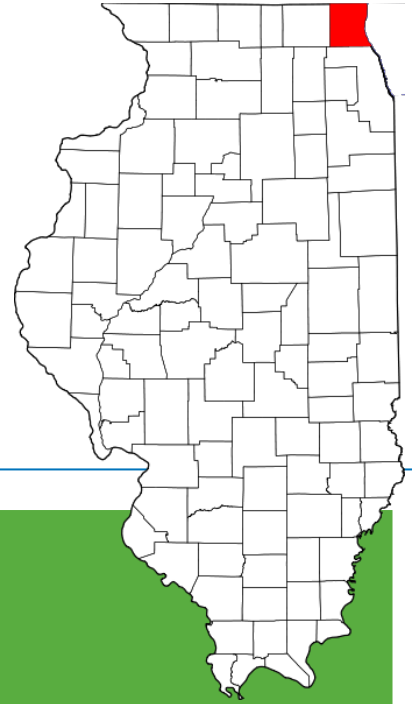




LakeCounty

Health Department and  
Community Health Center

Executive Director, Tony Beltran, MBA



# The State of Lake County's Air Quality Report 2014

Prepared October 2014 by the Lake County Health Department Assessment Team

For more information on the Lake County Health Department, the services it offers, or additional data questions, please refer to our website at [health.lakecountyil.gov](http://health.lakecountyil.gov), call 847.377.8000, or email at [HealthAssessment@lakecountyil.gov](mailto:HealthAssessment@lakecountyil.gov).

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## Introduction

The purpose of this report is to present information on the state of Lake County's air quality through: an explanation of air quality laws and regulations; the methods to determine air quality; the current air quality in Lake County; the sources of air pollution in Lake County; the health effects of air pollution; and current efforts in place to improve air quality in Lake County at the federal, state, and county levels.

## Executive Summary

The United States Environmental Protection Agency (USEPA) defines air quality as, *"the degree to which the ambient air is pollution-free"*<sup>1</sup>. The quality of air deteriorates when it is polluted with emissions (or contaminants) that arise from man-made and natural sources.

The main emissions that cause air pollution have been set by the USEPA as the *"six criteria air pollutants"*. The USEPA selected these six air pollutants to be of "criteria" as they have been found to cause the most harm to human health and the environment if they exceed permissible levels<sup>1</sup>.

### THE SIX CRITERIA AIR POLLUTANTS

- Nitrogen Oxides
- Sulfur Dioxide
- Carbon Monoxide
- Particulate Matter
- Ground-level Ozone
- Lead

Exposure to any one of the criteria air pollutants can lead to numerous health effects depending on the amount and duration of exposure as well as the health of the individual. The health effects are worse for "sensitive" populations such as asthmatics, individuals with respiratory and/ or heart diseases, children, and the elderly. The effects that may occur are: irritation of the nose and throat, coughing, wheezing, shortness of breath, chest tightness; and in severe cases, respiratory distress and/ or heart problems leading to hospitalization and even death.

To protect the health and environment of the population, the USEPA has set standards for each of these pollutants. The primary standards set limits to protect public health, including the health of "sensitive" populations. The secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings<sup>2</sup>.

There are many natural contributors to air pollution aside from the pollutants themselves. The weather plays a role, through wind, rain, and temperature. The wind can transport and spread pollutants widely. Rain removes pollutants from air and transfers them to soil and water<sup>3</sup>. Sunlight and exposure to warm temperatures causes certain pollutants to react together to form ground-level ozone. Cold temperatures affect car emission control systems which results in increases in carbon monoxide<sup>4</sup>.

## Air Quality Laws and Regulations

The Clean Air Act (CAA), passed in 1970, is a comprehensive federal law that regulates air emissions from stationary and mobile sources. The law authorized the USEPA to establish National Ambient Air Quality Standards to protect public health and welfare and to regulate emissions of hazardous air pollutants. Two of the 1990 Amendments to the CAA authorized a program to control 189 (since reduced to 187) toxic pollutants and to establish the Title V permit program and requirements; which is a comprehensive air pollution control permit that, as implemented in Illinois, incorporates all state and federal air regulations into a single enforceable permit document<sup>37</sup>.

Most of the responsibilities for implementing the CAA are placed on the states, provided there is an approved State Implementation Plan (SIP) that demonstrates compliance with the CAA and EPA rules. The Illinois SIP was adopted by the state government and approved by the USEPA and is legally binding under both state and federal law. The Illinois Pollution Control Board can adopt stricter standards on behalf of the state to control air pollution but cannot set limits lower than the federal standards.

The Illinois EPA Bureau of Air implements the Clean Air Act Permit Program (CAAPP) requirements under the SIP for major sources. It issues state operating permits to potentially major sources that contain restrictions in their permits to keep emissions below major source levels (Federally Enforceable State Operating Permits). The Illinois EPA Bureau of Air also issues lifetime operating permits to non-major sources of air emissions. Sources have the ability to seek variances from their permit requirements. The Illinois Pollution Control Board is the administrative law branch that oversees, and either grants or denies, requests for variances from air permits<sup>35</sup>.

“Smaller sources”, as defined by Public Act 097-0095 do not require a permit, and must register in the Registration of Smaller Sources (ROSS) program during the 2013 fiscal year with the Illinois EPA. The ROSS program is believed to apply to more than 3,000 permitted sources which combined produce less than 1% of the air pollution in the State of Illinois.

The ROSS program factsheet may be found at:

<http://www.illinois.gov/dceo/SmallBizAssistance/EnvironmentalAssistanceProgram/Pages/SBEAP-ROSSProgram.aspx>

When or if the Illinois EPA Bureau of Air finds a source facility to be in violation of its permit, enforcement action may be taken by the state. The USEPA also has the option of initiating enforcement actions for potentially major sources in the state. The USEPA provides funding and oversight for the CAAPP and has the ability to identify and cite violations through its own initiative.

# Current Air Quality in Lake County

## Air Quality Index

The Air Quality Index (AQI) is the national standard utilized to measure air quality. This index reports how clean or unhealthy the air is on a daily basis for any location in the United States. It is calculated by the USEPA using five of the major criteria air pollutants: ground-level ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen oxide<sup>5</sup>.

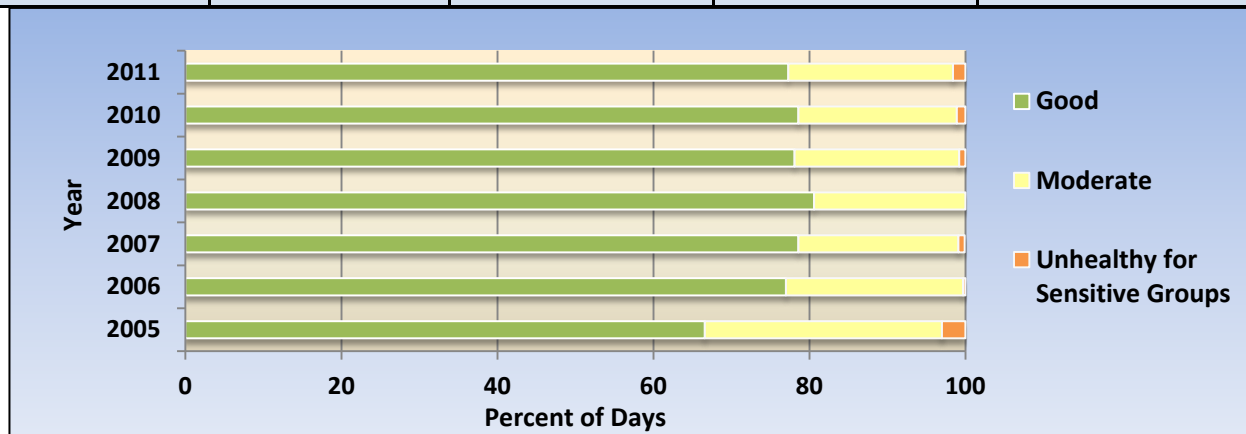
### Air Quality Index Rating

AQI Level	Color	Health Concern
Good	Green	Little to no health risk
Moderate	Yellow	Individuals sensitive to ozone or particle pollution may experience respiratory symptoms
Unhealthy for Sensitive Groups	Orange	Individuals of sensitive groups may experience health effects; the general population is unaffected
Unhealthy	Red	Everyone begins to experience health effects
Very Unhealthy	Purple	Health Alert: Everyone experiences serious health effects
Hazardous	Maroon	Health Warnings/Emergency Conditions: Everyone experiences increase in serious health effects

Source: Air Quality Index, USEPA

### Percent of Days - Air Quality Index Category, Lake County (2005-2011)

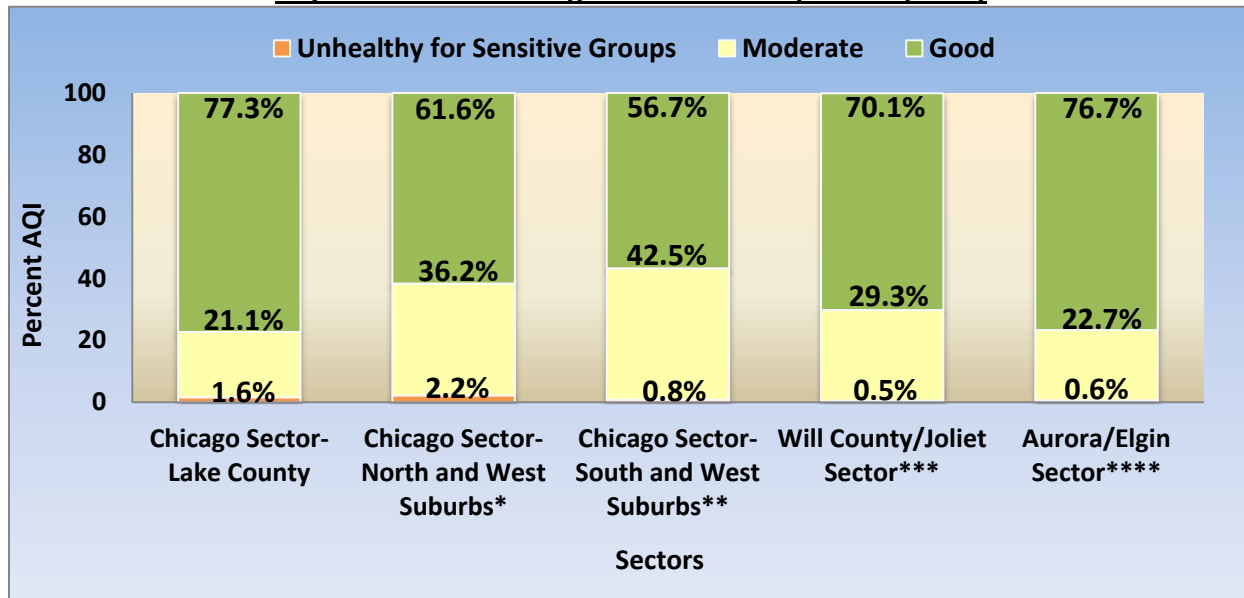
Year	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy
2005	66.6%	30.4%	3.0%	0.0%
2006	77.0%	22.7%	0.3%	0.0%
2007	78.6%	20.5%	0.8%	0.0%
2008	80.6%	19.4%	0.0%	0.0%
2009	78.1%	21.1%	0.8%	0.0%
2010	78.6%	20.3%	1.1%	0.0%
2011	77.3%	21.1%	1.6%	0.0%



Source: Illinois Annual Air Quality Report (2005-2011)

The AQI data indicates that since 2006, Lake County’s percentage of days with *good* air quality has been over 75%. Since 2009, there has been a slight increase in the percentage of days rated as *unhealthy for sensitive groups*.

**AQI Summaries–Chicagoland Area Comparison (2011)**



Source: Illinois Annual Air Quality Report (2011)

\*Parts of Cook, DuPage, and McHenry Counties north of I-290 (the Eisenhower Expressway) and outside of Chicago city limits.

\*\*Parts of Cook and DuPage Counties south of I-290 and outside of Chicago city limit.

\*\*\*Will County Only

\*\*\*\*Eastern part of Kane County

The 2011 air quality index summaries (by sector) illustrate that Lake County has a higher percent of *good* air quality compared to other sectors in the Chicagoland area. The percentage of days rated as *unhealthy for sensitive groups* in Lake County is lower than the North and West Suburbs sector, but higher than the other sectors.



## Air Quality Report Card

The American Lung Association (ALA) conducts a “State of the Air” report every year where it utilizes ozone (ground-level) and particulate matter concentrations from monitoring sites around the nation to ultimately calculate an air quality grade for each county<sup>6</sup>. According to the ALA, ozone and particulate matter are the main focus of their analysis of air quality as these pollutants, “are the most widespread air pollutants—and among the most dangerous”<sup>6</sup>. Ground-level ozone is defined as, “a criteria air pollutant created by chemical reactions between nitrogen oxides and volatile organic compounds (VOC) in the presence of sunlight”<sup>1</sup>. Emissions from industrial facilities and electric utilities, motor vehicle exhaust, gasoline vapors, and chemical solvents are some of the major sources of nitrogen oxides and VOCs. Particulate matter or “particle pollution” is defined as, “a complex mixture of extremely small particles and liquid droplets”<sup>1</sup>. Particle pollution is made up of a number of components, including acids (such as nitric and sulfuric), organic chemicals, metals, and soil or dust particles.

The ALA methodology utilizes the AQI rating system to rate the ozone and particulate matter for each day at a given location. The number of orange, red, purple, and maroon days for each county is identified for a 3-year period and totaled by color. The colors correlate with the AQI colors and are interpreted as: unhealthy for sensitive groups, unhealthy, and very unhealthy respectively. The total number of colored days is utilized in a calculation that results in a “weighted average” which is assigned a grade<sup>7</sup>.

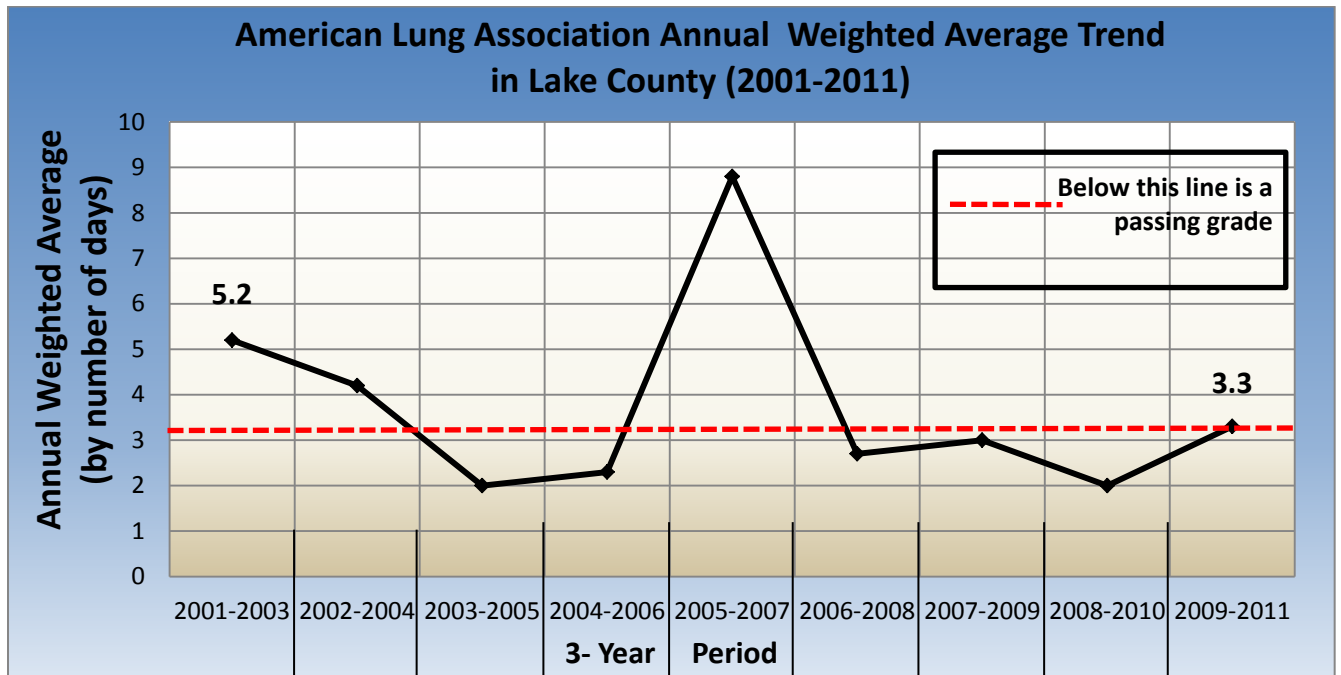
### Air Quality Report Card, Collar County Comparison

County*	Pollutants Monitored	2008-2010 Air Quality Grade	2009-2011 Air Quality Grade
Lake	Ozone	C	F
McHenry	Ozone and Particulate Matter	A	B
DuPage	Ozone and Particulate Matter	A	B
Kane	Ozone and Particulate Matter	B	B
Will	Ozone and Particulate Matter	A	B

*Source: American Lung Association, State of the Air Reports 2012 and 2013*

*\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.*

Lake County has only one monitoring site, located in Zion at the North Unit of Illinois Beach State Park, which measures ozone concentrations and there is no direct monitoring site for particulate matter. Lake County received a “C” grade for its air quality for the time period of 2008-2010 and an “F” grade for the time period of 2009-2011. McHenry, DuPage, and Will received “A” grades for their air quality for the time period of 2008-2010 and “B” grades for the time period of 2009-2011. Kane County received a “B” grade for both time periods.



*Source: American Lung Association, State of the Air Reports 2002-2013*

The annual weighted average is a calculated weighted average which essentially represents the total number of high ozone days averaged over a 3-year period of time. The annual weighted average for Lake County has fluctuated from 2001-2011. There has been an overall decline in the annual weighted average with the exception of the 3-year time period 2005-2007 and another slight increase from 2009-2011. The total number of high ozone days from 2009-2011 was 10 orange days out of 1,095 days with no red or maroon days. This is 1% of days being unhealthy for sensitive groups over a 3-year period of time. Please note that the spike in 2006 is most likely related to the weather conditions of high humidity and high cooling days (temperatures above 65 degrees Fahrenheit) represented for that year.

### Differences between Air Quality Index and Air Quality Report Card

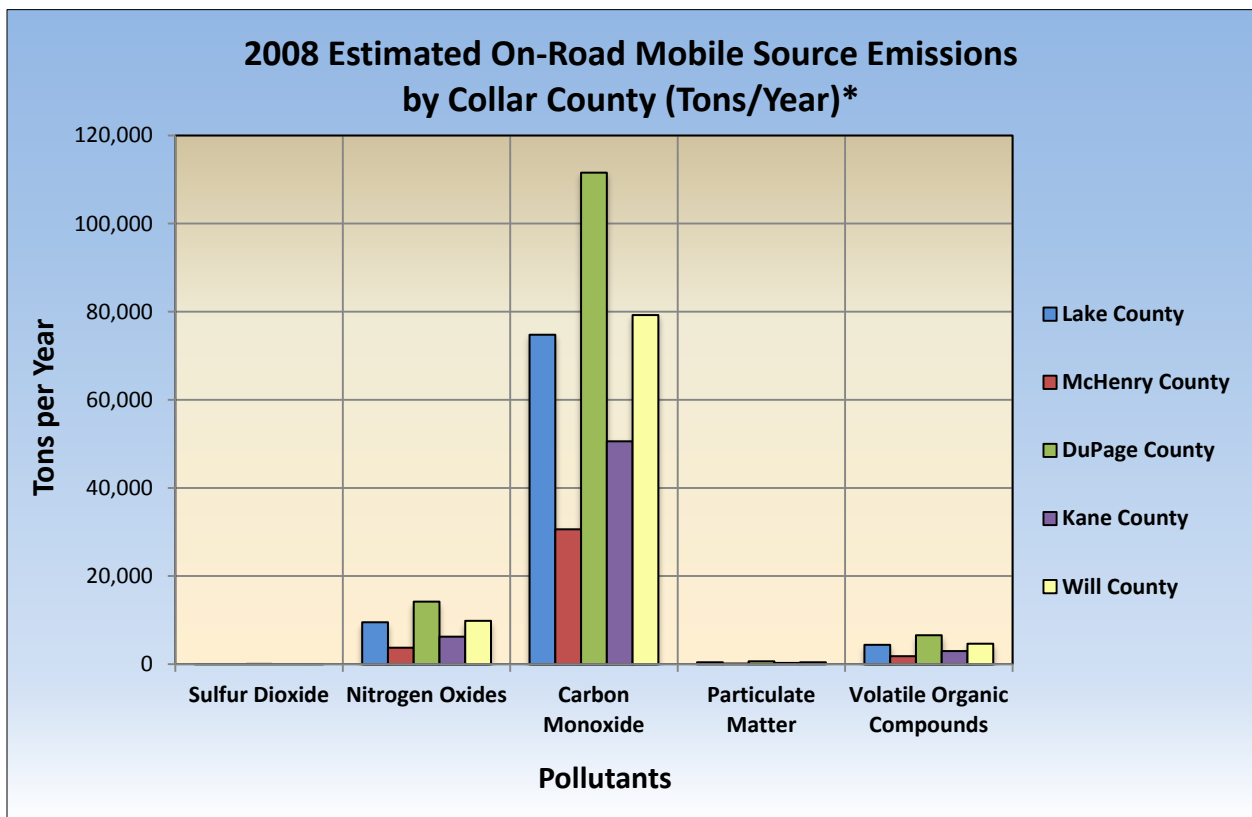
The main differences between the air quality index and the air quality report card are the pollutants taken into account and the methodology used to determine unhealthy air quality. The air quality index takes five of the major criteria pollutants into account; whereas the air quality report card focuses only on two criteria air pollutants (particulate matter is not factored for Lake County as it does not have a monitor for it). The air quality index is calculated by the USEPA, which determines violations in ozone and particulate matter standards for each county by using the four highest unhealthy days and averaging it over a 3-year time period. The air quality report card is calculated by the American Lung Association, which determines violations in ozone and particulate matter standards for each county by taking all unhealthy air days into consideration and averaging it over a 3-year time period<sup>7</sup>.

## Sources of Air Pollution

There are many sources of air pollution which have been identified and broadly categorized according to their movement and if they are man-made or natural.

### Mobile Source Emissions

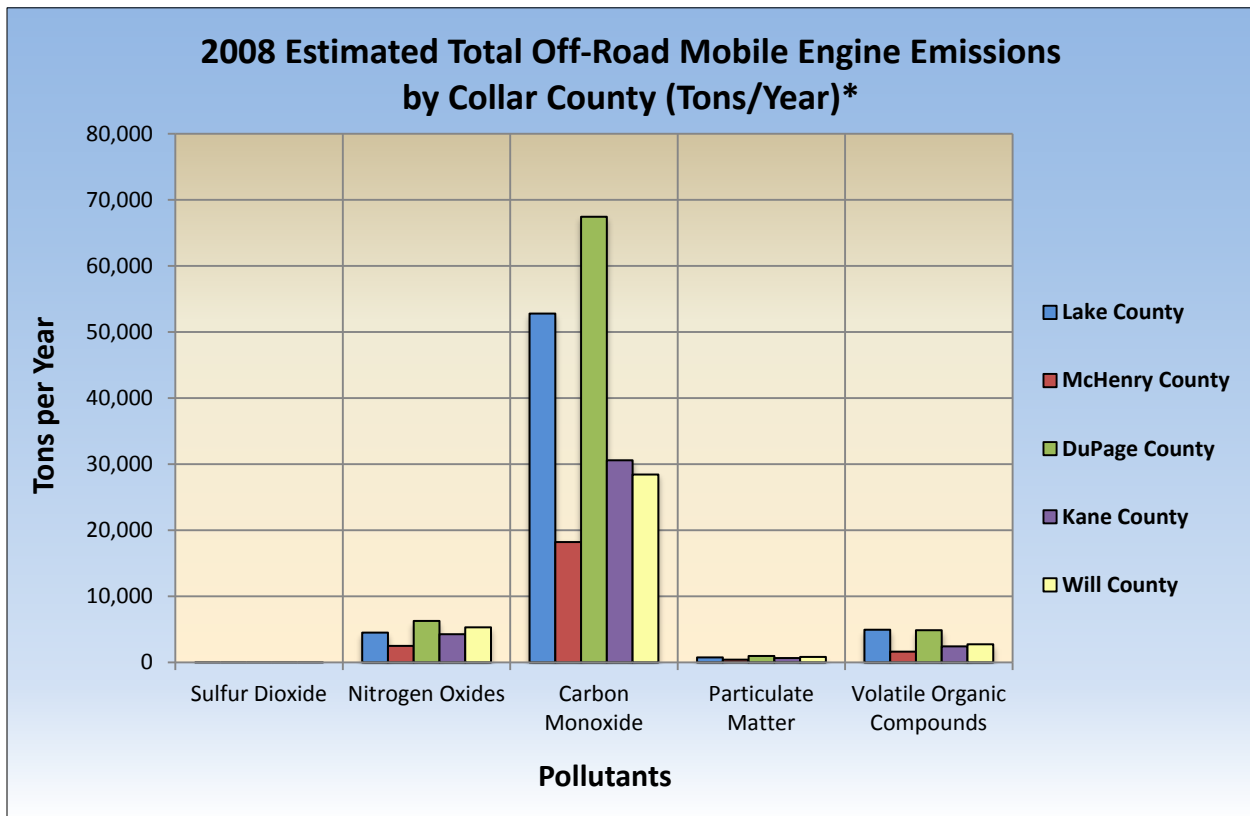
Mobile sources are portable or self-propelled sources of air pollution. These sources are divided into on-road and off-road. Examples of on-road sources are: automobiles, trucks, buses, and motorcycles. Examples of off-road sources are: airplanes, trains, construction equipment, and motorboats<sup>8</sup>.



*Source: Illinois EPA Bureau of Air (2008)*

\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.

DuPage County has the highest estimated on-road mobile source emissions for all criteria air pollutants in 2008. Carbon Monoxide emissions from on-road mobile sources are the highest of all the criteria air pollutants for all collar counties. Nitrogen Oxide emissions from on-road mobile sources are the 2<sup>nd</sup> highest of the criteria air pollutants.



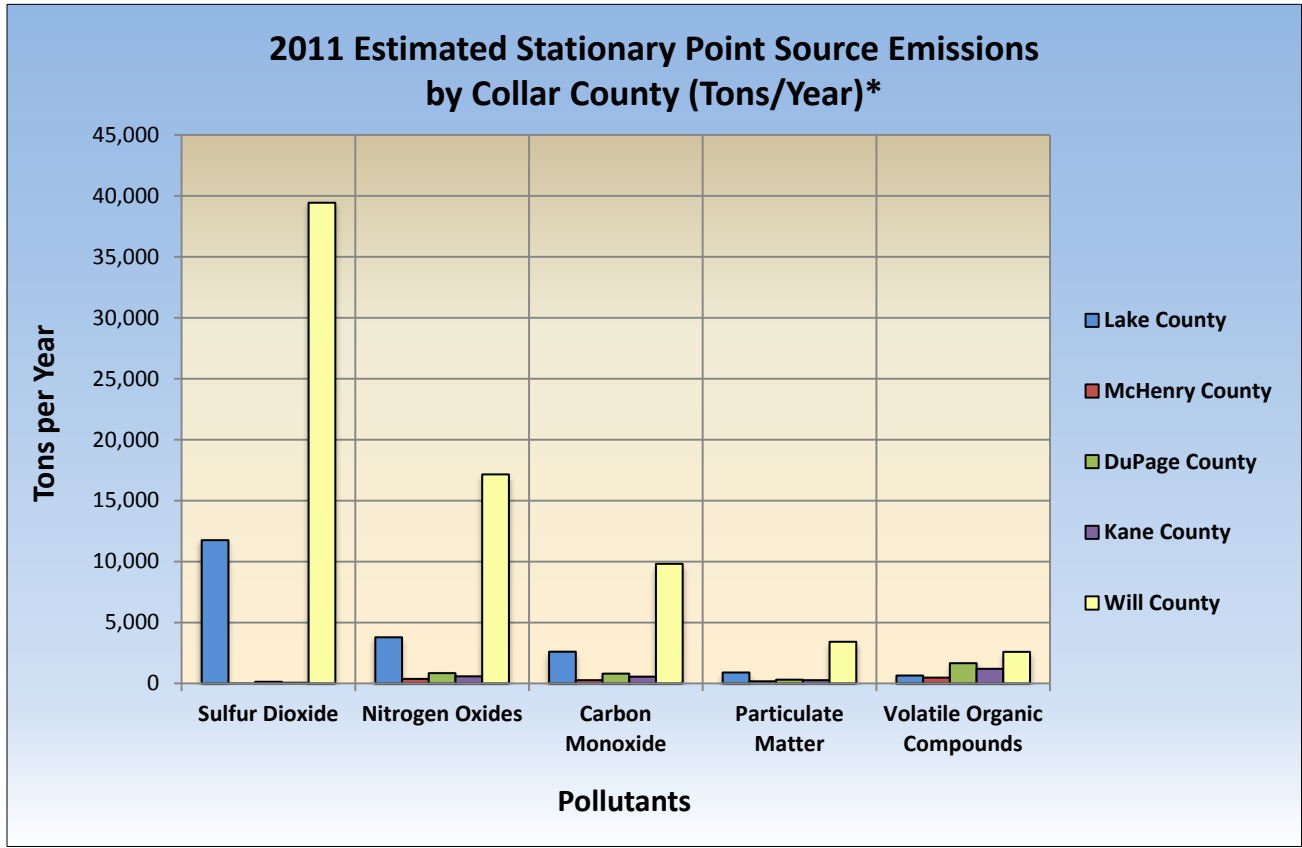
*Source: Illinois EPA Bureau of Air (2008)*

\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.

DuPage County has the highest estimated off-road mobile engine emissions for all criteria air pollutants for 2008. Carbon Monoxide emissions from off-road mobile engines are the highest of all the criteria air pollutants for all collar counties. Nitrogen Oxide emissions and Volatile Organic Compound emissions from off-road mobile engines are the 2<sup>nd</sup> highest of the criteria air pollutants.

## Stationary Point Source Emissions

Stationary point sources are identifiable sources of air pollution at fixed locations. These sources are most commonly utilized for reporting air pollution emissions as the data is readily available, detailed, regularly recorded, and frequently reviewed.



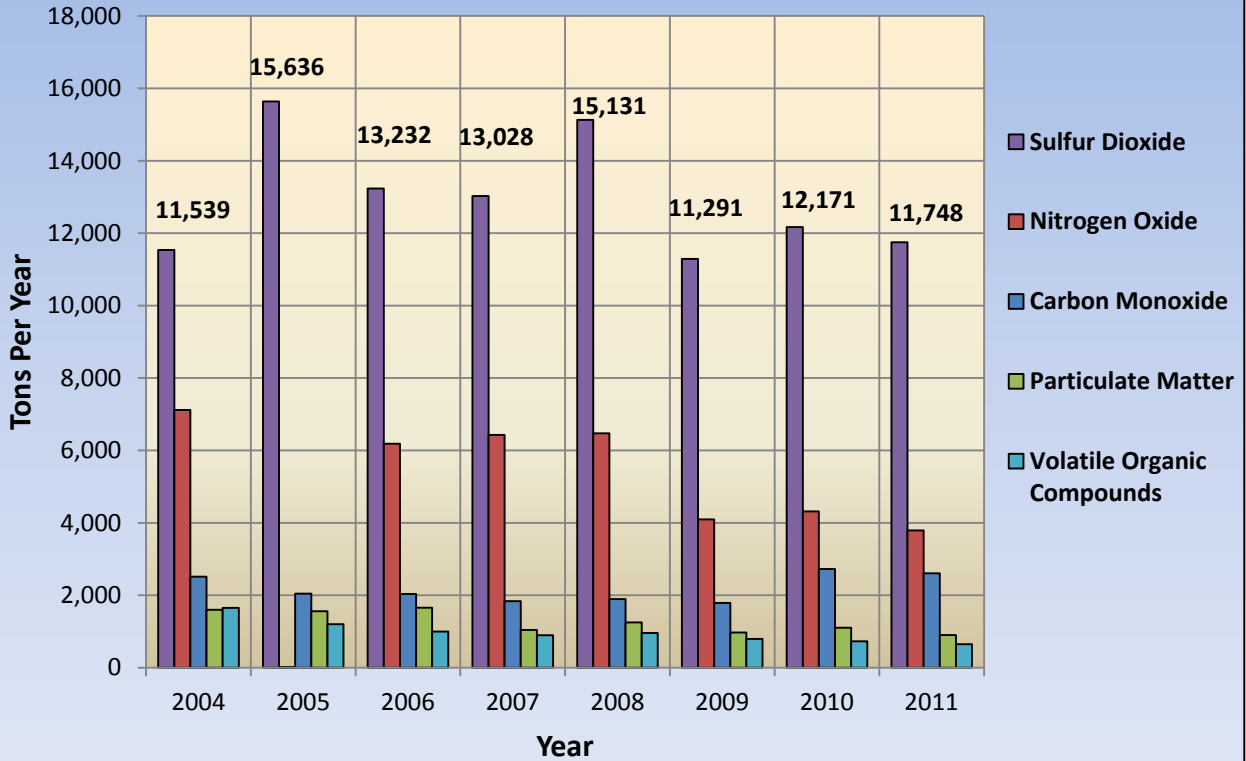
*Source: Illinois Annual Air Quality Report (2011)*

*\*Estimated Stationary point source emissions values are obtained through synthetic estimates and are not direct values from pollutant monitors.*

*\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.*

Will County has the highest estimated stationary point source emissions for all criteria air pollutants. Lake County has the 2<sup>nd</sup> highest stationary point source emissions for all of the criteria air pollutants except for volatile organic compounds as DuPage, Kane and Will County are higher.

### Lake County Estimated Stationary Point Source Emissions (Tons/Year)



Source: Illinois Annual Air Quality Report (2004-2011)

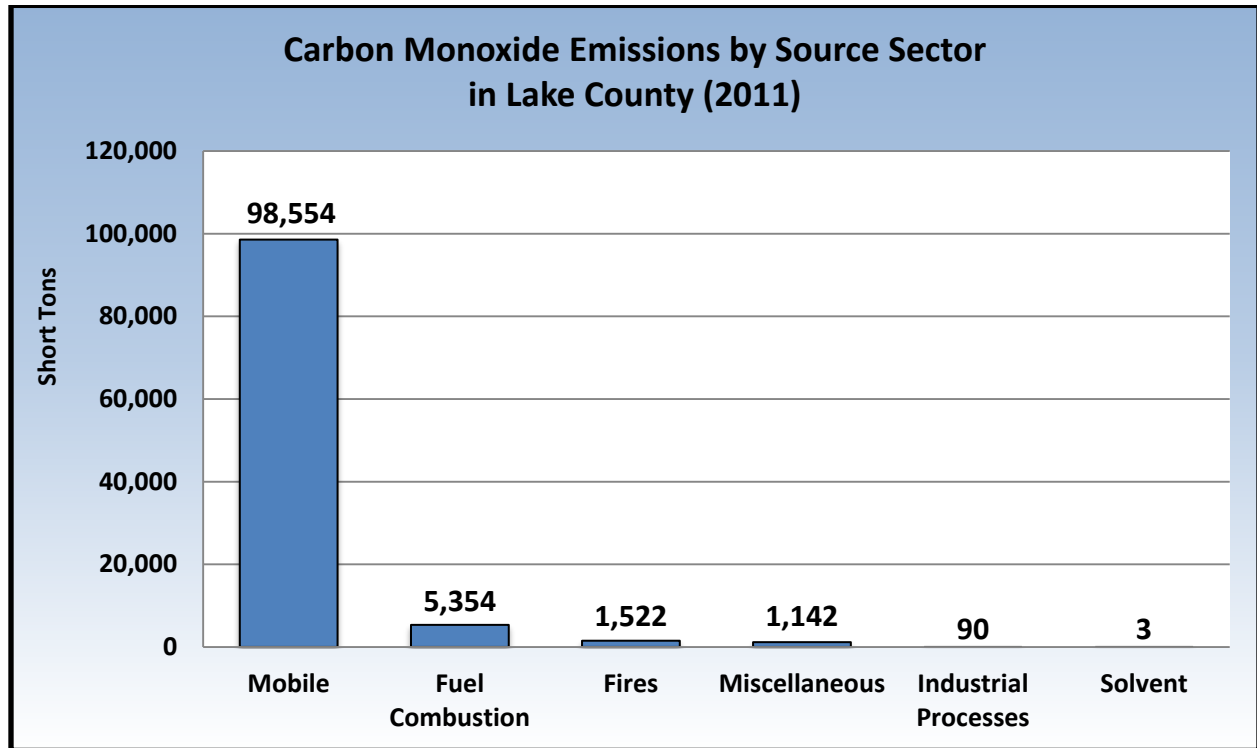
The highest estimated emissions from stationary point sources in Lake County from 2004-2011 has consistently been sulfur dioxide. The second highest has been nitrogen oxide (with one exception occurring in the year 2005). The estimated emissions of carbon monoxide, particulate matter and volatile organic compounds have been significantly lower in comparison to sulfur dioxide and nitrogen oxide.

## Source Sector Emissions

Source sectors are a group of similar emitting sources of air pollution.

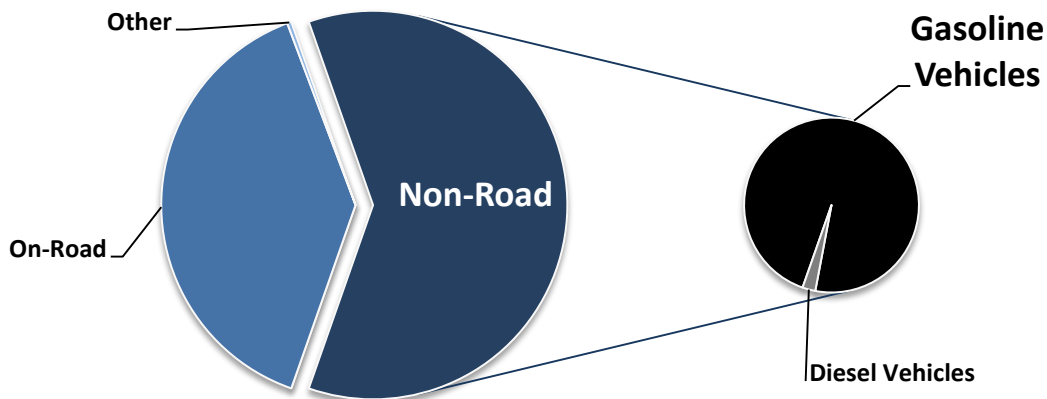
## Carbon Monoxide

Carbon monoxide emissions are the highest of the critical air pollutants in Lake County by source sector (from 2004-2011). The main source of carbon monoxide emissions in Lake County are mobile sources, the major component being gasoline-driven vehicles<sup>9</sup>.



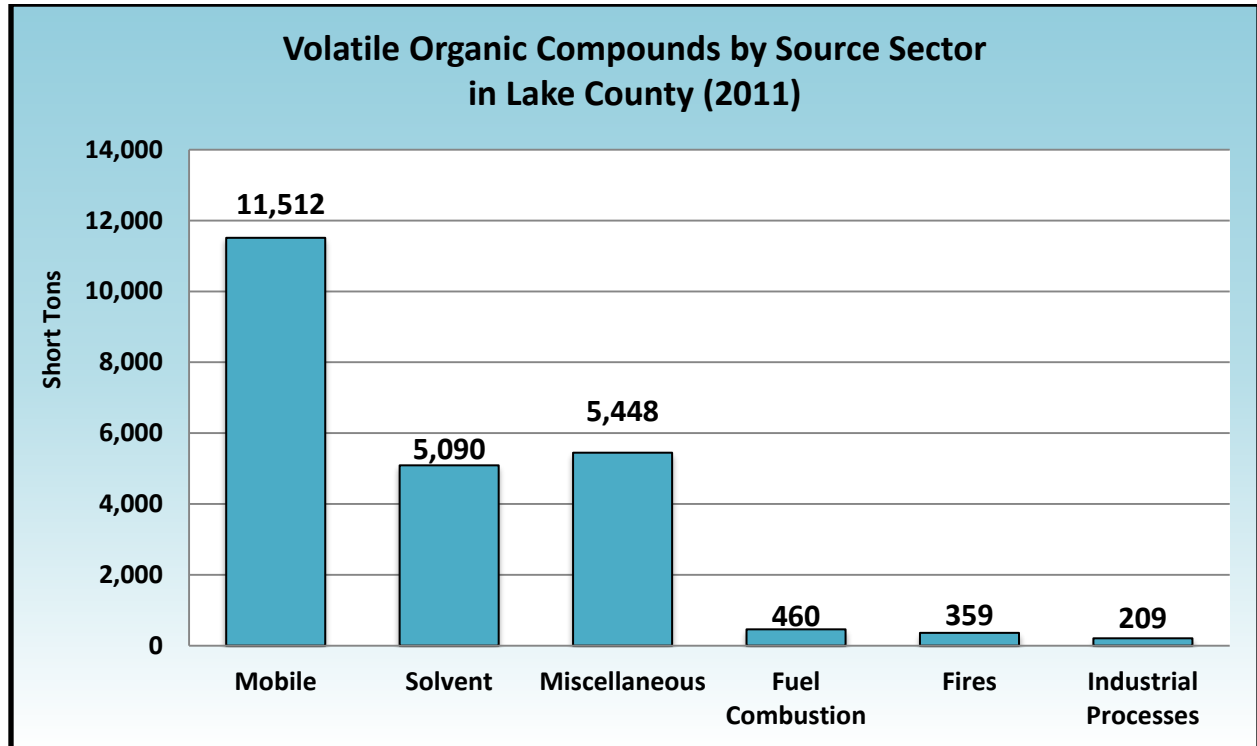
Source: USEPA State and County Source Emissions 2011

### Mobile Sources for Carbon Monoxide Emissions in Lake County (2011)



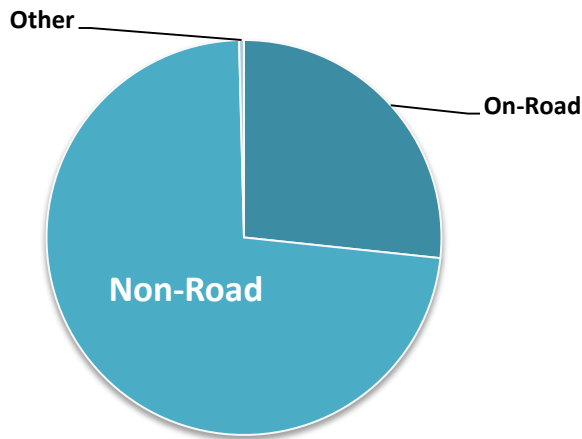
## Volatile Organic Compounds

Volatile organic compound emissions are the second highest critical air pollutant in Lake County (from 2004-2011). The main sources of volatile organic material are mobile sources and solvents. Mobile sources consist of gasoline and diesel-driven vehicles. Solvents are utilized in dry cleaning, degreasing, graphic arts, and also have various consumer and commercial uses<sup>9</sup>.



Source: USEPA State and County Source Emissions 2011

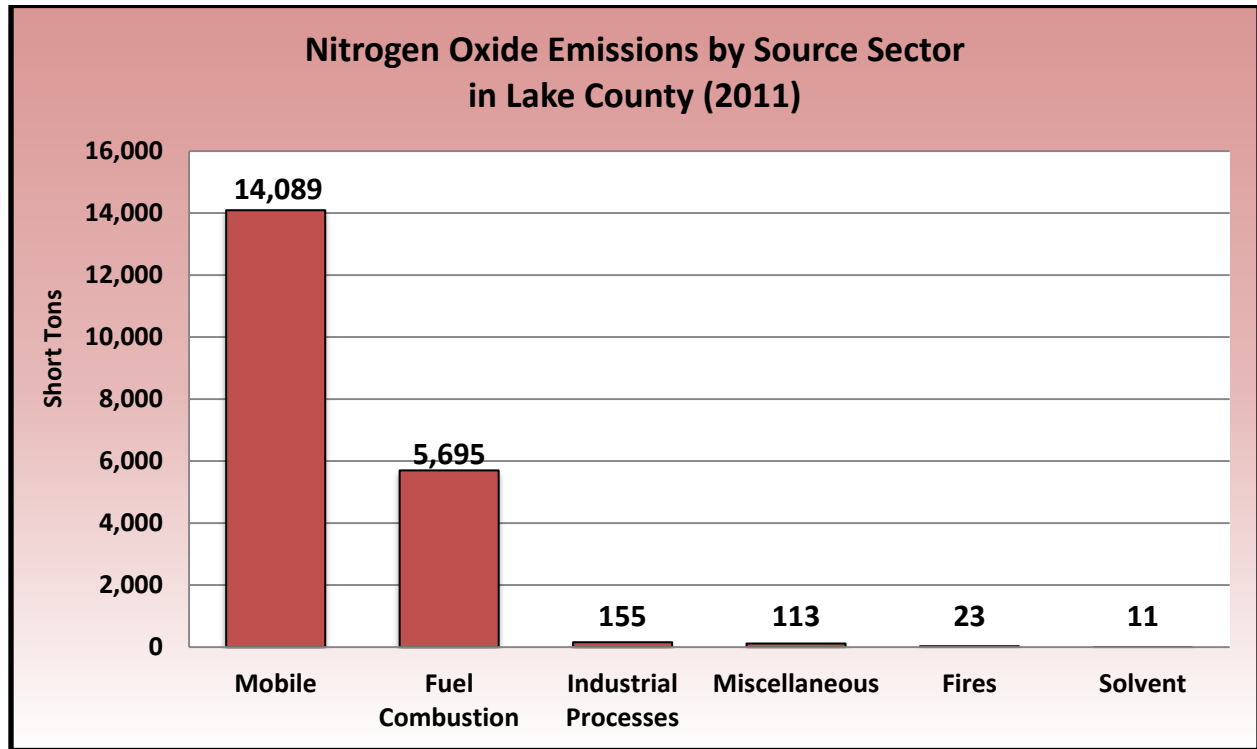
## Mobile Sources for Volatile Organic Compound Emissions in Lake County (2011)





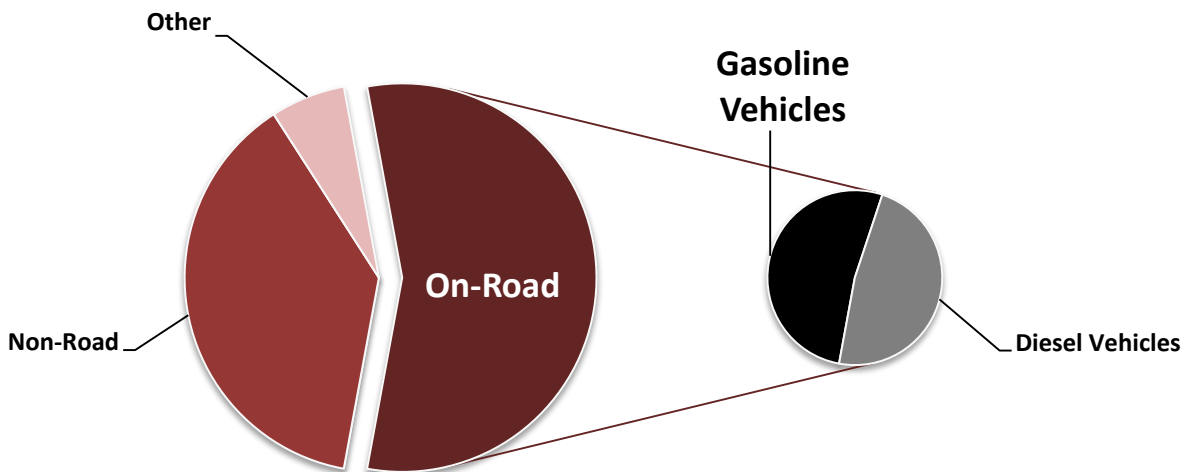
## Nitrogen Oxides

Nitrogen oxide emissions are the third highest of the critical air pollutants in Lake County by source sector (from 2004-2011). The main source of nitrogen oxide emissions are mobile sources (mainly on-road vehicles)<sup>9</sup>.



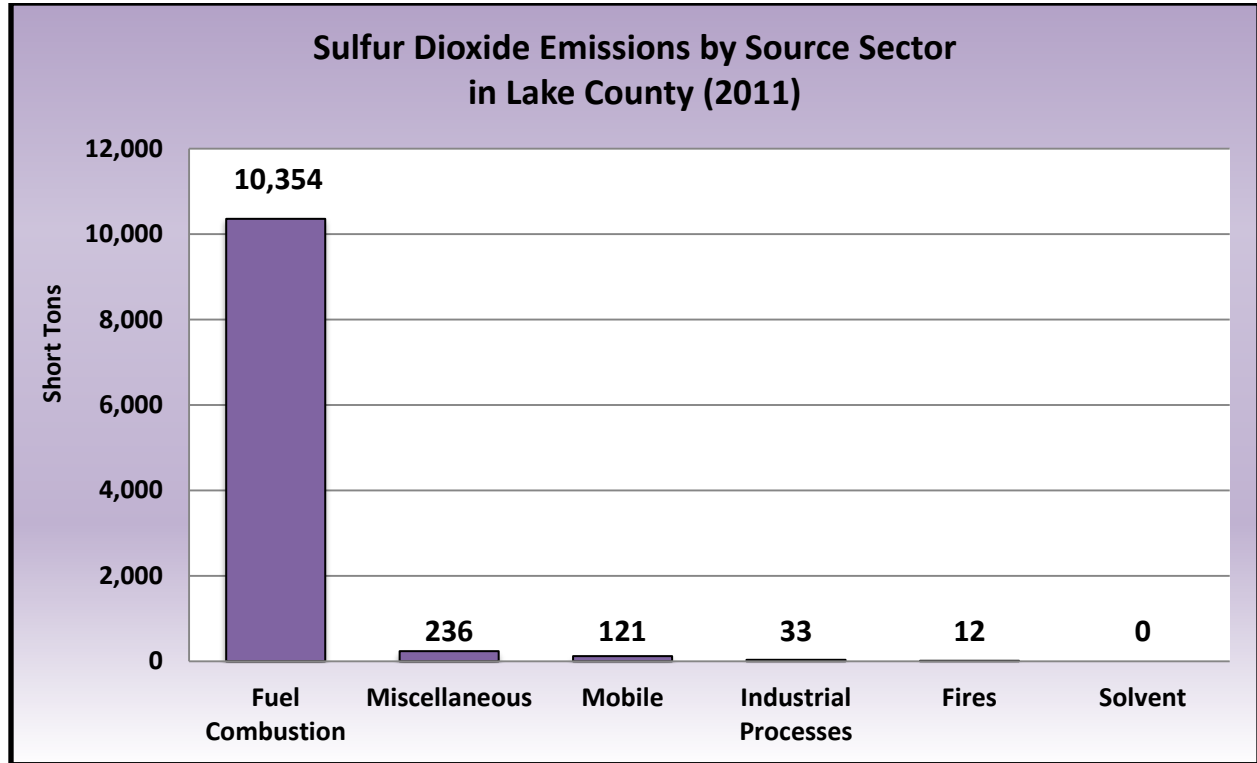
Source: USEPA State and County Source Emissions 2011

### Mobile Sources for Nitrogen Oxide Emissions in Lake County (2011)



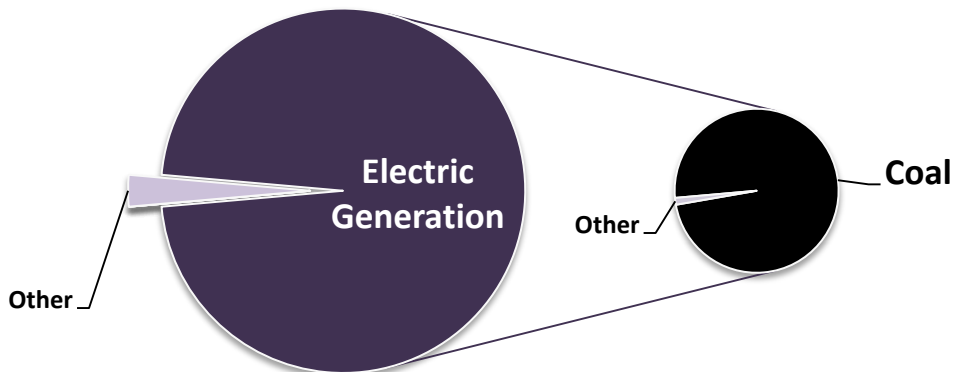
## Sulfur Dioxide

Sulfur dioxide emissions are the fourth highest critical air pollutant in Lake County (from 2004-2011). The main source of sulfur dioxide emissions is fuel combustion. Coal has been found to be the primary source of fuel combustion in Lake County<sup>9</sup>.



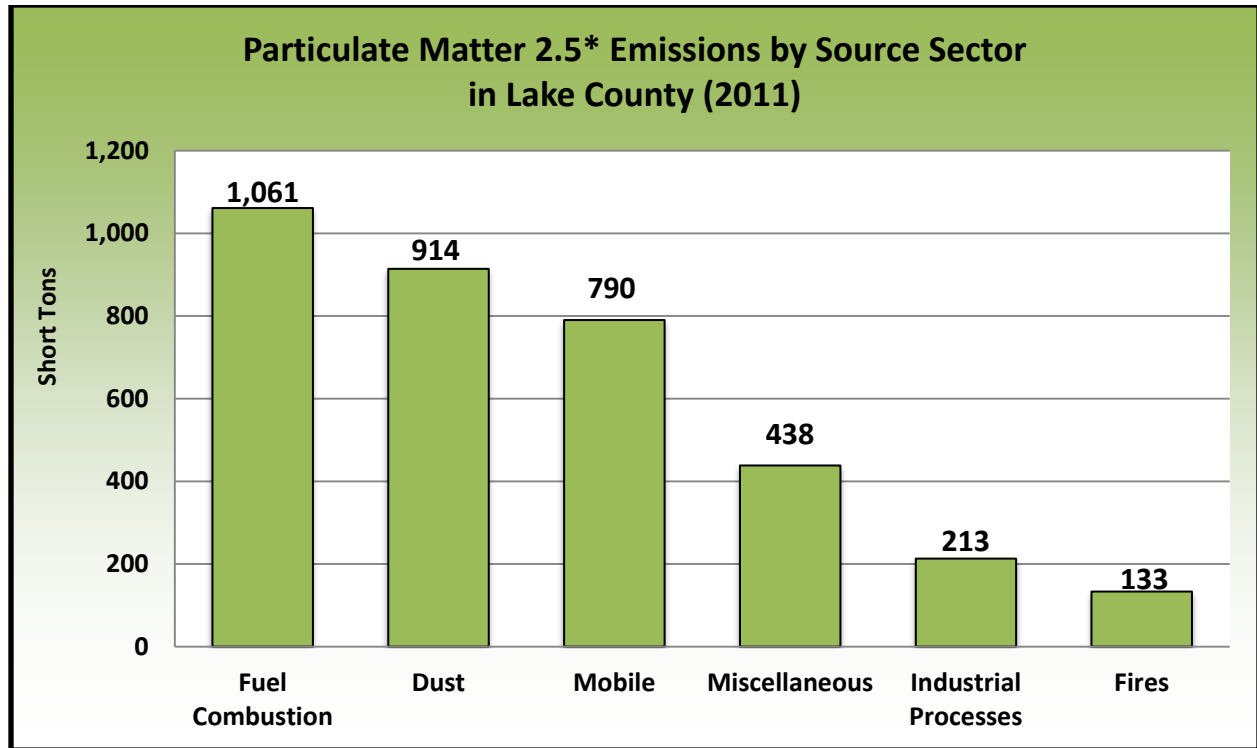
Source: USEPA State and County Source Emissions 2011

### Fuel Combustion Sources for Sulfur Dioxide Emissions in Lake County (2011)



## Particulate Matter

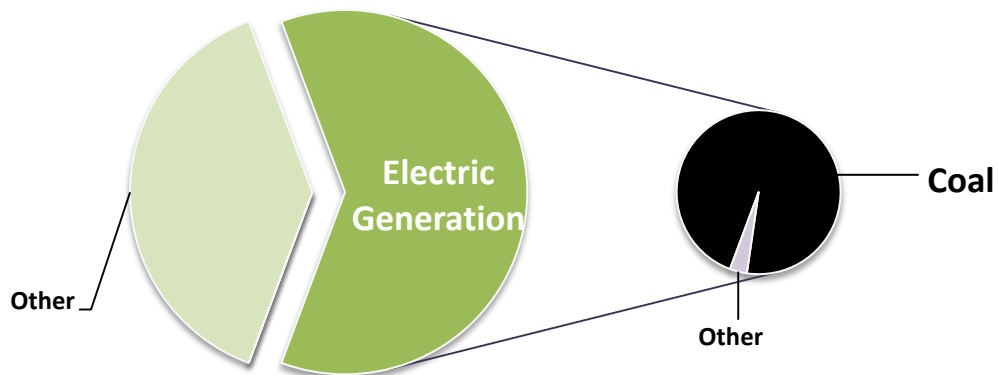
Particulate matter emissions are the fifth highest critical air pollutant in Lake County (from 2004-2011). The main sources of particulate matter emissions in Lake County are fuel combustion and dust. Dust arises from various types of construction and from unpaved roads<sup>9</sup>.



Source: USEPA State and County Source Emissions 2011

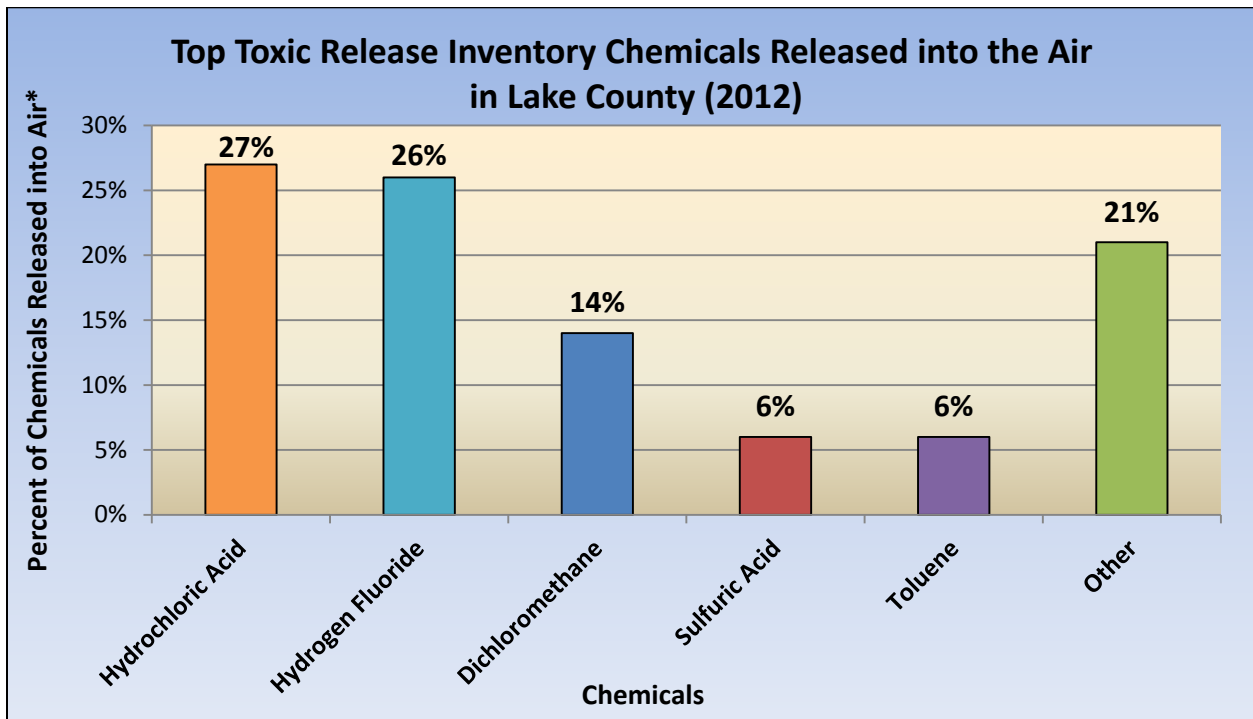
\*2.5 um sized particulate matter causes significant health effects as opposed to particulate matter sized 10 um.

## Fuel Combustion Sources for Particulate Matter 2.5\* in Lake County (2011)



## Toxic Release Inventory

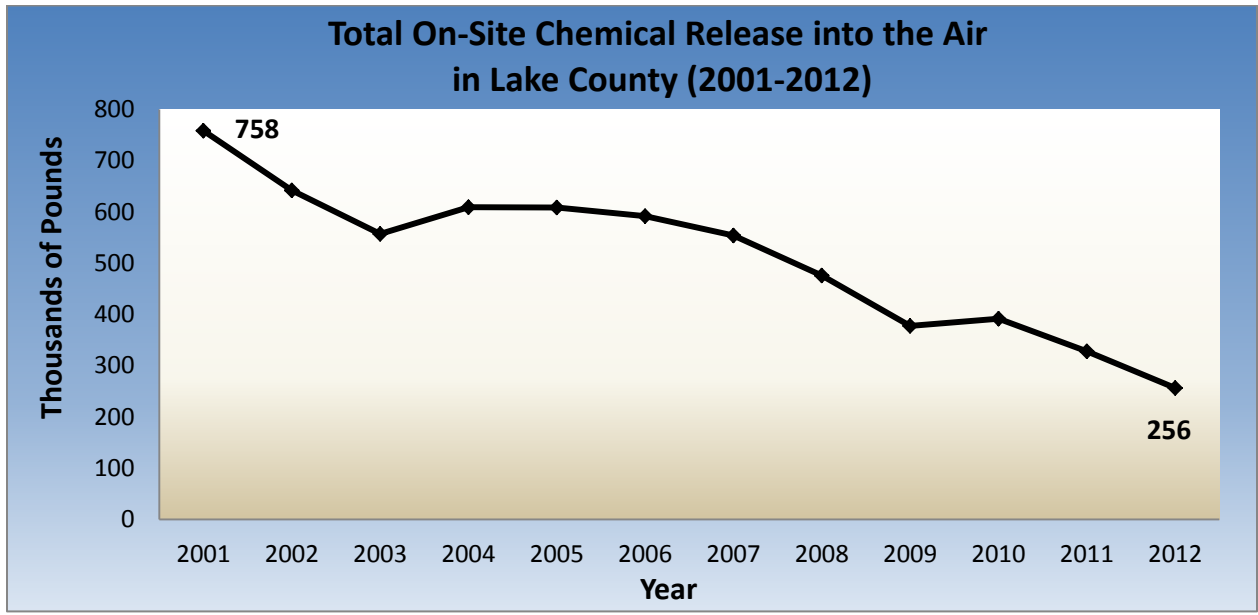
The Toxic Release Inventory (TRI) is a program by the USEPA which tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. All industry sectors in the United States must report annually how much of a chemical is released or emitted from their facility into the environment. This monitoring helps to improve public health and increase environmental protection by keeping a check on all chemicals released by facilities, setting standards for each chemical, and specifying how the facilities must operate with the chemicals utilized<sup>13</sup>.



Source: USEPA Toxic Release Inventory Summary for Lake County (2012)

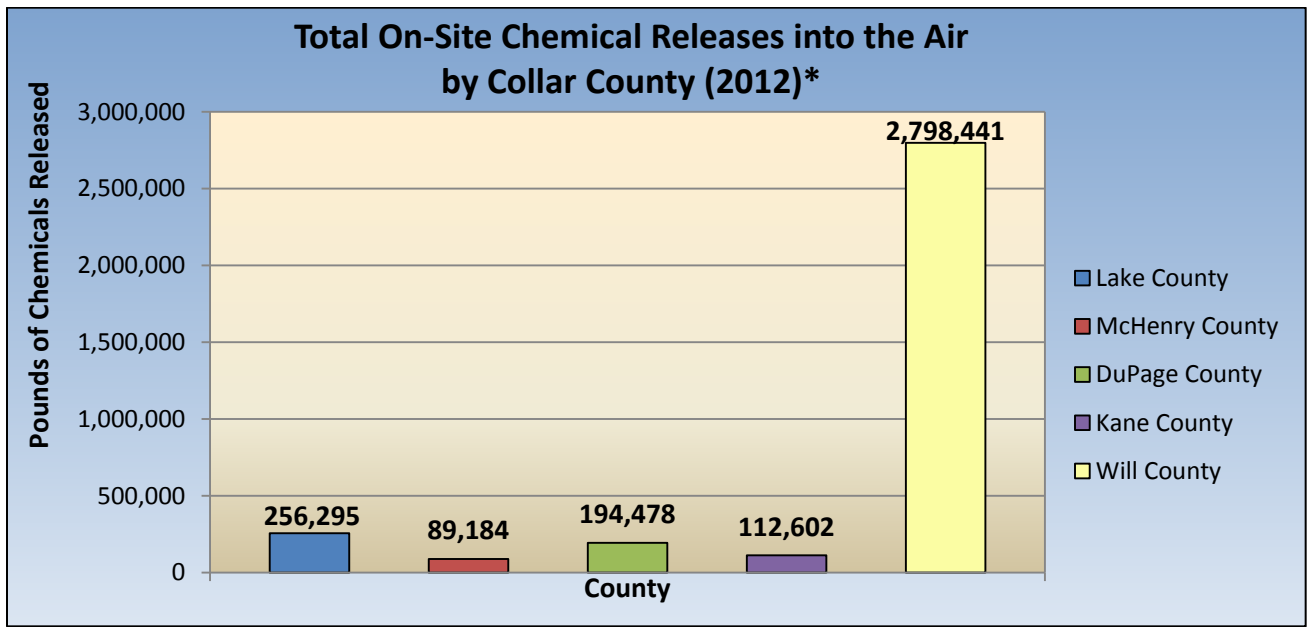
\*Percent calculated from 256,295 lbs. of chemicals released into the air in Lake County (2012)

In Lake County, there are a total of 39 TRI facilities. In 2012, the total on-site chemical releases were 258,580 pounds; with the majority of releases being into the air (256,295 pounds). The top chemicals released into the air were: hydrochloric acid, hydrogen fluoride, dichloromethane, sulfuric acid, and toluene<sup>14</sup>. It should be noted that a large portion of the toxic release inventory chemicals released into the air are by major manufacturers in Lake County.



Source: USEPA Toxic Release Inventory Summary for Lake County (2012)

The total on-site chemical releases into the air in Lake County decreased from 2001 to 2012.



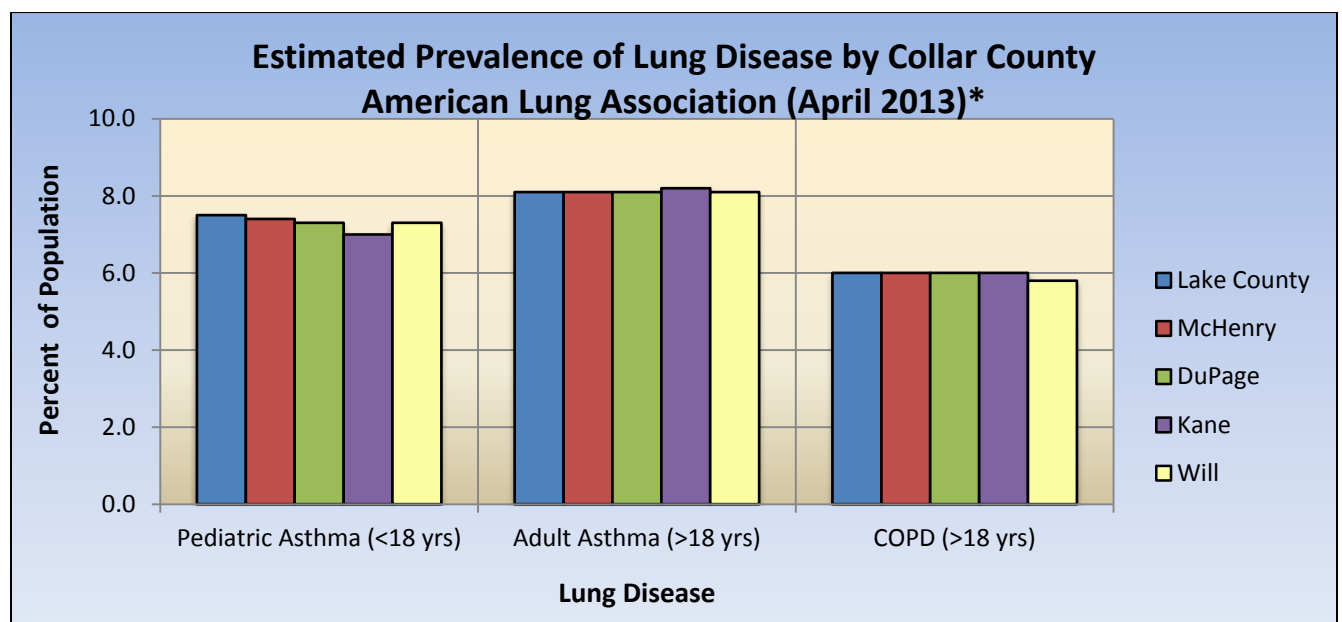
Source: USEPA Toxic Release Inventory Summary Explorer (2012)

\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.

When compared to the collar counties, Lake County has had more on-site chemical releases in 2012 than McHenry, DuPage, and Kane counties; but had far less on-site chemical releases when compared to Will County.

## Health Effects of Air Pollution

Air pollution has the potential to affect everyone’s health. It directly harms lung tissue and bypasses or weakens important natural defense systems in the body. Common symptoms are watering from the eyes and nose, scratchy throat, and coughing. Individuals who are more sensitive to air pollution include: those with pre-existing lung conditions, children, the elderly, and individuals who are vigorously active outdoors. Air pollution affects sensitive individuals by causing inflammation of the cells that line the lungs and reduction in lung function. Those with pre-existing lung conditions, such as asthma and chronic obstructive pulmonary disease (COPD), will experience an aggravation of symptoms and may require emergency room visits and/or hospitalization<sup>10</sup>.

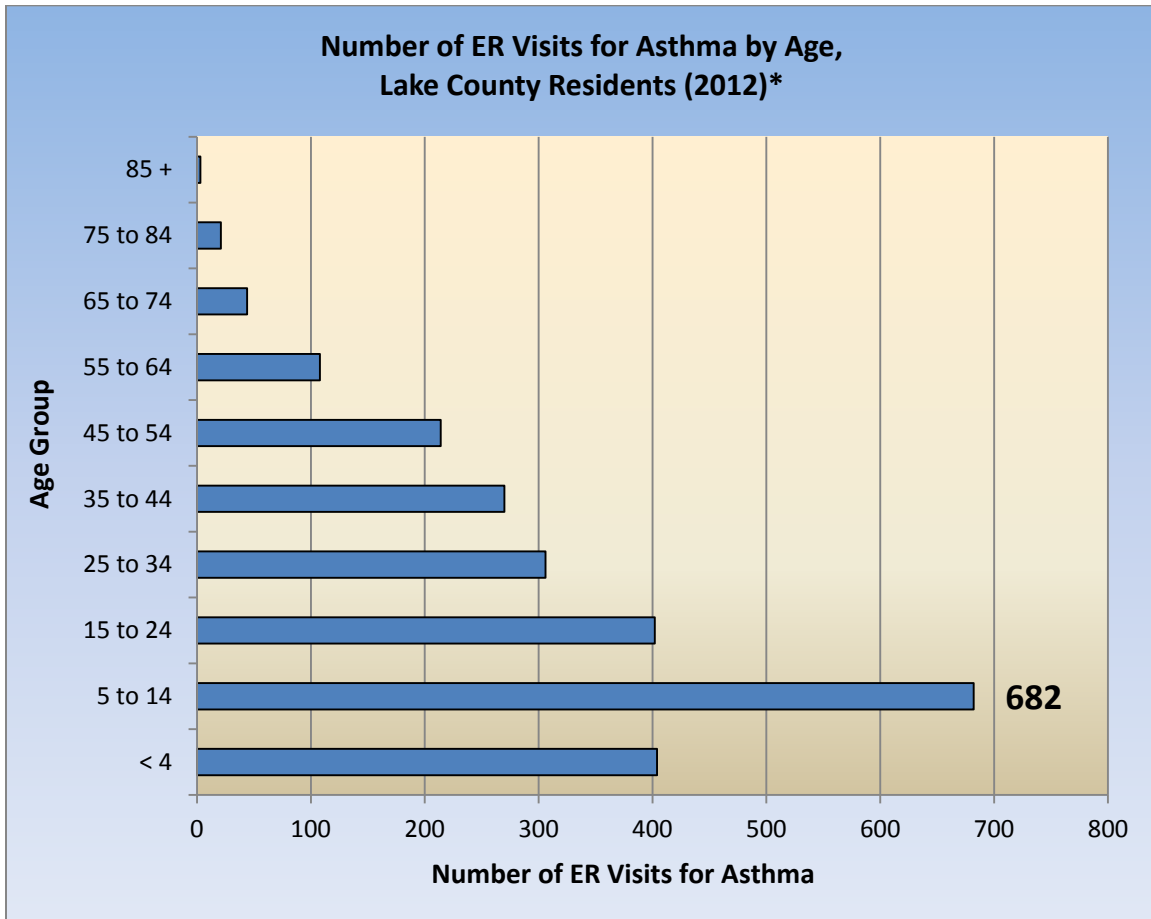


Source: Estimated Prevalence and Incidence of Lung Disease, American Lung Association 2013

\* Cook County is not included in the comparison as it differs greatly in geographic size, population and amount of pollutants.

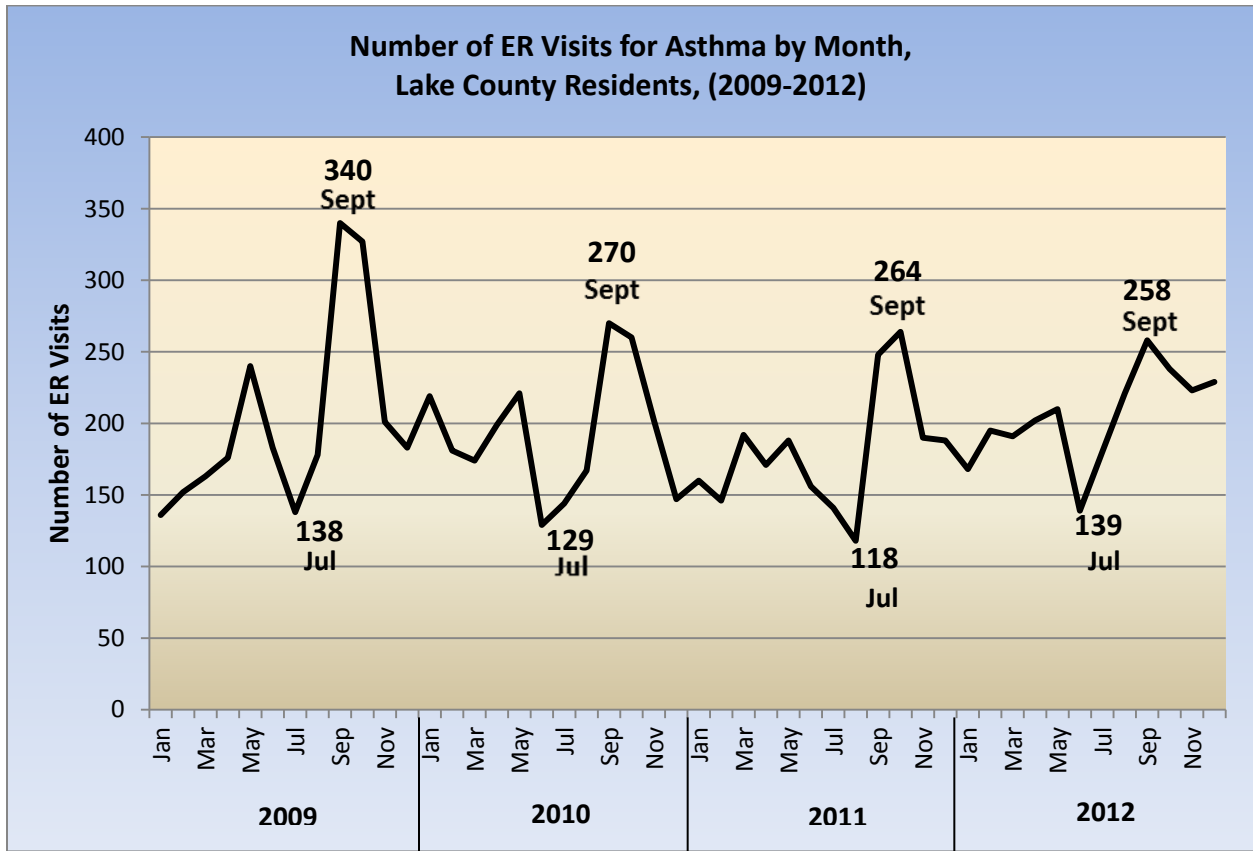
The 2013 estimated prevalence of pediatric asthma in Lake County was 7.5%; adult asthma was 8.1%; and COPD was 6.0%<sup>11</sup>. When compared to the other collar counties, Lake County had very similar prevalence values for pediatric asthma, adult asthma, and COPD.

While the prevalence of adult asthma is higher than the prevalence of pediatric asthma in Lake County, the number of emergency room (ER) visits for asthma attacks are higher in children when compared to adults. In 2012, children aged 5-14 years had the highest number of ER visits due to asthma. Uncontrolled asthma sends one out of every three children with asthma to the emergency department each year<sup>27</sup>. Asthma exacerbations that are uncontrolled by medication are one of the most common causes of ER visits for pediatric asthma. This can potentially be reduced by increasing asthma education and awareness in families with children who have asthma<sup>27</sup>.



Source: Lake County Health Department Hospital Data 2012  
 \*The total number of visits could include multiple visits by one resident.

It is important to note that ER visits for asthma are **not** indicative of the prevalence of the disease as those with controlled asthma in the community will most likely not visit the ER and the data represents the number of ER visits not individuals.



Source: Lake County Health Department Hospital Data 2012

There is a consistent seasonal variation to asthma-related ER visits. Major increases in ER visits occur during the months of September to November and decreases in visits during the months of July to August. The increases in asthma-related ER visits during the months of September to November have been thought to occur due to: increases in environmental allergens during the fall season (e.g., mold, ragweed, pollen); increases in respiratory viral infections; increased exposure to indoor allergens (as the weather gets colder); and decreases in prescription fills for asthma medications in the summer<sup>28</sup>. The decrease in prescription fills for asthma medications in the summer may be related to decreases in asthma symptoms and travel during summer vacation. Asthma triggers may be lower in summer months compared to fall months as there is a decrease in respiratory viral infections and decreased exposure to indoor allergens<sup>29</sup>.



## Current Efforts to Improve Air Quality

There are many efforts in place aimed at reducing air pollution and improving air quality in Lake County. These efforts come from all levels of government: federal, state, and local. The regulatory authority of air quality efforts occurs only at the federal and state level.

### Federal

#### The Clean Air Act

The Clean Air Act is a federal law that was passed in 1970 and updated in 1990 to control air pollution in the United States. *“Under this act, the USEPA may set limits on certain air pollutants, including setting limits on how much can be in the air anywhere in the United States. This helps to ensure basic health and environmental protection from air pollution”<sup>15</sup>*. In addition to setting limits on air pollutants, the USEPA must approve state and local agency plans to reduce air pollution and assist all agencies with research, engineering designs and funding for clean air progress. The regulations, policies, and programs implemented by the USEPA under the Clean Air Act aim towards: reducing outdoor concentrations of air pollutants that cause smog, haze, and acid rain; reducing emissions of toxic air pollutants that are known to or suspected of causing cancer and other health effects; and phasing out the production and use of chemicals that destroy stratospheric ozone<sup>15</sup>. The impact of the Clean Air Act on air pollution has been significant. From 1990 thru 2008, the total emissions of six common pollutants decreased 41%, emissions of volatile organic compounds decreased 31%, carbon monoxide emissions decreased 46%, and sulfur dioxide emissions decreased 51%. In addition, new cars, light trucks, and heavy-duty diesel engines are up to 95% cleaner than past models, and new non-road engines such as those used in construction and agriculture have 90% less particulate matter and nitrogen oxide emissions<sup>34</sup>.

### State

#### Illinois Air Team-Vehicle Emissions Testing Program

According to the USEPA, *“motor vehicles are responsible for nearly one half of smog-forming volatile organic compounds (VOCs), more than half of the nitrogen oxide (NOx) emissions, and about half of the toxic air pollutant emissions in the United States. Motor vehicles, including non-road vehicles, now account for 75 percent of carbon monoxide emissions nationwide”<sup>30</sup>*. One of the critical ways to reduce excessive air pollution by vehicles is through maintenance of a car's engine and pollution control equipment. The Clean Air Act requires vehicle emission testing programs to reduce emissions that contribute to air pollution in large, metropolitan areas which do not meet certain federal air quality standards. The Illinois EPA vehicle emissions testing program, “Illinois Air Team”, provides emissions testing at various stations throughout the state. Vehicles registered in specific zip codes in the Northeastern Illinois and Metro-East St. Louis areas are subject to testing. In Lake County, all of the zip codes are subject to testing and there are a total of four testing stations<sup>16</sup>. After a vehicle is tested it will be given a pass or fail. If the vehicle fails, it means that it has not met the vehicle emissions standards set by the USEPA and needs to be repaired and then re-tested.

### Vehicles Emission Testing Failures, Lake County 2010-2012

Test Year	Initial Tests	Initial Test Failures	Initial Fail Rate
2010	169,320	8,875	5.2%
2011	179,753	10,301	5.7%
2012	185,022	10,326	5.6%

Source: Illinois Air Team Vehicle Emissions Testing Data 2010-2012

Lake County has had a slight increase in initial fail rates for vehicle emissions since 2010. This is an overall positive result however, as there has also been an increase in testing of vehicles. Increase in testing means that more vehicles that are potential polluters will be identified and will most likely be sent for repairs. This in turn helps to reduce vehicle emissions that contribute to air pollution in Lake County.

#### Illinois EPA-Bureau of Air Permit Program

This program regulates air pollution by requiring air permits for businesses that utilize equipment that emit any of the criteria air pollutants. The Bureau of Air determines if a particular business may be granted a permit (usually construction or operational) after a detailed evaluation of emission sources, industrial/processing equipment, and air control equipment<sup>17</sup>.

#### Illinois EPA-Green Fleets Program

This is a voluntary program, *“where businesses, government units, and other organizations in Illinois gain recognition and additional marketing opportunities for having clean, green, domestic, renewable, American fuel vehicles in their fleet”*<sup>18</sup>. The Green Fleets members utilize fuels that are considered green, such as: natural gas, propane, 85% ethanol (E-85), electricity, and biodiesel. The rewards for utilizing these fuels are increased marketing for the organizations and agencies involved. The rewards for the state are improved air quality and promotion of domestic fuels. In Lake County, there are seven organizations that are Green Fleets members.

The Green Fleets Program contains another program called the *“Illinois Alternate Fuels Rebate Program.”* This program offers rebates to anyone using E85 or biodiesel fuels (20% blend or higher); for purchasing a new alternative fuel vehicle; or for converting to a conventional vehicle to alternate fuel. Application to this program is available for any resident, business, local government, or organization in Illinois<sup>18</sup>.

## Local

Lake County agencies have put forth their own efforts at reducing air pollution and improving air quality. Lake County has no specific regulatory authority over air quality as that occurs at the federal and state levels.

### Land Conservation Partners of Lake County

This is a partnership between 17 public and private land conservation organizations who are working towards maintaining Lake County's quality of life through preserving open space and natural areas<sup>21</sup>. Preserving natural areas and open space is important as it conserves land, trees, and vegetation, which in turn improves air quality<sup>22</sup>. Trees and vegetation reduce air pollution by removing and absorbing various criteria pollutants from the air through their leaves (called dry deposition). They also remove and store carbon, evaporate emissions from parked cars with their shade, and reduce greenhouse gasses from power plants through reducing energy demand<sup>31</sup>. According to a report from the United States Department of Agriculture (USDA) Forest Service, *"in urban areas with 100% tree cover (i.e., contiguous forest stands), short term improvements in air quality (one hour) from pollution removal by trees were as high as 15% for ozone, 14% for sulfur dioxide, 13% for particulate matter, 8% for nitrogen dioxide, and 0.05% for carbon monoxide"*<sup>32</sup>. Lake County's Forest Preserve consists of 30,000 acres of preserved land and open space (approximately 10% of the land area in Lake County) which is beneficial in contributing to good air quality<sup>33</sup>.

### Open Burning Restrictions

*"Open Burning is combustion of any matter in the open or in an open dump"*<sup>23</sup>. This is restricted in certain areas of Lake County due to the hazard of uncontained fires and the pollutants released into the air from open burning. The pollutants may be harmful to health and negatively impact air quality. There are currently 29 municipalities in Lake County with an open burning ban and 22 with managed restrictions on opening burning of landscape materials<sup>24</sup>. The Lake County Health Department Environmental Services program investigates inquiries regarding open burning and informs residents on whether open burning is banned or allowed in the municipalities with managed restrictions<sup>25</sup>.

### Lake County Environmental Services

*"This program helps to serve to prevent disease and assure sanitary conditions in order to maintain and improve the quality of life in Lake County"*<sup>25</sup>. The environmental services program informs Lake County residents on issues related to indoor and outdoor air quality. It also educates residents on: the Clean Air Act; ozone action days; controlling mold and mildew; radon; and how to reduce asthma attacks<sup>26</sup>. Keeping residents well informed on indoor and outdoor air pollution helps them to protect themselves from the possible health effects of air pollution as well as provide ideas as to what they can do at an individual level to reduce air pollution in Lake County.

### **Lake County Transportation Improvements - CMAQ**

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) was the first transportation funding bill that introduced air quality analysis into the planning and implementation process for federal-aid projects. ISTEA included the Congestion Mitigation and Air Quality Program (CMAQ) a fund source made available only to urbanized areas nationwide determined to be in a state of non-attainment for certain National Ambient Air Quality Standards (NAAQS) established in the 1990 Clean Air Act Amendment. Northeastern Illinois is a non-attainment area for fine particulate matter (PM2.5) and a moderate non-attainment area for ground level ozone. While all federal-aid projects must be modeled in aggregate to demonstrate improved air quality, each individual project submitted for CMAQ funding must be analyzed to determine the emissions reductions that may be anticipated with its implementation. In Northeastern Illinois projects that reduce emissions that contribute to ozone and PM2.5 are given priority for CMAQ funds.

Lake County has actively pursued the use of CMAQ funds for projects as diverse as adaptive traffic signal controls, fiber-optic traffic signal interconnections, roundabouts and bicycle paths. Since the inception of the Program the County has received approval for the use of CMAQ funds amounting to \$81.8 million. It is estimated by the Chicago Metropolitan Agency for Planning that the Lake County projects implemented with CMAQ funds are eliminating 473 kg of volatile organic compounds on a daily basis<sup>36</sup>.

### **Lake County Diesel Retrofits**

In 2006 and 2010 Lake County, working with the USEPA and IEPA, retrofit the older Lake County diesel vehicles with emission reduction devices. The vehicles were equipped with Diesel Oxidation Catalysts and Closed Crankcase Ventilation Systems which have been proven by the EPA to reduce pollutants by 40%<sup>36</sup>.

### **Lake County PASSAGE**

Lake County PASSAGE was launched in 2005 and is *“an intelligent transportation system designed to provide motorists real time traffic congestion information due to crashes and construction events”*<sup>19</sup>. Providing this information keeps county residents aware of high traffic areas, which they can potentially reduce emissions and exposure to air pollution (through vehicle emissions and/or construction dust). Being aware of live traffic may also help in reducing air pollution by giving residents a chance to plan ahead and choose alternate routes of travel. Avoiding the stop-and-go routine of high traffic areas reduces vehicle emissions<sup>20</sup>.

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