



North Carolina
State *of the*
Environment
Report **2011**

Enjoy the "goodliest" land, air and water of the Old North State.

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North Carolina Department of Environment and Natural Resources

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

To the citizens of North Carolina:

Our state's scenic beauty and abundant natural resources have attracted new residents, new companies and tourists to our mountains, coastal areas and piedmont for many years. Though we all must share the responsibility of managing, protecting and conserving a high quality environment in North Carolina, the Department of Environment and Natural Resources (DENR) strives to lead efforts to conserve and protect these natural resources, and to continue our state's tradition of ensuring clean air, clean water and abundant natural spaces for the enjoyment and recreation of citizens and visitors alike.

The 2011 edition of the State of the Environment Report highlights DENR's strategic goals; the protection strategies the department uses to attain these goals and thus attain a healthy, vibrant environment in North Carolina; and data and trends (where available) to help quantify the status of the state's air quality, water resources and land resources. The report also discusses emerging challenges as the department faces its vision of securing the future of a cleaner environment, sustained natural resources, healthier lives and a stronger economy.

DENR's mission is to conserve and protect North Carolina's natural resources and to maintain an environment of high quality by providing valuable services that consistently support and benefit the health and economic well-being of all citizens of our state. Governor Perdue, the department and I believe that a clean environment lends itself to a thriving economy, and trust that our protection and conservation efforts over the years and into the future – in combination with the efforts of our partners and all of you – will continue to enable North Carolinians, businesses and visitors alike to enjoy the "goodliest" land, air and water of the Old North State.

Sincerely,



Dee Freeman

1601 Mail Service Center, Raleigh, North Carolina 27699-1601
Phone: 919-707-8622 \ FAX: 919-707-8625 Internet: www.ncdenr.gov

One
North Carolina
Naturally



North Carolina is a large and diverse state rich in resources, from its people and vibrant cultural institutions to its natural resources.

Executive Summary

North Carolina is a large and diverse state rich in resources, from its people and vibrant cultural institutions to its natural resources. This report is a science-based review of the state's air, water and land resources. This document also fulfills the requirements of G.S. 143B 279.5 by evaluating the quality of the state's environment and describing the department's efforts to protect the state's natural resources. The report identifies both current and emerging environmental issues facing the state.



Much of the information presented in this report documents noteworthy progress in addressing past environmental challenges. For example, the state's environmental protection programs have resulted in significant improvements in air quality and water quality; those improvements are reflected by a number of the environmental indicators presented in the report.

Air quality in North Carolina has improved substantially since the 1980s. As a result of efforts at the federal, state and local levels – and with the cooperation of business and industry – the state has taken significant steps to reduce ozone and particle pollution. Additional reductions are expected as industries and motor vehicles meet more stringent federal air quality standards. The state has also achieved significant reductions in the emission of toxic air pollutants in recent years. New federal standards, including some still in development, represent the most significant emerging issue for the Division of Air Quality. Implementation

of stricter standards requires additional program resources at the state level and meeting those standards becomes a greater challenge as the state's population increases.

The majority of the state's lakes, streams, and rivers have good water quality. Those waters support fisheries and fish habitats, provide drinking water and allow a number of recreational uses. However, about 40 percent of the state's waters have impaired water quality. Mercury, bacteria and large amounts of sediment are among the major causes of water quality impairment in the state. In some areas, excess nutrients (primarily nitrogen and phosphorus) have threatened water quality in both rivers and water supply reservoirs. The state has made significant progress in addressing nutrient pollution; nutrient management strategies for the Neuse and Tar-Pamlico river basins have been successful in reducing fish kills and noxious algal blooms. Similar strategies have more recently been developed for the Falls Lake and Jordan Lake water supply reservoirs. Recent accomplishments related to water supply include the development of local water shortage response plans to improve the state's

drought response; recovery of the aquifers in the Central Coastal Plain; increased collection of groundwater data; and development of water supply models for most of the 17 major river basins.

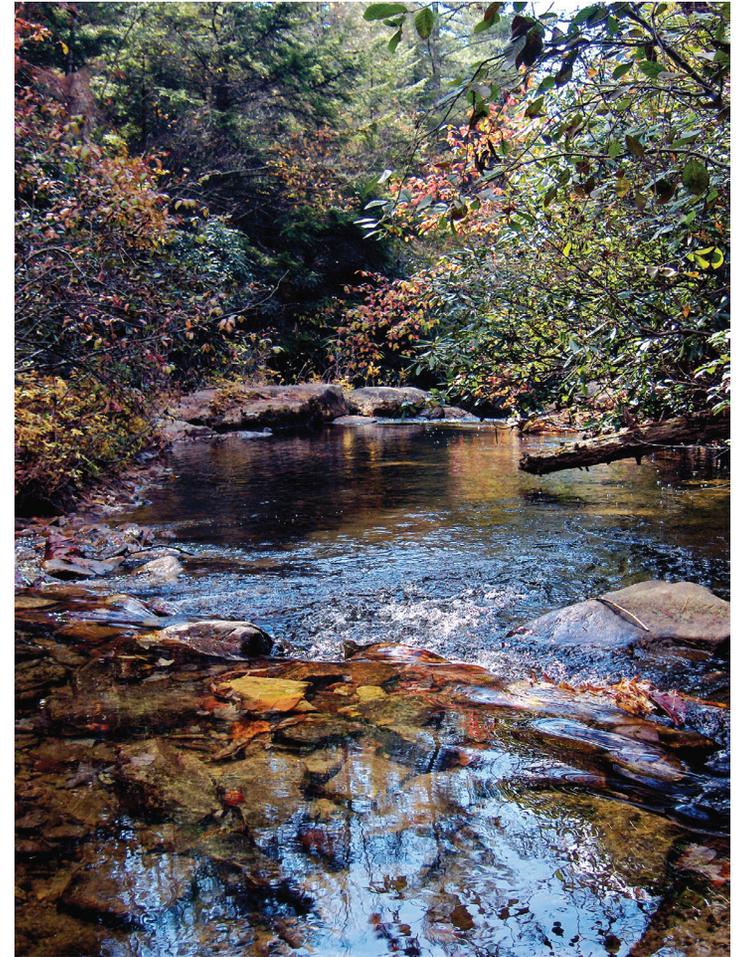
The state continues to face a number of challenges, however. Over the last decade, rapid population growth and development in some parts of the state put additional stress on water bodies and other sensitive natural areas. The state will need to maintain strong sedimentation and water quality programs to realize the benefits of growth without putting drinking water supplies, fisheries and wildlife habitat at risk. Growth (of both cars and people) in the state's urban and suburban counties will also make attainment of stricter air quality standards an ongoing challenge.

After a decade of strong growth, the rate of land conservation has declined since 2009. However, the state continues to work on protection of key parcels, focusing on acquisition of lands that are critical for water quality protection, wildlife habitat, recreation, agriculture and military activities. The North Carolina state parks system manages more than 213,000 acres, including 35 state parks, four recreation areas and a system of state natural areas. Since 1994, the Parks and Recreation Trust Fund (PARTF) has been used to acquire 18,622 acres of land for state parks. PARTF also collaborated with other funding agencies to preserve an additional 37,616 acres.

The state has continued to make progress in cleaning up contaminated properties and in helping to provide alternative water supply where drinking water wells have been contaminated. Progress in some programs continues to be slow, however, because of limited resources. In the most recent federal fiscal year, the N.C. Brownfields program received 45 proposals for voluntary cleanup and redevelopment of contaminated sites across the state – a 25 percent increase over the previous year. The state's Inactive Hazardous Sites program continues to focus on the more than 2,000 sites with hazardous contamination and the highest level of risk.

Since 1988, more than 17,730 petroleum-leaking underground storage tank (UST) releases have been assessed and remediated. Approximately 7,770 additional releases still need to be cleaned up and several hundred new UST releases are reported every year (more than 700 in 2010-2011). Progress toward cleaning up and closing out intermediate and low-risk UST sites has been slow in recent years because the commercial and noncommercial UST trust funds (which reimburse for cleanup of UST sites) do not receive sufficient revenue to reimburse for all of the cleanup work that needs to be done.

A major air quality development in 2011 was the settlement of a lawsuit against the Tennessee Valley Authority (TVA). North Carolina filed a public nuisance lawsuit against the TVA in 2006, claiming that the utility's coal-fired



plants sent polluted air into North Carolina. This agreement will result in the closure of many uncontrolled units and installation of emission-control equipment on almost all of the remaining units. In addition, the TVA will pay \$11.2 million to North Carolina over the next five years to be used for energy efficiency and electricity demand reduction programs. These measures will improve North Carolina's air quality and reduce incidences of premature mortality, asthma, chronic bronchitis and other cardiopulmonary illnesses.

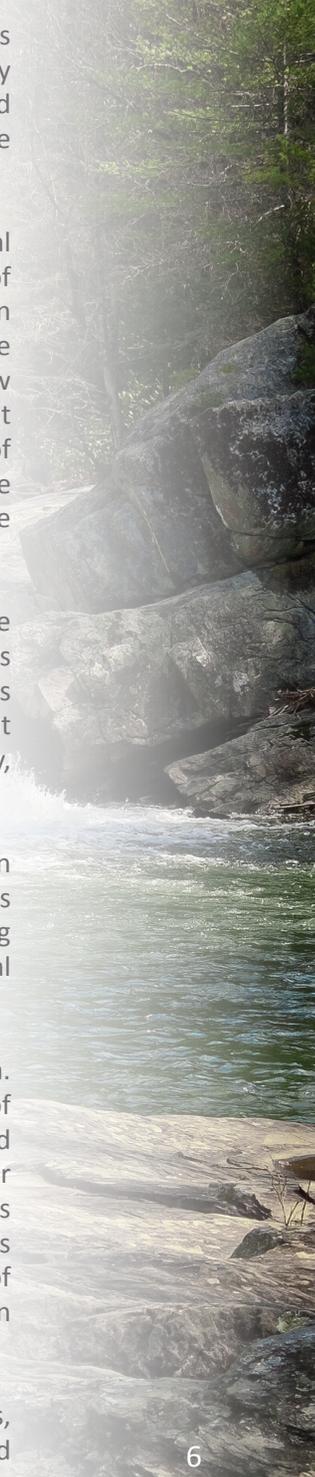
The department is promoting several new and ongoing initiatives aimed at improving the quality of environmental and natural resource data. In early 2012, the Albemarle-Pamlico National Estuary Program will release its State of the Sounds report, an assessment of the estuarine ecosystem in northeastern North Carolina and southeastern Virginia. The report, based on a suite of environmental indicators, will shed light on the overall health of the estuarine system and discuss some of its most significant threats. The Division of Marine Fisheries began a new spatial analysis of all coastal fish habitat to identify and prioritize a network of strategic habitat areas. Assessment of the northern half of the coast is complete, and assessments will continue in 2012 and 2013. Finally, the Office of Conservation, Planning and Community Affairs developed the Conservation Planning Tool to identify and prioritize areas for future conservation. This analysis pinpoints "gaps" in ecosystem networks and delineates unique resources or features.

In response to public feedback, the department created the Environmental Assistance Center in 2011 to increase its efforts to help small businesses, landowners and residents comply with environmental rules. This center, which uses existing agency staff, focuses on the needs of those customers who are frequently affected by environmental rules but lack the expertise and money to hire someone to guide them through the regulatory, permitting and compliance process.

The department also faces several important emerging issues. As directed in Session Law 2011-276, DENR is leading a state study to identify issues associated with oil and gas exploration in the state; the study will specifically focus on the use of horizontal drilling and hydraulic fracturing to extract shale gas. This report will be provided to the General Assembly by May 1, 2012.

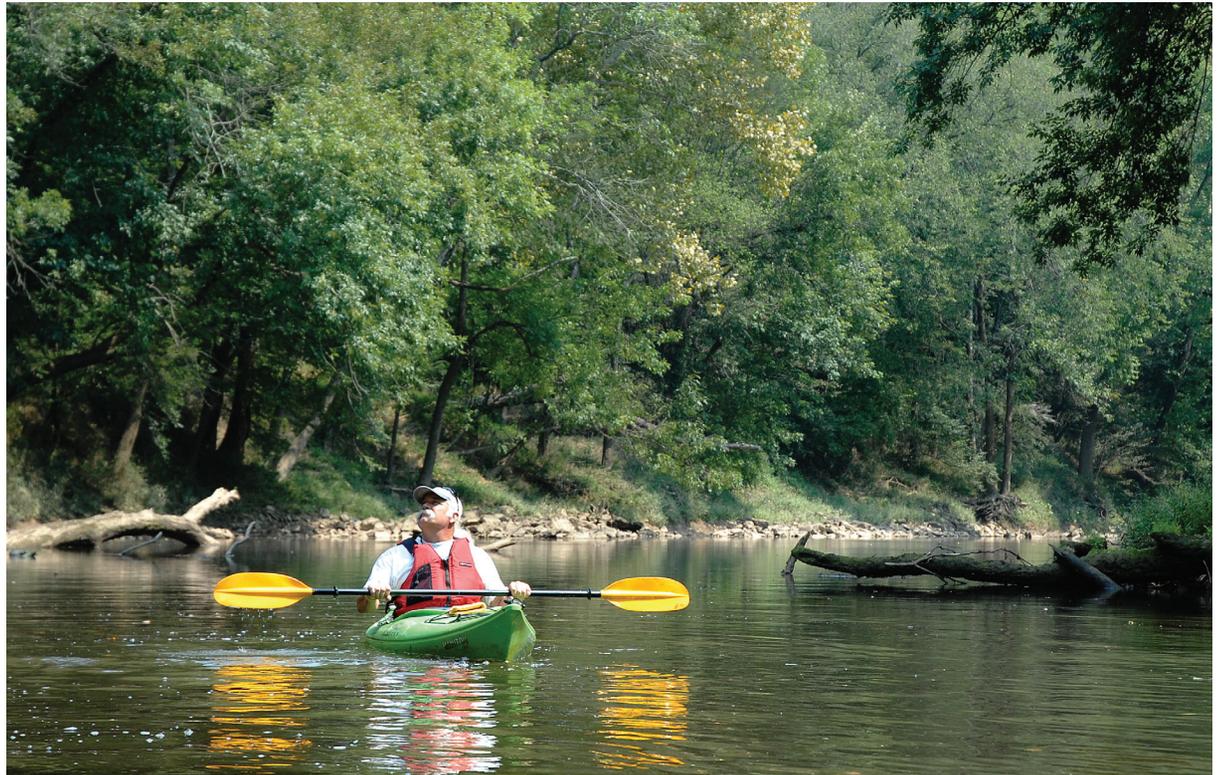
DENR has done research on the potential impacts of climate change in North Carolina. Even small increases in temperatures could cause major changes such as disruption of normal growing conditions for food crops; melting of polar icecaps; rising sea levels and flooding of coastal lands; changes in ocean currents; and more frequent and stronger storms. The Coastal Resources Commission's Science Panel on Coastal Hazards has reviewed projections for sea level rise on the North Carolina coast; based on the panel's work, the Commission has begun to consider how to plan for the potential impacts of sea level rise. The department has also participated in statewide initiatives that focus on climate change adaptation and mitigation.

Water supply and allocation of water has become another emerging issue in the state. For the last five years, the General Assembly has debated a number of bills dealing with water conservation, drought response and



allocation of water resources between competing water users. Most recently, the General Assembly directed the department's Division of Water Resources to complete hydrologic models of the state's major river basins. The models -- which will demonstrate a water body's response to water withdrawals by various users under different conditions -- will be critical for future water supply planning.

North Carolinians value the state's environmental quality and rely heavily on outdoor resources and amenities for industrial and recreational pursuits. In a recent poll completed by Public Policy Polling, nearly half of respondents indicated that the state should be doing more to protect the environment. More than 80 percent of people surveyed indicated that protecting North Carolina's air and water is very important for attracting good jobs to the state. The recent recession and resulting state fiscal constraints have had noticeable impacts on various department programs. In the past few years, the aquariums, zoological park, Museum of Natural Sciences and state parks system have had some of the highest visitor numbers ever recorded. This has increased the needs for staff, exhibit and facility maintenance and program development. Reductions in fee income, trust fund balances, and appropriations have led to reduced levels of habitat preservation, fewer pollution prevention initiatives and a diminished ability to clean up polluted sites. The department is focusing on maintaining core services and evaluating opportunities to increase institutional efficiency in this challenging operational environment.





This document provides a tool to allow the people of North Carolina, state leaders and public agencies to assess the quality of the state's environment.

Introduction

North Carolina is a large and diverse state rich in resources, from its people and vibrant cultural institutions to its natural resources. This report is a science-based review of the state's air, water and land resources. This document provides a tool to allow the people of North Carolina, state leaders and public agencies to assess the quality of the state's environment. In addition, the report highlights management strategies for environmental and natural resource protection, specific accomplishments, current activities and emerging environmental issues.

The North Carolina General Assembly created the Department of Environment and Natural Resources (DENR) to protect the state's environment and natural resources and to prevent public health problems caused by pollution (G.S. 143B-279.2). The department also provides the organizational structure for several commissions created by the General Assembly with the specific authority to adopt environmental rules, including the Environmental Management Commission (air quality and water quality rules); Coastal Resources Commission (coastal development rules), Marine Fisheries Commission (fisheries management plans); Sedimentation Control Commission (rules on sedimentation and erosion control); and Mining Commission.

The department must provide staff support to the rule-making commissions and implement environmental policies set out in state law and through commission rules. Particularly in the programs addressing water quality, air quality, solid waste, hazardous waste and petroleum underground storage tanks, those statutes and rules often reflect federal requirements. The department also implements federal regulatory programs under the Clean Air Act, Clean Water Act, Safe Drinking Water Act and the Resource Conservation and Recovery Act by delegation from the U.S. Environmental Protection Agency (EPA).

DENR meets its environmental and natural resource management responsibilities in a number of different ways. Some programs carry out monitoring, permitting and compliance activities designed to balance growth and development with the need to be good stewards of the state's air, water and other natural resources for all of the state's citizens. Other programs focus on preserving natural areas; maintaining recreational lands for public use; restoring natural ecosystems; or cleaning up environmental contamination. The North Carolina Zoological Park, state aquariums, state parks system and the North Carolina Museum of Natural Sciences provide opportunities for citizens to learn about and interact with nature.



In meeting its state and federal responsibilities, the department must often find the right balance between effective environmental protection and the need for strong economic growth. The department works with the rule-making commissions to develop and enforce rules that are clear, consistent and practical. DENR also has programs designed specifically to assist business and industry with permitting issues and compliance problems. In addition to helping with compliance, the Division of Environmental Assistance and Outreach works with companies to identify waste reduction and efficiency measures that can reduce operating costs -- allowing the company to operate more profitably -- and in some cases eliminate the need for an environmental permit.

All of this goes on against a backdrop of significant growth and development over the last 20 years. According to Census Bureau estimates, North Carolina's population increased by nearly three million -- or 44 percent -- between 1990 and 2010. During the last decade, North Carolina had the fifth-highest growth rate in the country. By 2030, the state's population is expected to reach 12.5 million; that would represent an increase of another 25 percent over the current population. Much of this growth will come from people migrating into the state, many of whom do so because of the state's scenic beauty, natural resources and quality of life. As North Carolina continues to grow, maintaining the state's environmental quality will be one of our most important challenges.



We hope that the information in this report gives you a picture of the state's environmental health and allows you to see both the progress that has been made and the challenges for the future. Environmental quality is site-specific and can vary dramatically in different regions of the state; wherever possible this report contains links to websites that can provide location-specific measures of environmental quality. In addition, all of the reports that DENR submits to the General Assembly are available on our website at: <http://portal.ncdenr.org/web/lia/denr-legislative-reports>



The N.C. Department of Environment and Natural Resources' strategic plan identifies goals for the department that will support conserving and protecting the state's natural resources, while maintaining a high quality of life and fostering economic development.

Department of Environment and Natural Resources' Strategic Goals

The N.C. Department of Environment and Natural Resources' strategic plan identifies goals for the department that will support conserving and protecting the state's natural resources, while maintaining a high quality of life and fostering economic development. Broad supporting actions accompany each of the goals. These supporting actions serve as a starting point for divisions and programs to create measurable accomplishments. The 2009-2013 strategic plan contains eight specific goals:



Sustaining Water for the Future. Better manage the entire water cycle to prepare for the future by developing and implementing sustainable solutions based on sound science that effectively: protects water at its source; treats it to the highest standards; delivers it to homes and businesses; encourages its efficient use; and then collects and again treats the wastewater before reintroducing it safely back into the environment.

Sustaining Clean Air for the Future. Work to improve air quality of the state for the health and well-being of all its citizens by using sound science, monitoring and input from the public and regulated community.

Growing a Green Economy. The department will champion evolving, and support existing, primary industries that promote environmental protection and energy independence and use of products, production techniques and services that have minimal impact to the waste stream, while attaining energy independence, resiliency to climate change and economic development in the state, the region and the country.

Conserving Natural Areas and Sustaining Working Lands. DENR and its One North Carolina Naturally initiative will coordinate public and private efforts to sustain, conserve, restore and protect the state's natural, economic and social resources in a balanced, focused and integrated way for current and future generations.

Climate Change. To address climate change in North Carolina in a comprehensive way, using mitigation efforts and adaptation strategies to increase the resilience of our state's resources to these complex changes.

More Effective Environmental Regulation. To protect the environment by developing and enforcing rules that are clear and consistent and result in business and government, together, preserving the environment and its resources, while growing our economy as well as maintaining the high quality of life for the state's citizens that attracts new companies and retains existing industry.

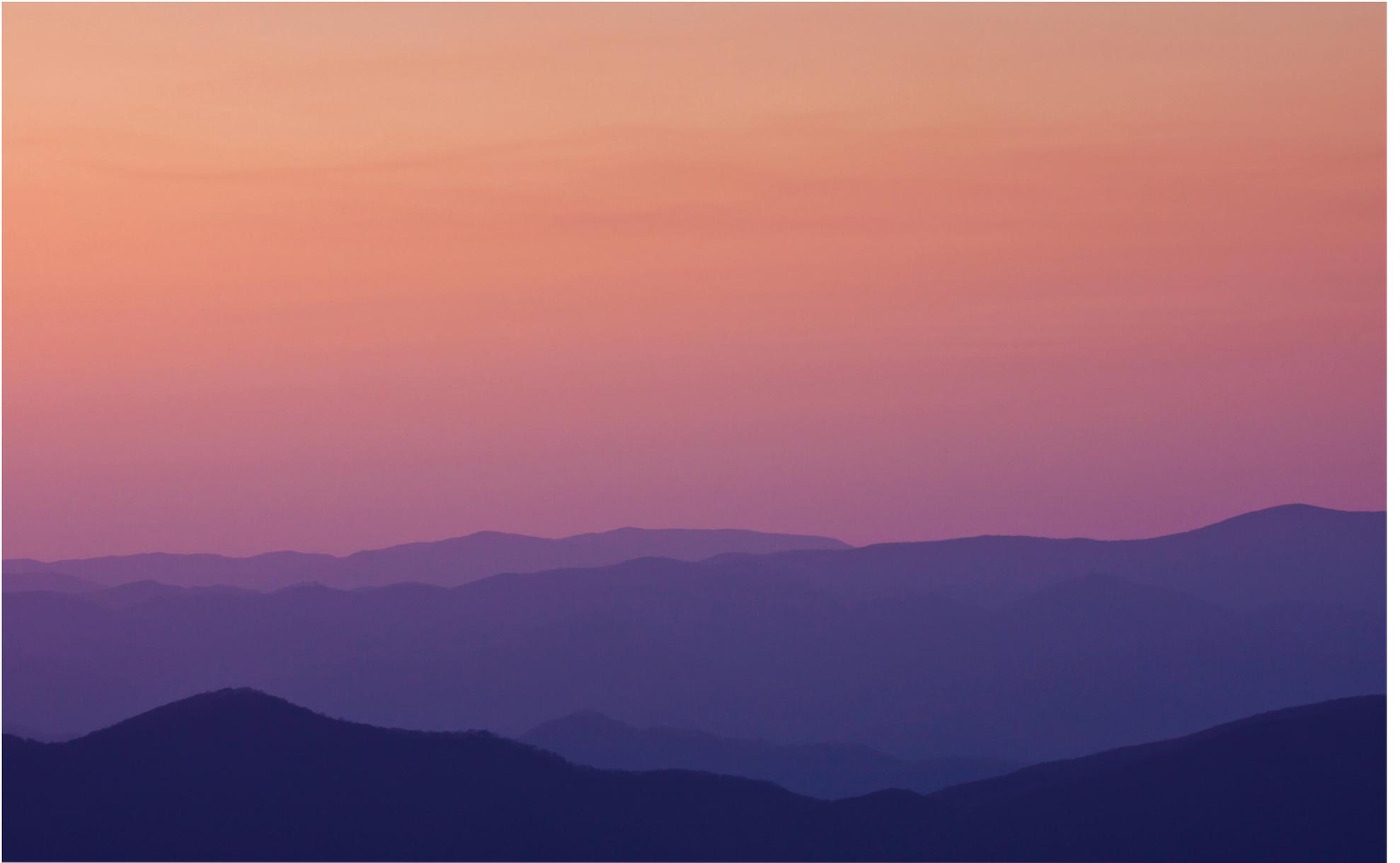
Growing DENR's Visitor Attractions and Nurturing North Carolina's Natural Resources. Enrich the quality of citizens' visits to our attractions by further developing the services within our museum, zoo, aquariums, state parks, coastal reserves and state forests. Create a memorable visitor experience that fosters awareness of environmental stewardship in a manner that is efficient, effective and ensures value.

Organizational Effectiveness Supporting DENR's Mission. An agency where all actions, services and products are of high quality, and serve the department's mission and vision through continuous improvement, optimum efficiency, effectiveness and customer satisfaction in all operations.

The full strategic plan is located on the department website:

www.ncdenr.gov.





The department uses a number of strategies to attain environment and natural resource protection.



Environment and Natural Resource Protection Strategies

The department uses a number of strategies to attain environment and natural resource protection. These include: pollution prevention, pollution mitigation, resource conservation, investment in environmental infrastructure, regulation and compliance and environmental education and outreach. These strategies are used alone or in combinations to achieve department goals. This section provides a working definition of these strategies and examples of DENR's program implementation of them.

Pollution Prevention

Pollution prevention, often abbreviated as P2, is a proactive, cost-effective strategy that creates a strong basis for environmental sustainability. Pollution prevention seeks to reduce waste from a production process by increasing efficiency, reducing the use of toxic materials, reducing resources consumed in the process and reusing waste where possible. Preventing pollution before it enters the state's land, water and air is a preferred method for natural resource protection because it is frequently the most cost-effective.

Since the mid-1980s, DENR has offered free and confidential pollution prevention services throughout North Carolina to public and private facilities. The Division of Environmental Assistance and Outreach offers P2 assistance through the Environmental Assistance Center, the Environmental Stewardship Initiative and Waste Reduction Partners.

The Environmental Stewardship Initiative is an environmental excellence program that recognizes regulated entities that have gone above and beyond regulatory requirements in their protection of the environment. The program also offers free assistance to those who wish to become environmental stewards. The requirements of the program are also proven tools for improving and assuring compliance.

Waste Reduction Partners (WRP) is one of DENR's most innovative programs. WRP is a team of highly experienced staff and volunteer retired engineers, architects and scientists, who provide North Carolina businesses and institutions with waste and energy reduction assessments and technical assistance. WRP services are typically grant-sponsored or supported through technical service contracts to provide services to clients at no cost. All services are non-regulatory and confidential.

Combined, the Waste Reduction Partners and Environmental Stewardship Initiative programs have seen their customers and members reduce water consumption by more than two billion gallons through efficiency techniques and technologies. Similarly, from 2004 to 2010, members reported reduced energy usage of 40 million (mmBTUs), or 40 trillion British Thermal Units, equivalent to the energy consumed annually by 526,000 North Carolina homes. These programs save the state's natural resources while simultaneously saving private companies money.

Pollution Mitigation

Pollution mitigation strategies allow communities to decrease the negative impacts of human activity on the natural environment, such as reducing the impacts of land development on water quality and wildlife habitat fragmentation, while still providing roads, buildings and other infrastructure necessary to support a growing population. North Carolina's nonregulatory Ecosystem Enhancement Program, founded in statute in 2003, provides an efficient and effective statewide compensatory-mitigation initiative that offsets unavoidable environmental damage to streams and wetlands caused by transportation-infrastructure improvements and other economic development. Compensatory mitigation involves an environmental crediting system in which a regulatory agency allocates credits and debits. Compensation activities – called “credits” – can involve habitat creation, restoration, enhancement, preservation or management, which may subsequently be used to offset unavoidable stream or wetland impacts -- called “debits” -- that occurred at a project development site. Cumulative Ecosystem Enhancement Program data is located in the Land section of this report.

Resource Conservation

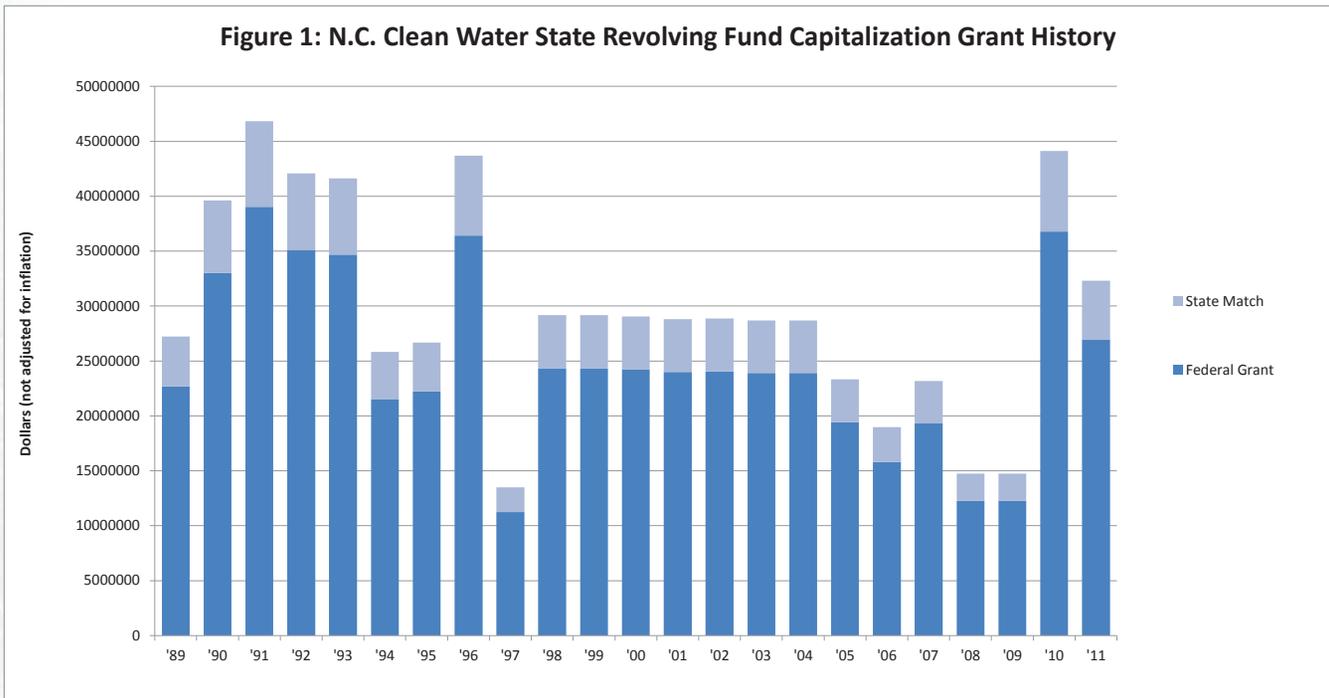
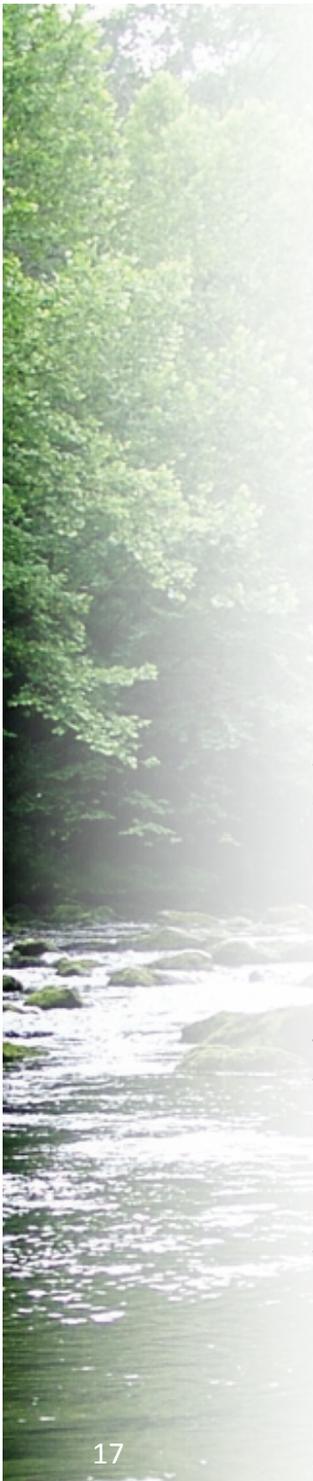
Resource conservation is the protection, preservation, management or restoration of wildlife and of natural resources such as forests, soil and water. DENR works with other state agencies, nonprofits, private industries and institutions to conserve plant and animal habitats and lands that offer the state opportunities for strategic resource preservation. North Carolina has many good reasons to engage in conservation, including: protection of water resources, enhancing outdoor recreation opportunities statewide, preserving working farms and forests, and protecting wildlife habitat. The conservation of these resources is critical for sustaining and enhancing the quality of life for current and future North Carolinians. Examples of recent resource conservation projects are located in the Land section of this report.

Environmental Infrastructure Investments

Environmental infrastructure consists of water supply, waste disposal and pollution control services. The Department of Environment and Natural Resources uses investments in environmental infrastructure to improve the quality of life for residents and to protect environmental and human health. Population growth, urbanization, changing environmental standards and industrial development place increasing demands on existing infrastructure. These demands in turn create a need for the planning, design and construction of new facilities.

DENR assists local communities with the development of wastewater and drinking water facilities. The Division of Water Quality administers several clean water funding programs available to local government units. During FY 2011, North Carolina made a total of 17 binding commitments in the Clean Water State Revolving Fund program for the construction of wastewater facilities. A majority of these projects either aided impaired streams or were part of a basinwide strategy. These obligations totaled \$172 million. In addition, projects totaling \$5.4 million were funded through the state's Wastewater Reserve fund for the construction of wastewater facilities. These funding programs increase the affordability of clean water infrastructure projects by offering a lower interest rate compared to market interest rates. In addition, Technical Assistance Grants totaling \$435,475 were made available to help develop plans to resolve non-compliance at wastewater facilities. Figure 1 below displays the federal capitalization grants and the associated state matching funds for each year since the program began. This table does not include supplemental, one-time American Recovery and Reinvestment Act funding.

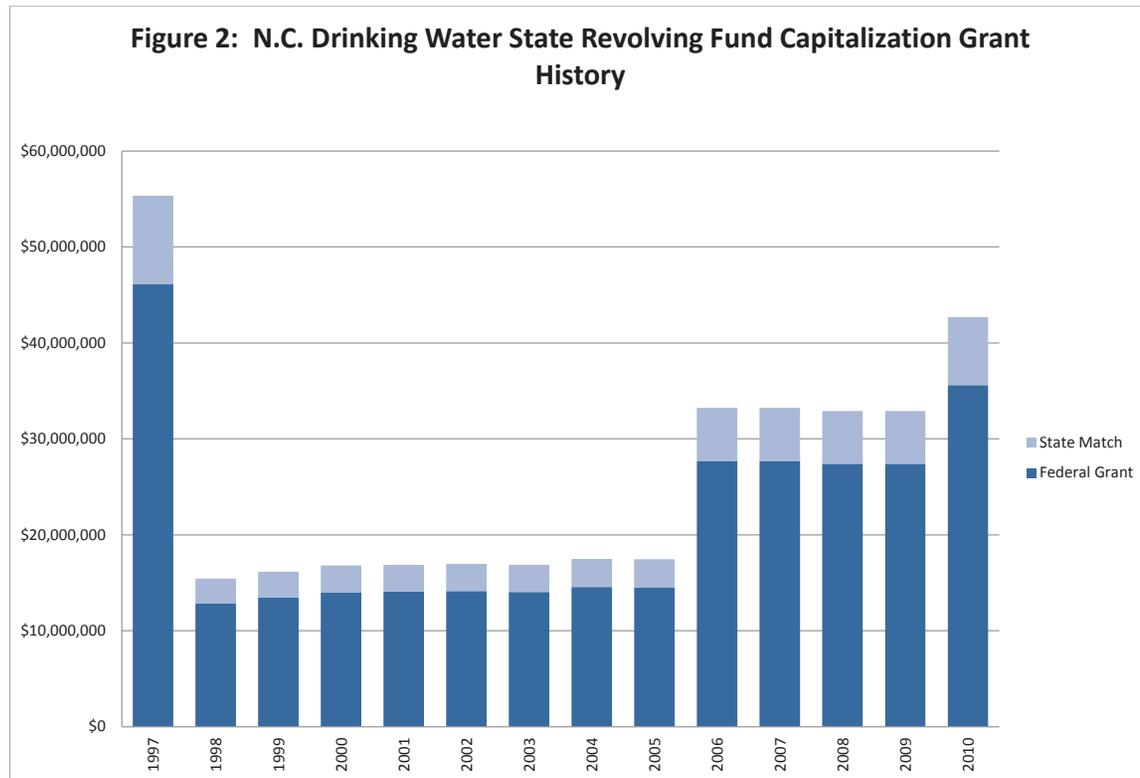




The Clean Water Management Trust Fund has provided more than \$248 million for 276 projects to improve wastewater systems for local governments and communities with failing systems dumping untreated waste into our surface water. These wastewater projects have focused on rural, economically distressed communities to eliminate failing septic tanks, straight piping (dumping sewage directly into the environment without treatment by a wastewater system) and failing wastewater collection and treatment plants. This effort has also focused on aiding communities in regionalizing treatment facilities and in better managing systems so that future repairs can be managed within the financial system of the community.

The Division of Water Resources (DWR) funds drinking water capital projects that protect public health through the Drinking Water State Revolving Fund (DWSRF). The DWSRF makes loans to communities at one-half of the market rate for a period of up to 20 years. All funded projects must address a threat to public health. At the end of FY 2010, the DWR committed approximately \$296 million in low-interest and principal forgiveness loans as part of the DWSRF Program. Figure 2 below displays the federal capitalization grants and the associated state matching funds for each year since the program began in 1997. This table does not include supplemental, one-time American Recovery and Reinvestment Act funding.

For FY 2010, almost \$36 million was committed to build a new five million gallon per day water treatment plant in Craven County, along with 16 new wells and various transmission lines. Other notable projects include a consolidation of nonviable Holly Hills and Mountain Creek Estates water systems in Jackson County; a raw-water bypass pump station for use in times of drought in Randolph County; and an installation of a water main extension along Thomas Langston Road to provide interconnection with the town of Winterville in Pitt County.



The N.C. Department of Environment and Natural Resources received more than \$157 million as part of the American Recovery and Reinvestment Act. The department is using the money to stimulate the economy, create jobs and help cities, towns and counties with a host of environmental improvements. A substantial portion of this funding supports the development of needed environmental infrastructure.

- \$70.7 million to fund wastewater improvements such as infrastructure projects that aid wastewater reuse, stormwater management, water efficiency and energy generation. Another \$251,000 has been awarded to regional councils of government for planning and to assess water quality and develop plans to control water pollution.
- \$65.6 million for public drinking water infrastructure improvements. The money will improve water quality in cities and towns by building interconnections between towns and replacing aging water lines. It has also been used to install more efficient residential water meters.

Regulation and Compliance

As a regulatory agency, DENR enforces state and federal pollution regulations. In addition, the EPA has delegated to DENR the authority to enforce federal laws and regulations dealing with air and water pollution in the state. Compliance activities include responding to complaints, conducting regular inspections, helping facilities meet regulations and taking enforcement actions against violators. Facilities and activities are often tracked and measured through the issuance of permits. The Division of Air Quality alone handles permits for more than 2,680 facilities with air emissions. DENR operates offices in each of the seven state regions to inform people about regulations and requirements, assist with permit applications, and conduct site visits for regulated activities.



In an ideal world, regulation is replaced by stewardship and an inherent respect for the environment. In this concept of stewardship, everyone takes responsibility for their actions and the use of resources for the benefit of the community. In the real world, stewardship is sometimes compromised by conflicting capabilities, priorities, values and perspectives. This creates the need for regulation and enforcement.

The challenge for regulators is to balance the use of compliance tools with the recognition of stewardship efforts. Regulated entities must be made aware of the conditions for compliance, made to feel the consequences of non-compliance and provided an opportunity to demonstrate behavior beyond compliance. When enforcement is necessary, it should be fair, focused, transparent and timely.

DENR balances enforcement with education, technical assistance and incentives to achieve compliance and encourage stewardship. In 2011, the department created the Environmental Permit and Compliance Assistance Center to increase its efforts to help small businesses, landowners and residents to comply with environmental rules. This center, which uses existing agency staff, focuses on the needs of those customers who are frequently affected by environmental rules but lack the expertise and money needed to hire someone to guide them through the regulatory, permitting and compliance process. Housed in the Division of Environmental Assistance and Outreach, some benefits of the Environmental Permit and Compliance Assistance Center include:

- Offering a single point of contact to guide applicants through the permitting system;
- Providing technical assistance to obtain necessary permits and/or address compliance assistance issues;
- Arranging pre-application meetings to outline potential permits, processes, timelines and expectations;
- Designating technical staff to answer – in plain English – regulatory questions, explain permit and regulatory issues, and receive and ensure resolution of environmental complaints and issues; and
- Providing technical assistance on compliance strategies, including those that reduce waste and enable companies to save money.

Environmental Education and Outreach

Another one of the Department of Environment and Natural Resources' strategies to protect natural resources is public education and outreach. Environmental education is a learning process that increases people's knowledge and awareness of the environment and associated challenges. Environmental education gives people an understanding of how individual actions affect the environment and allows them to acquire skills to weigh various sides of issues and become better equipped to make informed decisions.

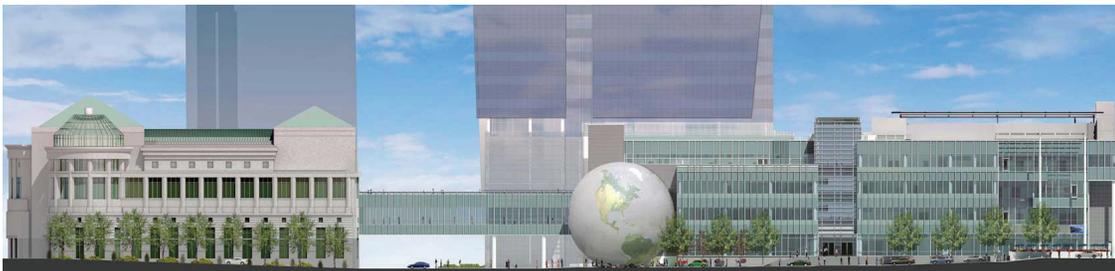
More than ever, children and adults need to understand how ecological systems work and why they matter. Some people have become so disconnected from the natural resources that sustain them that they don't know where their food comes from or where they get their drinking water. The health of the environment is inseparable from humans' well-being and economic prosperity and to successfully address and solve environmental problems people require knowledge, tools and sensitivity.



The Division of Environmental Education and Public Affairs administers the N.C. Environmental Education Certification Program. This program recognizes professional development in environmental education, to acknowledge educators committed to environmental stewardship and to establish standards for professional excellence in environmental education for formal and non-formal educators. Individuals who elect to take environmental education courses or workshops demonstrate a desire to develop a sense of stewardship for North Carolina's natural resources and to instill that sense of stewardship in children and adults.

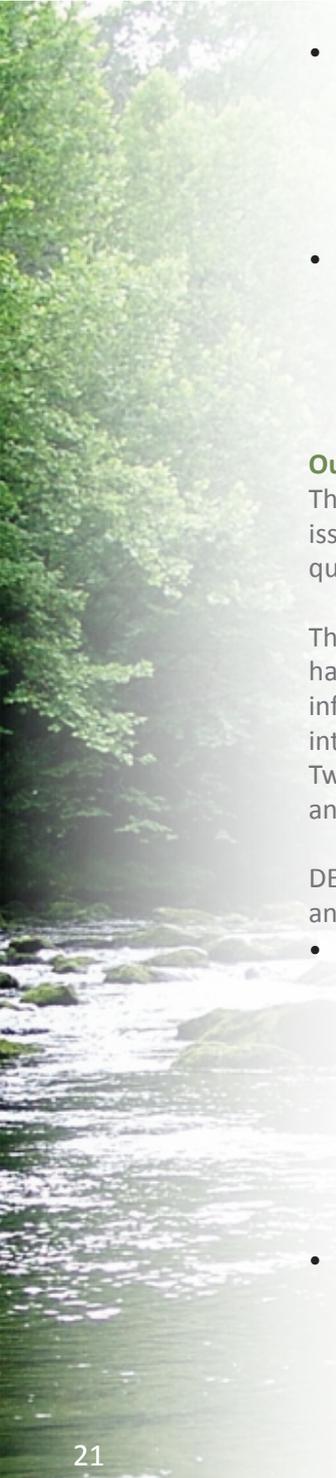
The department operates several facilities that help provide recreational and educational opportunities to citizens and visitors. North Carolina's zoo, aquariums, state parks and the Museum of Natural Sciences facilitate a wide variety of experiences and activities to help people understand and appreciate the natural world. These facilities provide unique experiences and create a critical link to the department's role in environmental education.

- The N.C. Zoological Park in Asheboro is designed to exhibit representative species of animal and plant life from around the world. Approximately 500 acres have been developed into one of the largest "natural habitat" zoos in the United States. Animals are given enclosures that mimic their natural habitats including trees, ponds, rocks, plants and dirt. It is also designed to foster conservation, preservation and propagation of wildlife. In FY 2010-11, an estimated 372,828 students and teachers participated in education programs-school groups, classroom programs and on-site programs. In FY 2010-11, N.C. Zoo attendance was 750,000, a 13-year high.
- The North Carolina Aquariums, located at Fort Fisher, Pine Knoll Shores and Roanoke Island, and Jennette's Pier in Nags Head, provide exhibits of live marine life and other marine educational programs, including field trips, workshops and films. The aquariums are open year-round and are some of the state's most popular attractions. In FY 2010-11, almost 1.1 million people visited North Carolina Aquariums. Approximately 517,000 people participated in free and for-fee educational programs in FY 2010-11.
- The N.C. Museum of Natural Sciences encourages visitors to explore the natural world through an array of permanent and special exhibits, live programs and educational opportunities at the Museum, on school grounds and in the field that appeal to all audiences including students, teachers and the general public.



The museum also operates the Prairie Ridge Ecostation, and the N.C. Museum of Forestry. In 2012, the museum's new wing, the Nature Research Center, an 80,000-square-foot environmental science center, is scheduled to open. In FY 2010-11 more than 709,000 people visited the museum and 449,354 individuals participated in natural science educational programs. In addition, the

Research and Collections section responded to nearly 11,000 public information requests and had 655 people visit the research collections.



- The North Carolina state parks system preserves and protects high quality examples of the biological, geological, archaeological, scenic and recreational resources of North Carolina by including such resources in the parks system for public enjoyment, education and inspiration. The park system consists of more than 213,000 acres, including 35 state parks, four recreation areas and a system of state natural areas. In 2010, nearly 14 million people visited North Carolina state parks and nearly 370,000 participated in guided education programs.
- The North Carolina Coastal Reserve and National Estuarine Research Reserve program protects more than 41,000 acres of unique coastal habitats in 10 reserve sites throughout coastal North Carolina. Each year, the program reaches thousands of students, teachers, local government officials, coastal decision makers and other members of the coastal community through workshops, reserve site field trips, summer camps, and other educational activities.

Outreach

The department's outreach efforts provide residents with information on a wide variety of common environmental issues and measures that can be taken to minimize environmental impact. Disposal of light bulbs, drinking water quality and public grant opportunities are just some of the topics people may read about on DENR's website.

The department has also created a social media presence to more directly reach the public. Its Facebook page, which has more than 1,300 fans, highlights recent departmental press releases and accomplishments. It also provides information about special projects or programs staff are involved in, to provide insight and a more personal view into the services the department provides to the people of North Carolina. Close to 850 people follow DENR's Twitter page, which provides direct linkage to department press releases and activities, as well as other activities and programs of environmental interest in North Carolina.

DENR divisions provide outreach with websites, direct interaction with the public at meetings and special events, and through the production of publications and other guidance documents. Some examples of outreach:

- One of the state's key efforts for educating and informing the public is the air quality forecasting program operated by DAQ and the Forsyth County Department of Environmental Affairs. The program issues daily air quality forecasts for ozone and particle pollution in the Asheville, Charlotte, Fayetteville, Hickory, Rocky Mount, Triad and Triangle metropolitan areas. In addition, DAQ issues special air quality forecasts for unusual events, such as the wildfires that affected much of Eastern North Carolina with smoke in the summers of 2008 and 2011. Other DAQ outreach efforts include maintaining a website, conducting public hearings on rules and certain permits, developing brochures and other publications on air quality issues, working with the news media on air issues, staffing exhibits at special events, and working with educators to teach students about air quality issues.
- The N.C. Recreational Water Quality Program, in the Division of Marine Fisheries, monitors 240 swimming sites, located on ocean beaches, sounds and coastal rivers. All ocean beaches and high-use sound-side beaches are tested weekly from April through September; lower-use beaches are tested twice a month. All sites are tested twice a month in October and monthly from November through March. As needed, the division issues swimming alerts and advisories to notify the public when testing shows that bacteriological standards for safe bodily contact are exceeded. These alerts and advisories are sent to local officials and media through press releases, highlighted on a website and sent via Twitter to interested parties.

- The Division of Water Quality has a full-time coordinator who provides a comprehensive outreach and education program to support local governments, educators and citizen groups in promoting nonpoint source pollution awareness and prevention. The outreach program focuses primarily on assisting the regulated community in meeting the minimum requirements for public participation and outreach under their National Pollution Discharge Elimination System (NPDES) permits, as well as on providing resources and support to communities under state stormwater programs such as the Coastal Rules, Neuse Rules, Falls Lake Rules and Jordan Lake Rules. Secondary goals of the department's program include establishing partnerships with other environmental government agencies, water quality organizations, community groups and educators. In an effort to provide thorough customer service, the program coordinator also serves as a first point of contact to provide rapid response to public requests for assistance with stormwater issues, permitting questions and water quality complaints.
- The Division of Water Resources administers two environmental education outreach programs: Stream Watch and Project WET (Water Education for Teachers). Stream Watch is a stewardship program whereby local citizens can "adopt" a waterway or a portion of one, and act on its behalf by visual monitoring and collecting litter along stream banks. Project WET is a K-12 interdisciplinary water education program intended to supplement a school's existing curriculum.
- Environmental education is considered a key component of the state parks system's mission. More than 250,000 visitors each year attend one of hundreds of interpretive programs given by park rangers, all of whom are certified environmental educators or working toward certification. In addition, each of 21 visitor centers contains a museum-quality exhibit hall with hands-on displays of the parks' natural resources. These and numerous wayside exhibits are researched by rangers and the system's education specialists. In recent years, the education program has adopted a theme to showcase specific resources. In 2011 it was the Year of the Turtle in state parks and 2012 will be the Year of the Bat. In 2011, educational day camps were held for the first

time on Jones Island, a recent addition to Hammocks Beach State Park. The Junior Ranger program was recognized with a 2011 Media Award from the National Association of Interpretation, and the division's education program was named "Outstanding Environmental Partner Organization" by Environmental Educators of North Carolina.

