



# AIR QUALITY

## Importance of Clean Air

Clean air is essential to public health, the environment and the economy in North Carolina. We need clean air so people can breathe without aggravating health problems such as asthma. We need it to preserve our forests, streams and lakes for wildlife and public recreation. We need it so citizens can view the beautiful vistas in our mountains, parks and coastal areas. We need it to sustain tourism, growth, forestry, agriculture and other aspects of the economy.

Despite the value of clean air, people often do not notice it unless there are problems, such as smoke, heavy haze, noxious fumes or bad odors. Clean air, however, is perhaps the most critical element needed to sustain life. Consider this: Humans can live for days without water and for weeks without food, but only a few minutes without air. That is why we have laws and regulatory programs to protect air quality.

In order to protect and maintain air quality, the U.S. Environmental Protection Agency (EPA) has adopted national standards for six primary, or criteria, air pollutants: ozone, lead, particulates (dust), carbon monoxide, sulfur dioxide, and nitrogen dioxide. These pollutants are all unhealthy to breathe, causing damage to the respiratory system and other organs at elevated levels. In addition to their primary health effects, these pollutants can cause secondary impacts on the environment, the economy and other areas. For example, high ozone levels can trigger asthma attacks in sensitive persons and cause coughing, chest pain and throat and lung irritation in healthy individuals. With regard to secondary impacts, ozone can reduce crop yields, harm trees and other natural vegetation, and damage buildings, tires and other man-made materials.

In addition to these criteria pollutants, haze, acid deposition, atmospheric deposition, and a range of toxic air pollutants can degrade air quality. Haze can reduce visibility and limit our enjoyment of parks and other natural areas. Acid deposition in the form of rain, mist and dry particles can damage trees, alter soils and kill aquatic life. Atmospheric deposition, the transportation of pollutants via air to surface waters, can deposit excess nutrients and alter the ecological balance of waterways and estuaries. Managing atmospheric deposition raise challenges to both air and water quality programs as well as with our neighboring states. Toxic air pollutants can cause short and long-term health effects, sometimes at extremely low concentrations. North Carolina has set limits for 105 air toxics, and the EPA regulates 188 such compounds.

As the primary regulatory authority for air quality, the Division of Air Quality (DAQ) has a number of responsibilities, including:

- Monitoring levels of pollutants in the ambient, or outdoor, air;
- Issuing permits for utilities, industries and other sources of air emissions;

- Inspecting facilities for compliance with air quality regulations.
- Developing programs for maintaining, protecting and improving air quality;
- Taking enforcement actions against violators of air quality regulations.
- Educating and informing the public about air quality issues;
- Overseeing the program for inspecting pollution controls in motor vehicles;
- Implementing rules for controlling odors from animal operations;
- Conducting research on the causes and effects of air pollution.

Regulating air quality can be difficult because many air pollutants can be harmful at very low concentrations, so they cannot be readily seen, smelled or sometimes even measured by instruments. The weather, as well, can have a big effect on air quality problems. For instance, ozone generally becomes a problem only during hot, sunny, stagnant weather. Winds and air currents also easily carry air pollutants across political boundaries. As a result, many air quality problems are regional issues that cannot be solved solely at the state or local level. North Carolina is working cooperatively with other states to address such regional issues through organizations, such as the Southern Appalachian Mountains Initiative (SAMI), an 8-state study seeking solutions to air pollution problems in the mountain region.

## Status and Trends

North Carolina has 190 monitors for measuring air quality, more than any other state in the Southeast except Florida. This network includes: 133 monitors operated by the Division of Air Quality; 45 monitors operated by local air quality programs in Forsyth, Mecklenburg, and Buncombe counties; two monitors operated by the Eastern Band of the Cherokee Indians; four rural ozone monitors operated for the EPA by contractors; and 8 monitors for the National Atmospheric Deposition Program/National Trends Network (NADP/NTN).

Long-term monitoring has shown declines for most air pollutants in North Carolina. (See Figure 1.) Levels of particulates, carbon monoxide, sulfur dioxide and lead have dropped substantially in the ambient air since the 1970s. Long-term trends are less clear for ozone and nitrogen dioxide, both of which have remained relatively constant.

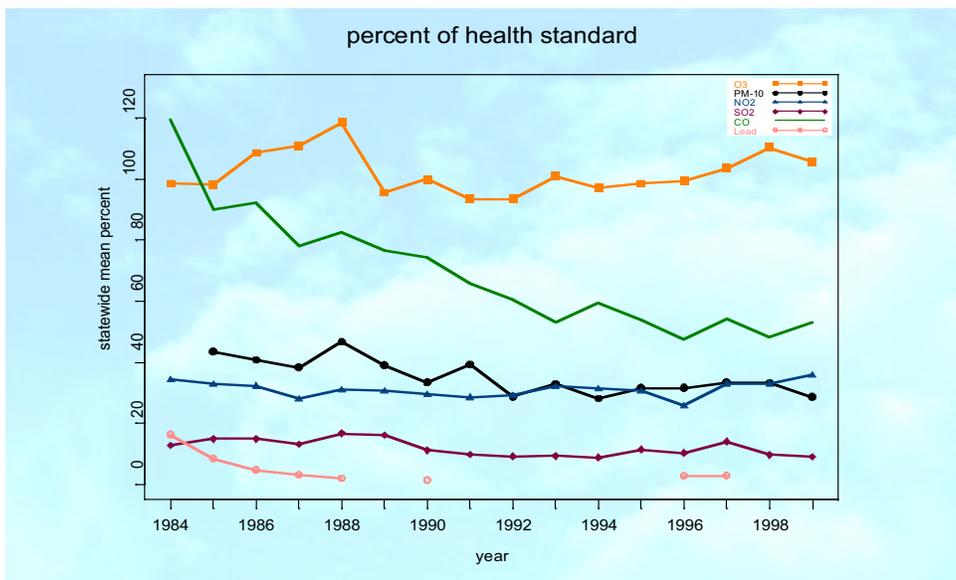
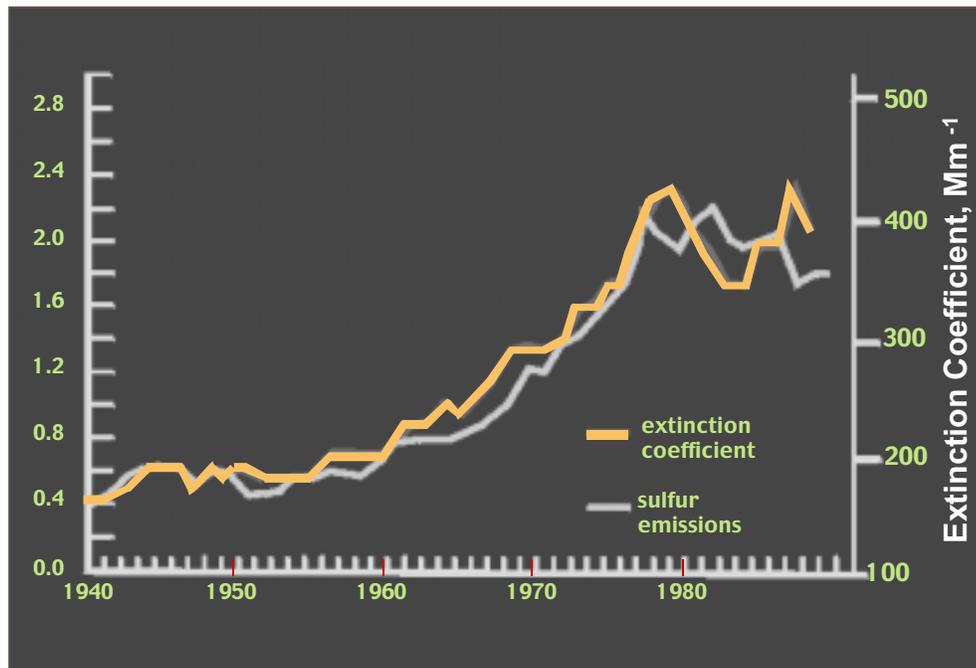


Figure 1

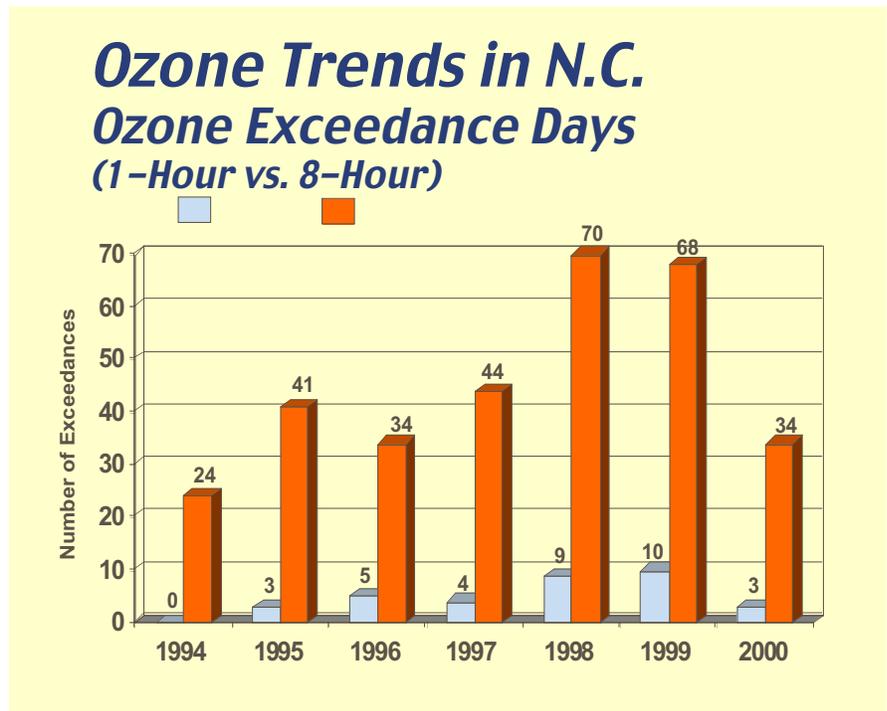
Rainfall has become less acidic during the 1990s, as shown by NADP/NTN monitoring of acid rain and deposition. This improvement apparently is due to stricter controls on sulfur oxide and nitrogen oxide emissions from power plants. Currently, North Carolina does not have reliable, long-term data on visibility trends across the state. However, data collected by the National Park Service show that annual average visibility in the Great Smoky Mountains National Park has declined from about 93 miles under natural conditions to about 22 miles today. (See Figure 2.) Sulfur oxide emissions are the main cause of haze in the Southeast.

## Visibility Trends Southeast $SO_2$ Emissions and Haziness



Ozone levels, in particular, increased in the late 1990s after declining from the late 1980s to the mid-1990s. (See Figure 3.) The recent rise in ozone levels can be attributed to the weather as well as increased emissions from industry and motor vehicles. Ozone is a secondary pollutant that forms when nitrogen oxides react with hydrocarbons in the air during hot, sunny weather with little wind. The weather in North Carolina was very conducive to ozone formation during the summers of 1998 and 1999, which were unusually hot, dry and stagnant. Ozone levels are also rising due to increased industrial emissions and highway traffic resulting from North Carolina's growing population and economy. Cooler and wetter weather during the summer of 2000 resulted in a substantial drop in ozone levels this year.

In addition to these factors, the EPA adopted new federal standards for ozone and fine particulates (PM 2.5) in 1997. The EMC, at the behest of Governor Hunt, adopted both of these standards in North Carolina, but a lawsuit has delayed the implementation of the standards at the federal level. The new 8-hour ozone standard is much stricter than the old 1-hour standard. The entire state had been in compliance with the old ozone standard since the early 1990s, although exceedances have occurred in the Charlotte and Triangle metropolitan areas during the summers of 1998 and 1999. However, preliminary monitoring data indicate that ozone levels exceed the new standard across much of North Carolina. From 1997 to 1999, more than two-thirds of the state's ozone monitoring sites exceeded the new standard.



North Carolina is now conducting a major expansion of its air monitoring network to include 35 sites for measuring fine particulates under the new PM 2.5 standard. New data indicate that much of the state will not comply with the new fine particulate standard, with levels above the standard in 20 of the 30 monitored counties.

## Air Quality Initiatives

North Carolina has a number of initiatives underway to address air quality problems, ranging from ozone to odors from animal operations. Governor Jim Hunt recognized the importance of clean air by hosting a first-ever multi-state summit focusing on air quality in April 1999. The Governors' Summit on Mountain Air Quality was aimed at building long-term regional cooperation and support for solutions to ozone, haze, acid rain and other air pollution problems in the mountain region.

At the summit, Gov. Hunt announced his Clean Air Plan for protecting public health, the environment and the economy. The governor's plan calls for major reductions in ozone-forming emissions from industry and motor vehicles. In July 1999, the N.C. General Assembly approved legislation enacting a major portion of the Hunt plan. The legislation is aimed at reducing car and truck emissions, which account for about half of the ozone-forming pollution statewide and up to 90 percent in our large cities. The bill will require the use of low-sulfur gasoline statewide by January 2004 and will enhance and expand the motor vehicle emissions testing program from nine counties now to 48 counties by July 2006. Other legislation approved in 1999 will increase substantially the funding for mass transit and rail and provide more incentives for alternative fuel vehicles.

Governor Hunt also asked the Environmental Management Commission (EMC) to adopt rules requiring substantial reductions in ozone-forming emissions from the state's coal-fired power plants and other large industrial sources. The EMC adopted new rules in October 2000 requiring power plants and other industries to reduce emissions of ozone-forming pollutants by more than two-thirds by 2006. When the rules are fully implemented, emissions of nitrogen oxides (NOx), the key contributor to ozone formation in our state, will drop from 89,000 tons to 28,100 tons of NOx by 2006.

The Division of Air Quality is working cooperatively with Virginia and South Carolina to perform the technical analyses needed to develop a more detailed plan for complying with the stricter new ozone standard. This plan, when completed in 2003, could call for additional restrictions and cutbacks in industrial emissions of ozone-forming pollutants. Other recent air quality initiatives include:

- In May 1999, the DAQ also expanded its Air Awareness/ Ozone Action Program to the mountains, issuing daily ozone forecasts for a five-county area surrounding Asheville. North Carolina now operates this program in four metropolitan areas: Charlotte, the Triangle, the Triad and Asheville. This voluntary program increases public awareness about air quality problems through ozone forecasts and other activities, while motivating individuals and businesses to car-pool or take other actions that help reduce air pollution. (See Figure 4, which shows a map associated with the ozone-forecasting program.)



Figure 4

- In April 1999, the Department of Environment and Natural Resources signed an agreement with federal land managers aimed at ensuring that new industrial air emissions do not degrade air quality in the Great Smoky Mountains and other pristine areas. The Permitting Procedures Document for Class I Areas establishes formal procedures for reviewing permit applications for new or expanded utilities and other large industries. The State of Tennessee also signed the agreement.
- In March 1999, the Division of Air Quality, in partnership with the Division of Water Quality and the Division of Soil and Water Conservation, began enforcing one of the nation's first comprehensive programs for controlling odors from animal operations. The rules primarily apply to large hog farms, but can be applied to any livestock operation using a wet waste-treatment system with lagoons and sprayfields. The rules set minimum requirements that all affected operations must follow. If problems persist, the DAQ can require more detailed best management plans and technological controls.
- The Division of Air Quality has worked with the Division of Motor Vehicles to approve new equipment for testing car and truck emissions as well as to develop a new computerized system for notifying motorists if their inspections lapse.

## What Can You Do To Protect Our Air Quality?

We all contribute to smog because much of the air pollution comes from our cars and trucks. Power plants are another large source of air emissions, and we all use electricity. The best way to reduce air pollution is to conserve energy, which also can save you money. Here are some simple things you can do to help, particularly on high ozone days:

- Limit driving by car-pooling and eating lunch at work.
- Ride the bus, bicycle or walk rather than driving your car.
- Keep your car or truck tuned up, so it pollutes less.
- If you drive, avoid idling for long periods of time, stay within speed limits, and combine errands to reduce the number of small trips.
- Incorporate energy conservation improvements in existing buildings and the use of energy efficient materials in new construction.
- Conserve electricity by setting thermostats at the highest comfortable temperature and turning off appliances that are not in use.
- Wait until after 6 p.m. to refuel your car or mow your lawn.
- Don't top off your gas tank.





# SUSTAINABLE DEVELOPMENT

## Importance of Sustainable Development

From clean air and water to healthy forests and fisheries, most environmental issues are impacted heavily by how North Carolina develops. Unplanned population and economic growth exacerbate environmental problems since they increase demand on the natural resources and the capacity of the environment to absorb our wastes. In the long run, an unhealthy environment will not support continued economic growth. On the other hand, if we integrate environmental and economic goals, we can improve the quality of life for North Carolina citizens now and in the future.

Sustainable Development, also known as Smart Growth, provides a vision for North Carolina to meet the needs of the present without compromising future generations' ability to meet their own needs (Bruntland Commission, 1987). All economic activity takes place in the confines of the environment, and benefits supplied by the environment are finite. As we develop sustainably, a healthy environment can continually provide the natural resources and open spaces needed to drive the economy, stimulate the creations of jobs, and meet our needs for a high quality of life. At the same time, a strong economy can allow our state to dedicate the money and resources needed to protect and conserve the environment. Only when the economy and environment reinforce each other can North Carolina work toward sustainable development.

## Status and Trends

North Carolina is at a crossroads regarding the sustainability of our environment and our economy. Despite our strong economy, we must address many difficult trends regarding the growth of our state: North Carolina's population is increasing at a significant rate. Additionally, as seen in Figure 1, the vehicle miles driven are increasing at an even more dramatic rate. This translates into more air pollution, more congestion, and a lower quality of life for North Carolina citizens. As population grows and cities sprawl outward, more and more farmlands and forestland are lost to urban growth as show in Figure 2. On the positive side, government, businesses, communities, and individuals across North Carolina have begun to recognize sustainability issues.

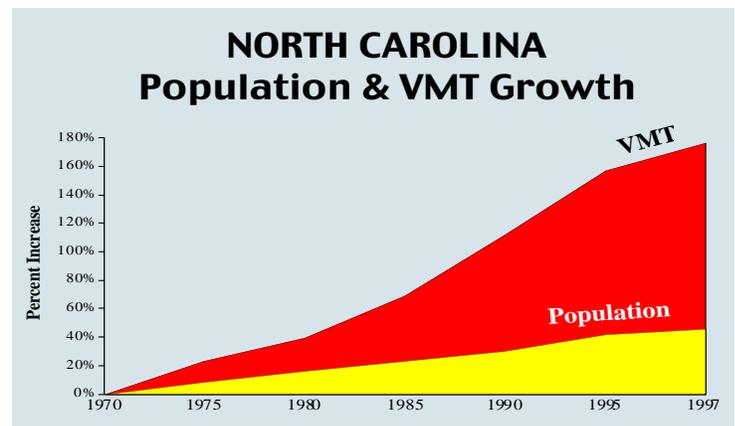
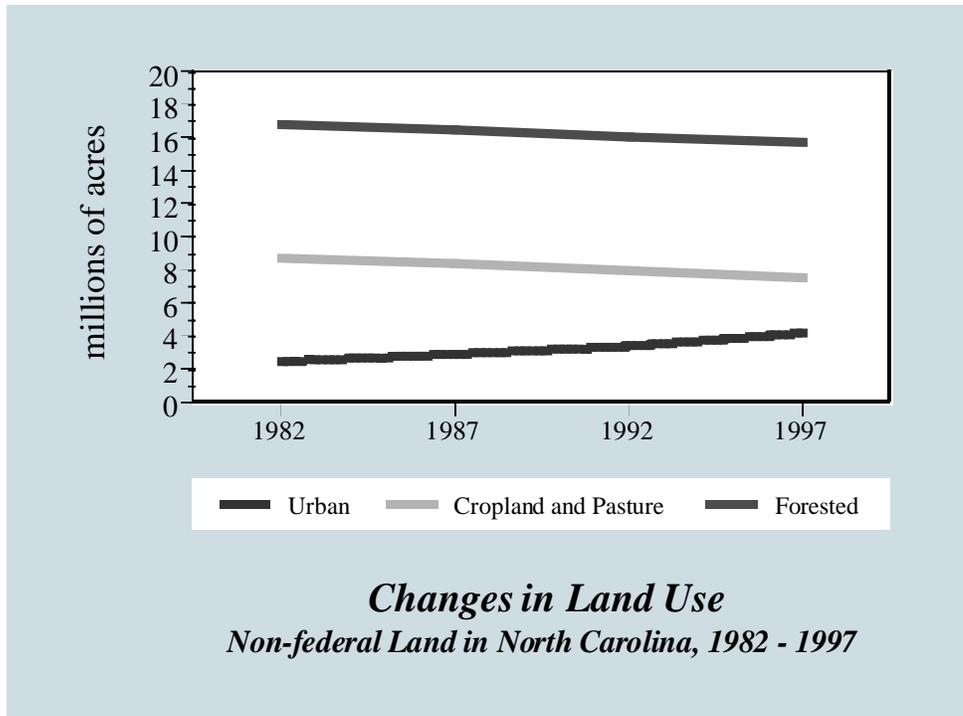


Figure 1

Figure 2



## Sustainable Development Initiatives

There are a myriad of efforts underway inside and outside of state government that together can move North Carolina away from unsustainable practices and toward sustainable development. Local government land-use planning, downtown revitalization, conservation of open spaces, innovative developments, increased citizen involvement and many other actions are underway. At the state level, Governor Hunt's commitment to sustainability has prompted a number of initiatives in DENR and other state agencies.

Following is a short list of such activities:

- **Smart Growth.** In early 1999, Governor Hunt appointed an Interdepartmental Task Force on Smart Growth. The task force held a series of public meetings across the state to provide the public an opportunity to provide input to the governor and state agencies on how North Carolina should grow. The work of the task force is leading to initiatives in DENR and other state agencies (see below.) The task force, as well as Governor Hunt's interdepartmental Clean Environment team, has opened lines of communication among state agencies to improve coordination and collaboration.
- **Million Acre Initiative.** In the fall of 1999, Governor Hunt announced his vision of conserving an additional million acres of open space over the next 10 years. DENR has been assigned the responsibility to develop this initiative, and has been working with other state agencies, land trusts, local governments, environmental groups and others to establish the structure of the initiative and identify the funding mechanisms to achieve the million-acre goal. See below for additional information on the Million Acres Initiative.

- **Brownfields.** The North Carolina Legislature created a brownfields program to encourage the redevelopment of partially contaminated sites for appropriate industrial uses. Brownfield redevelopment revitalizes cities and towns, takes advantage of existing infrastructure, and focuses industrial development away from “greenfields” and open spaces. Currently, the demand for assistance outpaces the staff resources for this program.
- **Natural Resource Sustainability.** DENR is working to ensure that all resource extraction in the state - from municipal water use to forest and fishery harvests - is done sustainably. DENR’s efforts have resulted in the development of 20-year water-use plans by local governments, improved rates of recovery for forests, and the recovery of several fish species.
- **Sustainability of State Government Operations.** Governor Hunt believes that state government must lead by example, and his leadership sparked this initiative. All state agencies have developed and are implementing plans to make their operations less wasteful and more environmentally responsible. Through this initiative state agencies are reducing energy consumption, increasing recycling, promoting water conservation, and expanding telecommuting along with many other actions.
- **Industrial Recruitment.** Industrial recruitment brings jobs to North Carolina and keeps our economy strong. The Department of Commerce is committed, with DENR’s assistance, to incorporate environmental considerations into the recruitment of new industries.
- **Hurricane Floyd Recovery.** New action pursuant to Hurricane Floyd requires 20 percent open space on new developments using state funds. In addition, harmful activities in the floodplain such as junk yards and hazardous waste facilities will be prohibited in the 100-year floodplain. These measures will help Eastern North Carolina rebuild in a smart way.
- **Water and Wastewater needs.** The NC Rural Economic Development Center conducted a survey to determine statewide water and wastewater infrastructure needs. The 1998 report identified over 11 billion dollars in needs. The state legislature responded by enacting a Critical Needs Bond Act for \$800,000,000 in general obligation bonds for grants and loans for water and wastewater needs. The act also created a state Infrastructure Council. The state is aware that the Bond Act was only a small step to address critical needs. The council is currently considering options for a permanent source of funding for water and wastewater infrastructure.

## What Can You Do To Promote Sustainability in Our State?

Sustainable development depends on - as the common bumper sticker tells us - thinking globally, acting locally! We all must recognize that we are part of a complex and fragile planet and that every one of us must make our local contribution to ensure the sustainability of our society. Many specific actions mentioned elsewhere in this State of the Environment Report - e.g. water conservation or carpooling - contribute to sustainable development. In addition to these worthy actions, you can do the following:

- Promote sound land-use planning and participate in local government sponsored land-use planning efforts.

- Obtain a conservation easement for your land so it will be permanently protected as open space.
- Commit yourself to a sustainability ethic. Incorporate conservation and pollution prevention principles into every facet of your life at home and at work. Through such an ethic, you can go beyond just recycling to changing your behaviors from shopping habits to your diet.
- Make yourself heard at your work, school, place of worship, and in your community. Local efforts depend on an involved public as a catalyst for change. Participate actively to ensure that North Carolina provides the highest quality of life for all its citizens, now and in the future.

