

## Siler City Water Resources Protection - *Conservation Planning for Economic Development*

### OVERVIEW

In 2016, Triangle J Council of Governments, in partnership with the Town of Siler City and Biocenosis, LLC, received a small 205J regional water quality planning grant to assess natural resources and provide policy guidance within the Town of Siler City's planning jurisdiction. The goals of the project were to identify important natural resources and develop draft policy language options to promote water quality protection and help integrate it with other goals held by the Town of Siler City, such as economic development and parks & recreation. This project built upon existing efforts by the Town of Siler City to protect water quality as it grows, such as protecting riparian buffers, which resulted from a permitting effort. When the Town was seeking a permit to expand one of its water supply reservoirs, one of the review agencies recommended protecting riparian buffers as a means to protect threatened and endangered aquatic species in the Rocky river. This 205J conservation planning project was focused on the Town of Siler City's Corporate Limits and extra-territorial jurisdiction (ETJ,) shown on the attached map titled "***Siler City Water Resources.***"

### NATURAL RESOURCE ASSESSMENT

The project was conducted in two phases. The first phase was led by Biocenosis, and included a GIS-based analysis of local natural resources using the Biodiversity and Wildlife Habitat Assessment (BWA), which is a method for using conservation data to identify and prioritize high-quality and significant natural resources essential to healthy ecosystems. The BWA conducted for the Siler City and its extraterritorial jurisdiction (ETJ) follows the methodology outlined in Comprehensive Conservation Plan for Chatham County, which is modeled after the assessment used in the N.C. Conservation Planning Tool. The primary goals of this assessment are the preservation of aquatic and terrestrial habitats, landscape function, and connectivity. The result of the assessment is a map that represents the highest priority areas for conservation of wildlife habitat and biodiversity. A description of the methodology used for the BWA along with the conservation data ranking used in the analysis can be found in the attached document titled "***Biodiversity and Wildlife Habitat Assessment for Siler City, NC.***" The following are some of the insight gained from evaluating the BWA for Siler City:

- Highest ranked natural resources within Siler City's ETJ were the four Natural Heritage Natural Areas:
  1. Donnelley Hardpan Bog
  2. Rocky River
  3. Rocky River Basalt Bluffs & Levees
  4. Brush Creek Aquatic Habitat / Deep River
- Hydrology is especially important natural resource in Siler City since all the streams within the town and its jurisdiction drain to habitat in the Deep and Rocky Rivers for the federally listed endangered species, Cape Fear Shiner.
- Large, contiguous hardwood forest blocks, greater than 50 acres and greater than 75 acres, that encircle the town.
- Restoration rather than protection of natural resources is needed within the town limits due to amount of impervious surface.

As part of this project, TJCOG, Biocenosis and Siler City hosted a Green Growth Workshop, where NC Wildlife Resources Commission staff provided training and assistance to local stakeholders on the conservation planning process. Biocenosis presented the BWA process, and local stakeholders provided input on the ranking and weighting of the data used in the assessment. Local stakeholders also contribute knowledge of important natural resources and conservation properties in the planning area. A visual summary of the Green Growth Workshop is shown in Figure 1 below.

The conservation planning assessment also included a review of large intact hardwood forest blocks, significant natural heritage areas and lands managed for conservation, as shown on the attached map "**Conservation Planning for Siler City's ETJ.**" Through the abovementioned assessments, the following natural features were identified as priorities for conservation:

- *Streams and rivers:* Siler City is located in the Cape Fear River watershed, which is the largest river basin in North Carolina. Protecting the streams and rivers, whether they be ephemeral, intermittent, or perennial, is important for protecting water quality for Siler City and for the millions of people living downstream. The streams and rivers in Siler City also provide important habitats for fish, mussels, crayfish, salamanders, and turtles. Directly downstream of Siler City, Rocky River is home to many rare species, including the federally-listed endangered Cape Fear Shiner (*Notropis mekistocholas*), which occurs nowhere else outside of the Cape Fear basin. In addition, the Rocky River has known occurrences of 5 species of rare mussels: Carolina creekshell (*Villosa vaughaniana*) (a federal species of concern), notched rainbow (*Villosa constricta*), brook floater, creeper (*Strophitus undulatus*), and eastern creekshell (*Villosa delumbis*). Many of these species also occur in Brush Creek. These species are in decline in other parts of the state, in large part due to increased sedimentation, nutrients, and contaminants caused by stormwater run-off associated with impervious surfaces and agricultural practices. A lack of riparian vegetation or inadequate width of forested buffer can cause streambank erosion and sedimentation. The persistence of these sensitive species downstream of Siler City indicates that the water quality is quite high; maintaining high water quality for these species and for human use of the creek is important. It also helps keep these species from becoming listed by the federal government, which reduces regulatory burden on local governments, developers and landowners. Likely Siler City's wide riparian buffers contributes to the persistence of these species downstream.
- *Large intact hardwood forest blocks* – Siler City has many large blocks of intact mixed hardwood and pine forests that provides important habitat for many of our wildlife, including game species like deer. Forests are primarily threatened by conversion to loblolly pine plantations and fragmentation due to clearing for development. Communities gain many benefits from protecting their forestland, including carbon sequestration, air pollutant removal, and water treatment. Research has shown that for every 10 percent increase in forest cover in a watershed, water treatment costs decreased by approximately 20 percent. Many species of wildlife rely on having large forested areas; they will not persist in small patches of forests. The **Conservation Planning for Siler City's ETJ** map identifies contiguous forests blocks of at least 75 acres, this size has been shown to be adequate for several bird species of conservation concern that occur in the Piedmont, such as Scarlet Tanager. Small patches of forests, even in residential

subdivisions, are important as migratory stop over sites for birds but will not provide breeding habitat for most species.

- *Natural Heritage Natural Areas* –

- **Donnelley Hardpan Bog** is a 16-acre Natural Heritage Area of statewide significance within the Western Carolina Slate Belt owned by the NC Herpetological Society. “This flat upland area has clay hardpan soils derived from mafic rock. It contains an excellent example of the extremely rare Upland Pool community type. The pool has no canopy, and is dominated by buttonbush (*Cephalanthus occidentalis*) and cypress-swamp sedge (*Carex jorii*). The pool is also significant for unusual occurrences of Coastal Plain flora and for its importance as a breeding site for the spotted salamander (*Ambystoma maculatum*). Low, poorly-drained areas contain good quality Upland Depression Swamp Forest (Basic Variant) dominated by willow oak with an herb layer of the uncommon longleaf spikegrass (*Chasmanthium sessiliflorum*) and sphagnum moss (*Sphagnum lescurii*). Also present is a fair quality Xeric Hardpan Forest (Basic Hardpan Variant) with a canopy of post oak and blackjack oak and a sparse herb layer of broom moss (*Dicranum scoparium*) and reindeer lichen (*Cladina* sp.).” - NC Natural Heritage Program, *Piedmont Mafic Areas Inventory*, 1995.
- **Upper Rocky River Aquatic Habitat** “is a Natural Heritage Area of state significance. This reach of the Rocky River stretches approximately 18 miles from the Rocky River Reservoir to just above the confluence of Bear Creek, and more than half of it lies within the Rocky River Local Watershed Plan (LWP) study area. The Rocky River is one of Chatham County’s biological treasures as it is home to a diversity of mussels and is the principal world refuge for the federally endangered Cape Fear shiner and federal-candidate Septima’s Clubtail dragonfly,” - NC Division of Mitigation Services (formerly Ecosystem Enhancement Program), *Upper Rocky River Local Watershed Plan Preliminary Findings Report*, 2005.
- **Rocky River Basalt Bluffs & Levees** is in private ownership by 130 Chatham and “is a Natural Heritage Area of county significance. The Rocky River flows through this 435-acre site. Historical records for the presence of the Cape Fear shiner, Savannah shore mussel, and squawfoot mussel exist at this site; however, water quality degradation has led to the extirpation of these three species. The most prominent geologic feature of this site is a large flow of basalt that crosses the river just upstream of SR 2170 (Rives Chapel Road). In contrast to downstream sites, this reach of the Rocky River has relatively few riffle areas. The vegetation is dry mesic oak-hickory forest grading into mesic mixed hardwoods. The variety of slope and aspect at this site provide habitat for a variety of subcommunities including mountain laurel, broach beech fern, and wild comfrey. The levee forest that grows along the old stagecoach road at the southernmost end of this site is one of the most outstanding examples in the county. Here the circumneutral to basic soils weathered from basalt are reflected by the presence of shagbark hickory, hackberry, southern sugar maple, buckeye, bladdernut, and coralberry.” - NC Division of Mitigation Services (formerly Ecosystem Enhancement Program), *Upper Rocky River Local Watershed Plan Preliminary Findings Report*, 2005.

- **Brush Creek Aquatic Habitat / Deep River** has multiple private landowners and “is significant because it contains several rare mussel species, including the atlantic pigtoe, Carolina creekshell (*Villosa vaughaniana*), brook floater, creeper (*Strophitus undulatus*), eastern creekshell (*Villosa delumbis*), notched rainbow (*Villosa constricta*), and triangle floater (*Alasmidonta undulata*).” Also, Brush Creek drains to the Deep River and habitat of the federally endangered Cape Fear shiner. - NC Natural Heritage Program, *Inventory of the Natural Areas and Wildlife Habitats of Chatham County, North Carolina*, 1992.
- **Floodplains** – Intact, protected floodplains, i.e., forested communities in low-lying areas along streams and rivers, provide multiple benefits to communities, including the protection of water quality and aquatic habitat in adjacent streams, flood storage and conveyance, and they are an important and biologically-productive habitat that is among the most threatened in our state. Many wildlife species use floodplains for breeding, foraging and movement. The restoration and protection of floodplain in Siler City is a priority.
- **Wetlands** – Wetlands perform many ecosystem services, including flood protection and pollution control, and they provide essential breeding, rearing, and foraging sites for numerous fish and wildlife species. Many wetlands are regulated under the Clean Water Act, Sections 404 and 401, with regulatory authority provided by the US Army Corps of Engineers. Small, isolated wetlands, such as upland pools and depressions, are not regulated, and as a consequence are considered to be one of the most endangered habitats in North America. In North Carolina, they serve as critical habitat for many declining species of plants and animals. Donnelley Hardpan Bog in northern Siler City is an exceptional example of an isolated wetland. This bog is home to Four-toed salamander (*Hemidactylium scutatum*), a state species of special concern, because it known to be in decline in North Carolina. This wetland would not be protected under current state and federal rules. It is up to conservation-minded landowners and communities to protect these critical habitats. Most of these systems have been lost to draining for agriculture, forestry, and development. It is important to identify these wetlands (often not mapped) and protect them.

Additionally, within the Town limits, underutilized properties along the floodplains and stream corridors were also identified as potential sites for stream restoration, stormwater management and/ water quality treatment. This information is shown on the attached map “**Evaluation Underutilized Properties within the Town of Siler City**” and the accompanying summary of methodology, “**Data Analysis used to identify underutilized or vacant parcels within Siler City town limits with potential conservation value.**”



Figure 1. Visual summary of Siler City Green Growth Workshop on June 23, 2016.

This image is a visual summary from the Green Growth Workshop held in Siler City on June 23<sup>rd</sup>, 2016. The workshop was well attended with a mix of local stakeholders and resource professionals. Brooke Massa with the NC Wildlife Resources Commission presented about why green growth is needed. She described that between 1960 and 2030 North Carolina is moving from a primarily rural population to a population living mostly in urban areas. Additionally, as we are growing, we are using five times more land per each unit of growth than we had historically. We are losing habitat, and as a result, we are losing rare, threatened and endangered species like specialized mussels that filter water and improve its quality.

Green growth is a framework to consider natural resources as a way to guide growth – where growth is directed to the places that are most suitable and away from the places that are most precious or fragile. Conservation supports growth. It supports smart, healthy, thriving communities. When we live with nature, our people are healthier, we have lower costs for water and development, there's less conflict and property values increase.

So, we're developing a plan to protect the places that matter most. It begins with goals and strategies, and in the end, it should also include action items and who will do what when to implement the plan. It's based on principles and customized for the community. One thing that we have heard loud and clear is that developers love certainty. Even if the requirements are stringent, as long as they are well articulated and clear, that supports continued economic development.

## POLICY GUIDANCE

The second phase of the project involved the development of draft policy language for consideration by Town staff as part of an update to the Siler City Land Development Plan (LDP). Beyond this 205j grant project, TJCOG staff are providing direct technical assistance to the Town of Siler City for the LDP update, so the policy guidelines below can be incorporated into that larger process. TJCOG staff also provided a review of the Town's existing ordinances related to water resources and conservation, and provided a set of targeted resources, which are listed below.

### Overall Policy Approach

The overall policy approach recommended for Siler City is a balanced, complimentary approach that advances water resources goals, while at the same time encouraging continued economic development. Conservation and growth can work together, and in fact, each can make the other stronger. There is a broad base of evidence that demonstrates that natural resource conservation is an important factor in economic development. The field of "Green Infrastructure" has emerged in recognition of the explicit links between the natural and built environment.

As part of the Siler City Land Development Plan update, it is recommended that Siler City incorporate Green Infrastructure an intentional component and community goal.

### Green Infrastructure Definitions

The term green infrastructure can be defined in two contexts or scales – the landscape scale and the local scale.

***At the landscape scale, green infrastructure refers to the interconnected network of green space that provide environmental, social, and economic benefits.*** This includes protected natural areas and active open spaces such as greenways, forests, floodplains, wetlands, parks, stream corridors and street trees. At this scale, green infrastructure provides a wide array of ecosystem services including cleaner air and water, flood protection, climate resilience, less heat stress, more biodiversity and wildlife habitat, and healthy soils with less erosion and sedimentation. In addition, green infrastructure can increase property values and provides increased quality of life and health and wellness through access to recreation, shade and natural amenities.

***At the local scale, green infrastructure refers to a more natural approach to managing stormwater by infiltrating it in the ground or capturing it for later reuse.*** In this context, green infrastructure is a combination of natural and engineered systems to reduce runoff and improve water quality using vegetation and/or porous surfaces. Local-scale green infrastructure practices include rain gardens, bioretention, permeable pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting systems.

Both of these definitions of green infrastructure are compatible and applicable for use in Siler City. The natural resources assessment identified a number of important natural areas in the ETJ that, along with the protected riparian buffers, provide a network of interconnected green spaces that provide multiple benefits to the community and environment. In addition, the assessment identified opportunities to restore and enhance the ecological services, floodplain functions, and water quality benefits of the riparian corridors within the Town limits.

## Land Development Plan Goals

This section provides draft language for consideration in the update to the Siler City Land Development Plan. Several of the recommendations below are excerpted or adapted from the Comprehensive Conservation Plan for Chatham County and the CTNC Farms for Food: Action + Strategy report.

### Green Infrastructure Landscape Goal:

Establish and maintain a protected network of interconnected green spaces that provide environmental, social, and economic benefits.

### Green Infrastructure Stormwater Goal:

Promote and encourage an integrated, naturalized approach to stormwater management that minimizes connected impervious surfaces and runoff and maximizes infiltration.

Category	Developers	Town Staff	Description
Protect Natural Assets	X	X	Protect important natural assets and open spaces such as significant natural heritage areas, greenway corridors, contiguous hardwood forests, floodplains, wetlands, parks, stream corridors and street trees.
	X	X	Protect areas with conservation value as shown on the Biodiversity and Wildlife Habitat Assessment and Conservation Planning maps through acquisition, easements, or voluntary or required conservation development standards.
	X	X	Protect important natural areas and adjacent lands by purchasing or acquiring easements in partnership with land trusts and other conservation partners.
		X	Consider a Conservation Overlay District to require consideration of important resource areas and coordinate zoning districts with desired land uses based on updated information about natural resources protection priorities.
	X	X	Promote infill development and an inward growth pattern, rather than outward growth, to reduce the impact of sprawl on wildlife habitat.
		X	Develop conservation subdivision standards that incentivize or require developers to conserve significant natural resources.
	X	X	Revise the Landscaping ordinance to encourage or require the use of native plants and prohibit the use of non-native invasive plants.
Expand Tree Protection		X	Building on the Town of Siler City's UDO Article XIX, expand policies and regulations that protect trees, intact hardwood forests and tree canopy.

		X	Consider expanding Siler City’s current tree protection ordinance and implement a canopy assessment or tree inventory.
Buffer More Streams		X	Building on the riparian buffer protection already in place for perennial and intermittent streams, encourage or require protected buffers for headwater streams, wetlands, seeps and springs.
		X	Revise the existing riparian buffer ordinances to include ephemeral waterways and wetlands, or develop a new voluntary, incentivized approach to protecting and restoring vegetated buffers on ephemeral waterways and wetlands.
		X	Expand the definition of streams beyond those indicated on the most recent version of USGS 7.5’ topographic quadrangle maps to include any surface waters meeting the definition of ephemeral, intermittent or perennial stream based on the most recent approved methodology for stream determination (currently North Carolina Methodology for Identification of Intermittent and Perennial Streams and Their Origins (V.4.11, 2010) – Effective September 1, 2010.
Maintain Site Hydrography		X	Actively promote Low Impact Development (LID) practices that match pre-development site hydrology.
	X		Avoid alteration of hydrology to maintain pre- and post-development hydrograph for new development projects.
Invest in Green Infrastructure	X	X	Invest in green spaces and connected corridors that provide multiple benefits.
		X	Consider bonds and appropriations to protect important natural areas and open space.
	X	X	Provide opportunities for students, leaders and community members to experience and learn more about the economic, social and environmental benefits of green infrastructure.
	X	X	Convene a technical work group to assist in establishing a local stormwater utility.
		X	Educate developers, local government staff, elected officials, and landowners on the importance of natural resources for economic and ecosystem value, and ways in which to minimize impacts.
	X	X	Establish demonstration areas for backyard wildlife habitat improvements, rain gardens, and other BMPs that protect water quality and provide wildlife habitat.
		X	Provide passive recreational opportunities, such as trails and greenways, to natural areas that have public access.



		X	Coordinate park and greenway planning and acquisition to provide connectivity and buffers to important natural areas and existing protected areas.
Support Working Lands		X	Promote agribusiness and working forests and farmlands.
	X	X	Build support for a Working Lands Protection Program, which would help the county compete for state conservation funding and meet the needs of farmers.
	X	X	Consider establishing a working farm urban center as recommended by the Conservation Trust for NC (CTNC) in the recently completed regional farmland conservation assessment and strategy Triangle Farms for Food: Strategy + Action Plan.
	X	X	Develop a strategic place-based farmland map, building on the Western Chatham County Large Farms and Livestock & Siler City Farm Ring place-based strategies identified in the Triangle Farms for Food report, to identify priority protection areas and actions needed.
	X	X	Develop coordinated direct and cooperative agricultural marketing ventures, particularly in livestock processing and value added meat processing.
	X	X	Continue farmland preservation efforts.
			Establish a Voluntary Agricultural District (VAD) or Enhanced VAD.
		X	Continue to incorporate underlying soils quality into planning decisions.
	X	X	Help existing farmland to remain active and productive to increase farming viability.
	X	X	Initiate a farm belt project to create a peri-urban ring of small, diversified, intensively cropped farms to provide local food, training opportunities and agricultural jobs in the community.
	X	X	Integrate agriculturally-oriented cluster developments so that new development can co-exist with farmland preservation.
	X	X	Enhance public understanding of agriculture and forestry and improve relationships between residential and agricultural neighbors.
Incentivize Private Conservation		X	Provide and support incentives for landowners who commit to the conservation of natural areas on private land through programs like the Wildlife Conservation Lands Program.
	X	X	Collaborate with the NC Division of Forest Resources to manage forestlands.
	X	X	Promote best management practices (BMPs) on working lands.

	X	X	Collaborate with the NCDFR to ensure that Forestry Practice Guidelines (FPGs) for Water Quality are being followed and enforced.
	X	X	Incentivize conservation on private lands.
	X	X	Revise ordinances to encourage new developments to adopt low impact development techniques through the use of incentives.
	X	X	Promote voluntary cost-share programs and other incentives for private landowners.
	X	X	Provide and promote tax incentives for private landowners through present-use value and other conservation tax credit programs.
	X	X	Promote stewardship in private landowners by helping them consider and plan for important natural resources on their land.
	X	X	Inform landowners about preservation programs, incentives and opportunities available for conservation on private land.
	X	X	Provide information on tax policies and other incentives that benefit landowners who commit to conservation of private land.
Coordinate Conservation Planning		X	Coordinate conservation planning efforts with Chatham County and conservation partners, such as Triangle Land Conservancy.
		X	Coordinate the expansion of sewer and water utilities with the conservation goals of Siler City, such as using a urban growth boundary to reduce sprawl.
		X	Integrate conservation goals into transportation planning, economic development, parks and recreation, and other planning efforts of Siler City.
		X	Promote and coordinate with regional open space and land-use planning initiatives to develop policies and planning that is protective of important natural resources.
		X	Support and participate in the Chatham Conservation Partnership (CCP), and commit to assisting with regular updates of the Comprehensive Conservation Plan.
		X	Provide conservation guidance and assistance for developers and coordinated development plan review and permitting.
		X	Coordinate with state and federal agencies in development reviews and permitting.
		X	Join Chatham County's well-established sediment and erosion control program.

		X	Support a jointly funded Chatham County natural resource professional to assist in the planning and protection of important natural resources, updating natural resource mapping and inventories, coordinating with willing landowners, advocating for preservation, promoting educational opportunities, and negotiating with resource agencies, and developing grant proposals.
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### Siler City Ordinance Review

This section includes a review of the Town of Siler City’s existing ordinances. As part of this review, TJCOG staff reviewed the following section of the Unified Development Ordinance (UDO), with special attention given to Article XVI and Appendix H (in bold below):

- UDO Article I – General Provisions
- UDO Article IV – Permits and Final Plat Approval
- UDO Article IX – Zoning Districts and Zoning Map
- UDO Article XII – Density and Dimensional Regulations
- UDO Article XIII – Recreational Facilities & Open Space
- UDO Article XIV – Streets and Sidewalks
- UDO Article XV – Utilities
- **UDO Article XVI – Floodways, Floodplains, Drainage, Erosion and Watershed Protection**
- UDO Article XVIII – Parking and Driveways
- UDO Article XIX – Screening and Trees
- UDO Article XX – Amendments
- UDO Appendix E – Guide for Landscaping
- **UDO Appendix H – Watershed Protection Ordinance**

The review of Siler City’s ordinances identified many ways that the Town is doing an excellent job of protecting water quality through existing regulations. Notably:

- The town has done an excellent job recognizing the many benefits of trees and actively protecting large trees and requiring shade trees and street trees.
- Likewise, the Town has very done well to protect vegetated riparian buffers along all perennial and intermittent streams.
- The ordinances do an excellent job of limiting disturbance to stream corridors by directing development, roads, and utilities away from protected buffers.
- The Town also allows and encourages cluster developments, which help protect water quality while at the same time reduce the impact and cost of development, utilities and maintenance.
- The Town’s floodplain overlay district and floodplain ordinances limit any development that would hinder the important hydrologic functions of the flood prone areas.
- The stormwater management section encourages infiltration practices and requires developments exceeding 7% imperviousness to maintain pre-development hydrography including stormwater volume. It also prevents discharge of stormwater into streams or the ditching or piping of stormwater through riparian buffers. A stormwater operation and maintenance agreement is also required in perpetuity.
- The watershed protection ordinance provides additional development restrictions to protect water quality in areas draining to the Town’s water supply sources.

Beyond the recommendations above for consideration in the Land Development Plan, there was only one area where a change is recommended for consistency within the existing ordinances. The Watershed Protection Ordinance, which originally pre-dates the UDO calls for protected buffers of 100 feet on perennial streams in Section H-3 (4). However, the UDO calls for more protective buffers of 200 feet on perennial or intermittent streams within 2,500 feet of the Rocky River, and 100 feet on perennial streams and 50 feet on intermittent streams for areas beyond 2,500 feet of the Rocky River in §243. For consistency, it is recommended that the Watershed Protection Ordinance be updated to include the same buffer protection requirements as §243.

## Green Infrastructure and Conservation Resources for Siler City

As part of this project, TJCOG staff compiled a targeted set of reference green infrastructure and conservation plans, policies and ordinances. The resources are listed and linked below:

### Policies and Fact Sheets:

- [The Economic Benefits of Protecting Healthy Watersheds](#)
- [Regulatory Strategies to Incorporate Green Infrastructure for North Carolina](#)
- [An Introduction to Green Infrastructure Practices](#)
- [9 Ways to Make Green Infrastructure Work for Cities and Towns](#)
- [A Quick Guide to Community Planning for Green Infrastructure](#)
- [Green Infrastructure in the City of Durham](#)
- [Methods and Strategies for Financing Green Infrastructure in the City and County of Durham, North Carolina](#)
- [Crosswalking between Gray and Green Infrastructure for Budget Officers](#)
- [NC Forest Practices Guidelines Related to Water Quality \(FPGs\)](#)
- [North Carolina Forestry Best Management Practices Manual to Protect Water Quality \[Forestry BMP Manual\]](#)

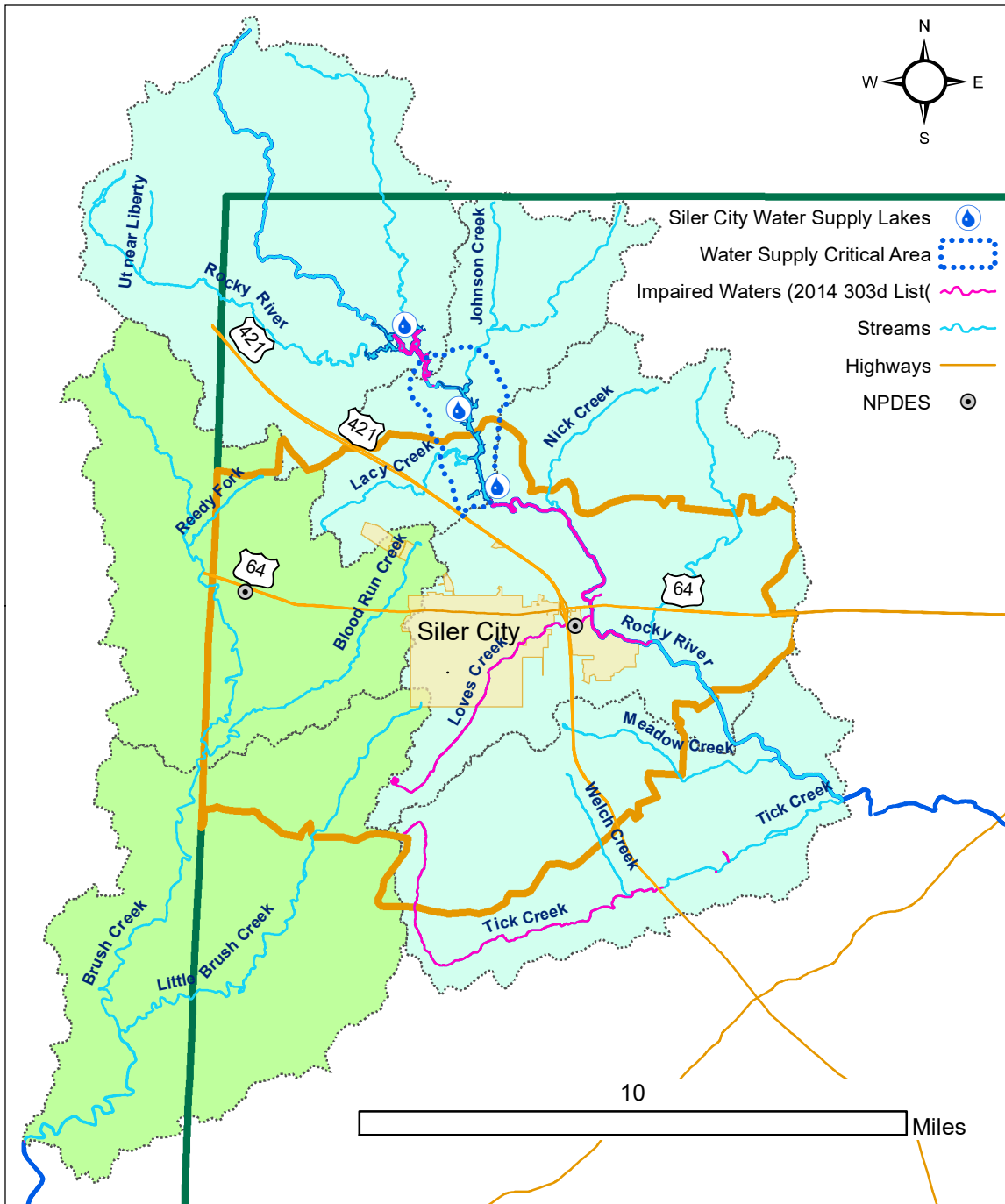
### Planning:

- [Triangle Farms for Food: Strategy + Action Plan](#)
- [Evaluating and Conserving Green Infrastructure across the Landscape: A Practitioner's Guide – North Carolina Edition](#)
- [A Comprehensive Conservation Plan for Chatham County, North Carolina](#)
- [The Value of Green Infrastructure: A guide to Recognizing its Economic, Environmental and Social Benefits](#)
- [Green Growth Toolbox Handbook](#)
- [Community Solutions for Stormwater Management: A Guide for Voluntary Long-Term Planning](#)
- [Davidson Rural Area Plan: Cultivating Conservation & Quality Growth](#)
  - [Chatham County Plans & Guidelines](#)
  - [Chatham County Land Conservation and Development Plan](#)
  - [Chatham County Land Use Strategic Plan](#)
  - [Chatham County Appearance Commission Design Guidelines](#)
  - [Chatham County Farmland Preservation Plan](#)
- [NCDNR Forest Resources Assessment](#)

- [NCDMS Watershed Planning](#)
- [NC Conservation Planning Tool](#)
- [NCNHP Natural Area Inventories](#)
- [NCWRC Wildlife Action Plan](#)
- [Triangle Land Conservancy Planning](#)
  - [Rocky River Watershed Conservation Assessment](#)

Ordinances:

- [Developing Tree Protection Ordinances in North Carolina: A Guide to Local Ordinance Creation](#)
- [Model Natural Resources Conservation Ordinance](#)
- [Chatham County Planning Ordinances](#)
  - [Chatham County Zoning Ordinance](#)
  - [Chatham County Watershed Ordinance](#)
  - [Chatham County Compact Communities Ordinance](#)
  - [Chatham County Subdivision Regulations](#)
  - [Chatham County Flood Damage Prevention Ordinance](#)
- [Chatham County Water Resources](#)
  - [Chatham County Stormwater Ordinance](#)
- [Chatham County Erosion Control](#)
  - [Chatham County Soil Erosion Sedimentation Control Ordinance](#)
- [Town of Pittsboro Land Management Codes](#)
  - [Town of Pittsboro Zoning Ordinance](#)
  - [Town of Pittsboro Subdivision Regulations](#)
  - [Town of Pittsboro Flood Damage Prevention Ordinance](#)
  - [Town of Pittsboro Riparian Buffer Protection Ordinance](#)



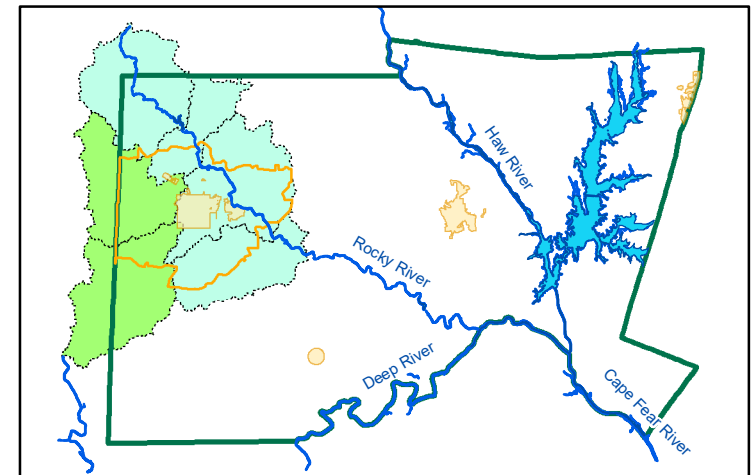
# Siler City Water Resources

The Siler City ETJ is located in Chatham County, NC within the upper Rocky River and upper Deep River watersheds. The CapeFear River forms at the confluence of the Deep River and the Haw River just before it leaves Chatham County. Siler City relies on 3 water supply lakes the upper water supply is impaired.

- Rivers
- Town Limits
- Siler City ETJ
- Chatham County

## Watersheds within Siler City ETJ

- watersheds draining to Rocky River
- watersheds draining to Upper Deep River



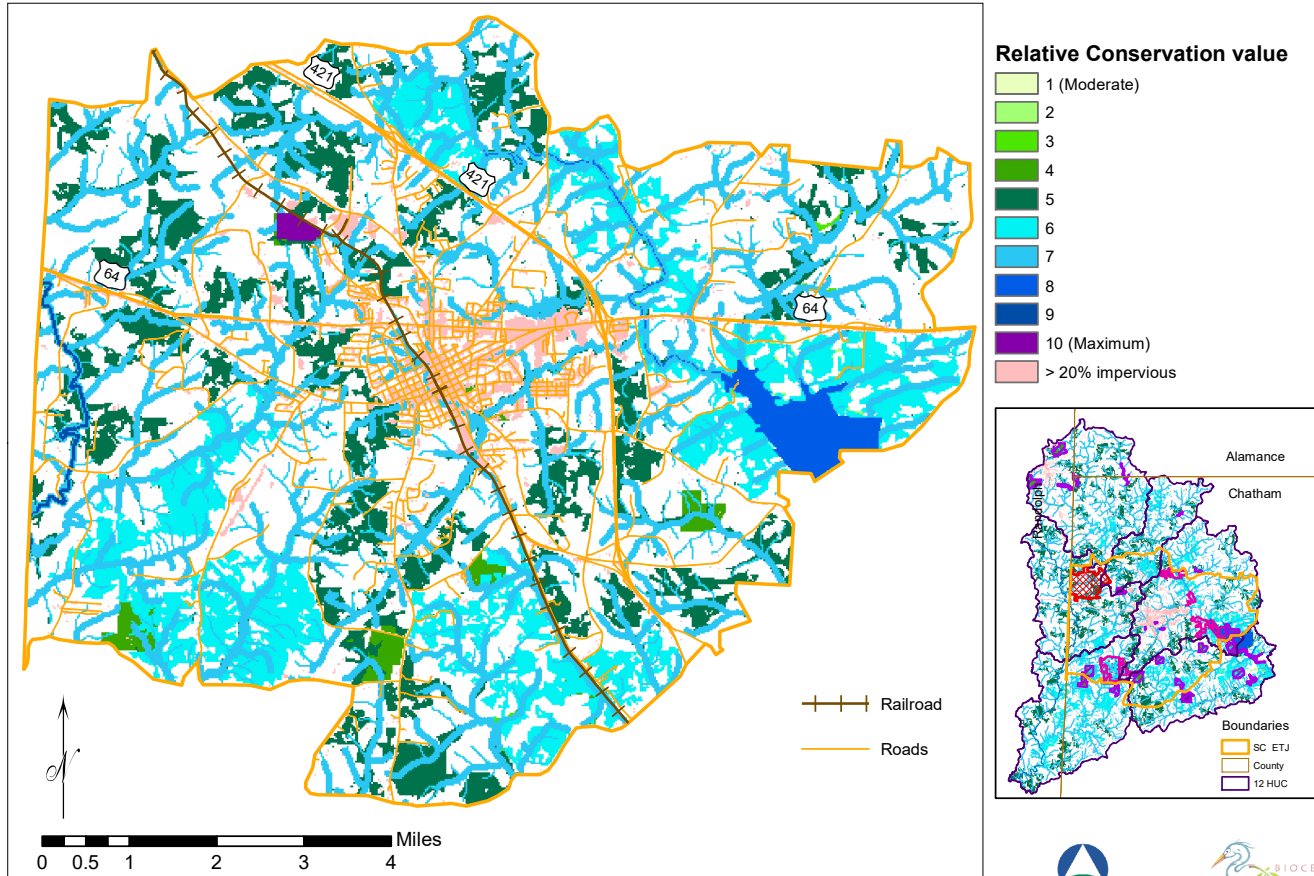
# Biodiversity and Wildlife Habitat Assessment for Siler City, NC

The Biodiversity and Wildlife Habitat Assessment (BWHA) is a method for compiling and prioritizing conservation data in order to identify essential high-quality natural resources required to maintain healthy ecosystems. The tool helps highlight areas of significant natural resources. The BWHA conducted for the Siler City follows the methodology outlined in *Comprehensive Conservation Plan for Chatham County, Appendix E-Methods: Conservation Ranking and Analyses* ([www.chathamconservation.wikispaces.com](http://www.chathamconservation.wikispaces.com)). The Chatham BWHA is modeled after the assessment used in the N.C. Conservation Planning Tool. The primary goals of this assessment are the preservation of aquatic and terrestrial habitats, landscape function, and connectivity. The result of the assessment is a map that represents the highest priority areas for conservation of wildlife habitat and biodiversity.

## Conservation Layers and Assessment Map

The BWHA for Siler City is a geographic information systems (GIS) map layer that is a composite of 30 x 30 meter pixel grid comprised of 7 conservation layers categories and a impervious surface category. Each layer included has conservation value and has been ranked on an ordinal scale of 1 to 10 representing a moderate to high conservation value. A description of each layer and its relative conservation value is provided in a table on the next page. The relative conservation value is based on resource rarity and distinctiveness; resource function; and data precision, accuracy, and completeness. In addition to conservation layers, impervious surface layers were included with a ranking of (-1) to reflect negative impacts on biodiversity and wildlife habitat. Detailed information about the data used, the conservation value ranking, and methods used for the BWHA can be found in *N.C. Conservation Planning Tool, Chapter 4: Biodiversity/Wildlife Assessment* ([www.conservationtool.nc.gov](http://www.conservationtool.nc.gov)).

*Biodiversity & Habitat Assessment for Siler City, ETJ*



Water Resource Planning Project for Siler City funded by 205 (j) WQ Management Planning Grant

## Ranking of Layers in Biodiversity & Wildlife Habitat Assessment for Siler City

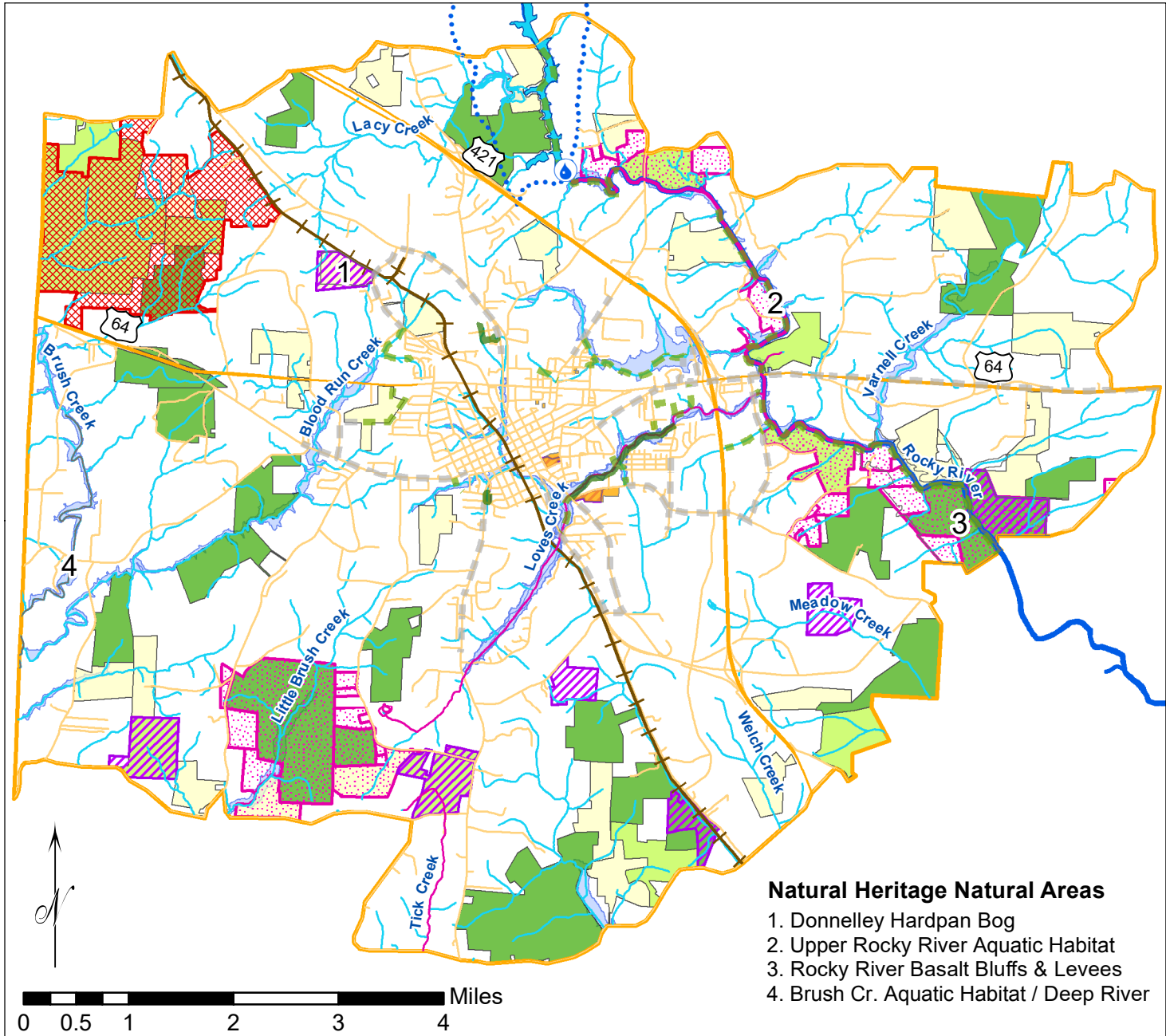
Data layers ranked from 1 to 10 (moderate to maximum conservation priority) Rank based on 1) resource rarity and distinctiveness, 2) resource function, 3) data precision, accuracy, and completeness.

Category Name	Value	Individual Input Layers	Source	Notes
<b>Rare species and high quality communities</b>	10	NHPNA - National or State Significance	NCNHP 4/20164	based on NC Natural Heritage Program (NCNHP) data - Natural Heritage Areas - includes terrestrial and aquatic NHAs; based on NCNHP data in the NC Conservation Planning Tool (NCCPT)
	8	NHPNA - Regional Significance	NCNHP 4/20164	
	6	NHPNA - Local Significance	NCNHP 4/20164	
	5	EOs - High ranking	NCNHP 4/20164	based on NCNHP data in the NCCPT- locations of Element Occurrences (EOs) (rare or protected species, high quality communities, and animal assemblages); high ranking includes overlapping EOs, those with Global (G1/G2) and State ranks (S1/S2), and those considered current (and last observation less than 30 years ago) and remaining EOs ranked as other.
	4	EOs - Other	NCNHP 4/20164	
<b>Guilds</b>	10-1	Landscape Habitat Indicator (LHI) Guilds	NCNHP 2013	based on NCNHP's most current analysis of conservation priorities for the NC Piedmont; Guilds represent groups of indicator wildlife species that rely on unfragmented habitat and are closely associated with particular habitats.
<b>Watersheds</b>	7	Streams - Rare Species (Priority Watersheds)	NCNHP 01/2014	based on NCNHP data - 12-digit HUCs in which federal- and state-listed rare species are known to occur; USGS stream segments buffered by 200 and soil streams by buffered by 50 ft. that intersect with HUCs '
<b>Streams</b>	7/9	BioClass - benthos: Excellent / Good	NCDWR 2016	based on Department of Water Quality (DWQ) hydrography and bioclassification (benthic and fish) as of 2012; stream segments buffered by 100'
	7/9	BioClass fish: Excellent / Good	NCDWR 2014	
	6*	Streams - USGS	USGS	based on USGS blue-line streams; streams buffered by 100'
	6	Streams - Soil Streams	RJG&A 2010	based on digitized streams from Chatham soil survey maps (NRCS 2005); verified by soil scientist; streams buffered by 50'
<b>Wetlands</b>	5	Wetlands - High Confidence	RJG&A 2010	based on union of NWI, Chatham soils data (NRCS 2005 - hydric soils and "wet spots"), and flood hazard areas; depicts high likelihood for wetland habitat
	3	Wetlands - Medium Confidence	RJG&A 2010	based on Chatham soils data (NRCS 2005) - Riverview map unit (not included in High Confidence Wetlands); verified by soil scientist; depicts moderate likelihood for wetland habitat based on soils
<b>Forest</b>	5*	Hardwood Forest Blocks 75 acres+	NLCD 2011	Deciduous forests blocks defined by the NLCD that are ≥ 75 acres.
	6*	Hardwood Forest Blocks 500 acres +	NLCD 2011	Deciduous forests blocks defined by the NLCD that are ≥ 500 acres.
	7*	Floodplain Forests	NLCD 2011	Select all forest defined by the NLCD that are within the PBO_floodplain.shp
<b>Managed Areas</b>	4	Conservation Lands (NO Buffer)	NCNHP 10/2014	based on NCNHP data for Managed Areas (MAREAs) ; not buffered with a 1/4 mile as in the CCP
<b>Impervious surface</b>	99 (-1)	Impervious surface above 20% (land use/cover)	NLCD 2011	based on NLCD 2011 impervious surface data
	99 (-1)	Roads	Chatham 2014	based on Chatham centerline data with addition of US15-501 expansion; roads buffered by 15 feet each side (30 feet total)
	99 (-1)	Buildings	NCDEM 2011	based on building footprints digitized from 2007 aerial photos for Risk Assessment by NC Dept. of Environmental Management (NCDEM)

\*Conservation value increased based on comments received at the June 2016 Green Growth Toolbox Meeting in Siler City



# Conservation Planning for Siler City's ETJ



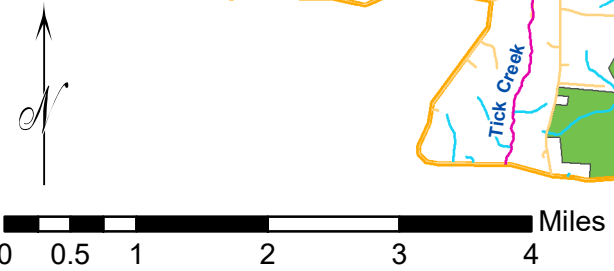
- Water Intake
- Water Supply Critical Area
- Impaired Waters
- Creeks
- River
- Floodplain
- Town Parks
- Existing Greenway
- Proposed Greenway Trails
- Proposed Multi-Use Side Paths
- ETJ
- Railroad
- Roads

### Added layers

- Chatham - Siler City megasite
- Managed Areas
- 130 Chatham Parcels
- Parcels 75 Acres +
  - 75 Acres plus contiguous Hardwood Forest
  - 75 Ac plus Hardwood Forest
  - 50 Ac plus Hardwood Forest

### Natural Heritage Natural Areas

1. Donnelley Hardpan Bog
2. Upper Rocky River Aquatic Habitat
3. Rocky River Basalt Bluffs & Levees
4. Brush Cr. Aquatic Habitat / Deep River



# Evaluation Underutilized Properties within the Town of Siler City

Vacant and/or underutilized commercial or industrial properties were selected from the parcel layer with tax data for Oct. 2016 using the criteria Fair Market Value (FMV) Improvements < \$1000.

Each parcel selected was evaluated for its conservation value. Parcels in use or with no conservation value were removed from selection. Remaining parcels were ranked as HIGH or POSSIBLE conservation value depending on location, whether they were in the floodplain, and whether they had access to sewer & water.

## Vacant/Underutilized Parcels with Conservation Value

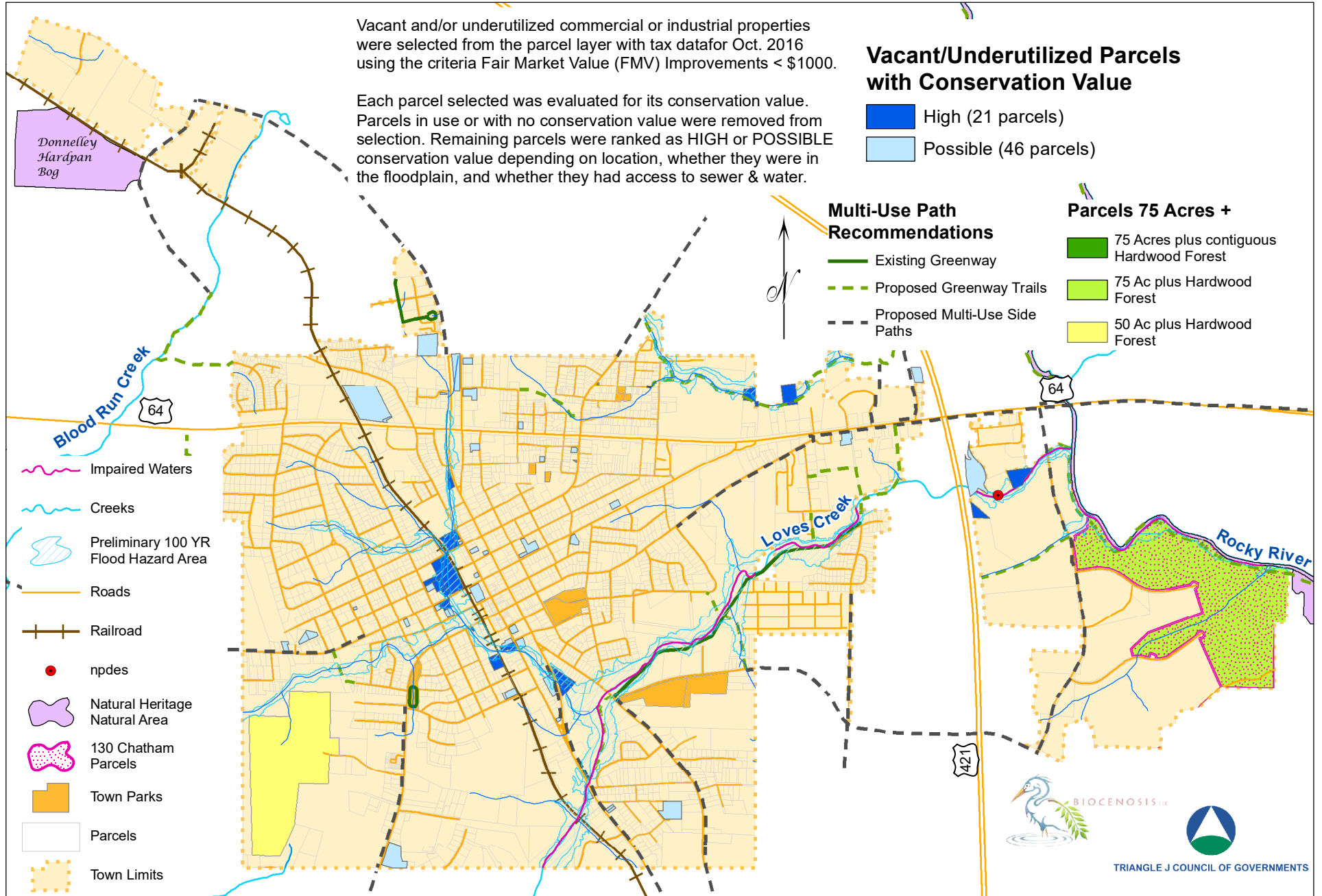
- High (21 parcels)
- Possible (46 parcels)

### Multi-Use Path Recommendations

- Existing Greenway
- Proposed Greenway Trails
- Proposed Multi-Use Side Paths

### Parcels 75 Acres +

- 75 Acres plus contiguous Hardwood Forest
- 75 Ac plus Hardwood Forest
- 50 Ac plus Hardwood Forest



## **Data Analysis used to identify underutilized or vacant parcels within Siler City town limits with potential conservation value**

- 1) Vacant and/or underutilized commercial or industrial properties were selected using the criteria Fair Market Value (FMV) Improvement <1000 from an enriched parcel layer obtained from the Chatham County tax office in October 2016.
- 2) Each parcel selected was evaluated by Jack Meadows, Siler City Town Planner, and Catherine Deininger, Biocenosis LLC, for its conservation value using aerial imagery and using local knowledge. Parcels in use or with no conservation value were removed from the selection. Remaining parcels were ranked with a High or Possible conservation value depending on location whether or not they were in the floodplain, and whether they had access to sewer and water.
- 3) Parcels with AKPAR 15030, 16386, and 71117 were added as parcels with high conservation value even though they were not identified in the original selection (1) as vacant parcels within the floodplain.