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*spot*light

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Happy Earth Day

North Carolina's air is worth celebrating

SUMMARY: **North Carolina's air quality is worth celebrating. Despite scare tactics from environmental advocates, N.C.'s air is cleaner than ever and only getting better.**

The EPA monitors six common air pollutants. It is clear that across the board, N.C.'s air is doing extremely well in relation to all of these pollutants.

• Ground-level ozone (the primary contributor to smog): Just three years ago, 20 N.C. counties violated the federal standard for ozone. In 2006, only two counties exceeded the standard.

• Particulate matter (specifically fine particles called $PM_{2.5}$): In the 1999-2001 measurement, 14 out of 25 N.C. counties violated the federal standard—now only two out of 31 violate the standard. $PM_{2.5}$ has been steadily declining over the last six years, from 14.8 micrograms per cubic meter of air to 12.58 micrograms per cubic meter of air.

• Carbon monoxide: 2005 levels of carbon monoxide in N.C. were 3.7 times less than 1990 levels and five times less than the federal standard.

• Lead: Since 1980, lead has declined by 96 percent across the entire country, in part due to unleaded gasoline. The EPA data indicate that North Carolina's lead air concentration is 37.5 times below the federal standard.

• Sulfur dioxide (contributes to acid raid): The 2005 level of sulfur dioxide in N.C. is 9.4 times less than the federal standard and is at its lowest level during the period for which data are available (1990-2005).

• Nitrogen dioxide (contributes to ozone and acid rain): The 2005 level of nitrogen dioxide in N.C. was 4.2 times less than the federal standard. Nitrogen dioxide levels from 1990-2005 have been far below the federal standard.

For many environmental advocates, Earth Day is a special occasion to scare more people into believing air quality is getting worse. Unfortunately, the scare tactics have worked. Too many people think that the air in North Carolina is getting dirtier and harder to breathe. The fact is, North Carolina's air is cleaner than ever and only getting better.

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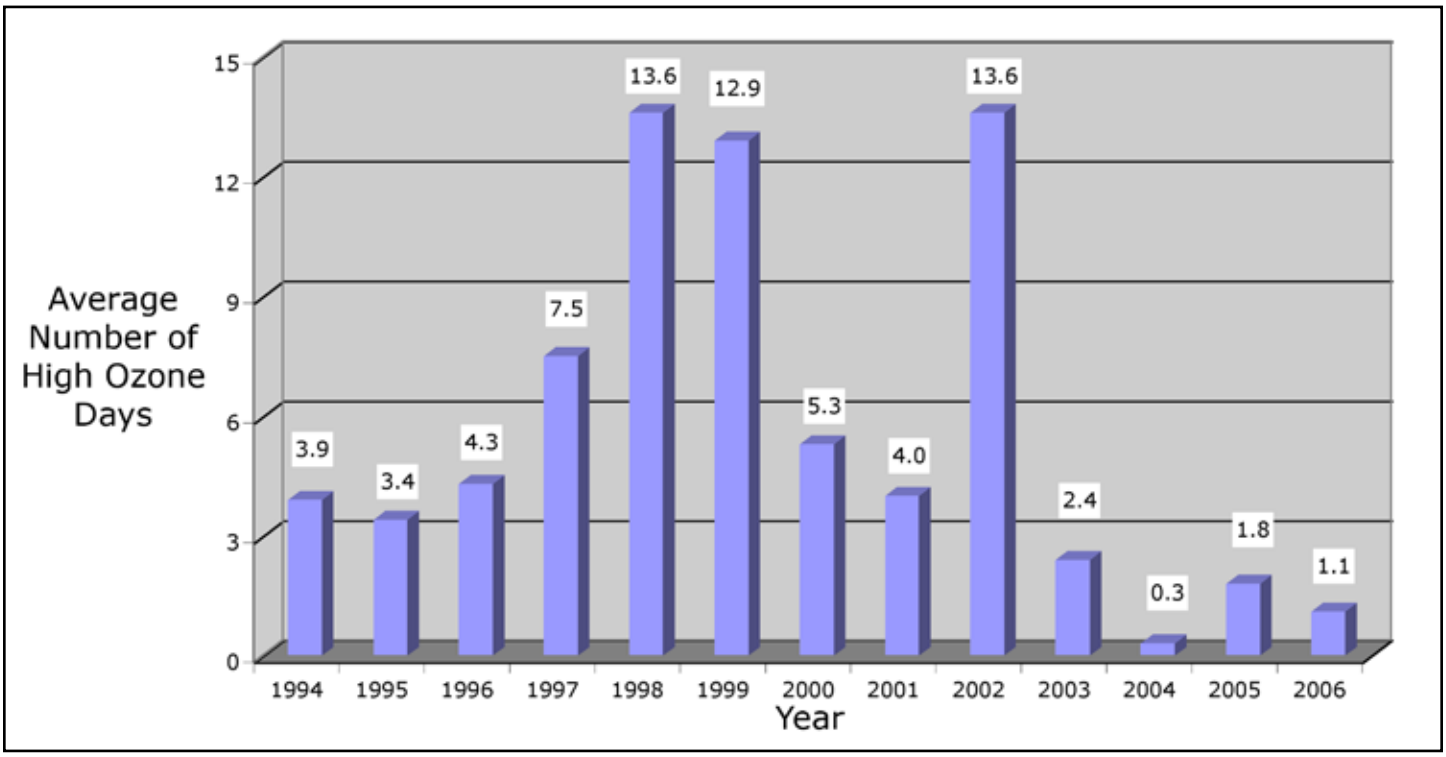
Chart 1. Average Number of High Ozone Days, Calculated from All N.C. Monitors, 1994-2006



These misconceptions are a serious problem because they influence policymakers when they make decisions that affect all North Carolinians. This *Spotlight* will provide the facts on air quality in North Carolina. Earth Day 2007 should be a time to celebrate, not a time to cower in fear.

Background

The Environmental Protection Agency (EPA) has developed standards for six common air pollutants called the National Ambient Air Quality Standards (NAAQS). Ambient air quality simply means outdoor air quality. These pollutants, which also are referred to as criteria pollutants, include ozone, particulate matter, carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide.[1] The following sections will briefly describe each pollutant and, using the latest available data, illustrate how the air is only getting cleaner.

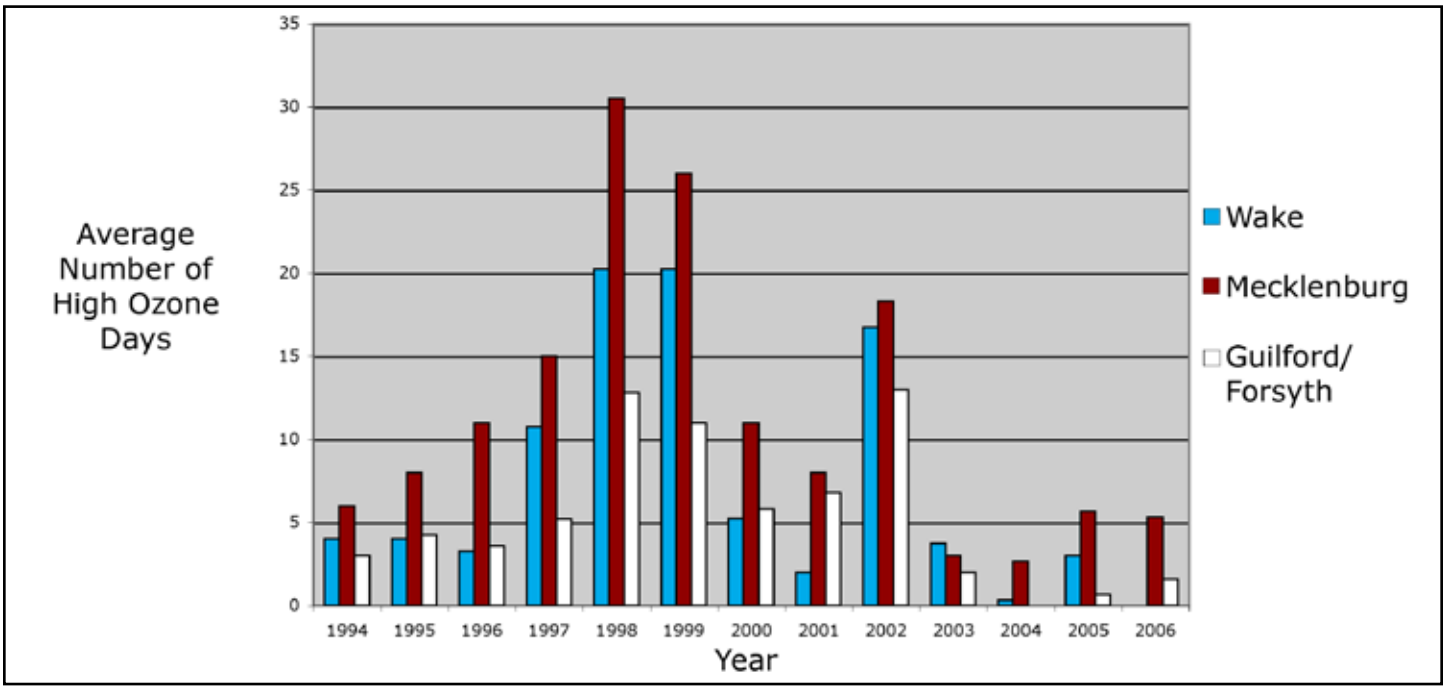
Ozone

Ozone is a gas that generally is not emitted into the air but is a result of a chemical reaction between nitrogen dioxide and volatile organic compounds (refers to numerous gases that are emitted). The hotter it is, the higher the ozone concentration will be. As a result, ozone levels are highest during the summer.

Ozone, when referred to as a pollutant, means *ground-level ozone* and is the primary source of smog. It should not be confused with the ozone layer. The ozone layer consists of ozone that exists in the stratosphere, which is about 10-30 miles above the surface. Ozone in the ozone layer is critical to protecting life on the planet from sunrays.[2]

Many people seem to assume that ozone is getting worse. There are monitors throughout the state that measure ozone levels. When ozone gets to .085 parts per million averaged over an eight-hour period, it exceeds the federal ozone standard. “Parts per million” refers to the volume of a pollutant—it means one part of a pollutant in one million parts of air by weight.[3] As Chart 1 shows,[4] the average number of days that exceed this standard (“high ozone days”) fluctu-

Chart 2. Average Number of High Ozone Days, Calculated from All Monitors in Selected N.C. Counties, 1994-2006



ates, likely due to temperature, but over the last four years, the numbers have been at their lowest levels. The good news on ozone also applies to metropolitan counties as demonstrated[5] in Chart 2.

Despite this good news, ozone is a prime target for scare tactics by environmental advocacy groups. In an April 20, 2005, press release (in conjunction with Earth Day 2005), the Southern Alliance for Clean Energy, with other supporting organizations, stated "This last year [2004], ozone levels in the Smokies rivaled those in major cities such as Atlanta and Los Angeles."[6] Chart 3 shows[7] how ridiculous this statement is and why it is critical to be wary of these

Chart 3. Average Number of High Ozone Days, Calculated from All Monitors in Atlanta, L.A., and the Smokies, 2004

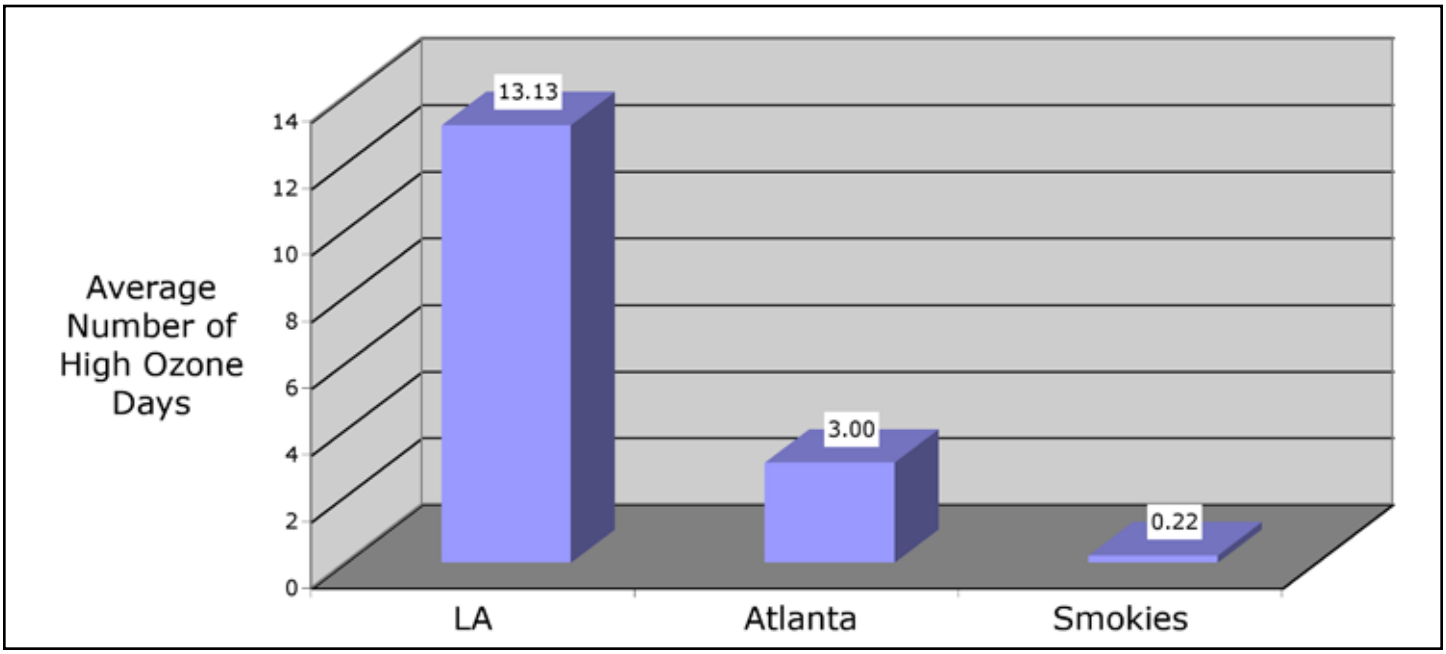
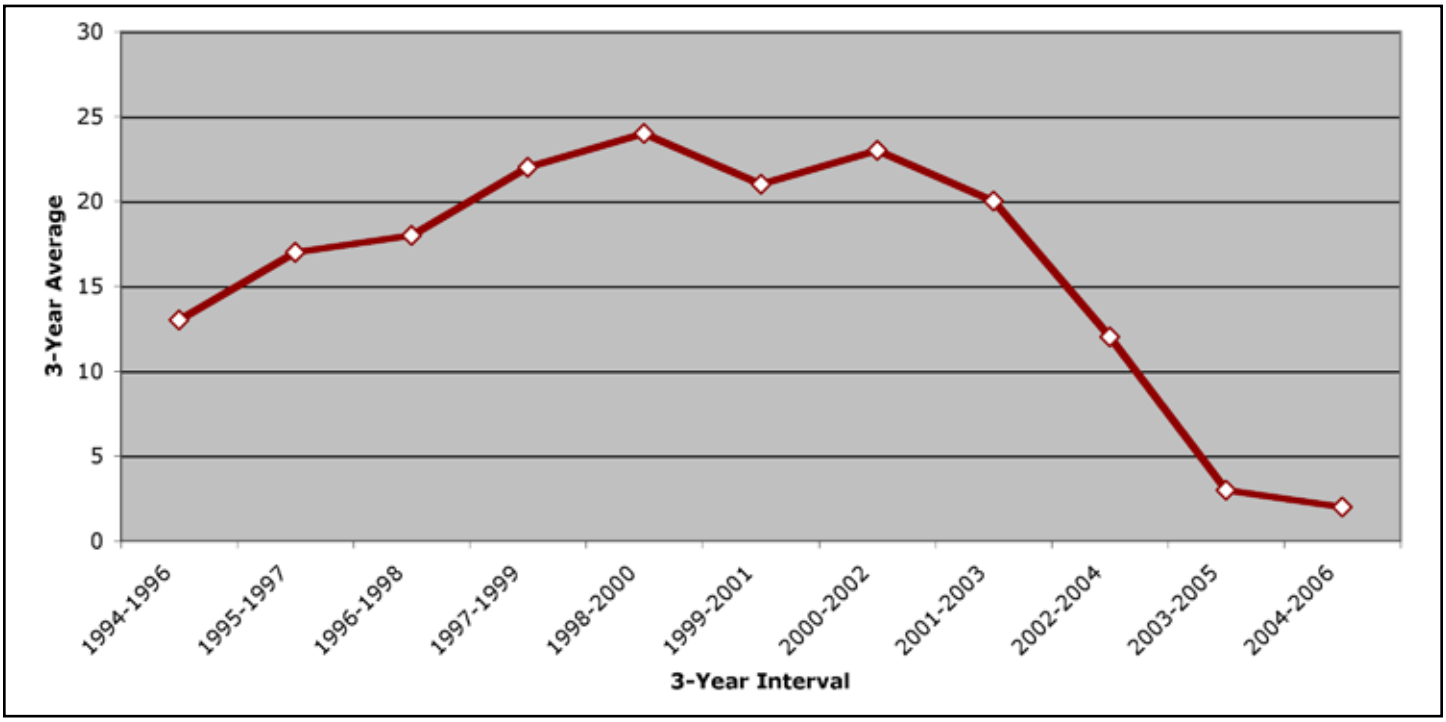


Chart 4. Number of North Carolina Counties with 8-Hour Ozone Violations, Based on 3-Year Averages, 1994-1996 through 2004-06



outrageous claims. In 2004, the average number of high ozone days from all monitors in the Smokies was 13.6 times less than Atlanta and 59.7 times less than Los Angeles.

The North Carolina Division of Environment and Natural Resources (DENR) identifies counties that violate the federal standard based on a three-year average. As Chart 4 demonstrates,[8] the number of counties that exceeded the standard has been drastically reduced.

Particulate Matter

Particulate matter is a mixture of very small particles and drops of liquid.[9] The primary particulate matter (PM) of concern is called $PM_{2.5}$. The numbers refer to the diameter of the particles. $PM_{2.5}$, also called fine particle pollution, includes particles that are 2.5 micrometers in diameter or smaller.[10] These particles are 30 times smaller than the diameter of the average human hair.[11] The standards for $PM_{2.5}$ are relatively new and were finalized in 1997.[12]

As Chart 5 shows,[13] the number of counties that have exceeded the $PM_{2.5}$ federal standard of 15 micrograms per cubic meter of air has decreased dramatically. The three-year average from 1999-2001 identified 14 out of 25 counties above the standard. In the latest three-year average, from 2004-06, the number is only two out of 31 counties that are above the standard. As shown[14] in Chart 6, using DENR data, the average of all the county measurements has steadily declined from 14.8 micrograms per cubic meter of air to 12.58 micrograms per cubic meter of air.

Carbon Monoxide

Carbon monoxide "is a colorless, odorless gas that is formed when carbon in fuel is not burned completely."[15] The highest concentrations of carbon monoxide generally are found during the coldest times of the year.[16]

As Chart 7 shows,[17] North Carolina's carbon monoxide level has been well below the federal standard of 9 parts per million in every year for which data are made available by the EPA. There also is a clear and significant downward

Chart 5. Number of Counties Above the Federal $PM_{2.5}$ Standard, 1999-2001 through 2004-06

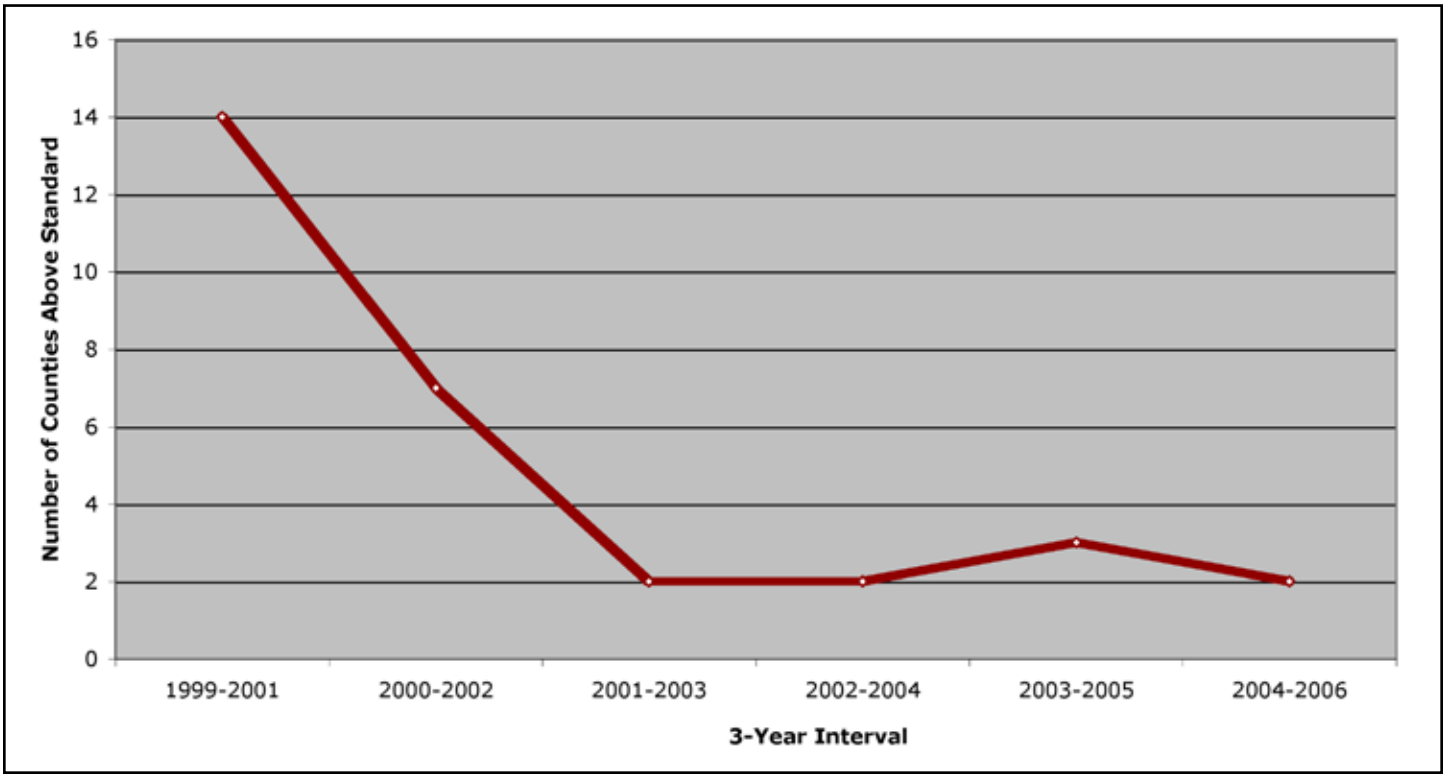


Chart 6. Average Concentration of $PM_{2.5}$ Calculated from N.C. Counties Sampled, 1999-2001 through 2004-06

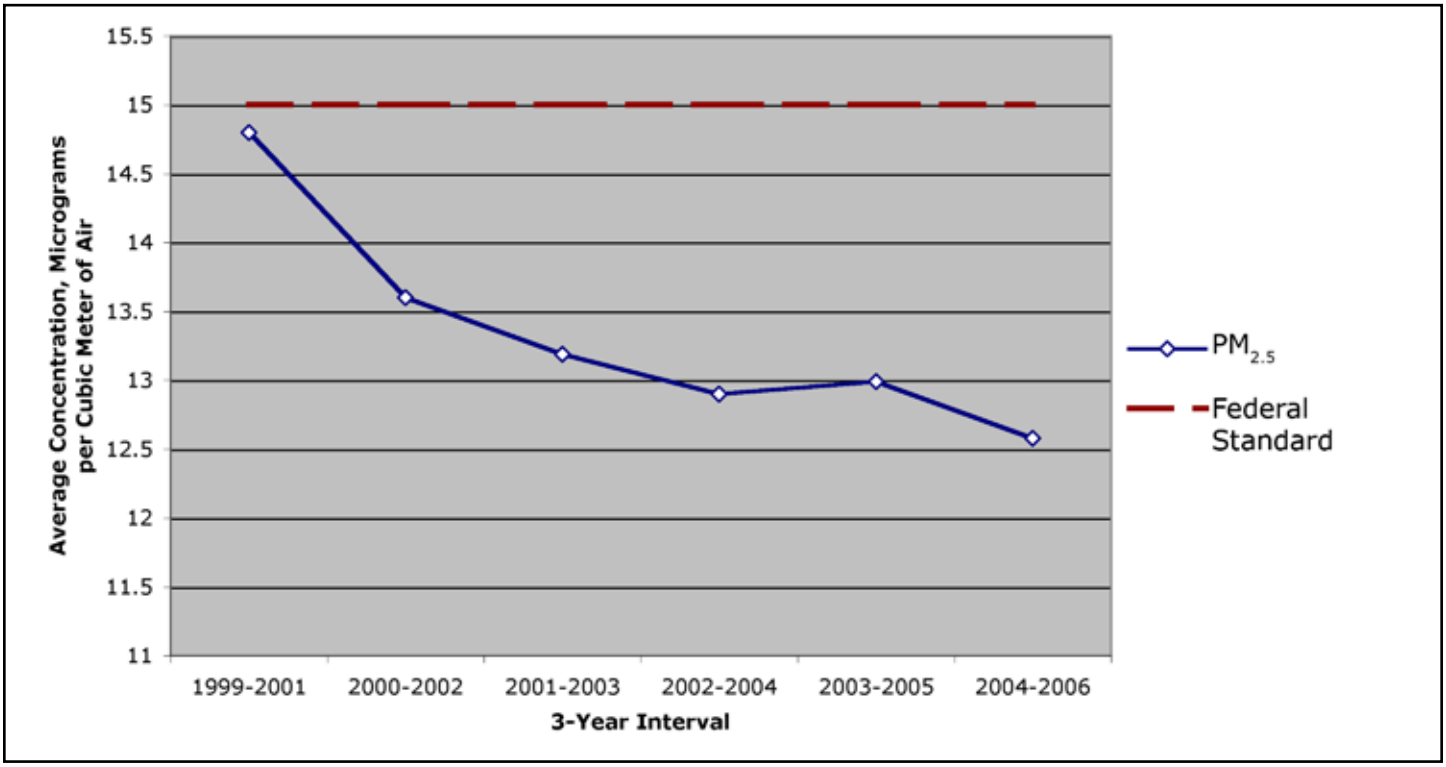
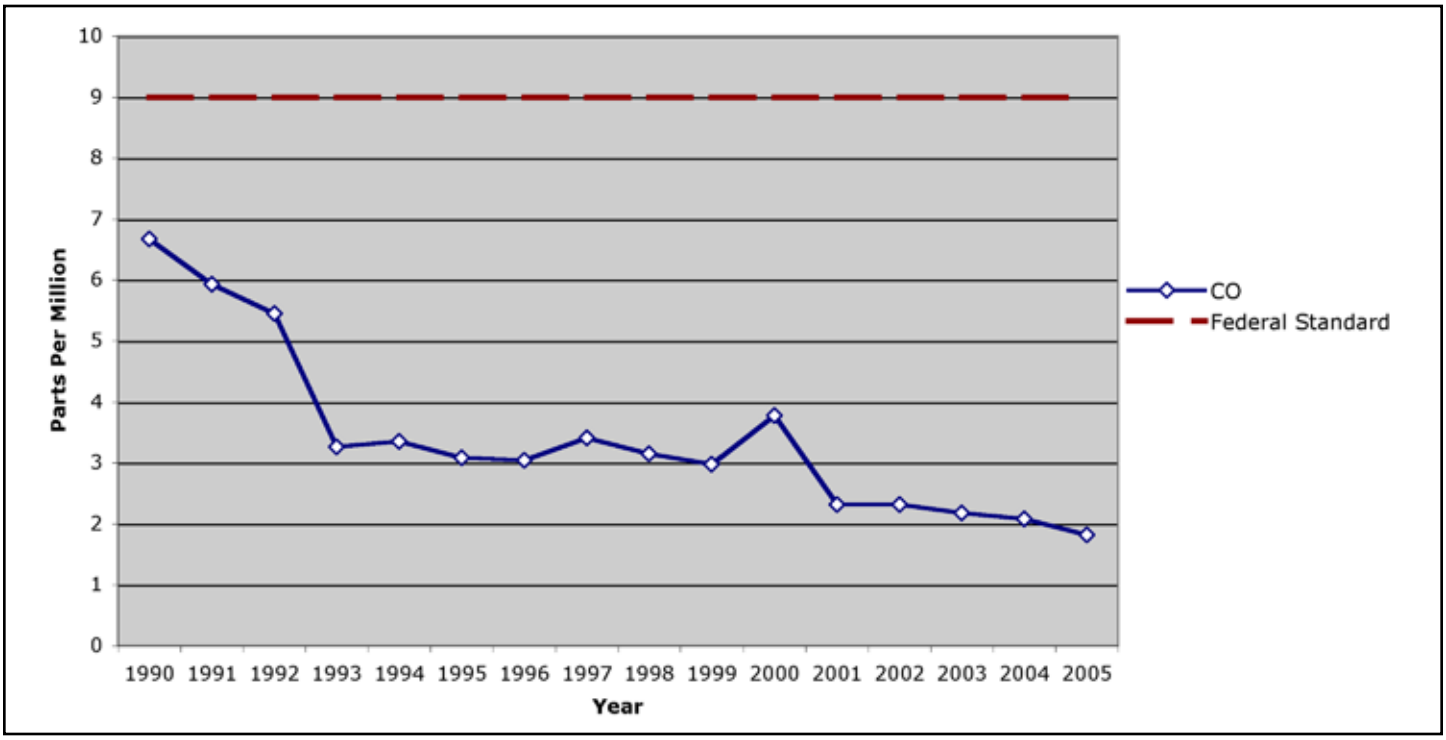


Chart 7. Average Concentration of Carbon Monoxide Calculated from Monitors Sampled, 1990-2005



trend. In 1990, North Carolina's carbon monoxide level was 6.67 parts per million, and in 2005, the number was only 1.82 parts per million. To put it another way, the 2005 levels were 3.7 times less than the 1990 levels. The 2005 levels were five times less than the federal standard.

Lead

Lead is a metal that has been drastically reduced in the air since 1980. According to the EPA, "Nationally, average lead concentrations decreased dramatically after EPA's regulations reduced the lead content in gasoline."[18] From 1980 to 2005, there was a 96 percent decrease in the national average of lead concentration in the air. Since 1990, there has been a 38 percent decrease in the national average.[19] In North Carolina, lead air quality was measured at five monitoring sites in 1996, three of which provided the necessary data. The numbers at each site were all .04 micrograms per cubic meter of air.[20] The federal standard is 1.5 micrograms per cubic meter of air—the observed North Carolina data are 37.5 times less than the federal standard.

Sulfur Dioxide

Sulfur dioxide is a gas that can dissolve in water vapor to form acid.[21] It is a contributor to acid raid.[22] The federal standard for sulfur dioxide is .03 parts per million. As shown[23] in Chart 8, North Carolina's sulfur dioxide levels have been far below the federal standard during the years for which the EPA makes data available (from 1990). The numbers appear to fluctuate, but recent years have been extremely low, with 2005 recording the lowest number measured. In 2005, sulfur dioxide was measured at only .0032 parts per million. The latest measurement is 9.4 times less than the federal standard of .03 (note that the latest measurement is not .032, but .0032).

Nitrogen Dioxide

Nitrogen dioxide is a type of nitrogen oxide gas that contains two oxygen atoms (NO_2).[24] It is a contributor both to

Chart 8. Average Concentration of Sulfur Dioxide Calculated from Monitors, Sampled 1990-2005

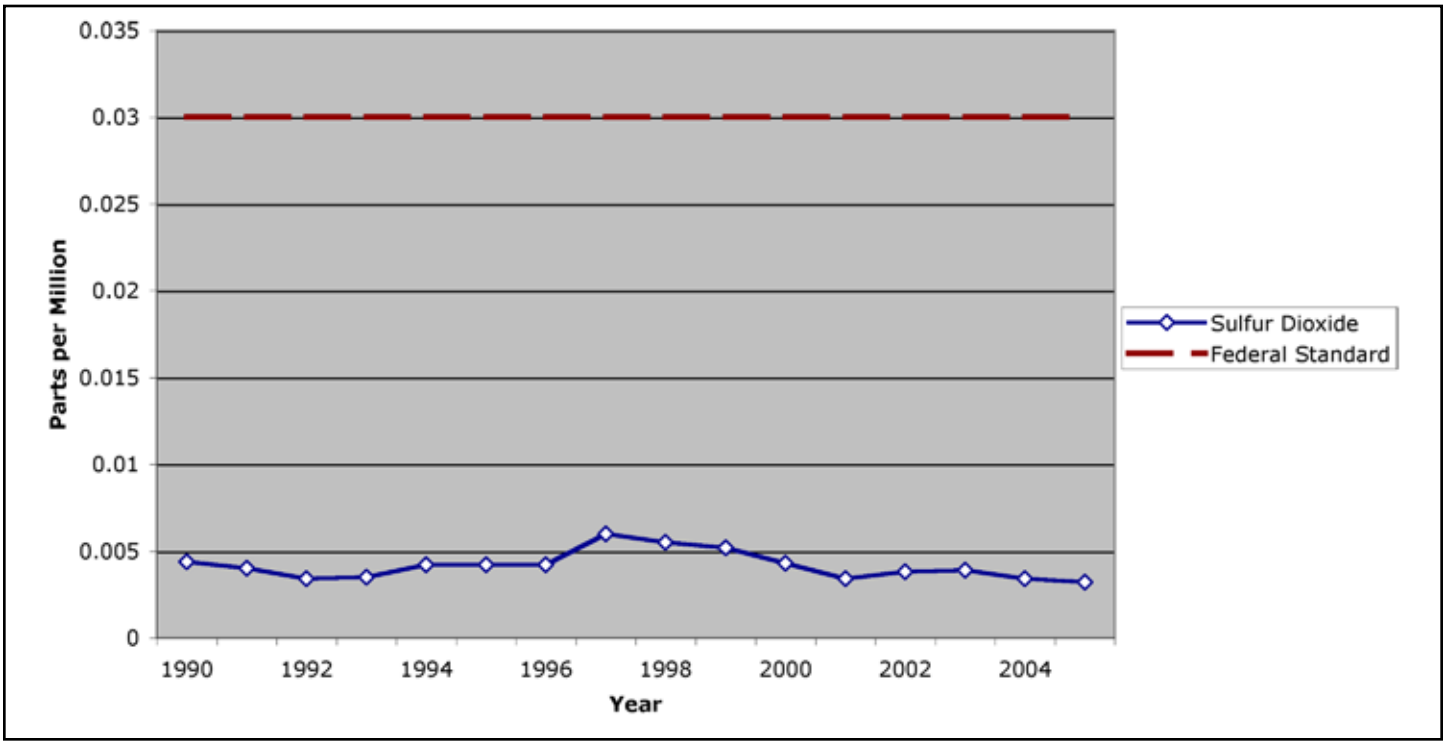
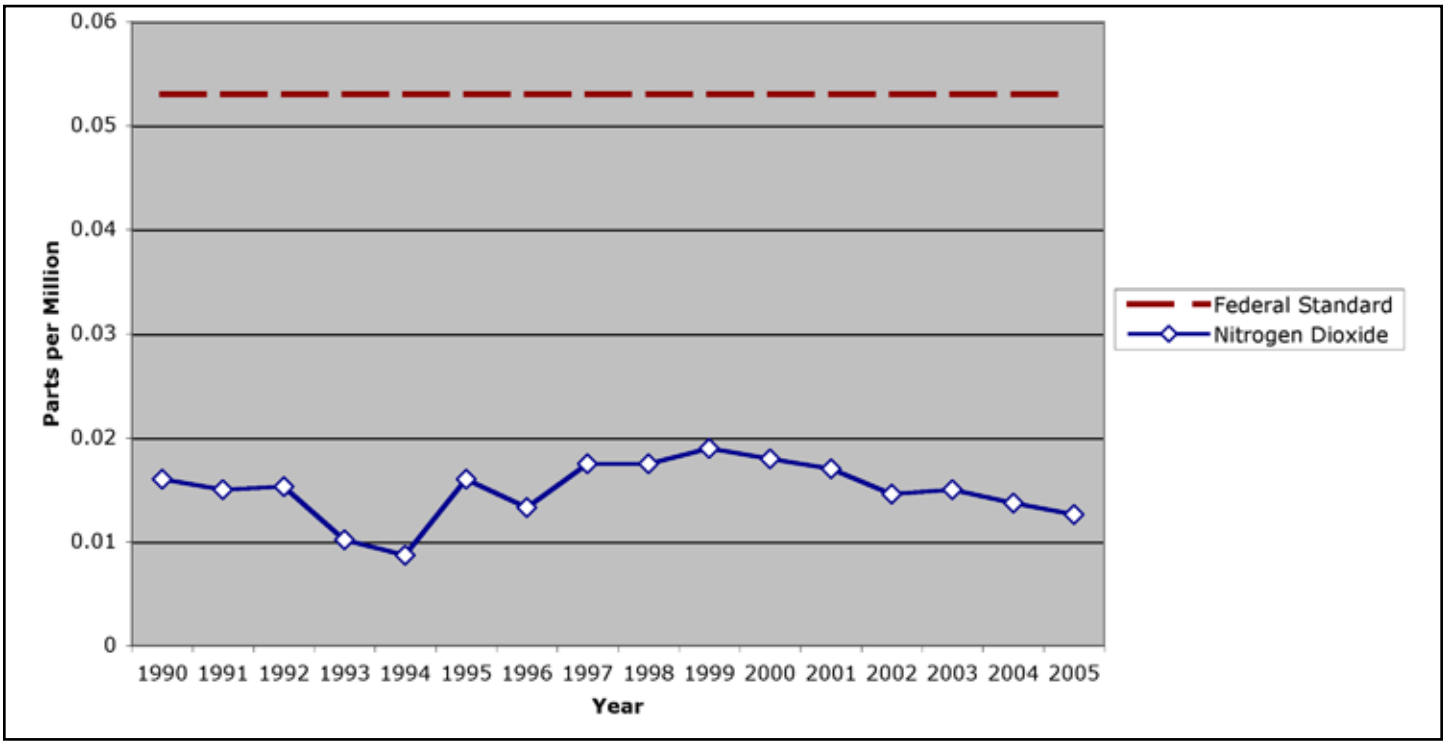


Chart 9. Average Concentration of Nitrogen Dioxide Calculated from Monitors, Sampled 1990-2005



ozone and to acid rain.[25] Humans create nitrogen oxides through the burning of fuel at high temperatures.[26]

As shown[27] in Chart 9, North Carolina has remained far below the federal standard for nitrogen dioxide of .053 parts per million during the years for which data have been been available from the EPA. The numbers seem to fluctuate, but since 1999, there certainly has been a downward trend. The measurement for 2005 of .0126 parts per million was the third lowest measurement between 1990-2005 and was 4.2 times less than the federal standard.

Conclusion

The truth on air quality does not sell newspapers nor help raise money for environmental causes—good news usually never does. Nevertheless, the truth does help inform sound public policy. This Earth Day, North Carolinians should be proud of the air quality in the state. It should be a time to reflect on success and focus on real problems, not red herrings.

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Notes

1. Environmental Protection Agency, EPA's Six Common Air Pollutants web page, www.epa.gov/air/urbanair.
2. EPA's Ground-Level Ozone home page, www.epa.gov/air/ozonepollution/index.html.
3. See, *e.g.*, the "GreenFacts Glossary," www.greenfacts.org/glossary/pqrs/parts-per-million-ppm.htm.
4. Results were derived by using data from the N.C. Division of Environment and Natural Resources (DENR), dividing the total number of high ozone days in the state by the total number of monitors in the state.
5. Results were derived by using data from DENR, dividing the total number of high ozone days in the selected counties by the total number of monitors in the selected counties.
6. "Media Conference Call: President Bush to Visit Nation's Most Polluted Park on Earth Day," Southern Alliance for Clean Energy press release, April 20, 2005, press.arrivenet.com/politics/article.php/626751.html.
7. Data for Atlanta and Los Angeles were calculated based on the metropolitan statistical areas (MSAs) for the cities. Data for the Smokies were based on all the monitors that exist in the seven most western counties of the state: Cherokee, Clay, Graham, Haywood, Jackson, Macon, and Swain. These also are the counties that belong to the nonprofit tourism marketing organization for the North Carolina Smokies, called Smoky Mountain Host of North Carolina: www.visitsmokies.org.

   The only county in the entire DENR western region that had a monitor with a high ozone day was Graham County. Had this study chosen a higher number of western counties from which to derive Smoky Mountain data, it would have yielded lower average numbers of high ozone days. In other words, if the number of counties were increased, this would have brought the Smokies number down, not up. Also, had this study been limited to only those two N.C. counties containing the Great Smoky Mountains National Park, the average number of high ozone days would have been zero (Haywood and Swain Counties, in which the Park is located in North Carolina, had no high ozone days). See, *e.g.*, this Audubon Society web page, www.audubon.org/chapter/nc/nc/IBAs/Mtn/great_smoky_mountains.htm, that indicates the counties where the Park is located.
8. See the DENR ozone maps, daq.state.nc.us/monitor/data/o3design; also see "Spring 2007 CAPCA Update," PowerPoint presentation by Keith Overcash, North Carolina Division of Air Quality, April 12, 2007.
9. EPA's Particulate Matter home page, www.epa.gov/air/particlepollution/index.html.
10. *Ibid.*
11. EPA's Particulate Matter Basic Information web page, www.epa.gov/air/particlepollution/basic.html.
12. EPA Particulate Matter Standards home page, www.epa.gov/air/particlepollution/standards.html.
13. See DENR's air quality data web page, daq.state.nc.us/monitor/data; also see "Spring 2007 CAPCA Update," PowerPoint presentation by Keith Overcash, North Carolina Division of Air Quality, April 12, 2007.
14. *Ibid.*
15. EPA web page entitled "CO: What is it? Where does it come from?", www.epa.gov/air/urbanair/co/what1.html.
16. *Ibid.*
17. The EPA calculates CO air quality for a specific monitoring site based on the second highest 8-hour average in a year. Results for this chart were derived from data obtained at the DENR web site, daq.state.nc.us/monitor/data, calculated by averaging those numbers from all the sites in the given year.
18. EPA's Lead air trends home page, www.epa.gov/air/airtrends/lead.html.
19. *Ibid.*
20. See this EPA web page on lead to learn more, including the different monitoring locations for lead in North Carolina, www.epa.gov/air/airtrends/lead.html. The lead data can be accessed at this DENR web page, daq.state.nc.us/monitor/data.
21. EPA web page entitled "SO_2: What is it? Where does it come from?", www.epa.gov/air/urbanair/so2/what1.html.
22. EPA web page entitled Sulfur Dioxide (SO_2) – NAAQS Implementation", www.epa.gov/ttn/naaqs/so2/index.html.
23. The EPA calculates sulfur dioxide air quality for a specific monitoring site based on the annual mean. Results for this chart were derived from data obtained at the DENR web site, daq.state.nc.us/monitor/data, calculated by averaging those numbers from all the sites in the given year. To learn more about sulfur dioxide, see www.epa.gov/air/airtrends/sulfur.html.
24. EPA web page entitled "NOX: What is it? Where does it come from?", www.epa.gov/air/urbanair/nox/what.html.
25. *Op. cit.*, note 2; also see the EPA web page entitled "What is Acid Rain?", www.epa.gov/acidrain/what/index.html.
26. *Op. cit.*, note 24.
27. The EPA calculates nitrogen dioxide air quality for a specific monitoring site based on the annual mean. Results for this chart were derived from data obtained at the DENR web site, daq.state.nc.us/monitor/data, calculated by averaging those numbers from all the sites in the given year. To learn more about nitrogen dioxide, please see www.epa.gov/air/airtrends/nitrogen.html.