

9.6 Environment



Wake Forest, NC

INTRODUCTION

North Carolina enjoys a wealth of natural resources and scenic landscapes that have attracted tourists for generations, and helped support immigration and business development for more than two centuries. From the sand dunes at Jockey's Ridge State Park, Outer Banks, coastal maritime forests, Tryon Palace at New Bern state historic site, to Bentonville Civil War Battlefields, Umstead State Park near Raleigh, the Piedmont Uwharrie National Forest, Longleaf Pine forest at Sandhills gameland near Pinehurst and Fort Bragg, Lake Norman near Charlotte, NC Zoological Park in Asheboro, to iconic mountain features such as Grandfather Mountain and Chimney Rock state park. People from throughout the world recognize our state's rich and diverse ecosystems, distinct physiographic regions and mild climate as the foundation for a quality lifestyle. It is incumbent upon all North Carolinians to steward these natural assets so that future generations can enjoy and prosper from these resources. The high quality lifestyle enjoyed by North Carolinians today is sustained by our clean air, clean water, stable soil and groundwater, and an ample supply of locally grown food and natural resources.

STATE OF THE ENVIRONMENT IN NORTH CAROLINA

A potential threat to the current and future lifestyle is our rapidly growing population and its accompanying land use development. North Carolina currently ranks tenth in the most populated states, with 9.5 million people. In the next 20 years, our population will increase to more than 12 million.¹ It is vitally important that North Carolinians use sound judgment in accommodating such growth, and balance the opportunity of future land development with land and water conservation principles and practices. As our population grows, there will be demand and need for more grey infrastructure (roads, potable water, sewer services, trash disposal, energy, public schools, shopping and office centers, etc.).

The need for grey infrastructure must be balanced with the needs to conserve and steward our green infrastructure (streams, lakes, native vegetation, soil, groundwater, wetlands, etc.). Green Infrastructure is the interconnected green space network (including natural areas and

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features, public and private conservation lands, working lands with conservation values and other protected open space) that is managed for its natural resource values and for the associated benefits it confers to human populations.

If we can accommodate growth and development in a way that does not compromise the ability to conserve and steward our natural resources, North Carolina will continue to be an attractive state that supports manufacturing, increased tourism, progressive agriculture, active military base operations and sustained economic growth. These values are intertwined and must be achieved simultaneously as we manage future challenges and opportunities.

STEWARDSHIP RESPONSIBILITY

At the statewide level, stewardship of natural resources has been actively managed by agencies within North Carolina state government, in partnership with federal, local government, non-governmental organizations, and private-sector businesses. North Carolina has established an excellent record of achievement when it comes to balancing the needs of environmental stewardship in association with progressive growth and development.

NC Department of Environment and Natural Resources (DENR)

As the lead environmental stewardship agency for North Carolina, the Department of Environment and Natural Resources (DENR) has helped preserve and protect natural resources within the state for more than 100 years. Known in the early 1900s as the N.C. Geological and Economic Survey, its original mission was to protect watersheds, prevent and control wildfires, and manage the state's geologic and mineral resources.² Today, the Department works across multiple divisions to accomplish the following:

- Administer regulatory programs designed to protect air quality, water quality, and public health
- Offer technical assistance to businesses, farmers, local governments, and the public
- Offer educational programs encouraging responsible environmental stewardship behavior at DENR facilities and through the state's school system
- Through its natural resource divisions, work to protect fish, wildlife and wilderness areas
- Work with state parks and forests to ensure safe and enjoyable outdoor recreation experiences

NC Division of Parks and Recreation (DPR)

There are several ways in which the purposes and mission of the North Carolina Division of Parks and Recreation (DPR) can contribute to the achievement of the state's bicycle and pedestrian goals. Although the division's focus is recreation rather than transportation, they can be an important partner in advocating, planning, funding and implementing bicycle and pedestrian projects because walking and biking often encompass both recreation and transportation purposes.

DPR is responsible for preparation of the NC Statewide Comprehensive Outdoor Recreation Plan (SCORP), which provides guidance on recreational trends and needs for the federal Land and Water Conservation Fund and other grant programs. This report identifies walking and cycling as important recreational needs that should be met. This is consistent with the recognition that walking and cycling are important transportation needs. The next SCORP update will be in 2014.

In addition to preparing the SCORP, DPR operates the State Parks System, consisting of more than 218,000 acres, with 41 state parks and recreation areas as well as 33 undeveloped



conservation areas, including state natural areas, state rivers, state trails, and state lakes. Park resources can help mitigate climate, air, and water pollution, which contribute to impacts on public health. The state parks are also important destinations for local and regional trails and greenways and for NCDOT's statewide bicycle routes. NCDOT should coordinate with DPR to establish safe, appropriate, and environmentally sustainable walking and biking access to state parks.

The State Parks System includes four State Trails, one of which is the Mountains-to-Sea State Trail (MST). The State Trails are multi-jurisdictional partnerships to provide connected, long-distance hiking and paddle trails. The focus of these trails is recreational, but they can serve transportation purposes as well. The Mountains-to-Sea State Trail is a partnership among state and federal land managing agencies, counties and municipalities, and volunteer groups such as the Friends of the Mountains-to-Sea Trail.

Hickory Nut Gorge in western North Carolina ▼



The Mountains-to-Sea State Trail will be a continuous, off-road trail from the Great Smoky Mountains National Park in western North Carolina to Jockeys Ridge State Park on the Outer Banks. The distance is approximately 1,000 miles, but only 530 miles have been completed. The NC Division of Parks and Recreation is working with multiple partners to complete the trail. NCDOT has assisted with planning and implementation of some segments of the Mountains-to-Sea State Trail because the trail is an important component of a walk/bike strategy for many communities along the route of the trail.

The NC Parks and Recreation Trust Fund (PARTF) was established in 1994 to fund improvements to the state parks system, to fund grants for local government park and recreation projects, and to improve public access to the state's beaches and estuarine shorelines. The PARTF local grant program is administered by DPR, and through this program, hundreds of grants have been awarded for

trail and greenway projects, including bicycle and walking paths that are primarily used for recreation. The purpose of PARTF is focused on recreation, but many of these projects may also serve transportation needs. PARTF is an important partner in providing bicycle and pedestrian opportunities in North Carolina.

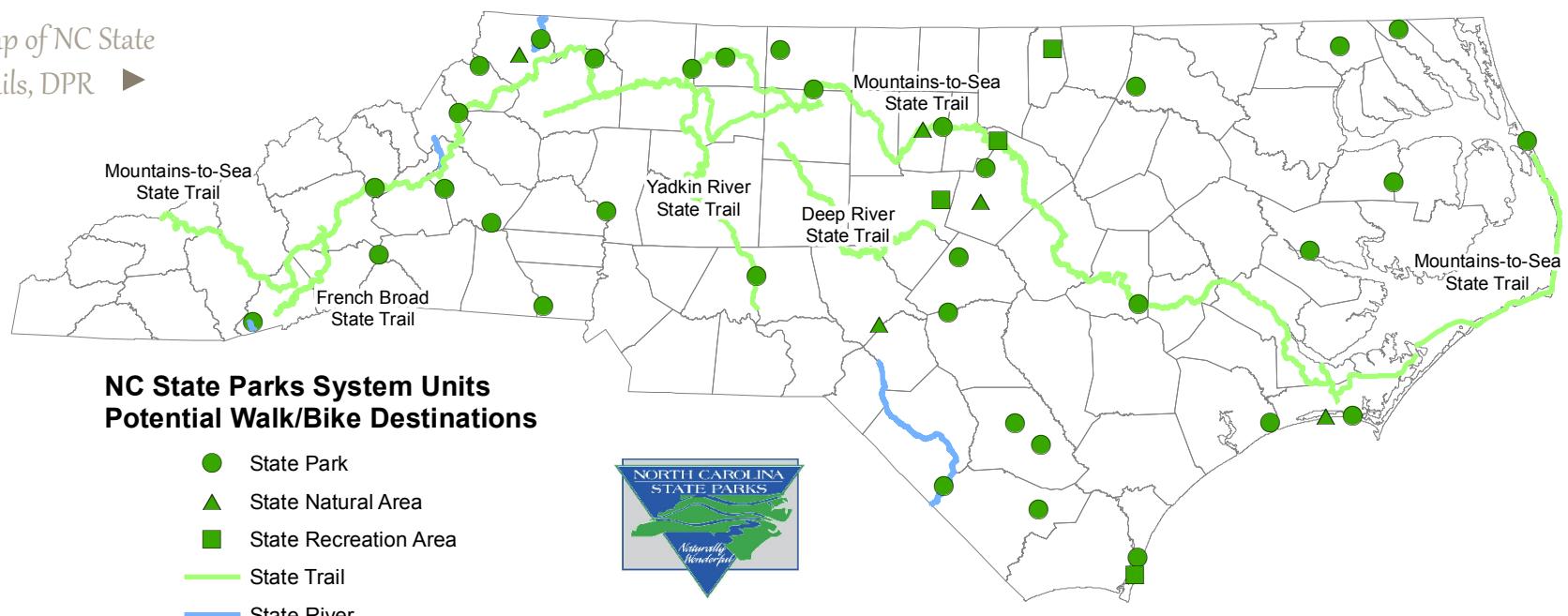
DPR also administers the North Carolina Trails System (GS 113A-83). By statute, the NC Trails System is focused on scenic and recreational trails to serve the outdoor recreation needs of an expanded population and to promote public access and enjoyment of outdoor, natural and remote areas. The DPR State Trails Program also administers federal Recreational Trail Program grants and state Adopt-a-Trail grants to provide funding to government agencies and non-profit organizations for trail and greenway projects.

NCDOT should work closely with DPR to explore ways to coordinate and enhance the role that recreational trails and greenways can play in implementing bicycle and pedestrian transportation projects. The interface between

recreation and transportation purposes can help to advance statewide goals for walking and biking.

The mission of the state parks system is to conserve and protect representative examples of the natural beauty, ecological features and recreational resources of statewide significance; to provide outdoor recreational opportunities in a safe and healthy environment; and to provide environmental education opportunities that promote environmental stewardship of the state's natural heritage.

Map of NC State Trails, DPR ►





Federal and Local Partners

North Carolina benefits in land and water stewardship efforts from its strong working relations and partnership with federal agencies, including (but not limited to) the U. S. Fish and Wildlife Service, U. S. Forest Service, National Park Service, and the U. S. Army Corps of Engineers. These agencies all play a vital and important role in managing land and water resources, and determining for how land and water is used in a manner that is consistent with state and federal programs and laws. Federally owned land accounts for approximately 8% of all land in North Carolina, or roughly 2.3 million acres. (Source: U.S. General Services Administration, 2010)

North Carolina's local governments are among the most valued partners in land and water conservation. The vast majority of land use development is controlled by decision makers in local governments. Local governments also enforce sustainable land development activity, are responsible for making sure that sediment and erosion

control occurs, that urban forests are established and that sidewalks and trails are planned and constructed.

Non-governmental organizations play a vital role in stewardship of our natural resources. A wide range of NGOs collaborate with state and local governments every day to promote and carry out stewardship work. In order to continuing the promotion of environmental stewardship, environmental literacy, and strategic transportation choice throughout North Carolina, collaboration will be required among state agencies, local governments and NGOs.

Stewardship is the responsibility of each and every North Carolinian, and is easily achieved by, among many other endeavors, maintaining sound vegetation practices on privately owned land, participating in local waste recycling programs, by composting organic material, conserving potable water and participating in alternative transportation programs like bike-to-work and safe-routes-to-school.



◀ Nantahala River with paddle trails and greenway trail

more walking and biking. Incentivizing land use patterns that are conducive to connectivity for pedestrians and bicyclists facilitates walking and biking as a viable choice in transportation. Land development patterns should encourage block size limits that are conducive to walking. By encouraging the appropriate location of key community destinations, connectivity for pedestrians and bicyclists can be increased.

In order to effectively increase the desire for walking and bicycling, North Carolina communities must encourage density and more compact development patterns. National transportation studies conclude that 1-3 mile distances are the predominant distances walkers and bikers will travel to work or to shop. The development pattern in urbanized communities provides more opportunity to encourage and promote active adoption of a bicycling and walking. Community planners, developers and public officials play a role in selecting and approving development patterns that can lead to or facilitate bike and pedestrian patterns. The denser development and redevelopment within urban areas discourages development in the rural green spaces, farm fields and forests.

Land Use and Road Space Requirements

Roads and surface parking lots require a substantial amount of land area to accommodate large volumes of motor vehicles. In urban areas, making space for greater numbers of motor vehicles requires expropriating valuable urban property to construct new roads, widen existing roads, or construct or expand parking lots. As a result, development becomes more spread out throughout a municipality or region, leading to a loss of open space and conversion of farmland. Increases to impervious surface area also compromise water and flood drainage, putting areas at greater risk of flooding and reducing water and soil quality.

TRANSPORTATION IMPACTS TO THE ENVIRONMENT

In order to consider the value that biking and walking may have for the environment, it is important to first examine the adverse effects that continued automobile use has on the environment. Motor vehicles and the roadway infrastructure they require contribute to several issues of environmental quality, energy consumption, and conservation that could be mitigated by substituting some automobile trips with walking and bicycling.

Development Impacts and Encouragement of Walking and Bicycling

Developing communities that are more conducive to biking and walking leads to their use of walking and biking as an alternative to motorized transportation. Designing communities and developments to provide better connectivity for pedestrians and bicyclists encourages





▲ Roadways and parking areas require significant amounts of land.

ENERGY AND ENVIRONMENTAL BENEFITS OF BICYCLING AND WALKING

Providing environments for safe and efficient walking and biking can encourage people to replace some driving trips with these human-powered modes. Such efforts can help to improve the environment in North Carolina by lowering vehicle emissions resulting in cleaner air, healthier communities and by preserving valuable natural resources.

Overview of Air Quality and Water Quality Mandates

Air quality in North Carolina has been steadily improving since the early 1980's as a result of efforts throughout the state to reduce ozone and particle pollution. Collectively, cars, trucks and other vehicles are the largest source of air pollution in North Carolina. Highway and off-road vehicles account for three-fourths (76%) of the statewide emissions

of nitrogen oxides (as of 2010), the main cause of ozone, which is the state's most widespread air quality problem. As new and more stringent federal air quality standards are achieved, air quality throughout the state will continue to improve.

North Carolina's streams, rivers and lakes generally have good water quality. Approximately 30 percent of the state's waters have impaired water quality, due to high levels of mercury, bacteria and large amounts of sediment. Significant progress has been made across North Carolina addressing nutrient pollution through nutrient management strategies for the Neuse and Tar-Pamlico river basins.

As North Carolina grows, both in terms of population and land use development, future impacts to air quality and water quality will occur.



▲ A slight increase in bicycling and walking would reduce emissions in NC.

Air Quality

As of 2003, 27 percent of U.S. greenhouse gas emissions were attributed to the transportation sector. Personal vehicles account for almost two-thirds (62 percent) of all transportation emissions.⁴ Primary emissions that pose potential risks are carbon dioxide, carbon monoxide, volatile organic compounds, (VOCs), nitrous oxides (NOx), benzene and airborne particulates. Children and senior citizens are particularly sensitive to the harmful affects of air pollution, as are individuals with heart or other respiratory illnesses. Increased health risks such as asthma and heart problems are associated with vehicle emissions.⁵ The most pollutants are released during the first few minutes of starting an engine, known as a "cold start". Therefore a longer vehicle trip produces fewer pollutants per mile than a shorter one.

According to the Bureau of Transportation Statistics, 40% of daily trips in the US are two miles or less and 25% are less than one mile, a distance that can easily be covered by walking or bicycling.⁶ Transitioning some of these trips to walking and biking rather than driving would greatly reduce cold starts and resulting pollution.

Older car and truck air-conditioning units also contribute significantly to reduced air quality due to their use of chlorofluorocarbons (CFCs). Approximately 25 percent of all CFCs are emitted by motor vehicle air-conditioning units.⁷ CFCs are the third-greatest contributor to the greenhouse effect (14%), behind carbon dioxide (50%) and methane (18%). CFCs are also known contributors to the degradation of the stratospheric ozone layer. As the ozone layer degrades, greater levels of ultraviolet radiation pass through the atmosphere to the earth's surface, increasing the likelihood and severity of sunburns and skin cancers.

Reduction in Vehicle Emissions and Congestion

The reduction in vehicle emissions as a result of decreased automobile dependency can be viewed as a benefit to North Carolina residents and their surrounding environment. Decreasing the dependency on daily motor vehicle trips and increasing the number of alternative travel methods such as bicycling and walking can reduce emissions and assist in improving air quality. Replacing two miles of driving each day with walking or bicycling will, in one year, prevent 730 pounds of carbon dioxide from entering the atmosphere.⁸

A research study on active transportation and air quality found that a five percent increase in the walkability of a neighborhood is associated with a per capita 32.1% increase in active travel, 6.5% fewer miles driven, 5.6% fewer grams of nitrous oxides (NOx) emitted, and 5.5% fewer grams of volatile organic compounds (VOCs) emitted.⁹ These reductions can have considerable positive health effects. A study in Minneapolis-St. Paul, Minnesota found that if bicycles were used for half of the short trips made on good weather days, the Twin Cities could prevent 300 deaths and save \$57 million in annual medical costs due to reduced air pollution and increased physical activity. Collectively, 11 major Midwest cities would save \$7 billion in medical costs each year and prevent 1,100 deaths.¹⁰

Walking and bicycling help to improve roadway efficiency, mitigate congestion and noise pollution, and reduce stress. Replacing motor vehicle trips with walking and bicycling helps to reduce the number of vehicles on the road and adds minimally to road congestion.¹¹ As quieter forms of transportation, walking and biking are also more desirable modes of travel in dense areas and in residential neighborhoods.



Traffic congestion carries a number of costs, including wasted time, excess fuel consumption, wasted productivity, and stress. According to the Texas Transportation Institute, congestion in the Raleigh-Durham area alone creates 19.2 million hours of travel delay and results in 6.5 million gallons of wasted fuel each year.¹² These inefficiencies contribute to an estimated annual congestion cost of \$418 million. Traffic congestion in Charlotte leads to similar costs; 17.7 million hours are lost to travel delay and 5.2 million gallons of excess fuel are consumed as a result. The estimated annual congestion cost for Charlotte is \$378 million. Congestion and noise pollution also carry stress costs that may interfere with individuals' physical health and quality of life.

Water Quality

Motor oil and other contaminants that leak onto the roadway end up in road runoff, polluting waterways and groundwater. Fuel that is stored in tanks underground may also seep into the surrounding soil over time and into aquifers and other water sources.

The extraction, shipping, and storing of oil has also led to widespread environmental pollution. Major oil spills, such as the 1989 Exxon Valdez oil spill off the coast of Alaska and the 2006 Deepwater Horizon oil spill in the Gulf of Mexico, create long-lasting contamination of marine habitats.¹³ At a local level, oil and gasoline commonly leak from motor vehicles, fuel pumps, or other sources into road runoff or are poured down drains or into sewers. All of these contaminants then seep into surrounding waterways and groundwater.

Another source of water pollution is from the everyday use and wear and tear of motor vehicles. Brake lining wear, leaked fluids, and the release of lead and rare earth metals from batteries and other auto parts all leach into the surrounding environment and accumulate over time.¹⁴

Salts that are used to de-ice roadways during the winter months also accumulate in stormwater runoff and pollute the environment.

Energy Conservation and Independence

According to the National Association of Realtors and Transportation for America, 89% of Americans believe that transportation investments should support the goal of reducing energy use.¹⁵ Providing alternative modes of travel has the potential to shift dependency on foreign oil and promote sustainable transportation choices in communities. With better walking and bicycling facilities, many people would be able to make short trips of three miles or less – which currently account for 50 percent of all motor vehicle trips – by foot or bike without the need to use a car.



▲ Congestion is a growing problem in a number of areas, including NC.

The transportation sector accounts for 71 percent of all petroleum use in the US. Fuel consumption could be drastically reduced by replacing some driving trips with walking and bicycling trips, particularly short trips of three miles or less. Approximately 25% of all driving trips are less than one mile, 40% of daily trips are within two miles or less, and approximately 50% of trips are three miles or less. Reducing the percentage of short trips made by motor vehicle by taking advantage of walking and biking would help to reduce state and national fuel consumption and the environmental costs associated with it.

Solid Waste

Every year in the United States, an estimated 10 million motor vehicle chassis and 250 million used tires are dumped into landfills and scrap yards.¹⁶ Much of this waste is not recycled and is left to rust and decay, leaching harmful chemicals and materials. By contrast, the primary sources of waste from walking and bicycling are worn-out shoes and bicycle tires and parts, much of which can be recycled. The amount of waste produced from walking and bicycling that cannot be recycled is an order of magnitude less than that produced from discarded motor vehicles and parts.

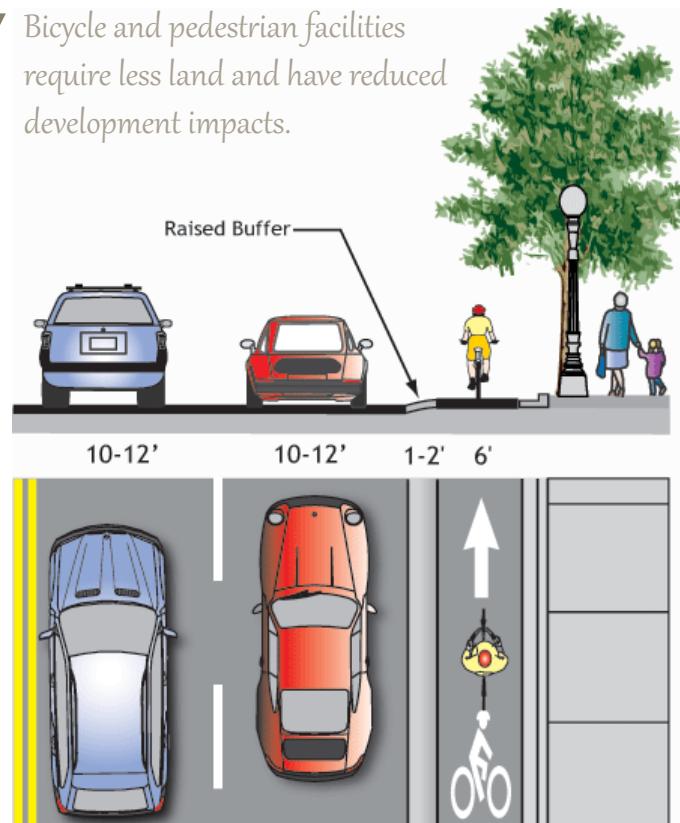


▲ Much of the waste generated from automobile manufacturing is not recycled.

Roadway Development Impacts

Transitioning to a multimodal transportation network that provides adequate facilities for walking and biking would require less infrastructure development than an auto-dependent transportation system. Walking and biking produce much less wear and tear on roads and require much less impervious surface to operate. With reduced motor vehicle use, roadways would not need to be maintained, expanded, or built as frequently or intensively. This would help to mitigate the associated loss of open space, conversion of farmland, use of valuable urban property, and compromise to water and flood drainage that results from building, expanding, and maintaining paved surfaces.¹⁷

▼ Bicycle and pedestrian facilities require less land and have reduced development impacts.



Wildlife Habitat

Large road projects have deleterious effects on surrounding wildlife habitat. Not only can sprawling roads and development limit the extent of unique North Carolina habitats, but they can also create a barrier within habitats, known as habitat fragmentation. This segmentation of ecosystems and habitat ranges for North Carolina species interferes with the ability of wildlife to sustain their populations and can lead to a loss of biodiversity.

TRAILS AND GREENWAYS BENEFIT COMMUNITY CONSERVATION

Trails are an integral part of our natural environment and can be used as a tool for conservation. Trails assist with preserving important natural landscapes, providing necessary links between fragmented habitats and providing tremendous opportunities for protecting plant and animal species. Increased development has contributed to the creation of habitat islands—isolating wildlife, reducing their natural habitats and survival. Trails provide that important link between these island populations and habitats and increase the available land to many wildlife species.

Greenways provide numerous direct and indirect ecological benefits to the communities in which they are located. They function as protectors and preservers of our natural resources by preserving vital habitat corridors and promoting plant and animal diversity. They cleanse and replenish the air, buffer the negative effects of development while mitigating noise, water, thermal and air pollution.

Greenways are community connectors. They create linkages and corridors for the human and natural community alike. Depending upon the location, some greenways are the only wooded areas around, sheltering birds and other species along the tree buffers. In other cases greenways



- ▲ Greenway corridors provide many benefits to wildlife habitat if properly constructed.

provide open areas for species that prefer the edge of the greenway corridor. But some greenways serve greater purpose, particularly if they contain sufficient buffers that provide corridors wide enough for particular species to move within. Greenways can be utilized to link protected open spaces, community parks and waterways, which serve as human transportation corridors and effectively link certain habitats and animal communities. Take for example a wooded river walkway or greenway. If sufficiently buffered, it serves the purpose of buffering the river's floodplain and sheltering a significant habitat community, while providing a human transportation or recreation linkage.

It is important to consider the natural landscape in the design and implementation of a greenway. Some habitats and species are particularly sensitive to impervious surfaces or to light infiltration. The shaded woodland along the greenway can provide a different climate for the user or the animal inhabitant. Greenways need not be only narrow linear pathways. Well-known greenways, like the Mountains-to-Sea Trail, are developed by linkages of park and conservation nodes that provide activity areas along a larger greenway. Few users utilize the entire length of longer systems like the 900-mile MST. Instead many communities have developed loop systems that allow the public to access the trunk line for the larger greenway system while incorporating smaller linkages as part of a community system.

Some greenways are developed for environmental restoration. Wetland and stream mitigation or preservation projects sometimes provide an excellent opportunity to develop trails or greenways that can make an area accessible to pedestrians and bicyclists. These situations maximize the public benefit of the property's conservation by water quality improvements and public accessibility.

Greenways and trails are more than functional pedestrian and bicycle thoroughfares. Communities and organizations utilize conservation and recreation tools to obtain goals that benefit transportation while upholding important natural resource objectives. The Carolina Thread Trail and the Neuse River Greenway are excellent examples of larger community greenway transportation projects with equally important water quality and habitat conservation objectives. The Neuse River Greenway is both a Raleigh greenway and part of the much larger Mountains-to-Sea Trail. These same greenways systems support public health and recreation objectives. Planning for greenways does often not just meet the objectives of one agency or

planning entity. Greenways and trails provide an excellent opportunity for different partners with different objectives to make a proposed project more successful. These same partners are able to bring different matching resources as well as expertise to the table for successful implementation.

Enhancing Cultural Awareness and Community Identity

Trails, greenways, and open space can serve as connections to local heritage by preserving historic places and by providing access to them. They provide a sense of place and an understanding of past events by drawing greater public attention to historic and cultural locations and events. Trails often provide access to historic sites such as battlegrounds, bridges, buildings, and canals that otherwise would be difficult to access or interpret. Each community and region has its own unique history, its own features and destinations, and its own landscapes. By recognizing, honoring, and connecting these features, the combined results serve to enhance cultural awareness and community identity, potentially attracting tourism. Being aware of the historical and cultural context when naming parks and trails and designing features will further enhance the overall trail- and park-user experience. An important link to our future is through our past. Greenways can serve to elevate the special history and culture of towns, cities and villages by providing accessibility to historic and architectural significant buildings, educational interpretation and special community assets.

Improved Water Quality and Wildlife Habitat

Greenway corridors often become off-road transportation facilities with simultaneous benefits. They help link fragmented tracts of land and protect sensitive natural features, natural processes, and ecological integrity.



Greenways also contribute to cleaner air by preserving stands of plants that create oxygen and filter air pollutants such as ozone, sulfur dioxide, carbon monoxide and airborne particles of heavy metal. The natural buffer zones that occur along greenways protect streams, rivers and lakes, preventing soil erosion and filtering pollution caused by agricultural and roadway runoff.¹⁸

“The protection of open spaces associated with trail and greenway development often also protects natural floodplains along rivers and streams. According to the Federal Emergency Management Agency (FEMA), the implementation of floodplain ordinances is estimated to prevent \$1.1 billion in flood damages annually. By restoring developed floodplains to their natural state and protecting them as greenways, many riverside communities are preventing potential flood damages and related costs.”

Federal Emergency Management Agency. (2005) Building Stronger: State and Local Mitigation Planning.

PROMOTING ENVIRONMENTAL STEWARDSHIP IN NORTH CAROLINA

The choices that we make every day are what ultimately drive the strength of our economy, resource base, and the quality of the environment. The State of North Carolina is fortunate to have policies and programs underway that promote and encourage environmental stewardship through low impact development and the conservation of natural resources. Both NCDOT and NCDENR support stewardship efforts at the state level, and their continued partnership will provide the leadership that is necessary to offer sustainable transportation choices to North Carolinians. The following programs, recognition and leadership programs, environmental education, information sharing, and collaborative problem solving opportunities will enhance and promote environmental stewardship in the state for generations.

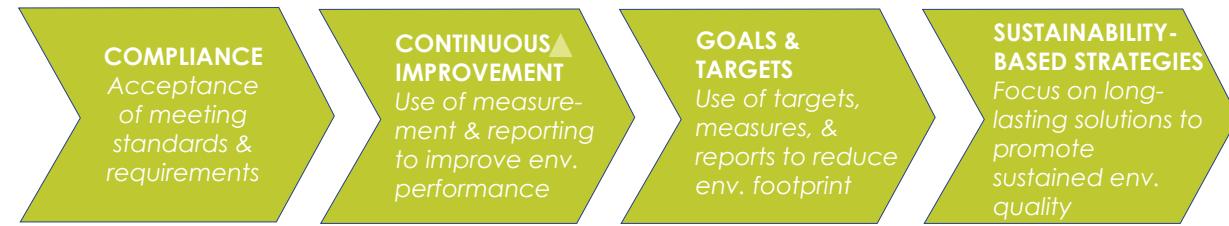
Current Policies and Programs

EPA Building Blocks for Sustainable Communities
The purpose of delivering this program is to stimulate a discussion about growth and development and strengthen local capacity to implement sustainable approaches to community development. The program provides quick, targeted technical assistance to selected local and/or tribal governments in helping them achieve desired development goals, improve quality of life, and become more economically and environmentally sustainable.

<http://www.epa.gov/smartgrowth/buildingblocks.htm>

The Evolution of Environmental Stewardship

Source: EPA Environmental
Stewardship Staff Committee



Bike-share systems to create alternative commuting options

Bike-share systems are designed to make it economical and convenient to use bicycles for trips that are too far to walk but too short to drive in creating a balanced and dynamic transit system. Charlotte launched the largest bike sharing system in North Carolina in 2012 with over 200 bikes and 20 stations strategically located throughout the city.

<http://charlotte.bcycle.com/About/WhatIsCharlotteBcycle.aspx>

NC Environmental Stewardship Initiative (ESI)

DENR's Environmental Stewardship Initiative is designed to promote and encourage superior environmental performance by North Carolina's regulated community. This voluntary program provides benefits and technical assistance to stimulate the development and implementation of programs that use pollution prevention and innovative approaches to meet and go beyond regulatory requirements. This program seeks to reduce the impact on the environment beyond measures required by any permit or rule, producing a better environment, conserving natural resources and resulting in long-term economic benefits.

<http://portal.ncdenr.org/web/deao/outreach/esi>

North Carolina Natural Heritage Program (NCNHP)

The North Carolina Natural Heritage Program (NCNHP), within DENR, works in partnership with a variety of state and federal agencies, private organizations, individuals, and corporations to identify the most significant natural areas of North Carolina and share this information, enabling future generations to enjoy the full diversity of North Carolina's natural heritage.

The NCNHP maintains the state's most extensive database for information on rare plants and animals, natural communities, outstanding natural areas, and land managed for conservation across the state. This scientific evidence is used to consider the ecological significance of various sites, and to evaluate the likelihood and nature of ecological impacts. Analysis of the data facilitates the establishment of priorities for the protection of North Carolina's most significant natural areas. NCNHP consolidates the information collected about rare species, high quality natural communities, and significant natural areas and makes it available for a variety of uses, including conservation and development planning throughout North Carolina.

North Carolina Conservation Planning Tool

The North Carolina Conservation Planning Tool (CPT) compiles this data into maps that communities can use to visualize how natural resources add value, and apply this information to put conservation opportunities in order of



priority. This can support development planning that meets the needs of both people and the natural world upon which we depend, such as greenways alongside streams. The Biodiversity/Wildlife Habitat Assessment of the CPT is being integrated into the Wildlife Resources Commission's Green Growth Toolbox, which is shared with local governments and regional planning groups that want to address natural resources as part of their planning process.

Green Growth Toolbox

The NC Wildlife Resources Commission partners with the NC Conservation Planning Tool and other organizations to implement the Green Growth Toolbox. The Green Growth Toolbox is a non-regulatory tool for local governments, planners, communities and developers interested in conserving priority wildlife and habitat through their local land use planning methods. The GGT consists of a handbook that details community benefits, how to interpret NC conservation data sources for habitat mapping and how to achieve Green Growth through community plans, incentives, ordinances, development review and site design. NCWRC and partners provide training workshops to planners and communities with free follow-up technical assistance on planning projects. The Green Growth Toolbox can be used to minimize transportation impacts to wildlife and habitats because it details land use planning techniques that conserve priority wildlife habitats and travel corridors. It also provides specific wildlife science-based guidance on how much habitat priority wildlife need in order to remain in developing landscapes.

<http://www.ncwildlife.org/greengrowth>

Complete Streets Policy

Complete Streets is North Carolina's approach to interdependent, multi-modal transportation networks that safely accommodate access and travel for all users. The policy requires planners and designers to consider and

incorporate multimodal alternatives in the design and improvement of all transportation projects within a growth area of a municipality unless certain circumstances exist.

<http://www.ncdot.gov/bikeped/lawspolicies/policies/>

National Trails Day

National Trails Day is a celebration of trails that involve a broad array of activities including hiking, dog walking, bike riding, trail maintenance, birding, wildlife photography, geocaching, paddle trips, trail running, trail dedications, health-focused programs, and children's activities. 29 events were officially registered in North Carolina in 2012, and National Trails Day took place June 1 in 2013.

<http://www.americanhiking.org/national-trails-day/>

North Carolina Safe Routes Action Plan

As part of the Safe Routes to School National Partnership, the mission of this program is to advocate for safe walking and bicycling to and from schools, and in daily life, to improve health and well-being of America's students and to foster the creation of livable, sustainable communities.

<http://www.saferoutespartnership.org/sites/default/files/pdf/NCActionPlan11-2012.pdf>

Active Living By Design

Active Living By Design (ALBD) creates community-led change by working with local and national partners to build a culture of active living and healthy eating. Established by the Robert Wood Johnson Foundation, ALBD is part of the North Carolina Institute for Public Health at the UNC Gillings School of Global Public Health in Chapel Hill, North Carolina. ALBD's mission is to create community-led change by working with local and national partners to build a culture of active living and healthy eating.

<http://www.activelivingbydesign.org/>

ENDNOTES

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