Dick has orig. Pkg. Jimmy w/o encl. cc: Stan w/encl air APB

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
OFFICE OF THE SECRETARY
FRANKFORT KENTUCKY 40601
TELEPHONE: (502) 564-3350

U.S. EPA REGION 4
OFFICE OF
REGIONAL ADMINISTRATOR
2003 JUL 15 A 15

July 14, 2003

Mr. James I. Palmer, Jr.
Regional Administrator
U.S. EPA, Region 4
Atlanta Federal Center
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8960

Dear Mr. Palmer:

On December 20, 2002, you notified my office that proposed boundary designations under the new 8-hour ozone standard were due April 15, 2003. After further review, on February 27, 2003, U.S. EPA notified states that the deadline had been extended and that proposed designations were due on July 15, 2003.

Although the 8-hour standard was upheld through numerous court challenges, EPA has only recently released draft implementation guidance on what the potential impacts may be for areas designated as nonattainment. States will be faced with numerous difficulties in the implementation of the 8-hour ozone standard and having no clear decision on implementation issues as these designations are made, makes these decisions more difficult. States are left trying to explain potential impacts to our local communities with no clear cut answers on future impacts. I am especially concerned that EPA's eventual decisions, especially in relationship to designating areas under Subpart 1 or Subpart 2 of the Act, may subject areas to additional requirements pending the outcome of that implementation plan.

However, Section 107 of the Clean Air Act requires Governors of states, including Kentucky, to designate areas within their respective states as either attaining or not attaining National Ambient Air Quality Standards. In order to comply with those provisions in the Act, I am submitting the following designation recommendations for Kentucky counties under the 8-hour ozone standard. Supporting documentation, based on EPA's guidance criteria is enclosed.

County	Designation
Bell	Nonattainment
Boyd	Nonattainment
Bullitt	Nonattainment
Oldham	Nonattainment
Jefferson	Nonattainment
Boone	Nonattainment
Campbell	Nonattainment
Kenton	Nonattainment
Christian	Nonattainment
Warren	Nonattainment
Rest of State	Attainment

Kentucky wishes to comply with the Act and cooperate with U.S. EPA to improve and preserve air quality for the citizens of the Commonwealth. However, these recommendations are being made with great reservation, since eventual outcomes of requirements for these areas are still being debated on a national level. Therefore, I urge EPA to finalize implementation guidelines for these areas under the 8-hour ozone standard as quickly and judiciously as possible.

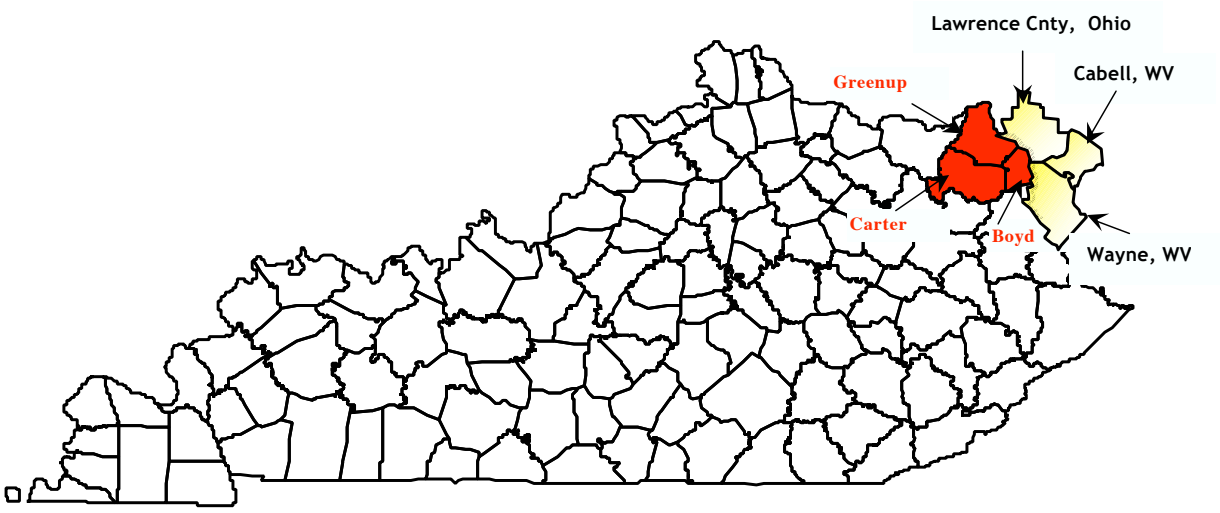
Sincerely,

Paul E. Patton

Enclosure

c: Henry C. List

Kentucky Portion of the Ashland-Huntington MSA



The Huntington-Ashland Metropolitan Statistical Area encompasses three states and six counties. It includes Lawrence County in Ohio, Cabell and Wayne Counties in West Virginia, and Boyd, Greenup, and Carter Counties in Kentucky. In 2001, this MSA was listed as the 128rd largest MSA within the United States.

BOYD COUNTY, KENTUCKY

Boyd County is part of the Huntington-Ashland Metropolitan Statistical Area (MSA) and is located to the south-southeast of Greenup County, Kentucky, and to the east-northeast of Carter County, Kentucky.

Geography/Topography

Boyd County has a land area of 160 square miles and is located on the banks of the Ohio River in the Appalachian foothills of the tri-state area of Kentucky, Ohio and West Virginia. Although part of the Eastern Kentucky Coal Field Region, the topography of this area is less rugged than that of other eastern Kentucky counties.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Ashland area came from the west/southwest and typically from 4-6 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 84 F, the mean low was 65 F. The mean precipitation for the same period was 4.7 inches.

Planning

The authority for air quality planning in the Ashland area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Boyd County is performed by FIVCO in conjunction with the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-019-0017) in Ashland, Boyd County, shows an 8-hour design value of .088 parts per million (ppm) which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 49,727 persons living in Boyd County. (See table 1-C) That represents approximately 311 persons per square mile. The population of Boyd County is approximately

26% rural with the remaining 74% living in incorporated areas. The largest cities in Boyd County are Ashland and Catlettsburg. (See table 1-C)

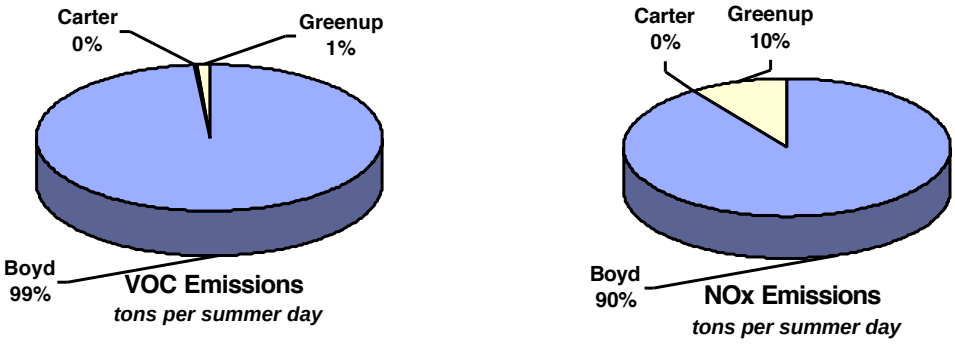
Boyd County's population from 1990 through 2000 decreased by approximately 3% (51,150 to 49,752). The population is further expected to decrease by an additional 3% between 2000 and 2010. (See table 1-B)

Based on 2001 population data for the entire Huntington-Ashland MSA, Boyd County represents approximately 16% of the total 2001 population in the MSA and 44% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Boyd County were estimated at 18.61 tons per summer day (tpsd) in 2001 which represents approximately 99% of the 18.87 tpsd of overall VOC point source emissions from the Kentucky portion of the Huntington-Ashland MSA. Point source NOx emissions from Boyd County were estimated at 20.06 tpsd in 2001 which represents approximately 90% of the 22.21 tpsd of overall NOx point source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

2001 Point Source Emissions

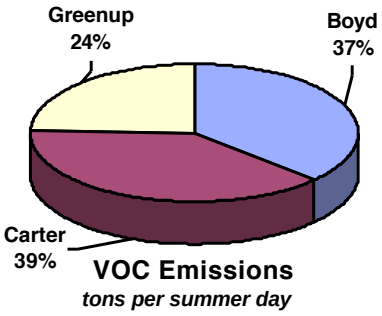


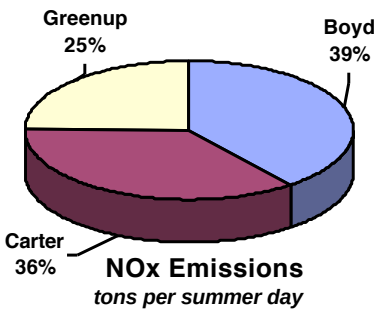
For VOC and NOx control, point sources located within Boyd County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations are required to remain in Boyd County.

Onroad mobile source VOC emissions from Boyd County were estimated at 3.19 tpsd in 2001 which represents approximately 37% of the 8.66 tpsd of overall

VOC onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. Onroad mobile source NOx emissions from Boyd County were estimated at 4.02 tpsd in 2001 which represents approximately 39% of the 10.20 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions

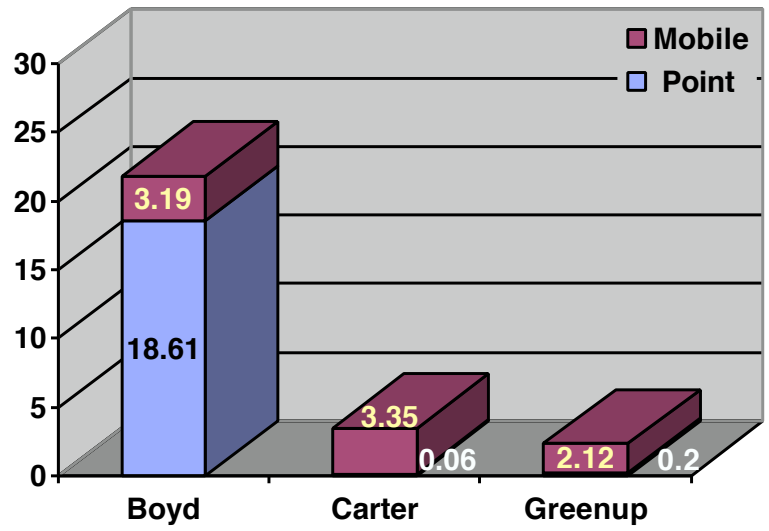




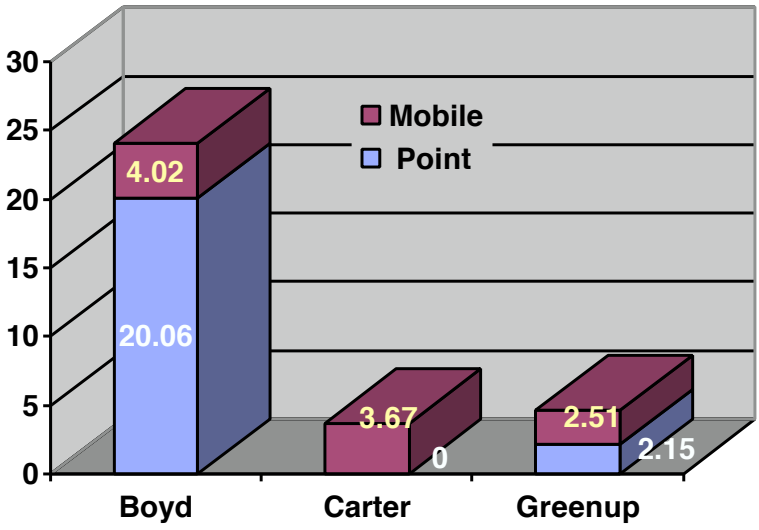
Commuting traffic from other counties into Boyd County is high, and the commuting traffic from Boyd County into other counties is minimal.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

2001 VOC Contribution
(tons per summer day)



2001 NOx Contribution
(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data presented indicate that Boyd County, Kentucky, does contribute a significant amount of ozone forming emissions in the area. In 1998 there was a violation of the 1-hour standard in the West Virginia portion of the area, which required Kentucky and West Virginia to implement contingency measures. While overall VOC emission reductions have occurred since 1990, this county has recorded a violation of the 8-hour ozone standard based on 2000 - 2002 monitoring data.

Therefore, Boyd County should be designated nonattainment for the 8-hour ozone standard.

CARTER COUNTY, KENTUCKY

Carter County is part of the Huntington-Ashland Metropolitan Statistical Area (MSA) and is located to the south-southwest of Greenup County, Kentucky, and to the west of Boyd County, Kentucky.

Geography/Topography

Carter County has a land area of 410 square miles and is located in the Appalachian foothills of the tri-state area of Kentucky, Ohio and West Virginia. Although part of the Eastern Kentucky Coal Field Region, the topography of this area is less rugged than that of other eastern Kentucky counties.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Ashland area came from the west/southwest and typically from 4-6 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 84 F, the mean low was 65 F. The mean precipitation for the same period was 4.7 inches.

Planning

The authority for air quality planning in the Ashland area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Carter County is by FIVCO in conjunction with the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-043-0500) in Grayson Lake, Carter County, shows an 8-hour design value of .080 parts per million (ppm) which would be classified as a county in attainment of the standard. (See table 1-A)

Population

Based on projections to 2001 from 2000 census data, there are approximately 27,024 persons living in Carter County. That represents approximately 66 persons per square mile. The population of Carter County is approximately 82% rural with the remaining 18% living in incorporated areas. The largest cities in Carter County are Grayson and Olive Hill.

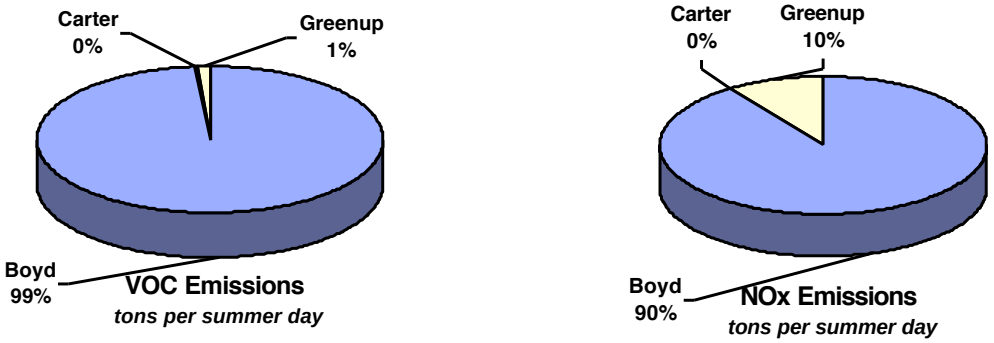
Carter County's population from 1990 through 2000 increased by approximately 11% (24,340 to 26,889). The population is further expected to increase by an additional 9% between 2000 and 2010. (See table 1-B)

Based on 2001 population data for the entire Huntington-Ashland MSA, Carter County represents approximately 9% of the total 2001 population in the MSA and 24% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Carter County were estimated at 0.06 tpsd 2001 which represents less than 1% of the 18.87 tpsd of overall VOC point source emissions from the Kentucky portion of the Huntington-Ashland MSA. Point source NOx emissions from Carter County were estimated at 0.00 tpsd in 2001 which represents 0% of the 22.21 tpsd of overall NOx point source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

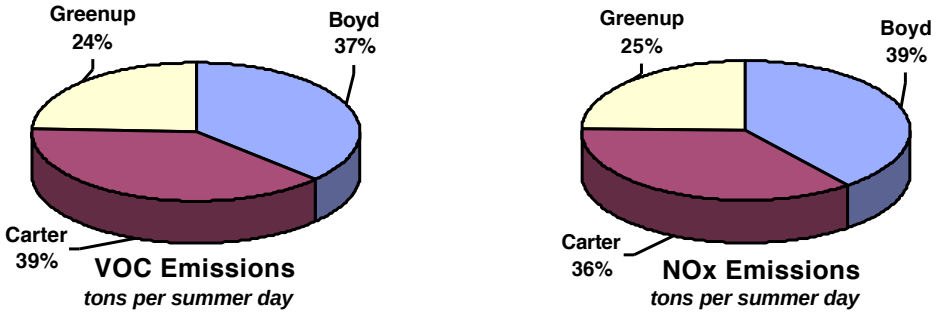
2001 Point Source Emissions



Point sources located within Carter County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Carter County were estimated at 3.35 tpsd in 2001 which represents approximately 39% of the 8.66 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. Onroad mobile source NOx emissions from Carter County were estimated at 3.67 tpsd in 2001 which represents approximately 36% of the 10.20 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions

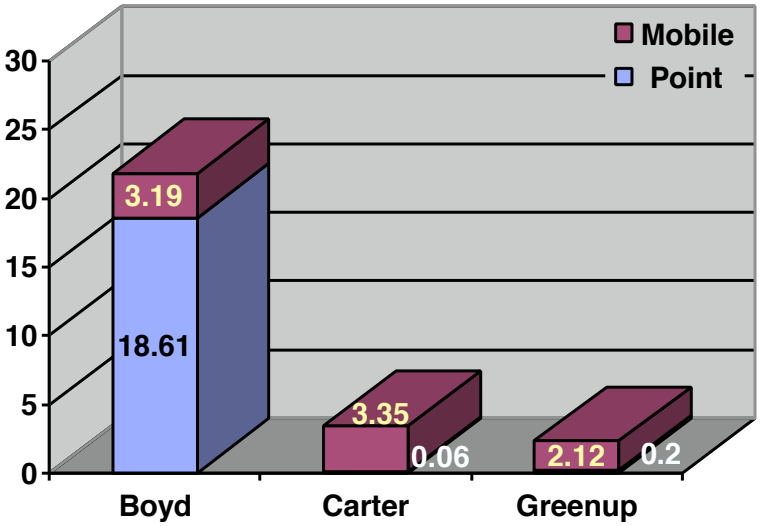


Commuting traffic from other counties into Carter County is minimal, and the commuting traffic from Carter County into other counties is high.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

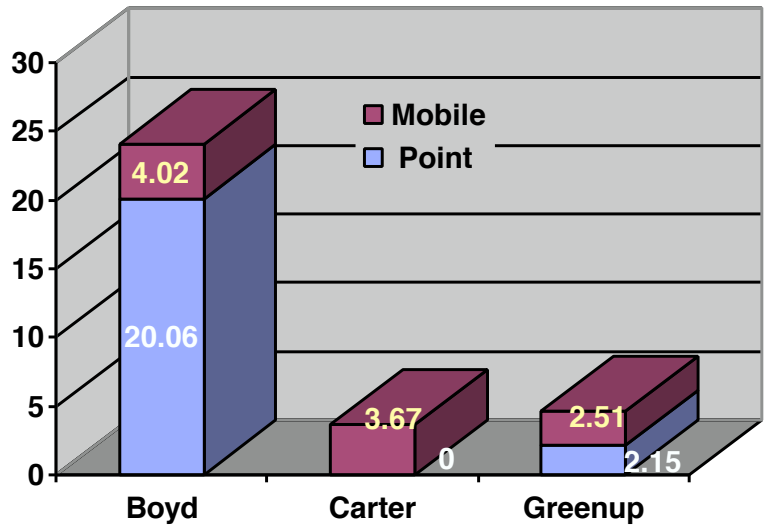
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The Carter County monitor was sited as the upwind, or background, monitor for the Ashland-Huntington area. Regional emission reductions in both VOC and NOx have occurred during the last several years. Monitoring and emissions data and other documentation presented indicate that Carter County, Kentucky, does not contribute significantly to violations of the 8-hour standard in the region and therefore should be designated attainment for the 8-hour ozone standard.

Greenup County, Kentucky

Greenup County is part of the Huntington-Ashland Metropolitan Statistical Area (MSA) and is located to the north-northwest of Boyd County, north-northeast of Carter County, Kentucky.

Geography/Topography

Greenup County has a land area of 346 square miles and is located in the Appalachian foothills of the tri-state area of Kentucky, Ohio and West Virginia. Although part of the Eastern Kentucky Coal Field Region, the topography of this area is less rugged than that of other eastern Kentucky counties. Greenup County is bordered by the Ohio River on its eastern border.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Ashland-Huntington area came from the west/southwest and typically from 4-6 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 84 F, the mean low was 65 F. The mean precipitation for the same period was 4.7 inches.

Planning

The authority for air quality planning in Ashland area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Greenup County is performed by FIVCO in conjunction with the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 - 2002 monitoring period, the ozone monitor (21-089-0007) in Worthington, Greenup County, shows an 8-hour design value of .083 parts per million (ppm). This average would classify Greenup County as a county meeting the 8-hour standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are approximately 36,823 persons living in Greenup County. That represents approximately 106 persons per square mile. The population of Greenup County

is approximately 39% rural with the remaining 61% living in incorporated areas. There are eight incorporated cities in Greenup County with the largest being Flatwoods, Raceland, Russell, and Worthington.

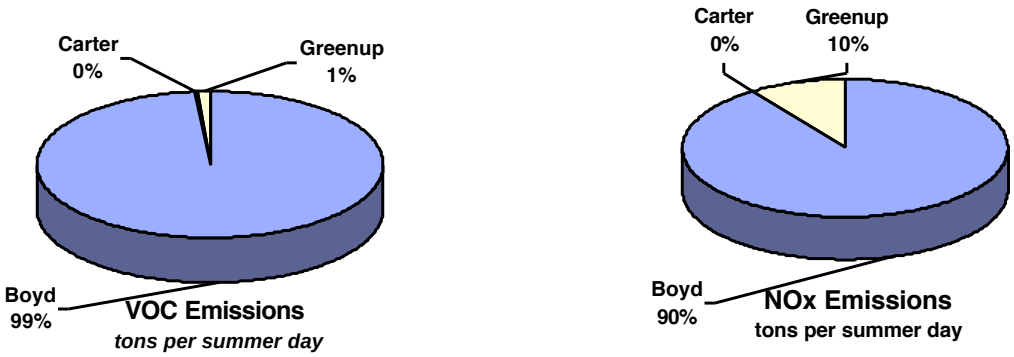
Greenup County's population from 1990 through 2000 increased by approximately 0.4% (36,742 to 36,891). The population was further expected to increase by an additional 0.3% between 2000 and 2010. (See table 1-B)

Based on 2001 population data for the entire Huntington-Ashland MSA, Greenup County represents approximately 12% of the total 2001 population in the MSA and 32% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Greenup County were estimated at 0.20 tpsd in 2001 which represents 1% of the 18.87 tpsd of overall VOC point source emissions from the Kentucky portion of the Huntington-Ashland MSA. Point source NOx emissions from Greenup County were estimated at 2.15 tpsd in 2001 which represents 10% of the 22.21 tpsd of overall NOx point source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

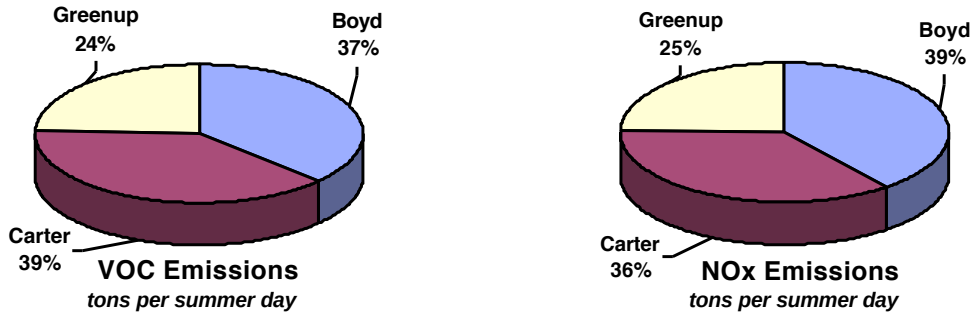
2001 Point Source Emissions



Point sources located within Greenup County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any emission controls previously installed as a result of a nonattainment designation must remain in place.

Onroad mobile source VOC emissions from Greenup County were estimated at 2.12 tpsd in 2001 which represents approximately 24% of the 8.66 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. Onroad mobile source NOx emissions from Greenup County were estimated at 2.51 tpsd in 2001 which represents approximately 25% of the 10.20 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Huntington-Ashland MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions

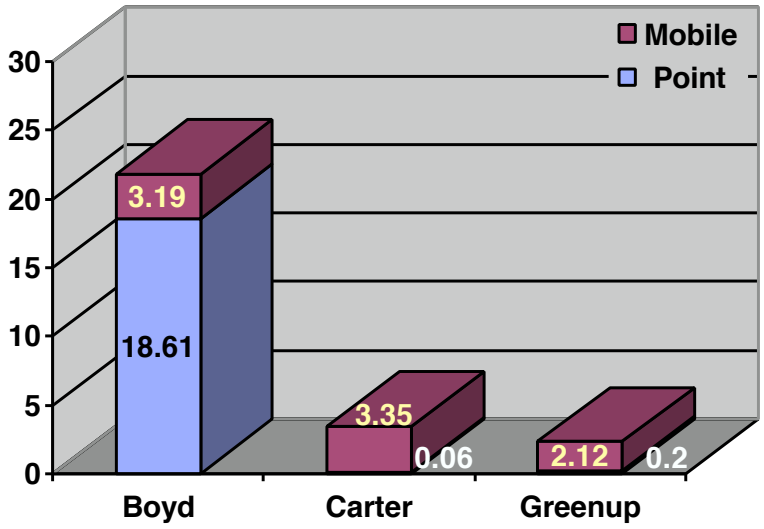


Commuting traffic from other counties into Greenup County is high, commuting traffic from Greenup County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

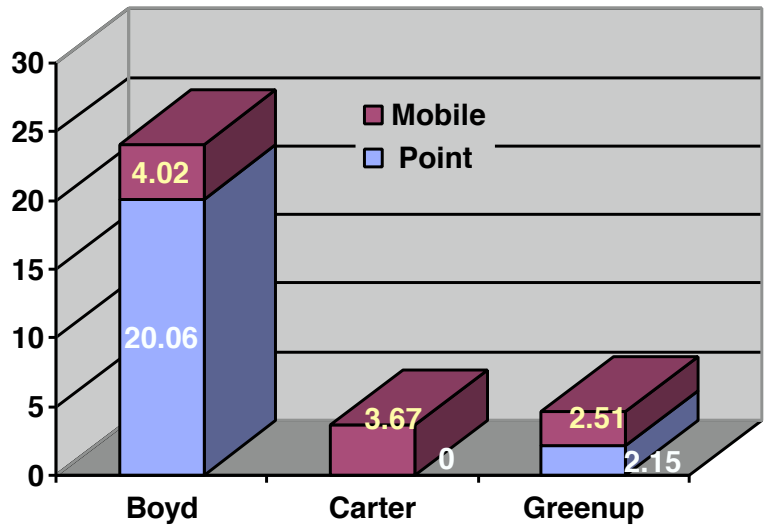
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

Regional emission reductions have occurred over the last several years in both VOC and NOx emissions. The present monitoring and emissions data presented indicate that Greenup County, Kentucky, is not contributing significantly to violations of the 8-hour standard in the region and therefore, should be designated attainment for the 8-hour ozone standard.

Huntington-Ashland MSA

Figure 1-A
Wind Rose Patterns

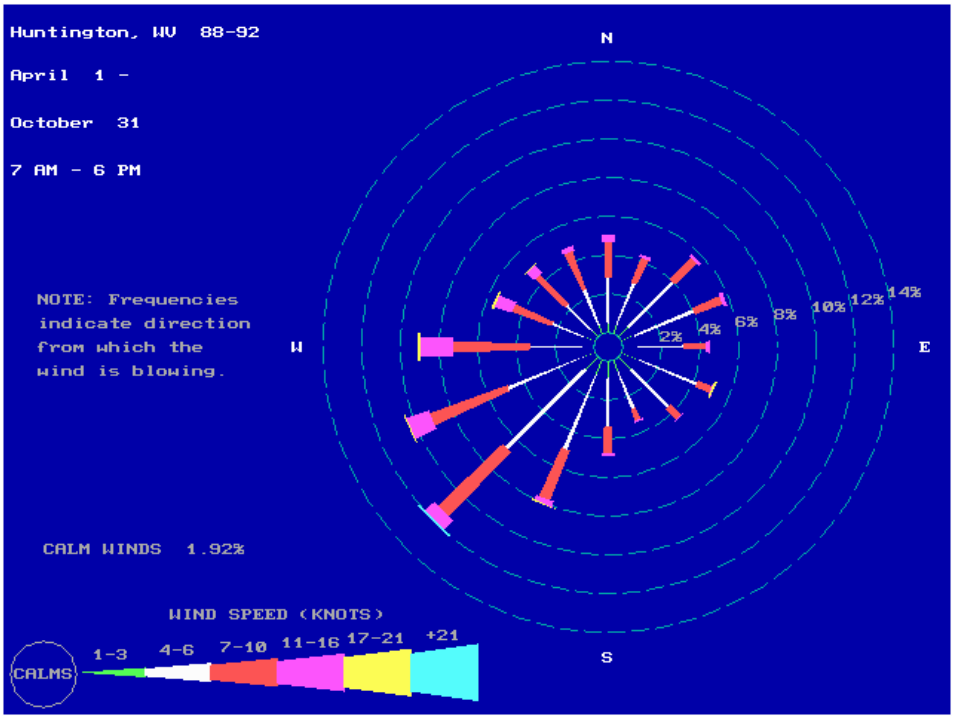


Figure 1-B
2001 VOC and NOx Emissions
Kentucky Portion of the Huntington-Ashland MSA
(tons per summer day)

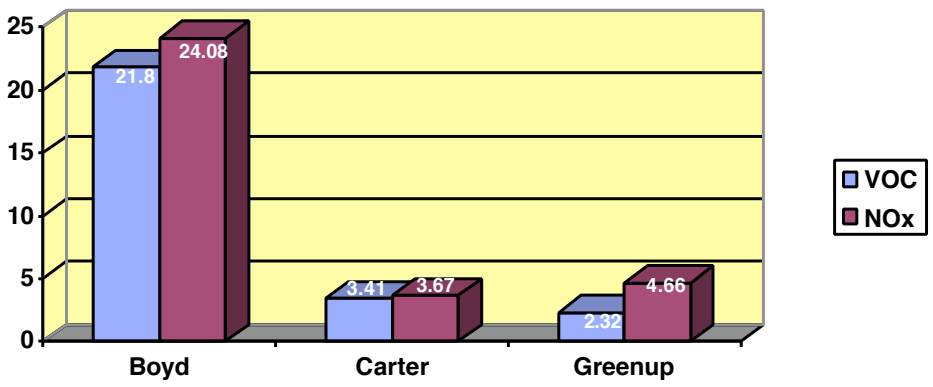


Table 1-A
Ozone Design Values
(parts per million)

Monitor	2000	2001	2002	3-year Average
Boyd *	.079	.085	.102	.088
Carter	.080	.076	.086	.080
Greenup	.077	.088	.084	.083

*Monitor location was changed beginning in 2002.

Table 1-B
Ashland Area Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Boyd	51,150	49,752	-2.7%	48,148	-3.2%
Carter	24,340	26,889	10.5%	29,406	9.4%
Greenup	36,742	36,891	0.4%	36,989	0.3%

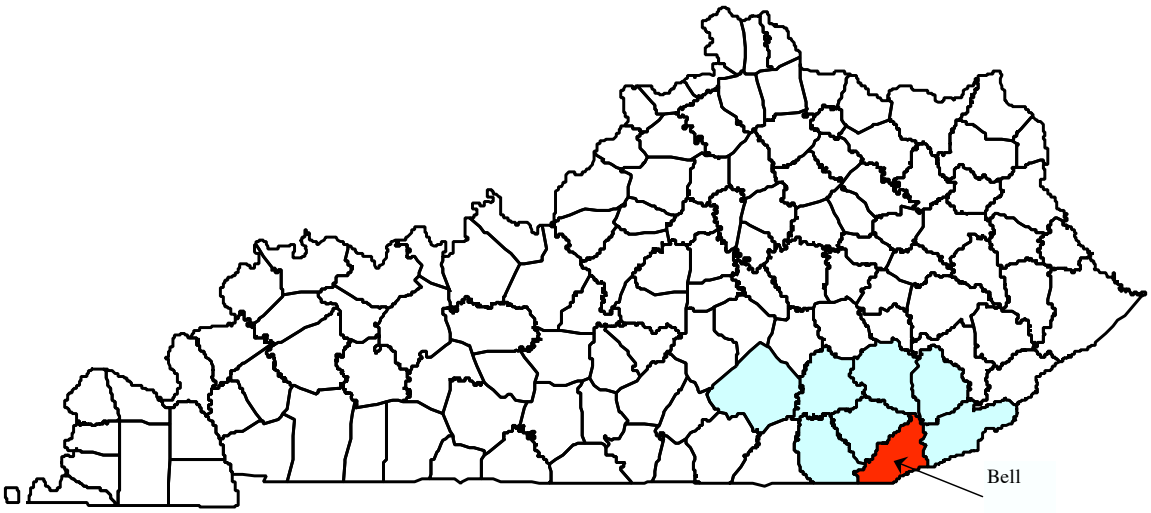
Table 1-C
2001 Estimated Huntington-Ashland MSA Population

Kentucky	Estimated Population
Boyd County	49,727
Carter County	27,024
Greenup County	36,823
Ohio	
Lawrence County	62,009
West Virginia	
Cabell County	95,682
Wayne County	42,665
Total Estimated Population	313,930

Table 1-D
2001 VOC and NOx Emissions
(tons per summer day)

County	VOC			NOx		
	Point	Mobile	Total	Point	Mobile	Total
Boyd	18.61	3.19	21.80	20.06	4.02	24.08
Carter	0.06	3.35	3.41	0.00	3.67	3.67
Greenup	0.20	2.12	2.32	2.15	2.51	4.66
Total	**18.87**	**8.66**	**27.53**	**22.21**	**10.20**	**32.41**

Bell County, Kentucky Area



The Bell County area is located in rural southeastern Kentucky. Since this rural county is not defined by metropolitan statistical area (MSA) boundaries, a comparison with adjacent or regional counties has been included.

BELL COUNTY AREA, KENTUCKY

Bell County is part of the Kentucky River Area Development District. It is located to the west of Harlan County, Kentucky, to the southeast of Knox County, to the east of Whitley County, and to the north of both Claiborne County, Tennessee and Lee County, Virginia.

Geography/Topography

Bell County has a land area of 360 square miles. It is situated in the Eastern CoalField Region of Kentucky and contains some of its most rugged topography. Both the Cumberland Gap National Historic Park and the Pine Mountain State Resort Park are located within Bell County's boundaries making it the only county in Kentucky to contain both a national park and a state park. In 1996, the Cumberland Gap Tunnel was opened to traffic traveling between Kentucky and Tennessee.

Meteorological Information

Due to the close proximity of Knoxville, Tennessee, meteorological data from Knoxville was used for this Kentucky area. Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Bell County area came from the southwest, typically from 4-6 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 85 F, the mean low was 64 F. The mean precipitation for the same period was 4.3 inches.

Planning

The authority for air quality planning in the Bell County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Bell County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

This monitor site was established in 1992 as a special purpose monitor to collect ozone data for transport purposes. For the 2000 – 2002 monitoring period, the ozone monitor (21-013-0002) in Middlesboro, Bell County, shows an 8-hour design value of .086 parts per million (ppm) which would be classified as a county in violation of the standard. (See table 1-A)

Population

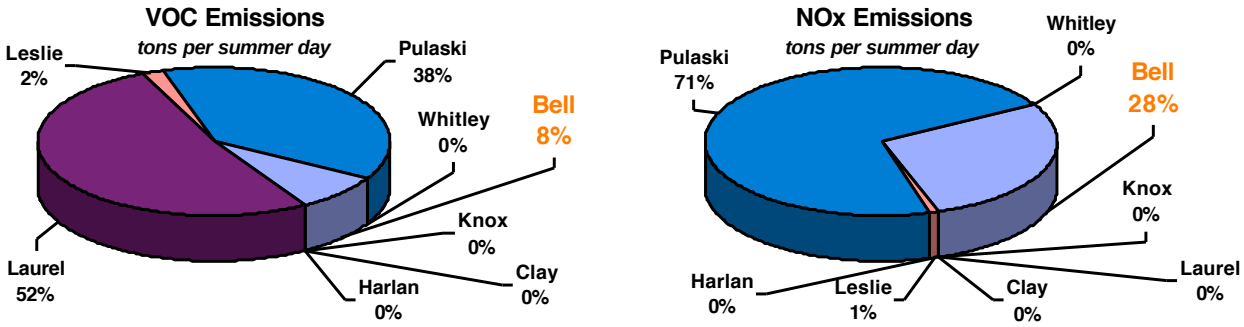
Based on projections to 2001 from the 2000 census data, there are 29,873 persons living in Bell County. (See table 1-C) That represents approximately 83 persons per square mile. The population of Bell County is approximately 63% rural with the remaining 37% living in incorporated areas. The largest cities in Bell County are Middlesboro and Pineville.

Bell County's population from 1990 through 2000 decreased by approximately 4.6% (31,506 to 30,060). The population is further expected to decrease by an additional 4.9% between 2000 and 2010. A review of surrounding counties indicates overall positive growth for 1990 through 2000 and for 2000 through 2010. (See table 1-B)

Air Emissions

Point source VOC emissions from Bell County were estimated at 0.16 tons per summer day (tpsd) in 2001 which represents approximately 8% of the total 2.02 tpsd of overall VOC point source emissions from the Bell County Regional Area (See map of area on page 1). Point source NOx emissions from Bell County were estimated at 6.84 tpsd in 2001 which represents approximately 28% of the total 24.44 tpsd of overall NOx point source emissions from the Bell County area (See table 1-D)

Regional
2001 Point Source Emissions



Point sources located within Bell County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Bell County were estimated at 1.74 tpsd in 2001. Onroad mobile source NOx emissions from Bell County were estimated at 2.58 tpsd in 2001 (See table 1-D)

Commuting traffic from other counties within into Bell County is minimal, and the commuting traffic from Bell County into other counties is minimal.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

Conclusion and Recommendation

Although Bell County recorded a violation of the 8-hour ozone standard based on 2000 - 2002 monitoring data, NOAA's Hysplit back trajectory modeling analyses indicate that ozone transport may be responsible. Therefore, Bell County should not be designated nonattainment for the 8-hour ozone standard since it is not able to control any upwind pollution impacting its air quality (Please see enclosed Hysplit back trajectory model information).

While it is Kentucky's opinion that Bell County is impacted by other regional emissions, the fact remains the county is registering a violation of the 8-hour ozone standard. Therefore, Kentucky is requesting that if Bell County is designated nonattainment that a designation of a Rural Transport Area as described in Section 182 of the Clean Air Act be given. Bell County is a rural area that does not include, and is not adjacent to, any part of a metropolitan statistical area or consolidated metropolitan statistical area. Sources of VOC and NOx emissions within the area do not make a significant contribution to the ozone concentrations measured in the area.

Bell County, Kentucky Area

Figure 1-A
Wind Rose Patterns

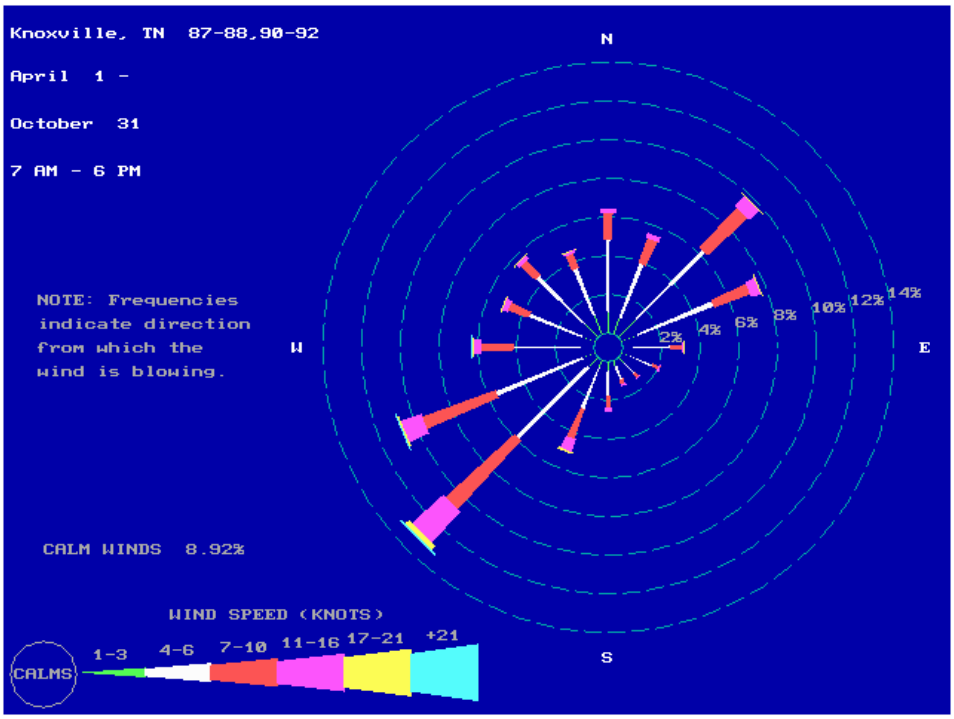


Figure 1-B
2001 Bell County Regional Area Point Source VOC and NOx Emissions
(tons per summer day)

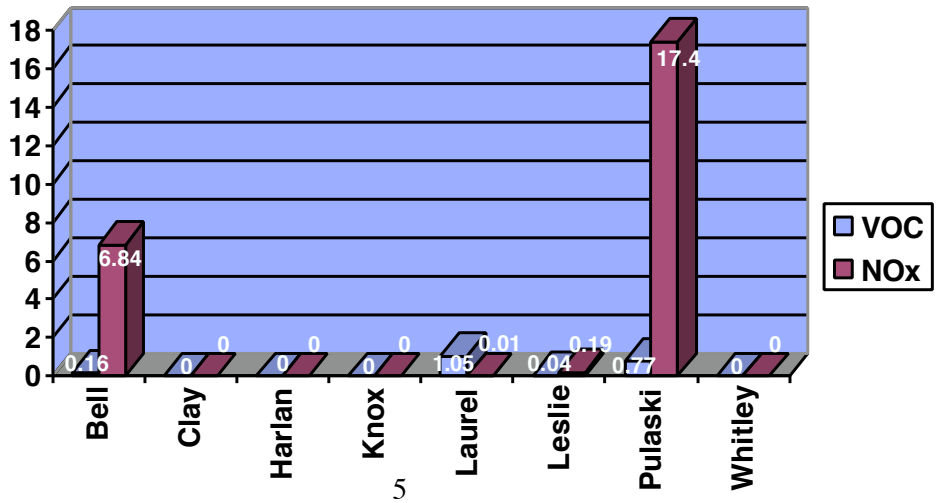


Table 1-A
Ozone Design Values
(parts per million)

County	2000	2001	2002	Design Value
Kentucky				
Bell	.090	.077	.091	.086
Pulaski	.087	.077	.081	.081
Tennessee				
Knoxville Area				
Anderson	.093	.085	.099	.092
Blount	.096	.086	.102	.094
Knox	.100	.090	.098	.096
Sevier (GSM)	.096	.091	.103	.096
Sevier (CD)	.100	.093	.101	.098
Eastern Tennessee				
Sullivan (B)	.092	.085	.093	.090
Sullivan (K)	.097	.086	.093	.092

Table 1-B
Bell County Regional Area Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Bell	31,506	30,060	-4.6%	28,588	-4.9%
Clay	21,746	24,556	12.9%	27,615	12.5%
Harlan	36,574	33,202	-9.2%	29,893	-10.0%
Knox	29,676	31,795	7.1%	33,751	6.2%
Laurel	43,438	52,715	21.4%	63,370	20.2%
Leslie	13,642	12,401	-9.1%	10,999	-11.3%
Pulaski	49,489	56,217	13.6%	63,228	12.5%
Whitley	33,326	35,865	7.6%	38,411	7.1%
Overall Growth			39.7%		32.2%

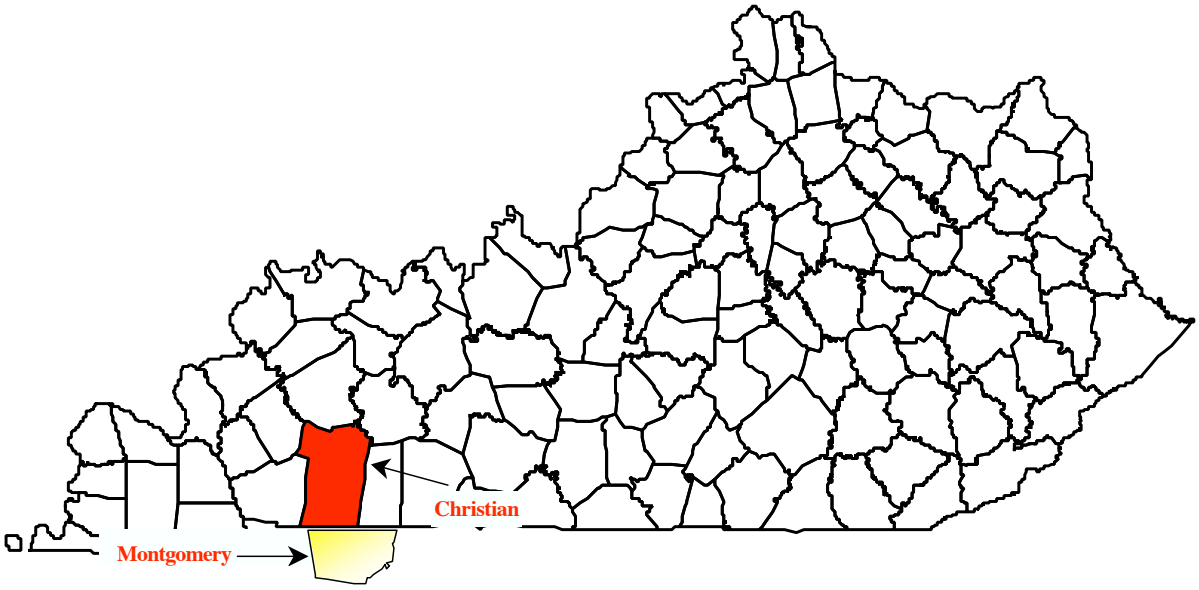
Table 1-C
2001 Estimated Bell County Regional Area Population

Kentucky	Estimated Population
Bell County	29,873
Clay County	24,506
Harlan County	32,683
Knox County	31,717
Laurel County	53,691
Leslie County	12,315
Pulaski County	56,774
Whitley County	36,466
Total Estimated Population	278,025

Table 1-D
2001 Bell County Regional Area VOC and NOx Emissions
(tons per summer day)

County	*VOC*			*NOx*		
	Point	Mobile	Total	Point	Mobile	Total
Bell	0.16	1.74	1.90	6.84	2.58	9.42
Clay	0.00			0.00		
Harlan	0.00			0.00		
Knox	0.00			0.00		
Laurel	1.05			0.01		
Leslie	0.04			0.19		
Pulaski	0.77			17.40		
Whitley	0.00			0.00		
Total Emissions	2.02			24.44		

Clarksville, TN-Hopkinsville, KY Area



The Clarksville TN-Hopkinsville, KY MSA was listed in 2001 as being the 166th largest MSA within the United States. The Clarksville, TN-Hopkinsville, KY MSA includes Christian County in Kentucky and Montgomery County in Tennessee. Christian County is located approximately 70 miles northwest of Nashville, Tennessee.

Christian County, Kentucky

Christian County is Kentucky's second largest county in area. It is situated in southwestern Kentucky, and borders Tennessee to the south, Hopkins County, Kentucky, to the north, Trigg County, Kentucky, to the west and Todd County, Kentucky, to the east.

Geography/Topography

Christian County is part of the Clarksville, TN-KY Metropolitan Statistical Area (MSA). This MSA includes Clarksville, Tennessee (i.e., Montgomery County) and Hopkinsville, Kentucky (i.e., Christian County). Christian County has a land area of 721 square miles

Meteorological Information

Due to the close proximity of Nashville, Tennessee, meteorological data from Nashville was used for this Kentucky area. Wind speed/wind direction information for Nashville shows that the majority of the time for the period 1988–1992, the wind in the Christian County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 90 F. The mean low was 69 F. The mean precipitation for the same period was 4.0 inches.

Planning

The authority for air quality planning in the Christian County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Christian County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (TVA site) located in Christian County, Kentucky shows an 8-hour design value of .085 parts per million (ppm) which would be classified as a county in violation of the standard. The Montgomery County, Tennessee monitor that had an 8-hour design value of .088 ppm in 2000 was discontinued in 2001. (See table 1-A)

Population

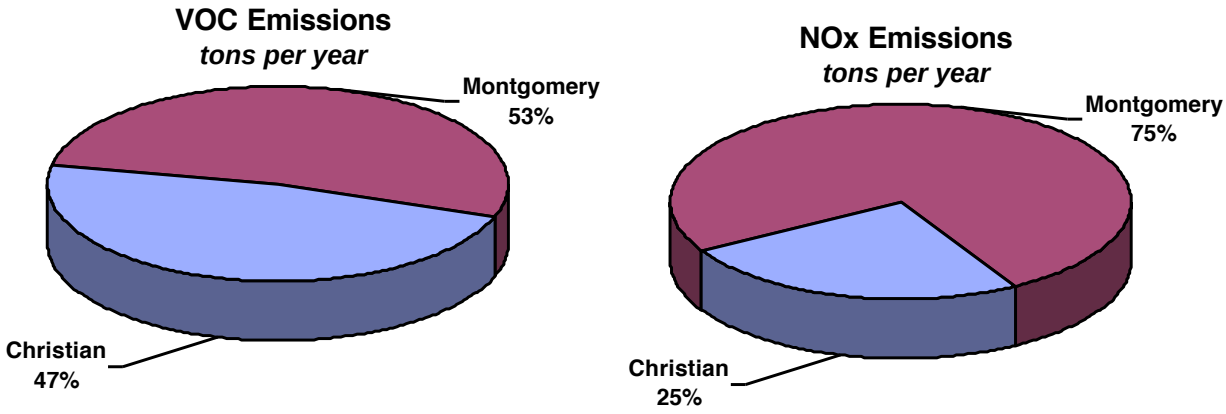
Based on projections to 2001 from 2000 census data, there are 71,649 persons living in Christian County, Kentucky, which represents approximately 99 persons per square mile. The population of Christian County is approximately 27% rural with the remaining 73% living in incorporated areas. The largest city in Christian County is Hopkinsville. (See table 1-C)

Christian County's population from 1990 through 2000 increased by approximately 5% (68,941 to 72,265). The Christian County population is further expected to increase by an additional 4% between 2000 and 2010. In addition, the Montgomery County, Tennessee population from 1990 through 2000 increased by approximately 34%. (See table 1-B)

Air Emissions

Point source emissions in tons per summer day (tpsd) were not available for Tennessee. Therefore, an annual emission comparison is being performed. VOC point source emissions from Christian County were estimated at 742 tons per year (tpy) in 1999 which represents approximately 47% of the total 1,565 tpy overall VOC point source emissions from the Clarksville-Hopkinsville Area. Point source NOx emissions from Christian County were estimated at 127 tpy in 1999 which represents approximately 25% of the total 509 tpy overall NOx point source emissions from the Clarksville-Hopkinsville MSA. (See table 1-D)

1999 NEI Clarksville-Hopkinsville Point Source Emissions
(tons per year)



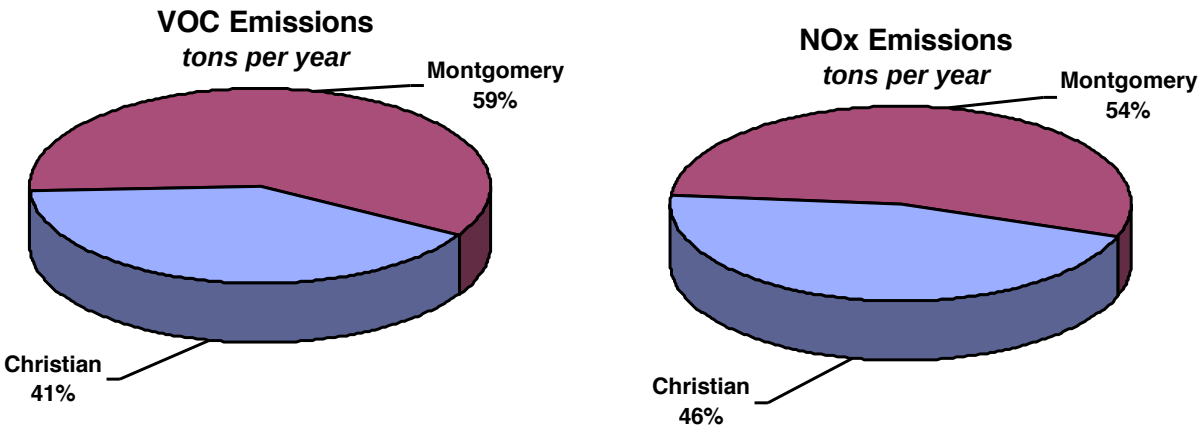
In addition, 2001 point source VOC emissions from Christian County were estimated at 1.68 tpsd in 2001. The Christian County 2001 point source NOx emissions were estimated to be 0.13 tpsd. (See table 1-E)

Point sources located within Christian County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Based on data from the 1999 NEI, Onroad mobile source VOC emissions from Christian County were estimated at 2,035 tons per year (tpy) in 1999 which represents approximately 41% of the total 4,970 tpy overall VOC onroad mobile source emissions from the Clarksville-Hopkinsville Area. Onroad mobile source NOx emissions from Christian County were estimated at 3,215 tpy in 1999 which represents approximately 46% of the total 7,003 tpy overall NOx onroad mobile source emissions from the Clarksville-Hopkinsville MSA. (See table 1-D)

1999 NEI Christian County Onroad Mobile Source Emissions

(tons per year)

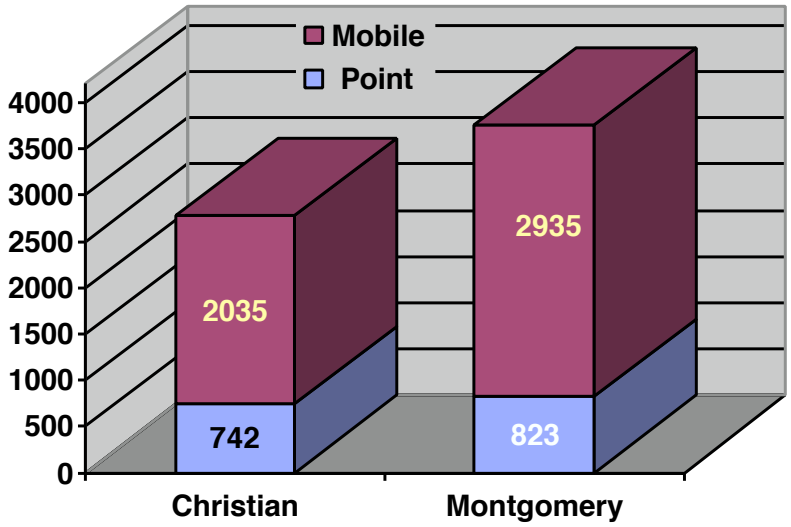


In addition, 2001 onroad mobile source VOC emissions within Christian County were estimated to be 4.63 tpsd. Christian County 2001 onroad mobile NOx emissions were estimated to be 7.19 tpsd. (See table 1-E)

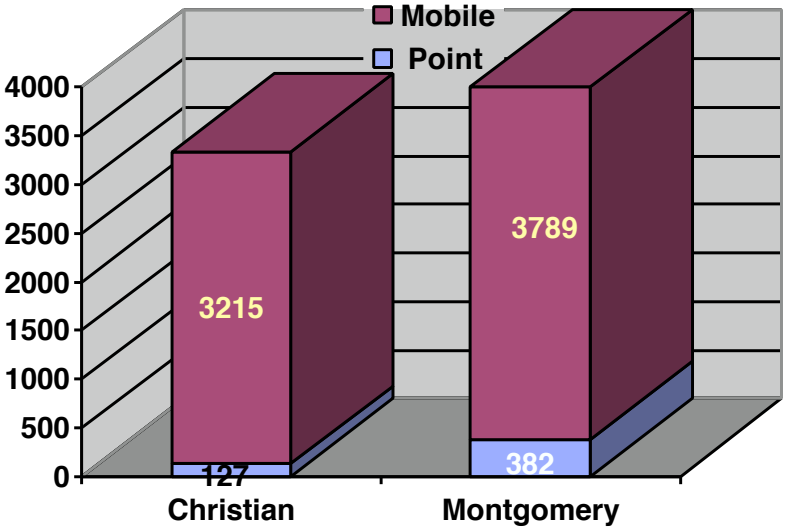
Commuting traffic from other counties into Christian County is high, and the commuting traffic from Christian County into other counties is minimal.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

1999 VOC Contribution
(tons per year)



1999 NOx Contribution
(tons per year)



Conclusion and Recommendation

Monitoring data and emissions data presented indicate that Christian County, Kentucky should be designated nonattainment for the 8-hour ozone standard.

Clarksville-Hopkinsville MSA

Figure 1-A
Wind Rose Patterns

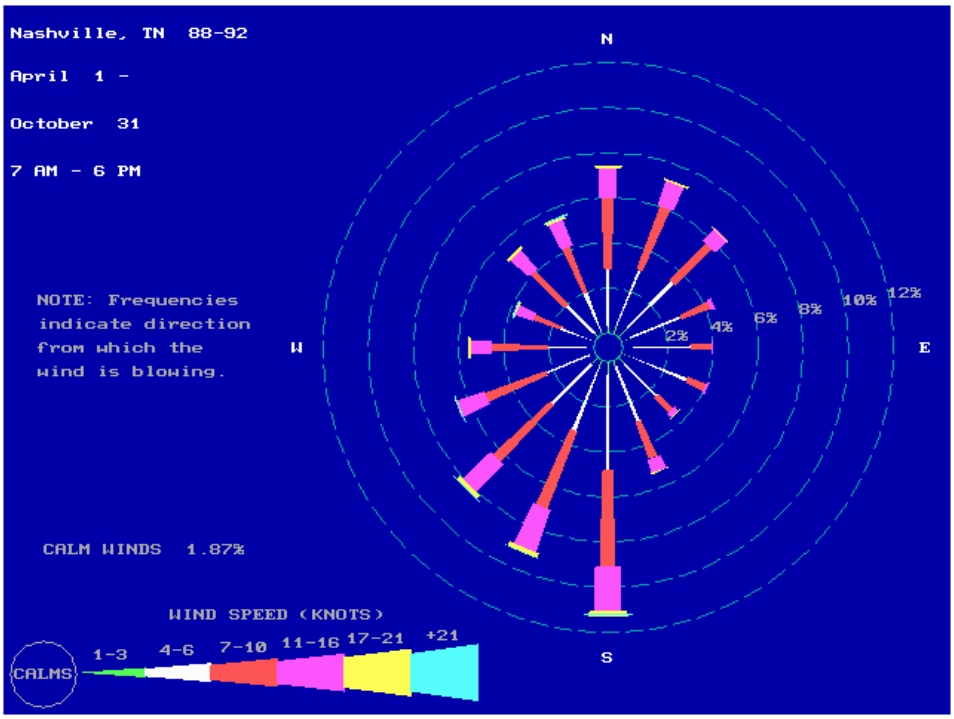


Figure 1-B
Clarksville-Hopkinsville 1999 NEI VOC and NOx Emissions
(tons per year)

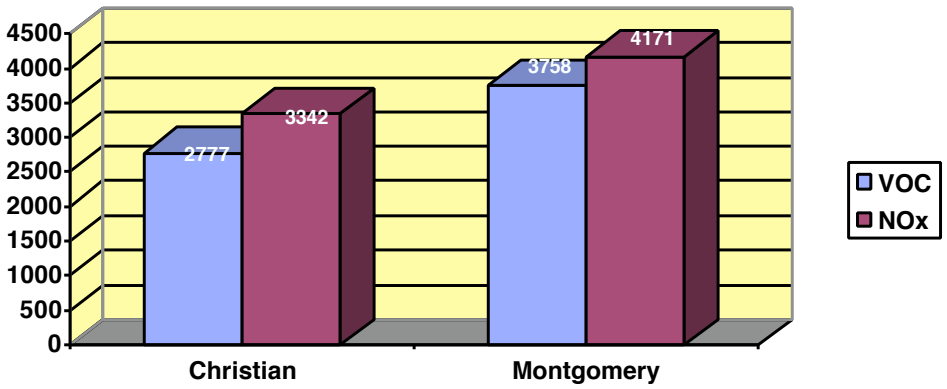


Table 1-A
Ozone Design Values
(parts per million)

County	2000	2001	2002	Design Value
Christian	.081	.082	.093	.085
Montgomery	.088	**	**	**

**Montgomery County, TN, ozone monitor was discontinued in 2001.

Table 1-B
Clarksville-Hopkinsville MSA Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Christian	68,941	72,265	4.8%	74,791	3.5%
Montgomery	*	*	34.1%	*	*

*Not Available

Table 1-C
2001 Estimated Clarksville-Hopkinsville MSA Population

Kentucky	Estimated Population
Christian County	71,649
Tennessee	
Montgomery County	135,023

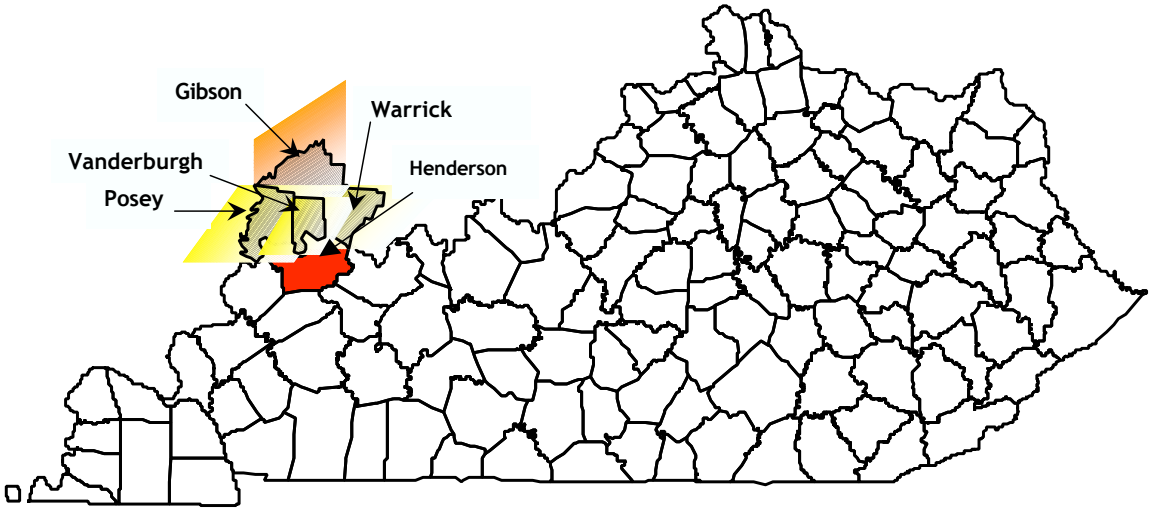
Table 1-D
1999 NEI Clarksville-Hopkinsville MSA VOC and NOx Emissions
(tons per year)

County	VOC			NOx		
	Point	Mobile	Total	Point	Mobile	Total
Christian	742	2035	2777	127	3215	3342
Montgomery	823	2935	3758	382	3789	4171
Total	1565	4970	6535	509	7004	7513

Table 1-E
2001 Christian County VOC and NOx Emissions
(tons per summer day)

County	*VOC*			*NOx*		
	Point	Mobile	Total	Point	Mobile	Total
Christian	1.68	4.63	6.31	0.13	7.19	7.32

Henderson County, Kentucky



The Evansville-Henderson, Indiana-Kentucky MSA, (Metropolitan Statistical Area) encompasses two states and four counties. It includes Henderson County in Kentucky and Posey, Vanderburgh, and Warrick Counties in Indiana. Gibson County, Indiana, which is not in the Evansville-Henderson MSA, was also included in this document for study purposes. In 2001, this MSA was listed as the 133rd largest MSA within the United States.

HENDERSON COUNTY, KENTUCKY

Henderson County is part of the Evansville-Henderson, Indiana-Kentucky Metropolitan Statistical Area (MSA) and is located to the west of Daviess County, Kentucky, to the northwest of McLean County, Kentucky, to the north of Webster County, Kentucky, and to the northeast of Union County, Kentucky. Additionally it is located to the southeast of Posey County, Indiana, to the south of Vanderburgh County, and to the southwest of Warrick County, Indiana.

Geography/Topography

Henderson County has a land area of 440 square miles and is located in northwestern Kentucky where the banks of the Ohio River form the northern boundary of the county. It is part of the Western Kentucky Coal Field Region.

Meteorological Information

Due to the close proximity of Evansville, Indiana, meteorological data from Evansville was used for this Kentucky area. Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Henderson County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from July 1961 through 1990 was 87 F, the mean low was 67 F. The mean precipitation for the same period was 4.5 inches.

Planning

The authority for air quality planning in the Henderson County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for all of Henderson County is performed by the Evansville Urban Transportation Study (EUTS), which is the Metropolitan Planning Organization.

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-101-0014) in Henderson County, Kentucky, shows an 8-hour design value of .079 which would be classified as a county in attainment of the standard. However, because of a Posey County, Indiana, ozone monitor with a design value of .087 parts per million (ppm), Henderson County, information is being presented in this document. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 44,835 persons living in Henderson County. That represents approximately 102

persons per square mile. The population of Henderson County is approximately 41% rural with the remaining 59% living in incorporated areas. The largest city in Henderson County is Henderson.

Henderson County's population from 1990 through 2000 increased by approximately 4% (43,044 to 44,829). The population is further expected to increase by an additional 3% between 2000 and 2010. (See table 1-B)

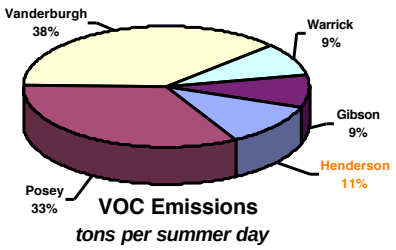
Based on 2001 population data for the Evansville-Henderson study area, Henderson County represents approximately 14% of the total 2001 population in the study area and 100% of the Kentucky portion of the study area. (See table 1-C)

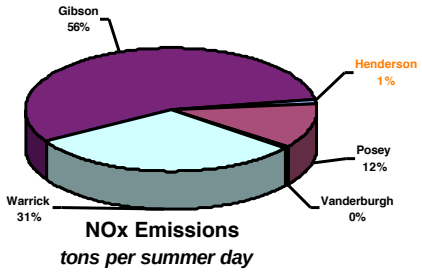
Air Emissions

Point source VOC emissions from Henderson County were estimated at 2.43 tons per summer day (tpsd) in 1999 which represents approximately 11% of the total 21.52 tpsd overall VOC point source emissions from the Evansville-Henderson study area. Point source NOx emissions from Henderson County were estimated at 2.63 tpsd in 1999 which represents approximately 1% of the total 227.89 tpsd overall NOx point source emissions from the Evansville-Henderson study area. (See table 1-D)

1999 Evansville-Henderson Study Area Point Source Emissions

(tons per summer day)





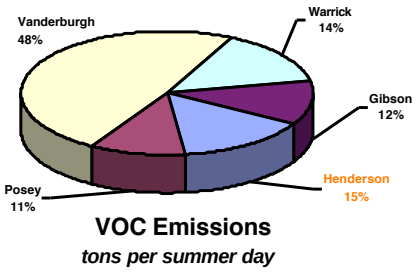
Point sources located within Henderson County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control

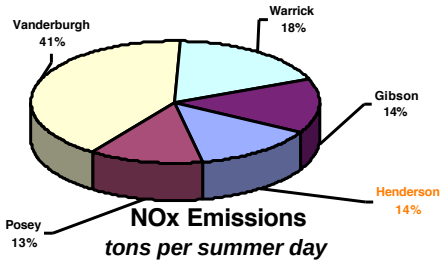
Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Henderson County were estimated at 3.85 tpsd in 1999 which represents approximately 15% of the total 26.10 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Evansville-Henderson study area. Onroad mobile source NOx emissions from Henderson County were estimated at 4.61 tpsd in 1999 which represents approximately 14% of the total 33.61 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Evansville-Henderson study area. (See table 1-D)

1999 Evansville-Henderson County Study Area Onroad Mobile Source Emissions

(tons per summer day)



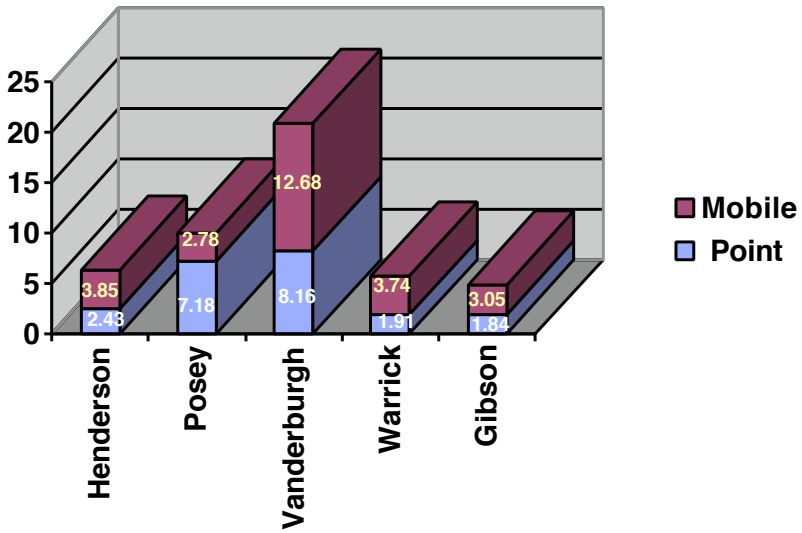


Commuting traffic from other counties into Henderson County is minimal, and the commuting traffic from Henderson County into other counties is minimal.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

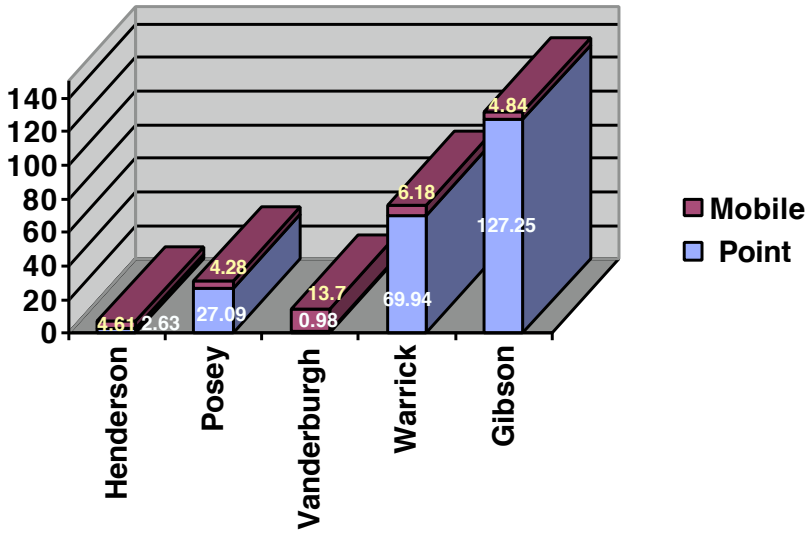
1999 VOC Contribution

(tons per summer day)



1999 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

Henderson County, based on 2000 – 2002 ozone monitoring data, is meeting the 8-hour ozone standard with a design value of .079 ppm. Historic monitoring data shows that the county has been in compliance since the 99-01 period. The Henderson monitor has routinely recorded 4th highest maximum values below the 0.085 level. Predominant wind patterns would typically have Henderson County, Kentucky, emissions moving away from the violating monitor in Indiana (Posey County). The monitoring and emissions data and other documentation presented indicate that Henderson County, Kentucky, does not contribute a significant amount of ozone forming emissions in the Evansville-Henderson MSA. Henderson County contributes approximately 13% of the total VOC emissions and less than 3% of the total NOx emissions in the study area. Therefore, Henderson County should be designated attainment for the 8-hour ozone standard.

Henderson County, Kentucky

Figure 1-A
Wind Rose Patterns

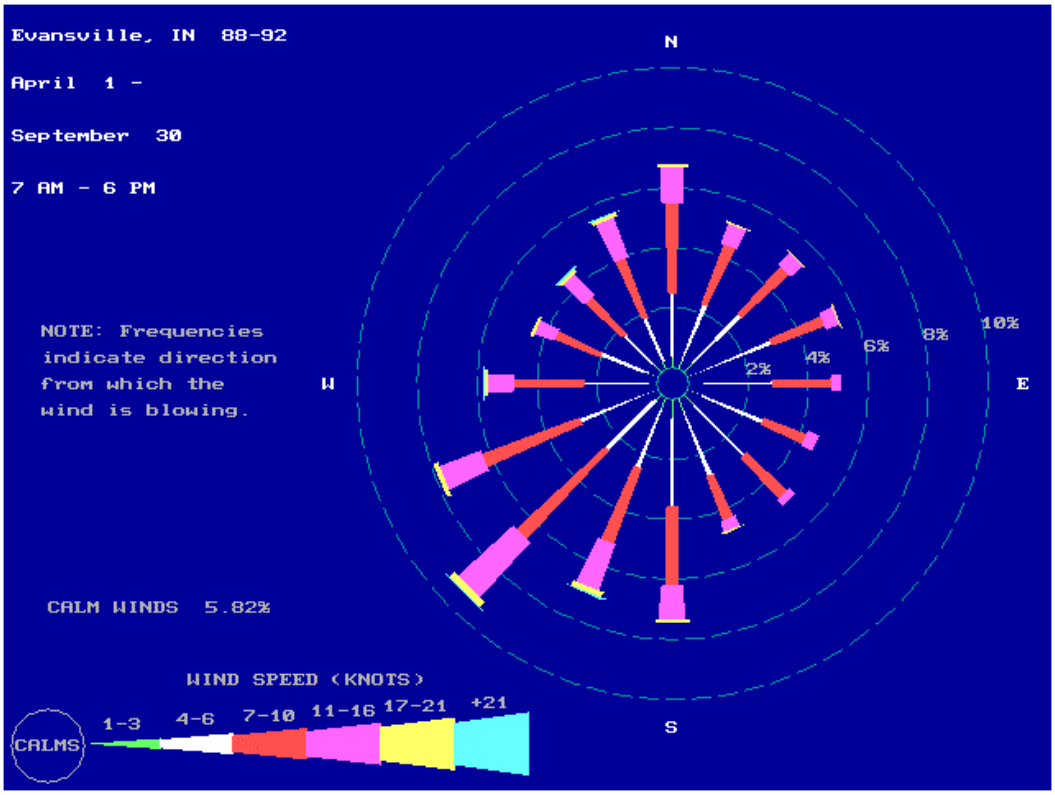


Figure 1-B
1999 Evansville-Henderson MSA
VOC and NOx Emissions
(tons per summer day)

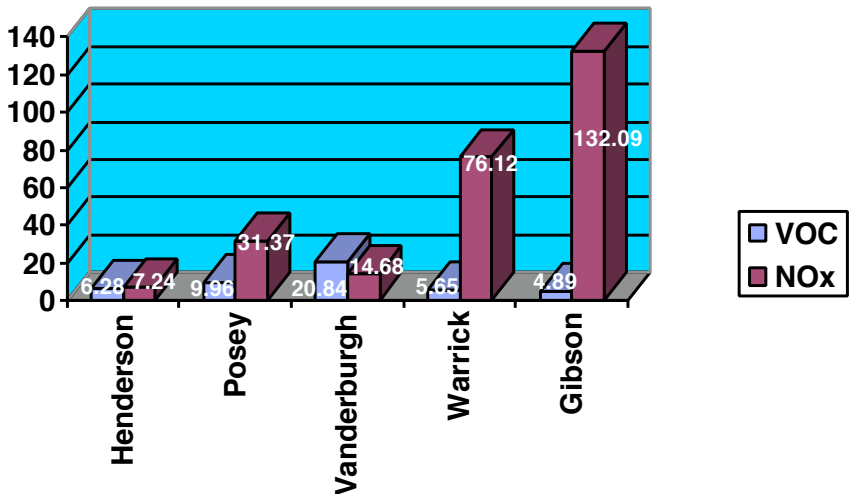


Table 1-A
Evansville-Henderson MSA Ozone 8-Hour Design Values
(parts per million)

County	2000	2001	2002	Design Value
Kentucky				
Henderson-21-101-0014	.078	.074	.087	.079
Indiana				
Posey – 18-129-0003	.085	.079	.097	.087
Warrick – 18-173-0002	.077	.081	.094	.084
Warrick – 18-173-0008	.073	.078	.091	.080
Warrick – 18-173-0009	.077	.075	.090	.080
Vanderburgh -18-163-0012	.081	.073	.095	.083
Vanderburgh -18-163-0013	.075	.072	.086	.077

	4th Highest 8-Hour Value						8-Hour Avg. Design Value			
	1996	1997	1998	1999	2000	2001	96-98	97-99	98-00	99-01
Kentucky										
Henderson	.088	.082	.082	.096	.078	.074	.084	.086	.085	.082
Indiana										
Posey	.054	.087	.092	.096	.085	.079	.077	.091	.091	.086
Warrick-0002	.093	.091	.096	.095	.077	.081	.093	.094	.089	.084
Warrick-0008	.090	.095	.091	.087	.073	.078	.092	.091	.083	.079
Warrick-0009	.094	.094	.093	.092	.077	.075	.093	.093	.087	.081
Vanderburgh-12	.090	.093	.092	.098	.081	.073	.091	.094	.090	.084
Vanderburgh-13	.094	.089	.094	.091	.075	.072	.092	.091	.086	.079

Table 1-B
Henderson County Kentucky Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Kentucky					
Henderson	43,044	44,829	4.1%	46,303	3.3%
Indiana					
Posey	25,968	27,061	4.2%	26,605	-1.7%
Warrick	44,920	52,383	16.6%	56,631	8.1%
Vanderburgh	165,058	171,922	4.2%	174,355	1.4%
Gibson*	31,913	32,500	1.8%	32,904	1.2%

*Gibson County, Indiana is not part of the Evansville-Henderson MSA.

Table 1-C
2001 Estimated Evansville-Henderson MSA Population

Kentucky	Estimated Population
Henderson County	44,835
Indiana	**Estimated Population**
Posey County	27,067
Vanderburgh County	171,268
Warrick County	53,080
Total MSA Estimated Population	296,250
Gibson County*	32,716
Total Estimated Population	328,966

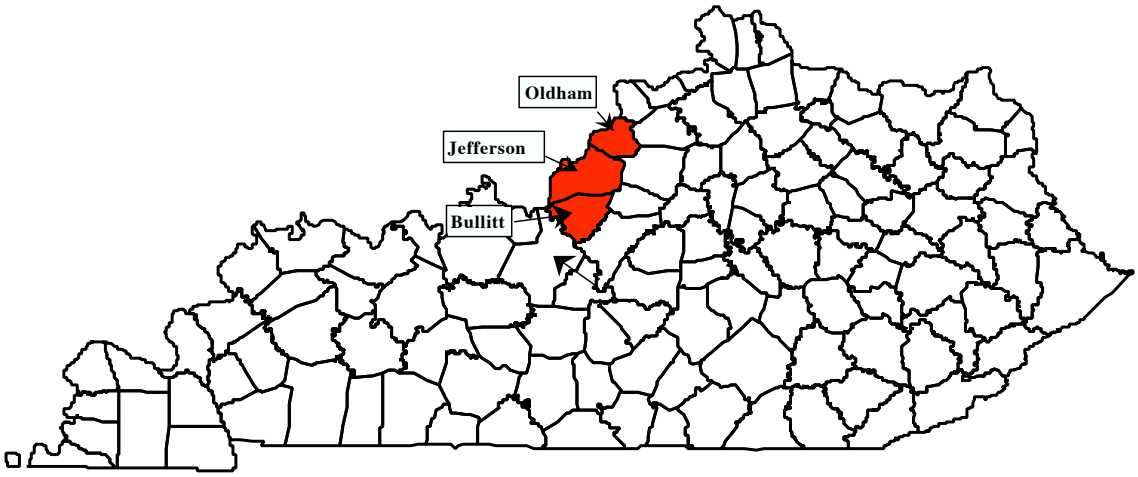
*Gibson County, Indiana, is not part of the Evansville-Henderson MSA, but is provided for comparison.

Table 1-D
1999 Evansville-Henderson MSA VOC and NOx Emissions
(tons per summer day)

County	*VOC*			*NOx*		
	Point	Mobile	Total	Point	Mobile	Total
Henderson	2.43	3.85	6.28	2.63	4.61	7.24
Posey	7.18	2.78	9.96	27.09	4.28	31.37
Vanderburgh	8.16	12.68	20.84	0.98	13.70	14.68
Warrick	1.91	3.74	5.65	69.94	6.18	76.12
Gibson*	1.84	3.05	4.89	127.25	4.84	132.09
Total Emissions	21.52	26.10	47.62	227.89	33.61	261.50

***Gibson County, Indiana, is not part of the Evansville-Henderson MSA.**

Louisville, KY-IN MSA



The Louisville, KY MSA was listed in 2001 as being the 50th largest MSA within the United States. This MSA encompasses seven counties, Scott, Clark, Floyd, and Harrison Counties, Indiana and Oldham, Jefferson, and Bullitt Counties, Kentucky.

BULLITT COUNTY, KENTUCKY

Bullitt County is part of the Louisville, Kentucky Metropolitan Statistical Area (MSA) and is on the I-65 South interstate corridor. It is located directly south of Jefferson County, northeast of Hardin County, and northwest of Nelson County.

Geography/Topography

Bullitt County has a land mass of 299 square miles and is the southern most county in the entire MSA. The Ohio River touches the western county border. The county is geographically at the junction of the Outer Bluegrass and the Knobs Regions.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Bullitt County area came from the south southwest and typically at 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 87 F, the mean low was 67 F. The mean precipitation for the same period was 4.5 inches.

Planning

The authority for air quality planning in the Bullitt County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Bullitt County is performed by the Kentuckiana Regional Planning and Development Agency (KIPDA).

Air Monitoring

For the 2000 – 2002 monitoring period, the Bullitt County ozone monitor (21-029-0006) showed a design value of 0.085 parts per million (ppm), which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 63,043 persons living in Bullitt County. That represents approximately 211 persons per square mile. The population of Bullitt County is approximately 35% rural with

65% of the people living in incorporated areas. The largest cities in Bullitt County are Mt. Washington and Shepherdsville. (See table 1-C)

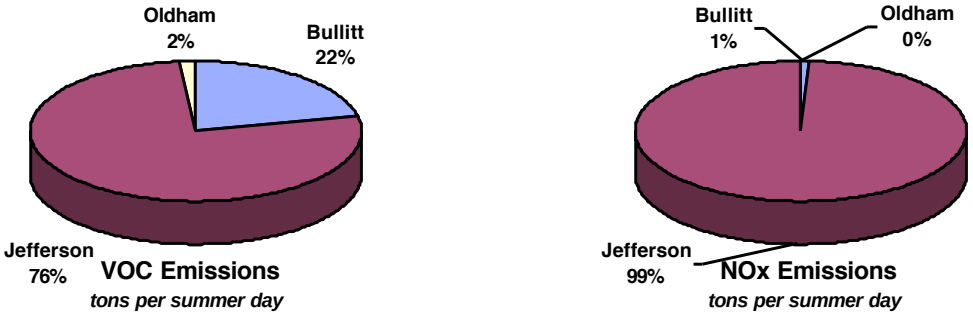
Bullitt County's population from 1990 through 2000 increased by approximately 29% (47,567 to 61,236). The population is further expected to increase by an additional 27% between 2000 and 2010. (See table 1-B)

Based on 2001 population data for the entire Louisville MSA, Bullitt County represents approximately 6% of the total 2001 population in the entire MSA and 8% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Bullitt County were estimated at 7.76 tons per summer day (tpsd) in 2001 which represents approximately 22% of the total 35.89 tpsd of the overall VOC point source emissions from the Kentucky portion of the Louisville MSA. The Kentucky portion of the MSA's point source NOx emissions were estimated to be 87.20 tpsd. Bullitt County's point source NOx contribution is approximately 0.80 tpsd or 1% of the Kentucky portion of the Louisville MSA total. (See table 1-D)

2001
Point Source Emissions

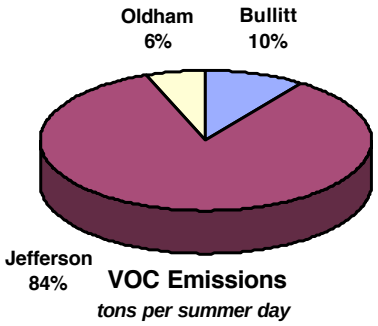


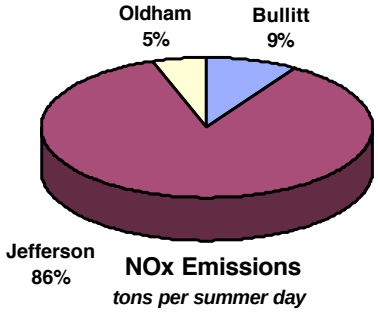
Point sources located within Bullitt County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations in the partial county area are required to remain in the area.

It should be noted that reformulated gasoline, an emission control strategy relating to onroad mobile sources, and Stage I controls at gasoline stations are in place in the former 1-hour ozone nonattainment portion of Bullitt County.

Onroad mobile source VOC emissions within Bullitt County were estimated to be 3.50 tpsd emissions in 2001. This represents approximately 10% of the total 36.04 tpsd of onroad mobile VOC emissions in the Kentucky portion of the Louisville MSA. Bullitt County onroad mobile NOx emissions were estimated to be 7.77 tpsd which is approximately 9% of the total 86.35 tpsd contribution from all three Kentucky counties in the MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions



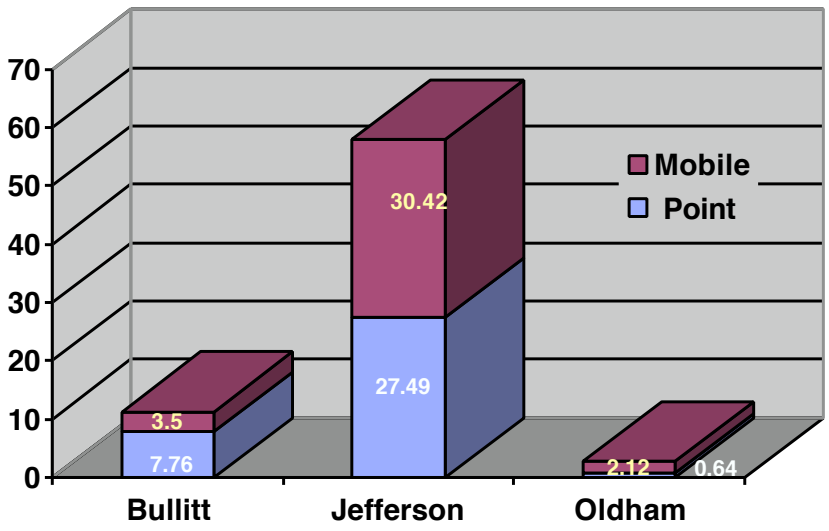


Commuting traffic from other counties into Bullitt County is high, while the commuting traffic from Bullitt County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

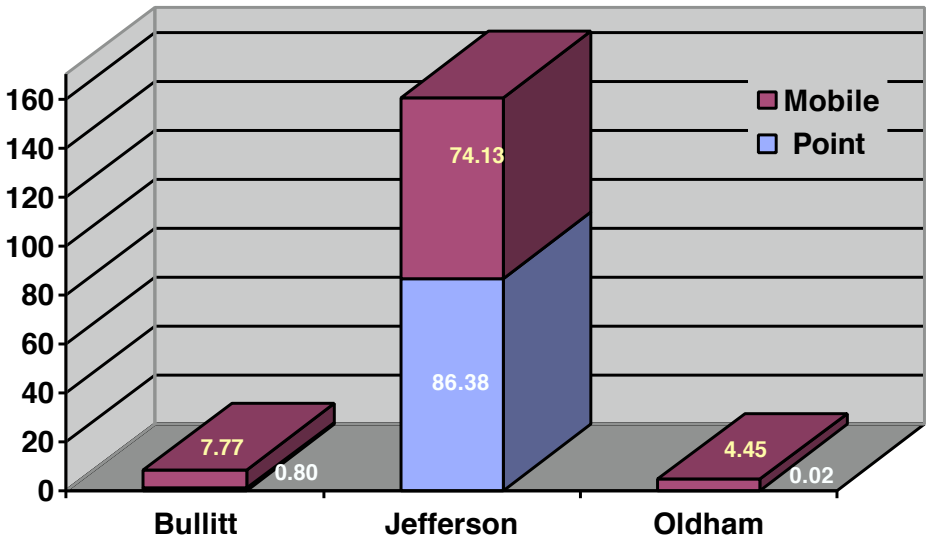
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data presented indicate that Bullitt County, Kentucky, should be designated nonattainment for the 8-hour ozone standard.

OLDHAM COUNTY, KENTUCKY

Oldham County is part of the Louisville, Kentucky Metropolitan Statistical Area (MSA) and is on the I-71 North-South interstate corridor. It is located northwest of Jefferson County, south of Trimble County, and northwest of Shelby County.

Geography/Topography

Oldham County has a land area of 189 square miles and is the eastern most county in the entire MSA. The Ohio River forms the northwest border of the county. The county geographically is in the Outer Bluegrass Region.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Oldham County area came from the south southwest and typically at 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 87 F, the mean low was 67 F. The mean precipitation for the same period was 4.5 inches.

Planning

The authority for air quality planning in the Oldham County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Oldham County is performed by the Kentuckiana Regional Planning and Development Agency (KIPDA).

Air Monitoring

For the 2000 – 2002 monitoring period, the Oldham County ozone monitor (21-185-0004) showed a design value of 0.087 parts per million (ppm), which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 48,000 persons living in Oldham County. That represents approximately 254 persons per square mile. The population of Oldham County is approximately 35% rural

with 65% of the people living in incorporated areas. The largest city in Oldham County is LaGrange. (See table 1-C)

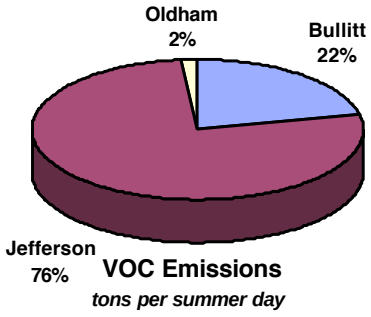
Oldham County's population from 1990 through 2000 increased by approximately 39% (33,263 to 46,178). The population is further expected to increase by an additional 36% between 2000 and 2010. (See table 1-B)

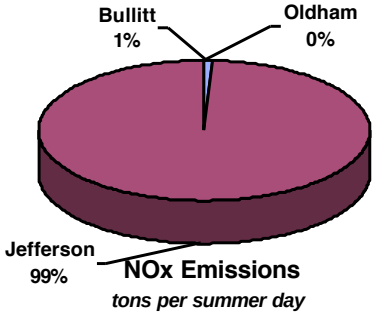
Based on 2001 population data for the entire Louisville MSA, Oldham County represents approximately 5% of the total 2001 population in the entire MSA and 6% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Oldham County were estimated at 0.64 tpsd in 2001 which represents approximately 2% of the total 35.89 tpsd of the overall VOC point source emissions from the Kentucky portion of the Louisville MSA. The Kentucky portion of the MSA's point source NOx emissions were estimated to be 87.20 tpsd. Oldham County's point source NOx contribution is approximately 0.02 tpsd or less than 1% of the Kentucky portion of the Louisville MSA total. (See table 1-D)

2001
Point Source Emissions



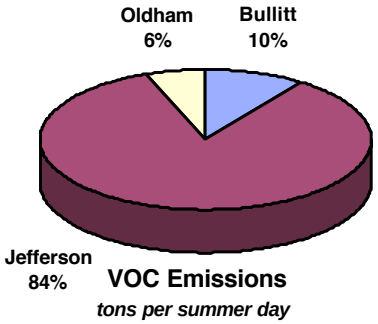


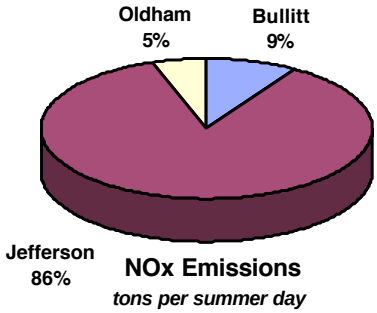
Point sources located within Oldham County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations in the partial county area are required to remain in the area.

It should be noted that reformulated gasoline, an emission control strategy relating to onroad mobile sources, and Stage I controls at gasoline stations are in place in the former 1-hour ozone nonattainment portion of Oldham County.

Onroad mobile source VOC emissions within Oldham County were estimated to be 2.12 tpsd in 2001. This represents approximately 6% of the total 36.04 tpsd onroad mobile VOC emissions in the Kentucky portion of the Louisville MSA. Oldham County onroad mobile NOx emissions were estimated to be 4.45 tpsd which is approximately 5% of the total 86.35 tpsd contribution from all three Kentucky counties in the MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions

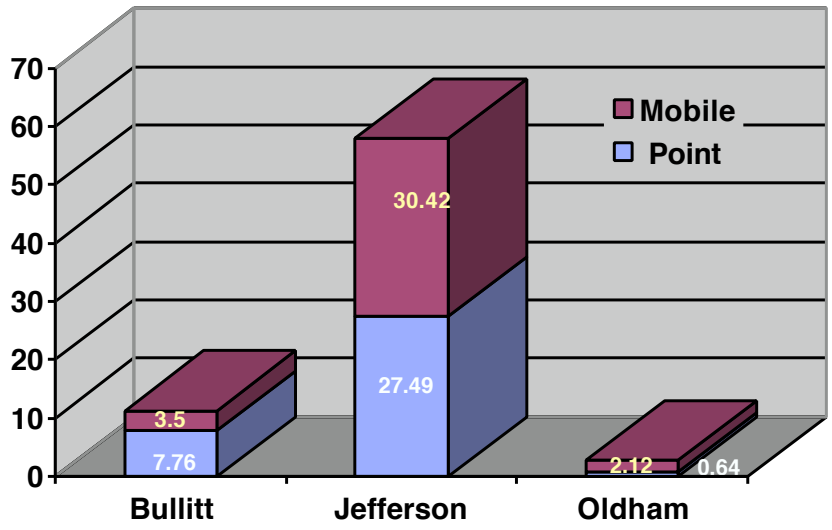




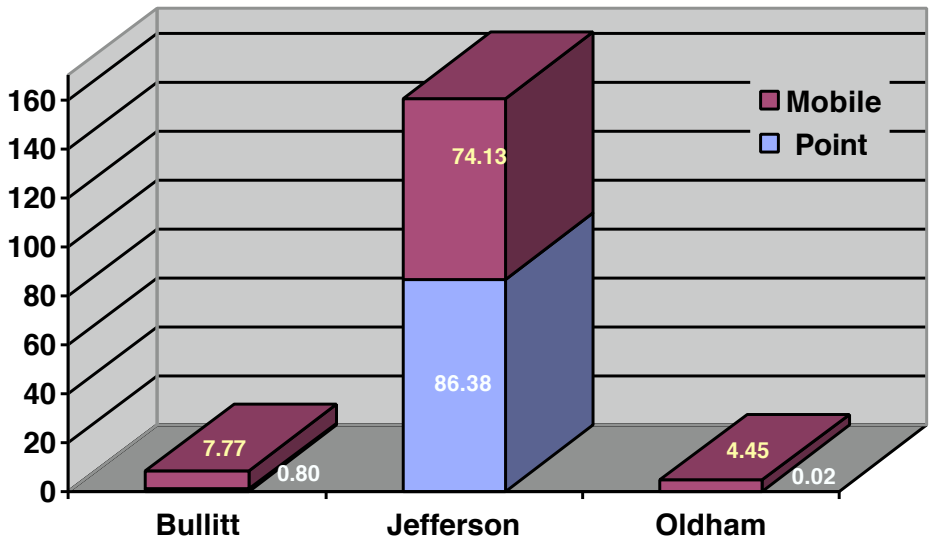
Commuting traffic from other counties into Oldham County is high, while the commuting traffic from Oldham County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

2001 VOC Contribution
(tons per summer day)



2001 NOx Contribution
(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data presented indicate that Oldham County, Kentucky, should be designated nonattainment for the 8-hour ozone standard.

JEFFERSON COUNTY, KENTUCKY

Jefferson County is part of the Louisville, Kentucky Metropolitan Statistical Area (MSA) and is located at the intersection of the I-65 North-South, I-71 North-South, and I-64 East-West interstate corridors in central Kentucky.

Geography/Topography

Jefferson County has a land mass of 385 square miles and is the central county in the Kentucky portion of the Louisville MSA. Oldham County lies to the northwest and Bullitt County to the south of Jefferson County. The Ohio River forms the northern border of Jefferson County.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Jefferson County area came from the south southwest and typically at 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 87 F, the mean low was 67 F. The mean precipitation for the same period was 4.5 inches.

Planning

The authority for air quality planning in the Jefferson County resides with the Louisville Metro Air Pollution Control District and with the Kentucky Natural Resources and Environmental Protection Cabinet which provides oversight. Transportation planning for Jefferson County is performed by the Kentuckiana Regional Planning and Development Agency (KIPDA).

Air Monitoring

For the 2000 – 2002 monitoring period, the Jefferson County ozone monitor (21-111-0027-Bates) showed a design value of 0.085 parts per million (ppm), which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 692,910 persons living in Jefferson County. That represents approximately 1,800

persons per square mile. The population of Jefferson County is approximately 2% rural with 98% of the people living in incorporated areas. The largest city in Jefferson County is Louisville. (See table 1-C)

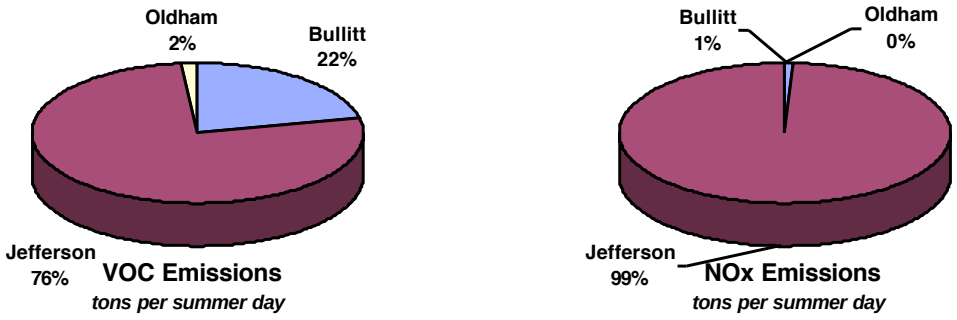
Jefferson County's population from 1990 through 2000 increased by approximately 4% (665,123 to 693,604). The population is further expected to increase by an additional 3% between 2000 and 2010. (See table 1-B)

Based on 2001 population data for the entire Louisville MSA, Jefferson County represents approximately 67% of the total 2001 population in the entire MSA and 86% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Jefferson County were estimated at 27.49 tpsd in 2001 which represents approximately 76% of the total 35.89 tpsd of the overall VOC point source emissions from the Kentucky portion of the Louisville MSA. The Kentucky portion of the MSA's point source NOx emissions were estimated to be 87.20 tpsd. Jefferson County's point source NOx contribution is approximately 86.38 tpsd or 99% of the Kentucky portion of the Louisville MSA total. (See table 1-D)

2001
Point Source Emissions

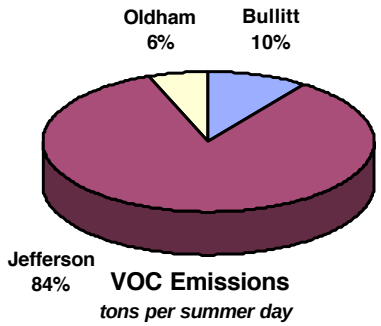


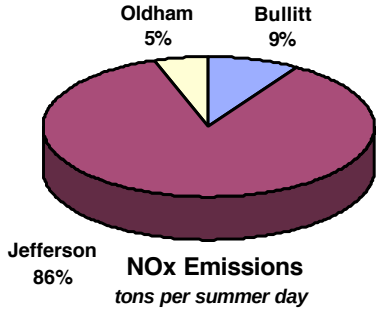
Point sources located within Jefferson County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, New Source Performance Standards (NSPS), and any additional local emission control measures. Any

controls imposed as a result of previous nonattainment designations are required to remain in Jefferson County.

It should be noted that three emission control strategies relating to onroad mobile sources are currently in place in Jefferson County: a vehicle inspection and maintenance program, Stage II Vapor Recovery, and reformulated gasoline. Stage I controls at gasoline stations are also in place in Jefferson County. Onroad mobile source VOC emissions within Jefferson County were estimated to be 30.42 tpsd in 2001. This represents approximately 84% of the total 36.04 tpsd of onroad mobile VOC emissions in the Kentucky portion of the Louisville MSA. Jefferson County onroad mobile NOx emissions were estimated to be 74.13 tpsd which is approximately 86% of the total 86.35 tpsd contribution from all three Kentucky counties in the MSA. (See table 1-D)

2001 Onroad Mobile Source Emissions



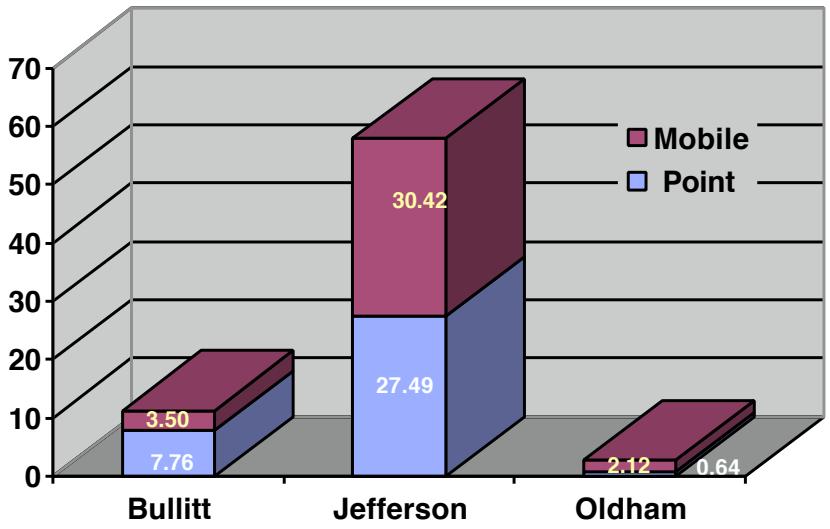


Commuting traffic from other counties into Jefferson County is minimal, while the commuting traffic from Jefferson County into other counties is not significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

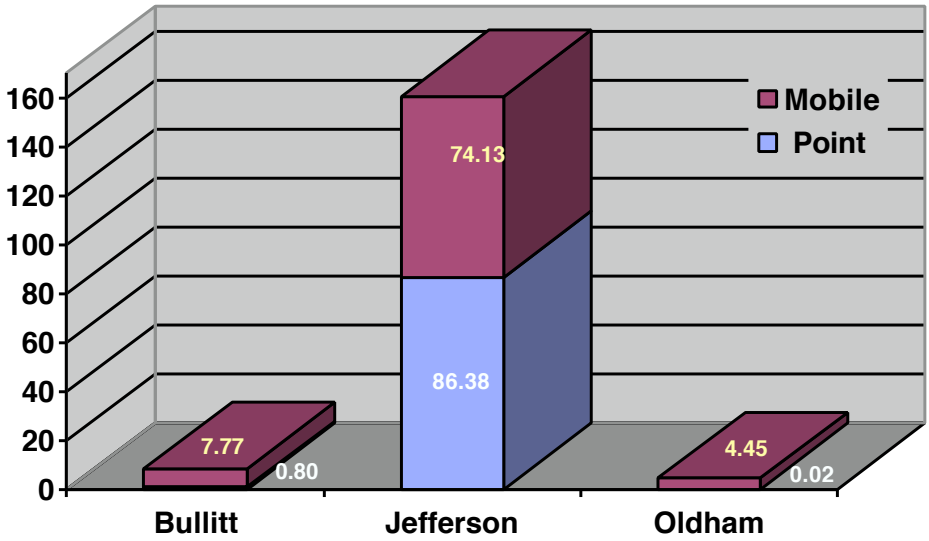
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data presented indicate that Jefferson County, Kentucky, should be designated nonattainment for the 8-hour ozone standard.

Louisville MSA

Figure 1-A
Wind Rose Patterns

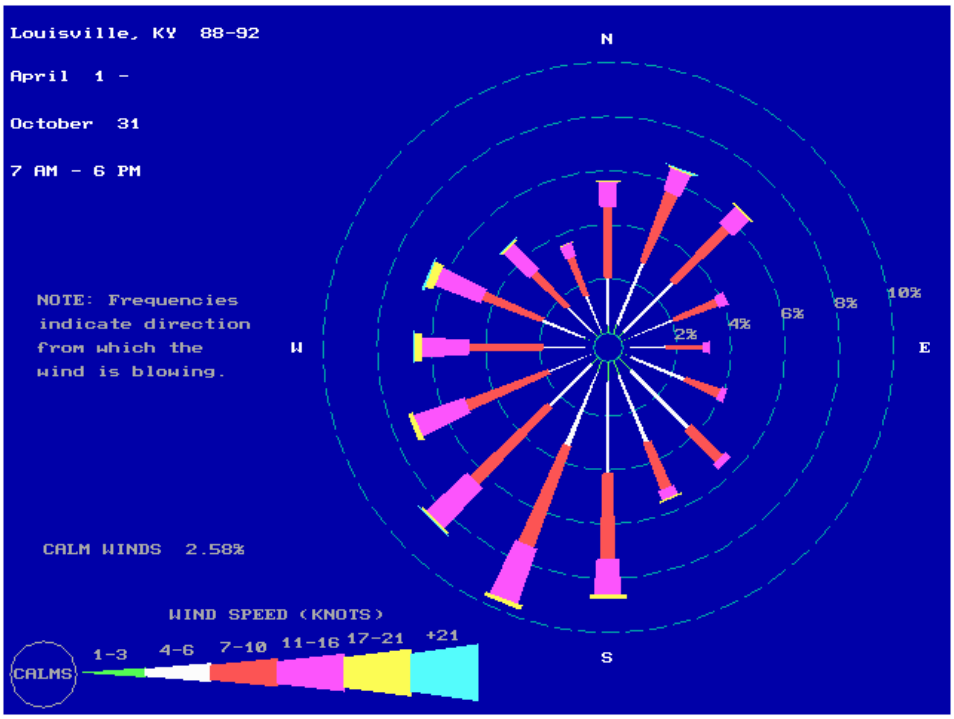


Figure 1-B
2001 VOC and NOx Emissions
Kentucky Portion of the Louisville MSA
(tons per summer day)

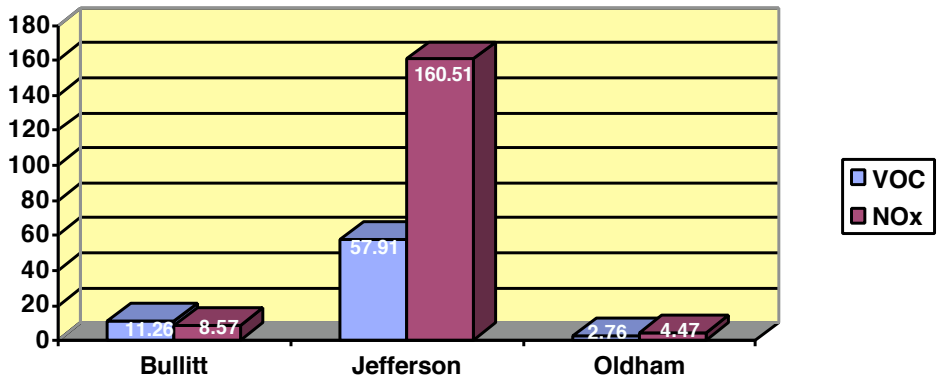


Table 1-A
Kentucky Portion of the Louisville MSA
Ozone Design Values
(parts per million)

County	2000	2001	2002	Design Value
Jefferson				
Bates	.090	.081	.085	.085
WLKY	.084	.077	.088	.083
Watson Lane	.076	.081	.096	.084
Bullitt	.082	.082	.091	.085
Oldham	.085	.086	.091	.087

Table 1-B
Kentucky Portion of the Louisville MSA
Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Bullitt	47,567	61,236	28.7%	77,928	27.3%
Jefferson	665,123	693,604	4.3%	717,376	3.4%
Oldham	33,263	46,178	38.8%	62,789	36.0%

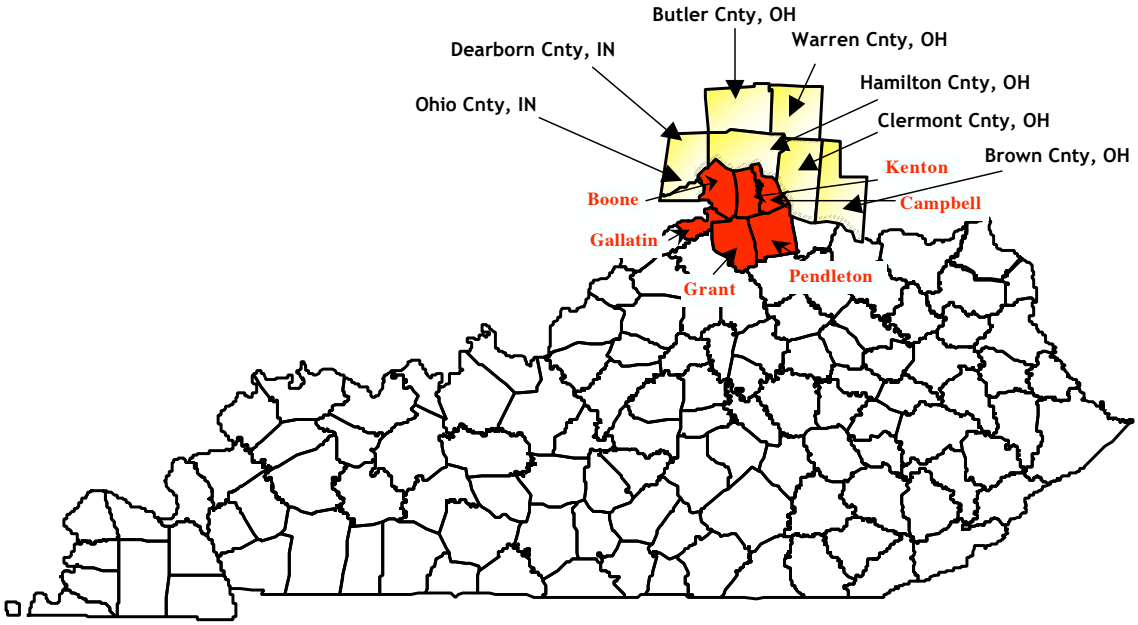
Table 1-C
2001 Estimated Louisville MSA Population Growth Data

Kentucky	Estimated Population
Bullitt County	63,043
Jefferson County	692,910
Oldham County	48,000
Indiana	
Clark County	97,364
Floyd County	71,348
Harrison County	34,929
Scott County	23,247
Total Estimated Population	1,030,841

Table 1-D
Kentucky Portion of the Louisville MSA
2001 VOC and NOx Emissions
(tons per summer day)

County	VOC			NOx		
	Point	Mobile	Total	Point	Mobile	Total
Bullitt	7.76	3.50	11.26	0.80	7.77	8.57
Jefferson	27.49	30.42	57.91	86.38	74.13	160.51
Oldham	0.64	2.12	2.76	0.02	4.45	4.47
Total	35.89	36.04	71.93	87.20	86.35	173.55

Kentucky Portion of the Cincinnati-Hamilton, OH-KY-IN CMSA



The Cincinnati-Hamilton CMSA was listed in 2001 as being the 24rd largest MSA within the United States. This MSA encompasses three states and thirteen counties. It includes Dearborn and Ohio Counties in Indiana, Butler, Brown, Clermont, Hamilton, and Warren Counties in Ohio, and Boone, Campbell, Gallatin, Grant, Kenton, and Pendleton Counties in Kentucky.

This is the northern most geographic region of Kentucky and the apex of an industrial triangle anchored by Louisville on the southwest and Lexington on the southeast. Within the triangle is more than a third of the state's population and nearly one-half of its manufacturing jobs. The interstate highway system places these three metropolitan areas within less than two hours driving from each other.

BOONE COUNTY, KENTUCKY

Boone County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located to the west of Kenton County, Kentucky, to the north of Grant County, Kentucky, and to the southwest of Cincinnati, Ohio.

Geography/Topography

Boone County has a land area of 246 square miles and is located on the banks of the Ohio River in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Boone County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Boone County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Boone County is performed by the Ohio, Kentucky, Indiana Regional Council of Governments (OKI).

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-015-0003) in Boone County, shows an 8-hour design value of .086 which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 90,489 persons living in Boone County. That represents approximately 368 persons per square mile. The population of Boone County is approximately 25% rural with

the remaining 75% living in incorporated areas. The largest cities in Boone County are Florence and Burlington. (See table 1-C)

Boone County's population from 1990 through 2000 increased by approximately 49% (57,589 to 85,991). The population is further expected to increase by an additional 47% between 2000 and 2010. (See table 1-B)

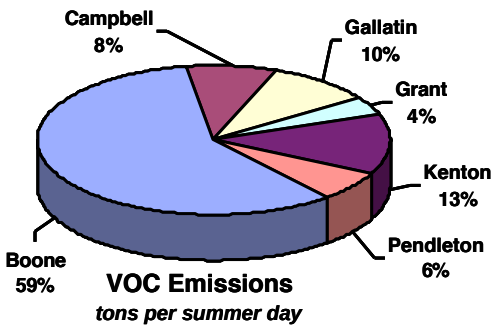
For the entire Cincinnati-Hamilton MSA, Boone County represents approximately 5% of the total population in the MSA and 23% of the Kentucky portion of the MSA. (See table 1-C)

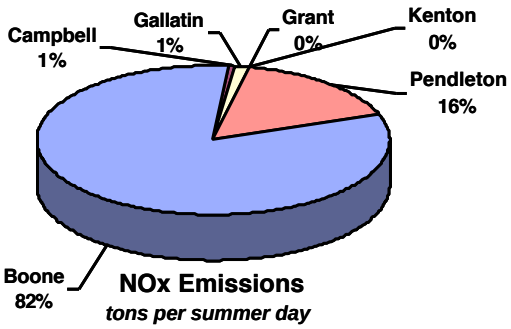
Air Emissions

The graph below shows point source VOC emissions from Boone County were estimated at 2.61 tons per summer day (tpsd) in 2001 which represents approximately 59% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Boone County were estimated at 21.57 tpsd in 2001 which represents approximately 82% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Boone County's emissions to the entire region.

2001 Point Source Emissions





Point sources located within Boone County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source

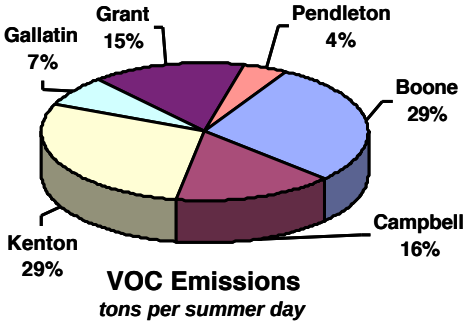
Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations are required to remain in Boone County.

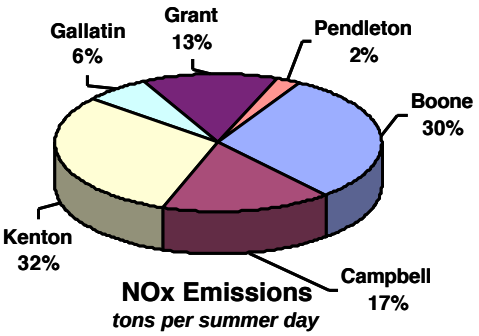
It should be noted that three emission control strategies relating to onroad mobile sources are in place in Boone County: a vehicle inspection and maintenance program, Stage II Vapor Recovery at gasoline pumps, and reformulated gasoline. Stage I controls at gasoline stations are also in place in Boone County.

Onroad mobile source VOC emissions from Boone County were estimated at 4.71 tpsd in 2001 which represents approximately 29% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Boone County were estimated at 11.58 tpsd in 2001 which represents approximately 30% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Boone County's emissions to the entire region.

2001 Onroad Mobile Source Emissions



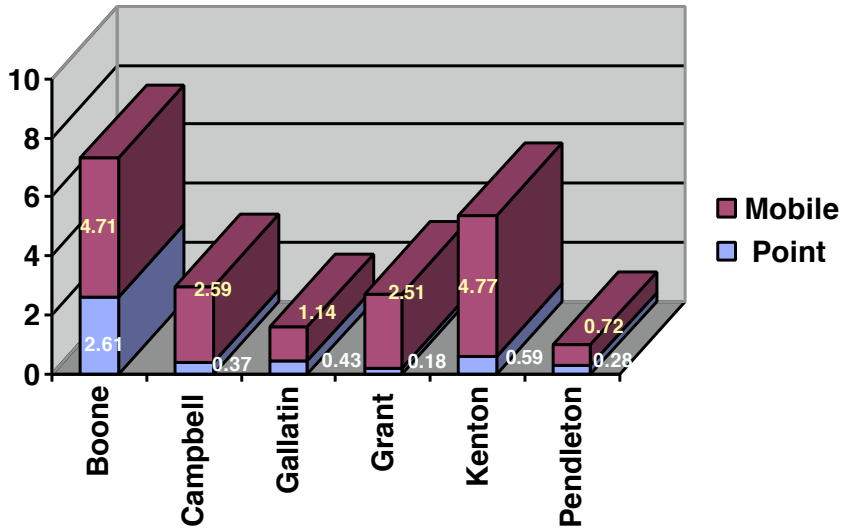


Commuting traffic from other counties into Boone County is significant, and the commuting traffic from Boone County into other counties is high.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

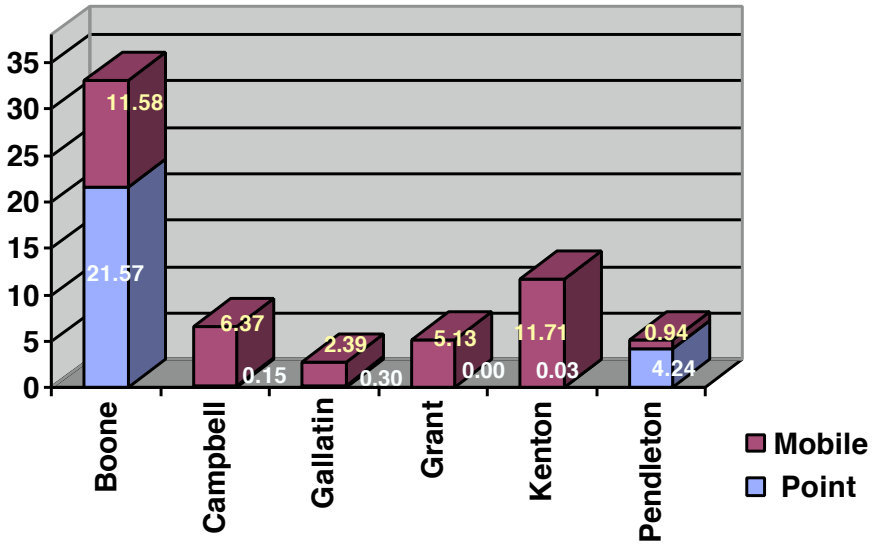
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data and other documentation presented indicate that Boone County, Kentucky, does contribute a significant amount of ozone forming emissions in the Kentucky portion of the area. While overall VOC emission reductions have occurred since 1990 in the area with a required 15% VOC emission reduction plan under the 1-hour ozone standard, the county has recorded a violation of the 8-hour ozone standard based on the 2000 – 2002 monitoring data. Therefore, Boone County should be designated nonattainment for the 8-hour ozone standard.

CAMPBELL COUNTY, KENTUCKY

Campbell County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located to the east of Kenton County, Kentucky, to the north of Pendleton County, Kentucky, and to the southeast of Cincinnati, Ohio.

Geography/Topography

Campbell County has a land area of 151 square miles and is located on the banks of the Ohio River in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Campbell County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Campbell County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Campbell County is performed by the Ohio, Kentucky, Indiana Regional Council of Governments (OKI).

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-037-1001) in Campbell County, shows an 8-hour design value of .094 which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 88,362 persons living in Campbell County. That represents approximately 585 persons per square mile. The population of Campbell County is approximately 16% rural with the remaining 84% living in incorporated areas. The largest cities in Campbell County are Newport and Ft. Thomas. (See table 1-C)

Campbell County's population from 1990 through 2000 increased by approximately 6% (83,866 to 88,616). The population is further expected to increase by an additional 4% between 2000 and 2010. (See table 1-B)

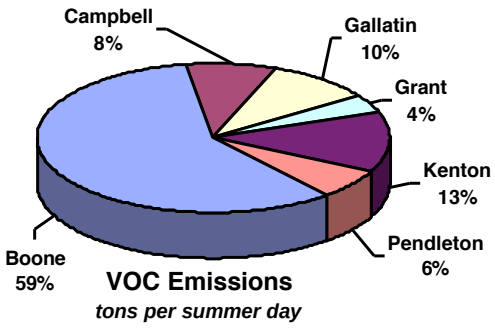
For the entire Cincinnati-Hamilton MSA, Campbell County represents approximately 4% of the total population in the MSA and 24% of the Kentucky portion of the MSA. (See table 1-C)

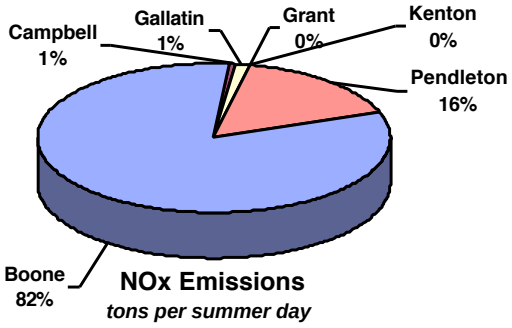
Air Emissions

Point source VOC emissions from Campbell County were estimated at 0.37 tpsd in 2001 which represents approximately 8% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Campbell County were estimated at 0.15 tpsd in 2001 which represents approximately 1% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Campbell County's emissions to the entire region.

2001 Point Source Emissions





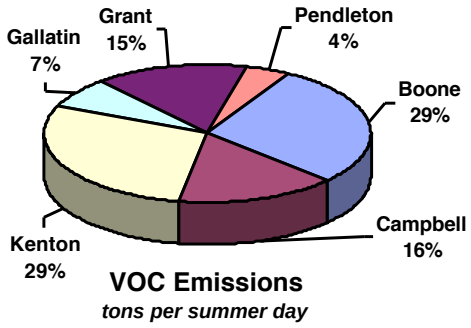
Point sources located within Campbell County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations are required to remain in Campbell County.

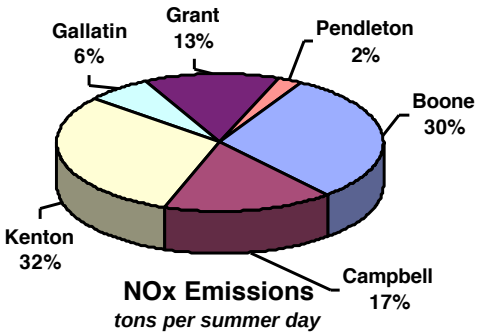
It should be noted that three emission control strategies relating to onroad mobile sources are in place in Campbell County: a vehicle inspection and maintenance program, Stage II Vapor Recovery, and reformulated gasoline. Stage I controls at gasoline stations are also in place in Campbell County.

Onroad mobile source VOC emissions from Campbell County were estimated at 2.59 tpsd in 2001 which represents approximately 16% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Campbell County were estimated at 6.37 tpsd in 2001 which represents approximately 17% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Campbell County's emissions to the entire region.

2001 Onroad Mobile Source Emissions

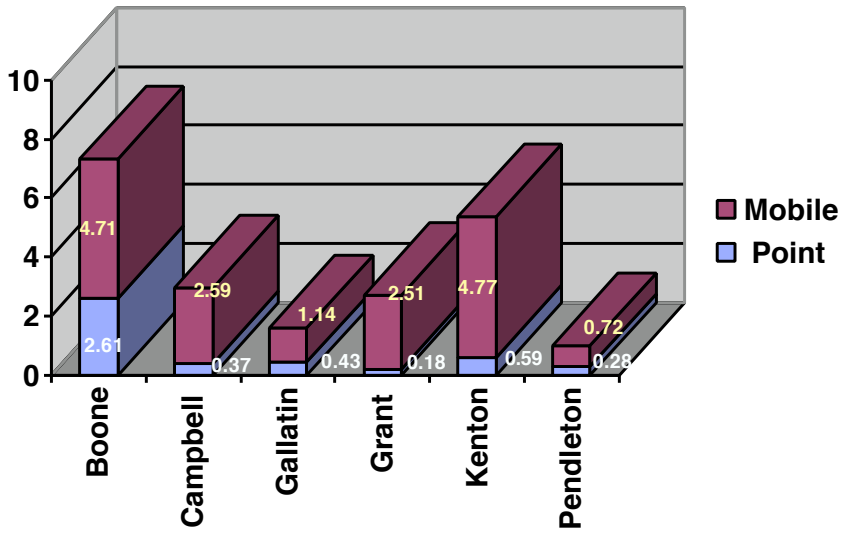




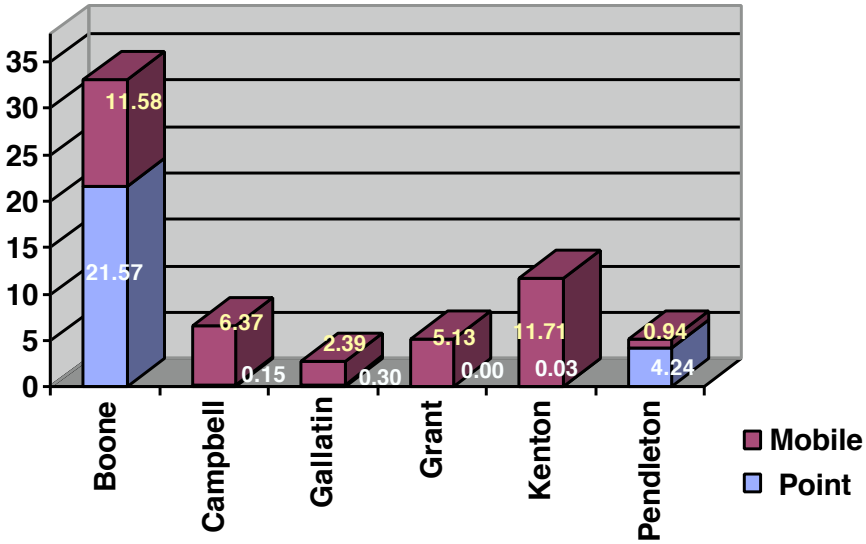
Commuting traffic from other counties into Campbell County is high, and the commuting traffic from Campbell County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

2001 VOC Contribution
(tons per summer day)



2001 NOx Contribution
(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data and other documentation presented indicate that Campbell County, Kentucky, does contribute ozone forming emissions in the area. While overall VOC emission reductions have occurred since 1990 in the area with a required 15% VOC emission reduction plan under the 1-hour ozone standard, the county has recorded a violation of the 8-hour ozone standard based on the 2000 – 2002 monitoring data. Therefore, Campbell County should be designated nonattainment for the 8-hour ozone standard.

KENTON COUNTY, KENTUCKY

Kenton County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located to the west of Campbell County, Kentucky, to the east of Boone County, Kentucky, and to the south of Cincinnati, Ohio.

Geography/Topography

Kenton County has a land area of 162 square miles and is located on the banks of the Ohio River in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Kenton County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Kenton County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Kenton County is performed by the Ohio, Kentucky, Indiana Regional Council of Governments (OKI).

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-117-0007) in Kenton County, shows an 8-hour design value of .088 which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 151,366 persons living in Kenton County. That represents approximately 934 persons per square mile. The population of Kenton County is approximately 7% rural with the remaining 93% living in incorporated areas. The largest cities in Kenton County are Covington and Erlanger. (See table 1-C)

Kenton County's population from 1990 through 2000 increased by approximately 7% (142,031 to 151,464). The population is further expected to increase by an additional 6% between 2000 and 2010. (See table 1-B)

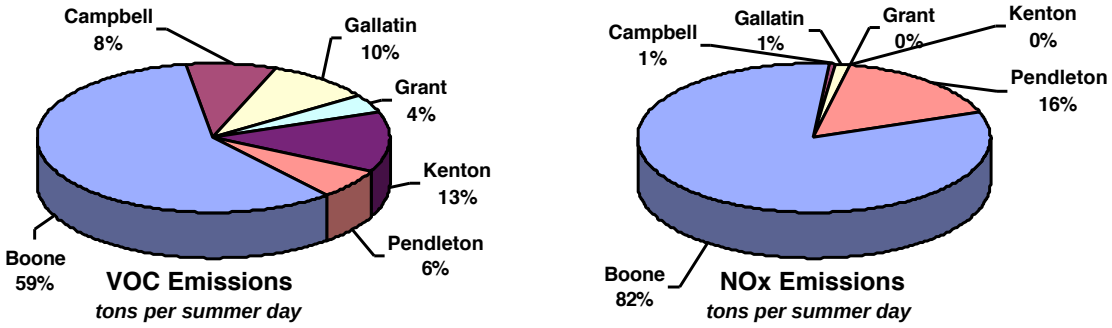
For the entire Cincinnati-Hamilton MSA, Kenton County represents approximately 8% of the total population in the MSA and 40% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Kenton County were estimated at 0.59 tpsd in 2001 which represents approximately 13% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Kenton County were estimated at 0.03 tpsd in 2001 which represents less than 1% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Kenton County's emissions to the entire region.

2001 Point Source Emissions



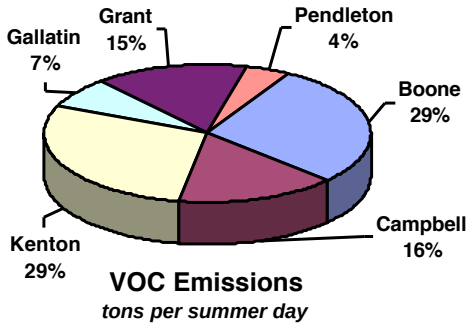
Point sources located within Kenton County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS). Any controls imposed as a result of previous nonattainment designations are required to remain in Kenton County.

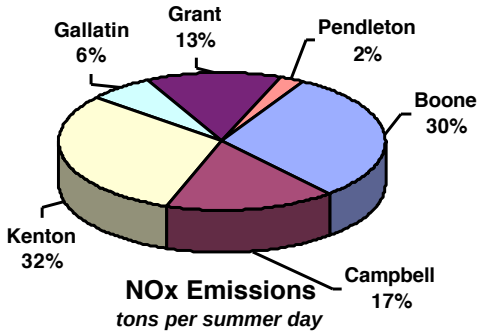
It should be noted that three emission control strategies relating to onroad mobile sources are in place in Kenton County: a vehicle inspection and maintenance program, Stage II Vapor Recovery, and reformulated gasoline. Stage I controls at gasoline stations are also in place in Kenton County.

Onroad mobile source VOC emissions from Kenton County were estimated at 4.77 tpsd in 2001 which represents approximately 29% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Kenton County were estimated at 11.71 tpsd in 2001 which represents approximately 32% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Kenton County's emissions to the entire region.

2001 Onroad Mobile Source Emissions



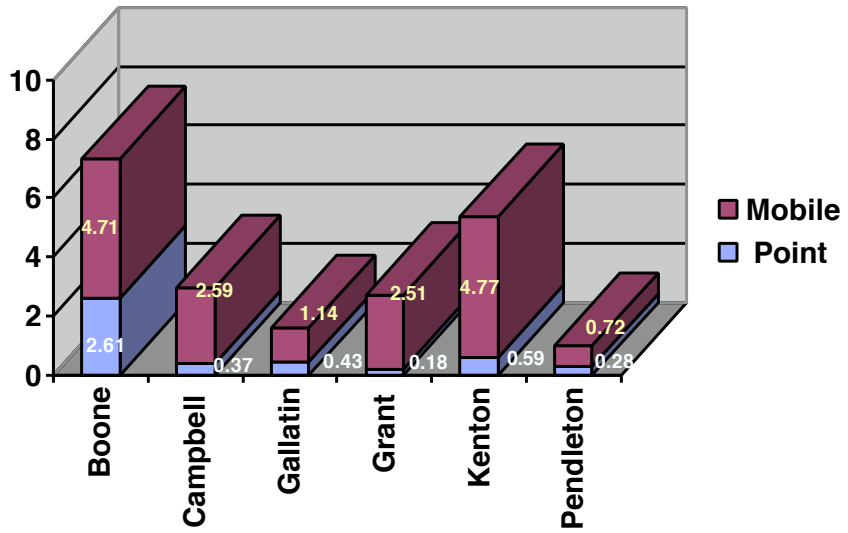


Commuting traffic from other counties into Kenton County is high, and the commuting traffic from Kenton County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

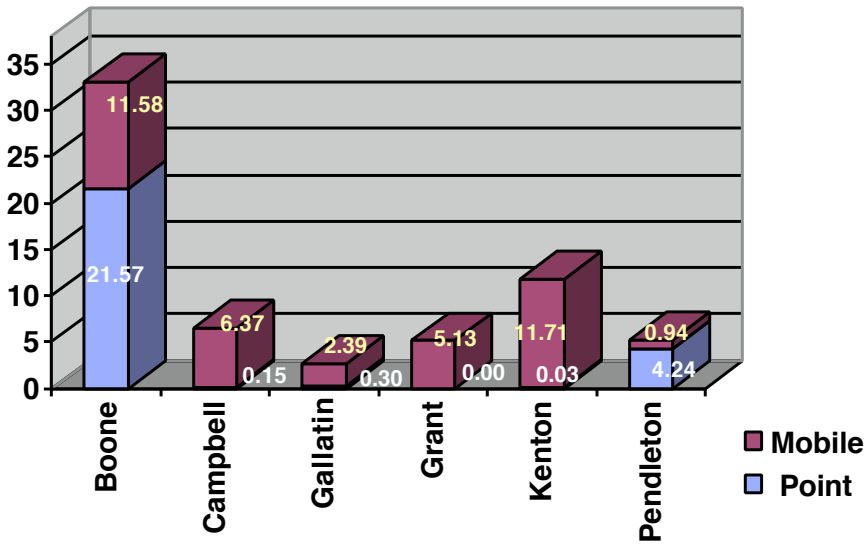
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The monitoring and emissions data and other documentation presented indicate that Kenton County, Kentucky, does contribute ozone forming emissions in the area. While overall VOC emission reductions have occurred since 1990 in the area with a required 15% VOC emission reduction plan under the 1-hour ozone standard, the county has recorded a violation of the 8-hour ozone standard based on the 2000 – 2002 monitoring data. Therefore, Kenton County should be designated nonattainment for the 8-hour ozone standard.

GALLATIN COUNTY, KENTUCKY

Gallatin County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located to the southwest of Boone County, Kentucky, and to the northwest of Owen and Grant Counties, Kentucky.

Geography/Topography

Gallatin County has a land area of 98 square miles and is located on the banks of the Ohio River in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Gallatin County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Gallatin County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Gallatin County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, there were no ozone monitors located in Gallatin County. However, the Boone, Kenton, and Campbell County monitors to the north and northeast all show 8-hour design values in exceedance of the National Ambient Air Quality Standards (NAAQS). (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 7,961 persons living in Gallatin County. That represents approximately 81 persons per square mile. The population of Gallatin County is approximately 100% rural

with few people living in incorporated areas. The largest cities in Gallatin County are Warsaw and Glencoe. (See table 1-C)

Gallatin County's population from 1990 through 2000 increased by approximately 46% (5,393 to 7,870). The population is further expected to increase by an additional 48% between 2000 and 2010. (See table 1-B)

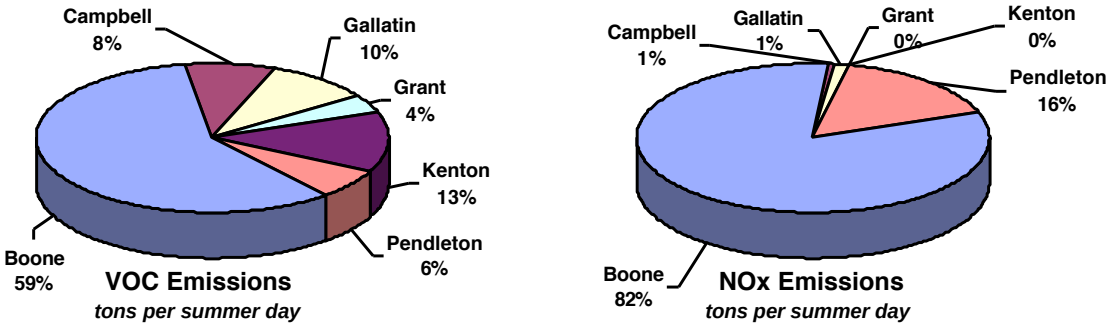
For the entire Cincinnati-Hamilton MSA, Gallatin County represents less than 1% of the total population in the MSA and 2% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Gallatin County were estimated at 0.43 tpsd in 2001 which represents approximately 10% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Gallatin County were estimated at 0.30 tpsd in 2001 which represents approximately 1% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Gallatin County's emissions to the entire region.

2001 Point Source Emissions

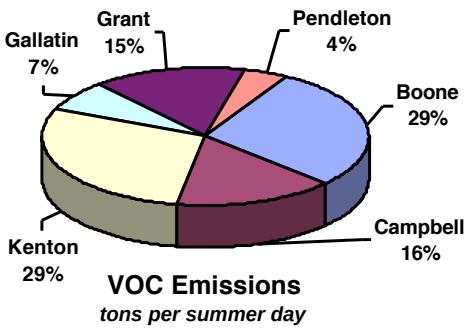


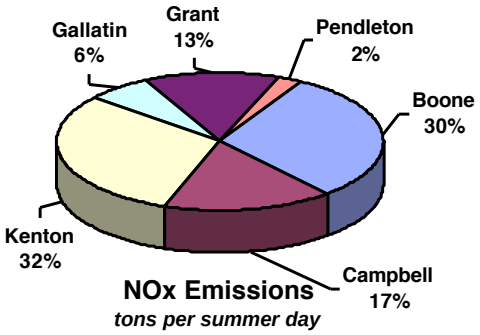
Point sources located within Gallatin County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Gallatin County were estimated at 1.14 tpsd in 2001 which represents approximately 7% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Gallatin County were estimated at 2.39 tpsd in 2001 which represents approximately 6% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Gallatin County's emissions to the entire region.

2001 Onroad Mobile Source Emissions



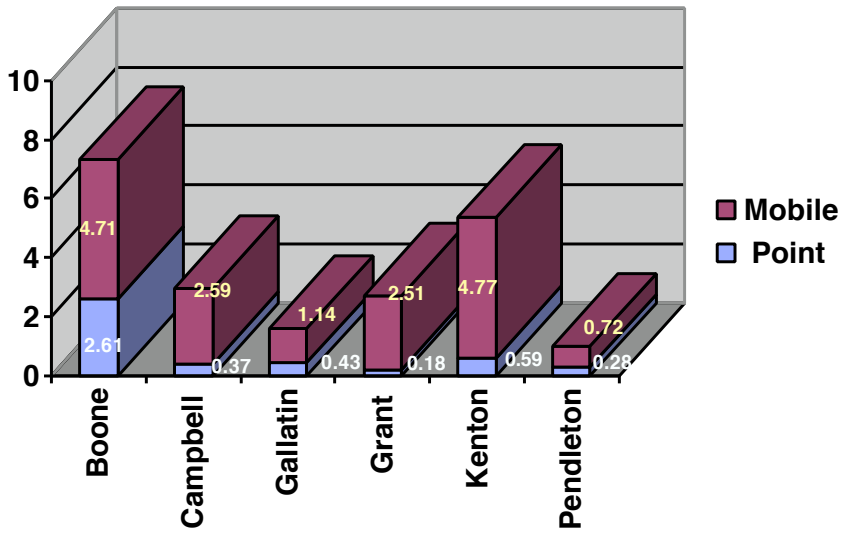


Commuting traffic from other counties into Gallatin County is high, and the commuting traffic from Gallatin County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

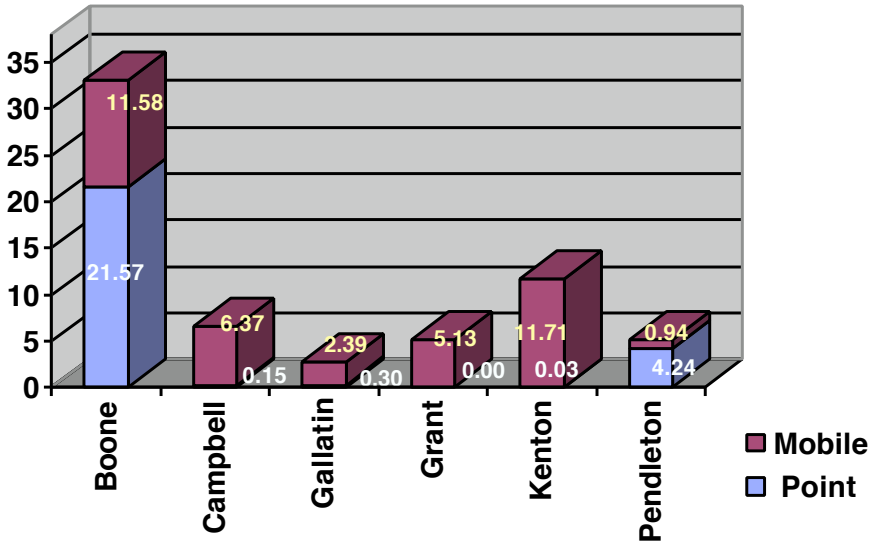
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The emissions data and other documentation presented indicate that Gallatin County, Kentucky, does not contribute significantly to the monitored violations in the region and therefore should be designated attainment for the 8-hour ozone standard.

GRANT COUNTY, KENTUCKY

Grant County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located to the southeast of Gallatin County, Kentucky, to the west of Pendleton County, Kentucky, and directly north of Scott County, Kentucky.

Geography/Topography

Grant County has a land area of 259 square miles and is located in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Grant County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Grant County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Grant County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, there were no ozone monitors located in Grant County. However, the Boone, Kenton, and Campbell County monitors to the northwest, north, and northeast all show 8-hour design values in exceedance of the National Ambient Air Quality Standards (NAAQS). (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 23,237 persons living in Grant County. That represents approximately 90 persons per square mile. The population of Grant County is approximately 78% rural with

the remaining 22% living in incorporated areas. The largest cities in Grant County are Williamstown and Dry Ridge. (See table 1-C)

Grant County's population from 1990 through 2000 increased by approximately 42% (15,737 to 22,384). The population is further expected to increase by an additional 45% between 2000 and 2010. (See table 1-B)

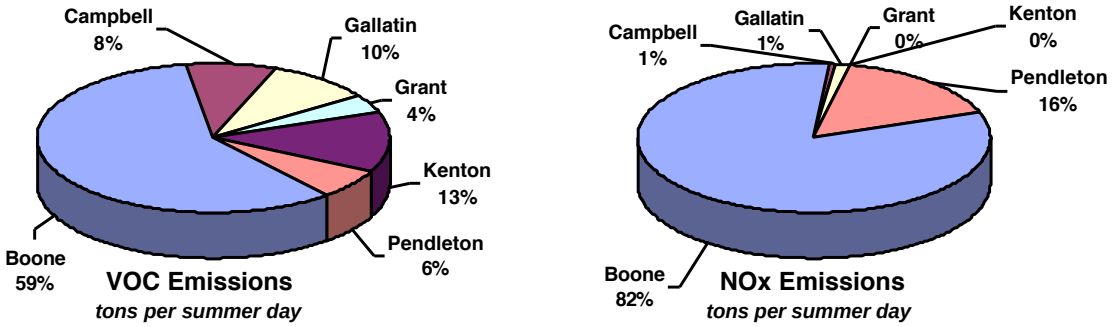
For the entire Cincinnati-Hamilton MSA, Grant County represents approximately 1% of the total population in the MSA and 6% of the Kentucky portion of the MSA. (See table 1-C)

Air Emissions

Point source VOC emissions from Grant County were estimated at 0.18 tpsd in 2001 which represents approximately 4% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Grant County were estimated at 0.00 tpsd in 2001 which represents 0% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Grant County's emissions to the entire region.

2001 Point Source Emissions

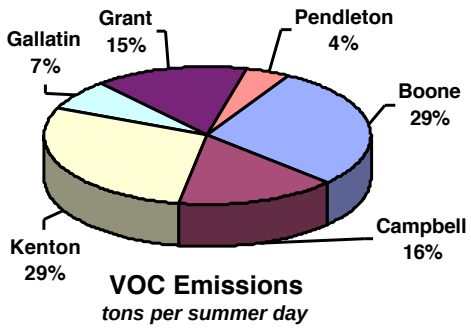


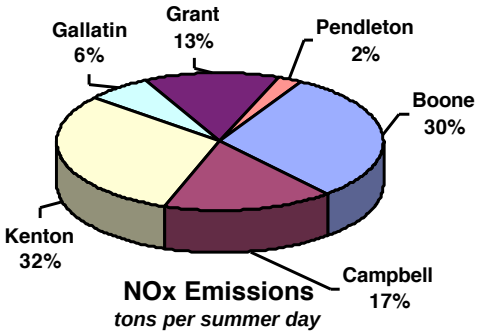
Point sources located within Grant County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Grant County were estimated at 2.51 tpsd in 2001 which represents approximately 15% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Grant County were estimated at 5.13 tpsd in 2001 which represents approximately 13% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Grant County's emissions to the entire region.

2001 Onroad Mobile Source Emissions



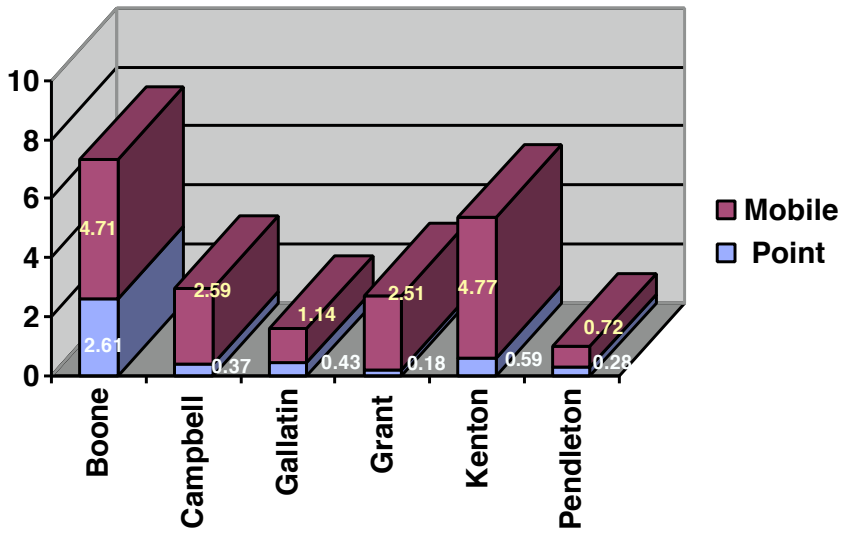


Commuting traffic from other counties into Grant County is minimal, and the commuting traffic from Grant County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

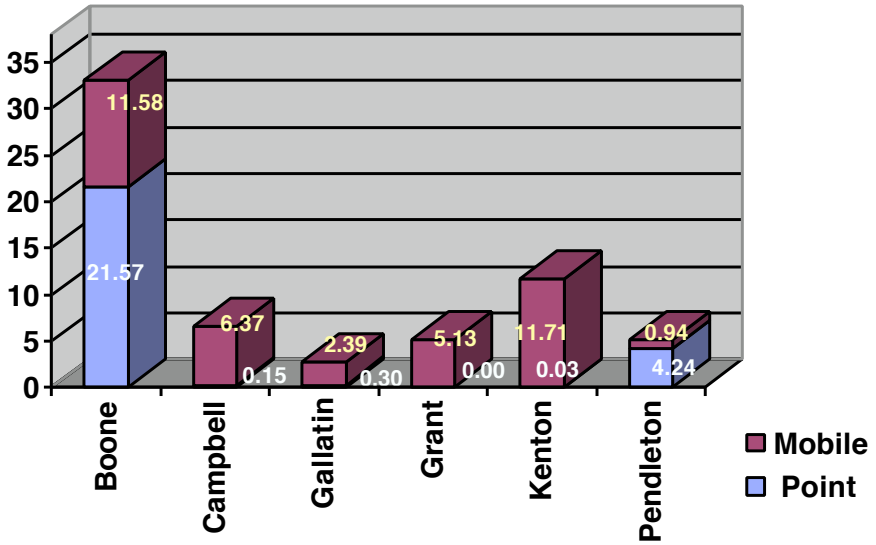
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The emissions data and other documentation presented indicate that Grant County, Kentucky, does not contribute significantly to the monitored violations in the region and therefore should be designated attainment for the 8-hour ozone standard.

PENDLETON COUNTY, KENTUCKY

Pendleton County is part of the Cincinnati-Hamilton Metropolitan Statistical Area (MSA) and is located directly south of Kenton and Campbell Counties, Kentucky, and to the east of Grant County, Kentucky.

Geography/Topography

Pendleton County has a land area of 280 square miles and is located on the banks of the Ohio River in the tri-state area of Kentucky, Ohio and Indiana.

Meteorological Information

Wind speed/wind direction information shows that the majority of the time for the period 1988–1992, the wind in the Pendleton County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 86 F, the mean low was 65 F. The mean precipitation for the same period was 4.2 inches.

Planning

The authority for air quality planning in the Pendleton County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Pendleton County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, there were no ozone monitors located in Pendleton County. However, the Boone, Kenton, and Campbell County monitors to the north and northwest all show 8-hour design values in exceedance of the National Ambient Air Quality Standards (NAAQS). (See table 1-A)

Population

Based on projections to 2001 from the 2000 census data, there are 14,611 persons living in Pendleton County. That represents approximately 52 persons per square mile. The population of Pendleton County is approximately 100%

rural with few people living in incorporated areas. The largest cities in Pendleton County are Falmouth and Butler. (See table 1-C)

Pendleton County's population from 1990 through 2000 increased by approximately 20% (12,036 to 14,390). The population is further expected to increase by an additional 23% between 2000 and 2010. (See table 1-B)

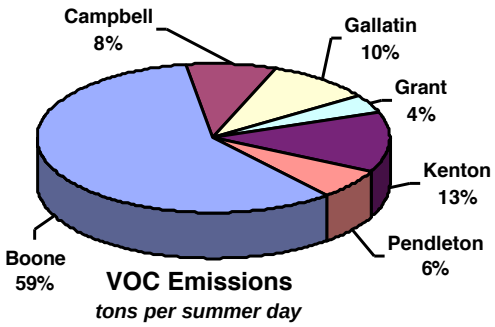
For the entire Cincinnati-Hamilton MSA, Pendleton County represents approximately 1% of the total population in the MSA and 4% of the Kentucky portion of the MSA. (See table 1-C)

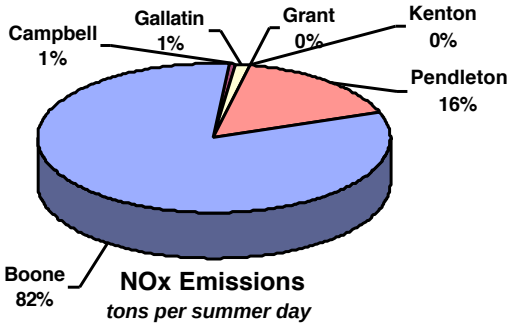
Air Emissions

Point source VOC emissions from Pendleton County were estimated at 0.28 tpsd in 2001 which represents approximately 6% of the total 4.46 tpsd of overall VOC point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Point source NOx emissions from Pendleton County were estimated at 4.24 tpsd in 2001 which represents approximately 16% of the total 26.29 tpsd of overall NOx point source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Pendleton County's emissions to the entire region.

2001 Point Source Emissions





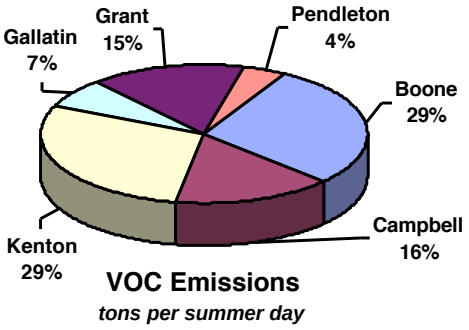
Point sources located within Pendleton County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control

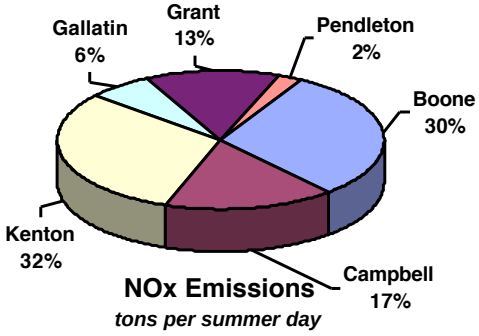
Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

Onroad mobile source VOC emissions from Pendleton County were estimated at 0.72 tpsd in 2001 which represents approximately 4% of the total 16.44 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. Onroad mobile source NOx emissions from Pendleton County were estimated at 0.94 tpsd in 2001 which represents approximately 2% of the total 38.12 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Cincinnati-Hamilton MSA. (See table 1-D)

A comparison across the entire Ohio, Kentucky, Indiana MSA was performed using the federal 1999 National Emission Inventory data. Figures 1-C through 1-F provide a comparison of Pendleton County's emissions to the entire region.

2001 Onroad Mobile Source Emissions



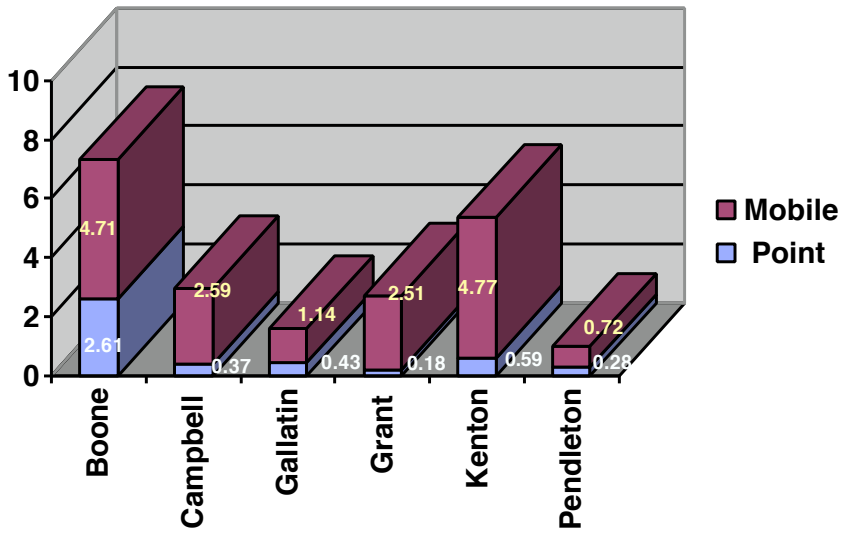


Commuting traffic from other counties into Pendleton County is minimal, and the commuting traffic from Pendleton County into other counties is significant.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

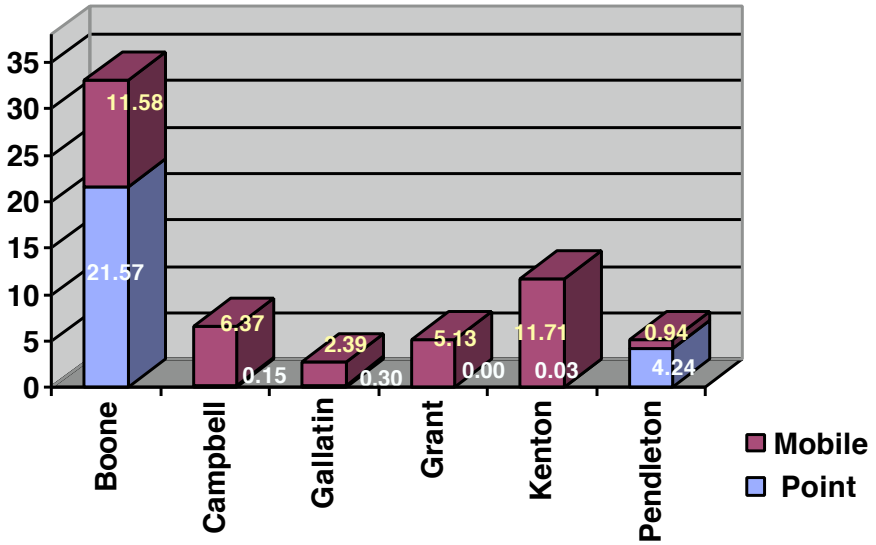
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The emissions data and other documentation presented indicate that Pendleton County, Kentucky, does not contribute significantly to the monitored violations in the region and therefore should be designated attainment for the 8-hour ozone standard.

Cincinnati-Hamiltion MSA

Figure 1-A
Wind Rose Patterns

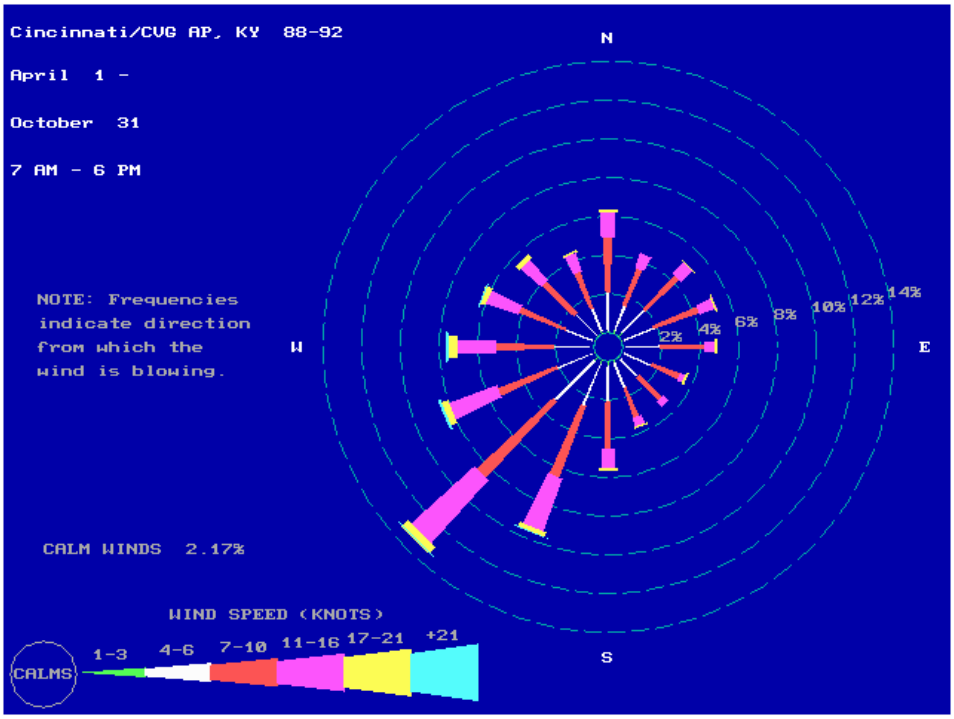


Figure 1-B
2001 VOC and NOx Emissions
Kentucky Portion of the Cincinnati-Hamilton MSA
(tons per summer day)

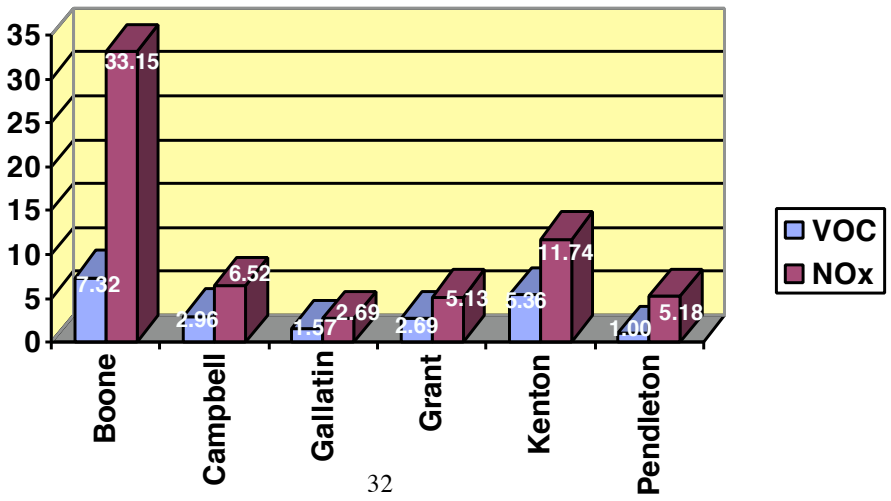


Table 1-A
Ozone Design Values
(parts per million)

Monitor	2000	2001	2002	3-year Average
Boone	.083	.083	.094	.086
Campbell	.093	.088	.102	.094
Kenton	.087	.082	.096	.088

Table 1-B
Northern Kentucky Area Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Boone	57,589	85,991	49.3%	126,036	46.6%
Campbell	83,866	88,616	5.7%	92,385	4.3%
Gallatin	5,393	7,870	45.9%	11,638	47.9%
Grant	15,737	22,384	42.2%	32,341	44.5%
Kenton	142,031	151,464	6.6%	159,730	5.5%
Pendleton	12,036	14,390	19.6%	17,690	22.9%

Table 1-C
2001 Estimated Cincinnati-Hamilton MSA Population

Kentucky	Estimated Population
Boone County	90,489
Campbell County	88,362
Gallatin County	7,961
Grant County	23,237
Kenton County	151,366
Pendleton County	14,611
Ohio	
Brown County	42,890
Clermont County	181,673
Hamilton County	835,362
Butler	337,013
Warren County	169,025
Indiana	
Dearborn County	46,806
Ohio County	5,726
Total Estimated Population	1,994,521

Table 1-D
2001 VOC and NOx Emissions
(tons per summer day)

County	VOC			NOx		
	Point	Mobile	Total	Point	Mobile	Total
Boone	2.61	4.71	7.32	21.57	11.58	33.15
Campbell	0.37	2.59	2.96	0.15	6.37	6.52
Gallatin	0.43	1.14	1.57	0.30	2.39	2.69
Grant	0.18	2.51	2.69	0.00	5.13	5.13
Kenton	0.59	4.77	5.36	0.03	11.71	11.74
Pendleton	0.28	0.72	1.00	4.24	0.94	5.18
Total	4.46	16.44	20.90	26.29	38.12	64.41

Figure 1-C
1999 NEI Point Source VOC Emissions for Cincinnati-Hamilton Area
tons per year

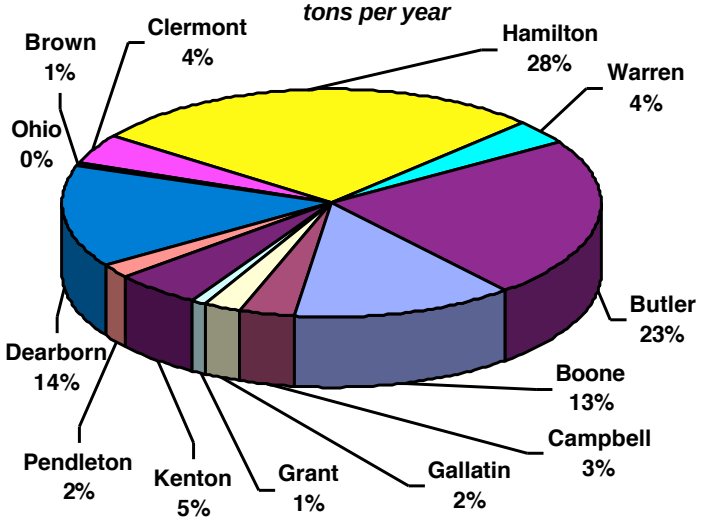


Figure 1-D
1999 NEI Point Source NOx Emissions for Cincinnati-Hamilton Area
tons per year

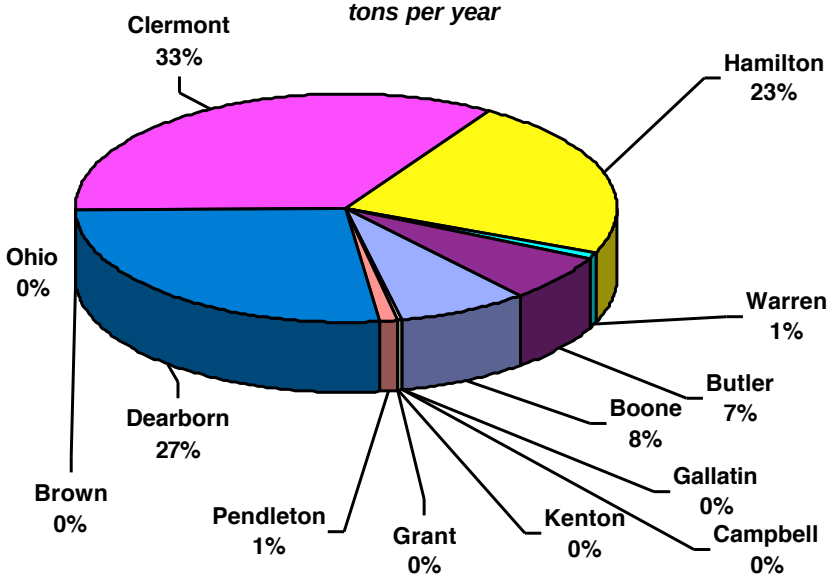


Figure 1-E
1999 NEI Onroad Mobile Source VOC Emissions for Cincinnat Hamilton Area
tons per year

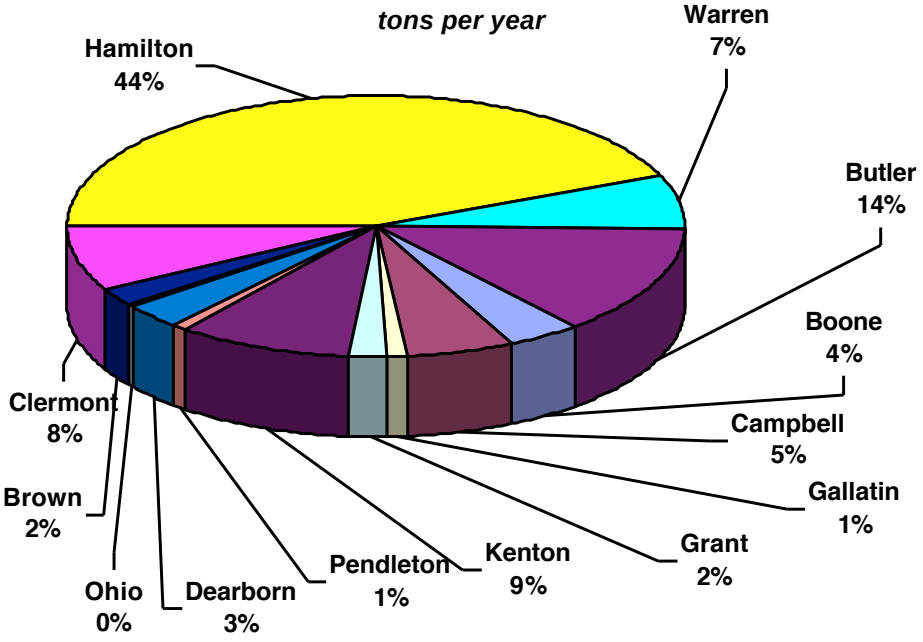
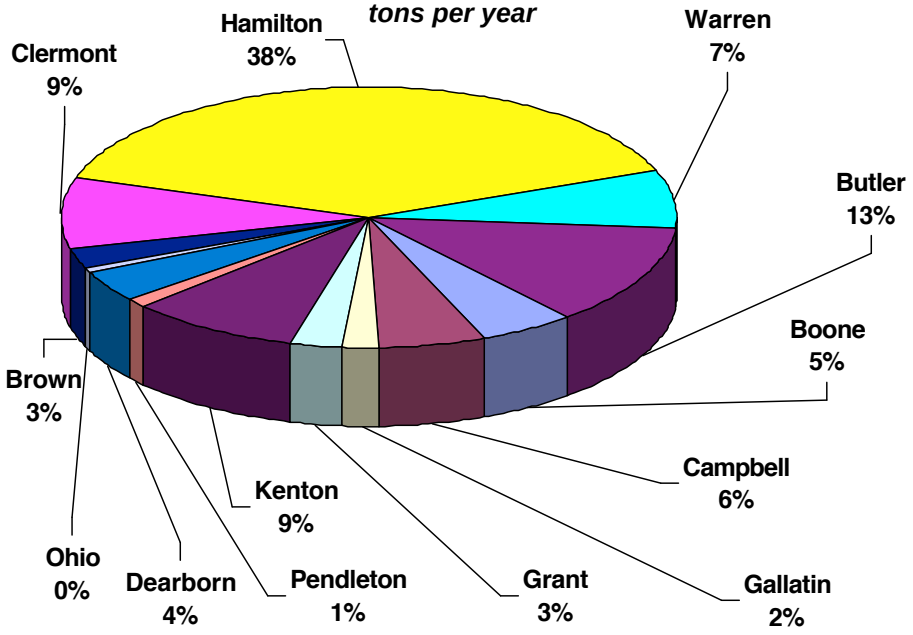
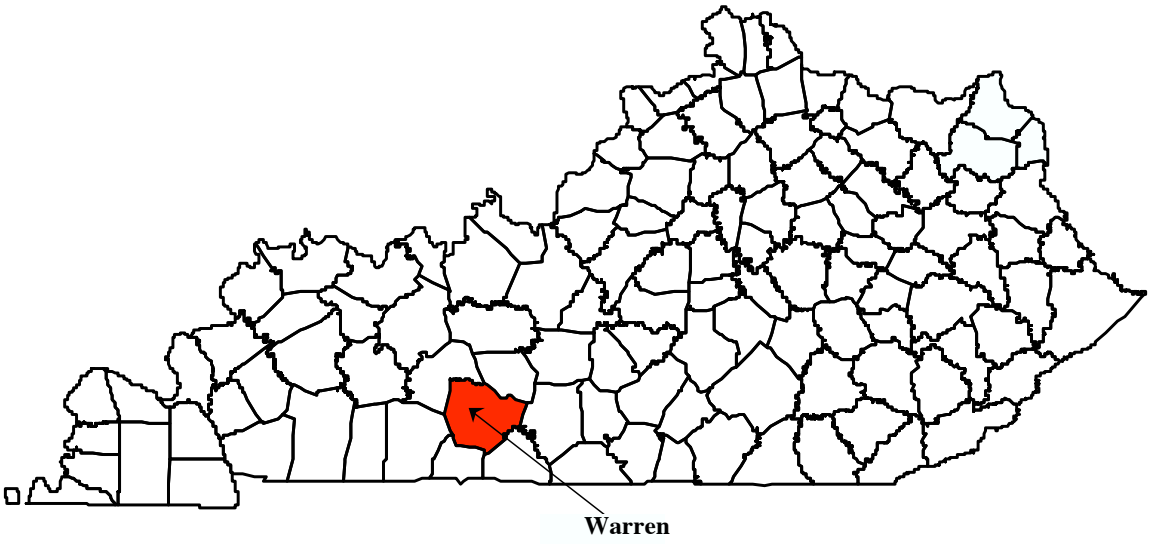


Figure 1-F
1999 NEI Onroad Mobile Source NOx Emissions for Cincinnati-Hamilton Area
tons per year



WARREN COUNTY, KENTUCKY



Warren County is located in south central Kentucky. Warren County is located approximately 60 miles northeast of Nashville, Tennessee.

Warren County, Kentucky

Warren County is located on the I-65 South interstate corridor and is located in Pennyrile region of Kentucky.

Geography/Topography

Warren County, Kentucky is situated in south central Kentucky. Warren County has a land area of 545 square miles. The county is located south of Mammoth Cave National Park which is located in Edmonson County, Kentucky.

Meteorological Information

Due to the close proximity of Nashville, Tennessee, meteorological data from Nashville was used for this south central Kentucky area. Wind speed/wind direction information for Nashville shows that the majority of the time for the period 1988–1992, the wind in the Warren County area came from the southwest and typically from 7-10 knots. (See figure 1-A) The mean high temperature for July for the area from 1961 through 1990 was 90 F, the mean low was 69 F. The mean precipitation for the same period was 4.0 inches.

Planning

The authority for air quality planning in the Warren County area resides with the Kentucky Natural Resources and Environmental Protection Cabinet. Transportation planning for Warren County is performed by the Kentucky Transportation Cabinet.

Air Monitoring

For the 2000 – 2002 monitoring period, the ozone monitor (21-227-0008) located in Warren County shows an 8-hour design value of .086 parts per million (ppm) which would be classified as a county in violation of the standard. (See table 1-A)

Population

Based on projections to 2001 from 2000 census data, there are 93,232 persons living in Warren County. That represents approximately 171 persons per square mile. The population of Warren County is approximately 37% rural with the remaining 63% living in incorporated areas. The largest city in Warren County is Bowling Green. (See table 1-C)

Warren County's population from 1990 through 2000 increased by approximately 19% (77,720 to 92,522). The population is further expected to increase by an additional 17% between 2000 and 2010. (See table 1-B)

Air Emissions

Point source VOC emissions from Warren County were estimated at 4.86 tons per summer day (tpsd) in 2001. The Warren County point source NOx emissions were estimated to be 0.10 tpsd. (See table 1-D)

Point sources located within Warren County are subject to PSD requirements, CTG RACT requirements, Maximum Achievable Control Technology (MACT) requirements for sources of Hazardous Air Pollutants, and New Source Performance Standards (NSPS).

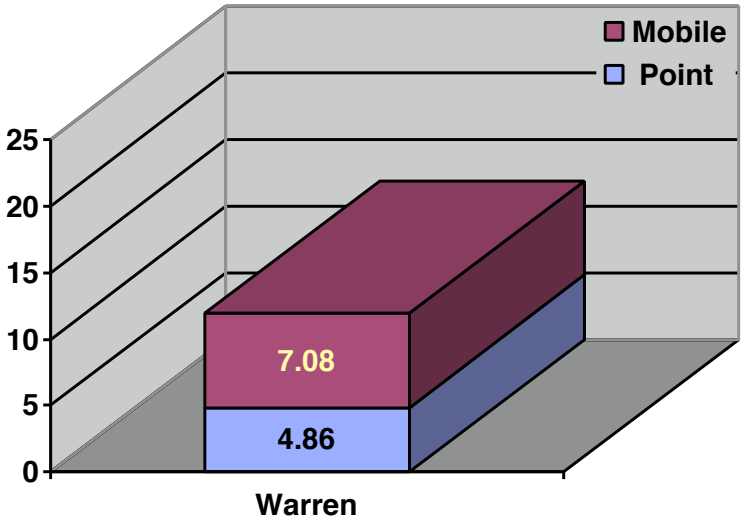
Onroad mobile source VOC emissions within Warren County were estimated to be 7.08 tpsd in 2001. Onroad mobile source NOx emissions were estimated to be 11.47 tpsd. (See table 1-D)

Commuting traffic from other counties into Warren County is minimal, and the commuting traffic from Warren County into other counties is minimal.

Commuting Classifications	
Not Significant	0-10%
Minimal	11-30%
High	31-50%
Significant	51% or more

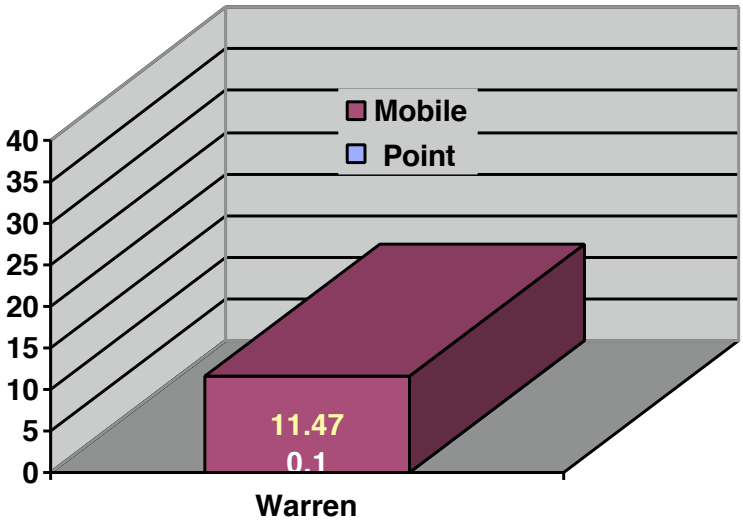
2001 VOC Contribution

(tons per summer day)



2001 NOx Contribution

(tons per summer day)



Conclusion and Recommendation

The monitoring data and growth patterns presented indicate that Warren County, Kentucky, should be designated nonattainment for the 8-hour standard.

Warren County, Kentucky

Figure 1-A
Wind Rose Patterns

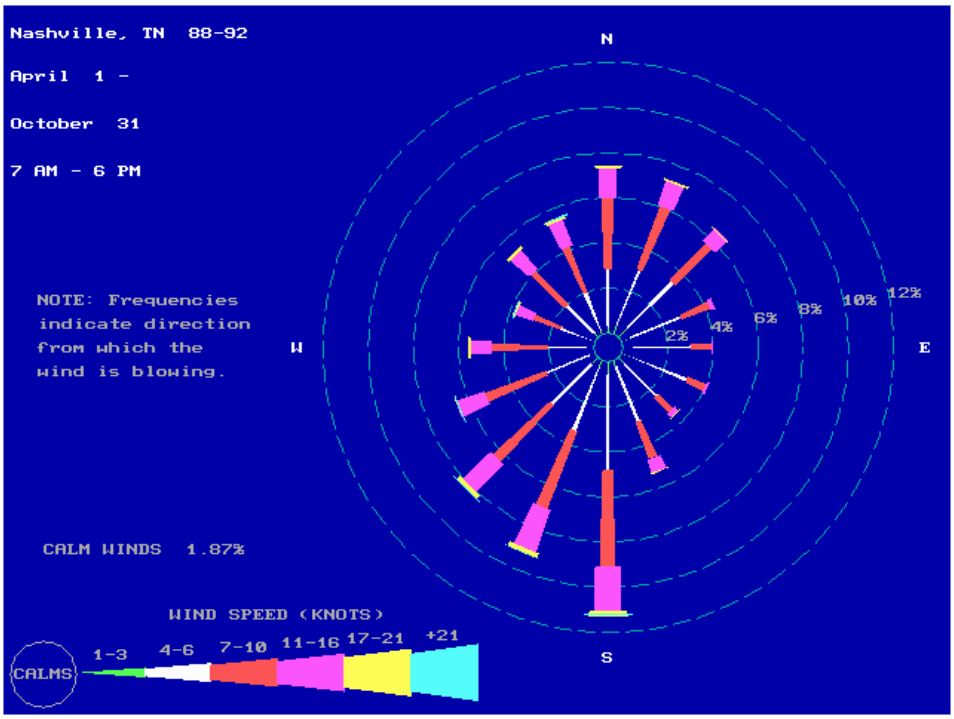


Figure 1-B
2001 Warren County VOC and NOx Emissions
(tons per summer day)

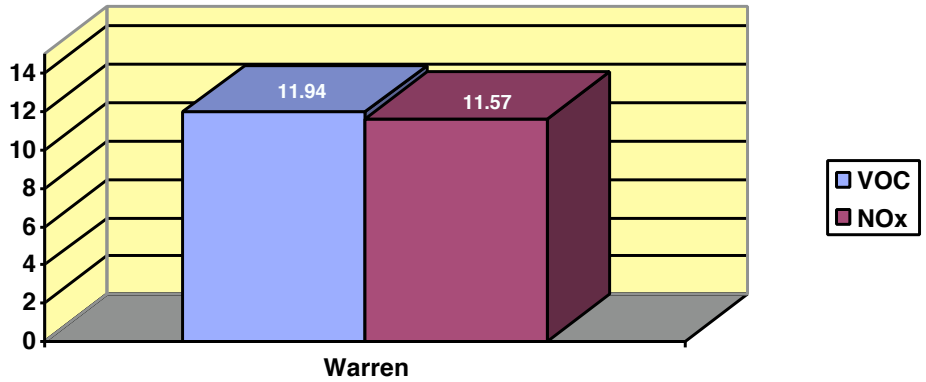


Table 1-A
Ozone Design Values
(parts per million)

Monitor	2000	2001	2002	Design Value
Warren	.088	.081	.090	.086

Table 1-B
Warren County Kentucky Population Growth Data

County	1990	2000	%Growth 1990 - 2000	2010	%Growth 2000 - 2010
Warren	77,720	92,522	19.0%	108,054	16.8%

Table 1-C
2001 Estimated Warren County Kentucky Population

Kentucky	Estimated Population
Warren County	93,232

Table 1-D
2001 Warren County VOC and NOx Emissions
(tons per summer day)

County	VOC			NOx		
	Point	Mobile	Total	Point	Mobile	Total
Warren	4.86	7.08	11.94	0.10	11.47	11.57

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION FOR AIR QUALITY
803 SCHENKEL LN
FRANKFORT KY 40601-1403

October 6, 2003

Beverly Banister, Director
Air, Pesticides, and Toxics Management Division
U.S. EPA REGION 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8960

Dear Ms. Banister:

On July 14, 2003, Governor Paul Patton submitted to U.S. EPA a list of proposed designations for Kentucky for the 8-hour ozone standard. This list was based on 2000–2002 monitoring data.

Although the 2003-ozone season is not yet over, it is rare in Kentucky to record higher 4th daily maximums after October 1. There are only six counties that now show violations of the 8-hour ozone standard based on 2001-2003 preliminary monitoring data. They are Boone, Campbell, Kenton, Boyd, Oldham, and Christian. The division recognizes that Bullitt and Jefferson Counties are impacted due to violations in Oldham County and counties in Southern Indiana. Once the monitoring season is completed and the data has been quality assured, we will provide a follow-up letter summarizing the results.

If you have any questions, please feel free to contact me at (502) 573-3382.

Sincerely,

John S. Lyons
Director

JSL/JEG/gfr

cc: Kay Prince

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION FOR AIR QUALITY
803 SCHENKEL LN
FRANKFORT KY 40601-1403

October 22, 2003

Beverly Banister, Director
Air, Pesticides, and Toxics Management Division
U.S. EPA REGION 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8960

Dear Ms. Banister:

By letter dated July 14, 2003, Kentucky submitted proposed 8-Hour Ozone Nonattainment areas. Since that submittal, an ozone monitor in Warrick County, Indiana, Monitor (18-173-0002) has monitoring data that represents a violation of this standard. As Henderson County, Kentucky, is a part of the Metropolitan Statistical Area including Warrick County, Indiana, Kentucky has undertaken an analysis of data pertaining to the circumstances around this violation.

Included for your review is the analysis of this data. It is our firm belief that Henderson County should remain classified as attainment for the 8-Hour Ozone Standard.

If you have any questions regarding this matter, please contact either Ms. Lona Brewer or Mr. John Gowins of my staff at (502) 573-3382.

Sincerely,

John S. Lyons
Director

JSL/JEG

cc: Kay Prince

Data Analysis for the Warrick County, Indiana Ozone Monitor (18-173-0002)

An analysis of air monitoring, emissions data, and meteorological impacts has been performed by the Kentucky Division for Air Quality (DAQ) as a result of a violation of the 8-hour ozone standard in Warrick County, Indiana. This was performed because Henderson County, Kentucky is in a Metropolitan Statistical Area (MSA), which includes Warrick County, Indiana, and the United States Environmental Protection Agency (USEPA) has set presumptive boundaries of nonattainment at the boundaries of the MSA.

The back-trajectory analysis was performed by using data from USEPA's Aerometric Information Retrieval System (AIRS). The four highest readings on the Warrick County, Indiana monitor from the years 2000, 2001, 2002, and 2003 to date were utilized in performing NOAA's HYSPLIT Trajectory Model runs. These model runs are included as an attachment with this paper.

For 2000, of the three dates run from values at the Warrick monitor with the HYSPLIT model, two indicated trajectories that passed through Henderson County. The 8-hour ozone values were .080 on July 9 and .077 on July 27 at the Warrick monitor. It should be noted that on July 27 the air column traveled through Huntsville and Birmingham, Alabama, and downwind from Memphis Tennessee prior to transiting Henderson County. The highest reading of .081 at Warrick County occurred on July 26. The back trajectory indicates that this air column traveled through southern Indiana and Illinois prior to impacting the monitor. No trajectory runs were conducted for the fourth highest maximum (.077 on August 15) because the dataset for that date was not complete.

For 2001, of the four dates run with the HYSPLIT model, only one, on June 19, indicated that the trajectory of the air column passed through Henderson County. The 8-hour ozone value at the Warrick monitor on that date was .081, which equaled the fourth highest maximum value. It should be noted that the air column traveled through Huntsville, Alabama, and Memphis, Tennessee prior to transiting Henderson County. The remaining model runs indicate trajectory paths other than through Henderson County.

For 2002, of the four dates run, from values recorded at the Warrick monitor using the HYSPLIT model, only one, on July 8 indicates that the air column may have traversed southern Henderson County. The 8-hour ozone reading on this date was .113 ppm at the Warrick site. Reviewing the back trajectory on this date it should be noted that the lower level air columns travel through the Cincinnati, Ohio area and through southwestern Kentucky prior to passing through southern Henderson County and possibly impacting the monitor at Warrick County, Indiana. The upper level air flow was from central Indiana during that same time period. The remaining model runs indicate trajectory paths other than through Henderson County.

For 2003, of the four dates run from the Warrick monitor using the HYSPLIT model, two indicated trajectories that passed through Henderson County, with neither date having an 8-hour value above the standard. On June 7, the trajectory passed through Nashville, Tennessee and Henderson County before impacting the monitor in Warrick County, Indiana. The Warrick monitored value was .082. On August 27, the trajectory passed through Oklahoma City, Oklahoma, Topeka and Kansas City, Kansas, Kansas City and St. Louis Missouri prior to transiting Henderson County and impacting the monitor at Warrick County. This value, from the Warrick monitor, also was .082, which was the 4th highest maximum. Note that on the other two dates, the ozone values at the Warrick site were .101 on June 24, and .090 on July 17, and on neither date did the air column pass through Henderson County.

As discussed in Kentucky's submittal to USEPA regarding proposed 8-Hour Standard Nonattainment Areas dated July 14, 2003, for the 2000 – 2002 monitoring period, the ozone monitor (21-101-0014) in Henderson County, Kentucky, shows an 8-hour design value of .079, which would be classified as a county in attainment of the standard. As of October 1, 2003, this design value has not changed.

Point source VOC emissions from Henderson County were estimated at 2.43 tons per summer day (tpsd) in 1999 which represents approximately 11% of the total 21.52 tpsd overall VOC point source emissions from the Evansville-Henderson study area. Point source NOx emissions from Henderson County were estimated at 2.63 tpsd in 1999 which represents approximately 1% of the total 227.89 tpsd overall NOx point source emissions from the Evansville-Henderson study area. (See the table below)

1999 Evansville-Henderson MSA VOC and NOx Emissions

(tons per summer day)

County	*VOC* Point	Mobile	Total	*NOx* Point	Mobile	Total
Henderson	2.43	3.85	6.28	2.63	4.61	7.24
Posey	7.18	2.78	9.96	27.09	4.28	31.37
Vanderburgh	8.16	12.68	20.84	0.98	13.70	14.68
Warrick	1.91	3.74	5.65	69.94	6.18	76.12
Gibson*	1.84	3.05	4.89	127.25	4.84	132.09
Total Emissions	21.52	26.10	47.62	227.89	33.61	261.50

***Gibson County, Indiana, is not part of the Evansville-Henderson MSA.**

Onroad mobile source VOC emissions from Henderson County were estimated at 3.85 tpsd in 1999 which represents approximately 15% of the total 26.10 tpsd of overall VOC onroad mobile source emissions from the Kentucky portion of the Evansville-Henderson study area. Onroad mobile source NOx emissions from Henderson County were estimated at 4.61 tpsd in 1999 which represents approximately 14% of the total 33.61 tpsd of overall NOx onroad mobile source emissions from the Kentucky portion of the Evansville-Henderson study area. (See the table above)

Henderson County, based on 2000 – 2002 ozone monitoring data and 2003 data to October 1, 2003, is meeting the 8-hour ozone standard with a design value of .079 ppm. Historic monitoring data shows that the county has been in compliance since the 99-01 period. The Henderson monitor has routinely recorded 4th highest maximum values below the 0.085 level. Predominant wind patterns would typically have Henderson County, Kentucky, emissions moving away from the violating monitor in Indiana (Warrick County). The monitoring and emissions data and other documentation presented indicate that Henderson County, Kentucky, does not contribute a significant amount of ozone forming emissions in the Evansville-Henderson MSA. Henderson County contributes approximately 13% of the total VOC emissions and less than 3% of the total NOx emissions in the study area. With this minimal impact, and the back-trajectory analysis, Kentucky maintains that Henderson County should be designated attainment for the 8-hour ozone standard.

Back Trajectory Analysis Prepared by the Kentucky Division for Air Quality

For the Warrick County, Indiana Ozone Monitor (18-173-0002)

At Lat (37.9375) Long (– 87.314167)

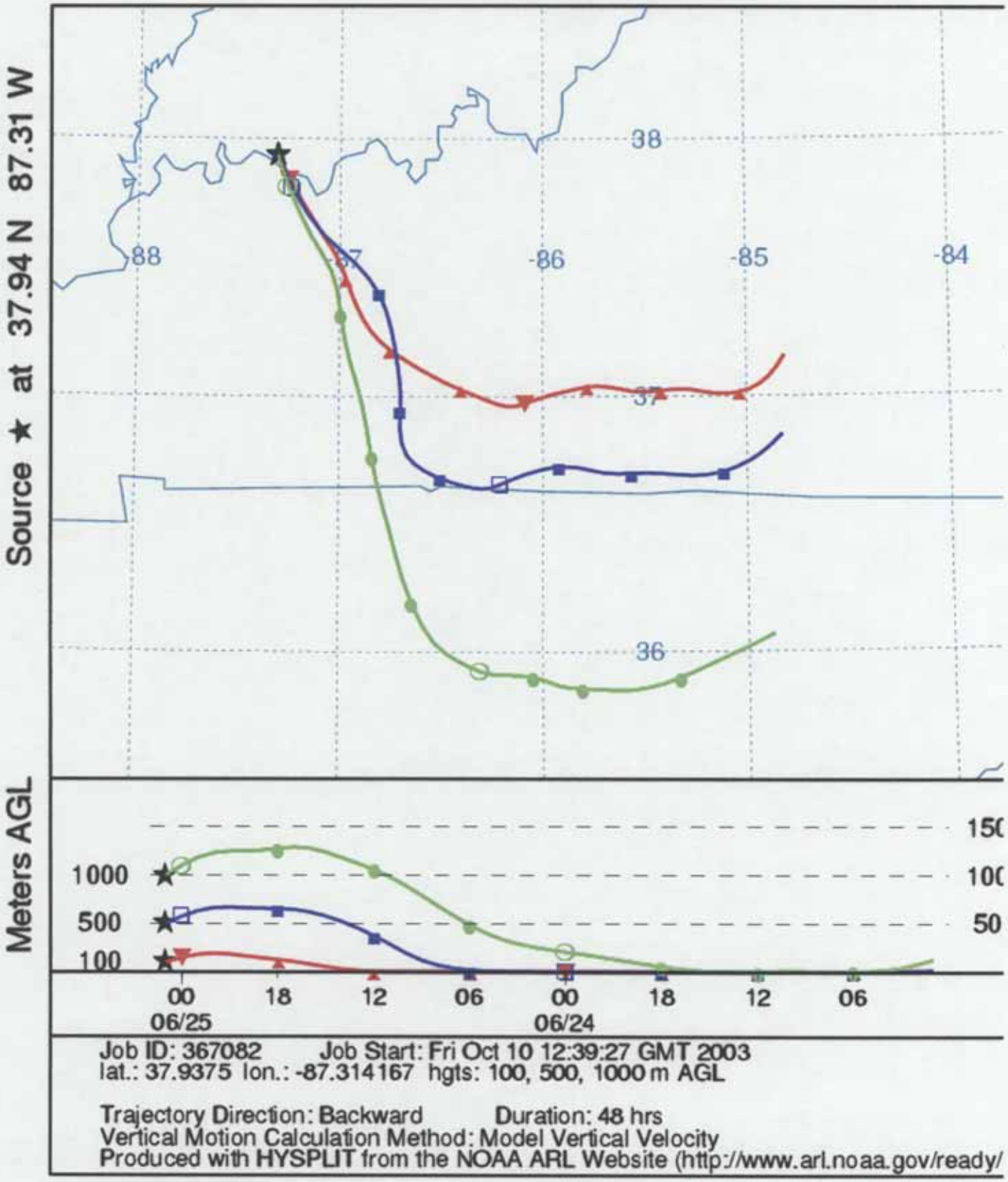
Top Four 8HR Ozone 2000-2003

Using NOAA's HYSPLIT Trajectory Model

Warrick County, Indiana Ozone Monitor (Site ID - 18-173-0002)
2003 8-Hour Average Top Four Maximum Values

Date	Start Hour (CST)	8-Hour Reading (PPM)	
06/24/2003	11	.101	
07/17/2003	13	.090	
06/07/2003	13	.082	
08/27/2003	10	.082	(4^{th} Max)

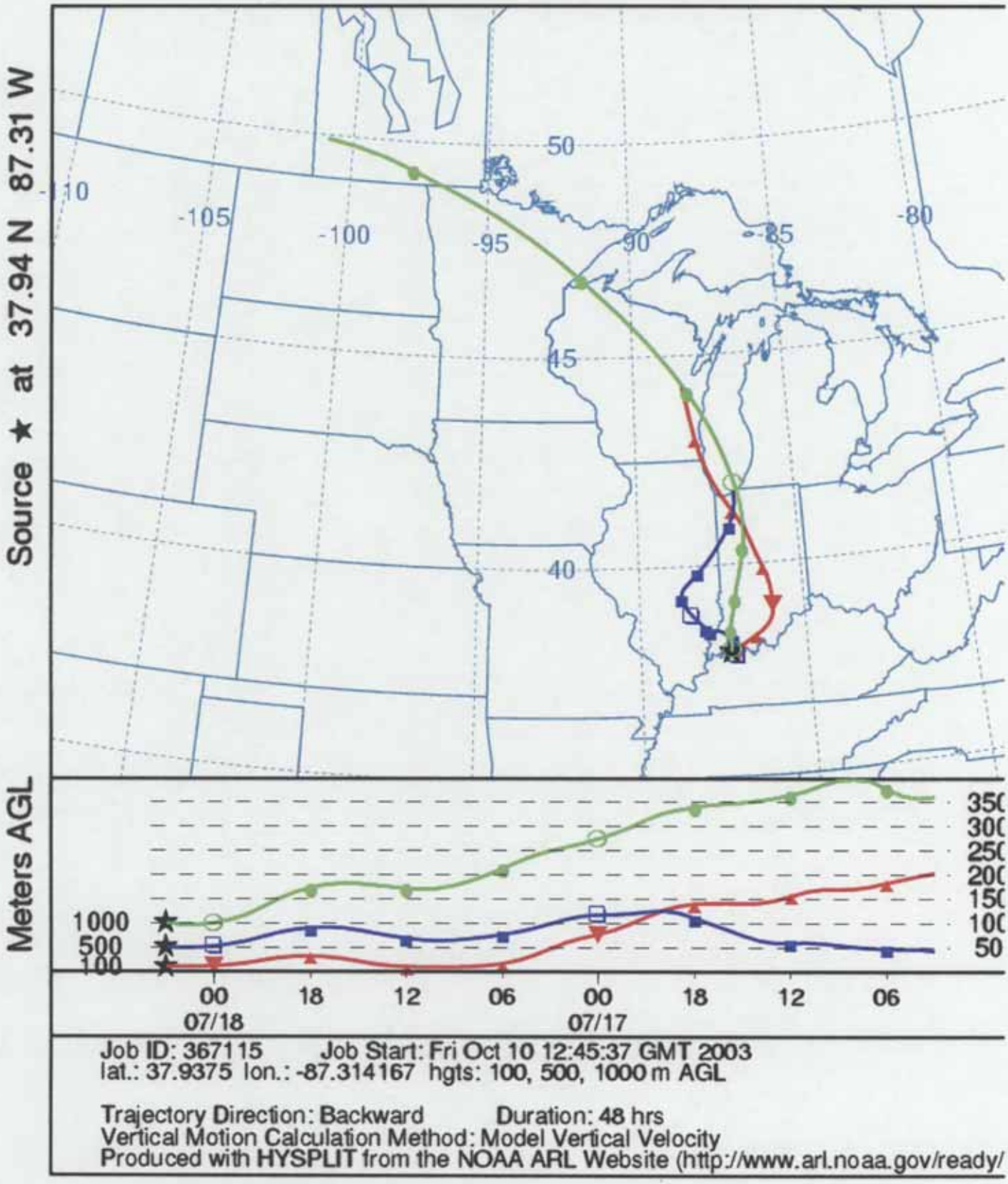
NOAA HYSPLIT MODEL
Backward trajectories ending at 01 UTC 25 Jun 03
EDAS Meteorological Data



Job ID: 367082 Job Start: Fri Oct 10 12:39:27 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

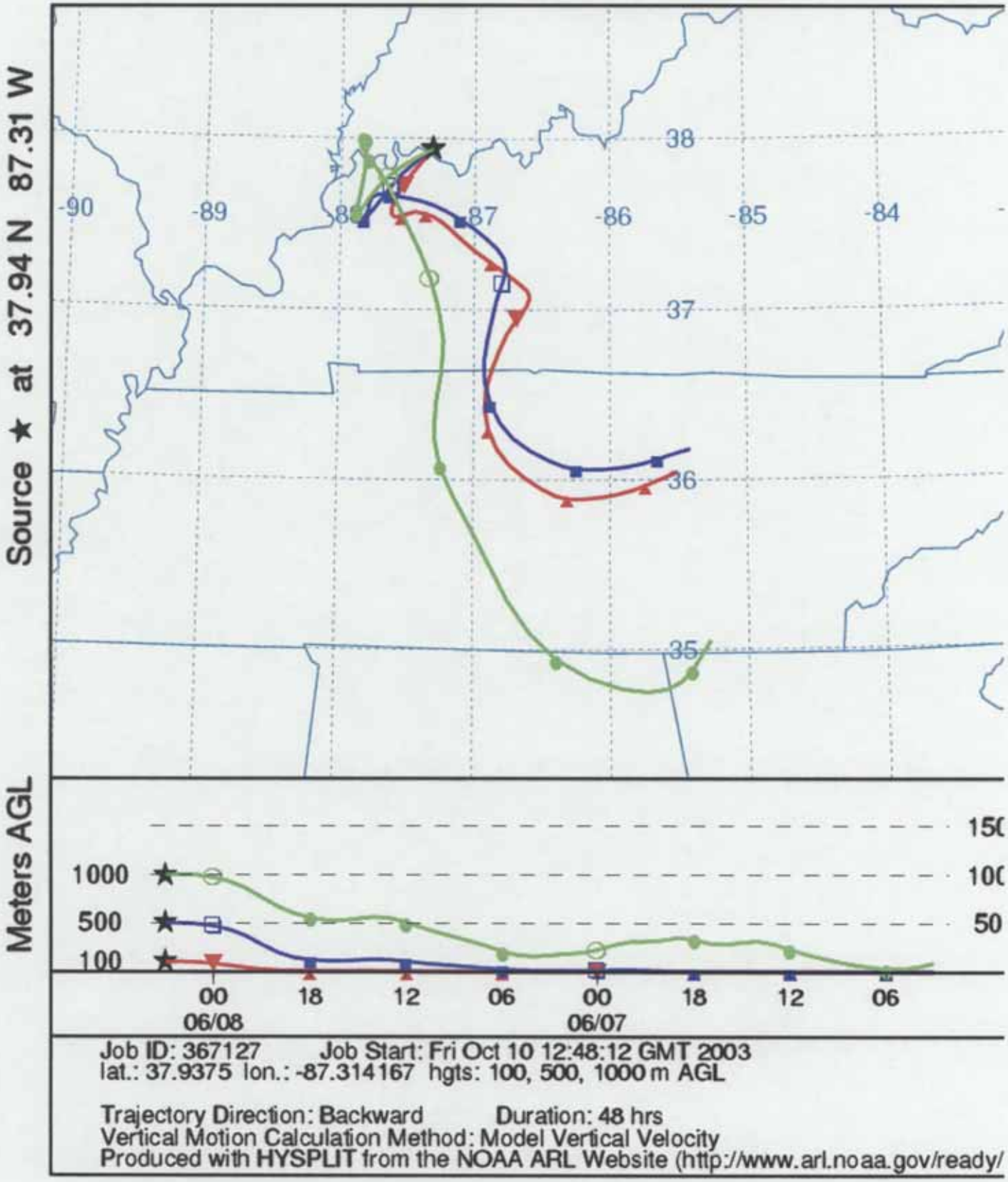
NOAA HYSPLIT MODEL
Backward trajectories ending at 03 UTC 18 Jul 03
EDAS Meteorological Data



Job ID: 367115 Job Start: Fri Oct 10 12:45:37 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

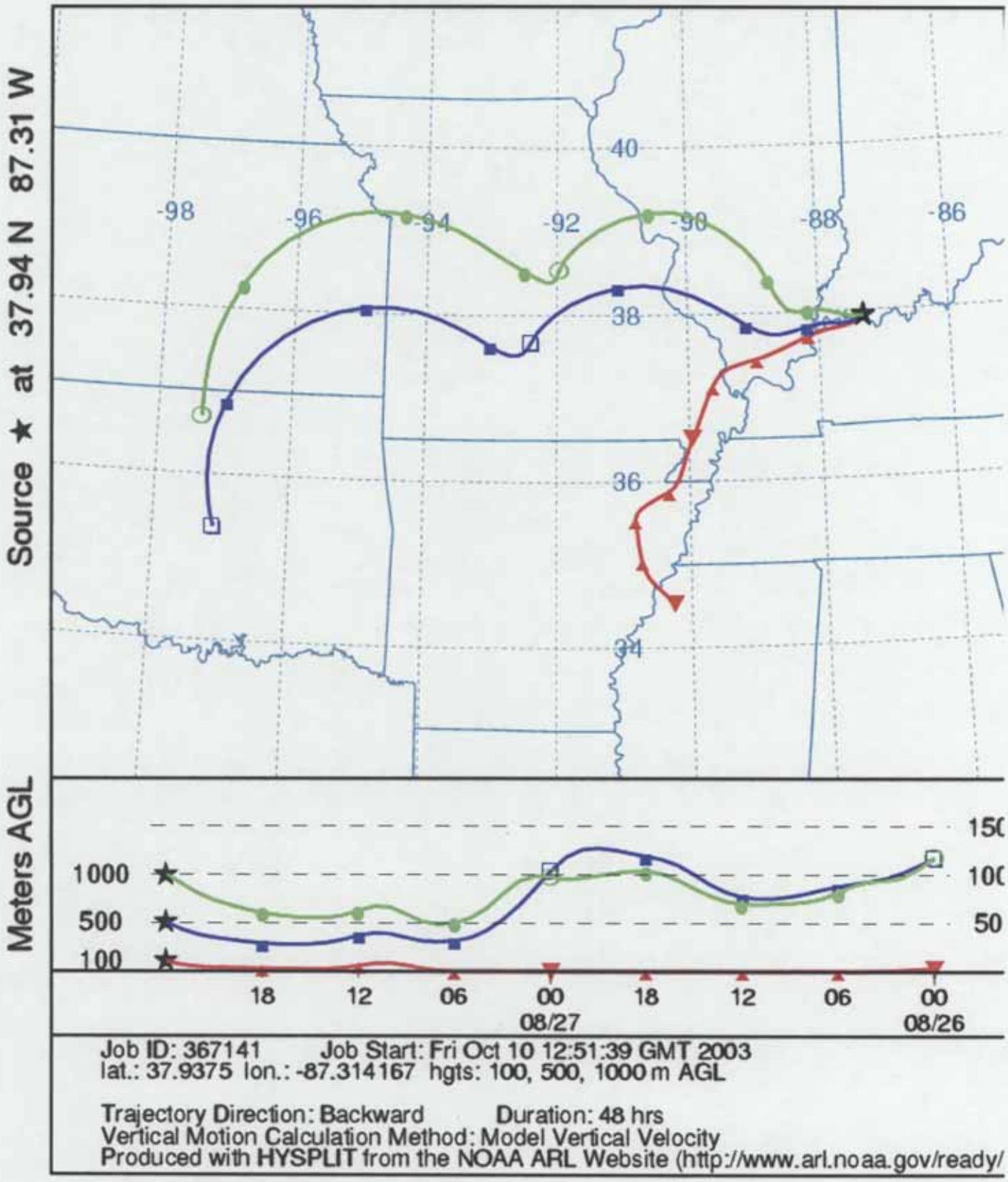
NOAA HYSPLIT MODEL
Backward trajectories ending at 03 UTC 08 Jun 03
EDAS Meteorological Data



Job ID: 367127 Job Start: Fri Oct 10 12:48:12 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 28 Aug 03
EDAS Meteorological Data



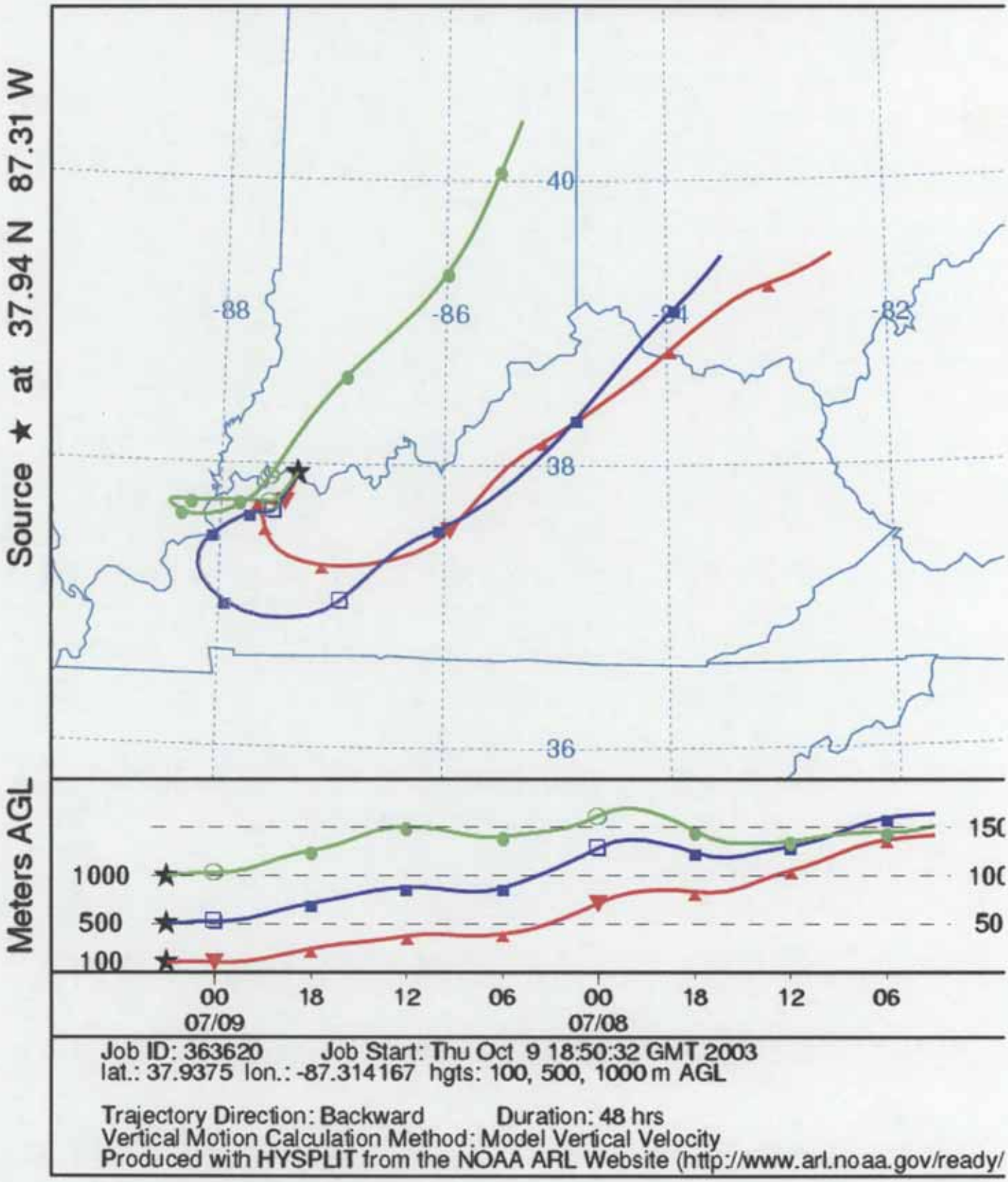
Job ID: 367141 Job Start: Fri Oct 10 12:51:39 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

Warrick County, Indiana Ozone Monitor (Site ID - 18-173-0002)
2002 8-Hour Average Top Four Maximum Values

Date	Start Hour (CST)	8-Hour Reading (PPM)	
07/08/2002	13	.113	
08/09/2002	11	.097	
06/21/2002	10	.094	
09/06/2002	10	.094	(4^{th} Max)

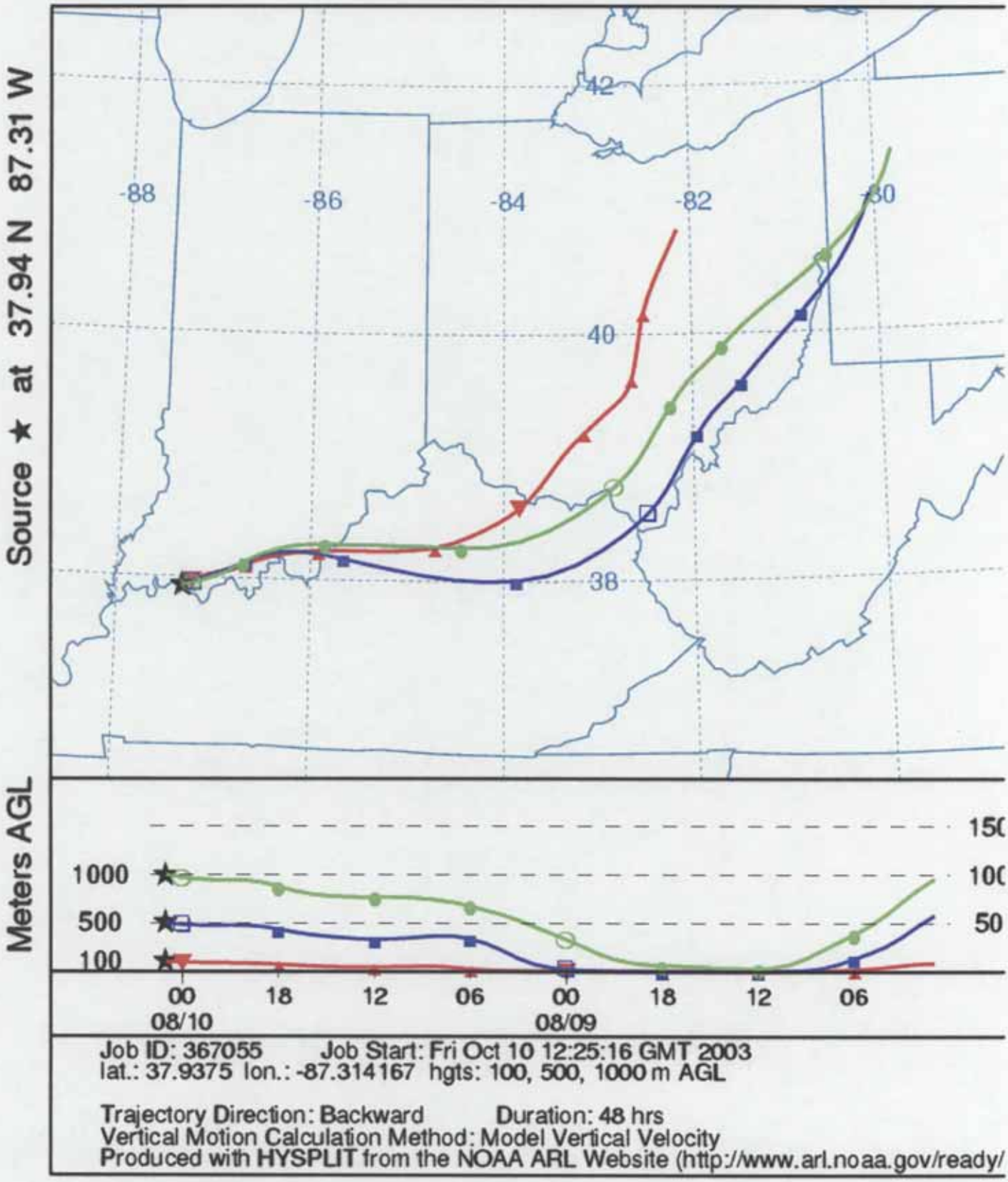
NOAA HYSPLIT MODEL
Backward trajectories ending at 03 UTC 09 Jul 02
EDAS Meteorological Data



Job ID: 363620 Job Start: Thu Oct 9 18:50:32 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

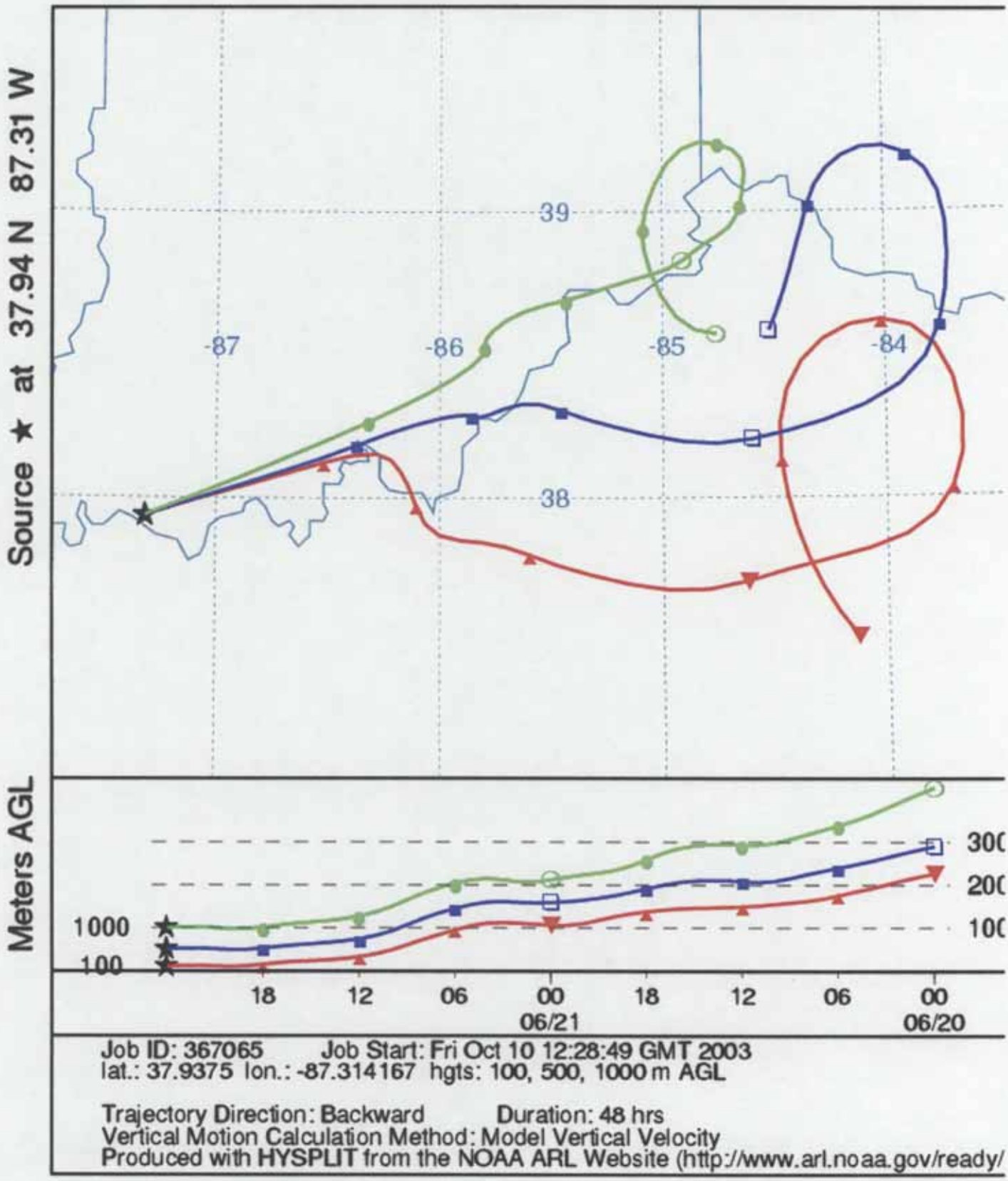
NOAA HYSPLIT MODEL
Backward trajectories ending at 01 UTC 10 Aug 02
EDAS Meteorological Data



Job ID: 367055 Job Start: Fri Oct 10 12:25:16 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

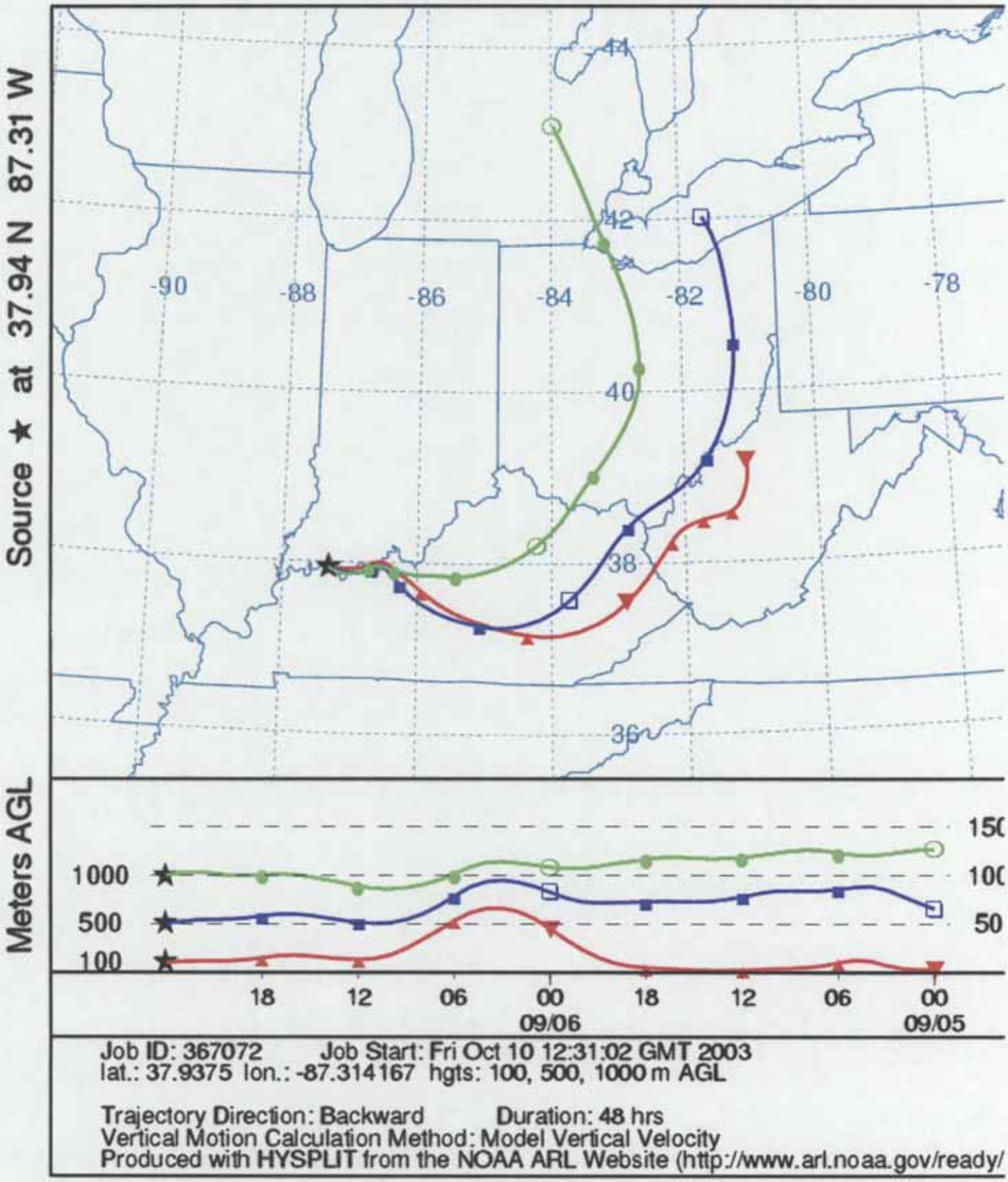
NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 22 Jun 02
EDAS Meteorological Data



Job ID: 367065 Job Start: Fri Oct 10 12:28:49 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 07 Sep 02
EDAS Meteorological Data



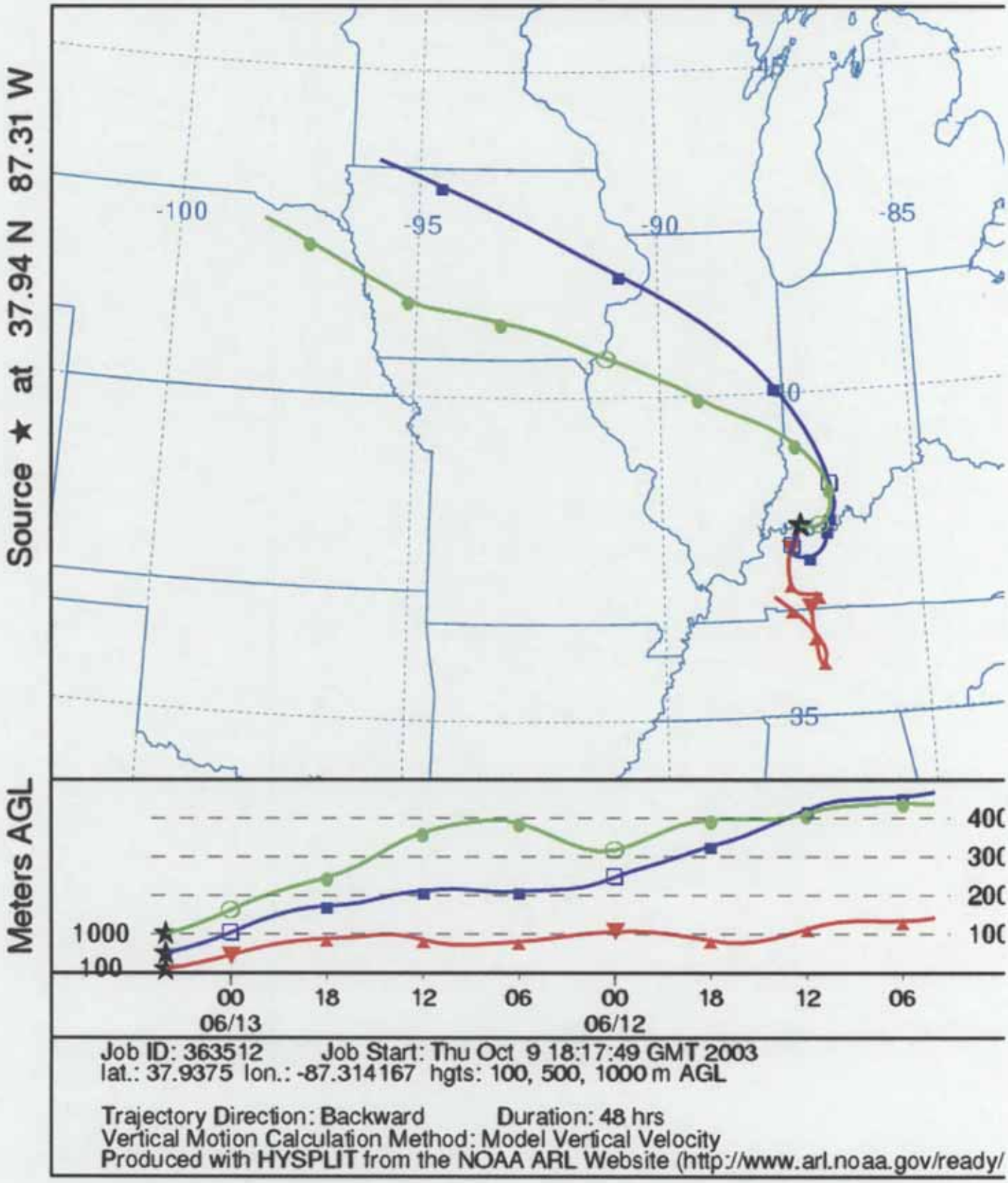
Job ID: 367072 Job Start: Fri Oct 10 12:31:02 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

Warrick County, Indiana Ozone Monitor (Site ID - 18-173-0002)
2001 8-Hour Average Top Four Maximum Values

Date	Start Hour (CST)	8-Hour Reading (PPM)	
06/12/2001	14	.087	
06/18/2001	10	.082	
06/19/2001	09	.081	
09/13/2001	10	.081	(4^{th} Max)

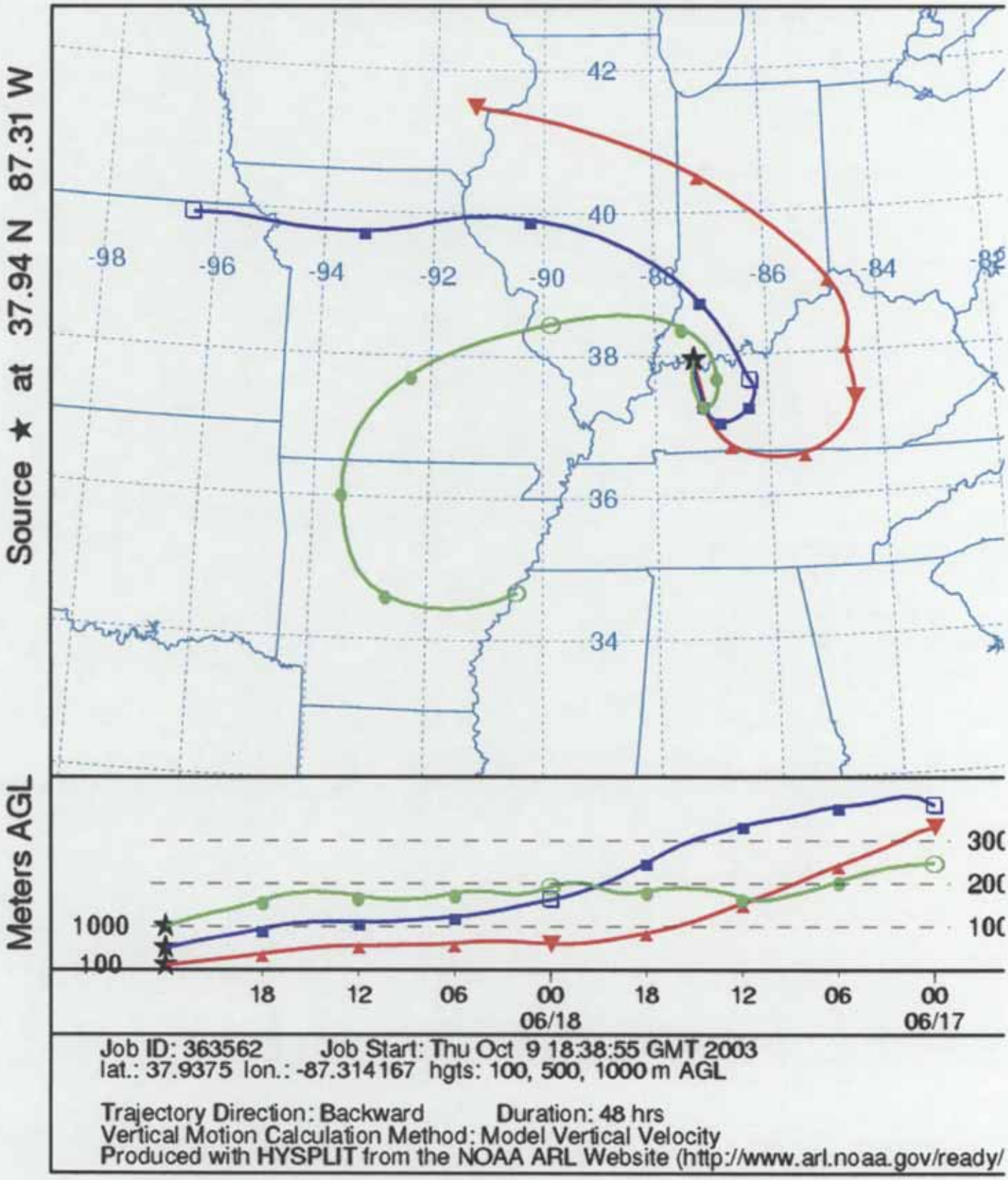
NOAA HYSPLIT MODEL
Backward trajectories ending at 04 UTC 13 Jun 01
EDAS Meteorological Data



Job ID: 363512 Job Start: Thu Oct 9 18:17:49 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

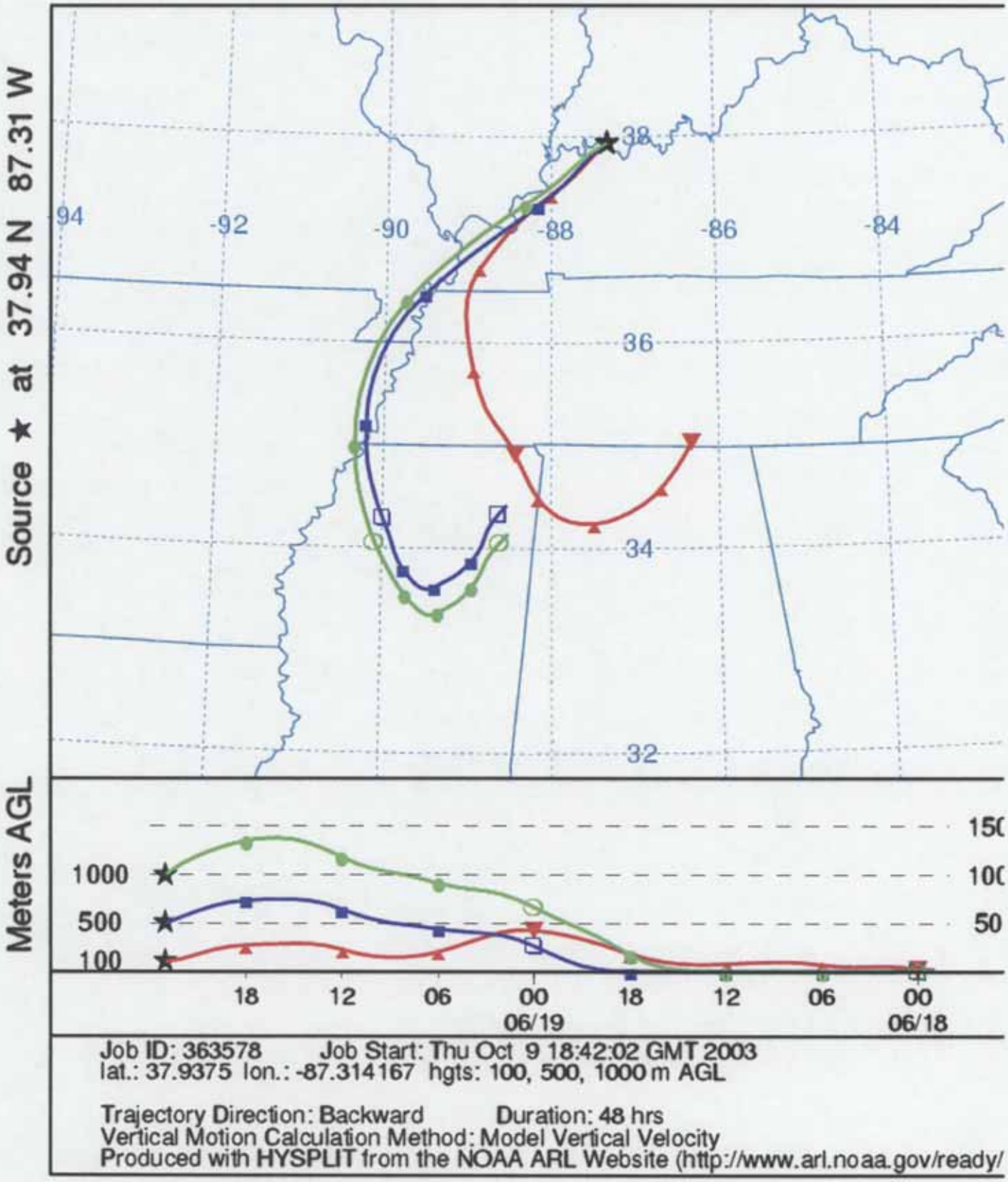
NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 19 Jun 01
EDAS Meteorological Data



Job ID: 363562 Job Start: Thu Oct 9 18:38:55 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

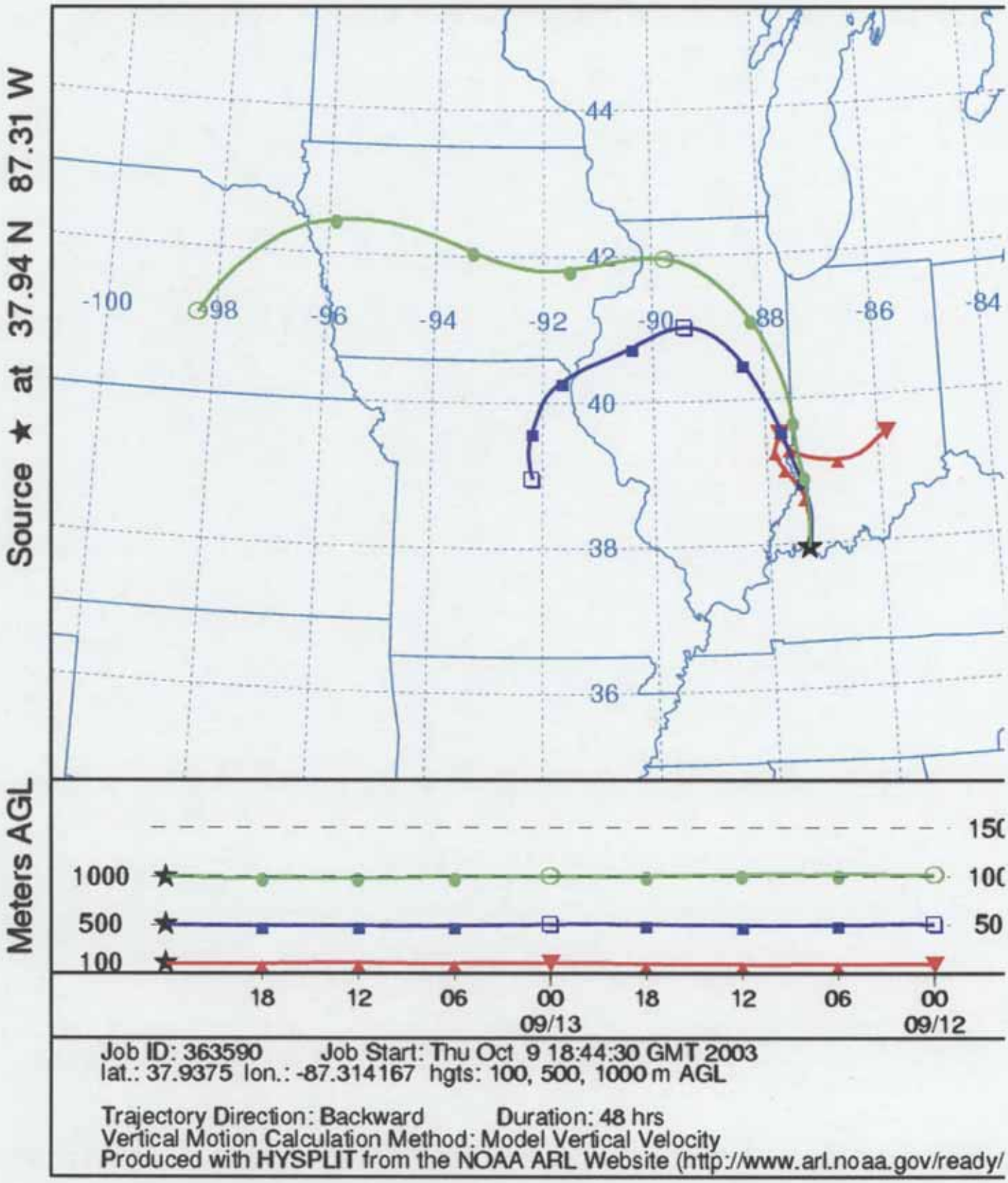
NOAA HYSPLIT MODEL
Backward trajectories ending at 23 UTC 19 Jun 01
EDAS Meteorological Data



Job ID: 363578 Job Start: Thu Oct 9 18:42:02 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 14 Sep 01
EDAS Meteorological Data



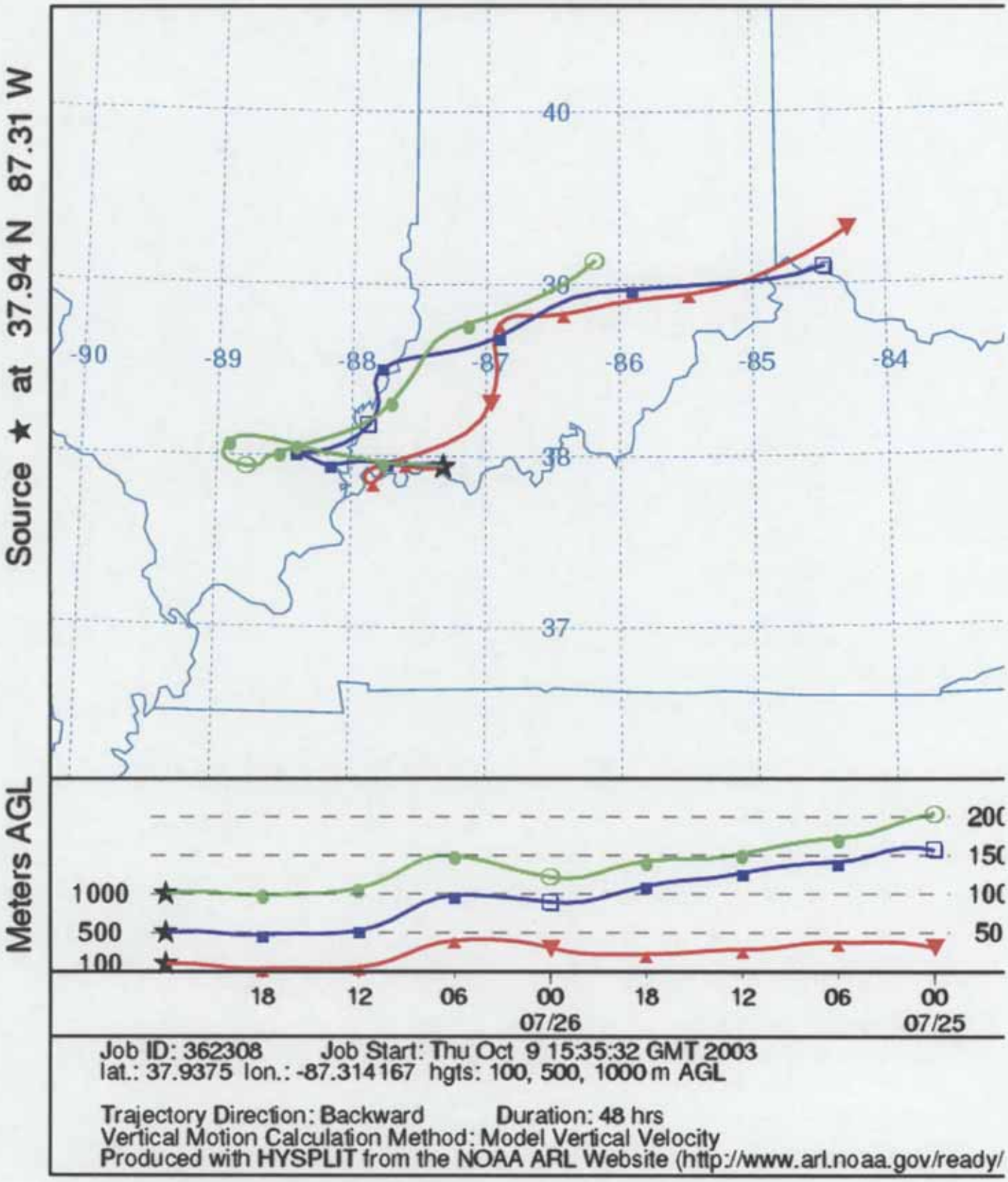
Job ID: 363590 Job Start: Thu Oct 9 18:44:30 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with **HYSPLIT** from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

Warrick County, Indiana Ozone Monitor (Site ID - 18-173-0002)
2000 8-Hour Average Top Four Maximum Values

Date	Start Hour (CST)	8-Hour Reading (PPM)	
07/26/2000	10	.081	
07/09/2000	12	.080	
07/27/2000	09	.077	
08/15/2000	10	.077	(4^{th} Max)

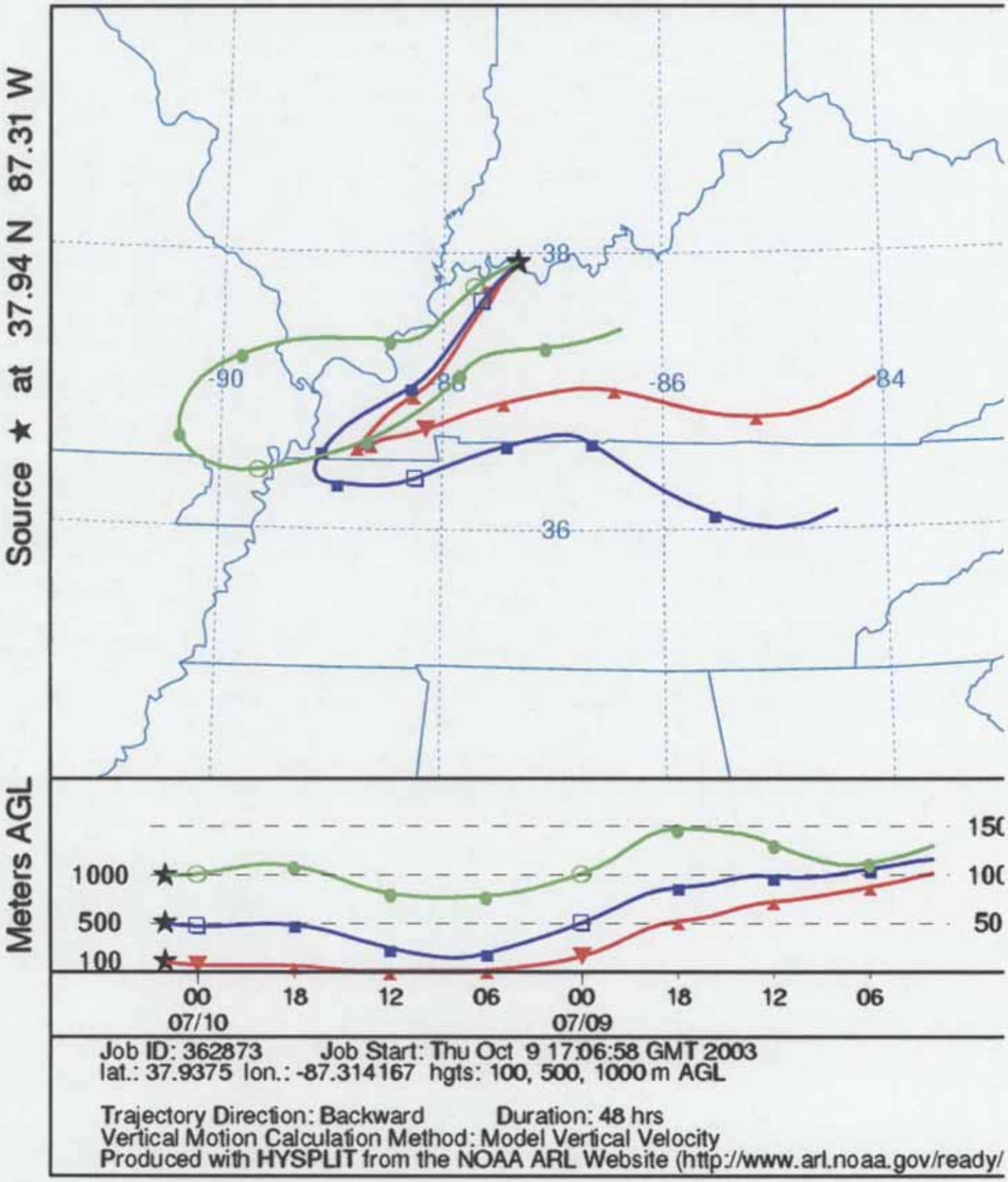
NOAA HYSPLIT MODEL
Backward trajectories ending at 00 UTC 27 Jul 00
EDAS Meteorological Data



Job ID: 362308 Job Start: Thu Oct 9 15:35:32 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

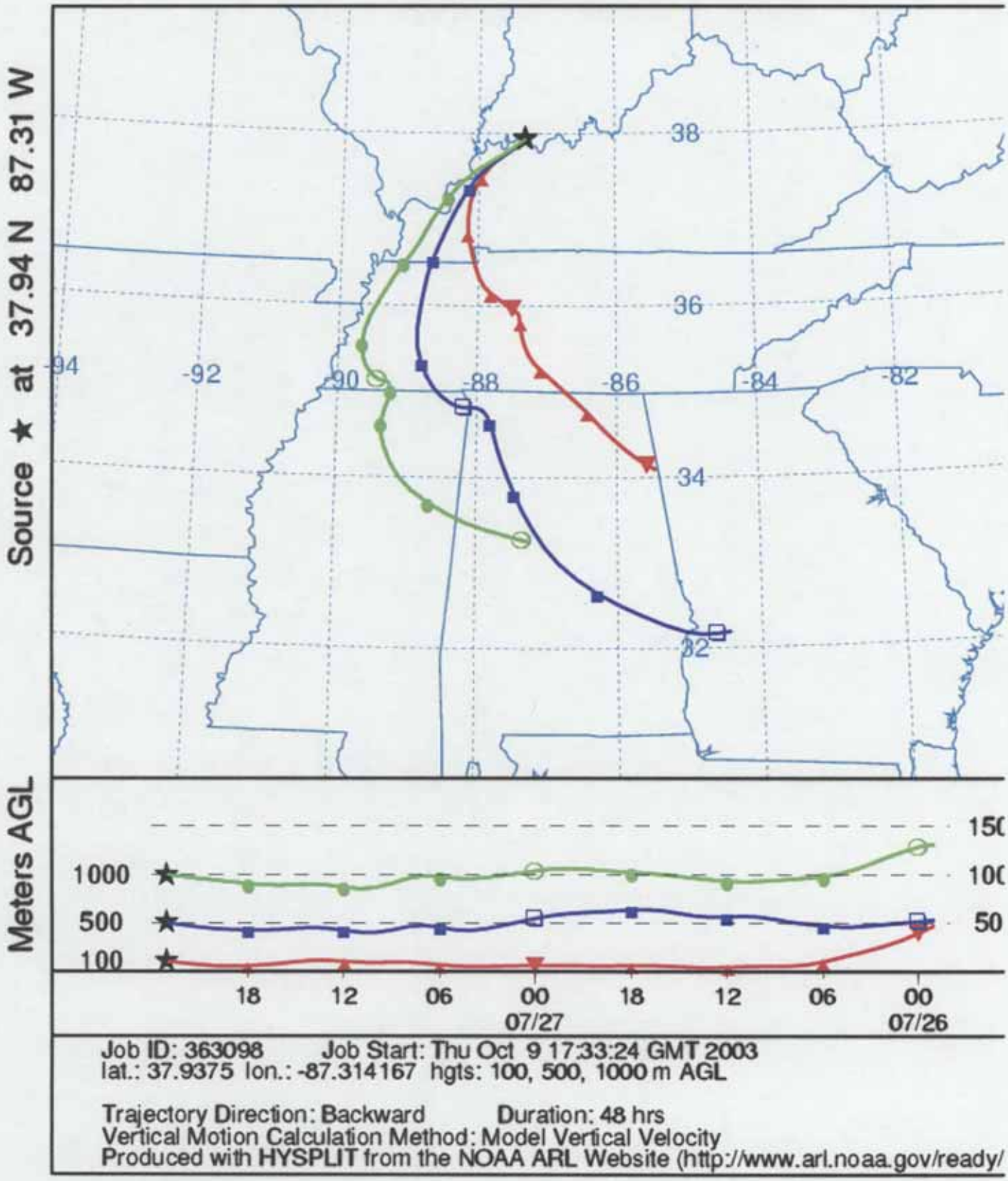
NOAA HYSPLIT MODEL
Backward trajectories ending at 02 UTC 10 Jul 00
EDAS Meteorological Data



Job ID: 362873 Job Start: Thu Oct 9 17:06:58 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

NOAA HYSPLIT MODEL
Backward trajectories ending at 23 UTC 27 Jul 00
EDAS Meteorological Data



Job ID: 363098 Job Start: Thu Oct 9 17:33:24 GMT 2003
lat.: 37.9375 lon.: -87.314167 hgts: 100, 500, 1000 m AGL

Trajectory Direction: Backward Duration: 48 hrs
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/

4th Max Value for 2000 - No Run for this Value

The 4th Max High 8-hour ozone value in 2000 occurred on 08/15/00 beginning at 10am (08/16/00 at 00Z).

This is a data request that falls onto a 'crack' or 'break' in the Hysplit dataset selected for that run. NOAA provides the supporting met data in packets of 1st through the 15th of the month, and 16th to the end of the month.

In this case, the trajectory cannot go backwards 48 hours where there is insufficient data in the meteorology dataset. This "invalid" request occurs any time a requested model run falls on the 16th and 17th (and the 1st and 2nd).

In this case, there was insufficient data to make a 48hr, 24hr, or even a 12hr model run.

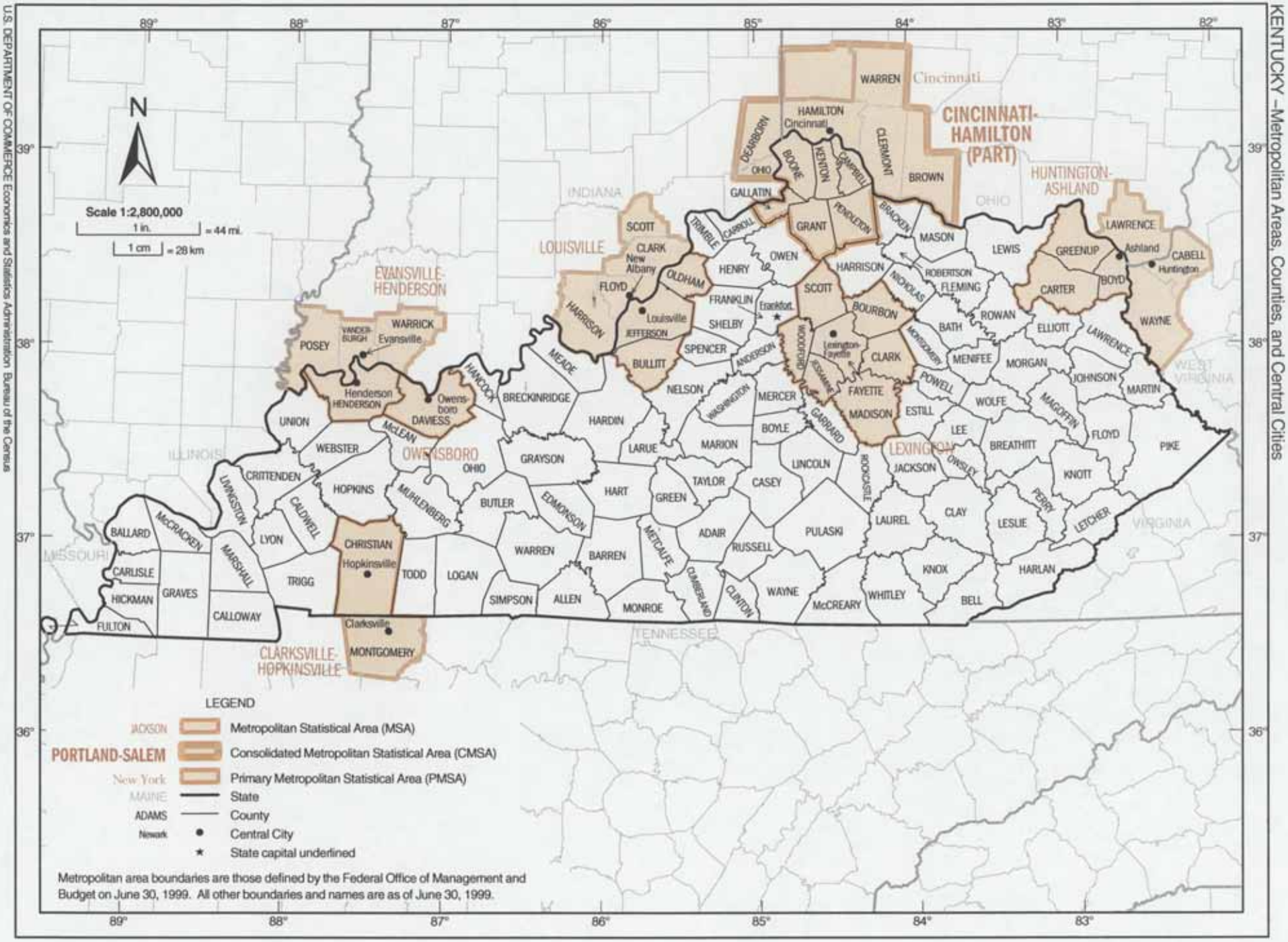
Time Conversion Table

Z Time (UTC)	**Pacific** Standard Time	**Mountain** Standard Time	**Central** Standard Time	**Eastern** Standard Time
00Z	4:00 PM	5:00 PM	6:00 PM	7:00 PM
03Z	7:00 PM	8:00 PM	9:00 PM	10:00 PM
06Z	10:00 PM	11:00 PM	12:00 AM	1:00 AM
09Z	1:00 AM	2:00 AM	3:00 AM	4:00 AM
12Z	4:00 AM	5:00 AM	6:00 AM	7:00 AM
15Z	7:00 AM	8:00 AM	9:00 AM	10:00 AM
18Z	10:00 AM	11:00 AM	12:00 PM	1:00 PM
21Z	1:00 PM	2:00 PM	3:00 PM	4:00 PM

Z Time (UTC)	**Pacific** Daylight Savings Time	**Mountain** Daylight Savings Time	**Central** Daylight Savings Time	**Eastern** Daylight Savings Time
00Z	5:00 PM	6:00 PM	7:00 PM	8:00 PM
03Z	8:00 PM	9:00 PM	10:00 PM	11:00 PM
06Z	11:00 PM	12:00 AM	1:00 AM	2:00 AM
09Z	2:00 AM	3:00 AM	4:00 AM	5:00 AM
12Z	5:00 AM	6:00 AM	7:00 AM	8:00 AM
15Z	8:00 AM	9:00 AM	10:00 AM	11:00 AM
18Z	11:00 AM	12:00 PM	1:00 PM	2:00 PM
21Z	2:00 PM	3:00 PM	4:00 PM	5:00 PM

History of "Z-time" (UTC,GMT,etc) by Harold Maybeck

dismiss


KENTUCKY –Metropolitan Areas, Counties, and Central Cities
U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration Bureau of the Census
N
Scale 1:2,800,000
1 in. = 44 mi.
1 cm = 28 km
89°
88°
87°
86°
85°
84°
83°
82°
39°
38°
37°
36°
CINCINNATI-HAMILTON (PART)
HUNTINGTON-ASHLAND
LOUISVILLE
EVANSVILLE-HENDERSON
OWENSBORO
LEXINGTON
CLARKSVILLE-HOPKINSVILLE
PORTLAND-SALEM
Cincinnati
Louisville
Evansville
Henderson
Owensboro
Hopkinsville
Clarksville
Ashland
Huntington
Lexington-Fayette
Frankfort
New Albany
INDIANA
OHIO
ILLINOIS
MISSOURI
TENNESSEE
VIRGINIA
WEST VIRGINIA
WARREN
HAMILTON
CLERMONT
BROWN
DEARBORN
BOONE
KENTON
CAMPBELL
GALLATIN
GRANT
PENDLETON
BRACKEN
MASON
LEWIS
GREENUP
LAWRENCE
CABELL
WAYNE
SCOTT
CLARK
FLOYD
HARRISON
TRIMBLE
CARROLL
OWEN
HENRY
OLDHAM
FRANKLIN
SHELBY
JEFFERSON
BULLITT
SPENCER
ANDERSON
NICHOLAS
ROBERTSON
FLEMING
BOURBON
WOODFORD
JESSAMINE
MONTGOMERY
BATH
ROWAN
ELLIOTT
CARTER
BOYD
LAWRENCE
JOHNSON
MARTIN
MENIFEE
MORGAN
POWELL
WOLFE
MAGOFFIN
FLOYD
PIKE
KNOTT
LEE
BREATHITT
OWSLEY
JACKSON
ESTILL
MADISON
FAYETTE
GARRARD
BOYLE
MERCER
NELSON
WASHINGTON
MARION
LINCOLN
ROCKCASTLE
LAUREL
CLAY
LESLIE
PERRY
LETCHER
HARLAN
KNOX
BELL
WHITLEY
McCREARY
PULASKI
RUSSELL
ADAIR
CASEY
TAYLOR
GREEN
HART
BARREN
METCALFE
CUMBERLAND
CLINTON
WAYNE
MONROE
ALLEN
SIMPSON
LOGAN
TODD
TRIGG
WARRICK
VANDERBURGH
POSEY
UNION
HENDERSON
DAVIESS
McLEAN
WEBSTER
HOPKINS
CRITTENDEN
LIVINGSTON
CALDWELL
LYON
MUHLENBERG
BUTLER
GRAYSON
EDMONSON
HARDEN
LARUE
BRECKINRIDGE
MEADE
HANCOCK
CHRISTIAN
MONTGOMERY
BALLARD
McCRACKEN
MARSHALL
CARLISLE
GRAVES
HICKMAN
FULTON
CALLOWAY
LEGEND
Metropolitan Statistical Area (MSA)
Consolidated Metropolitan Statistical Area (CMSA)
Primary Metropolitan Statistical Area (PMSA)
State
County
Central City
State capital underlined
Metropolitan area boundaries are those defined by the Federal Office of Management and Budget on June 30, 1999. All other boundaries and names are as of June 30, 1999.

Warrick County IN **8HR OZONE**
Central Std Time
Alcoa/200 Yds S. 650S **18-173-0002**
Lat 37.9375
Long -87.314167

Top 4 Max Values		2000	Month	Date	Start Time	ZULU	3YR Design Value
	1	0.081	7	26	10:00	00Z	
	2	0.080	7	9	12:00	02Z	
	3	0.077	7	27	9:00	23Z	
	4	0.077	8	15	10:00	00Z	
Top 4 Max Values		**2001**	**Month**	**Date**	**Start Time**		
	1	0.087	6	12	14:00	04Z	
	2	0.082	6	18	10:00	00Z	
	3	0.081	6	19	9:00	23Z	
	4	0.081	9	13	10:00	00Z	
Top 4 Max Values		**2002**	**Month**	**Date**	**Start Time**		
	1	0.113	7	8	13:00	03Z	
	2	0.097	8	9	11:00	01Z	
	3	0.094	6	21	10:00	00Z	
	4	0.094	9	6	10:00	00Z	0.0840
Top 4 Max Values		**2003 thru September**	**Month**	**Date**	**Start Time**		
	1	0.101	6	24	11:00	01Z	
	2	0.090	7	17	13:00	03Z	
	3	0.082	6	7	13:00	03Z	
	4	0.082	8	27	10:00	00Z	0.0856

Jun. 19, 2003

Ozone (44201) INDIANA PPM (007)

8-HOUR

SITE ID	POC	REP ORG	CITY	COUNTY	ADDRESS	YEAR	METH	%OBS	VALID DAYS MEAS	NUM DAYS REQ	1ST MAX 8-HR	2ND MAX 8-HR	3RD MAX 8-HR	4TH MAX 8-HR	DAY MAX>/= 0.085	CERT	EDT
18-163-0013	1	0520	EVANSVILLE	VANDERBURGH	14940 OLD STATE	2000	047	100	183	183	.077	.076	.075	.075	0	Y	0
18-163-0013	1	0520	EVANSVILLE	VANDERBURGH	14940 OLD STATE	2001	047	98	179	183	.079	.076	.073	.072	0		0
18-163-0013	1	0520	EVANSVILLE	VANDERBURGH	14940 OLD STATE	2002	047	100	183	183	.097	.095	.089	.086	5		0
18-173-0002	1	0024	NOT IN A CITY	WARRICK	200 YARDS S. OF	1992	047	96	175	183	.087	.084	.080	.077	1		0
18-173-0002	1	0024	NOT IN A CITY	WARRICK	200 YARDS S. OF	1993	047	94	172	183	.086	.084	.083	.083	1		0
18-173-0002	1	0024	NOT IN A CITY	WARRICK	200 YARDS S. OF	1994	047	93	171	183	.127	.114	.110	.109	22		0
18-173-0002	1	0024	NOT IN A CITY	WARRICK	200 YARDS S. OF	1995	047	68	125	183	.104	.101	.088	.088	5		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	1995	047	91	166	183	.104	.089	.088	.087	7		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	1996	047	83	151	183	.102	.097	.097	.093	14		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	1997	047	96	175	183	.095	.094	.091	.091	7		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	1998	047	84	153	183	.119	.113	.099	.096	10	Y	0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	1999	047	72	132	183	.101	.098	.096	.095	5		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	2000	047	79	145	183	.081	.080	.077	.077	0	Y	0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	2001	047	99	181	183	.087	.082	.081	.081	1		0
18-173-0002	2	0520	NOT IN A CITY	WARRICK	200 YARDS S. OF	2002	047	99	182	183	.113	.097	.094	.094	17		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1992	047	95	174	183	.084	.075	.075	.075	0		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1993	047	99	181	183	.087	.087	.085	.081	3		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1994	047	99	181	183	.112	.101	.095	.092	11		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1995	047	95	174	183	.106	.098	.090	.090	9		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1996	047	99	181	183	.094	.093	.090	.090	10		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1997	047	100	183	183	.109	.097	.097	.095	9		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1998	047	100	183	183	.114	.105	.100	.091	9	Y	0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	1999	047	100	183	183	.092	.091	.088	.087	5		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	2000	047	89	162	183	.078	.075	.074	.073	0	Y	0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	2001	047	97	177	183	.091	.081	.079	.078	1		0
18-173-0008	1	0520	BOONVILLE	WARRICK	BOONVILLE HIGH :	2002	047	96	175	183	.107	.093	.092	.091	13		0

Note: The * indicates that the mean does not satisfy summary criteria.

8HR

Warrick County

Alcoa

Year	1st		2nd		3rd		4th		5th		Days => 0.085 ppm
1995	0.105		0.090		0.090		0.088		0.087		8
1996	0.102		0.098		0.097		0.094		0.091		14
1997	0.095	8/1	0.094	7/18	0.091	7/12	0.091	8/2	0.090	7/17	7
1998	0.119	9/13	0.113	9/12	0.099	5/14	0.096	5/18	0.095	8/22	10
1999	0.101	9/5	0.098	9/4	0.096	6/22	0.095	8/12	0.090	9/3	5
2000	0.081	7/26	0.081	7/9	0.077	7/27	0.077	8/15	0.076	4/30	0
2001	0.087	6/12	0.082	6/18	0.081	6/19	0.081	9/13	0.078	8/2	1
2002	0.113	7/8	0.097	8/9	0.094	6/21	0.094	9/6	0.093	9/7	17
2003	0.101	6/24	0.090	7/17	0.082	6/7	0.082	8/27	0.078	4/27	2
(95-97 ave)							0.091				
(96-98 ave)							0.093				
(97-99 ave)							0.094				
(98-00 ave)							0.089				
(99-01 ave)							0.084				
(00-02 ave)							0.084				
(01-03 ave)							0.085				

Boonville HS

Year	1st		2nd		3rd		4th		5th		Days => 0.085 ppm
1995	0.106		0.098		0.091		0.089		0.087		9
1996	0.095		0.093		0.091		0.090		0.089		10
1997	0.109	7/17	0.098	7/12	0.097	7/18	0.095	8/2	0.094	7/21	9
1998	0.114	9/13	0.105	9/12	0.100	8/22	0.091	5/13	0.091	5/14	9
1999	0.092	6/21	0.091	9/5	0.088	6/22	0.087	9/2	0.085	8/12	5
2000	0.078	6/1	0.075	7/27	0.074	6/9	0.073	6/8	0.073	7/9	0
2001	0.091	6/12	0.081	6/19	0.079	6/18	0.078	9/13	0.074	6/10	1
2002	0.107	7/8	0.093	9/6	0.092	6/21	0.091	7/16	0.091	9/8	13
2003	0.087	6/24	0.087	8/27	0.083	7/17	0.076	6/7	0.074	6/18	2
(95-97 ave)							0.091				
(96-98 ave)							0.092				
(97-99 ave)							0.091				
(98-00 ave)							0.083				
(99-01 ave)							0.079				
(00-02 ave)							0.080				
(01-03 ave)							0.081				

— Value changed to .080 to reflect AQS

IDEM WEBPAGE
LAST UPDATED 9/02/03

Tecumseh HS

Year	1st		2nd		3rd		4th		5th		Days => 0.085 ppm
1995	0.108		0.108		0.096		0.087		0.086		10
1996	0.104		0.103		0.095		0.094		0.094		9
1997	0.108	7/17	0.097	7/18	0.095	8/1	0.094	7/12	0.089	6/24	10
1998	0.109	9/13	0.098	9/12	0.095	8/17	0.093	8/21	0.088	5/13	9
1999	0.098	8/21	0.096	9/5	0.094	9/2	0.092	6/22	0.092	9/4	11
2000	0.080	6/1	0.079	6/8	0.078	7/27	0.077	6/9	0.077	7/9	0
2001	0.087	6/12	0.077	6/18	0.076	9/13	0.075	6/10	0.075	6/19	1
2002	0.094	9/6	0.091	6/21	0.091	7/15	0.090	7/16	0.089	7/8	12
2003	0.089	6/24	0.066	8/27	0.082	7/17	0.075	6/29	0.075	6/7	2
(95-97 ave)							0.091				
(96-98 ave)							0.093				
(97-99 ave)							0.093				
(98-00 ave)							0.087				
(99-01 ave)							0.081				
(00-02 ave)							0.080				
(01-03 ave)							0.080				

Dick

HENRY C. LIST
SECRETARY

PAUL E. PATTON
GOVERNOR

COMMONWEALTH OF KENTUCKY
NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION FOR AIR QUALITY
803 SCHENKEL LN
FRANKFORT KY 40601-1403

November 17, 2003

Beverly Banister, Director
Air, Pesticides, and Toxics Management Division
U.S. EPA Region 4
61 Forsyth Street, S.W.
Atlanta, Georgia 30303-8960

Dear Ms. Banister:

By letter dated July 14, 2003, Kentucky submitted proposed 8-Hour Ozone Nonattainment areas. Included in this list of proposed nonattainment areas were Bell and Warren counties.

A review of the 2003 ozone season data for Bell and Warren counties has been performed and the data has been quality assured and entered into the federal database. The following summarizes the 8-Hour ozone data for these two counties:

	2001	2002	2003	3-Yr Average
Bell	0.077	0.091	0.078	0.082
Warren	0.081	0.090	0.076	0.082

As you can see, the monitoring data for Bell and Warren counties indicate that they are attaining the standard. Kentucky is therefore requesting that these counties be removed from the July 14, 2003 list of nonattainment areas and be designated as attainment for the 8-Hour Standard.

If you have any questions regarding this matter, please contact either Ms. Lona Brewer or Mr. John Gowins of my staff at (502) 573-3382.

Sincerely,

John S. Lyons

John S. Lyons
Director

JSL/JEG
cc: Kay Prince