MERCER URBAN FOREST

PHASE I - SITE ASSESSMENT

MERCER UNIVERSITY
HGOR

00. INTRODUCTION

Mercer University engaged HGOR to assess undeveloped portions of the Mercer University Cecil B. Day campus in Atlanta, Georgia relative to ecological, educational, and environmental opportunities.

As a result of three days' on-site reconnaissance, we discovered some of the finest natural environments in the metro region, with many of the real gems of this forest tucked away from view.

This book uncovers those hidden treasures and reveals potential opportunities and challenges associated with the land.

00. CONTENTS

01. URBAN ECOLOGY

Urban Ecology is the study of the relationship between living organisms and their surroundings in an urban environment.

Atlanta is often described as a city in a forest. This green appearance may belie the impacts of the region's urbanization on ecologically functioning natural systems. Throughout the country, there is emphasis on reestablishing functioning eco-systems within urban areas as green infrastructure. Green infrastructure enhances urban ecology by utilizing natural processes to filter pollutants, lower area temperatures, and offer essential wildlife habitat.

In particular, preserved stream corridors are primary in combating soil erosion, mitigate storm water flows, and enhance water quality.

WHY IS GREEN SPACE IMPORTANT?

Our greenspaces should not be underestimated in the essential functions they provide for healthy living in an urban environment.

There has been much study on Biophilia, the hypothesis that we have an instinctive bond with the living systems around us, and that our sustained separation from a natural world may be the root cause of many present-day disorders. Connection to the natural environment can be therapeutic and restorative to our psychological wellbeing.

Unfortunately, today's societies are becoming more and more disconnected from nature. With all the daily distractions and electronic devices capturing our attention, we are becoming strangers to the natural world that surrounds us. As Richard Louv remarks in his landmark book *Last Child in the Woods*, "Our society is teaching young people to avoid direct experience in nature. That lesson is delivered in schools, families, even organizations devoted to the outdoors, and codified into the legal and regulatory structures of many of our communities…well-meaning public-school systems, media, and parents are effectively scaring children straight out of the woods and fields." Can we really expect future generations to respect and care for the environment if they have been separated from it throughout their entire life? Who will be the stewards of the environment if they don't understand the ecosystems that surround them or were never taught about natural systems and their importance to our health and welfare?

1. IS THERE A LINK BETWEEN MODERN BEHAVIORAL ISSUES AND A LACK OF EXPOSURE TO NATURAL SYSTEMS? COULD EXPOSURE TO NATURE BUILD PRESERVATION EFFORTS FOR THE FUTURE AND CREATE A HIGHER FUNCTIONING SOCIETY?

2. NATURAL SYSTEMS CAN BE WEAVED INTO ANY LEVEL OF URBAN DENSITY. THE INVESTMENT MADE IN NEW YORK CITY IN THE "HIGH LINE" HAS CREATED A DOMINO EFFECT IN PUBLIC AWARENESS AND INVESTMENT.

3. WE ARE ONLY BEGINNING TO UNDERSTAND THE INTERRELATION OF NATURAL SYSTEMS - INCLUDING THE RELATIONSHIP BETWEEN BIODIVERSITY AND OUR NATIVE POLLENATORS. THE FUTURE OF OUR FOOD CROPS MIGHT DEPEND ON PRESERVATION OF THE SPECIES WITH WHICH THEY EVOLVED.

4. ATLANTA IS EXPERIENCING AN UNPRECEDENTED WAVE OF INVESTMENT IN GREENWAYS AND TRAIL NETWORKS. DROUGHT AND THE "TRI-STATE WATER WARS" HAS ALSO CREATED AN IMPETUS FOR WATER QUALITY REMEDIATION IN CONJUNCTION WITH GREENWAY DEVELOPMENT.

02. CONTEXT

Atlanta has been described as both a city in a forest as well as a city bound by traffic gridlock and suburban sprawl. For a major metropolitan area, the geography of Atlanta's location is unique. Portions of the city are at 1,050 feet above mean sea level, making it the highest major metropolitan area east of the Mississippi. The high elevation of the city, and undulating topography has made the gridded development that defines most cities unwieldy and Atlanta took on a sinous development pattern that responded to existing ridge lines, including the subcontinental divide that runs roughly east-west along Dekalb Ave.

The location of the city at such a high elevation has created issues relating to water supply and water quality. Atlanta, due to its location at the top of the regional watershed for both the Apalachicola and Alabama rivers, has also become a punching bag in the "Tri-State Water Wars" between Georgia, Alabama, and Mississippi in a dispute over the rights regarding water use and water quality.

The social and political issues over water quality and water rights also have spawned opportunties, however. The development of Atlanta over the geographical ridgelines has created the possibility of knitting together communities through the same riparian forest corridors that development has historically avoided. The best way to fix a watershed is from the top down, and Atlanta now has a historical opportunity to accept a leadership role in establishing best practice management techniques in protecting and improving our greenways and riparian environments.

If Atlanta is known as a "city in a forest", then Mercer's Cecil B. Day campus might well be known as the true "campus in a forest". No other institution in Atlanta has the same opportunity for impact on the riparian systems at such a meaningful point at the headwaters of the watershed.

Growing awareness around the issues of water quality, natural systems, and pedestrian connectivity provide Mercer with an opportunity for institutional leadership and regional recognition.


ATLANTA

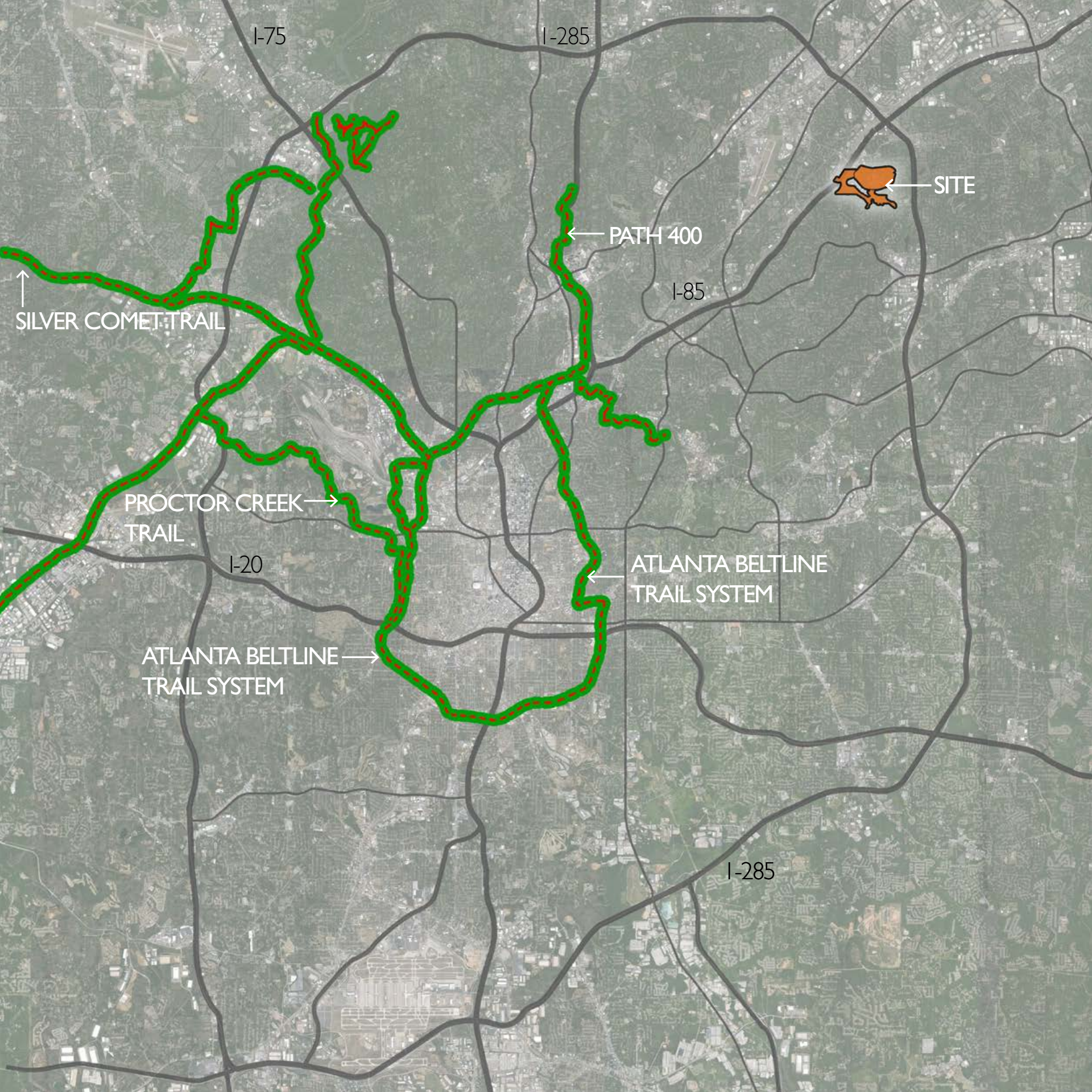
SITE CONNECTIVITY

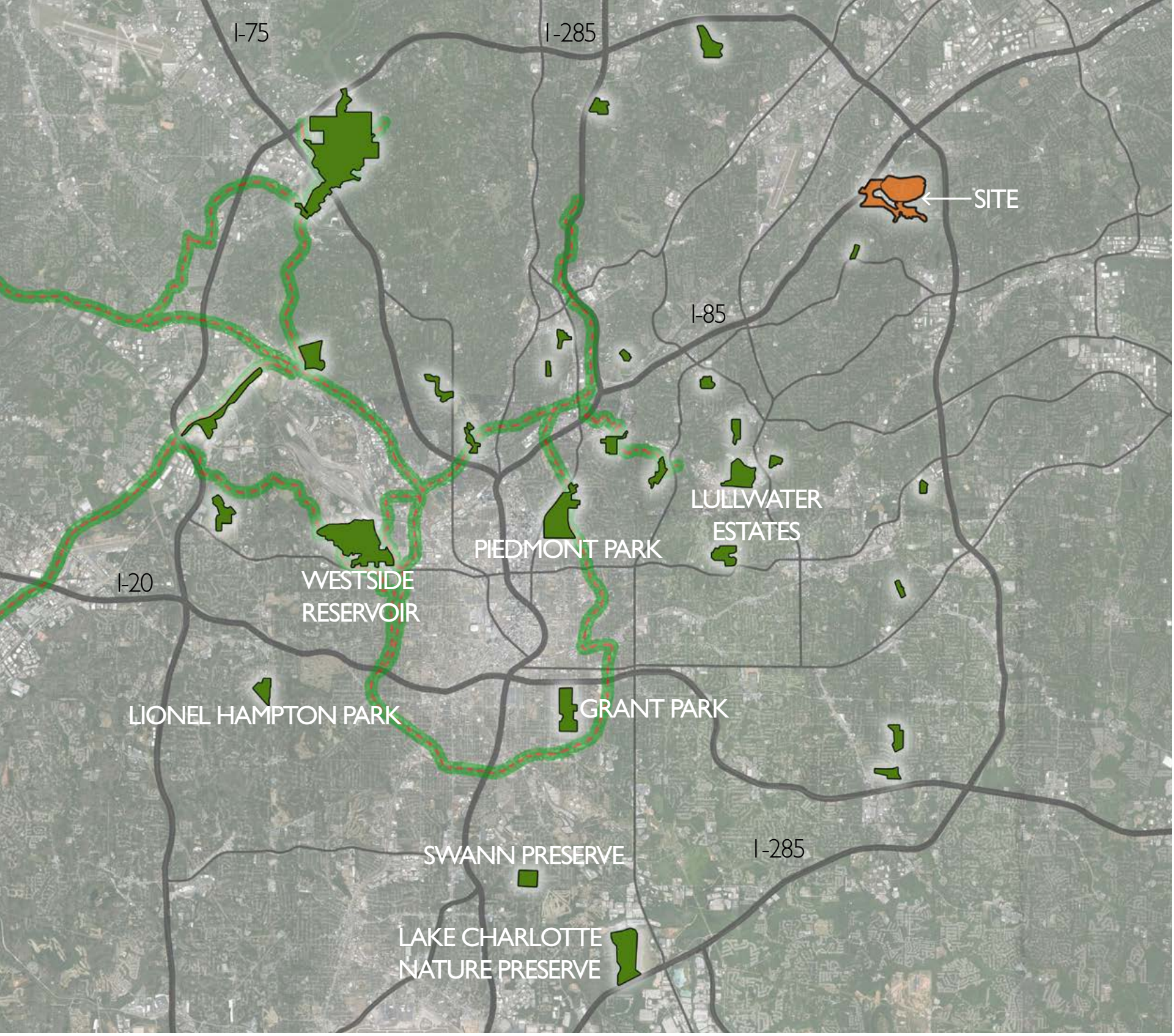
Movement and initiative abound within the region to extend and connect a multi-jurisdictional network of multi-purpose trails.

The success of the Atlanta Beltline, Silver Comet Trail, Big Creek Greenway, Path 400 and numerous smaller trail components present an emerging framework approaching 200 miles in length.

Stream corridors, as a result of their connected nature and gentle gradients, are being consistently identified for the inclusion of trails.

Both the North and South Forks of Peachtree Creek are being studied for trail opportunities as they traverse a variety of communities. Shortly after the two streams merge to form the larger Peachtree Creek, planning is under way for the convergence of their potential paths with the regional Path 400 and the Atlanta Beltline.


I-75
I-285
SITE
PATH 400
I-85
SILVER COMET TRAIL
PROCTOR CREEK TRAIL
I-20
ATLANTA BELTLINE TRAIL SYSTEM
ATLANTA BELTLINE TRAIL SYSTEM
I-285


I-75
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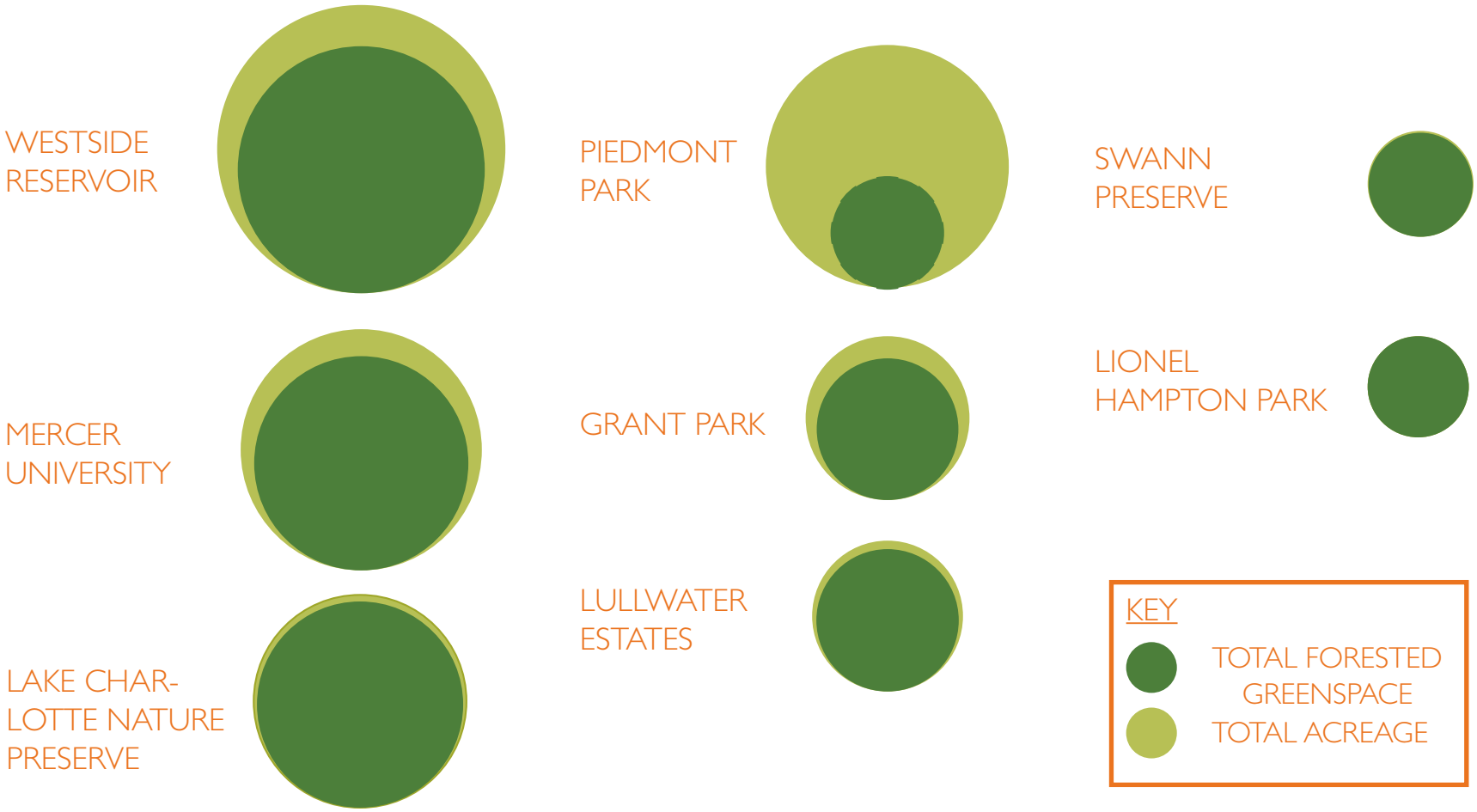
SITE
I-85
LULLWATER
ESTATES
PIEDMONT PARK
WESTSIDE
RESERVOIR
I-20
LIONEL HAMPTON PARK
GRANT PARK
SWANN PRESERVE
I-285
LAKE CHARLOTTE
NATURE PRESERVE

02. CONTEXT



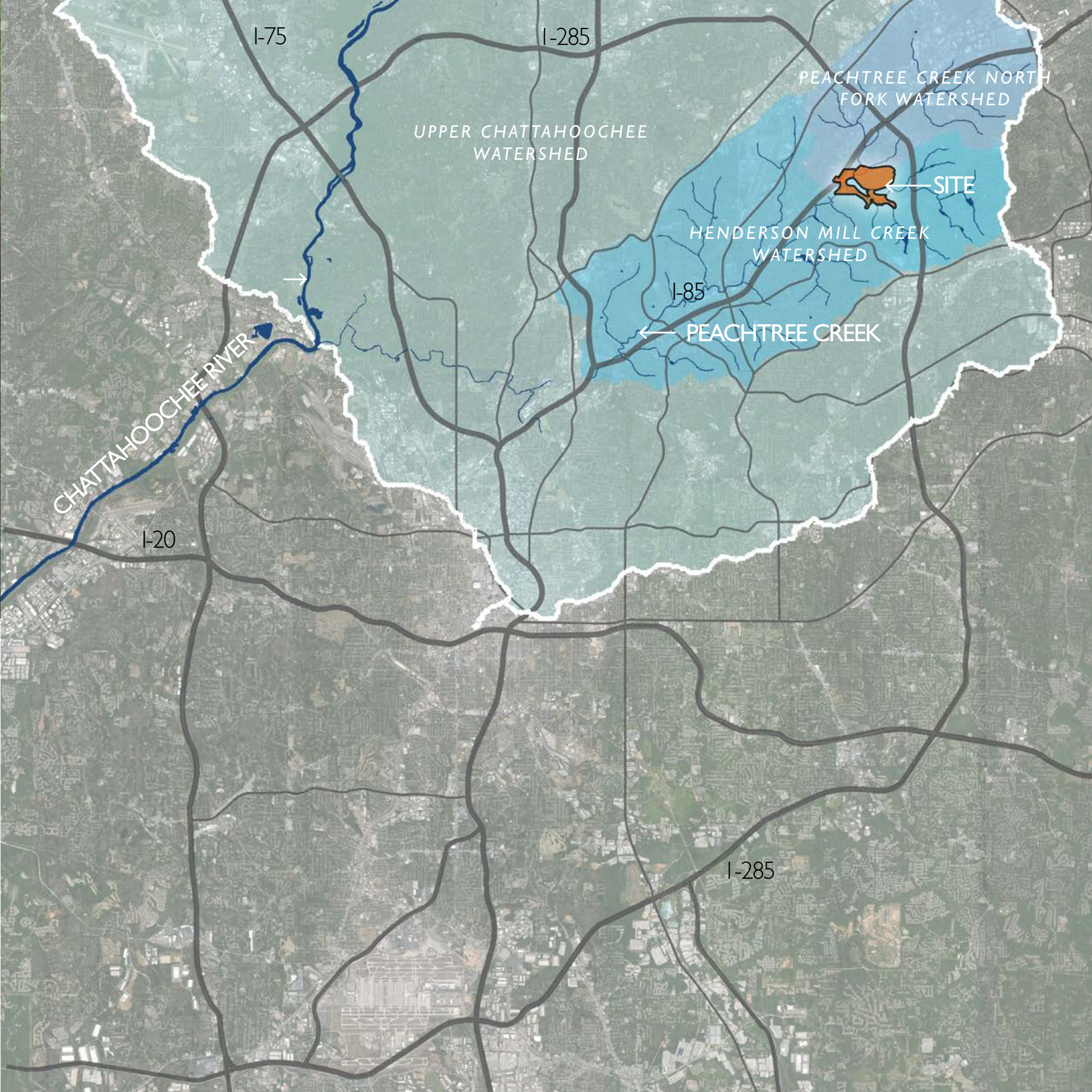
A GREEN NETWORK

Developing within the Atlanta region is an emerging network of parks and greenspaces. When comparing the size of the parks throughout the city with the amount of forested land, there is a high percentage of parks with over 50% tree canopy cover. These parks are used and loved by the local communities and serve as an integral part of our growing urban population. The value of this green network will only continue to increase as the population and urbanization engulf the area. These forested sanctuaries will reduce the heat island effect, improve air quality, and provide areas for people to gather and recreate. The natural areas of Mercer's Campus could provide an ecological destination for the community to learn about the diverse ecological communities that surround them.

HYDROLOGY

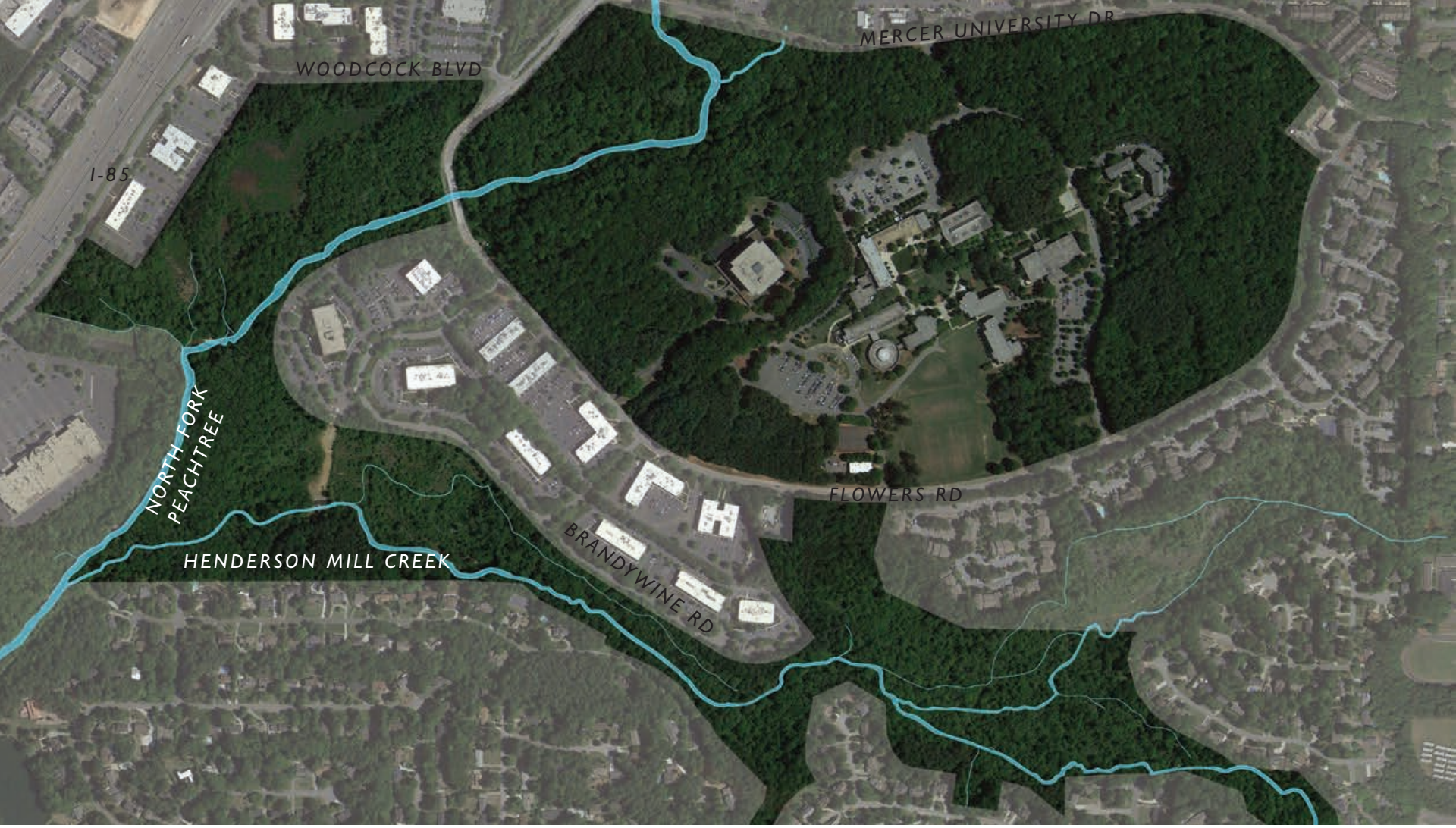
Located within the upper region of the Peachtree creek watershed, the site contains the confluence of Henderson Mill creek and the North Fork of Peachtree Creek and provides over two miles of major streams within the campus.

The amount and quality of riparian environments associated with the two streams are currently functioning as a dynamic component of green infrastructure to enhance water quality and groundwater recharge, for the entire watershed prior to its journey into the Chattahoochee River. The type and amount of hydric systems on site is extremely rare within the metropolitan Atlanta region.


I-75
I-285
PEACHTREE CREEK NORTH FORK WATERSHED
UPPER CHATTAHOOCHEE WATERSHED
SITE
HENDERSON MILL CREEK WATERSHED
I-85
PEACHTREE CREEK
CHATTAHOOCHEE RIVER
I-20
I-285

03. SITE HYDROLOGY & ECOLOGY

The land we stand on, no matter where we are, is part of larger dynamic system of water flow, plant communities and animal habitat. Stream watersheds connect us to those downstream and how we care for that resource affects those communities. The particles we put in the air travel to other places and affect the recipients downwind. The plants we place in our yards and landscapes may be transported by wind or bird into adjacent natural areas. We often don't realize what the accumulated effects of our actions are, but in an urban environment, the results are often intensified.



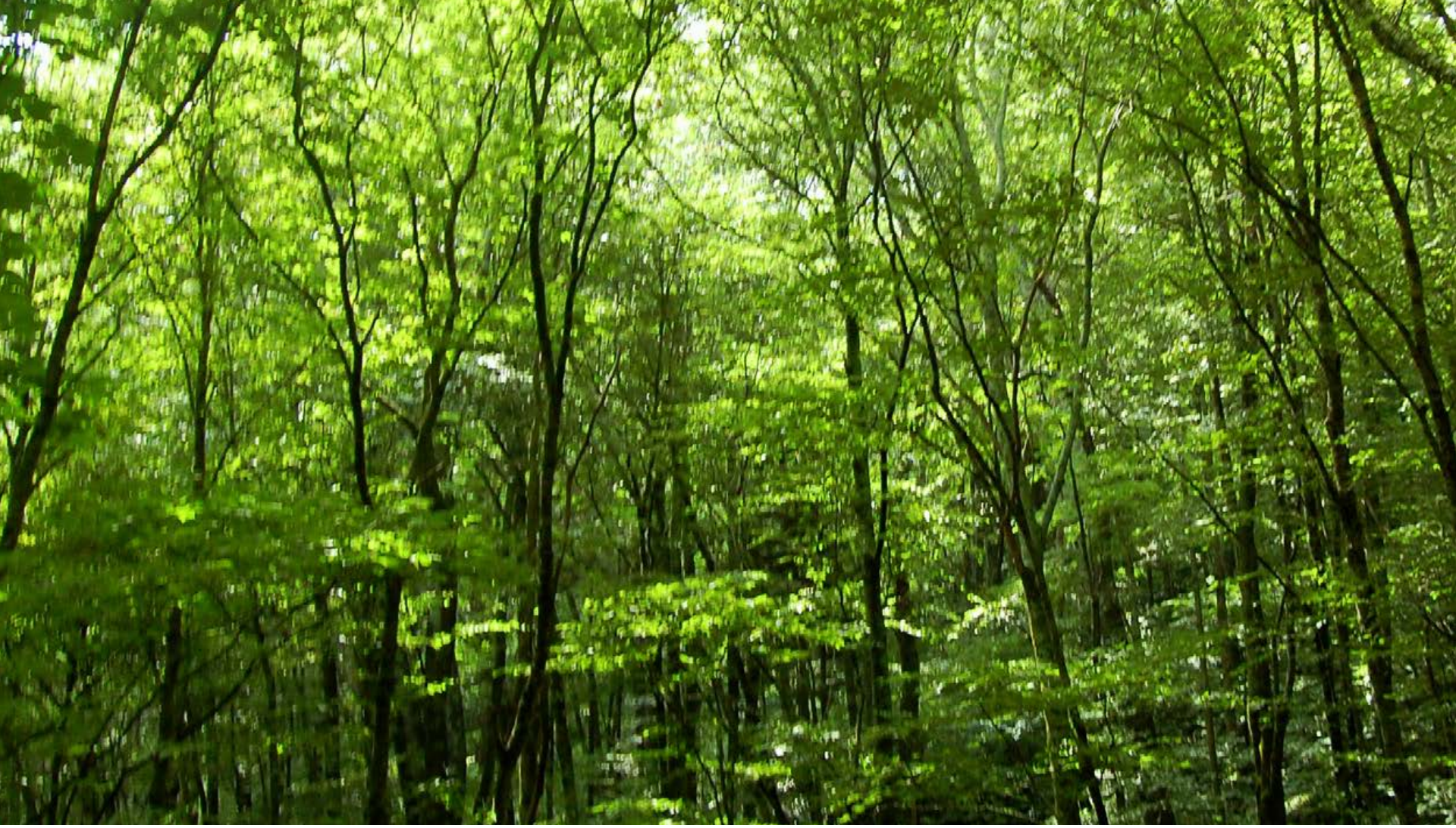
SITE INTRODUCTION

The Mercer University Cecil B. Day Campus is essentially a campus in the middle of a forest. The forest is a mixture of upland and bottomland environments knitted together into a heathy functioning Piedmont ecosystem. The land contains an abundance and a diverse amount of native plant communities.

Considering the urban context of the Mercer property, situated within the major metropolitan area of Atlanta, it has the potential to be a remarkable asset to the university and surrounding communities.

03. HYDROLOGY & ECOLOGY


MERCER
UNIVERSITY
CECIL B. DAY CAMPUS
FOUNDED 1833



SITE ECOLOGICAL COMMUNITIES

The 2013 publication *The Natural Communities of Georgia* divides the state into five distinct Ecological Regions: Cumberland Plateau/Ridge and Valley, Blue Ridge Mountains, Piedmont, Coastal Plain, and Maritime. The regions are defined by latitude, altitude, climate, topography, soils and geology. These physical attributes in turn define the biological communities that differentiate them.

Within the Piedmont region itself, where the site lies, there are twelve distinct ecological communities. Of these twelve communities within the Piedmont region there are two mesic environments, mesic forest and oak-hickory-pine forest, and two hydric environments, forested floodplain and seepage wetland that are identified within the Mercer Urban Forest. There are two distinct subcategory communities. Within the oak-hickory-pine community there is a subcategory of mafic forest and within the forested floodplain community there are shrub and herbaceous wetlands.

SITE HYDROLOGY

The entire Mercer Urban Forest sits within the watershed of the North Fork of Peachtree Creek. The forest contains both the North Fork of Peachtree Creek and Henderson Mill Creek, which flow along its borders to the west and south of campus. Along these streams are several different types of ecological communities that provide many environmental benefits. These communities include Forested Floodplains, Seepage Wetlands, and Shrub and Herbaceous Wetlands. Of particular note is the large Shrub and Herbaceous wetland dominated by Arrow Arum located just west of the North Fork of Peachtree Creek and Mercer Campus Drive.

All of these communities are a critical component to this urban forest and provide ecologically sensitive areas that can be used for recreation and education.

INVASIVE SPECIES AND THEIR IMPACT ON URBAN ENVIRONMENTS

Invasive species are universally recognized as one of the most serious ecological threats to our natural environments. The invasion of these species into our ecosystems degrade their unique aesthetic and recreational values.

The most serious threat in the Mercer Forest is Chinese Privet, and its proliferation and density in the floodplain makes many areas nearly impassable. Privet, along with several other exotic invaders, have pushed many of the native species to the brink of extinction through habitat loss. Their proliferation has the potential of greatly reducing the biodiversity of the plant communities in the environment which in turn greatly reduces the biodiversity of the insect and animal life that depend on them. Insects, for example, have very specific diets of plants that they have evolved with and depend upon. When those plants are lost due to invading exotics, the insects that depend on them are lost as well.

The nearly 300 acres that comprise Mercer's Urban Forest are quite pristine and relatively free from invasive exotic species in many locations. However, the largest single environment on the property, the forested floodplain, is heavily impacted by invasive species . This habitat has a diverse array of plant material due to its rich floodplain soils, available moisture, and dynamic environmental influences such as occasional flooding. However, almost a quarter of the species in this environment are invasive exotics. This is also heavily influenced by the urban location of Mercer's campus. Most of the invasive plants we see in our natural areas are seeding out from populations of plants found in the yard of the average homeowner. These plants are also found in suburban natural areas, but the density of urban households, each with its own collection of exotic species, provides an intense amount of seed stock waiting for a bird to transport them into the closest natural area.

BOTANICAL NAME	COMMON NAME
Pyrus calleryana	Callery Pear
Rosa multiflora	Multiflora Rose
Ulmus parvifolia	Lacebark Elm
Elaeagnus umbellata	Autumn-olive
Euonymus fortunei	Wintercreeper
Glechoma hederacea	Ground Ivy

BOTANICAL NAME	COMMON NAME
Liriope muscari	Liriope
Mahonia bealei	Leatherleaf Mahonia
Nandina domestica	Nandina
Polygonum cuspidatum	Japanese Fleeceflower
Vinca major	Large Periwinkle
Wisteria sinensis	Chinese Wisteria

PRIVET
LIGUSTRUM SINENSE

ORIENTAL BITTERSWEET
CELASTRUS ORBICULATUS

AUTUMN-OLIVE
ELAEAGNUS UMBELLATA

ENGLISH IVY
HEDRA HELIX

ASIAN DAY FLOWER
COMMELINA COMMUNIS


MESIC FOREST

MESIC FOREST

In the Piedmont region, mesic forests are defined as forests with a rich canopy usually dependent on a healthy profile of topsoil. They often have a north-facing slope which keeps them from drying out as quickly as other slope orientations. This environment also is found in the deeper ravines of the Piedmont. Indicator trees include American Beech, Northern Red Oak, and in the lower elevations, Tulip Tree and White Basswood.

MESIC FOREST - PLANT LIST

BOTANICAL NAME	COMMON NAME
Acer barbatum	Southern Sugar Maple
Acer leucoderme	Whitebark Maple
Acer rubrum	Red Maple
Aesculus sylvatica	Painted Buckeye
Anemonella thalictroides	Rue Anemone
Asarum arifolium	Arrowleaf Ginger
Aster divaricatus	White Wood Aster
Athyrium filix-femina	Lady Fern
Calycanthus floridus	Carolina Sweetshrub
Carya glabra	Pignut Hickory
Carya tomentosa	Mockernut Hickory
Cercis canadensis	Eastern Redbud
Claytonia virginica	Spring Beauty
Cornus alternifolia	Pagoda Dogwood
Corylus americana	American Hazelnut
Cornus florida	Flowering Dogwood
Crataegus flabellata	Fanleaf Hawthorn
Euonymus americanus	Strawberry-bush
Fagus grandifolia	American Beech
Halesia tetraptera	Common Silverbell
Hepatica americana	Round-lobed Hepatica
Hydrangea arborescens	Mountain Hydrangea
Ilex opaca	American Holly
Iris cristata	Dwarf Crested Iris
Lindera benzoin	Spicebush
Liriodendron tulipifera	Tulip Tree

BOTANICAL NAME	COMMON NAME
Mitchella repens	Partridgeberry
Morus rubra	Red Mulberry
Nyssa sylvatica	Black Gum
Onoclea sensibilis	Sensitive Fern
Panax quinquefolius	Ginseng
Polystichum acrostichoides	Christmas Fern
Polygonatum biflorum	Common Solomon's Seal
Quercus alba	White Oak
Quercus rubra	Northern Red Oak
Quercus shumardii	Shumard Oak
Rhododendron canescens	Piedmont Azalea
Sanguinaria canadensis	Bloodroot
Thelypteris hexagonoptera	Broad Beech Fern
Thelypteris noveboracensis	New York Fern
Tilia americana v. heterophylla	White Basswood
Tiarella cordifolia	Foamflower
Tipularia discolor	Cranefly Orchid
Trillium cuneatum	Wake Robin
Ulmus alata	Winged Elm
Ulmus americana	American Elm
Ulmus rubra	Slippery Elm
Uvularia perfoliata	Perfoliate Bellwort
Vaccinium stamineum	Deerberry
Vitis rotundifolia	Muscadine Grape
Viburnum rufidulum	Rusty Blackhaw Viburnum
* *Elaeagnus umbellata*	* Autumn-olive
* *Hedera Helix*	* English Ivy

**INDICATES EXOTIC INVASIVE SPECIES*

WHITEBARK MAPLE
ACER LEUCODERME

PAINTED BUCKYEYE
AESCULUS SYLVATICA

MOCKERNUT HICKORY
CARYA TOMENTOSA

EASTERN REDBUD
CERCIS CANADENSIS

STRAWBERRY-BUSH
EUONYMUS AMERICANUS

AMERICAN BEECH
FAGUS GRANDIFOLIA

COMMON SILVERBELL
HALESIA TETRAPTERA

MOUNTAIN HYDRANGEA
HYDRANGEA ARBORESCENS

RED MULBERRY
MORUS RUBRA

FOAMFLOWER
TIARELLA CORDIFOLIA

PIEDMONT AZALEA
RHODODENDRON CANESCENS

BLOODROOT
SANGUINARIA CANESCENS

BROAD BEECH FERN
THELYPTERIS HEXAGONOPTERA

DWARF CRESTED IRIS
IRIS CRESTATA

FLOWERING DOGWOOD
CORNUS FLORIDA

DEERBERRY
VACCINIUM STAMINEUM


FORESTED
FLOODPLAIN

FORESTED FLOODPLAIN

Floodplains are the naturally rich forested areas in the Georgia Piedmont. They are relatively flat areas adjacent to streams that may occasionally flood, however, the flooding event is too infrequent to contain standing water for any great length of time. As such, they tend to be more dry than wet, but fertile soils and above average moisture provide an environment that many plants find favorable. Indicator species include Red Maple, Green Ash, Cottonwood, and oaks such as Water Oak and Overcup Oak. The riparian zone is slightly different from a forested floodplain, but not enough to be distinguished as a separate habitat. Streams here typically create a natural sandy levee on their banks, built up over years of flooding. These higher, sandier soils are the preferred habitat of many trees and shrubs. Indicator riparian trees include River Birch, Sycamore, Ironwood and Black Walnut. Riparian shrubs include Virginia Sweetspire, Indigo Bush, Mountain Laurel, Silky Dogwood, and River Cane of the Piedmont.

FORESTED FLOODPLAIN-PLANT LIST

BOTANICAL NAME	COMMON NAME
Acer barbatum	Southern Sugar Maple
Acer negundo	Boxelder
Acer rubrum	Red Maple
Acer saccharinum	Silver Maple
Aesculus sylvatica	Painted Buckeye
Alnus serrulata	Hazel Alder
Amorpha fruticosa	Indigo-bush
Ambrosia trifida	Giant Ragweed
Apios americana	Groundnut
Arisaema draconitum	Green Dragon
Arundinaria gigantea	Giant Cane
Aralia spinosa	Devils-walkingstick
Betula nigra	River Birch
Bignonia capreolata	Crossvine
Boehmeria cylindrica	False Nettle
Carpinus caroliniana	American Hornbeam
Carex crinata	Drooping Sedge
Carex lurida	Large Sedge
Carya cordiformis	Bitternut Hickory
Carya ovalis	Red Hickory
Campsis radicans	Trumpet Vine
Celtis laevigata	Sugar Hackberry
Chasmanthium latifolium	River Oats
Corylus americana	American Hazelnut
Cornus amomum	Silky Dogwood
Cornus strictus	Swamp Dogwood
Commelina virginica	Virginia Dayflower
Decumaria barbara	Climbing Hydrangea

BOTANICAL NAME	COMMON NAME
Dichanthelium clandestinum	Deer-tongue Grass
Eupatorium fistulosum	Joe Pye Weed
Fagus grandifolia	American Beech
Fraxinus pennsylvanica	Green Ash
Hypericum hypericoides	St Andrew's Cross
Ilex verticillata	Winterberry
Impatiens capensis	Spotted Touch-me-not
Itea virginica	Virginia Sweetspire
Lindera benzoin	Spicebush
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip Tree
Lobelia cardinalis	Cardinal Flower
Lycopus virginicus	Virginia Horehound
Mikania scandens	Climbing Hempweed
Morus rubra	Red Mulberry
Onoclea sensibilis	Sensitive Fern
Passiflora lutea	Yellow Passionflower
Peltandra virginica	Arrow Arum
Phytolacca americana	Pokeweed
Phlox glaberrima	Smooth Phlox
Pinus taeda	Loblolly Pine
Platanus occidentalis	Sycamore
Populus deltoides	Eastern Cottonwood
Quercus lyrata	Overcup Oak
Quercus nigra	Water Oak
Rosa multiflora	Multiflora Rose
Rudbeckia laciniata	Cutleaf Coneflower
Rubus pensilvanicus	Sawtooth Blackberry
Sambucus canadensis	Elderberry

**INDICATES EXOTIC INVASIVE SPECIES*

BOTANICAL NAME	COMMON NAME
Sagittaria latifolia	Arrowhead Duck Potato
Salix nigra	Black Willow
Senecio glabellus	Butterweed
Sisyrinchium atlanticum	Atlantic BlueEyed Grass
Smilax rotundifolia	Bullbrier
Sparganium americanum	Eastern Bur-reed
Toxicodendron radicans	Poison Ivy
Trillium cuneatum	Wake Robin
Tradescantia virginiana	Spiderwort
Ulmus americana	American Elm
Vitis aestivalis	Summer Grape
Vitis rotundifolia	Muscadine Grape
Woodwardia areolata	Netted Chain Fern

BOTANICAL NAME	COMMON NAME
**Albizia julibrissin*	Mimosa
**Celastrus orbiculaus*	Oriental Bittersweet
**Dioscorea polystachya*	Chinese Yam
**Dryopteris erythrosora*	Autumn Fern
**Elaeagnus pungens*	Thorny Elaeagnus
**Elaeagnus umbellata*	Autumn-olive
**Euonymus fortunei*	Wintercreeper
**Glechoma hederacea*	Ground Ivy
**Hedera helix*	English Ivy
**Hibiscus syriacus*	Rose of Sharon
**Ilex cornuta*	Chinese Holly
**Ilex crenata*	Japanese Holly
**Ligustrum japonicum*	Wax Leaf Ligustrum
**Liriope muscari*	Liriope
**Ligustrum sinense*	Chinese Privet
**Lonicera japonica*	Japanese Honeysuckle
**Lonicera maackii*	Amur Honeysuckle
**Mahonia bealei*	Leatherleaf Mahonia
**Melia azedarach*	Chinaberry
**Microstegium vimineum*	Nepal Microstegium
**Morus alba*	White Mulberry
**Murdannia keisak*	Asiatic Dayflower
**Nandina domestica*	Nandina
**Polygonum cuspidatum*	Japanese Fleeceflower
**Pueraria lobata*	Kudzu

RED MAPLE
ACER RUBRUM

GREEN DRAGON
ARISAEMA DRACONITUM

OVERCUP OAK
QUERCUS LYRATA

AMERICAN HAZELNUT
CORYLUS AMERICANA

SPOTTED TOUCH-ME-NOT
IMPATIENS CAPENSIS

VIRGINIA SWEETSPIRE
ITEA VIRGINICA

CLIMBING HYDRANGEA
DECUMARIA BARBARA

DEER-TONGUE GRASS
DICHANTHELIUM CLANDESTINUM

SHRUB & HERBACEOUS WETLAND

SHRUB & HERBACEOUS WETLAND

While floodplains in the Piedmont are typically more dry than wet, occasionally site conditions or beaver activity cause inundation enough to prevent the growth of even the most wet tolerant trees, and instead the landscape is dominated by shrubs and grasses. In these situations, there has to be a good source of water to dam up. This may be a braided stream or a springhead. The water source is fairly constant and the beaver dam maintains a permanent pool resulting in a shallow body of water. Many aquatic forbs and grasses thrive in this sunny condition and wetland shrubs occupy isolated uplands and marginal edges of the wetland. Thus this habitat is very distinctive from the typical forested floodplain. Indicator shrubs include Silky Dogwood, Buttonbush, Hazel Alder, Elderberry and American Snowbell. The herbaceous aquatics include Arrow Arum, Soft Rush, Rice Cutgrass, and Arrowhead along with many others.

SHRUB AND HERBACEOUS WETLAND-PLANT LIST

BOTANICAL NAME	COMMON NAME
Acer negundo	Boxelder
Acer rubrum	Red Maple
Alnus serrulata	Hazel Alder
Carex crinata	Drooping Sedge
Carex lurida	Large Sedge
Cephalanthus occidentalis	Buttonbush
Clematis virginiana	Virginsbower Clematis
Cornus amomum	Silky Dogwood
Cornus strictus	Swamp Dogwood
Commelina virginica	Virginia Dayflower
Fraxinus pennsylvanica	Green Ash
Glyceria striata	Fowl Manna Grass
Ilex verticillata	Winterberry
Itea virginica	Virginia Sweetspire
Impatiens capensis	Spotted Touch-me-not
Lobelia cardinalis	Cardinal Flower
Lycopus virginicus	Virginia Horehound
Peltandra virginica	Arrow Arum
Polygonum sagittatum	Tearthumb
Rudbeckia laciniata	Cutleaf Coneflower
Sagittaria latifolia	Arrowhead Duck Potato
Salix nigra	Black Willow
Scirpus cyperinus	Wooly Bulrush
Styrax americanus	American Snowbell
Viburnum nudum	Possumhaw Viburnum

BOTANICAL NAME	COMMON NAME
* *Murdannia keisak*	Asiatic Dayflower
* *Ligustrum sinense*	Chinese Privet

**INDICATES EXOTIC INVASIVE SPECIES*

SILKY DOGWOOD
CORNUS AMOMUM

SILKY DOGOOD
CORNUS AMOMUM

TEARTHUMB
POLYGONUM SAGITTATUM

ARROWHEAD DUCK POTATO
SAGITTARIA LATIFOLIA

BOXELDER
ACER NEGUNDO

SPOTTED TOUCH-ME-NOT
IMPATIENS CAPENSIS

03. HYDROLOGY & ECOLOGY

LARGE SEDGE
CAREX LURIDA

ARROW ARUM
PELTANDRA VIRGINICA

BUTTONBUSH
CEPHALANTHUS OCCIDENTALIS

HAZEL ALDER
ALNUS SERRULATA

VIRGINSBOWER CLEMATIS
CLEMATIS VIRGINIANA

RED MAPLE
ACER RUBRUM

WOOLY BULRUSH
SCIRPUS CYPERINUS

POSSUMHAW VIBURNUM
VIRBURNUM NUDUM

VIRGINIA DAYFLOWER
COMMELINA VIRGINICA

ASIATIC DAYFLOWER*
MURDANNIA KEISAK

BLACK WILLOW
SALIX NIGRA

FOWL MANNA GRASS
GLYCERIA STRIATA

CARDINAL FLOWER
LOBELIA CARDINALIS

WINTERBERRY
ILEX VERTICILLATA

AMERICAN SNOWBELL
STYRAX AMERICANUS

CUTLEAF CONEFLOWER
RUDBECKIA SAGITTATUM


OAK PINE HICKORY
FOREST

OAK PINE HICKORY FOREST

Oak Pine Hickory forests are one of the most prevalent forest types in the Piedmont. Side slopes with a southern or western orientation or even low ridges will have this type of forest. It is still typically found with fairly healthy topsoil layers, but the orientation and elevation create a dryer, sub-mesic environment. Indicator trees include White Oak, Southern Red Oak, Southern Sugar Maple, Mockernut Hickory, Pignut Hickory, and Loblolly and Shortleaf Pine in younger forests.

03. HYDROLOGY & ECOLOGY

OAK PINE HICKORY-PLANT LIST

BOTANICAL NAME	COMMON NAME
Acer barbatum	Southern Sugar Maple
Acer rubrum	Red Maple
Aesculus sylvatica	Painted Buckeye
Antennaria plantaginifolia	Native Pussytoes
Aronia arbutifolia	Red Chokeberry
Aralia spinosa	Devils-walkingstick
Asarum arifolium	Arrowleaf Ginger
Asimina parviflora	Dwarf Pawpaw
Campsis radicans	Trumpet Vine
Carya tomentosa	Mockernut Hickory
Cercis canadensis	Eastern Redbud
Celtis laevigata	Sugar Hackberry
Chasmanthium sessiliflorum	Longleaf Wood Oats
Corylus americana	American Hazelnut
Cornus florida	Flowering Dogwood
Diospyros virginiana	American Persimmon
Euonymus americanus	Strawberry-bush
Fagus grandifolia	American Beech
Fraxinus pennsylvanica	Green Ash
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip Tree
Magnolia tripetala	Umbrella Magnolia
Morus rubra	Red Mulberry
Onoclea sensibilis	Sensitive Fern
Oxydendrum arboreum	Sourwood
Parthenocissus quinquefolia	Virginia Creeper
Pinus echinata	Shortleaf Pine
Pinus taeda	Loblolly Pine
Polystichum acrostichoides	Christmas Fern
Prunus serotina	Black Cherry
Quercus alba	White Oak
Quercus nigra	Water Oak
Sassafras albidum	Sassafras
Ulmus alata	Winged Elm
Vaccinium corymbosum	Highbush Blueberry
Vaccinium virgatum	Rabbiteye Blueberry
Viburnum prunifolium	Blackhaw Viburnum
Vitis rotundifolia	Muscadine Grape
Viburnum rufidulum	Rusty Blackhaw Viburnum
Yucca filamentosa	Adam's Needle Yucca
* *Hedera Helix*	English Ivy

*INDICATES EXOTIC INVASIVE SPECIES

UMBRELLA MAGNOLIA
MAGNOLIA TRIPETALA

TRUMPET VINE
CAMPSIS RADICANS

NATIVE PUSSYTOES
ANTENNARIA PLANTAGINIFOLIA

DEVILS-WALKINGSTICK
ARALIA SPINOSA

DWARF PAWPAW
ASIMINA PARVIFLORA

CHRISTMAS FERN
POLYSTICHUM ACROSTICHOIDES

VIRGINIA CREEPER
PARTHENOCISSUS QUINQUEFOLIA

BLACK CHERRY
PRUNUS SEROTINA

WHITE OAK
QUERCUS ALBOA

WINGED ELM
ULMUS ALATA

SUGAR HACKBERRY
CELTIS LAEVIGATA

ADAM'S NEEDLE YUCCA
YUCCA FILAMENTOSA

HIGHBUSH BLUEBERRY
VACCINIUM CORYMBOSUM

SENSITIVE FERN
ONOCLEA SENSIBILIS

LOBLOLLY PINE
PINUS TAEDA

BLACKHAW VIBURNUM
VIBURNUM PRUNIFOLIUM

AMERICAN PERSIMMON
DIOSPYROS VIRGINIANA

SOURWOOD
OXYDENDRUM ARBOREUM

SEEPAGE WETLAND

SEEPAGE WETLAND

Seepage wetlands are wetland areas outside of a floodplain. They are typically areas adjacent to the toe of a slope or in a ravine, bordered by upland, where water seeps out from a springhead and saturates the surrounding areas. If narrow, these wetlands may seem almost stream-like, but the water barely breaks the ground level. A healthy community of trees, shrubs and herbaceous material take full advantage of the abundant moisture. Indicator trees can be Red Maple, Sweet Gum, Tulip Tree and Green Ash. The understory shrubs contain Virginia Sweetspire, Possumhaw Viburnum and Winterberry. Herbaceous material may include plants such as Lizard's Tail, Arrow Arum, Cutleaf Coneflower and an assortment of fern.

SEEPAGE WETLAND-PLANT LIST

BOTANICAL GARDENS	COMMON NAME
Acer barbatum	Southern Sugar Maple
Acer rubrum	Red Maple
Aesculus sylvatica	Painted Buckeye
Alnus serrulata	Hazel Alder
Arundinaria gigantea	Giant Cane
Athyrium filix-femina	Lady Fern
Carex leptalea	Bristly-stalked Sedge
Cornus amomum	Silky Dogwood
Cornus strictus	Swamp Dogwood
Commelina virginica	Virginia Dayflower
Fraxinus pennsylvanica	Green Ash
Halesia tetraptera	Common Silverbell
Ilex verticillata	Winterberry
Lindera benzoin	Spicebush
Lycopus virginicus	Virginia Horehound
Onoclea sensibilis	Sensitive Fern
Sambucus canadensis	Elderberry
Saururus cernuus	Lizard's Tail
Thelypteris noveboracensis	New York Fern
Woodwardia areolata	Netted Chain Fern

LADY FERN
ATHYRIUM FILIX-FEMINA

BRISTLY-STALKED SEDGE
CAREX LEPTALEA

WINTERBERRY
ILEX VERTICILLATA

SPICEBUSH
LINDERA BENZOIN

PAINTED BUCKEYE
AESCULUS SYLVATICA

RED MAPLE
ACER RUBRUM

SOUTHERN SUGAR MAPLE
ACER BARBATUM

GIANT CANE
ARUNDINARIA GIGANTEA

VIRGINIA DAYFLOWER
COMMELINA VIRGINICA

SWAMP DOGWOOD
CORNUS STRICTUS

SILKY DOGWOOD
CORNUS AMOMUM

COMMON SILVERBELL
HALESIA TETRAPTERA

ELDERBERRY
SAMBUCUS CANADENSIS

SENSITIVE FERN
ONOCLEA SENSIBILIS

VIRGINIA HOREHOUND
LYCOPUS VIRGINICUS

NEW YORK FERN
THELYPTERIS NOVEBORACENSIS

LIZARD'S TAIL
SAURURUS CERNUUS

GREEN ASH
FRAXINUS PENNSYLVANICA

HAZEL ALDER
ALNUS SERRULATA

NETTED CHAIN FERN
WOODWARDIA AREOLATA


MAFIC FOREST

MAFIC FOREST

The majority of the forests of the Georgia Piedmont are acidic in nature. This is typically due to the soil being influenced by underlying granitic or igneous rock below. But occasionally a forest sits upon soapstone or amphibolite. These rock types cause the soils to be more basic with a higher pH, creating a forest with a mafic substrate. This can be identified by forest composition, as there are certain trees and shrubs which compete better in these types of soils. Indicator canopy trees include White Oak, Post Oak, and Hickories, while understory trees include Carolina Buckthorn, Redbud, and Alternate Leaf Dogwood.

MAFIC FOREST-PLANT LIST

BOTANICAL NAME	COMMON NAME
Acer barbatum	Southern Sugar Maple
Acer leucoderme	Whitebark Maple
Amelanchier arborea	Downy Serviceberry
Asimina parviflora	Dwarf Pawpaw
Calycanthus floridus	Carolina Sweetshrub
Carya glabra	Pignut Hickory
Carya ovalis	Red Hickory
Castanea pumila	Chinkapin
Carya tomentosa	Mockernut Hickory
Cercis canadensis	Eastern Redbud
Celtis tenuifolia	Dwarf Hackberry
Chasmanthium sessiliflorum	Longleaf Wood Oats
Cornus alternifolia	Pagoda Dogwood
Crataegus flava	Yellow Hawthorn
Crataegus spathulata	Littlehip Hawthorn
Euonymus americanus	Strawberry-bush
Fraxinus pennsylvanica	Green Ash
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip Tree
Matelea carolinensis	Maroon Carolina Milkvine
Morus rubra	Red Mulberry
Nyssa sylvatica	Black Gum
Phlox glaberrima	Smooth Phlox
Pinus taeda	Loblolly Pine
Prunus serotina	Black Cherry
Quercus alba	White Oak
Quercus coccinea	Scarlet Oak
Quercus falcata	Southern Red Oak
Quercus stellata	Post Oak

BOTANICAL NAME	COMMON NAME
Acer barbatum	Southern Sugar Maple
Rhamnus caroliniana	Carolina Buckthorn
Rubus pensilvanicus	Sawtooth Blackberry
Sassafras albidum	Sassafras
Trillium catesbaei	Catesby's Nodding Trillium
Tradescantia virginiana	Spiderwort
Ulmus alata	Winged Elm
Uvularia perfoliata	Perfoliate Bellwort
Viburnum prunifolium	Blackhaw Viburnum
Vitis rotundifolia	Muscadine Grape
Viburnum rufidulum	Rusty Blackhaw Viburnum
**Celastrus orbiculaus*	Oriental Bittersweet
**Elaeagnus umbellata*	Autumn-olive
**Hedera helix*	English Ivy
**Rosa multiflora*	Multiflora Rose

**INDICATES EXOTIC INVASIVE SPECIES*

PIGNUT HICKORY
CARYA GLABRA

RED HICKORY
CARYA OVALIS

CHINKAPIN
CASTANEA PUMILA

PAGODA DOGWOOD
CORNUS ALTERNIFOLIA

DWARF HACKBERRY
CELTIS TENUIFOLIA

LITTLEHIP HAWTHORN
CRATAEGUS SPATHULATA

CAROLINA MILKVINE
MATELEA CAROLINENSIS

WHITE OAK
QUERCUS ALBA

CAROLINA BUCKTHORN
RHAMNUS CAROLINIANA

WINGED ELM
ULMUS ALATA

BLACKHAW VIBURNUM
VIBURNUM PRUNIFOLIUM

CATESBY'S TRILLIUM
TRILLIUM CATESBAEI

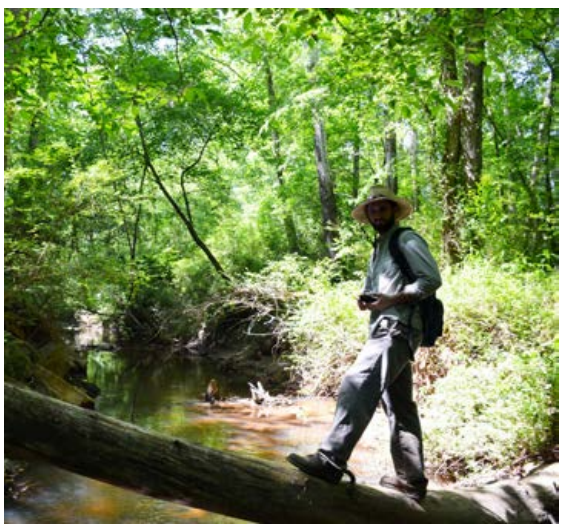
04. SITE ASSESSMENT

The following accounts are a detailed descriptions of the various habitats encountered on several walks across the Mercer Urban Forest. Topography, hydrology and the prevalent species in each area surveyed were the key factors in determining the limits of the natural communities.

SITE ASSESSMENT

The site was divided into 5 zones which were each walked and characteristics and features were documented. Through a deeper exploration of the site we were able to better understand the nature of the site and the value that it provides for the college, community and the environment.

ROUTES WALKED



TODD FULLER *PROJECT MANAGER*

BEVERLY BELL *LANDSCAPE ARCHITECT*

STEPHEN A. SANCHEZ *PRINCIPAL*

ZONE 1

CHARACTERISTICS

Zone 1 is composed of both upland (mesic) and hydric ecological communities as a result of the varying topography and landforms present. North Fork Peachtree Creek bisects the area, creating a forested floodplain and riparian zone to the North, a mesic forest located south of the creek, and a floodplain shrubs and herbaceous wetland on the eastern side.

The mesic forest contains northern-facing slopes with an incredibly rich diversity of species ranging from Northern Red Oak to Bloodroot and Solomon Seal. Occasional invasive species are found including Autumn Olive and English Ivy which present a threat of degradation to this particularly diverse and unique mesic forested area.

The forested floodplains and riparian zones are relatively flat but consist of the highest concentration of exotic invasive plants such as Chinese Privet and Thorny Eleagnus. The multitude of invasive species is threatening to the limited number of native species that do exist such as Boxelder and Sycamore. In addition, trash including plastic bottles and old tires found along the natural levee in this area diminish the area's ecological value.

A small forested wetland stretches along the toes of Mercer University Road. Natives such as Cottonwood and Winterberry are present with limited numbers of privet as of now. Nonetheless, the potential for invasives such as Chinese Privet to infiltrate is likely, considering the surrounding vegetation.

Opportunities for this zone include creating a network of trails that would provide educational exposure to the characteristic nexus of the upland mesic and floodplain hydric ecological communities. The relatively flat and dry areas of the zone would lend to the ease of such trail location.

1. THE ENTIRE AREA NORTH OF PEACHTREE CREEK CONTAINS A FORESTED FLOODPLAIN.

2. THE NORTH FORK OF PEACHTREE CREEK PROVIDES AN OPPORTUNITY TO EXPLORE STREAM RESTORATION EFFORTS FOR URBAN STREAMS IMPACTED BY URBAN TRASH, STORMWATER RUNOFF AND POLLUTANTS.

3. A DIVERSE OAK-HICKORY FOREST DOMINATES THE SOUTHERN PORTION OF THE AREA BELOW PEACHTREE CREEK.

4. NATIVE SPECIES SUCH AS BLOODROOT (SHOWN ABOVE) THRIVE ON THE NORTHERN-FACING SLOPES OF THE MESIC FOREST IN ZONE 1.

ZONE 2

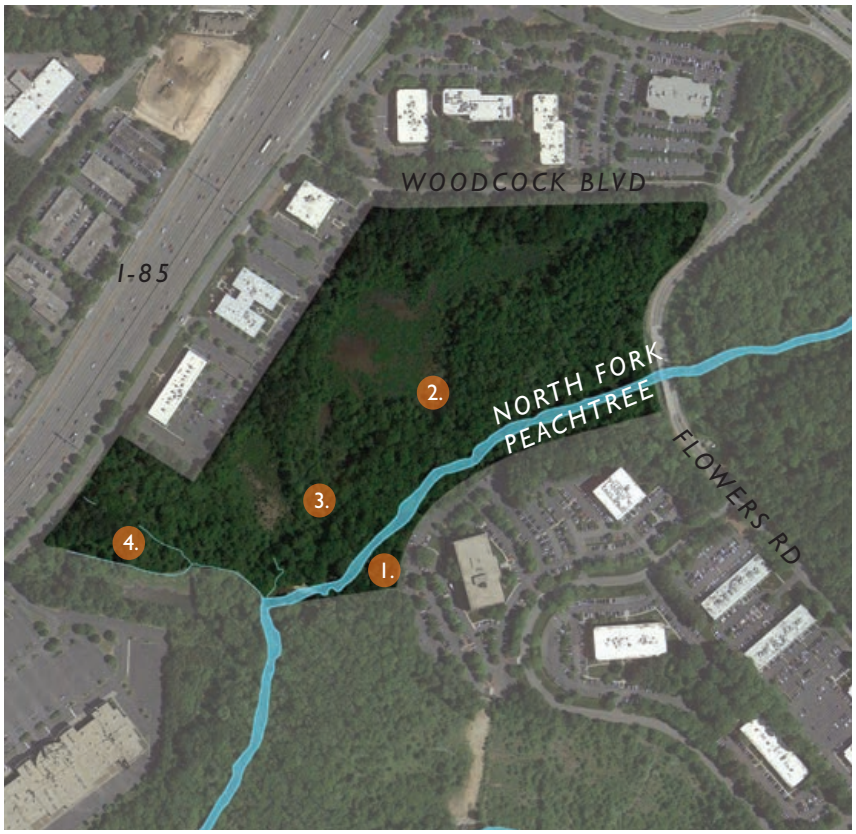
CHARACTERISTICS

Zone 2 is located on the northern side of Peachtree Creek and contains a forested floodplain and riparian zone threatened by exotic invasives along with a richly diverse floodplain including shrub and herbaceous wetland areas.

The forested floodplain and riparian zone contains an overhead canopy of bottomland species such as Green Ash and River Birch. However, the understory is mainly dominated by Chinese Privet which poses a risk to the present natives Boxelder and Ironwood. Similarly, although some natives can be found on the groundplain, an ample amount of exotics such as Ground Ivy are present.

Three shrub/herbaceous wetlands also exist in the floodplain of Zone 2 which are individually distinct based on their hydrological conditions and species composition. The northernmost wetland is the most aquatic with a large expanse of open water predominately populated by the species Arrow Arum. The middle herbaceous wetland is relatively dry and therefore easier to traverse during the early stage of the growing season. Arrowleaf Tearthumb will hinder such traverse later in the season when it is fully grown. The third and southernmost wetland is likely a manmade impoundment and a corrugate pipe drainage structure is present. Various sedges and Arrowhead populate this wetland.

Considering the urban context, these wetlands represent a rich aquatic environment with only minor impacts from invasive species that are largely unknown by Mercer patrons. The shrub and herbaceous wetlands of Zone 2 provide a prospective area for pedestrian boardwalk connections that would highlight the aesthetic, educational, and unique characteristics of Mercer's campus.



1. BOTTOMLAND SPECIES COMPOSE THE CANOPY OF THE FORESTED FLOODPLAIN ZONE; HOWEVER, THE UNDERSTORY CONSISTS OF THICK PRIVET.

2. ARROW ARUM POPULATES THE OPEN WATER OF THE NORTHERN WETLAND AREA CREATING AN EXPANSIVE AQUATIC ENVIRONMENT.

3. THE MIDDLE HERBACEOUS WETLAND PROVIDES EASY ACCESS FOR PEDESTRIANS DURING THE EARLY GROWING SEASON DUE TO DRY CONDITIONS AND PREMATURE ARROWLEAF TEARTHUMB.

4. EVIDENCE OF HUMAN INFLUENCE IS FOUND THROUGHOUT THE SOUTHERNMOST WETLAND INCLUDING TIRES AND A CORRUGATE PIPE DRAINAGE STRUCTURE.

ZONE 3

CHARACTERISTICS

The vast majority of Zone 3 consists of floodplain forest; however, shrub/herbaceous wetlands and mesic forest ecological communities are also present.

The floodplain forest areas are relatively flat with little standing water. Despite the lack of saturated soils, floodplain species are predominating. Chinese Privet is the prevailing species and at points encompasses both the canopy and the ground plane, thus severely limiting the ability for any other natives to habitat the area. Despite the abundance of exotics, several distinguished natives were identified including Green Dragon and an Overcup Oak.

The middle area of Zone 3 is mostly a shrub/herbaceous plant community. The most distinguishing feature of this area is a pristine vegetated wetland created by a small mud beaver dam. The wetland is dominated by a complex mixture of aquatic grasses and bordering wetland shrubs. Although this area is adjacent to the road, the view is obscured by a thin wall of vegetation.

The mesic forest on the southern perimeter of Zone 3 contains northern facing slopes that lead up to the surrounding residential developments. Even though the slopes are similar in form to those found in Zone 1, the biodiversity is inferior. In addition, neighboring residents have cleared areas of the Mercer forest that are adjacent to their properties.

Zone 3 harbors a significantly unique wetland area; however, the overabundance of invasive privet greatly diminishes the potential for expanding this biodiverse segment and threatens its existence. Future measures that limit the spread of privet and other exotics will help conserve this space and provide the opportunity for connection to other ecologically important areas on site.

1. SEWER LINES CROSS THE WIDTH OF HENDERSON MILL CREEK. ROCK REINFORCEMENTS FORTIFY THE BANKS BUT HINDER THE ACCESS OF THE CREEK TO THE FLOOD PLAIN.

2. A BEAVER DAM HAS CREATED A PRISTINE VEGETATED WETLAND FEATURING A VARIETY OF AQUATIC GRASSES AND WETLAND SHRUBS THAT LINE THE PERIMETER.

3. THE MESIC FOREST PORTION OF ZONE 3 CONTAINS NORTHERN-FACING SLOPES THAT EXTEND OUT TO THE SURROUNDING RESIDENTIAL COMMUNITIES.

4. URBAN INFLUENCES HAVE INCISED BANKS OF THE CREEK, RESULTING IN POOR ROOT STRUCTURE FOR OVERARCHING TREES NEXT TO THE CREEK.

ZONE 4

CHARACTERISTICS

Zone 4 is comprised mostly of a floodplain with small sections of mesic forest along its edges. Within the mesic areas there are examples of native specimen trees which compose most of the upper story. The understory consists of a few rare native species such as Rusty Blackhaw and American Ginseng.

There is a small Seepage Wetland area, which is home to an abundance of native plant species that thrive in wet conditions. Surrounding the wetland are a variety of tree and plant species that are only found in this portion of the site.

Two smaller open areas in Zone 4 are mostly shrub-filled. One area mostly contains of low growing native plant species such as Winterberry and Buttonbush. The other clearing is a classic example of a beaver-dammed wetland which extends into the neighboring property, and is dominated by aquatic perennials, grasses, and open water.

Comprising the rest of the area is forested floodplains that cover the upper reaches of Henderson Mill Creek and surrounding tributaries. In the lower areas the trees are younger and the stream follows a more braided pattern. As you travel to higher ground the trees become larger and more diverse including native species that one can find throughout the remaining forested floodplain areas.

The composition of Zone 4 is unique from all the other areas on site. There are a more diverse distribution of plant species as well as ecological habitats that would provide a interactive experiential area for students and locals to enjoy the native features that this site has to offer.

1. NATIVE PLANT SPECIES THAT PREFER WET CONDITIONS FLOURISH IN THIS SMALL SEEPAGE WETLAND.

2. STORMWATER RUNOFF FROM SURROUNDING NEIGHBORHOODS IS CONVEYED THROUGH AN UNDERGROUND PIPING SYSTEM, WHICH INCREASES WATER TEMPERATURE AND THE AMOUNT OF POLLUTANTS IN THE

3. THE DRIED UP NORTH FORK OF THE MIDDLE BRANCH OF HENDERSON CREEK IS POPULATED BY A MIX OF CANOPY TREES INCLUDING GREEN ASH AND AN OCCASIONAL AMERICAN ELM.

4. A MOTHER DUCK NAVIGATES HER DUCKLINGS THROUGH THE OPEN WATERS OF THE BEAVER-DAMMED WETLAND.

ZONE 5

CHARACTERISTICS

The nature trails which pass through the forested area east of campus bisect the heart of an Oak Pine Hickory forest in Zone 5. A ridge line extends due east from Mercer Lane and continues in that direction all the way to Mercer University Drive. The land to the south of this ridge line comprises the majority of the Oak Pine Hickory forest in this zone. This forest contains some wonderful large White Oak, Tulip Trees, Red and Mockernut Hickory,

The appearance of certain plants show indications that this forest may have a mafic substrate. A strong canopy of White Oak is one sign. Other indicator species found in this zone are Alternate Leaf Dogwood, Redbud, Chalkbark Maple, Dwarf Hackberry, Rusty Possumhaw Viburnum, Carolina Buckthorn and Carolina Milkvine

To the west of University Circle, adjacent to Flowers Road, the trail crosses University Circle and crosses over acreek. Though it has many of the characteristics of the Oak Pine Hickory forest, this area also has many mesic qualities. They are a few large specimen Beech in this segment and the stream is lined with Netted Chain Fern and other wet-loving species such as Virginia Sweetspire.

With already pre-existing trails, this area would provide a great educational experience for students or visitors to the campus to learn about forest structure. The ability to easily escape campus and stroll through the woods would be a desired amenity for many students and faculty.

1. THE FOREST COMPOSITION IN THE NORTHERN EDGE OF THIS ZONE TRANSITIONS TO A MESIC FOREST.

2. SEVERAL INDICATOR SPECIES SUCH AS ALTERNATE-LEAF-DOG-WOOD REVEAL THAT THE SOILS HAVE A HIGHER PH AND THE UNDERLYING ROCK MAY BE SOAPSTONE OR AMPHIBOLITE.

3. THIS FOREST SITS ON A RIDGELINE WHICH LIMITS THE CANO-PY TREE TO SPECIES ADAPTED TO DRYER CONDITIONS IN THE THIN SOILS.

4. A SMALL CREEK RUNS THROUGH THIS WESTERN SEGMENT. THE BANKS WERE RICH WITH FERNS SUCH AS THIS PATCH OF NETTED CHAIN FERN.

05. OPPORTUNITIES & SUMMARY

Reconnaissance and study to date highlight the presence of a pristine and, at points, an imperiled and impacted environment on the campus.

The sheer size, diversity, and location of the land, streams, and wetlands afford a unique opportunity for preservation, restoration, and education.

But perhaps more importantly is the opportunity to develop and codify a definitive process for such reclamations within the larger Piedmont Region. While today much of this information resides in disparate locations, the construction of a complete restoration and long-term land management program is lacking.

As we continue to explore how functioning urban ecologies enhance our overall quality of life, the development of clear, knowledge-based methodologies and results will be invaluable. Should Mercer University desire to pursue this opportunity the program could be developed as "The Mercer Method," utilizing the site as a living laboratory and providing needed guidance and impetus to others within the watershed and region to systematically restore a fully functioning urban riparian-based ecology.

At a micro level, this connected green infrastructure would enhance neighborhoods and communities throughout its reach, while at a significantly larger scale addressing and positively impacting water quality and water-based resources at a state and regional level.


NATURE