

**VASCULAR PLANT INVENTORY AND PLANT
COMMUNITY CLASSIFICATION FOR KINGS MOUNTAIN
NATIONAL MILITARY PARK**



Report for the Vertebrate and Vascular Plant Inventories:
Appalachian Highlands and Cumberland/Piedmont Network

Prepared by NatureServe for the National Park Service
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This report consists of the main report along with a series of appendices with information about the plants and plant communities found at the site. Electronic files have been provided to the National Park Service in addition to hard copies. Current information on all communities described here can be found on NatureServe Explorer at www.natureserve.org/explorer.

Cover photo: Georgia aster (*Symphotrichum georgianum*) in mowed power line right of way within park boundary. Photo by Tom Govus.

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Summary

The first step in any effort to monitor the “vital signs” or ecological health of a tract of land is to develop a baseline from which to measure and gauge trends. We established a baseline for Kings Mountain National Military Park in three ways:

- 1) Ecologists from NatureServe established fifteen permanently marked one-hectare circular plots within the park in a grid system and another six circular plots in unique ecological areas that were not covered by the initial grid-based plot layout. The permanently marked plots are available to be used by researchers on studies ranging from bird point counts to individual plant monitoring.
- 2) Ecologists collected data on all unique vegetation communities within the park and identified 13 natural and 12 human-modified or successional vegetation associations (unique ecological assemblages of plants) within the park boundary. Two other ecological communities probably exist within the park, but neither was found or confirmed from our field work. The most globally rare community in the park appears to be the Piedmont Chestnut Oak – Blackjack Oak Woodland. This xeric, fire dependent community may warrant special attention due to its relatively high global rank/rarity (G2G3). Other highly ranked communities include the Piedmont Small Stream Sweetgum Forest, the Piedmont Seepage Wetland, and the Piedmont Mesic Basic Oak-Hickory Forest.
- 3) Ecologists collected and vouchered 25 specimens that will be delivered to the National Park Service and probably housed at Kings Mountain National Military Park. Of these 25 specimens, there are 22 vouchered species new to the park. These species were added to an existing list that included vouchers from projects done by Kennemore (1995). We now count 525 documented species, varieties, or subspecies of vascular plants in the park (508 species). We estimate that between 95% and 100% of the vascular flora of the park is now documented. The most highly ranked species in terms of global rarity in the park include (in alphabetical order) hairy wild indigo (*Baptisia cinerea*), Virginia thistle (*Cirsium virginianum*), sunfacing coneflower (*Rudbeckia heliopsidis*), Biltmore’s carrionflower (*Smilax biltmoreana*), and Georgia aster (*Symphyotrichum georgianum*). Georgia aster is considered a South Carolina state species of concern by the South Carolina Natural Heritage Program.

Introduction

Effective management of natural resources in our national parks relies upon ready access to comprehensive and scientifically credible information on species and habitats found within park boundaries. Currently, only a few units have compiled the baseline information needed to begin to assess the current state of natural resources at specific parks. Fewer still have begun to track and assess trends over time. With the passage of the National Parks Omnibus Management Act of 1998 by Congress, the National Park Service was given the mandate to “undertake a program of inventory and monitoring of National Park System resources to establish baseline information and to provide information on the long-term trends and the condition of National Park system resources.” Funding for this initiative was appropriated in fiscal year 2000. In September 2001, NatureServe began work on the vascular plant inventory portion of the project at Kings Mountain National Military Park.

Although Kings Mountain National Military Park is better known for its historic importance in the Revolutionary War, the park contains significant natural resources, especially in its xeric slope forests, narrow bottomland floodplains, and in a small portion of the park with somewhat more mesic slopes with basic soils. After assessing the past and current state of research in the park, we began to work on accomplishing three primary objectives:

- 1) Establish at least 20 permanent plots throughout the park for present and future monitoring purposes.
- 2) Document all ecological communities on the site as defined by the United States National Vegetation Classification (Grossman et al. 1998, Anderson et al. 1998).
- 3) Collect any species found in plots that were not already collected by Kennemore (1995).

The ultimate goal of the project is to deliver the information described in this report to all interested parties, to inform land management, conservation priorities, and future research at the park, and to ensure that future generations of visitors will visit a park that is both ecologically and historically intact.

Study Area

Kings Mountain National Military Park is located in Cherokee County and York County, South Carolina. It is surrounded on two sides by Kings Mountain State Park.

The site is 1,597 ha (3,946 acres), composed primarily of forest and woodland. Although much of this area has been disturbed by cutting and agriculture, a good deal of the park has been recovering for at least 50 years from human disturbances. Elevation ranges from a low of 650 feet as Garner Branch exits the park to 1045 feet on top of Brown’s Mountain.

Kings Mountain National Military Park occurs in the Piedmont ecoregion (Bailey 1994, Griffith 2002). All creeks in the park eventually flow into the Broad River or one of its tributaries (Jones 1962).

The park has a diversity of soils ranging from loams to clays and is dominated by the Tatum-Nason-Maneto association, a type of soil associated with hills dissected by streams in a small area of the foothills of the Piedmont of South Carolina (Wallace 1965). More specifically, most of the upland areas of the park are dominated by Manteo channery silt loams (Jones 1962), whereas the bottomlands are classified as “mixed alluvial” (Wallace 1965). Other types of soils identified by either Wallace (1965) or Jones (1962) as being significant components of the park include Tatum silt loams, Tatum gravelly silt loams, Nason silt loams, and Tatum silty clay loams.

The climate in upstate South Carolina consists of mild winters and warm/hot summers. Records from adjacent Spartanburg County show that the average minimum winter temperature is 43 degrees F whereas the average summer maximum temperature is 77.4 degrees F. The average rainfall is only about 49 inches annually, the average length of freeze-free growing is about 227 days, and the snow cover averages about 4.6 inches annually (Jones 1962).

Land History

Kings Mountain National Military Park was created by an act of Congress in 1931. Between the time of the war and the establishment of the park, the area served as pastureland, cropland, sites for homes, and later, as a battlefield memorial maintained by the Daughters of the American Revolution (US GPO 2000). The land upon which the park is located was sparsely settled at the time of battle and consisted of woodland, field, and forest prior to the Revolutionary War (US GPO 1928). Past studies of the southern Piedmont of North and South Carolina near Charlotte, NC suggest that much of the area was subject to frequent fire and consisted of large swaths of fairly open woodland and grassland (Barden 1997, Davis 2001), and accounts of the battlefield seem to also suggest that the area was only sparsely covered by trees (US GPO 1928). Since the time of battle much of the land upon which the park now sits was settled, logged, grazed, and used to raise crops. Since the establishment of the park, many former agricultural fields have grown up into successional forests.

Methods

The inventory and monitoring project covers two main areas: permanent plot establishment for future research in the park and a vegetation classification of all the vegetation associations within the park according to the National Vegetation Classification (Grossman et al. 1998). In addition, our team collected any vascular plants that fell into plots that were not already listed on the existing plant list.

Permanent plot establishment

In order to set up a gridded system of one-hectare circular plots within the park boundary as mandated by the *Study Plan for Vertebrate and Vascular Plant Inventories* (Nichols 2000), Judy Teague from NatureServe used GIS layers supplied by the National Park Service's Cumberland Piedmont Network. She manipulated the GIS layers supplied to us with the program ArcView (ArcView 1992). We chose a 56-meter buffer around the current park boundary since each point represents the center of a one-hectare circular plot and we did not wish to sample any private holdings outside of the park. With this buffer in place, Judy established an evenly spaced grid system (we chose the approximate grid size of 960 meters by 960 meters *a priori* based on observations made by a team of park service personnel in 2000 (Nichols 2000)). At each north-south and east-west line, we recorded the coordinates for one grid point (Figure 1 and Table 1).

Once we had fully laid out the grid using ArcView and recorded all of the GPS coordinates for use onsite, we identified areas of the park that were most likely to hold unique associations not represented by the gridded points. We added points in various places, including the north facing slopes of Stonehouse Creek. We flagged these areas for visits and established plots there and in other suitable habitat that was not represented by the gridded plots.

Once at the park, we met with park personnel and local researchers, described the project's goals, and asked for their collaboration in the project. Through this process, we identified priority areas of the park for additional plot establishment and species inventory. In 2001 and 2002, we established fifteen plots on the grid system and an additional six plots off of the grid in habitats not covered by any of the grid points (Figure 1). Using the GPS units (Garmin Corp. 1999), we attempted to position ourselves within at least five meters of the "real" map location (the hypothetical location that we created in the lab prior to visiting the site). Once we were within five meters, we monumented each plot with a one foot piece of metal conduit and a small blue anodized aluminum tag with a distinctive number attached to an adjacent distinctive tree. General written directions to each permanent plot exist on the vegetation plot sheets filled out during the course of fieldwork and can also be found in the Access database archive of plot information held by the National Park Service. Due to variation in signal strength, accuracy may be more than five meters in some cases. In 2002, we recorded additional data at each point.

Vegetation classification

After the establishment of each permanent one-hectare plot, we visually surveyed the area. We chose a representative and relatively homogenous 20 by 50-meter section of the one-hectare plot in which to place our standardized vegetation monitoring quadrats. Within the plot, we measured environmental characteristics and identified every vascular plant within the plot (see

Appendix I for a blank version of the data sheets used). We assigned each species a cover value by strata and an overall cover value for the plot based on a modified Braun-Blanquet cover class scale (Braun-Blanquet 1928). In addition, we searched for and identified any species within the full hectare that were not represented in the 20 by 50-meter sample. Finally, we returned in the spring of 2002 to resample the plots to attempt to document any species that we had missed the previous summer. Please contact the archivist or resource manager at the park for details and specific plot locations.

We proofed the plot sheets, entered the data into the National Park Service PLOTS database, and assigned each plot to an association based on floristic composition and environmental factors using the National Vegetation Classification (Anderson et al. 1998, Grossman et al. 1998). We compared the plots with similar plots in other parks in the Piedmont and with written descriptions of each related classification unit. These comparisons, combined with a thorough review of all classification possibilities and a review of the literature for some of these association types, allowed us to produce the current park vegetation classification.

Vascular plant inventory

While gathering plot data, we occasionally discovered plant species within the plots that had not already been documented. We collected any new specimens encountered within the plots and recorded the GPS coordinates using our Garmin GPS unit. We pressed and thoroughly dried all specimens, identified any unknowns that could be identified, and then vouchered all new species according to National Park Service standards using the Integrated Taxonomic Information System (ITIS) as the naming standard.

To assess the success of past inventories, we used the program PC-ORD (McCune and Grace 2002, McCune and Mefford 1999) to create a species area curve using the data gathered at each one-hectare plot. In addition, we used a jackknife method within PC-ORD to estimate the total number of species found in the park (Palmer 1990). This method used the formula $JACK1 = SO + r1[n-1]/n$ where SO is the number of species observed in n quadrats, $r1$ is the number of species present in only one quadrat, and n is the number of plots sampled.

Results

During the species inventory work, we encountered and collected 25 specimens (Tables 2,3) of over 22 species that had not been confirmed previously from the park. We created 25 vouchers for the herbarium at Kings Mountain National Military Park (Table 3) from the plants we collected and photographed. These specimens are in addition to plants collected by Kennemore (1995).

In addition to collecting all new plants encountered within the plots, we estimated what percentage of the flora in the park is now documented. Eliminating all varieties, subspecies, and questionable identifications and including previously collected specimens, we believe that researchers have documented 508 species for the park. The estimates of the number of total species in the park that we generated using PC-ORD based on the plot data taken throughout the park were 433 using all 21 full plots and the first-order jackknife method, 532 using all plots and the second-order jackknife method, 264 using just the 16 gridded plots and the first-order jackknife method, and 313 using just the 16 gridded plots and the second-order jackknife method (Table 4). In addition, we calculated alpha (average species richness per plot), beta (measure of the heterogeneity of the data (alpha/gamma)), and gamma (total species overall plots) diversity values for the park based on information gathered from the plot data (Table 4). The alpha value for all plots combined was 45.6, the beta value was 6.1, and the gamma value was 276.

Using the information gathered in each plot, we discerned 25 distinct vegetation associations within five distinct natural ecological systems (ecological systems represent recurring groups of biological communities that are found in similar physical environments and are influenced by similar ecological processes (Comer 2003)), as defined by the United States National Vegetation Classification (Table 5). In addition, we identified an additional two communities that are likely to be found in the park but that weren't found in our search effort. However, only 13 of the communities identified are considered "natural" as opposed to "semi-natural", "human modified/successional" or "exotic species dominated". The common names of all of the communities are as follows (* = natural community; *italics* = not documented in park, but probably present):

Shortleaf Pine Early Successional Forest (CEGL006327)
Loblolly Pine Successional Forest (CEGL008462)
**Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest (CEGL007119)*
Virginia Pine Successional Forest (CEGL002591)
Red-Cedar Successional Forest (CEGL007124)
Successional Black Walnut Forest (CEGL007879)
Successional Sweetgum Forest (CEGL007216)
Successional Tuliptree - Hardwood Forest (CEGL007221)
**Piedmont Dry-Mesic Oak-Hickory Forest (CEGL008475)*
**Piedmont Mesic Basic Oak-Hickory Forest (CEGL003949)*
**Interior Southern Red Oak - White Oak Forest (CEGL007244)*
**Xeric Ridgetop Chestnut Oak Forest (CEGL008431)*
**Felsic Monadnock Forest (CEGL006281)*
**Piedmont Chestnut Oak – Heath Bluff (CEGL004415)*
Successional Sweetgum Floodplain Forest (CEGL007330)

*Piedmont Small Stream Sweetgum Forest (CEGL004418)
*Piedmont Headwater Low-Elevation Seepage Swamp (CEGL004426)
*Appalachian Shortleaf Pine - Mesic Oak Forest (CEGL008427)
*Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest (CEGL007493)
Loblolly Pine – Tuliptree Successional Bottomland Forest (CEGL007546)
*Piedmont Chestnut Oak - Blackjack Oak Woodland (CEGL003708)
*Appalachian Shortleaf Pine – Post Oak Woodland (CEGL003765)
Golden Bamboo Shrubland (CEGL008560)
Blackberry – Greenbrier Successional Shrubland Thicket (CEGL004732)
Saturated Alder Thicket (CEGL003912)
Broomsedge Old Field (CEGL004044)
Cultivated meadow (CEGL004048)

While working in the park, we also captured digital images of plots and plants. These images are indexed (Table 7) and a selection of them can be seen in Appendix III.

Finally, we have included the key to associations (Appendix IV). This tool helps those with a basic understanding of vegetation to classify community types within the park quickly and easily.

Discussion/Conclusions

Species Inventory

The field work from this project added over 22 species to a list of 486 species already present within the current boundary of the park (Table 2). One goal of the Inventory and Monitoring program of the National Park Service is to document at least 90% of the vascular flora of the park. Using various estimates and assumptions, the estimate for total number of species in the park ranged from 264 to 532. Excluding varieties, subspecies, and unidentifiable collections, researchers past and present have confirmed 508 species within the park. First-order jackknife estimates often underestimate number of species as evidenced by the lowest estimate in our first-order jackknife, whereas second-order jackknife estimates often overestimate the number of species (McCune and Grace 2002). In this case, all estimates appear to have underestimated the total number of species in the park. This could be because the jackknife method in general is less useful with a small sample size such as our 16-21 plots. Using all of the plot data (Figure 2), according to the jackknife estimates we have documented between 95 and 100% of the species in the park. Based on our own knowledge of the park and our belief that we have supplemented well the work of Kennemore (1995), we feel that 95-100% of the vascular flora of the park is documented. These numbers should only be used as an estimate, since tests of these indices have shown even the best ones to routinely underestimate the number of species in a park. Since we did sample systematically and without bias, we most likely have a more accurate number than if we had sampled only in areas that were of similar vegetation or only focused on particular parts of the park (Palmer 1990, McCune and Grace 2002).

For an historic park, Kings Mountain National Military Park has a high diversity of ecological community types ranging from temporarily flooded bottomlands to very dry/xeric woodland slopes. Although a significant amount of acreage within the park is still early successional, the majority of the park contains forests of at least 70 years of age. The most globally rare community in the park appears to be the Piedmont Chestnut Oak – Blackjack Oak Woodland. This xeric, fire dependent community may warrant special attention due to its relatively high global rank/rarity (G2G3). Other highly ranked communities that may warrant special attention include the Piedmont Small Stream Sweetgum Forest, the Piedmont Seepage Wetland, and the Piedmont Mesic Basic Oak-Hickory Forest. Each of these forests takes up a relatively small percentage of the park's land but holds a relatively large percentage of the overall biodiversity of the park. In addition, although not considered a "natural community", the old fields within the power line right of ways deserve management attention due to their high level of biodiversity and the fact that they provide habitat for uncommon/rare plant species such as Georgia aster.

There are no occurrences of federal rare or endangered species. However, there is at least one species that is listed as of concern in the state. Georgia aster is found in only a handful of sites in South Carolina and has a spotty distribution throughout its range in Alabama, Georgia, Florida, and North Carolina (NatureServe 2004). In addition, the eastern narrowleaf sedge (*Carex amphibola*) is considered of state concern, even though its global rank is a secure G5.

Most of the remaining species on the species list are G4 or G5 (secure). The most highly ranked species in terms of global rarity in the park include (in alphabetical order) hairy wild indigo (*Baptisia cinerea*) (G3G4, SNR), Virginia thistle (*Cirsium virginianum*)(G3, SNR), sunfacing

coneflower (*Rudbeckia heliopsisidis*)(G2, S1), and Biltmore's carrionflower (*Smilax biltmoreana*)(G3G4, SNR) (NatureServe 2004).

No single habitat type provides refuge for all of the sensitive species mentioned above. Georgia aster seems to occur in power line right of ways that have been cut regularly so as to allow for the most well developed herbaceous vegetation without interference from woody shrubs.

At least 11% (58 species) of the plant species in the park are not native to the region. Most of these species were plantings or are harmless present day components of the flora that found their way into natural areas from plantings or errant seed mixes. However, at least 21 of the 508 species found within the park are considered aggressive invasive species that are severe/significant threats and are actively outcompeting and replacing native species in other parts of the Southeast (Miller 2000). These species are probably the biggest single threat to the overall ecological health of the park at this point in time. Along the wood edges, wisteria (*Wisteria floribunda* and *sinensis*) can take hold and eventually overtake the canopy of stands, causing them to become monocultures of these invasive exotics and thereby seriously reducing biodiversity in the area. In the interior woods and forests, shrubs and vines such as Japanese honeysuckle (*Lonicera japonica*), common periwinkle (*Vinca minor*), and privet (*Ligustrum sinense/vulgare*) all have begun to colonize areas of the understory. Much of the floodplain for the creeks that run through the park is heavily dominated by a combination of exotics, but especially Nepalese browntop (*Microstegium vimineum*), creeping smartweed (*Polygonum cespitosum* var. *longisetum*), and Chinese privet. In the power line rights of way, both wet and dry, multiflora rose (*Rosa multiflora*), mimosa (*Albizia julibrissin*), princess tree (*Paulownia tomentosa*), privet, tree-of-heaven (*Ailanthus altissima*), and Chinese lespedeza (*Lespedeza cuneata*) have colonized areas and seem to be expanding in cover over time. Aggressive, exotic species in old fields include brome (both *Bromus japonicus* and *Bromus secalinus*), yellow sweet-clover (*Melilotus officinalis*), garden vetch (*Vicia sativa* ssp. *Nigra*), and green bristlegrass (*Setaria viridis*). Queen Anne's lace (*Daucus carota*) is considered a "significant threat" though this omnipresent old field species isn't invasive in other habitats and is already an integrated part of the flora so probably does not deserve attention as a threat. Other species may need monitoring and attention to assure that they are not spreading (kudzu (*Pueraria montana*) and English ivy (*Hedera helix*), but the ones mentioned above seem to be the most likely candidates for control in the future. In areas where exotics have become a monoculture, removal should occur in conjunction with planting and seeding of natives to help prevent quick recolonization by the same or new invasive exotic species.

Vegetation community analysis

The unit of association is the finest level of the vegetation classification and is defined as "a plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy" (Grossman et al. 1998). Ecological community information such as that gathered for this project and described in Appendix II can be very useful as a management and monitoring tool for the parks. Once identified to the association level, it is possible for photointerpreters to map these associations and for land managers on a local scale to use the ecological community information gathered by researchers throughout the association's range to make more informed decisions about how to manage locally. In addition to the information contained in Appendix II, we have included the "ecological system" (Comer 2004) to which each association belongs, a global and local description for each association, specific information on the status of each

association both globally and within the park, possible threats to the association in the park, plants of concern found in the park, and management concerns where they apply:

Shortleaf Pine Early-Successional Forest

Identifier: CEGLO06327

Stands of shortleaf pine (*Pinus echinata*) may occur in any upland areas away from steep to moderate slopes. They occur on old abandoned agricultural fields that have been allowed to grow without heavy disturbances such as mowing. The community occurs in the same environment as the loblolly pine (*Pinus taeda*) forests and plantations in other parts of the park. The distribution of these two forests was most likely dictated by the proximity of the land to a seed source of either shortleaf pine or loblolly pine or the planting of either species within the areas that later developed to become pine forest. In either case, the environment of both types of forest is one of past severe natural disturbance followed by a recovery period of between 15 and 60 years.

Stands of this vegetation have very low herbaceous cover. Depending upon the amount of pine beetle damage and the soils, this community may have herbs associated with dry-mesic or xeric communities. Canopy coverage can also vary depending upon the number of canopy pines that were hit by windstorms or pine beetles. Plot 12, for instance, has bracken fern (*Pteridium aquilinum*), Maryland butterfly-pea (*Clitoria mariana*), little bluestem (*Schizachyrium scoparium*), and tickseed (*Coreopsis major*), all species of more open, fairly dry habitats in the Piedmont. The herbaceous stratum may also be dominated by exotics including Japanese honeysuckle or by species highly tolerant of low-nutrient, high-acidity disturbed soils such as fan clubmoss (*Lycopodium digitatum*), poison ivy (*Toxicodendron radicans*), striped prince's pine (*Chimaphila maculata*), Virginia creeper (*Parthenocissus quinquefolia*), and roundleaf catbrier (*Smilax rotundifolia*). The canopy varies greatly depending upon the age of the forest and pine beetle damage. Younger forests (ones that were old fields only 20-40 years ago) may have low canopies without an understory and may be completely dominated by shortleaf pine or mixed with loblolly and Virginia pine (*Pinus virginiana*). On the other hand, older forests (those between 40 and 60 years of age) may be more diverse, since understory species such as tuliptree (*Liriodendron tulipifera*), red maple (*Acer rubrum*), blackjack oak (*Quercus marilandica*), and white oak (*Quercus alba*) may begin to replace the shortleaf pine as they reach the end of their lifespan and begin to senesce.

In the park, this community may intergrade with Loblolly Pine Successional Forest (CEGL008462), although loblolly pine is much less common in the park. In addition, it may be difficult to distinguish from Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest (CEGL007119) on aerial photography since the differences have more to do with the fact that one is successional and the other is not than with floristic differences in the canopy.

This community exists in scattered small to large patches throughout the park on relatively flat upland areas that were plowed and heavily farmed in the recent past (15-60 years ago). It can be the dominant type (a matrix type) in large areas that have been disturbed by plowing in the past 70 years.

Loblolly Pine Successional Forest

Identifier: CEGl008462

This community is found in upland areas within the park that were heavily farmed and then left fallow. The sites tend to be poorly drained uplands.

Within the park, this community type is almost always dominated by stands of loblolly pine, either planted and left untended or generated naturally after abandonment of farmland. Loblolly pine is considered native to bottomlands and river corridors, but is also successful at germinating on fallow agricultural land. Sweetgum (*Liquidambar styraciflua*) often codominates. Understory composition varies depending upon location, pine beetle damage, and moisture regime, but ranges from being dominated by thick stands of Nepalese browntop (*Microstegium vimineum*) and poison ivy in the most mesic examples to having a more sparse and diverse understory in the driest examples.

This community is rare within the park, occurring only in small patches where heavy farming occurred less than about 60 years ago and the land has not yet fully recovered. It is a rare sight in the park since much of the park was farmed but started recovering more than 60 years ago.

Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest

Identifier: CEGl007119

This community may occur on dry narrow ridges and dry upper exposed slopes along the highest ridgelines in the park. Although not documented with the plots that were laid out, we feel that there is a good likelihood that this community exists within the park boundary.

Examples in the park would probably have a somewhat open to closed canopy of Virginia pine with a well developed ericaceous understory.

Virginia Pine Successional Forest

Identifier: CEGl002591

This community exists in small patches in the park, especially in areas that were most heavily farmed and impacted by row crop agriculture. It exists in heavily plowed and eroded areas that were allowed to grow back over the last 10-60 years or so.

The canopy is always dominated by Virginia Pine with a variable understory that is usually very sparse and often is dominated by invasive exotics such as Japanese honeysuckle.

This community occurs in at least a few small patches on the edge of the park in areas heavily impacted by past agricultural practices. It has been heavily impacted by pine beetle damage in the past two decades.

Red-cedar Successional Forest

Identifier: CEGl007124

This community is very rare within the park but exists in small patches in areas of recovering pasture that are no longer being grazed or plowed. This red-cedar community generates on land that is higher in pH than Virginia or shortleaf pine stands.

This community is dominated by young to moderate even aged stands of red-cedar (*Juniperus virginiana* var. *virginiana*) with a subcanopy, shrub, and herbaceous layer that can vary widely by occurrence depending upon moisture, soil nutrients, and disturbance history.

Since Kings Mountain is made up mostly of highly acidic soils, this community is very rare within the park. In fact, our 2004 report did not document any occurrences of this type within the park. However, the Gallyoun et al. (1996) mapping work documented this community type in at least one small patch in the park and work done later in 2004 confirmed its existence within the boundary.

Successional Black Walnut Forest

Identifier: CEG007879

Within the park, this community is limited to very disturbed bottomlands that were formerly homesites or agricultural fields.

Black walnut (*Juglans nigra*) is always the most common canopy tree, but it may be accompanied by tuliptree (*Liriodendron tulipifera*) and red mulberry (*Morus rubra*) in some examples. The understory may contain Northern spicebush (*Lindera benzoin*) in the shrub layer and is dominated by a combination of wingstem (*Verbesina alternifolia*), Nepalese browntop (*Microstegium vimineum*), and assorted other herbaceous species associated with rich floodplain sites.

This association is found only on highly disturbed large creek bottoms. Most of the wider floodplains that can sustain this community are located on the edge of the park.

Successional Sweetgum Forest

Identifier: CEG007216

This association is found in heavily impacted areas in the park, especially underneath and adjacent to power line right of ways or abandoned right of ways where repeated mowing has created conditions more favorable for successional hardwoods and less favorable for pine trees easily killed back by damage to crowns.

This community can range from a very tall canopy to a shrubby canopy that is growing quickly towards the canopy with time. Sweetgum (*Liquidambar styraciflua*) is dominant, often with some tuliptree (< 50%) and often patches of blackberry (*Rubus spp.*) at the shrub level where there are canopy openings.

This community was not documented by plots in this project but was found later during the accuracy assessment work in former power line right of ways that had recently been abandoned or had remained unmowed for more than 3-5 years. It is uncommon rare in the park outside of these right of way areas.

Successional Tuliptree - Hardwood Forest

Identifier: CEGl007221

Within the park, this community is found in areas that were once clearcut or plowed as old fields. They often occur on gentle slopes and ravines that were plowed but that were not colonized by pine trees after abandonment, whereas the pine-dominated successional types tend to occur in more exposed locations on broad ridges and slopes.

Stands are generally dominated by tuliptree. Many stands are codominated by dry-mesic oak species such as chestnut oak (*Quercus prinus*), black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), and white oak (*Quercus alba*) as well as the ubiquitous red maple and sweetgum. Within the park, some examples of this community type are up to 60% oak, but the oak individuals are very young. The herbaceous stratum can vary widely and may include only a handful of dry-site species.

This community is most common on protected slopes and slightly inclining ravines where farming or logging occurred less than 70 years ago. It is a common type in the park.

Piedmont Dry-Mesic Oak - Hickory Forest

Identifier: CEGl008475

This forest occurs on mid and lower, somewhat protected slopes (though on lower slopes it can be present on south-facing slopes). The sites usually have a moderate to steep slope with very acidic dry-mesic soils. This is a matrix type on lower slopes within the park.

Stands of this forest generally have a closed canopy dominated by white oak with black oak, scarlet oak, and tuliptree codominant. In areas that have not been burned, the understory can be very heavily dominated by red maple and sourwood (*Oxydendrum arboreum*). The herbaceous layer is generally sparse with a deep cover of last year's fallen leaves and scattered occurrences of herbs and subshrubs such as blackseed spargrass (*Piptochaetium avenaceum*), striped prince's pine, and cranefly orchid (*Tipularia discolor*). Shrubs range from sparse to moderate in cover and generally include Blue Ridge blueberry (*Vaccinium pallidum*). Muscadine (*Vitis rotundifolia*) is usually also present in small quantities on the ground. This community may intergrade with bottomland vegetation at the foot of slopes that border stream valleys.

This widespread and dominant (matrix) community type occurs on lower and mid slopes and is generally considered intermediate in moisture regime between the upper and mid slope chestnut oak and pine forests and the more mesic creekside and bottomland communities.

Piedmont Mesic Basic Oak - Hickory Forest

Identifier: CEGl003949

Within the park, this community is very rare, with only one accessible well-developed example in a steep ravine and creek slope with a predominantly northern exposure. The community may be influenced by the geology of the site. The circumneutral soils may be a result of a diabase dike or sill running through the area. Further soil analysis may help to determine how different this community is from the surrounding area.

The canopy is dominated by northern red oak (*Quercus rubra*) and often tuliptree in combination with small amounts of white oak and beech (*Fagus grandifolia*). In some cases, beech can be codominant in the canopy. This community exists in ravine areas and is best developed on the north-oriented faces of these ravines. The subcanopy is dominated by umbrella tree (*Magnolia tripetala*), and the herb layer is diverse and moderate in cover with species such as Christmas fern (*Polystichum acrostichoides*), foamflower (*Tiarella cordifolia*), and broadleaf enchanter's nightshade (*Circaea lutetiana*). In addition, indicators of rich, somewhat basic soil, usually associated with the coves of the southern Appalachians 60 miles to the west, are present. These include species such as broad beech fern (*Phegopteris hexagonoptera*), Canada horsebalm (*Collinsonia canadensis*), white wood aster (*Eurybia divaricata*), violet woodsorrel (*Oxalis violacea*), etc. This community is differentiated from non-basic oak-hickory forests by lacking such species as southern red oak (*Quercus falcata*) and sourwood (*Oxydendrum arboreum*).

This community is restricted to north-facing ravines near creek bottoms in the park.

Southern Red Oak - White Oak Mixed Oak Forest

Identifier: C EGL007244

This is perhaps the most common older forest (more than 60-80 years since plowing) in the park. Stands may have existed for over 80 years without major disturbance (besides selective cutting). They occur in the drier uplands of the park away from the more mesic creek bottoms and low slopes on low-fertility acidic soil. Fire may have been a component of this community type in the past, especially if it was very light ground fire. However, it is unclear what exact role it may have had in this community (possibly a transitional community between the fire-free creek slopes and the fire-prone ridges). It is possible that this community was more open when fire was more common on the landscape but has since become a closed-canopy community.

The canopy can vary quite a bit within the park but is always dominated by a combination of southern red oak, scarlet oak, chestnut oak, white oak, black oak, and sometimes northern red oak. The subcanopy is generally very well-developed and contains large amounts of sourwood, red maple, and blackgum (*Nyssa sylvatica*). The shrub stratum is sparse but does often contain blueberry spp. in small quantities. Herbs are uncommon in this community, but false Solomon's seal (*Maianthemum racemosum*), striped prince's pine, little brown jug (*Hexastylis arifolia*), and other dry-mesic subshrubs and herbs may be present in small quantities.

This community occurs in areas between the creek slopes and the ridgelines that have been undisturbed (no plowing, clearcutting, or catastrophic fires) for at least the past 60-80 years.

Xeric Ridgetop Chestnut Oak Forest

Identifier: C EGL008431

This forest is found on ridgetops and exposed upper ridges and very occasionally on very exposed lower slopes where the correct conditions present themselves. Within the park, this community is found over quartzite/schist geology.

Within the park, this community has a closed to slightly open canopy dominated by either chestnut oak or scarlet oak or a combination of both. In addition, southern red oak and black oak can comprise small amounts of the canopy. Forests that have not been disturbed by fires can

have heavy understories of red maple and sourwood. Ericaceous shrubs are usually present in sparse to moderate numbers. Herbaceous cover is generally sparse, but little heartleaf (*Hexastylis minor*), striped prince's pine, cranefly orchid, bracken fern, and other dry-site herbs occur.

This community is widespread on ridges and upper slopes throughout the park.

Felsic Monadnock Forest

Identifier: CEGLO06281

Within the park, this community occurs in large patches on upper slopes and crests of ridges over shallow soils. The soils are extremely acidic and generally support little to no herbaceous or shrub layer. In addition, these ridges are very prone to fire and may have a sparse canopy as a result.

Chestnut oak and/or scarlet oak usually dominate the canopy, although white oak and hickory species can sometimes be co-dominant in the canopy as well. The understory often has substantial amounts of red maple and sourwood. Areas that are regularly burned are much more open. The herb layer is generally sparse but muscadine may be dominant in some patches.

This forest is found throughout the park's upper slopes and ridgecrests.

Piedmont Chestnut Oak - Heath Bluff

Identifier: CEGLO04415

This community exists on steep, usually north facing, protected slopes with a grade of more than 25%. In general, these communities range down to the creek bottomland and can often intergrade with the bottomland types in the park.

This community has a canopy dominated most often by chestnut oak, but also sometimes dominated or codominated by scarlet oak, white oak, and northern red oak. Pine can often be high cover in some examples. The shrub layer is usually dominated 100% by mountain laurel (*Kalmia latifolia*). The herbaceous layer is very sparse, but galax (*Galax urceolata*) is often present.

This community occurs throughout the park in steep protected slopes adjacent to creeks.

Successional Sweetgum Floodplain Forest

Identifier: CEGLO07330

Although not documented by any full plots, this community exists in the most impacted bottomlands in the park. The community may occur on the edges of the park where fields were last abandoned prior to the creation of the current boundary.

The canopy of this bottomland association is dominated by a combination of sweetgum and tuliptree. White oak may sometimes codominate, especially in examples where the floodplain is

particularly narrow and the community intergrades with the adjacent community of C EGL008475.

In bottomland areas of the park. This community was not documented with a plot but exists in the park as a lower quality version of the documented community Piedmont Small Stream Sweetgum – Tuliptree Forest (CEGL004418).

Piedmont Small Stream Sweetgum - Tuliptree Forest

Identifier: C EGL004418

Within the park, communities of this type are found along the narrow floodplains of the perennial creeks that run in and through the park. This community often intergrades with adjacent lower slope communities, especially where the floodplain is narrow.

The canopy, subcanopy, shrub, and herbaceous layers of this community type vary widely within the park depending upon the size of the floodplain, the disturbance history, and the underlying soils. One example of this community had very few canopy sweetgum, but still had the other canopy trees associated with this community (tuliptree, red mulberry, black walnut, etc.). The understory also varies. The shrub layer can include flowering dogwood (*Cornus florida*), northern spicebush, redbud (*Cercis canadensis*), multiflora rose, privet, and ironwood (*Carpinus caroliniana*) in varying amounts. The herbaceous layer is moderate to dense and very diverse. Although these examples usually contain a very large component of invasive exotic species, these species are often outcompeted by natives, and diversity continues to be high as a consequence. Most of the examples of this community in the park have been highly impacted by human disturbance such as plowing, cattle grazing, clearcutting, and erosion upstream. As a consequence, these occurrences are all low-quality occurrences of this relatively highly ranked association.

Again, this community is found throughout the park in the floodplains of flat, wide to narrow stream bottoms of medium-sized creeks.

Piedmont Low-Elevation Headwater Seepage Swamp

Identifier: C EGL004426

This community occurs in very small (usually less than 20 m x 20 m) patches at streamhead areas. Often the sites are on very small flat areas without perennial water flow that sustain high levels of moisture in the spring and during rain events but that are not wet at other times.

The canopy usually consists of at least 25% red maple but can often also contain large amounts of other trees from adjacent slopes or wetland areas (sweetgum, tuliptree, white oak). The shrub layer is often dense with saplings of canopy trees and the herbaceous layer usually contains at least a few cinnamon fern (*Osmunda cinnamomea*), occasionally along with rush (*Juncus*) spp. and sedge (*Carex*) spp. Sphagnum may sometimes be present as well.

This community occurs in very small patches throughout the park (potentially hundreds of occurrences in the upper ends of watersheds).

Appalachian Shortleaf Pine - Mesic Oak Forest

Identifier: C EGL008427

Representatives of this community within the park occur on low, mid, and upper gentle to moderate slopes at various aspects. They are generally intermediately exposed to protected and dry-mesic in nature.

The vegetation varies by occurrence but generally consists of a component of shortleaf pine in the canopy, with shared dominance by white oak, black oak, scarlet oak, and southern red oak. The understory varies but currently appears to be dominated in most examples by a thick stand of red maple. This is probably due to the lack of fire in the park over the past 50 years. The community was most likely tolerant of fire and was probably more open when fire played a greater role in the area. There is now very little regeneration of oak in this community to replace the canopy oaks. Blueberry spp. are important components of the tall- and short-shrub layers. Blue Ridge blueberry (*Vaccinium pallidum*) is common as a short shrub in most occurrences.

This community occurs throughout the park's lower, middle, and upper slopes but not generally on the ridgetops or in the draws.

Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest

Identifier: C EGL007493

This community is probably an intermediate community in terms of moisture regime and exposure between the dry-mesic Appalachian Shortleaf Pine - Mesic Oak Forest (C EGL008427) of the slopes and the xeric Piedmont Rock Chestnut Oak - Blackjack Oak Woodland (C EGL003708) of the south-facing rocky ridges of the park. It is found on exposed lower and mid slopes and some ridges scattered throughout the park. Some examples of this community type may merely be a fire-suppressed, closed-canopy version of Piedmont Rock Chestnut Oak - Blackjack Oak Woodland (C EGL003708). It may be appropriate to group some of the examples of this community in with C EGL003708 when managing communities within the park and deciding on appropriate management techniques.

The canopy is dominated by chestnut oak with southern red oak and scarlet oak. The subcanopy can have a substantial component of blackjack oak along with the more constant sourwood, dogwood, and blackgum. The short-shrub layer is moderately to densely populated with mountain laurel, Blue Ridge blueberry, and sometimes black huckleberry (*Gaylussacia baccata*). Again, this community is very similar to Piedmont Rock Chestnut Oak - Blackjack Oak Woodland (C EGL003708) and may begin to resemble it more with repeated fires.

This type exists in patches throughout the park and can occur in very exposed upper slopes down to less exposed lower slopes.

Loblolly Pine - Tuliptree Successional Bottomland Forest

Identifier: C EGL007546

This wetland forest may occur in the largest creek floodplains in the park. No plot data exist for this type, but it was identified by Gallyoun et al. (1996) as existing in the park and was documented during the 2004 accuracy assessment work.

This successional vegetation is dominated by loblolly pine and tuliptree. The shrub layer varies with each occurrence, but can be sparse or can be dominated by shrubs such as northern spicebush, pawpaw (*Asimina triloba*), or mountain laurel.

This community exists along the largest, widest floodplains in the park.

Piedmont Rock Chestnut Oak - Blackjack Oak Woodland

Identifier: C EGL003708

In the vicinity of Kings Mountain, the geology on which this association occurs is assumed to be "Battleground schist" which includes "Kings Mountain quartzite." This community type is only found on a few sites in Kings Mountain where the geology and aspect (southern aspect) encourage its formation. It is assumed that this community is maintained by a combination of harsh environmental conditions, geology, and fire regime.

The very sparse canopy of this community is generally dominated by chestnut oak, while the understory and tall-shrub layers are dominated by blackjack oak and shortleaf pine. The herb layer can be moderate to sparse, with species generally associated with xeric woodlands. At Kings Mountain, herb layer species include bracken fern, little bluestem, downy danthonia (*Danthonia sericea*), eastern turkeybeard (*Xerophyllum asphodeloides*), panicgrass (*Dichantherium* spp.), etc.

This community occurs on the most exposed upper south facing slopes in the park. It is patchy but may occur in large patches where the conditions are appropriate.

Appalachian Shortleaf Pine - Post Oak Woodland

Identifier: C EGL003765

Within the park, this community occurs on upper slopes and broad ridges in areas with somewhat shallow soils and dry conditions.

The canopy of this stand is dominated by shortleaf pine, post oak (*Quercus stellata*), and blackjack oak but may also contain smaller amounts of white oak and southern red oak. The ericaceous and herb layers vary by occurrence.

This community occurs only on broad ridges over shallow soils where the conditions are somewhat more xeric than in the surrounding forest. It is an uncommon community scattered throughout the park.

Golden Bamboo Shrubland

Identifier: C EGL008560

Disturbed lands where *Phyllostachys aurea* was introduced.

A monoculture of *Phyllostachys aurea*.

This community may exist in the park around an old homesite (but has yet to be documented here).

Blackberry - Greenbrier Successional Shrubland Thicket

Identifier: C EGL004732

This community exists in old field areas that have not been mowed in several years and in powerline rights-of-way within the park that are mowed or brush-hogged on a consistent schedule but not every year.

Stands of this association within the park vary quite a lot in composition. Some examples in old fields are relatively lacking in diversity, mainly composed of blackberry and greenbrier. However, some examples along rights-of-way have become refugia for species that need openings to survive and that can no longer survive in the forests of Kings Mountain NMP due to the lack of canopy openings that were traditionally maintained by fire. In one powerline right-of-way, this community consists of the traditional species such as blackberry and blueberry spp. but also contained species more commonly thought of as prairie or woodland species such as lousewort (*Pedicularis canadensis*), hairy phlox (*Phlox amoena*), false aloe (*Manfreda virginica*), Georgia aster (*Symphotrichum georgianum*), kidneyleaf rosinweed (*Silphium compositum*), Allegheny Mountain goldenbanner (*Thermopsis mollis*), common star-grass (*Hypoxis hirsuta*), and white colicroot (*Aletris farinosa*). These plants exist nowhere else in the park currently, but were most likely an important component of the woodland and savanna vegetation of the park prior to fire suppression. Although this community is a human-created community, within the park it is an important refugia of species and a potential seedbank for restoration of the ecological communities that existed in the park over 200 years ago.

This community exists throughout the park in any old field that has not been mowed or otherwise disturbed for 3-10 years, and along maintained powerline rights-of-way.

Saturated Alder Thicket

Identifier: C EGL003912

This community is documented only from one location in the park, a saturated area beneath a powerline right-of-way. It is not likely to occur in the rest of the heavily wooded park.

This community is dominated by alder (*Alnus serrulata*) with a series of small openings dominated by cinnamon fern and other herbs associated with saturated soil in the Piedmont.

This community is restricted to saturated areas under powerline rights-of-way within the park.

Successional Broomsedge Vegetation

Identifier: C EGL004044

This community is mostly limited to powerline rights-of-way within the park.

Vegetation varies depending upon the moisture regime but is dominated by broomsedge (*Andropogon virginicus*) and other native grasses and herbaceous species.

This community is limited to power line right of ways that are regularly mowed.

Cultivated Meadow

Identifier: CEG004048

This community occurs as an old field on many sites with a regular mowing regime.

Vegetation is dominated by European exotic grasses such as fescue (*Lolium*) spp. Occasionally examples may be diverse and contain a larger component of native species.

Throughout the park in areas that are mowed or otherwise maintained in an early-successional state (fields, monument areas, and some roadsides).

Ecological Community Summary

Of the 27 associations described above, only 13 associations are considered natural/not successional. These thirteen associations occur in areas that have been fallow for more than 70 years or occur in bottomland areas that recover more quickly from stand initiating disturbance. They account for most of the park's acreage. When considering priorities for land management, exotic invasive control, preservation, etc., these communities should take higher priority than the successional and exotic-dominated communities.

Of all the natural communities, the most globally rare community in the park appears to be the Piedmont Chestnut Oak – Blackjack Oak Woodland. This xeric, fire dependent community may warrant special attention due to its relatively high global rank/rarity (G2G3). During fieldwork it was noted that many of these areas have been burned recently.

Other highly ranked communities that may warrant special attention include the Piedmont Small Stream Sweetgum Forest, the Piedmont Seepage Wetland, and the Piedmont Mesic Basic Oak-Hickory Forest. Each of these forests takes up a relatively small percentage of the park's land but holds a relatively large percentage of the overall biodiversity of the park.

The Piedmont Small Stream Sweetgum Forest and Piedmont Seepage Wetland are especially susceptible to invasion by invasive exotics such as Nepalese browntop (*Microstegium vimineum*). The Piedmont Mesic Basic Oak-Hickory Forest only takes up a very small amount of land in the western part of the park, so any park development along Dellingham Branch's north facing slopes should be examined closely to see how it might affect this community type. In addition, although not considered a "natural community", the old fields/shrublands within the power line right of ways deserve management attention due to their high level of biodiversity and the fact that they provide habitat for uncommon/rare plant species such as Georgia aster.

The oak and oak-pine communities in the park are much more common and secure throughout their range than the communities mentioned above. However, the versions of communities within the park are potentially higher quality than those on private lands surrounding the park. The increased reliance on fire in the uplands to maintain an open structure appears to also be increasing the amount of herbaceous cover in some areas of the park underneath the understory. This side effect may potentially benefit the overall biodiversity of the park by creating more habitat for the native species of plants that currently only exist along the power line right of ways in and around the park.

Kings Mountain National Military Park's natural resources are a great asset to the park system. Some of the recommendations for this park in terms of sustaining and promoting increased plant biodiversity include:

- 1) control invasive exotics in all communities, but especially those in and near the Piedmont Small Stream Sweetgum Forest and Piedmont Seepage Wetland and in the power line right of ways. These areas have very high biodiversity, but are also most susceptible to invasion by a number of invasive exotics, especially privet and Japanese honeysuckle.
- 2) Continue to use fire to manage the Piedmont Chestnut Oak – Blackjack Oak Woodland and surrounding dry slopes. The open canopy allows for greater light in the understory and thereby promotes a higher cover of native herbaceous plant species.

- 3) Continue to protect high quality versions of all natural communities within the park. Although many natural communities in the park are globally common, there are few high quality versions of these forests in the Piedmont.

Focus some management on the areas of the power line right of ways that have the highest concentration of native species. These communities are probably the tracts of land that most approach what patches of regularly burned land may have looked like in this area. The plants found in these patches (and along some roadsides in the park) are not found elsewhere in the park, so they should be protected and managed in a way that promotes their populations.

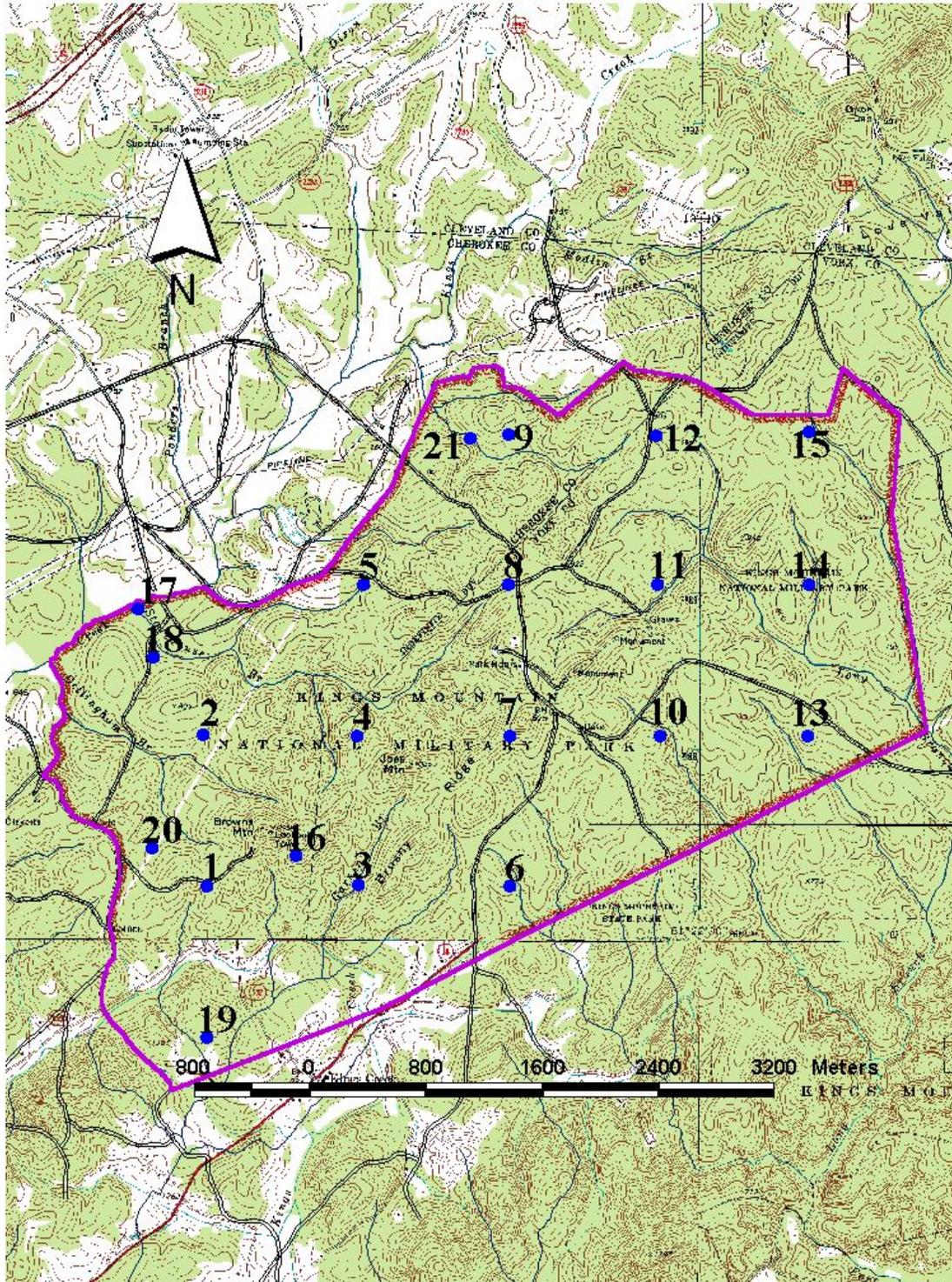
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Figure 1. Map of Kings Mountain National Military Park with all permanent points marked at their actual locations (gridded plots are plots 1-15).

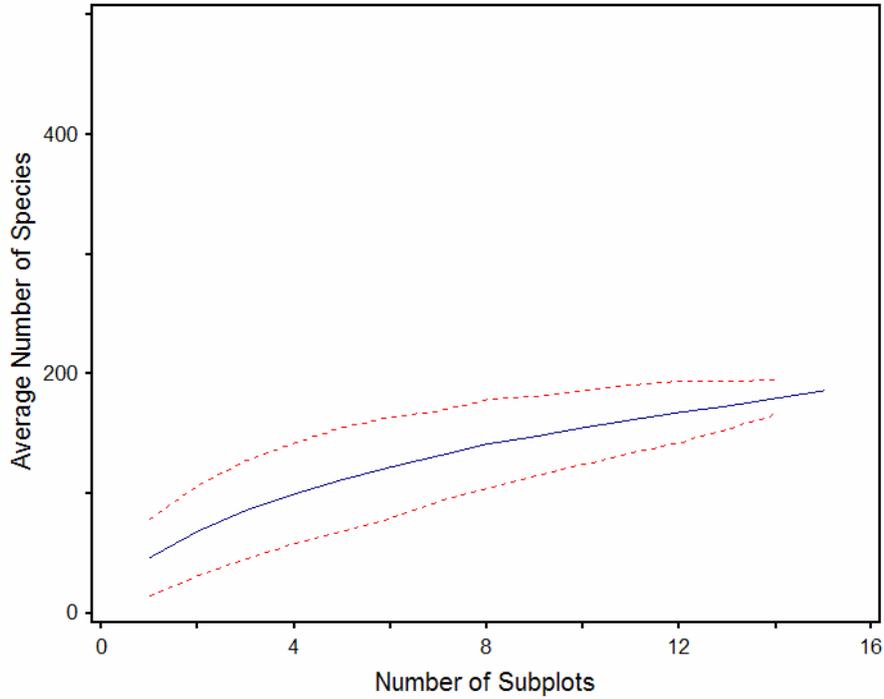


Date: 5-12-04

Image generated by Brigitte O'Donoghue

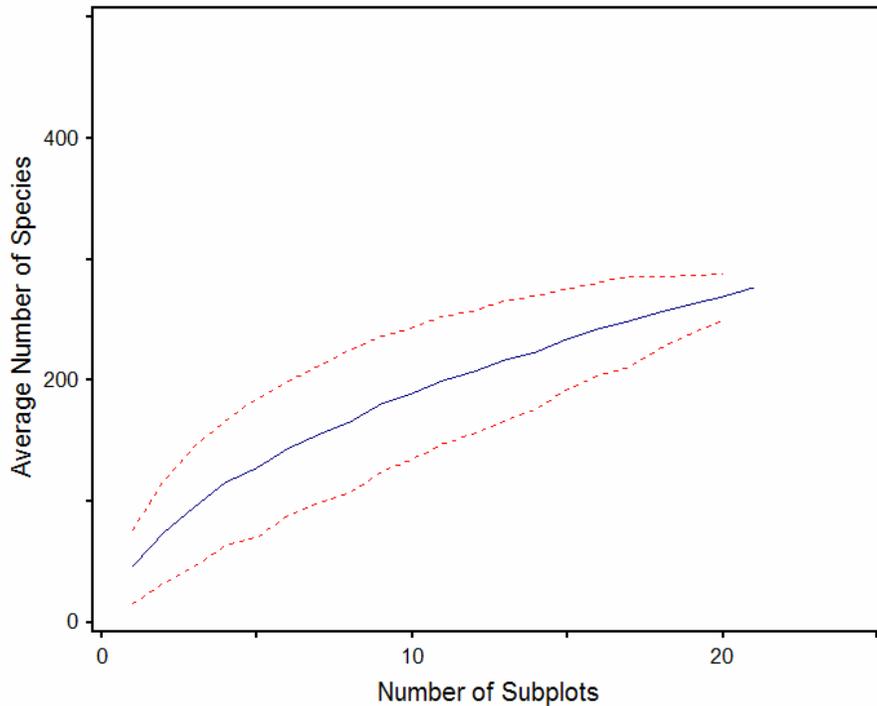
Figure 2. Species area curves for Kings Mountain National Military Park derived using data from a) just the 15 gridded plots in the park and b) all 21 plots.

a)



First-order jackknife estimate of number of species in park = 264.4
Second-order jackknife estimate of number of species in park = 313.1
----- (dotted line) = confidence interval

b)



First-order jackknife estimate of number of species in park = 432.7
Second-order jackknife estimate of number of species in park = 531.6
----- (dotted line) = confidence interval

Table 1. Plot numbers and locations for all permanent plots established at Kings Mountain National Battlefield.

Plot Number	X Coordinate	Y Coordinate	Projection	Zone	Type of plot
1	462705	3887337	NAD83	17	FULL
2	462687	3888303	NAD83	17	FULL
3	463674	3887345	NAD83	17	FULL
4	463670	3888296	NAD83	17	FULL
5	463706	3889259	NAD83	17	FULL
6	464643	3887333	NAD83	17	FULL
7	464641	3888293	NAD83	17	FULL
8	464633	3889263	NAD83	17	FULL
9	464635	3890221	NAD83	17	FULL
10	465606	3888297	NAD83	17	FULL
11	465592	3889262	NAD83	17	FULL
12	465582	3890214	NAD83	17	FULL
13	466545	3888294	NAD83	17	FULL
14	466558	3889262	NAD83	17	FULL
15	466552	3890241	NAD83	17	FULL
16	463278	3887529	NAD83	17	FULL
17	462269	3889105	NAD83	17	FULL
18	462366	3888796	NAD83	17	FULL
19	462706	3886365	NAD83	17	FULL
20	462359	3887574	NAD83	17	FULL
21	464394	3890196	NAD83	17	FULL

Table 2. List of all plants documented for Kings Mountain National Military Park ordered alphabetically by scientific name.

Latin Name	CommonName	TSN	Grank
<i>Acalypha rhomboidea</i>	Virginia threeseed mercury	28193	G5
<i>Acer barbatum</i>	southern sugar maple	28759	G4G5Q
<i>Acer negundo</i>	box elder	28749	G5
<i>Acer rubrum</i>	red maple	28728	G5
<i>Ageratina altissima</i>	white snakeroot	36466	G5
<i>Agrimonia microcarpa</i>	Small-fruited agrimony	25097	G5
<i>Agrostis perennans</i>	Perennial bentgrass	40423	G5
<i>Ailanthus altissima</i>	Tree-of-heaven	28827	GNR
<i>Aira elegans</i>	annual silver hairgrass	564994	GNR
<i>Albizia julibrissin</i>	silk tree	26449	GNR
<i>Aletris farinosa</i>	white colicroot	42769	G5
<i>Allium canadense</i>	meadow onion	42635	G5
<i>Allium vineale</i>	field garlic	42637	GNR
<i>Alnus serrulata</i>	alder	19468	G5
<i>Amaranthus spinosus</i>	thorny pigweed	20748	G5
<i>Ambrosia artemisiifolia</i>	common ragweed	36496	G5
<i>Ambrosia trifida</i>	great ragweed	36521	G5
<i>Amelanchier arborea</i>	downy serviceberry	25110	G5
<i>Amianthium muscitoxicum</i>	flypoison	42775	G4G5
<i>Amphicarpaea bracteata</i>	American hogpeanut	182067	G5
<i>Amsonia tabernaemontana</i>	eastern bluestar	30148	G5
<i>Andropogon ternarius</i>	splitbeard bluestem	40455	G5
<i>Andropogon virginicus</i>	broomsedge	40456	G5
<i>Anemone lancifolia</i>	mountain thimble-weed	18442	G5
<i>Anemone virginiana</i>	Virginia anemone	18451	G5
<i>Antennaria plantaginifolia</i>	plantain-leaf pussytoes	36717	G5
<i>Aphanes microcarpa</i>	slender parsely piert	184594	GNR
<i>Aplectrum hyemale</i>	puttyroot	43489	G5
<i>Arisaema dracontium</i>	green dragon	42529	G5
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	42525	G5
<i>Aristolochia serpentaria</i>	Virginia snakeroot	18342	G4
<i>Arthraxon hispidus</i>	small carpgrass	41445	GNR
<i>Aruncus dioicus</i>	common goatsbeard	25130	G5
<i>Arundinaria gigantea</i>	giant cane	40477	G5
<i>Asarum canadense</i>	Canadian wild ginger	18353	G5
<i>Asclepias tuberosa</i>	butterflyweed	30313	G5?
<i>Asclepias variegata</i>	white milkweed	30319	G5
<i>Asimina parviflora</i>	smallflower pawpaw	18113	G5
<i>Asimina triloba</i>	pawpaw	18117	G5
<i>Asplenium platyneuron</i>	ebony spleenwort	17355	G5
<i>Athyrium filix-femina</i> ssp. <i>asplenioides</i>	lowland ladyfern	17415	G5
<i>Aureolaria virginica</i>	downy false-foxglove	33490	G5
<i>Baptisia alba</i>	prairie false-indigo	26467	G5
<i>Baptisia albescens</i>	spiked wild indigo	192869	G4
<i>Baptisia cinerea</i>	hairy wild-indigo	26472	G3G4

Latin Name	CommonName	TSN	Grank
Baptisia tinctoria	yellow wild-indigo	26489	G4G5
Betula nigra	river birch	19480	G5
Bidens bipinnata	Spanish needles	500993	G5
Bidens frondosa	devil's beggarticks	35707	G5
Bignonia capreolata	crossvine	34307	G5
Boehmeria cylindrica	false nettle	19121	G5
Botrychium biternatum	southern grapefern	17175	G5
Botrychium virginianum	rattlesnake fern	17173	G5
Brachyelytrum erectum	bearded short-husk	41527	G5
Bromus japonicus	Japanese brome	40479	GNR
Bromus latiglumis	earlyleaf brome	40504	G5
Bromus pubescens	hairy wood brome grass	40514	G5
Bromus secalinus	rye brome	40519	GNR
Calycanthus floridus var. glaucus	sweet shrub	527039	G5
Campsis radicans	trumpet creeper	34309	G5
Cardamine hirsuta	hairy bittercress	22797	GNR
Carex amphibola	eastern narrowleaf sedge	39491	G5
Carex annectens	yellow-fruited sedge	39373	G5
Carex atlantica ssp. capillacea	howe sedge	523748	G5Q
Carex caroliniana	Carolina sedge	39382	G5
Carex complanata	hirsute sedge	39551	G5
Carex crinita	fringed sedge	39385	G5
Carex debilis var. pubera	white edge sedge	527086	G5
Carex intumescens	bladder sedge	39403	G5
Carex laxiculmis	spreading sedge	39411	G5
Carex lurida	shallow sedge	39414	G5
Carex retroflexa	reflexed sedge	39782	G5
Carex rosea	rosy sedge	39429	G5
Carex seorsa	weak stellate sedge	39433	G4
Carex sp.	sedge	39369	n/a
Carex styloflexa	bent sedge	39823	G4G5
Carex tenera	slender sedge	39838	G5
Carex torta	twisted sedge	39848	G5
Carex tribuloides	blunt broom sedge	39438	G5
Carex venusta	dark green sedge	39441	G4
Carex vulpinoidea	fox sedge	39442	G5
Carpinus caroliniana	American hornbeam	19504	G5
Carya alba	mockernut hickory	501306	G5
Carya ovata	shagbark hickory	19243	G5
Castanea dentata	American chestnut	19454	G4
Castanea mollissima	Chinese chestnut	501318	GNR
Catalpa speciosa	Northern catalpa	34315	G3G4
Ceanothus americanus	New Jersey tea	28454	G5
Celtis laevigata	sugarberry	19042	G5
Centrosema virginianum	coastal butterfly-pea	25778	G5
Cerastium glomeratum	sticky mouse-ear chickweed	19955	GNR
Cercis canadensis	eastern redbud	25782	G5
Chaerophyllum tainturieri	hairyfruit chervil	29617	G5
Chamaecrista fasciculata	prairie senna	501383	G5

Latin Name	CommonName	TSN	Grank
<i>Chamaecrista nictitans</i>	partridge pea	501388	G5
<i>Chamaelirium luteum</i>	devil's-bit	42894	G5
<i>Chamaesyce nutans</i>	eyebane	501442	G5
<i>Chasmanthium latifolium</i>	fish-on-a-string	41547	G5
<i>Chasmanthium laxum</i>	slender woodoats	41548	G5
<i>Chelone glabra</i>	white turtlehead	33182	G5
<i>Chimaphila maculata</i>	striped prince's pine	23767	G5
<i>Chionanthus virginicus</i>	fringetree	32950	G5
<i>Chrysogonum virginianum</i>	green-and-gold	37045	G5
<i>Chrysopsis mariana</i>	Maryland goldenaster	202495	G5
<i>Cicuta maculata</i> var. <i>maculata</i>	water hemlock	182151	G3G5
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	broadleaf enchanter's nightshade	27569	G5
<i>Cirsium altissimum</i>	tall thistle	36337	G5
<i>Cirsium carolinianum</i>	Carolina thistle	36352	G5
<i>Cirsium horridulum</i>	yellow thistle	36379	G5
<i>Cirsium virginianum</i>	Virginia thistle	36427	G3
<i>Clitoria mariana</i>	Maryland butterfly-pea	26542	G5
<i>Collinsonia canadensis</i>	Canada horsebalm	32474	G5
<i>Commelina communis</i>	Asiatic dayflower	39127	GNR
<i>Conyza canadensis</i>	Canada horseweed	37113	G5
<i>Coreopsis major</i>	wood tickseed	37143	G5
<i>Coreopsis pubescens</i> var. <i>robusta</i>	star tickseed	527493	G5
<i>Cornus amomum</i>	silky dogwood	27799	G5
<i>Cornus florida</i>	flowering dogwood	27806	G5
<i>Crataegus pruinosa</i>	frosted hawthorne	24595	G5
<i>Croton glandulosus</i> var. <i>septentrionalis</i>	vente conmigo	527541	G5
<i>Cruciata pedemontana</i>	pedmont bedstraw	502717	GNR
<i>Cryptotaenia canadensis</i>	Canadian honewort	29475	G5
<i>Cynoglossum virginianum</i>	wild comfrey	31891	G5
<i>Cyperus echinatus</i>	globe flatsedge	501920	G5
<i>Cyperus odoratus</i>	rusty flatsedge	39894	G5
<i>Cyperus refractus</i>	reflexed flatsedge	39897	G5
<i>Cyperus strigosus</i>	straw-colored flatsedge	39901	G5
<i>Cypripedium acaule</i>	moccasin flower	43534	G5
<i>Cypripedium pubescens</i> var. <i>pubescens</i>	greater yellow lady's slipper	566231	G4?
<i>Dactylis glomerata</i>	orchardgrass	193446	GNR
<i>Danthonia sericea</i>	downy danthonia	41635	G5?
<i>Danthonia spicata</i>	poverty oatgrass	41642	G5
<i>Daucus carota</i>	Queen Anne's lace	29477	GNR
<i>Desmodium canescens</i>	hoary ticktrefoil	25792	G5
<i>Desmodium ciliare</i>	hairy small-leaf ticktrefoil	25793	G5
<i>Desmodium nudiflorum</i>	nakedflower ticktrefoil	25812	G5
<i>Desmodium nuttallii</i>	Nuttall's ticktrefoil	25813	G5
<i>Desmodium paniculatum</i>	panickedleaf ticktrefoil	25815	G5
<i>Desmodium viridiflorum</i>	velvetleaf ticktrefoil	25833	G5?
<i>Dichantherium acuminatum</i>	tapered rosette grass	41646	G5

Latin Name	CommonName	TSN	Grank
Dichanthelium acuminatum var. acuminatum	tapered rosette grass	527684	G5
Dichanthelium boscii	Bosc's panicgrass	41655	G5
Dichanthelium commutatum	variable panicgrass	41647	G5
Dichanthelium dichotomum	cypress panicgrass	41659	G5
Dichanthelium dichotomum var. tenue	cypress panicgrass	527694	G5
Dichanthelium laxiflorum	openflower rosette grass	41661	G5
Dichanthelium scoparium	velvet panicum	41651	G5
Dichanthelium sphaerocarpon	roundseed panicgrass	41671	G5
Dichanthelium sphaerocarpon var. isophyllum	roundseed panicgrass	527701	G5
Digitaria filiformis	slender crabgrass	40608	G5
Digitaria ischaemum	smooth crabgrass	40637	GNR
Diodia teres	poorjoe	34789	G5
Dioscorea oppositifolia	Chinese yam	502075	GNR
Dioscorea villosa	wild yam	43367	G4G5
Diospyros virginiana	common persimmon	23855	G5
Duchesnea indica	Indian strawberry	25163	G5
Eclipta prostrata	false daisy	196226	G5
Elephantopus carolinianus	Carolina elephantsfoot	37297	G5
Elephantopus tomentosus	devil's grandmother	37300	G5
Elymus virginicus	Virginia wildrye	40681	G5
Epifagus virginiana	beechdrops	34276	G5
Epigaea repens	trailing arbutus	23646	G5
Equisetum arvense	field horsetail	17152	G5
Eragrostis hirsuta	bigtop lovegrass	40744	G5
Eragrostis spectabilis	purple lovegrass	40717	G5
Erechtites hieracifolia	burnweed	505920	G5
Eremochloa ophiuroides	centipede grass	41713	GNR
Erigeron annuus	daisy fleabane	35804	G5
Erigeron philadelphicus	Philadelphia fleabane	35809	G5
Erigeron pulchellus	robin's plantain	35808	G5
Erigeron strigosus	prairie fleabane	35951	G5
Erythronium americanum	dogtooth violet	196365	G5
Erythronium umbilicatum	dimpled troutlily	42931	G5
Euonymus americanus	hearts-a-bustin'	27947	G5
Eupatorium album	white thoroughwort	35982	G5
Eupatorium album var. album	white thoroughwort	528105	G5
Eupatorium capillifolium	dogfennel	35978	G5
Eupatorium fistulosum	trumpetweed	502509	G5?
Eupatorium hyssopifolium	hyssopleaf thoroughwort	35979	G5
Eupatorium rotundifolium	roundleaf thoroughwort	36001	G5
Eupatorium rotundifolium var. rotundifolium	roundleaf thoroughwort	528121	G5
Eupatorium sessilifolium var. vaseyi	upland boneset	528125	G5
Euphorbia corollata	flowering spurge	28057	G5
Euphorbia pubentissima	flowering spurge	28125	G5
Eurybia divaricata	white wood aster	513440	G5

Latin Name	CommonName	TSN	Grank
<i>Eurybia spectabilis</i>	western showy aster	513460	G5
<i>Fagus grandifolia</i>	American beech	19462	G5
<i>Festuca paradoxa</i>	clustered fescue	40821	G5
<i>Festuca subverticillata</i>	nodding fescue	502612	G5
<i>Fragaria virginiana</i>	Virginia strawberry	24639	G5
<i>Fraxinus americana</i>	white ash	32931	G5
<i>Galactia regularis</i>	eastern milkpea	26699	G5
<i>Galactia volubilis</i>	downy milkpea	26703	G5
<i>Galax urceolata</i>	beetleweed	502705	G5
<i>Galium aparine</i>	stickywilly	34797	G5
<i>Galium circaezans</i>	licorice bedstraw	34800	G5
<i>Galium latifolium</i>	purple bedstraw	34883	G5
<i>Galium pilosum</i>	hairy bedstraw	34907	G5
<i>Gamochaeta purpurea</i>	spoonleaf purple everlasting	37421	G5
<i>Gaylussacia baccata</i>	black huckleberry	23660	G5
<i>Gentiana saponaria</i>	soapwort gentian	29986	G5
<i>Geum canadense</i>	white avens	24645	G5
<i>Gleditsia triacanthos</i>	honeylocust	26714	G5
<i>Glyceria striata</i>	fowl mannagrass	40833	G5
<i>Goodyera pubescens</i>	downy rattlesnake plantain	43594	G5
<i>Gratiola virginiana</i>	roundfruit hedgehyssop	33191	G4G5
<i>Halesia carolina</i>	Carolina silverbell	23864	G4G5
<i>Hedera helix</i>	English ivy	29393	GNR
<i>Helenium amarum</i>	bitterweed	36007	G5
<i>Helianthus atrorubens</i>	purpledisk sunflower	36620	G5
<i>Helianthus decapetalus</i>	forest sunflower	502923	G5
<i>Helianthus divaricatus</i>	woodland sunflower	36636	G5
<i>Helianthus laevigatus</i>	smooth sunflower	36650	G4
<i>Helianthus microcephalus</i>	small woodland sunflower	36654	G5
<i>Hepatica nobilis</i> var. <i>obtusa</i>	roundlobe hepatica	528379	G5
<i>Heuchera americana</i>	American alumroot	24340	G5
<i>Hexastylis arifolia</i>	littlebrownjug	502983	G5
<i>Hexastylis heterophylla</i>	variableleaf heartleaf	502985	G4G5Q
<i>Hexastylis minor</i>	little heartleaf	502987	G4G5Q
<i>Hieracium gronovii</i>	beaked hawkweed	37710	G5
<i>Hieracium venosum</i>	rattlesnake hawksweed	37734	G5
<i>Houstonia caerulea</i>	bluet	35038	G5
<i>Houstonia longifolia</i>	longleaf summer bluet	35045	G4G5
<i>Houstonia purpurea</i>	Venus' pride	35051	G5
<i>Hybanthus concolor</i>	eastern greenviolet	22026	G5
<i>Hydrangea arborescens</i>	wild hydrangea	24195	G5
<i>Hydrangea cinerea</i>	ashy hydrangea	503096	G4
<i>Hypericum drummondii</i>	Drummond St. John's wort	21436	G5
<i>Hypericum hypericoides</i>	St. Andrew's cross	503138	G5
<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>	St. Andrew's cross	524170	G5
<i>Hypericum mutilum</i>	dwarf St. Johnswort	21421	G5
<i>Hypericum nudiflorum</i>	early St. Johnswort	21452	G5
<i>Hypericum punctatum</i>	spotted St. Johnswort	21422	G5

Latin Name	CommonName	TSN	Grank
<i>Hypochaeris radicata</i>	spotted catsear	37794	GNR
<i>Hypoxis hirsuta</i>	common star-grass	503146	G5
<i>Ilex opaca</i>	American holly	27982	G5
<i>Impatiens capensis</i>	jewelweed	29182	G5
<i>Ionactis linariifolius</i>	stiff-leaved aster	507245	G5
<i>Ipomoea lacunosa</i>	whitestar	30776	G5?
<i>Iris cristata</i>	dwarf crested iris	43204	G5
<i>Juglans nigra</i>	black walnut	19254	G5
<i>Juncus effusus</i>	common rush	39232	G5
<i>Juncus tenuis</i>	poverty rush	39243	G5
<i>Juniperus virginiana</i>	eastern redcedar	18048	G5
<i>Kalmia latifolia</i>	mountain laurel	23677	G5
<i>Krigia dandelion</i>	potato dwarf dandelion	37812	G5
<i>Kummerowia striata</i>	Japanese clover	503294	GNR
<i>Lactuca canadensis</i>	wild lettuce	36596	G5
<i>Lactuca floridana</i>	woodland lettuce	36599	G5
<i>Lactuca sp.</i>	wild lettuce	36594	n/a
<i>Lamium amplexicaule</i>	henbit deadnettle	32539	GNR
<i>Leersia virginica</i>	whitegrass	40890	G5
<i>Lespedeza cuneata</i>	Chinese lespedeza	25898	GNR
<i>Lespedeza hirta</i>	hairy lespedeza	25900	G5
<i>Lespedeza repens</i>	creeping lespedeza	503402	G5
<i>Lespedeza X manniana</i>	Mann's lespedeza	25905	?
<i>Lespedeza X nuttallii</i>	Nuttall's lespedeza	25906	?
<i>Leucanthemum vulgare</i>	ox-eye daisy	37903	GNR
<i>Leucothoe axillaris</i>	coastal doghobble	23550	G5
<i>Leucothoe fontanesiana</i>	highland doghobble	23553	G5
<i>Liatris pilosa var. pilosa</i>	shaggy blazing star	531224	G5?
<i>Ligusticum canadense</i>	Canadian licorice-root	29528	G4
<i>Ligustrum sinense</i>	Chinese privet	32979	GNR
<i>Ligustrum vulgare</i>	European privet	32980	GNR
<i>Lilium michauxii</i>	Carolina lily	42741	G4G5
<i>Lindera benzoin</i>	northern spicebush	18147	G5
<i>Linum striatum</i>	ridged yellow flax	29223	G5
<i>Linum virginianum</i>	woodland flax	29202	G4G5
<i>Liquidambar styraciflua</i>	sweetgum	19027	G5
<i>Liriodendron tulipifera</i>	tuliptree	18086	G5
<i>Lobelia cardinalis</i>	cardinalflower	34505	G5
<i>Lobelia elongata</i>	longleaf lobelia	34506	G4G5
<i>Lobelia inflata</i>	Indian-tobacco	34524	G5
<i>Lobelia puberula</i>	downy lobelia	34529	G5
<i>Lolium perenne ssp. multiflorum</i>	Italian ryegrass	524260	GNR
<i>Lonicera japonica</i>	Japanese honeysuckle	35283	GNR
<i>Lonicera sempervirens</i>	trumpet honeysuckle	35303	G5
<i>Luzula acuminata</i>	hairy woodrush	39336	G5
<i>Luzula echinata</i>	hedgohog woodrush	39342	G5
<i>Luzula multiflora</i>	common woodrush	39333	G5
<i>Lycopodium digitatum</i>	fan clubmoss	17028	G5
<i>Lyonia ligustrina</i>	maleberry	23559	G5

Latin Name	CommonName	TSN	Grank
<i>Lysimachia quadrifolia</i>	whorled yellow loosestrife	23997	G5
<i>Magnolia tripetala</i>	umbrella-tree	18077	G5
<i>Maianthemum racemosum</i> ssp. <i>racemosum</i>	false solomon's-seal	524297	G5
<i>Manfreda virginica</i>	false aloe	503687	G5
<i>Matelea gonocarpos</i>	angularfruit milkvine	503702	G5
<i>Medeola virginiana</i>	Indian cucumber	42963	G5
<i>Melilotus officinalis</i>	yellow sweet-clover	26150	GNR
<i>Menispermum canadense</i>	common moonseed	18871	G5
<i>Microstegium vimineum</i>	Nepalese browntop	503829	GNR
<i>Mimosa microphylla</i>	littleleaf sensitive-briar	507831	G5
<i>Mitchella repens</i>	partridgeberry	35063	G5
<i>Monarda clinopodia</i>	white bergamot	32288	G5
<i>Monotropa hypopithys</i>	pinemap	503871	G5
<i>Morus rubra</i>	red mulberry	19070	G5
<i>Muhlenbergia schreberi</i>	nimblewill	41939	G5
<i>Muscari neglectum</i>	starch grape hyacinth	503892	GNR
<i>Myosotis macrosperma</i>	largeseed forget-me-not	31695	G5
<i>Narcissus pseudonarcissus</i>	daffodil	503930	GNR
<i>Nyssa sylvatica</i>	blackgum	27821	G5
<i>Nyssa sylvatica</i> var. <i>sylvatica</i>	blackgum	27822	G5
<i>Obolaria virginica</i>	Virginia pennywort	30104	G5
<i>Oenothera biennis</i>	common evening-primrose	27368	G5
<i>Oenothera fruticosa</i>	narrowleaf evening-primrose	27369	G5
<i>Oenothera fruticosa</i> ssp. <i>glauca</i>	narrowleaf evening-primrose	524358	G5
<i>Ophioglossum vulgatum</i>	Southern adder's-tongue	565333	G5
<i>Orobanche uniflora</i>	oneflowered broomrape	34300	G5
<i>Osmunda cinnamomea</i>	cinnamon fern	17219	G5
<i>Osmunda regalis</i> var. <i>spectabilis</i>	royal fern	529314	G5
<i>Oxalis stricta</i>	yellow woodsorrel	29095	G5
<i>Oxalis violacea</i>	violet woodsorrel	29098	G5
<i>Oxydendrum arboreum</i>	sourwood	23690	G5
<i>Packera anonyma</i>	Small's ragwort	518137	G5
<i>Panicum anceps</i>	beaked panicgrass	40904	G5
<i>Panicum rigidulum</i> var. <i>pubescens</i>	redtop panicgrass	529368	G4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	28602	G5
<i>Paspalum dilatatum</i>	dallasgrass	40997	GNR
<i>Paspalum floridanum</i>	Florida paspalum	40992	G5
<i>Paulownia tomentosa</i>	princesstree	33460	GNR
<i>Pedicularis canadensis</i>	Canadian lousewort	33362	G5
<i>Penstemon australis</i>	Eustis Lake beardtongue	33823	G5
<i>Penstemon laevigatus</i>	eastern smooth beardtongue	33929	G5
<i>Perilla frutescens</i>	beefsteakplant	32634	GNR
<i>Phlox amoena</i>	hairy phlox	30910	G4
<i>Photinia pyrifolia</i>	red chokeberry	565398	G5
<i>Phytolacca americana</i>	American pokeweed	19523	G5
<i>Pinus echinata</i>	shortleaf pine	183335	G5
<i>Pinus virginiana</i>	Virginia pine	183394	G5

Latin Name	CommonName	TSN	Grank
<i>Piptochaetium avenaceum</i>	blackseed speargrass	504408	G5
<i>Pityopsis aspera</i>	pineland silkgrass	196344	G5
<i>Pityopsis graminifolia</i>	narrowleaf silkgrass	196349	G5
<i>Plantago aristata</i>	largebracted plantain	32875	G5
<i>Plantago lanceolata</i>	narrowleaf plantain	32874	G5
<i>Plantago rugelii</i>	blackseed plantain	504439	G5
<i>Plantago virginica</i>	Virginia plantain	32895	G5
<i>Platanthera blephariglottis</i>	white fringed orchid	43419	G4G5
<i>Platanthera clavellata</i>	fringed orchid	43423	G5
<i>Platanus occidentalis</i>	sycamore	19020	G5
<i>Poa annua</i>	annual bluegrass	41107	GNR
<i>Poa autumnalis</i>	autumn bluegrass	41111	G5
<i>Podophyllum peltatum</i>	mayapple	18850	G5
<i>Polygala curtissii</i>	Curtiss' milkwort	29332	G5
<i>Polygonatum biflorum</i>	smooth Solomon's seal	43006	G5
<i>Polygonum cespitosum</i> var. <i>longisetum</i>	creeping smartweed	529778	GNR
<i>Polygonum persicaria</i>	spotted ladythumb	20915	G3G5
<i>Polygonum sagittatum</i>	arrowleaf tearthumb	20863	G5
<i>Polygonum setaceum</i>	bog smartweed	20926	G5
<i>Polygonum virginianum</i>	jumpseed	20931	G5
<i>Polystichum acrostichoides</i>	Christmas fern	17675	G5
<i>Potentilla canadensis</i>	dwarf cinquefoil	24698	G5
<i>Prenanthes altissima</i>	tall rattlesnakeroot	38273	G5?
<i>Prenanthes serpentaria</i>	lion's foot	38286	G5
<i>Prenanthes trifoliolata</i>	gall of the earth	504596	G5
<i>Prunella vulgaris</i>	common selfheal	32381	G5
<i>Prunus angustifolia</i>	Chickasaw plum	24768	G5
<i>Prunus serotina</i>	black cherry	24764	G5
<i>Pseudognaphalium obtusifolium</i> ssp. <i>obtusifolium</i>	rabbit tobacco	525057	G5
<i>Pteridium aquilinum</i>	bracken fern	17224	G5
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	529930	GNR
<i>Pycnanthemum montanum</i>	thinleaf mountainmint	32653	G3G5
<i>Pyrrhopappus carolinianus</i>	Carolina desert-chicory	38324	G5
<i>Quercus alba</i>	white oak	19290	G5
<i>Quercus coccinea</i>	scarlet oak	19288	G5
<i>Quercus falcata</i>	southern red oak	19277	G5
<i>Quercus marilandica</i>	blackjack oak	19374	G5
<i>Quercus nigra</i>	water oak	19280	G5
<i>Quercus phellos</i>	willow oak	19282	G5
<i>Quercus prinus</i>	chestnut oak	19398	G5
<i>Quercus rubra</i>	northern red oak	19408	G5
<i>Quercus stellata</i>	post oak	19422	G5
<i>Quercus velutina</i>	black oak	19447	G5
<i>Ranunculus abortivus</i>	littleleaf buttercup	18559	G5
<i>Ranunculus hispidus</i>	bristly buttercup	18613	G5
<i>Ranunculus hispidus</i> var. <i>nitidus</i>	bristly buttercup	194960	G5
<i>Ranunculus recurvatus</i>	blisterwort	18641	G5

Latin Name	CommonName	TSN	Grank
Ranunculus sardous	hairy buttercup	18645	GNR
Rhexia mariana var. mariana	Maryland meadowbeauty	529993	G5
Rhododendron periclymenoides	pink azalea	23726	G5
Rhus copallina	dwarf sumac	28773	G5
Rhus glabra	smooth sumac	28782	G5
Robinia hispida	bristly locust	26191	G4
Robinia pseudoacacia	black locust	504804	G5
Robinia viscosa	clammy locust	26198	G3
Rosa multiflora	multiflora rose	24833	GNR
Rosa wichuraiana	memorial rose	24846	GNR
Rubus argutus	sawtooth blackberry	24877	G5
Rubus flagellaris	northern dewberry	24921	G4G5Q
Rubus trivialis	southern dewberry	25067	G5
Rudbeckia heliopsisidis	sunfacing coneflower	36774	G2
Rudbeckia hirta	blackeyed Susan	36765	G5
Rudbeckia laciniata	cutleaf coneflower	36775	G5
Rudbeckia laciniata var. digitata	cutleaf coneflower	530175	G5
Ruellia caroliniensis	Carolina wild petunia	34373	G5
Rumex crispus	curly dock	20937	GNR
Rumex obtusifolius	bitter dock	20939	GNR
Sabatia angularis	rosepink	30005	G5
Saccharum alopecuroidum	silver plumegrass	504929	G5
Saccharum brevibarbe var. contortum	bent-awn plumegrass	531431	G3G5
Salix sericea	silky willow	22496	G5
Salvia lyrata	lyreleaf sage	32690	G5
Samolus valerandi ssp. parviflorus	water pimpernel	524659	G5
Sanguinaria canadensis	bloodroot	18990	G5
Sanicula canadensis	Canadian blacksnakeroot	29850	G5
Sanicula odorata	clustered blacksnakeroot	505004	G5
Sassafras albidum	sassafras	18158	G5
Schizachyrium scoparium	little bluestem	42076	G5
Schizachyrium scoparium var. scoparium	little bluestem	530264	G5
Schoenoplectus tabernaemontani	great bulrush	507797	G5
Scirpus cyperinus	woolgrass	40228	G5
Scirpus georgianus	Georgia bulrush	40259	G5
Scirpus polyphyllus	leafy bulrush	40274	G5
Scutellaria elliptica	hairy skullcap	32796	G5
Scutellaria integrifolia	helmet flower	32801	G5
Selaginella apoda	meadow spikemoss	17066	G5
Senna occidentalis	septicweed	505166	GNR
Sericocarpus asteroides	white-topped aster	508089	G5
Sericocarpus linifolius	narrowleaf aster	508090	G5
Setaria parviflora	marsh bristlegrass	505191	G5
Setaria viridis	green bristlegrass	41231	GNR
Silene virginica	fire pink	20141	G5
Silphium astericus var. laevicaule	starry rosinweed	521532	G5
Silphium compositum	kidneyleaf rosinweed	38394	G5

Latin Name	CommonName	TSN	Grank
<i>Sisyrinchium albidum</i>	white blue-eyed grass	43241	G5?
<i>Sisyrinchium angustifolium</i>	narrowleaf blue-eyed grass	43240	G5
<i>Smallanthus uvedalia</i>	Bear's foot	38419	G4G5
<i>Smilax biltmoreana</i>	Biltmore's carrionflower	505253	G3G4
<i>Smilax glauca</i>	cat greenbrier	43342	G5
<i>Smilax herbacea</i>	smooth carrionflower	43356	G5
<i>Smilax rotundifolia</i>	roundleaf greenbrier	43346	G5
<i>Smilax smallii</i>	lanceleaf greenbrier	505258	G5?
<i>Solanum americanum</i>	American black nightshade	565523	G5
<i>Solanum carolinense</i>	Carolina horsenettle	30413	G5
<i>Solidago arguta</i> var. <i>caroliniana</i>	Atlantic goldenrod	530438	G5
<i>Solidago latissimifolia</i>	Elliott's goldenrod	505283	G5
<i>Solidago nemoralis</i>	gray goldenrod	36281	G5
<i>Solidago odora</i>	anisescented goldenrod	36284	G5
<i>Solidago puberula</i>	downy goldenrod	36294	G5
<i>Solidago puberula</i> var. <i>pulverulenta</i>	downy goldenrod	530472	G5
<i>Solidago rugosa</i>	rough-leaf goldenrod	36299	G5
<i>Solidago</i> sp.	goldenrod	36223	n/a
<i>Solidago speciosa</i> var. <i>erecta</i>	showy goldenrod	530478	G5
<i>Solidago tortifolia</i>	twistleaf goldenrod	36316	G4G5
<i>Sorghastrum nutans</i>	Indiangrass	42102	G5
<i>Sphenopholis intermedia</i>	slender wedgescale	505324	G5
<i>Sphenopholis nitida</i>	shiny wedgescale	41281	G5
<i>Sphenopholis pensylvanica</i>	swamp wedgescale	41282	G4
<i>Spiranthes lacera</i> var. <i>gracilis</i>	northern slender ladies'-tresses	530529	G5
<i>Spiranthes praecox</i>	greenvein ladies'-tresses	43447	G5
<i>Staphylea trifolia</i>	American bladdernut	28646	G5
<i>Stellaria media</i>	common chickweed	20169	GNR
<i>Stellaria pubera</i>	star chickweed	20193	G5
<i>Stylosanthes biflora</i>	sidebeak pencilflower	26973	G5
<i>Symphyotrichum concolor</i>	eastern silver aster	522192	G4?
<i>Symphyotrichum cordifolium</i>	common blue wood aster	522193	G5
<i>Symphyotrichum dumosum</i> var. <i>dumosum</i>	rice button aster	566329	G5
<i>Symphyotrichum georgianum</i>	Georgia aster	522211	G2G3
<i>Symphyotrichum lateriflorum</i> var. <i>lateriflorum</i>	starved aster	566334	G5
<i>Symphyotrichum patens</i> var. <i>patens</i>	late purple aster	566339	G5
<i>Symphyotrichum pilosum</i> var. <i>pilosum</i>	frost aster	566340	G5
<i>Symphyotrichum puniceum</i> var. <i>puniceum</i>	purplestem aster	566343	G5
<i>Symplocos tinctoria</i>	horse-sugar	23878	G5
<i>Taraxacum officinale</i>	common dandelion	36213	GNR
<i>Tephrosia spicata</i>	spiked hoarypea	26996	G4G5
<i>Tephrosia virginiana</i>	goat's rue	26998	G5
<i>Thalictrum revolutum</i>	waxy leaf meadow-rue	18660	G5
<i>Thalictrum thalictroides</i>	rue anemone	18683	G5

Latin Name	CommonName	TSN	Grank
<i>Thaspium barbinode</i>	hairyjoint meadowparsnip	29888	G5
<i>Thaspium trifoliatum</i>	purple meadowparsnip	29890	G5
<i>Thelypteris noveboracensis</i>	New York fern	17261	G5
<i>Thermopsis fraxinifolia</i>	ashleaf goldenbanner	508156	G3?
<i>Thermopsis mollis</i>	Allegheny Mountain goldenbanner	27002	G4?
<i>Tiarella cordifolia</i>	heartleaf foamflower	24530	G5
<i>Tiarella cordifolia</i> var. <i>collina</i>		530685	G5
<i>Tilia americana</i> var. <i>heterophylla</i>	white basswood	530692	G5
<i>Tipularia discolor</i>	crippled crane-fly	43703	G4G5
<i>Toxicodendron pubescens</i>	poison oak	505545	G5
<i>Toxicodendron radicans</i>	poison ivy	28821	G5
<i>Tragia urens</i>	wavyleaf noseburn	28436	G5
<i>Tragia urticifolia</i>	nettleleaf noseburn	28437	G5
<i>Tridens flavus</i>	purpletop tridens	42227	G5
<i>Trifolium dubium</i>	suckling clover	26205	GNR
<i>Trifolium pratense</i>	red clover	26313	GNR
<i>Trifolium repens</i>	white clover	26206	GNR
<i>Tripsacum dactyloides</i>	eastern gamagrass	41287	G5
<i>Triticum aestivum</i>	common wheat	42237	GNR
<i>Tsuga canadensis</i>	eastern hemlock	183397	G5
<i>Ulmus alata</i>	winged elm	19051	G5
<i>Ulmus rubra</i>	slippery elm	19050	G5
<i>Uvularia puberula</i>	mountain bellwort	43111	G5
<i>Uvularia sessilifolia</i>	sessileleaf bellwort	43112	G5
<i>Vaccinium arboreum</i>	farkleberry	23580	G5
<i>Vaccinium corymbosum</i>	highbush blueberry	23573	G5
<i>Vaccinium elliotii</i>	Elliott's blueberry	23592	G5Q
<i>Vaccinium pallidum</i>	Blue Ridge blueberry	23610	G5
<i>Vaccinium stamineum</i>	deerberry	23615	G5
<i>Vaccinium tenellum</i>	small black blueberry	23616	G5
<i>Valerianella locusta</i>	European cornsalad	35392	G5
<i>Valerianella radiata</i>	beaked cornsalad	35397	G5
<i>Verbesina alternifolia</i>	wingstem	38597	G5
<i>Vernonia glauca</i>	broadleaf ironweed	38637	G5
<i>Veronica hederifolia</i>	ivyleaf speedwell	33418	GNR
<i>Veronica officinalis</i>	common gypsyweed	33398	G5
<i>Veronica persica</i>	birdeye speedwell	33405	GNR
<i>Viburnum prunifolium</i>	blackhaw	35253	G5
<i>Vicia caroliniana</i>	Carolina vetch	26334	G5
<i>Vicia sativa</i> ssp. <i>nigra</i>	garden vetch	524809	GNR
<i>Vinca minor</i>	common periwinkle	30238	GNR
<i>Viola hastata</i>	halberdleaf yellow violet	22086	G5
<i>Viola pedata</i>	birdfoot violet	22130	G5
<i>Viola sororia</i>	woolly blue violet	22169	G5
<i>Viola x primulifolia</i>	primrose violet	22143	G5
<i>Vitis cinerea</i>	graybark grape	28615	G4G5
<i>Vitis labrusca</i>	fox grape	28608	G5
<i>Vitis rotundifolia</i>	muscadine	28609	G5

Latin Name	CommonName	TSN	Grank
<i>Vitis vulpina</i>	frost grape	28610	G5
<i>Waldsteinia fragarioides</i>	Appalachian barren strawberry	505735	G5
<i>Wisteria floribunda</i>	Japanese wisteria	27020	GNR
<i>Wisteria sinensis</i>	Chinese wisteria	27023	GNR
<i>Woodwardia areolata</i>	netted chain fern	17749	G5
<i>Xanthorhiza simplicissima</i>	yellowroot	18809	G5
<i>Xerophyllum asphodeloides</i>	eastern turkeybeard	505767	G4
<i>Yucca filamentosa</i>	Adam's needle	43140	G5
<i>Zephyranthes atamasca</i>	Atamasco lily	505791	G4G5
<i>Zizia trifoliata</i>	meadow alexanders	29908	G5

Numeric rank

G1 = Critically imperiled globally

G2 = Imperiled globally

G3 = Rare or uncommon

G4 = Widespread, abundant, and apparently secure, but with cause for long-term concern

G5 = Demonstrably widespread, abundant and secure

G? = Unranked

GNR = Not ranked (usually because it is an exotic species)

n/a = not ranked (usually because only genus was identified)

Qualifiers:

? = Inexact numeric rank

Q = Questionable taxonomy

Table 3. List of vouchers that were collected at Kings Mountain National Military Park.

Standard Latin Name	Common Name	Catalog #	Collector	Habitat
<i>Aletris farinosa</i>	white colicroot	3180	Govus, T., White, R.	Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest
<i>Asimina parviflora</i>	smallflower pawpaw	3181	Govus, T., White, R.	Submesic mixed hardwood
<i>Baptisia albescens</i>	spiked wild indigo	3183	Govus, T., White, R.	Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia) Shrubland
<i>Carex amphibola</i>	eastern narrowleaf sedge	3184	Govus, T., Martinez, R.	Liriodendron - Morus rubra - Juglans nigra bottomland
<i>Carex laxiculmis</i>	spreading sedge	3185	Govus, T., White, R.	Quercus rubra - Liriodendron / Magnolia tripetala/ mixed herb forest
<i>Carex seorsa</i>	weak stellate sedge	3186	Govus, T., Martinez, R.	Liriodendron - Morus rubra - Juglans nigra bottomland
<i>Carex</i> sp.	sedge (unknown)	3187	Govus, T., Martinez, R.	Liriodendron - Morus rubra - Juglans nigra bottomland
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	broadleaf enchanter's nightshade	3188	Govus, T., White, R.	Quercus rubra - Liriodendron / Magnolia tripetala/ mixed herb forest
<i>Coreopsis pubescens</i> var. <i>robusta</i>	star tickseed	3189	NatureServe	Power line right of way
<i>Dichanthelium</i> <i>commutatum</i>	variable panicgrass	3190	Govus, T., Martinez, R.	Quercus marilandica / Vaccinium arboreum woodland
<i>Erythronium umbilicatum</i>	dimpled troutlily	3191	Govus, T., Martinez, R.	Liriodendron - Morus rubra - Juglans nigra bottomland
<i>Eurybia divaricata</i>	white wood aster	3192	Govus, T., White, R.	Quercus rubra - Liriodendron / Magnolia tripetala/ mixed herb forest
<i>Gaylussacia baccata</i>	black huckleberry	3193	Govus, T., White, R., Martinez, R.	Quercus prinus - Quercus coccinea - Pinus echinata forest
<i>Hypericum hypericoides</i>	St. Andrew's cross	3194	Govus, T., White, R., Martinez, R.	Quercus marilandica woodland
<i>Lactuca</i> sp.	wild lettuce	3195	Govus, T., Martinez, R.	Quercus marilandica / Vaccinium arboreum woodland
<i>Lespedeza</i> x <i>nuttallii</i>	Nuttall's lespedeza	3196	Govus, T., White, R., Martinez, R.	Shortleaf pine forest
<i>Mimosa microphylla</i>	littleleaf sensitive- briar	3197	Govus, T., White, R.	Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest

Standard Latin Name	Common Name	Catalog #	Collector	Habitat
<i>Ophioglossum vulgatum</i>	southern adder's-tongue	3198	NatureServe	Bottomland forest
<i>Rubus argutus</i>	sawtooth blackberry	3199	Govus, T., White, R.	Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest
<i>Rubus enslenii</i> (=Rubus flagellaris)	northern dewberry	3200	Govus, T., White, R.	Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest
<i>Sanicula odorata</i>	clustered blacksnakeroot	3201	Govus, T., White, R.	Quercus rubra - Liriodendron / Magnolia tripetala/ mixed herb forest
<i>Smilax biltmoreana</i>	Biltmore's carrionflower	3203	Govus, T., White, R.	Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest
<i>Smilax biltmoreana</i>	Biltmore's carrionflower	3202	Govus, T., White, R., Martinez, R.	Quercus alba - Quercus prinus - Carya forest
<i>Symphiotrichum georgianum</i>	Georgia aster	3182	NatureServe	Power line right of way
<i>Vaccinium tenellum</i>	small black blueberry	3204	Govus, T., White, R., Martinez, R.	Quercus alba - Quercus prinus - Carya forest

Table 4. Tables of vascular plant diversity measures and species total estimates for Kings Mountain National Military Park

	Diversity Measures			
	N	alpha	beta	Gamma
Gridded plots only	15	45.5	4.1	185
All plots	21	45.6	6.1	276
Total for park				508

alpha = average species richness per plot

beta = measure of the heterogeneity of the data

(gamma/alpha)

gamma = total species for all plots/park

	Estimate of # of species in park	If estimate is correct, % of species confirmed for park (based on 508 species confirmed)
First-order jackknife estimate (all plots)	432.7	117%
Second-order jackknife estimate (all plots)	531.6	96%
First-order jackknife estimate (gridded plots)	264.4	192%
Second-order jackknife estimate (gridded plots)	313.1	162%

Table 5. Exotic plant species at Kings Mountain National Military Park.

Latin Name	CommonName	TSN	Threat?	Source
<i>Ailanthus altissima</i>	Tree-of-heaven	28827	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
<i>Aira elegans</i>	annual silver hairgrass	564994	Not perceived as a threat	
<i>Albizia julibrissin</i>	silk tree	26449	Severe Threat	Tennessee Exotic Pest Plants Council 2001
<i>Allium vineale</i>	field garlic	42637	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Aphanes microcarpa</i>	slender parsley piert	184594	Not perceived as a threat	
<i>Arthraxon hispidus</i>	small carpgrass	41445	Threat	Southern Weed Science Society 1998
<i>Bromus japonicus</i>	Japanese brome	40479	Significant Threat	Tennessee Exotic Pest Plants Council 2001
<i>Bromus secalinus</i>	rye brome	40519	Significant Threat	Tennessee Exotic Pest Plants Council 2001
<i>Cardamine hirsuta</i>	hairy bittercress	22797	Not perceived as a threat	
<i>Castanea mollissima</i>	Chinese chestnut	501318	Not perceived as a threat	
<i>Cerastium glomeratum</i>	sticky mouse-ear chickweed	19955	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Commelina communis</i>	Asiatic dayflower	39127	Threat	Southern Weed Science Society 1998
<i>Cruciata pedemontana</i>	piedmont bedstraw	502717	Not perceived as a threat	
<i>Dactylis glomerata</i>	orchardgrass	193446	Not perceived as a threat	
<i>Daucus carota</i>	Queen Anne's lace	29477	Significant Threat	Tennessee Exotic Pest Plants Council 2001
<i>Digitaria ischaemum</i>	smooth crabgrass	40637	Not perceived as a threat	Southern Weed Science Society 1998
<i>Dioscorea oppositifolia</i>	Chinese yam	502075	Threat	Southern Weed Science Society 1998
<i>Eremochloa ophiuroides</i>	centipede grass	41713	Not perceived as a threat	

Latin Name	CommonName	TSN	Threat?	Source
Gleditsia triacanthos	honey locust	26714	Introduced locally (native to U.S.)	Weakley 2003
Hedera helix	English ivy	29393	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
Hypochaeris radicata	spotted catsear	37794	Not perceived as a threat	
Kummerowia striata	Japanese clover	503294	Lesser Threat	Tennessee Exotic Pest Plants Council 2001
Lamium amplexicaule	henbit deadnettle	32539	On list for So. Weed Society	Southern Weed Science Society, Weeds of the United States and Canada
Lespedeza cuneata	Chinese lespedeza	25898	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
Leucanthemum vulgare	ox-eye daisy	37903	Not perceived as a threat	
Ligustrum sinense	Chinese privet	32979	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
Ligustrum vulgare	European privet	32980	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
Lolium perenne ssp. multiflorum	Italian ryegrass	524260	Not perceived as a threat	
Lonicera japonica	Japanese honeysuckle	35283	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
Melilotus officinalis	yellow sweet-clover	26150	Significant Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1997
Microstegium vimineum	Nepalese browntop	503829	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1997
Muscari neglectum	starch grape hyacinth	503892	Not perceived as a threat	
Narcissus pseudonarcissus	daffodil	503930	Not perceived as a threat	
Paspalum dilatatum	dallasgrass	40997	Not perceived as a threat	

Latin Name	CommonName	TSN	Threat?	Source
<i>Paulownia tomentosa</i>	princesstree	33460	Severe Threat	Tennessee Exotic Pest Plants Council 2001
<i>Perilla frutescens</i>	beefsteakplant	32634	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Poa annua</i>	annual bluegrass	41107	Not perceived as a threat	
<i>Polygonum cespitosum</i> var. <i>longisetum</i>	creeping smartweed	529778	Significant Threat	Tennessee Exotic Pest Plants Council 2001
<i>Pueraria montana</i> var. <i>lobata</i>	kudzu	529930	Severe Threat	Tennessee Exotic Pest Plants Council 2001; Miller 1997
<i>Ranunculus sardous</i>	hairy buttercup	18645	On list	Southern Weed Science Society 1998
<i>Rosa multiflora</i>	multiflora rose	24833	Severe Threat	Tennessee Exotic Pest Plants Council 2001
<i>Rosa wichuraiana</i>	memorial rose	24846	Not perceived as a threat	
<i>Rumex crispus</i>	curly dock	20937	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Rumex obtusifolius</i>	bitter dock	20939	Not perceived as a threat	
<i>Senna occidentalis</i>	septicweed	505166	On list for So. Weed Society	Southeast Exotic Pest Plants Council 1996
<i>Setaria viridis</i>	green bristlegrass	41231	Significant Threat	Tennessee Exotic Pest Plants Council 2001
<i>Stellaria media</i>	common chickweed	20169	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Taraxacum officinale</i>	common dandelion	36213	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Trifolium dubium</i>	suckling clover	26205	Not perceived as a threat	
<i>Trifolium pratense</i>	red clover	26313	Not perceived as a threat	
<i>Trifolium repens</i>	white clover	26206	Not perceived as a threat	
<i>Triticum aestivum</i>	common wheat	42237	Not perceived as a threat	
<i>Veronica hederifolia</i>	ivyleaf speedwell	33418	Not	

Latin Name	CommonName	TSN	Threat?	Source
			perceived as a threat	
Veronica persica	birdeye speedwell	33405	Not perceived as a threat	
Vicia sativa ssp. nigra	garden vetch	524809	Significant Threat	Tennessee Exotic Pest Plants Council 2001
Vinca minor	common periwinkle	30238	Significant Threat	Tennessee Exotic Pest Plants Council 2001
Wisteria floribunda	Japanese wisteria	27020	Significant Threat	Tennessee Exotic Pest Plants Council 2001
Wisteria sinensis	Chinese wisteria	27023	Significant Threat	Tennessee Exotic Pest Plants Council 2001

"Severe Threat" - Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation; includes species that are or could become widespread.

"Significant Threat" - Exotic plant species that possess characteristics of invasive species but are not presently considered to spread as easily into native plant communities as those species listed as "Severe Threat".

Table 6. Association numbers, plot numbers, and global ranks of all associations identified at Kings Mountain National Military Park (not yet populated).

CEGL #	Ecological Systems (Comer 2004)	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
6327	Human Modified / Successional	<i>Pinus echinata</i> Early Successional Forest	Shortleaf Pine Early Successional Forest	Shortleaf Pine Early Successional Forest	12	GNA
8462	Human Modified/ Successional	<i>Pinus taeda</i> – <i>Liquidambar styraciflua</i> Semi-natural Forest	Loblolly Pine – Sweetgum Semi-Natural Forest	Loblolly Pine Successional Forest		GNA
7119	Southern Appalachian Low Mountain Pine Forest	<i>Pinus virginiana</i> – <i>Pinus (rigida, echinata)</i> – (<i>Quercus prinus</i>) / <i>Vaccinium pallidum</i> Forest	Virginia Pine – (Pitch Pine, Shortleaf Pine) – (Rock Chestnut Oak) / Hillside Blueberry Forest	Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest		G4?
2591	Human Modified / Successional	<i>Pinus virginiana</i> Successional Forest	Virginia Pine Successional Forest	Virginia Pine Successional Forest		GNA
7124	Human Modified / Successional	<i>Juniperus virginiana</i> var. <i>virginiana</i> – (<i>Quercus</i> sp.) Forest	Eastern Red Cedar – (Oak Sp.) Forest	Red-Cedar Successional Forest		GNA
7879	Semi-Natural Wooded Uplands	<i>Juglans nigra</i> / <i>Verbesina alternifolia</i> Forest	Black Walnut / Common Wingstem Forest	Successional Black Walnut Forest	17	GD
7216	Human Modified / Successional	<i>Liquidambar styraciflua</i> Forest	Sweetgum Forest	Successional Sweetgum Forest		GNA
7221	Human Modified / Successional	<i>Liriodendron tulipifera</i> - <i>Acer rubrum</i> - <i>Quercus</i> spp. Forest	Tuliptree - Red Maple - Oak species Forest	Successional Tuliptree - Hardwood Forest	2, 5	GNA
8475	Southern Piedmont Dry Oak – (Pine) Forest	<i>Quercus alba</i> - <i>Quercus (rubra, coccinea)</i> - <i>Carya (alba, glabra)</i> / <i>Vaccinium pallidum</i> Piedmont Dry-Mesic Forest	White Oak - (Northern Red Oak, Scarlet Oak) - (Mockernut Hickory, Pignut Hickory) / Hillside Blueberry Piedmont Dry-Mesic Forest	Piedmont Dry-Mesic Oak-Hickory Forest	5,6	G5

CEGL #	Ecological Systems (Comer 2004)	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
3949	Southern Piedmont Mesic Forest	Quercus rubra / Magnolia tri – Cercis Canadensis / Actaea Racemosa – Tiarella Cordifolia Forest	Red Oak / Umbrella Magnolia – Redbud / Black Bugbane – Heart-leaf Foamflower Forest	Piedmont Mesic Basic Oak-Hickory Forest	18	G3?
7244	Southern Piedmont Dry Oak – (Pine) Forest	Quercus falcata - Quercus alba - Carya alba / Oxydendrum arboreum / Vaccinium stamineum Forest	Southern Red Oak - White Oak - Mockernut Hickory / Sourwood / Deerberry Forest	Interior Southern Red Oak - White Oak Forest	11, 14, 19	G4G5
8431	Southern Piedmont Dry Oak – (Pine) Forest	Quercus prinus - (Quercus coccinea) / Carya pallida / Vaccinium arboreum - Vaccinium pallidum Forest	Rock Chestnut Oak - (Scarlet Oak) / Sand Hickory / Farkleberry - Hillside Blueberry Forest	Xeric Ridgetop Chestnut Oak Forest	4, 8, 10, 13	G4G5
6281	Southern Piedmont Dry Oak – (Pine) Forest	Quercus prinus - Quercus alba / Oxydendrum arboreum / Vitis rotundifolia Forest	Rock Chestnut Oak - White Oak / Sourwood / Muscadine Forest	Felsic Monadnock Forest		G3G4
4415	Southern Piedmont Dry Oak – (Pine) Forest	Quercus prinus - Quercus alba / Oxydendrum arboreum / Kalmia latifolia Forest	Rock Chestnut Oak - White Oak / Sourwood / Mountain Laurel Forest	Piedmont Chestnut Oak – Heath Bluff	21	G2G3
7330	Human Modified/Successional OR Southern Piedmont Small Stream and Floodplain Forest	Liquidambar styraciflua – (Liriodendron tulipifera) Temporarily Flooded Forest	Sweetgum – (Tuliptree) Temporarily Flooded Forest	Successional Sweetgum Floodplain Forest	?	GNA
4418	Southern Piedmont Small Floodplain and Riparian Forest	Liquidambar styraciflua / Lindera benzoin / Arisaema triphyllum ssp. triphyllum Forest	Sweetgum / Northern Spicebush / Jack-in-the-Pulpit Forest	Piedmont Small Stream Sweetgum Forest	3	G3
4426	Piedmont Seepage Wetland	Acer rubrum var. trilobum / Viburnum nudum var. nudum /	Carolina Red Maple / Southern Wild Raisin / Cinnamon Fern -	Piedmont Headwater Low-		G3?

CEGL #	Ecological Systems (Comer 2004)	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
		Osmunda cinnamomea – Saururus cernuus - Impatiens capensis Forest	Lizard's-tail - Orange Jewelweed Forest	Elevation Seepage Swamp		
8427	Southern Appalachian Low Mountain Pine Forest	Pinus echinata - Quercus alba / Vaccinium pallidum / Hexastylis arifolia - Chimaphila maculata Forest	Shortleaf Pine - White Oak / Hillside Blueberry / Arrowleaf Heartleaf - Striped Wintergreen Forest	Appalachian Shortleaf Pine - Mesic Oak Forest	15	G3G4
7493	Southern Appalachian Low Mountain Pine Forest	Pinus echinata - Quercus (prinus, falcata)/Oxydendrum arboreum/Vaccinium pallidum Forest	Shortleaf Pine - (Rock Chestnut Oak, Southern Red Oak) / Sourwood / Hillside Blueberry Forest	Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest	9	G3G4
7546	Southern Piedmont Small Floodplain and Riparian	Pinus taeda – Liriodendron tulipifera / Lindera benzoin / Carex crinita Forest	Loblolly Pine – Tuliptree / Northern Spicebush / Fringed Sedge Forest	Loblolly Pine – Tuliptree Successional Bottomland Forest		GNA
3708	Southern Piedmont Dry Oak-(Pine) Forest	Quercus prinus - Quercus marilandica Piedmont Woodland	Rock Chestnut Oak - Blackjack Oak Piedmont Woodland	Piedmont Chestnut Oak - Blackjack Oak Woodland	1, 7, 16	G2G3
3765	Southern Appalachian Low Mountain Pine Forest	Pinus echinata – Quercus stellata – Quercus marilandica / Vaccinium pallidum Woodland	Shortleaf Pine – Post Oak – Blackjack Oak / Hillside Blueberry Woodland	Appalachian Shortleaf Pine – Post Oak Woodland	7 (in part)	G4?
8560	Exotic Species Dominated	Phyllostachys aurea Shrubland	Golden Bamboo Shrubland	Golden Bamboo Shrubland		GNA
4732	Human Modified / Successional	Rubus (argutus, trivialis) – Smilax (glauca, rotundifolia) Shrubland	(Southern Blackberry, Southern Dewberry)– (Whiteleaf Greenbrier, Common Greenbrier) Shrubland	Blackberry – Greenbrier Successional Shrubland Thicket	20	GNA
3912	Human Modified / Successional	Alnus serrulata Saturated Southern Shrubland	Smooth Alder Saturated Southern Shrubland	Saturated Alder Thicket	20 in part	G4

CEGL #	Ecological Systems (Comer 2004)	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
4044	Human Modified / Successional	Andropogon virginicus var. virginicus Herbaceous Vegetation	Broomsedge Herbaceous Vegetation	Broomsedge Old Field	20 in part	GNA
4048	Exotic Species Dominated	Lolium (arundinaceum, pratense) Herbaceous Vegetation	(Tall Fescue, Meadow Fescue) Herbaceous Vegetation	Cultivated meadow		GNA

Numeric rank

G1 = Critically imperiled globally

G2 = Imperiled globally

G3 = Rare or uncommon

G4 = Widespread, abundant, and apparently secure, but with cause for long-term concern

G5 = Demonstrably widespread, abundant and secure

G? = Unranked

GNA = Not ranked (usually because it is a human modified or exotic type)

Qualifiers:

? = Inexact numeric rank

Q = Questionable taxonomy

Table 7. Plot photo names and photo descriptions for Kings Mountain National Military Park.

Photo file name	Date taken	Photographer	Description of photo
KIMOPlot01.jpg	10-3-01	Rickie White	Plot 1
KIMOPlot02.jpg	10-3-01	Rickie White	Plot 2
KIMOPlot03.jpg	10-5-01	Rickie White	Plot 3
KIMOPlot04.jpg	10-5-01	Rickie White	Plot 4
KIMOPlot05.jpg	10-4-01	Rickie White	Plot 5
KIMOPlot06.jpg	10-9-01	Tom Govus	Plot 6
KIMOPlot07.jpg	10-4-01	Rickie White	Plot 7
KIMOPlot08.jpg	10-3-01	Rickie White	Plot 8
KIMOPlot09.jpg	10-9-01	Tom Govus	Plot 9
KIMOPlot10.jpg	10-5-01	Rickie White	Plot 10
KIMOPlot11.jpg	10-4-01	Rickie White	Plot 11
KIMOPlot12.jpg	10-4-01	Rickie White	Plot 12
KIMOPlot13.jpg	10-9-01	Tom Govus	Plot 13
KIMOPlot14.jpg	10-4-01	Rickie White	Plot 14
KIMOPlot15.jpg	10-9-01	Tom Govus	Plot 15
KIMOPlot16.jpg	10-10-01	Tom Govus	Plot 16
KIMOPlot17.jpg	10-10-01	Tom Govus	Plot 17
KIMOPlot18a.jpg	10-10-01	Tom Govus	Plot 18
KIMOPlot18b.jpg	10-10-01	Tom Govus	Plot 18
KIMOPlot19.jpg	10-3-01	Rickie White	Plot 19
KIMOPlot20.jpg	4-16-02	Rickie White	Plot 20
KIMOPlot21.jpg	4-16-02	Rickie White	Plot 21
GeorgiaAsterTG.jpg	10-01	Tom Govus	Power line right of way
HognoseSnakea.jpg	10-01	Rickie White	Taken on road near park office
HognoseSnakeb.jpg	10-01	Rickie White	Taken on road near park office

Appendix I. Plot sheets used for permanent plots (formatted to fit in this report)

Location name _____ *Jurisdiction (State):* _____
 Location organization (NPS, USFS, etc.) _____
 Air photo # (if known) _____ Polygon code (if known) _____ Subplot? Y or N Subplot Parent Code _____

Provisional community name _____
 Classified community name _____
 Classifier _____ Date _____
TUSNVC Elcode _____ *EONum-Suffix* _____

Sublocation (I.D.able feature on topo map) _____
USGS Quad name _____ *Quad code (if known)* _____
 Survey date: _____ Surveyors: _____

Directions to permanent marker and to the plot (use reverse of sheet if necessary):

Vegetation Plot length (m) _____ *Plot width (m)* _____ *Plot shape (rectangle?)* _____ *Permanent? Y or N*

Digital photos **Regular camera** **No pictures taken** **Roll# or disc #** _____ **Frame #** _____

Plot representativeness (is the matrix the same?) _____

_____ **UTM** _____ **Lat/long** (if lat/long, then values are _____ **N** _____ **W**)

GPS Techniques/Equipment _____ **GPS file name** _____

Field UTM X _____ **m E** **Corrected UTM X** _____ **m E**
Field UTM Y _____ **m N** **Corrected UTM Y** _____ **m N**

Coordinate accuracy _____ **m / ft** **UTM Zone** _____ **GPS location with respect to permanent marker if not 0,0: x** _____ **y** _____

Estimated position marked on Topo. Sheet. **Elevation** _____ **m / ft** *topo map? altimeter?*
 DEM? GPS?

ENVIRONMENTAL / SITE INFORMATION

<p>Measured Slope _____</p> <p><input type="checkbox"/> Flat 0° 0%</p> <p><input type="checkbox"/> Gentle 0-5° 1-9%</p> <p><input type="checkbox"/> Mod 6-14° 10-25%</p> <p><input type="checkbox"/> Somewhat steep 15-25° 26-49%</p> <p><input type="checkbox"/> Steep 27-45° 50-100%</p> <p><input type="checkbox"/> Very steep 45-69° 101-275%</p> <p><input type="checkbox"/> Abrupt 70-100° 276-300%</p> <p><input type="checkbox"/> overhanging/sheltered >100° >300%</p>	<p>Measured Aspect _____ ° (N=0°)</p> <p><input type="checkbox"/> Flat</p> <p><input type="checkbox"/> Variable</p> <p><input type="checkbox"/> N 338-22°</p> <p><input type="checkbox"/> NE 23-67°</p> <p><input type="checkbox"/> E 68-112°</p> <p><input type="checkbox"/> SE 113-157°</p> <p><input type="checkbox"/> S 158-202°</p> <p><input type="checkbox"/> SW 203-247°</p> <p><input type="checkbox"/> W 248-292°</p> <p><input type="checkbox"/> NW 293-337°</p> <p>Compass: magnetic ? / corrected?</p>	<p>Topographic Position</p> <p><input type="checkbox"/> Interfluvial (Ridge, summit or crest)</p> <p><input type="checkbox"/> High Slope (upper slope, convex slope)</p> <p><input type="checkbox"/> Midslope (middle slope)</p> <p><input type="checkbox"/> Lowslope (lower slope, footslope)</p> <p><input type="checkbox"/> Toeslope (alluvial toeslope)</p> <p><input type="checkbox"/> Low level (terrace)</p> <p><input type="checkbox"/> Channel bed</p> <p><i>Cowardin System</i></p> <p><input type="checkbox"/> Upland <input type="checkbox"/> Palustrine</p> <p><input type="checkbox"/> Estuarine <input type="checkbox"/> Lacustrine</p> <p><input type="checkbox"/> Riverine</p>
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<p>Landform (check most applicable)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Alluvial flat <input type="checkbox"/> Alluvial terrace <input type="checkbox"/> Bank <input type="checkbox"/> Bar <input type="checkbox"/> Bench <input type="checkbox"/> Cliff <input type="checkbox"/> Colluvial Slope <input type="checkbox"/> Cove <input type="checkbox"/> Debris slide <input type="checkbox"/> Depression 	<ul style="list-style-type: none"> <input type="checkbox"/> Draw <input type="checkbox"/> Floodplain <input type="checkbox"/> Gap <input type="checkbox"/> Hanging valley <input type="checkbox"/> Knob <input type="checkbox"/> Midslope <input type="checkbox"/> Mima mound <input type="checkbox"/> Nose slope <input type="checkbox"/> Ravine <input type="checkbox"/> Ridge <input type="checkbox"/> Ridgetop bedrock outcrop 	<ul style="list-style-type: none"> <input type="checkbox"/> Saddle <input type="checkbox"/> Scour <input type="checkbox"/> Seep <input type="checkbox"/> Toe slope <input type="checkbox"/> Slope <input type="checkbox"/> Streambed <input type="checkbox"/> Slough <input type="checkbox"/> Streamhead <input type="checkbox"/> <input type="checkbox"/>
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<p>Geology</p>		
<p><u>Igneous Rocks:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Granitic(Granite, Schyolite, Syenite, Trachyte) <input type="checkbox"/> Dioritic (Diorite, Dacite, Andesite) <input type="checkbox"/> Gabbroic (Gabbro, Basalt, Pyroxenite, Peridotite Diabase, Traprock) 	<p><u>Sedimentary Rocks:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Conglomerates and Breccias <input type="checkbox"/> Sandstone & conglomerate <input type="checkbox"/> Siltstone (calcareous or noncalc) <input type="checkbox"/> Shale (calcareous or noncalc) <input type="checkbox"/> Limestone and Dolomite <input type="checkbox"/> Gypsum <input type="checkbox"/> Marl 	<p><u>Metamorphic Rocks:</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Gneiss <input type="checkbox"/> Schist <input type="checkbox"/> Slate and Phyllite <input type="checkbox"/> Marble <input type="checkbox"/> Serpentine (Ultramafic) <input type="checkbox"/> Other _____

<p>Hydrologic Regime (check only for wetlands)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Intermittently flooded <input type="checkbox"/> Permanently flooded <input type="checkbox"/> Semipermanently flooded <input type="checkbox"/> Temporarily Flooded (e.g. floodplains) <input type="checkbox"/> Seasonally Flooded (e.g. seasonal ponds) <input type="checkbox"/> Saturated (e.g. bogs, perennial seeps) <input type="checkbox"/> Unknown <input type="checkbox"/> Not a wetland (Upland: XERIC : DRY - MESIC : MESIC) <ul style="list-style-type: none"> <input type="checkbox"/> Permanently flooded – Tidal <input type="checkbox"/> Tidally flooded <input type="checkbox"/> Irregularly flooded <input type="checkbox"/> Irregularly exposed 	<p>Salinity/Halinity Modifiers:</p> <p><i>Upland (N/A)</i></p> <p><i>Coastal Tidal: Saltwater- Tidal</i></p> <p><i>Coastal Tidal – Brackish</i></p> <p><i>Coastal Tidal – Freshwater</i></p> <p><i>Inland Saltwater</i></p> <p><i>Inland Brackish seeps)</i></p> <p><i>Unknown</i></p>	<p>Hydrology Evidence (Describe the hydrological factors that caused you to assign the type to the hydrologic regime that you chose.):</p>
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<p><i>Environmental comments:</i></p> <hr/> <p><i>Landscape comments:</i></p> <hr/>

<p>Soil Texture:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Silt loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Clay <input type="checkbox"/> Peat <input type="checkbox"/> Muck 	<p>Soil Taxon Description:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>Drainage:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Rapidly drained <input type="checkbox"/> Well drained <input type="checkbox"/> Moderately well drained <input type="checkbox"/> Somewhat poorly drained <input type="checkbox"/> Poorly drained <input type="checkbox"/> Very poorly drained <p>Soil depth (optional): _____</p>
--	---

Appendix II. Descriptions of alliances and associations found at Kings Mountain National Military Park.

**NATIONAL CLASSIFICATION OF
ECOLOGICAL COMMUNITIES:
TERRESTRIAL VEGETATION OF THE
UNITED STATES**

Kings Mountain National Military Park

Report from
Biotics
November, 2004

by

NatureServe

1101 Wilson Blvd., 15th floor
Arlington, VA 22209

This subset of the International Classification of Ecological Communities (ICEC) covers vegetation alliances and associations attributed to Ninety Six National Historic Site. This community classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. A fully searchable and periodically updated on-line source for the ICEC is at <http://www.natureserveexplorer.org>. Comments and suggestions regarding the contents of this subset should be directed to rickie_white@mindspring.com and Rickie White.



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1101 Wilson Blvd, 15th floor
Arlington, VA 22209

These data are extracted from:

NatureServe. 2004. International Classification of Ecological Communities: Terrestrial Vegetation. Natural Heritage Central Databases. NatureServe, Arlington, VA.

This document may be generally cited as follows:

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¹ NatureServe (formerly called “Association for Biodiversity Information” (“ABI”)) is an international organization including NatureServe regional offices, a NatureServe central office, U.S. State Natural Heritage Programs, and Conservation Data Centres (CDC) in Canada and Latin America and the Caribbean. Ecologists from the following organizations have contributed the development of the ICEC:

United States

Central NatureServe Office, Arlington, VA; Eastern Regional Office, Boston, MA; Midwestern Regional Office, Minneapolis, MN; Southeastern Regional Office, Durham, NC; Western Regional Office, Boulder, CO; Alabama Natural Heritage Program, Montgomery AL; Alaska Natural Heritage Program, Anchorage, AK; Arizona Heritage Data Management Center, Phoenix AZ; Arkansas Natural Heritage Commission Little Rock, AR; Blue Ridge Parkway, Asheville, NC; California Natural Heritage Program, Sacramento, CA; Colorado Natural Heritage Program, Fort Collins, CO; Connecticut Natural Diversity Database, Hartford, CT; Delaware Natural Heritage Program, Smyrna, DE; District of Columbia Natural Heritage Program/National Capital Region Conservation Data Center, Washington DC; Florida Natural Areas Inventory, Tallahassee, FL; Georgia Natural Heritage Program, Social Circle, GA; Great Smoky Mountains National Park, Gatlinburg, TN; Gulf Islands National Seashore, Gulf Breeze, FL; Hawaii Natural Heritage Program, Honolulu, Hawaii; Idaho Conservation Data Center, Boise, ID; Illinois Natural Heritage Division/Illinois Natural Heritage Database Program, Springfield, IL; Indiana Natural Heritage Data Center, Indianapolis, IN; Iowa Natural Areas Inventory, Des Moines, IA; Kansas Natural Heritage Inventory, Lawrence, KS; Kentucky Natural Heritage Program, Frankfort, KY; Louisiana Natural Heritage Program, Baton Rouge, LA; Maine Natural Areas Program, Augusta, ME; Mammoth Cave National Park, Mammoth Cave, KY; Maryland Wildlife & Heritage Division, Annapolis, MD; Massachusetts Natural Heritage & Endangered Species Program, Westborough, MA; Michigan Natural Features Inventory, Lansing, MI; Minnesota Natural Heritage & Nongame Research and Minnesota County Biological Survey, St. Paul, MN; Mississippi Natural Heritage Program, Jackson, MI; Missouri Natural Heritage Database, Jefferson City, MO; Montana Natural Heritage Program, Helena, MT; National Forest in North Carolina, Asheville, NC; National Forests in Florida, Tallahassee, FL; National Park Service, Southeastern Regional Office, Atlanta, GA; Navajo Natural Heritage Program, Window Rock, AZ; Nebraska Natural Heritage Program, Lincoln, NE; Nevada Natural Heritage Program, Carson City, NV; New Hampshire Natural Heritage Inventory, Concord, NH; New Jersey Natural Heritage Program, Trenton, NJ; New Mexico Natural Heritage Program, Albuquerque, NM; New York Natural Heritage Program, Latham, NY; North Carolina Natural Heritage Program, Raleigh, NC; North Dakota Natural Heritage Inventory, Bismarck, ND; Ohio Natural Heritage Database, Columbus, OH; Oklahoma Natural Heritage Inventory, Norman, OK; Oregon Natural Heritage Program, Portland, OR; Pennsylvania Natural Diversity Inventory, PA; Rhode Island Natural Heritage Program, Providence, RI; South Carolina Heritage Trust, Columbia, SC; South Dakota Natural Heritage Data Base, Pierre, SD; Tennessee Division of Natural Heritage, Nashville, TN; Tennessee Valley Authority Heritage Program, Norris, TN; Texas Conservation Data Center, San Antonio, TX; Utah Natural Heritage Program, Salt Lake City, UT; Vermont Nongame & Natural Heritage Program, Waterbury, VT; Virginia Division of Natural Heritage, Richmond, VA; Washington Natural Heritage Program, Olympia, WA; West Virginia Natural Heritage Program, Elkins, WV; Wisconsin Natural Heritage Program, Madison, WI; Wyoming Natural Diversity Database, Laramie, WY

Canada

Alberta Natural Heritage Information Centre, Edmonton, AB, Canada; Atlantic Canada Conservation Data Centre, Sackville, New Brunswick, Canada; British Columbia Conservation Data Centre, Victoria, BC, Canada; Manitoba Conservation Data Centre, Winnipeg, MB, Canada; Ontario Natural Heritage Information Centre, Peterborough, ON, Canada; Quebec Conservation Data Centre, Quebec, QC, Canada; Saskatchewan Conservation Data Centre, Regina, SK, Canada; Yukon Conservation Data Centre, Yukon, Canada

Latin American and Caribbean

Centro de Datos para la Conservacion de Bolivia, La Paz, Bolivia; Centro de Datos para la Conservacion de Colombia, Cali, Valle, Columbia; Centro de Datos para la Conservacion de Ecuador, Quito, Ecuador; Centro de Datos para la Conservacion de Guatemala, Ciudad de Guatemala, Guatemala; Centro de Datos para la Conservacion de Panama, Quarry Heights, Panama; Centro de Datos para la Conservacion de Paraguay, San Lorenzo, Paraguay; Centro de Datos para la Conservacion de Peru, Lima, Peru; Centro de Datos para la Conservacion de Sonora, Hermosillo, Sonora, Mexico; Netherlands Antilles Natural Heritage Program, Curacao, Netherlands Antilles; Puerto Rico-Departamento De Recursos Naturales Y Ambientales, Puerto Rico; Virgin Islands Conservation Data Center, St. Thomas, Virgin Islands.

NatureServe also has partnered with many International and United States Federal and State organizations, which have also contributed significantly to the development of the International Classification. Partners include the following The Nature Conservancy; Provincial Forest Ecosystem Classification Groups in Canada; Canadian Forest Service; Parks Canada; United States Forest Service; National GAP Analysis Program; United States National Park Service; United States Fish and Wildlife Service; United States Geological Survey; United States Department of Defense; Ecological Society of America; Environmental Protection Agency; Natural Resource Conservation Services; United States Department of Energy; and the Tennessee Valley Authority. Many individual state organizations and people from academic institutions have also contributed to the development of this classification.

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I. Forest

I.A.8.N.b. Rounded-crowned temperate or subpolar needle-leaved evergreen forest

Pinus echinata Forest Alliance

Shortleaf Pine Early-Successional Forest

***Pinus echinata* Early-Successional Forest**

Shortleaf Pine Early-Successional Forest

Identifier: CEGL006327

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

Physiognomic Group Temperate or subpolar needle-leaved evergreen forest (I.A.8.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)

Formation Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)

Alliance *Pinus echinata* Forest Alliance (A.119)

Alliance (English name) Shortleaf Pine Forest Alliance

Association *Pinus echinata* Early-Successional Forest

Association (English name) Shortleaf Pine Early-Successional Forest

Association (Common name) Shortleaf Pine Early-Successional Forest

Ecological System(s): East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest (CES203.506)

Semi-natural Forest (CES203.285)

ELEMENT CONCEPT

Global Summary: This association represents early-successional *Pinus echinata*-dominated vegetation. This broadly defined type has a wide distribution throughout the native range of *Pinus echinata* where it may develop under a variety of circumstances associated with severe natural and/or anthropogenic disturbance. It is most frequently associated with abandoned agricultural land, unmanaged clearcuts, and burned or heavily eroded areas, where adjacent *Pinus echinata* are able to seed into the newly disturbed area and colonize before other species such as *Pinus taeda*. These are considered semi-natural forests as they typically result from anthropogenic disturbances that fundamentally alter the vegetation structure, floristic composition, and often the physical and chemical structure of the soil. Vegetation tends to be dense with a moderately to extremely barren understory. While *Pinus echinata* is clearly the single most dominant tree, other "old-field" *Pinus* species (e.g., *Pinus taeda*, *Pinus virginiana*) and/or other early-successional deciduous trees (e.g., *Acer rubrum*, *Liquidambar styraciflua*, *Liriodendron tulipifera*) may also be present. Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. As these forests age, mid-successional species such as *Quercus* spp. and *Carya* spp. may begin to replace senescent *Pinus echinata* individuals.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: Stands of *Pinus echinata* within the park may occur in any upland areas away from steep to moderate slopes. They occur on old

abandoned agricultural fields that have been allowed to grow without heavy disturbances such as mowing. The community occurs in the same environment as the *Pinus taeda* forests and plantations in other parts of the park. The distribution of these two forests was most likely dictated by the proximity of the land to a seed source of either *Pinus echinata* or *Pinus taeda* or the planting of either species within the areas that later developed to become pine forest. In either case, the environment of both types of forest is one of past severe natural disturbance followed by a recovery period of between 15 and 60 years.

Global Environment: This broadly defined type may develop under a variety of circumstances associated with severe natural and/or anthropogenic disturbance. It is most frequently associated with abandoned agricultural land, unmanaged clearcuts, and burned or eroded areas. These are considered semi-natural forests as they typically result from anthropogenic disturbances which fundamentally alter the vegetation structure, floristic composition, and often the physical and chemical structure of the soil.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Stands of this vegetation have very low herbaceous cover. Depending upon the amount of pine beetle damage and the soils, this community may have herbs associated with dry-mesic or xeric communities. Canopy coverage can also vary depending upon the number of canopy pines that were hit by windstorms or pine beetles. Plot 12, for instance, has *Pteridium aquilinum*, *Clitoria mariana*, *Schizachyrium scoparium*, and *Coreopsis major*, all species of more open, fairly dry habitats in the Piedmont. The herbaceous stratum may also be dominated by exotics (*Lonicera japonica*) or by species highly tolerant of low-nutrient, high-acidity disturbed soils (*Lycopodium digitatum*, *Toxicodendron radicans*, *Chimaphila maculata*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*). The canopy varies greatly depending upon the age of the forest and pine beetle damage. Younger forests (ones that were old fields only 20-40 years ago) may have low canopies without an understory and may be completely dominated by *Pinus echinata* or mixed with *Pinus taeda* or *Pinus virginiana*. On the other hand, older forests (those between 40 and 60 years of age) may be more diverse, since understory species such as *Liriodendron tulipifera*, *Acer rubrum*, *Quercus marilandica*, and *Quercus alba* may begin to replace the *Pinus echinata* as they reach the end of their lifespan and begin to senesce.

Global Vegetation: *Pinus echinata* is clearly the single most dominant tree. In addition, other "old-field" *Pinus* species (e.g., *Pinus taeda*, *Pinus virginiana*) and/or other early-successional deciduous trees (e.g., *Acer rubrum*, *Liquidambar styraciflua*, *Liriodendron tulipifera*) may also be present. Forests of 50+ years may begin to become codominated by mid-successional species such as *Quercus* spp. and *Carya* spp. in some instances. Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i> , <i>Pinus virginiana</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> , <i>Cornus florida</i> , <i>Oxydendrum arboreum</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Pinus echinata*

Global: *Pinus echinata*

OTHER NOTEWORTHY SPECIES**Kings Mountain National Military Park:****Global:****CONSERVATION STATUS RANK**

Global Rank & Reasons: GNA (ruderal) (3-Apr-2000). This forest represents a ruderal community resulting from succession following anthropogenic disturbance of an area. It is not of conservation concern and does not receive a conservation status rank. Stands have suffered some damage from the Southern Pine Beetle (*Dendroctonus frontalis*).

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments: In the park, this community may intergrade with ~*Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest (CEGL008462)\$\$, although CEGL008462 is much less common in the park. In addition, it may be difficult to distinguish from ~*Pinus virginiana* - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest (CEGL007119)\$\$ on aerial photography since the differences have more to do with the fact that one is successional and the other is not than with floristic differences in the canopy.

Global Comments: In Kentucky, this vegetation is known only from the eastern part of the state. In Louisiana, this successional vegetation occurs in the Florida parishes and may have a dense shrub understory. In Arkansas, old fields succeed to *Pinus echinata*. Stands have suffered some damage from the Southern Pine Beetle (*Dendroctonus frontalis*).

Global Similar Associations:

- *Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest (CEGL008462)—is commonly found in the same area as CEGL006327 in the Piedmont. CEGL008462 contains at least 50% *Pinus taeda* in the canopy, whereas CEGL006327 is mostly *Pinus echinata*.
- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011)—occurs in similar environments with similar disturbance histories but is dominated by (>50% of canopy) *Pinus taeda* instead of *Pinus echinata*.
- *Pinus virginiana* - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest (CEGL007119)—can have a very similar canopy in the Piedmont and Blue Ridge ecoregions, but CEGL007119 is generally created and maintained by fire and/or logging but not heavy plowing and/or erosion. CEGL006327 generally has signs of heavy agricultural use such as sparse herbaceous or shrub layers, large percentage of invasive exotics such as *Lonicera japonica* in the herbaceous layer, old plowlines, human debris, and extremely even-aged canopy, whereas CEGL007119 generally has a more intact herbaceous/shrub layer (especially *Vaccinium pallidum*) and less signs of severe human disturbance.
- *Pinus virginiana* Successional Forest (CEGL002591)—occurs in similar environments but is dominated (>50% of canopy) by *Pinus virginiana* instead of *Pinus echinata*.

Global Related Concepts:

- IA7a. Xeric Shortleaf Pine - Oak Forest (Allard 1990) B
- T1A9bI1a. *Pinus echinata* (Foti et al. 1994) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community exists in scattered small to large patches throughout the park on relatively flat upland areas that were plowed and heavily farmed in the recent past (15-60 years ago). It can be a matrix type in large areas that have been disturbed by plowing in the past 70 years.

Global Range: This community is found throughout the southeastern United States.

Nations: US

States/Provinces: AL, AR, GA, KY, LA, MO, MS, NC, SC, TN, TX, WV?

USFS Ecoregions: 221J:CC, 222:C, 231A:CC, 231E:CP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Bm:CCC, M221A:C?, M221B:C?, M221D:CC, M222A:CC

Federal Lands: NPS (Cowpens, Kings Mountain, Little River Canyon?, Natchez Trace?); TVA (Tellico); USFS (Bienville?, Chattahoochee, Daniel Boone, Holly Springs?, Mark Twain, Ouachita, Ozark, St. Francis, Sumter?, Tombigbee?)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.12.

Local Description Authors: R. White

Global Description Authors: A.S. Weakley and K.D. Patterson, mod. R.E. Evans

References: Allard 1990, Foti 1994b, Foti et al. 1994, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Pinus taeda Forest Alliance

Mid- to Late-Successional Loblolly Pine - Sweetgum Forest

***Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest**

Loblolly Pine - Sweetgum Semi-natural Forest

Identifier: CEG008462

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

Physiognomic Group Temperate or subpolar needle-leaved evergreen forest (I.A.8.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)

Formation Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)

Alliance *Pinus taeda* Forest Alliance (A.130)

Alliance (English name) Loblolly Pine Forest Alliance

Association *Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest

Association (English name) Loblolly Pine - Sweetgum Semi-natural Forest

Association (Common name) Mid- to Late-Successional Loblolly Pine - Sweetgum Forest

Ecological System(s): Semi-natural Forest (CES203.285)**ELEMENT CONCEPT**

Global Summary: This community type is broadly defined to accommodate mid- to late-successional upland forests strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*, resulting from past disturbance (such as agricultural or other land clearing). Understory composition differs based on edaphic site and on age and history. This broadly defined type occupies a variety of edaphic sites, ranging from mesic through dry-mesic sites on a wide variety of (generally acidic) soils. If left unmanaged or undisturbed, this can be a short-lived forest type, which is likely to succeed with greater age into various oak- and oak-pine-dominated forests.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: This community is found in upland areas within the park that were heavily farmed and then left fallow. The sites tend to be poorly drained uplands.

Global Environment: Stands of this community type are strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*, resulting from past disturbance followed by forest succession. This community type is more influenced by past land-use history than by specific soil differences. However, this community type tends to occur on poorly drained and low-nutrient soils, especially in areas that were farmed heavily in the past.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Within the park, this community type is almost always dominated by stands of *Pinus taeda*, either planted and left untended or generated naturally after abandonment of farmland. In addition, *Liquidambar styraciflua* codominates. Understories vary depending upon location, pine beetle damage, and moisture regime, but range from being dominated by thick stands of *Microstegium vimineum* and *Toxicodendron radicans* in the most mesic examples to having a more sparse and diverse understory in the driest examples.

Global Vegetation: Stands of this community type are strongly codominated by *Pinus taeda* and *Liquidambar styraciflua*. Some other species which may be present in stands of this

association include *Quercus phellos*, *Quercus nigra*, *Ulmus alata*, and *Prunus serotina*, along with *Vitis rotundifolia*, *Toxicodendron radicans*, *Rubus argutus*, *Eupatorium capillifolium*, *Eupatorium hyssopifolium*, *Erigeron strigosus*, *Solidago gigantea*, *Ambrosia artemisiifolia*, and the exotics *Lespedeza cuneata* and *Ligustrum sinense*. Examples of this association in low-lying areas may also have a dense herbaceous layer of *Microstegium vimineum*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus taeda</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus taeda</i>
Tree canopy	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Pinus taeda*

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (modified/managed) (20-Oct-2000). This forest represents early successional or silviculturally managed vegetation and is thus not of conservation concern and does not receive a conservation status rank.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments: This community likely occurs along the northern periphery of the Gulf Coast Prairies and Marshes Ecoregion of eastern Texas.

Global Similar Associations:

- *Liriodendron tulipifera* - *Pinus taeda* Forest (CEGL007521)—with greater dominance by *Liriodendron*.
- *Pinus taeda* - (*Pinus echinata*) - *Quercus falcata* - *Carya texana* / *Vaccinium arboreum* Forest (CEGL007528)—overlaps only in the western part of the range of this type.
- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011)—is very similar and may need to be merged with this concept someday. For now, the main difference is that CEGL006011 does not have *Liquidambar styraciflua* present in the canopy but instead in the subcanopy/tall-shrub layer.
- *Pinus taeda* / *Saccharum alopecuroidum* - (*Andropogon* spp.) Forest (CEGL007109)—a related *Pinus taeda*-dominated type placed in evergreen.

Global Related Concepts:

- IF3a. Recently Harvested Timber Land (Allard 1990) B
- IF3b. Plantation (Hardwood or Conifer) (Allard 1990) B
- Loblolly Pine - Hardwood (13) (USFS 1988) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- T1B3aIII6a. *Pinus taeda* - *Liquidambar styraciflua* (Foti et al. 1994) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community is rare within the park, occurring only in small patches where heavy farming occurred less than about 60 years ago and

the land has not yet fully recovered. It is a rare sight in the park since much of the park was farmed but started recovering more than 60 years ago.

Global Range: This altered forest type is widespread in the lowland portions of the southeastern United States, particularly on the Coastal Plain, but also on adjacent inland provinces.

Nations: US

States/Provinces: AL, AR, GA, LA, MS, NC, OK, SC, TX, VA

USFS Ecoregions: 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Fa:CPP, 232Bm:CCC, 232Cb:CCC, 232F:CC, 255Da:PPP

Federal Lands: DOD (Fort Benning?); NPS (Guilford Courthouse, Kings Mountain, Little River Canyon?, Ninety Six); USFS (Angelina, Croatan, Davy Crockett, Kisatchie, Oconee, Ouachita, Sabine NF, Sam Houston, Talladega?, Tuskegee?, Uwharrie)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: A.S. Weakley, mod. R. White

References: Allard 1990, Eyre 1980, Foti 1994b, Foti et al. 1994, Harcombe and Neaville 1977, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Southeastern Ecology Working Group n.d., USFS 1988, Zandoni et al. 1979

Pinus virginiana Forest AllianceAppalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest***Pinus virginiana* - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest
Virginia Pine - (Pitch Pine, Shortleaf Pine) - (Rock Chestnut Oak) / Hillside Blueberry Forest****Identifier: CEGL007119****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

Physiognomic Group Temperate or subpolar needle-leaved evergreen forest (I.A.8.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)

Formation Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)

Alliance *Pinus virginiana* Forest Alliance (A.131)

Alliance (English name) Virginia Pine Forest Alliance

Association *Pinus virginiana* - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest

Association (English name) Virginia Pine - (Pitch Pine, Shortleaf Pine) - (Rock Chestnut Oak) / Hillside Blueberry Forest

Association (Common name) Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest

Ecological System(s): Allegheny-Cumberland Sandstone Box Canyon and Rockhouse (CES202.349)

Cumberland Sandstone Glade and Barrens (CES202.337)

Central Interior Highlands Dry Acidic Glade and Barrens (CES202.692)

Southern Appalachian Low Mountain Pine Forest (CES202.332)

ELEMENT CONCEPT

Global Summary: This community includes *Pinus virginiana*-dominated forests of low-elevation ridges and steep upper slopes, occurring primarily in the Appalachian provinces of the eastern United States, from central Pennsylvania, south and west to northern Georgia and northern Alabama. This community occurs on narrow ridges, steep slopes, and other exposed topographic positions, over shallow, infertile soils. This mainly evergreen forest is often of low stature, with a somewhat open to closed canopy, sparse to very dense shrub cover dominated by ericaceous species, and a sparse herb stratum. *Pinus virginiana* is the canopy dominant throughout the range of the type. In some parts of the range, other *Pinus* species may be canopy associates, as well as dry-site *Quercus* species (e.g., *Quercus prinus*, *Quercus coccinea*). Deciduous species may form a subcanopy or sapling stratum, particularly in areas where fire has been excluded. Common shrub dominants include *Vaccinium pallidum*, *Vaccinium stamineum*, and *Kalmia latifolia*. Herbs vary with geography but are typical of infertile, xeric habitats. Some typical herbs in this forest are *Baptisia tinctoria*, *Chimaphila maculata*, *Dichanthelium commutatum*, *Epigaea repens*, *Euphorbia corollata*, *Galax urceolata*, *Hypoxis hirsuta*, *Iris verna*, *Pityopsis graminifolia* var. *latifolia*, *Pteridium aquilinum* var. *latiusculum*, and *Schizachyrium scoparium*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This community may occur on dry narrow ridges and dry upper exposed slopes along the highest ridgelines in the park. Although not documented with the plots that were laid out, we feel that there is a good likelihood that this community exists within the park boundary.

Global Environment: Stands of this forest occur on narrow ridges and knobs, steep upper slopes, bluff and cliff tops, and other exposed sites throughout the range of the type. The community is found primarily on south-, southeast- or southwest-facing aspects on excessively drained, shallow soils. In the Blue Ridge Escarpment region, the western margin of the Blue Ridge, and west into the Ridge and Valley and Cumberland Mountains, this xeric forest occurs on convex slopes and ridges below 610 m (2000 feet) elevation, over soils classed as Inceptisols, typically Lithic Dystrochrepts originating from sandstone, shale and other noncalcareous parent material. Occurrences in rugged parts of the western Piedmont are also likely. Its environmental situation in the western Alleghenies is not known. In the Interior Low Plateau of Kentucky, Tennessee, and Indiana, this association occurs in edaphically extreme situations, including bluff tops and narrow ridges in thin soils weathered from relatively acidic caprocks with southern and western aspects, as well as other similar slopes, over cherty limestone, siltstones, sandstones, and shales. In particular, in the Knobstone Escarpment Subsection (a few Indiana counties just north of Louisville, Kentucky), it occurs in gladelike situations on steep slopes with thin soils.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This was not documented within the park, but examples in the park would probably have a somewhat open to closed canopy of *Pinus virginiana* with a well developed ericaceous understory.

Global Vegetation: This community is a needle-leaved evergreen forest with a somewhat open to closed canopy. A deciduous subcanopy may be present, especially in areas where fire has been excluded. The shrub layers can be sparse to very dense and are composed of tall and short shrubs, predominantly ericaceous species. Herb cover is sparse, and leaf litter often dominates the ground layer. *Pinus virginiana* is the canopy dominant throughout the range of the type. In the southern Appalachians and southern Ridge and Valley it may occur with mixes of *Pinus rigida*, *Pinus echinata*, or *Pinus strobus*. Within its range, *Pinus pungens* may be present as a very minor component. Small stems of *Quercus prinus*, *Quercus coccinea*, *Acer rubrum*, *Nyssa sylvatica*, and *Oxydendrum arboreum* are common in the subcanopy and sapling strata, particularly in areas where fire has been excluded. In the southern Blue Ridge/Piedmont and southern Blue Ridge/Ridge and Valley transition regions, *Quercus marilandica*, *Quercus falcata*, and *Quercus stellata* can be deciduous components. Common shrub dominants include *Vaccinium pallidum*, *Vaccinium stamineum*, and *Kalmia latifolia*. Other typical shrubs can include *Gaylussacia ursina*, *Gaylussacia baccata*, *Sassafras albidum*, and *Vaccinium hirsutum* (southwestern North Carolina and southeastern Tennessee only). *Smilax glauca* and *Smilax rotundifolia* can be common vines. Characteristic herbaceous species from the southern Blue Ridge and southern Ridge and Valley include *Baptisia tinctoria*, *Chimaphila maculata*, *Dichanthelium commutatum*, *Epigaea repens*, *Euphorbia corollata*, *Galax urceolata*, *Hypoxis hirsuta*, *Iris verna*, *Pityopsis graminifolia* var. *latifolia*, *Pteridium aquilinum* var. *latiusculum*, and *Schizachyrium scoparium*. Typical herbs from examples in the western portion of the range (Interior Low Plateau) include *Antennaria plantaginifolia*, *Antennaria solitaria*, *Carex albicans* var. *albicans* (= *Carex artitecta*), *Danthonia spicata*, *Dichanthelium dichotomum*, *Lespedeza violacea* (= *Lespedeza intermedia*), *Hieracium gronovii*, *Hieracium venosum*, *Krigia biflora*,

Solidago erecta, and *Tephrosia virginiana* (M. Homoya pers. comm. 1999). In some of these examples *Opuntia humifusa*, *Calamagrostis porteri* ssp. *insperata*, and *Solidago squarrosa* may occur locally.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i>
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Gaylussacia baccata</i> , <i>Vaccinium pallidum</i> , <i>Vaccinium stamineum</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global: *Comptonia peregrina*, *Gaultheria procumbens*, *Pinus virginiana*, *Pteridium aquilinum*, *Xerophyllum asphodeloides*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Buckleya distichophylla*, *Calamagrostis porteri* ssp. *insperata*, *Cleistes bifaria*, *Penstemon deamii*, *Thermopsis villosa*, *Vaccinium hirsutum*

CONSERVATION STATUS RANK

Global Rank & Reasons: G4? (11-Feb-2001). This xeric evergreen forest community will be maintained on sites where local soil conditions, topographic extremes, or occasional fire function to retard hardwood invasion. Infestations of southern pine beetle (*Dendroctonus frontalis*) can cause mortality of canopy trees. Examples affected by southern pine beetle in the Great Smoky Mountains can have up to 80-90% standing dead pine.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments: Some vegetation formerly placed (at least conceptually) in the ~*Pinus virginiana* - *Quercus (coccinea, prinus)* Forest Alliance (A.408)\$\$ and its provisional association ~*Pinus virginiana* - *Quercus (coccinea, prinus)* Forest (CEGL005040)\$\$, has been transferred here, with this association (CEGL007119) becoming more geographically inclusive. In Indiana examples, the substrate is primarily a matrix of acidic siltstone, shale, and sandstone. Rarely are cliffs formed; instead the setting is mostly very steep slopes with high hills and deep ravines. This association also includes vegetation from the transition between the Cumberland Plateau / Southern Ridge and Valley and the Upper East Gulf Coastal Plain in Alabama. Though located in the Coastal Plain, these occurrences are physiographically and floristically similar to this montane association.

Early successional vegetation associated with old fields, old pastures, clearcuts, and burned or eroded areas and dominated by *Pinus virginiana* is classified as ~*Pinus virginiana* Successional Forest (CEGL002591)\$. Appalachian xeric oak forests with similar floristics, but with a mainly deciduous canopy are classed in ~*Quercus (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest (CEGL006271)\$. Appalachian shale forests and woodlands with *Pinus virginiana* occur on steep, shaley slopes and have a stunted canopies and sparse herb and shrub strata, characterized by species adapted to shaley substrates. These shale

communities are classed in ~*Pinus virginiana* - *Quercus (coccinea, prinus)* Forest Alliance (A.408)\$\$ and ~*Pinus (rigida, pungens, virginiana)* - *Quercus prinus* Woodland Alliance (A.677)\$\$.

Global Similar Associations:

- *Pinus pungens* - *Pinus rigida* - (*Quercus prinus*) / *Kalmia latifolia* - *Vaccinium pallidum* Woodland (CEGL007097)
- *Pinus virginiana* - (*Pinus rigida, Pinus pungens*) / *Schizachyrium scoparium* Forest (CEGL008500)
- *Pinus virginiana* - *Quercus (coccinea, prinus)* Forest (CEGL005040)
- *Pinus virginiana* - *Quercus falcata* - *Carya pallida* Forest (CEGL006354)
- *Pinus virginiana* / *Quercus marilandica* Serpentine Forest (CEGL006266)
- *Pinus virginiana* Successional Forest (CEGL002591)— is distinguished from this community by differences in land-use history; CEGL002591 exists in flat to moderately sloping land that was heavily plowed in the recent past (10-60 years), whereas this community is generally a product of less disturbed soils and more historic disturbance by fire or logging without plowing.
- *Quercus (pinus, coccinea)* / *Kalmia latifolia* / (*Galax urceolata, Gaultheria procumbens*) Forest (CEGL006271)

Global Related Concepts:

- IA7c. Xeric Virginia Pine Ridge Forest (Allard 1990) B
- Low Mountain Pine Forest (Montane Pine Subtype) (Schafale 1998b) ?
- Oligotrophic Forest (Rawinski 1992) B
- Virginia Pine - Mixed Oaks, HR (Pyne 1994) B
- Virginia Pine - Oak: 78 (Eyre 1980) B
- Virginia Pine, BR, R&V, CUPL (Pyne 1994) B
- Virginia Pine: 79 (Eyre 1980) B
- Virginia pine forest (CAP pers. comm. 1998) ?
- Xeric Pine Forest, Pine - Heath Ridge Forest (Ambrose 1990a) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community exists in small patches along exposed ridgelines and upper slopes.

Global Range: This community occurs primarily in the Appalachian region of the United States, ranging from central Pennsylvania, south and west through the Ridge and Valley, Blue Ridge, and Cumberland Plateau to northern Georgia and Alabama, extending westward to scattered areas in the Interior Low Plateau and eastward into the upper Piedmont. It is reported from the states of Georgia, North Carolina, South Carolina, Tennessee, Kentucky, Pennsylvania, Indiana, Ohio, and is probably in Maryland, Virginia, and West Virginia.

Nations: US

States/Provinces: AL, GA, IN, KY, MD?, NC, OH, PA, SC, TN, VA?, WV

USFS Ecoregions: 221Ea:CC?, 221Eb:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCC, 221Eg:CCC, 221Ha:CCC, 221Hb:CCC, 221Hc:CCP, 221He:CCC, 221Ja:CCC, 221Jb:CCC, 222Da:CCC, 222Dc:CCC, 222Dg:CCC, 222Dj:CCC, 222Eg:CCC, 222Ej:CCC, 222El:CCC, 222En:CCC, 222Eo:CCC, 222Fd:CCC, 222Ff:CCC, 231Aa:CCC, 231Ab:CCC, 231Ae:CCC, 231Bc:CCC, 231Cd:CCC, 231Da:CCC, 231Dc:CCC, M221Aa:CCP, M221Ab:CCC, M221Ac:CCC, M221Bd:CCP, M221Be:CCP, M221Cd:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Chickamauga-Chattanooga, Great Smoky Mountains, Kennesaw Mountain, Kings Mountain?, Little River Canyon?, Mammoth Cave); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, Land Between the Lakes?, Nantahala, Pisgah, Sumter, Talladega)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: K.D. Patterson, mod. R. White

References: Allard 1990, Ambrose 1990a, Barden 1977, Burns and Honkala 1990a, CAP pers. comm. 1998, Cooper 1963, Core 1966, Evans 1991, Eyre 1980, Fike 1999, Gettman 1974, Homoya pers. comm., Malter 1977, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Patterson et al. 1999, Peet et al. unpubl. data 2002, Pyne 1994, Racine 1966, Rawinski 1992, Schafale 1998b, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d., Walton et al. 1997, Whittaker 1956

Virginia Pine Successional Forest***Pinus virginiana* Successional Forest****Virginia Pine Successional Forest****Identifier: C EGL002591****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

Physiognomic Group Temperate or subpolar needle-leaved evergreen forest (I.A.8.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)

Formation Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)

Alliance *Pinus virginiana* Forest Alliance (A.131)

Alliance (English name) Virginia Pine Forest Alliance

Association *Pinus virginiana* Successional Forest

Association (English name) Virginia Pine Successional Forest

Association (Common name) Virginia Pine Successional Forest

Ecological System(s): Central Appalachian Dry Oak-Pine Forest (CES202.591)

Northeastern Interior Dry-Mesic Oak Forest (CES202.592)

Southern Appalachian Low Mountain Pine Forest (CES202.332)

Semi-natural Forest (CES203.285)

ELEMENT CONCEPT

Global Summary: This community occurs in areas where canopy removal has created dry, open conditions and bare mineral soil, allowing for the establishment of *Pinus virginiana*. These habitats include old fields, old pastures, clearcuts, and burned or eroded areas. This forest typically has a very dense canopy of *Pinus virginiana* and little understory vegetation. The dense canopy may also include admixtures of other *Pinus* species (e.g., *Pinus taeda*, *Pinus echinata*) or other early successional deciduous trees (e.g., *Acer rubrum*, *Liquidambar styraciflua*, *Liriodendron tulipifera*). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. Shrub and herb layers are frequently very sparse. Stands are short-lived, generally less than 75 years.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: This community exists in small patches in the park, especially in areas that were most heavily farmed and impacted by row crop agriculture. It exists in heavily plowed and eroded areas that were allowed to grow back over the last 10-60 years or so.

Global Environment: This community occurs in areas where canopy removal has created open conditions and bare mineral soil, allowing for the establishment of *Pinus virginiana*. These conditions can include old fields, old pastures, clearcuts, and burned or eroded areas. In the Ridge and Valley of Tennessee, northeastern Monroe County, early successional forests with *Pinus virginiana* dominance were found on low slopes in areas that were cleared for agriculture prior to the 1970s, when Tellico Lake was created (Andreu and Tukman 1995). In the Central Appalachians, this vegetation occurs where soft shales have been farmed (primarily in valleys), resulting in stands with nothing but successional species in the understory. Soils underlying these communities are of two general types, i.e., those derived in residuum from calcareous shale and

calcareous sandstone of the Middle Ordovician and those of some other origin. Series of the former type include Dandridge (Lithic Ruptic-Alfic Eutrochrepts), Tellico (Typic Rhododults), and Steekee (Ruptic-Ultic Dystrochrepts). Other soil series that this forest type may occur on include Litz, Dewey, Alcoa, Bland, Etowah, Lobdell and Neubert. All of these soils are well-drained and range in pH from moderate acid to very strongly acidic.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy is always dominated by *Pinus virginiana* with a variable understory that is usually very sparse and often is dominated by invasive exotics such as *Lonicera japonica*.

Global Vegetation: This forest typically has a very dense canopy of *Pinus virginiana* and little understory vegetation. *Pinus taeda* or *Pinus echinata* may co-occur with *Pinus virginiana* in the canopy. The canopy can also have significant admixtures of early successional deciduous trees (e.g., *Acer rubrum*, *Liquidambar styraciflua*, *Liriodendron tulipifera*). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species. Shrub and herb strata are absent to sparse in coverage. In eastern Tennessee the subcanopy may contain *Acer saccharum* and *Cornus florida*; other associated species may include *Cercis canadensis*, *Parthenocissus quinquefolia*, *Lonicera japonica*, and *Microstegium vimineum* (Andreu and Tukman 1995). In the Central Appalachians, associates include *Pinus taeda*, *Pinus echinata*, and *Pinus rigida*. The dense ericaceous shrub stratum contains *Vaccinium* spp., *Gaylussacia* spp., *Kalmia latifolia*, and *Rhododendron* spp.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i>
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> , <i>Cornus florida</i> , <i>Nyssa sylvatica</i> , <i>Oxydendrum arboreum</i>
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Cornus florida</i> , <i>Nyssa sylvatica</i> , <i>Oxydendrum arboreum</i>
Tall shrub/sapling	Broad-leaved evergreen tree	<i>Vaccinium arboreum</i>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium stamineum</i>
Short shrub/sapling	Broad-leaved deciduous tree	<i>Cercis canadensis</i> , <i>Cornus florida</i> , <i>Oxydendrum arboreum</i> , <i>Quercus alba</i> , <i>Sassafras albidum</i>
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> , <i>Smilax glauca</i> , <i>Toxicodendron radicans</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (13-Jun-2000). This forest represents early successional vegetation and is thus not of conservation concern.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments: Early successional *Pinus virginiana* vegetation occurring over calcareous substrates is classed in ~*Pinus virginiana* - *Juniperus virginiana* var. *virginiana* - *Ulmus alata* Forest (CEGL007121)\$\$ and has species indicative of calcareous substrates.

Global Similar Associations:

- *Pinus echinata* Early-Successional Forest (CEGL006327)—occurs in similar environments but is dominated (>50% of canopy) by *Pinus echinata* instead of *Pinus virginiana*.
- *Pinus taeda* - *Liquidambar styraciflua* Semi-natural Forest (CEGL008462)—is commonly found in the same area as CEGL002591 in the Piedmont. CEGL008462 contains at least 50% *Pinus taeda* in the canopy, whereas CEGL002591 is mostly *Pinus virginiana*.
- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011)—occurs in similar environments with similar disturbance histories but is dominated by (>50% of canopy) *Pinus taeda* instead of *Pinus virginiana*.
- *Pinus virginiana* - *Juniperus virginiana* var. *virginiana* - *Ulmus alata* Forest (CEGL007121)—on more calcareous or circumneutral substrates.
- *Pinus virginiana* - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest (CEGL007119)—can have a very similar canopy in the Piedmont and Blue Ridge ecoregions, but CEGL007119 is generally created and maintained by fire and/or logging but not heavy plowing and/or erosion. CEGL002591 generally has signs of heavy agricultural use such as sparse herbaceous or shrub layers, large percentage of invasive exotics such as *Lonicera japonica* in the herbaceous layer, old plowlines, human debris, and extremely even-aged canopy, whereas CEGL007119 generally has a more intact herbaceous/shrub layer (especially *Vaccinium pallidum*) and less signs of severe human disturbance.

Global Related Concepts:

- IA7c. Xeric Virginia Pine Ridge Forest (Allard 1990) B
- Unclassified Old-Field Successional Forest (Fleming and Moorhead 2000) ?
- Virginia Pine - Oak: 78 (Eyre 1980) B
- Virginia Pine, RV (Pyne 1994) B
- Virginia Pine: 79 (Eyre 1980) B Xeric Pine Forest (Ambrose 1990a) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs in at least a few small patches on the edge of the park in areas heavily impacted by past agricultural practices.

Global Range: This successional community is possible in the Piedmont from Pennsylvania south to Alabama, and ranges west into the Appalachians, Ridge and Valley, the Cumberland Plateau, and in scattered locales of the Interior Low Plateau.

Nations: US

States/Provinces: AL, GA, IN, KY, MD, NC, NJ, PA, SC, TN, VA, WV

USFS Ecoregions: 221D:CC, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 221J:CC, 222Ej:CCC, 222En:CCC, 222Eo:CCC, 231Ae:CCC, 231Cd:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ca:CCP, M221Cb:CCP, M221Cc:CCP, M221Cd:CCC, M221Ce:CCP, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Cumberland Gap, Great Smoky Mountains, Kings Mountain, Little River Canyon?, Mammoth Cave, Shiloh); TVA (Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Jefferson, Sumter, Uwharrie?)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: M. Andreu and M. Tukman, mod. K.D. Patterson

References: Allard 1990, Ambrose 1990a, Andreu and Tukman 1995, Eyre 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 2000, Nelson 1986, Patterson et al. 1999, Pyne 1994, Southeastern Ecology Working Group n.d.

I.A.8.N.c. Conical-crowned temperate or subpolar needle-leaved evergreen forest

Juniperus virginiana Forest Alliance

Red-cedar Successional Forest

***Juniperus virginiana* var. *virginiana* - (*Quercus* spp.) Forest**

Eastern Red-cedar - (Oak species) Forest

Identifier: CEGL007124

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

Physiognomic Group Temperate or subpolar needle-leaved evergreen forest (I.A.8.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)

Formation Conical-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.c.)

Alliance *Juniperus virginiana* Forest Alliance (A.137)

Alliance (English name) Eastern Red-cedar Forest Alliance

Association *Juniperus virginiana* var. *virginiana* - (*Quercus* spp.) Forest

Association (English name) Eastern Red-cedar - (Oak species) Forest

Association (Common name) Red-cedar Successional Forest

Ecological System(s): East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland (CES203.482)

Semi-natural Forest (CES203.285)

ELEMENT CONCEPT

Global Summary: This is a successional community dominated by a nearly monospecific *Juniperus virginiana* var. *virginiana* canopy. Species composition and cover are variable depending upon geographic location and disturbance history. Some examples are densely forested (75-100% total cover) with *Juniperus virginiana* var. *virginiana* and sparse subcanopy, shrub and herb strata. Other examples, especially those that are somewhat more open-canopied, are more species-rich and other tree species may enter the canopy in low levels of abundance. Species that may occur in the canopy include *Carya alba*, *Carya ovata*, *Cercis canadensis*, and *Pinus virginiana*. Various oaks (including *Quercus coccinea*, *Quercus falcata*, and *Quercus phellos*) may also be present, seeding in from adjacent oak-hardwood forests. The midstory is typically sparse, with canopy species as well as *Cornus florida*, *Ilex opaca*, *Liquidambar styraciflua*, and *Prunus serotina* var. *serotina*. In addition, *Frangula caroliniana* occurs in various strata. Herbs are patchy and typically include *Asplenium platyneuron*, *Chasmanthium laxum*, *Eupatorium* spp., *Polystichum acrostichoides*, and *Carex* spp.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This community is very rare within the park but exists in small patches in areas of recovering pasture that are no longer being grazed or plowed. This red-cedar community generates on land that is higher in pH than Virginia or shortleaf pine stands.

Global Environment: This community occurs in a variety of disturbed areas such as eroded soils on abandoned agricultural land (Andreu and Tukman 1995). In Kentucky this vegetation occurs throughout the state (Bluegrass region, Highland Rim, East Gulf Coastal Plain) on

calcareous substrates or on abandoned agricultural land; acreage of this type has increased from presettlement. This type also includes the *Juniperus virginiana* var. *virginiana* woodland from Tellico Lake (Andreu and Tukman 1995) which occurs on drier sites with shallow, rocky soils.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This community is dominated by young to moderate even aged stands of *Juniperus virginiana* var. *virginiana* with a subcanopy, shrub, and herbaceous layer that can vary widely by occurrence depending upon moisture, soil nutrients, and disturbance history.

Global Vegetation: Stands are dominated by *Juniperus virginiana* var. *virginiana*. A host of other woody species may also be present, some of which may occur in the canopy at low levels of abundance. These species include *Carya alba*, *Carya ovata*, *Cercis canadensis*, *Pinus virginiana*, *Quercus coccinea*, *Quercus falcata*, and *Quercus phellos*. The midstory is typically sparse, with canopy species as well as *Cornus florida*, *Ilex opaca*, *Liquidambar styraciflua*, and *Prunus serotina* var. *serotina* (NatureServe Ecology unpubl. data). In addition, *Frangula caroliniana* occurs in various strata. Herbs are patchy and typically include *Asplenium platyneuron*, *Chasmanthium laxum*, *Eupatorium* spp., *Polystichum acrostichoides*, and *Carex* spp. The exotics *Lonicera japonica* and *Microstegium vimineum* may also be present.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i> var. <i>virginiana</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (3-Sep-2002). This forest represents early successional, modified, or silviculturally managed vegetation and is thus not of conservation concern and does not receive a conservation status rank.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Kings Mountain National Military Park Comments:

Global Comments: Originally described from Tellico Pilot Project (Ridge and Valley of Tennessee, northeastern Monroe County) based on 10 stands sampled by Andreu and Tukman (1995). This community is very closely related to *Juniperus virginiana* Woodland and to mixed juniper-oak forest types but is distinguished by the closed-canopy evergreen dominance of *Juniperus virginiana*. *Juniperus virginiana* woodlands may be equivalent to this type.

Global Similar Associations:

- *Juniperus virginiana* Midwest Forest (CEGL002593)
- *Juniperus virginiana* var. *virginiana* / *Rhus copallinum* / *Schizachyrium scoparium* Woodland (CEGL007704)

Global Related Concepts:

- Eastern Redcedar: 46 (Eyre 1980) B
- IB5a. Eastern Red Cedar Woodland (Allard 1990) ?
- Red cedar, RV (Pyne 1994) B

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: Since Kings Mountain is made up mostly of highly acidic soils, this community is very rare within the park. In fact, our 2004 report did not document any occurrences of this type within the park. However, the Gallyoun et al. (1996) mapping work documented this community type in at least one small patch in the park and work done later in 2004 confirmed its existence within the boundary.

Global Range: This community is widely distributed in the southeastern and central United States.

Nations: US

States/Provinces: AL, AR, GA, KY, LA, MS, NC, OK, SC, TN, VA?, WV?

USFS Ecoregions: 221:C, 222Ak:CCP, 222Cg:CCC, 222Eb:CCC, 222Ed:CCC, 222Ej:CCC, 222En:CCC, 222Eo:CCC, 222Lc:CCP, 222Me:CCP, 231:C, 251Cc:CC?, 251Ch:CCP, M221Be:CCC

Federal Lands: DOD (Arnold, Camp Gruber, J. Percy Priest); NPS (Blue Ridge Parkway?, Chickamauga-Chattanooga, Chickasaw NRA, Cumberland Gap, Fort Donelson, Kings Mountain, Mammoth Cave, Natchez Trace, Russell Cave, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Cherokee?, Daniel Boone, Ouachita)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: K.D. Patterson

References: Allard 1990, Andreu and Tukman 1995, Evans 1991, Eyre 1980, Gallyoun et al. 1996, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Pyne 1994, Rice 1960, Rosson 1995, Southeastern Ecology Working Group n.d.

I.B.2.N.a. Lowland or submontane cold-deciduous forest

Juglans nigra Forest Alliance

Successional Black Walnut Forest

Juglans nigra / *Verbesina alternifolia* Forest

Black Walnut / Common Wingstem Forest

Identifier: C EGL007879

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Juglans nigra* Forest Alliance (A.1932)

Alliance (English name) Black Walnut Forest Alliance

Association *Juglans nigra* / *Verbesina alternifolia* Forest

Association (English name) Black Walnut / Common Wingstem Forest

Association (Common name) Successional Black Walnut Forest

Ecological System(s): South-Central Interior Large Floodplain (CES202.705)

ELEMENT CONCEPT

Global Summary: This is a potentially widespread association. This community was sampled on former homesites along streams, possibly in association with circumneutral soils, at 460-610 m (1500-2000 feet) elevation in the Smokies. In addition, the association was sampled from the Piedmont of South Carolina in low-lying, poor-drainage areas from approximately 170 to 200 m (550-650 feet) in elevation. The community was originally defined from former homesites in Great Smoky Mountains National Park, where this association is an open, successional forest. *Juglans nigra* is often the sole canopy tree, though *Liriodendron tulipifera*, *Juglans cinerea*, *Robinia pseudoacacia*, *Morus rubra*, and *Aesculus flava* are codominants in some examples. The herb stratum is dominated by *Verbesina alternifolia*. Other herbs include *Amphicarpaea bracteata* and *Ambrosia trifida*. The exotics *Rosa multiflora* and *Microstegium vimineum* can be common in this community.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: Within the park, this community is limited to very disturbed bottomlands that were formerly homesites or agricultural fields.

Global Environment: This community often occurs on former homesites along streams, possibly in association with circumneutral soils. It was originally defined from former homesites in Great Smoky Mountains National Park, where this association is an open, successional forest.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: *Juglans nigra* is always the most common canopy tree, but it may be accompanied by *Liriodendron tulipifera* and *Morus rubra* in some examples. The understory may contain *Lindera benzoin* in the shrub layer and is dominated by a combination of *Verbesina alternifolia*, *Microstegium vimineum*, and assorted other herbaceous species associated with rich floodplain sites.

Global Vegetation: *Juglans nigra* is often the sole canopy tree, though *Liriodendron tulipifera*, *Juglans cinerea*, *Celtis laevigata*, and *Aesculus flava* are dominant or codominant in some

examples. The herb stratum is dominated by *Verbesina alternifolia* or *Microstegium vimineum*. Other herbs include *Amphicarpaea bracteata* and *Ambrosia trifida*. The exotic *Rosa multiflora* can be common in this community.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Juglans nigra</i>
Herb (field)	Forb	<i>Verbesina alternifolia</i>
Herb (field)	Graminoid	<i>Microstegium vimineum</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Juglans nigra</i>
Herb (field)	Forb	<i>Verbesina alternifolia</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Juglans nigra*, *Microstegium vimineum*, *Verbesina alt*

Global: *Juglans nigra*, *Rosa multiflora*, *Verbesina alternifolia*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (2-Apr-2001). This vegetation represents vegetation created by anthropogenic disturbance and is thus not a conservation priority. Rank changed from GW to GD 2001-04-02 MP.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Kings Mountain National Military Park Comments:

Global Comments: This association was described from Great Smoky Mountains National Park where this association is distinguished on air photography.

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This association is found only on highly disturbed large creek bottoms. Most of the wider floodplains that can sustain this community are located on the edge of the park.

Global Range: This potentially widespread association is currently defined only for Tennessee but likely ranges into adjacent states.

Nations: US

States/Provinces: NC, SC, TN, VA?

USFS Ecoregions: 231Aa:PPP, 231Ae:PPP, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Cumberland Gap, Great Smoky Mountains, Kings Mountain, Mammoth Cave, Ninety Six)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.17.

Local Description Authors: R. White

Global Description Authors:

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Southeastern Ecology Working Group n.d.

Liquidambar styraciflua Forest Alliance

Successional Sweetgum Forest

Liquidambar styraciflua Forest

Sweetgum Forest

Identifier: CEGL007216**NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Liquidambar styraciflua* Forest Alliance (A.234)

Alliance (English name) Sweetgum Forest Alliance

Association *Liquidambar styraciflua* Forest

Association (English name) Sweetgum Forest

Association (Common name) Successional Sweetgum Forest

Ecological System(s): Semi-natural Forest (CES203.285)**ELEMENT CONCEPT**

Global Summary: This early-successional upland forest results from succession following human activities, such as logging and clearing. Stands are dominated by *Liquidambar styraciflua*, sometimes to the exclusion of other species. A related, later-successional bottomland association is ~*Liquidambar styraciflua* / *Lindera benzoin* / *Arisaema triphyllum* ssp. *triphyllum* Forest (CEGL004418)\$.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: This association is found in heavily impacted areas in the park, especially underneath and adjacent to power line right of ways or abandoned right of ways where repeated mowing has created conditions more favorable for successional hardwoods and less favorable for pine trees easily killed back by damage to crowns.

Global Environment: This association is found in uplands that have been heavily impacted by agriculture or other severe disturbances and are recovering.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This community can range from a very tall canopy to a shrubby canopy that is growing quickly towards the canopy with time. *Liquidambar styraciflua* is dominant, often with some *Liriodendron tulipifera* (but less than 50%) and often patches of *Rubus argutus* at the shrub level where there are canopy openings.

Global Vegetation: Stands are dominated by *Liquidambar styraciflua*, sometimes to the exclusion of other species.

MOST ABUNDANT SPECIES**Kings Mountain National Military Park**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i>
Shrub/sapling (tall & short)	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i>

Global

Stratum

Tree canopy

Shrub/sapling (tall & short)

Lifeform

Broad-leaved deciduous tree

Broad-leaved deciduous tree

Species*Liquidambar styraciflua**Liquidambar styraciflua***CHARACTERISTIC SPECIES****Kings Mountain National Military Park: *Liquidambar styraciflua*****Global:****OTHER NOTEWORTHY SPECIES****Kings Mountain National Military Park:****Global:****CONSERVATION STATUS RANK**

Global Rank & Reasons: GNA (modified/managed) (19-Aug-2002). This is an upland successional vegetation type composed of native species. Its conservation value is limited, but it may provide buffer for communities of greater conservation value.

CLASSIFICATION**Status:** Standard**Classification Confidence:** 3 - Weak**Kings Mountain National Military Park Comments:****Global Comments:****Global Similar Associations:**

- *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp. *triphyllum* Forest (CEGL004418)—a later-successional bottomland association.
- *Liquidambar styraciflua* - *Quercus (alba, falcata)* Forest (CEGL007217)—of interior provinces.
- *Liquidambar styraciflua* - *Quercus (nigra, phellos)* - *Pinus taeda* / *Vaccinium elliotii* - *Morella cerifera* Forest (CEGL007726)—a more diverse successional forest of the Coastal Plain.

Global Related Concepts:**OTHER COMMENTS****Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community was not documented by plots in this project but was found later during the accuracy assessment work in former power line right of ways that had recently been abandoned or had remained unmowed for more than 3-5 years. It is uncommon rare in the park outside of these right of way areas.

Global Range: This association may be found throughout the southeastern United States, in the coastal plains and interior ecoregions. It is also attributed to New Jersey with the merger of CEGL006927. The status in intervening states (e.g., Delaware, Maryland) needs to be assessed.

Nations: US**States/Provinces:** AL, GA, KY, LA, MS, NC, NJ, OK, SC, TN, VA**USFS Ecoregions:** 222Fa:CCP, 222Fb:CCC, 222Fe:CCP, 231Aa:PPP, M221Dc:???, M221Dd:???**Federal Lands:** NPS (Cowpens, Cumberland Gap, Guilford Courthouse, Kings Mountain, Mammoth Cave, Ninety Six); USFS (Oconee?, St. Francis?)**ELEMENT SOURCES****Kings Mountain National Military Park Inventory Notes:****Kings Mountain National Military Park Plots:** None**Local Description Authors:** R. White**Global Description Authors:** R. White, mod. M. Pyne**References:** NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Liriodendron tulipifera Forest Alliance

Interior Mid- to Late-Successional Tuliptree - Hardwood Upland Forest (Acid Type)

Liriodendron tulipifera* - *Quercus* spp. Forest*Tuliptree - Oak species Forest****Identifier: CEGL007221****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Liriodendron tulipifera* Forest Alliance (A.236)

Alliance (English name) Tuliptree Forest Alliance

Association *Liriodendron tulipifera* - *Quercus* spp. Forest

Association (English name) Tuliptree - Oak species Forest

Association (Common name) Interior Mid- to Late-Successional Tuliptree - Hardwood Upland Forest (Acid Type)

Ecological System(s): East Gulf Coastal Plain Southern Mesic Slope Forest (CES203.476)

Southern Interior Low Plateau Dry Oak Forest (CES202.898)

East Gulf Coastal Plain Northern Dry Upland Hardwood Forest (CES203.483)

ELEMENT CONCEPT

Global Summary: This semi-natural or successional community is one of several described upland associations dominated by *Liriodendron tulipifera*. Within its range, it differs from other described types based on the lack of a significant pine component [see ~*Liriodendron tulipifera* - *Pinus taeda* Forest (CEGL007521)\$]\$ and the absence of species affiliated with circumneutral conditions [see ~*Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Forest (CEGL007220)\$]\$]; it is later successional and more diverse than ~*Liriodendron tulipifera* Forest (CEGL007218)\$]\$ or ~*Liriodendron tulipifera* - *Robinia pseudoacacia* Forest (CEGL007219)\$]\$. Examples are common across large areas of the upland landscape which have been previously disturbed. Species found in stands attributable to this type may include a fairly diverse and varied composition. *Acer rubrum*, *Quercus* spp., and occasionally *Liquidambar styraciflua* may be common in some stands of this type. These successional forests often follow cropping, clearcut logging, or other severe disturbance, and are successional to mixed *Quercus* - *Carya* forests. The oaks in these stands will frequently be multi-stemmed, resulting from coppicing.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: Within the park, this community is found in areas that were once clearcut or plowed as old fields. They often occur on gentle slopes and ravines that were plowed but that were not colonized by pine trees after abandonment, whereas the pine-dominated successional types tend to occur in more exposed locations on broad ridges and slopes.

Global Environment: These semi-natural upland deciduous forests are found primarily in areas which were once clearcuts, old fields, or were cleared by fire or other natural disturbances. These non-wetland forests are also found along mesic stream terraces.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Stands are generally dominated by *Liriodendron tulipifera*. Many stands are codominated by dry-mesic oak species such as *Quercus prinus*, *Quercus velutina*, *Quercus coccinea*, and *Quercus alba* as well as the ubiquitous *Acer rubrum* and *Liquidambar styraciflua*. Within the park, some examples of this community type are up to 60% oak, but the oak individuals are very young. The herbaceous stratum can vary widely and may include only a handful of dry-site species.

Global Vegetation: The canopy of this semi-natural upland association is dominated by *Liriodendron tulipifera*. A variety of other species may also be present, including *Acer rubrum*, *Quercus alba*, *Quercus falcata*, *Quercus nigra*, *Quercus velutina*, *Cornus florida*, *Carya* spp., and other species (NatureServe Ecology unpubl. data).

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i> , <i>Quercus alba</i> , <i>Quercus prinus</i> , <i>Quercus velutina</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Liriodendron tulipifera*

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (19-Aug-2002). This forest represents early successional vegetation and is thus not of conservation concern. This is a successional vegetation type composed of native species. Its conservation value is limited, but mature examples could provide buffer for communities of greater conservation value.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Kings Mountain National Military Park Comments:

Global Comments:

Global Similar Associations:

- *Liriodendron tulipifera* - *Acer negundo* Forest (CEGL007184)—a bottomland type.
- *Liriodendron tulipifera* - *Robinia pseudoacacia* Forest (CEGL007219)—with Appalachian distribution.
- *Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Forest (CEGL007220)—is generally found on calcareous soils.

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community is most common on protected slopes and slightly inclining ravines where farming or logging occurred less than 70 years ago. It is a common type in the park.

Global Range: This association is known from the southern Cumberland Plateau, Piedmont, and Interior Low Plateau of the southeastern U.S. and may also occur in the Upper East Gulf Coastal Plain. It is known from Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee, and possibly Virginia.

Nations: US

States/Provinces: AL, GA, KY, NC, SC, TN, VA?

USFS Ecoregions: 221Hc:CCC, 222C:CC, 222D:CC, 222Eb:CCC, 222En:CCC, 222Eo:CCC, 231Aa:CCP, 231Ae:CCC, 231Bc:CCC, 231Cd:CCP, 231Dc:CCC

Federal Lands: DOD (Fort Benning); NPS (Blue Ridge Parkway?, Cowpens, Cumberland Gap, Fort Donelson, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Natchez Trace, Ninety Six, Shiloh); USFS (Bankhead, Daniel Boone, Oconee?, Talladega)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.2, KIMO.5.

Local Description Authors: R. White

Global Description Authors: R.E. Evans/M. Pyne

References: Gallyoun et al. 1996, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Quercus alba - (*Quercus rubra*, *Carya* spp.) Forest Alliance

Piedmont Dry-Mesic Oak - Hickory Forest

Quercus alba - *Quercus (rubra, coccinea)* - *Carya (alba, glabra)* / *Vaccinium pallidum*

Piedmont

Dry-Mesic Forest

White Oak - (Northern Red Oak, Scarlet Oak) - (Mockernut Hickory, Pignut Hickory) /

Hillside Blueberry

Piedmont Dry-Mesic Forest

Identifier: CEGL008475

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus alba* - (*Quercus rubra*, *Carya* spp.) Forest Alliance (A.239)

Alliance (English name) White Oak - (Northern Red Oak, Hickory species) Forest Alliance

Association *Quercus alba* - *Quercus (rubra, coccinea)* - *Carya (alba, glabra)* / *Vaccinium pallidum* Piedmont

Dry-Mesic Forest

Association (English name) White Oak - (Northern Red Oak, Scarlet Oak) - (Mockernut Hickory, Pignut Hickory) / Hillside

Blueberry Piedmont Dry-Mesic Forest

Association (Common name) Piedmont Dry-Mesic Oak - Hickory Forest

Ecological System(s): Atlantic Coastal Plain Northern Dry Hardwood Forest (CES203.475)

Northeastern Interior Dry-Mesic Oak Forest (CES202.592)

Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

ELEMENT CONCEPT

Global Summary: This forest is found on submesic to dry-mesic to subxeric upland sites of mid- to upper-slope position with northerly or easterly aspects, or mid to lower slopes with more southerly aspects. In drier landscapes, this type could occupy habitats considered relatively mesic (e.g., concave slopes, lower slopes, shallow ravines). These sites are described as dry to intermediate in soil moisture. The soils are acidic and nutrient-poor, being weathered from felsic metamorphic and sedimentary rocks, or composed of unconsolidated sediments. Stands of this forest are closed to somewhat open and are dominated by mixtures of oaks and hickories, with *Quercus alba* being most prevalent, along with *Quercus rubra*, *Quercus coccinea*, *Quercus velutina*, *Carya alba*, *Carya ovalis*, and *Carya glabra*. The *Carya* spp. are common in this type but often most abundant in the understory. In forests with a history of disturbance such as selective logging or windstorms, early-successional species such as *Liriodendron tulipifera* or *Pinus* sp. may codominate. In Virginia examples, *Quercus prinus* is inconstant but sometimes important. In addition, *Pinus* spp., *Liriodendron tulipifera*, *Liquidambar styraciflua*, and *Acer rubrum* may be common. Understory species include *Acer rubrum*, *Cornus florida*, *Oxydendrum arboreum*, *Ilex opaca*, and *Nyssa sylvatica*. Shrubs include *Vaccinium stamineum*, *Vaccinium pallidum*, *Viburnum acerifolium*, *Viburnum rafinesquianum*, and *Euonymus americana*. In

Virginia, *Vaccinium pallidum* is the principal ericad of patchy low-shrub layers, and stands may contain *Calycanthus floridus*. The woody vines *Vitis rotundifolia* and *Toxicodendron radicans* often are present. Herbs are fairly sparse, with *Hexastylis* spp., *Goodyera pubescens*, *Chimaphila maculata*, *Desmodium nudiflorum*, *Maianthemum racemosum*, *Polygonatum biflorum*, *Viola hastata*, *Tipularia discolor*, and *Hieracium venosum* as some common components. This association is less nutrient-rich than ~*Quercus rubra* - *Quercus alba* - *Carya glabra* / *Geranium maculatum* Forest (CEGL007237)\$.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This forest occurs on mid and lower, somewhat protected slopes (though on lower slopes it can be present on south-facing slopes). The sites usually have a moderate to steep slope with very acidic dry-mesic soils. This is a matrix type on lower slopes within the park.

Global Environment: The sites on which this vegetation is found are described as 'intermediate' in soil moisture (Jones 1988a, 1988b). This association is less nutrient-rich than ~*Quercus rubra* - *Quercus alba* - *Carya glabra* / *Geranium maculatum* Forest (CEGL007237)\$. Virginia stands occur on submesic to subxeric uplands with acidic, nutrient-poor soils weathered from felsic metamorphic and sedimentary rocks, and unconsolidated sediments. This type frequently occupies somewhat mesic habitats (e.g., concave slopes, lower slopes, shallow ravines) in dry landscapes where Mixed Oak/Heath types are prevalent. It is probably a large-patch or matrix type in some regions (G. Fleming pers. comm. 2001). In North Carolina, this is a matrix type, probably the most common forest type remaining in the Piedmont.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Stands of this forest generally have a closed canopy dominated by *Quercus alba* with *Quercus velutina*, *Quercus coccinea*, and *Liriodendron tulipifera* codominant. In areas that have not been burned, the understory can be very heavily dominated by *Acer rubrum* and *Oxydendrum arboreum*. The herbaceous layer is generally sparse with a deep cover of last year's fallen leaves and scattered occurrences of herbs and subshrubs such as *Piptochaetium avenaceum*, *Chimaphila maculata*, and *Tipularia discolor*. Shrubs range from sparse to moderate in cover and generally include *Vaccinium pallidum*. *Vitis rotundifolia* is usually also present in small quantities on the ground. This community may intergrade with bottomland vegetation at the foot of slopes that border stream valleys.

Global Vegetation: Stands of this forest are closed to somewhat open, and are dominated by mixtures of oaks and hickories, with *Quercus alba* being most prevalent, along with *Quercus rubra*, *Quercus coccinea*, *Quercus velutina*, *Carya alba*, *Carya ovalis*, and *Carya glabra*. The *Carya* spp. are common in this type, but often most abundant in the understory. In Virginia examples, *Quercus prinus* is inconstant but sometimes important. In addition, *Pinus* spp., *Liriodendron tulipifera*, *Liquidambar styraciflua*, and *Acer rubrum* may be common. Understory species include *Acer rubrum*, *Cornus florida*, *Oxydendrum arboreum*, *Ilex opaca*, and *Nyssa sylvatica*. Shrubs include *Vaccinium stamineum*, *Vaccinium pallidum*, *Viburnum acerifolium*, *Viburnum rafinesquianum*, and *Euonymus americana*. In Virginia, *Vaccinium pallidum* is the principal ericad of patchy low-shrub layers, and stands may contain *Calycanthus floridus* (G. Fleming pers. comm. 2001). The woody vines *Vitis rotundifolia* and *Toxicodendron radicans* often are present. Herbs are fairly sparse, with *Hexastylis* spp., *Goodyera pubescens*, *Chimaphila maculata*, *Desmodium nudiflorum*, *Maianthemum racemosum*, *Polygonatum biflorum*, *Viola hastata*, *Tipularia discolor*, and *Hieracium venosum* as some common components (Schafale and Weakley 1990).

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Quercus alba*

Global: *Quercus alba*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G5? (28-Oct-2003). This is not a rare community type, although stands older than about 80 years old are probably rare. Most of the rolling upland landscape of the Piedmont and other regions where this occurs have been logged more than once since European settlement. This is probably a large-patch or matrix type in some regions (G. Fleming pers. comm. 2001). In North Carolina, this is a matrix type, probably the most common forest type remaining in the Piedmont.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments:

Global Similar Associations:

- *Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium* Forest (CEGL006336)
- *Quercus alba - Carya alba / Euonymus americana / Hexastylis arifolia* Forest (CEGL006227)—similar with a more southerly range.
- *Quercus alba - Carya alba / Vaccinium elliotii* Forest [Provisional] (CEGL007224)—of the Coastal Plain.
- *Quercus alba - Carya glabra / Mixed Herbs Coastal Plain* Forest (CEGL007226)—of the Coastal Plain.
- *Quercus alba - Carya ovata / Cercis canadensis* Forest (CEGL007232)
- *Quercus alba - Quercus nigra - Quercus falcata / Ilex opaca / Clethra alnifolia - Arundinaria gigantea ssp. tecta* Forest (CEGL007862)—of the Coastal Plain.
- *Quercus alba - Quercus rubra - Carya glabra - Carya ovata / Viburnum rafinesquianum / Viola tripartita* Forest (CEGL007236)
- *Quercus falcata - Quercus alba - Carya alba / Oxydendrum arboreum / Vaccinium stamineum* Forest (CEGL007244)—contains a substantial amount of *Quercus falcata* in addition to *Quercus alba*.
- *Quercus rubra - Quercus alba - Carya glabra / Geranium maculatum* Forest (CEGL007237)—a related more mesic type.
- *Quercus rubra / Magnolia tripetala - Cercis canadensis / Actaea racemosa - Tiarella cordifolia* Forest (CEGL003949)

Global Related Concepts:

- *Quercus alba - Quercus coccinea - Carya (glabra, alba) / Vaccinium pallidum* Forest (Patterson pers. comm.) ?
- IA6i. Interior Upland Dry-Mesic Oak - Hickory Forest (Allard 1990) B
- Oak - Chestnut - Hickory Forest (Ambrose 1990a) B
- White oak - northern red oak - false Solomon's seal (*Quercus alba - Quercus rubra - Smilacina racemosa*) community type (Jones 1988b) ?
- White oak - northern red oak - false Solomon's seal (*Quercus alba - Quercus rubra - Smilacina racemosa*) community type (Jones 1988a) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This widespread matrix community type occurs on lower and mid slopes and is generally considered intermediate in moisture regime between the upper and mid slope chestnut oak and pine forests and the more mesic creekside and bottomland communities.

Global Range: This association is found in the Piedmont and northern Coastal Plain (Chesapeake Bay Lowlands Ecoregion) of Virginia, as well as south in the Piedmont to the Carolinas and possibly Georgia, as well as possibly in related areas of Maryland.

Nations: US

States/Provinces: GA?, MD?, NC, SC, VA

USFS Ecoregions: 221Db:CCC, 231Aa:CCC, 231Ae:CCC, 232Ad:CCC, 232Bt:CC?, 232Bx:CCC

Federal Lands: NPS (Guilford Courthouse, Kings Mountain, Ninety Six); USFS (Oconee?)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.5 and KIMO.6.

Local Description Authors: R. White

Global Description Authors: M.P. Schafale/G.P. Fleming

References: Allard 1990, Ambrose 1990a, Fleming et al. 2001, Fleming pers. comm., Jones 1988a, Jones 1988b, Nelson 1986, Patterson pers. comm., Schafale and Weakley 1990, Skeen et al. 1980, Southeastern Ecology Working Group n.d.

Piedmont Mesic Basic Oak - Hickory Forest***Quercus rubra* / *Magnolia tripetala* - *Cercis canadensis* / *Actaea racemosa* - *Tiarella cordifolia* Forest****Northern Red Oak / Umbrella Magnolia - Redbud / Black Cohosh - Heartleaf Foamflower Forest****Identifier: C EGL003949****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus alba* - (*Quercus rubra*, *Carya* spp.) Forest Alliance (A.239)

Alliance (English name) White Oak - (Northern Red Oak, Hickory species) Forest Alliance

Association *Quercus rubra* / *Magnolia tripetala* - *Cercis canadensis* / *Actaea racemosa* - *Tiarella cordifolia* Forest

Association (English name) Northern Red Oak / Umbrella Magnolia - Redbud / Black Cohosh - Heartleaf Foamflower Forest

Association (Common name) Piedmont Mesic Basic Oak - Hickory Forest

Ecological System(s): Southern Piedmont Mesic Forest (CES202.342)**ELEMENT CONCEPT**

Global Summary: This basic mesic forest of the southern Piedmont is a more mesic variation of ~*Quercus alba* - *Carya ovata* / *Cercis canadensis* Forest (CEGL007232)\$. It occurs on circumneutral to basic, well-drained soils in the Piedmont of South Carolina and possibly also occurs in Virginia, North Carolina, Georgia, and Alabama. Proportions of *Liriodendron tulipifera* and other early-successional species increase following disturbance. The canopy is dominated by *Quercus rubra* and often *Liriodendron tulipifera* in combination with small amounts of *Quercus alba* and *Fagus grandifolia*. This community exists in ravine areas and is best developed on the north-oriented faces of these ravines. The subcanopy is dominated by *Magnolia tripetala*, and the herb layer is diverse and moderate in cover with species such as *Actaea racemosa*, *Polystichum acrostichoides*, *Tiarella cordifolia*, and *Circaea lutetiana*. In addition, indicators of rich, somewhat basic soil, usually associated with the coves of the southern Appalachians 60 miles to the west, are present. These include species such as *Phegopteris hexagonoptera*, *Collinsonia canadensis*, *Eurybia divaricata* (= *Aster divaricatus*), *Oxalis violacea*, *Adiantum pedatum*, *Cercis canadensis*, *Luzula* spp., and *Corylus* sp. As with C EGL007232, this community is differentiated from non-basic oak-hickory forests by lacking such species as *Quercus falcata*, *Quercus coccinea*, and *Oxydendrum arboreum*.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: Within the park, this community is very rare, with only one accessible well-developed example in a steep ravine and creek slope with a predominantly northern exposure. The community may be influenced by the geology of the site. The circumneutral soils may be a result of a diabase dike or sill running through the area.

Global Environment: This basic mesic forest of the southern Piedmont is a more mesic variation of ~*Quercus alba* - *Carya ovata* / *Cercis canadensis* Forest (CEGL007232)\$. A basic or mafic substrate is necessary for best development of this community. It commonly occurs on mesic north-oriented low slopes and bottoms.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy is dominated by *Quercus rubra* and often *Liriodendron tulipifera* in combination with small amounts of *Quercus alba* and *Fagus grandifolia*. In some cases, *Fagus grandifolia* can be codominant in the canopy. This community exists in ravine areas and is best developed on the north-oriented faces of these ravines. The subcanopy is dominated by *Magnolia tripetala*, and the herb layer is diverse and moderate in cover with species such as *Actaea racemosa*, *Polystichum acrostichoides*, *Tiarella cordifolia*, and *Circaea lutetiana*. In addition, indicators of rich, somewhat basic soil, usually associated with the coves of the southern Appalachians 60 miles to the west, are present. These include species such as *Phegopteris hexagonoptera*, *Collinsonia canadensis*, *Eurybia divaricata* (= *Aster divaricatus*), *Oxalis violacea*, *Adiantum pedatum*, *Luzula* spp., and *Corylus americana*. This community is differentiated from non-basic oak-hickory forests by lacking such species as *Quercus falcata* and *Oxydendrum arboreum*.

Global Vegetation: Stands of this forest are dominated by *Quercus rubra* and often *Liriodendron tulipifera* in combination with small amounts of *Quercus alba* and *Fagus grandifolia*. The subcanopy is dominated by *Magnolia tripetala*, and the herb layer is diverse and moderate in cover with species such as *Actaea racemosa*, *Polystichum acrostichoides*, *Tiarella cordifolia*, and *Circaea lutetiana*. Proportions of *Liriodendron tulipifera* and other early successional species increase following disturbance. As with CEGL007232, this community is differentiated from non-basic oak-hickory forests by lacking such species as *Quercus falcata* and *Oxydendrum arboreum*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i> , <i>Quercus rubra</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Magnolia tripetala</i>
Herb (field)	Forb	<i>Actaea racemosa</i>
Herb (field)	Fern	<i>Polystichum acrostichoides</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Actaea racemosa*, *Cercis canadensis*, *Magnolia tripetala*

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park: *Collinsonia canadensis*, *Leucothoe fontanesiana*, *Tiarella cordifolia*

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3? (25-Feb-2004). This community type is limited to areas of dissected topography with base rich soils in parts of the Piedmont. Only one occurrence has been documented (Kings Mountain, SC), although this type could potentially occur in Alabama, Georgia, North Carolina, and Virginia. However, any other potential occurrences are most likely very small, very widely dispersed, and not currently protected. Logging that damages the soil

structure or alters the species composition of existing stands, any land use practice upslope that increases erosion, and invasion of certain invasive exotics are all potentially important threats that may occur on these small patches in the near future. The G3 rank appears to be justified given the known rarity of base rich soils in the Piedmont and the fact that only one occurrence has been documented as of February 2004. However, this type could potentially occur in other states in the Piedmont which have not been surveyed for this type yet. The ? on the rank indicates a degree of uncertainty on the rank based on the potential for this type to be found in some of these areas.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: This association is differentiated from non-basic oak-hickory forests by lacking such species as *Quercus falcata* and *Oxydendrum arboreum*. This community was created in response to the need for the description of a more mesic variant of ~*Quercus alba* - *Carya ovata* / *Cercis canadensis* Forest (CEGL007232)\$\$ in the Piedmont. This forest is not in Kentucky or Tennessee.

Global Similar Associations:

- *Quercus alba* - *Carya alba* - (*Quercus velutina*) / *Desmodium nudiflorum* - (*Carex picta*) Forest (CEGL007795)—is related vegetation of these states in the Interior Low Plateau.
- *Quercus alba* - *Carya ovata* / *Cercis canadensis* Forest (CEGL007232)
- *Quercus alba* - *Quercus (rubra, coccinea)* - *Carya (alba, glabra)* / *Vaccinium pallidum* Piedmont Dry-Mesic Forest (CEGL008475)—is a non-basic type with an overlapping range.
- *Quercus alba* - *Quercus rubra* - *Carya glabra* - *Carya ovata* / *Viburnum rafinesquianum* / *Viola tripartita* Forest (CEGL007236)—is a basic / mafic type with an overlapping range, poorly described.
- *Quercus rubra* - *Quercus alba* - *Carya glabra* / *Geranium maculatum* Forest (CEGL007237)

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community is restricted to north-facing ravines near creek bottoms in the park.

Global Range: The community has been described for Kings Mountain National Military Park, but most likely occurs in other areas of the Piedmont of South Carolina, North Carolina, and Virginia where the appropriate soils and topography exist.

Nations: US

States/Provinces: AL?, GA?, NC?, SC, VA?

USFS Ecoregions: 231Aa:CCC

Federal Lands: NPS (Kings Mountain)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.18.

Local Description Authors: R. White

Global Description Authors: R. White

References: Allard 1990, Ambrose 1990a, Eyre 1980, Fleming et al. 2001, Fleming pers. comm., NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Rawinski 1992, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

Quercus alba - *Quercus (falcata, stellata)* Forest AllianceSouthern Red Oak - White Oak Mixed Oak Forest*Quercus falcata* - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest**Southern Red Oak - White Oak - Mockernut Hickory / Sourwood / Deerberry Forest****Identifier: CEGL007244****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus alba* - *Quercus (falcata, stellata)* Forest Alliance (A.241)

Alliance (English name) White Oak - (Southern Red Oak, Post Oak) Forest Alliance

Association *Quercus falcata* - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest

Association (English name) Southern Red Oak - White Oak - Mockernut Hickory / Sourwood / Deerberry Forest

Association (Common name) Southern Red Oak - White Oak Mixed Oak Forest

Ecological System(s): Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)

East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland (CES203.482)

Southern Interior Low Plateau Dry Oak Forest (CES202.898)

Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

East Gulf Coastal Plain Northern Dry Upland Hardwood Forest (CES203.483)

ELEMENT CONCEPT

Global Summary: This southern red oak - white oak dry forest is found in the Piedmont of Georgia, South Carolina, North Carolina, and Virginia, and in the interior uplands and Cumberland Plateau of Kentucky and Tennessee. It has also been reported from the Upper East Gulf Coastal Plain of Mississippi, Tennessee and Georgia. It generally is a second-growth forest on low-fertility Ultisols. The vegetation is dominated by *Quercus* spp. and lesser amounts of *Carya* spp. The canopy is continuous, and several species of *Quercus* may be present or codominant (e.g., *Quercus falcata*, *Quercus alba*, *Quercus velutina*, *Quercus coccinea*, and *Quercus stellata*). The subcanopy closure is variable, ranging from less than 25% to more than 40% cover, and the shrub and herb layers generally are sparse. Subcanopy species include canopy species and *Acer rubrum*, *Liriodendron tulipifera*, *Oxydendrum arboreum*, *Liquidambar styraciflua*, *Ulmus alata*, *Cornus florida*, *Nyssa sylvatica*, *Juniperus virginiana* var. *virginiana*, and *Vaccinium arboreum*. The tall-shrub stratum may contain *Rhododendron canescens* and *Vaccinium arboreum*. The low-shrub stratum can be sparse to moderate and may be dominated by various ericaceous shrubs such as *Vaccinium pallidum*, *Vaccinium stamineum*, *Vaccinium fuscum*, and *Gaylussacia baccata*. *Smilax glauca* and *Vitis rotundifolia* are common vines. Herbaceous species that may be present include *Aristolochia serpentaria*, *Symphotrichum dumosum* (= *Aster dumosus*), *Clitoria mariana*, *Desmodium nudiflorum*, *Euphorbia corollata*, *Galium circaezans*, *Chimaphila maculata*, *Polystichum acrostichoides*, *Asplenium platyneuron*,

Hexastylis arifolia, *Coreopsis major*, *Solidago odora*, *Tephrosia virginiana*, *Potentilla simplex*, *Porteranthus stipulatus*, *Pteridium aquilinum*, *Lespedeza* spp., *Dichanthelium* spp., and *Hieracium venosum*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This is perhaps the most common older forest (more than 60-80 years since plowing) in the park. Stands may have existed for over 80 years without major disturbance (besides selective cutting). They occur in the drier uplands of the park away from the more mesic creek bottoms and low slopes on low-fertility acidic soil. Fire may have been a component of this community type in the past, especially if it was very light ground fire. However, it is unclear what exact role it may have had in this community (possibly a transitional community between the fire-free creek slopes and the fire-prone ridges). It is possible that this community was more open when fire was more common on the landscape but has since become a closed-canopy community.

Global Environment: Stands are typically found on low fertility Ultisols in the Piedmont, the interior uplands, and the Cumberland Plateau. This community occurs on soils of relatively low fertility; suborders on which this community occurs include Hapludults and Paleudults. Stands are uneven-aged, and tree replacement occurs in gaps. Severe fires most likely destroy community occurrences, although light fires probably are tolerated. Stands occur on silt loam and loam soils in western Tennessee (Shiloh National Military Park) on moderate to gentle slopes and ridgetops.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy can vary quite a bit within the park but is always dominated by a combination of *Quercus falcata*, *Quercus coccinea*, *Quercus prinus*, *Quercus alba*, *Quercus velutina*, and sometimes *Quercus rubra*. The subcanopy is generally very well-developed and contains large amounts of *Oxydendrum arboreum*, *Acer rubrum*, and *Nyssa sylvatica*. The shrub stratum is sparse but does often contain *Vaccinium* spp. in small quantities. Herbs are uncommon in this community, but *Maianthemum racemosum*, *Chimaphila maculata*, *Hexastylis arifolia*, and other dry-mesic subshrubs and herbs may be present in small quantities.

Global Vegetation: The vegetation is dominated by *Quercus* spp. and lesser amounts of *Carya* spp. The canopy is continuous, and several species of *Quercus* may be present (e.g., *Quercus falcata*, *Quercus alba*, *Quercus velutina*, *Quercus coccinea*, and *Quercus stellata*). The subcanopy closure is variable, ranging from less than 25% to more than 40% cover, and the shrub and herb layers generally are sparse. Subcanopy species include canopy species and *Acer rubrum*, *Liriodendron tulipifera*, *Oxydendrum arboreum*, *Liquidambar styraciflua*, *Ulmus alata*, *Cornus florida*, *Nyssa sylvatica*, *Juniperus virginiana* var. *virginiana*, and *Vaccinium arboreum*. The tall-shrub stratum may contain *Rhododendron canescens* and *Vaccinium arboreum*. The low-shrub stratum is dominated by various ericaceous shrubs such as *Vaccinium pallidum*, *Vaccinium stamineum*, *Vaccinium fuscatum*, and *Gaylussacia baccata*. *Smilax glauca* and *Vitis rotundifolia* are common vines. Herbaceous species that may be present include *Aristolochia serpentaria*, *Symphotrichum dumosum* (= *Aster dumosus*), *Clitoria mariana*, *Desmodium nudiflorum*, *Euphorbia corollata*, *Galium circaezans*, *Chimaphila maculata*, *Polystichum acrostichoides*, *Asplenium platyneuron*, *Hexastylis arifolia*, *Coreopsis major*, *Solidago odora*, *Tephrosia virginiana*, *Potentilla simplex*, *Porteranthus stipulatus*, *Pteridium aquilinum*, *Lespedeza* spp., *Dichanthelium* spp., and *Hieracium venosum*.

At Shiloh (western Tennessee) this association is documented from 3 plots; the canopy is dominated by *Quercus alba*, *Quercus falcata*, *Quercus stellata*, *Ulmus alata*, and *Carya alba*. *Quercus muehlenbergii* is also present as a canopy species in one of the plots. Subcanopy dominants are *Liquidambar styraciflua*, *Ulmus alata*, *Nyssa sylvatica*, *Fraxinus americana*, and *Carya glabra*. Other subcanopy trees are *Quercus rubra*, *Quercus alba*, *Carya alba*, *Juniperus virginiana* var. *virginiana*, *Carya ovalis*, *Diospyros virginiana*, and *Fagus grandifolia*. The most abundant tall shrubs are *Carya alba*, *Quercus falcata*, *Ulmus alata*, and *Liquidambar styraciflua*. Other tall shrubs are *Carya ovalis*, *Sassafras albidum*, *Quercus alba*, *Nyssa sylvatica*, *Vaccinium arboreum*, *Vaccinium stamineum*, and less abundant *Quercus velutina*, *Quercus rubra*, *Fagus grandifolia*, *Fraxinus americana*, *Acer rubrum*, *Smilax rotundifolia*, and *Ilex opaca*. Short shrubs are diverse; *Quercus falcata*, *Vitis rotundifolia*, *Vaccinium stamineum*, and *Carya alba* are the most abundant. Other short shrubs are *Quercus velutina*, *Ulmus alata*, *Quercus alba*, *Nyssa sylvatica*, *Parthenocissus quinquefolia*, *Prunus serotina*, and *Sassafras albidum*. Short shrubs which are sparse include *Amelanchier arborea*, *Vaccinium arboreum*, *Juniperus virginiana* var. *virginiana*, *Diospyros virginiana*, *Hypericum hypericoides*, *Fraxinus americana*, *Smilax rotundifolia*, *Ilex opaca*, *Acer rubrum*, *Quercus phellos*, *Celtis occidentalis*, *Rubus argutus*, *Morus rubra*, *Smilax bona-nox*, *Ilex decidua*, *Toxicodendron radicans*, and *Carya ovalis*. In one of the plots *Chasmanthium sessiliflorum* is the dominant herb, in the other plots there is no single dominant and herbs are all sparse. Other herbs include *Dichanthelium boscii*, *Carex complanata*, *Dichanthelium laxiflorum*, *Danthonia spicata*, *Lespedeza repens*, *Lespedeza procumbens*, *Carex leavenworthii*, *Schizachyrium scoparium* and present a in trace amounts *Carex swanii*, *Dichanthelium dichotomum* var. *dichotomum*, *Sericocarpus linifolius*, *Galium circaezans*, *Panicum anceps*, *Tridens flavus*, *Aristolochia serpentaria*, *Dichanthelium acuminatum* var. *acuminatum*, *Galium pilosum*, *Solidago rugosa*, *Erechtites hieracifolia*, *Sanicula canadensis*, *Asplenium platyneuron*, *Acalypha rhomboidea*, *Mimosa microphylla*, *Conyza canadensis*, and *Penstemon calycosus*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus coccinea</i> , <i>Quercus falcata</i> , <i>Quercus velutina</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Nyssa sylvatica</i> , <i>Oxydendrum arboreum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium pallidum</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> , <i>Quercus alba</i> , <i>Quercus coccinea</i> , <i>Quercus falcata</i> , <i>Quercus velutina</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Cornus florida</i> , <i>Oxydendrum arboreum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium pallidum</i> , <i>Vaccinium stamineum</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Amorpha schwerinii*, *Brickellia cordifolia*, *Corallorhiza wisteriana*, *Hexastylis lewisii*, *Monotropsis odorata*, *Nestronia umbellula*, *Onosmodium virginianum*, *Porteranthus stipulatus*, *Prunus umbellata*, *Rhus michauxii*, *Thermopsis mollis*, *Yucca flaccida*

CONSERVATION STATUS RANK

Global Rank & Reasons: G4G5 (15-Oct-2002). This is not a rare forest type, although most examples have been impacted by removal of the more valuable timber species (e.g., *Quercus alba*), and remaining ones on private land are highly vulnerable to canopy removal and conversion to other forest types or other land uses.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: The limits of the range of this type needs to be clarified in Kentucky.

Global Similar Associations:

- *Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest (CEGL008427)—a related mixed type.
- *Quercus alba* - *Carya alba* / *Euonymus americana* / *Hexastylis arifolia* Forest (CEGL006227)—a more mesic type with range overlap in the southern Piedmont.
- *Quercus alba* - *Quercus (rubra, coccinea)* - *Carya (alba, glabra)* / *Vaccinium pallidum* Piedmont Dry-Mesic Forest (CEGL008475)—has a higher proportion of *Quercus alba* to other oak species.
- *Quercus alba* - *Quercus falcata* / *Vaccinium (arboreum, hirsutum, pallidum)* Forest (CEGL008567)—more eastern and montane in distribution.
- *Quercus falcata* - *Quercus alba* - *Quercus stellata* - *Quercus velutina* Forest (CEGL005018)

Global Related Concepts:

- Black Oak: 110 (Eyre 1980) B
- IA6i. Interior Upland Dry-Mesic Oak - Hickory Forest (Allard 1990) B
- Mesotrophic Forest (Rawinski 1992) ?
- Southern Red Oak, HR (Pyne 1994) B
- Submesic Broadleaf Deciduous Forest (Ambrose 1990a) B
- White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) B
- White Oak - Mixed Hardwoods, HR (Pyne 1994) B White Oak - Mixed Oak - Hickory, HR (Pyne 1994) B
- White Oak: 53 (Eyre 1980) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs in areas between the creek slopes and the ridgelines that have been undisturbed (no plowing, clearcutting, or catastrophic fires) for at least the past 60-80 years.

Global Range: This southern red oak - white oak dry forest is found in the Piedmont of Georgia, South Carolina, North Carolina, and Virginia, and in the interior uplands and Cumberland Plateau of Kentucky and Tennessee. It has also been reported from the Upper East Gulf Coastal Plain of Mississippi, Tennessee and Georgia.

Nations: US

States/Provinces: AL, GA, KY, MS, NC, SC, TN, VA?

USFS Ecoregions: 221Hc:CCC, 222Cg:CCC, 222Eb:CCC, 231Ae:CCC

Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon?); DOE (Oak Ridge); NPS (Blue Ridge Parkway?, Cowpens, Guilford Courthouse, Kings Mountain, Little River Canyon?, Natchez Trace, Ninety Six, Shiloh); USFS (Daniel Boone, Holly Springs?, Oconee, Sumter, Talladega, Uwharrie); USFWS (Eufaula)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.11, KIMO.14, KIMO.19.

Local Description Authors: R. White

Global Description Authors: S. Landaal, mod. R.E. Evans

References: ALNHP 2002, Allard 1990, Ambrose 1990a, Evans 1991, Eyre 1980, Golden 1979, NatureServe Ecology - Southeastern U.S. unpubl. data, Oberholster 1993, Oosting 1942, Peet and Christensen 1980, Peet et al. unpubl. data 2002, Pyne 1994, Rawinski 1992, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

Quercus prinus - (*Quercus coccinea*, *Quercus velutina*) Forest Alliance

Xeric Ridgetop Chestnut Oak Forest

Quercus prinus - (*Quercus coccinea*) / *Carya pallida* / *Vaccinium arboreum* - *Vaccinium pallidum* Forest

Rock Chestnut Oak - (Scarlet Oak) / Sand Hickory / Farkleberry - Hillside Blueberry Forest

Identifier: CEGL008431

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus prinus* - (*Quercus coccinea*, *Quercus velutina*) Forest Alliance (A.248)

Alliance (English name) Rock Chestnut Oak - (Scarlet Oak, Black Oak) Forest Alliance

Association *Quercus prinus* - (*Quercus coccinea*) / *Carya pallida* / *Vaccinium arboreum* - *Vaccinium pallidum*

Forest

Association (English name) Rock Chestnut Oak - (Scarlet Oak) / Sand Hickory / Farkleberry - Hillside Blueberry Forest

Association (Common name) Xeric Ridgetop Chestnut Oak Forest

Ecological System(s): Southern Appalachian Oak Forest (CES202.886)

Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)

ELEMENT CONCEPT

Global Summary: This association includes xeric rock chestnut oak forests on high slopes and ridges in the southern Cumberland Plateau, southern Ridge and Valley, Southern Blue Ridge, and occasionally in the Piedmont of North Carolina, South Carolina, and Georgia. This forest occurs over rocky, shallow soils derived from various geologies. These include sandstone, quartzite (in the Piedmont), schist, or weakly metamorphosed, metasedimentary rocks (in the western edge of the Southern Blue Ridge). This is a closed-canopy, deciduous forest with open to sparse shrub layers and a sparse to absent herb layer. The canopy is dominated by *Quercus prinus*, sometimes sharing dominance with *Quercus coccinea*. Other oaks in the canopy can include *Quercus velutina*, *Quercus stellata*, and *Quercus alba*, although these oaks are not dominant. Hickories (e.g., *Carya glabra*, *Carya pallida*) may be present in the canopy and/or subcanopy. Some examples may have coverage of pine in the canopy, most commonly *Pinus virginiana* and *Pinus echinata*. The most common subcanopy trees are *Acer rubrum*, *Carya pallida*, *Cornus florida*, *Nyssa sylvatica*, and *Oxydendrum arboreum*. The most constant shrub species are *Chimaphila maculata*, *Vaccinium arboreum*, *Vaccinium pallidum*, *Vaccinium stamineum*, *Diospyros virginiana*, and *Sassafras albidum*. Herb coverage is sparse, with little constancy among examples. Some of the more typical herb species are *Euphorbia corollata*, *Hieracium venosum*, *Carex nigromarginata*, and *Solidago odora*, but many other species may occur.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This forest is found on ridgetops and exposed upper ridges and very occasionally on very exposed lower slopes where the correct conditions present themselves. Within the park, this community is found over quartzite/schist geology.

Global Environment: This forest is found on north- and west-facing high slopes and ridgetops over soils derived from sandstone, in the Cumberland Plateau and Ridge and Valley, or weakly metamorphosed, metasedimentary rocks in the western edge of the Southern Blue Ridge. Examples ranged from 225 to 732 m (740-2400 feet) elevation, with most examples occurring over 900 feet elevation. Examples in the Piedmont are usually over metamorphic rock such as schist or quartzite. In the Blue Ridge, this type does not generally reach elevations above 2400 feet.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Within the park, this community has a closed to slightly open canopy dominated by either *Quercus prinus* or *Quercus coccinea* or a combination of both. In addition, *Quercus falcata* and *Quercus velutina* can comprise small amounts of the canopy. Forests that have not been disturbed by fires can have heavy understories of *Acer rubrum* and *Oxydendrum arboreum*. Ericaceous shrubs are usually present in sparse to moderate numbers. Herbaceous cover is generally sparse, but *Hexastylis minor*, *Chimaphila maculata*, *Tipularia discolor*, *Pteridium aquilinum*, and other dry-site herbs occur.

Global Vegetation: This is a closed-canopy, deciduous forest with open to sparse shrub layers and a sparse to absent herb layer. The canopy is dominated by *Quercus prinus* sometimes sharing dominance with *Quercus coccinea* (and in some Piedmont examples, with *Quercus coccinea* as the dominant canopy tree). Other oaks in the canopy can include *Quercus velutina*, *Quercus stellata*, and *Quercus alba*, although these oaks are not dominant. Hickories (e.g., *Carya glabra*, *Carya pallida*) may be present in the canopy and/or subcanopy. Some examples may have coverage of pine in the canopy, most commonly *Pinus virginiana* and *Pinus echinata*. The most common subcanopy trees are *Acer rubrum*, *Carya pallida*, *Cornus florida*, *Nyssa sylvatica*, and *Oxydendrum arboreum*. Other minor species in the canopy and subcanopy can include *Carya glabra*, *Castanea dentata*, and *Magnolia macrophylla*. The most constant shrub species are *Chimaphila maculata*, *Vaccinium arboreum*, *Vaccinium pallidum*, *Vaccinium stamineum*, *Diospyros virginiana*, and *Sassafras albidum*. Other shrubs that can occur in examples of this community are *Lyonia ligustrina*, *Castanea pumila*, *Viburnum acerifolium*, *Rhododendron alabamense*, and *Rhododendron canescens*. Herb coverage is sparse, with little constancy among examples. Some of the more typical herb species are *Euphorbia corollata*, *Hieracium venosum*, *Carex nigromarginata*, and *Solidago odora*, but many other species may occur. In the lower Piedmont of Georgia, some additional herbs may include *Schizachyrium scoparium*, *Dichanthelium boscii*, *Piptochaetium avenaceum*, *Tephrosia virginiana*, *Verbesina virginica*, *Hypoxis hirsuta*, *Tragia urticifolia*, *Brickellia eupatorioides*, *Scutellaria elliptica*, *Arnoglossum atriplicifolium*, *Pityopsis aspera*, and *Coreopsis major*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus coccinea</i> , <i>Quercus prinus</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> , <i>Oxydendrum arboreum</i>
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium pallidum</i>
Herb (field)	Dwarf-shrub	<i>Chimaphila maculata</i>

Global

Stratum

Tree canopy
Tree subcanopy

Lifeform

Broad-leaved deciduous tree
Broad-leaved deciduous tree

Species

Quercus coccinea, *Quercus prinus*
Acer rubrum

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Acer rubrum*, *Oxydendrum arboreum*, *Quercus coccinea*, *Quercus prinus*, *Vaccinium pallidum*

Global: *Acer rubrum*, *Oxydendrum arboreum*, *Quercus coccinea*, *Quercus prinus*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4G5 (31-Jan-2003). This is a wide-ranging type, found on a variety of substrates in several ecoregions; its threats are limited.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: This association was defined from examples found in the southern Ridge and Valley of northwestern Georgia, the Cumberland Plateau of northern Alabama, and the western edge of the Southern Blue Ridge in northern Georgia and southeastern Tennessee, where it represents the driest oak forests of this region. This type may be present in the McCreary and Somerset ranger districts of the Daniel Boone National Forest (Kentucky). Stands of *Quercus prinus* along ecoregional transitions may be difficult to classify [see similar associations].

Global Similar Associations:

- *Quercus (pinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens)* Forest (CEGL006271)—is defined for the Southern Blue Ridge. Has dense, less diverse, ericaceous shrub layer and more acid-loving, Blue Ridge species.
- *Quercus prinus - Carya spp. - Quercus velutina / Vaccinium arboreum / Iris verna var. smalliana* Forest (CEGL007261)—is defined for the lower Piedmont of Alabama and has Coastal Plain affinities.
- *Quercus prinus - Quercus (alba, coccinea, velutina) / Viburnum acerifolium - (Kalmia latifolia)* Forest (CEGL005023)
- *Quercus prinus - Quercus alba / Oxydendrum arboreum / Vitis rotundifolia* Forest (CEGL006281)—is defined for the Piedmont and occurs on granite monadnocks.
- *Quercus prinus - Quercus marilandica* Piedmont Woodland (CEGL003708)—can often be found in adjacent ridgetop areas of the Piedmont but has a more open canopy and contains *Quercus marilandica*.
- *Quercus prinus - Quercus spp. / Vaccinium arboreum - (Kalmia latifolia, Styrax grandifolius)* Forest (CEGL007700)—is a broadly defined type for the Appalachian Plateau and Interior Low Plateau.

Global Related Concepts:

- Chestnut Oak Forest (Lipps and DeSelm 1969) ?
- Chestnut Oak Forest (Lipps 1966) ?
- Chestnut Oak Type (Chapman 1957) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community is widespread on ridges and upper slopes throughout the park.

Global Range: This association occurs in the southern Cumberland Plateau and southern Ridge and Valley of Georgia and Alabama, and ranges into the Southern Blue Ridge and Piedmont regions as well. This or related vegetation is reported from the Daniel Boone National Forest of Kentucky; this needs investigation.

Nations: US

States/Provinces: AL, GA, KY?, TN

USFS Ecoregions: 231Aj:CCC, 231Cd:CCC, 231Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Kings Mountain, Little River Canyon?); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone?)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.4, KIMO.8, KIMO.10, KIMO.13.

Local Description Authors: R. White

Global Description Authors: mod. R. White

References: Chapman 1957, Govus 2002, Lipps 1966, Lipps and DeSelm 1969, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Felsic Monadnock Forest***Quercus prinus* - *Quercus alba* / *Oxydendrum arboreum* / *Vitis rotundifolia* Forest****Rock Chestnut Oak - White Oak / Sourwood / Muscadine Forest****Identifier: CEG006281****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus prinus* - (*Quercus coccinea*, *Quercus velutina*) Forest Alliance (A.248)

Alliance (English name) Rock Chestnut Oak - (Scarlet Oak, Black Oak) Forest Alliance

Association *Quercus prinus* - *Quercus alba* / *Oxydendrum arboreum* / *Vitis rotundifolia* Forest

Association (English name) Rock Chestnut Oak - White Oak / Sourwood / Muscadine Forest

Association (Common name) Felsic Monadnock Forest

Ecological System(s): Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)**ELEMENT CONCEPT**

Global Summary: This forest, dominated by *Quercus prinus*, occurs mainly on resistant ridges (monadnocks) over felsic rock of the Piedmont from Virginia to Alabama, and sparingly in the low mountains of, at least, North Carolina. Soils that are well-drained, acidic and nutrient-poor contribute to low species richness. *Quercus prinus* is dominant or codominant in some occurrences with *Quercus alba*. Other canopy species include *Quercus falcata*, *Carya alba*, *Quercus marilandica*, *Quercus coccinea*, *Nyssa sylvatica*, *Acer rubrum*, *Pinus echinata*, and *Quercus stellata*. The subcanopy is dominated by *Oxydendrum arboreum* with *Cornus florida*. The herb and shrub layers are sparse, with *Vitis rotundifolia* as a typical component.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: Within the park, this community occurs in large patches on upper slopes and crests of ridges over shallow soils. The soils are extremely acidic and generally support little to no herbaceous or shrub layer. In addition, these ridges are very prone to fire and may have a sparse canopy as a result.

Global Environment: This forest occurs mainly on resistant ridges (monadnocks) over felsic rock of the Piedmont and sparingly in the low mountains. It most often is found on resistant ridges (monadnocks) of quartzite, rhyolite, and pyrophyllite; soil series include Nason, Georgeville, Tatum, Uwharrie (Typic Hapludults), Davidson (Rhodic Paleudult), and Goldston (Ruptic-Ultic Dystrochrept) (Schafale and Weakley 1990). These soils are well-drained, acidic, nutrient-poor, and rocky. Community occurrences are found in exposed locations and, consequently, lightning strikes and high winds are common. Fires are probably more common than in most other Piedmont forest types, but most would have little effect on the community because most of the species are fire tolerant and the shrub and herb layers are sparse.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: *Quercus prinus* and/or *Quercus coccinea* usually dominate the canopy, although *Quercus alba* and *Carya* spp. can sometimes be co-dominant in the canopy as well. The understory often has substantial amounts of *Acer rubrum* and *Oxydendrum arboreum*. Areas that are regularly burned are much

more open. The herb layer is generally sparse but *Vitis rotundifolia* may be dominant in some patches.

Global Vegetation: In typical stands of this association, *Quercus prinus* is dominant (or codominant in some occurrences with *Quercus alba*). Other canopy species that may be present include *Carya glabra*, *Quercus coccinea*, *Quercus marilandica*, and *Pinus virginiana*. Other subcanopy species include *Acer rubrum* and *Nyssa sylvatica*. Species that may be present in the sparse shrub layer include *Vaccinium pallidum*, *Vaccinium stamineum*, *Gaylussacia baccata*, *Gaylussacia frondosa*, and *Kalmia latifolia*. The herb layer contains such species as *Vitis rotundifolia*, *Toxicodendron radicans*, *Quercus prinus*, *Chimaphila maculata*, *Danthonia spicata*, *Desmodium nudiflorum*, *Schizachyrium scoparium*, *Tephrosia virginiana*, *Hieracium venosum*, *Coreopsis verticillata*, and *Pteridium aquilinum*. Canopy cover ranges from 60% to approaching 100% except following a natural disturbance. *Quercus prinus* contributes 75% of the total tree cover. The subcanopy ranges from sparse to fairly dense, while the shrub and herb layers rarely have 25% cover, and frequently have <5%. Most likely because of the dry, acid, low-nutrient soils, this community has relatively low for species richness, i.e., 34.0 species/0.1 ha average in North Carolina (Peet and Christensen 1980). In addition, of the forest types in NC sampled by Peet and Christensen (1980), this is the only type where tree species contributed more than half (66.5%) of understory cover, e.g., less than 1 m tall.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> , <i>Quercus coccinea</i> , <i>Carya spp.</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Oxydendrum arboreum</i> , <i>Acer rubrum</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>
Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> , <i>Quercus falcata</i> , <i>Quercus prinus</i> , <i>Quercus stellata</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Carya alba</i> , <i>Carya glabra</i> , <i>Cornus florida</i> , <i>Oxydendrum arboreum</i> , <i>Quercus prinus</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Amorpha schwerinii*, *Fothergilla major*, *Monotropsis odorata*, *Smilax biltmoreana*, *Thermopsis mollis*

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (15-Aug-1997).

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments:

Global Similar Associations:

- *Quercus prinus* - (*Quercus coccinea*) / *Carya pallida* / *Vaccinium arboreum* - *Vaccinium pallidum* Forest (CEGL008431)

Global Related Concepts:

- Chestnut Oak (52) (USFS 1988) ?
- Chestnut Oak - Scarlet Oak - Yellow Pine (45) (USFS 1988) ?
- Chestnut Oak: 44 (Eyre 1980) B
- IA7d. Piedmont Monadnock Forest (Allard 1990) ?
- Oligotrophic Forest (Rawinski 1992) B
- Piedmont Xeric Broadleaf Deciduous-Needleleaf Evergreen Forest (Ambrose 1990a) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This forest is found throughout the park's upper slopes and ridgcrests.

Global Range: This forest is found in the Piedmont from Virginia to Alabama, and sparingly in the low mountains of, at least, North Carolina.

Nations: US

States/Provinces: AL, GA, NC, SC, VA

USFS Ecoregions: 231Ae:CCC, 231Ag:CCC

Federal Lands: NPS (Kings Mountain); USFS (Oconee?, Sumter, Uwharrie)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots:

Local Description Authors: R. White

Global Description Authors: S. Landaal

References: Allard 1990, Ambrose 1990a, Eyre 1980, Nelson 1986, Peet and Christensen 1980, Peet et al. unpubl. data 2002, Rawinski 1992, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d., USFS 1988, Wells 1974

I.B.2.N.d. *Quercus prinus* - *Quercus* (*alba*, *falcata*, *rubra*, *velutina*) Forest Alliance

Piedmont Chestnut Oak - Heath Bluff

***Quercus prinus* - *Quercus alba* / *Oxydendrum arboreum* / *Kalmia latifolia* Forest**

Rock Chestnut Oak - White Oak / Sourwood / Mountain Laurel Forest

Identifier: CEG004415

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Lowland or submontane cold-deciduous forest (I.B.2.N.a.)

Alliance *Quercus prinus* - *Quercus* (*alba*, *falcata*, *rubra*, *velutina*) Forest Alliance (A.249)

Alliance (English name) Rock Chestnut Oak - (White Oak, Southern Red Oak, Northern Red Oak, Black Oak) Forest Alliance

Association *Quercus prinus* - *Quercus alba* / *Oxydendrum arboreum* / *Kalmia latifolia* Forest

Association (English name) Rock Chestnut Oak - White Oak / Sourwood / Mountain Laurel Forest

Association (Common name) Piedmont Chestnut Oak - Heath Bluff

Ecological System(s): Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

ELEMENT CONCEPT

Global Summary: This association occurs on steep, typically north-facing bluffs in the Piedmont of the Carolinas and Virginia. The canopy is dominated by *Quercus alba*, *Quercus prinus*, *Quercus rubra*, and *Acer rubrum* var. *rubrum*. The subcanopy is strongly dominated by *Oxydendrum arboreum*. Other canopy and subcanopy trees may include *Quercus coccinea*, *Quercus stellata*, *Quercus velutina*, *Cornus florida*, *Pinus echinata*, and *Pinus virginiana*. The shrub stratum is characteristically dense, and is dominated by *Kalmia latifolia*; other shrubs may include *Symplocos tinctoria*, *Gaylussacia frondosa* (= var. *frondosa*), *Vaccinium stamineum*, and *Amorpha schwerinii*. The herb stratum is sparse and of low diversity, though typical herbs and subshrubs include *Epigaea repens*, *Hexastylis virginica*, *Chimaphila maculata*, *Monotropa hypopithys*, *Schizachyrium scoparium*, and *Iris verna* var. *verna*. This community occurs on more-or-less steep slopes, over acidic soils (pH 4.2) with low nutrient availability.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This community exists on steep, usually north facing, protected slopes with a grade of more than 25%. In general, these communities range down to the creek bottomland and can often intergrade with the bottomland types in the park.

Global Environment: This association occurs on steep, typically north-facing bluffs in the Piedmont. This community occurs on more-or-less steep slopes, over acidic soils (pH 4.2) with low nutrient availability.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This community has a canopy dominated most often by *Quercus prinus*, but also sometimes dominated or codominated by *Quercus coccinea*, *Quercus alba*, and *Quercus rubra*. Pine can often be high cover in some

examples. The shrub layer is usually dominated 100% by *Kalmia latifolia*. The herbaceous layer is very sparse, but *Galax urceolata* and *Gaultheria procumbens* are often present.

Global Vegetation: The canopy of stands of this association is typically dominated by *Quercus alba*, *Quercus prinus*, *Quercus rubra*, and *Acer rubrum* var. *rubrum*. The subcanopy is strongly dominated by *Oxydendrum arboreum*. Other canopy and subcanopy trees may include *Quercus coccinea*, *Quercus stellata*, *Quercus velutina*, *Cornus florida*, *Pinus echinata*, and *Pinus virginiana*. The shrub stratum is characteristically dense, and is dominated by *Kalmia latifolia*; other shrubs may include *Symplocos tinctoria*, *Gaylussacia frondosa* (= var. *frondosa*), *Vaccinium stamineum*, and *Amorpha schwerinii*. The herb stratum is sparse and of low diversity, though typical herbs and subshrubs include *Epigaea repens*, *Hexastylis virginica*, *Chimaphila maculata*, *Monotropa hypopithys*, *Schizachyrium scoparium*, and *Iris verna* var. *verna*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> , <i>Quercus alba</i> , <i>Quercus coccinea</i>
Shrub	Evergreen shrub	<i>Kalmia latifolia</i>
Herb	Herb	<i>Galax urceolata</i> , <i>Gaultheria procumbens</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> , <i>Quercus alba</i> , <i>Quercus coccinea</i>
Shrub	Evergreen shrub	<i>Kalmia latifolia</i> , <i>Rhododendron maximum</i> , <i>Rhododendron catawbiense</i>
Herb	Herb	<i>Galax urceolata</i> , <i>Gaultheria procumbens</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Amorpha schwerinii*

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3 (31-Jan-2001). This heath bluff community is apparently limited to small occurrences on steep bluffs in the Piedmont of North Carolina, Virginia, and presumably South Carolina. In Virginia, it appears to be restricted to the southern part of the Piedmont. These sites are less impacted by land alteration than most communities in the Piedmont, because of the steep slopes involved, but most sites have been logged, and all occur in landscapes that have been fragmented and altered by land-use practices.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments:

Global Similar Associations:

- *Fagus grandifolia* - *Quercus alba* - (*Quercus prinus*) / *Kalmia latifolia* - (*Rhododendron catawbiense*) Forest (CEGL004539)—American beech-dominated Piedmont heath bluff.

Global Related Concepts:

- *Quercus alba* - *Fagus grandifolia* / *Kalmia latifolia* - *Rhododendron periclymenoides* Forest (Patterson pers. comm.) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs throughout the park in steep protected slopes adjacent to creeks.

Global Range: This association occurs on steep, typically north-facing bluffs in the Piedmont of North Carolina, Virginia, and presumably South Carolina. In Virginia, it appears to be restricted to the southern part of the Piedmont.

Nations: US

States/Provinces: NC, SC, VA

USFS Ecoregions: 231Af:CCC

Federal Lands: NPS (Kings Mountain); USFS (Uwharrie)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots:

Local Description Authors: R. White

Global Description Authors: R.K. Peet

References: Patterson pers. comm., Peet et al. unpubl. data 2002, Schafale and Weakley 1990, Southeastern Ecology Working Group

n.d., Wells 1970c, Wells 1974 flooded cold-deciduous forest

Liquidambar styraciflua - (*Liriodendron tulipifera*, *Acer rubrum*) Temporarily Flooded Forest Alliance

Successional Sweetgum Floodplain Forest

***Liquidambar styraciflua* - (*Liriodendron tulipifera*) Temporarily Flooded Forest Sweetgum - (Tuliptree) Temporarily Flooded Forest**

Identifier: C EGL007330

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Temporarily flooded cold-deciduous forest (I.B.2.N.d.)

Alliance *Liquidambar styraciflua* - (*Liriodendron tulipifera*, *Acer rubrum*) Temporarily Flooded Forest (A.287)

Alliance

Alliance (English name) Sweetgum - (Tuliptree, Red Maple) Temporarily Flooded Forest Alliance

Association *Liquidambar styraciflua* - (*Liriodendron tulipifera*) Temporarily Flooded Forest

Association (English name) Sweetgum - (Tuliptree) Temporarily Flooded Forest

Association (Common name) Successional Sweetgum Floodplain Forest

Ecological System(s): Atlantic Coastal Plain Small Brownwater River Floodplain Forest (CES203.250)

East Gulf Coastal Plain Small Stream and River Floodplain Forest (CES203.559)

East Gulf Coastal Plain Large River Floodplain Forest (CES203.489)

Southern Piedmont Small Floodplain and Riparian Forest (CES202.323)

ELEMENT CONCEPT

Global Summary: This association is dominated by *Liquidambar styraciflua*, but can be dominated by *Liriodendron tulipifera* in some cases, and occurs on heavily disturbed sites such as wetland old fields that have been recovering for the past 10-60 years. This is a successional community that develops following clearcutting or other disturbance along floodplains of major creeks and other temporarily flooded areas. As this community ages, it often begins to approach the composition of more natural *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp. *triphyllum* Forest (CEGL004418)\$. This association is known from the Piedmont, Interior Low Plateau, Inner South Atlantic Coastal Plain, Upper East Gulf Coastal Plain, and possibly other provinces. *Acer rubrum* may be a major component of the canopy and subcanopy and may even partially dominate in some instances. In more mature examples, other canopy/subcanopy species which may occur to a lesser extent and often as scattered emergents are *Quercus alba*, *Quercus phellos*, *Quercus nigra*, *Nyssa sylvatica*, and *Cornus florida*. Stands in the Inner Coastal Plain of South Carolina typically contain *Persea palustris* and *Magnolia virginiana*. The shrub layer can contain *Carpinus caroliniana*, *Itea virginica*, *Vitis rotundifolia*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*, and/or *Rubus* sp., in addition to canopy/subcanopy species. *Lonicera japonica* is often abundant in the understory. On disturbed sites, the shrub layer is often dominated by *Ligustrum sinense*, and the ground layer is typically solid *Microstegium vimineum* or a tangle of *Smilax rotundifolia* and *Rubus* sp. The

herbaceous layer may include *Chasmanthium laxum*, *Carex* spp., *Boehmeria cylindrica*, and *Botrychium biternatum*, sometimes growing on hummocks in standing water.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Kings Mountain National Military Park Environment: Although not documented by any full plots, this community exists in the most impacted bottomlands in the park. The community may occur on the edges of the park where fields were last abandoned prior to the creation of the current boundary.

Global Environment: This association occurs on disturbed sites such as wetland old fields. This is a successional community that develops following clearcutting or other disturbance along floodplains of major creeks and other temporarily flooded areas. These are productive stream terraces subject to occasional flooding (Jones et al. 1981b).

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy of this bottomland association is dominated by a combination of *Liquidambar styraciflua* and *Liriodendron tulipifera*. *Quercus alba* may sometimes codominate, especially in examples where the floodplain is particularly narrow and the community intergrades with the adjacent community of CEG008475.

Global Vegetation: The canopy of this association is dominated by *Liquidambar styraciflua* but can be dominated by *Liriodendron tulipifera* in some cases. *Acer rubrum* may be a major component of the canopy and subcanopy and may even partially dominate in some instances (TNC 1998a). In more mature examples, other canopy/subcanopy species which may occur to a lesser extent and often as scattered emergents are *Quercus alba*, *Quercus phellos*, *Quercus nigra*, *Fraxinus americana*, *Carya* spp., *Nyssa sylvatica*, and *Cornus florida*. Stands in the Inner Coastal Plain of South Carolina typically contain *Persea palustris* and *Magnolia virginiana* (Jones et al. 1981b). The shrub layer contains *Carpinus caroliniana*, *Itea virginica*, *Vitis rotundifolia*, *Parthenocissus quinquefolia*, *Smilax rotundifolia*, and *Rubus* sp., in addition to canopy/subcanopy species. *Lonicera japonica* is often abundant in the understory. On disturbed sites, the shrub layer is often dominated by *Ligustrum sinense*, and the ground layer is typically solid *Microstegium vimineum* or a tangle of *Smilax rotundifolia* and *Rubus* sp. The herbaceous layer may include *Chasmanthium laxum*, *Carex* spp., *Boehmeria cylindrica*, and *Botrychium biternatum*, sometimes growing on hummocks in standing water. Various *Carex* species may be present.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree Canopy	Broad-leaved Deciduous	<i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree Canopy	Broad-leaved Deciduous	<i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (8-Aug-2000). This is a successional community which develops following clearcutting or other disturbance along floodplains of major creeks and other temporarily flooded areas.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: At Arnold Air Force Base, this community is found primarily in the vicinity of Hunt Creek, Heron Pond, and Sinking Pond in areas that have experienced logging. Prior to logging, these areas would probably have had canopies dominated by *Quercus phellos* or *Quercus alba*, with the overall community structure being that of ~*Quercus alba* - *Carya (alba, ovata)* - *Liriodendron tulipifera* - (*Quercus phellos*) / *Cornus florida* Forest (CEGL007709)\$\$ or possibly ~*Quercus phellos* - *Quercus alba* / *Vaccinium fuscatum* - (*Viburnum nudum*) / *Carex (barrattii, intumescens)* Forest (CEGL007364)\$. The sweet gum-red maple-red bay community of Jones et al. 1981b (2 stands sampled) is included here.

Global Similar Associations:

- *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp. *triphyllum* Forest (CEGL004418)—may be difficult to distinguish from older versions of this community; trees will be older, uneven-aged, and the herbaceous layer more diverse in this association.
- *Quercus alba* - *Carya (alba, ovata)* - *Liriodendron tulipifera* - (*Quercus phellos*) / *Cornus florida* Forest (CEGL007709)
- *Quercus phellos* - *Quercus alba* / *Vaccinium fuscatum* - (*Viburnum nudum*) / *Carex (barrattii, intumescens)* Forest (CEGL007364)

Global Related Concepts:

- Sweet gum-red maple-red bay community (Jones et al. 1981b) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: In bottomland areas of the park. This community was not documented with a plot but exists in the park as a lower quality version of the documented community ~*Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp. *triphyllum* Forest (CEGL004418)\$.

Global Range: This association is known from the Piedmont, Interior Low Plateau, Inner South Atlantic Coastal Plain, and possibly other provinces.

Nations: US

States/Provinces: AL, GA?, KY, MS, NC, SC, TN

USFS Ecoregions: 221Hc:CCC, 222Eb:CCC, 231Aa:CCC, 231Cd:CCP, 231Cg:CCC, 231D:CC, 232Cg:CCC

Federal Lands: DOD (Arnold, Fort Benning?); DOE (Savannah River Site); NPS (Cowpens, Kings Mountain, Little River Canyon, Shiloh); USFS (Bankhead?, Daniel Boone, Oconee?)

ELEMENT SOURCES**Kings Mountain National Military Park Inventory Notes:**

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: mod. R. White

References: Jones et al. 1981b, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., TNC 1998a

Piedmont Small Stream Sweetgum - Tuliptree Forest***Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp.*****triphyllum* Forest****Sweetgum - Tuliptree / Northern Spicebush / Jack-in-the-Pulpit Forest****Identifier: CEGL004418****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Temporarily flooded cold-deciduous forest (I.B.2.N.d.)

Alliance *Liquidambar styraciflua* - (*Liriodendron tulipifera*, *Acer rubrum*) Temporarily Flooded Forest (A.287)

Alliance

Alliance (English name) Sweetgum - (Tuliptree, Red Maple) Temporarily Flooded Forest Alliance

Association *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Lindera benzoin* / *Arisaema triphyllum* ssp.*triphyllum* Forest

Association (English name) Sweetgum - Tuliptree / Northern Spicebush / Jack-in-the-Pulpit Forest

Association (Common name) Piedmont Small Stream Sweetgum - Tuliptree Forest

Ecological System(s): Southern Piedmont Small Floodplain and Riparian Forest (CES202.323)**ELEMENT CONCEPT**

Global Summary: These forests develop along small streams in the Piedmont. The topographic features of floodplains can heavily influence the individual makeup of examples of this association. The canopy, subcanopy, shrub, and herbaceous layers often are well-developed. Dominant canopy species always include *Liquidambar styraciflua* and *Liriodendron tulipifera*, while *Acer barbatum* and *Acer rubrum* var. *rubrum* may also make up significant amounts of the canopy. This community type exists as a continuum between two subtypes, i.e., the tuliptree subtype and the sweetgum subtype. In some examples only one or the other dominates the canopy. However, in many examples both are equally dominant. Common species in the canopy and understory include *Ilex opaca* var. *opaca*, *Aesculus sylvatica*, *Carpinus caroliniana* ssp. *caroliniana*, *Cornus florida*, *Crataegus flava*, *Fagus grandifolia*, *Juglans nigra*, *Morus rubra* var. *rubra*, *Ostrya virginiana* var. *virginiana*, *Oxydendrum arboreum*, *Pinus echinata*, *Prunus serotina* var. *serotina*, *Quercus alba*, *Quercus rubra* var. *rubra*, *Ulmus rubra*, *Ulmus americana*, *Ulmus alata*, *Juniperus virginiana* var. *virginiana*, *Nyssa sylvatica*, *Fraxinus americana*, *Halesia tetraptera* var. *tetraptera*, *Arundinaria gigantea* ssp. *gigantea*, *Cornus florida*, and *Fraxinus pennsylvanica*. *Euonymus americana*, *Lindera benzoin* var. *benzoin*, and *Corylus americana* are common and dominant in the shrub layer. Other shrub species that may be present include *Viburnum acerifolium*, *Viburnum nudum* var. *nudum*, *Viburnum prunifolium*, *Viburnum rufidulum*, *Hamamelis virginiana*, *Asimina triloba*, and *Ilex decidua* among others. Vines are prominent and species include *Vitis rotundifolia*, *Apios americana*, *Campsis radicans*,

Aristolochia serpentaria, *Bignonia capreolata*, *Dioscorea quaternata*, *Gelsemium sempervirens*, *Parthenocissus quinquefolia* (= var. *quinquefolia*), *Campsis radicans*, *Passiflora lutea*, *Smilax bona-nox*, *Smilax glauca*, *Smilax hugeri*, *Smilax rotundifolia*, and *Toxicodendron radicans* ssp. *radicans*. The herbaceous layer is species rich and often has good sedge development. Common species in this layer include *Thalictrum thalictroides*, *Trillium cuneatum*, *Arisaema triphyllum* ssp. *triphyllum*, *Asplenium platyneuron* var. *platyneuron*, *Botrychium virginianum*, *Carex* spp., *Carex impressinervis*, *Carex striatula*, *Galium circaezans*, *Geum canadense*, *Polystichum acrostichoides*, and *Scutellaria integrifolia* among many others. Soils are relatively acid. The exotics *Microstegium vimineum*, *Ligustrum sinense*, and *Lonicera japonica* are common in this community.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Kings Mountain National Military Park Environment: Within the park, communities of this type are found along the narrow floodplains of the perennial creeks that run in and through the park. This community often intergrades with adjacent lower slope communities, especially where the floodplain is narrow.

Global Environment: These forests develop along small streams in the Piedmont. The topographic features of floodplains can heavily influence the individual makeup of examples of this association. The canopy, subcanopy, shrub, and herbaceous layers often are well-developed.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy, subcanopy, shrub, and herbaceous layers of this community type vary widely within the park depending upon the size of the floodplain, the disturbance history, and the underlying soils. One example of this community had very few canopy *Liquidambar styraciflua*, but still had the other canopy trees associated with this community (*Liriodendron tulipifera*, *Morus rubra*, *Juglans nigra*, etc.). The understory also varies. The shrub layer can include *Cornus florida*, *Lindera benzoin*, *Cercis canadensis*, *Rosa multiflora*, *Ligustrum sinense*, and *Carpinus caroliniana* in varying amounts. The herbaceous layer is moderate to dense and very diverse. Although these examples usually contain a very large component of invasive exotic species, these species are often outcompeted by natives, and diversity continues to be high as a consequence. Most of the examples of this community in the park have been highly impacted by human disturbance such as plowing, cattle grazing, clearcutting, and erosion upstream. As a consequence, these occurrences are all low-quality occurrences of this relatively highly ranked association.

Global Vegetation: The canopy, subcanopy, shrub, and herbaceous layers of stands of this association are often well-developed. Dominant canopy species always include *Liquidambar styraciflua* and *Liriodendron tulipifera*, while *Acer barbatum* and *Acer rubrum* var. *rubrum* may also make up significant amounts of the canopy. This community type exists as a continuum between two subtypes, i.e., the tuliptree subtype and the sweetgum subtype. In some examples only one or the other dominates the canopy. However, in many examples both are equally dominant. Other common species in the canopy and understory include *Ilex opaca* var. *opaca*, *Aesculus sylvatica*, *Carpinus caroliniana* ssp. *caroliniana*, *Cornus florida*, *Crataegus flava*, *Fagus grandifolia*, *Juglans nigra*, *Morus rubra* var. *rubra*, *Ostrya virginiana* var. *virginiana*, *Oxydendrum arboreum*, *Pinus echinata*, *Prunus serotina* var. *serotina*, *Quercus alba*, *Quercus rubra* var. *rubra*, *Ulmus rubra*, *Ulmus americana*, *Ulmus alata*, *Juniperus virginiana* var. *virginiana*, *Nyssa sylvatica*, *Fraxinus americana*, *Halesia tetraptera* var. *tetraptera*, *Arundinaria gigantea* ssp. *gigantea*, *Cornus florida*, and *Fraxinus pennsylvanica*. *Euonymus americana*, *Lindera benzoin* var. *benzoin*, and *Corylus americana* are common and dominant in the shrub

layer. Other shrub species that may be present include *Viburnum acerifolium*, *Viburnum nudum* var. *nudum*, *Viburnum prunifolium*, *Viburnum rufidulum*, *Hamamelis virginiana*, *Asimina triloba*, and *Ilex decidua*, among others. Vines are prominent and species include *Vitis rotundifolia*, *Apios americana*, *Campsis radicans*, *Aristolochia serpentaria*, *Bignonia capreolata*, *Dioscorea quaternata*, *Gelsemium sempervirens*, *Parthenocissus quinquefolia* (= var. *quinquefolia*), *Campsis radicans*, *Passiflora lutea*, *Smilax bona-nox*, *Smilax glauca*, *Smilax hugeri*, *Smilax rotundifolia*, and *Toxicodendron radicans* ssp. *radicans*. The herbaceous layer is species-rich and often has good sedge development. Common species in this layer include *Thalictrum thalictroides*, *Trillium cuneatum*, *Arisaema triphyllum* ssp. *triphyllum*, *Asplenium platyneuron* var. *platyneuron*, *Botrychium virginianum*, *Carex* spp., *Carex impressinervia*, *Carex striatula*, *Galium circaezans*, *Geum canadense*, *Polystichum acrostichoides*, and *Scutellaria integrifolia*, among many others. Soils are relatively acid. The exotics *Microstegium vimineum*, *Ligustrum sinense*, and *Lonicera japonica* are common in this community. Other exotics that colonize quickly in disturbed and fragmented versions of this association include *Wisteria sinensis*, *Rosa multiflora*, *Clematis terniflora*, *Hedera helix*, and *Elaeagnus* sp.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i>
Herb (field)	Graminoid	<i>Microstegium vimineum</i>
Herb (field)	Fern	<i>Polystichum acrostichoides</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Carex impressinervia*

CONSERVATION STATUS RANK

Global Rank & Reasons: G3 (17-May-2002). This community, and other types of floodplain forests, are threatened by alteration of the hydroperiod by artificial impoundments or river diversion projects, or the disruption of the floodplain communities by forestry or agriculture. The largest threat, however, is the invasive exotic species that have colonized most of the remaining examples of this association.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Kings Mountain National Military Park Comments:

Global Comments: Low-quality occurrences of this type may look very similar to some occurrences of ~*Liquidambar styraciflua* - (*Liriodendron tulipifera*) Temporarily Flooded Forest (CEGL007330)\$. The presence of higher quality patches of native herbs and stands of native shrubs such as *Lindera benzoin* are the best ways to distinguish these two types. In addition, stands of CEGL007330 will generally be more even-aged and single species-dominated than this association (CEGL004418).

Global Similar Associations:

- *Liquidambar styraciflua* - (*Liriodendron tulipifera*) Temporarily Flooded Forest (CEGL007330)—occurs in the same habitat but is a highly impacted version of this forest that occurs on old farm fields and other second-growth areas.

- *Liquidambar styraciflua* Forest (CEGL007216)
- *Liriodendron tulipifera* - *Acer rubrum* - *Liquidambar styraciflua* / *Medeola virginiana* Forest (CEGL006601)

Global Related Concepts:**OTHER COMMENTS****Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: Again, this community is found throughout the park in the floodplains of flat, wide to narrow stream bottoms of medium-sized creeks.

Global Range: This community is definitely found in Virginia and North Carolina and may extend into the South Carolina and Georgia Piedmont. It is limited in distribution to the Piedmont of these states, and within the Piedmont, only to those flat, wide stream bottoms of medium-sized creeks.

Nations: US

States/Provinces: GA?, NC, SC?, VA

USFS Ecoregions: 231Ae:CCC, 231Af:CCC

Federal Lands: NPS (Cowpens, Guilford Courthouse, Kings Mountain); USFS (Uwharrie)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.3.

Local Description Authors: R. White

Global Description Authors: mod. R. White

References: Fleming et al. 2001, Peet et al. unpubl. data 2002, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

I.B.2.N.g. Saturated cold-deciduous forest

Acer rubrum - *Nyssa sylvatica* Saturated Forest Alliance

Piedmont Low-Elevation Headwater Seepage Swamp

Acer rubrum var. *trilobum* / *Viburnum nudum* var. *nudum* / *Osmunda cinnamomea* - *Saururus*

cernuus - *Impatiens capensis* Forest

Carolina Red Maple / Southern Wild Raisin / Cinnamon Fern - Lizard's-tail - Orange Jewelweed Forest

Identifier: CEGL004426

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

Physiognomic Group Cold-deciduous forest (I.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous forest (I.B.2.N.)

Formation Saturated cold-deciduous forest (I.B.2.N.g.)

Alliance *Acer rubrum* - *Nyssa sylvatica* Saturated Forest Alliance (A.348)

Alliance (English name) Red Maple - Blackgum Saturated Forest Alliance

Association *Acer rubrum* var. *trilobum* / *Viburnum nudum* var. *nudum* / *Osmunda cinnamomea* -

Saururus cernuus - *Impatiens capensis* Forest

Association (English name) Carolina Red Maple / Southern Wild Raisin / Cinnamon Fern - Lizard's-tail - Orange Jewelweed Forest

Association (Common name) Piedmont Low-Elevation Headwater Seepage Swamp

Ecological System(s): Piedmont Seepage Wetland (CES202.298)

ELEMENT CONCEPT

Global Summary: This saturated vegetation is found in seepage areas, often on edges of floodplains or in headwaters of small streams, in the upper Coastal Plain and Piedmont of North Carolina, South Carolina, Virginia, and likely other states. The canopy includes *Acer rubrum*, *Quercus phellos*, and possibly other wetland trees. Some herbs found in this association include *Saururus cernuus*, *Impatiens capensis*, *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Boehmeria cylindrica*, *Rudbeckia laciniata*, *Ranunculus recurvatus*, and *Juncus* spp. Some more western examples may contain *Chelone glabra* and *Saxifraga micranthidifolia*. Occurrences in South Carolina's Savannah River drainage are dominated by *Carex atlantica* ssp. *capillacea*, *Carex debilis* var. *pubera*, *Carex debilis* var. *debilis*, and *Carex leptalea*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Kings Mountain National Military Park Environment: This community occurs in very small (usually less than 20 m x 20 m) patches at streamhead areas. Often the sites are on very small flat areas without perennial water flow that sustain high levels of moisture in the spring and during rain events but that are not wet at other times.

Global Environment: This saturated vegetation is found in seepage areas, often on edges of floodplains or in headwaters of small streams in the upper Coastal Plain and Piedmont of North Carolina, South Carolina, Virginia, and likely other states.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy usually consists of at least 25% *Acer rubrum* but can often also contain large amounts of other trees from adjacent

slopes or wetland areas (*Liquidambar styraciflua*, *Liriodendron tulipifera*, *Quercus alba*). The shrub layer is often dense with saplings of canopy trees and the herbaceous layer usually contains at least a few *Osmunda cinnamomea*, occasionally along with *Juncus* spp. and *Carex* spp. Sphagnum may sometimes be present as well.

Global Vegetation: The canopy includes *Acer rubrum*, *Quercus phellos*, and possibly other wetland trees. Some herbs found in this association include *Saururus cernuus*, *Impatiens capensis*, *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Boehmeria cylindrica*, *Chelone glabra*, *Rudbeckia laciniata*, *Ranunculus recurvatus*, and *Juncus* spp. Some more montane-influenced examples (e.g., Stokes County, North Carolina) may contain *Saxifraga micranthidifolia* (Schafale and Weakley 1990). Occurrences in South Carolina's Savannah River drainage are dominated by *Carex atlantica* ssp. *capillacea*, *Carex debilis* var. *pubera*, *Carex debilis* var. *debilis*, and *Carex leptalea* (P. Hyatt pers. comm.).

An apparent example at Hanging Rock State Park (Stokes County, northwestern Piedmont of North Carolina) contains *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Woodwardia areolata*, *Carex intumescens*, *Chasmanthium laxum*, *Calamagrostis coarctata*, *Doellingeria umbellata* var. *umbellata* (= *Aster umbellatus* var. *umbellatus*), *Viola X primulifolia*, and *Chelone cuthbertii*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i>
Herb (field)	Fern	<i>Osmunda cinnamomea</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer rubrum</i>
Herb (field)	Fern	<i>Osmunda cinnamomea</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global: *Chelone cuthbertii*

CONSERVATION STATUS RANK

Global Rank & Reasons: G3? (31-Jan-2001). This seepage forest community occurs in small areas over a fairly wide distribution. Few, if any, examples are unaltered, and nearly all examples have been altered by both timber harvest and siltation.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: Vegetation which may fit this concept at Hanging Rock State Park (Stokes County, northwestern Piedmont of North Carolina) has a canopy dominated by *Acer rubrum* var. *trilobum* and *Liriodendron tulipifera*, and a subcanopy containing *Ilex opaca* var. *opaca* and *Acer rubrum*. Shrubs include *Viburnum nudum* var. *nudum*, *Ilex montana*, *Photinia pyrifolia* (= *Aronia arbutifolia*), and *Gaylussacia frondosa*?. The herbaceous layer contains *Osmunda cinnamomea*, *Osmunda regalis* var. *spectabilis*, *Woodwardia areolata*, *Carex intumescens*,

Chasmanthium laxum, *Calamagrostis coarctata*, *Doellingeria umbellata* var. *umbellata* (= *Aster umbellatus* var. *umbellatus*), *Viola X primulifolia*, and *Chelone cuthbertii* (M. Pyne pers. comm. 1997).

Global Similar Associations:

- *Acer rubrum* var. *trilobum* - *Liriodendron tulipifera* / *Ilex opaca* var. *opaca* / *Osmunda cinnamomea* Forest (CEGL004551)

Global Related Concepts:

- Diabase Bog (Hall and Boyer 1992) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs in very small patches throughout the park (potentially hundreds of occurrences in the upper ends of watersheds).

Global Range: This vegetation is found in the upper Coastal Plain and Piedmont of North Carolina, South Carolina, Virginia, and likely other states. Examples are known from Orange, Stokes, and Yadkin counties in the Piedmont of North Carolina (Schafale and Weakley 1990) and Cherokee County, South Carolina (NatureServe unpublished data 2004).

Nations: US

States/Provinces: GA?, NC, SC, VA?

USFS Ecoregions: 231Aa:CCP, 231Ae:CCP, 231Af:CCP, 231An:CCP, 231Ao:CCP, 232Bq:CCP, 232Br:CCP

Federal Lands: NPS (Kings Mountain)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots:

Local Description Authors: R. White

Global Description Authors: M. Pyne

References: Hall and Boyer 1992, Hyatt pers. comm., Pyne pers. comm., Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

I.C.3.N.a. Mixed needle-leaved evergreen - cold-deciduous forest

Pinus echinata - *Quercus* (*alba*, *falcata*, *stellata*, *velutina*) Forest Alliance

Appalachian Shortleaf Pine - Mesic Oak Forest

Pinus echinata - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest

Shortleaf Pine - White Oak / Hillside Blueberry / Arrowleaf Heartleaf - Striped Wintergreen Forest

Identifier: CEGL008427

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Mixed evergreen-deciduous forest (I.C.)

Physiognomic Group Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)

Physiognomic Subgroup Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)

Formation Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a.)

Alliance *Pinus echinata* - *Quercus* (*alba*, *falcata*, *stellata*, *velutina*) Forest Alliance (A.394)

Alliance (English name) Shortleaf Pine - (White Oak, Southern Red Oak, Post Oak, Black Oak) Forest Alliance

Association *Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest

Association (English name) Shortleaf Pine - White Oak / Hillside Blueberry / Arrowleaf Heartleaf - Striped Wintergreen Forest

Association (Common name) Appalachian Shortleaf Pine - Mesic Oak Forest

Ecological System(s): Southern Appalachian Low Mountain Pine Forest (CES202.332)
ELEMENT CONCEPT

Global Summary: This association includes forests dominated by a mixture of *Pinus echinata* and mesophytic and dry-mesophytic oaks (e.g., *Quercus alba*, *Quercus rubra*, *Quercus velutina*) occurring in the Piedmont of the southeastern United States, ranging north and west through the Southern Ridge and Valley, Cumberland Plateau, low-elevation Southern Blue Ridge, and upper Piedmont. These forests occur on low to middle slope positions, on protected to intermediately exposed sites. The mixed evergreen - deciduous canopy is dominated by *Pinus echinata* and *Quercus alba*, sometimes with high coverage of other *Quercus* spp. (*Quercus velutina*, *Quercus coccinea*, *Quercus falcata*, *Quercus rubra*). Xerophytic *Quercus* spp. such as *Quercus prinus*, *Quercus stellata*, as well as other species of pines, may be present but are typically not abundant. A well-developed subcanopy is typical, with species such as *Acer rubrum*, *Nyssa sylvatica*, *Carya glabra*, *Cornus florida*, and *Oxydendrum arboreum*. The shrub stratum is sparse to patchy with low shrubs (*Vaccinium pallidum*, *Vaccinium stamineum*, *Vaccinium arboreum*, *Chimaphila maculata*) and vines (*Vitis rotundifolia*). The herb stratum is patchy to absent. *Hexastylis arifolia* is a typical herb. Stands without fire management may experience invasion by *Acer rubrum*. *Piptochaetium avenaceum* may be an important grass in more open stands.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: Representatives of this community within the park occur on low, mid, and upper gentle to moderate slopes at various aspects. They are generally intermediately exposed to protected and dry-mesic in nature.

Global Environment: These forests occur on low to middle slope positions, on protected to intermediately exposed sites.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The vegetation varies by occurrence but generally consists of a component of *Pinus echinata* in the canopy, with shared dominance by *Quercus alba*, *Quercus velutina*, *Quercus coccinea*, and *Quercus falcata*. The understory varies but currently appears to be dominated in most examples by a thick stand of *Acer rubrum*. This is probably due to the lack of fire in the park over the past 50 years. The community was most likely tolerant of fire and was probably more open when fire played a greater role in the area. There is now very little regeneration of oak in this community to replace the canopy oaks. *Vaccinium* spp. are important components of the tall- and short-shrub layers. *Vaccinium pallidum* is common as a short shrub in most occurrences.

Global Vegetation: The mixed evergreen - deciduous canopy of stands is dominated by *Pinus echinata* and *Quercus alba*, sometimes with high coverage by other *Quercus* spp. (*Quercus velutina*, *Quercus coccinea*, *Quercus falcata*, *Quercus rubra*). Xerophytic *Quercus* spp. such as *Quercus prinus*, *Quercus stellata*, as well as other species of pines, may be present but are typically not abundant. A well-developed subcanopy is typical, with species such as *Acer rubrum*, *Nyssa sylvatica*, *Carya glabra*, *Cornus florida*, and *Oxydendrum arboreum*. The shrub stratum is sparse to patchy with low shrubs (*Vaccinium pallidum*, *Vaccinium stamineum*, *Vaccinium arboreum*, *Chimaphila maculata*) and vines (*Vitis rotundifolia*). The herb stratum is patchy to absent. *Hexastylis arifolia* is a typical herb. Stands without fire management may experience invasion by *Acer rubrum*. *Piptochaetium avenaceum* may be an important grass in more open stands. A dense forest from the Talladega National Forest, Talladega Ranger District, included here, is dominated by *Quercus coccinea*, *Pinus echinata*; other canopy components include *Quercus velutina*, *Quercus alba*, *Quercus falcata*, *Liriodendron tulipifera*, *Pinus taeda*, *Carya glabra*, and *Liquidambar styraciflua*. The patchy shrub layer includes *Vaccinium arboreum*, *Vaccinium pallidum*, *Viburnum acerifolium*, and *Acer rubrum*. The sparse herbaceous layer is characterized by *Piptochaetium avenaceum*, which may be an important grass in more open stands.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus coccinea</i> , <i>Quercus falcata</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus echinata</i>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus coccinea</i> , <i>Quercus falcata</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Vaccinium pallidum*

Global: *Pinus echinata*, *Quercus falcata*, *Quercus stellata*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:**CONSERVATION STATUS RANK**

Global Rank & Reasons: G3G4 (23-Oct-2002). Although this association has a reasonably wide potential natural range, shortleaf pine (*Pinus echinata*) populations seem to have undergone rangewide declines in vigor and extent. This phenomenon is especially pronounced in the range of this type, primarily due to changes in fire regime and to depredations of the Southern Pine Beetle (*Dendroctonus frontalis*). This community has had little inventory, but the total acreage in viable condition is believed to be quite limited. The more mesic to submesic habitat of this association may never have been common and is likely more vulnerable to successional changes than more xeric stands. Further, stands of this association are threatened by removal of commercially valuable tree species (e.g., *Quercus alba*, *Quercus rubra*, *Pinus echinata*), as well as by conversion to commercial forest plantations, and by the effects of continued fire suppression, which would inhibit the reproduction of *Pinus echinata* and cause the grass-dominated herbaceous layer to deteriorate. Following the removal of the commercially valuable species, and in the absence of fire, stands could become populated with successional hardwoods (e.g., *Liriodendron tulipifera*, *Liquidambar styraciflua*) as well as less fire-adapted pines (*Pinus taeda*, *Pinus virginiana*). The range in the rank reflects the need for further inventory and evaluation of this community.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: This forest has an overall more mesophytic species composition and occurs on deeper soil or on more protected sites than the more extreme shortleaf pine - oak forest, ~*Pinus echinata* - *Quercus* (*prinus*, *falcata*) / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest (CEGL007493)\$. In the Daniel Boone National Forest (Kentucky) this vegetation is important as part of a pine-oak matrix which is significant for restoration of Red-cockaded Woodpecker (*Picoides borealis*) habitat. *Piptochaetium avenaceum* may be an important grass in more open stands. Some plots attributed to this type have more *Quercus alba* than *Pinus echinata*.

Global Similar Associations:

- *Pinus echinata* - *Quercus* (*prinus*, *falcata*) / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest (CEGL007493)—is codominated by drier-site oaks and generally has a higher coverage of ericads in the shrub layer.
- *Pinus echinata* - *Quercus alba* / *Viburnum* (*dentatum*, *acerifolium*) Forest (CEGL003855)
- *Pinus echinata* - *Quercus stellata* - *Quercus prinus* - *Carya glabra* / (*Danthonia spicata*, *Piptochaetium avenaceum*) Forest (CEGL007500)—is a more open, grassy variant.
- *Quercus alba* - *Quercus falcata* / *Vaccinium* (*arboreum*, *hirsutum*, *pallidum*) Forest (CEGL008567)—is a related, primarily deciduous type of the Ridge and Valley and parts of the Southern Blue Ridge adjacent to the Ridge and Valley.
- *Quercus falcata* - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest (CEGL007244)—is a related, primarily deciduous type with representation in the Piedmont and Ridge and Valley but not in the Blue Ridge.

Global Related Concepts:**OTHER COMMENTS****Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community occurs throughout the park's lower, middle, and upper slopes but not generally on the ridgetops or in the draws.

Global Range: This community occurs in the Piedmont of the southeastern United States, ranging north and west through the Southern Ridge and Valley, Cumberland Plateau, and low Southern Blue Ridge.

Nations: US

States/Provinces: AL, GA, KY, NC, SC, TN, VA?

USFS Ecoregions: 221H:PP, 221I:PP, 221J:PP, 222E:PP, 231Ab:CCC, 231C:CP, 231Db:CCC, 231Dc:CCC, M221C:CP, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Carl Sandburg Home, Kings Mountain, Little River Canyon?); USFS (Chattahoochee, Cherokee, Daniel Boone, Sumter, Talladega)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.11, KIMO.15.

Local Description Authors: R. White

Global Description Authors:

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Pinus echinata - *Quercus (coccinea, prinus)* Forest Alliance

Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest

Pinus echinata - *Quercus (pinus, falcata)* / *Oxydendrum arboreum* / *Vaccinium pallidum*
Forest

Shortleaf Pine - (Rock Chestnut Oak, Southern Red Oak) / Sourwood / Hillside Blueberry Forest

Identifier: C EGL007493

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Mixed evergreen-deciduous forest (I.C.)

Physiognomic Group Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)

Physiognomic Subgroup Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)

Formation Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.a.)

Alliance *Pinus echinata* - *Quercus (coccinea, prinus)* Forest Alliance (A.395)

Alliance (English name) Shortleaf Pine - (Scarlet Oak, Rock Chestnut Oak) Forest Alliance

Association *Pinus echinata* - *Quercus (pinus, falcata)* / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest

Association (English name) Shortleaf Pine - (Rock Chestnut Oak, Southern Red Oak) / Sourwood / Hillside Blueberry Forest

Association (Common name) Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest

Ecological System(s): Southern Appalachian Low Mountain Pine Forest (CES202.332)
ELEMENT CONCEPT

Global Summary: This association includes crests of low-elevation slopes and ridges on the fringes of the Southern Blue Ridge, extending into the southern Ridge and Valley and Cumberland Plateau, where *Pinus echinata* and dry-site oaks characteristic of lower elevations codominate in association with other Appalachian flora. This forest is known from the southern Blue Ridge Escarpment of North Carolina, South Carolina, and Georgia, particularly in the Blue Ridge/Piedmont transition, where it occurs on exposed, rocky ridges and upper, convex slopes, at elevations at or below 670 m (2200 feet). It also extends into the southern Ridge and Valley and Cumberland Plateau, but more information is needed to characterize the variation in that part of the range. This community may occur in slightly more protected situations in the hotter Piedmont ecoregion. Canopies are codominated by *Pinus echinata* and combinations of dry-site oaks that may include *Quercus falcata*, *Quercus coccinea*, *Quercus prinus*, *Quercus stellata*, and *Quercus velutina*. On rocky sites, canopies may be slightly stunted. Mid-canopy trees can be scattered or form a well-developed subcanopy. Common subcanopy trees can include *Oxydendrum arboreum*, *Ilex opaca* var. *opaca*, *Cornus florida*, *Quercus marilandica*, *Quercus stellata*, and *Carya pallida*. The shrub stratum varies in composition and density but is typically dominated by *Vaccinium pallidum*. Other shrubs may include *Vaccinium stamineum*, *Gaylussacia ursina*, *Gaylussacia baccata*, *Rhododendron calendulaceum*, *Rhododendron minus*, *Castanea pumila*, and *Kalmia latifolia*. On some sites *Symplocos tinctoria* can be important. *Vitis rotundifolia* and *Smilax glauca* are common vines. The herb stratum is poorly developed with scattered species such as *Chimaphila maculata*, *Iris verna*, *Pteridium aquilinum* var. *latiusculum*, *Goodyera pubescens*, *Hexastylis arifolia*, *Coreopsis major* (= var. *rigida*),

Tipularia discolor, *Schizachyrium scoparium*, *Pityopsis graminifolia* var. *latifolia*, *Tephrosia virginiana*, *Silphium compositum*, *Dichanthelium* spp., and *Galax urceolata*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This community is probably an intermediate community in terms of moisture regime and exposure between the dry-mesic ~*Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest (CEGL008427)\$\$ of the slopes and the xeric ~*Quercus prinus* - *Quercus marilandica* Piedmont Woodland (CEGL003708)\$\$ of the south-facing rocky ridges of the park. It is found on exposed lower and mid slopes and some ridges scattered throughout the park. Some examples of this community type may merely be a fire-suppressed, closed-canopy version of ~*Quercus prinus* - *Quercus marilandica* Piedmont Woodland (CEGL003708)\$\$\$. It may be appropriate to group some of the examples of this community in with CEGL003708 when managing communities within the park and deciding on appropriate management techniques.

Global Environment: This association includes crests of low-elevation slopes and ridges on the fringes of the Southern Blue Ridge, extending into the southern Ridge and Valley and Cumberland Plateau, where *Pinus echinata* and dry-site oaks characteristic of lower elevations codominate in association with other Appalachian flora. This forest is known from the southern Blue Ridge Escarpment region of North Carolina, South Carolina, and Georgia, particularly in the Blue Ridge/Piedmont transition, where it occurs on exposed, rocky ridges and upper, convex slopes, at elevations at or below 2200 feet. It also extends into the southern Ridge and Valley and Cumberland Plateau, but more information is needed to characterize the variation in that part of the range.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy is dominated by *Quercus prinus* with *Quercus falcata* and *Quercus coccinea*. The subcanopy can have a substantial component of *Quercus marilandica* along with the more constant *Oxydendrum arboreum*, *Cornus florida*, and *Nyssa sylvatica*. The short-shrub layer is moderately to densely populated with *Kalmia latifolia*, *Vaccinium pallidum*, and sometimes *Gaylussacia baccata*. Again, this community is very similar to ~*Quercus prinus* - *Quercus marilandica* Piedmont Woodland (CEGL003708)\$\$ and may begin to resemble it more with repeated fires.

Global Vegetation: Canopies are codominated by *Pinus echinata* and combinations of dry-site oaks that may include *Quercus falcata*, *Quercus coccinea*, *Quercus prinus*, *Quercus stellata*, and *Quercus velutina*. On rocky sites, canopies may be slightly stunted. Mid-canopy trees can be scattered or form a well-developed subcanopy. Common subcanopy trees can include *Oxydendrum arboreum*, *Ilex opaca* var. *opaca*, *Cornus florida*, *Quercus marilandica*, *Quercus stellata*, and *Carya pallida*. The shrub stratum varies in composition and density but is typically dominated by *Vaccinium pallidum*. Other shrubs may include *Vaccinium stamineum*, *Gaylussacia ursina*, *Gaylussacia baccata*, *Rhododendron calendulaceum*, *Rhododendron minus*, *Castanea pumila*, and *Kalmia latifolia*. On some sites *Symplocos tinctoria* can be important. *Vitis rotundifolia* and *Smilax glauca* are common vines. The herb stratum is poorly developed with scattered species such as *Chimaphila maculata*, *Iris verna*, *Pteridium aquilinum* var. *latiusculum*, *Goodyera pubescens*, *Hexastylis arifolia*, *Coreopsis major* (= var. *rigida*), *Tipularia discolor*, *Schizachyrium scoparium*, *Pityopsis graminifolia* var. *latifolia*, *Tephrosia virginiana*, *Silphium compositum*, *Dichanthelium* spp., and *Galax urceolata*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

Stratum

Tree canopy

Tree subcanopy

Short shrub/sapling

Lifeform

Broad-leaved deciduous tree

Broad-leaved deciduous tree

Broad-leaved deciduous shrub

Species*Quercus coccinea*, *Quercus falcata*, *Quercus prinus**Nyssa sylvatica*, *Oxydendrum arboreum**Vaccinium pallidum***Global****Stratum****Lifeform****Species****CHARACTERISTIC SPECIES****Kings Mountain National Military Park:** *Kalmia latifolia***Global:****OTHER NOTEWORTHY SPECIES****Kings Mountain National Military Park:****Global:****CONSERVATION STATUS RANK**

Global Rank & Reasons: G3G4 (12-Jan-2000). This community occurs within a restricted geographic range and is uncommon within this range. Because this community is poorly known and essentially uninventoried throughout its range, there remain questions regarding its taxonomic distinctiveness and geographic extent. Further inventory and more detailed field information may expand the current range and concept of this type.

CLASSIFICATION**Status:** Standard**Classification Confidence:** 2 - Moderate**Kings Mountain National Military Park Comments:**

Global Comments: These communities are distinguished by canopies codominated by *Pinus echinata* and combinations of dry-site oaks that may include *Quercus falcata*, *Quercus coccinea*, *Quercus prinus*, *Quercus stellata*, and *Quercus velutina*. These communities are not well known. In North Carolina they are apparently largely confined to Cherokee County. Examples are also known from the southern portion of the Chattooga River Basin watershed in South Carolina and Georgia. This forest is probably fire-dependent to some extent, and fire (prescribed or natural) will stimulate regeneration of *Pinus echinata*. Many occurrences of this community are highly disturbed and contain exotic species such as *Ligustrum japonicum*, *Dioscorea oppositifolia*, and *Lonicera japonica*. *Pinus echinata*, in many occurrences, has been attacked by the Southern Pine Bark Beetle, which will eventually kill the trees. The concepts of the former associations *Pinus echinata* - *Quercus falcata* / *Vaccinium pallidum* Forest (CEGL007494) and *Pinus echinata* - *Quercus prinus* / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest (CEGL007495) were merged into this association and should be considered variants of this community. ~*Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest (CEGL008427)\$\$ includes shortleaf pine - mesic oak forests of the non-coastal plain, non-Ozark/Ouachita portion of the *Pinus echinata* range, with an overall more mesophytic species composition than the association described here.

Global Similar Associations:

- *Pinus echinata* - *Quercus alba* / *Vaccinium pallidum* / *Hexastylis arifolia* - *Chimaphila maculata* Forest (CEGL008427)
- *Pinus echinata* - *Quercus prinus* / *Rhododendron minus* / *Vaccinium pallidum* Forest (CEGL007496)
- *Pinus echinata* - *Quercus stellata* - *Quercus marilandica* / *Vaccinium pallidum* Woodland (CEGL003765)
- *Pinus echinata* - *Quercus stellata* - *Quercus prinus* - *Carya glabra* / (*Danthonia spicata*, *Piptochaetium avenaceum*) Forest (CEGL007500)—a more open, grassy variant.

Global Related Concepts:

- IA7a. Xeric Shortleaf Pine - Oak Forest (Allard 1990) B

- Southern Mountain Pine-Oak Forest (Schafale 1998b) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This type exists in patches throughout the park and can occur in very exposed upper slopes down to less exposed lower slopes.

Global Range: This association occurs in the southern fringes of the Southern Blue Ridge, extending into the southern Ridge and Valley and Cumberland Plateau. It could possibly range into the upper Piedmont.

Nations: US

States/Provinces: GA, KY, NC, SC, TN?

USFS Ecoregions: 231Ae:CCP, 231Ag:CCC, 231Dc:CCC, M221Cd:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Great Smoky Mountains, Kings Mountain, Little River Canyon?); USFS (Chattahoochee, Cherokee?, Daniel Boone, Nantahala, Sumter)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.9

Local Description Authors: R. White

Global Description Authors: K.D. Patterson

References: Allard 1990, Evans 1991, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Schafale 1998b, Southeastern Ecology Working Group n.d.

I.C.3.N.b. Temporarily flooded mixed needle-leaved evergreen - cold-deciduous forest

Pinus taeda - Liriodendron tulipifera Temporarily Flooded Forest Alliance

Loblolly Pine - Tuliptree Successional Bottomland Forest

***Pinus taeda - Liriodendron tulipifera / Linder benzoin / Carex crinita* Forest**

Loblolly Pine - Tuliptree / Northern Spicebush / Fringed Sedge Forest

Identifier: CEGL007546

NVC Classification

Physiognomic Class Forest (I)

Physiognomic Subclass Mixed evergreen-deciduous forest (I.C.)

Physiognomic Group Mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.)

Physiognomic Subgroup Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.)

Formation Temporarily flooded mixed needle-leaved evergreen - cold-deciduous forest (I.C.3.N.b.)

Alliance *Pinus taeda - Liriodendron tulipifera* Temporarily Flooded Forest Alliance (A.434)

Alliance (English name) Loblolly Pine - Tuliptree Temporarily Flooded Forest Alliance

Association *Pinus taeda - Liriodendron tulipifera / Linder benzoin / Carex crinita* Forest

Association (English name) Loblolly Pine - Tuliptree / Northern Spicebush / Fringed Sedge Forest

Association (Common name) Loblolly Pine - Tuliptree Successional Bottomland Forest

Ecological System(s): Southern Piedmont Small Floodplain and Riparian Forest (CES202.323)

ELEMENT CONCEPT

Global Summary: This broadly defined, successional wetland forest is dominated by *Pinus taeda* and *Liriodendron tulipifera*, but many other canopy species are usually present. *Linder benzoin* is a typical shrub, and *Carex crinita* is a typical herb. More information is needed on the detailed floristics of this association. It develops in river floodplain alluvial terraces along streams following major disturbances such as blowdowns, logging, and agriculture.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Kings Mountain National Military Park Environment: This wetland forest may occur in the largest creek floodplains in the park. No plot data exist for this type, but it was identified by Gallyoun et al. (1996) as existing in the park and was documented during the 2004 accuracy assessment work.

Global Environment: This broadly defined, successional wetland forest develops in river floodplain alluvial terraces along streams following major disturbances such as blowdowns, logging, and agriculture. This is primarily a Zone IV community with a likelihood of 51-100% of flooding with intermittent periodicity for 1-2 months (12.5-25% of total) of the growing season. Flooding usually occurs in the spring. Just as important as flooding regime in determining the species composition of this community is land-use history since this community most often develops on floodplains subjected to timbering practices.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This successional vegetation is dominated by *Pinus taeda* and *Liriodendron tulipifera*. The shrub layer varies with each

occurrence, but can be sparse or can be dominated by shrubs such as *Lindera benzoin*, *Asimina triloba*, or *Kalmia latifolia*.

Global Vegetation: This successional vegetation is dominated by *Pinus taeda* and *Liriodendron tulipifera*, but many other canopy species are usually present. *Lindera benzoin* is a typical shrub, and *Carex crinita* is a typical herb. More information is needed on the detailed floristics of this association.

Other woody species that may be present include *Liquidambar styraciflua*, *Platanus occidentalis*, *Cornus florida*, *Acer rubrum*, *Nyssa biflora*, *Quercus alba*, *Fagus grandifolia*, *Morus rubra*, *Betula nigra*, *Fraxinus americana*, *Ilex opaca*, *Lindera benzoin*, and *Asimina parviflora*. Woody species common in the Piedmont portion of the range include *Aesculus sylvatica* and *Acer negundo*. Herbaceous and woody vine species that may occur include *Carex crinita*, *Botrychium virginianum*, *Eupatorium purpureum*, *Polystichum acrostichoides*, *Arundinaria gigantea*, *Toxicodendron radicans ssp. radicans*, *Asplenium platyneuron*, *Woodwardia areolata*, *Osmunda cinnamomea*, *Ophioglossum vulgatum*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Dulichium arundinaceum*, *Carex albolutescens*, *Hypericum nudiflorum*, *Corydalis flavula*, and others. The exotics *Ligustrum sinense* and *Lonicera japonica* commonly occur in forests of this alliance. The preceding information is from the related alliance description (Weakley et al. 1998), and these floristics were included in a 1995 CCA for the 'Pinus taeda - Liriodendron tulipifera / Lindera benzoin / Carex crinita Successional Forest' (1C03B020.01F), on which this association is apparently based. It is not clear where these data originated. Some of the taxa mentioned (e.g., *Eupatorium purpureum*) seem "suspicious" and out of place.

Apparently related vegetation from the Savannah River Site cited in Jones et al. (1981b) indicates dominance of some stands by *Pinus taeda*, *Nyssa biflora*, and *Liriodendron tulipifera* in the canopy, with *Persea palustris*, *Magnolia virginiana*, *Acer rubrum*, and *Nyssa biflora* in the subcanopy. Other species present include *Vaccinium formosum*, *Viburnum nudum*, *Arundinaria gigantea*, *Toxicodendron radicans ssp. radicans*, *Mitchella repens*, *Osmunda cinnamomea*, and *Onoclea sensibilis*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus taeda</i>
Tree canopy	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus taeda</i>
Tree canopy	Broad-leaved deciduous tree	<i>Liquidambar styraciflua</i> , <i>Liriodendron tulipifera</i> , <i>Platanus occidentalis</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Cornus florida</i>
Tree subcanopy	Broad-leaved evergreen tree	<i>Ilex opaca</i>
Shrub/sapling (tall & short)	Vine/Liana	<i>Lonicera japonica</i> , <i>Toxicodendron radicans ssp. radicans</i>
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Lindera benzoin</i>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Asimina parviflora</i>
Herb (field)	Forb	<i>Eupatorium purpureum</i>
Herb (field)	Graminoid	<i>Arundinaria gigantea</i> , <i>Carex crinita</i>

Herb (field)

Fern

Botrychium virginianum, *Polystichum acrostichoides***CHARACTERISTIC SPECIES****Kings Mountain National Military Park:****Global:****OTHER NOTEWORTHY SPECIES****Kings Mountain National Military Park:****Global:****CONSERVATION STATUS RANK**

Global Rank & Reasons: GNA (modified/managed) (19-Aug-2002). This is a successional forest composed of species native to the southeastern United States; it is not of conservation concern and does not receive a conservation status rank.

CLASSIFICATION**Status:** Standard**Classification Confidence:** 2 - Moderate**Kings Mountain National Military Park Comments:**

Global Comments: On the Bankhead National Forest, this community was observed on previously farmed alluvial terraces along medium-sized streams. The canopy of this forest is dominated by *Pinus taeda* with *Liriodendron tulipifera*, *Liquidambar styraciflua*, and *Nyssa sylvatica* also present in the canopy. Midstory components include *Nyssa sylvatica*, *Magnolia macrophylla*, *Carpinus caroliniana*, and *Ostrya virginiana*. Shrubs include *Hamamelis virginiana*, *Lindera benzoin*, and *Asimina parviflora*. Jones et al. (1981a) describe an old-growth stand at the Boiling Springs Natural Area at the DOE Savannah River Plant (upper coastal plain, Barnwell County, South Carolina) as a "loblolly pine-bottomland hardwood stand" which has a "senescent upperstory" composed of *Pinus taeda* and *Liriodendron tulipifera*. In contrast, the analysis of common forest types at the Savannah River Plant by Jones et al. (1981b) and Jones and Churchill (1987) includes floodplain vegetation dominated by *Pinus taeda* and *Liquidambar styraciflua*.

Global Similar Associations:

- *Liquidambar styraciflua* - *Liriodendron tulipifera* / *Onoclea sensibilis* Forest (CEGL007329)—a related deciduous type.

Global Related Concepts:

- Bottomland Hardwood - Yellow Pine (46) (USFS 1988) ?
- IA8c. Lowland Pine - Oak Forest (Allard 1990) ?
- Loblolly Pine - Hardwood: 82 (Eyre 1980) B
- Loblolly pine - Swamp gum - Naked withe-rod Community (Jones et al. 1981b) ?
- Loblolly pine-bottomland hardwood (Jones et al. 1981a) ?

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community exists along the largest, widest floodplains in the park.

Global Range: This association is known from the Cumberland Plateau, Piedmont, South Atlantic Coastal Plain, and Chesapeake Bay Lowlands. It is also probably found in the East Gulf Coastal Plain and Upper East Gulf Coastal Plain.

Nations: US**States/Provinces:** AL, GA, NC, SC, VA**USFS Ecoregions:** 231Aa:CCC, 231Ae:CCC, 231Af:CCC, 231An:CCC, 231Ao:CCP, 231Cd:CCC, 232Br:CCC

Federal Lands: DOE (Savannah River Site); NPS (Kennesaw Mountain, Kings Mountain, Little River Canyon?); USFS (Bankhead, Oconee?, Sumter, Uwharrie)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: S. Landaal

References: Allard 1990, Eyre 1980, Gallyoun et al. 1996, Jones and Churchill 1987, Jones et al. 1981a, Jones et al. 1981b, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Peet et al. unpubl. data 2002, Southeastern Ecology Working Group n.d., USFS 1988, Weakley et al. 1998

II. Woodland

II.B.2.N.a. Cold-deciduous woodland

Quercus prinus - *Quercus marilandica* Woodland Alliance

Piedmont Rock Chestnut Oak - Blackjack Oak Woodland

***Quercus prinus* - *Quercus marilandica* Piedmont Woodland**

Rock Chestnut Oak - Blackjack Oak Piedmont Woodland

Identifier: C EGL003708

NVC Classification

Physiognomic Class Woodland (II)

Physiognomic Subclass Deciduous woodland (II.B.)

Physiognomic Group Cold-deciduous woodland (II.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous woodland (II.B.2.N.)

Formation Cold-deciduous woodland (II.B.2.N.a.)

Alliance *Quercus prinus* - *Quercus marilandica* Woodland Alliance (A.623)

Alliance (English name) Rock Chestnut Oak - Blackjack Oak Woodland Alliance

Association *Quercus prinus* - *Quercus marilandica* Piedmont Woodland

Association (English name) Rock Chestnut Oak - Blackjack Oak Piedmont Woodland

Association (Common name) Piedmont Rock Chestnut Oak - Blackjack Oak Woodland

Ecological System(s): Southern Piedmont Dry Oak-(Pine) Forest (CES202.339)

ELEMENT CONCEPT

Global Summary: This broadly defined type represents woodland vegetation dominated by *Quercus prinus* and *Quercus marilandica* found in the Piedmont of South Carolina and Georgia. Examples are typically found on south- to west-facing slopes. Stands are dominated by *Quercus prinus* and *Quercus marilandica*, which may be widely spaced and dwarfed. *Pinus echinata* and *Carya pallida* may also be present. Exposure and topography contribute to maintenance of the woodland physiognomy. Canopy, subcanopy, and shrub strata may all be sparse in coverage. Rocks (typically quartzite exposures) are present at the surface. *Vaccinium pallidum* and *Vaccinium stamineum* are typical in the shrub layer. *Vaccinium arboreum* and *Crataegus spathulata* may also be present. Examples at Franklin D. Roosevelt Park (Georgia) and Kings Mountain National Military Park (South Carolina) typically occur downslope from *Quercus prinus*-dominated monadnock forests over quartzite-influenced soils.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: In the vicinity of Kings Mountain, the geology on which this association occurs is assumed to be "Battleground schist" which includes "Kings Mountain quartzite." This community type is only found on a few sites in Kings Mountain where the geology and aspect (southern aspect) encourage its formation. It is assumed that this community is maintained by a combination of harsh environmental conditions, geology, and fire regime.

Global Environment: This association is based on data from south- to west-facing slopes in the Piedmont of South Carolina and Georgia. Exposure and topography contribute to maintenance of woodland physiognomy. Rocks (typically quartzite exposures) are present at the surface. Examples typically occur downslope from *Quercus prinus*-dominated monadnock forests (e.g., Kings Mountain, South Carolina, and F. D. Roosevelt State Park, Georgia). At F. D. Roosevelt

State Park (Harris County), this community occurs in a transitional zone between extensive outcrops of Hollis quartzite (nearly cliff-like) and deeper-soil *Quercus prinus* forests on the summit of Pine Mountain (Govus 2002). In the vicinity of Kings Mountain, the geology on which this association occurs is assumed to be "Battleground schist" which includes the "Kings Mountain quartzite."

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The very sparse canopy of this community is generally dominated by *Quercus prinus*, while the understory and tall-shrub layers are dominated by *Quercus marilandica* and *Pinus echinata*. The herb layer can be moderate to sparse, with species generally associated with xeric woodlands. At Kings Mountain, herb layer species include *Pteridium aquilinum*, *Schizachyrium scoparium*, *Danthonia sericea*, *Xerophyllum asphodeloides*, *Dichantheium* spp., etc.

Global Vegetation: Examples of this woodland are typically dominated by *Quercus prinus* and *Quercus marilandica*, which may be widely spaced and dwarfed (Govus 2002). *Pinus echinata* and *Carya pallida* may also be present. Understory species may include *Quercus marilandica*, *Quercus margarettiae*, *Prunus umbellata*, *Prunus alabamensis*, *Cercis canadensis*, and *Carya glabra*. *Vaccinium pallidum* and *Vaccinium stamineum* are typical in the shrub layer. *Vaccinium arboreum*, *Crataegus spathulata*, and *Hypericum hypericoides* may also be present. Typical grasses (commonly associated with glades and woodlands) include *Schizachyrium scoparium*, *Sporobolus clandestinus*, *Sporobolus junceus*, *Aristida purpurascens*, and *Piptochaetium avenaceum*. Some other herbaceous taxa may include *Commelina erecta*, *Coreopsis major*, *Hypericum drummondii*, *Liatris squarrosa*, *Manfreda virginica*, *Penstemon australis*, *Pityopsis aspera*, *Solidago odora*, *Symphotrichum patens*, *Tephrosia virginiana*, *Tragia urticifolia*, *Trichostema setaceum*, and *Xerophyllum asphodeloides*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Quercus marilandica</i>
Shrub/sapling (tall & short)	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i>
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Quercus marilandica</i>
Shrub/sapling (tall & short)	Broad-leaved evergreen shrub	<i>Kalmia latifolia</i>
Herb (field)	Graminoid	<i>Schizachyrium scoparium</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park: *Quercus marilandica*, *Vaccinium arboreum*

Global: *Quercus marilandica*

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park: *Xerophyllum asphodeloides*

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3 (30-Jan-2003). This community type is very rare, being restricted to ridges in the southern Piedmont composed of quartzite or related felsic materials. It is thought to be inherently rare because of its unusual geology and topographic position. It would be of limited extent on the landscape, and would benefit from the presence of fire, which would help maintain the grass- and forb-dominated herbaceous layer. Fire-suppressed examples might

not be able to be distinguished from more common and widespread *Quercus prinus*-dominated forests. Threats are limited due to the limited productivity of these sites and presumed lack of merchantable timber. Timber productivity is presumably very low in this environment because of dry and rocky conditions. Fire suppression could be a problem, but the general droughtiness of the sites probably substantially limits woody plant succession.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Kings Mountain National Military Park Comments:

Global Comments: Additional types within this alliance may be developed as more information becomes available. This vegetation type is based on plot data from NPS small parks project (Kings Mountain, South Carolina), and the concept needs to be refined and defined regionally when more data are available. At F. D. Roosevelt State Park (Harris County, Georgia Piedmont), there are interesting *Quercus prinus* woodlands of limited extent with a very well-developed herbaceous and grassy ground stratum (e.g., T. Govus FDR Plot #3). This community occurs in a transitional zone between extensive outcrops of Hollis quartzite (nearly cliff-like) and deeper-soil chestnut oak forests on the summit of Pine Mountain. The canopy consists of widely spaced and dwarfed *Quercus prinus* with scattered *Carya pallida* and *Pinus echinata*. A sparse subcanopy includes *Quercus marilandica*, *Quercus margarettiae*, *Prunus umbellata*, *Prunus alabamensis*, *Cercis canadensis*, and *Carya glabra*. An equally sparse shrub layer is dominated by *Vaccinium arboreum* and *Crataegus spathulata*. The herbaceous layer is very well-developed and quite diverse including a number of native grass species associated with glades and woodlands such as *Sporobolus junceus*, *Piptochaetium avenaceum*, *Aristida purpurascens*, *Schizachyrium scoparium*, and *Sporobolus clandestinus*. Other herbaceous species of note found in this glade type habitat were *Commelina erecta*, *Penstemon australis*, *Hypericum drummondii*, *Trichostema setaceum*, *Liatris squarrosa*, *Manfreda virginica*, *Tragia urticifolia*, *Symphotrichum patens*, *Tephrosia virginiana*, *Pityopsis aspera*, and *Solidago odora*. This community, with an abundance of fine fuels at the ground level, would also benefit from introduction of a prescribed burning program (Govus 2002).

Global Similar Associations:

- *Quercus prinus* - (*Quercus coccinea*) / *Carya pallida* / *Vaccinium arboreum* - *Vaccinium pallidum* Forest (CEGL008431)

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs on the most exposed upper south facing slopes in the park. It is patchy but may occur in large patches where the conditions are appropriate.

Global Range: This type occurs in the Piedmont of South Carolina, Georgia, and possibly other states.

Nations: US

States/Provinces: GA, SC

USFS Ecoregions: 231Aa:CC?, 231Ae:CCC, 231Aj:CCC

Federal Lands: NPS (Kings Mountain)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.1, KIMO.7, KIMO.16.

Local Description Authors: R. White

Global Description Authors: M. Pyne

References: Gallyoun et al. 1996, Govus 2002, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

II.C.3.N.a. Mixed needle-leaved evergreen - cold-deciduous woodland

Pinus echinata - Quercus stellata - Quercus marilandica Woodland Alliance

Appalachian Shortleaf Pine - Post Oak Woodland

***Pinus echinata - Quercus stellata - Quercus marilandica / Vaccinium pallidum* Woodland Shortleaf Pine - Post Oak - Blackjack Oak / Hillside Blueberry Woodland**

Identifier: CEGL003765

NVC Classification

Physiognomic Class Woodland (II)

Physiognomic Subclass Mixed evergreen - deciduous woodland (II.C.)

Physiognomic Group Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.)

Physiognomic Subgroup Natural/Semi-natural mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.)

Formation Mixed needle-leaved evergreen - cold-deciduous woodland (II.C.3.N.a.)

Alliance *Pinus echinata - Quercus stellata - Quercus marilandica* Woodland Alliance (A.680)

Alliance (English name) Shortleaf Pine - Post Oak - Blackjack Oak Woodland Alliance

Association *Pinus echinata - Quercus stellata - Quercus marilandica / Vaccinium pallidum* Woodland

Association (English name) Shortleaf Pine - Post Oak - Blackjack Oak / Hillside Blueberry Woodland

Association (Common name) Appalachian Shortleaf Pine - Post Oak Woodland

Ecological System(s): Southern Appalachian Low Mountain Pine Forest (CES202.332)
ELEMENT CONCEPT

Global Summary: This shortleaf pine - oak woodland is known from low elevations in the Southern Blue Ridge Escarpment region, and probably extends into the adjacent southern Ridge and Valley, Cumberland Plateau, and Piedmont. This association is a woodland where *Pinus echinata*, *Quercus stellata*, and *Quercus marilandica* occur in the canopy, each contributing 25-75% to the total canopy coverage. Other species make up less than 25% of the total canopy cover and may include *Quercus falcata*, *Quercus coccinea*, *Carya pallida*, *Pinus rigida*, and *Pinus virginiana*. Shrub strata vary in composition and density, but *Vaccinium pallidum* and other ericaceous species such as *Vaccinium stamineum*, *Gaylussacia ursina*, *Gaylussacia baccata*, and *Kalmia latifolia* are typical. Herbs found in these woodlands include *Baptisia tinctoria*, *Chamaecrista fasciculata* (= *Cassia fasciculata*), *Chamaecrista nictitans* (= *Cassia nictitans*), *Ceanothus americanus*, *Chrysopsis mariana*, *Clitoria mariana*, *Coreopsis tripteris*, *Crotalaria sagittalis*, *Desmodium rotundifolium*, *Saccharum giganteum*, *Euphorbia corollata*, *Helianthus atrorubens*, *Helianthus microcephalus*, *Pityopsis aspera* var. *adenolepis*, *Polygala verticillata*, *Rudbeckia hirta*, *Schizachyrium scoparium* var. *scoparium*, *Mimosa microphylla* (= *Schrankia microphylla*), *Silphium compositum*, *Sorghastrum nutans*, *Stylosanthes biflora*, and *Tephrosia virginiana*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: Within the park, this community occurs on upper slopes and broad ridges in areas with somewhat shallow soils and dry conditions.

Global Environment: This shortleaf pine - oak woodland is known from low elevations in the Southern Blue Ridge Escarpment region, and probably extends into the adjacent southern Ridge and Valley, Cumberland Plateau, and Piedmont.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: The canopy of this stand is dominated by *Pinus echinata*, *Quercus stellata*, and *Quercus marilandica* but may also contain smaller amounts of *Quercus alba* and *Quercus falcata*. The ericaceous and herb layers vary by occurrence.

Global Vegetation: The canopy of stands of this association are dominated by some combination of *Pinus echinata*, *Quercus stellata*, and *Quercus marilandica* (each contributing 25-75% to the total canopy coverage). Other species may include *Quercus falcata*, *Quercus coccinea*, *Carya pallida*, *Pinus rigida*, and *Pinus virginiana*. The shrub strata vary in composition and density, but *Vaccinium pallidum* and other ericaceous species such as *Vaccinium stamineum*, *Gaylussacia ursina*, *Gaylussacia baccata*, and *Kalmia latifolia* are typical. Herbs found in these woodlands include *Baptisia tinctoria*, *Chamaecrista fasciculata* (= *Cassia fasciculata*), *Chamaecrista nictitans* (= *Cassia nictitans*), *Ceanothus americanus*, *Chrysopsis mariana*, *Clitoria mariana*, *Coreopsis tripteris*, *Crotalaria sagittalis*, *Desmodium rotundifolium*, *Saccharum giganteum*, *Euphorbia corollata*, *Helianthus atrorubens*, *Helianthus microcephalus*, *Pityopsis aspera* var. *adenolepis*, *Polygala verticillata*, *Rudbeckia hirta*, *Schizachyrium scoparium* var. *scoparium*, *Mimosa microphylla* (= *Schrankia microphylla*), *Silphium compositum*, *Sorghastrum nutans*, *Stylosanthes biflora*, and *Tephrosia virginiana*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus stellata</i> , <i>marilandica</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Quercus stellata</i> , <i>marilandica</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus stellata</i> , <i>marilandica</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Quercus stellata</i> , <i>marilandica</i>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4? (22-Oct-2002). This association is probably very widespread at low elevations in and around the southern Appalachians. The final resolution of the rank and rarity of this association depends on the determination of its total global range. It is vulnerable to logging, development, invasion by exotic plant species, and fire exclusion. Shortleaf pine (*Pinus echinata*) populations seem to have undergone rangewide declines in the vigor and extent. Stands of this association are threatened by the effects of continued fire suppression, which would inhibit the reproduction of *Pinus echinata* and cause the grass-dominated herbaceous layer to deteriorate.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments: Probably very widespread at low elevations in and around the southern Appalachians. This association occurs on more xeric, extreme sites than a similar association, ~*Pinus echinata* - *Quercus (prinus, falcata)* / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest (CEGL007493)\$.

Global Similar Associations:

- *Pinus echinata* - *Quercus (prinus, falcata)* / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest (CEGL007493)
- *Pinus echinata* / *Schizachyrium scoparium* Appalachian Woodland (CEGL003560)—a related evergreen woodland

Global Related Concepts:

- IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community occurs only on broad ridges over shallow soils where the conditions are somewhat more xeric than in the surrounding forest. It is an uncommon community scattered throughout the park.

Global Range: This shortleaf pine - oak woodland is known from low elevations in the Southern Blue Ridge Escarpment region, and probably extends into the adjacent southern Ridge and Valley, Cumberland Plateau, and Piedmont.

Nations: US

States/Provinces: GA, KY?, NC, SC, TN

USFS Ecoregions: 221:?, 231Ag:PPP, M221Dc:CCP, M221Dd:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Kings Mountain?); USFS (Sumter)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.7, in part.

Local Description Authors: R. White

Global Description Authors:

References: Allard 1990, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d.

III. Shrubland

III.A.2.N.f. Temperate broad-leaved evergreen shrubland with a sparse cold-deciduous tree layer

Phyllostachys aurea Shrubland Alliance

Golden Bamboo Shrubland

Phyllostachys aurea Shrubland

Golden Bamboo Shrubland

Identifier: CEGL008560

NVC Classification

Physiognomic Class Shrubland (III)

Physiognomic Subclass Evergreen shrubland (III.A.)

Physiognomic Group Temperate broad-leaved evergreen shrubland (III.A.2.)

Physiognomic Subgroup Natural/Semi-natural temperate broad-leaved evergreen shrubland (III.A.2.N.)

Formation Temperate broad-leaved evergreen shrubland with a sparse cold-deciduous tree layer (III.A.2.N.f.)

Alliance *Phyllostachys aurea* Shrubland Alliance (A.2010)

Alliance (English name) Golden Bamboo Shrubland Alliance

Association *Phyllostachys aurea* Shrubland

Association (English name) Golden Bamboo Shrubland

Association (Common name) Golden Bamboo Shrubland

Ecological System(s):

ELEMENT CONCEPT

Global Summary: Uplands dominated by *Phyllostachys aurea*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: Disturbed lands where *Phyllostachys aurea* was introduced.

Global Environment: Disturbed lands, often near creeks and other mesic areas.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: A monoculture of *Phyllostachys aurea*.

Global Vegetation: Usually a monoculture of *Phyllostachys aurea* with no light or resources reaching the understory.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
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Tall shrub/sapling	<i>Phyllostachys aurea</i>	
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CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (invasive) (3-Oct-2001). This shrubland represents vegetation dominated by an invasive exotic and thus does not receive a conservation. status rank.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments: This community probably exists in the park in at least one old homesite location.

Global Comments:

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: May exist in the park around an old homesite.

Global Range: This vegetation is possible throughout the southeastern United States.

Nations: US

States/Provinces: AL?, AR?, FL, GA, LA?, MS?, NC?, SC, TN, TX, VA?

USFS Ecoregions: 231Ae:CCC, 231F:CP, 232B:CC, 232E:CP, 255D:PP

Federal Lands: NPS (Cowpens, Kings Mountain?, Ninety Six)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: R. White

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

*III.B.2.N.a. Temperate cold-deciduous shrubland**Rubus (argutus, trivialis)* Shrubland AllianceBlackberry - Greenbrier Successional Shrubland Thicket*Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia)* Shrubland**(Southern Blackberry, Southern Dewberry) - (Whiteleaf Greenbrier, Common Greenbrier) Shrubland****Identifier: CEGL004732****NVC Classification**

Physiognomic Class Shrubland (III)

Physiognomic Subclass Deciduous shrubland (III.B.)

Physiognomic Group Cold-deciduous shrubland (III.B.2.)

Physiognomic Subgroup Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)

Formation Temperate cold-deciduous shrubland (III.B.2.N.a.)

Alliance *Rubus (argutus, trivialis)* Shrubland Alliance (A.908)

Alliance (English name) (Southern Blackberry, Southern Dewberry) Shrubland Alliance

Association *Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia)* Shrubland

Association (English name) (Southern Blackberry, Southern Dewberry) - (Whiteleaf Greenbrier, Common Greenbrier) Shrubland

Association (Common name) Blackberry - Greenbrier Successional Shrubland Thicket

Ecological System(s):**ELEMENT CONCEPT**

Global Summary: Stands of this successional community develop following disturbance (complete forest canopy removal). These stands are dominated by greenbrier species (*Smilax glauca*, *Smilax rotundifolia*) and blackberries/dewberries (*Rubus argutus*, *Rubus trivialis*). Many examples include a great variety of tree saplings and other woody species (*Quercus* spp., *Liquidambar styraciflua*, *Acer rubrum*, *Diospyros virginiana*, *Juniperus virginiana* var. *virginiana*, *Rhus copallinum*), herbs (*Solidago* spp., Asteraceae spp., *Helianthus* spp., *Hypericum* spp., *Potentilla simplex*), and grasses (*Andropogon* spp., *Dichanthelium* spp., *Panicum* spp., *Schizachyrium scoparium*, *Lolium* spp., and *Sorghastrum nutans*). Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have *Lonicera japonica* as a codominant vine overtopping much of the blackberry and greenbrier.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: This community exists in old field areas that have not been mowed in several years and in powerline rights-of-way within the park that are mowed or brush-hogged on a consistent schedule but not every year.

Global Environment: This community can exist in both lowlands and uplands that have been cleared but have not been further disturbed by continued mowing or plowing for 3-5 years.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Stands of this association within the park vary quite a lot in composition. Some examples in old fields are relatively lacking in diversity, mainly composed of *Rubus* spp. and *Smilax* spp. However, some examples along rights-of-way have become refugia for species that need openings to survive and that can no longer survive in the forests of Kings Mountain NMP due to the lack of canopy openings that were traditionally maintained by fire. In one powerline right-of-way, this community consists of

the traditional species such as *Rubus trivialis*, *Rubus argutus*, and *Vaccinium* spp. but also contained species more commonly thought of as prairie or woodland species such as *Pedicularis canadensis*, *Phlox amoena*, *Manfreda virginica*, *Symphyotrichum georgianum* (= *Aster georgianus*), *Silphium compositum*, *Thermopsis mollis*, *Hypoxis hirsuta*, and *Aletris farinosa*. These plants exist nowhere else in the park currently, but were most likely an important component of the woodland and savanna vegetation of the park prior to fire suppression. Although this community is a human-created community, within the park it is an important refugia of species and a potential seedbank for restoration of the ecological communities that existed in the park over 200 years ago.

Global Vegetation: Stands of this association are dominated by greenbrier species (*Smilax glauca*, *Smilax rotundifolia*) and blackberries/dewberries (*Rubus argutus*, *Rubus trivialis*). They also contain a great variety of tree saplings and other woody species (e.g., *Quercus* spp., *Liquidambar styraciflua*, *Acer rubrum*, *Rhus copallinum*). Some herbs in central Tennessee examples may include *Solidago* spp., Asteraceae spp., *Helianthus* spp., *Hypericum* spp., *Potentilla simplex*; grasses may include *Andropogon* spp., *Dichanthelium* spp., *Panicum* spp., *Schizachyrium scoparium*, *Lolium* spp., and *Sorghastrum nutans*. Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have *Lonicera japonica* as a codominant vine overtopping much of the blackberry and greenbrier.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Rubus argutus</i> , <i>Rubus trivialis</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park: *Aletris farinosa*, *Hypoxis hirsuta*, *Manfreda virginica*, *Pedicularis canadensis*, *Phlox amoena*, *Silphium compositum*, *Symphyotrichum georgianum*, *Thermopsis mollis*

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (1-Oct-2001). This type represents ruderal successional vegetation dominated by species native to North America. GRank changed from GW to GD to reflect this composition.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: In sandy parts of the southeastern U.S. Coastal Plain (e.g., Fort Benning, Georgia) the common blackberry is *Rubus cuneifolius*, and it does not form monocultural stands worthy of recognition as a vegetation type. At Arnold Air Force Base, Coffee and Franklin counties, Tennessee, this community is often found in powerline corridors and other areas that have experienced total canopy removal.

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community exists throughout the park in any old field that has not been mowed or otherwise disturbed for 3-10 years, and along maintained powerline rights-of-way.

Global Range: This ruderal successional vegetation could be found throughout the upper southern United States.

Nations: US

States/Provinces: AL?, GA, MS?, NC, SC, TN

USFS Ecoregions: 222Eb:CCC, 222Ed:CCC, 231Aa:CCC, 231Ae:CCC

Federal Lands: DOD (Arnold); NPS (Blue Ridge Parkway, Cowpens, Cumberland Gap, Kings Mountain, Mammoth Cave, Ninety Six, Stones River); USFS (Talladega?, Tuskegee?)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.20.

Local Description Authors: R. White

Global Description Authors: M.J. Russo, mod. R. White

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Southeastern Ecology Working Group n.d., TNC 1998a

III.B.2.N.g. Saturated cold-deciduous shrubland
Alnus serrulata Saturated Shrubland Alliance
Saturated Alder Thicket

***Alnus serrulata* Saturated Southern Shrubland**
Smooth Alder Saturated Southern Shrubland
Identifier: CEGL003912

NVC Classification

Physiognomic Class Shrubland (III)
 Physiognomic Subclass Deciduous shrubland (III.B.)
 Physiognomic Group Cold-deciduous shrubland (III.B.2.)
 Physiognomic Subgroup Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
 Formation Saturated cold-deciduous shrubland (III.B.2.N.g.)
 Alliance *Alnus serrulata* Saturated Shrubland Alliance (A.1014)
 Alliance (English name) Smooth Alder Saturated Shrubland Alliance
 Association *Alnus serrulata* Saturated Southern Shrubland
 Association (English name) Smooth Alder Saturated Southern Shrubland
 Association (Common name) Saturated Alder Thicket

Ecological System(s): East Gulf Coastal Plain Small Stream and River Floodplain Forest (CES203.559)

East Gulf Coastal Plain Northern Depression Pondshore (CES203.558)

Western Highland Rim Seepage Fen (CES202.346)

ELEMENT CONCEPT

Global Summary: This broadly defined type represents saturated vegetation dominated by *Alnus serrulata* from several coastal and interior ecoregions of the southeastern United States. It may be subdivided as more information becomes available. Saturated vegetation dominated by *Alnus serrulata* at Fort Benning, Georgia (East Gulf Coastal Plain - Upper East Gulf Coastal Plain transition region), on the upper ends of beaver ponds, is placed here, at least until another specific association is developed if necessary. These are shrub-dominated inclusions in a *Nyssa biflora* saturated forest.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Kings Mountain National Military Park Environment: This community is documented only from one location in the park, a saturated area beneath a powerline right-of-way. It is not likely to occur in the rest of the heavily wooded park.

Global Environment: At Fort Benning, Georgia (East Gulf Coastal Plain - Upper East Gulf Coastal Plain transition region), saturated vegetation dominated by *Alnus serrulata* is found on the upper ends of beaver ponds. These are shrub-dominated inclusions in a *Nyssa biflora* saturated forest.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: This community is dominated by *Alnus serrulata* with a series of small openings dominated by *Osmunda cinnamomea* and other herbs associated with saturated soil in the Piedmont.

Global Vegetation: This association accommodates saturated stands of *Alnus serrulata* in a variety of ecoregions and environmental situations. Additional types may be developed if necessary as more information becomes available.

MOST ABUNDANT SPECIES**Kings Mountain National Military Park**

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Shrub/sapling (tall & short)	Broad-leaved deciduous tree	<i>Alnus serrulata</i>

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Shrub/sapling (tall & short)	Broad-leaved deciduous tree	<i>Alnus serrulata</i>

CHARACTERISTIC SPECIES**Kings Mountain National Military Park: *Alnus serrulata*****Global:****OTHER NOTEWORTHY SPECIES****Kings Mountain National Military Park:****Global:****CONSERVATION STATUS RANK**

Global Rank & Reasons: G4 (15-Oct-2002).

CLASSIFICATION

Status: Standard

Classification Confidence:**Kings Mountain National Military Park Comments:**

Global Comments: In the Western Highland Rim of Tennessee, small-scale saturated areas dominated by *Alnus serrulata* may form at the margins of seepage areas otherwise dominated by herbaceous plants, classified as ~*Carex lurida* - *Carex leptalea* - *Parnassia grandifolia* - *Juncus brachycephalus* - (*Xyris tennesseensis*) Herbaceous Vegetation (CEGL004161)\$. This alliance may cover some of the larger, open acid seeps in Arkansas Interior Highlands and Gulf Coastal Plain (D. Zollner pers. comm.). Saturated vegetation dominated by *Alnus serrulata* at Fort Benning, Georgia (East Gulf Coastal Plain - Upper East Gulf Coastal Plain transition region), on the upper ends of beaver ponds which are inclusions in a *Nyssa biflora* saturated forest apparently belong here, at least until a specific association is developed if necessary.

Global Similar Associations:

- (*Carex interior*, *Carex lurida*) - *Carex leptalea* - *Parnassia grandifolia* - *Rhynchospora capillacea* Herbaceous Vegetation (CEGL002404)

Global Related Concepts:

- IIC1e. Interior Basin Shrub Swamps (Allard 1990) ?
- IIE1a. Southern Appalachian Bog Complex (Allard 1990) B

OTHER COMMENTS**Other Comments:****ELEMENT DISTRIBUTION**

Kings Mountain National Military Park Range: This community is restricted to saturated areas under powerline rights-of-way within the park.

Global Range: This association occurs in several coastal and interior ecoregions of the southeastern United States.

Nations: US

States/Provinces: AL, GA, KY, NC, SC, TN, WV?

USFS Ecoregions: 221Hb:CCC, 221He:CCC, 222E:CC, 231A:C?, 231Bc:CCC, M221Cd:CCP, M222:?

Federal Lands: DOD (Fort Benning); NPS (Blue Ridge Parkway?, Cumberland Gap, Kings Mountain); USFS (Daniel Boone, Talladega)

ELEMENT SOURCES**Kings Mountain National Military Park Inventory Notes:**

Kings Mountain National Military Park Plots: KIMO.20.

Local Description Authors: R. White

Global Description Authors:

References: Allard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Zollner pers. comm.

V. Herbaceous Vegetation

V.A.5.N.c. Medium-tall sod temperate or subpolar grassland

Andropogon virginicus Herbaceous Alliance

Successional Broomsedge Vegetation

***Andropogon virginicus* var. *virginicus* Herbaceous Vegetation**

Common Broomsedge Herbaceous Vegetation

Identifier: C EGL004044

NVC Classification

Physiognomic Class Herbaceous Vegetation (V)

Physiognomic Subclass Perennial graminoid vegetation (V.A.)

Physiognomic Group Temperate or subpolar grassland (V.A.5.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)

Formation Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)

Alliance *Andropogon virginicus* Herbaceous Alliance (A.1208)

Alliance (English name) Common Broomsedge Herbaceous Alliance

Association *Andropogon virginicus* var. *virginicus* Herbaceous Vegetation

Association (English name) Common Broomsedge Herbaceous Vegetation

Association (Common name) Successional Broomsedge Vegetation

Ecological System(s): East Gulf Coastal Plain Jackson Prairie and Woodland
(CES203.555)

Texas-Louisiana Coastal Prairie (CES203.550)

ELEMENT CONCEPT

Global Summary: This association includes herbaceous-dominated vegetation that has been anthropogenically altered and/or maintained, especially on old fields, and pastures. Examples support predominately native species, one of the most dominant or characteristic species being *Andropogon virginicus* var. *virginicus*. This is a very common and wide-ranging association and can be quite variable in terms of species composition. Additional components are other perennial grasses and herbaceous species, most with pioneer or weedy tendencies, the exact composition of which will vary with geography, management history, and habitat.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Kings Mountain National Military Park Environment: This community is mostly limited to powerline rights-of-way within the park.

Global Environment: This vegetation typically occurs on old fields, pastures, and rocky sites. It will persist indefinitely under a regular mowing regime, e.g., in powerline corridors.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Vegetation varies depending upon the moisture regime but is dominated by *Andropogon virginicus* and other native grasses and herbaceous species.

Global Vegetation: Stands of this community are dominated by *Andropogon virginicus* var. *virginicus*. Associated species vary with geography and habitat and include typical pioneer species. Other species with high cover values in plot samples attributed to this type include *Tridens flavus*, *Setaria parviflora* (= *Setaria geniculata*), *Eragrostis spectabilis*, and *Panicum anceps* (NatureServe Ecology unpubl. data). On the eastern Highland Rim of Tennessee (Arnold

Air Force Base), associated species include *Andropogon virginicus*, *Diodia teres*, *Aristida dichotoma*, *Aristida oligantha*, *Packera anonyma* (= *Senecio anonymus*), *Paspalum laeve*, *Lespedeza virginica*, and *Plantago virginica*. *Rubus argutus* and *Smilax* spp. may be locally abundant but are not dominant. In clearcuts, *Schizachyrium scoparium*, *Danthonia spicata*, and *Dichantheium* spp. are also common, as are occasional *Quercus* spp. and *Rubus argutus*.

MOST ABUNDANT SPECIES

Kings Mountain National Military Park

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (8-Aug-2000). This is a ruderal community and represents vegetation resulting from succession following anthropogenic disturbance of an area. It is not a conservation priority for its own sake and does not receive a conservation rank.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Kings Mountain National Military Park Comments:

Global Comments:

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: This community is limited to power line right of ways that are regularly mowed.

Global Range: This community is possibly found throughout the southeastern United States.

Nations: US

States/Provinces: AL, AR, GA, IL, IN, KY, LA, MO?, MS, NC, OK, SC, TN, TX, VA

USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 231Aa:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:C??, M221Bd:C??, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon); NPS (Cowpens, Fort Donelson, Kings Mountain, Little River Canyon?, Mammoth Cave, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: KIMO.20.

Local Description Authors: R. White

Global Description Authors: A.S. Weakley

References: Fleming and Coulling 2001, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Penfound 1953, Southeastern Ecology Working Group n.d., TNC 1998a, Tarr et al. 1980

Lolium (arundinaceum, pratense) Herbaceous AllianceCultivated Meadow***Lolium (arundinaceum, pratense)* Herbaceous Vegetation****(Tall Fescue, Meadow Fescue) Herbaceous Vegetation****Identifier: CEGL004048****NVC Classification**

Physiognomic Class Herbaceous Vegetation (V)

Physiognomic Subclass Perennial graminoid vegetation (V.A.)

Physiognomic Group Temperate or subpolar grassland (V.A.5.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)

Formation Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)

Alliance *Lolium (arundinaceum, pratense)* Herbaceous Alliance (A.1213)

Alliance (English name) (Tall Fescue, Meadow Fescue) Herbaceous Alliance

Association *Lolium (arundinaceum, pratense)* Herbaceous Vegetation

Association (English name) (Tall Fescue, Meadow Fescue) Herbaceous Vegetation

Association (Common name) Cultivated Meadow

Ecological System(s): Exotic-dominated Community (CES203.287)**ELEMENT CONCEPT**

Global Summary: This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained. The dominant species in this type are the European "tall or meadow fescues" of uncertain and controversial generic placement. These communities are sometimes nearly monospecific but can also be very diverse and contain many native species of grasses, sedges, and forbs. This vegetation is currently defined for the southern Appalachians, Ozarks, Ouachita Mountains, and parts of the Piedmont and Interior Low Plateau, but it is possible throughout much of the eastern United States and southern Canada.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Kings Mountain National Military Park Environment: This community occurs as an old field on many sites with a regular mowing regime.

Global Environment: This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained.

VEGETATION DESCRIPTION

Kings Mountain National Military Park Vegetation: Vegetation is dominated by European exotic grasses such as *Lolium* spp. Occasionally examples may be diverse and contain a larger component of native species.

Global Vegetation: The dominant species in this alliance are the European 'tall or meadow fescues,' of uncertain and controversial generic placement. Although traditionally treated as *Festuca pratensis* (= *Festuca elatior*) and *Festuca arundinacea*, these two closely related species are now usually treated as either *Lolium pratense* and *Lolium arundinaceum* (Kartesz 1999), or as *Schedonorus pratensis* and *Schedonorus arundinaceus*. These communities are sometimes nearly monospecific but can also be very diverse and contain many native species of grasses, sedges, and forbs. In the Black Belt region of Alabama and Mississippi, it is commonly found in mixture with *Paspalum dilatatum* (dallisgrass) (Bransby n.d.). The exotics *Lespedeza cuneata* and *Bromus tectorum* may be present in stands.

MOST ABUNDANT SPECIES**Kings Mountain National Military Park**

Stratum **Lifeform** **Species**

Global
Stratum

Lifeform

Species

CHARACTERISTIC SPECIES

Kings Mountain National Military Park:

Global:

OTHER NOTEWORTHY SPECIES

Kings Mountain National Military Park:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (invasive) (5-Jan-2000). This vegetation is dominated by an exotic species, is of anthropogenic origin, and is thus not a conservation priority.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Kings Mountain National Military Park Comments:

Global Comments: *Lolium pratense* and *Lolium arundinaceum* are two closely related species which were traditionally treated as *Festuca pratensis* (= *Festuca elatior*) and *Festuca arundinacea*, and could alternately be treated as *Schedonorus pratensis* and *Schedonorus arundinaceus*. Conversion to Kartesz (1999) standard has necessitated the shift of this to the *Lolium* names from *Festuca*.

Global Similar Associations:

- *Dactylis glomerata* - *Rumex acetosella* Herbaceous Vegetation (CEGL006107)

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Kings Mountain National Military Park Range: Throughout the park in areas that are mowed or otherwise maintained in an early-successional state (fields, monument areas, and some roadsides).

Global Range: This association is possible throughout much of the eastern United States and southern Canada.

Nations: CA?, US

States/Provinces: AL, AR, GA, KY, MO, MS, NB?, NC, NS?, OK, QC?, SC, TN, VA, WV

USFS Ecoregions: 221:C, 222E:CC, 231Ae:CCC, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC, M231A:CC

Federal Lands: NPS (Blue Ridge Parkway, Buffalo, Carl Sandburg Home, Cowpens, Cumberland Gap, Great Smoky Mountains, Guilford Courthouse, Kings Mountain, Mammoth Cave, Ninety Six, Shiloh, Stones River); USFS (Cherokee, Ouachita, Ozark)

ELEMENT SOURCES

Kings Mountain National Military Park Inventory Notes:

Kings Mountain National Military Park Plots: None.

Local Description Authors: R. White

Global Description Authors: A.S. Weakley

References: Bransby n.d., Heath et al. 1973, Hoagland 2000, Kartesz 1999, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

Appendix III. Photos of selected plots of Kings Mountain National Military Park.



Plot 1 at Kings Mountain National Military Park.



Plot 4 at Kings Mountain National Military Park



Plot 7 at Kings Mountain National Military Park.



Georgia aster (*Symphyotrichum georgianum*) in power line right of way.



Plot 10 at Kings Mountain NMP.



Plot 13 at Kings Mountain NMP.



Plot 16 at Kings Mountain NMP.



Plot 17 at Kings Mountain NMP.



Plot 18 at Kings Mountain National Military Park.



Plot 20 at Kings Mountain National Military Park.

Appendix IV. Key to EcoGroups and Ecological Communities of Kings Mountain National Military Park.

This key was developed for Kings Mountain National Military Park and is intended to allow field workers and naturalists to quickly identify community types while in the field. Due to the small size of the park and the limited habitat types available within the park boundary, this key does not cover all of the ecosystems of the adjacent region. However, within the boundary, we believe this key represents the range of variation of existing vegetation.

The document is structured like a dichotomous key. The user must make a series of choices based on the structure, composition, and environment of the vegetation to arrive at the correct association. If the key leads to a choice that is not reasonable, consider returning to the beginning of the key and reviewing your decisions to confirm that you are confident in all your choices. It may be useful to walk around the area in question to get a feel for the composition of the area. This exercise may help you arrive at the correct place in the key since small-scale variations within a matrix community may be misleading. In addition, ecotones between ecological communities may have traits of both communities and so may need to be classified as both communities.

Where appropriate, the name of the NatureServe Ecological Group (EcoGroup) appears in [brackets]. The EcoGroup is a broader concept than the association level, so similar communities may fall out in one ecogroup. The full association name and code (e.g. CEGL002591) appears alongside an underlined title of the type. The CEGL code may be used to refer back to the document or to look association names and information up in other references that use the National Vegetation Classification. The “common name” of the community also appears with the scientific name of the association.

[ALL CAPS AND BRACKETS] signifies an ecological system

Bold faced words signify an NVC ecological community type

Italics signify a community type that hasn't been documented with a plot, but that we suspect is in the park based on past studies.

Key to Ecological Communities of Kings Mountain National Military Park

1a. Wetland Vegetation: Wetland habitats such as flatlands adjacent to creeks inundated during local flooding events. These “floodplains” may only be inundated once a year and may have little to no herbaceous cover. There is often little to distinguish them from uplands besides topography (flat) and species composition (usually sweetgum, tuliptree, and red maple are good canopy indicators, although white oak can often be a co-dominant)

2a. Forested wetland (canopy cover >20%)

3a.: Older forest (canopy trees at least 70 years old and uneven aged)

4a. Forest dominated by tuliptree and/or sweetgum, but little red maple (<25%). Usually near perennial streams on narrow to wide floodplains.

[SOUTHERN PIEDMONT SMALL FLOODPLAIN AND RIPARIAN]

5a. Forest canopy is <25% pine species. Canopy is dominated by either sweetgum, tuliptree, red maple, or a combination of all three. Distinguished from CEGL007330 by a higher diversity of herbaceous plants and an older uneven aged tree canopy.

Herbaceous cover often over 50% and often containing large cover of ferns.

Piedmont Small Stream Sweetgum Forest (CEGL004418)

5b. Forest canopy contains at least 25% pine, usually loblolly pine. Otherwise, canopy is similar to CEGL004418. Canopy often dominated by invasive exotics or sparse and low diversity relative to other bottomland types. This community is generally limited to the widest floodplains in the park (at least 30 meters wide).

Loblolly Pine – Tuliptree Successional Bottomland Forest (CEGL007546)

4b. Streamhead seepages that are often dry but show evidence of past water (streamcut or sphagnum moss). Dominated by red maple with co-dominants including tuliptree, sweetgum, and white oak comprising up to 50% of canopy. This community often grades into small stream communities such as CEGL004418 or CEGL007546).

[PIEDMONT SEEPAGE WETLAND]

Piedmont Low-Elevation Headwater Seepage Swamp (CEGL004426)

3b. Successional forested wetland (heavily disturbed by either logging or plowing less than 70 years ago). Indicators include sweetgum, tuliptree, loblolly pine, black walnut, etc.). Oaks may be present but are overtopped by larger pines and successional hardwoods and are less than 50% of total canopy.

[HUMAN MODIFIED/SUCCESSIONAL]

6a. Canopy dominated by hardwoods (<25% pine)

7a. Canopy not dominated by red maple.

8a. Canopy dominated or co-dominated by black walnut, usually with an herbaceous/shrub layer of wingstem (*Verbesina* spp.) and/or coralberry. Usually found on old homesites, especially wet areas that were heavily fertilized by livestock.

Successional Black Walnut Forest (CEGL007879)

8b. Canopy dominated by sweetgum. Distinguished from CEGL004418 by its relatively low herbaceous diversity and even aged young stand of sweetgum.

Successional Sweetgum Floodplain Forest (CEGL007330)

7b. Streamhead seepages that are often dry but show evidence of past water (streamcut or sphagnum moss). Dominated by red maple with co-dominants including tuliptree, sweetgum, and white oak comprising up to 50% of canopy. This community often grades into small stream communities such as CEGL004418 or CEGL007546 or CEGL007330)

Piedmont Low-Elevation Headwater Seepage Swamp (CEGL004426)

- 6b. Canopy with a large percentage of loblolly pine in canopy (>25% cover of pine)
Loblolly Pine – Tuliptree Successional Bottomland Forest (CEGL007546)

2b. Shrub dominated wetland (forest canopy <20% over shrubs)

[HUMAN MODIFIED/SUCCESSIONAL]

9a. Shrubland dominated by the exotic golden bamboo (*Phyllostachys aurea*). Usually found around old homesites where it may have been planted by farmers and spread from plantings.

Golden Bamboo Shrubland (CEGL008560)

9b. Shrubland dominated by the native shrub alder (*Alnus serrulata*) and found mainly where streams enter manmade ponds and other semipermanently inundated sites.

Saturated Alder Thicket (CEGL003912)

1b. Terrestrial Vegetation: Upland habitats not inundated by flood waters

10a. Vegetation dominated by herbaceous vegetation or shrubs, but not trees (<40% cover of trees)

[HUMAN MODIFIED/SUCCESSIONAL]

11a. Successional shrubland dominated by blackberry and/or greenbrier.

Blackberry-Greenbrier Successional Shrubland Thicket (CEGL004732)

11b. Successional herbaceous vegetation

12a. Herbaceous vegetation dominated by exotic species, especially fescue (*Lolium* spp.). Heavily disturbed (plowed/mowed) within the past decade.

Cultivated meadow (CEGL004048)

12b. Vegetation dominated by native herbaceous species, especially broomsedge, asters, etc.

Broomsedge Old Field (CEGL004044)

10b. Forests and woodlands (>40% cover of trees)

13a. Successional forests and woodlands resulting from recent disturbance (plowing/ stand initiating clearcut); stand usually a young to medium aged forest with few trees more than 70 years old and very even aged.; sites are former fields, pastures, clearcuts, burned or eroded areas. Indicators include pine species, redcedar, tuliptree, sweetgum, and red maple.

[SEMI-NATURAL WOODED UPLAND]

14a. Evergreen/mixed canopy (canopy at least 40% evergreen)

15a. Canopy dominated by red cedar (>50% of canopy)

Red-Cedar Successional Forest (CEGL007124)

15b. Canopy dominated by at least 50% pine.

16a. Canopy dominated by loblolly pine or a combination of loblolly pine and sweetgum.

**Successional Loblolly Pine – Sweetgum Forest
(CEGL008462)**

16b. Canopy dominated by Virginia pine or shortleaf pine.

17a. Canopy dominated by shortleaf pine

**Shortleaf Pine Early Successional Forest
(CEGL006327)**

17b. Canopy dominated by Virginia pine

Virginia Pine Successional Forest (CEGL002591)

14b Hardwood dominated canopy (at least 60% of canopy)

18a. Canopy dominated by black walnut. Sometimes this may have very low canopy coverage, approaching that of a woodland.

Successional Black Walnut Forest (CEGL007879)

18b. Canopy not dominated by black walnut.

19a. Dominant stratum dominated by tuliptree with oaks and maples often in understory.

**Successional Tuliptree – Hardwood Forest
(CEGL007221)**

19b. Sweetgums dominate the dominant stratum.

Successional Sweetgum Forest (CEGL007216)

13b Mature, relatively undisturbed vegetation (at least 70 years since plowing or other severe human-induced disturbance). Canopy usually uneven aged and with fewer signs of recent human disturbance. Indicators include oak and hickory species greater than 50 years old.

20a. Site on well protected lower slope within 100 meters of perennial stream.

[SOUTHERN PIEDMONT MESIC FOREST]

21a. Mesic slope dominated by northern red oak with mesic species such as umbrella magnolia and sometimes beech.

Piedmont Mesic Basic Oak-Hickory Forest (CEGL003949)

21b. Protected but with shallow soils, so somewhat dry. Any combination of chestnut oak, scarlet oak, or white oak may dominate. Usually contains no northern red oak or umbrella magnolia. Understory almost 100% mountain laurel.

Piedmont Chestnut Oak - Heath Bluff (CEGL004415)

20b. Site not a well protected lower slope. Dry-mesic to xeric forests and woodlands.

22a. Canopy containing at least 25% pine.

**[SOUTHERN APPALACHIAN LOW MOUNTAIN PINE
FOREST]**

23a. Canopy consists of at least 50% Virginia pine

**Appalachian Low-Elevation Mixed Pine / Hillside
Blueberry Forest (CEGL007119)**

23b. Canopy consists of at least 25% shortleaf pine and at least 25% oak species.

24a. Forested (canopy and understory cover >60%)

25a. Dry-mesic oak species (especially white oak) present and accounting for at least 25% of canopy. Very little if any mountain laurel present.

**Appalachian Shortleaf Pine – Mesic Oak
Forest (CEGL008427)**

25b. Oak species associated with dry /xeric forests (southern red oak and scarlet oak and chestnut oak) account for at least 25% of canopy. Mountain laurel usually >25% of shrub layer.

**Southern Blue Ridge Escarpment
Shortleaf Pine – Oak Forest
(CEGL007493)**

24b. Xeric/dry-mesic ridgetop or ridgecrest woodland with post oak and shortleaf pine (canopy/understory cover <60%)

**Appalachian Shortleaf Pine-Post Oak Woodland
(CEGL003765)**

22b. Oak and/or hickory spp. dominate the canopy (<25% pine in canopy)

[SOUTHERN PIEDMONT DRY OAK – (PINE) FOREST]

26a. Chestnut oak or blackjack or scarlet oak dominated forest (>75% chestnut and/or scarlet oak in canopy).

Usually exposed upper slopes or ridgetops, but one type found in more protected situations.

27a. Forest

28a. Xeric ridgetop/upper slope forest with ericaceous understory (at least 20% cover of blueberry or mountain laurel).

**Xeric Ridgetop Chestnut Oak Forest
(CEGL008431)**

28b. Ridgetop and upper slope forest without ericaceous understory. Usually dominated instead by muscadine or very sparse. Very shallow soil. (<20% cover of blueberry or mountain laurel)

Felsic Monadnock Forest (CEGL006281)

27b. Woodland (<60% canopy cover) with some blackjack oak in tall shrub layer/understory and often with chestnut oak overtopping the blackjack oak.

Piedmont Rock Chestnut Oak – Blackjack Oak Woodland (CEGL003708)

26b. Dry-mesic to mesic forests of uplands and gentle to moderate slopes but not ridgetops – usually not dominated by chestnut oak, scarlet oak, or blackjack oak. More often, dominated by white oak, black oak, and/or southern red oak.

29a. Less than 40% of canopy covered by white oak. Usually southern red oak, black oak, and white oak, with some scarlet and chestnut oak, but usually less than 25% cover. Key indicator – southern red oak
Southern Red Oak – White Oak Forest (CEGL007244)

29b. More than 40% of canopy covered by white oak. Other associated species include black oak, northern red oak, and only occasionally scarlet oak. Key indicator is white oak.
Piedmont Dry-Mesic Oak-Hickory Forest (CEGL008475)