state botanical garden of georgia

2012 master plan update

The State Botanical Garden of Georgia

THE UNIVERSITY OF GEORGIA COLLEGE OF ENVIRONMENT + DESIGN

C E+D

landscape architecture
historic preservation
env. planning + design
environmental ethics

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Wilf Nicholls	Director
Shirley Berry	Assistant Director
Jim Affolter	Director of Research
Jeannette Coplin	Director of Horticulture
Anne Shenk	Director of Education
Andrea Parris	Director of Development
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Heather Alley	Research Staff
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Billie Gotsch	International Garden Curator
Shelly Prescott	Flower Garden Curator
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Melanie Parker	Greenhouse Manager
Shene Stroud	Rental Even Coordinator

The Garden is accomplishing it's mission on a daily basis in every season of the year. This success has been possible because of the very dedicated staff, volunteers, and many donors and supporters, and ongoing support from the University of Georgia.

charrette participants

Betsy Ellison
Flossie Dodge
Sylvia Gibson
Caroline Gilham
Ben Liverman
Marianne McConn
Lara Mathes
Carol Nourse
Hugh Nourse
Dave Phlegar
Shelly Prescott
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Mike Sikes
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Eileen Small
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faculty and students

Alfie Vick
Jon Calabria
Pratt Cassity
Dan Nadenicek
Lisa Biddle
Deepali Pavnaskar
Ashley Stinson

board of advisors

Many thanks to all of the Board of Advisors for their generous support and guidance

executive summary

The last master plan for the State Botanical Garden of Georgia (SBGG) was completed in 1990. In the intervening 22 years since that time, the SBGG has undergone tremendous growth and transformation. New buildings have been constructed, including: the Cecil B Day Chapel, the Garden Club of Georgia Headquarters and the new Horticulture Complex. New cultivated gardens have been established, including: the International Garden, Heritage Garden and Flower Garden. The natural areas have received increasing levels of attention and stewardship, including: designation as an Important Bird Area (IBA), significant privet eradication efforts, and donation of the Ivy wetland.

Along with these physical changes, the SBGG has developed outstanding educational and recreational programs that have contributed to the local and regional appeal of the Garden to both the general public and professionals. Additionally, new leadership at the Director position has reinvigorated the SBGG at a time when creativity and entrepreneurship is more critical than ever in the face of limited funding from the State of Georgia.

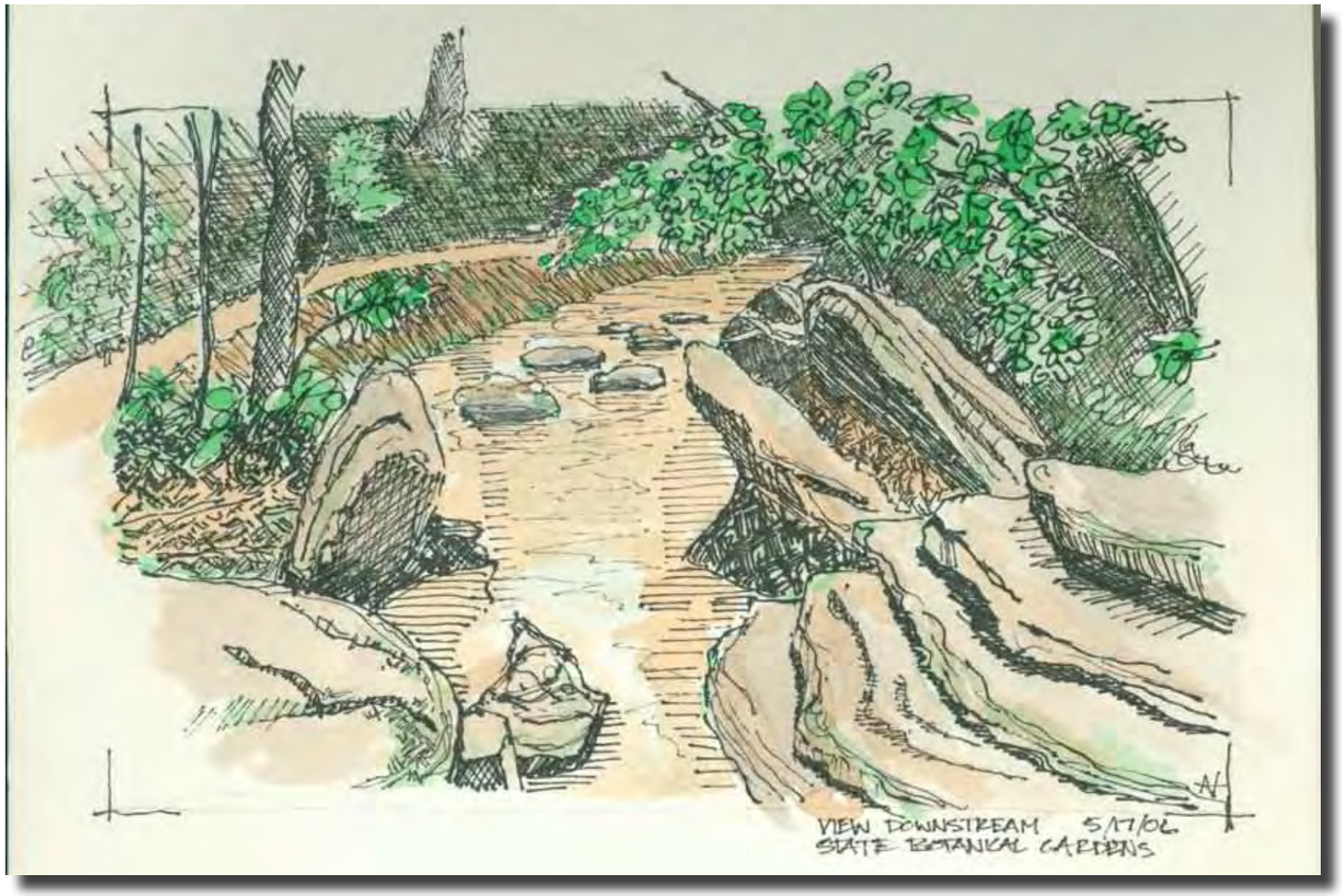
The time for an assessment of existing resources of the SBGG and a plan for the next decade of growth and stewardship is now. Our team at the College of Environment & Design has been honored and excited to produce this master plan. This document will establish a snapshot of the SBGG as it exists now, assess needs and opportunities for improving current amenities and visitor experience, and plan for the inclusion of anticipated new gardens and structures.

forward

This master plan update seeks to enhance to functionality and sustainability of the SBGG facilities and site and to plan for the introduction of new facilities and collections. The goals of the master plan were established through a comprehensive inventory and analysis of the existing conditions, combined with input from SBGG staff and charrette participants. The master plan project team conducted interviews with the SBGG staff and garden curators throughout the fall of 2011, and the plan was completed in October of 2012. Primary goals of the master plan are:

1. Plan in accordance with the SBGG mission
2. Enhance the sustainability of existing collections
3. Protect the SBGG natural areas
4. Plan for significant new buildings and gardens
5. Enhance the visitor experience and wayfinding
6. Accommodate larger numbers of visitors
7. Encourage more diverse modes of transportation to the SBGG

This report is organized into four sections, plus appendices. The Introduction & History section presents background context about the project and the master plan process. The Inventory & Analysis section presents the comprehensive environmental and cultural inventory that was completed by landscape architecture graduate students. The Master Plan section presents recommendations for the physical evolution of the SBGG over the next ten years. These recommendations are summarized in simple diagrams and given more specific direction through illustrative renderings and descriptions. Finally, the Management Plan section presents a framework for protecting and restoring the natural areas of the SBGG property.



ECOLOGY
GARDENS
BUILDINGS
ADMINISTRATION

1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989

Botanical Garden is proposed by the Campus Planning and Improvement Committee (CPIC)

Dean Hubert and three students from SED conduct a landscape design analysis of the proposed site

Formal approval of the site for the garden

Three miles of trails were laid out, cleared, and opened for public use

Board of Regents formally designate the land for perpetual use as a botanical garden

Professor William Berry hired to prepare Master Plan

Dr. Francis E. Johnstone named director

GCG plant collections and Elizabeth Bradley Turner Memorial Rose Garden dedicated

Dedication of the Callaway Building

Administration moved from the Provost's Office to the Office of the Vice President for Services

Environmental Planning and Design of Pittsburgh hired to review the Master Plan

Propagation greenhouse completed

Dr. J. H. Tinga named acting director

Preliminary plans and model for a combined visitor center and conservatory

Dr. Samuel B. Jones, Jr. takes over as director

Plans for International Garden formulated, prepared by Margaret Koepke of the School of Environmental Design

Name changed to The State Botanical Garden of Georgia

Board of advisors created

Visitor Center/ Conservatory dedicated; entry plaza and fountain constructed

Major renovation to the shade garden

Botanical Garden Faculty Committee is charged with developing a proposal

Advisory committee of non-University persons formed

Presentation of topographical model and written analysis to Botanical Garden Committee; aided in selecting areas to develop and laying out trails and roads

Formal approval of a budget for The University of Georgia Botanical Garden

Advisory committee forms Friends of the Garden

Master Plan complete

Ground broken for the Callaway Building

Trails and road shifted to new entrance

Botanical Garden contributions: 13 species and cultivars of American holly, collection of rhododendron cultivars, collection of azaleas and a dahlia garden. Construction of a greenhouse in the maintenance area

Dr. Frank B. Golley named acting director

Dr. Michael A. Dirr named director

All-American display garden incorporated into annual/ perennial garden; art in the garden program initiated; wildflower garden developed

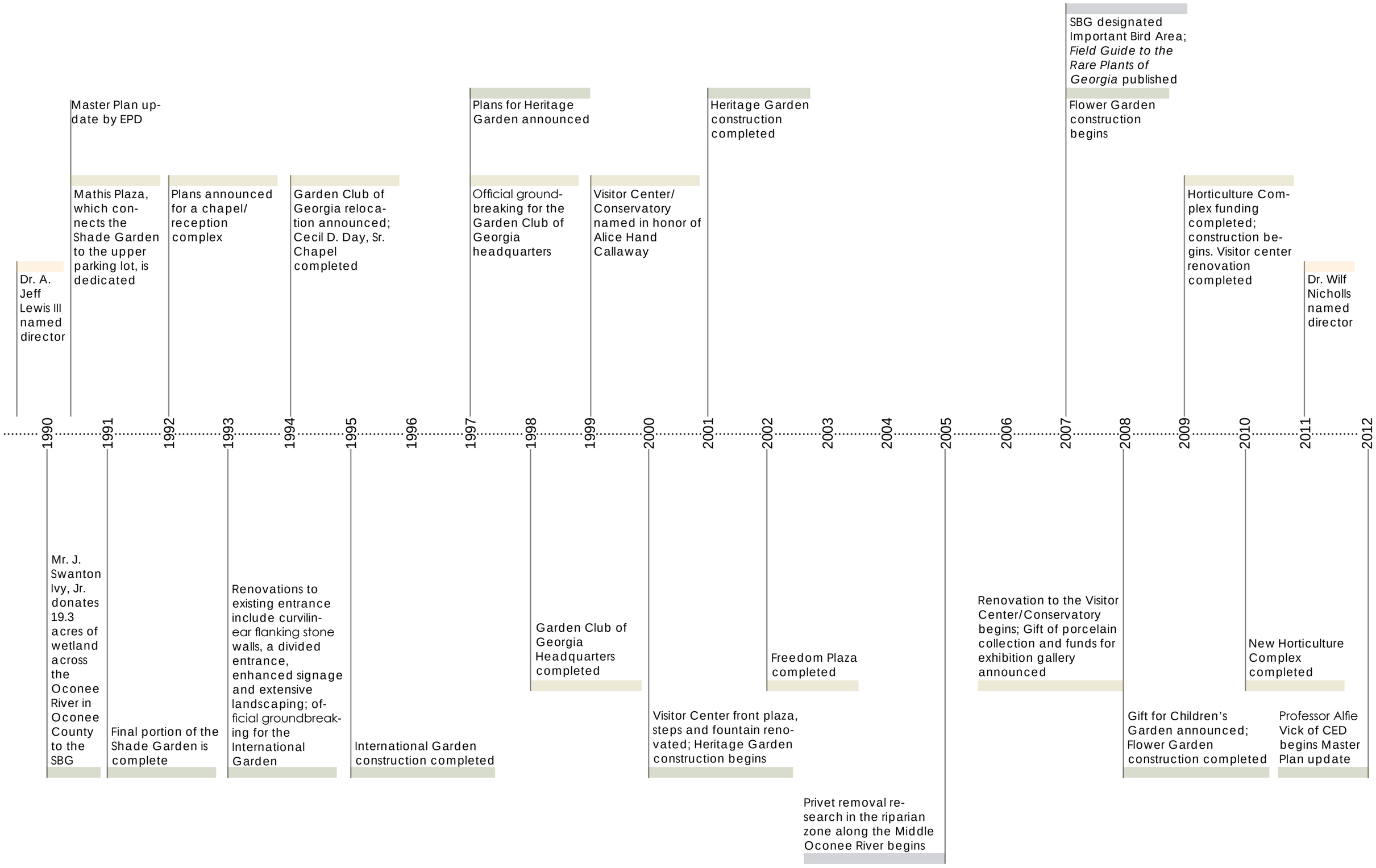
Ground broken for Visitory Center/ Conservatory

Dr. Michael A. Dirr named acting director

Dr. Roy A. Mecklenburg named director

Establishment of the Fred C. Galle Native Azalea Garden

Deer fence established around 80 acres of the garden


1990
Dr. A. Jeff Lewis III named director
1991
Master Plan update by EPD
Mathis Plaza, which connects the Shade Garden to the upper parking lot, is dedicated
1992
Plans announced for a chapel/ reception complex
1993
1994
Garden Club of Georgia relocation announced; Cecil D. Day, Sr. Chapel completed
1995
1996
1997
Plans for Heritage Garden announced
1998
Official groundbreaking for the Garden Club of Georgia headquarters
1999
Visitor Center/ Conservatory named in honor of Alice Hand Callaway
2000
2001
Heritage Garden construction completed
2002
2003
2004
2005
2006
2007
SBG designated Important Bird Area; Field Guide to the Rare Plants of Georgia published
Flower Garden construction begins
2008
2009
Horticulture Complex funding completed; construction begins. Visitor center renovation completed
2010
2011
Dr. Wilf Nicholls named director
2012
1990
Mr. J. Swanton Ivy, Jr. donates 19.3 acres of wetland across the Oconee River in Oconee County to the SBG
1991
Final portion of the Shade Garden is complete
1992
1993
Renovations to existing entrance include curvilinear flanking stone walls, a divided entrance, enhanced signage and extensive landscaping; official groundbreaking for the International Garden
1994
1995
International Garden construction completed
1996
1997
1998
1999
2000
Garden Club of Georgia Headquarters completed
2001
Visitor Center front plaza, steps and fountain renovated; Heritage Garden construction begins
2002
2003
Freedom Plaza completed
2004
Privet removal research in the riparian zone along the Middle Oconee River begins
2005
2006
Renovation to the Visitor Center/Conservatory begins; Gift of porcelain collection and funds for exhibition gallery announced
2007
2008
Gift for Children's Garden announced; Flower Garden construction completed
2009
2010
New Horticulture Complex completed
2011
Professor Alfie Vick of CED begins Master Plan update
2012

community design

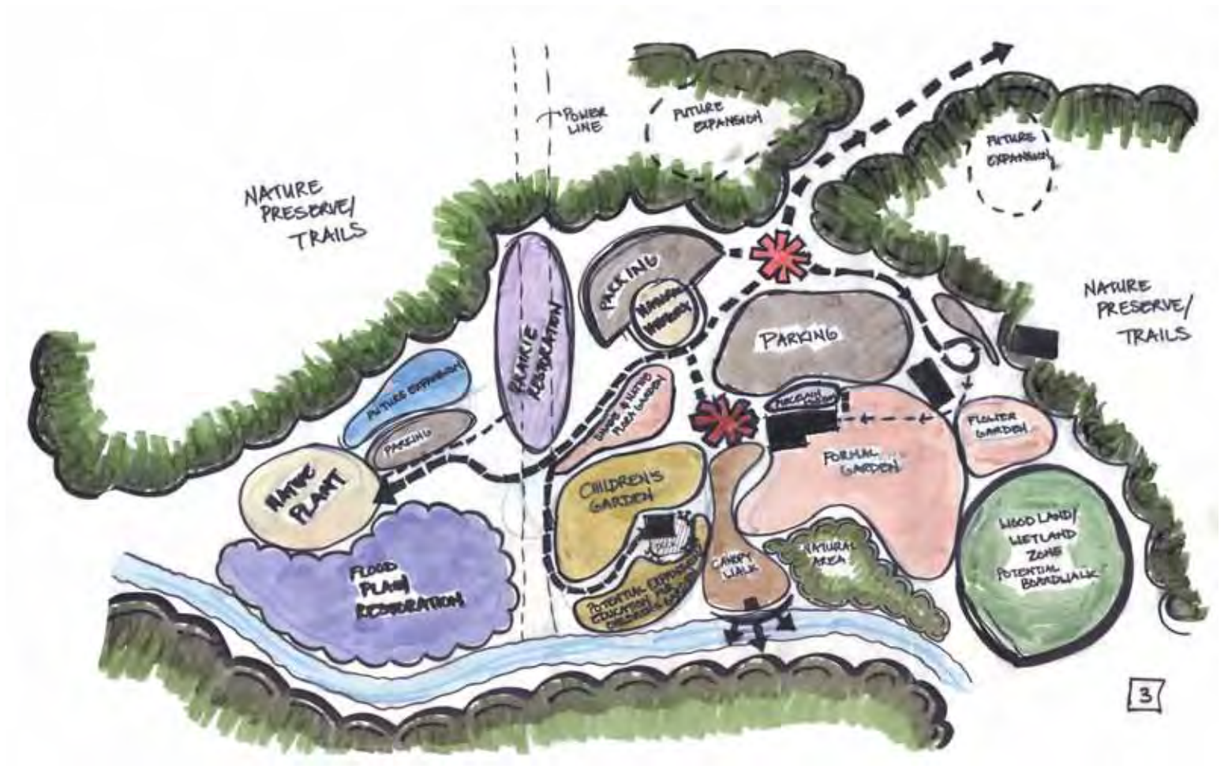


Figure 2. Master plan concept diagram from the Fall 2011 charrette.

In the early years of the State Botanical Garden of Georgia (SBGG) the UGA School of Environment and Design (SED) was closely involved in the study, placement, and design of the institution. Faculty and graduate students were commissioned to work on projects that ranged from preliminary studies and plans to promotional brochures and landscape design analysis – all under the direction of Dean Hubert B. Owens. Professor William Beery from SED was hired to prepare a master plan for the garden, and students aided Professor Beery on detailed conceptual plans for the Garden Club of Georgia district plant collections (currently the shade garden at the SBG).

The SBG is entering into its 44th year under the leadership of a new director, Dr. Wilf Nicholls, and is once again enjoying this kind of relationship with the College of Environment and Design (CED). Dean Daniel Nadenicek and Dr. Nicholls are working together to create opportunities for students and faculty to learn through the State Botanical Garden. Professor Alfie Vick is the faculty member directing the largest of these projects – a new master plan for the SBG. Two graduate students are aiding Professor Vick in this year-long endeavor to produce the final master plan document. Contributing faculty are Professor Jon Calabria and Pratt Cassity of the CED's Center for Community Design and Preservation.

In the Fall 2011 semester, two major projects were completed that will be used in the creation of the final master plan. First, graduate students in Professors Vick and Calabria's LAND 6030: Nature and Sustainability Studio used Geographic Information System (GIS) technology to create an inventory of the SBG grounds and composite suitability analyses that will be used to guide the future development, conservation, and restoration of the garden property.

A community design charrette followed the inventory and analysis and was conducted by Pratt Cassity. Participants included the students from the design studio, students from the MEPD and BLA programs, CED faculty, staff from the Office of the University Architects, staff at the Garden, members of the Board of Advisors, and Friends of the Garden members. The charrette created an opportunity for students to work closely with stakeholders that had a strong interest in the development and future of the SBGG. The combination of these groups of people brought to light many new opportunities for the garden that had not been considered by the class while working individually in a studio environment.

Figures 3 - 7. Charrette participants collaborate to generate a vision for the future of the State Botanical Garden of Georgia

While the tangible products of the studio and the charrette are obvious - a comprehensive environmental inventory, composite analyses, various visions for a conceptual master plan for the SBGG - the intangible benefits are those reaped by the students. Relationships with institutions such as the State Botanical Garden afford students opportunities that they can't get in a classroom - the opportunity to work on real projects and interact with stakeholders, to design with groups of people with different ideas and opinions, to propose ideas to people who aren't giving them a grade, and to have a voice that reaches beyond the walls of a studio.

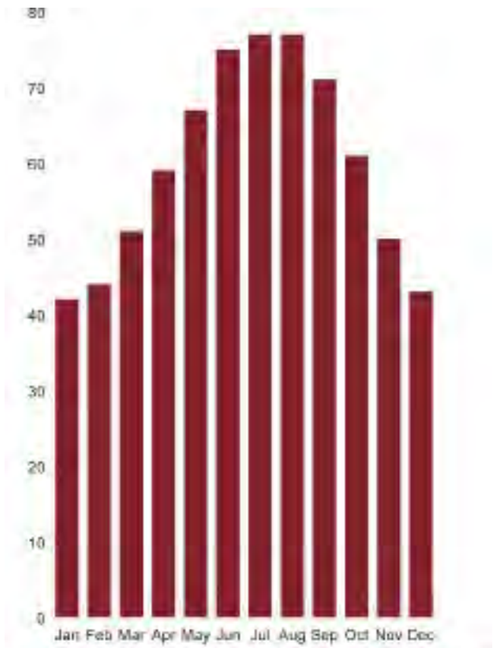
inventory & analysis

In the Fall semester of 2011, the graduate landscape architecture studio taught by CED assistant professor Jon Calabria and associate professor Alfie Vick conducted a site inventory of the State Botanical Garden of Georgia.

The inventory is focused on the environmental and built characteristics of the SBGG and is surrounding context. Data was collected from existing maps, on-site investigation, and aerial photographs / satellite imagery. The data was spatially analyzed using Geographic Information Systems (GIS), specifically using the software package ArcMap 10, and the maps that follow were produced. Digital versions of these maps, along with all the GIS shapefiles are archived at the CED and at the SBGG.

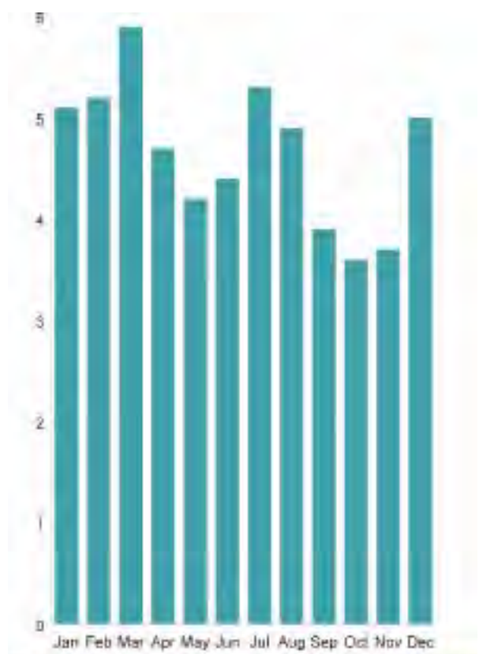
The inventory maps serve as a basis for sound planning and decision-making for the master plan. They reveal the underlying environmental characteristics and context of the SBGG landscape, including the soil, vegetation and hydrology of the site. They also present a snapshot in time record of the built environment of the SBGG as it existed in 2011; the buildings, roads, sidewalks and more that are found on site.

Most of the inventory maps are produced at one of two drawings scales, either a site scale (e.g., Soils Inventory) or a landscape context scale (e.g., Transportation Context Inventory), although there are a couple exceptions (e.g., Watershed Basins HUC 10 Inventory). The SBGG property boundary shown on these inventory maps is the one that was provided by the Office of University Architects at the time the inventory was done, the fall of 2011. On page 34-35 of this document, an updated property boundary is presented with justification for the changes.



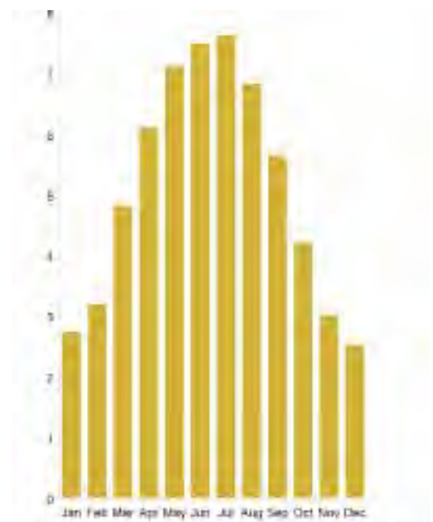
Monthly Average Temperatures in Degrees Fahrenheit 1895-1993

Georgia State Climate Office, Driftmier Engineering Center, University of Georgia



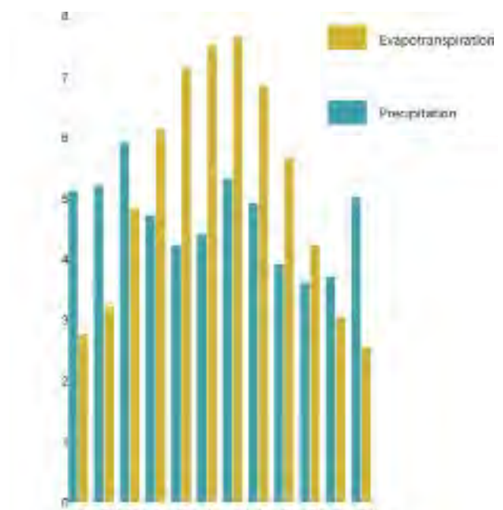
Monthly Average Precipitation in Inches (1895-1993)

Georgia State Climate Office, Driftmier Engineering Center, University of Georgia



Monthly Average Evapotranspiration in Inches

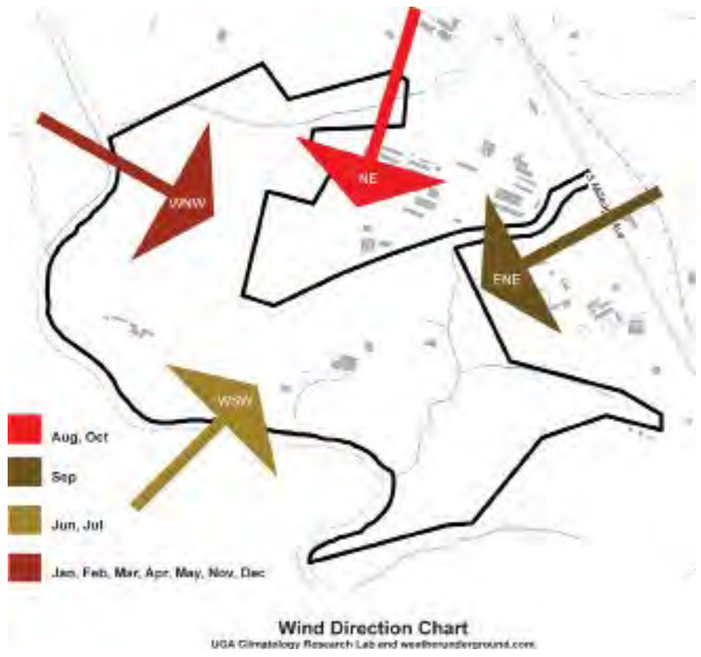
NOAA Technical Report NWS 34



Precipitation versus Evapotranspiration in Inches

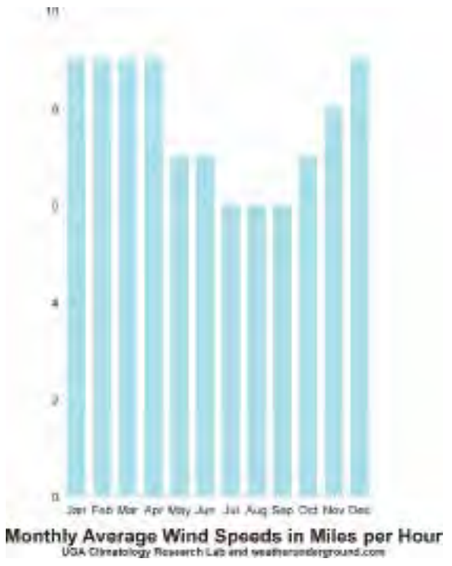
al Report NWS 34 and Georgia State Climate Office, Driftmier Engineering Center, University of

USDA Plant Hardiness Zone Map 2012



Wind Direction Chart

UGA Climatology Research Lab and weatherunderground.com



Monthly Average Wind Speeds in Miles per Hour

UGA Climatology Research Lab and weatherunderground.com

CLIMATE

Climate plays an important role in both the growth and health of plants and the comfort of visitors. Understanding climate on site is crucial to planning and maintaining the collections as well as accommodating users.

Climate on site is characterized by warm, humid summers and wet, cold winters. Average temperatures range from a high of about 90 degrees in the summer to a low of about 33 degrees in the winter. Each year sees around 51 days per year with a temperature of 90 degrees or higher and 50 days per year with a minimum temperature that falls below freezing. During winter months, trace amounts of snow are likely. The site has historically been classified into the USDA's Hardiness Zone 7b, however the latest revision puts the SBGG in Zone 8a with an annual minimum temperature range of 10 to 15 degrees Fahrenheit (garnered from temperature data taken in 1976 through 2005). Average temperatures projected over 60 years by University of Georgia's Climate Lab through the Geology department shows a trend of increasing temperatures. The last frost date (32 degrees) generally falls in the spring between March 30th and April 5th, and first frost date (32 degrees) typically falls between October 30th and November 5th.

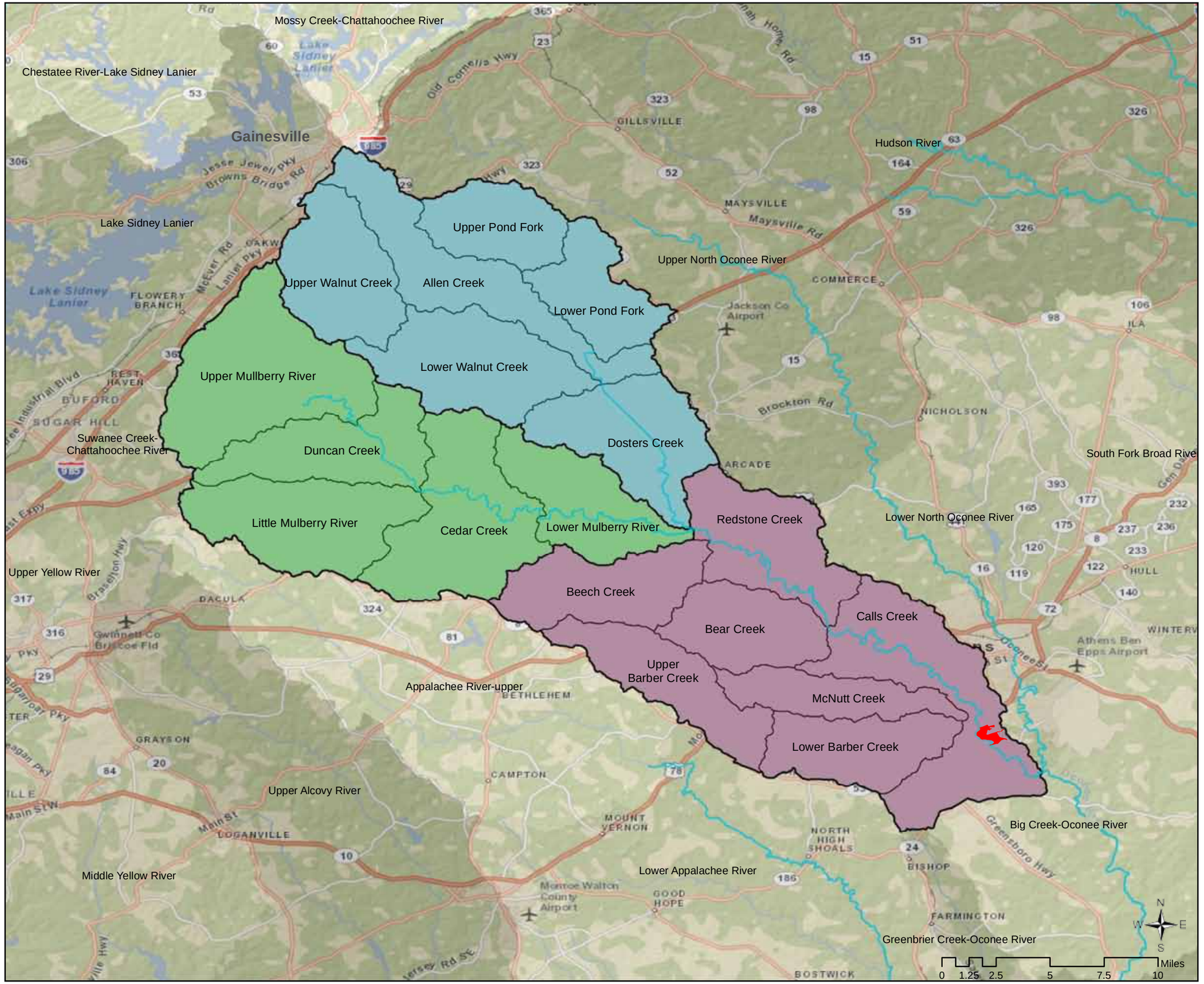
Large rain events are typical to the site, which can experience one-year events with an intensity rate of 5.19 inches per hour during a five-minute period and one hundred year events with an intensity rate of 9.18 inches per hour during a five-minute period. Around 50 inches of precipitation is expected in the region annually. Most months receive on average over 3.5 inches of precipitation while January, February and March receive over 4.5 inches of precipitation. However, drought conditions are extremely likely in the state of Georgia and projected to occur more frequently. On site wind speeds range from 6 to 9 miles per hour with winds predominately from the northwest. Vegetation, slope aspect, and proximity to the Oconee River contribute to microclimates on site. Over the next several decades, climate change is likely to affect the SBGG and will need to be monitored closely.

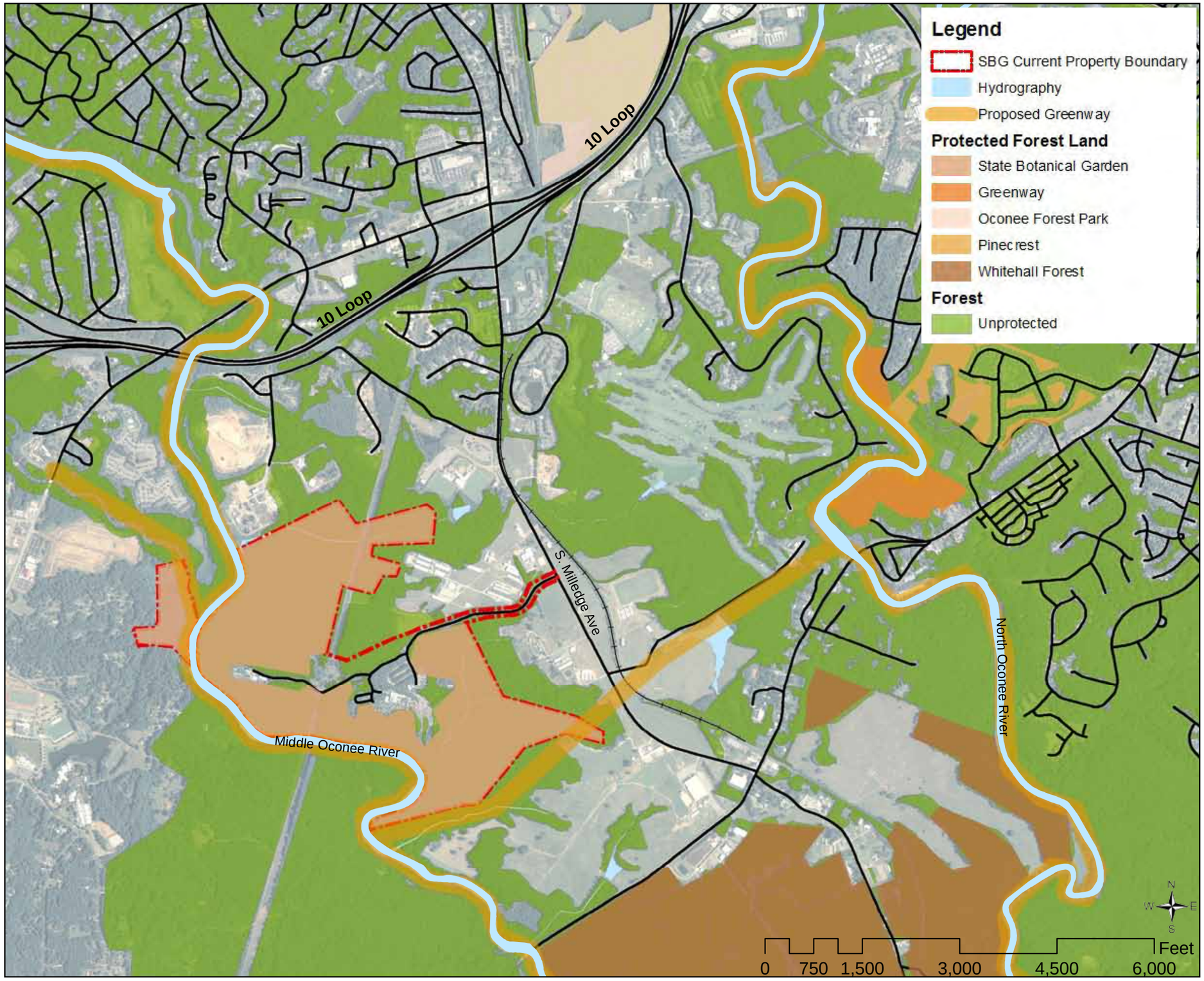
WATERSHED BASINS
HUC10

The Middle Oconee River runs through the State Botanical Garden of Georgia (SBGG), forming the western boundary of the property. It is the main feature of the Oconee River Basin, with headwaters approximately 60 miles north of Athens in Hall County.

South of SBGG, the Middle Oconee joins the North Oconee to form the Oconee River proper, which then flows south past two impoundments before its confluence with the Ocmulgee to form the Altamaha River. The basin drains a total of 5,330 square miles and stretches over 220 miles through the state of Georgia, where it flows into the Atlantic Ocean.

The river system is home to a large variety of aquatic life, including some federally and state-protected species. The Altamaha Shiner and the Robust Redhorse are two examples of state protected species.





GREEN INFRASTRUCTURE

The 313-acre State Botanical Garden of Georgia (SBGG) is located in Clarke County, approximately four miles from downtown Athens and the University of Georgia. Approximately 87% of the site is natural forested landcover, in various stages of maturity. The natural landcover is a functional and important green infrastructure. The EPA defines green infrastructure as, "Green infrastructure uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water."(EPA, 2012) http://water.epa.gov/infrastructure/greeninfrastructure/gi_what.cfm

These important ecosystem services benefit the community in environmental, economic and social functions.
One example in particular is the role that SBGG plays for wildlife. In 2007, the National Audubon Society designated the garden as an Important Bird Area (IBA). The program "recognizes that coupled with global warming, habitat loss and fragmentation are the most serious threats facing populations of birds across America and around the world. By working to identify and implement conservation strategies at Important Bird Areas, we hope to minimize the effects that habitat loss and degradation have on birds and other biodiversity" (http://web4.audubon.org/bird/iba/). There are many species of land birds, such as warblers, vireos, and thrushes, which use the garden for breeding, winter habitat, and as spring and fall migration corridors. Many of these species are of high conservation priority in Georgia.

While the land cover condition of SBGG itself is critical to providing habitat, its landscape ecology context contributes significantly to its ecological value. The SBGG functions as a protected (not likely to be developed) habitat patch within a network of regional habitat. Other significant protected patches include the Whitehall Forest, the Oconee Forest Park, Pinecrest conservation easement (Athens Land Trust), and an Athens-Clarke County Greenway parcel. Protected habitat corridors consist primarily of the required buffers along the surrounding rivers and streams, as well as the land acquired for the planned greenway. There is currently a large amount of unprotected habitat around SBGG, much of it belonging to UGA. Efforts to preserve this habitat will benefit SBGG.

TRANSPORTATION CONTEXT

The South Milledge Corridor and SBGG are currently underserved by transportation options. At this time the only safe and feasible way to access SBGG is by personal automobile. This is an unsustainable situation and must be remedied in order to increase visitorship and community value while minimizing the need for additional parking.

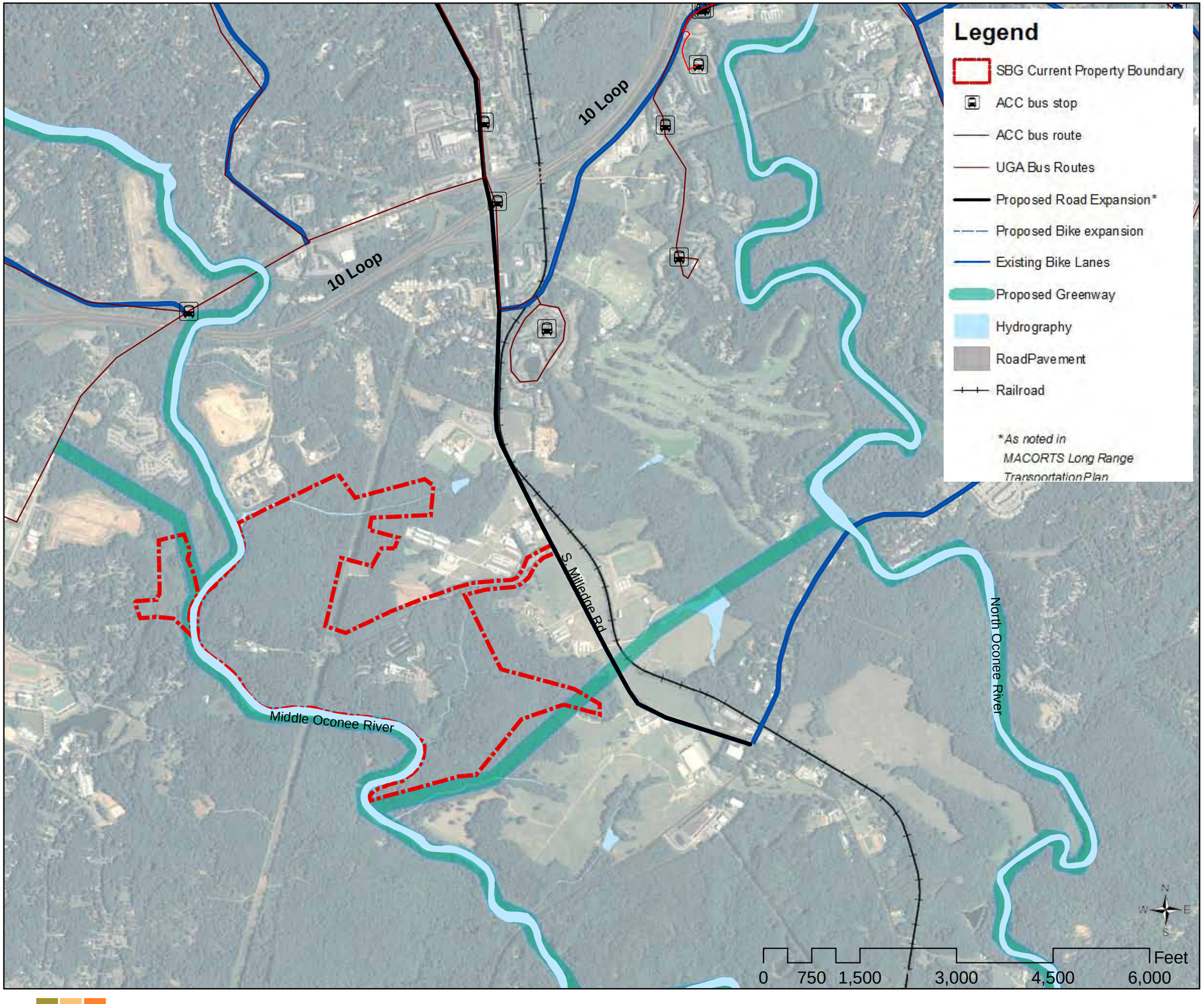
Currently, A-CC bus routes, UGA bus routes, and on-street bike lanes stop at the UGA Golf Course approximately one mile north of the SBGG main entrance. Sidewalks do not exist south of the 10 Loop. In other words, bus, bicycle and pedestrian access to SBGG is currently unavailable.
Some planned/proposed improvements will help to rectify this situation:

- The MACORTS Long Range Transportation Plan proposes widening South Milledge to include turn lanes and on-street bike lanes. Estimated completion: 2030.

- The Oconee Rivers Greenway is planned to extend south along the Middle Oconee River, providing access to the west side of SBGG. An east-west connector is planned along the south side of SBGG, connecting the Middle Oconee River route with the North Oconee River route. Estimated completion: unknown.

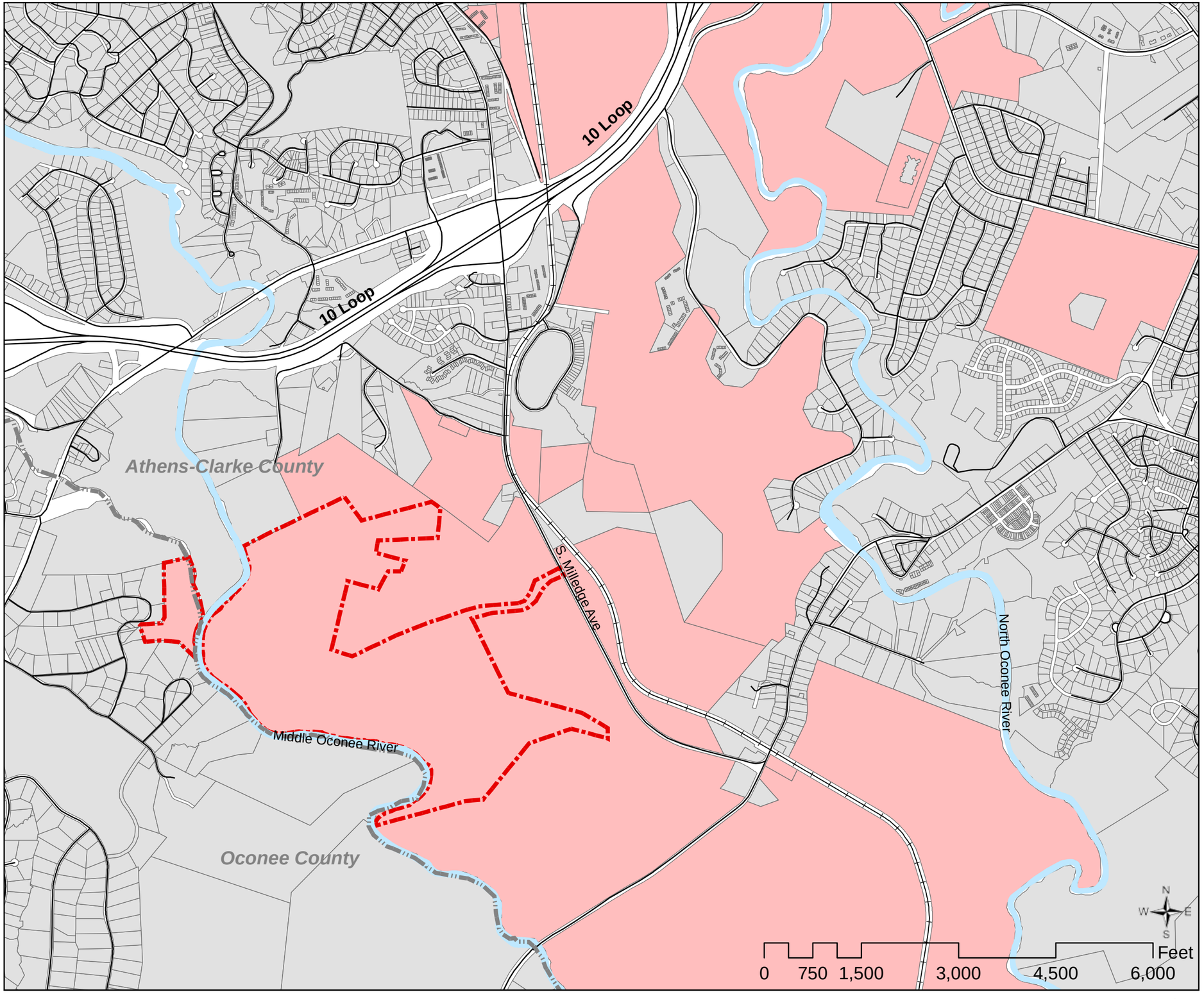
- UGA Campus Transit has expressed a willingness to serve South Milledge. Leverage exists from multiple users, including: SBGG, new intramural and other athletic facilities, UGArden, Horticulture Department facilities. Estimated completion: 5 years.

- Another opportunity is the unused rail corridor that parallels South Milledge. This rail connects to campus and downtown, and proposals exist to convert it to light rail. Estimated completion: unkown.



PARCEL OWNERSHIP

The SBGG is surrounded by UGA property on the south, east and most of the north boundaries. The remainder of the northern property boundary is adjacent to the Athens-Clarke County Middle Oconee Water Reclamation Facility. The Middle Oconee River comprises the western boundary of SBGG, with private property in Oconee County on the other side of the river. The Ivy Wetland is a part of SBGG, and lies on the west side of the Middle Oconee in Oconee County. It is currently not accessible to the public.



Legend

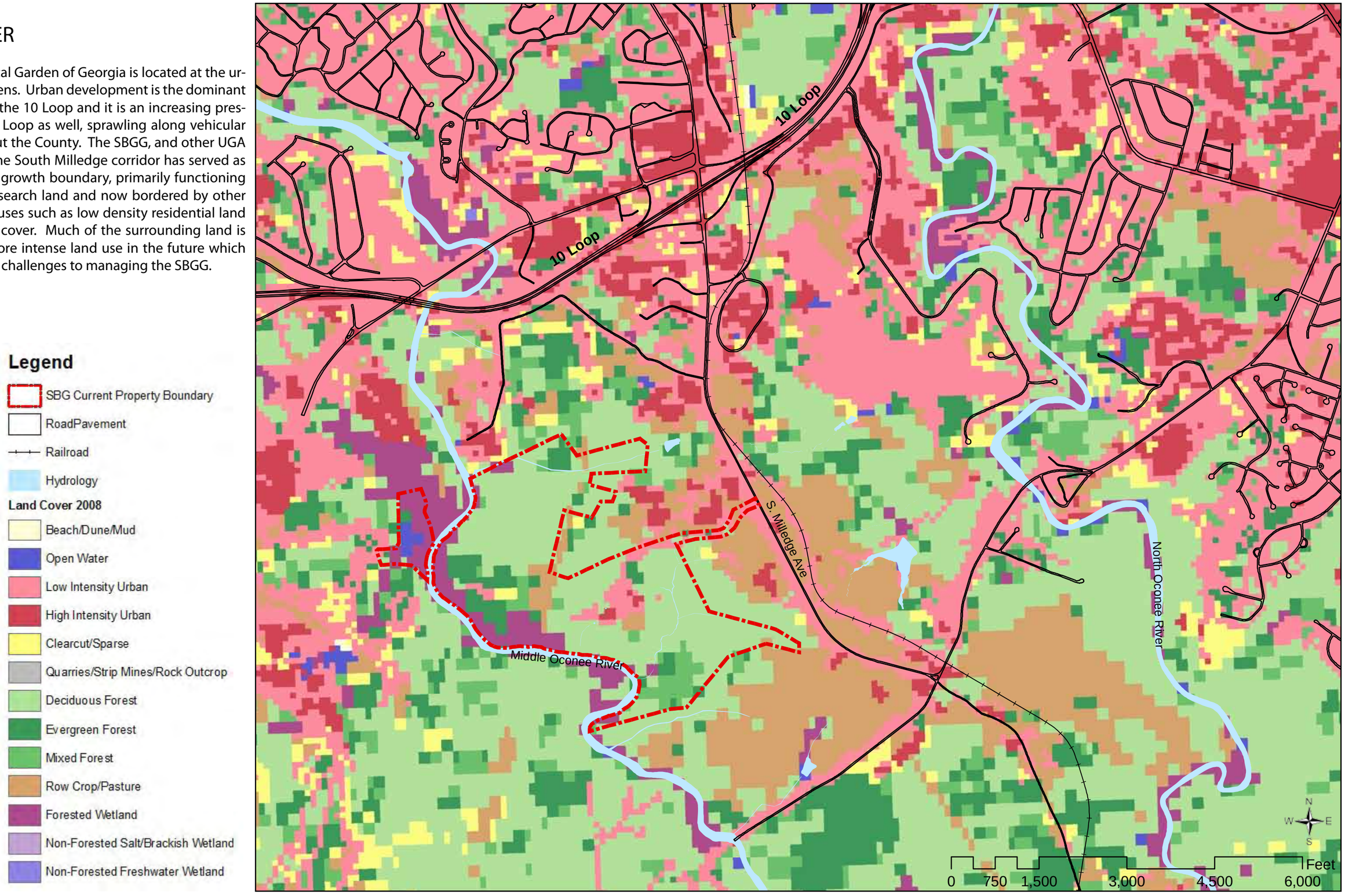
- SBG Property Boundary
- Roads
- Railroads

Parcel Ownership

- Privately or Publically Owned, not B.O.R.
- University of Georgia, Board of Regents

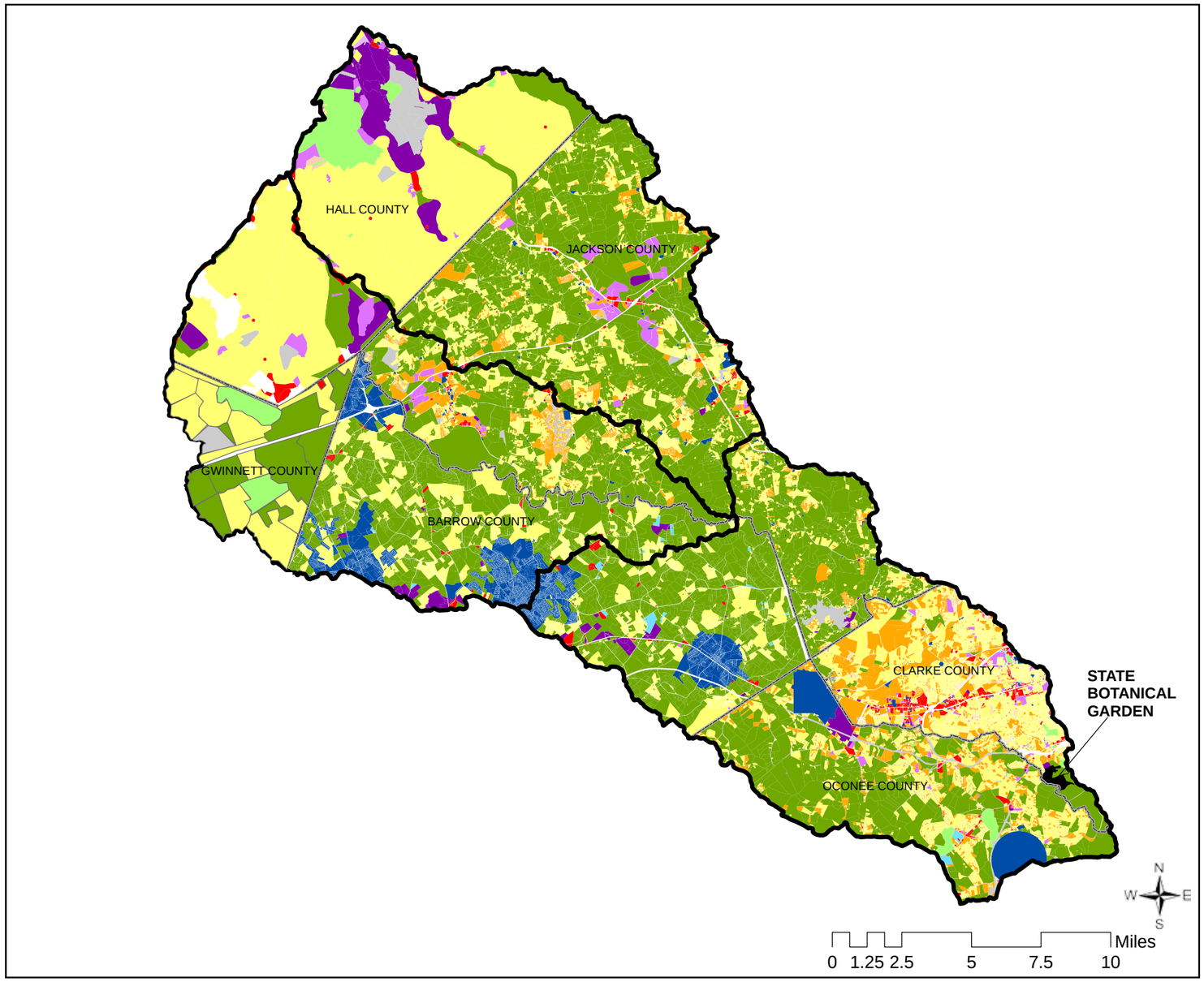
LAND COVER

The State Botanical Garden of Georgia is located at the urban fringe of Athens. Urban development is the dominant landcover inside the 10 Loop and it is an increasing presence outside the Loop as well, sprawling along vehicular routes throughout the County. The SBGG, and other UGA property along the South Milledge corridor has served as a de facto urban growth boundary, primarily functioning as agricultural research land and now bordered by other "greenbelt" land uses such as low density residential land and natural land cover. Much of the surrounding land is susceptible to more intense land use in the future which would bring new challenges to managing the SBGG.



LAND USE WITHIN WATERSHED

The Middle Oconee watershed extends from Whitehall Forest (just south of the SBGG) up into Hall County including a portion of Gainesville, GA. The watershed comprises portions of six counties: Clarke, Oconee, Barrow, Jackson, Gwinnett and Hall. Most of the land use within the watershed is agricultural, although it is punctuated by the cities of: Athens, Watkinsville, Bogart, Winder, Statham Braselton and Gainesville. These urbanized areas contain a large proportion of impervious surfaces, which alter and degrade surface water resources if left unmitigated. Hall County in particular shows a dominance of low-density land-use throughout the county, although the distinction between this land use and the adjacent agricultural use is probably exaggerated simply due to classification preferences of the different county governments. An excellent description of the Upper Oconee River Basin can be found at: http://www.gaepd.org/Files_PDF/plans/oconee/chapt-2.pdf



Legend

- HUC10 Watersheds
- Counties

Land Use Description

- Agriculture
- City
- Commercial
- Government
- Industrial
- Park/Recreation/Conservation
- Public/Institutional
- Residential
- Transportation/Communication/Utility
- Unclassififed
- Undeveloped/Unused

HISTORIC RESOURCES

The Regents of the University System of Georgia purchased the property where the current the State Botanical Garden of Georgia (SBGG) is housed in July of 1936 from the Georgia Rural Rehabilitation Corporation (GRRC). Initially, the land was used by the Agronomy department at the University of Georgia (UGA) for research and development and was later used by the Forestry and Horticulture departments for research and practice areas. In 1968, The UGA Horticulture department introduced the idea of a 'living library' - giving birth of the SBGG. The property was set out within the larger parcel as a place for plant research and as a location for land conservation practices at UGA. The property has many cultural and historic remnants of past land uses throughout the landscape.

Historic land use maps were generated from aerial photography taken by the United States Department of Agriculture's (USDA) Agricultural Stabilization and Conservation Service (ASCS) using GIS software. The photographs are all in black and white making it difficult to determine specific land uses limiting categorization to general categories including agricultural, forested, developed, utilities, rivers, and other.

Extensive research exists on how and when the State Botanical Garden formed and was began but there is little information available concerning the use of the land predating 1968 and almost no information exists for the landscape pre-1936. What are the stories of the people who lived here? What is the history of the educational and research based operations of the university on the land before the formation of the State Botanical Garden? These questions could be answered and the garden could engage its visitors on the cultural heritage and research use of the site. Georgia's unique human history on the land can be used in order to educate visitors on the historic context by which the garden exists through historic interpretation and access to these various locations to create a more dynamic experience for visitors to the SBGG.

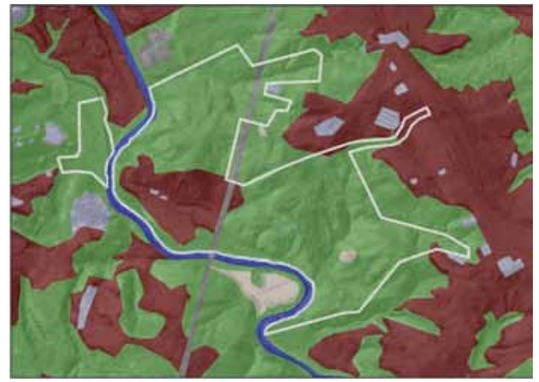
1938 Land Use - ASCS Aerials

1944 Land Use - ASCS Aerials

1951 Land Use - ASCS Aerials

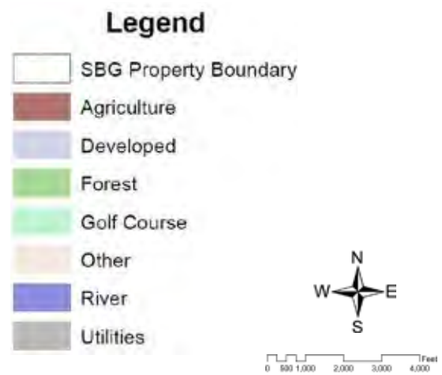
1955 Land Use - ASCS Aerials

1960 Land Use - ASCS Aerials

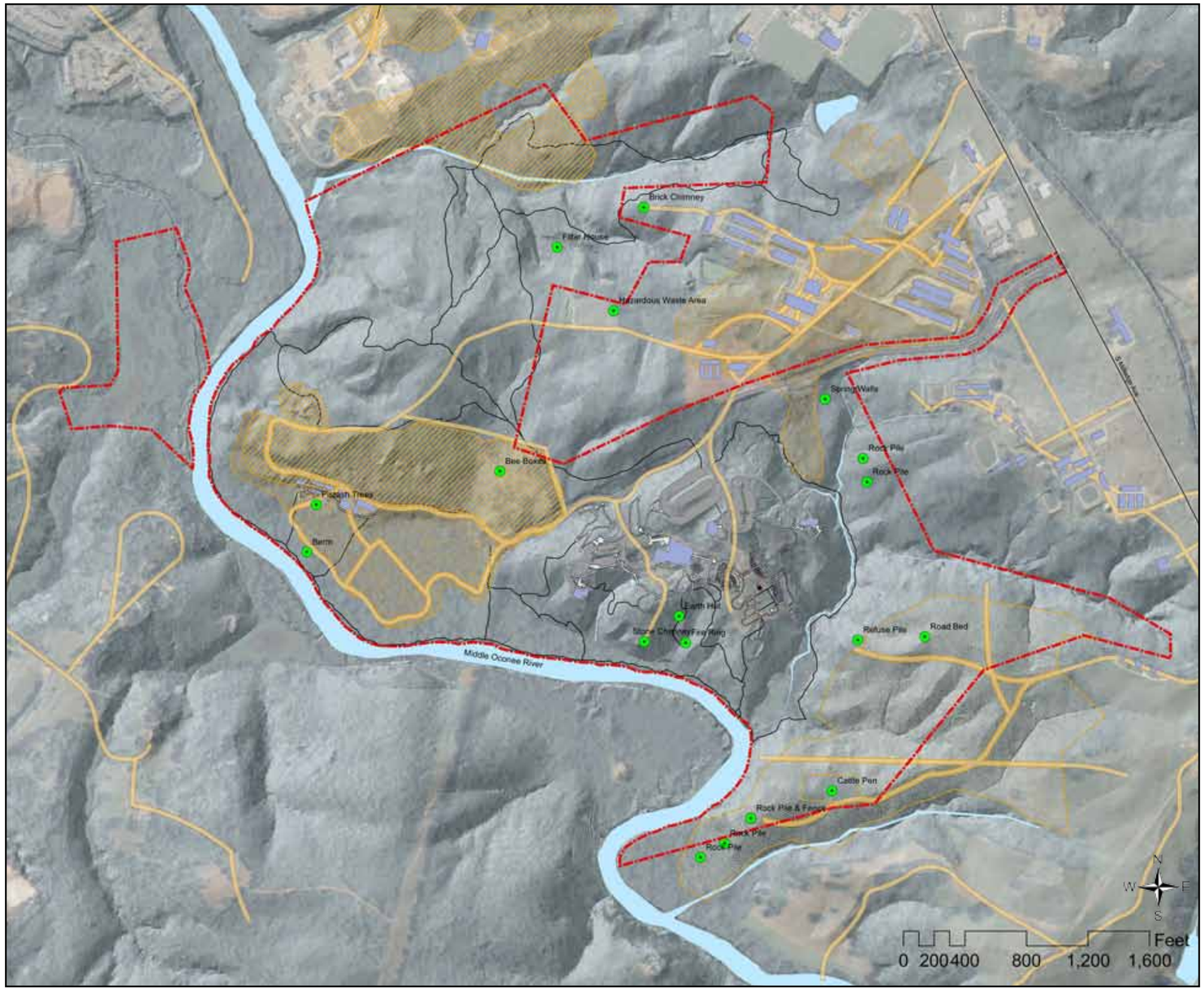


1967 Land Use - ASCS Aerials

1973 Land Use - ASCS Aerials



CULTURAL RESOURCES



The locations of points and areas of cultural significance that remain on the property in 2011 have been GPS located and digitized using Geographic Information System (GIS) software. Many of these points have been photo documented and most have no historical interpretation. Some approximate dating was determined by appearance of items in the aerial photographs. Descriptions and photos of the cultural resources identified on this map can be found in Appendix A.

These cultural resources can provide a story that is similar to many places throughout the state of Georgia and used as an educational tool held within the landscape. Protecting, restoring and preserving these resources would create a more dynamic experience for visitors. Individual and groups of visitors will have the opportunity to learn about the history of Georgia's evolving landscape and the ecological changes that occur through the cultural human intervention on the landscape over time. These cultural elements may not have great significance in a specific event or person but they can help visitors understand the historical context in which that landscape has evolved through Georgia's history.

Legend

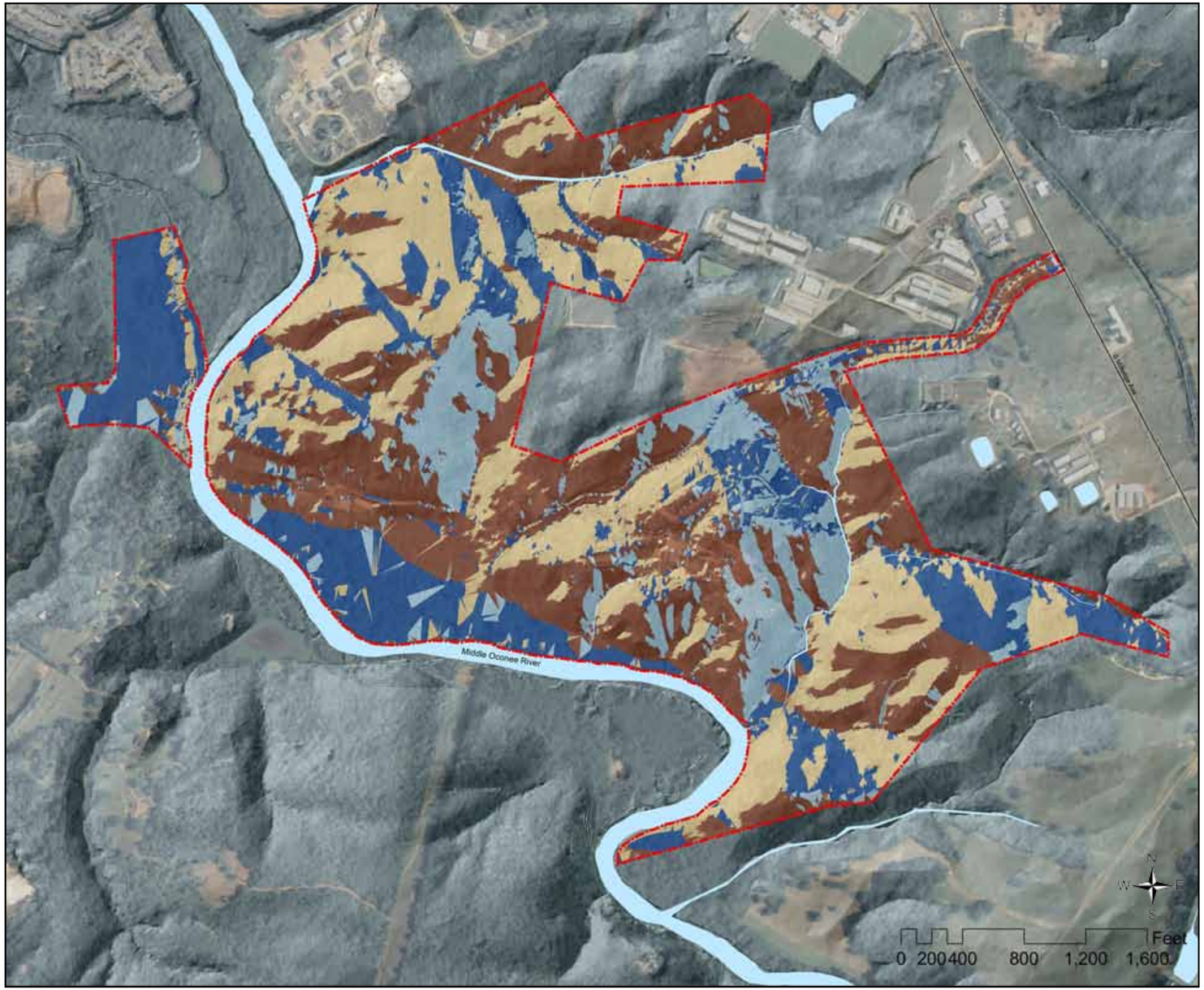
- SBG Property Boundary
- Cultural Resource Points
- Historic Roads (1938-1973)
- Current Roads
- Current UGA Buildings
- Current Trails

Extent of Previous Agricultural Land (1938-1973)

- Agricultural
- Flat Agricultural
- Terraced Agricultural

SOLAR ASPECT

Generally, the SBGG site slopes south and west toward the Middle Oconee River. Variations in aspect can be found throughout the site due to its diverse topography and the ridges and valleys created by the streams flowing through the property. The variety of slope aspect creates varied microclimates, which can help in allowing for a diverse display of plant species. North facing slopes may be associated with cooler and moister conditions and more diverse groundlayer vegetation. South facing slopes may be hotter and drier, although when considered in combination with other characteristics they may make ideal locations for siting buildings in order to maximize passive solar potential.



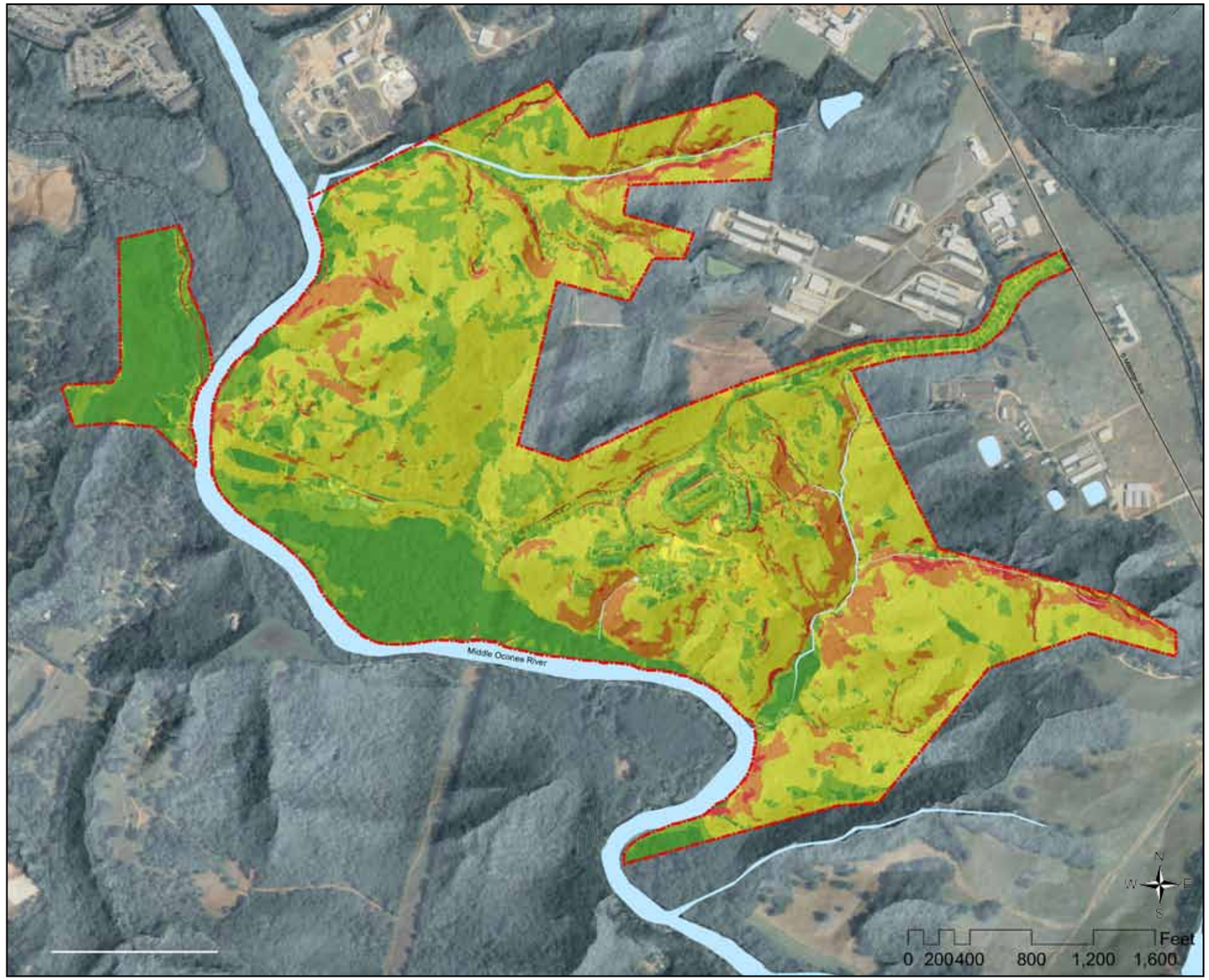
Legend

- SBG Property Boundary
- Hydrography

Solar Aspect

- Cool (North)
- Cool Morning Sun (East)
- Hot (South)
- Warm Afternoon Sun (West)

SLOPE



The State Botanical Garden in Clarke County, Georgia is located northeast of the Middle Oconee River. The site is made up of varied terrains that range from zero to greater than 25% slopes. More than 50% of the property falls into the 25% slope or greater range. The steepest slopes associated with the major streams on the property, North Creek and South Creek, as well the bluffs that are found along the Middle Oconee River. The flattest parts of the property are found adjacent to the Middle Oconee River in the floodplain as well as the developed areas of the site.

This site has elevations that range from 536 feet to 703 feet. Its highest point at 703 feet is located at the southeast end of the property. There are also two secondary high points of 682 feet located at the center and north end of the property. The lowest portions of the site are between 536 and 556 feet and are located on the southwest end of the site along the Middle Oconee River. This area is also associated with the Middle Oconee River's flood plain.

Legend

- SBG Property Boundary
- Hydrography

Slope Inventory

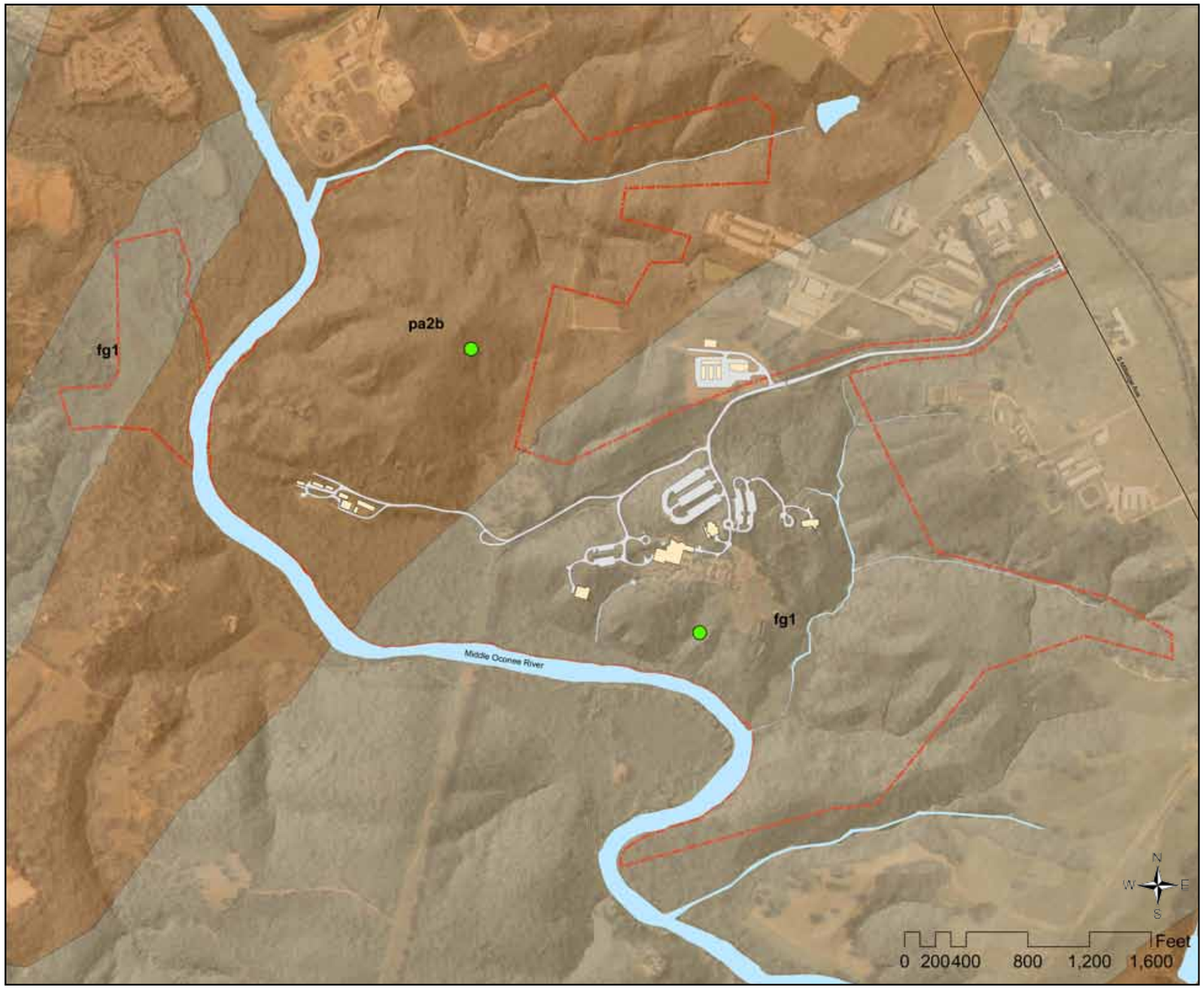
- 0 - 2%
- 2 - 6%
- 6 - 15%
- 15 - 25%
- 25+%

GEOLOGY

The State Botanical Garden of Georgia (SBGG) spans two different geologic groups as defined by the United States Geologic Survey. The northern half of the property sits on pa2b geology, or a sillimanite schist/gneiss/amphibolite. This geology mostly influences development of fairly well drained soil profiles made of sandy silts and clays. The deep soil profiles influence the formation of undulating rounded hilltops with steep side slopes. The southern half of the SBG is on fg1 geology, or a biotite gneiss/feldspathic biotite gneiss. Gneiss residual soils contain sandy silts or sandy clays and have a plastic subsoil in humid climates. Profiles run from five to ten feet deep. Gneiss regions typically have a high level of visual diversity.

Although the geology is important to the soil structure and analyzing the topographic features of the site, it should not greatly affect construction in any way as the soils are stable, and the bedrock strong.

Inventory data was made available through the Georgia GIS Clearinghouse. A detailed description of the geology of the SBGG can be found in the "Natural Environments of the State Botanical Garden of Georgia" (Wharton, 1998).



Legend

SBG Property Boundary

Hydrography

USGS Geologic Group Code

fg1: biotite gneiss/feldspathic biotite gneiss

pa2b: sillimanite shist/gneiss/amphibolite

amphibolite surface rocks

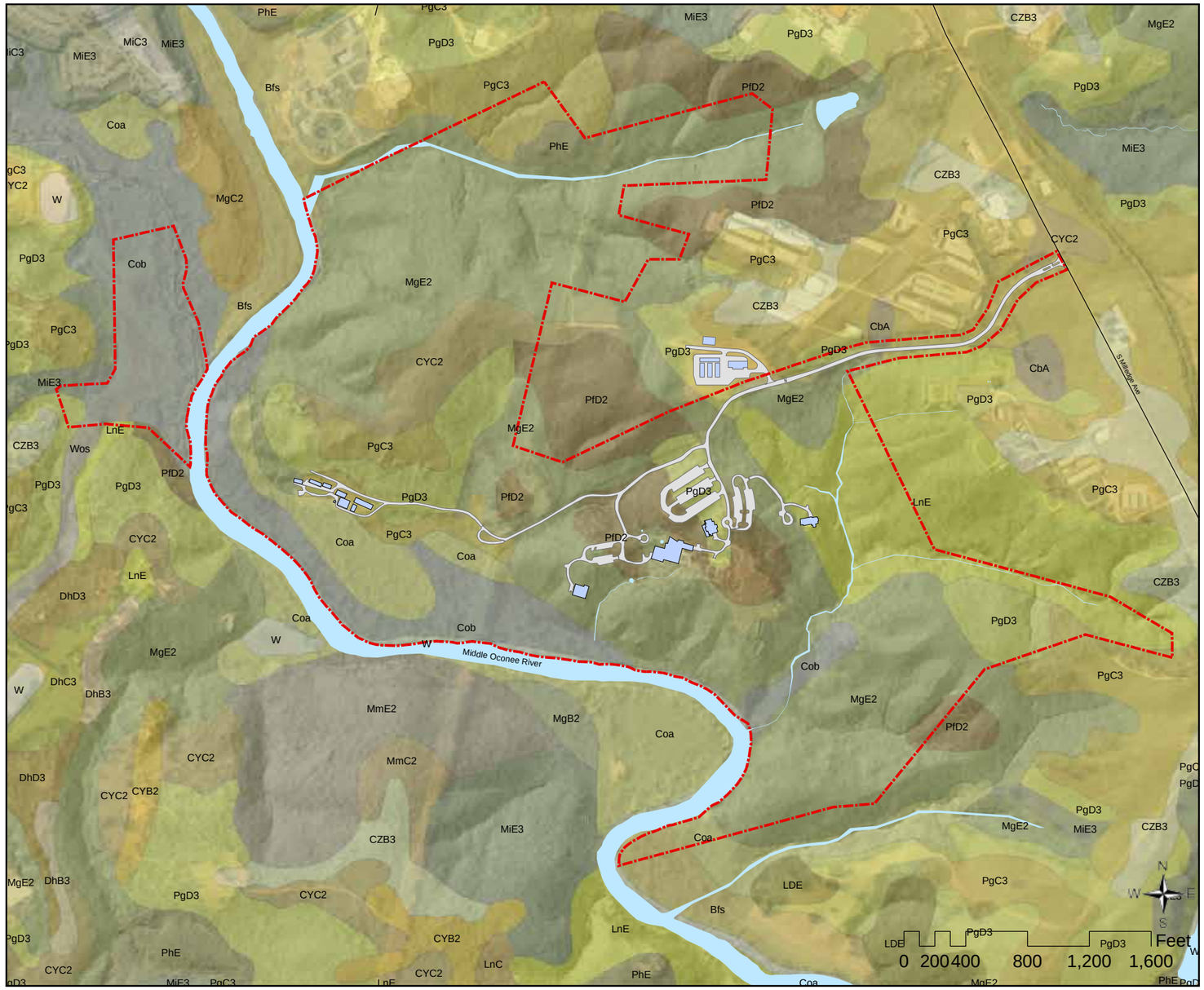
SOILS

Soils at the SBGG (excluding the Ivy Wetland) are predominantly Madison sandy loam (49.6%) and Pacolet sandy clay loam (22.4%); also, Louisburg loamy sand (9.1%), Chewacla soils and alluvial land (8.1%), Congaree soils and alluvial land (4.8%), and Cecil sandy loam (4.0%); with the presence of Pacolet gullied land (0/7%), Buncombe loamy sand (0.4%), Cecil soils overwash (0.1%); and the remainder surface water (0.8%).

The Ivy Wetland is nearly entirely Chewacla soils and alluvial land (92.0%); also present is Pacolet sandy clay loam (3.5%), Madison sandy clay loam (2.0%), Pacolet sandy loam (0.8%), Wehadkee and alluvial land (0.8%), Louisburg loamy sand (0.6%), and surface water (0.3%).

Wharton reports that analysis of the soils at the SBGG indicate higher levels of fertility than would typically be found in the Piedmont, despite the history of agriculture and erosion.

Excerpted soil reports are included in Appendix C.



Legend

Soil Unit Code

- SBG Property Boundary
- Hydrography
- SBG Buildings
- Roads and Parking
- Bfs
- CYB2
- CYC2
- CZB3
- CbA
- Coa
- Cob
- DhB3
- DhC3
- DhD3
- LDE
- LnC
- LnE
- MgB2
- MgC2
- MgE2
- MiC3
- MiE3
- MmC2
- MmE2
- PfD2
- PgC3
- PgD3
- PhE
- W
- Wos

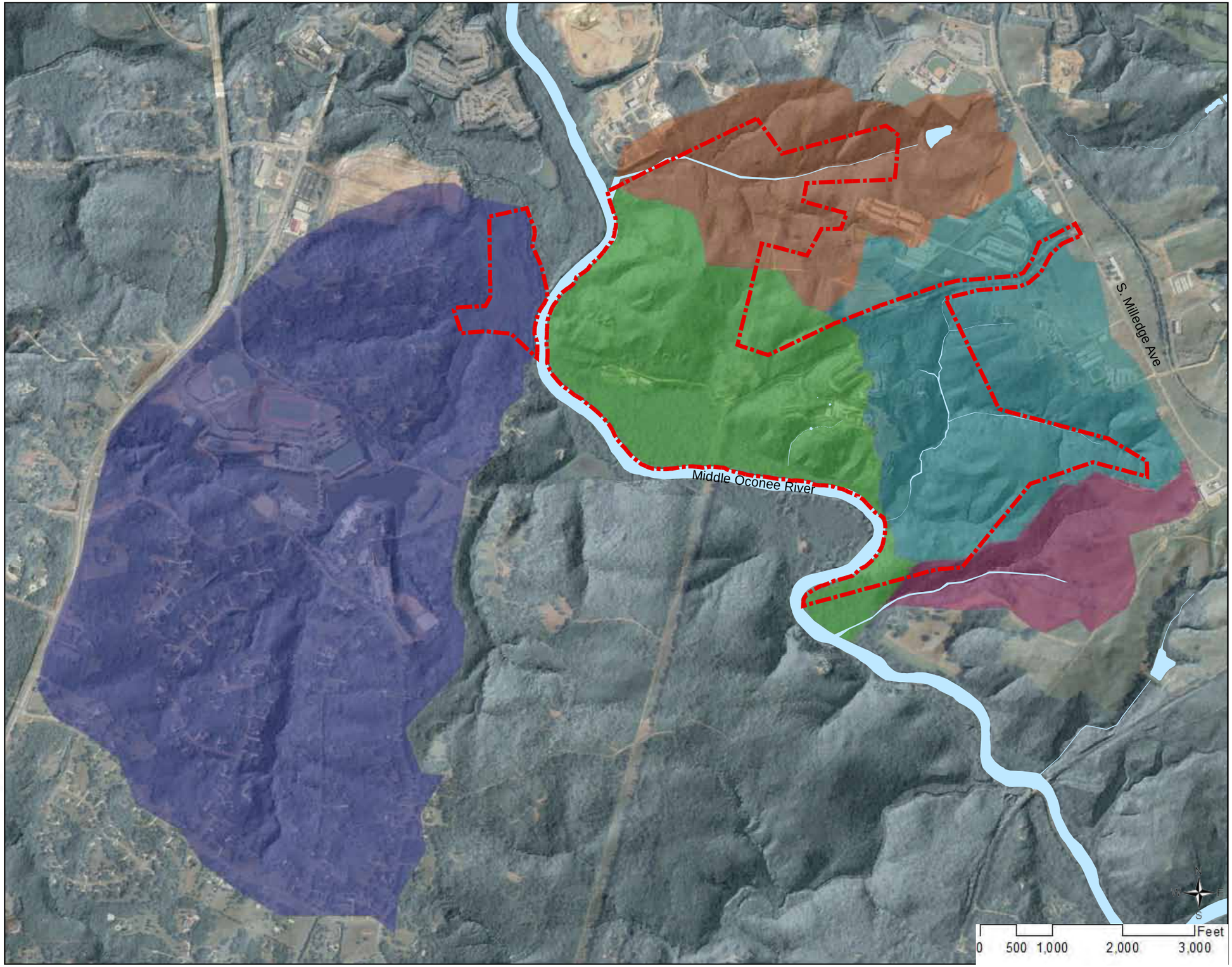
HYDROLOGY
SITE WATERSHED BASINS

There are four primary watersheds comprising the SBGG. South Creek, along the Orange Trail drains the eastern portion of the property, including the Main Entrance Drive, the Flower Garden and most of the off-site development along South Milledge Avenue. This watershed receives runoff from these off-site areas which has been a problem in the past (when the swine farm lagoons were still extant) and could be again in the future (many new UGA green houses are planned within this watershed along South Milledge).

North Creek drains the northern portion of the property, and its major impacts include overflow from the retention pond serving the UGA softball field and the groundwater contamination located just outside the SBGG boundary (this contamination has been remediated and is monitored by the state EPD).

The third water shed within the main SBGG property lacks a perennial stream but drains to the Middle Oconee though several intermittent and ephemeral channels. Portions of the curated gardens, the Visitor Center and the CNPS all are within this watershed.

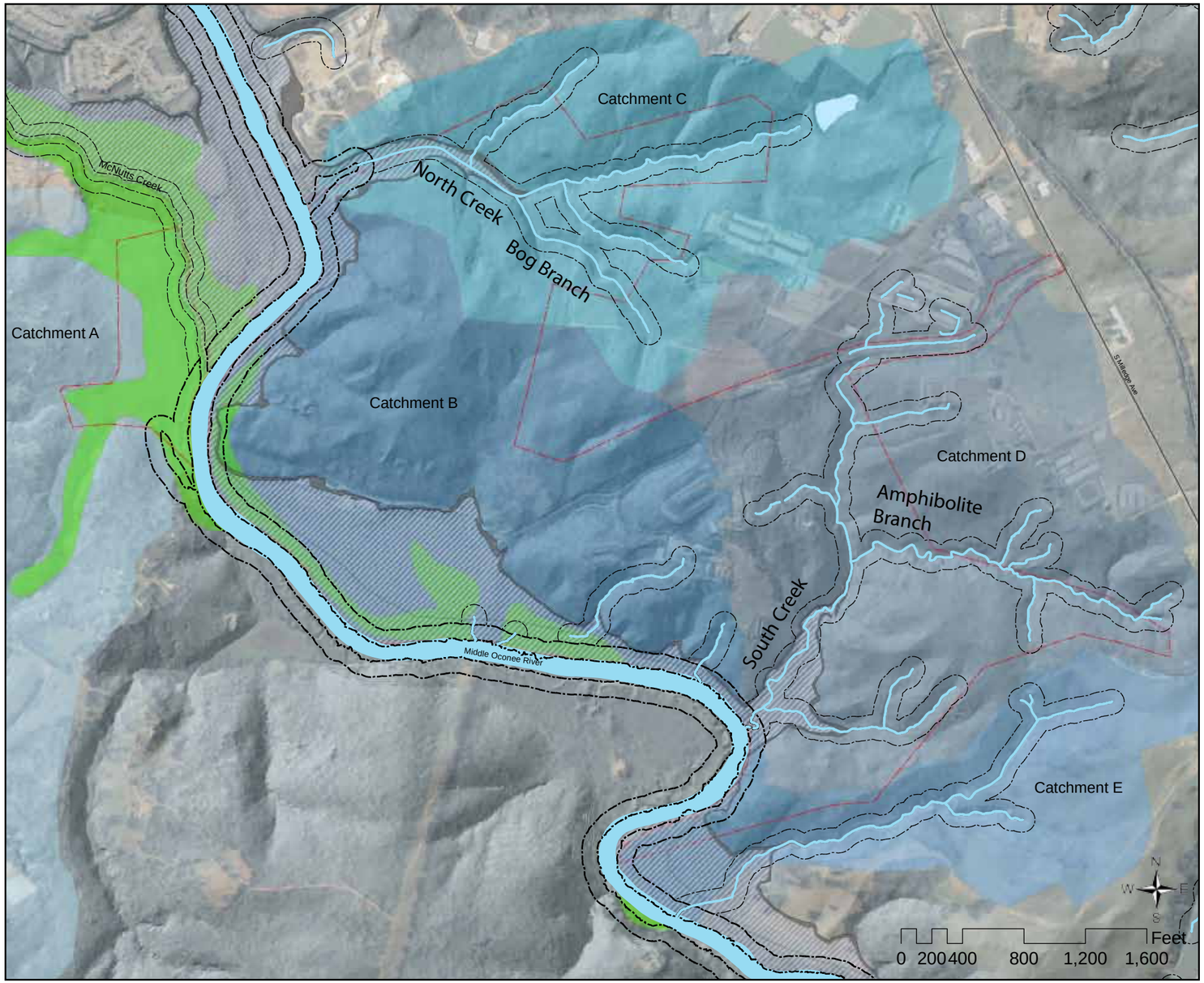
Across the river, the Ivy Wetland is at the bottom of a larger watershed draining residential and commercial land-use in Oconee County.



HYRDOLOGY
FLOODPLAINS AND BUFFERS

The surface water resources on the site are subject to local, state and federal regulatory protections. It must be noted that the inventory presented here is informational only, and does not represent the actual delineation of any regulatory protections, which must be verified by field-run survey and/or interpretation of the governing jurisdiction.

The State of Georgia requires a 25-foot undisturbed buffer on each side of perennial streams (measured from the top of bank) and other surface water bodies. Athens-Clarke County requires an additional 50-foot (total of 75-feet) buffer on each side. The Middle Oconee River is protected by a 100-foot buffer. Also shown on this map are the 100-year and 500-year floodplains, as determined by the Federal Emergency Management Agency (FEMA). The 100-year floodplain is subject to local and federal development restrictions. The National Wetlands Inventory indicates the presence of forested wetland on both sides of the Middle Oconee River. If verified, these wetlands would be subject to legal protections as well.



Legend

- SBG Property Boundary
- Streams
- Stream Buffer - 100ft
- Stream Buffer - 75ft
- Freshwater Forested/Shrub Wetland

Flood Plain

- 500 Year Flood Event
- 100 Year Flood Event

Site Catchment

- A
- B
- C
- D
- E

VEGETATION
PLANT COMMUNITIES

Vegetation on site is characterized predominately by hardwood and mixed hardwood forests, consisting of species of pine, oak, and hickory. An evaluation of the successional stages on the property revealed how previous land management practices have impacted the landscape. Pine forests are mainly confined to the western portions of the property, located by the old plant propagation greenhouses. Two unique plant communities were also discovered on the site. These included three wetlands and a heath bluff, which bear great potential for educating visitors to plant communities, which are not endemic to the Georgia Piedmont.

To classify existing vegetation, a Landsat Landcover layer was referenced along with aerial imagery from March 2003, in GIS. Using the landcover layer as a guide and the aerial as the base, existing vegetation was digitized into twelve distinct plant communities.

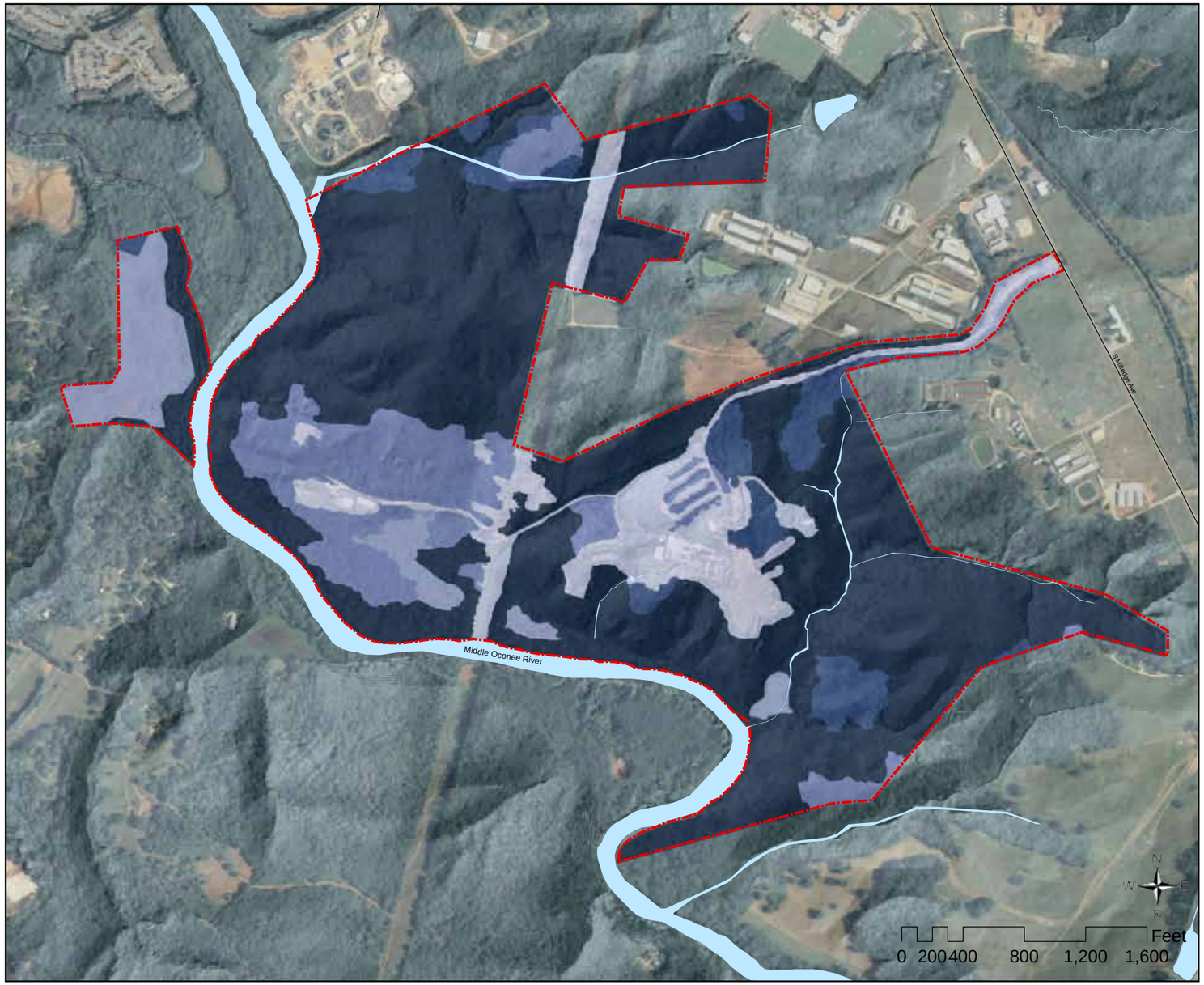
Descriptions of the plant communities found on site are located in Appendix B of this document.

Legend

- SBG Property Boundary
- Hydrography

Plant Communities

- Bottomland Hardwood
- Garden Areas
- Garden Areas Forested
- Hardwood Forest
- Heath Bluff
- Loblolly and Shortleaf Pine
- Mixed Pine Hardwood
- Open Loblolly and Shortleaf Pine
- Pasture Hay
- Utility Swath
- Wetland



VEGETATION
SUCCESSIONAL AGE

Several large stands on the property are in a mature hardwood successional stage, primarily along the Middle Oconee River and on the northern and southeastern boundaries of the property. Areas that were once used for agriculture are now in the mixed pine or pine successional stages and are found in patches on the southern and northern borders of the property. A large patch of pine forest dates back 20-40 years where the largest agricultural field once lay and was converted back to forest sometime during the 1970s.

The successional stages map shows the relative age of each plant community. The plant communities' map was overlaid with historic aerial images (similar to the historic/cultural inventory) dating between 1938 and 2009. Using these two sources, it was determined how forests were managed and when they were allowed to enter into a natural successional stage. The successional stages correlated very well with the historic inventory maps and by plant community. Ages were broken into five ranges (0 to 5, 5-20, 20-40, 40-70, 70+), with 70+ years being the maximum age class since the aerial imagery only went back 70 years.

Legend

- SBG Property Boundary
- Hydrography

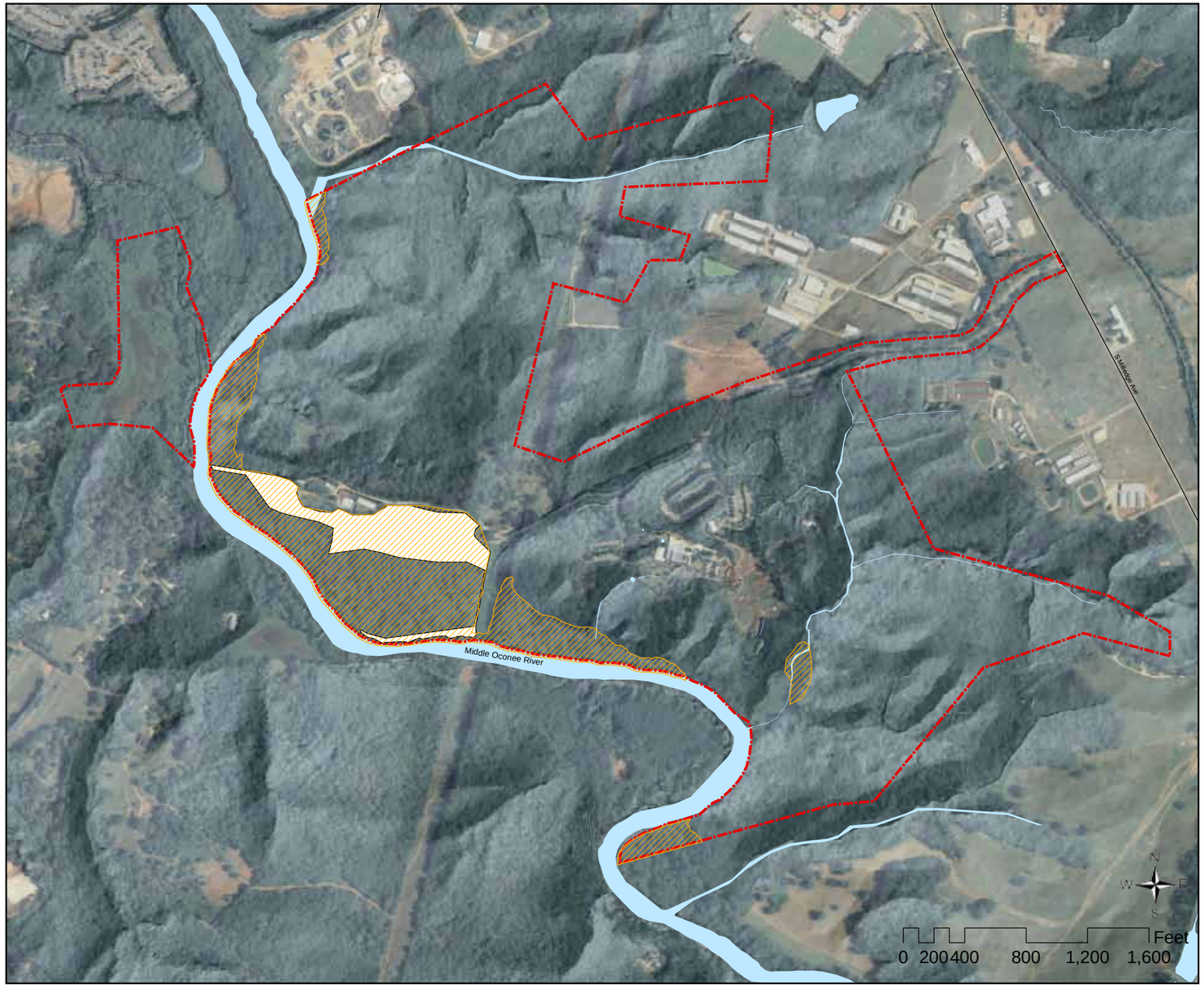
Successional Age

- 0 to 5 years
- 5 to 20 years
- 20 to 40 years
- 40 to 70 years
- 70+ years

VEGETATION
INVASIVE SPECIES

Most natural areas in the Piedmont are affected in some way by invasive exotic plant species, and the SBGG is no exception. Most problematic is the widesperead infestation of Chinese privet (Ligustrum sinense) throughout the floodplain of the Middle Oconee River. Privet seeds are deposited in the floodplain by periodic flooding as well as by birds. In some areas the privet growth is so dense that it effectively eliminates native groundlayer, shrub and understory diversity.

Privet control research has been ongoing at the SBGG since 1995. Three 5-acre research plots monitor the impact of different management techniques. Recently, in the fall of 2011/spring of 2012, a Gyrotrac machine was employed to cut and grind several acres of privet-infested floodplain.



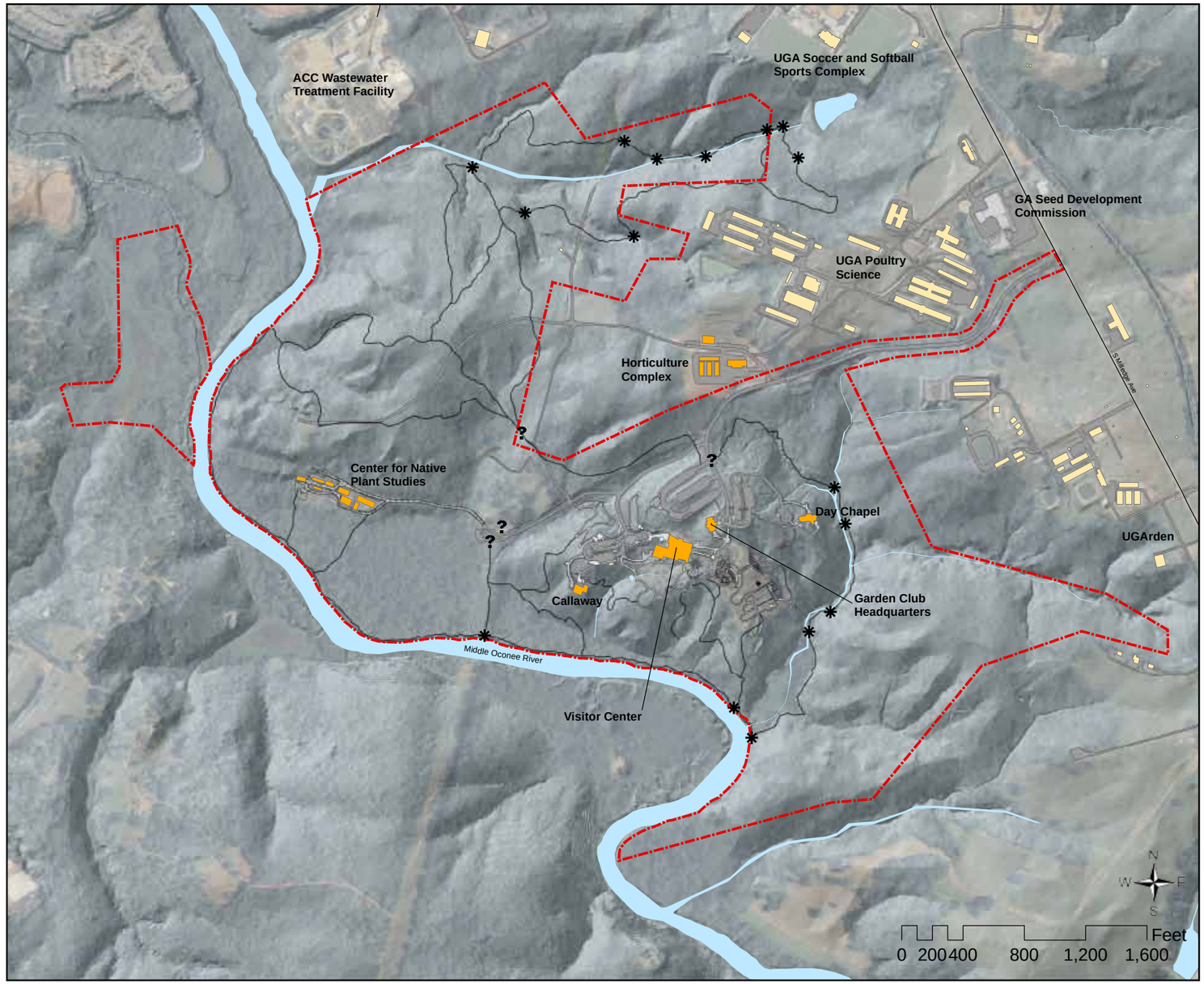
Legend

- SBG Property Boundary
- Hydrography
- Chinese Privet Distribution
- Area of Privet Removal by Gyrotrac, December 2011

EXISTING BUILT STRUCTURES

Several existing buildings are located on the SBGG property. These include the: Visitor Center, Callaway Building, Garden Club of Georgia Headquarters, new Horticulture Complex, Center for Native Plant Studies, Day Chapel, and a restroom building.

Other built structures include map kiosks, rain shelters, and footbridges that are located throughout the site.



Legend

- SBG Property Boundary
- UGA Buildings
- SBG Buildings
- Roads and Parking areas
- Service Drive areas
- Gravel areas
- Sidewalks
- Trails
- Bridge Locations
- Kiosk Locations

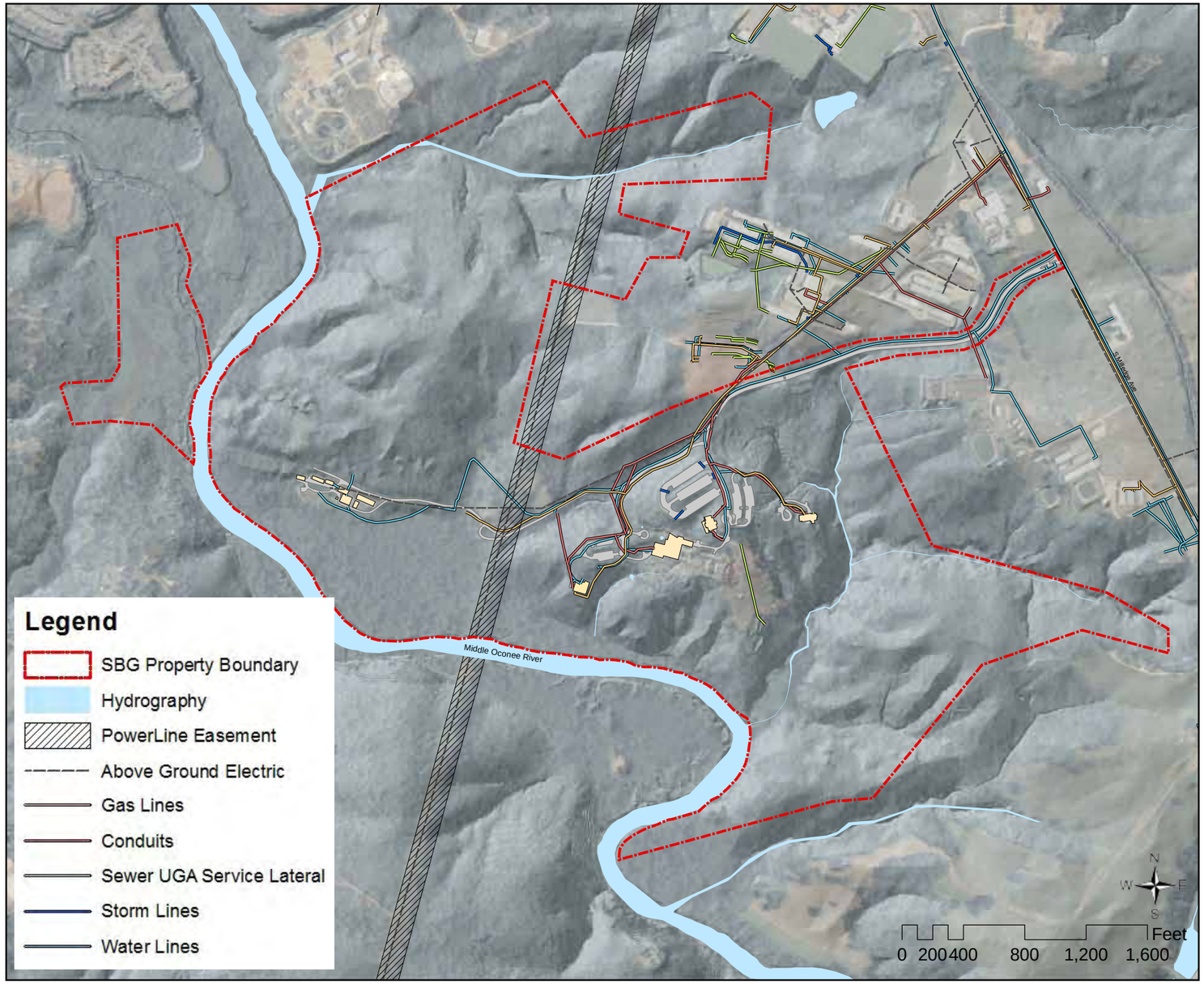
INFRASTRUCTURE

The utilities infrastructure at the SBGG include water lines, gas lines, sewer lines, storm lines, above ground electrical lines and electrical conduit lines. The core of the SBGG, in regards to infrastructure, is the Visitors Center; all necessary utilities are available at the core as well as radiating out to other buildings, including the Day Chapel. Water, gas, and electrical are available near the CNPS, as well as septic for restrooms, but sewer and communication would need to be added if that area were to be further developed.

Gas, power and other buried conduit enters the SBGG property from the north near the new Horticulture Complex. Once it reaches the paved drive, it forks, providing gas to the core of the SBG and continues toward, but does not reach, the old greenhouse. Gas lines also run to the Day Chapel on the east side of the property.

The main water line into the SBGG begins at Milledge Avenue, continues along the Main Entrance Drive before branching in multiple directions from the Main Parking Lot.

A large electrical transmission line runs north and south across the entire property, essentially cutting the property into two halves. The line falls in between the core of the SBGG and the Center for Native Plant Studies



GARDEN BOUNDARIES

There are eight distinct cultivated gardens that currently exist at SBGG. They are:

- Lower Shade Garden (1988)
- Upper Shade Garden (1991)
- Dunson Native Flora Garden (1981)
- International Garden (1995)
- Herb and Physic Garden (1984)
- Heritage Garden (2001)
- Flower Garden (2008)
- Horticulture Complex Demonstration Gardens (2010)

The boundaries of the existing gardens shown on this map were drawn based on descriptions and on-site meetings with each of the garden curators. Some of the boundaries are distinct, such as a sidewalk or a row of plants. Other times they are a bit more vague, such as 'approximately 25 feet from the edge of the sidewalk.

Legend

- Buildings
- Sidewalks
- Paved parking areas
- SBG Current Property Boundary
- Hydrography

Gardens

- Flower Garden
- Herb and Physics Garden
- Heritage Garden
- Hort Complex Demo Gardens
- International Garden
- Lower Shade
- Upper Shade
- Dunson Native Flora Garden

master plan

EXISTING AND PROPOSED DIAGRAMS

The master plan presented here is intended to address the goals that were identified at the beginning of the project:

1. Plan in accordance with the SBGG mission
2. Enhance the sustainability of existing collections
3. Protect the SBGG natural areas
4. Plan for significant new buildings and gardens
5. Enhance the visitor experience and wayfinding
6. Accommodate larger numbers of visitors
7. Encourage more diverse modes of transportation to the SBGG

The image on the facing page serves as a simple key map to the recommendations which are presented in more detail on the following pages.

The first series of five Existing and Proposed diagrams describe the physical improvements and additions to the SBGG. Specifically, they are organized into the following categories: property boundary, buildings, vehicular circulation, pedestrian circulation, and gardens (The other critical resource at the SBGG is the natural areas that comprise the majority of the property area and they are addressed in the next section of the document, the Management Plan). Each diagram is accompanied by written text that explains the rationale and the expected outcome of the recommended changes.

After the Existing and Proposed diagrams, several of the proposed improvements are explained in more detail and illustrated with a conceptual Site Design. It is important to note that the images and plans presented here are conceptual in nature, and the implementation of any of these improvements would require more detailed surveys and construction drawings.

Opposite: Master Plan Key Map