management plan

Creating a Landscape Management Plan

The State Botanical Garden of Georgia contains x acres of land, only x of which is cultivated as formal gardens. The remaining forested and riparian landscape has been loosely managed for over fifty years without an agreed-upon trajectory or documented management plan. This master plan proposes that the natural landscape should be guided by a landscape management plan to restore it to optimal health. The recommendations here call for the division of the landscape into conservation areas or restoration areas, which will be described in detail later.

Landscape management is an adaptive process that guides the regeneration and healing of natural landscapes. Often, landscapes that have been affected by humans get caught in positive feedback loops due to human disruption – these can include the introduction and pervasive spread of exotic invasive species, accelerated erosion, disruption of the natural predator chain for controlling nuisance species, etc. A well-written landscape management plan can address these issues and guide the natural healing of a landscape by monitoring and adjusting the goals of the plan. Landscape management is not a linear progression, it is a cycle that continually evaluates the landscape, introduces small-scale experimentation, and makes corrections and adjustments according to the end goals. The feedback loop of landscape management can be seen in Figure X.

A landscape management plan, once initiated, will have vast benefits for the staff of the State Botanical Garden; however, this can only occur when

- An organizational structure is in place to guide landscape changes over

time and monitor the results

- There is enough knowledge to know what is being managed
- There is a prescription for health; and
- There is a working document and/or management records.
-

The creation of a landscape management committee, or restructuring of job duties, will ensure that there is a dedicated group of people to oversee the implementation of the management plant. These people will be in charge of the monitoring and recording of data, as well as consulting with other staff members or experts for proposed revisions to the management plan. Once the revisions are approved the group will oversee their implementation and continue monitoring the landscape.

The State Botanical Garden of Georgia employs experts in a variety of fields, from horticulture, to natural resource conservation, to ecology, etc. An open discussion about the management of the natural landscapes of the SBGG will encourage the sharing of expertise, and will result in a collective knowledge. The staff are already loosely managing these natural areas, but by gathering this collective knowledge and creating a working document, a historical record will be created that can be accessed in the future. It also allows the expertise of the staff to be passed on when positions turn over. An agreed upon trajectory will also facilitate the pursuit of grant funding associated with the management goals.

A management plan requires that there is a prescription for health – in other words, there needs to be a proposed list of guiding principles and recommendations that will help achieve a specific ecological trajectory. Again, harnessing the combined expertise of the staff at the SBGG and coming to consensus about an ecological goal will satisfy this requirement. This prescription for health will continue to guide the management decisions as they go through the feedback process.

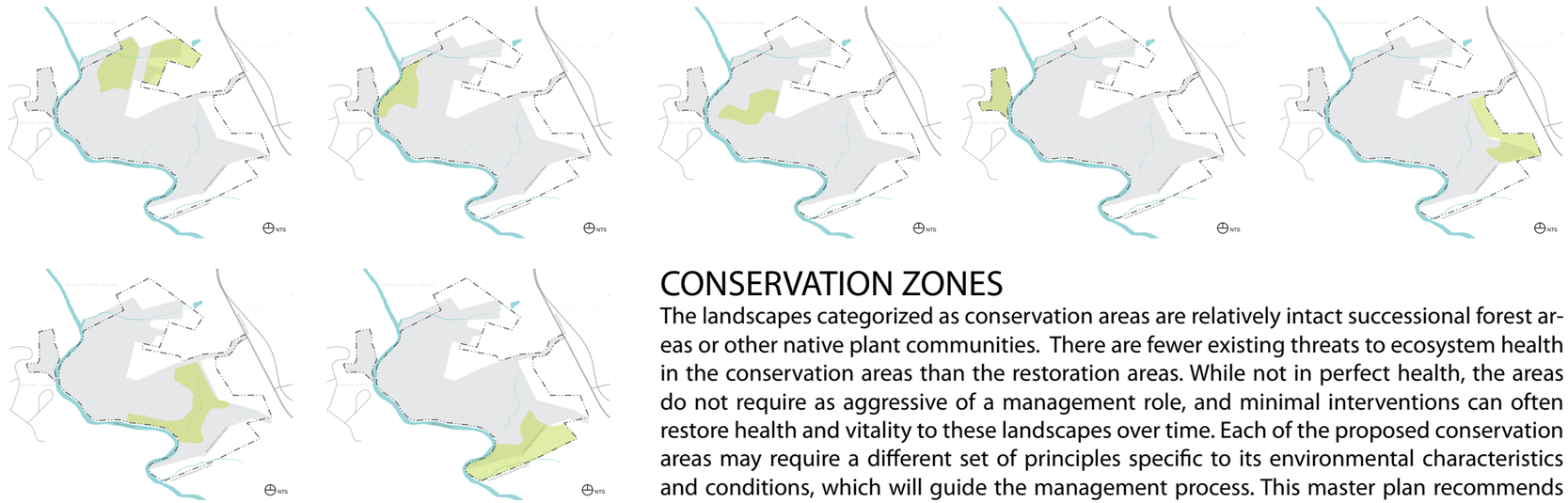
Finally, all of these requirements need to be combined into a working document. A management plan will not achieve its goals if written records are not kept. This document needs to survive retirements, restructuring, leadership changes, etc. and the only way to ensure that ecological goals are met is to continually record the monitoring, revisions, approvals, and implementation of management decisions.

Users of the State Botanical Garden can be either engaged or disengaged in the landscape management plan; however, part of the mission of the SBG is aimed at public education, and because of this, it is recommended that the staff should decide how to engage the public in the management of the natural landscape. The most passive form of engagement and education could consist of placing interpretive signage along the trails that pass through specific conservation or restoration areas, calling out specific features or projects that the staff is working on. A more active approach could engage the users at the SBG through volunteer monitoring groups, invasive species removal days, restoration plantings, or a place where visitors can upload photographs, helping to maintain a visual history of the garden.


Athens-Clarke County
Oconee County
North Creek Conservation Area
North Creek Conservation Area
Oconee Floodplain Conservation Area
Ivy Wetland Conservation Area
Homestead Conservation Area
Piedmont Prairie Restoration Area
Oconee Floodplain Restoration Area
Orange Trail Conservation Area
Oconee Uplands Conservation Area
Oconee Bluffs Conservation Area
South Milledge Avenue
Middle Oconee River
State Botanical Garden Property
Proposed State Botanical Garden Property
0 150 300 450 600 1,200 1,800 2,400
Feet

MANAGEMENT ZONES

The natural areas of the State Botanical Garden of Georgia comprise a diverse set of plant communities, which are determined by a variety of natural and cultural factors including: soil type, slope and aspect, previous land use, and moisture regime. The management zones presented here were delineated using these factors and other landscape features, resulting in nine different zones each with a unique identity. These delineations are schematic in nature, and should be ground-truthed and modified accordingly as the management plan is developed. There are seven conservation areas and two restoration areas.



CONSERVATION ZONES

The landscapes categorized as conservation areas are relatively intact successional forest areas or other native plant communities. There are fewer existing threats to ecosystem health in the conservation areas than the restoration areas. While not in perfect health, the areas do not require as aggressive of a management role, and minimal interventions can often restore health and vitality to these landscapes over time. Each of the proposed conservation areas may require a different set of principles specific to its environmental characteristics and conditions, which will guide the management process. This master plan recommends

RESTORATION ZONES

The natural features that have been categorized as restoration areas are landscapes within the garden boundaries that have been severely degraded or impacted by human interventions. These areas require an active management role; however, it is entirely possible for ecological reclamation to be achieved. Written records and working documents are extremely important for the management of the restoration areas. Once again, this process should begin with a thorough SWOT analysis, where experts can gage the health of the restoration area and determine guiding principles based on its strengths, weaknesses, opportunities,

NORTH CREEK CONSERVATION AREA

The North Creek Conservation Area comprises some of the most dramatic and remote natural landscapes in the SBGG. The mature forest over rolling topography is characteristic of the native Piedmont Oak-Hickory forest that once dominated this region. Although this plant community is dominant, it is not the only one present here.

Steep ravines and creeks create a multitude of microclimates, and scenic small waterfalls. Frequent occurrences of chalk maple in the understory are related to soils types and nutrients here. American beech is dominant in some of the mesic forests. A bog is located on one of the tributaries to North Creek, which we have named Bog Branch. Rivercane, sedges, rushes and salamanders are all found here (Wharton, 1998).

OCONEE FLOODPLAIN CONSERVATION AREA

The Oconee Floodplain Conservation Area offers an experience of the forested floodplain of the Middle Oconee River. Unlike many other floodplain areas, Chinese privet is a relatively minor presence here. That being said, privet and other invasive exotics are a constant threat in this landscape that experiences frequent to occasional flooding. While containing areas of floodplain, this conservation area also includes the adjacent upland areas as well as one of two unique heath bluff community found at SBGG. This landscape provides an excellent opportunity to experience a relatively abrupt transition from floodplain to uplands, contrasting with other areas that have more extensive lowlands.

OCONEE FLOODPLAIN RESTORATION AREA

The Oconee Floodplain Restoration Area is one of the youngest successional forests at the SBGG. It was an agricultural pasture or cleared land up until the mid-1970's. It is not surprising that this young floodplain forest is also the epicenter for Chinese privet (Ligustrum sinense) invasion at the SBGG. Beginning in 2005, privet removal research has been active in this area comparing the effectiveness of various methods of eradication. In the winter of 2011-12, a large portion of this area was cleared using Gyrotrack equipment to cut and grind the privet (and bamboo) that had infested the area. Ongoing management must continue to work towards the eradication of invasive exotic species, while simultaneously planning for and implementing restoration plantings. A comprehensive restoration plan for the Oconee Floodplain Restoration Area should be developed to include restoration, management, and monitoring goals, objectives, and actions.

HOMESTEAD CONSERVATION AREA

The Homestead Conservation Area comprises an area that is in the early stages of secondary succession. The landscape is dominated by pine and mixed-pine forest, which has reforested the area after farming was ceased approximately 40 years ago. In addition to the vegetation, many indicators of the landscape's agricultural past are still present: agricultural terraces that were installed for soil conservation, an old chimney which is a remnant of a former homestead, and more. The 2012 master plan proposes the creation of a Homestead Garden in this area, to inform visitors about the region's agricultural history and educate about the traditional gardening practices.

The Homestead Conservation Area is also an important landscape to interpret old field succession. This landscape is in the pine stage, while others in SBGG are at later stages of succession.

PIEDMONT PRAIRIE RESTORATION AREA

The Piedmont Prairie Restoration Area is essentially the Georgia Power transmission line easement. In the past, curated collections such as the Flower Garden were located here. In recent years, the collections have been relocated and the easement has been relatively underutilized north of the paved driveway. In contrast, the portion of transmission line easement south of the driveway has been restored/managed as early succession grasses, shrubs and wildflowers. The results have been significant in terms of insect and bird habitat created, and provides evidence that similar results can be achieved elsewhere.

While extensive prairies were not historically present in the southeast as they were in the midwest, smaller meadows and savannas were documented (and, rarely, still exist) and offer a potential natural reference model for restoration efforts subject to the limitations of a powerline easement. A comprehensive restoration plan for the Piedmont Prairie Restoration Area should be developed to include restoration, management, and monitoring goals, objectives, and actions.

IVY WETLAND CONSERVATION AREA

The Ivy Wetland Conservation Area, located across the Middle Oconee River at the confluence with McNutt Creek, was donated to the SBGG in 1990. The wetland was reportedly created by beavers, and remains a beautiful and important wetland habitat. The forest on the edge of the wetland is a blue heron rookery. The site is not currently accessible to the public, however its ecological value and research value is significant. Public access may be possible in the future, perhaps in conjunction with the proposed Middle Oconee Greenway.

OCONEE UPLANDS CONSERVATION AREA

Ampibolite Creek is a small, picturesque tributary of South Creek that extends from its confluence near the Orange Trail east towards Milledge Avenue and the UGArden. The creek was first named by Charles Wharton in 1998 due to the dark, almost black amphibolite rock that is found in the creekbed. The mineral content of this rock may influence the botanical composition plant communities that are found in the area. Along the creek stream edge and colluvial flat communities are present, transitioning to mesic slopes and ridges as one moves uphill and away from the creek. The deciduous forest near the headwaters of Amphibolite Creek is some of the oldest and most mature forest on the SBGG property.

An abandoned spur trail leads up Amphibolite Creek for a short distance before dissipating. We propose reestablishing this trail and extending it further along Amphibolite Creek, being sure to prioritize the stream health by respecting the appropriate stream buffers, in order to provide access to this beautiful area of the SBGG.

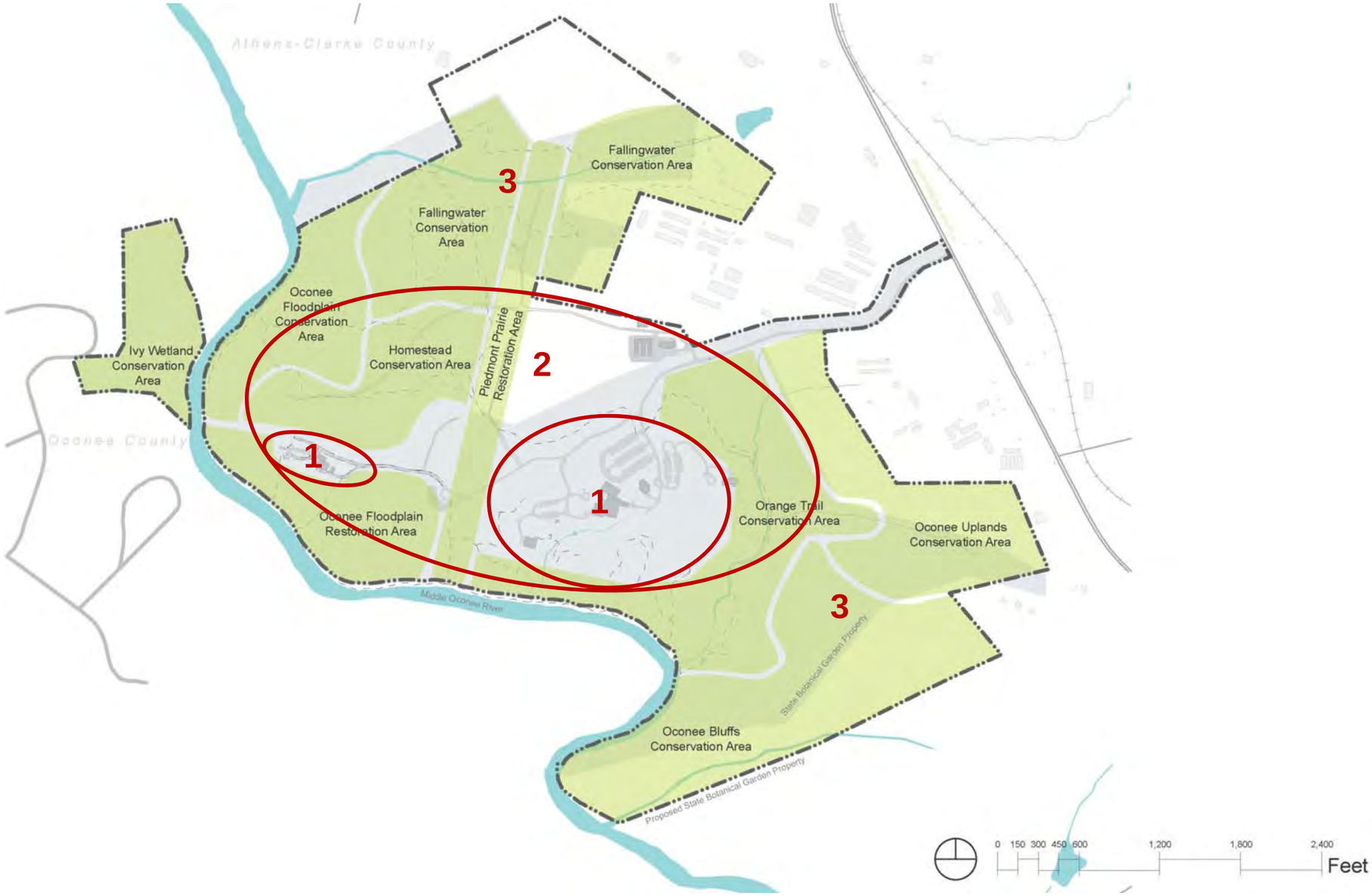
ORANGE TRAIL CONSERVATION AREA

The South Creek Conservation Area includes the Orange Trail as it follows South Creek from the trailhead to the Middle Oconee River. This is the most heavily used and perhaps most loved natural area at the SBGG, popular among families who love the direct access to the beautiful creek, naturalists who enjoy the transect through different stages of succession and from upland to floodplain and wetlands, runners who enjoy the challenging topography and beautiful surroundings, and UGA faculty and students who use the area for botanical and aquatic sampling and surveys. Easy access from the Main Parking Lot as well as from the Flower Garden contribute to the popularity of the Orange Trail.

Unique management issues that need to be addressed here include mitigating the heavy use, as well as managing and mitigating the off-site impacts of runoff that flows through South Creek. In the past, high levels of nutrients were detected due to the swine lagoons that were located on Milledge Avenue. Those lagoons are gone, however plans to construct dozens of horticulture greenhouses in the near future present a possible new impact that will need to be addressed. Every effort should be made to influence the horticulture greenhouses to mitigate their runoff "at the source" by collecting and reusing or infiltrating runoff outside the SBGG property. Also, this area includes the South Creek Wetland, formerly a beaver wetland but now maintained by a concrete sack dam. The dam is failing and water is eroding around the side of it causing lowered water levels in the wetland. A complete analysis and

OCONEE BLUFFS CONSERVATION AREA

The namesake of this conservation area is located south of the Orange Trail along the Middle Oconee River. One of two occurrences of a heath bluff community is located here. Wharton describes these areas as "steep riverside bluffs along the Oconee River, with considerable exposed bedrock and boulders. The evergreen heath, mountain laurel, is diagnostic." The spur trail that leads through this area is not formally marked but it is already moderately used. Visitors enjoy accessing the large boulders along the banks of the Middle Oconee as well as exploring the loop trail through the adjacent forest. We propose formalizing this existing trail, as appropriate, to provide access to this unique area. The other heath bluff is no longer accessible to the public due to trail relocations that were necessary in that area, so this is the only readily accessible heath bluff community.



DEER EXCLUSION AND MANAGEMENT

Deer at the SBGG are a major problem and are currently a limitation to the expansion and sustainability of the curated botanical collections. This issue must be addressed to maintain the existing collections, and a solution is a prerequisite to adding any additional collections.

Existing Deer Fence
The large red oval on this plan represents the approximate location of the perimeter deer fence, which was installed in 1989. There are several gates that allow visitors and staff to pass through the fence. Today there are deer inside the fence, either existing as an "exclusive" population of extremely lucky deer or somehow coming and going in a manner that is still unknown.

The smallest red oval on this plan represents the approximate location of the CNPS deer fence which was installed in the summer of 2012. This 12' tall fence is intended to completely exclude deer from its interior in order to protect the CNPS growing facilities and future collections.

Proposed Deer Fence
The medium-sized red oval on this plan represents a proposed deer fence that would enclose the curated collections around the Visitor Center, including the Shade, Native Flora, Flower, Herb, International, and Childrens Gardens.

Discussion
These three deer fences would effectively establish three zones of deer exclusion/management.
ZONE 1- Deer Exclusion Areas
The deer exclusion areas include the most sensitive and vulnerable botanical resources at the SBGG, including the curated gardens in the vicinity of the Visitor Center, as well as the outdoor propagation areas of Center for Native Plant Studies. The management of these areas should be "No deer, no exceptions." In they occasion that deer do penetrate the fence, they should be removed as expediently and humanely as possible.

The CNPS recently had the high-security deer fence installed. The other proposed high-security deer fence should be carefully evaluated for cost, location, aesthetics and visitor accessibility. The security of the collections should be achieved in the least visually and physically invasive manner possible.

appendices

Brick Chimney
Appears on 1938 aerial image and seems to be attached to a near-by grouping of buildings by road. Existing roadbed can be seen.

Earth Hut
Does not appear on aerial images but a garden employee re-marked that it was built by the garden staff dating it post 1968.

Hazardous Waste Area
Appears on 1960 aerial. Site was completely fenced in and sealed off. According to garden staff, the filter house near by is connect-

Cattle Pen
Appears in 1973 aerial image. A roadbed is visible. Structure looks like it has been modified over time.

Fire Ring
Unknown date. Does not show up on any aerial images.

Refuse Pile
First appears in the aerials in 1955. The road to it appears in 1944. A license plate was found with the date 1955.

appendix A Cultural Resource Inventory

Rock Piles
Various rock piles around the property. All are approximately equal in shape and size. Could have been from clearing the land

Spring and Walls
Could be pre-1938. Concrete spring with two walls and a damn. Could have been used to water livestock or irrigate farmland. Area

Stone Chimney
A road appears in the 1938 aerial image to the location of the chimney. Garden staff re-used some of the stones in the interna-

Some other features that were not photographed but are marked on the inventory:

Bee Boxes
These do not appear to be on any of the aerial images. They appear to be in good shape, which suggests a more recent installation.

Berm
This feature could have been created to prevent flooding as early as 1938.

Filter House
Unknown date, does not appear in aerials images. Seems to be associated with the hazardous waste area because it lays down slope in an ephemeral streambed.

Pistachio Trees
A small grove of pistachio trees might have been among some of the first horticultural experimental tree. Unknown date.

Plant Community Descriptions appendix B

PLANT COMMUNITY DESCRIPTIONS

Invasive Species
This vegetative overlay contains areas of the site where the understory is composed almost exclusively of Chinese privet, Ligustrum sinense. The locations of this unique understory layer are along the river banks and bottomland hardwood portions of the site where moist soil conditions have aided in the proliferation of this invasive exotic. The existence of this invasive exotic understory layer has disrupted the natural forest successional process along the river. Due to the invasive nature of this plant, the State Botanical Garden (SBG) has undergone a Chinese Privet Removal Project along portions of this area.

Heath Bluff
This vegetative overlay shows the extent of a heath bluff found on the northern exposure of a rock outcrop on the east bank of the Middle Oconee River, just south of the Orange Trail. Heath bluffs are atypical in the Georgia Piedmont and are more typical of northern affinities and mountainous regions, making this a unique plant community on site. The shrub layer is dominated by heath species of mountain laurel and Carolina rhododendron.

Bottomland Hardwood
This vegetative community is found along the floodplain of the Middle Oconee River and near stream tributaries on the site. Due to the flat, moist soil conditions, this area can be classified as wet-mesic and is a diverse and species rich area of the site. Common species include American beech, tulip poplar, and white oak. Subcanopy and shrub layers consist of ironwood, mulberry, painted buckeye, and native azalea.

Garden Areas
These vegetative areas contain developed areas of the site (roads, buildings, sidewalks) as well as garden spaces that have little to no forest canopy cover. The vegetation, if existent, is highly managed and not a naturally occurring plant community.
Forested Garden Areas
The vegetated areas contain garden spaces with mature canopy cover. Forested areas consist of both naturally-occurring and managed vegetation.

Hardwood
Consisting of mesic to moderately mesic forests, the community includes non-wetland floodplain forests of yellow-poplar, sweetgum, ravines of oaks, beech, and many upland oak-hickory stands—the most prevalent community on the site.

Mixed Pine and Hardwood
A vegetative community of mesic to moderately dry forests of mixed deciduous and evergreen species: sweetgum, yellow-poplar, various oak species, and loblolly or shortleaf pine.

Open Grassland
A vegetative community comprised of recent clearcuts, sparse vegetation, and other early successional areas.

Open Loblolly and Mixed Pines
A vegetative community including older, fairly open stands that may be almost savanna-like in appearance.

Loblolly and Shortleaf Pine
A vegetative community consisting of dominant pine stands regenerating from old field conditions or other recent disturbances.

Utility Swath
The community consists of an open swath of vegetation maintained for Georgia Power transmission lines. Current vegetation under easement contains a vegetated mix of perennial grasses, planted gardens, and early successional shrub areas. A native Georgia perennial and grass prairie is planned for the area.

Wetland
The site contains three wetland locations. The old beaver dam, located on the southeastern portion of the site, is highly visible along the Orange Trail. This wetland was altered by human and animal activity in the past 10 years and currently contains a mix of wetland plant species and open canopy. The other wetland areas consist of a small area located adjacent to the southern end of the utility swath and a larger wetland located on the southwestern end of the site across from the Middle Oconee River.

appendix C Soil Reports

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Map Unit Legend

Clarke and Oconee Counties, Georgia (GA623)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Bfs	Buncombe loamy sand	1.3	0.4%
CbA	Cecil soils, 0 to 2 percent slopes, overwash	0.2	0.1%
Coa	Congaree soils and alluvial land	14.1	4.8%
Cob	Chewacla soils and alluvial land	23.9	8.1%
CYC2	Cecil sandy loam, 6 to 10 percent slopes, eroded	11.9	4.0%
LnE	Louisburg loamy sand, 10 to 25 percent slopes	26.8	9.1%
MgE2	Madison sandy loam, 15 to 25 percent slopes, eroded	145.7	49.6%
PfD2	Pacolet sandy loam, 10 to 15 percent slopes, eroded	20.8	7.1%
PgC3	Pacolet sandy clay loam, 6 to 10 percent slopes, severely eroded	18.1	6.2%
PgD3	Pacolet sandy clay loam, 10 to 15 percent slopes, severely eroded	26.8	9.1%
PhE	Pacolet-Gullied land complex, 10 to 25 percent slopes	2.2	0.7%
W	Water	2.3	0.8%
Totals for Area of Interest		**294.0**	**100.0%**

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Map Unit Legend

Clarke and Oconee Counties, Georgia (GA623)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Cob	Chewacla soils and alluvial land	16.1	92.0%
LnE	Louisburg loamy sand, 10 to 25 percent slopes	0.1	0.6%
MiE3	Madison sandy clay loam, 10 to 25 percent slopes, severely eroded	0.3	2.0%
PfD2	Pacolet sandy loam, 10 to 15 percent slopes, eroded	0.1	0.8%
PgD3	Pacolet sandy clay loam, 10 to 15 percent slopes, severely eroded	0.6	3.5%
W	Water	0.0	0.3%
Wos	Wehadkee and Alluvial land, wet	0.1	0.8%
Totals for Area of Interest		**17.5**	**100.0%**