age living in Montgomery County			259,419
Number of workers 16+ years of age working in Montgomery County			288,140
Commute Out To	Number	Percent	Commute In From
Greene Co. OH	24,214	9.3%	Greene Co. OH
Miami Co. OH	4,722	1.8%	Miami Co. OH
Warren Co. OH	4,488	1.7%	Warren Co. OH
Hamilton Co. OH	2,698	1.0%	Clark Co. OH
Butler Co. OH	2,622	1.0%	Preble Co. OH
Clark Co. OH	2,517	1.0%	Butler Co. OH
Franklin Co. OH	1,022	0.4%	Darke Co. OH
Preble Co. OH	933	0.4%	Hamilton Co. OH
Champaign Co. OH	675	0.3%	Clinton Co. OH
Darke Co. OH	647	0.2%	Champaign Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Dayton-Springfield area.

Factor 6: Topography/Land use/Land cover

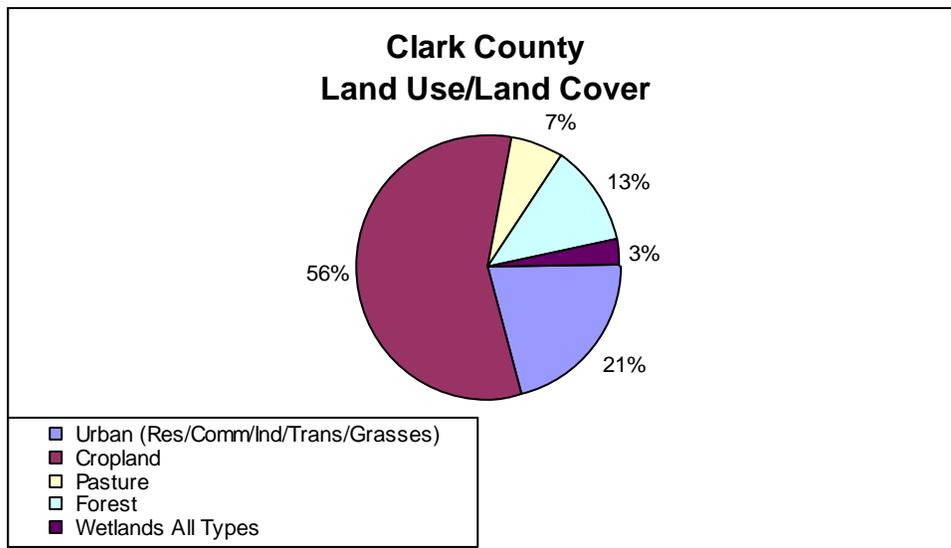
Clark County lies within the glaciated till plains of the Central Lowlands Province (see Appendix F). Relief ranges from nearly level to steep, but the land surface is predominately undulating. The highest elevation in the county is 1,250 feet above sea level close to Catawba near the Champaign County line. The lowest

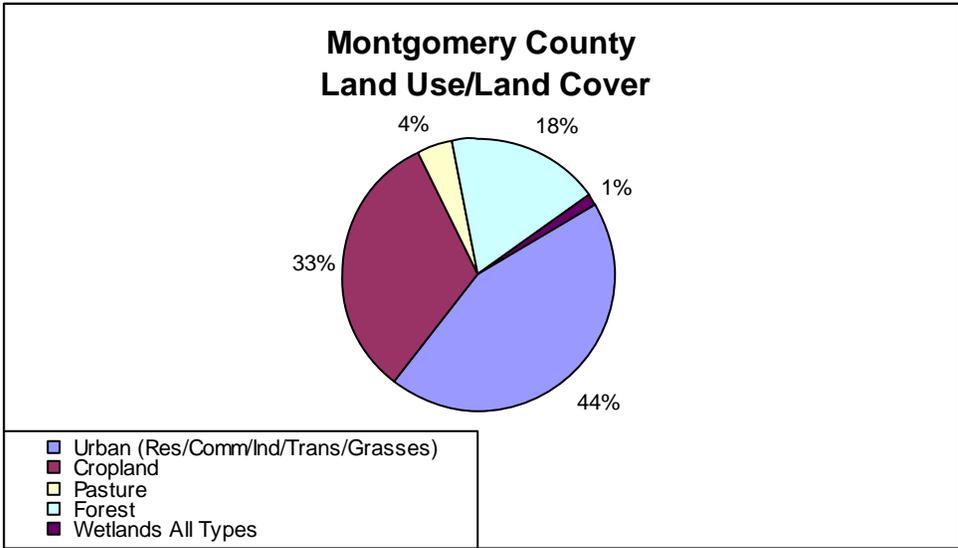
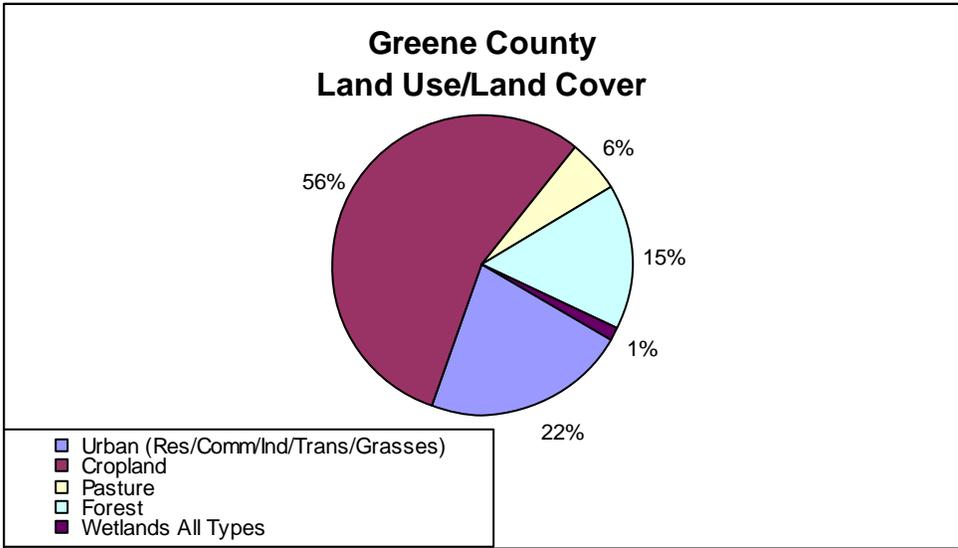
elevation is 820 feet in the southwest corner where the Mad River crosses the county line.

Greene County is located in the glaciated till plains of the Central Lowlands Province. Relief varies very little throughout the county. The eastern part is nearly level to gently undulating, while the central and western part of the county is more pronounced with undulating to rolling hills.

Montgomery County, like Greene and Clark counties, lies within the glaciated till plains of the Central Lowlands Province. The relief varies greatly throughout the county, from nearly level to significant relief changes along the Great Miami River, Stillwater River and other drainageways.

As shown in the following pie charts, the land use/land cover in Montgomery County has the highest percentage of urban area. Clark and Greene counties share very similar characteristics with nearly the same percentage of all categories.





Factor 7: Jurisdictional boundaries

The Dayton, OH Metropolitan Statistical Area includes: Greene, Miami, Montgomery and Preble counties. The principal city is Dayton. The Springfield, OH MSA includes Clark County. The principal city is Springfield.

The Miami Valley regional Planning Commission (MVRPC) is the planning agency designated as the Metropolitan Planning Organization for the region composed of three counties: Greene, Miami and Montgomery counties. The cities of Franklin and Carlisle in Warren County are part of the Miami Valley regional Planning Commission (MVRPC) planning area.

The Clark County-Springfield Transportation Coordinating Committee (CCSTCC) is the planning agency designated as the MPO for the region composed of Clark County.

Factor 8: Level of control of emission sources

In the Dayton-Springfield area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) impacting the nonattainment monitor in Montgomery County. This area is just north of the Ohio River and north of several coal-fired electric utilities. The major units in this area have, or will be, controlling NO_x and SO₂ emissions in response to the NO_x trading program and CAIR programs.

Huntington-Ashland, WV-KY-OH

Current county nonattainment: Lawrence, Scioto, Adams (P), Gallia (P)



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment: None



Source: Office of Strategic Research, Ohio Department of Development

Discussion

There are no violating monitors in Lawrence or Scioto counties. Adams County contains the DP&L Killen Generating Station and the DP&L J.M. Stuart Generating Station. Gallia County contains the Ohio Power Gavin power plant and the Ohio Valley Electric Corporation Kyger Creek power plant. The 2005 SO₂ emissions in Adams and Gallia counties are high but as part of the CAIR requirements, it is forecasted that significant reductions in emissions will occur. The counties in this area have low population and growth, low kDVMT and no significant levels of commuters.

Ohio EPA is recommending attainment for Lawrence and Scioto counties due to no monitor violations, low population and insignificant commuting. Due to the location of the monitor in Lawrence County, it is likely the levels being detected are coming from across the Ohio River. The low emissions demonstrate that Lawrence and Scioto counties are not a significant source of PM_{2.5}. In addition, Ohio EPA is recommending attainment for Adams and Gallia counties due to the forecasted reductions as a result of the CAIR requirements and the low population and insignificant commuting in these counties.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-087-0010	Lawrence	31.2	38.5	30.8	34
39-145-0013	Scioto	29.4	40.3	30.5	33

Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
39-087-0010	Lawrence	13.7	17.0	14.4	15.0
39-145-0013	Scioto	13.0	16.2	14.3	14.5

Sites with less than 75% capture

West Virginia

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile ($\mu\text{g}/\text{m}^3$)

Site	County	2004	2005	2006	24-Hour Average
		54-011-0006	Cabell, WV	30.9	

Sites with less than 75% capture

AQS: Annual Average ($\mu\text{g}/\text{m}^3$)

Site	County	2004	2005	2006	Annual Average
		54-011-0006	Cabell, WV	15.2	

Sites with less than 75% capture

Kentucky

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile ($\mu\text{g}/\text{m}^3$)

Site	County	2004	2005	2006	24-Hour Average
		21-019-0017	Boyd, KY	30.3	
21-043-0500	Carter, KY	24.5	37.2	25.5	29

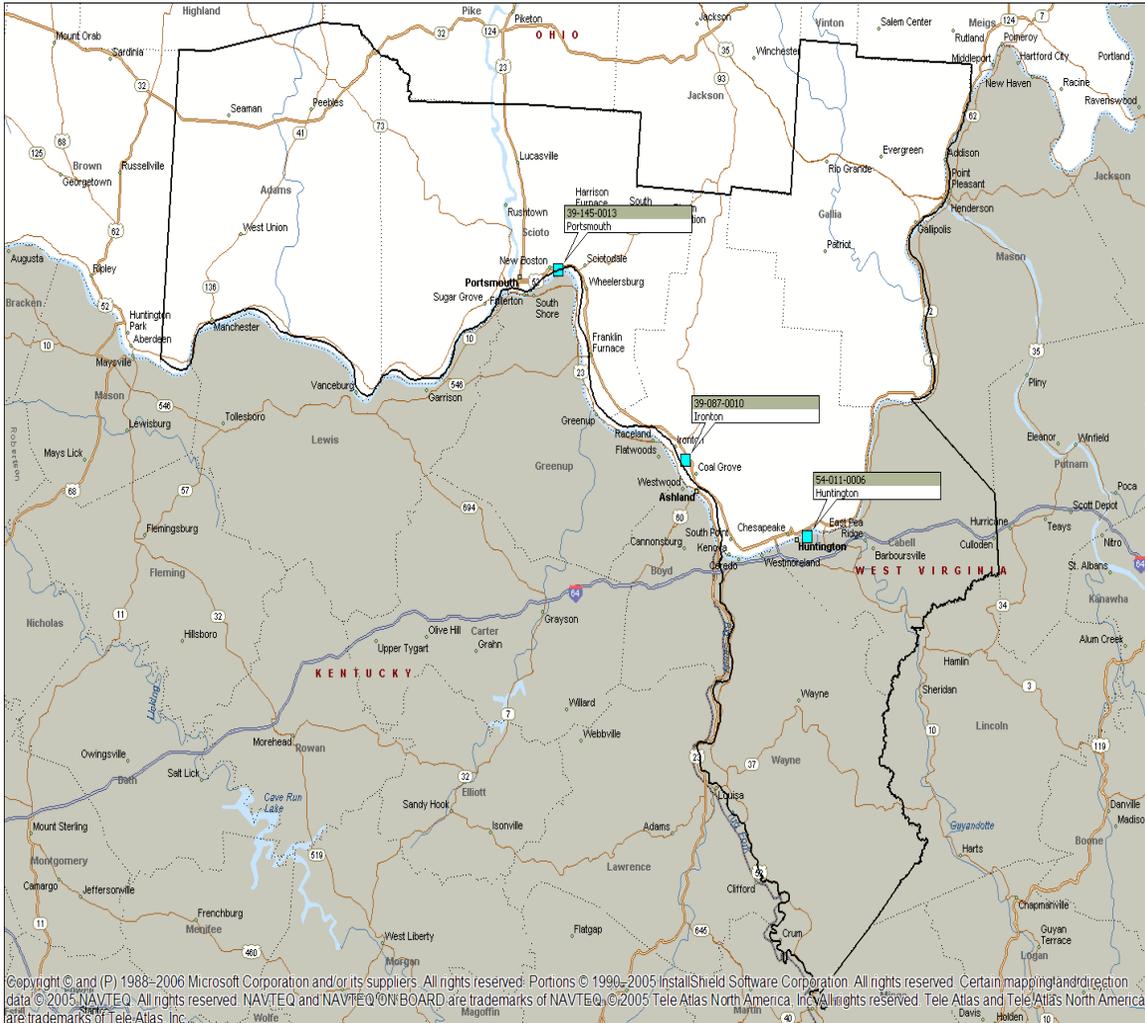
Sites with less than 75% capture

AQS: Annual Average ($\mu\text{g}/\text{m}^3$)

Site	County	2004	2005	2006	Annual Average
		21-019-0017	Boyd, KY	13.3	
21-043-0500	Carter, KY	11.1	13.6	11.5	12.1

Sites with less than 75% capture

Huntington-Ashland Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data
(tons per year)

2005			
County	SO₂	NO_x	PM_{2.5}
LAWRENCE	0.37	7.49	0.51
SCIOTO	3.03	10.32	0.70
Adams (P)	400.96	34.23	10.93
Gallia (P)	249.47	34.01	3.21
Highland	0.37	4.73	0.53
Pike	3.95	4.68	0.70
Jackson	0.17	2.92	0.42
Vinton	0.08	1.52	0.23
Meigs	0.20	3.36	0.28

2009			
County	SO₂	NO_x	PM_{2.5}
LAWRENCE	0.26	7.82	0.51
SCIOTO	2.88	11.04	0.69
Adams (P)	63.08	24.80	11.19
Gallia (P)	64.76	32.32	11.53
Highland	0.18	4.17	0.48
Pike	3.88	5.34	0.70
Jackson	0.11	3.82	0.43
Vinton	0.05	1.39	0.22
Meigs	0.14	3.59	0.28

West Virginia

2005			
County	SO₂	NO_x	PM_{2.5}
Cabell	4.60	17.36	2.34
Mason	0.57	8.71	0.70
Wayne	2.52	23.04	1.14
Kanawha	11.31	50.39	3.44
Putnam	2.99	8.15	0.82

2009			
County	SO₂	NO_x	PM_{2.5}
Cabell	3.89	11.19	1.91
Mason	123.92	38.50	8.06
Wayne	2.31	17.87	0.87
Kanawha	55.32	56.03	4.01
Putnam	71.14	28.99	9.86

Kentucky

2005			
County	SO ₂	NO _x	PM _{2.5}
Boyd	31.14	28.70	4.85
Carter	0.27	0.60	0.69
Greenup	6.15	8.20	0.73
Lewis	1.21	7.28	0.61

2009			
County	SO ₂	NO _x	PM _{2.5}
Boyd	31.14	30.63	4.88
Carter	2.81	0.59	0.74
Greenup	7.82	8.18	0.75
Lewis	1.20	8.17	0.62

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Huntington-Ashland area are in the categories of manufacturing, government and service as shown below.

Lawrence County

Dow Chemical Co	Manufacturing
Duke Energy Corp	Manufacturing
Emerson Electric/Liebert Corp	Manufacturing
Engines Inc of Ohio	Manufacturing
Ironton City Bd of Ed	Government
Jo-Lin Health Center	Service
Lawrence County Government	Government
McGinnis Inc	Manufacturing
McSweeneys Inc	Manufacturing
Ohio University	Government
Rock Hill Local Bd of Ed	Government
South Point Local Bd of Ed	Government
Superior Marine Ways Inc	Service
Wal-Mart Stores Inc	Trade

Scioto County

G&J Pepsi-Cola Bottlers Inc	Manufacturing
Mitchellace Inc	Manufacturing
OSCO Industries	Manufacturing
Portsmouth City Bd of Ed	Government
Scioto County Government	Government
Shawnee State University	Government
Southern Ohio Medical Center	Service
State of Ohio	Government
Sunoco In/Sun Coke	Manufacturing
Taylor Lumber Inc	Manufacturing
Wal-Mart Stores Inc	Trade

Adams County

Adams County Government	Service
Adams County Hospital	Service
Adams County/Ohio Valley Local Bd of Ed	Government
DPL Inc/Dayton Power & Light Co	Utility
Eagle Creek Nursing Center	Service
General Electric Co	R&D
Maca Plastics Inc	Manufacturing
Toyo Denso Co/Weastec Inc	Manufacturing
Wal-Mart Stores Inc	Trade

Gallia County

American Electric Power	Utility
DMI Technology/ElectroCraft	Manufacturing
Gallia County Local Bd of Ed	Government
Gallipolis City Bd of Ed	Government
GKN Sinter Metals	Manufacturing
Holzer Clinic	Service
Holzer Medical Center	Service
Infocision Management Corp	Service
Ohio Valley Bank	Finance
Ohio Valley Electric Corp	Utility
State of Ohio	Government
University of Rio Grande	Service
Wal-Mart Stores Inc	Trade

Factor 3: Population and Projected Growth

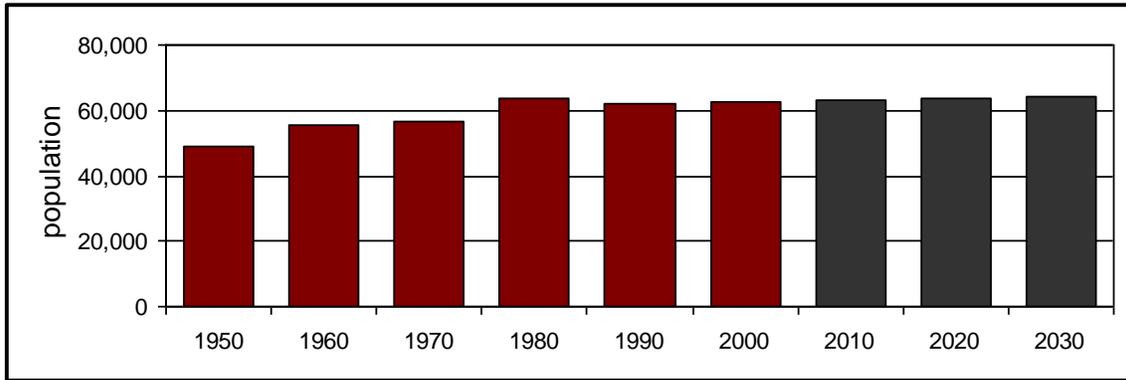
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Huntington-Ashland area are; Irononton in Lawrence County; Portsmouth in Scioto County; West Union and Seaman in Adams County; and Gallipolis in Gallia County.

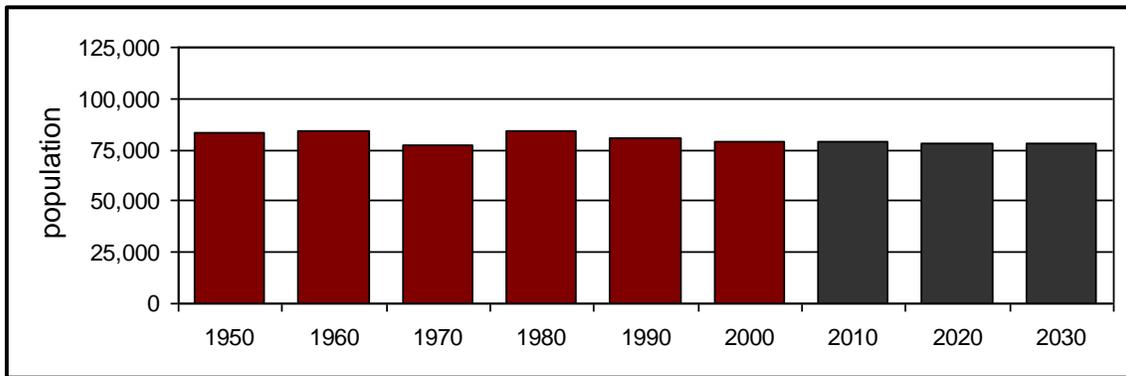
As indicated in the following table and graphs, Scioto County has the highest population in this area and it is projected to gradually decrease. The population in the surrounding counties is projected to gradually increase.

COUNTY	2004	2005	2006	2010	2020	2030
Lawrence	62,573	62,946	63,179	62,910	63,830	64,060
Scioto	76,579	76,506	76,441	78,820	78,330	78,270
Adams (P)	28,278	28,454	28,516	29,410	31,490	33,510
Gallia (P)	31,232	31,241	31,313	32,230	33,360	34,020
Pike	28,265	28,058	28,269	29,770	31,080	31,560
Jackson	33,302	33,576	33,543	34,020	35,060	35,680

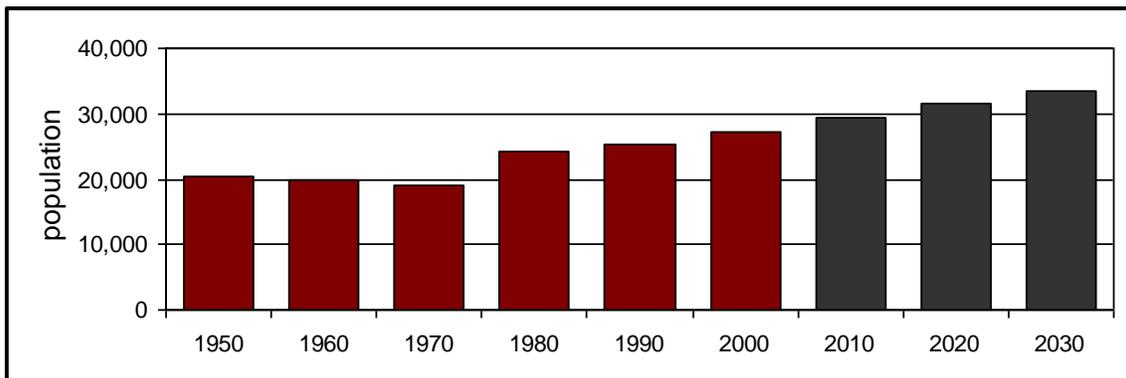
Lawrence County



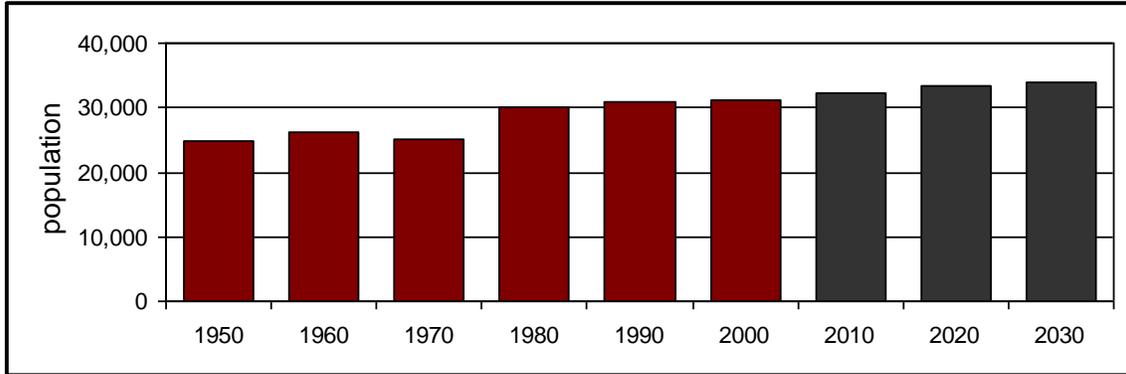
Scioto County



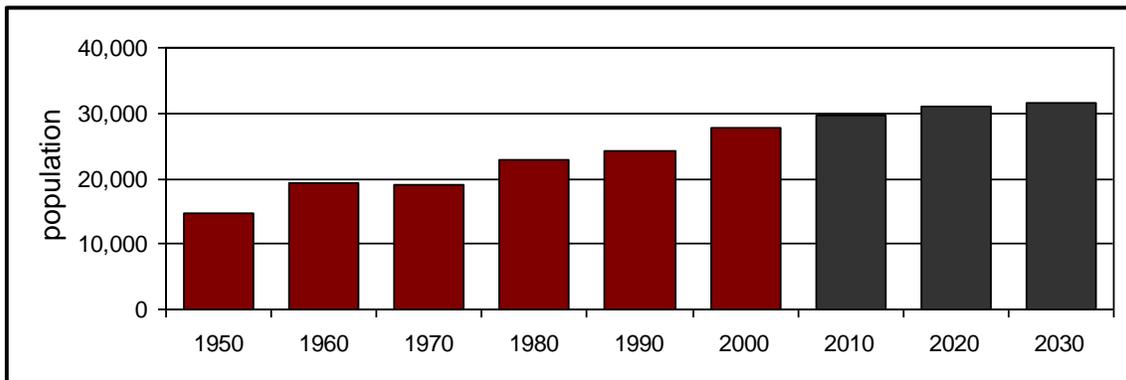
Adams County



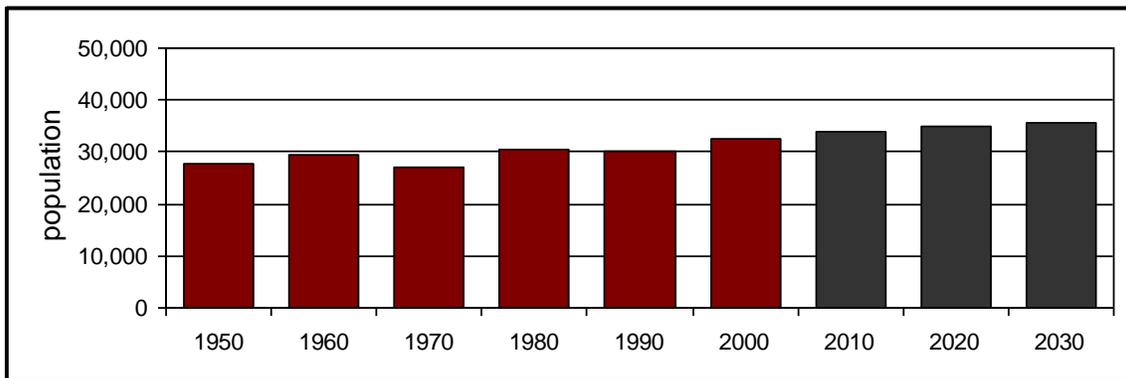
Gallia County



Pike County



Jackson County

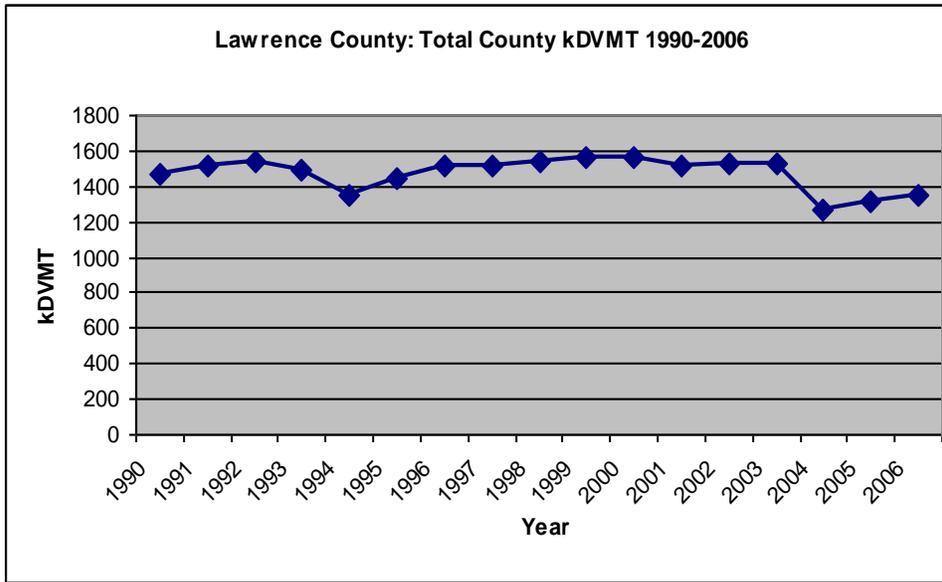


Factor 4: Traffic and commuting patterns

The kDVMT in the Huntington-Ashland area did not change significantly 2004 to 2006 as shown in the following graphs. Lawrence County experienced a slight trend upward while Scioto and Gallia counties had slight decreases in kDVMT. Adams County kDVMT remained about the same during this time period. Scioto County has the prestige of having the highest kDVMT in this area.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

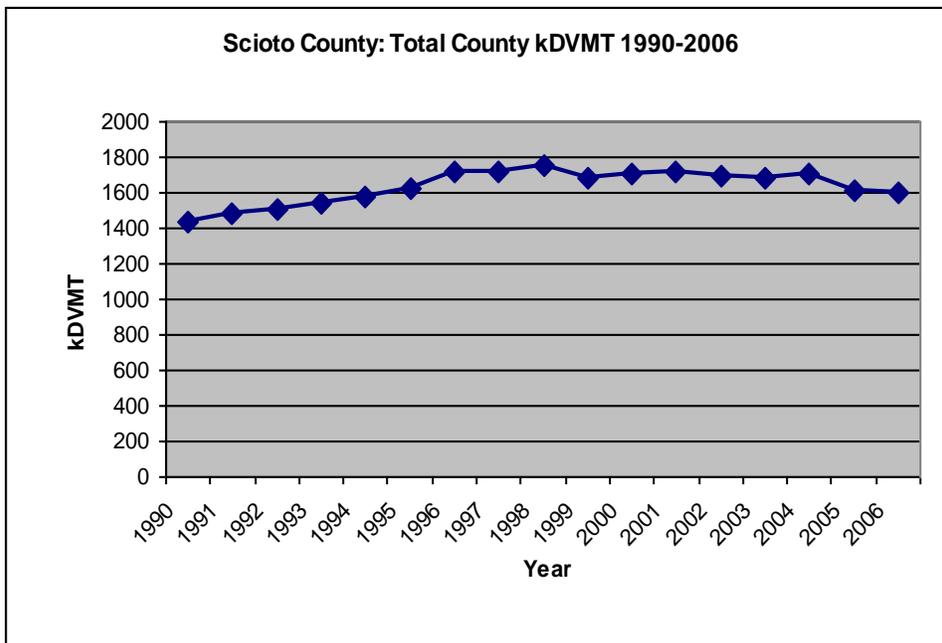
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 1272.93

2005 = 1315.02

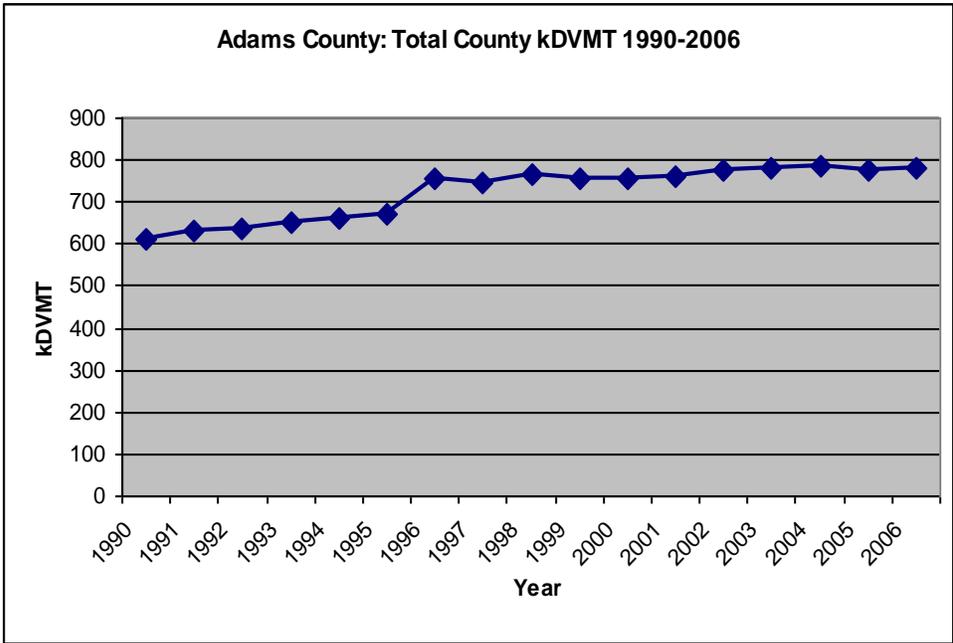
2006 = 1345.98



2004 = 1705.15

2005 = 1616.94

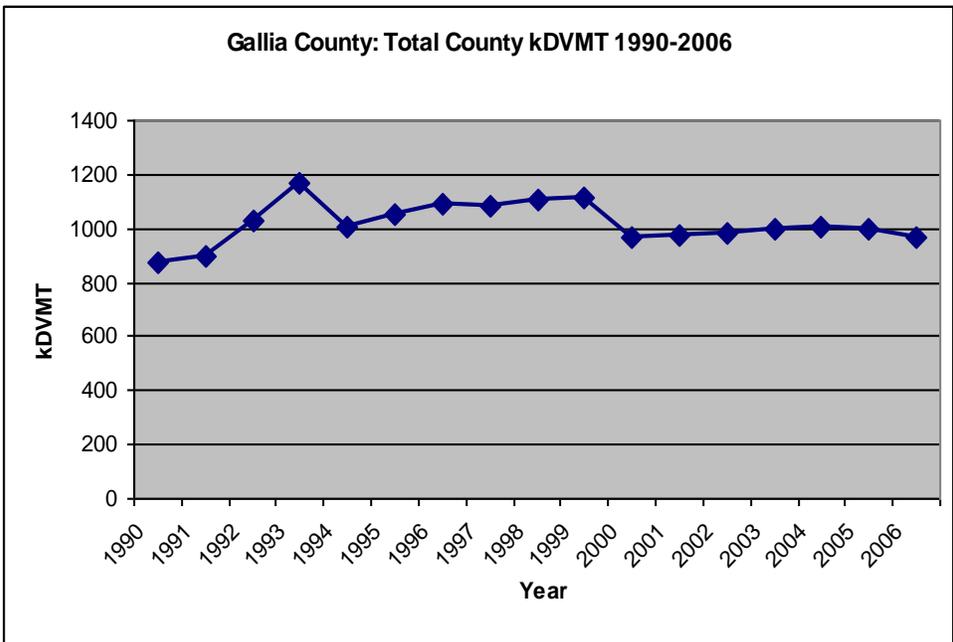
2006 = 1602.83



2004 = 784.37

2005 = 776.36

2006 = 781



2004 = 1007.72

2005 = 997.03

2006 = 968.24

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

The majority of Lawrence County workers commuting outside the county, travel to West Virginia and Kentucky. The largest portion of Scioto County workers commuting outside the county, travel to Pike County. Most of the commuting workers from Holmes County drive to Wayne County, while Adams County workers travel to Hamilton and Brown counties, and Gallia County commuters drive to Jackson County and Mason County, West Virginia as shown in the tables below.

Lawrence			Percent of workers that work outside the county		58.0%
			Average commute time in minutes -		24.1
Number of workers 16+ years of age living in Lawrence County			23,136		
Number of workers 16+ years of age working in Lawrence County			12,671		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Cabell Co. WV	7,179	31.0%	Cabell Co. WV	626	4.9%
Boyd Co. KY	2,926	12.6%	Boyd Co. KY	540	4.3%
Greenup Co. KY	715	3.1%	Scioto Co. OH	455	3.6%
Wayne Co. WV	622	2.7%	Greenup Co. KY	443	3.5%
Scioto Co. OH	616	2.7%	Wayne Co. WV	400	3.2%
Jackson Co. OH	179	0.8%	Gallia Co. OH	111	0.9%
Kanawha Co. WV	175	0.8%	Carter Co. KY	58	0.5%
Gallia Co. OH	164	0.7%	Lewis Co. KY	36	0.3%
Putnam Co. WV	95	0.4%	Jackson Co. OH	31	0.2%
Franklin Co. OH	82	0.4%	Lawrence Co. KY	31	0.2%
Percent is of workers living in county.			Percent is of workers working in county.		

Scioto			Percent of workers that work outside the county		22.7%
			Average commute time in minutes -		26.0
Number of workers 16+ years of age living in Scioto County			28,356		
Number of workers 16+ years of age working in Scioto County			25,573		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Pike Co. OH	2,453	8.7%	Greenup Co. KY	1,252	4.9%
Franklin Co. OH	540	1.9%	Lawrence Co. OH	616	2.4%
Ross Co. OH	494	1.7%	Pike Co. OH	504	2.0%
Lawrence Co. OH	455	1.6%	Lewis Co. KY	341	1.3%
Jackson Co. OH	428	1.5%	Jackson Co. OH	211	0.8%
Boyd Co. KY	390	1.4%	Boyd Co. KY	166	0.6%
Greenup Co. KY	332	1.2%	Adams Co. OH	126	0.5%
Adams Co. OH	223	0.8%	Ross Co. OH	92	0.4%
Cabell Co. WV	108	0.4%	Wayne Co. WV	73	0.3%
Hamilton Co. OH	99	0.3%	Franklin Co. OH	38	0.1%
Percent is of workers living in county.			Percent is of workers working in county.		

Adams	Percent of workers that work outside the county		40.1%
	Average commute time in minutes -		36.8
Number of workers 16+ years of age living in Adams County			11,133
Number of workers 16+ years of age working in Adams County			7,882
Commute Out To	Number	Percent	Commute In From
Hamilton Co. OH	935	8.4%	Brown Co. OH
Brown Co. OH	793	7.1%	Scioto Co. OH
Clermont Co. OH	527	4.7%	Highland Co. OH
Highland Co. OH	523	4.7%	Mason Co. KY
Mason Co. KY	412	3.7%	Pike Co. OH
Clinton Co. OH	293	2.6%	Carter Co. KY
Scioto Co. OH	126	1.1%	Clermont Co. OH
Warren Co. OH	118	1.1%	Fleming Co. KY
Boone Co. KY	105	0.9%	Franklin Co. OH
Montgomery Co. OH	76	0.7%	Hamilton Co. OH
Percent is of workers living in county.			Percent is of workers working in county.

Gallia	Percent of workers that work outside the county		25.2%
	Average commute time in minutes -		28.1
Number of workers 16+ years of age living in Gallia County			11,813
Number of workers 16+ years of age working in Gallia County			12,073
Commute Out To	Number	Percent	Commute In From
Mason Co. WV	669	5.7%	Mason Co. WV
Jackson Co. OH	595	5.0%	Meigs Co. OH
Franklin Co. OH	218	1.8%	Jackson Co. OH
Cabell Co. WV	190	1.6%	Lawrence Co. OH
Meigs Co. OH	187	1.6%	Putnam Co. WV
Athens Co. OH	165	1.4%	Vinton Co. OH
Lawrence Co. OH	111	0.9%	Athens Co. OH
Ross Co. OH	108	0.9%	Franklin Co. OH
Kanawha Co. WV	96	0.8%	Scioto Co. OH
Jackson Co. WV	71	0.6%	Cabell Co. WV
Percent is of workers living in county.			Percent is of workers working in county.

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Huntington-Ashland area.

Factor 6: Topography/Land use/Land cover

Adams County is in three distinct land resource areas. A gently sloping landscape in the northwestern part of the county, a rolling to steep region in the central and southwestern parts and a steep and very steep Western Allegheny

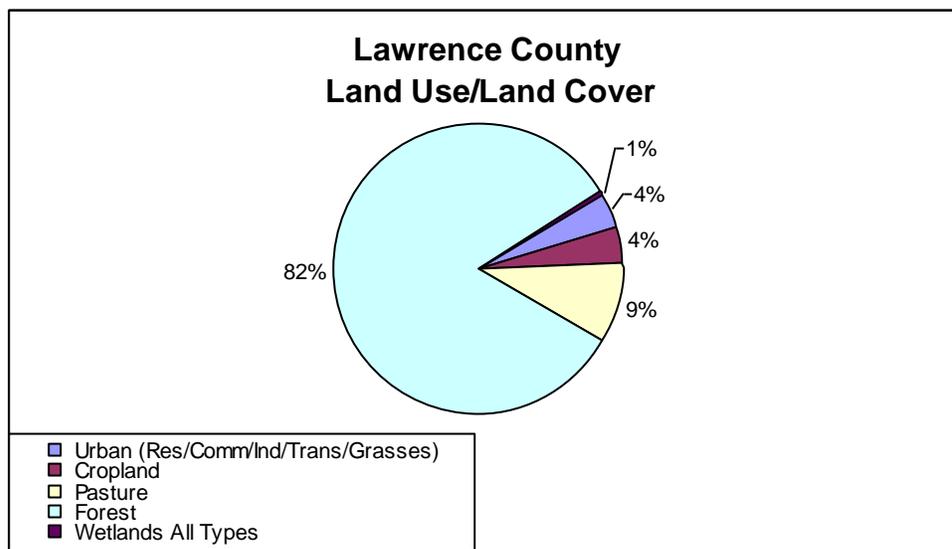
Plateau in the eastern part of the county (see Appendix F). Elevation ranges from 1,270 feet to about 780 feet above sea level.

Scioto County is on the unglaciated Allegheny Plateau. The landscape consists of hills, narrow and wide ridgetops, and stream valleys. Elevation in the county ranges from 464 feet along the Adams-Scioto county line to 1,338 feet near Mt. Joy in the northwest part of the county.

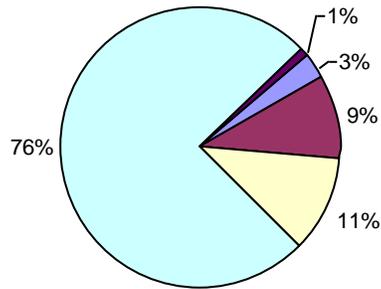
Lawrence County is the southernmost county in Ohio. The county is located on the unglaciated Allegheny Plateau. Relief consists of steep and very steep slopes and V-shaped valleys. The elevation ranges from 515 feet to 1,061 feet above sea level.

Gallia County is in the unglaciated Allegheny Plateau region. It is extensively dissected by drainageways and has hilly and rough topography. The highest point in the county is about 1,060 feet and the lowest is about 515 feet above sea level.

As shown in the following pie charts, the land use/land cover in this area is predominately characterized as forest area.

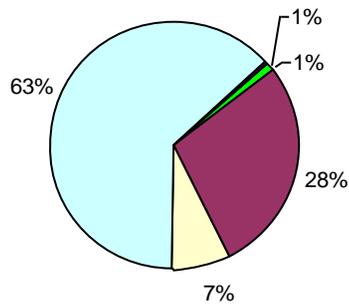


Scioto County Land Use/Land Cover



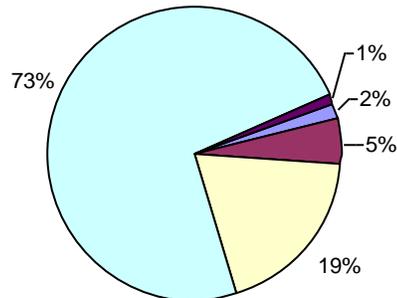
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Adams County Land Use/Land Cover



- Urban Res/Comm/Ind/Trans/Grasses
- Cropland
- Pasture
- Forest
- Wetlands All Types

Gallia County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Factor 7: Jurisdictional Boundaries

The Huntington-Ashland, WV-KY-OH Metropolitan Statistical Area includes: Boyd and Greenup counties in Kentucky, Cabell and Wayne counties in West Virginia and Lawrence County in Ohio. The principal cities are Huntington, WV and Ashland, KY.

KYOVA Interstate Planning Commission (KYOVA) is the planning agency designated as the Metropolitan Planning Organization for the Huntington-Ashland area. The KYOVA region is composed of three counties: Cabell and Wayne counties in KY and Lawrence County in Ohio.

Factor 8: Level of control of emission sources

In the Huntington-Ashland area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- Reductions in industrial activity

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area, although there has also been a loss of industry within this part of the Ohio River Valley.

Parkersburg-Marietta, WV-OH:

Current county nonattainment: Washington

 Current nonattainment counties  Current partial nonattainment

***Recommended* county nonattainment:** Washington



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There is one Ohio county and one West Virginia county in this existing PM_{2.5} nonattainment area, Washington County, Ohio and Wood County, WV. Ohio EPA recommends retaining Washington County as nonattainment for the Parkersburg-Marietta area due to the high SO₂ emissions. Athens and Morgan counties are two of four adjacent counties to Washington County. Athens and Morgan counties are discussed in this section while Noble and Monroe counties are discussed in the Wheeling, WV-OH section. These counties have insignificant emissions, low population and growth, low commuting and consequently are not considered contributing counties.

As shown in the tables below, the three-year annual average concentration at site 54-107-1002 in Wood County, WV is not attaining the annual standard. There is a monitor in Athens County. This is not a violating monitor and is included for informational purposes.

Factor 1: Air quality data

 = Exceeds standard

West Virginia

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
54-107-1002	WOOD, WV	34.7	36.2	35.1	35

 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
54-107-1002	WOOD, WV	14.9	16.4	14.7	 15.3

 Sites with less than 75% capture

Ohio

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-009-0003	Athens	 33.1	33.1	29.5	32

 Sites with less than 75% capture

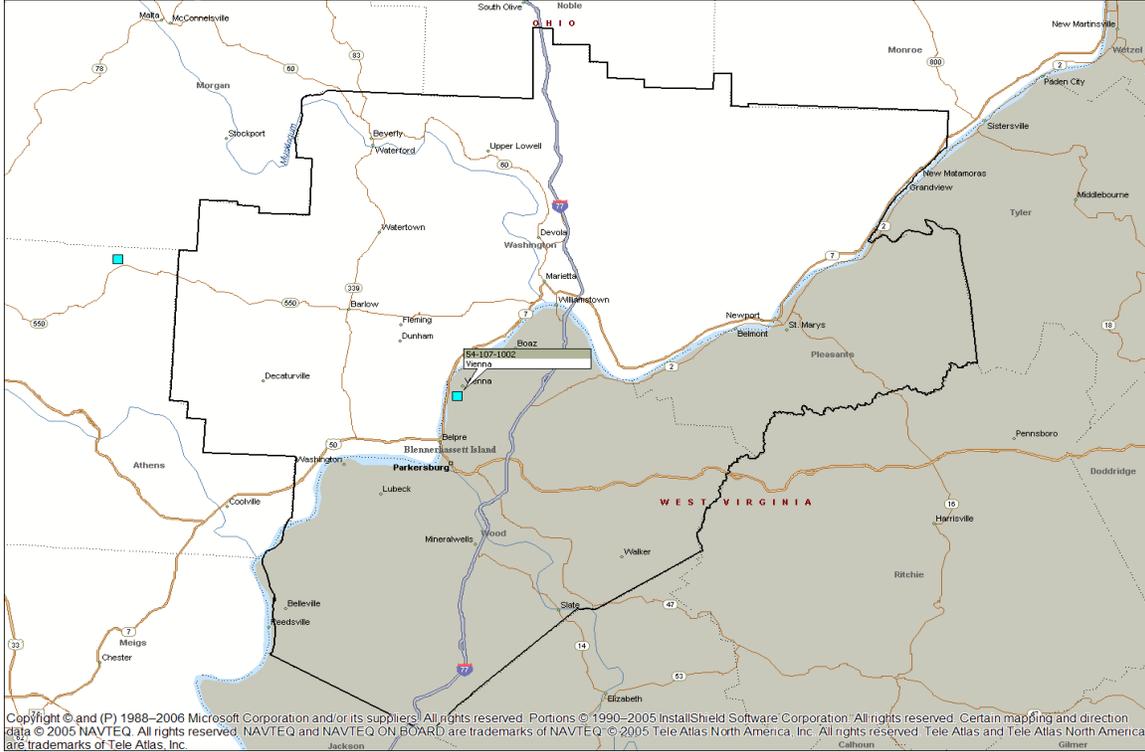
AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
39-009-0003	Athens	 11.4	13.3	11.8	12.2

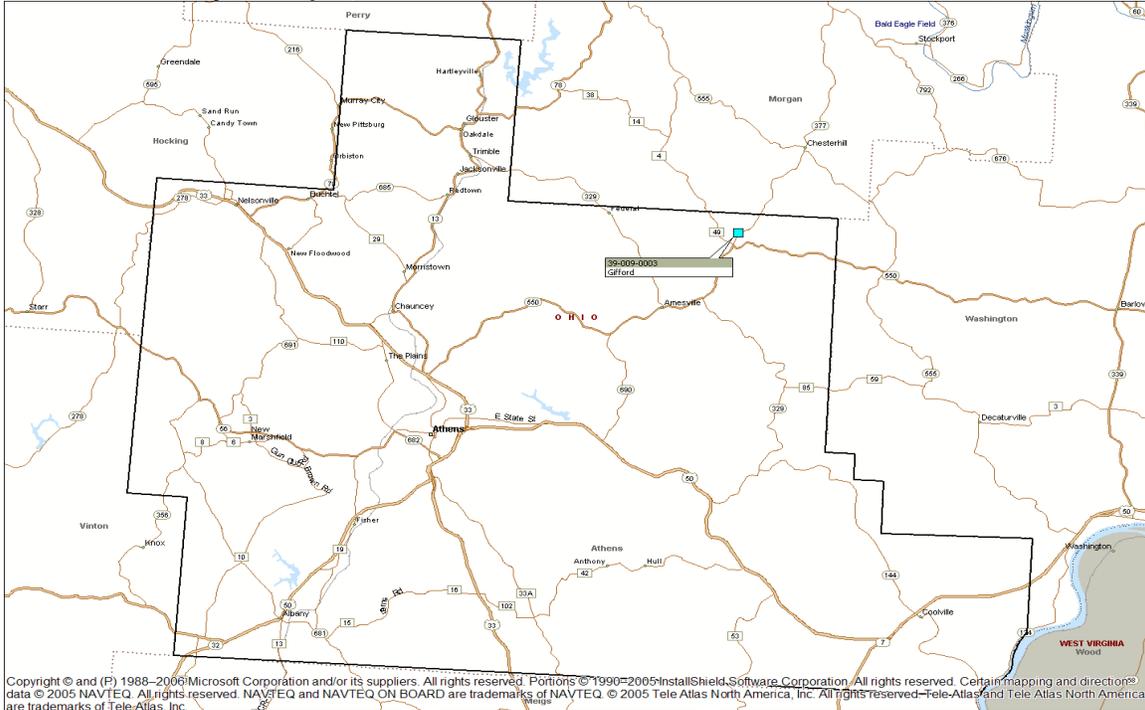
 Sites with less than 75% capture

Parkersburg-Marietta Area PM_{2.5} Monitor Locations and Site ID Numbers

Wood County, WV



Athens County, OH (Adjacent to current/recommended nonattainment area)



Factor 2: Emissions data
(tons per year)

2005			
County	SO₂	NO_x	PM_{2.5}
WASHINGTON	486.60	38.02	2.91
Athens	0.24	4.64	0.77
Morgan	0.08	1.18	0.28

2009			
County	SO₂	NO_x	PM_{2.5}
WASHINGTON	222.48	25.99	9.21
Athens	0.12	5.16	0.77
Morgan	0.05	1.57	0.28

West Virginia

2005			
County	SO₂	NO_x	PM_{2.5}
Pleasants	25.61	7.18	1.10
Wood	14.48	16.68	2.07
Wirt	0.05	0.53	0.15
Tyler	0.11	3.92	0.32

2009			
County	SO₂	NO_x	PM_{2.5}
Pleasants	122.01	18.44	6.15
Wood	13.53	7.50	1.65
Wirt	0.04	0.19	0.10
Tyler	0.05	2.77	0.23

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in Parkersburg-Marietta area are in the categories of government, manufacturing and service as shown below.

Washington County

American Electric Power Co	Utility
Eramet Marietta Inc	Manufacturing
KRATON Polymers LLC	Manufacturing
Marietta City Bd of Ed	Government
Marietta College	Service
Marietta Memorial Hospital	Service
RJF International Corp	Manufacturing
Thermo Fisher Scientific Inc	Manufacturing
Wal-Mart Stores Inc	Trade
Warren Local Bd of Ed	Government

Athens County

Alexander Local Bd of Ed	Government
Athens City Bd of Ed	Government
Athens County Government	Government
Diagnostic Hybrids Inc	Manufacturing
ED MAP Inc	Service
Federal Hocking Local Bd of Ed	Government
Hocking College	Government
Nelsonville-York City Bd of Ed	Government
O'Bleness Memorial Hospital	Service
Ohio University	Government
Wal-Mart Stores Inc	Trade

Morgan County

Careserve Inc/Mark Rest Center	Service
Draper Inc	Manufacturing
Hann Manufacturing	Manufacturing
Kroger Co	trade
MAHLE International	Manufacturing
Miba Bearings US LLC	Manufacturing
Morgan County Govt	Government
Morgan Local Bd of Ed	Government
Warren's Morgan Co IGA	trade

Factor 3: Population and Projected Growth

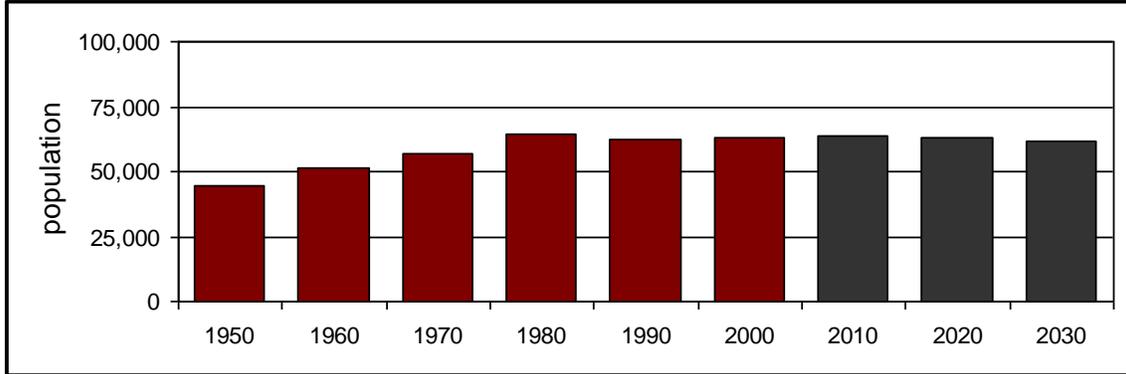
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Parkersburg-Marietta area are; Marietta in Washington County. In the adjacent counties: Athens, Nelsonville and Glouster in Athens County; and McConnelsville in Morgan County.

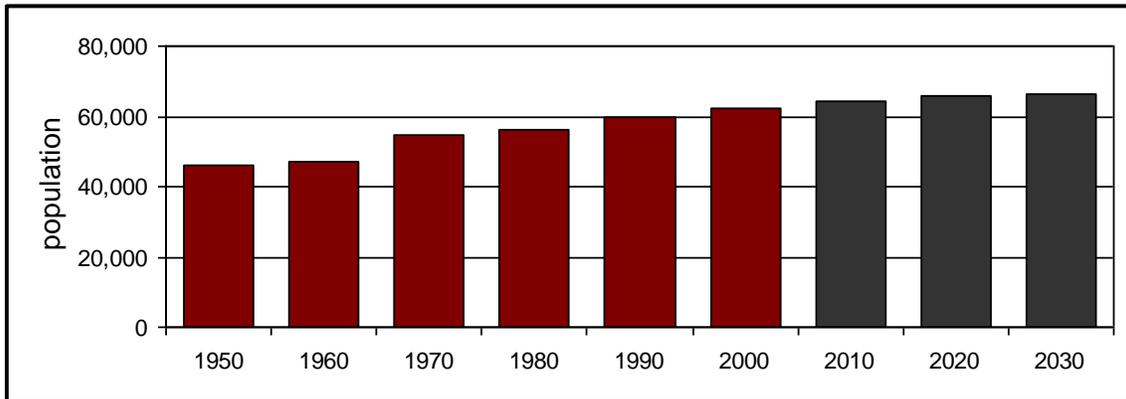
As indicated in the following table and graphs, Washington and Athens counties have been in a population competition but it appears that Athens County is projected to pull ahead of Washington County in the near future. Washington and Morgan counties are projected to experience a decrease in population.

	2004	2005	2006	2010	2020	2030
Washington	62,582	62,155	61,867	63,510	63,090	61,650
Athens	62,185	62,028	61,860	64,540	66,000	66,340
Morgan	14,932	14,895	14,821	15,200	15,120	14,620

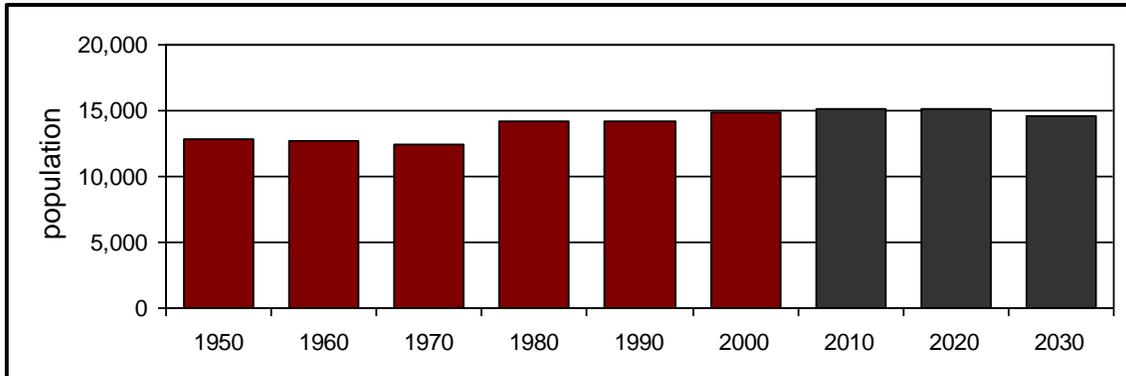
Washington County



Athens County



Morgan County

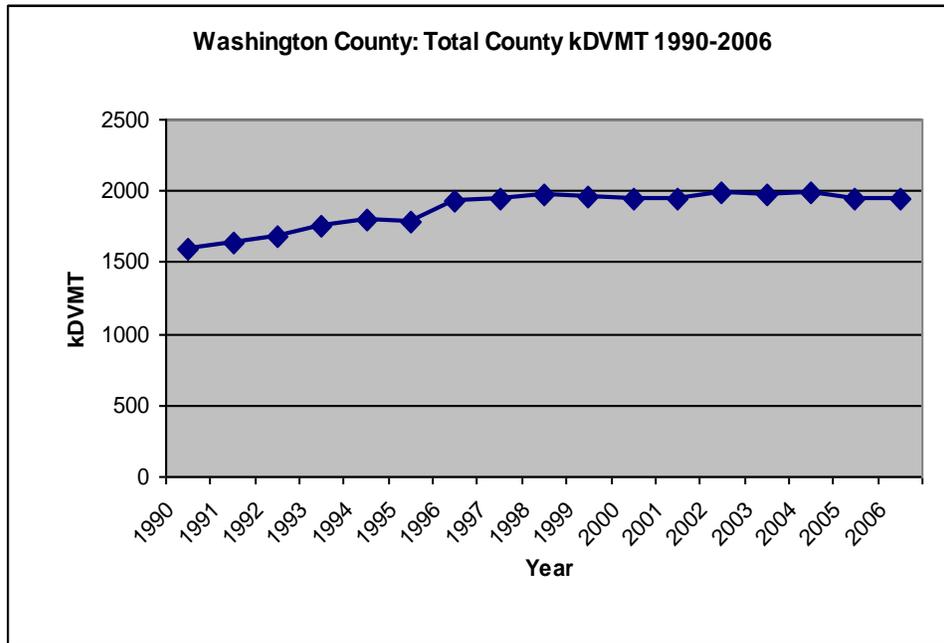


Factor 4: Traffic and commuting patterns

Unlike population, Washington County has first place for kDVMT between 2004 and 2006. Washington and Athens counties both experienced a slight increase in kDVMT, while Morgan County has had a consistent downward trend in kDVMT for quite a few years.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

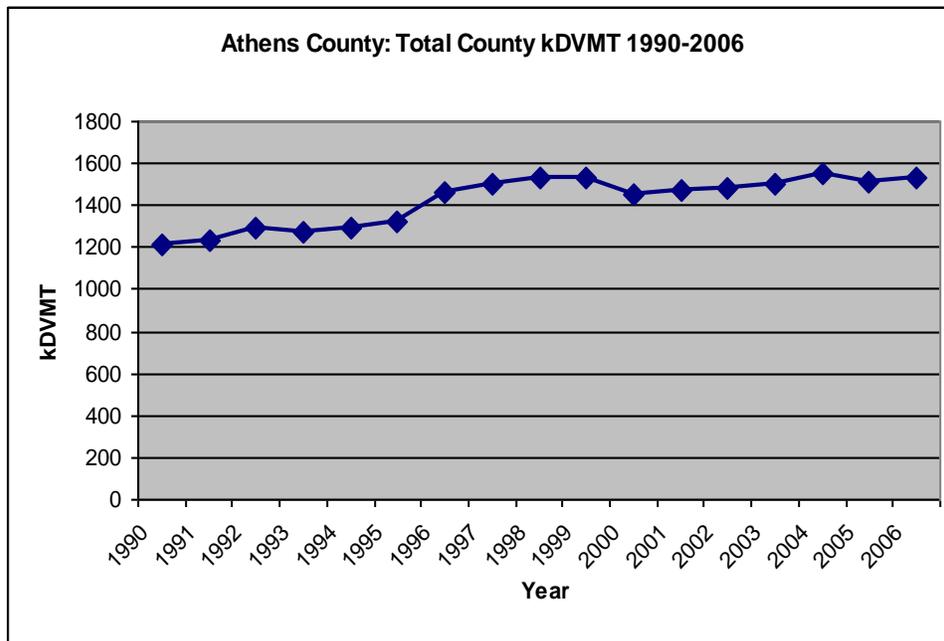
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 1982.19

2005 = 1939.15

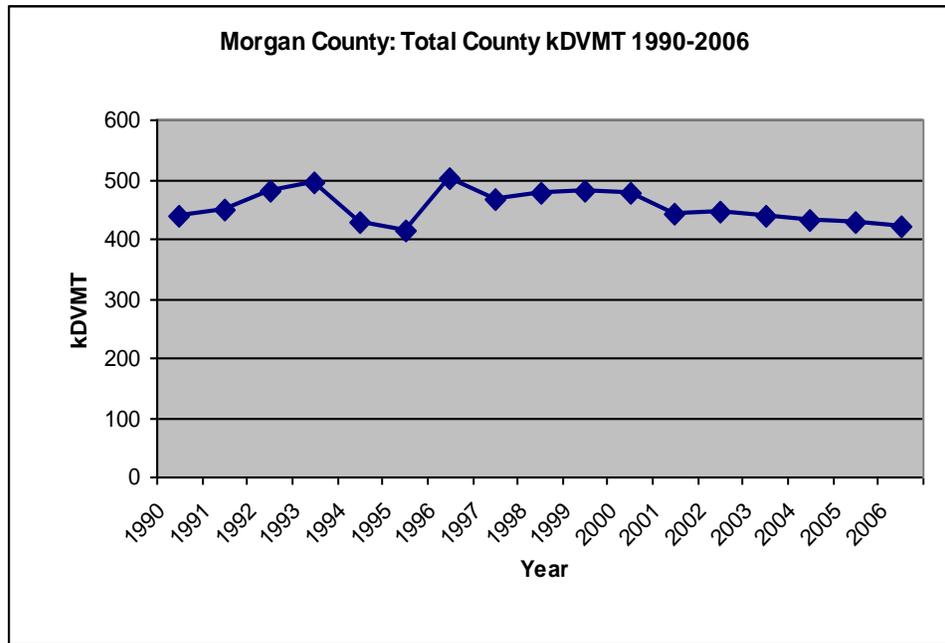
2006 = 1949.44



2004 = 1551.84

2005 = 1511.92

2006 = 1530.52



2004 = 430.92

2005 = 426.43

2006 = 422.76

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Not surprisingly, the majority of Washington County workers commuting outside the county, travel to Wood County, WV. Likewise, Wood County, WV has a number of workers traveling across the river to Washington County. A low number of workers from Athens and Morgan County commute to Washington County.

Washington			Percent of workers that work outside the county		29.2%
			Average commute time in minutes -		22.5
Number of workers 16+ years of age living in Washington County			28,171		
Commute Out To	Number	Percent			
Wood Co. WV	5,927	21.0%			
Pleasants Co. WV	378	1.3%			
Monroe Co. OH	221	0.8%			
Athens Co. OH	208	0.7%			
Noble Co. OH	197	0.7%			
Morgan Co. OH	125	0.4%			
Franklin Co. OH	124	0.4%			
Jackson Co. WV	95	0.3%			
Guernsey Co. OH	83	0.3%			
Tyler Co. WV	71	0.3%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Washington County			26,792		
Commute In From	Number	Percent			
Wood Co. WV	3,316	12.4%			
Morgan Co. OH	501	1.9%			
Athens Co. OH	462	1.7%			
Noble Co. OH	453	1.7%			
Pleasants Co. WV	391	1.5%			
Meigs Co. OH	340	1.3%			
Monroe Co. OH	237	0.9%			
Ritchie Co. WV	137	0.5%			
Franklin Co. OH	84	0.3%			
Tyler Co. WV	81	0.3%			
Percent is of workers working in county.					

Athens			Percent of workers that work outside the county		16.8%
			Average commute time in minutes -		21.7
Number of workers 16+ years of age living in Athens County			25,586		
Commute Out To			Number	Percent	
Franklin Co. OH	712	2.8%			
Hocking Co. OH	580	2.3%			
Wood Co. WV	563	2.2%			
Washington Co. OH	462	1.8%			
Fairfield Co. OH	431	1.7%			
Vinton Co. OH	149	0.6%			
Meigs Co. OH	142	0.6%			
Jackson Co. OH	130	0.5%			
Perry Co. OH	123	0.5%			
Ross Co. OH	112	0.4%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Athens County			26,145		
Commute In From			Number	Percent	
Meigs Co. OH	1,334	5.1%			
Hocking Co. OH	945	3.6%			
Vinton Co. OH	420	1.6%			
Morgan Co. OH	380	1.5%			
Jackson Co. OH	220	0.8%			
Washington Co. OH	208	0.8%			
Gallia Co. OH	165	0.6%			
Fairfield Co. OH	142	0.5%			
Wood Co. WV	116	0.4%			
Perry Co. OH	110	0.4%			
Percent is of workers working in county.					

Morgan			Percent of workers that work outside the county		47.0%
			Average commute time in minutes -		36.2
Number of workers 16+ years of age living in Morgan County			5,858		
Commute Out To			Number	Percent	
Muskingum Co. OH	707	12.1%			
Washington Co. OH	501	8.6%			
Athens Co. OH	380	6.5%			
Franklin Co. OH	307	5.2%			
Perry Co. OH	225	3.8%			
Licking Co. OH	157	2.7%			
Guernsey Co. OH	80	1.4%			
Fairfield Co. OH	68	1.2%			
Wood Co. WV	51	0.9%			
Pickaway Co. OH	29	0.5%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Morgan County			3,632		
Commute In From			Number	Percent	
Muskingum Co. OH	211	5.8%			
Washington Co. OH	125	3.4%			
Athens Co. OH	54	1.5%			
Perry Co. OH	52	1.4%			
Guernsey Co. OH	21	0.6%			
Noble Co. OH	13	0.4%			
Brooke Co. WV	10	0.3%			
Jackson Co. WV	7	0.2%			
Virginia Beach city VA	7	0.2%			
Tuscarawas Co. OH	6	0.2%			
Percent is of workers working in county.					

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Parkersburg-Marietta area.

Factor 6: Topography/Land use/Land cover

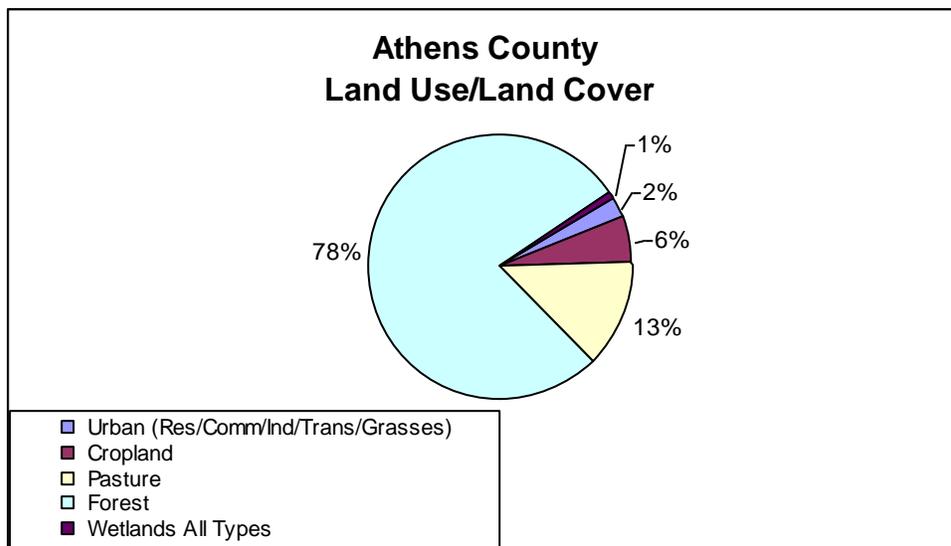
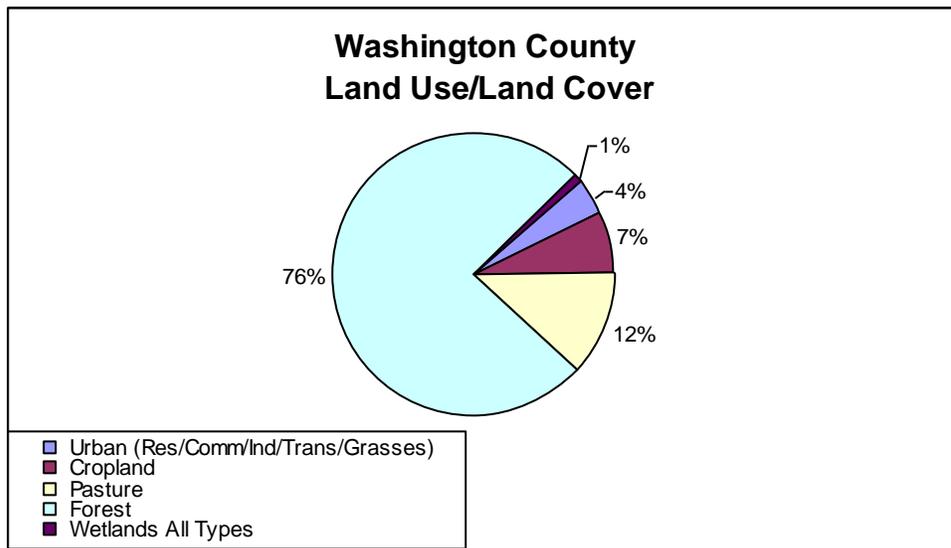
Washington County is entirely within the unglaciated Allegheny Plateau region (see Appendix F). The landscape is one of hills, narrow ridgetops, and stream valleys. The eastern part of the county is rugged with steep to very steep slopes while the central and western parts of the county have a more rolling topography,

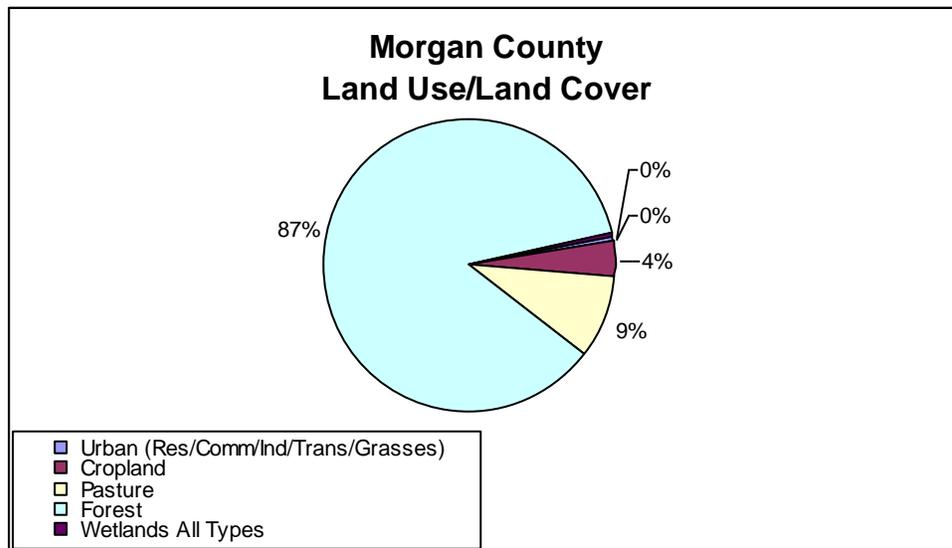
wider ridgetops and fewer steep side slopes. The lowest point in the county is 580 feet and the highest is more than 1,200 feet above sea level.

Morgan County lies in the unglaciated Appalachian Plateaus Province. Rugged, it consists mostly of steep hillsides and narrow ridgetops. Some broad, gently sloping uplands are in the western part of the county and in stream valleys. The elevation ranges from about 630 feet to 1115 feet above sea level.

Athens County, like Morgan and Washington counties, is in the unglaciated Allegheny Plateau region. The northern part of the county is rugged with steep to very steep slopes and the southern part of the county has more rolling hills and fewer steep hillsides. The highest point is 1,055 and lowest point is about 640 feet above sea level.

As shown in the following pie charts, the land use/land cover in this area is predominately characterized as forest area.





Factor 7: Jurisdictional boundaries

The Parkersburg-Marietta-Vienna, WV-OH Metropolitan Statistical Area includes: Pleasants, Wirt and Wood counties in West Virginia; and Washington County, Ohio. The principal cities are Parkersburg and Vienna, West Virginia; and Marietta, Ohio.

The Wood, Wirt, Washington Interstate Planning Commission (WWWIPC) is the planning agency designated as the Metropolitan Planning Organization for Parkersburg-Marietta area. The WWWIPC region is composed of two counties: Wood County, WV and the greater Marietta area of Washington County, OH.

Factor 8: Level of control of emission sources

In the Parkersburg-Marietta area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- NO_x trading program
- Clean Air Interstate Rule (CAIR)

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) affecting this area.

Steubenville-Weirton, OH:

Current county nonattainment: Jefferson



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment: Jefferson



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There is one Ohio county and two West Virginia counties in this existing PM_{2.5} nonattainment area, Jefferson County, Ohio and Hancock and Brooke counties in WV. Ohio EPA recommends retaining Jefferson County as nonattainment for the Weirton-Steubenville WV-OH area due to monitor violations and high SO₂ emissions.

There is one adjacent county discussed in this section; Harrison County. Columbiana, Carroll and Belmont counties are also adjacent to Jefferson County but are included in the Youngstown-Warren, Canton-Massillon and Wheeling, WV-OH sections respectively. Harrison County is not considered a contributing county due to insignificant emissions, low population, no expected growth and insignificant commuting levels. The 2005 emissions in Brooke and Hancock counties in WV and Washington and Beaver counties in PA, are also low as shown in the following tables.

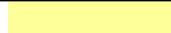
The three-year average of the 98th percentile and the three-year annual average concentration at both sites in Jefferson County are not attaining the 24-hour revised standard or the annual standard.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-081-0017	Jefferson	43.8	43.8	32.1	40
39-081-1001		51.5	44.2	32.9	43

 Sites with less than 75% capture

AQS: Annual Average

Site	County				Annual Average
		2004	2005	2006	
39-081-0017	Jefferson	15.9	16.4	13.8	15.4
39-081-1001		16.2	18.1	14.6	16.3

 Sites with less than 75% capture

West Virginia

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile ($\mu\text{g}/\text{m}^3$)

Site	County				24- Hour Average
		2004	2005	2006	
54-009-0005	BROOKE	48.4	38.8	32.2	40
54-029-0011	HANCOCK	47.5	44.7	36.9	43
54-029-1004		42.0	43.9	33.7	40

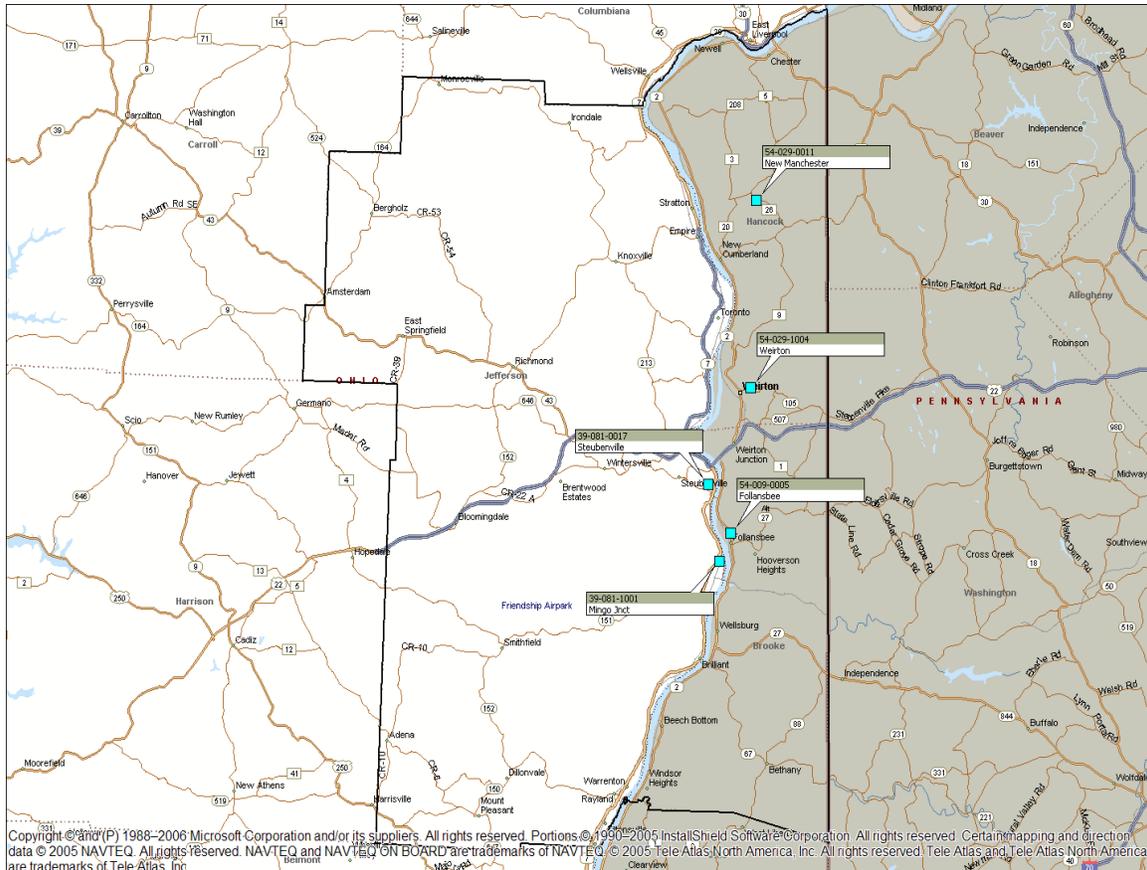
Sites with less than 75% capture

AQS: Annual Average

Site	County				Annual Average
		2004	2005	2006	
54-009-0005	BROOKE	16.6	17.4	15.2	16.4
54-029-0011	HANCOCK	15.2	17.3	14.6	15.7
54-029-1004		16.2	16.3	13.7	15.4

Sites with less than 75% capture

Steubenville-Weirton Area PM_{2.5} Monitor Locations and Site ID Numbers



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**Factor 2: Emissions data
(tons per day)**

2005			
County	SO₂	NO_x	PM_{2.5}
JEFFERSON	613.28	84.62	5.48
Harrison	0.17	2.26	0.23

2009			
County	SO₂	NO_x	PM_{2.5}
JEFFERSON	207.81	51.18	16.93
Harrison	0.11	2.54	0.21

Pennsylvania and West Virginia

2005			
County	SO₂	NO_x	PM_{2.5}
Brooke, WV	3.36	5.45	1.25
Hancock, WV	2.81	7.44	17.36
Beaver, PA	16.87	18.85	2.41
Washington, PA	4.03	25.26	3.06

2009			
County	SO₂	NO_x	PM_{2.5}
Brooke	3.22	4.83	1.11
Hancock	4.24	10.15	15.53
Beaver, PA*	108.36	29.04	12.20
Washington, PA*	38.23	21.86	4.70

* Does not include on-road data

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Ohio portion of the Weirton-Steubenville, WV-OH area are in the categories of government, manufacturing and service as shown in the following tables. It is likely that the utilities employ a significant number of people in this area.

Jefferson County

American Electric Power	Utility
Buckeye Local Bd of Ed	Government
Edison Local Bd of Ed	Government
FirstEnergy Corp	Utility
Franciscan Univ of Steubenville	Service
Indian Creek Local Bd of Ed	Government
Steubenville City Bd of Ed	Government
Titanium Metals Corp/Timet	Manufacturing
Trinity Health System	Service
Wal-Mart Stores Inc	Trade
Wheeling-Pittsburgh Steel	Manufacturing

Harrison County

CamOhio LLC	Mining
Carriage Inn of Cadiz	Service
Freeport Press Inc	Manufacturing
Gables Care Center	Service
Harrison Community Hospital	Service
Harrison County Government	Government
Harrison Hills City Bd of Ed	Government
McDonough Corp/L J Smith	Manufacturing
Saint-Gobain/Bayform	Manufacturing

Factor 3: Population and Projected Growth

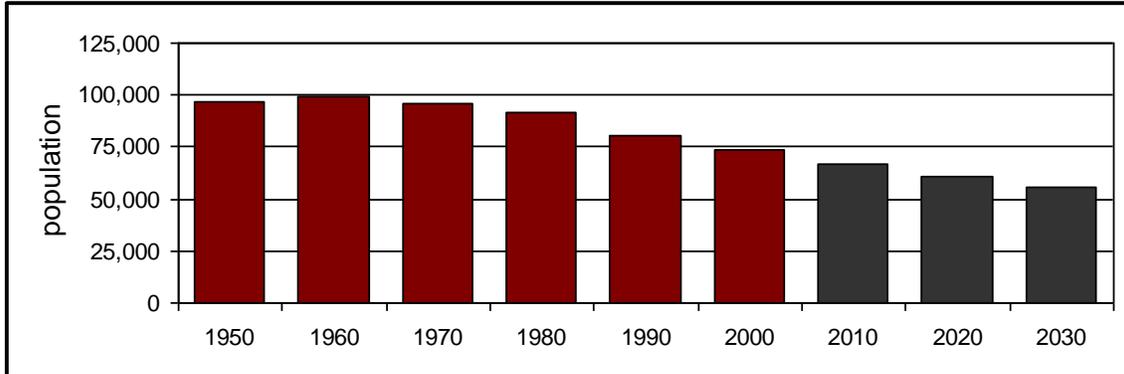
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Ohio portion of the Weirton-Steubenville, WV-OH area are; Steubenville in Jefferson County; and in the adjacent Harrison County, the city of Cadiz.

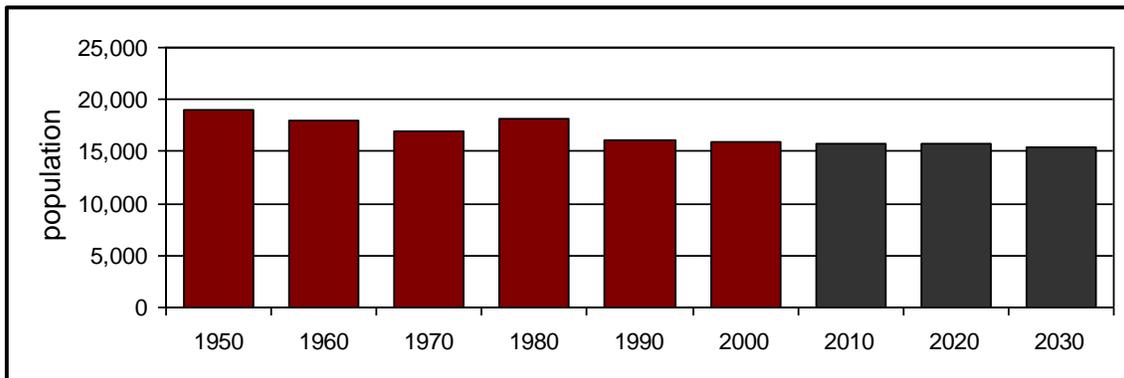
As indicated in the following table and graphs, Jefferson County has the highest population in this area and it is projected to decrease. The population in Harrison County is also projected to decrease.

	2004	2005	2006	2010	2020	2030
Jefferson	71,277	70,631	70,125	66,530	60,770	55,850
Harrison	15,873	15,881	15,799	15,710	15,680	15,460

Jefferson County



Harrison County

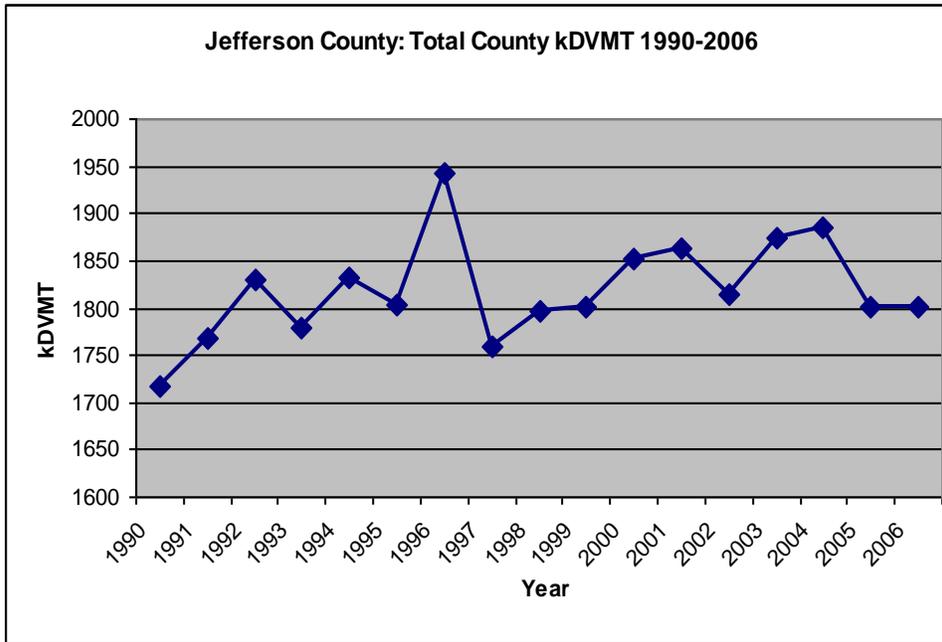


Factor 4: Traffic and commuting patterns

The kDVMT in Jefferson County have had an interesting fifteen years of ups and downs. From 2005 to 2006 the kDVMT in Jefferson County was virtually unchanged. Harrison County has remained generally constant.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

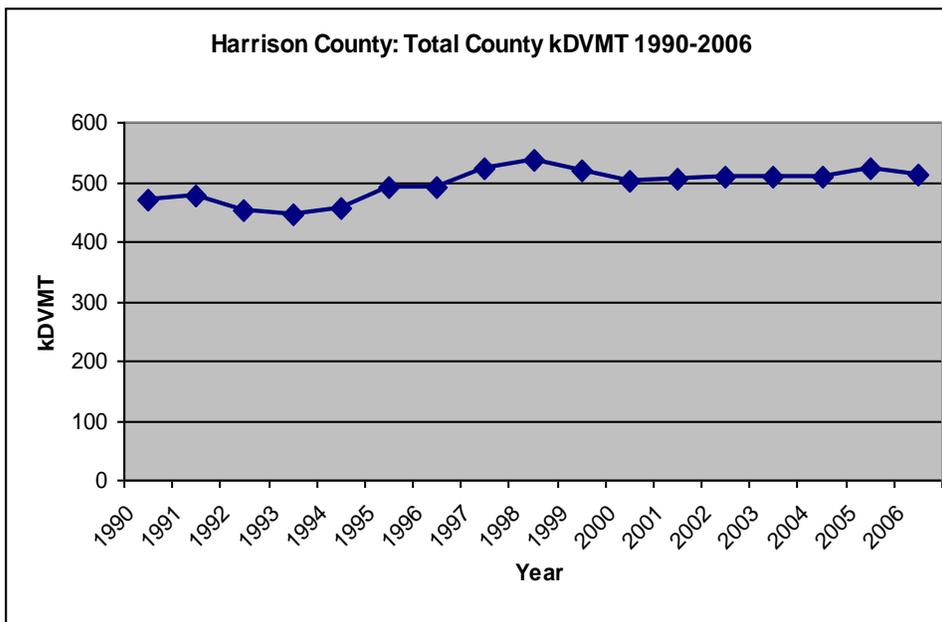
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 1884.67

2005 = 1801.26

2006 = 1801.73



2004 = 509.74

2005 = 522.22

2006 = 511.2

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

The majority of Jefferson County workers commuting outside the county, travel to Brooke County, WV County. The largest portion Harrison County workers commuting outside the county travel to Tuscarawas County.

Jefferson			Percent of workers that work outside the county		31.3%
			Average commute time in minutes -		22.2
Number of workers 16+ years of age living in Jefferson County			28,793		
Number of workers 16+ years of age working in Jefferson County			25,922		
Commute Out To			Number	Percent	
Brooke Co. WV	2,377	8.3%			
Belmont Co. OH	1,236	4.3%			
Allegheny Co. PA	1,094	3.8%			
Hancock Co. WV	784	2.7%			
Ohio Co. WV	706	2.5%			
Columbiana Co. OH	632	2.2%			
Harrison Co. OH	383	1.3%			
Carroll Co. OH	265	0.9%			
Stark Co. OH	195	0.7%			
Beaver Co. PA	154	0.5%			
Commute In From			Number	Percent	
Brooke Co. WV	1,296	5.0%			
Belmont Co. OH	1,129	4.4%			
Hancock Co. WV	1,007	3.9%			
Harrison Co. OH	593	2.3%			
Columbiana Co. OH	517	2.0%			
Ohio Co. WV	436	1.7%			
Carroll Co. OH	178	0.7%			
Allegheny Co. PA	175	0.7%			
Washington Co. PA	171	0.7%			
Marshall Co. WV	147	0.6%			
Percent is of workers living in county.			Percent is of workers working in county.		

Harrison			Percent of workers that work outside the county		52.4%
			Average commute time in minutes -		28.8
Number of workers 16+ years of age living in Harrison County			6,585		
Number of workers 16+ years of age working in Harrison County			4,416		
Commute Out To			Number	Percent	
Tuscarawas Co. OH	1,410	21.4%			
Jefferson Co. OH	593	9.0%			
Belmont Co. OH	361	5.5%			
Stark Co. OH	292	4.4%			
Carroll Co. OH	188	2.9%			
Ohio Co. WV	83	1.3%			
Brooke Co. WV	65	1.0%			
Wayne Co. OH	62	0.9%			
Holmes Co. OH	34	0.5%			
Allegheny Co. PA	33	0.5%			
Commute In From			Number	Percent	
Jefferson Co. OH	383	8.7%			
Belmont Co. OH	280	6.3%			
Tuscarawas Co. OH	182	4.1%			
Carroll Co. OH	160	3.6%			
Guernsey Co. OH	52	1.2%			
Holmes Co. OH	41	0.9%			
Stark Co. OH	27	0.6%			
Brooke Co. WV	18	0.4%			
Allegheny Co. PA	13	0.3%			
Hamilton Co. OH	12	0.3%			
Percent is of workers living in county.			Percent is of workers working in county.		

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Weirton-Stuebenville area.

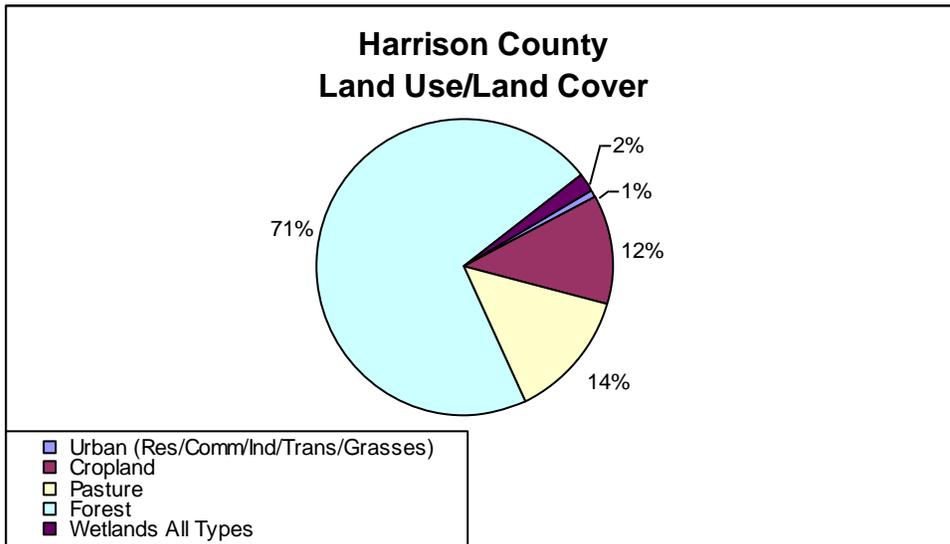
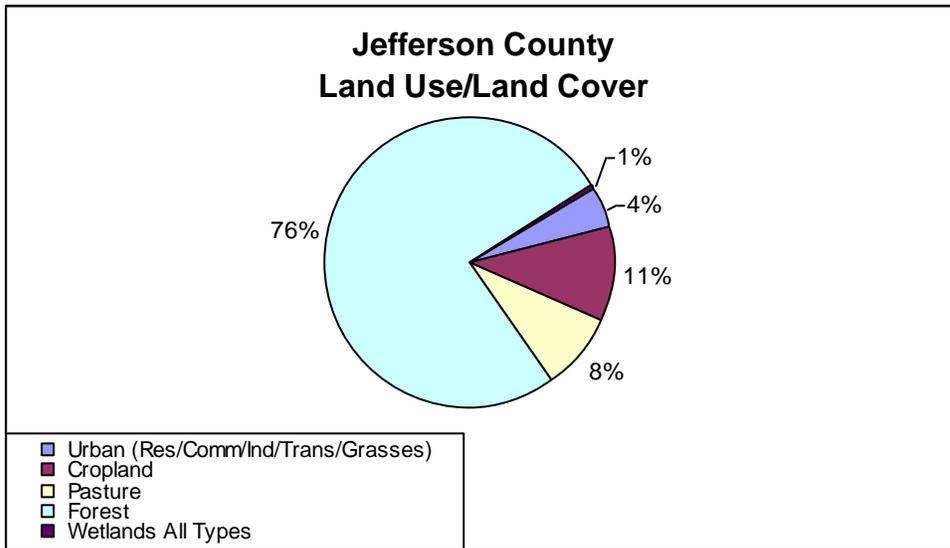
Factor 6: Topography/Land use/Land cover

Jefferson County is in the unglaciated Allegheny Plateau region (see Appendix F). The county has been extensively dissected by drainageways that empty into the Ohio River, which is the sinuous eastern border of the county. Relief is

generally greatest in the eastern part of the county. The elevation ranges from 1,388 feet to about 644 feet above sea level.

Harrison County is located in the, you guessed it, the unglaciated Allegheny Plateau region and is similar in topography to that of Jefferson County. The highest point in the county is 1,366 feet and the lowest point is about 861 feet above sea level.

As shown in the following pie charts, the land use/land cover in Jefferson and Harrison counties are nearly the same, predominately characterized as forest area.



Factor 7: Jurisdictional boundaries

The Weirton-Steubenville, WV-OH Metropolitan Statistical Area includes: Brooke and Hancock, West Virginia and Jefferson County, Ohio. The principal cities are Weirton, WV and Steubenville, OH.

The Brooke-Hancock-Jefferson Metropolitan Planning Commission (BHJMPO) is the planning agency designated as the Metropolitan Planning Organization for the Weirton-Steubenville area. The BHJMPO region is composed of three counties: Hancock and Brooke counties in WV and Jefferson County, OH.

Factor 8: Level of control of emission sources

In the Weirton-Steubenville area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area. In addition, this area will be targeted for diesel emission reductions and there are also significant point sources which may be controlled which will contribute to improved air quality in Jefferson County.

Toledo, OH:

Current county nonattainment: none



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment: none



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There are two counties included in the Toledo area, Lucas and Wood. Ohio EPA recommends retaining Lucas and Wood counties as attainment for PM_{2.5} due to no monitored violations. While there are no monitored violations, the concentrations are very near the revised 24-hour revised standard at one monitor. Therefore, Ohio EPA is providing the same level of detailed information as the other areas in Ohio that have PM_{2.5} monitored violations. There are seven adjacent counties to the Toledo area discussed in this section; Fulton, Henry, Putnam, Hancock, Seneca, Sandusky, and Ottawa.

The 2005 SO₂ and NO_x emissions in Lucas County are notable and the SO₂ emissions are forecasted to increase by 2009.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-095-0024	Lucas	34.3	45.3	25.9	35
39-095-0025		31.6	44.6	25.2	34
39-095-0026		30.6	42.9	27.1	34

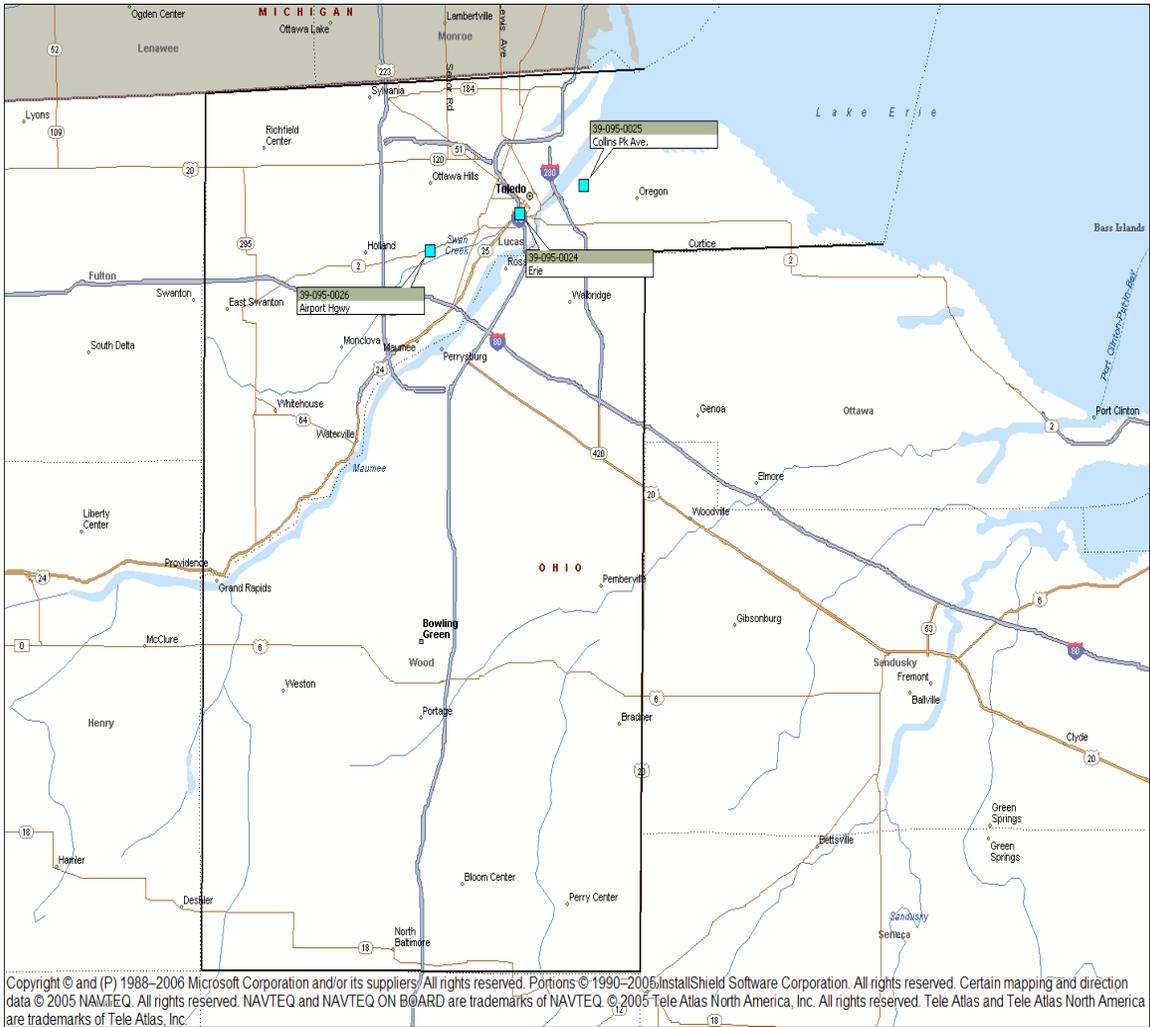
 Sites with less than 75% capture

AQS: Annual Average

Site	County				Annual Average
		2004	2005	2006	
39-095-0024	Lucas	13.7	15.8	12.7	14.1
39-095-0025		13.3	15.5	11.9	13.6
39-095-0026		13.0	15.7	12.6	13.8

 Sites with less than 75% capture

Toledo Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data
(tons per day)

2005			
County	SO₂	NO_x	PM_{2.5}
LUCAS	68.49	70.96	5.03
WOOD	1.80	24.61	1.61
Fulton	0.98	12.27	0.75
Henry	5.65	5.97	0.41
Hancock	0.67	12.31	0.67
Seneca	15.67	24.72	1.17
Sandusky	6.72	20.45	1.03
Ottawa	3.10	11.75	0.91

2009			
County	SO₂	NO_x	PM_{2.5}
LUCAS	101.26	60.50	6.94
WOOD	1.23	25.55	1.52
Fulton	0.67	10.18	0.65
Henry	5.44	6.69	0.39
Hancock	0.27	12.46	0.60
Seneca	15.40	24.71	1.12
Sandusky	6.39	19.86	0.94
Ottawa	2.75	12.21	0.86

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Toledo area are in the categories of manufacturing, government and service as shown below.

Lucas County

Andersons Inc	Trade
Carlyle Group/HCR Manor Care	Service
Chrysler LLC	Manufacturing
City of Toledo	Government
Dana Corp	Manufacturing
General Motors Corp	Manufacturing
Libbey Inc	Manufacturing
Lucas County Government	Government
Mercy Health Partners	Service
Owens Corning	Manufacturing
Promedica Health System	Service
Toledo City Bd of Ed	Government
United Parcel Service Inc	Transportation
University of Toledo	Government

Wood County

Bowling Green State University	Government
Chrysler LLC	Manufacturing
Cooper Standard Automotive Inc	Manufacturing
First Solar Inc	Manufacturing
Great Lakes Window Inc	Manufacturing
Magna Int'l/Norplas Inc	Manufacturing
Owens Community College	Government
Owens Illinois Inc	Manufacturing
Perrysburg Exempted Village Bd of Ed	Government
Rudolph-Libbe Companies	Construction
Walgreen Co	Trade
Wood County Government	Government
Wood County Hospital Assoc	Service

Fulton County

Dana Corp	Manufacturing
Fulton County Government	Government
Fulton County Health Center	Service
International Automotive Components	Manufacturing
ITT Industries Inc	Manufacturing
North Star BlueScope Steel LLC	Manufacturing
Sauder Woodworking Co	Manufacturing
TRW Automotive	Manufacturing

Henry County

Alex Products	Manufacturing
Campbell Soup Co	Manufacturing
Deshler Group/Claud Sintz Inc	Manufacturing
Filling Memorial Home of Mercy	Service
Henry County Hospital	Service
Lutheran Home at Napoleon	Service
Napoleon Area City Bd of Ed	Government
Silgan Holding Inc	Manufacturing
Tenneco Inc	Manufacturing
Wal-Mart Stores Inc	Trade

Hancock County

Blanchard Valley regional Health	Service
Consolidated Biscuit Co	Manufacturing
Cooper Tire & Rubber Co	Manufacturing
Findlay City Bd of Ed	Government
Kohl's Corp	Trade
Lowe's Companies Inc	Trade
Marathon Petroleum Co LLC	Trade
Nissin Brake Ohio	Manufacturing
Sanoh America Inc	Manufacturing
University of Findlay	Service
Whirlpool Corp	Manufacturing

Seneca County

American Standard Inc	Manufacturing
Dorel Industries/Ameriwood Ind	Manufacturing
Fostoria City Bd of Ed	Government
Heidleberg College	Service
Mercy Hospital of Tiffin	Service
National Machinery LLC	Manufacturing
State of Ohio	Government
ThyssenKrupp/TKA Atlas Inc	Manufacturing
Tiffin City Bd of Ed	Government
Tiffin University	Service

Sandusky County

Atlas Industries	Manufacturing
Bellevue Hospital	Service
Crown Battery	Manufacturing
Eaton INOAC	Manufacturing
Fremont City Bd of Ed	Government
HJ Heinz Co	Manufacturing
Memorial Hospital	Service
Poly-Foam Int'l/Style Crest	Manufacturing
Revere Plastics Inc	Manufacturing
Sandusky County Government	Government
Whirlpool Corp	Manufacturing

Ottawa County

Benton-Carroll-Salem Local Bd of Ed	Government
Brush Wellman Inc	Manufacturing
FirstEnergy Corp	Utility
Luther Home of Mercy	Service
Magruder Hospital	Service
Ottawa County Government	Government
Port Clinton City Bd of Ed	Government
Silgan Holdings Inc	Manufacturing
USG Corp/US Gypsum Co	Manufacturing

Factor 3: Population and Projected Growth

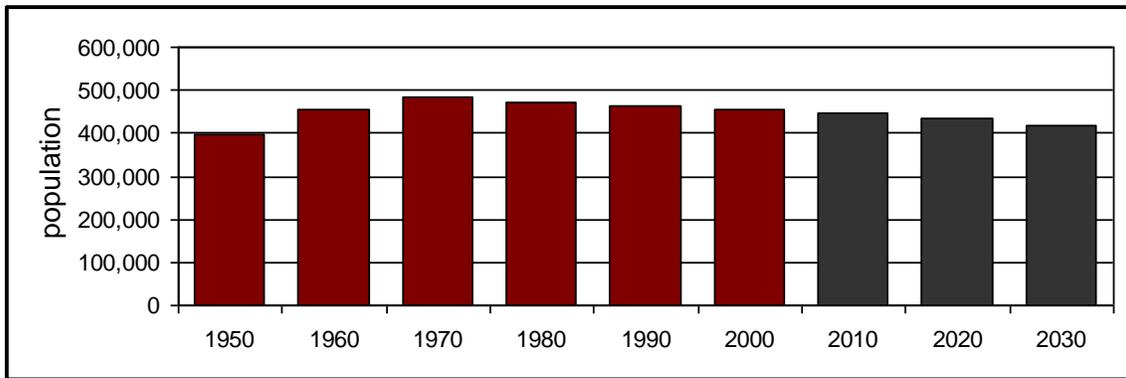
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in the Toledo area and adjacent counties are; Toledo, Oregon and Sylvania in Lucas County; Bowling Green, Perrysburg, Rossford and Maumee in Wood County; Wauseon in Fulton County; Napoleon in Henry County, Ottawa in Putnam County; Findlay in Hancock County; Tiffin in Seneca County, Fremont and Clyde in Sandusky; and Port Clinton, Marblehead and Kelleys Island in Ottawa County. Lucas County has the highest population in this area and it is projected to steadily decrease while the population in Wood County is projected to steadily increase. The population in Fulton, Henry and Hancock is projected to increase and in Seneca, Sandusky and Ottawa counties the

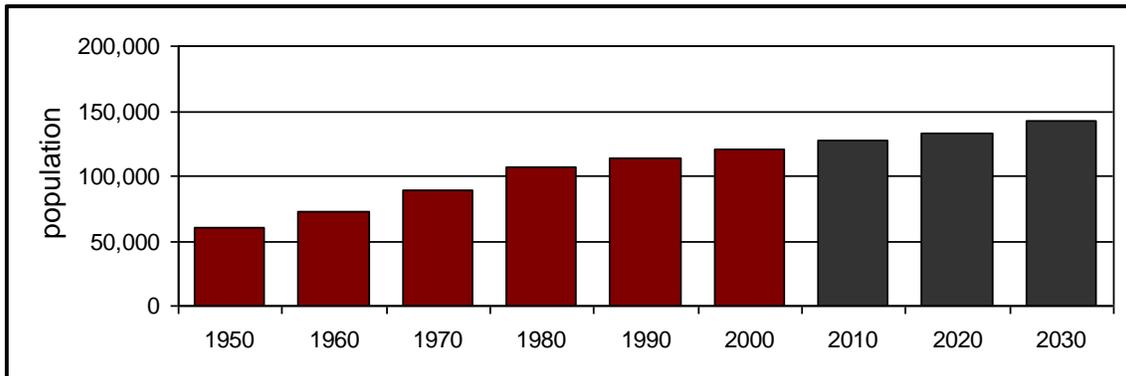
population is expected to gradually decrease as shown in the table and graphs below.

	2004	2005	2006	2010	2020	2030
Lucas	449,588	447,410	445,281	444,870	434,650	417,870
Wood	123,377	123,889	124,183	127,020	133,330	141,880
Fulton	42,785	42,888	42,900	44,610	47,210	49,110
Henry	29,364	29,431	29,520	29,540	29,990	30,110
Hancock	73,470	73,508	73,824	74,180	76,910	79,040
Seneca	57,724	57,373	57,255	56,750	54,260	50,920
Sandusky	61,689	61,579	61,625	59,940	57,900	56,420
Ottawa	41,436	41,430	41,331	40,800	40,270	38,520

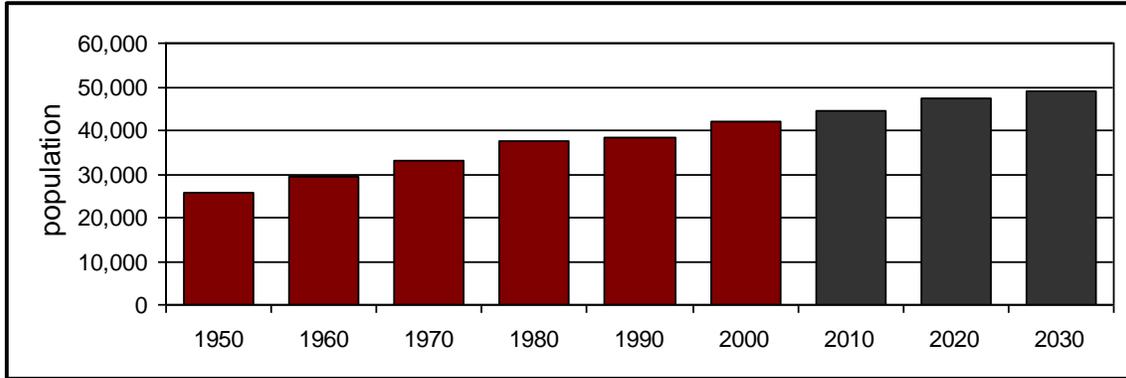
Lucas County



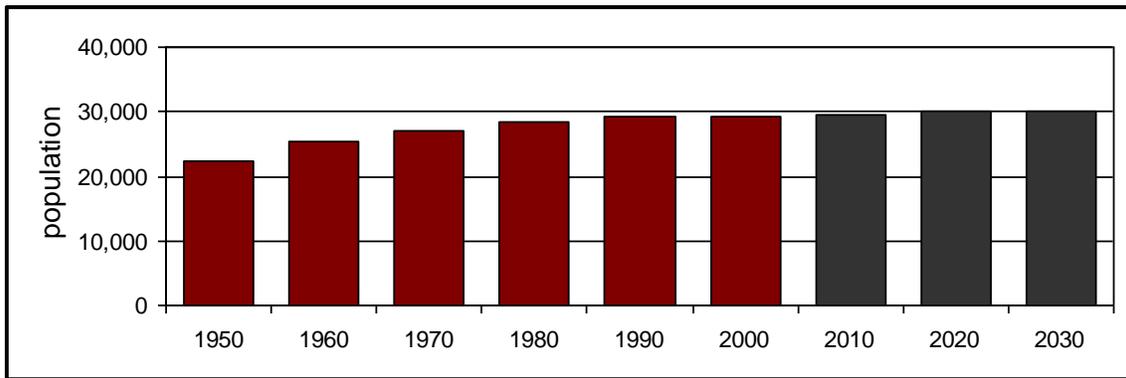
Wood County



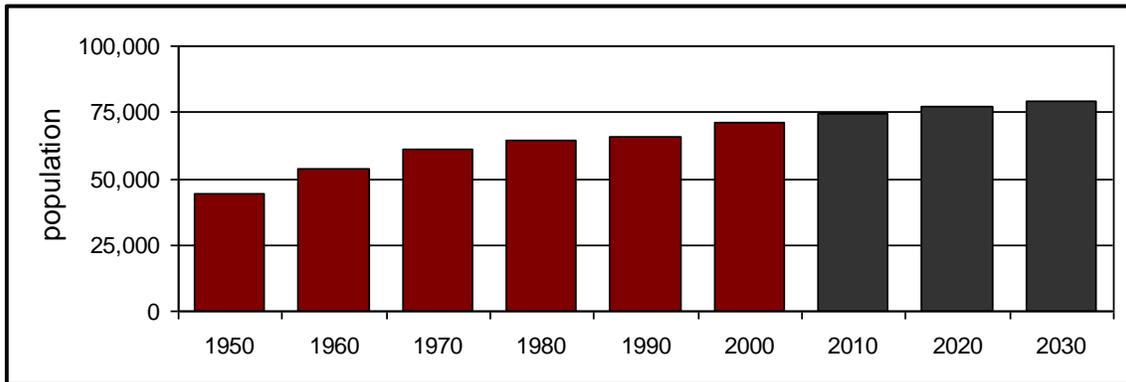
Fulton County



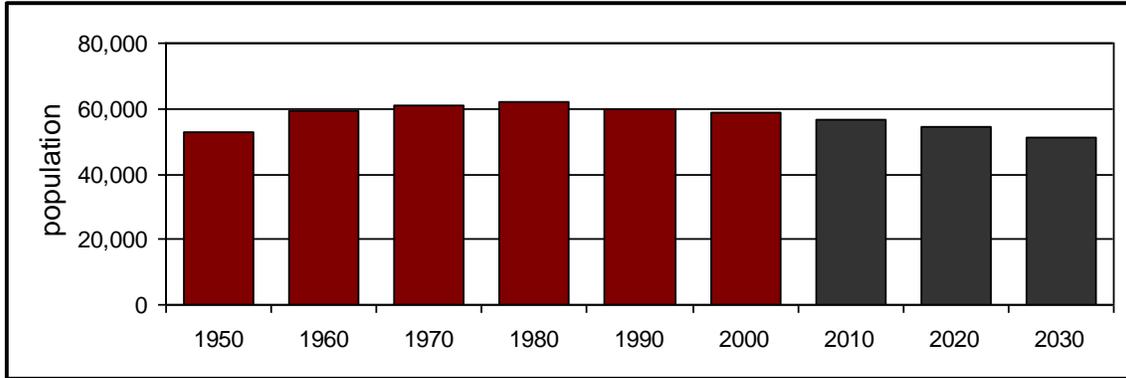
Henry County



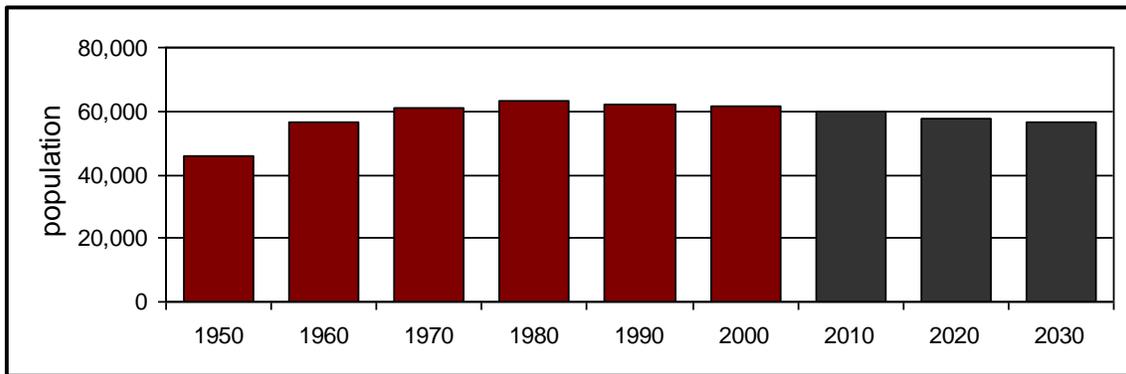
Hancock County



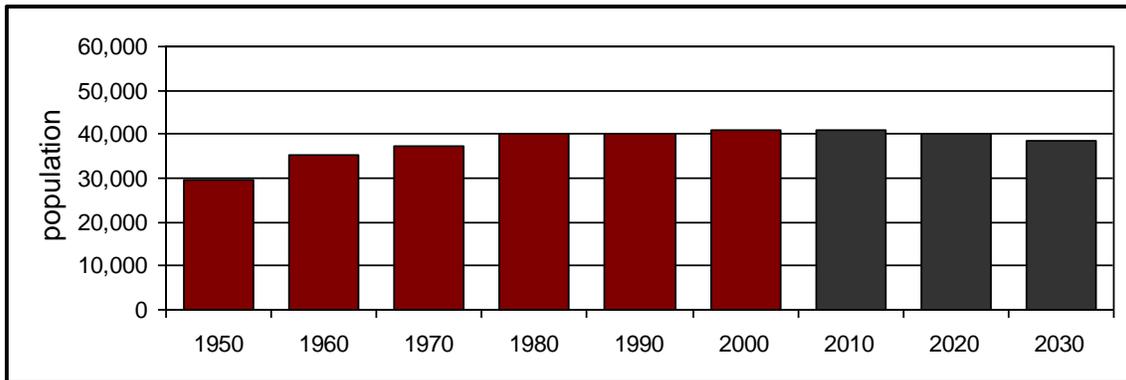
Seneca County



Sandusky County



Ottawa County

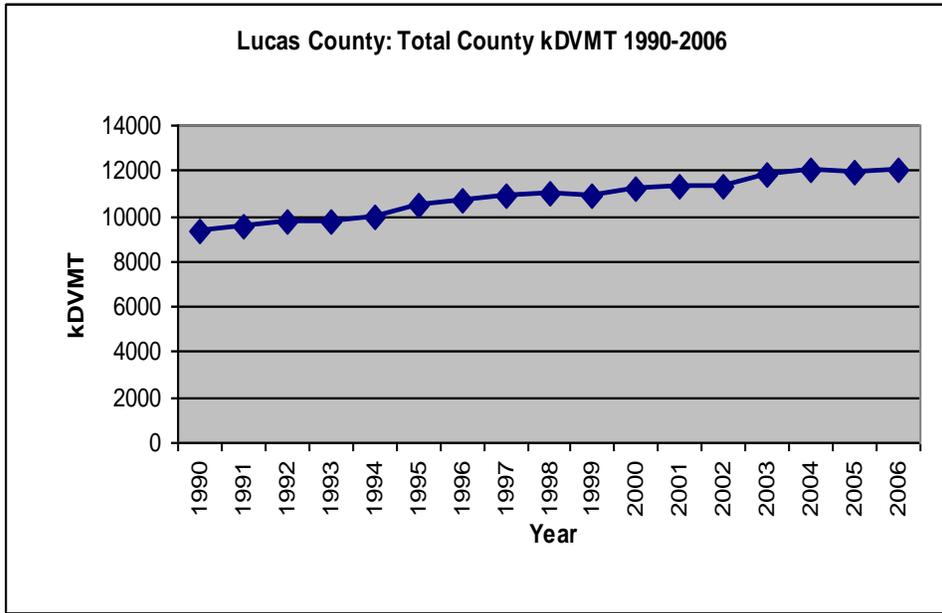


Factor 4: Traffic and commuting patterns

As expected, Lucas County has the highest kDVMT in the Toledo area as indicated in the tables below. Fulton County has experienced a very slight increase of kDVMT between 2005 and 2006 while all other surrounding counties have had slight decreases. Seneca, Sandusky and Ottawa counties had the most notable downward trend in kDVMT between 2004 and 2006.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

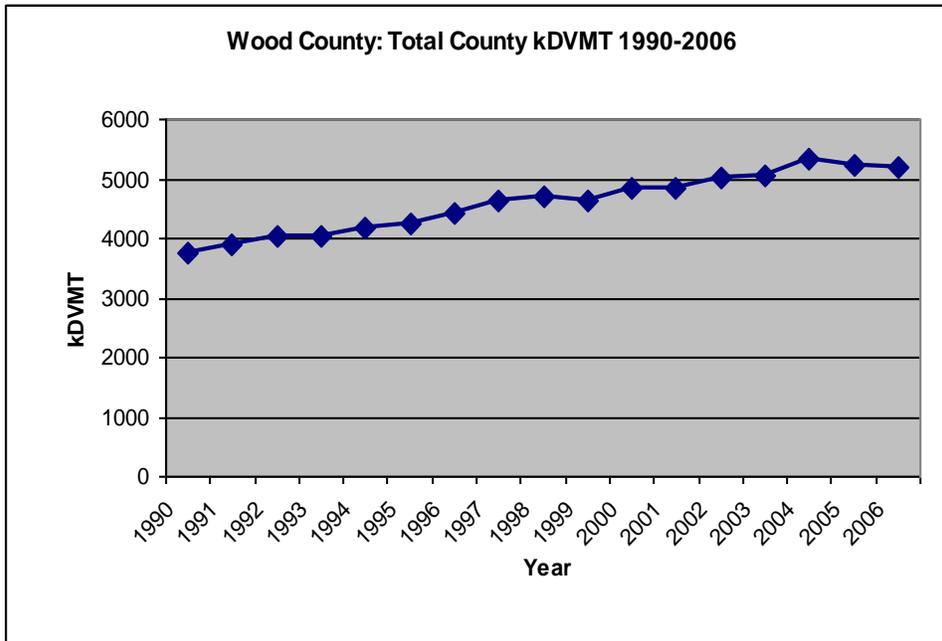
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 12032.29

2005 = 11895.43

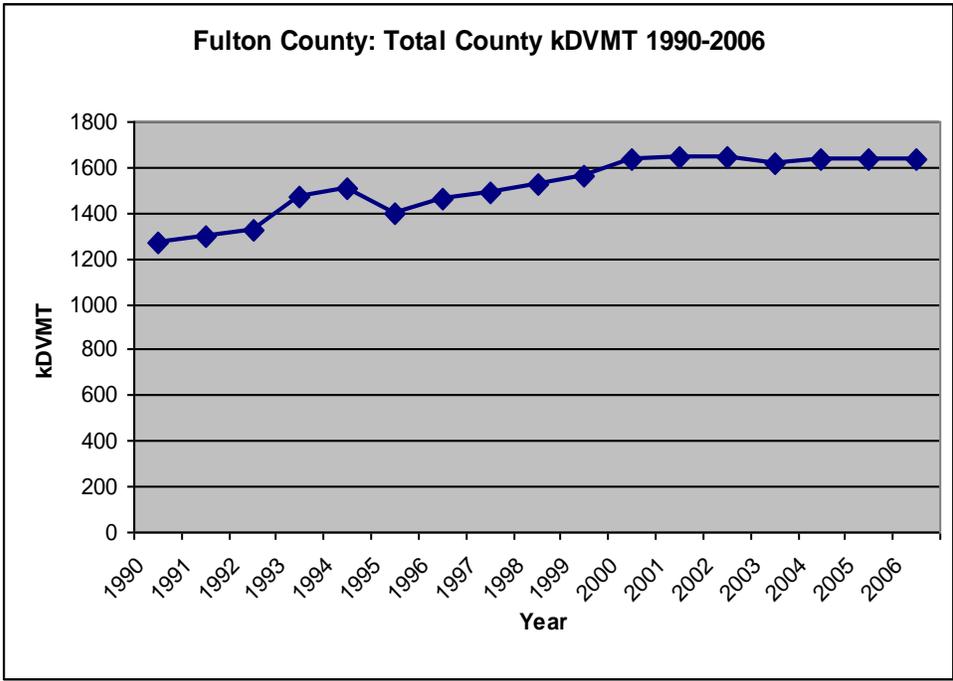
2006 = 11980.01



2004 = 5316.14

2005 = 5228.79

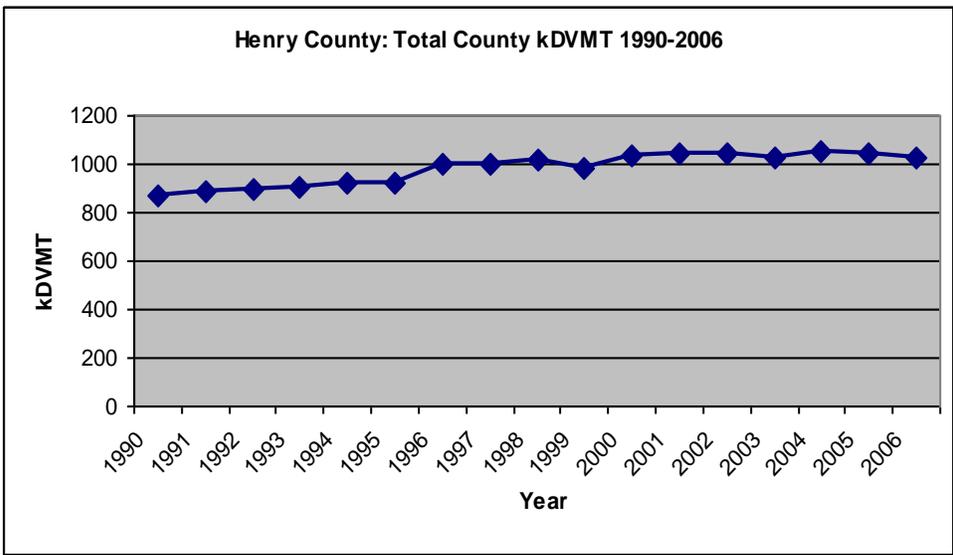
2006 = 5179.89



2004 = 1639.24

2005 = 1637.05

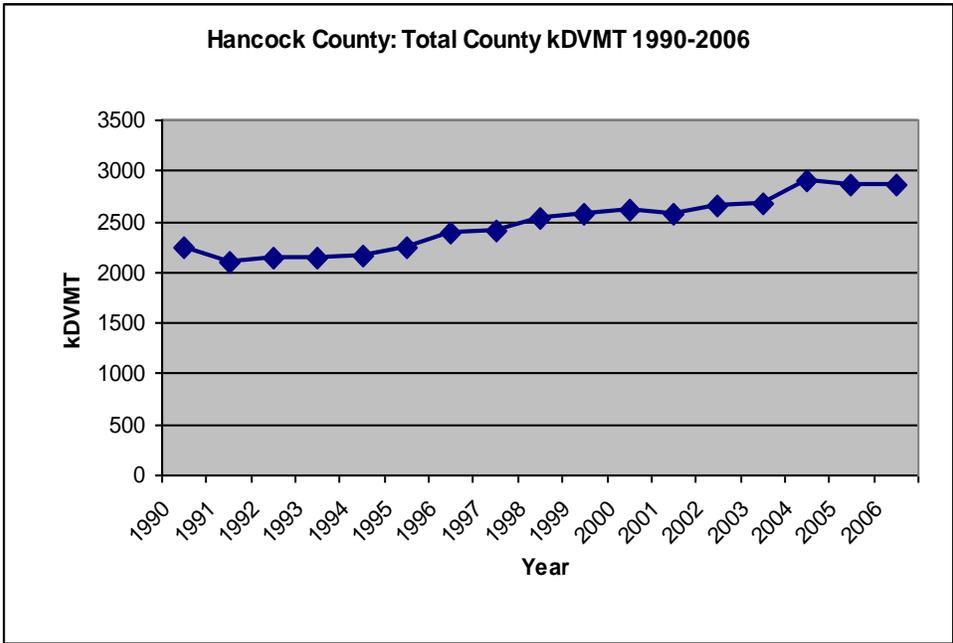
2006 = 1639.18



2004 = 509.74

2005 = 522.22

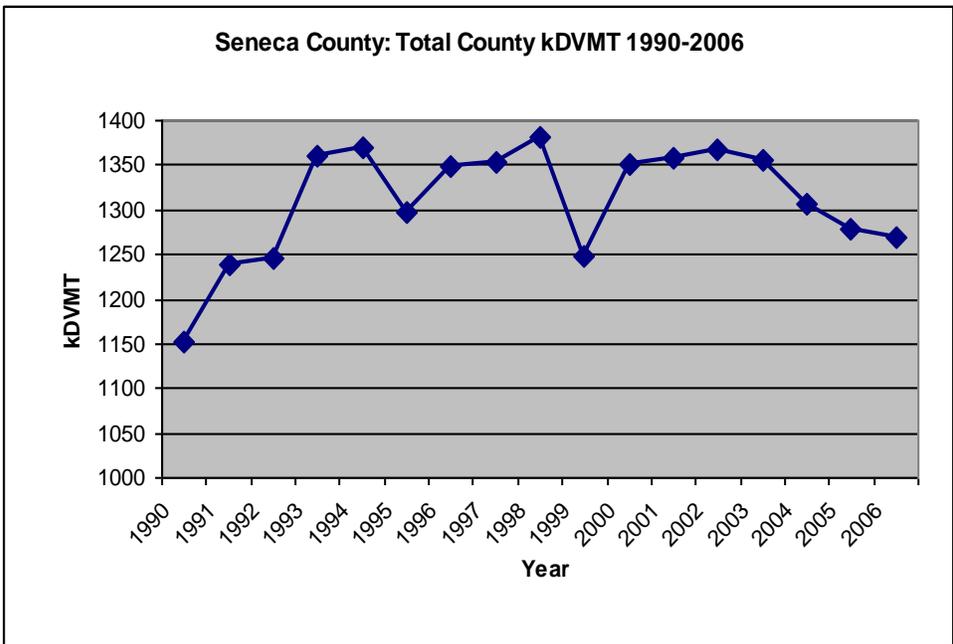
2006 = 511.2



2004 = 2900.9

2005 = 2866.29

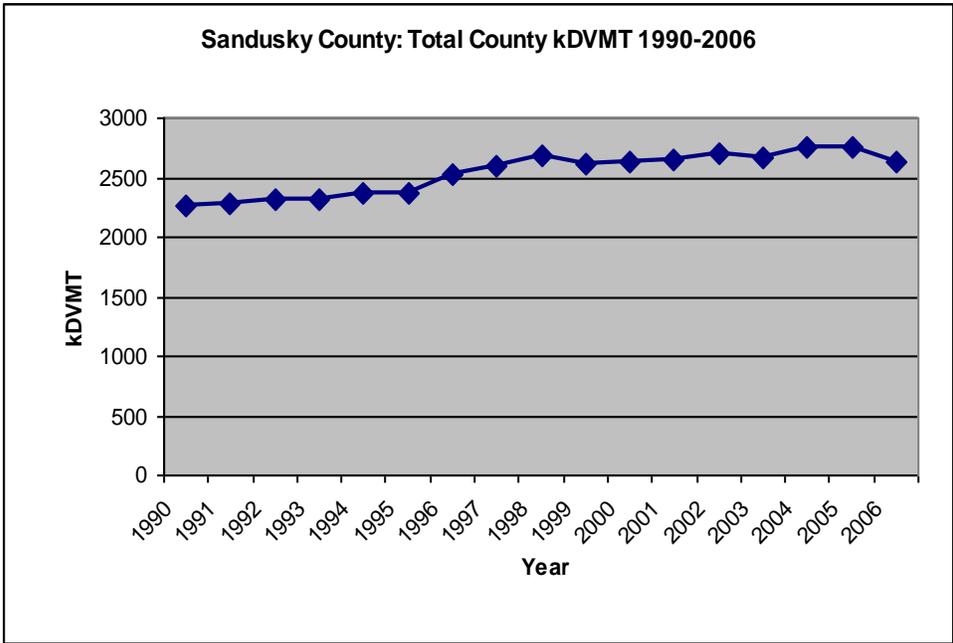
2006 = 2861.8



2004 = 1306.61

2005 = 1278.29

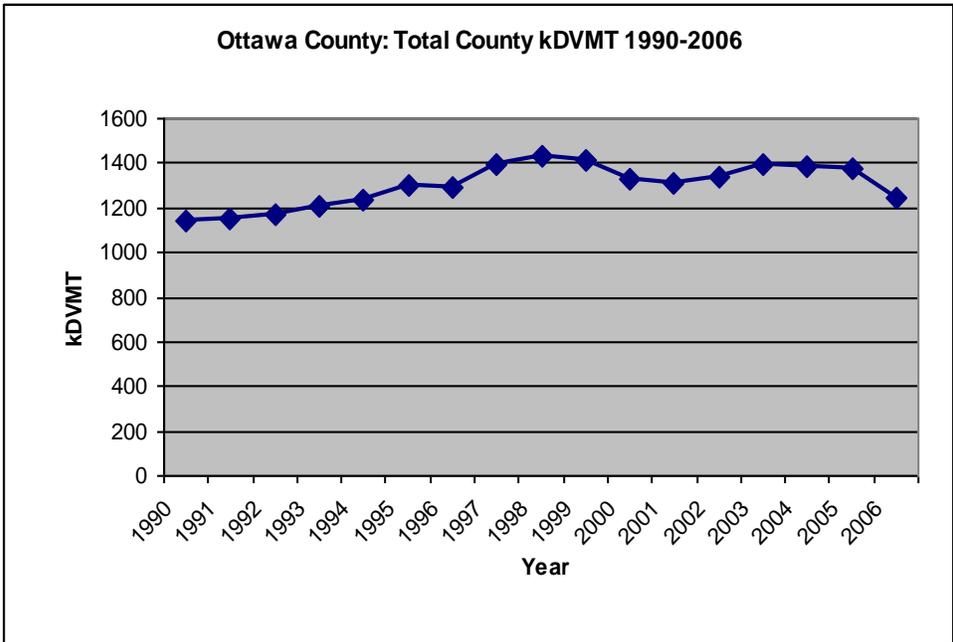
2006 = 1269.44



2004 = 2751.89

2005 = 2762.48

2006 = 2632.8



2004 = 1382.95

2005 = 1375.25

2006 = 1244.3

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

As shown in the following tables, the majority of Ohio commuters traveling into Lucas County are from Wood, Fulton and Ottawa counties. Due to the commuting pattern from Wood County into Lucas County where a violating monitor is located, Wood County (partial) is considered a contributing county. Ohio EPA recommends including the five townships located along the Wood-Lucas county line as part of the nonattainment area. These five townships are likely the major contributors to the volume of commuters as the rest of Wood County is predominately rural.

Lucas			Percent of workers that work outside the county		15.5%
			Average commute time in minutes -		20.5
Number of workers 16+ years of age living in Lucas County			207,585		
Number of workers 16+ years of age working in Lucas County			226,840		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Wood Co. OH	17,054	8.2%	Wood Co. OH	19,504	8.6%
Monroe Co. MI	4,456	2.1%	Monroe Co. MI	12,654	5.6%
Fulton Co. OH	1,957	0.9%	Fulton Co. OH	5,203	2.3%
Wayne Co. MI	1,906	0.9%	Ottawa Co. OH	3,418	1.5%
Washtenaw Co. MI	867	0.4%	Lenawee Co. MI	1,557	0.7%
Ottawa Co. OH	738	0.4%	Sandusky Co. OH	1,537	0.7%
Lenawee Co. MI	583	0.3%	Henry Co. OH	952	0.4%
Hancock Co. OH	514	0.2%	Wayne Co. MI	922	0.4%
Sandusky Co. OH	418	0.2%	Hancock Co. OH	607	0.3%
Oakland Co. MI	375	0.2%	Seneca Co. OH	480	0.2%
Percent is of workers living in county.			Percent is of workers working in county.		

Wood			Percent of workers that work outside the county		44.3%
			Average commute time in minutes -		20.1
Number of workers 16+ years of age living in Wood County			61,207		
Number of workers 16+ years of age working in Wood County			60,992		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Lucas Co. OH	19,504	31.9%	Lucas Co. OH	17,054	28.0%
Hancock Co. OH	2,177	3.6%	Ottawa Co. OH	1,652	2.7%
Seneca Co. OH	889	1.5%	Hancock Co. OH	1,603	2.6%
Ottawa Co. OH	760	1.2%	Sandusky Co. OH	1,408	2.3%
Sandusky Co. OH	587	1.0%	Seneca Co. OH	1,019	1.7%
Monroe Co. MI	384	0.6%	Henry Co. OH	865	1.4%
Henry Co. OH	359	0.6%	Monroe Co. MI	778	1.3%
Wayne Co. MI	307	0.5%	Fulton Co. OH	622	1.0%
Fulton Co. OH	269	0.4%	Lenawee Co. MI	128	0.2%
Defiance Co. OH	172	0.3%	Putnam Co. OH	109	0.2%
Percent is of workers living in county.			Percent is of workers working in county.		

Fulton	Percent of workers that work outside the county		39.0%
	Average commute time in minutes -		21.3
Number of workers 16+ years of age living in Fulton County			20,855
Commute Out To			Number Percent
Lucas Co. OH	5,203	24.9%	
Williams Co. OH	677	3.2%	
Henry Co. OH	659	3.2%	
Wood Co. OH	622	3.0%	
Lenawee Co. MI	233	1.1%	
Defiance Co. OH	217	1.0%	
Monroe Co. MI	122	0.6%	
Wayne Co. MI	30	0.1%	
Hillsdale Co. MI	29	0.1%	
Sandusky Co. OH	29	0.1%	
Percent is of workers living in county.			
Number of workers 16+ years of age working in Fulton County			21,516
Commute In From			Number Percent
Henry Co. OH	1,981	9.2%	
Lucas Co. OH	1,957	9.1%	
Williams Co. OH	1,810	8.4%	
Defiance Co. OH	1,270	5.9%	
Lenawee Co. MI	639	3.0%	
Wood Co. OH	269	1.3%	
Hillsdale Co. MI	156	0.7%	
Paulding Co. OH	134	0.6%	
Monroe Co. MI	87	0.4%	
Sandusky Co. OH	72	0.3%	
Percent is of workers working in county.			

Henry	Percent of workers that work outside the county		43.0%
	Average commute time in minutes -		21.4
Number of workers 16+ years of age living in Henry County			13,911
Commute Out To			Number Percent
Fulton Co. OH	1,981	14.2%	
Defiance Co. OH	1,327	9.5%	
Lucas Co. OH	952	6.8%	
Wood Co. OH	865	6.2%	
Williams Co. OH	295	2.1%	
Hancock Co. OH	189	1.4%	
Putnam Co. OH	138	1.0%	
Allen Co. OH	38	0.3%	
Lenawee Co. MI	23	0.2%	
Monroe Co. MI	18	0.1%	
Percent is of workers living in county.			
Number of workers 16+ years of age working in Henry County			11,170
Commute In From			Number Percent
Defiance Co. OH	817	7.3%	
Fulton Co. OH	659	5.9%	
Williams Co. OH	406	3.6%	
Lucas Co. OH	365	3.3%	
Wood Co. OH	359	3.2%	
Putnam Co. OH	206	1.8%	
Paulding Co. OH	105	0.9%	
Hancock Co. OH	43	0.4%	
Seneca Co. OH	34	0.3%	
Webb Co. TX	26	0.2%	
Percent is of workers working in county.			

Hancock			Percent of workers that work outside the county		18.7%
			Average commute time in minutes -		17.5
Number of workers 16+ years of age living in Hancock County			35,845		
Commute Out To			Number	Percent	
Wood Co. OH	1,603	4.5%			
Seneca Co. OH	1,296	3.6%			
Allen Co. OH	1,074	3.0%			
Lucas Co. OH	607	1.7%			
Wyandot Co. OH	491	1.4%			
Putnam Co. OH	382	1.1%			
Hardin Co. OH	379	1.1%			
Sandusky Co. OH	126	0.4%			
Ottawa Co. OH	50	0.1%			
Van Wert Co. OH	49	0.1%			
Number of workers 16+ years of age working in Hancock County			41,331		
Commute In From			Number	Percent	
Seneca Co. OH	3,118	7.5%			
Wood Co. OH	2,177	5.3%			
Putnam Co. OH	1,722	4.2%			
Allen Co. OH	1,169	2.8%			
Wyandot Co. OH	1,107	2.7%			
Hardin Co. OH	1,082	2.6%			
Lucas Co. OH	514	1.2%			
Sandusky Co. OH	191	0.5%			
Henry Co. OH	189	0.5%			
Franklin Co. OH	91	0.2%			
Percent is of workers living in county.			Percent is of workers working in county.		

Seneca			Percent of workers that work outside the county		37.2%
			Average commute time in minutes -		20.5
Number of workers 16+ years of age living in Seneca County			28,274		
Commute Out To			Number	Percent	
Hancock Co. OH	3,118	11.0%			
Sandusky Co. OH	2,735	9.7%			
Wood Co. OH	1,019	3.6%			
Huron Co. OH	954	3.4%			
Wyandot Co. OH	781	2.8%			
Lucas Co. OH	480	1.7%			
Erie Co. OH	317	1.1%			
Crawford Co. OH	284	1.0%			
Ottawa Co. OH	177	0.6%			
Allen Co. OH	68	0.2%			
Number of workers 16+ years of age working in Seneca County			23,261		
Commute In From			Number	Percent	
Hancock Co. OH	1,296	5.6%			
Sandusky Co. OH	1,217	5.2%			
Wood Co. OH	889	3.8%			
Wyandot Co. OH	675	2.9%			
Crawford Co. OH	323	1.4%			
Huron Co. OH	282	1.2%			
Lucas Co. OH	138	0.6%			
Erie Co. OH	89	0.4%			
Ottawa Co. OH	81	0.3%			
Franklin Co. OH	48	0.2%			
Percent is of workers living in county.			Percent is of workers working in county.		

Sandusky	Percent of workers that work outside the county		31.1%
	Average commute time in minutes -		19.4
Number of workers 16+ years of age living in Sandusky County			29,971
Number of workers 16+ years of age working in Sandusky County			28,184
Commute Out To	Number	Percent	
Erie Co. OH	1,659	5.5%	
Lucas Co. OH	1,537	5.1%	
Ottawa Co. OH	1,426	4.8%	
Wood Co. OH	1,408	4.7%	
Huron Co. OH	1,305	4.4%	
Seneca Co. OH	1,217	4.1%	
Hancock Co. OH	191	0.6%	
Fulton Co. OH	72	0.2%	
Cuyahoga Co. OH	59	0.2%	
Monroe Co. MI	44	0.1%	
Percent is of workers living in county.			
Commute In From	Number	Percent	
Seneca Co. OH	2,735	9.7%	
Ottawa Co. OH	1,299	4.6%	
Huron Co. OH	1,025	3.6%	
Erie Co. OH	768	2.7%	
Wood Co. OH	587	2.1%	
Lucas Co. OH	418	1.5%	
Hancock Co. OH	126	0.4%	
Lorain Co. OH	71	0.3%	
Franklin Co. OH	51	0.2%	
Wyandot Co. OH	45	0.2%	
Percent is of workers working in county.			

Ottawa	Percent of workers that work outside the county		43.8%
	Average commute time in minutes -		22.5
Number of workers 16+ years of age living in Ottawa County			19,434
Number of workers 16+ years of age working in Ottawa County			15,208
Commute Out To	Number	Percent	
Lucas Co. OH	3,418	17.6%	
Wood Co. OH	1,652	8.5%	
Sandusky Co. OH	1,299	6.7%	
Erie Co. OH	1,107	5.7%	
Cuyahoga Co. OH	155	0.8%	
Huron Co. OH	151	0.8%	
Monroe Co. MI	90	0.5%	
Seneca Co. OH	81	0.4%	
Wayne Co. MI	75	0.4%	
Lorain Co. OH	71	0.4%	
Percent is of workers living in county.			
Commute In From	Number	Percent	
Sandusky Co. OH	1,426	9.4%	
Wood Co. OH	760	5.0%	
Lucas Co. OH	738	4.9%	
Erie Co. OH	530	3.5%	
Seneca Co. OH	177	1.2%	
Huron Co. OH	111	0.7%	
Monroe Co. MI	68	0.4%	
Hancock Co. OH	50	0.3%	
Lorain Co. OH	43	0.3%	
Franklin Co. OH	32	0.2%	
Percent is of workers working in county.			

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Toledo area.

Factor 6: Topography/Land use/Land cover

Lucas County is in the glaciated Huron-Erie Lake Plains region (see Appendix F). The county is on a nearly level plain. The generally flat landscape is broken by low, rounded hills created by streams throughout the county. The average elevation is about 614 feet above sea level.

Wood County lies entirely within the Huron-Erie Lake Plains region. The county landscape is relatively uniform, and level with most of the county having a slope of six percent or less. The highest point is about 775 feet and the lowest point is about 575 feet above sea level.

Fulton County, like Lucas and Wood counties, is located in the Huron-Erie Lake Plains region. The county is made up of gently rolling terrain and nearly level plain. The landscape slopes eastward toward Lake Erie. The elevation ranges from about 680 feet to 806 feet above sea level.

Henry County has large glaciated areas of level or nearly level topography. The elevation ranges from 625 feet to 750 feet above sea level.

Hancock County like most counties in the northwest section of Ohio has a relatively uniform, level topography. The highest point is 955 feet and the lowest is 715 feet above sea level. Most of the county has a slope of six percent or less.

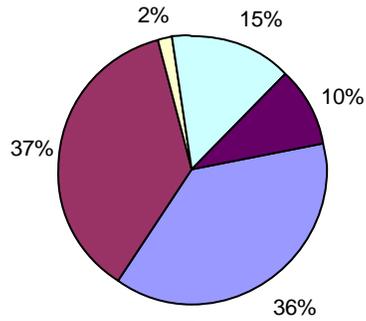
Seneca County straddles the Lake Plain and Till Plain areas of the Central Lowlands region. Relief of the county is mainly nearly level to undulating. As expected, steeper areas are along streams.

Sandusky County is mainly in the broad lake plain section of the Central Lowlands Province. Exceptions to the nearly flat topography dominant throughout the county are the beach ridges in the southeastern and southwestern parts of the county. Elevation ranges from 575 feet to 810 feet above sea level.

Ottawa County lies entirely within the glaciated part of Ohio. The relief of the county is nearly level to sloping. West of Port Clinton the surface is flat and is a little elevated above Lake Erie. East of Port Clinton the relief is gently rolling.

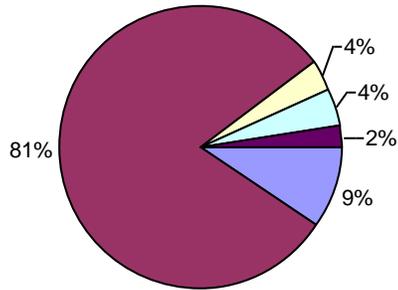
As shown in the following pie charts, the land use/land cover in this area is cropland and more cropland. As expected Lucas County has the highest percentage of urban area with 36 percent.

Lucas County Land Use/Land Cover



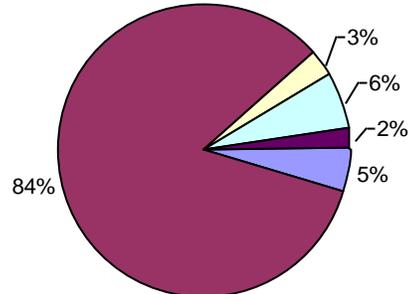
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Wood County Land Use/Land Cover



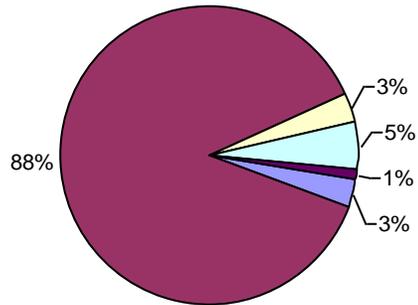
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Fulton County Land Use/Land Cover



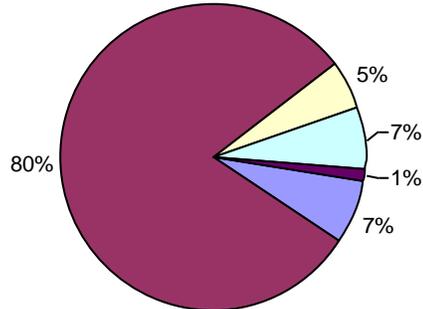
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Henry County Land Use/Land Cover



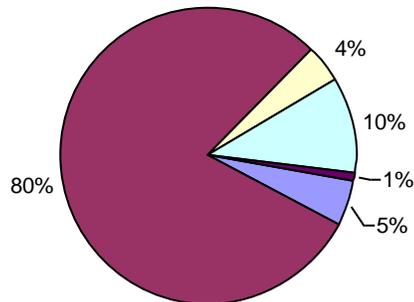
- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Hancock County Land Use/Land Cover

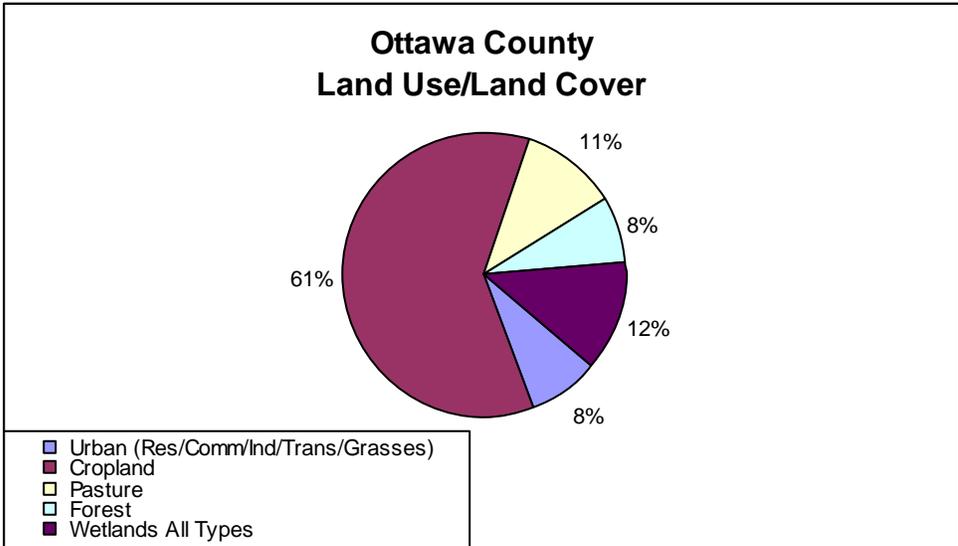
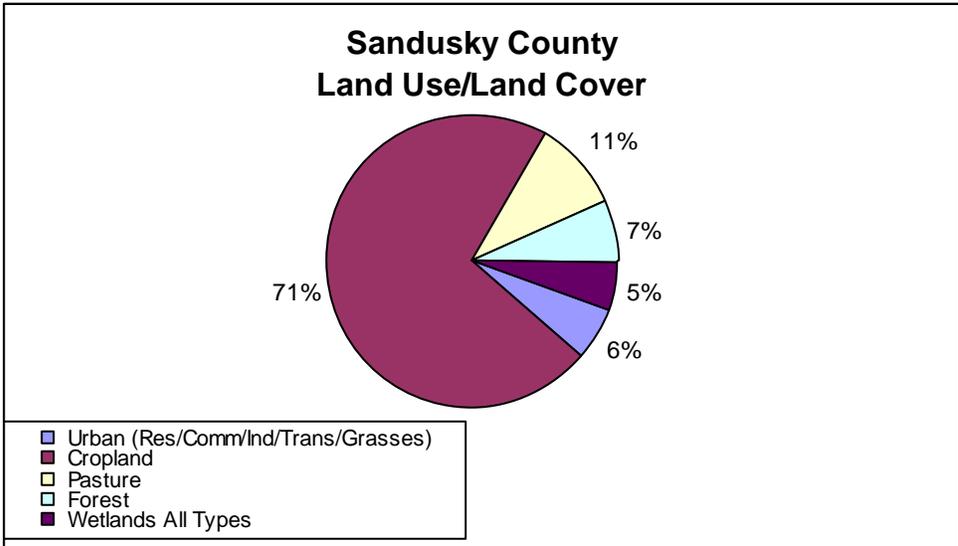


- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types

Seneca County Land Use/Land Cover



- Urban (Res/Comm/Ind/Trans/Grasses)
- Cropland
- Pasture
- Forest
- Wetlands All Types



Factor 7: Jurisdictional boundaries

The Toledo, OH Metropolitan Statistical Area includes: Fulton, Lucas, Ottawa and Wood counties. The principal city is Toledo.

The Toledo Metropolitan Area Council of Governments (TMACOG) is the planning agency designated as the Metropolitan Planning Organization for greater Toledo area. The TMACOG region is composed of three counties in two states: Lucas and Wood counties in Ohio and Monroe County in Michigan.

Factor 8: Level of control of emission sources

In the Toledo area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- Ohio Clean Diesel Initiatives
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area. There have also been significant enforcement activities affecting sulfur emissions from the refineries in Toledo which will also contribute to improved air quality.

Wheeling, WV-OH:

Current county nonattainment: Belmont



Current nonattainment counties



Current partial nonattainment

Recommended county nonattainment: None



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There is one Ohio county and two West Virginia counties in this existing PM_{2.5} nonattainment area, Belmont County in Ohio and Marshall and Ohio counties in West Virginia. The monitors used for this area are located in West Virginia. The American Electric Power Burge Plant is located in Belmont County. As part of the CAIR requirements, it is forecasted that significant reductions in emissions will occur. Belmont County has low population, little expected growth and insignificant commuting levels. Due to these factors, Ohio EPA recommends attainment for Belmont County. There are three adjacent counties to Belmont County included in this section; Guernsey, Noble and Monroe. These three counties have insignificant emissions, low population, little expected growth and low commuting levels and therefore are not considered contributing counties.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
54-051-1002	MARSHALL	34.8	32.0	34.7	34
54-069-0008	OHIO	33.6			
54-069-0010			31.3	27.5	

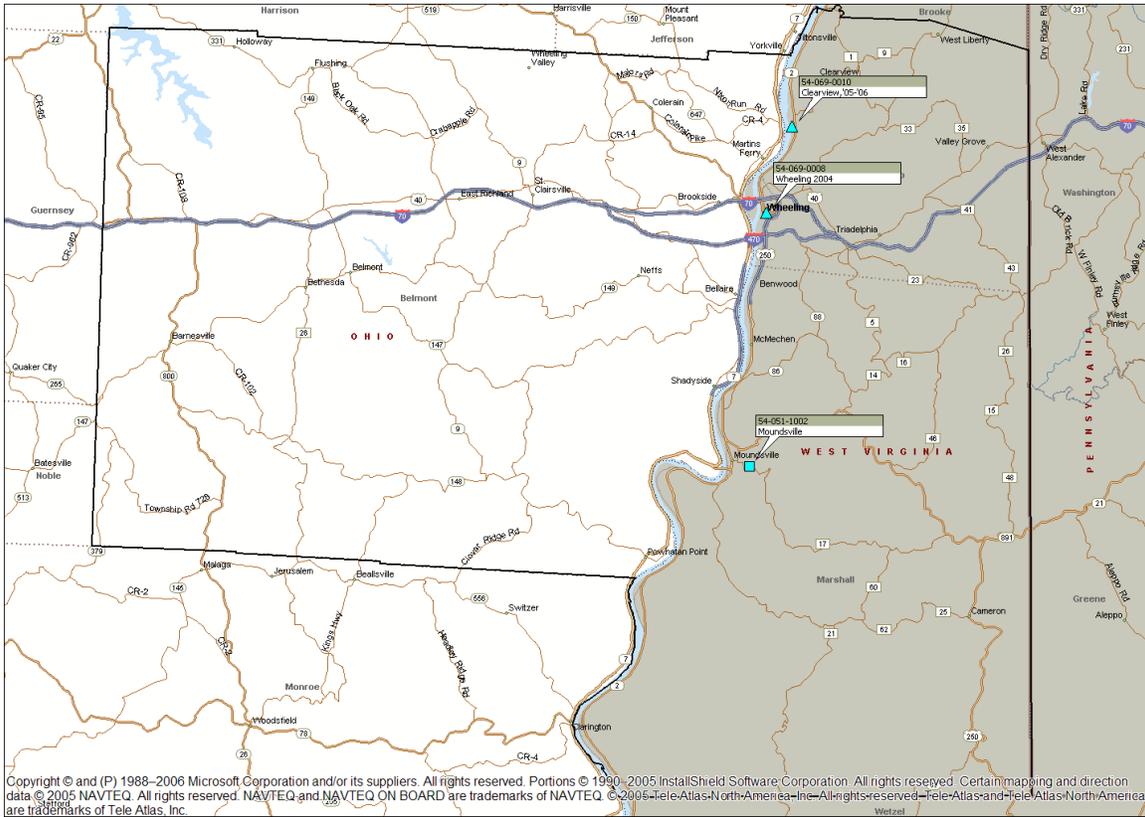
 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
54-051-1002	MARSHALL	14.4	16.2	14.5	15.0
54-069-0008	OHIO	14.1			
54-069-0010				15.4	13.1

 Sites with less than 75% capture

Wheeling WV-OH Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data (tons per day)

2005			
County	SO ₂	NO _x	PM _{2.5}
BELMONT	120.91	22.02	1.41
Monroe	0.31	2.76	0.35
Noble	0.12	3.90	0.26
Guernsey	2.08	13.73	0.68

2009			
County	SO ₂	NO _x	PM _{2.5}
BELMONT	58.11	20.78	3.69
Monroe	0.26	3.25	0.35
Noble	0.04	2.20	0.21
Guernsey	1.84	10.88	0.57

West Virginia and Pennsylvania

2005			
County	SO ₂	NO _x	PM _{2.5}
Marshall, WV	23.26	9.73	2.44
Ohio, WV	0.61	9.63	0.60
Wetzel, WV	1.38	11.35	0.46
Greene, PA	2.98	8.43	1.73

2009			
County	SO ₂	NO _x	PM _{2.5}
Marshall, WV	223.92	32.11	11.29
Ohio, WV	0.40	6.16	0.42
Wetzel, WV	1.32	7.39	0.34
Greene, PA*	59.88	16.5	6.08

* Does not include on-road emissions

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Wheeling area are in the categories of government, government and service as shown below.

Belmont County

Barnesville Hospital Assn	Service
Belmont Community Hospital	Service
Belmont County Government	Government
Belmont County Technical College	Government
Commercial Vehicle Group/Mayflower	Manufacturing
East Ohio regional Hospital	Service
Kroger Co	Trade
Ohio Valley Coal Co	Mining
State of Ohio	Government
Wal-Mart Stores Inc	Trade
Wheeling-Pittsburgh Steel Corp	Manufacturing

Monroe County

Extendicare/Woodsfield Nursing Center	Service
Monroe County Government	Government
Ormet Corp	Manufacturing
Riesbeck Food Markets	Trade
Safe Auto Insurance Group	Service
Slay Transportation Co Inc	Transportation
Switzerland of Ohio Local Bd of Ed	Government

Noble County

Caldwell Exempted Village Bd of Ed	Government
MAHLE International	Manufacturing
Noble County Government	Government
Noble Local Bd of Ed	Government
Packaging Dynamics/Intl Converter	Manufacturing
State of Ohio	Government
Summit Acres	Service

Guernsey County

Cambridge City Bd of Ed	Government
Daimler AG/Detroit Diesel	Manufacturing
Colgate-Palmolive Co	Manufacturing
Federal-Mogul Corp	Manufacturing
Guernsey County Government	Government
Plastech Engineered Products	Manufacturing
Southeastern Ohio regional Medical Center	Service
State of Ohio	Government
Wal-Mart Stores Inc	Trade

Factor 3: Population and Projected Growth

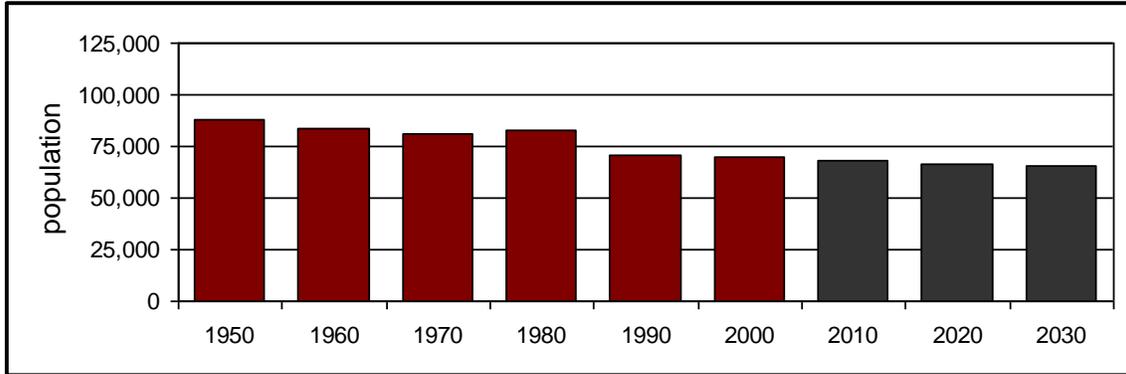
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Belmont County are St. Clairsville and Martins Ferry; in Monroe County, Woodsfield and Graysville; in Noble County, Caldwell; in Guernsey County, Cambridge.

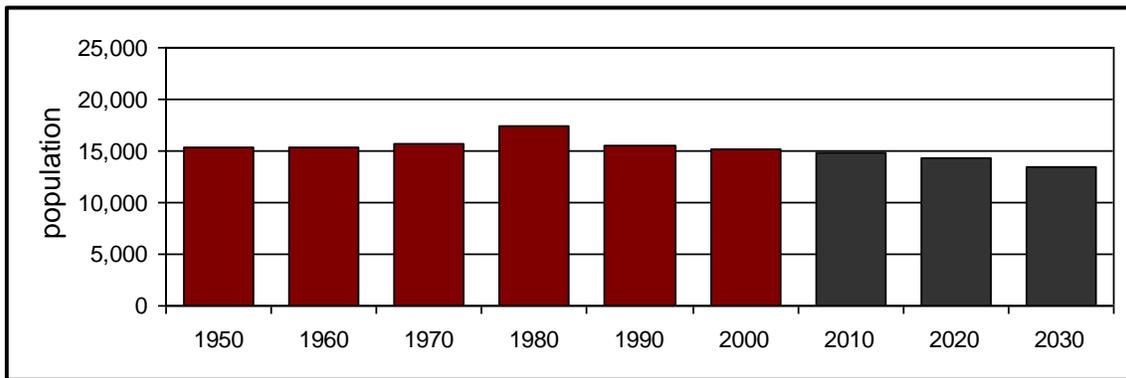
As indicated in the following table and graphs, Belmont County has the highest population in this area and it is projected to steadily decrease. The population in the surrounding counties is projected to remain generally constant with only minor changes in the future.

	2004	2005	2006	2010	2020	2030
Belmont	69,444	69,089	68,771	68,030	66,810	65,340
Monroe	14,927	14,736	14,606	14,800	14,280	13,490
Noble	14,172	14,097	14,165	15,370	16,230	16,690
Guernsey	41,185	41,007	40,876	41,400	42,480	43,360

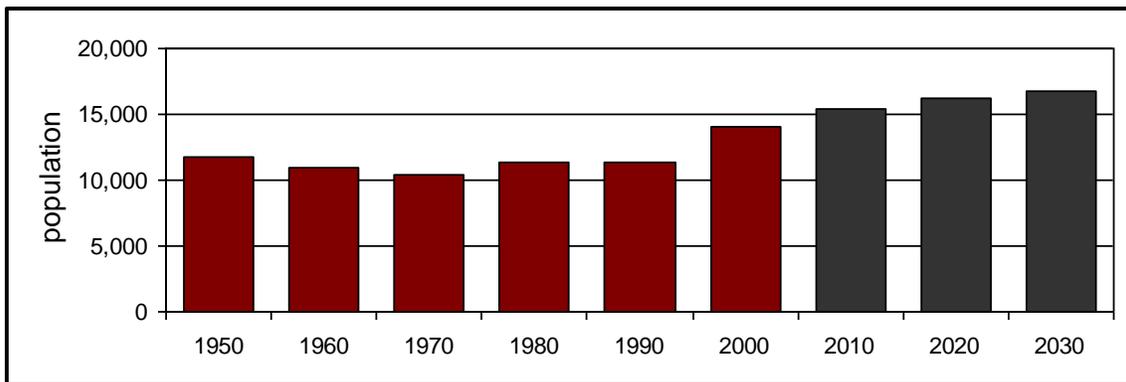
Belmont County



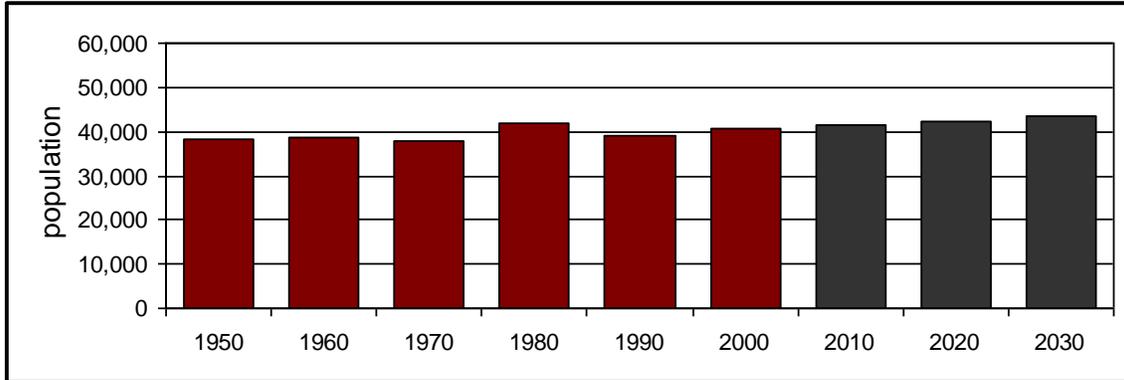
Monroe County



Noble County



Guernsey County

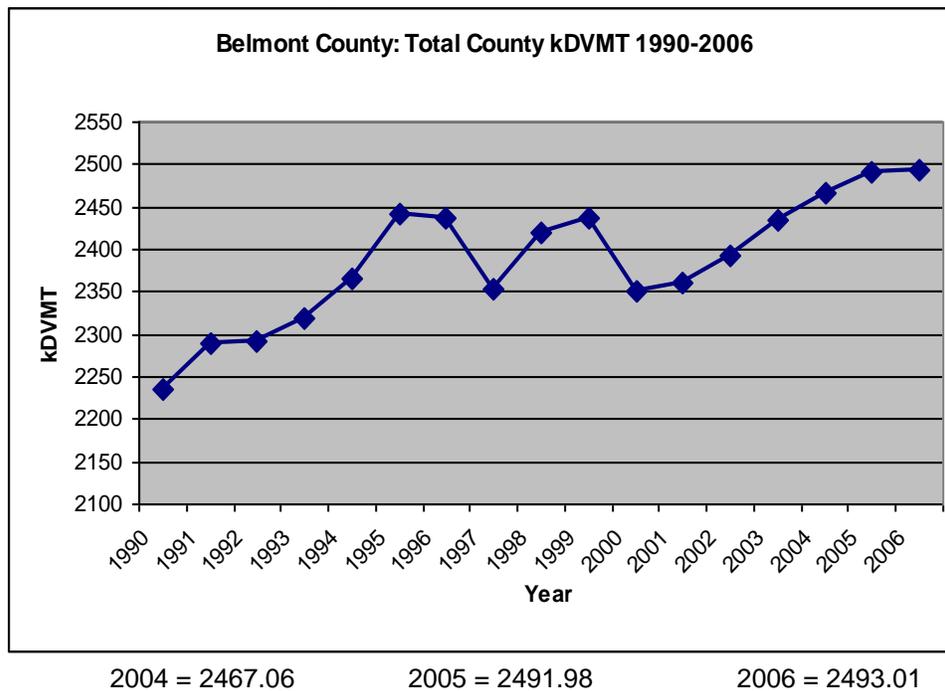


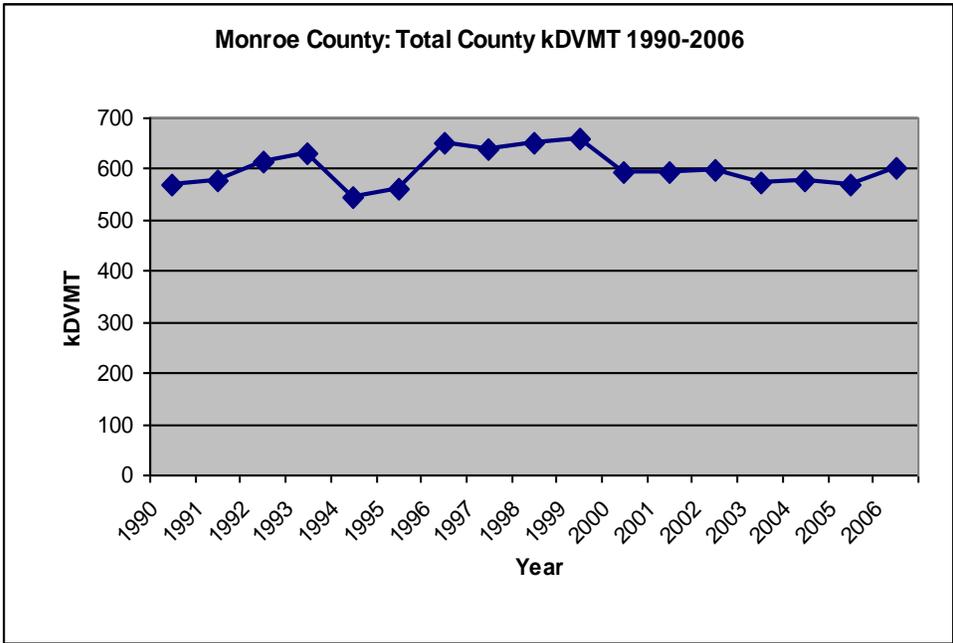
Factor 4: Traffic and commuting patterns

Belmont and Guernsey counties have the highest kDVMT in this area. Between 2004 and 2006, Belmont and Monroe counties had a very slight increase in kDVMT while Noble and Guernsey counties experienced very slight decreases in kDVMT as shown in the graphs below.

Estimated Vehicle Miles Traveled (kDVMT = in thousands)

Source: Ohio Department of Transportation, Office of Technical Services

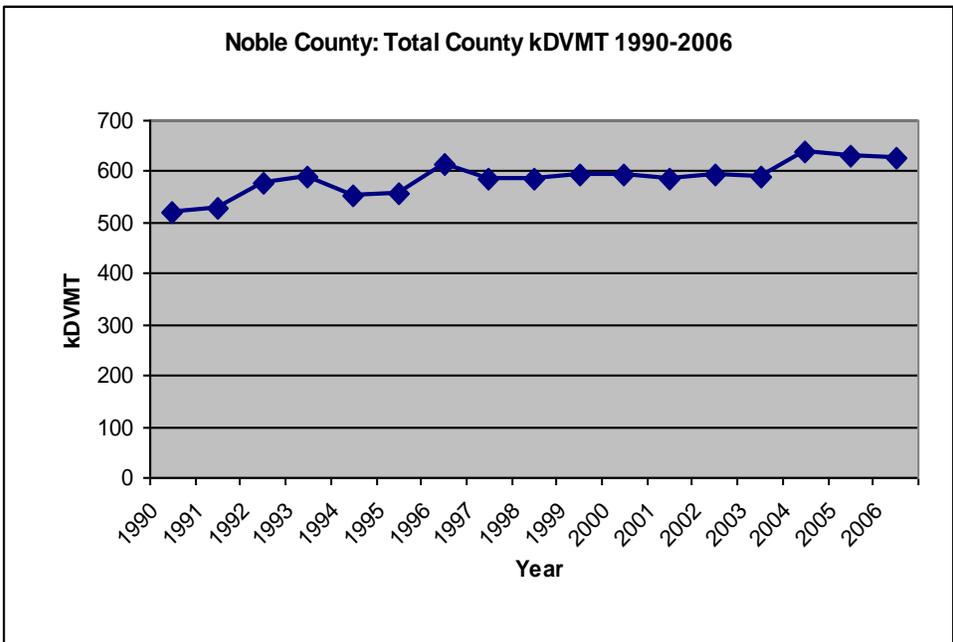




2004 = 575.35

2005 = 569.63

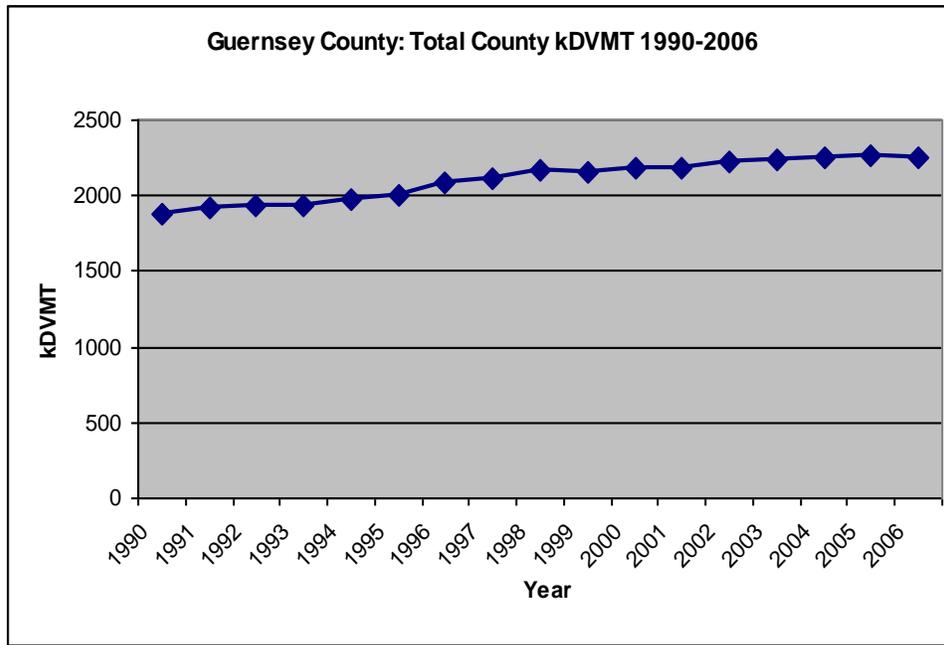
2006 = 600.06



2004 = 639.25

2005 = 629.96

2006 = 625.29



2004 = 2256.86

2005 = 2271.98

2006 = 2254.55

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Commuting in the Wheeling area is minimal as shown in the tables below. The largest number of commuters is from Belmont County traveling into Ohio County, WV. Each of the adjacent counties has commuters traveling into Belmont County but the number is insignificant.

Belmont			Percent of workers that work outside the county		36.0%
			Average commute time in minutes -		23.5
Number of workers 16+ years of age living in Belmont County			27,889		
Commute Out To	Number	Percent			
Ohio Co. WV	4,603	16.5%			
Jefferson Co. OH	1,129	4.0%			
Marshall Co. WV	1,064	3.8%			
Monroe Co. OH	626	2.2%			
Guernsey Co. OH	466	1.7%			
Harrison Co. OH	280	1.0%			
Wetzel Co. WV	227	0.8%			
Allegheny Co. PA	206	0.7%			
Franklin Co. OH	141	0.5%			
Washington Co. PA	138	0.5%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Belmont County			23,944		
Commute In From	Number	Percent			
Ohio Co. WV	1,876	7.8%			
Jefferson Co. OH	1,236	5.2%			
Marshall Co. WV	858	3.6%			
Monroe Co. OH	596	2.5%			
Harrison Co. OH	361	1.5%			
Guernsey Co. OH	318	1.3%			
Brooke Co. WV	155	0.6%			
Noble Co. OH	103	0.4%			
Washington Co. PA	75	0.3%			
Muskingum Co. OH	38	0.2%			
Percent is of workers working in county.					

Guernsey			Percent of workers that work outside the county		26.4%
			Average commute time in minutes -		23.7
Number of workers 16+ years of age living in Guernsey County			16,644		
Number of workers 16+ years of age working in Guernsey County			15,528		
Commute Out To			Number	Percent	
Muskingum Co. OH	1,815	10.9%			
Noble Co. OH	438	2.6%			
Franklin Co. OH	396	2.4%			
Belmont Co. OH	318	1.9%			
Tuscarawas Co. OH	249	1.5%			
Coshocton Co. OH	210	1.3%			
Licking Co. OH	127	0.8%			
Stark Co. OH	88	0.5%			
Summit Co. OH	81	0.5%			
Cuyahoga Co. OH	52	0.3%			
Percent is of workers living in county.			Percent is of workers working in county.		

Noble			Percent of workers that work outside the county		45.3%
			Average commute time in minutes -		26.7
Number of workers 16+ years of age living in Noble County			5,028		
Number of workers 16+ years of age working in Noble County			3,796		
Commute Out To			Number	Percent	
Guernsey Co. OH	1,069	21.3%			
Washington Co. OH	453	9.0%			
Muskingum Co. OH	274	5.4%			
Belmont Co. OH	103	2.0%			
Franklin Co. OH	79	1.6%			
Monroe Co. OH	67	1.3%			
Wood Co. WV	27	0.5%			
Licking Co. OH	24	0.5%			
Summit Co. OH	21	0.4%			
Stark Co. OH	19	0.4%			
Percent is of workers living in county.			Percent is of workers working in county.		

Monroe			Percent of workers that work outside the county		38.5%
			Average commute time in minutes -		30.8
Number of workers 16+ years of age living in Monroe County			5,768		
Number of workers 16+ years of age working in Monroe County			5,346		
Commute Out To	Number	Percent	Commute In From	Number	Percent
Belmont Co. OH	596	10.3%	Belmont Co. OH	626	11.7%
Wetzel Co. WV	532	9.2%	Wetzel Co. WV	447	8.4%
Washington Co. OH	237	4.1%	Washington Co. OH	221	4.1%
Marshall Co. WV	145	2.5%	Marshall Co. WV	122	2.3%
Noble Co. OH	132	2.3%	Tyler Co. WV	102	1.9%
Ohio Co. WV	111	1.9%	Noble Co. OH	67	1.3%
Guernsey Co. OH	84	1.5%	Ohio Co. WV	36	0.7%
Tyler Co. WV	57	1.0%	Lucas Co. OH	33	0.6%
Wood Co. WV	46	0.8%	Franklin Co. OH	28	0.5%
Franklin Co. OH	29	0.5%	Montgomery Co. OH	15	0.3%
Percent is of workers living in county.			Percent is of workers working in county.		

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Wheeling area.

Factor 6: Topography/Land use/Land cover

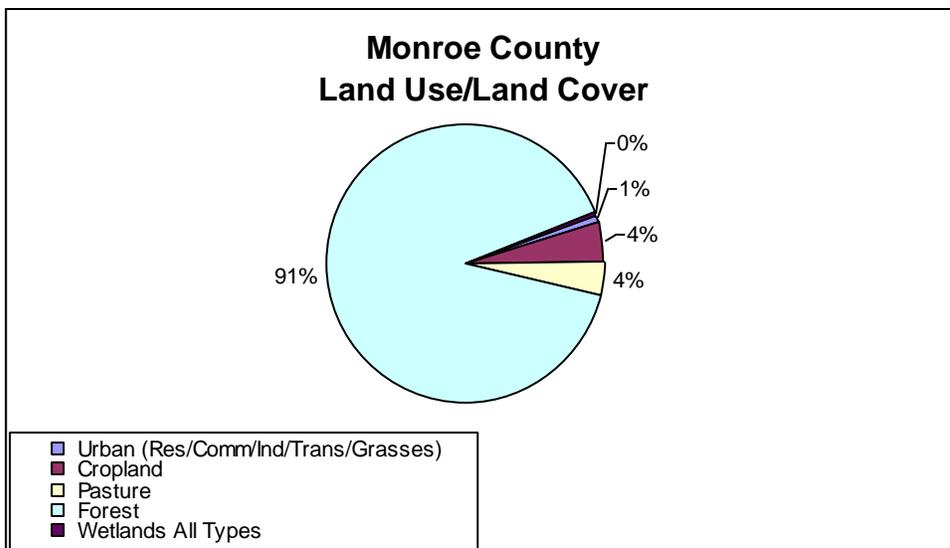
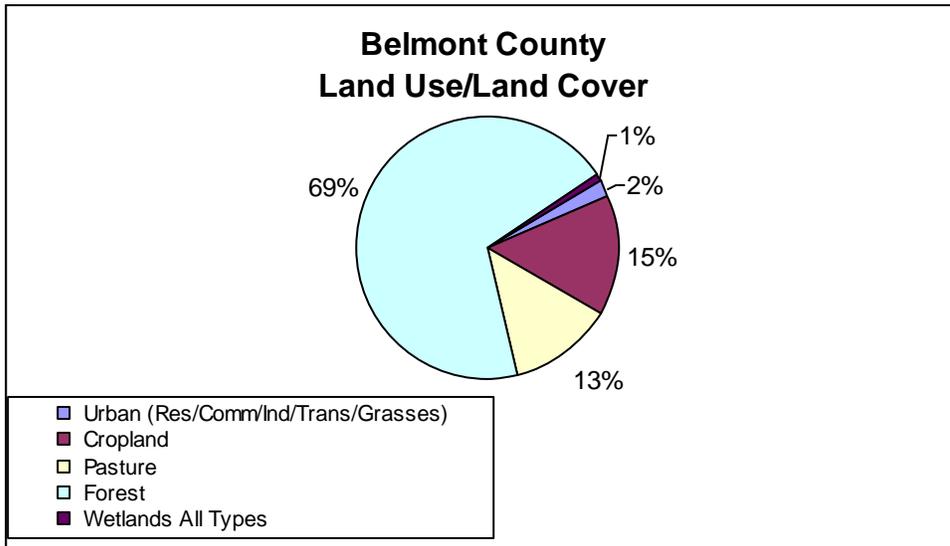
Belmont County is in the unglaciated Allegheny Plateau region (see Appendix F). The area has been extensively dissected by drainageways. The topography is varied with rugged, steep to very steep slopes in the eastern part of the county to more gently rolling in the western portion of the county. The highest elevation is 1,397 feet and the lowest is about 625 feet above sea level.

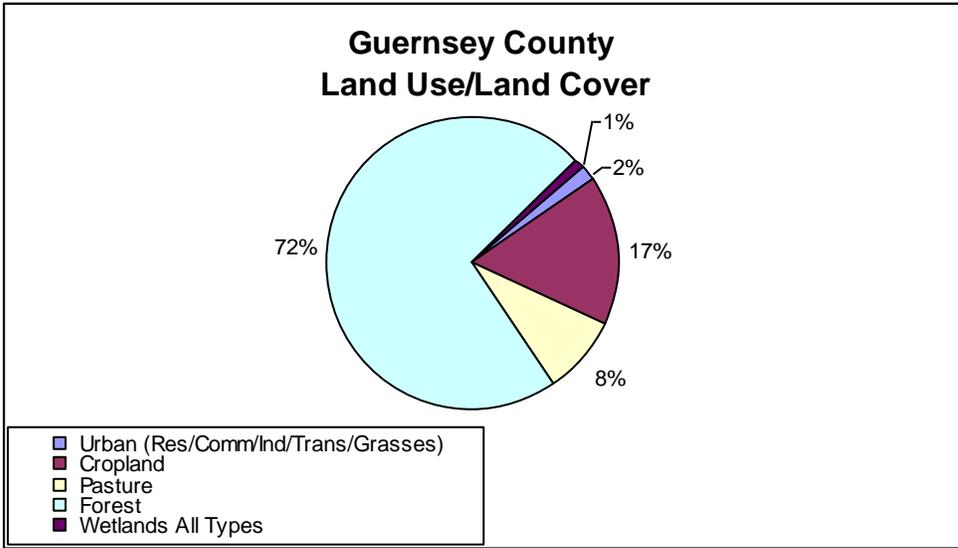
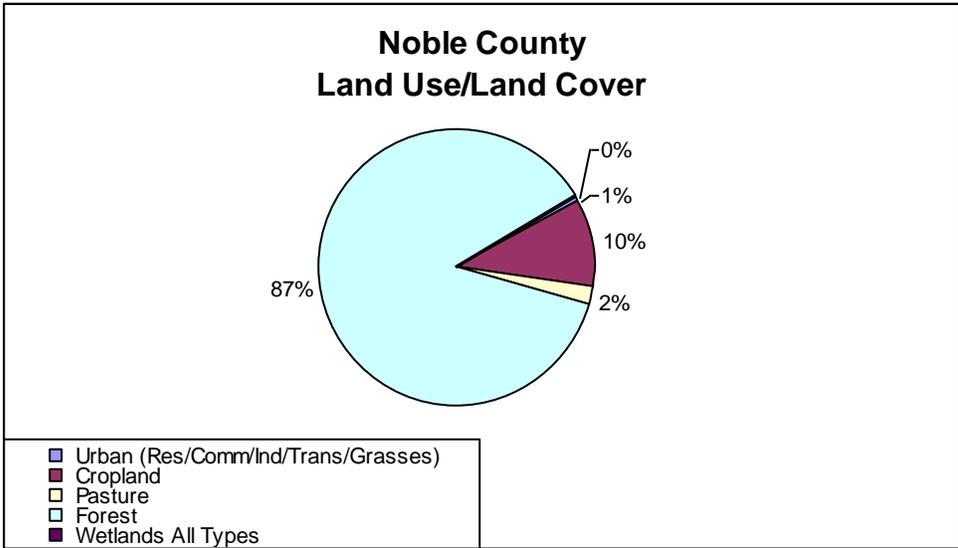
Monroe County is located entirely within the unglaciated Allegheny Plateau region. The county is thoroughly dissected and many of the slopes are steep to very steep. The elevation ranges from about 595 feet to 1,340 feet above sea level.

Noble County is also located in the unglaciated Allegheny Plateau region. The relief is mainly steep hills, ridges and many intervening valleys. The highest point is about 1,340 feet and the lowest is 675 feet above sea level.

Guernsey County lies in the Central and Western Allegheny Plateau areas. The county is extensively dissected by drainageways and is characterized by moderately steep to very steep hillsides and relatively narrow valleys that were produced by stream erosion. The elevation ranges from 1,310 feet to 770 feet above sea level.

As shown in the following pie charts, the land use/land cover in this area is predominately characterized as forest area.





Factor 7: Jurisdictional boundaries

The Wheeling, WV-OH Metropolitan Statistical Area includes: Marshall and Ohio counties in West Virginia and Belmont County in Ohio. The principal city is Wheeling, WV.

The Belomar regional Council (Belomar) is the planning agency designated as the Metropolitan Planning Organization for the greater Wheeling, WV area. The Belomar region is composed of three counties: Marshall and Ohio counties in WV and Belmont County, OH.

Factor 8: Level of control of emission sources

In the Wheeling area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- NOx trading program
- Clean Air Interstate Rule (CAIR)
- enforcement activities at major facilities

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in the Wheeling area. The recent consent decree with American Electric Power assured that the Burge Plant will experience significant emission reductions.

Youngstown-Warren-Sharon, PA-OH:

Current county nonattainment: none

 Current nonattainment counties  Current partial nonattainment

Recommended county nonattainment: Mahoning, Trumbull



Source: Office of Strategic Research, Ohio Department of Development

Discussion:

There are two counties in this recommended PM_{2.5} nonattainment area, Mahoning and Trumbull counties. Ohio EPA recommends that these counties be added as nonattainment for PM_{2.5} due to monitor violations for the 24-hour revised standard. Only one adjacent county is included with this area, Columbiana. Due to low emissions, population and commuting levels, Columbiana County is not considered a contributing county.

As shown in the following tables, the three-year average of the 98th percentile concentration at site 39-099-0014 in Mahoning County and 39-155-0007 in Trumbull County are not attaining the 24-hour revised standard.

Factor 1: Air quality data

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24-Hour Average
		2004	2005	2006	
39-099-0005	Mahoning	34.4	41.6	28.6	35
39-099-0014		36.0	42.6	31.1	
39-155-0007	Trumbull	33.5	45.1	28.7	

 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
39-099-0005	Mahoning	14.2	16.4	13.0	14.5
39-099-0014		14.7	16.9	13.5	15.0
39-155-0007	Trumbull	13.8	16.4	12.9	14.4

 Sites with less than 75% capture

Pennsylvania

 = Exceeds standard

AQS: 24-Hour Average – 98th Percentile (µg/m³)

Site	County				24- Hour Average
		2004	2005	2006	
45-085-0100	Mercer	34.5	39.0		35

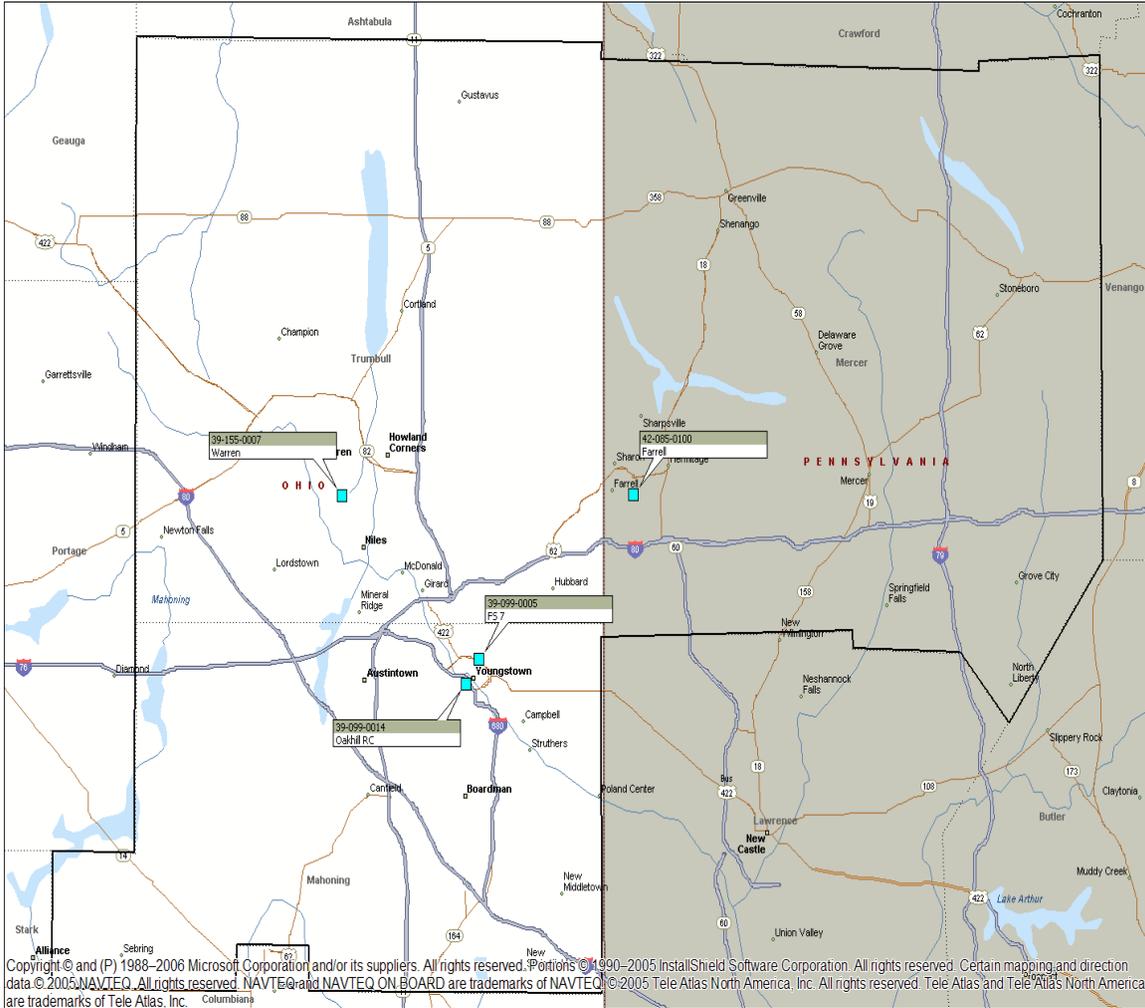
 Sites with less than 75% capture

AQS: Annual Average (µg/m³)

Site	County				Annual Average
		2004	2005	2006	
45-085-0100	Mercer	13.4	14.1		13.1

 Sites with less than 75% capture

Youngstown-Warren-Sharon Area PM_{2.5} Monitor Locations and Site ID Numbers



Factor 2: Emissions data (tons per day)

2005			
County	SO ₂	NO _x	PM _{2.5}
MAHONING	3.70	27.18	1.37
TRUMBULL	96.81	37.31	2.60
Columbiana	0.86	10.88	1.10

2009			
County	SO ₂	NO _x	PM _{2.5}
MAHONING	3.06	22.52	1.29
TRUMBULL	55.89	27.30	3.84
Columbiana	0.65	12.24	1.10

Pennsylvania

2005			
County	SO ₂	NO _x	PM _{2.5}
Mercer, PA	2.76	18.72	1.77
Lawrence, PA	11.31	17.44	2.50

2009			
County	SO ₂	NO _x	PM _{2.5}
Mercer, PA*	1.77	6.74	1.25
Lawrence, PA*	64.90	21.47	4.52

*Does not include on-road data

Major Employers:

Source: Ohio Department of Development 2007

Most of the major employers in the Youngstown-Warren area are in the categories of government, service and manufacturing as shown in the tables below.

Mahoning County

Austintown Local Bd of Ed	Government
Boardman Local Bd of Ed	Government
Forum Health	Service
HM Health Partners	Service
Mahoning County Government	Government
UCFC/Home Savings & Loan Co	Finance
Wal-Mart Stores Inc	Trade
Youngstown City Bd of Ed	Government
Youngstown State University	Government

Trumbull County

Delphi Corp	Manufacturing
Forum Health	Service
General Motors Corp	Manufacturing
Giant Eagle Inc	Trade
HM Health Services	Service
Sears Holdings/Kmart Corp	Trade
Trumbull County Government	Government
Warren City Bd of Ed	Government
West Corp	Service
WCI Steel Inc	Manufacturing

Columbiana County

Bain Capital/American Standard Inc	Manufacturing
Blackhawk Automotive Plastics Inc	Manufacturing
Columbiana County Government	Government
East Liverpool City Bd of Ed	Government
East Liverpool City Hospital	Service
Fresh Mark Inc	Manufacturing
Salem City Bd of Ed	Government
Salem Community Hospital	Service
Wal-Mart Stores Inc	Trade

Factor 3: Population and Projected Growth

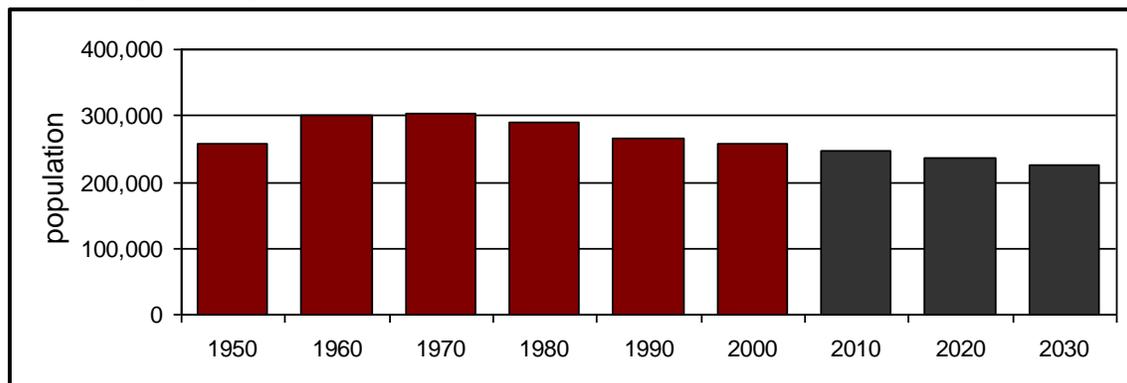
Sources: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau Population Estimates Program 2007

The primary urban areas in Trumbull County are Warren and Niles; in Mahoning County, Youngstown; in Columbiana County, E. Liverpool.

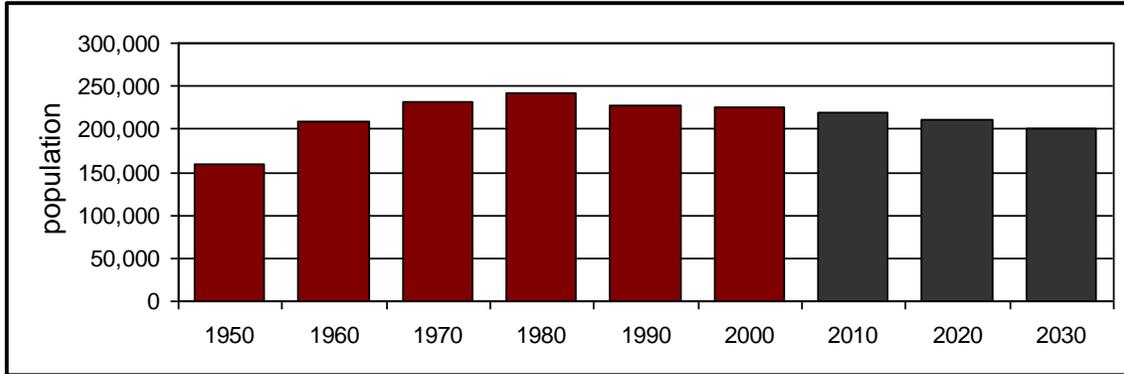
As indicated in the following table and graphs, Mahoning County has the highest population in this area and it is projected to steadily decrease. The population in Trumbull County is also projected to decrease. The population in Columbiana County remains generally constant with a projected slight increase.

	2004	2005	2006	2010	2020	2030
Mahoning	255,538	253,181	251,026	245,760	235,350	226,800
Trumbull	220,184	218,672	217,362	218,730	211,100	200,990
Columbiana	111,287	110,636	110,542	111,950	112,520	112,000

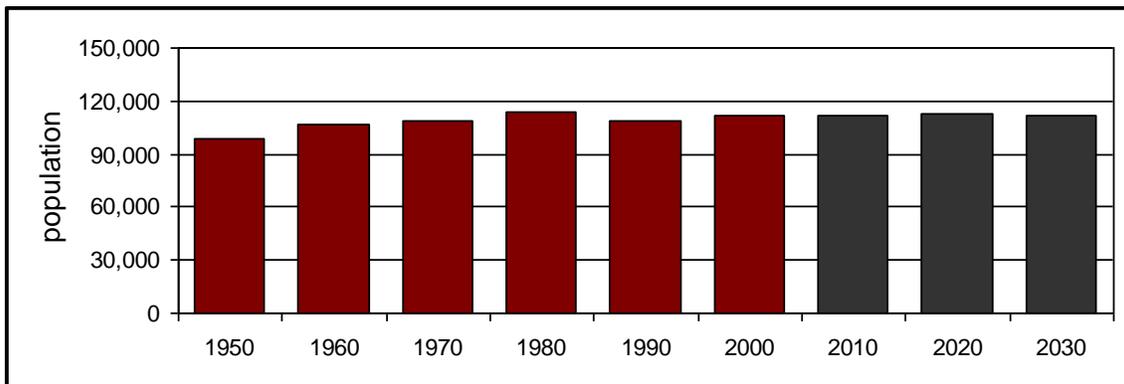
Mahoning County



Trumbull County



Columbiana County

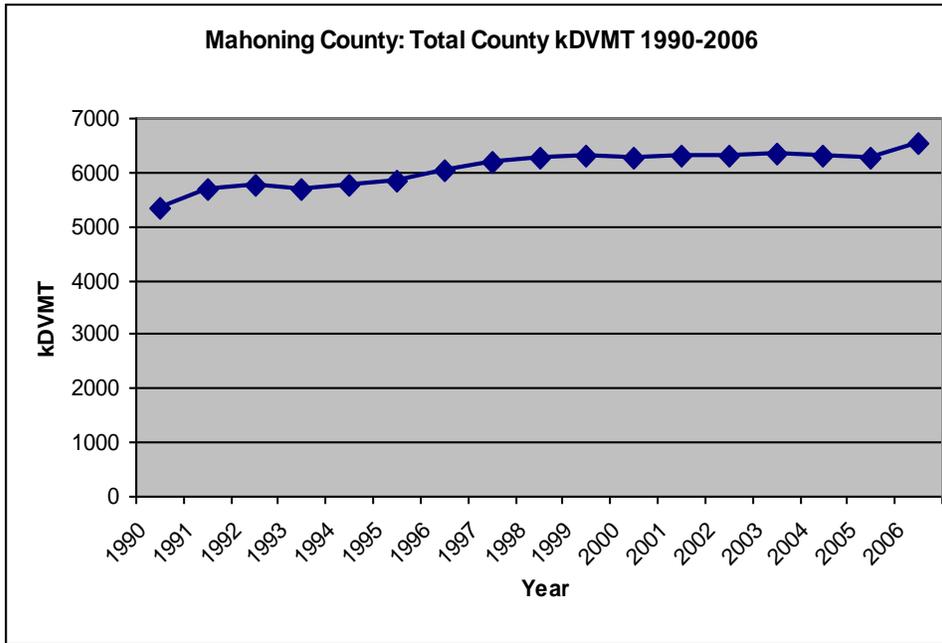


Factor 4: Traffic and commuting patterns

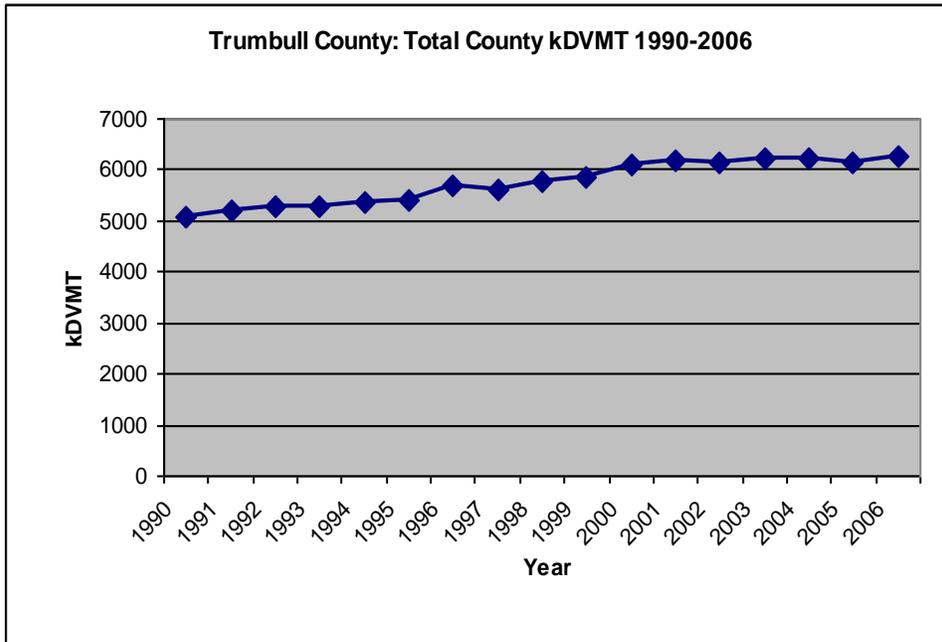
The kDVMT in Mahoning and Trumbull counties have had an upward trend, Columbiana has experienced a very steady downward trend in kDVMT between 2004 and 2006, as shown in the graphs below.

Estimated Daily Vehicle Miles Traveled (kDVMT = in thousands)

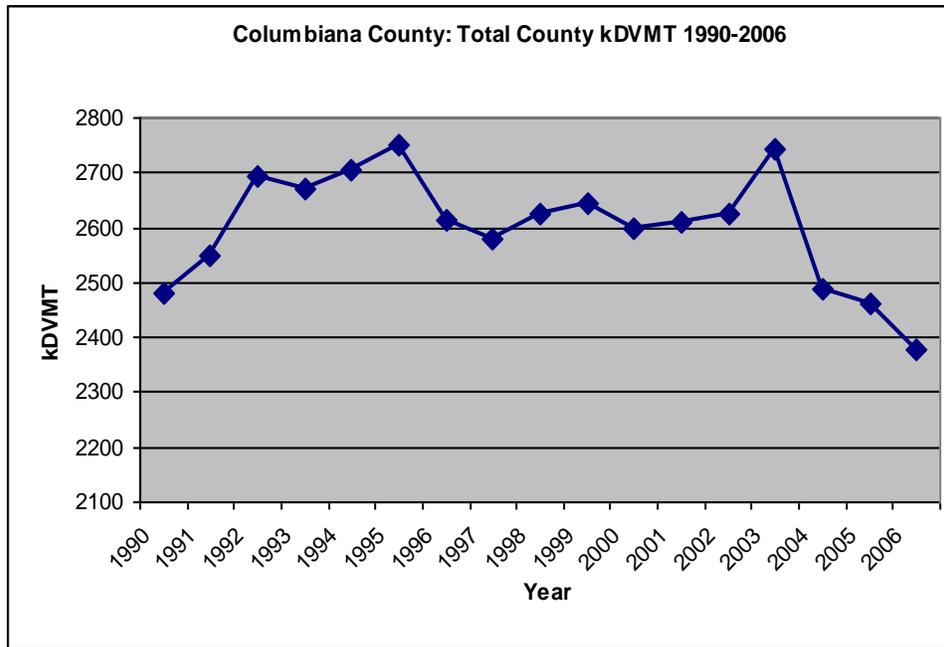
Source: Ohio Department of Transportation, Office of Technical Services



2004 = 6291.38 2005 = 6268.65 2006 = 6519.37



2004 = 6219.79 2005 = 6147.35 2006 = 6260.72



2004 = 2488.69

2005 = 2462.15

2006 = 2378.86

Commuter Patterns

Source: Office of Strategic Research, Ohio Department of Development
U.S. Census Bureau, 2000

Trumbull and Columbiana combined have about 20,000 workers commuting to Mahoning County. The largest portion of Mahoning County workers commuting outside the county, travel to Trumbull County.

Mahoning			Percent of workers that work outside the county		29.7%
			Average commute time in minutes -		21.5
Number of workers 16+ years of age living in Mahoning County			109,102		
Commute Out To	Number	Percent			
Trumbull Co. OH	19,210	17.6%			
Columbiana Co. OH	3,684	3.4%			
Stark Co. OH	2,548	2.3%			
Portage Co. OH	1,171	1.1%			
Cuyahoga Co. OH	1,117	1.0%			
Summit Co. OH	1,096	1.0%			
Lawrence Co. PA	718	0.7%			
Mercer Co. PA	624	0.6%			
Allegheny Co. PA	508	0.5%			
Beaver Co. PA	224	0.2%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Mahoning County			102,992		
Commute In From	Number	Percent			
Trumbull Co. OH	12,003	11.7%			
Columbiana Co. OH	7,371	7.2%			
Lawrence Co. PA	1,620	1.6%			
Stark Co. OH	1,158	1.1%			
Mercer Co. PA	1,083	1.1%			
Portage Co. OH	603	0.6%			
Summit Co. OH	460	0.4%			
Cuyahoga Co. OH	268	0.3%			
Beaver Co. PA	172	0.2%			
Allegheny Co. PA	159	0.2%			
			Percent is of workers working in county.		

Trumbull			Percent of workers that work outside the county		27.1%
			Average commute time in minutes -		21.0
Number of workers 16+ years of age living in Trumbull County			97,485		
Commute Out To			Number	Percent	
Mahoning Co. OH	12,003	12.3%			
Geauga Co. OH	3,900	4.0%			
Mercer Co. PA	2,457	2.5%			
Cuyahoga Co. OH	1,976	2.0%			
Portage Co. OH	1,863	1.9%			
Summit Co. OH	1,038	1.1%			
Ashtabula Co. OH	892	0.9%			
Columbiana Co. OH	344	0.4%			
Lawrence Co. PA	251	0.3%			
Stark Co. OH	202	0.2%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Trumbull County			100,101		
Commute In From			Number	Percent	
Mahoning Co. OH	19,210	19.2%			
Mercer Co. PA	2,805	2.8%			
Columbiana Co. OH	1,719	1.7%			
Portage Co. OH	1,449	1.4%			
Lawrence Co. PA	653	0.7%			
Ashtabula Co. OH	485	0.5%			
Summit Co. OH	447	0.4%			
Geauga Co. OH	310	0.3%			
Cuyahoga Co. OH	281	0.3%			
Stark Co. OH	172	0.2%			
Percent is of workers working in county.					

Columbiana			Percent of workers that work outside the county		39.5%
			Average commute time in minutes -		22.7
Number of workers 16+ years of age living in Columbiana County			49,461		
Commute Out To			Number	Percent	
Mahoning Co. OH	7,371	14.9%			
Stark Co. OH	3,306	6.7%			
Beaver Co. PA	1,889	3.8%			
Trumbull Co. OH	1,719	3.5%			
Hancock Co. WV	1,488	3.0%			
Allegheny Co. PA	735	1.5%			
Jefferson Co. OH	517	1.0%			
Summit Co. OH	464	0.9%			
Carroll Co. OH	453	0.9%			
Portage Co. OH	316	0.6%			
Percent is of workers living in county.					
Number of workers 16+ years of age working in Columbiana County			37,705		
Commute In From			Number	Percent	
Mahoning Co. OH	3,684	9.8%			
Hancock Co. WV	831	2.2%			
Stark Co. OH	640	1.7%			
Jefferson Co. OH	632	1.7%			
Beaver Co. PA	443	1.2%			
Trumbull Co. OH	344	0.9%			
Carroll Co. OH	297	0.8%			
Portage Co. OH	182	0.5%			
Lawrence Co. PA	152	0.4%			
Allegheny Co. PA	88	0.2%			
Percent is of workers working in county.					

Factor 5: Meteorology

Please refer to Appendix E for applicable meteorology information for the Youngstown-Warren area.

Factor 6: Topography/Land use/Land cover

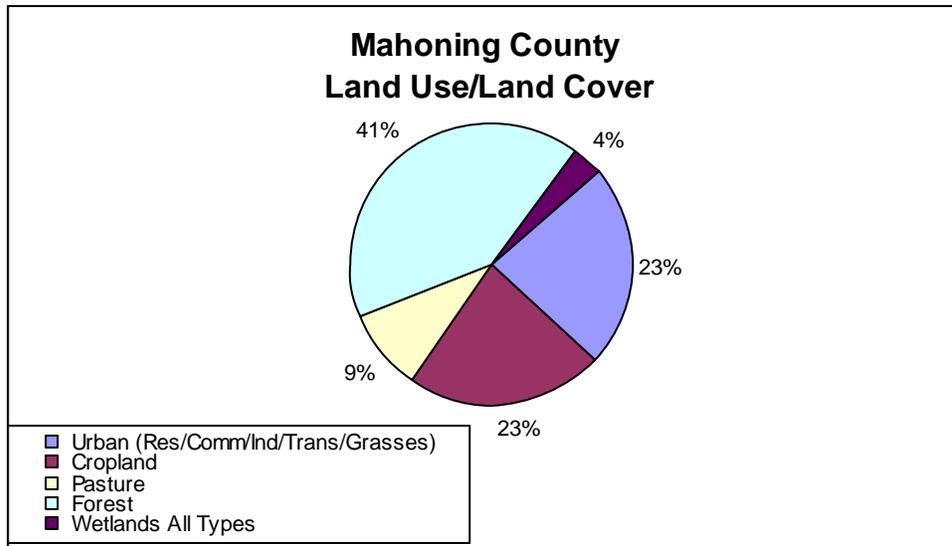
Mahoning County is in the glaciated part of the Allegheny Plateau region (see Appendix F). The northeastern part of the county contains some sloping to steep areas, mainly along the Mahoning River. The central and northern parts are mostly a nearly level plateau, where the average elevation is about 1,150 feet.

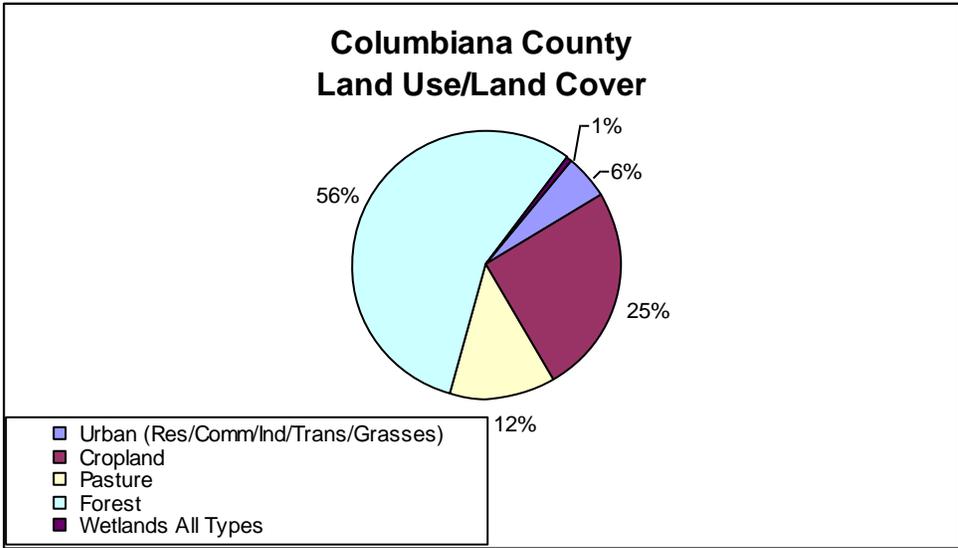
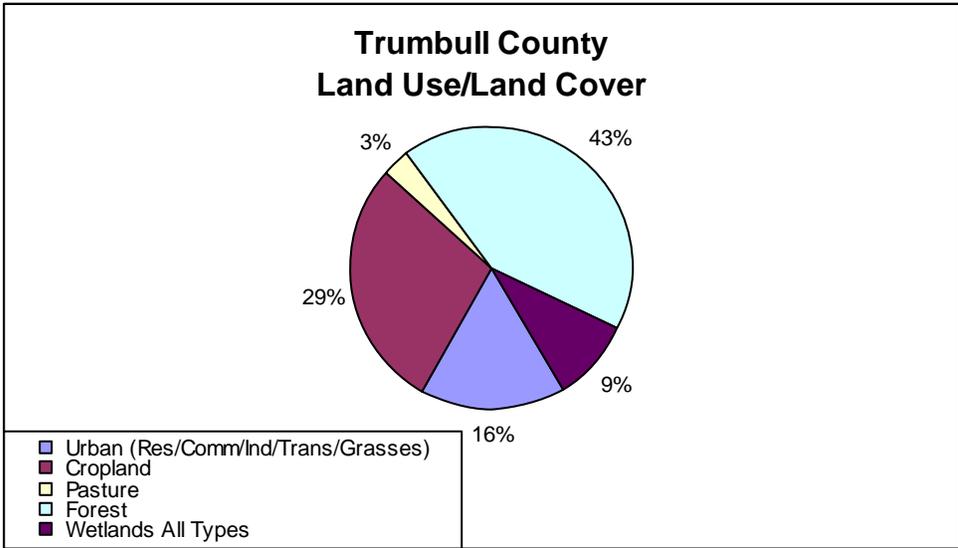
The highest point in the county is 1,320 feet and the lowest point is 800 feet above sea level.

Trumbull County is in the glaciated Appalachian Plateau region. The northern, western and south-central parts of the county generally are nearly level and gently sloping. The lowest elevation is 795 feet and the highest is 1,280 feet above sea level.

Columbiana County, like Trumbull and Mahoning counties, lies within the glaciated Allegheny Plateau Province, with the southern third of the county on the edge of the unglaciated Allegheny Plateau Province. Topography varies from rolling uplands in the northern part of the county to higher relief and steep uplands in the central area and a more rugged landscape in the unglaciated portion in the southern part of the county.

As shown in the following pie charts, the land use/land cover in these counties is predominately characterized as forest and cropland. Mahoning County has the highest percentage of urban area at 23 percent.





Factor 7: Jurisdictional boundaries

The Youngstown-Warren-Boardman, OH-PA Metropolitan Statistical Area includes: Mahoning and Trumbull counties in Ohio and Mercer County in Pennsylvania. The principal cities are Youngstown, Warren and Boardman in Ohio.

The Eastgate regional Council of Governments (Eastgate) is the planning agency designated as the Metropolitan Planning Organization for the greater Youngstown area. The Eastgate region is composed of three counties in two states: Mahoning and Trumbull counties in Ohio and Mercer County in Pennsylvania.

Factor 8: Level of control of emission sources

In the Youngstown-Warren area, the emission reduction programs which have had or will have the greatest potential impact on PM_{2.5} concentrations are:

- on-road and off-road diesel control programs in conjunction with ultra low sulfur diesel fuel requirements
- NO_x trading program
- Clean Air Interstate Rule (CAIR)
- reductions in industrial activity

CAIR is the program which will bring about largest reductions in precursor or primary emissions of any of the PM_{2.5} species (sulfates, nitrates, organic carbon, elemental carbon and crustal) in this area, although the area also continues to experiences industrial and economic down turn.