

Johnston County Natural Resource Initiative

Green Infrastructure Assessment Report



Prepared for the
Johnston County Natural Resource Initiative (JCNRI)



By
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FEBRUARY 2012

Funding

The Johnston County Natural Resource Initiative Green Infrastructure Assessment Report was made possible through funding from the U.S. Department of Agriculture Forest Service (USFS), Southern Region. The competitive funds were awarded to the N.C. Forest Service through a grant under the State and Private Forestry program of the USFS.

Acknowledgements

The Johnston County Natural Resource Initiative (JCNRI) has been made possible by many individuals, organizations, and county and state government agencies, including the towns of Benson, Clayton, Selma, Smithfield, and Wilson's Mills; Johnston County Planning and GIS Departments; Johnston County Soil and Water Conservation District; N.C. Cooperative Extension; N.C. Forest Service, N.C. Wildlife Resources Commission, N.C. Natural Heritage Program; Triangle Land Conservancy; Triangle J Council of Governments; and N.C. State University. More information about the project and partners can be found on the JCNRI Wikispace: jcnri.wikispaces.com.

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EXECUTIVE SUMMARY

What is the Johnston County Natural Resource Initiative?

The Johnston County Natural Resource Initiative (JCNRI) is a collaborative effort among county and municipal governments, natural resource professionals, and non-profit organizations to develop and promote strategies in the County for the conservation of natural resources through a network of farms, forests, and open space. Participants include Johnston County Soil and Water, Johnston County Cooperative Extension, Johnston County Planning Department, North Carolina Natural Heritage Program, North Carolina Forest Service, North Carolina Wildlife Resources Commission, North Carolina State University, Triangle Land Conservancy, Triangle J Council of Governments, and staff from the towns of Benson, Clayton, Selma, Smithfield, and Wilson’s Mills. Funding for this project was provided through a grant from the U.S. Department of Agriculture Forest Service, Southern Region.

The North Carolina Forest Service led the assessment process and worked in conjunction with the Johnston County Planning Department to meet their need for a reference document concerning the natural resources of the County. All other agencies and organizations involved provided expertise and guidance related to their particular field of natural resource management.

Johnston County residents and landowners were invited to participate in three different workshops. Those workshops were held on March 31, 2009, November 12, 2009, and September 23, 2010. The workshops introduced the project to residents and landowners, provided information about green infrastructure, and allowed for public input and comment on the project. Stakeholder feedback from those public meetings was incorporated into the assessment.

A workshop for planners and elected officials from the County as well as all the cities and towns in the County was held on September 23, 2010. A speaker from the Green Infrastructure Center presented on how to use green infrastructure planning and how this document could be used by attendees.

What is Green Infrastructure?

Green infrastructure (GI) is a connected network of green spaces (natural lands, working lands, and open space) that is planned and managed for its natural resource value and for the associated benefits and services provided to people and communities. Those benefits and services are collectively referred to as “ecosystem services.”

Ecosystem services are generally viewed as free benefits to society, such as wildlife habitat, watershed services, carbon storage, and scenic landscapes. Lacking a formal market, these natural assets are often overlooked in public, corporate, and individual decision-making processes. Recognizing forest ecosystems as natural assets with economic and social value can help promote conservation and more responsible decision-making. Green infrastructure plays a critical role in providing the natural resources (water, land, air, forest, wetlands, etc.) that support our communities, cities, and societies. Without these resources, our basic needs for food, shelter, and raw materials will not be met.

Normally, when we think of infrastructure, we think of grey infrastructure such as buildings, roadways, and sewer systems. We understand that there has to be connectivity between our roads and highways, utility lines, or water systems for this infrastructure to function successfully.

Green infrastructure is applying these same concepts of connectivity to trees and the natural system. It is a strategic approach to land conservation, addressing the economic and social impacts of sprawl, fragmented open spaces, and forestland.

The green infrastructure network is formed by connecting significant sites (community parks and arboretums) and natural hubs (working lands, state forests, and wildlife refuges) with linkages such as trails and river corridors. It is designed to be flexible and adjustable to meet the needs of current development. Just as grey infrastructure is managed to meet the needs of society, so must the components of green infrastructure.

What is the Purpose of this Green Infrastructure Assessment?

This assessment was prepared in order to highlight the existing natural resources of the County and to provide direction in linking these resources together to form a green infrastructure network. The information is intended as a tool to aid decision makers in strategic planning and taking proactive steps to conserve the natural resources of the County. The green infrastructure assessment provides the foundation needed to integrate conservation planning with land development and grey infrastructure. As Johnston County continues to grow in population, more roads, homes, and businesses will be developed and built to accommodate the growth. The County's natural resources currently provide clean water, desirable farmland, workable forestland, livable wildlife habitats, and enticing recreational areas for its residents. Breaking the links between these elements can increase the risks of flooding; lead to more sedimentation in creeks and rivers; increase costs for providing goods, utilities, and services; and degrade the desirability and appeal of recreational areas.

What are the Key Findings of this Assessment Report?

- ✿ Johnston County has a rich cultural history rooted in agriculture dating back to pre-colonial times. Much of the County's history can be linked back to the Neuse River, which historically served as an important shipping corridor. Throughout the County's history, the Neuse River has also been the primary source of clean surface water supplies for agriculture and other uses (e.g., human consumption, recreation, etc.).
- ✿ Present-day Johnston County is the tenth largest county by land area in the state and is comprised of a diverse landscape dominated by agricultural land, forestland, and expanding urban centers. Despite population growth and expanding urban areas, the County remains predominately rural, with approximately 91 percent of the County classified as agricultural land, forestland, water, or wetland. As of 2006, urban land uses represented approximately 9 percent of the County with a majority located within municipal boundaries and along the I-40 and I-95 corridors and interchanges.
- ✿ The County is situated on the transition of two major physiographic regions of the state – the Piedmont and Coastal Plain. This transition area is termed the “Fall Line” and provides for unique geologic features that support diverse natural communities and wildlife habitats. The geology of the County also produces fertile soils suitable for agriculture and forestry. Approximately 41 percent of the County's soils are designated as prime farmland soils by

the Natural Resource Conservation Service (NRCS). Another 15 percent of the County is designated as prime farmland when the soils are sufficiently drained and 21 percent are considered farmland soils of statewide importance.

- ✿ The County's wealth has long been linked to the natural resources managed on working lands, such as farm and forestland. While these resources are vital to the economic health of the County, they also provide many critical ecosystem services, including providing clean water, clean air, wildlife habitat, and recreation areas. Urban forests and urban tree canopy are also critical components of Johnston County's green infrastructure.
- ✿ Population growth and land use change are the most significant threats to conserving the natural resources (green infrastructure) of the County, including the economic and intrinsic values of these resources. Other threats include insects, diseases, and non-native invasive plants; fire exclusion and wildfire hazards; and mining and mineral exploration.
- ✿ The County's population has grown 174 percent in the last four decades from 61,737 in 1970 to 168,878 in 2010. While the highest decadal growth occurred between 1990 and 2000 at 50 percent, population growth continued to be high between 2000 and 2010, increasing 38 percent during this period.
- ✿ Population growth has contributed to land use conversion from farmlands, forestlands, and natural communities to urban land in some areas of the County. Farmland area has decreased 17 percent from 1987 to 2007 and forestland area has decreased 33 percent from 1992 to 2006. Upland forest natural communities, including hardwood dominated, pine dominated, and mixed forests, represent the largest declining category of natural communities, with a 42 percent decline from 1992 to 2006. However, upland forests still represent approximately 26 percent of the County.
- ✿ Population growth and land use change – both within and upstream of the County – has contributed to declining water quality. Since 1992, the number of watershed catchments with at least 70 percent forest or other natural vegetation – an important threshold indicator of when water quality conditions commonly begin to deteriorate in a watershed – has declined approximately 39 percent. Watershed impervious cover has also increased from 2001 to 2006, contributing to declining water quality. In 2010, there were eight surface water segments listed as impaired on the Clean Water Act 303(d) list by the N.C. Division of Water Quality for not meeting their intended uses. Impairments included: low dissolved oxygen, low pH, copper, zinc, turbidity, and poor ecological / biological integrity.
- ✿ Approximately 98 percent of the County's source water assessment areas are considered highly susceptible to contamination according to the N.C. Division of Water Resources Public Water Supply Section (approximately 53 percent of the County). While water supply has historically not been an issue for Johnston County residents, multiple information sources suggest that the demand for clean water could surpass supply as early as 2020.
- ✿ Urban tree canopy can improve air quality by absorbing and filtering out harmful pollutants. The indirect costs associated with poor air quality can be significant, including higher health care costs and lower tourism revenues. The Urban Tree Canopy (UTC) study conducted as a part of this project estimated that an 8 percent increase in urban tree canopy in Smithfield (approximately 600 acres) could equate to a 23 percent reduction in indirect costs associated with poor air quality. Other towns in the County could realize similar air quality improvements by expanding urban tree canopy.
- ✿ Johnston County has adopted a 2030 Comprehensive Plan and an Agricultural Development Plan that include recommendations for several important conservation strategies. However, implementation of these and other important measures will be needed to conserve the County's natural resources (green infrastructure). These conservation strategies will be necessary to sustain the economic and ecologic benefits derived from the County's farmlands, forestlands, natural communities, streams, rivers, and wetlands.

What are some of the Intended Uses of this Report?

This report is intended for use by the Johnston County Planning Department and the various municipal planning departments to assist in shaping the future of land use in the County. It may also be used by the public, land developers, and resource professionals to help make informed decisions related to natural resources, planning, and development. This report can help the County realize some of the goals outlined in the *Johnston County 2030 Comprehensive Plan* and complement some of the recommendations in the *Agricultural Development Plan for Johnston County*. As Johnston County grows, integration of land development with green infrastructure will be needed to conserve the economic and ecologic benefits of the County's natural resources for residents, landowners, and visitors. Natural resources identified in this report, including the linkages between those resources, can be used to help prioritize conservation efforts in the County.

What are the Next Steps?

The asset maps, resource descriptions, GIS analyses, and overall findings of this assessment can be used to help achieve the goals, objectives, and recommendations found in the *Johnston County 2030 Comprehensive Plan* and the *Agricultural Development Plan for Johnston County*. Specifically, this green infrastructure assessment can be incorporated into Action Recommendations 24, 26, and 35 in the *Johnston County 2030 Comprehensive Plan*. All data gathered and mapped for this assessment using geographic information systems (GIS) have been given to the Johnston County Planning Department. Thus, the County and all its municipalities can use the data to prioritize high-value asset areas for conservation, enhancement, and / or restoration; update zoning maps to help guide new development; and develop a list of voluntary options that encourage conservation of land areas with high-value green infrastructure assets.

Additionally, Johnston County could develop a green infrastructure or comprehensive conservation plan. The development of this plan could be achieved with the assistance of a group comprised of Johnston County residents, landowners, planning professionals, resource professionals, and elected officials. This group could help:

- ✿ Define the visions and goals for green infrastructure as a part of the *Johnston County 2030 Comprehensive Plan*, the *Agricultural Development Plan for Johnston County*, and other land use plans;
- ✿ Identify ways to fund green infrastructure planning and implementation without creating a new department or additional taxes;
- ✿ Set priorities for the County's green infrastructure (natural resources) identified in this assessment;
- ✿ Educate residents and visitors about the importance of maintaining the natural features that Johnston County residents cherish and that visitors are drawn to; and
- ✿ Develop a written green infrastructure or comprehensive conservation plan that is regularly monitored and updated in conjunction with the *Johnston County 2030 Comprehensive Plan*.

Conclusion

Johnston County is at a crossroads. The land use, economic, and ecologic alternatives are numerous and complex. County residents, land planners, and elected officials are faced with decisions on how to blend the County's rich history of rural land management (farm and forestland) and diverse natural landscapes, with the growing pressures of population growth, urban development, and economic expansion.

During the last two decades (1990-2010), the County has experienced rapid population growth and urban development. While this growth can be a welcome stimulus for the County's economy, without proper planning it can also have detrimental effects on the County's natural resources (green infrastructure). However, with the adoption of the *Johnston County 2030 Comprehensive Plan* and the *Agriculture Development Plan for Johnston County*, the County has taken two positive steps towards balancing growth and natural resource conservation. Each of these planning documents includes objectives, strategies, and recommendations that can be implemented to help conserve the green infrastructure of the County while expanding the economy. However, an opportunity still exists to more clearly define, plan, and implement the County's natural resource conservation goals, priorities, strategies with the development of a comprehensive natural resource or green infrastructure plan.

