VASCULAR PLANT INVENTORY AND ECOLOGICAL COMMUNITY CLASSIFICATION FOR LITTLE RIVER CANYON NATIONAL PRESERVE

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.natureserveexplorer.org.

Cover photo: Little River Falls. Photo by Rickie White.

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Vascular Plant Inventory and Plant Community Classification for Little River Canyon National Preserve

Table of Contents

List of Figures

List of Tables

List of Appendices

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 Little River Canyon National Preserve in three ways:

1) Ecologists from NatureServe, together with the Alabama Natural Heritage Program, established 47 permanently marked one-hectare circular plots within the park using a random stratified sampling procedure. The permanently marked plots are available to be used by researchers on studies ranging from bird point counts to individual plant monitoring. Additional plant association data was also collected in the form of 49 "Quick Plots" (non-permanent) to help clarify vegetation classification issues for photo-interpreters and document small patch plant associations.

2) Ecologists collected data on all unique vegetation communities within the park and identified 18 natural and 9 human-modified or successional vegetation associations (unique ecological assemblages of plants) within the park boundary. Other ecological communities may occur within the park, but we are confident that we have documented at least 90% of the communities from our field work. Several additional small patch associations native to the Southern Appalachians are also believed to present in the park and descriptions of these are provided for in the subset of plant communities for the park. The most globally rare community in the park appears to be the Southern Appalachian Low Mountain Seepage Bog. This wetland bog habitat warrants special attention due to its high global rank/rarity (G1) and abundance of globally rare and state ranked rare species. Other highly ranked communities include the Piedmont Beech / Heath Bluff, Alabama Cumberland Sandstone Glade, Southern Ridge and Valley Basic Mesic Hardwood Forest, and the Bushy St. John's-wort - Smooth Alder / Eastern Gammagrass Shrubland.

3) Ecologists collected and vouchered 17 specimens, all of which were new to the park. These species were added to an existing list that included vouchers from projects done by earlier researchers. We now count 994 documented species, varieties, or subspecies of vascular plants in the park (950 species). We estimate that at least 90% of the vascular flora of the park is now documented. Currently, 38 taxa monitored by the Alabama Natural Heritage Program as rare in the state have been documented, representing approximately 4% of the park's flora. Additionally, 95 exotic (non-native) taxa have been documented, representing approximately 10% of the park's flora.

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. National Park Service units are currently compiling the information needed to begin to assess the current state of natural resources at specific parks. A few 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 August 2002, NatureServe began work on the vascular plant inventory portion of the project at Little River Canyon National Preserve.

Little River Canyon National Preserve contains significant natural resources and offers a variety of recreational opportunities, including sightseeing, hiking, rock climbing, whitewater kayaking, fishing, camping, bird watching, and wildflower identification. After assessing the past and current state of research in the park, we began to work on accomplishing three primary objectives:

1) Establish a minimum of 40 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 new species of vascular plants found in plots (or anywhere on the park property) that have not already been documented by previous researchers.

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, Geology, and Soils

Little River Canyon is considered to be one of the deepest gorges east of the Rocky Mountains, and has long been recognized as the most extensive canyon system within the Cumberland Plateau. Having been referred to as the Grand Canyon of the South, the natural beauty of the area has become a premier tourist destination throughout the Southeast. Apart from its scenic qualities Little River is well renowned for its exceptional biodiversity, an attribute that is greatly influenced by a unique combination of geologies, soils, and climate. The Appalachian Plateau and Ridge and Valley physiographic provinces are represented within the preserve boundary, each defined by a distinct mix of topography, soil, and geology. The majority of the study area is underlain by Pottsville sandstone and Pottsville conglomerate, a formation complex that constitutes a significant proportion of Lookout Mountain on which Little River lies. Smaller inclusions of other substrates, namely carboniferous and ferruginous shales, are visible within some portions of the canyon. Limestone, while not presently reported from Little River, may be also evident, occurring as isolated examples within the southern portion of the park. Soils of the

park are primarily represented by the Hartsells Series, a geologically uniform series having originated as residuum from weathered sandstone. Deeper accumulations generally occupy gentle slopes above the canyon and terraces along the river, with shallower soils predominating along the canyon rim and steep side slopes.

Climate

Little River Canyon National Preserve is located in a mountainous region of northeast Alabama situated approximately 350 miles inland from the Gulf of Mexico. The park is far enough inland to be spared from destructive tropical hurricanes, yet close enough that the Gulf has a pronounced influence on the climate. Although summers are long and hot, they are not generally excessively hot. On a typical mid-summer day, the temperature will be nearly 70 degrees at daybreak, approach 90 degrees at mid-day, and level off in the low 90s during the afternoon. January is normally the coldest month but there is not much difference from mid-December to mid-February. Overall, winters are relatively mild. Even in cold spells it is unusual for the temperature to remain below freezing the entire day. Snowfall is erratic, sometimes experiencing several year spans with no measurable snowfall. Occasionally, 2 to 4 inches may accumulate during a snowstorm. The park is blessed with abundant rainfall, being fairly well distributed throughout the year. However, the winter season (January – March) and July produces twice the precipitation as October, the driest month. Summer precipitation is almost entirely from scattered afternoon and early evening thunderstorms. In a normal year, the last 32 degree minimum temperature in the spring is late March and the first in autumn is generally early November.

Land History

The composition and distribution patterns of ecological communities within the Little River watershed have been significantly altered by the influence of humanity. Prior to the arrival of European immigrants, the Native Americans, like humans everywhere, had shaped and modified the land to suit their purposes. Approximately 1,000 AD the Mississippian cultures began to develop, and by employing simple but effective stone tools and controlled burning, introduced agriculture into the region. The resulting patchwork of garden plots, abandoned fields, and woodlands had, in turn, increased habitat diversity for wildlife, thus adding to the variety and quantity of game available. Far from a virgin and primeval wilderness as many believed, the Little River landscape and much of eastern North America was an already transformed environment upon the arrival of the first Europeans. With the arrival of the nineteenth century came the total occupation of the region by European colonists. It was an era of forest clearing, and any virgin stand which survived that century was logged or farmed or both in the next. Prior to the last century, if a farm became depleted it was customary for the owners to move elsewhere. Logging and agriculture methods were abusive to the soil and it was the expectation of a homesteader arriving on new land that he could eventually exhaust the soil and have to move elsewhere. Today, the effects of human occupation upon the natural vegetation of the region are readily apparent. To accommodate the progress of humanity, forests are continually cleared and wetlands are drained, a series of events that has forever altered the landscape.

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 observed vascular plants that were not already documented on the existing species list for Little River Canyon National Preserve.

Permanent plot establishment

In order to set up a random stratified sample 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 (primarily a digital elevation model, hydrology layer, and geology map) supplied by the National Park Service's Cumberland/Piedmont Network to develop stratification classes. She manipulated the GIS layers supplied to us with the program ArcView (ArcView 1992) and chose to split the park into a northern and southern half with Highway 35 as the boundary to ensure that distribution of plots was even between the very narrow, steep southern half of the park and the wider, relatively less steep northern half. 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, we used environmental layers such as the digital elevation model, hydrology, and geology to place plots so that they represented each of the unique environmental units of the park but were also randomized. In this way, we were able to represent all potential environmental conditions.

Once we had developed the stratified sampling points using ArcView and recorded all of the GPS coordinates for use onsite, we (together with the Alabama Natural Heritage Program) established 47 permanent plots during the field seasons of 2002-2004 and collected appropriate vegetation and environmental data to classify plant associations. 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 iron 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.

Another source of plant classification data resulted from "quick plots" which were used largely in conjunction for work with photo-interpreters from the University of Georgia who were producing a vegetation map of the park. For areas in which the interpreters could not determine an appropriate USNVC type, NatureServe ecologists collected enough data (including GPS coordinates) to classify these associations. These plots are more properly termed "observation points" and did not involve permanent monuments or tags. These outings with photointerpreters also provided opportunities for field testing and correcting the vegetation keys to the plant association types. Occasionally, quick plots were used to record plant communities that were discovered during field work that had not been previously documented. Forty-nine quick plots

were collected during the course of this study to either answer classification questions or record undocumented plant associations (these plots were also entered into the PLOTS database).

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 hectare in which to place our standardized vegetation monitoring plot. 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. In addition, we searched for and identified any species within the full hectare that were not represented in the 20 by 50-meter sample. 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 NatureServe's 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 region and also 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 collecting 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 17 new species of vascular plants that had not been previously confirmed from the park, bringing the total number of species vouchered and documented for the park to 994 (Table 2). We created 17 voucher specimens (table 3) from the plants we collected and photographed and added those species to the list of those already collected and/or documented by previous researchers.

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 a total of 950 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 (using data from all 47 full, permanent plots only) were 752 using the first-order jackknife method, and 847 using 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 78.8, the beta value was 7.2, and the gamma value was 569.

Using the information gathered in each plot, we discerned 27 distinct vegetation associations within 10 distinct ecological systems (Table 6) as defined by the United States National Vegetation Classification (NatureServe 2005), and another 2 communities that are likely in the park but that weren't found in our search effort. However, only 18 of the communities identified during this effort 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 (* = human modified/successional; *italics* = not documented in park, but probably present):

*Virginia Pine Successional Forest
*Loblolly Pine – Shortleaf Pine Managed Woodland
*Chinese Privet Upland Shrubland
Rocky Bar and Shore (Alder – Yellowroot Type)
Southern Appalachian Low Mountain Seepage Bog
*Successional Broomsedge Vegetation
Southern Cumberland High-Energy River Oak Terrace Forest
Water-willow Rocky Bar and Shore
Cumberland Plateau Rockhouse
Piedmont Beech / Heath Bluff
Alabama Cumberland Sandstone Glade
*Shortleaf Pine Early-Successional Forest
Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest
*Successional Silktree Forest
Southern Red Oak – White Oak Mixed Oak Forest
Southeastern Interior Southern Red Oak – Post Oak Forest
*Successional Sweetgum Floodplain Forest
Upland Sweetgum – Red Maple Pone
Cumberland Forested Acidic Seep

Southern Blue Ridge Escarpment Shortleaf Pine – Oak Forest
Appalachian Shortleaf Pine – Xeric Oak Forest
*Loblolly Pine – Tuliptree Successional Bottomland Forest
Appalachian Shortleaf Pine – Mesic Oak Forest
Cumberland-Southern Ridge and Valley Mesic White Oak Forest
Cumberland Plateau Dry-Mesic White Oak Forest
Xeric Ridgetop Chestnut Oak Forest
*Mid- to Late-Successional Loblolly Pine – Sweetgum Forest
Southern Ridge and Valley Basic Mesic Hardwood Forest
Bushy St. John's-wort – Smooth Alder / Eastern Gammagrass Shrubland

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 fundamental understanding of vegetation to classify community types within the park quickly and easily based on vegetation composition. It is also a vital part of the process of conducting an assessment of the accuracy of vegetation mapping for the park.

Discussion/Conclusions

Species Inventory

The field work from this project added 17 new specimens to the documented plants at the park and brought the total list of species documented in the park to 994. 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 752 to 847. Excluding varieties, subspecies, and unidentifiable collections, researchers past and present have confirmed 950 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). Using all of the full plot data, according to the jackknife estimates we have documented at least 90% of the species in the park. The species area curve numbers we generated 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. Based on our own knowledge of the park and our belief that we have substantially supplemented previous research efforts, we feel that at least 90% of the vascular flora of the park is documented. 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).

Vegetation community analysis

The 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 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 "system" or broad ecological unit 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. A brief, non-technical description of the prominent Little River Canyon Preserve associations follows:

Virginia Pine Successional Forest
Identifier: CEGL002591
This association is restricted to the summit and upper slopes of Lookout Mountain along either side of Little River Canyon, originating on exposed mineral soil where the vegetation was cleared as a result of natural (fire, ice damage) and/or anthropogenic disturbances. This natural community is an early-successional forest, gradually succeeding into a climax forest comprised primarily of oak, hickory, and (shortleaf) pine. Examples are primarily comprised of young successional *Pinus virginiana*, accented by a suite of early-successional hardwood species, including *Liquidambar styraciflua, Liriodendron tulipifera, Nyssa sylvatica, Prunus serotina*,

and *Acer rubrum*. The shrub layer is typically sparse but is occasionally comprised of small pockets of dense vegetation, particularly in canopy openings. Herbs and vines are sparse.

Loblolly Pine – Shortleaf Pine Managed Woodland

Identifier: CEGL003618

Stands are characterized by partially open (40-50% cover) canopies comprised of *Pinus taeda, Pinus virginiana, Pinus echinata*, and a lesser abundance of oaks and other hardwoods. Shrubs are widely scattered and are represented by some of the following: *Vaccinium arboreum, Vaccinium elliottii, Sassafras albidum, Cornus florida, Callicarpa americana,* and a minimal incursion of the exotic *Ligustrum sinense*. Herbs are plentiful and diverse, with the majority of taxa appearing to be comprised of the grass (Poaceae), legume (Fabaceae), and aster (Asteraceae) families. The more characteristic and noteworthy herbaceous species documented are *Sorghastrum nutans, Schizachyrium scoparium, Danthonia sericea, Desmodium marilandicum, Tephrosia spicata, Chrysopsis mariana, Silphium asteriscus, Euphorbia corollata,* and various exotics, most notably *Microstegium vimineum, Lolium pratense, Lespedeza cuneata*, and *Lonicera japonica*.

Chinese Privet Upland Shrubland

Identifier: CEGL003807

This shrubland is characterized by dense, nearly monospecific stands of *Ligustrum sinense*, sporadically occurring in alluvial soils along Little River

Rocky Bar and Shore (Alder – Yellowroot Type)

Identifier: CEGL003895

This community occurs as a narrow zone (≤2 m width) along the margin of Little River and also partially extends upstream along some of the larger tributaries. Because of scouring, vegetation is typically stunted, dense, and somewhat contorted. *Alnus serrulata* and *Xanthorhiza simplicissima* are generally common, but *Kalmia latifolia, Rhododendron arborescens, Vaccinium elliottii, Cornus amomum*, and *Ilex verticillata* are also abundant and often assume localized dominance. Owing to the frequency and abrasive force of flooding, trees and tall shrubs are sparse, consisting of no more than 15% of the total cover. Herbs are relatively scarce, attaining their greatest development in openings.

Southern Appalachian Low Mountain Seepage Bog

Identifier: CEGL003914

Occupying gently sloping seepage areas on and near the summit of Lookout Mountain, examples are densely vegetated, often by a nearly impenetrable mixture of trees, shrubs, and vines. Herbaceous openings are frequent, however, containing a broad suite of species not commonly encountered elsewhere in the region. While *Sarracenia oreophila* has come to symbolize the identity and significance of this association, an array of other herbs are as equally indicative, including *Osmunda cinnamomea, Woodwardia areolata, Carex glaucescens, Arundinaria gigantea ssp. gigantea, Platanthera ciliaris, Cleistes bifaria, Bartonia virginica, Gentiana saponaria, Lobelia nuttallii,* and *Sphagnum* spp. Characteristic woody species include *Acer rubrum, Alnus serrulata, Nyssa sylvatica, Lyonia ligustrina, Rhododendron arborescens, Vaccinium corymbosum, Photinia pyrifolia,* and *Viburnum nudum var. cassinoides*.

Successional Broomsedge Vegetation
Identifier: CEGL004044
This association is represented by a dense stand of *Andropogon virginicus var. virginicus* accented by a sparse occurrence of *Packera anonyma, Lolium arundinaceum (= Festuca arundinacea), Conyza canadensis, Phytolacca americana, Valerianella radiata, Plantago aristata, Mimosa microphylla*, and several other species beginning to invade from adjoining forested areas. Woody vegetation, while generally scarce, is exemplified by a good diversity of species, specifically opportunistic and invasive taxa such as *Quercus stellata, Lonicera japonica, Rhus copallinum, Ailanthus altissima*, and *Juniperus virginiana var. virginiana*, among others. Examples within the preserve occupy utility corridors and old fields.

Southern Cumberland High-Energy River Oak Terrace Forest
Identifier: CEGL004098
Oaks, most notably *Quercus alba, Quercus coccinea, Quercus falcata, Quercus velutina*, and *Quercus stellata*, predominate the canopy layers along with an equal abundance of upland and bottomland species, including *Liriodendron tulipifera, Acer rubrum, Liquidambar styraciflua,* and *Oxydendrum arboreum,* among others. Shrub density varies among sites, but the most constant taxa include *Alnus serrulata, Acer leucoderme, Hamamelis virginiana, Calycanthus floridus, Ilex opaca, Kalmia latifolia,* and *Rhododendron arborescens*. The herbaceous component is generally sparse, but can develop dense patches dominated by various graminoids and ferns. This association occupies riverine terraces along Little River, where annual flooding occurs in response to seasonal precipitation.

Water-willow Rocky Bar and Shore
Identifier: CEGL004286
This association is frequently distributed in shoals and gravelly sands along Little River. While *Justicia americana* is prominent, this association is distinguished by a suite of other aquatic and semi-aquatic herbs, including *Orontium aquaticum, Podostemum ceratophyllum*, and the globally imperiled *Ptilimnium nodosum* and *Sagittaria secundifolia*.

Cumberland Plateau Rockhouse
Identifier: CEGL004301
This association is essentially confined to vertical sandstone cliffs typically just below the canyon rim. Because of harsh growing conditions, the vegetation is often very sparse, covering approximately 20% of the rock surface. Vascular vegetation is restricted to rock shelves and crevices where soil accumulation is sufficient to sustain a low diversity of shrubs and herbs. *Kalmia latifolia, Heuchera parviflora var. parviflora, Mitchella repens*, and *Dichanthelium dichotomum* serve as principal species, while *Vaccinium pallidum, Hydrangea cinerea, Parthenocissus quinquefolia, Porteranthus trifoliatus*, and *Carex virescens* generally occurs in lesser abundance. Nonvascular plants attain their greatest development in crevices and along the undersides of ledges where favorable moisture conditions allow several species to flourish.

Piedmont Beech / Heath Bluff
Identifier: CEGL004539
This association is represented as small, widely distributed occurrences that occupy shallow and rocky, sandstone-based soils of steep upper slopes, often occurring just below the canyon rim. Some examples also inhabit steep-sided streambanks. The vegetation is characterized by having a dense, nearly impenetrable shrub stratum shaded by an open canopy of pine and various hardwoods, most notably *Pinus virginiana, Pinus echinata, Quercus prinus, Quercus alba, Quercus coccinea,* and *Fagus grandifolia,* among others. The shrub component is dominated by *Kalmia latifolia* and, to a slightly lesser degree, *Rhododendron catawbiense*, often in accompaniment with a suite of secondary species. Because of dense shade, herbs are sparse and of low diversity.

Alabama Cumberland Sandstone Glade
Identifier: CEGL004622
This community is characteristic of shallow soils associated with sandstone outcrops along Little River Canyon and, to a lesser extent, elsewhere in the preserve. Examples contain a high diversity of graminoids and forbs, most notably *Andropogon ternarius, Schizachyrium scoparium, Danthonia sericea, Bulbostylis capillaris, Diamorpha smallii, Hypericum gentianoides, Croton willdenowii, Minuartia glabra, Trichostema dichotomum, Opuntia humifusa*, and *Nuttallanthus canadensis*. Typically, a scattering of small trees and shrubs, including *Pinus virginiana, Quercus marilandica, Kalmia latifolia,* and *Vaccinium arboreum* inhabit crevices and shallow depressions that have accumulated a sufficient layer of soil. Several regional endemics and rare species are restricted to this community are found in the preserve, including *Allium speculae, Coreopsis pulchra, Cuscuta harperi, Diervilla rivularis, Helianthus longifolius, Schoenolirion wrightii*, and *Phemeranthus mengesii*.

Shortleaf Pine Early-Successional Forest
Identifier: CEGL006327
This association is characterized as an early-successional forest dominated by *Pinus echinata*. Various oaks, most notably *Quercus stellata* and *Quercus marilandica*, are also present suggesting a gradual transition to a hardwood-dominated climax stage. The understory is generally open and contains smaller examples of the foregoing canopy species, as well as *Pinus taeda, Vaccinium arboreum*, and an occasional *Carya* sp. The herb layer is relatively sparse, with *Schizachyrium scoparium, Polygala* sp., *Solidago* sp., *Allium* sp., and various bryophytes serving as principal species. The presence of this association at the preserve is an artifact of either natural or human-derived disturbance. Owing to vegetation succession, a mixed pine (namely *Pinus echinata*) - hardwood forest will ultimately be attained.

Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest
Identifier: CEGL007119
This association in Little River Canyon National Preserve is restricted to well-drained shallow soils along the canyon rim and on upper slopes and ridgetops elsewhere in the preserve. Examples are relatively consistent and represented by a prominence of *Pinus virginiana* in the canopy and various deciduous species in the subcanopy and shrub layers. As the community matures, specifically in areas where fire has been excluded, a greater incidence of hardwoods will become apparent in the canopy, most notably *Quercus prinus, Quercus falcata, Carya alba*,

and *Nyssa sylvatica*. The shrub component is relatively dense, containing smaller examples of the foregoing deciduous species, in addition to a suite of common shrubs characteristic of the region. Herbs are generally sparse but assume some abundance in canopy gaps and shallow soils associated with sandstone outcrops.

Successional Silktree Forest
Identifier: CEGL007192
One example is currently known from the preserve, having become established in cleared areas as a result of anthropogenic disturbance. The vegetation is characterized by a prominence of *Albizia julibrissin*, with *Pinus virginiana* occurring as a minor component.

Southern Red Oak – White Oak Mixed Oak Forest
Identifier: CEGL007244
This community frequently occurs throughout the preserve, preferring well-drained soils along upper slopes and ridgetops. This hardwood-dominated association likely represents the principal climax forest on the preserve, consistently comprised of various oaks and hickories. While *Quercus* is the principal group, two species of *Carya* (*Carya alba* and, to a lesser extent, *Carya glabra*) are also commonly present, occasionally attaining some dominance in the canopy. The shrub component is generally well-developed, attaining its greatest presence in canopy openings and along drainage courses, and nearly always includes *Kalmia latifolia, Rhododendron canescens, Vaccinium arboreum,* and *Vaccinium pallidum,* among others. The herbaceous stratum is open and consistently includes *Pteridium aquilinum, Chasmanthium sessiliflorum, Dioscorea villosa, Chimaphila maculata, Coreopsis major*, and *Solidago odora*. Typical vines are *Toxicodendron radicans, Vitis rotundifolia,* and *Smilax* spp.

Southeastern Interior Southern Red Oak – Post Oak Forest
Identifier: CEGL007247
This is a closed-canopy forest essentially confined to the summit of Lookout Mountain, usually in close proximity to the canyon rim. Examples are dominated by *Quercus falcata, Quercus rubra, Fagus grandifolia*, and *Liriodendron tulipifera*. Characteristic subcanopy species include *Ulmus rubra, Morus rubra*, and *Sassafras albidum*, as well as smaller individuals of the foregoing canopy species. The shrub layer is generally sparse (less than 35% cover) containing immature examples of taxa found in the overstory, in addition to various species of small trees and shrubs. Principal herbs include *Polystichum acrostichoides, Carex digitalis, Podophyllum peltatum,* and *Phlox divaricata*.

Successional Sweetgum Floodplain Forest
Identifier: CEGL007330
This deciduous forest occurs on terraces along Little River and is consistently dominated by *Liquidambar styraciflua* and *Liriodendron tulipifera*, which are frequently accompanied by a suite of secondary species typical of bottomlands in the region. In addition to the above-mentioned taxa, the canopy also contains *Quercus alba* and *Pinus taeda*. Subcanopy species include the canopy components highlighted above, as well as *Acer rubrum* and, to a lesser degree, *Nyssa sylvatica*. Shrubs and vines, which are generally patchy in distribution, are represented by *Rhododendron canescens, Vaccinium corymbosum, Cornus florida,* and *Vitis*

rotundifolia, among several specimens of the foregoing canopy species. A rich and diverse herbaceous component is readily apparent throughout most of the growing season, often presenting a colorful display of wildflowers.

Upland Sweetgum – Red Maple Pond
Identifier: CEGL007388
This association occupies small depressions on the summit of Lookout Mountain that are characterized by an open to closed canopy of *Liquidambar styraciflua, Nyssa sylvatica*, and *Acer rubrum*. The shrub, vine, and herb layers are sparse and are usually best developed on tree trunks and stumps and along peripheral areas adjacent to the shoreline.

Cumberland Forested Acidic Seep
Identifier: CEGL007443
This closed-canopy hardwood forest occupies seepage areas at or near the upper end of drainage courses that originate on the summit of Lookout Mountain. The canopy cover is closed, with *Acer rubrum* var. *trilobum* and *Nyssa sylvatica* serving as principal species. The shrub layer is generally well-developed, containing several species but dominated by *Acer rubrum* var. *trilobum, Alnus serrulata, Liquidambar styraciflua,* and *Rhododendron canescens*. Herb cover varies but may be as high as 85-90%. The bryoid layer is usually patchy but well-represented, with *Sphagnum* spp. assuming the greatest dominance.

Southern Blue Ridge Escarpment Shortleaf Pine – Oak Forest
Identifier: CEGL007493
This mixed pine-hardwood forest is characterized by a prominence of moderately tall, somewhat contorted individuals of *Pinus echinata, Quercus falcata*, and *Quercus prinus* accented, in slightly lesser abundance, by *Quercus stellata* and *Carya alba*. The shrub and herbaceous layers are relatively sparse, with small stems of the foregoing overstory species in addition to *Quercus marilandica, Vaccinium arboreum, Vaccinium pallidum*, and various herbs such as *Pteridium aquilinum, Schizachyrium scoparium,* and *Hieracium venosum* serving as typical associates. Principal vines include *Vitis rotundifolia, Toxicodendron radicans*, and *Smilax* spp., which often sprawl along the ground. This association occurs from the upper slope to the rim of the canyon, as well as gentle slopes and ridges, primarily in the northern portion of the park, north of State Route 35.

Appalachian Shortleaf Pine – Xeric Oak Forest
Identifier: CEGL007500
This association occupies gentle ridges and sideslopes on the summit of Lookout Mountain, and is typically characterized as a closed-canopy pine-deciduous forest dominated by *Pinus echinata, Quercus prinus, Quercus stellata*, and *Quercus alba*. The subcanopy is commonly represented by *Oxydendrum arboreum, Cornus florida*, and *Nyssa sylvatica*, as well as several species of the foregoing canopy cover. The shrub component is relatively diverse but generally open, with *Corylus cornuta, Rhododendron canescens, Lyonia ligustrina, Vaccinium arboreum, Vaccinium pallidum*, and *Diospyros virginiana* appearing most typical. Several species of herbs, although sparse, are well-represented, including *Pteridium aquilinum, Coreopsis major, Solidago odora,* and *Tephrosia virginiana.* Characteristic vines include *Vitis rotundifolia* and *Smilax* spp.

Loblolly Pine – Tuliptree Successional Bottomland Forest
Identifier: CEGL007546
This association occupies terraced alluvial flats along Little River and are recognized as closed-canopy forests dominated by *Pinus taeda, Liriodendron tulipifera*, and *Quercus alba*. While occurrences are small, vegetation is diverse, containing a suite of early-successional species that will be gradually replaced with more shade-tolerant taxa as stands mature. Characteristic taxa of the shrub, vine, and herb layers include, but are not limited to, *Acer leucoderme, Acer rubrum, Lindera benzoin, Rhododendron canescens, Calycanthus floridus, Alnus serrulata, Vaccinium corymbosum, Toxicodendron radicans, Vitis rotundifolia, Thelypteris noveboracensis, Chasmanthium latifolium, Elymus virginicus, Iris cristata, Lobelia cardinalis, Elephantopus carolinianus, Verbesina occidentalis*, and *Sphagnum* spp. The exotic *Ligustrum sinense* is also present but sparse.

Appalachian Shortleaf Pine – Mesic Oak Forest
Identifier: CEGL008427
This association represents a dense-canopied forest containing *Pinus echinata* and *Quercus alba*, as well as *Quercus falcata* and, less commonly, *Quercus coccinea, Quercus prinus*, and *Quercus rubra*. A similar suite of species also characterizes the subcanopy, which is often associated with additional taxa having a tolerance of shade, including *Acer rubrum, Cornus florida*, and *Oxydendrum arboreum*. The shrub component assumes a patchy distribution in which *Rhododendron canescens, Vaccinium arboreum, Vaccinium pallidum,* and *Sassafras albidum* serve as some of the principal species. Woody vines include *Toxicodendron radicans, Vitis rotundifolia*, and *Smilax glauca*, all of which frequently function as ground cover. The herb layer is relatively sparse. This is a low- to mid-elevation community that occupies a broad range of gradients on Lookout Mountain.

Cumberland-Southern Ridge and Valley Mesic White Oak Forest
Identifier: CEGL008428
This closed-canopy forest is commonly codominated by *Quercus alba, Quercus rubra*, and *Liriodendron tulipifera*, with lesser amounts of *Quercus prinus, Quercus velutina, Carya alba, Acer rubrum*, and *Pinus taeda*. The subcanopy is fairly open, containing smaller examples of the foregoing canopy species, as well as *Acer leucoderme*, *Ostrya virginiana, Diospyros virginiana, Prunus serotina,* and *Oxydendrum arboreum,* among others. Shrubs are plentiful, with *Kalmia latifolia* as the most abundant species. The herb layer is generally sparse, but occasionally assumes some abundance, particularly in canopy gaps. Vines are frequent and are primarily represented by *Vitis rotundifolia* and *Parthenocissus quinquefolia*. This association is primarily restricted to riparian zones along small streams.

Cumberland Plateau Dry-Mesic White Oak Forest
Identifier: CEGL008430
This community is relatively widespread in the preserve, occupying a broad spectrum of elevations and topographic variants, but chiefly on middle to upper slopes. Examples are represented by a prominence of hardwoods and a rich diversity of shrubs, vines, and herbs. The canopy is characterized by a codominance of tall, straight *Quercus alba* and *Quercus prinus*.

While of secondary importance, *Carya glabra* and *Quercus rubra* are also well-established in the canopy, occasionally attaining localized dominance. The subcanopy contains a greater floral diversity than the canopy layer, with no apparent species assuming a principal status, with characteristic species including *Oxydendrum arboreum, Nyssa sylvatica*, and *Cornus florida*. The diversity and density of the shrub stratum is highly variable, typically occurring as a mosaic of dense thickets and open, sparsely vegetated areas. The herbaceous component is generally sparse.

Xeric Ridgetop Chestnut Oak Forest

Identifier: CEGL008431

This association is characterized as a closed-canopy deciduous forest dominated by *Quercus prinus* with an admixture of *Quercus coccinea, Quercus alba, Quercus velutina*, and *Carya alba*. The subcanopy is commonly represented by *Oxydendrum arboreum, Acer rubrum, Cornus florida*, and *Quercus stellata*, as well as several species of the foregoing canopy cover. Although seldom absent from either strata, *Quercus marilandica, Fagus grandifolia*, and *Sassafras albidum* are occasional and often widely distributed. The shrub component is relatively diverse but generally open, containing *Rhododendron canescens, Kalmia latifolia,* and *Vaccinium arboreum,* among others. Several species of herbs, though sparse, are well-represented, with no particular taxon appearing prominent. Characteristic vines include *Vitis rotundifolia* and *Smilax* spp. This community is confined to the summit and upper slopes of Lookout Mountain, being well represented throughout the preserve.

Mid- to Late-Successional Loblolly Pine – Sweetgum Forest

Identifier: CEGL008462

On-site examples follow similar patterns in age structure, floral composition, and the ability to occupy a broad spectrum of edaphic conditions, as elsewhere within the range of this association. *Pinus taeda* and, to a slightly lesser degree, *Liquidambar styraciflua* are the principal canopy and subcanopy species. Other taxa found in these strata include *Pinus virginiana, Carya alba, Nyssa sylvatica, Acer rubrum*, and various *Quercus* spp. The shrub component is generally diverse, assuming a highly variable level of density based on stand maturity; whence diversity and abundance of shrubs decrease as the stand matures. Herb diversity is also heterogeneous, with younger stands often containing a greater floral richness than older, more mature stands. This association is the result of former anthropogenic disturbance, and will gradually succeed into an oak-hickory-pine-dominated forest.

Southern Ridge and Valley Basic Mesic Hardwood Forest

Identifier: CEGL008488

This association is distinguished by a codominance of *Quercus rubra, Tilia americana var. heterophylla*, and *Fagus grandifolia* in the canopy. These species are complimented with slightly lesser amounts of *Acer saccharum, Carya ovata, Fraxinus americana, Liriodendron tulipifera, Betula lenta*, and where stands begin to blend with more acidic soil types, *Quercus prinus* and *Quercus velutina*. The subcanopy and shrub strata are relatively diverse, with *Acer leucoderme, Cercis canadensis, Cladrastis kentukea,* and *Morus rubra* serving as representative species. The herbaceous component is rich and diverse containing one of the highest concentrations of forbs and graminoids found in the preserve. Some of the more noteworthy species include *Asplenium*

rhizophyllum, Hybanthus concolor, Phacelia bipinnatifida, Panax quinquefolius, and *Cypripedium parviflorum var. pubescens*.

Bushy St. John's-wort – Smooth Alder / Eastern Gammagrass Shrubland
Identifier: CEGL008495
This association intermittently extends as a 1- to 3-m densely vegetated zone along the margin of Little River where frequent scouring from high water levels limits the establishment of large trees and shrubs. Floristically, ericads, primarily *Kalmia latifolia, Rhododendron arborescens, Rhododendron catawbiense, Vaccinium arboreum*, and *Vaccinium elliottii*, serve as the principal vegetation component, with all species combined constituting nearly 65% of the total cover. Other common and characteristic shrubs are *Viburnum dentatum, Cephalanthus occidentalis*, and *Cornus amomum*. *Hypericum densiflorum*, although present, is typically rare. Trees that survive the scouring action of Little River are generally stunted and contorted, bearing testimony to the ecological importance and abrasive force of flooding. Typical trees include *Oxydendrum arboreum, Nyssa sylvatica, Betula nigra, Acer rubrum, Liriodendron tulipifera*, and *Liquidambar styraciflua*. Herbaceous species also serve to distinguish this association, most of which are widely scattered. Typical herbs include *Tripsacum dactyloides, Boehmeria cylindrica, Angelica venenosa, Trautvetteria caroliniensis, Galax urceolata, Scutellaria lateriflora,* and *Marshallia trinervia*.

***Note: The following successional communities are included on the Little River vegetation community map (Jordan and Madden 2008), but were not sampled during this portion of the project and thus are not included in the vegetation classification:**

Early to Mid-Successional Loblolly Pine Forest (CEGL006011)
Wisteria Vineland (CEGL008568)
Cultivated Meadow (CEGL004048)

Ecological Community Summary and Management Considerations

As a result of this project, botanists and ecologists have identified 29 ecological community types within Little River Canyon National Preserve. The culmination of data illuminates a striking diversity of vegetation assemblages, ranging from sandstone glades and dry pine-hardwood forests in the uplands to floodplain forests and rocky shoals in the bottomlands. From a casual observation, various mixtures pine and hardwoods are the most notable features of the landscape, accenting the numerous outcrops in the region. The majority of the park contains older second and third growth forests, with the oldest timber occurring in the more remote sections of the canyon. While many of the communities in the park are considered globally secure, four are of noteworthy importance in terms of conservation significance. From a global perspective the rarest community type in the park is the Southern Appalachian Low Mountain Seepage Bog, a narrowly distributed wetland association currently reserving a rank of G1 according to the NatureServe global ranking system.

The long-term integrity of the preserve's vegetation resources will be dependent on active management by park service personnel. Discussions and general recommendations pertinent to vegetation management issues in the preserve are highlighted below:

1.) Monitoring and treatment of exotic plant infestations, and preventing the incursion of new occurrences, should remain an important component of land management throughout the preserve. Education of land managers about problems associated with exotic pests coupled with the use of native species indigenous to the region for improving wildlife habitat may be beneficial in this effort. Invasive exotic species have demonstrably caused irreparable damage to various natural communities throughout the Southeast. Chinese privet (*Ligustrum sinense*), Japaanese honeysuckle (*Lonicera japonica*), mimosa (*Albizia julibrissin*), and Japanese stiltgrass (*Microstegium vimineum*) are four invasive plant species that have become well established in several locations in LIRI. The widespread dispersal of the above-mentioned and other exotic species have been primarily attributed to highway maintenance and construction, horticultural purposes, and the enhancement of wildlife habitat. Many invasive exotic species are sold in nurseries, despite their known destructive impacts on native vegetation. Several websites are available that offer guidance to land managers and homeowners regarding the control of specific exotic and weedy species. Many provide images, management plan templates, weed control methods, tool reviews, technical support, and other sources pertinent to invasive species control. Consultation of the four websites presented below is recommended for additional information.

Southeast Exotic Pest Plant Council (http://se-eppc.org): A non-profit organization dedicated to promoting public awareness about the spread of exotic plants and to serve as an outlet for educational, advisory, and technical support on all aspects of exotic plants in the Southeast. The website also provides information on grant opportunities, publications, upcoming events, and links to other webpages devoted to invasive species.

The Nature Conservancy (http://tncinvasives.ucdavis.edu): A conservation organization that has recently launched a new initiative, the Global Invasive Species Team, whose mission is to abate the damage caused by human-facilitated introductions of non-native invasive species. The website provides resources designed to help all conservationists and land managers to deal most effectively with invasive species.

Invasive and Exotic Species of North America (http://www.invasive.org/species/weeds.cfm): A compilation of invasive species prepared by various federal agencies that offers a listing of invasive plants documented from each of the 13 southeastern states.

National Invasive Species Council (http://www.invasivespecies.gov): A website that focuses on federal efforts concerning invasive species. The site offers information outlining the impacts of invasive species and the Federal government's response, as well as furnishes profiles of exotic species and links to agencies and organizations dealing with invasive species issues.

2. Several community types within the Little River landscape are fire-maintained. Without fire, these pyrogenic associations will gradually assume a greater presence of woody vegetation to the detriment of both species and habitat diversity. Although the historic ratio of fire-maintained hardwoods (e.g., some oaks and hickories) to pine

(namely shortleaf) is poorly known, the restoration and maintenance of Little River's fire-adopted communities depends on the application of prescribed fires that mimic natural fire frequencies and timing. The Southern Appalachian Low Mountain Seepage Bog, home to the federally listed green pitcher-plant (*Sarracenia oreophila*), is a good example of a highly fire-driven plant community in the preserve.

In addition to fire, mechanical removal and herbicide application are two other methods of midstory vegetation control that can be employed. Neither is recommended for use in high quality community types, but both are beneficial for some restoration purposes. Two reasons are often given for mechanical tree removal in restoration and maintenance of fire-maintained communities. The first is removal of hardwoods that have encroached due to long-term fire suppression. The second reason is partial thinning of the canopy to enhance the growth and reproduction of the herbaceous layer, or to create a more natural distribution of canopy trees. However, caution is advised when incorporating mechanical tree removal, as the technique can impart undesirable side effects in areas containing an intact native, herbaceous groundcover. The equipment used in mechanical tree removal churns and compacts the soil, damaging groundcover species necessary for carrying fire, and promoting the germination of undesirable species that compete for light and nutrients with more desirable species.

Herbicide application is generally not recommended as a management tool within high quality natural communities, unless it is the only feasible alternative for combating exotic species. Various chemicals are available to kill hardwood and exotic species that have encroached into fire-maintained areas because of fire suppression.

The relative effects of mechanical removal and herbicide on natural community restoration needs to be better understood. For example, it is unknown what impacts are imposed on plant-mycorrhiza relationships through herbicide application or how such chemicals affect water quality. Until the effects of mechanical tree removal and herbicides are better understood, these techniques should not be employed in high quality natural communities.

3. Continue to protect high quality examples of all natural communities within the preserve. Although many natural communities in the preserve are globally common, the preserve protects some of the best quality examples of these plant associations in the immediate vicinity.

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Figure 1. Overview Map of Little River Canyon National Preserve with all permanent points marked at their actual locations.

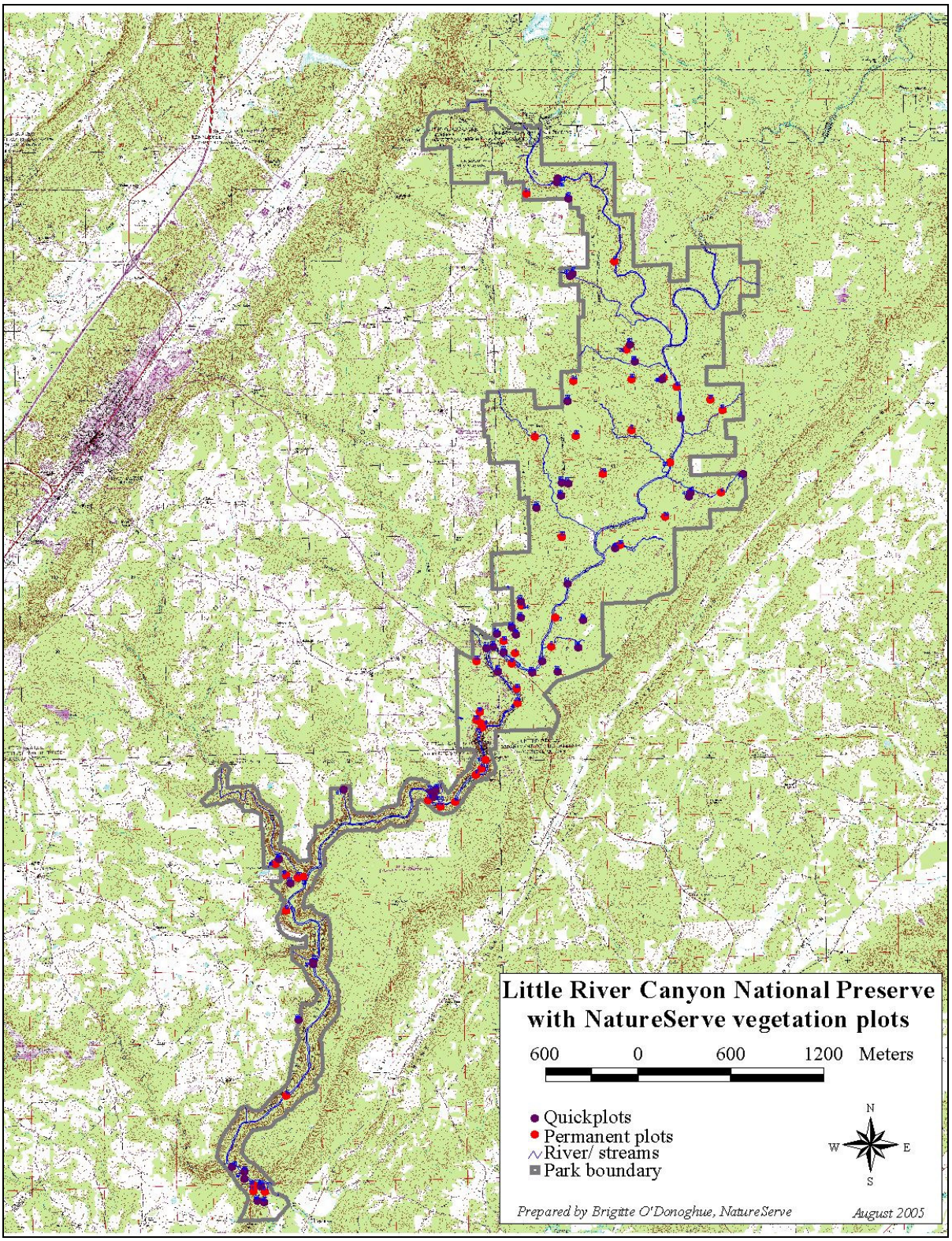


Figure 2. Map of southern part of Little River Canyon National Preserve with all permanent points marked at their actual locations.

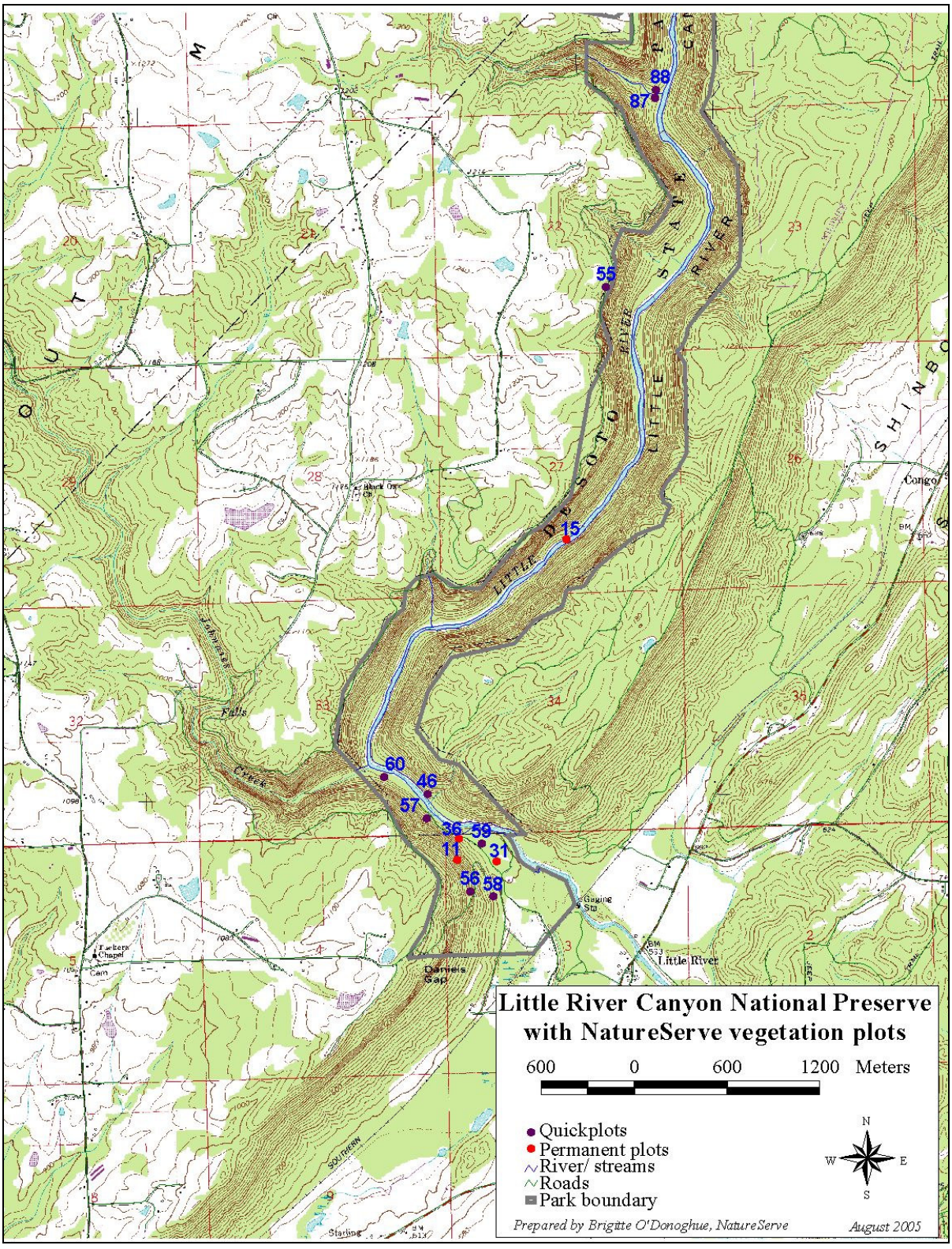


Figure 3. Map of south central part of Little River Canyon National Preserve with all permanent points marked at their actual locations.

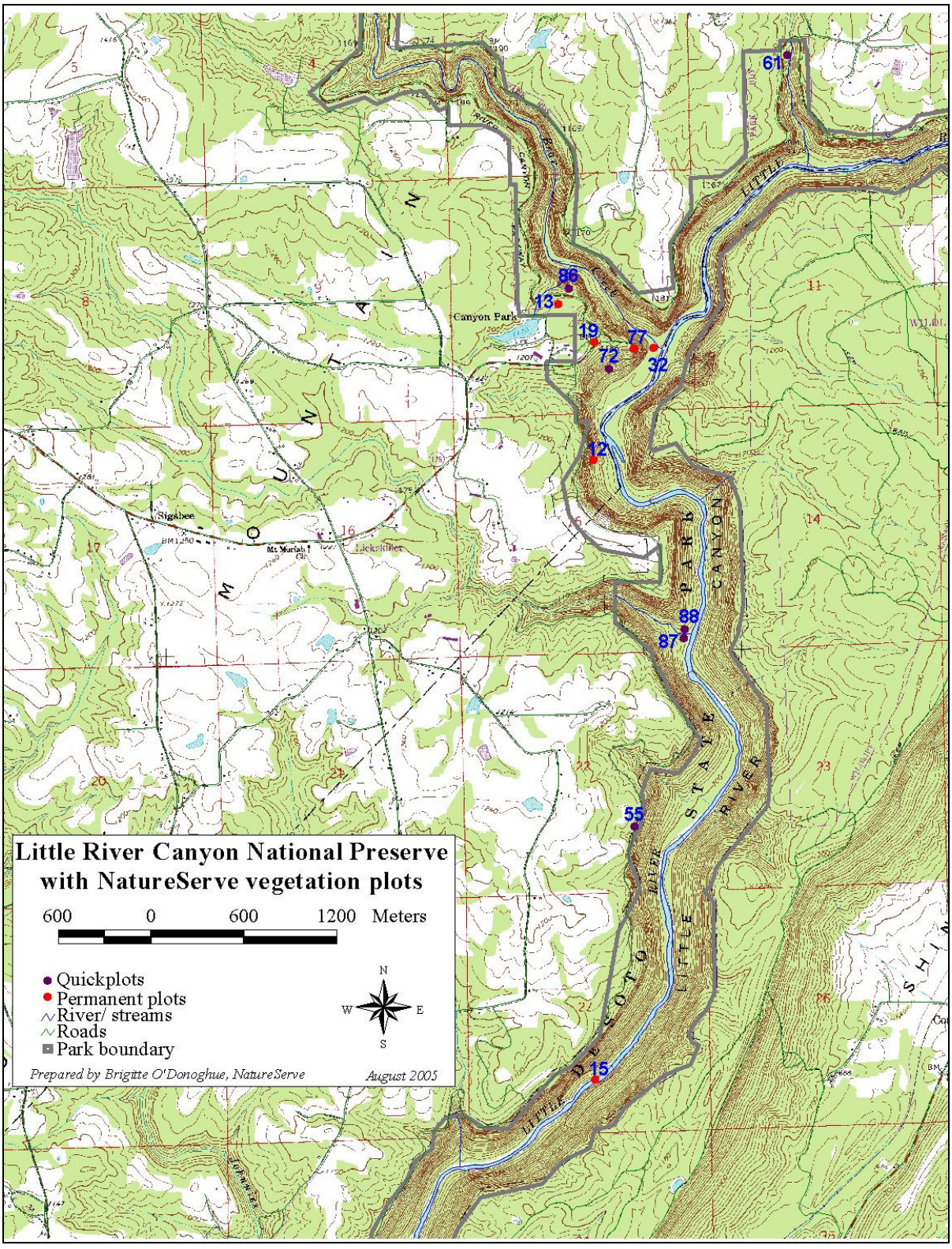


Figure 4. Map of north central part of Little River Canyon National Preserve with all permanent points marked at their actual locations.

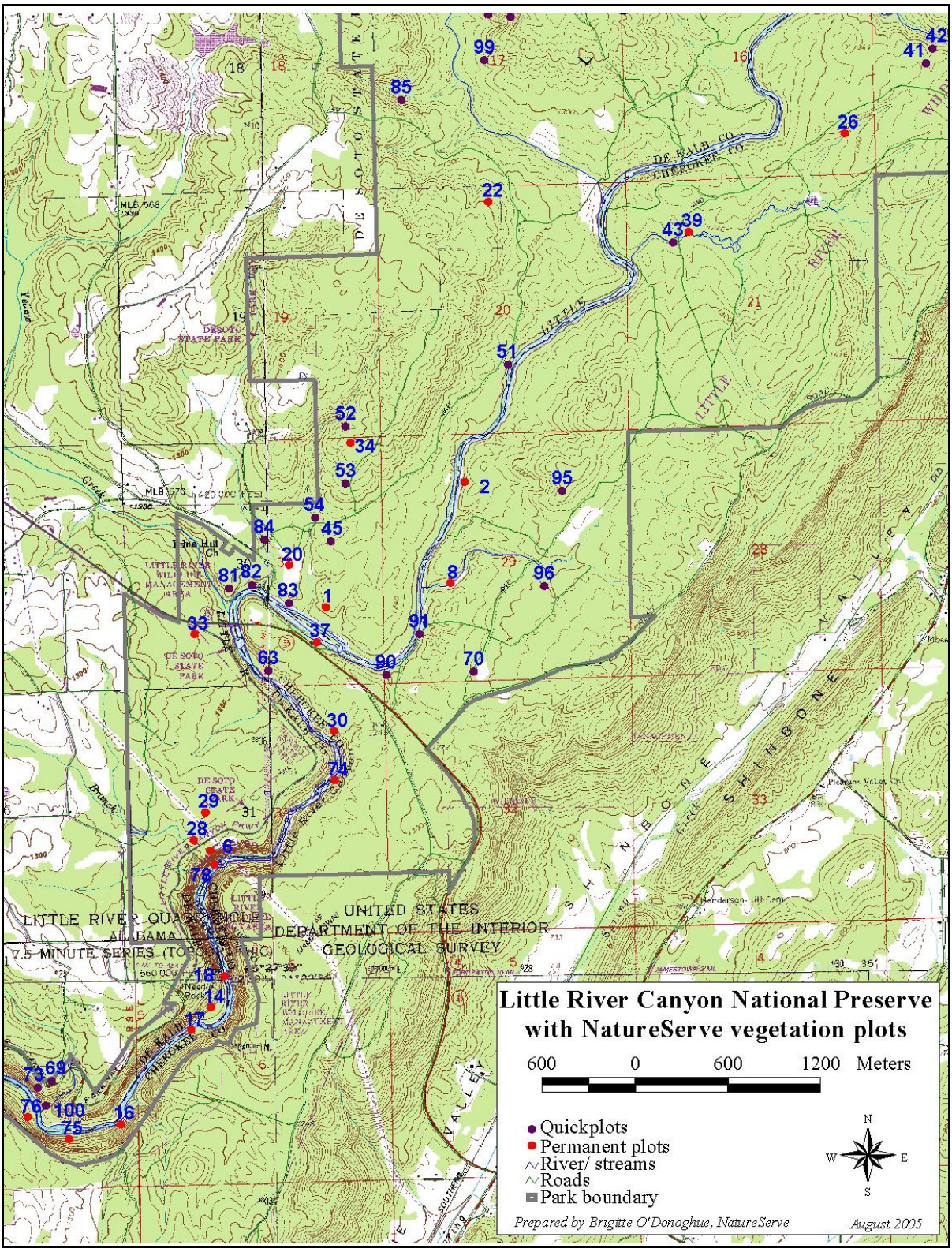


Figure 5. Map of north central part of Little River Canyon National Preserve with all permanent points marked at their actual locations.

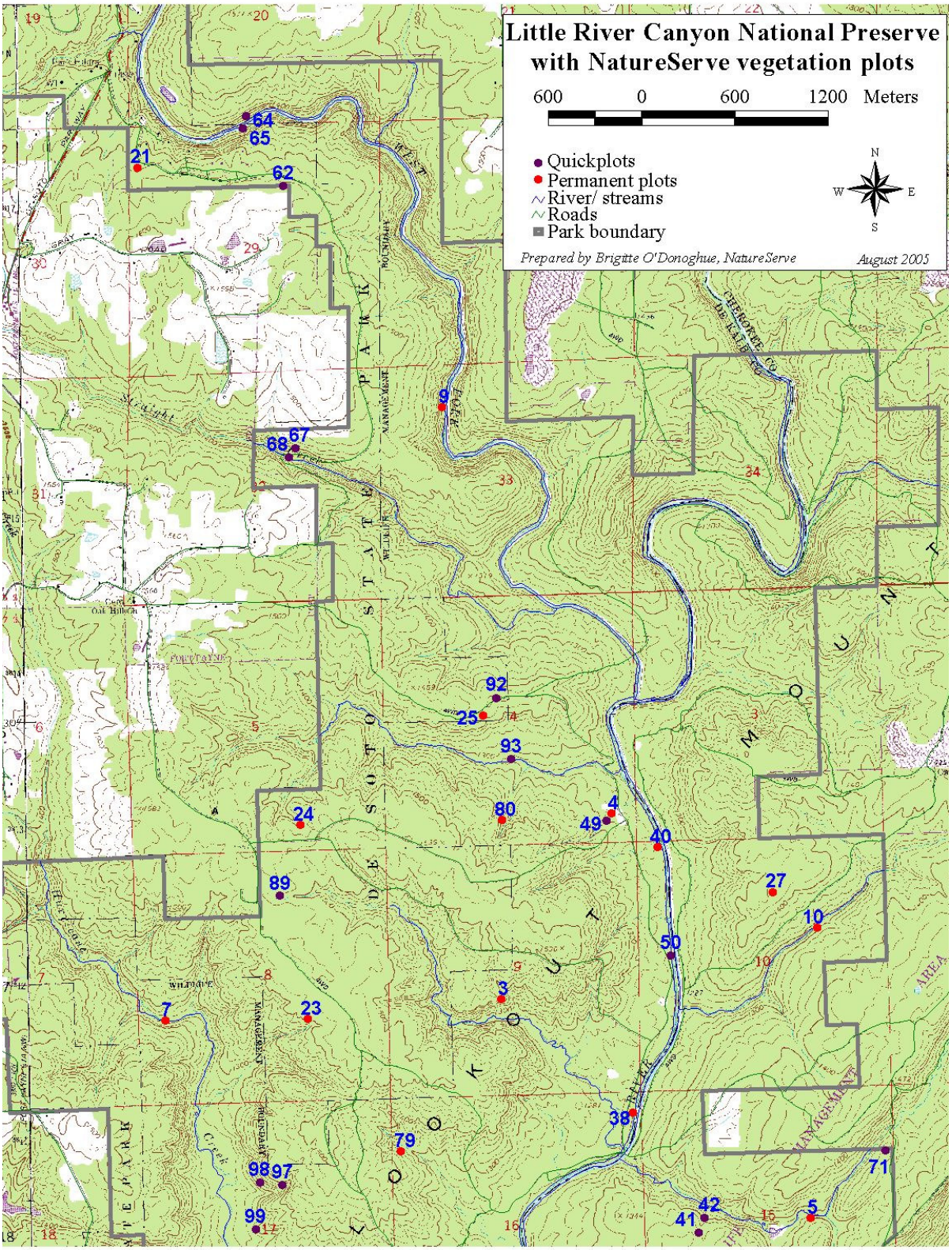
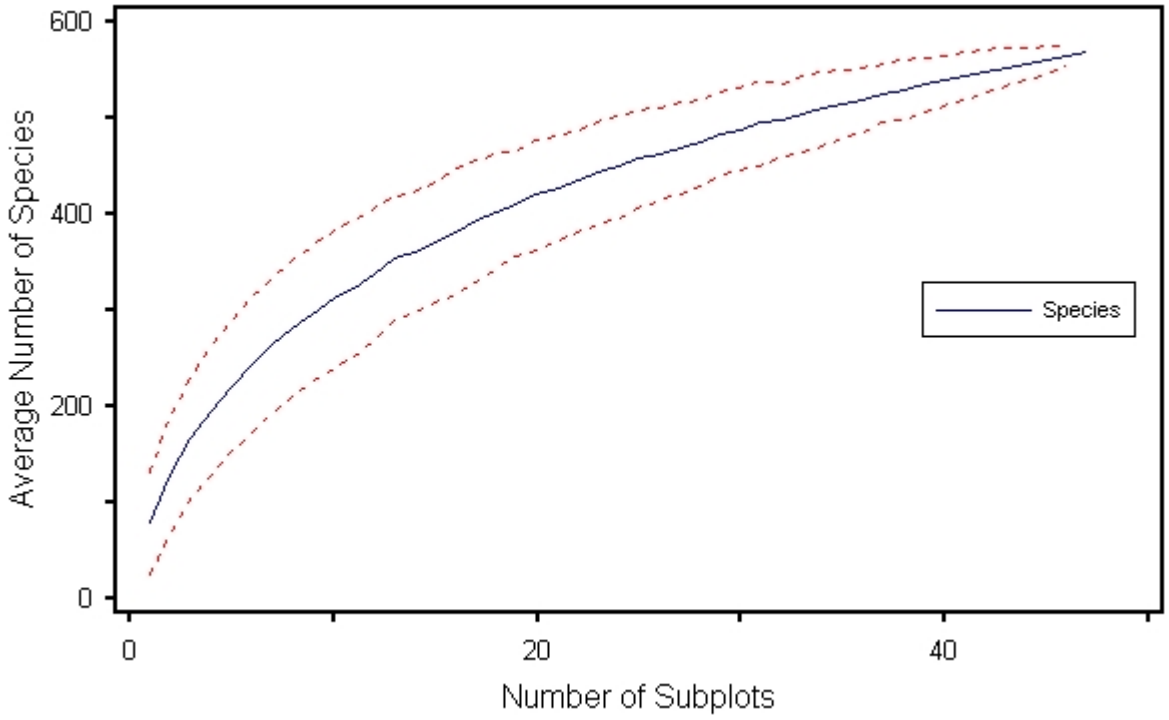


Figure 6. Species area curve for Little River Canyon National Preserve (using all 47 full plots).



First-order jackknife estimate of number of species in park = 752.0
Second-order jackknife estimate of number of species in park = 846.8

Table 1. Plot numbers and UTM coordinates for all plots established on Little River Canyon National Preserve (includes full plots and quickplots).

Plot Number	X Coordinate	Y Coordinate	Projection	UTM Zone	Type of Plot
1	626767	3807019	NAD83	16	Full - permanent
2	627661	3807833	NAD83	16	Full - permanent
3	629370	3812055	NAD83	16	Full - permanent
4	630077	3813252	NAD83	16	Full - permanent
5	631361	3810645	NAD83	16	Full - permanent
6	626046	3805341	NAD83	16	Full - permanent
7	627206	3811917	NAD83	16	Full - permanent
8	627573	3807174	NAD83	16	Full - permanent
9	628987	3815866	NAD83	16	Full - permanent
10	631399	3812515	NAD83	16	Full - permanent
11	620960	3794863	NAD83	16	Full - permanent
12	621676	3801205	NAD83	16	Full - permanent
13	621440	3802258	NAD83	16	Full - permanent
14	626025	3804415	NAD83	16	Full - permanent
15	621687	3797025	NAD83	16	Full - permanent
16	625443	3803656	NAD83	16	Full - permanent
17	625896	3804269	NAD83	16	Full - permanent
18	626114	3804616	NAD83	16	Full - permanent
19	621683	3802002	NAD83	16	Full - permanent
20	626528	3807291	NAD83	16	Full - permanent
21	627029	3817410	NAD83	16	Full - permanent
22	627817	3809654	NAD83	16	Full - permanent
23	628122	3811929	NAD83	16	Full - permanent
24	628075	3813176	NAD83	16	Full - permanent
25	629250	3813882	NAD83	16	Full - permanent
26	630113	3810100	NAD83	16	Full - permanent
27	631115	3812745	NAD83	16	Full - permanent
28	625912	3805504	NAD83	16	Full - permanent
29	625986	3805684	NAD83	16	Full - permanent
30	626819	3806210	NAD83	16	Full - permanent
31	621218	3794855	NAD83	16	Full - permanent
32	622073	3801962	NAD83	16	Full - permanent
33	625920	3806841	NAD83	16	Full - permanent
34	626925	3808089	NAD83	16	Full - permanent
35	619630	4163551	NAD83	16	Full - permanent
36	620971	3795006	NAD83	16	Full - permanent
37	626706	3806790	NAD83	16	Full - permanent
38	630217	3811323	NAD83	16	Full - permanent
39	629105	3809460	NAD83	16	Full - permanent
40	630374	3813035	NAD83	16	Full - permanent
41	630637	3810554	NAD83	16	Quickplot
42	630678	3810647	NAD83	16	Quickplot

Table 1. Plot numbers and UTM coordinates for all plots established on Little River Canyon National Preserve (includes full plots and quickplots).

Plot Number	X Coordinate	Y Coordinate	Projection	UTM Zone	Type of Plot
43	629006	3809389	NAD83	16	Quickplot
45	626798	3807446	NAD83	16	Quickplot
46	620761	3795308	NAD83	16	Quickplot
49	630048	3813204	NAD83	16	Quickplot
50	630460	3812338	NAD83	16	Quickplot
51	627940	3808595	NAD83	16	Quickplot
52	626894	3808191	NAD83	16	Quickplot
53	626895	3807820	NAD83	16	Quickplot
54	626696	3807598	NAD83	16	Quickplot
55	621951	3798738	NAD83	16	Quickplot
56	621046	3794654	NAD83	16	Quickplot
57	620754	3795146	NAD83	16	Quickplot
58	621198	3794616	NAD83	16	Quickplot
59	621123	3794972	NAD83	16	Quickplot
60	620472	3795424	NAD83	16	Quickplot
61	622966	3803938	NAD83	16	Quickplot
62	627967	3817292	NAD83	16	Quickplot
63	626398	3806605	NAD83	16	Quickplot
64	627724	3817745	NAD83	16	Quickplot
65	627705	3817661	NAD83	16	Quickplot
67	628044	3815603	NAD83	16	Quickplot
68	628001	3815546	NAD83	16	Quickplot
69	624997	3803937	NAD83	16	Quickplot
70	627721	3806597	NAD83	16	Quickplot
71	631840	3811081	NAD83	16	Quickplot
72	621778	3801821	NAD83	16	Quickplot
73	624906	3803892	NAD83	16	Quickplot
74	626824	3805894	NAD83	16	Full - permanent
75	625111	3803559	NAD83	16	Full - permanent
76	624846	3803700	NAD83	16	Full - permanent
77	621946	3801958	NAD83	16	Full - permanent
78	626022	3805434	NAD83	16	Full - permanent
79	628724	3811078	NAD83	16	Full - permanent
80	629373	3813211	NAD83	16	Full - permanent
81	626142	3807137	NAD83	16	Quickplot
82	626289	3807162	NAD83	16	Quickplot
83	626526	3807043	NAD83	16	Quickplot
84	626369	3807454	NAD83	16	Quickplot
85	627255	3810314	NAD83	16	Quickplot
86	621513	3802363	NAD83	16	Quickplot
87	622279	3800004	NAD83	16	Quickplot
88	622284	3800061	NAD83	16	Quickplot
89	627946	3812720	NAD83	16	Quickplot
90	627156	3806576	NAD83	16	Quickplot
91	627371	3806840	NAD83	16	Quickplot

Table 1. Plot numbers and UTM coordinates for all plots established on Little River Canyon National Preserve (includes full plots and quickplots).

Plot Number	X Coordinate	Y Coordinate	Projection	UTM Zone	Type of Plot
92	629337	3813996	NAD83	16	Quickplot
93	629432	3813602	NAD83	16	Quickplot
94	628293	3807774	NAD83	16	Quickplot
95	628174	3807154	NAD83	16	Quickplot
96	627958	3810858	NAD83	16	Quickplot
97	627815	3810874	NAD83	16	Quickplot
98	627788	3810573	NAD83	16	Quickplot
99	624963	3803776	NAD83	16	Quickplot
100	628293	3807774	NAD83	16	Quickplot

Table 2. List of all plants historically documented on Little River Canyon National Preserve. Species marked with an asterisk (*) are monitored by the Alabama Natural Heritage Program as rare in the state.

Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Acalypha gracilens	slender threeseed mercury	G5	28183	NatureServe PLOTS database 2001-2007
Acalypha virginica	Virginia threeseed mercury	G5	28195	NatureServe PLOTS database 2001-2007
Acer barbatum	southern sugar maple	G4G5Q	28759	NatureServe PLOTS database 2001-2007
Acer leucoderme	chalk maple	G5	28761	NatureServe PLOTS database 2001-2007
Acer negundo	boxelder	G5	28749	Whetstone et al. 1997
Acer rubrum	red maple	G5	28728	NatureServe PLOTS database 2001-2007
Acer rubrum var. rubrum	red maple	G5T5	28729	Dickson 1992
Acer rubrum var. trilobum	red maple	G5T5	182127	NatureServe PLOTS database 2001-2007
Acer saccharinum	silver maple	G5	28757	Whetstone et al. 1997
Acer saccharum	sugar maple	G5	28731	NatureServe PLOTS database 2001-2007
Acer spicatum	mountain maple	G5	28758	Whetstone et al. 1997
Achillea millefolium	common yarrow	G5	35423	Whetstone et al. 1997
Actaea pachypoda	white baneberry	G5	18722	NatureServe PLOTS database 2001-2007
Actaea racemosa var. racemosa	black bugbane	G4T4	-501896	NatureServe PLOTS database 2001-2007
Adiantum pedatum	northern maidenhair	G5	17311	NatureServe PLOTS database 2001-2007
Aesculus pavia	red buckeye	G5	28723	Whetstone et al. 1997
Agalinis purpurea	purple false foxglove	G5	33007	Whetstone et al. 1997
Agalinis tenuifolia	slenderleaf false foxglove	G5	33036	Dickson 1992
Ageratina altissima	white snakeroot	G5	36466	NatureServe PLOTS database 2001-2007
Ageratina altissima var. altissima	white snakeroot	G5T5	182398	Whetstone et al. 1997
Ageratina aromatica var. aromatica	lesser snakeroot	G5T5	182401	Dickson 1992
Agrimonia pubescens	soft agrimony	G5	25099	NatureServe PLOTS database 2001-2007
Agrimonia rostellata	beaked agrimony	G5	25100	NatureServe PLOTS database 2001-2007
Agrostis elliottiana	Elliott's bentgrass	G5	40397	Dickson 1992
Agrostis hyemalis	winter bentgrass	G5	40394	NatureServe PLOTS database 2001-2007
Agrostis perennans	upland bentgrass	G5	40423	NatureServe PLOTS database 2001-2007
Agrostis stolonifera	creeping bentgrass	G5	40400	NatureServe PLOTS database 2001-2007

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Ailanthus altissima	tree of heaven	GNR	28827	NatureServe PLOTS database 2001-2007
Albizia julibrissin	silktree	GNR	26449	NatureServe PLOTS database 2001-2007
Alisma subcordatum	American water plantain	G4G5	38895	Whetstone et al. 1997
Allium canadense	meadow garlic	G5	42635	NatureServe PLOTS database 2001-2007
*Allium speculae	Little River Canyon onion	G2	182651	NatureServe PLOTS database 2001-2007
Alnus serrulata	hazel alder	G5	19468	NatureServe PLOTS database 2001-2007
Alopecurus carolinianus	Carolina foxtail	G5	40440	Whetstone et al. 1997
Alternanthera philoxeroides	alligatorweed	GNR	20770	Whetstone et al. 1997
Amaranthus spinosus	spiny amaranth	G5	20748	Whetstone et al. 1997
Ambrosia artemisiifolia var. paniculata	annual ragweed	G5T3T5	182421	NatureServe PLOTS database 2001-2007
Ambrosia trifida var. trifida	great ragweed	G5T5	182422	Whetstone et al. 1997
Amelanchier arborea	common serviceberry	G5	25110	NatureServe PLOTS database 2001-2007
Amianthium muscitoxicum	flypoison	G4G5	42775	Whetstone et al. 1997
Ammannia coccinea	valley redstem	G5	27091	Whetstone et al. 1997
Amorpha fruticosa	desert false indigo	G5	25368	NatureServe PLOTS database 2001-2007
Ampelopsis arborea	peppervine	G5	28631	Whetstone et al. 1997
Ampelopsis cordata	heartleaf peppervine	G5	28633	Whetstone et al. 1997
Amphicarpaea bracteata	American hogpeanut	G5	182067	NatureServe PLOTS database 2001-2007
Amsonia tabernaemontana	eastern bluestar	G5	30148	NatureServe PLOTS database 2001-2007
Amsonia tabernaemontana var. salicifolia	eastern bluestar	G5T4?	182208	Dickson 1992
Amsonia tabernaemontana var. tabernaemontana	eastern bluestar	G5T5	182207	Dickson 1992
Andropogon glomeratus	bushy bluestem	G5	40454	NatureServe PLOTS database 2001-2007
Andropogon gyrans var. gyrans	Elliott's bluestem	G5T5	182528	Dickson 1992
Andropogon ternarius	splitbeard bluestem	G5	40455	NatureServe PLOTS database 2001-2007
Andropogon virginicus var. virginicus	broomsedge bluestem	G5T5	182523	NatureServe PLOTS database 2001-2007
Anemone quinquefolia var. quinquefolia	nightcaps	G5T4T5	181865	NatureServe PLOTS database 2001-2007
Anemone virginiana var. virginiana	tall thimbleweed	G5T5	181868	Whetstone et al. 1997

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Angelica triquinata	filmy angelica	G4	29452	NatureServe PLOTS database 2001-2007
Angelica venenosa	hairy angelica	G5	29453	NatureServe PLOTS database 2001-2007
Antennaria plantaginifolia	woman's tobacco	G5	36717	NatureServe PLOTS database 2001-2007
Antennaria solitaria	singlehead pussytoes	G5	36756	Whetstone et al. 1997
Anthemis cotula	stinking chamomile	G5	36330	Dickson 1992
Anthoxanthum odoratum	sweet vernalgrass	GNR	41395	NatureServe PLOTS database 2001-2007
Apios americana	groundnut	G5	25390	NatureServe PLOTS database 2001-2007
Apocynum cannabinum	Indianhemp	G5	30157	Whetstone et al. 1997
Aquilegia canadensis	red columbine	G5	18730	Dickson 1992
Arabidopsis thaliana	mouseear cress	GNR	23041	Whetstone et al. 1997
Arabis laevigata var. laevigata	smooth rockcress	G5T5	184378	Whetstone et al. 1997
Aralia spinosa	devil's walkingstick	G5	29378	NatureServe PLOTS database 2001-2007
Arenaria serpyllifolia	thymeleaf sandwort	GNR	20270	NatureServe PLOTS database 2001-2007
Arisaema dracontium	green dragon	G5	42529	Whetstone et al. 1997
Arisaema triphyllum	Jack in the pulpit	G5	42525	NatureServe PLOTS database 2001-2007
Aristida dichotoma	churchmouse threeawn	G5	41415	Whetstone et al. 1997
Aristida longispica	slimspike threeawn	G5	41423	Whetstone et al. 1997
Aristida purpurascens	arrowfeather threeawn	G5	41428	Whetstone et al. 1997
Aristida purpurascens var. purpurascens	arrowfeather threeawn	G5T5	185309	Dickson 1992
Aristida purpurascens var. virgata	arrowfeather threeawn	G5T4T5	185312	Dickson 1992
Aristolochia serpentaria	Virginia snakeroot	G4	18342	NatureServe PLOTS database 2001-2007
Arnoglossum atriplicifolium	pale Indian plaintain	G4G5	36583	NatureServe PLOTS database 2001-2007
Arthraxon hispidus	small carpgrass	GNR	41445	Whetstone et al. 1997
Aruncus dioicus var. dioicus	bride's feathers	G5T5?	184616	Whetstone et al. 1997
Arundinaria gigantea	giant cane	G5	40477	NatureServe PLOTS database 2001-2007
Arundinaria gigantea ssp. gigantea	switchcane	G5T5	185286	NatureServe PLOTS database 2001-2007
Asclepias amplexicaulis	clasping milkweed	G5	30244	Dickson 1992
Asclepias lanceolata	fewflower milkweed	G5	30242	Whetstone et al. 1997
Asclepias longifolia	longleaf milkweed	G4G5	30282	Whetstone et al. 1997
Asclepias quadrifolia	fourleaf milkweed	G5	30297	Whetstone et al. 1997

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Asclepias tuberosa	butterfly milkweed	G5?	30313	Whetstone et al. 1997
Asclepias variegata	redring milkweed	G5	30319	NatureServe PLOTS database 2001-2007
Asclepias verticillata	whorled milkweed	G5	30320	Whetstone et al. 1997
Asimina parviflora	smallflower pawpaw	G5	18113	NatureServe PLOTS database 2001-2007
Asimina triloba	pawpaw	G5	18117	NatureServe PLOTS database 2001-2007
*Asplenium bradleyi	Bradley's spleewort	G4	17338	Whetstone et al. 1997
Asplenium montanum	mountain spleenwort	G5	17351	Whetstone et al. 1997
Asplenium pinnatifidum	lobed spleenwort	G4	17354	Whetstone et al. 1997
Asplenium platyneuron	ebony spleenwort	G5	17355	NatureServe PLOTS database 2001-2007
Asplenium resiliens	blackstem spleenwort	G5	17358	Whetstone et al. 1997
Asplenium rhizophyllum	walking fern	G5	17359	NatureServe PLOTS database 2001-2007
*Asplenium trichomanes	maidenhair spleenwort	G5	17364	Whetstone et al. 1997
Athyrium filix-femina ssp. asplenioides	asplenium ladyfern	G5T5	17415	NatureServe PLOTS database 2001-2007
Aureolaria flava	smooth yellow false foxglove	G5	33484	Dickson 1992
Aureolaria pectinata	combleaf yellow false foxglove	G5?	33488	NatureServe PLOTS database 2001-2007
Aureolaria virginica	downy yellow false foxglove	G5	33490	NatureServe PLOTS database 2001-2007
Barbarea verna	early yellowrocket	GNR	22743	Whetstone et al. 1997
Bartonia virginica	yellow screwstem	G5	30025	NatureServe PLOTS database 2001-2007
Berchemia scandens	Alabama supplejack	G5	28447	NatureServe PLOTS database 2001-2007
Betula lenta	sweet birch	G5	19487	NatureServe PLOTS database 2001-2007
Betula nigra	river birch	G5	19480	NatureServe PLOTS database 2001-2007
Bidens aristosa	bearded beggarticks	G5	35713	Whetstone et al. 1997
Bidens bipinnata	Spanish needles	G5	500993	NatureServe PLOTS database 2001-2007
Bidens frondosa	devil's beggartick	G5	35707	NatureServe PLOTS database 2001-2007
Bidens laevis	smooth beggartick	G5	35711	Dickson 1992
Bidens tripartita	threelobe beggarticks	G5	35709	Whetstone et al. 1997
*Bigelowia nuttallii	Nuttall's rayless goldenrod	G3G4	36840	NatureServe PLOTS database 2001-2007

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Bignonia capreolata	crossvine	G5	34307	NatureServe PLOTS database 2001-2007
Boehmeria cylindrica	smallspike false nettle	G5	19121	NatureServe PLOTS database 2001-2007
Boltonia asteroides	white doll's daisy	G5	36853	Dickson 1992
Botrychium dissectum	cutleaf grapefern	G5	17171	NatureServe PLOTS database 2001-2007
Botrychium virginianum	rattlesnake fern	G5	17173	Whetstone et al. 1997
Brachyelytrum erectum	bearded shorthusk	G5	41527	NatureServe PLOTS database 2001-2007
Brickellia eupatorioides	false boneset	G5	36875	NatureServe PLOTS database 2001-2007
Bromus tectorum	cheatgrass	GNR	40524	Whetstone et al. 1997
Bulbostylis capillaris ssp. capillaris	densetuft hairsedge	G5T5	523708	NatureServe PLOTS database 2001-2007
Calamagrostis coarctata	arctic reedgrass	G5	506859	Dickson 1992
Callicarpa americana	American beautyberry	G5	32144	NatureServe PLOTS database 2001-2007
Callitriche heterophylla	twoheaded water-starwort	G5	32053	Whetstone et al. 1997
Calopogon tuberosus var. tuberosus	tuberous grasspink	G5T5	527036	Dickson 1992
Calycanthus floridus	eastern sweetshrub	G5	18142	NatureServe PLOTS database 2001-2007
Calystegia sepium	hedge false bindweed	G5	30650	Whetstone et al. 1997
Campanula divaricata	small bonny bellflower	G4	34482	NatureServe PLOTS database 2001-2007
Campanulastrum americanum	American bellflower	G5	501172	Whetstone et al. 1997
Campsis radicans	trumpet creeper	G5	34309	NatureServe PLOTS database 2001-2007
Capsella bursa-pastoris	shepherd's purse	GNR	22766	Whetstone et al. 1997
Cardamine angustata	slender toothwort	G5	22778	Whetstone et al. 1997
Cardamine bulbosa	bulbous bittercress	G5	22769	Dickson 1992
Cardamine concatenata	cutleaf toothwort	G5	22787	NatureServe PLOTS database 2001-2007
Cardamine diphylla	crinkleroot	G5	22792	NatureServe PLOTS database 2001-2007
Cardamine hirsuta	hairy bittercress	GNR	22797	Whetstone et al. 1997
Cardamine pensylvanica	Pennsylvania bittercress	G5	22772	Whetstone et al. 1997
Carex abscondita	thicket sedge	G4G5	39475	Whetstone et al. 1997
Carex albicans var. albicans	whitetinge sedge	G5T4T5	527064	Whetstone et al. 1997
Carex annectens	yellowfruit sedge	G5	39373	Dickson 1992
Carex blanda	eastern woodland sedge	G5?	39379	Whetstone et al. 1997

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Carex cephalophora	oval-leaf sedge	G5	39383	Whetstone et al. 1997
Carex cherokeensis	Cherokee sedge	G4G5	39545	Whetstone et al. 1997
Carex complanata	hirsute sedge	G5	39551	NatureServe PLOTS database 2001-2007
Carex crinita var. brevicrinis	fringed sedge	G5T5	527081	NatureServe PLOTS database 2001-2007
Carex debilis	white edge sedge	G5	39572	NatureServe PLOTS database 2001-2007
Carex digitalis	slender woodland sedge	G5	39576	NatureServe PLOTS database 2001-2007
Carex festucacea	fescue sedge	G5	39391	Whetstone et al. 1997
Carex glaucescens	southern waxy sedge	G4	39396	NatureServe PLOTS database 2001-2007
Carex grayi	Gray's sedge	G4	39622	Whetstone et al. 1997
Carex hirsutella	fuzzy wuzzy sedge	G5	39636	NatureServe PLOTS database 2001-2007
Carex intumescens	greater bladder sedge	G5	39403	NatureServe PLOTS database 2001-2007
Carex joorii	cypress swamp sedge	G4G5	39405	Dickson 1992
Carex laxiflora	broad looseflower sedge	G5	39662	NatureServe PLOTS database 2001-2007
Carex laxiflora var. laxiflora	broad looseflower sedge	G5T5	527110	NatureServe PLOTS database 2001-2007
Carex lupulina	hop sedge	G5	39413	Whetstone et al. 1997
Carex lurida	shallow sedge	G5	39414	Whetstone et al. 1997
Carex nigromarginata	black edge sedge	G5	39719	NatureServe PLOTS database 2001-2007
Carex rosea	rosy sedge	G5	39429	NatureServe PLOTS database 2001-2007
Carex tribuloides	blunt broom sedge	G5	39438	Dickson 1992
Carex virescens	ribbed sedge	G5	39867	NatureServe PLOTS database 2001-2007
Carpinus caroliniana	American hornbeam	G5	19504	NatureServe PLOTS database 2001-2007
Carya alba	mockernut hickory	G5	501306	NatureServe PLOTS database 2001-2007
Carya cordiformis	bitternut hickory	G5	19227	Whetstone et al. 1997
Carya glabra	pignut hickory	G5	19231	NatureServe PLOTS database 2001-2007
Carya illinoinensis	pecan	G5	19234	Whetstone et al. 1997
Carya ovalis	red hickory	G5	19241	Whetstone et al. 1997
Carya ovata	shagbark hickory	G5	19243	NatureServe PLOTS database 2001-2007
Carya pallida	sand hickory	G5	19244	NatureServe PLOTS database 2001-2007
Castanea dentata	American chestnut	G4	19454	NatureServe PLOTS database 2001-2007

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Castanea pumila	chinkapin	G5	19457	NatureServe PLOTS database 2001-2007
*Castilleja coccinea	scarlet Indian paintbrush	G5	501322	Whetstone et al. 1997
Catalpa bignonioides	southern catalpa	G3G4	34313	Whetstone et al. 1997
Caulophyllum thalictroides	blue cohosh	G4G5	18840	Whetstone et al. 1997
Ceanothus americanus	New Jersey tea	G5	28454	NatureServe PLOTS database 2001-2007
*Celastrus scandens	American bittersweet	G5	27974	NatureServe PLOTS database 2001-2007
Celtis laevigata	sugarberry	G5	19042	NatureServe PLOTS database 2001-2007
Celtis occidentalis	common hackberry	G5	19040	Whetstone et al. 1997
Centrosema virginianum	spurred butterfly pea	G5	25778	NatureServe PLOTS database 2001-2007
Cephalanthus occidentalis	common buttonbush	G5	34786	NatureServe PLOTS database 2001-2007
Cerastium glomeratum	sticky chickweed	GNR	19955	NatureServe PLOTS database 2001-2007
Cerastium semidecandrum	fivestamen chickweed	GNR	19961	Dickson 1992
Cercis canadensis var. canadensis	eastern redbud	G5T5	527241	NatureServe PLOTS database 2001-2007
Chaerophyllum tainturieri	hairyfruit chervil	G5	29617	Whetstone et al. 1997
Chamaecrista fasciculata var. fasciculata	sleepingplant	G5T4T5	566216	Dickson 1992
Chamaecrista nictitans	partridge pea	G5	501388	NatureServe PLOTS database 2001-2007
Chamaelirium luteum	fairywand	G5	42894	NatureServe PLOTS database 2001-2007
Chamaesyce maculata	spotted sandmat	G5?	565061	Whetstone et al. 1997
Chamaesyce nutans	eyebane	G5	501442	NatureServe PLOTS database 2001-2007
Chamaesyce serpens	matted sandmat	G5	28248	Dickson 1992
Chasmanthium latifolium	Indian woodoats	G5	41547	NatureServe PLOTS database 2001-2007
Chasmanthium laxum	slender woodoats	G5	41548	NatureServe PLOTS database 2001-2007
Chasmanthium sessiliflorum	longleaf woodoats	G5	41551	NatureServe PLOTS database 2001-2007
Cheilanthes lanosa	hairy lipfern	G5	17448	NatureServe PLOTS database 2001-2007
Cheilanthes tomentosa	woolly lipfern	G5	17455	Whetstone et al. 1997
Chelone glabra	white turtlehead	G5	33182	NatureServe PLOTS database 2001-2007
Chenopodium album	lambsquarters	G5	20592	Whetstone et al. 1997
Chimaphila maculata	striped prince's pine	G5	23767	NatureServe PLOTS database 2001-2007

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Chionanthus virginicus	white fringetree	G5	32950	NatureServe PLOTS database 2001-2007
Chrysopsis mariana	Maryland goldenaster	G5	202495	NatureServe PLOTS database 2001-2007
Cinna arundinacea	sweet woodreed	G5	40583	NatureServe PLOTS database 2001-2007
Circaea lutetiana ssp. canadensis	broadleaf enchanter's nightshade	G5T5	27569	Whetstone et al. 1997
Cirsium carolinianum	soft thistle	G5	36352	Dickson 1992
Cirsium discolor	field thistle	G5	36362	Dickson 1992
Cirsium horridulum var. horridulum	yellow thistle	G5T5	566219	Whetstone et al. 1997
Cirsium vulgare	bull thistle	GNR	36428	Whetstone et al. 1997
Cladrastis kentukea	Kentucky yellowwood	G4	26539	NatureServe PLOTS database 2001-2007
Claytonia virginica	Virginia springbeauty	G5	20382	Whetstone et al. 1997
Clematis viorna	vasevine	G5	18715	Whetstone et al. 1997
Clematis virginiana	devil's darning needles	G5	18716	Whetstone et al. 1997
Clitoria mariana	Atlantic pigeonwings	G5	26542	NatureServe PLOTS database 2001-2007
Cocculus carolinus	Carolina coralbead	G5	18864	NatureServe PLOTS database 2001-2007
Collinsonia canadensis	richweed	G5	32474	NatureServe PLOTS database 2001-2007
Collinsonia tuberosa	deepwoods horsebalm	G3G4	32475	NatureServe PLOTS database 2001-2007
*Comandra umbellata ssp. umbellata	bastard toadflax	G5T5	523880	NatureServe PLOTS database 2001-2007
Commelina communis	Asiatic dayflower	G5	39127	Whetstone et al. 1997
Commelina virginica	Virginia dayflower	G5	39128	Whetstone et al. 1997
Conoclinium coelestinum	blue mistflower	G5	511282	NatureServe PLOTS database 2001-2007
Conopholis americana	American squawroot	G5	34274	NatureServe PLOTS database 2001-2007
Consolida ajacis	doubtful knight's-spur	GNR	501621	Whetstone et al. 1997
Conyza canadensis	Canadian horseweed	G5	37113	NatureServe PLOTS database 2001-2007
*Corallorhiza wisteriana	spring coralroot	G5	43528	Whetstone et al. 1997
Coreopsis auriculata	lobed tickseed	G5	37124	Whetstone et al. 1997
Coreopsis lanceolata	lanceleaf tickseed	G5	37139	NatureServe PLOTS database 2001-2007
Coreopsis major	greater tickseed	G5	37143	NatureServe PLOTS database 2001-2007

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Coreopsis pubescens	star tickseed	G5?	37149	NatureServe PLOTS database 2001-2007
*Coreopsis pulchra	woodland tickseed	G2	37150	NatureServe PLOTS database 2001-2007
Coreopsis tripteris	tall tickseed	G5	37154	NatureServe PLOTS database 2001-2007
Cornus alternifolia	alternateleaf dogwood	G5	27813	NatureServe PLOTS database 2001-2007
Cornus amomum	silky dogwood	G5	27799	NatureServe PLOTS database 2001-2007
Cornus florida	flowering dogwood	G5	27806	NatureServe PLOTS database 2001-2007
Cornus foemina	stiff dogwood	G5	27803	NatureServe PLOTS database 2001-2007
Corylus americana	American hazelnut	G5	19506	NatureServe PLOTS database 2001-2007
Corylus cornuta	beaked hazelnut	G5	19507	NatureServe PLOTS database 2001-2007
Crataegus flabellata	fanleaf hawthorn	G4	24561	Dickson 1992
Crataegus flava	yellowleaf hawthorn	G5	24562	Dickson 1992
Crataegus marshallii	parsley hawthorn	G5	24584	NatureServe PLOTS database 2001-2007
Crataegus spathulata	littlehip hawthorn	G5	24603	NatureServe PLOTS database 2001-2007
Crataegus viridis	green hawthorn	G5	24612	Dickson 1992
Crotalaria sagittalis	arrowhead rattlebox	G5	26579	NatureServe PLOTS database 2001-2007
Crotalaria spectabilis	showy rattlebox	GNR	26580	Whetstone et al. 1997
Croton glandulosus var. septentrionalis	vente conmigo	G5T5	527541	Whetstone et al. 1997
Croton michauxii	Michaux's croton	G5	506919	NatureServe PLOTS database 2001-2007
Croton willdenowii	Willdenow's croton	G5	506921	NatureServe PLOTS database 2001-2007
Cruciata pedemontana	piedmont bedstraw	GNR	502717	Whetstone et al. 1997
Cuscuta compacta	compact dodder	G5	30725	NatureServe PLOTS database 2001-2007
*Cuscuta harperi	Harper's dodder	G2G3	30736	NatureServe PLOTS database 2001-2007
Cuscuta pentagona var. pentagona	fiveangled dodder	G5T5	527603	NatureServe PLOTS database 2001-2007
Cynodon dactylon	Bermudagrass	GNR	41619	NatureServe PLOTS database 2001-2007
Cynoglossum virginianum var. virginianum	wild comfrey	G5T5	527625	Whetstone et al. 1997
Cyperus croceus	Baldwin's flatsedge	G5	501917	Whetstone et al. 1997
Cyperus echinatus	globe flatsedge	G5	501920	Whetstone et al. 1997
Cyperus iria	ricefield flatsedge	GNR	39934	Whetstone et al. 1997

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Cyperus strigosus	strawcolored flatsedge	G5	39901	Whetstone et al. 1997
Cypripedium acaule	moccasin flower	G5	43534	NatureServe PLOTS database 2001-2007
Cypripedium parviflorum var. pubescens	greater yellow lady's slipper	G5T5		NatureServe PLOTS database 2001-2007
Dactylis glomerata ssp. glomerata	orchardgrass	GNRTNR	193447	Whetstone et al. 1997
Danthonia sericea	downy danthonia	G5?	41635	NatureServe PLOTS database 2001-2007
Danthonia spicata	poverty oatgrass	G5	41642	NatureServe PLOTS database 2001-2007
Daucus carota	Queen Anne's lace	GNR	29477	NatureServe PLOTS database 2001-2007
Decumaria barbara	woodvamp	G5	24323	NatureServe PLOTS database 2001-2007
Delphinium tricorne	dwarf larkspur	G5	18515	Whetstone et al. 1997
Deschampsia flexuosa	wavy hairgrass	G5	40595	NatureServe PLOTS database 2001-2007
Desmodium cuspidatum	largebract ticktrefoil	G5	25795	NatureServe 2005
Desmodium cuspidatum var. cuspidatum	largebract ticktrefoil	G5T5?	527673	NatureServe PLOTS database 2001-2007
Desmodium glabellum	Dillenius' ticktrefoil	G5	25799	Whetstone et al. 1997
Desmodium glutinosum	pointedleaf ticktrefoil	G5	25800	NatureServe PLOTS database 2001-2007
Desmodium laevigatum	smooth ticktrefoil	G5	25806	NatureServe PLOTS database 2001-2007
Desmodium marilandicum	smooth small-leaf ticktrefoil	G5	25809	NatureServe PLOTS database 2001-2007
Desmodium nudiflorum	nakedflower ticktrefoil	G5	25812	NatureServe PLOTS database 2001-2007
Desmodium obtusum	stiff ticktrefoil	G4G5	502019	NatureServe PLOTS database 2001-2007
Desmodium paniculatum var. paniculatum	panicledleaf ticktrefoil	G5T5	527679	NatureServe PLOTS database 2001-2007
Desmodium perplexum	perplexed ticktrefoil	G5	25785	NatureServe PLOTS database 2001-2007
Desmodium rotundifolium	prostrate ticktrefoil	G5	502020	NatureServe PLOTS database 2001-2007
Desmodium viridiflorum	velvetleaf ticktrefoil	G5?	25833	NatureServe PLOTS database 2001-2007
Diamorpha smallii	elf orpine	G4	502024	NatureServe PLOTS database 2001-2007
Dichanthelium aciculare	needleleaf rosette grass	G4G5	41653	NatureServe PLOTS database 2001-2007
Dichanthelium acuminatum	tapered rosette grass	G5	41646	NatureServe PLOTS database 2001-2007
Dichanthelium boscii	Bosc's panicgrass	G5	41655	NatureServe PLOTS database 2001-2007

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Dichanthelium clandestinum	deertongue	G5?	41656	NatureServe PLOTS database 2001-2007
Dichanthelium commutatum	variable panicgrass	G5	41647	NatureServe PLOTS database 2001-2007
Dichanthelium depauperatum	starved panicgrass	G5	41658	Dickson 1992
Dichanthelium dichotomum	cypress panicgrass	G5	41659	NatureServe PLOTS database 2001-2007
Dichanthelium dichotomum var. dichotomum	cypress panicgrass	G5T5	527691	NatureServe PLOTS database 2001-2007
Dichanthelium laxiflorum	openflower rosette grass	G5	41661	NatureServe PLOTS database 2001-2007
Dichanthelium ravenelii	Ravenel's rosette grass	G5	41669	NatureServe PLOTS database 2001-2007
Dichanthelium scabriusculum	woolly rosette grass	G4	41670	NatureServe PLOTS database 2001-2007
Dichanthelium scoparium	velvet panicum	G5	41651	NatureServe PLOTS database 2001-2007
Dichanthelium sphaerocarpon var. isophyllum	roundseed panicgrass	G5T5	527701	NatureServe PLOTS database 2001-2007
Dichanthelium sphaerocarpon var. sphaerocarpon	roundseed panicgrass	G5T5	527702	Dickson 1992
Dichanthelium strigosum	roughhair rosette grass	G5	502039	Dickson 1992
Dichondra carolinensis	Carolina ponysfoot	G5	30834	Whetstone et al. 1997
*Diervilla rivularis	mountain bush honeysuckle	G3	35311	NatureServe PLOTS database 2001-2007
Diervilla sessilifolia	southern bush honeysuckle	G4?	35312	Dickson 1992
Digitaria ciliaris	southern crabgrass	G5	40619	Whetstone et al. 1997
Digitaria ischaemum	smooth crabgrass	GNR	40637	Dickson 1992
Digitaria sanguinalis	hairy crabgrass	G5	40604	NatureServe PLOTS database 2001-2007
Digitaria violascens	violet crabgrass	GNR	502065	Dickson 1992
Diodia teres	poorjoe	G5	34789	NatureServe PLOTS database 2001-2007
Diodia virginiana	Virginia buttonweed	G5	34790	NatureServe PLOTS database 2001-2007
Dioscorea oppositifolia	Chinese yam	GNR	502075	Whetstone et al. 1997
Dioscorea villosa	wild yam	G4G5	43367	NatureServe PLOTS database 2001-2007
Diospyros virginiana	common persimmon	G5	23855	NatureServe PLOTS database 2001-2007
Dirca palustris	eastern leatherwood	G4	27129	Whetstone et al. 1997
Doellingeria infirma	cornel-leaf whitetop	G5	508087	NatureServe PLOTS database 2001-2007
Doellingeria umbellata var. umbellata	parasol whitetop	G5T5	566233	NatureServe PLOTS database 2001-2007
Draba brachycarpa	shortpod draba	G4G5	22865	Whetstone et al. 1997

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Draba verna	spring draba	GNR	22923	Whetstone et al. 1997
Drosera brevifolia	dwarf sundew	G5	22010	Dickson 1992
Dryopteris marginalis	marginal woodfern	G5	17541	NatureServe PLOTS database 2001-2007
Duchesnea indica	Indian strawberry	G5	25163	Whetstone et al. 1997
Echinochloa crus-galli	barnyardgrass	GNR	502210	Dickson 1992
Eleocharis obtusa	blunt spikerush	G5	40017	Whetstone et al. 1997
Elephantopus carolinianus	Carolina elephantsfoot	G5	37297	NatureServe PLOTS database 2001-2007
Elephantopus tomentosus	devil's grandmother	G5	37300	NatureServe PLOTS database 2001-2007
Elymus virginicus var. virginicus	Virginia wildrye	G5T5	527870	NatureServe PLOTS database 2001-2007
Epifagus virginiana	beechdrops	G5	34276	NatureServe PLOTS database 2001-2007
Epigaea repens	trailing arbutus	G5	23646	NatureServe PLOTS database 2001-2007
Eragrostis capillaris	lace grass	G5	40774	NatureServe PLOTS database 2001-2007
Eragrostis hirsuta	bigtop lovegrass	G5	40744	NatureServe PLOTS database 2001-2007
Erechtites hieraciifolia var. hieraciifolia	American burnweed	G5T5	196276	NatureServe PLOTS database 2001-2007
Erigeron annuus	eastern daisy fleabane	G5	35804	NatureServe PLOTS database 2001-2007
Erigeron philadelphicus	Philadelphia fleabane	G5	35809	Whetstone et al. 1997
Erigeron pulchellus var. pulchellus	robin's plantain	G5T5	527958	Whetstone et al. 1997
Erigeron strigosus	prairie fleabane	G5	35951	NatureServe PLOTS database 2001-2007
Eriocaulon compressum	flattened pipewort	G5	39198	Dickson 1992
Erodium cicutarium	redstem stork's bill	GNR	29147	Whetstone et al. 1997
Euonymus americana	strawberry bush	G5	502577	NatureServe PLOTS database 2001-2007
Eupatorium album var. album	white thoroughwort	G5T5	528105	NatureServe PLOTS database 2001-2007
Eupatorium capillifolium	dogfennel	G5	35978	NatureServe PLOTS database 2001-2007
Eupatorium fistulosum	trumpetweed	G5?	502509	NatureServe PLOTS database 2001-2007
Eupatorium hyssopifolium	hyssopleaf thoroughwort	G5	35979	NatureServe PLOTS database 2001-2007
Eupatorium mohrii	Mohr's thoroughwort	G4?	502518	Dickson 1992
Eupatorium perfoliatum var. perfoliatum	common boneset	G5T5	528117	NatureServe PLOTS database 2001-2007
Eupatorium purpureum var. purpureum	sweetscented joepyeweed	G5T5?	528118	NatureServe PLOTS database 2001-2007

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Eupatorium rotundifolium	roundleaf thoroughwort	G5	36001	NatureServe PLOTS database 2001-2007
Eupatorium rotundifolium var. rotundifolium	roundleaf thoroughwort	G5T5	528121	Dickson 1992
Eupatorium rotundifolium var. scabridum	roundleaf thoroughwort	G5T3T5	528122	Dickson 1992
Eupatorium serotinum	lateflowering thoroughwort	G5	35981	NatureServe PLOTS database 2001-2007
Eupatorium sessilifolium	upland boneset	G5	36004	Dickson 1992
Eupatorium sessilifolium var. vaseyi	upland boneset	G5T3T5	528125	Whetstone et al. 1997
Euphorbia corollata	flowering spurge	G5	28057	NatureServe PLOTS database 2001-2007
Euphorbia dentata var. dentata	toothed spurge	G5T5?	566240	Whetstone et al. 1997
Euphorbia mercurialina	mercury spurge	G4	28101	NatureServe PLOTS database 2001-2007
Euphorbia pubentissima	false flowering spurge	G5	28125	NatureServe PLOTS database 2001-2007
Eurybia divaricata	white wood aster	G5	513440	NatureServe PLOTS database 2001-2007
Eurybia hemispherica	southern prairie aster	G4	513445	Whetstone et al. 1997
*Eurybia surculosa	creeping aster	G4G5	513462	Whetstone et al. 1997
Fagus grandifolia	American beech	G5	19462	NatureServe PLOTS database 2001-2007
Fimbristylis autumnalis	slender fimbry	G5	40111	Whetstone et al. 1997
Fleischmannia incarnata	pink thoroughwort	G5	37385	NatureServe PLOTS database 2001-2007
*Fothergilla major	mountain witchalder	G3	19030	NatureServe PLOTS database 2001-2007
Frangula caroliniana	Carolina buckthorn	G5	506986	NatureServe PLOTS database 2001-2007
Fraxinus americana	white ash	G5	32931	NatureServe PLOTS database 2001-2007
Fraxinus pennsylvanica	green ash	G5	32929	Whetstone et al. 1997
Galactia volubilis	downy milkpea	G5	26703	NatureServe PLOTS database 2001-2007
Galax urceolata	beetleweed	G5	502705	NatureServe PLOTS database 2001-2007
Galium circaezans	licorice bedstraw	G5	34800	NatureServe PLOTS database 2001-2007
Galium obtusum	bluntleaf bedstraw	G5	34802	NatureServe PLOTS database 2001-2007
Galium pilosum	hairy bedstraw	G5	34907	NatureServe PLOTS database 2001-2007
Galium tinctorium	stiff marsh bedstraw	G5	34803	Whetstone et al. 1997

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Galium triflorum	fragrant bedstraw	G5	34933	Dickson 1992
Gamochaeta purpurea	spoonleaf purple everlasting	G5	37421	Whetstone et al. 1997
Gaura filipes	slenderstalk beeblossom	G5	27649	Whetstone et al. 1997
Gaylussacia dumosa	dwarf huckleberry	G5	23662	NatureServe PLOTS database 2001-2007
Gelsemium sempervirens	evening trumpetflower	G5	29932	NatureServe PLOTS database 2001-2007
Gentiana decora	showy gentian	G4?	29975	Dickson 1992
Gentiana saponaria var. saponaria	harvestbells	G5T5	566244	NatureServe PLOTS database 2001-2007
Gentiana villosa	striped gentian	G4	29990	NatureServe PLOTS database 2001-2007
Geranium carolinianum var. carolinianum	Carolina geranium	G5T5	528236	NatureServe PLOTS database 2001-2007
Geranium maculatum	spotted geranium	G5	29107	NatureServe PLOTS database 2001-2007
Geum canadense var. canadense	white avens	G5T5	195814	Whetstone et al. 1997
Glandularia canadensis	rose mock vervain	G5	502784	Whetstone et al. 1997
Gleditsia triacanthos	honeylocust	G5	26714	Whetstone et al. 1997
Goodyera pubescens	downy rattlesnake plantain	G5	43594	NatureServe PLOTS database 2001-2007
Gratiola neglecta	clammy hedgehyssop	G5	33197	Whetstone et al. 1997
Gratiola pilosa	shaggy hedgehyssop	G5?	33198	Dickson 1992
Gymnopogon ambiguus	bearded skeletongrass	G4	41749	NatureServe PLOTS database 2001-2007
Halesia diptera	two-wing silverbell	G5	23865	NatureServe PLOTS database 2001-2007
Halesia tetraptera var. tetraptera	mountain silverbell	G5T5	528317	NatureServe PLOTS database 2001-2007
Hamamelis virginiana	American witchhazel	G5	19033	NatureServe PLOTS database 2001-2007
Hasteola suaveolens	false Indian plaintain	G4	37587	Dickson 1992
Hedera helix	English ivy	GNR	29393	Whetstone et al. 1997
Helenium amarum var. amarum	yellowdicks	G5T5	528345	Whetstone et al. 1997
Helenium autumnale var. autumnale	common sneezeweed	G5T5	528347	Whetstone et al. 1997
Helenium flexuosum	purplehead sneezeweed	G5	36016	Whetstone et al. 1997
Helianthus angustifolius	swamp sunflower	G5	502919	Whetstone et al. 1997
Helianthus atrorubens	purpledisk sunflower	G5	36620	NatureServe PLOTS database 2001-2007
Helianthus divaricatus	woodland sunflower	G5	36636	NatureServe PLOTS database

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				2001-2007
Helianthus hirsutus	hairy sunflower	G5	36646	Whetstone et al. 1997
Helianthus longifolius	longleaf sunflower	G3	36651	NatureServe PLOTS database 2001-2007
Helianthus microcephalus	small woodland sunflower	G5	36654	NatureServe PLOTS database 2001-2007
Heliotropium indicum	Indian heliotrope	G5	31638	Whetstone et al. 1997
Hepatica nobilis	hepatica	G5	18779	NatureServe PLOTS database 2001-2007
Hepatica nobilis var. acuta	sharplobe hepatica	G5T5	528378	Whetstone et al. 1997
Hepatica nobilis var. obtusa	roundlobe hepatica	G5T5	528379	NatureServe PLOTS database 2001-2007
Heteranthera limosa	blue mudplantain	G5	42618	Dickson 1992
Heterotheca camporum var. glandulissimum	lemonyellow false goldenaster	G5TNR	528386	Whetstone et al. 1997
Heterotheca subaxillaris	camphorweed	G5	37686	Whetstone et al. 1997
Heuchera americana var. americana	American alumroot	G5T5	528400	NatureServe PLOTS database 2001-2007
Heuchera parviflora var. parviflora	littleflower alumroot	G4T4	528417	Dickson 1992
Heuchera villosa var. villosa	hairy alumroot	G5T5	528436	NatureServe PLOTS database 2001-2007
Hexastylis arifolia	littlebrownjug	G5	502983	NatureServe PLOTS database 2001-2007
Hexastylis arifolia var. ruthii	Ruth's littlebrownjug	G5T4?	528439	NatureServe PLOTS database 2001-2007
Hexastylis shuttleworthii	largeflower heartleaf	G4	502989	NatureServe PLOTS database 2001-2007
Hexastylis shuttleworthii var. shuttleworthii	largeflower heartleaf	G4T4	528441	NatureServe PLOTS database 2001-2007
Hexastylis virginica	Virginia heartleaf	G4	502990	Dickson 1992
Hibiscus moscheutos	crimsoneyed rosemallow	G5	21612	Whetstone et al. 1997
Hieracium gronovii	queendevil	G5	37710	Whetstone et al. 1997
Hieracium venosum	rattlesnakeweed	G5	37734	NatureServe PLOTS database 2001-2007
Holcus lanatus	common velvetgrass	GNR	41773	Dickson 1992
Hordeum pusillum	little barley	G5	40866	Dickson 1992
Houstonia caerulea	azure bluet	G5	35038	NatureServe PLOTS database 2001-2007
Houstonia purpurea	Venus' pride	G5	35051	NatureServe PLOTS database 2001-2007
Houstonia purpurea var. purpurea	Venus' pride	G5T5	196210	NatureServe PLOTS database 2001-2007
Houstonia pusilla	tiny bluet	G5	35052	Dickson 1992
Hybanthus concolor	eastern greenviolet	G5	22026	NatureServe PLOTS database 2001-2007

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Hydrangea arborescens	wild hydrangea	G5	24195	NatureServe PLOTS database 2001-2007
Hydrangea cinerea	ashy hydrangea	G4	503096	NatureServe PLOTS database 2001-2007
Hydrangea quercifolia	oakleaf hydrangea	G5	24200	NatureServe PLOTS database 2001-2007
Hydrophyllum canadense	bluntleaf waterleaf	G5	31390	Whetstone et al. 1997
Hymenocallis caroliniana	Carolina spiderlily	G4	503104	NatureServe PLOTS database 2001-2007
Hypericum cistifolium	roundpod St. Johnswort	G5	21432	Dickson 1992
Hypericum crux-andreae	St. Peterswort	G5	503132	Dickson 1992
Hypericum frondosum	cedarglade St. Johnswort	G4	21440	NatureServe PLOTS database 2001-2007
Hypericum gentianoides	orangegrass	G5	21420	NatureServe PLOTS database 2001-2007
Hypericum hypericoides	St. Andrew's cross	G5	503138	Whetstone et al. 1997
Hypericum hypericoides ssp. hypericoides	St. Andrew's cross	G5T5	524169	NatureServe PLOTS database 2001-2007
Hypericum hypericoides ssp. multicaule	St. Andrew's cross	G5T4	524170	Dickson 1997
Hypericum mutilum	dwarf St. Johnswort	G5	21421	NatureServe PLOTS database 2001-2007
Hypericum prolificum	shrubby St. Johnswort	G5	21455	Dickson 1992
Hypericum pseudomaculatum	false spotted St. Johnswort	G5?	21456	Dickson 1992
Hypericum punctatum	spotted St. Johnswort	G5	21422	Whetstone et al. 1997
Hypoxis curtissii	Curtis' star-grass	GNR	515032	Dickson 1992
Hypoxis hirsuta	common goldstar	G5	503146	NatureServe PLOTS database 2001-2007
Hypoxis wrightii	Wright's star-grass	G4	515037	Dickson 1992
Ilex ambigua	Carolina holly	G5	27987	NatureServe PLOTS database 2001-2007
Ilex decidua	possumhaw	G5	27998	NatureServe PLOTS database 2001-2007
Ilex longipes	Georgia holly	G5	28001	NatureServe PLOTS database 2001-2007
Ilex opaca var. opaca	American holly	G5T5	27983	NatureServe PLOTS database 2001-2007
Ilex verticillata	common winterberry	G5	27985	NatureServe PLOTS database 2001-2007
Impatiens capensis	jewelweed	G5	29182	Whetstone et al. 1997
Ionactis linariifolius	flaxleaf whitetop aster	G5	507245	Dickson 1992
Ipomoea coccinea	redstar	GNR	30770	Whetstone et al. 1997

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Ipomoea hederacea	ivyleaf morning-glory	G5	503177	Whetstone et al. 1997
Ipomoea lacunosa	whitestar	G5?	30776	Whetstone et al. 1997
Ipomoea pandurata	man of the earth	G5	30786	NatureServe PLOTS database 2001-2007
Ipomoea purpurea	tall morning-glory	GNR	30789	Whetstone et al. 1997
Iris cristata	dwarf crested iris	G5	43204	NatureServe PLOTS database 2001-2007
Iris verna var. smalliana	dwarf violet iris	G5T4T5	528565	NatureServe PLOTS database 2001-2007
Isanthus brachiatus	fluxweed	G5	515269	Dickson 1992
Isoetes engelmannii	Appalachian quillwort	G4	17127	NatureServe PLOTS database 2001-2007
Itea virginica	Virginia sweetspire	G4	24202	NatureServe PLOTS database 2001-2007
Juglans nigra	black walnut	G5	19254	NatureServe PLOTS database 2001-2007
Juncus acuminatus	tapertip rush	G5	39221	Whetstone et al. 1997
Juncus coriaceus	leathery rush	G5	39230	Whetstone et al. 1997
Juncus debilis	weak rush	G5	39231	Dickson 1992
Juncus diffusissimus	slimpod rush	G5	39265	Whetstone et al. 1997
Juncus effusus var. solutus	lamp rush	G5T5	528617	NatureServe PLOTS database 2001-2007
Juncus marginatus	grassleaf rush	G5	39289	Whetstone et al. 1997
Juncus scirpoides	needlepod rush	G5	39312	Dickson 1992
Juncus secundus	lopsided rush	G5?	39313	Whetstone et al. 1997
Juncus tenuis	poverty rush	G5	39243	NatureServe PLOTS database 2001-2007
Juncus validus var. validus	roundhead rush	G5T3T5	528645	Whetstone et al. 1997
Juniperus virginiana var. virginiana	eastern redcedar	G5T5	194806	NatureServe PLOTS database 2001-2007
Justicia americana	American water-willow	G5	34352	NatureServe PLOTS database 2001-2007
Kalmia latifolia	mountain laurel	G5	23677	NatureServe PLOTS database 2001-2007
Krigia biflora	twoflower dwarfdandelion	G5	37810	NatureServe PLOTS database 2001-2007
Krigia caespitosa	weedy dwarfdandelion	G5	565260	Whetstone et al. 1997
Krigia dandelion	potato dwarfdandelion	G5	37812	Whetstone et al. 1997
Krigia virginica	Virginia dwarfdandelion	G5	37816	NatureServe PLOTS database 2001-2007
Kummerowia striata	Japanese clover	GNR	503294	NatureServe PLOTS database 2001-2007
Lactuca canadensis	Canada lettuce	G5	36596	Whetstone et al. 1997
Lactuca floridana	woodland lettuce	G5	36599	Whetstone et al. 1997
Lactuca serriola	prickly lettuce	GNR	36608	Whetstone et al. 1997

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Lamium amplexicaule	henbit deadnettle	GNR	32539	Whetstone et al. 1997
Lamium purpureum var. purpureum	purple deadnettle	GNRTNR	528671	Whetstone et al. 1997
Laportea canadensis	Canadian woodnettle	G5	19127	NatureServe PLOTS database 2001-2007
Lathyrus hirsutus	Caley pea	GNR	25845	Whetstone et al. 1997
*Lathyrus venosus	veiny pea	G5	25886	NatureServe PLOTS database 2001-2007
Lechea minor	thymeleaf pinweed	G5	22290	Dickson 1992
Lechea racemulosa	Illinois pinweed	G5	22295	NatureServe PLOTS database 2001-2007
Leersia virginica	whitegrass	G5	40890	NatureServe PLOTS database 2001-2007
Lepidium virginicum var. virginicum	Virginia pepperweed	G5T5	528742	Whetstone et al. 1997
Lespedeza capitata	roundhead lespedeza	G5	25897	NatureServe PLOTS database 2001-2007
Lespedeza cuneata	Chinese lespedeza	GNR	25898	NatureServe PLOTS database 2001-2007
Lespedeza hirta	hairy lespedeza	G5	25900	NatureServe PLOTS database 2001-2007
Lespedeza procumbens	trailing lespedeza	G5	25907	NatureServe PLOTS database 2001-2007
Lespedeza repens	creeping lespedeza	G5	503402	NatureServe PLOTS database 2001-2007
Lespedeza stuevei	tall lespedeza	G4?	25911	Whetstone et al. 1997
Lespedeza violacea	violet lespedeza	G5	25914	NatureServe PLOTS database 2001-2007
Lespedeza virginica	slender lespedeza	G5	25915	NatureServe PLOTS database 2001-2007
Leucanthemum vulgare	oxeye daisy	GNR	37903	NatureServe PLOTS database 2001-2007
Liatris aspera	tall blazing star	G4G5	37909	Whetstone et al. 1997
Liatris microcephala	smallhead blazing star	G3G4	37930	NatureServe PLOTS database 2001-2007
Liatris pilosa var. pilosa	shaggy blazing star	G5?T4T5	531224	NatureServe PLOTS database 2001-2007; Whetstone et al. 1997
Liatris spicata	dense blazing star	G5	37944	Dickson 1992
Liatris squarrosa	scaly blazing star	G5	37945	Whetstone et al. 1997
Liatris squarrulosa	Appalachian blazing star	G4G5	503447	Dickson 1992
Ligustrum sinense	Chinese privet	GNR	32979	NatureServe PLOTS database 2001-2007
Ligustrum vulgare	European privet	GNR	32980	Rogers and Johnson 2000
Linaria vulgaris	butter and eggs	GNR	33216	Whetstone et al. 1997

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Lindera benzoin var. pubescens	northern spicebush	G5TNR	194909	NatureServe PLOTS database 2001-2007
Lindernia monticola	piedmont false pimpernel	G4	33225	Whetstone et al. 1997
Linum medium var. texanum	stiff yellow flax	G5T5	528821	NatureServe PLOTS database 2001-2007
Linum striatum	ridged yellow flax	G5	29223	Whetstone et al. 1997
Liquidambar styraciflua	sweetgum	G5	19027	NatureServe PLOTS database 2001-2007
Liriodendron tulipifera	tuliptree	G5	18086	NatureServe PLOTS database 2001-2007
Lithospermum canescens	hoary puccoon	G5	31945	Whetstone et al. 1997
Lithospermum tuberosum	tuberous stoneseed	G4	31954	Whetstone et al. 1997
Lobelia cardinalis	cardinalflower	G5	34505	NatureServe PLOTS database 2001-2007
Lobelia inflata	Indian-tobacco	G5	34524	NatureServe PLOTS database 2001-2007
Lobelia nuttallii	Nuttall's lobelia	G4G5	34527	NatureServe PLOTS database 2001-2007
Lobelia puberula	downy lobelia	G5	34529	NatureServe PLOTS database 2001-2007
Lobelia spicata	palespike lobelia	G5	34532	Whetstone et al. 1997
Lolium perenne	perennial ryegrass	GNR	40893	Dickson 1992
Lolium pratense	meadow ryegrass	G5	507983	NatureServe PLOTS database 2001-2007
Lonicera flava	yellow honeysuckle	G5?	35292	NatureServe PLOTS database 2001-2007
Lonicera japonica	Japanese honeysuckle	GNR	35283	NatureServe PLOTS database 2001-2007
Lonicera sempervirens	trumpet honeysuckle	G5	35303	NatureServe PLOTS database 2001-2007
Ludwigia alternifolia	seedbox	G5	27335	Whetstone et al. 1997
Ludwigia decurrens	wingleaf primrose-willow	G5	27343	NatureServe PLOTS database 2001-2007
Ludwigia leptocarpa	anglestem primrose-willow	G5	27349	NatureServe PLOTS database 2001-2007
Ludwigia peploides ssp. glabrescens	floating primrose-willow	G5T5	524268	Whetstone et al. 1997
Luzula acuminata	hairy woodrush	G5	39336	NatureServe PLOTS database 2001-2007
Luzula acuminata var. carolinae	Carolina woodrush	G5T4T5	529015	Whetstone et al. 1997
Luzula bulbosa	bulbous woodrush	G5	39338	NatureServe PLOTS database 2001-2007
Luzula echinata	hedgehog woodrush	G5	39342	Whetstone et al. 1997
Lycopodium digitatum	fan clubmoss	G5	17028	NatureServe PLOTS database 2001-2007

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Lycopus rubellus	taperleaf water horehound	G5	32261	NatureServe PLOTS database 2001-2007
Lycopus virginicus	Virginia water horehound	G5	32255	NatureServe PLOTS database 2001-2007
*Lygodium palmatum	American climbing fern	G4	17985	Dickson 1992
Lyonia ligustrina	maleberry	G5	23559	NatureServe PLOTS database 2001-2007
*Lysimachia graminea	grassleaf yellow loosestrife	G1Q	195805	NatureServe PLOTS database 2001-2007
Lysimachia hybrida	lowland yellow loosestrife	G5	23990	Dickson 1992
Lysimachia lanceolata	lanceleaf loosestrife	G5	23991	NatureServe PLOTS database 2001-2007
Lysimachia quadriflora	fourflower yellow loosestrife	G5?	23996	NatureServe PLOTS database 2001-2007
Lysimachia quadrifolia	whorled yellow loosestrife	G5	23997	NatureServe PLOTS database 2001-2007
Lysimachia tonsa	southern yellow loosestrife	G4	24001	Dickson 1992
Maclura pomifera	osage orange	G4G5	19102	Whetstone et al. 1997
Magnolia acuminata	cucumber-tree	G5	18071	NatureServe PLOTS database 2001-2007
Magnolia macrophylla	bigleaf magnolia	G5	18075	Whetstone et al. 1997
Magnolia tripetala	umbrella-tree	G5	18077	NatureServe PLOTS database 2001-2007
Maianthemum racemosum ssp. racemosum	feathery false lily of the vally	G5T5	524297	NatureServe PLOTS database 2001-2007
Malaxis unifolia	green adder's-mouth orchid	G5	43647	NatureServe PLOTS database 2001-2007
Malus angustifolia var. angustifolia	southern crabapple	G5?T5?	529082	NatureServe PLOTS database 2001-2007
Malus coronaria	sweet crabapple	G5	25257	Dickson 1992
Malus pumila	paradise apple	G5	25262	Dickson 1992
Manfreda virginica	false aloe	G5	503687	NatureServe PLOTS database 2001-2007
*Marshallia trinervia	broadleaf Barbara's buttons	G3	38072	NatureServe PLOTS database 2001-2007
Mecardonia acuminata	axilflower	G5	33645	Whetstone et al. 1997
Medeola virginiana	Indian cucumber	G5	42963	NatureServe PLOTS database 2001-2007
Medicago lupulina	black medick	GNR	503721	NatureServe PLOTS database 2001-2007
Medicago sativa ssp. sativa	alfalfa	GNRTNR	524303	Whetstone et al. 1997
*Melanthium parviflorum	Appalachian bunchflower	G4?	42966	NatureServe PLOTS database 2001-2007
Melia azedarach	Chinaberrytree	GNR	29024	Whetstone et al. 1997

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Melica mutica	twoflower melicgrass	G5	41858	NatureServe PLOTS database 2001-2007
Melothria pendula	Guadeloupe cucumber	G5?	22339	Whetstone et al. 1997
Microstegium vimineum	Nepalese browntop	GNR	503829	NatureServe PLOTS database 2001-2007
Mikania scandens	climbing hempvine	G5	36043	NatureServe PLOTS database 2001-2007
Mimosa microphylla	littleleaf sensitive-briar	G5	507831	NatureServe PLOTS database 2001-2007
Minuartia glabra	Appalachian stitchwort	G4	19995	NatureServe PLOTS database 2001-2007
Mitchella repens	partridgeberry	G5	35063	NatureServe PLOTS database 2001-2007
*Monarda clinopodia	white bergamot	G5	32288	NatureServe PLOTS database 2001-2007
Monarda fistulosa	wild bergamot	G5	565311	NatureServe PLOTS database 2001-2007
Monotropa hypopithys	pinesap	G5	503871	NatureServe PLOTS database 2001-2007
Monotropa uniflora	Indianpipe	G5	23778	NatureServe PLOTS database 2001-2007
Morus rubra var. rubra	red mulberry	G5T5	529232	Whetstone et al. 1997
Murdannia keisak	wartremoving herb	GNR	39145	Whetstone et al. 1997
Muscari neglectum	starch grape hyacinth	GNR	503892	Whetstone et al. 1997
Myriophyllum pinnatum	cutleaf watermilfoil	G5	27038	Whetstone et al. 1997
*Nestronia umbellula	leechbrush	G4	503952	NatureServe PLOTS database 2001-2007
Nicandra physalodes	apple of Peru	GNR	30561	Dickson 1992
Nothoscordum bivalve	crowpoison	G4	503966	Whetstone et al. 1997
Nuttallanthus canadensis	Canada toadflax	G5	503969	NatureServe PLOTS database 2001-2007
Nyssa sylvatica	blackgum	G5	27821	NatureServe PLOTS database 2001-2007
Obolaria virginica	Virginia pennywort	G5	30104	Whetstone et al. 1997
Oclemena acuminata	whorled wood aster	G5	507627	Dickson 1992
Oenothera biennis	common evening-primrose	G5	27368	Whetstone et al. 1997
Oenothera fruticosa	narrowleaf evening-primrose	G5	27369	Whetstone et al. 1997
Oenothera laciniata	cutleaf evening-primrose	G5	27371	NatureServe PLOTS database 2001-2007
Oenothera speciosa	pinkladies	G5	27415	Whetstone et al. 1997
Onoclea sensibilis	sensitive fern	G5	17637	NatureServe PLOTS database 2001-2007
Onosmodium virginianum	wild Job's tears	G4	31969	Whetstone et al. 1997

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Ophioglossum vulgatum	southern adderstongue	G5	565333	Whetstone et al. 1997
Opuntia humifusa	devil's-tongue	G5	19710	NatureServe PLOTS database 2001-2007
Orbexilum pedunculatum var. pedunculatum	Sampson's snakeroot	G5T5?	529302	NatureServe PLOTS database 2001-2007
Orontium aquaticum	goldenclub	G5	42532	NatureServe PLOTS database 2001-2007
Osmorhiza claytonii	Clayton's sweetroot	G5	29789	Whetstone et al. 1997
Osmorhiza longistylis	longstyle sweetroot	G5	29791	Whetstone et al. 1997
Osmunda cinnamomea	cinnamon fern	G5	17219	NatureServe PLOTS database 2001-2007
Osmunda regalis var. spectabilis	royal fern	G5T5	529314	NatureServe PLOTS database 2001-2007
Ostrya virginiana	hophornbeam	G5	19511	NatureServe PLOTS database 2001-2007
Oxalis corniculata	creeping woodsorrel	GNR	29067	Dickson 1992
*Oxalis grandis	great yellow woodsorrel	G4G5	29083	Dickson 1992
Oxalis priceae ssp. colorea	tufted yellow woodsorrel	G3G5TNR	524396	Whetstone et al. 1997
Oxalis stricta	common yellow oxalis	G5	29095	NatureServe PLOTS database 2001-2007; Whetstone et al. 1997
Oxalis violacea	violet woodsorrel	G5	29098	NatureServe PLOTS database 2001-2007
Oxydendrum arboreum	sourwood	G5	23690	NatureServe PLOTS database 2001-2007
Oxypolis rigidior	stiff cowbane	G5	29544	NatureServe PLOTS database 2001-2007
*Pachysandra procumbens	Allegheny-spurge	G4G5	28027	Whetstone et al. 1997
Packera anonyma	Small's ragwort	G5	518137	NatureServe PLOTS database 2001-2007
Packera glabella	butterweed	G5	565358	NatureServe PLOTS database 2001-2007
Panax quinquefolius	American ginseng	G3G4	29399	NatureServe PLOTS database 2001-2007
Panicum anceps	beaked panicgrass	G5	40904	NatureServe PLOTS database 2001-2007
Panicum capillare	witchgrass	G5	40914	NatureServe PLOTS database 2001-2007
Panicum dichotomiflorum var. dichotomiflorum	fall panicgrass	G5T5	529361	Dickson 1992
Panicum virgatum var. virgatum	switchgrass	G5T5	529371	NatureServe PLOTS database 2001-2007
Paronychia argyrocoma	silvery nailwort	G4	20321	Dickson 1992
Paronychia fastigiata	hairy forked nailwort	G5	20334	NatureServe PLOTS database

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				2001-2007
Parthenium integrifolium var. integrifolium	wild quinine	G5T5	529405	NatureServe PLOTS database 2001-2007
Parthenocissus quinquefolia	Virginia creeper	G5	28602	NatureServe PLOTS database 2001-2007
Paspalum dilatatum	dallisgrass	GNR	40997	Dickson 1992
Paspalum laeve	field paspalum	G4G5	41024	Dickson 1992
Paspalum setaceum	thin paspalum	G5	41042	Dickson 1992
Passiflora incarnata	purple passionflower	G5	504139	Whetstone et al. 1997
Passiflora lutea	yellow passionflower	G5	22226	NatureServe PLOTS database 2001-2007
Pedicularis canadensis ssp. canadensis	Canadian lousewort	G5T5	524407	NatureServe PLOTS database 2001-2007
Pellaea atropurpurea	purple cliffbrake	G5	17641	Whetstone et al. 1997
Pennisetum glaucum	pearl millet	GNR	565385	Dickson 1992
Penstemon australis	Eustis Lake beardtongue	G5	33823	Whetstone et al. 1997
Penstemon calycosus	longsepal beardtongue	G5	33845	Whetstone et al. 1997
Penstemon canescens	eastern gray beardtongue	G4	33846	NatureServe PLOTS database 2001-2007
Penstemon laevigatus	eastern smooth beardtongue	G5	33929	Whetstone et al. 1997
Perideridia americana	eastern yampah	G4	29797	NatureServe PLOTS database 2001-2007
Perilla frutescens var. frutescens	beefsteakplant	GNRTNR	529521	NatureServe PLOTS database 2001-2007
Phacelia bipinnatifida	fernleaf phacelia	G5	31459	NatureServe PLOTS database 2001-2007
Phacelia purshii	Miami mist	G5	504279	Whetstone et al. 1997
Phanopyrum gymnocarpon	savannah-panicgrass	G5	42017	NatureServe PLOTS database 2001-2007
Phaseolus polystachios	thicket bean	G5	504291	NatureServe PLOTS database 2001-2007
Phegopteris hexagonoptera	broad beechfern	G5	504296	Dickson 1992
Philadelphus hirsutus	streambank mock orange	G5	24427	Whetstone et al. 1997
Philadelphus inodorus	scentless mock orange	G4G5	24429	NatureServe PLOTS database 2001-2007
Phlox amoena ssp. amoena	hairy phlox	G4TNR	524465	NatureServe PLOTS database 2001-2007
Phlox carolina	thickleaf phlox	G5?	30921	Dickson 1992
Phlox divaricata	wild blue phlox	G5	30934	NatureServe PLOTS database 2001-2007
Phlox glaberrima	smooth phlox	G5	30940	Whetstone et al. 1997
Phoradendron leucarpum	oak mistletoe	G5	504341	NatureServe PLOTS database 2001-2007

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Photinia melanocarpa	black chokeberry	G5	565397	NatureServe PLOTS database 2001-2007
Photinia pyrifolia	red chokeberry	G5	565398	NatureServe PLOTS database 2001-2007
Phryma leptostachya	American lopseed	G5	504348	Whetstone et al. 1997
Phyllostachys aurea	golden bamboo	GNR	42023	Dickson 1992
Physalis heterophylla var. heterophylla	clammy groundcherry	G5T5	531099	NatureServe PLOTS database 2001-2007
Physalis virginiana var. virginiana	Virginia groundcherry	G5T5	529641	Whetstone et al. 1997
Physocarpus opulifolius var. opulifolius	common ninebark	G5T5	529660	NatureServe PLOTS database 2001-2007
Phytolacca americana	American pokeweed	G5	19523	NatureServe PLOTS database 2001-2007
Pilea pumila var. pumila	Canadian clearweed	G5T5	529663	NatureServe PLOTS database 2001-2007
Pinus echinata	shortleaf pine	G5	183335	NatureServe PLOTS database 2001-2007
Pinus strobus	eastern white pine	G5	183385	Dickson 1992
Pinus taeda	loblolly pine	G5	18037	NatureServe PLOTS database 2001-2007
Pinus virginiana	Virginia pine	G5	183394	NatureServe PLOTS database 2001-2007
Piptochaetium avenaceum	blackseed speargrass	G5	504408	NatureServe PLOTS database 2001-2007
Pityopsis graminifolia	narrowleaf silkgrass	G5	196349	NatureServe PLOTS database 2001-2007
Pityopsis graminifolia var. graminifolia	narrowleaf silkgrass	G5T4	196350	Dickson 1992
Plantago aristata	largebracted plantain	G5	32875	NatureServe PLOTS database 2001-2007
Plantago heterophylla	slender plantain	G5	32905	Whetstone et al. 1997
Plantago lanceolata	narrowleaf plantain	G5	32874	NatureServe PLOTS database 2001-2007
Plantago rugelii var. rugelii	blackseed plantain	G5T5	529717	NatureServe PLOTS database 2001-2007
Plantago virginica	Virginia plantain	G5	32895	NatureServe PLOTS database 2001-2007
Platanthera ciliaris	yellow fringed orchid	G5	43413	Whetstone et al. 1997
Platanus occidentalis	American sycamore	G5	19020	NatureServe PLOTS database 2001-2007
Pleopeltis polypodioides ssp. michauxiana	resurrection fern	G5T5	524533	NatureServe PLOTS database 2001-2007
Pluchea camphorata	camphor pluchea	G5	36061	NatureServe PLOTS database 2001-2007
Poa cuspidata	early bluegrass	G5	41122	Dickson 1992
Podophyllum peltatum	mayapple	G5	18850	NatureServe PLOTS database 2001-2007

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Podostemum ceratophyllum	hornleaf riverweed	G5	27031	Dickson 1992
Polygala ambigua	whorled milkwort	G5	519324	Dickson 1992
Polygala cruciata	drumheads	G5	29331	Dickson 1992
Polygala curtissii	Curtiss' milkwort	G5	29332	NatureServe PLOTS database 2001-2007
Polygala nana	candyroot	G5	29351	NatureServe PLOTS database 2001-2007
Polygala polygama	racemed milkwort	G5	29308	Whetstone et al. 1997
Polygala verticillata	whorled milkwort	G5	29320	Whetstone et al. 1997
Polygonatum biflorum var. commutatum	smooth Solomon's seal	G5T5	529769	NatureServe PLOTS database 2001-2007
Polygonella americana	southern jointweed	G5	21307	NatureServe PLOTS database 2001-2007
Polygonum aviculare	prostrate knotweed	GNR	20876	Whetstone et al. 1997
Polygonum caespitosum var. longisetum	oriental ladysthumb	GNRTNR	566299	Whetstone et al. 1997
Polygonum erectum	erect knotweed	G5	20893	Dickson 1992
Polygonum pensylvanicum	Pennsylvania smartweed	G5	20861	Whetstone et al. 1997
Polygonum punctatum var. punctatum	dotted smartweed	G5T5	529787	Whetstone et al. 1997
Polygonum scandens var. scandens	climbing false buckwheat	G5T5	529792	Whetstone et al. 1997
Polygonum tenue	pleatleaf knotweed	G5	20929	Dickson 1992
Polymnia canadensis	whiteflower leafcup	G5	36438	NatureServe PLOTS database 2001-2007
Polypodium virginianum	rock polypody	G5	17242	NatureServe PLOTS database 2001-2007
Polystichum acrostichoides var. acrostichoides	Christmas fern	G5T5	529799	NatureServe PLOTS database 2001-2007
Populus deltoides ssp. deltoides	eastern cottonwood	G5T5	22446	Whetstone et al. 1997
Porteranthus stipulatus	Indian physic	G5	25284	Whetstone et al. 1997
Porteranthus trifoliatus	Bowman's root	G4G5	25285	NatureServe PLOTS database 2001-2007
Potentilla canadensis var. canadensis	dwarf cinquefoil	G5T5	529812	NatureServe PLOTS database 2001-2007
Potentilla simplex	common cinquefoil	G5	24751	NatureServe PLOTS database 2001-2007
Prenanthes altissima	tall rattlesnakeroot	G5?	38273	NatureServe PLOTS database 2001-2007
Prenanthes serpentaria	cankerweed	G5	38286	Whetstone et al. 1997
Prosartes lanuginosa	yellow fairybells	G5	-502781	NatureServe PLOTS database 2001-2007
Prunella vulgaris ssp. lanceolata	lance selfheal	G5T5	32384	NatureServe PLOTS database 2001-2007

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Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Prunus angustifolia var. angustifolia	Chickasaw plum	G5T4T5	529868	Whetstone et al. 1997
Prunus mexicana	Mexican plum	G4G5	24791	Whetstone et al. 1997
Prunus persica	peach	G5	24765	Whetstone et al. 1997
Prunus serotina var. serotina	black cherry	G5T5	529886	NatureServe PLOTS database 2001-2007
Pseudognaphalium obtusifolium	rabbittobacco	G5	507657	NatureServe PLOTS database 2001-2007
Pseudognaphalium obtusifolium ssp. obtusifolium	rabbittobacco	G5T5	525057	Whetstone et al. 1997
Pteridium aquilinum	western brackenfern	G5	17224	NatureServe PLOTS database 2001-2007
*Ptilimnium nodosum	piedmont mock bishopweed	G2	29554	Whetstone et al. 1997
Pueraria montana var. lobata	kudzu	GNRTNR	529930	Rogers and Johnson 2000
Pycnanthemum albescens	whiteleaf mountainmint	G5	32657	NatureServe PLOTS database 2001-2007
Pycnanthemum incanum var. puberulum	hoary mountainmint	G5T4?	529932	NatureServe PLOTS database 2001-2007
Pycnanthemum tenuifolium	narrowleaf mountainmint	G5	32668	Whetstone et al. 1997
Pyrrhopappus carolinianus	Carolina desert-chicory	G5	38324	Whetstone et al. 1997
*Pyrularia pubera	buffalo nut	G5	504705	NatureServe PLOTS database 2001-2007
Pyrus communis	common pear	G5	25295	Whetstone et al. 1997
Quercus alba	white oak	G5	19290	NatureServe PLOTS database 2001-2007
Quercus coccinea	scarlet oak	G5	19288	NatureServe PLOTS database 2001-2007
Quercus falcata	southern red oak	G5	19277	NatureServe PLOTS database 2001-2007
*Quercus georgiana	Georgia oak	G3	19341	Whetstone et al. 1997
Quercus incana	bluejack oak	G5	19360	Whetstone et al. 1997
Quercus laurifolia	laurel oak	G5	19368	Dickson 1992
Quercus margarettiae	runner oak	G5	504713	NatureServe PLOTS database 2001-2007
Quercus marilandica	blackjack oak	G5	19374	NatureServe PLOTS database 2001-2007
Quercus muehlenbergii	chinkapin oak	G5	504714	Whetstone et al. 1997
Quercus nigra	water oak	G5	19280	NatureServe PLOTS database 2001-2007
Quercus phellos	willow oak	G5	19282	NatureServe PLOTS database 2001-2007
Quercus prinus	chestnut oak	G5	19398	NatureServe PLOTS database 2001-2007
Quercus rubra var. rubra	northern red oak	G5T5	195130	NatureServe PLOTS database

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				2001-2007
Quercus shumardii	Shumard's oak	G5	19417	Whetstone et al. 1997
Quercus stellata	post oak	G5	19422	NatureServe PLOTS database 2001-2007
Quercus velutina	black oak	G5	19447	NatureServe PLOTS database 2001-2007
Ranunculus hispidus	bristly buttercup	G5	18613	NatureServe PLOTS database 2001-2007
Ranunculus recurvatus	blisterwort	G5	18641	Whetstone et al. 1997
Ranunculus sardous	hairy buttercup	GNR	18645	Whetstone et al. 1997
Rhexia mariana	Maryland meadowbeauty	G5	27685	NatureServe PLOTS database 2001-2007
Rhexia virginica	handsome Harry	G5	27686	NatureServe PLOTS database 2001-2007
Rhododendron alabamense	Alabama azalea	G4	23701	Dickson 1992
Rhododendron arborescens	smooth azalea	G4G5	23703	NatureServe PLOTS database 2001-2007
Rhododendron canescens	mountain azalea	G5	23712	NatureServe PLOTS database 2001-2007
Rhododendron catawbiense	Catawba rosebay	G5	23714	NatureServe PLOTS database 2001-2007
Rhododendron periclymenoides	pink azalea	G5	23726	Dickson 1992
Rhododendron viscosum	swamp azalea	G5	23731	NatureServe PLOTS database 2001-2007
Rhus copallinum	flameleaf sumac	G5	504754	NatureServe PLOTS database 2001-2007
Rhus glabra	smooth sumac	G5	28782	NatureServe PLOTS database 2001-2007
Rhynchosia tomentosa	twining snoutbean	G5	504773	NatureServe PLOTS database 2001-2007
Rhynchospora caduca	anglestem beaksedge	G5	40154	Dickson 1992
Rhynchospora globularis	globe beaksedge	G5	40173	Whetstone et al. 1997
Rhynchospora glomerata	clustered beaksedge	G5	40174	NatureServe PLOTS database 2001-2007
Rhynchospora gracilenta	slender beaksedge	G5	40147	Whetstone et al. 1997
Rhynchospora inexpansa	nodding beaksedge	G5	40179	NatureServe PLOTS database 2001-2007
Rhynchospora macrostachya	tall horned beaksedge	G4	40148	Dickson 1992
*Ribes curvatum	granite gooseberry	G4	24461	NatureServe PLOTS database 2001-2007
*Ribes cynosbati	eastern prickly gooseberry	G5	24462	NatureServe PLOTS database 2001-2007
Robinia hispida	bristly locust	G4	26191	NatureServe PLOTS database 2001-2007

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Robinia hispida var. hispida	bristly locust	G4T4	530081	NatureServe PLOTS database 2001-2007
Robinia hispida var. rosea	bristly locust	G4T3?	530084	Whetstone et al. 1997
Robinia pseudoacacia	black locust	G5	504804	NatureServe PLOTS database 2001-2007
Rorippa palustris ssp. fernaldiana	Fernald's yellowcress	G5T5	524631	Whetstone et al. 1997
Rosa carolina var. carolina	Carolina rose	G5T5	530107	NatureServe PLOTS database 2001-2007
Rosa multiflora	multiflora rose	GNR	24833	Whetstone et al. 1997
Rosa setigera	climbing rose	G5	24839	Whetstone et al. 1997
Rubus argutus	sawtooth blackberry	G5	24877	NatureServe PLOTS database 2001-2007
Rubus bifrons	Himalayan berry	G5	24891	Whetstone et al. 1997
Rubus flagellaris	northern dewberry	G5	24921	NatureServe PLOTS database 2001-2007
Rubus hispidus	bristly dewberry	G5	24943	Whetstone et al. 1997
Rubus trivialis	southern dewberry	G5	25067	NatureServe PLOTS database 2001-2007
Rudbeckia fulgida var. fulgida	orange coneflower	G5T4?	530161	Whetstone et al. 1997
*Rudbeckia heliopsidis	sunfacing coneflower	G2	36774	NatureServe PLOTS database 2001-2007
Rudbeckia hirta	blackeyed Susan	G5	36765	NatureServe PLOTS database 2001-2007
Rudbeckia hirta var. hirta	blackeyed Susan	G5T4T5	530171	Whetstone et al. 1997
Rudbeckia hirta var. pulcherrima	blackeyed Susan	G5T5	530172	Whetstone et al. 1997
Rudbeckia laciniata	cutleaf coneflower	G5	36775	NatureServe PLOTS database 2001-2007
Rudbeckia triloba	browneyed Susan	G5	36784	Whetstone et al. 1997
Ruellia caroliniensis	Carolina wild petunia	G5	34373	NatureServe PLOTS database 2001-2007
Rumex acetosella	common sheep sorrel	GNR	20934	Whetstone et al. 1997
Rumex crispus	curly dock	GNR	20937	Whetstone et al. 1997
Sabatia angularis	rosepink	G5	30005	Whetstone et al. 1997
Sabatia brachiata	narrowleaf rose gentian	G5?	30001	Dickson 1992
Sabatia campanulata	slender rose gentian	G5	30002	Dickson 1992
*Sabatia capitata	Appalachian rose gentian	G2	30011	Whetstone et al. 1997
Sabatia gentianoides	pinewoods rose gentian	G4G5	30013	Dickson 1992
Saccharum alopecuroidum	silver plumegrass	G5	504929	NatureServe PLOTS database 2001-2007
Saccharum brevibarbe var. contortum	sortbeard plumegrass	G5T5	531431	Dickson 1992

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Saccharum giganteum	sugarcane plumegrass	G5	504933	NatureServe PLOTS database 2001-2007
Sagina decumbens	trailing pearlwort	G5	20022	Whetstone et al. 1997
*Sagittaria secundifolia	Little River arrowhead	G1	182454	NatureServe PLOTS database 2001-2007
Salix nigra	black willow	G5	22484	NatureServe PLOTS database 2001-2007
Salvia lyrata	lyreleaf sage	G5	32690	NatureServe PLOTS database 2001-2007
Salvia urticifolia	nettleleaf sage	G5	32750	Whetstone et al. 1997
Sambucus nigra ssp. canadensis	common elderberry	G5T5	525079	NatureServe PLOTS database 2001-2007
Sanguinaria canadensis	bloodroot	G5	18990	Whetstone et al. 1997
Sanicula canadensis var. canadensis	Canadian blacksnakeroot	G5T5	530236	NatureServe PLOTS database 2001-2007
Sanicula marilandica	Maryland sanicle	G5	29856	NatureServe PLOTS database 2001-2007
Sanicula smallii	Small's blacksnakeroot	G5	29860	NatureServe PLOTS database 2001-2007
*Sarracenia oreophila	green pitcherplant	G2	22000	NatureServe PLOTS database 2001-2007
Sassafras albidum	sassafras	G5	18158	NatureServe PLOTS database 2001-2007
Saururus cernuus	lizard's tail	G5	18221	Whetstone et al. 1997
Saxifraga virginiensis	early saxifrage	G5	24303	NatureServe PLOTS database 2001-2007
Schizachyrium scoparium	little bluestem	G5	42076	NatureServe PLOTS database 2001-2007
Schizachyrium scoparium var. scoparium	little bluestem	G5T5	530264	NatureServe PLOTS database 2001-2007
*Schoenolirion croceum	yellow sunnybell	G4	43025	NatureServe PLOTS database 2001-2007
*Schoenolirion wrightii	Texas sunnybell	G3	505059	Whetstone et al. 1997
Schoenoplectus purshianus	weakstalk bulrush	G4G5	507792	Dickson 1992
Scirpus atrovirens	green bulrush	G5?	40227	NatureServe PLOTS database 2001-2007
Scirpus cyperinus	woolgrass	G5	40228	Whetstone et al. 1997
Scleria oligantha	littlehead nutrush	G5	40314	NatureServe PLOTS database 2001-2007
Scleria triglomerata	whip nutrush	G5	40318	Dickson 1992
Scutellaria elliptica	hairy skullcap	G5	32796	NatureServe PLOTS database 2001-2007
Scutellaria incana	hoary skullcap	G5	32770	NatureServe PLOTS database 2001-2007
Scutellaria integrifolia	helmet flower	G5	32801	NatureServe PLOTS database 2001-2007
Scutellaria lateriflora	blue skullcap	G5	32765	NatureServe PLOTS database 2001-2007

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Scutellaria ovata	heartleaf skullcap	G5	32772	NatureServe PLOTS database 2001-2007
Secale cereale	cereal rye	GNR	42090	Dickson 1992
Sedum sarmentosum	stringy stonecrop	GNR	24167	Whetstone et al. 1997
Sedum ternatum	woodland stonecrop	G5	24184	NatureServe PLOTS database 2001-2007
Selaginella apoda	meadow spikemoss	G5	17066	Dickson 1992
Selaginella rupestris	northern selaginella	G5	17091	Whetstone et al. 1997
Senna obtusifolia	Java-bean	G5	505165	Whetstone et al. 1997
Sericocarpus asteroides	toothed whitetop aster	G5	508089	Whetstone et al. 1997
Sericocarpus linifolius	narrowleaf whitetop aster	G5	508090	Whetstone et al. 1997
Setaria parviflora	marsh bristlegrass	G5	505191	NatureServe PLOTS database 2001-2007
Seymeria cassioides	yaupon blacksenna	G5	34043	NatureServe PLOTS database 2001-2007
Sherardia arvensis	blue fieldmadder	GNR	35237	Whetstone et al. 1997
Sibara virginica	Virginia winged rockcress	G5	23307	Whetstone et al. 1997
Sicyos angulatus	oneseed burr cucumber	G5	22402	Whetstone et al. 1997
Sida acuta	common wireweed	G5	21726	Whetstone et al. 1997
Sida spinosa	prickly fanpetals	G5?	21732	Whetstone et al. 1997
Sideroxylon lycioides	buckthorn bully	G5	505220	NatureServe PLOTS database 2001-2007
Silene antirrhina	sleepy silene	G5	20045	Whetstone et al. 1997
*Silene caroliniana ssp. wherryi	Wherry's catchfly	G5T2T4Q	20058	NatureServe PLOTS database 2001-2007
*Silene rotundifolia	roundleaf catchfly	G4	20114	Whetstone et al. 1997
Silene stellata	widowsfrill	G5	20127	NatureServe PLOTS database 2001-2007
Silene virginica	fire pink	G5	20141	NatureServe PLOTS database 2001-2007
Silphium asteriscus	starry rosinweed	G5	38387	NatureServe PLOTS database 2001-2007
Silphium compositum	kidneyleaf rosinweed	G5	38394	Whetstone et al. 1997
Sisyrinchium angustifolium	narrowleaf blue-eyed grass	G5	43240	NatureServe PLOTS database 2001-2007
Sisyrinchium rosulatum	annual blue-eyed grass	G5	43272	NatureServe PLOTS database 2001-2007
Smallanthus uvedalius	hairy leafcup	G4G5	505252	NatureServe PLOTS database 2001-2007
Smilax bona-nox	saw greenbrier	G5	43341	NatureServe PLOTS database 2001-2007
Smilax glauca	cat greenbrier	G5	43342	NatureServe PLOTS database

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				2001-2007
Smilax herbacea	smooth carrionflower	G5	43356	Whetstone et al. 1997
Smilax hugeri	Huger's carrionflower	G4	505254	NatureServe PLOTS database 2001-2007
Smilax laurifolia	laurel greenbrier	G5	43345	NatureServe PLOTS database 2001-2007
Smilax rotundifolia	roundleaf greenbrier	G5	43346	NatureServe PLOTS database 2001-2007
Smilax tamnoides	bristly greenbrier	G5	43348	Dickson 1992
Smilax walteri	coral greenbrier	G5	43364	NatureServe PLOTS database 2001-2007
Solanum carolinense var. carolinense	Carolina horsenettle	G5T5	530413	NatureServe PLOTS database 2001-2007
Solanum ptychanthum	West Indian nightshade	G5	505270	Dickson 1992
Solidago arguta	Atlantic goldenrod	G5	36230	NatureServe PLOTS database 2001-2007
Solidago arguta var. boottii	Boott's goldenrod	G5T3T5	530437	Dickson 1992
Solidago arguta var. caroliniana	Atlantic goldenrod	G5T4	530438	Dickson 1992
Solidago caesia	wreath goldenrod	G5	36238	NatureServe PLOTS database 2001-2007
Solidago caesia var. curtisii	mountain decumbent goldenrod	G4G5	530442	Whetstone et al. 1997
Solidago canadensis var. scabra	Canada goldenrod	G5	530448	Whetstone et al. 1997
Solidago flaccidifolia	mountain goldenrod	G5	36255	NatureServe PLOTS database 2001-2007
Solidago flexicaulis	zigzag goldenrod	G5	36257	Dickson 1992
Solidago gigantea	giant goldenrod	G5	36259	NatureServe PLOTS database 2001-2007
Solidago latissimifolia	Elliott's goldenrod	G5	505283	NatureServe PLOTS database 2001-2007
Solidago nemoralis var. nemoralis	gray goldenrod	G5T5	530465	Whetstone et al. 1997
Solidago odora var. odora	anisescented goldenrod	G5T5	530467	NatureServe PLOTS database 2001-2007
Solidago rugosa	wrinkleleaf goldenrod	G5	36299	NatureServe PLOTS database 2001-2007
Solidago speciosa var. erecta	showy goldenrod	G5	530478	NatureServe PLOTS database 2001-2007
Solidago sphacelata	autumn goldenrod	G4G5	36312	Dickson 1992
Solidago ulmifolia	elmleaf goldenrod	G5	36225	NatureServe PLOTS database 2001-2007
Sonchus asper	spiny sowthistle	GNR	38424	NatureServe PLOTS database

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				2001-2007
Sorghastrum elliottii	slender Indiangrass	G5	42101	Dickson 1992
Sorghastrum nutans	Indiangrass	G5	42102	NatureServe PLOTS database 2001-2007
Sorghum halepense	Johnsongrass	GNR	42111	NatureServe PLOTS database 2001-2007
Sparganium americanum	American bur-reed	G5	42313	Dickson 1992
Spigelia marilandica	woodland pinkroot	G4	505330	NatureServe PLOTS database 2001-2007
Spiranthes cernua	nodding ladies'-tresses	G5	43444	Whetstone et al. 1997
Spiranthes lacera var. gracilis	northern slender ladies'-tresses	G5T4T5	530529	Dickson 1992
Spiranthes praecox	greenvein ladies'-tresses	G5	43447	Dickson 1992
Sporobolus contractus	spike dropseed	G5	42131	NatureServe PLOTS database 2001-2007
Sporobolus junceus	pineywoods dropseed	G5	42142	Whetstone et al. 1997
Stachys nuttallii	heartleaf hedgenettle	G5?	521940	Dickson 1992
Staphylea trifolia	American bladdernut	G5	28646	Whetstone et al. 1997
Stellaria media ssp. media	common chickweed	GNRTNR	524719	NatureServe PLOTS database 2001-2007
Stellaria pubera	star chickweed	G5	20193	Whetstone et al. 1997
Stenanthium gramineum	eastern featherbells	G4G5	43041	NatureServe PLOTS database 2001-2007
*Stewartia malacodendron	silky camellia	G4	21390	Dickson 1992
*Stewartia ovata	mountain camellia	G4	21391	NatureServe PLOTS database 2001-2007
Stylisma humistrata	southern dawnflower	G4G5	30890	NatureServe PLOTS database 2001-2007
Stylosanthes biflora	sidebeak pencilflower	G5	26973	Whetstone et al. 1997
Styrax americanus	American snowbell	G5	505398	Whetstone et al. 1997
Styrax grandifolius	bigleaf snowbell	G5	505399	Whetstone et al. 1997
Symphyotrichum concolor	eastern silver aster	G5	522192	Whetstone et al. 1997
Symphyotrichum cordifolium	common blue wood aster	G5	522193	NatureServe PLOTS database 2001-2007
Symphyotrichum dumosum	rice button aster	G5	522200	NatureServe PLOTS database 2001-2007
Symphyotrichum dumosum var. dumosum	rice button aster	G5T3T5	566329	Whetstone et al. 1997
Symphyotrichum lateriflorum	calico aster	G5	522220	NatureServe PLOTS database 2001-2007
Symphyotrichum lateriflorum var. lateriflorum	calico aster	G5T5	566334	Whetstone et al. 1997

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Symphyotrichum patens	late purple aster	G5	522232	NatureServe PLOTS database 2001-2007
Symphyotrichum patens var. patens	late purple aster	G5T5	566339	Whetstone et al. 1997
Symphyotrichum pilosum var. pilosum	hairy white oldfield aster	G5T5	566340	NatureServe PLOTS database 2001-2007; Whetstone et al. 1997
Symphyotrichum pilosum var. pringlei	Pringle's aster	G5T5	541110	Dickson 1992
Symphyotrichum shortii	Short's aster	G5	522246	NatureServe PLOTS database 2001-2007
Symphyotrichum undulatum	waxyleaf aster	G5	522257	Whetstone et al. 1997
Symplocos tinctoria	common sweetleaf	G5	23878	Whetstone et al. 1997
Taenidia integerrima	yellow pimpernel	G5	29875	Dickson 1992
*Talinum mengesii	Menges' fameflower	G3	20451	NatureServe PLOTS database 2001-2007
Taraxacum officinale ssp. officinale	common dandelion	G5T5	524742	NatureServe PLOTS database 2001-2007
Tephrosia spicata	spiked hoarypea	G4G5	26996	NatureServe PLOTS database 2001-2007
Tephrosia virginiana	Virginia tephrosia	G5	26998	NatureServe PLOTS database 2001-2007
Thalictrum dioicum	early meadow-rue	G5	18669	Whetstone et al. 1997
Thalictrum macrostylum	piedmont meadow-rue	G3G4	18671	NatureServe PLOTS database 2001-2007
Thalictrum thalictroides	rue anemone	G5	18683	NatureServe PLOTS database 2001-2007
Thaspium barbinode	hairyjoint meadowparsnip	G5	29888	NatureServe PLOTS database 2001-2007
Thaspium trifoliatum	purple meadowparsnip	G5	29890	Whetstone et al. 1997
Thelypteris noveboracensis	New York fern	G5	17261	NatureServe PLOTS database 2001-2007
Tiarella cordifolia	heartleaf foamflower	G5	24530	NatureServe PLOTS database 2001-2007
Tiarella cordifolia var. collina	heartleaf foamflower	G5T4T5	530685	Whetstone et al. 1997
Tilia americana	American basswood	G5	21536	NatureServe PLOTS database 2001-2007
Tipularia discolor	crippled cranefly	G4G5	43703	NatureServe PLOTS database 2001-2007
Toxicodendron pubescens	Atlantic poison oak	G5	505545	NatureServe PLOTS database 2001-2007
Toxicodendron radicans ssp. radicans	eastern poison ivy	G5T5	524765	NatureServe PLOTS database 2001-2007
Trachelospermum difforme	climbing dogbane	G4G5	30230	Dickson 1992
Tradescantia subaspera var. montana	zigzag spiderwort	G5T3T5Q	530714	NatureServe PLOTS database 2001-2007
Tradescantia virginiana	Virginia spiderwort	G5	39178	Whetstone et al. 1997

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Tragia urticifolia	nettleleaf noseburn	G5	28437	Whetstone et al. 1997
Trautvetteria caroliniensis var. caroliniensis	Carolina bugbane	G5T4T5	531134	NatureServe PLOTS database 2001-2007
Trichomanes boschianum	Appalachian bristle fern	G4	17928	Dickson 1992
Trichostema dichotomum	forked bluecurls	G5	32364	NatureServe PLOTS database 2001-2007
Trichostema setaceum	narrowleaf bluecurls	G5	32362	Whetstone et al. 1997
Tridens flavus	purpletop tridens	G5	42227	NatureServe PLOTS database 2001-2007
Trifolium arvense	rabbitfoot clover	GNR	26221	Dickson 1992
Trifolium campestre	field clover	GNR	26231	Whetstone et al. 1997
Trifolium dubium	suckling clover	GNR	26205	NatureServe PLOTS database 2001-2007
Trifolium incarnatum	crimson clover	GNR	26262	Whetstone et al. 1997
Trifolium pratense	red clover	GNR	26313	Whetstone et al. 1997
Trifolium repens	white clover	GNR	26206	NatureServe PLOTS database 2001-2007
Trillium catesbaei	bashful wakerobin	G4	43064	NatureServe PLOTS database 2001-2007
Trillium cuneatum	little sweet Betsy	G4G5	43056	NatureServe PLOTS database 2001-2007
Triodanis perfoliata var. biflora	clasping Venus' looking-glass	G5T5	530742	NatureServe PLOTS database 2001-2007
Triodanis perfoliata var. perfoliata	clasping Venus' looking-glass	G5T5	530743	Whetstone et al. 1997
Tripsacum dactyloides	eastern gamagrass	G5	41287	NatureServe 2005
Typha latifolia	broadleaf cattail	G5	42326	Whetstone et al. 1997
Ulmus alata	winged elm	G5	19051	NatureServe PLOTS database 2001-2007
Ulmus americana	American elm	G5?	19049	Whetstone et al. 1997
Ulmus rubra	slippery elm	G5	19050	Whetstone et al. 1997
Uvularia perfoliata	perfoliate bellwort	G5	43110	NatureServe PLOTS database 2001-2007
Uvularia sessilifolia	sessileleaf bellwort	G5	43112	NatureServe PLOTS database 2001-2007
Vaccinium arboreum	farkleberry	G5	23580	NatureServe PLOTS database 2001-2007
Vaccinium corymbosum	highbush blueberry	G5	23573	NatureServe PLOTS database 2001-2007
Vaccinium elliottii	Elliott's blueberry	G5	23592	NatureServe PLOTS database 2001-2007
Vaccinium fuscatum	black highbush blueberry	G5	23594	NatureServe PLOTS database 2001-2007
Vaccinium pallidum	Blue Ridge blueberry	G5	23610	NatureServe PLOTS database 2001-2007

Table 2. List of all plants historically documented on Little River Canyon National Preserve. Species marked with an asterisk (*) are monitored by the Alabama Natural Heritage Program as rare in the state.

Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Vaccinium stamineum	deerberry	G5	23615	NatureServe PLOTS database 2001-2007
Valerianella radiata	beaked cornsalad	G5	35397	NatureServe PLOTS database 2001-2007
Verbascum thapsus	common mullein	GNR	33394	Whetstone et al. 1997
Verbena brasiliensis	Brazilian vervain	GNR	32086	Whetstone et al. 1997
Verbena simplex	narrowleaf vervain	G5	32123	Whetstone et al. 1997
Verbena urticifolia var. urticifolia	white vervain	G5T5	530790	Whetstone et al. 1997
Verbesina occidentalis	yellow crownbeard	G5	38610	NatureServe PLOTS database 2001-2007
Verbesina virginica var. virginica	white crownbeard	G5?T5?	530792	NatureServe PLOTS database 2001-2007
Vernonia flaccidifolia	Tennessee ironweed	G4	38632	Whetstone et al. 1997
Vernonia gigantea ssp. gigantea	giant ironweed	G5T5	38635	NatureServe PLOTS database 2001-2007
Veronica arvensis	corn speedwell	GNR	33411	Whetstone et al. 1997
Veronica peregrina	neckweed	G5	33421	Whetstone et al. 1997
Veronica persica	birdeye speedwell	GNR	33405	Dickson 1992
Viburnum acerifolium	mapleleaf viburnum	G5	35255	NatureServe PLOTS database 2001-2007
Viburnum dentatum	southern arrowwood	G5	35251	NatureServe PLOTS database 2001-2007
Viburnum nudum	possumhaw	G5	35252	NatureServe PLOTS database 2001-2007
Viburnum nudum var. cassinoides	withe-rod	G5T5	530807	NatureServe PLOTS database 2001-2007
Viburnum rufidulum	rusty blackhaw	G5	35274	NatureServe PLOTS database 2001-2007
Vicia caroliniana	Carolina vetch	G5	26334	NatureServe PLOTS database 2001-2007
Vicia grandiflora	large yellow vetch	GNR	26342	Whetstone et al. 1997
Vicia sativa ssp. nigra	garden vetch	GNRTNR	524809	NatureServe PLOTS database 2001-2007
Vicia villosa ssp. varia	winter vetch	G5T5	524812	Whetstone et al. 1997
Vinca major	bigleaf periwinkle	GNR	30237	Whetstone et al. 1997
Viola bicolor	field pansy	G5	22047	Whetstone et al. 1997
Viola blanda	sweet white violet	G4G5	22050	Dickson 1992
Viola conspersa	American dog violet	G5	22060	NatureServe PLOTS database 2001-2007
Viola cucullata	marsh blue violet	G4G5	505709	Dickson 1992
Viola hastata	halberdleaf yellow violet	G5	22086	NatureServe PLOTS database 2001-2007
Viola palmata var. palmata	early blue violet	G5T5?	531142	NatureServe PLOTS database 2001-2007; Whetstone et al. 1997

Table 2. List of all plants historically documented on Little River Canyon National Preserve. Species marked with an asterisk (*) are monitored by the Alabama Natural Heritage Program as rare in the state.

Scientific Name (Kartesz 1999)	Common name	G_RANK	TSN	Source
Viola pedata	birdfoot violet	G5	22130	Whetstone et al. 1997
Viola pubescens	downy yellow violet	G5	22144	NatureServe PLOTS database 2001-2007
Viola pubescens var. pubescens	downy yellow violet	G5T5	530837	Whetstone et al. 1997
Viola pubescens var. scabriuscula	downy yellow violet	G5T5	531467	Dickson 1992
Viola rostrata	longspur violet	G5	22158	NatureServe PLOTS database 2001-2007
Viola sagittata	arrowleaf violet	G5	22162	Whetstone et al. 1997
Viola sagittata var. ovata	arrowleaf violet	G5T5	541747	Whetstone et al. 1997
Viola sororia	common blue violet	G5	22169	NatureServe PLOTS database 2001-2007
Viola tripartita	threepart violet	G5	22178	Whetstone et al. 1997
Viola walteri	prostrate blue violet	G4G5	22183	NatureServe PLOTS database 2001-2007
Viola X primulifolia		GNA	22143	NatureServe PLOTS database 2001-2007
Vitis aestivalis	summer grape	G5	28607	NatureServe PLOTS database 2001-2007
Vitis rotundifolia	muscadine	G5	28609	NatureServe PLOTS database 2001-2007
Vitis vulpina	frost grape	G5	28610	Whetstone et al. 1997
Vulpia octoflora	sixweeks fescue	G5	42264	Dickson 1992
Waldsteinia fragarioides	Appalachian barren strawberry	G5	505735	NatureServe PLOTS database 2001-2007
Wisteria frutescens	American wisteria	G5	27021	Whetstone et al. 1997
Woodsia obtusa	bluntlobe cliff fern	G5	17744	Whetstone et al. 1997
Woodwardia areolata	netted chainfern	G5	17749	NatureServe PLOTS database 2001-2007
Xanthium strumarium var. glabratum	rough cockleburr	G5T5?	530873	Whetstone et al. 1997
Xanthorhiza simplicissima	yellowroot	G5	18809	NatureServe PLOTS database 2001-2007
Xyris difformis	bog yelloweyed grass	G5	39102	NatureServe PLOTS database 2001-2007
Xyris jupicai	Richard's yelloweyed grass	G5	39109	Whetstone et al. 1997
Yucca filamentosa	Adam's needle	G5	43140	NatureServe PLOTS database 2001-2007
Zizia aptera	meadow zizia	G5	29905	NatureServe PLOTS database 2001-2007
Zizia aurea	golden zizia	G5	29906	Whetstone et al. 1997

Table 3. Voucher specimens collected on Little River Canyon National Preserve.

Scientific Name	Common name	Catalog No	Collector	Habitat
Allium canadense	meadow garlic	LIRI.00428	Alfred Schotz	Oak flats
Carex laxiflora var. laxiflora	broad looseflower sedge	LIRI.00429	Alfred Schotz	Acer rubrum / Alnus serrulata Bottomland Forest
Chamaecrista nictitans	partridge pea	LIRI.00430	Rickie White & Heather McCoy	Mowed field
Cladrastis kentuckea	Kentucky yellowwood	LIRI.00444	Alfred Schotz	Limestone Forest
Desmodium cuspidatum var. cuspidatum	largebract ticktrefoil	LIRI.00431	Alfred Schotz	Scoured riverbed/ forested hardwood slope
Dichanthelium ravenelii	Ravenel's rosette grass	LIRI.00432	Alfred Schotz	Oak-Hickory Pine Plateau Forest
Digitaria sanguinalis	hairy crabgrass	LIRI.00433	Rickie White & Heather McCoy	Mowed field
Doellingeria infirma	cornel-leaf whitetop	LIRI.00434	Alfred Schotz	Scoured riverbed/ forested hardwood slope
Lathyrus venosus	veiny pea	LIRI.00435	Alfred Schotz	Scoured riverbed/ forested hardwood slope
Lolium pratense	meadow ryegrass	LIRI.00436	Alfred Schotz	Oak flats
Malaxis unifolia	green adder's-mouth orchid	LIRI.00437	Alfred Schotz	Loblolly pine plantation
Oenothera laciniata	cutleaf evening-primrose	LIRI.00438	Alfred Schotz	Mowed field
Panicum capillare	witchgrass	LIRI.00439	Rickie White & Heather McCoy	Mowed field
Polygonatum biflorum var. commutatum	smooth Solomon's seal	LIRI.00440	Alfred Schotz	Mowed field
Rhynchosia tomentosa	twining snoutbean	LIRI.00441	Rickie White & Heather McCoy	Mowed field
Tripsacum dactyloides	eastern gamagrass	LIRI.00442	Alfred Schotz	River bank

Table 3. Voucher specimens collected on Little River Canyon National Preserve.

Scientific Name	Common name	Catalog No	Collector	Habitat
Uvularia sessilifolia	sessileleaf bellwort	LIRI.00443	Alfred Schotz	Boulders in river

Table 4. Table of vascular plant diversity measures and species total estimates for Little River Canyon National Preserve.

Diversity Measures			
# of plots	alpha	beta	gamma
47	78.8	7.2	569

alpha = average species richness per plot
beta = measure of the heterogeneity of the data (gamma/alpha)
gamma = total # of species

	Estimate of # of species in park	If estimate is correct, % of species confirmed for park (based on 950 species documented)
First-order jackknife estimate (all full plots)	752.0	126%
Second-order jackknife estimate (all full plots)	846.8	112%

Table 5. Exotic plant species occurring on Little River Canyon National Preserve.

Scientific Name	Common Name	IRank/ Rank	TSN	Ranking Source
Achillea millefolium	common yarrow	Not ranked	35423	
Ailanthus altissima	tree of heaven	Medium	28827	NatureServe
Albizia julibrissin	silktree	Medium/Low	26449	NatureServe
Alternanthera philoxeroides	alligatorweed	Medium	20770	NatureServe
Anthemis cotula	stinking chamomile	Medium/Insignificant	36330	NatureServe
Anthoxanthum odoratum	sweet vernalgrass	Not ranked	41395	
Arabidopsis thaliana	mouseear cress	Not ranked	23041	
Arenaria serpyllifolia	thymeleaf sandwort	Not ranked	20270	
Arthraxon hispidus	small carpgrass	Medium/Low	41445	NatureServe
Barbarea verna	early yellowrocket	Not ranked	22743	
Bromus tectorum	cheatgrass	High	40524	NatureServe
Calystegia sepium	hedge false bindweed	Not ranked	30650	
Capsella bursa-pastoris	shepherd's purse	Insignificant	22766	NatureServe
Cardamine hirsuta	hairy bittercress	Not ranked	22797	
Cerastium glomeratum	sticky chickweed	Not ranked	19955	
Cerastium semidecandrum	fivestamen chickweed	Not ranked	19961	
Chenopodium album	lambsquarters	Not ranked	20592	
Cirsium vulgare	bull thistle	Medium/Low	36428	NatureServe
Commelina communis	Asiatic dayflower	Not ranked	39127	
Consolida ajacis	doubtful knight's-spur	Not ranked	501621	
Crotalaria spectabilis	showy rattlebox	Not ranked	26580	
Cruciata pedemontana	piedmont bedstraw	Not ranked	502717	
Cynodon dactylon	Bermudagrass	Medium/Low	41619	NatureServe
Cyperus iria	ricefield flatsedge	Not ranked	39934	
Dactylis glomerata ssp. glomerata	orchardgrass	Not ranked	193447	
Daucus carota	Queen Anne's lace	Low	29477	NatureServe
Digitaria ischaemum	smooth crabgrass	Not ranked	40637	
Digitaria violascens	violet crabgrass	Not ranked	502065	
Dioscorea oppositifolia	Chinese yam	High/Low	502075	NatureServe
Draba verna	spring draba	Low/Insignificant	22923	NatureServe
Duchesnea indica	Indian strawberry	Low/Insignificant	25163	NatureServe
Echinochloa crus-galli	barnyardgrass	Medium/Insignificant	502210	NatureServe
Erodium cicutarium	redstem stork's bill	Medium/Low	29147	NatureServe
Hedera helix	English ivy	High/Medium	29393	NatureServe
Heliotropium indicum	Indian heliotrope	Not ranked	31638	
Holcus lanatus	common velvetgrass	High/Medium	41773	NatureServe
Ipomoea coccinea	redstar	Not ranked	30770	
Ipomoea hederacea	ivyleaf morning-glory	Not ranked	503177	
Ipomoea purpurea	tall morning-glory	Medium/Low	30789	NatureServe
Kummerowia striata	Japanese clover	Low	503294	NatureServe
Lactuca serriola	prickly lettuce	Low/Insignificant	36608	NatureServe
Lamium amplexicaule	henbit deadnettle	Not ranked	32539	

Table 5. Exotic plant species occurring on Little River Canyon National Preserve.

Scientific Name	Common Name	IRank/ Rank	TSN	Ranking Source
Lamium purpureum var. purpureum	purple deadnettle	Not ranked	528671	
Lathyrus hirsutus	Caley pea	Not ranked	25845	
Lespedeza cuneata	Chinese lespedeza	Medium	25898	NatureServe
Leucanthemum vulgare	oxeye daisy	Medium/Low	37903	NatureServe
Ligustrum sinense	Chinese privet	High/Medium	32979	NatureServe
Ligustrum vulgare	European privet	High/Medium	32980	NatureServe
Linaria vulgaris	butter and eggs	High/Low	33216	NatureServe
Lolium perenne	perennial ryegrass	Medium	40893	NatureServe
Lolium pretense	meadow ryegrass	High/Low	507983	NatureServe
Lonicera japonica	Japanese honeysuckle	High/Medium	35283	NatureServe
Malus pumila	paradise apple	Medium/Insignificant	25262	NatureServe
Medicago lupulina	black medick	Medium/Insignificant	503721	NatureServe
Medicago sativa ssp. sativa	alfalfa	Not ranked	524303	
Melia azedarach	Chinaberrytree	Medium/Low	29024	NatureServe
Microstegium vimineum	Nepalese browntop	High/Medium	503829	NatureServe
Murdannia keisak	wartremoving herb	Medium/Low	39145	NatureServe
Muscari neglectum	starch grape hyacinth	Not ranked	503892	
Nicandra physalodes	apple of Peru	Not ranked	30561	
Paspalum dilatatum	dallisgrass	Not ranked	40997	
Pennisetum glaucum	pearl millet	Not ranked	565385	
Perilla frutescens var. frutescens	beefsteakplant	Not ranked	529521	
Phyllostachys aurea	golden bamboo	Not ranked	42023	
Plantago lanceolata	narrowleaf plantain	High/Low	32874	NatureServe
Polygonum aviculare	prostrate knotweed	Low	20876	NatureServe
Prunus persica	peach	Insignificant	24765	NatureServe
Pueraria montana var. lobata	kudzu	Not ranked	529930	
Pyrus communis	common pear	High/Low	25295	NatureServe
Ranunculus sardous	hairy buttercup	Not ranked	18645	
Rosa multiflora	multiflora rose	Medium/Low	24833	NatureServe
Rubus bifrons	Himalayan berry	Not ranked	24891	
Rumex acetosella	common sheep sorrel	Medium/Low	20934	NatureServe
Rumex crispus	curly dock	Not ranked	20937	
Secale cereale	cereal rye	Not ranked	42090	
Sedum sarmentosum	stringy stonecrop	Not ranked	24167	
Sherardia arvensis	blue fieldmadder	Not ranked	35237	
Sonchus asper	spiny sowthistle	Not ranked	38424	
Sorghum halepense	Johnsongrass	High/Medium	42111	NatureServe
Stellaria media ssp. media	common chickweed	Not ranked	524719	
Taraxacum officinale ssp. officinale	common dandelion	Not ranked	524742	
Trifolium arvense	rabbitfoot clover	Low	26221	NatureServe
Trifolium campestre	field clover	Not ranked	26231	
Trifolium dubium	suckling clover	Not ranked	26205	

Table 5. Exotic plant species occurring on Little River Canyon National Preserve.

Scientific Name	Common Name	IRank/ Rank	TSN	Ranking Source
Trifolium incarnatum	crimson clover	Not ranked	26262	
Trifolium pratense	red clover	Low/Insignificant	26313	NatureServe
Trifolium repens	white clover	Medium/Low	26206	NatureServe
Verbascum thapsus	common mullein	Medium	33394	NatureServe
Verbena brasiliensis	Brazilian vervain	Not ranked	32086	
Veronica arvensis	corn speedwell	Not ranked	33411	
Veronica persica	birdeye speedwell	Not ranked	33405	
Vicia grandiflora	large yellow vetch	Not ranked	26342	
Vicia sativa ssp. nigra	garden vetch	Not ranked	524809	
Vicia villosa ssp. varia	winter vetch	Not ranked	524812	
Vinca major	bigleaf periwinkle	Not ranked	30237	

Table 6. Association Global Element Codes (e.g. last 4 digits of CEGL002591), plot numbers, and global ranks of all associations identified and potentially occurring at Little River Canyon National Preserve.

CEGL	Scientific Name	Common Name	Ecological System Name	Plot Code	G Rank
2591	Pinus virginiana Successional Forest	Virginia Pine Successional Forest	Southern Appalachian Low-Elevation Pine Forest	13	GNA
3618	Pinus taeda - (Pinus echinata) / Schizachyrium scoparium Woodland	Loblolly Pine - Shortleaf Pine Managed Woodland	Human Modified / Successional	31, 59	GNA
3807	Ligustrum sinense Upland Shrubland	Chinese Privet Upland Shrubland	Human Modified / Successional	84	GNA
3895	Alnus serrulata - Xanthorhiza simplicissima Shrubland	Rocky Bar and Shore (Alder - Yellowroot Type)	Cumberland Riverscour	None	G3G4
3914	Alnus serrulata - Rhododendron arborescens / Sarracenia oreophila - Rhynchospora rariflora Shrubland	Southern Appalachian Low Mountain Seepage Bog	Southern and Central Appalachian Bog and Fen	29, 33	G1
4044	Andropogon virginicus var. virginicus Herbaceous Vegetation	Successional Broom-sedge Vegetation	Human Modified / Successional	19	GNA
4098	Quercus (alba, coccinea, falcata, velutina) / Kalmia latifolia Temporarily Flooded Forest	Southern Cumberland High-Energy River Oak Terrace Forest	South-Central Interior Small Stream and Riparian	37, 38, 39, 40, 50, 51, 83	G4?
4286	Justicia americana Herbaceous Vegetation	Water-willow Rocky Bar and Shore	Cumberland Riverscour	18	G4G5
4301	Heuchera parviflora var. parviflora - Trichomanes boschianum - Thalictrum mirabile - (Ageratina luciae-brauniae, Solidago albopilosa) Herbaceous Vegetation	Cumberland Plateau Rockhouse	Cumberland Acidic Cliff and Rockhouse	None	G2

CEGL	Scientific Name	Common Name	Ecological System Name	Plot Code	G Rank
4539	Fagus grandifolia - Quercus alba / Kalmia latifolia - (Symplocos tinctoria, Rhododendron catawbiense) / Galax urceolata Forest	Piedmont Beech / Heath Bluff	South-Central Interior Mesophytic Forest	7, 9, 65, 68, 74, 86, 97	G2G3
4622	Bigelowia nuttallii - Coreopsis pulchra - Liatris microcephala Herbaceous Vegetation	Alabama Cumberland Sandstone Glade	Cumberland Sandstone Glade and Barrens	28, 30, 81	G2
6327	Pinus echinata Early-Successional Forest	Shortleaf Pine Early-Successional Forest	Southern Appalachian Low-Elevation Pine Forest	70	GNA
7119	Pinus virginiana - Pinus (rigida, echinata) - (Quercus prinus) / Vaccinium pallidum Forest	Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest	Southern Appalachian Low-Elevation Pine Forest	2, 55, 77, 78	G4?
7192	Albizia julibrissin Forest	Successional Silktree Forest	Human Modified / Successional	87	GNA
7244	Quercus falcata - Quercus alba - Carya alba / Oxydendrum arboreum / Vaccinium stamineum Forest	Southern Red Oak - White Oak Mixed Oak Forest	Allegheny-Cumberland Dry Oak Forest and Woodland	5, 10, 54, 62, 69	G4G5
7247	Quercus falcata - Quercus (coccinea, stellata) / Vaccinium (pallidum, stamineum) Forest	Southeastern Interior Southern Red Oak - Post Oak Forest	Allegheny-Cumberland Dry Oak Forest and Woodland	95	G4
7330	Liquidambar styraciflua - (Liriodendron tulipifera) Temporarily Flooded Forest	Successional Sweetgum Floodplain Forest	South-Central Interior Small Stream and Riparian	90	GNA
7388	Liquidambar styraciflua - Acer rubrum / Carex spp. - Sphagnum spp. Forest	Upland Sweetgum - Red Maple Pond	Central Interior Highlands and Appalachian Sinkhole and Depression Pond	34	G2G3Q
7443	Acer rubrum var. trilobum - Nyssa sylvatica / Osmunda cinnamomea - Chasmanthium laxum - Carex intumescens / Sphagnum lescurii Forest	Cumberland Forested Acidic Seep	Cumberland Seepage Forest	8, 43, 49, 89	G3?

CEGL	Scientific Name	Common Name	Ecological System Name	Plot Code	G Rank
7493	Pinus echinata - Quercus (prinus, falcata) / Oxydendrum arboreum / Vaccinium pallidum Forest	Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest	Southern Appalachian Low-Elevation Pine Forest	53	G3G4
7500	Pinus echinata - Quercus stellata - Quercus prinus - Carya glabra / (Danthonia spicata, Piptochaetium avenaceum) Forest	Appalachian Shortleaf Pine - Xeric Oak Forest	Southern Appalachian Low-Elevation Pine Forest	4, 25, 26, 92, 98	G3?
7546	Pinus taeda - Liriodendron tulipifera / Lindera benzoin / Carex crinita Forest	Loblolly Pine - Tuliptree Successional Bottomland Forest	South-Central Interior Small Stream and Riparian	15, 46, 60, 63, 64, 82, 88, 93	GNA
8427	Pinus echinata - Quercus alba / Vaccinium pallidum / Hexastylis arifolia - Chimaphila maculata Forest	Appalachian Shortleaf Pine - Mesic Oak Forest	Southern Appalachian Low-Elevation Pine Forest	67, 99	G3G4
8428	Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina Forest	Cumberland-Southern Ridge and Valley Mesic White Oak Forest	South-Central Interior Mesophytic Forest	14, 16, 35, 36, 57, 61, 66, 80, 85	G3G4
8430	Quercus alba - (Quercus prinus) / (Hydrangea quercifolia) - Viburnum acerifolium / Carex picta - Piptochaetium avenaceum Forest	Cumberland Plateau Dry-Mesic White Oak Forest	Allegheny-Cumberland Dry Oak Forest and Woodland	11, 12, 45, 56, 58, 72, 73, 79, 100	G3G4
8431	Quercus prinus - (Quercus coccinea) / Carya pallida / Vaccinium arboreum - Vaccinium pallidum Forest	Xeric Ridgetop Chestnut Oak Forest	Allegheny-Cumberland Dry Oak Forest and Woodland	3, 21, 22, 23, 24, 27, 52, 71	G4G5
8462	Pinus taeda - Liquidambar styraciflua Semi-natural Forest	Mid- to Late-Successional Loblolly Pine - Sweetgum Forest	East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest	1, 20	GNA
8488	Quercus rubra - Tilia americana var. heterophylla - Carya carolinae-septentrionalis / Acer (barbatum, leucoderme) / Hydrangea quercifolia Forest	Southern Ridge and Valley Basic Mesic Hardwood Forest	South-Central Interior Mesophytic Forest	32, 75, 76	G2G3

CEGL	Scientific Name	Common Name	Ecological System Name	Plot Code	G Rank
8495	Hypericum densiflorum - Alnus serrulata / Tripsacum dactyloides Shrubland	Bushy St. John's-wort - Smooth Alder / Eastern Gammagrass Shrubland	Cumberland Riverscour	6, 17, 42, 44, 47	G1G2

Global 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 Little River Canyon National Preserve.

Photo file name	Date taken	Photographer	Description of photo
LIRI02a.jpg	08-07-02	Al Schotz	Plot 2
LIRI02b.jpg	08-07-02	Al Schotz	Plot 2
LIRI02c.jpg	08-07-02	Al Schotz	Plot 2
LIRI02d.jpg	08-07-02	Al Schotz	Plot 2
LIRI04a.jpg	08-06-02	Rickie White	Plot 4
LIRI04b.jpg	08-06-02	Rickie White	Plot 4
LIRI04c.jpg	08-06-02	Rickie White	Plot 4
LIRI04d.jpg	08-06-02	Rickie White	Plot 4
LIRI07.jpg	08-06-02	Rickie White	Plot 7
LIRI07E.jpg	08-06-02	Rickie White	Plot 7, facing east
LIRI07N.jpg	08-06-02	Rickie White	Plot 7, facing north
LIRI07S.jpg	08-06-02	Rickie White	Plot 7, facing south
LIRI07W.jpg	08-06-02	Rickie White	Plot 7, facing west
LIRI08a.jpg	08-07-02	Al Schotz	Plot 8
LIRI08b.jpg	08-07-02	Al Schotz	Plot 8
LIRI08c.jpg	08-07-02	Al Schotz	Plot 8
LIRI08d.jpg	08-07-02	Al Schotz	Plot 8
LIRI22Downslope.jpg	08-06-02	Rickie White	Plot 22, facing downslope
LIRI22Side1.jpg	08-06-02	Rickie White	Plot 22
LIRI22Side2.jpg	08-06-02	Rickie White	Plot 22
LIRI22Upslope.jpg	08-06-02	Rickie White	Plot 22, facing upslope
LIRI24a.jpg	08-05-02	Rickie White	Plot 24
LIRI24b.jpg	08-05-02	Rickie White	Plot 24
LIRI24c.jpg	08-05-02	Rickie White	Plot 24
LIRI24d.jpg	08-05-02	Rickie White	Plot 24
LIRI26a.jpg	08-07-02	Al Schotz	Plot 26
LIRI26b.jpg	08-07-02	Al Schotz	Plot 26
LIRI26c.jpg	08-07-02	Al Schotz	Plot 26
LIRI26d.jpg	08-07-02	Al Schotz	Plot 26

Appendix I. Plot sheets used for permanent plots

SEVENTEEN PARKS PROJECT: Permanent Plot *Sampling Form* Page 1

County:_____ **Location (Park) Code**_____ **Plot Code:**____ **Jurisdiction (State):**___ **Location org:**_NPS_

Provisional community name_____

*Classified community name*_____
Classifier _____ *Date*_____ *NVC ELCODE*_____

Survey date:_____ **Surveyor initials:**_____

Directions to plot:

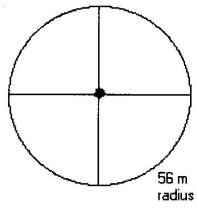
Tagged tree is a _____ of ____ cm dbh with tag #_____. Conduit is at a bearing of ____ degrees and ____ m from tree.

Directions to tag tree (including any notes on best access route):

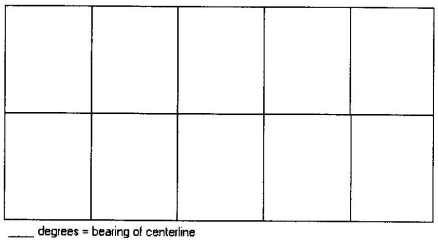
Time taken to walk to plot:_____

PLOT CONFIGURATION (Depict the plot layout with respect to the 1 hectare and attempt to draw in conduit, points where GPS positions were collected, witness trees, locations of pictures taken, and sketches of all communities within the 1 hectare!)

Plot representativeness -Is the 1 hectare all the same? ____YES ____ NO - If not, depict in circle below)



1 ha circle



____ degrees = bearing of centerline

20 x 50 Meter plot

Est. Extent of occurrence of community:

< 1HA 1-10 HA 10-100HA > 100HA

PIC #_____ **Description of pic(s):**_____

_____

Select one: UTM OR Lat/long (If lat/long, then values are _____ **N** _____ **W**

GPS Techniques/Equipment _Garmin GPS III Plus__ **Datum(pick one)** __NAD 83_OR_NAD27___ Zone:__16__OR__17__

GPS Unit ID _____ **GPS file name** ___ ___ ___ ___ ___ ___ (standard = First letter of park + # of plot (C04)

Field UTM X ___ ___ ___ ___ ___ ___ **m E Y** ___ ___ ___ ___ ___ ___ ___ **m N Elevation** _____ **m / ft**

Averaging performed (at least 120 observations)? ____ **Coordinate accuracy** _____ **m / ft DOP** _____ **# sats** _____

SEVENTEEN PARKS PROJECT: Permanent Plot *Sampling Form* **Page** 2

County:_____ **Location (Park) Code**_____ **Plot Code:**____ **Jurisdiction (State):**___ **Location org:**_NPS_

ENVIRONMENTAL / SITE INFORMATION

Measured Slope _____ ° ____ %

__ Flat	0 °	0 %
__ Gentle	0-5 °	1-9%
__ Moderate	6-14 °	10-25%
__ Somewhat steep	15-25 °	26-49%
__ Steep	27-45 °	50-100%
__ Very steep	45-69 °	101-275%
__ Abrupt	70-100 °	276-300
__ ovrhng/shltrd	>100 °	>300%

Measured Aspect ____ ° (N=0 °)

__ Flat	__ SE 113-157 °
__ Variable	__ S 158-202 °
__ N 338-22 °	__ SW 203-247 °
__ NE 23-67 °	__ W 248-292 °
__ E 68-112 °	__ NW 293-337

Topographic Position
__ Interfluve (Ridge/summit/crest) __ Toeslope
__ High Slope (upper/convex slope)
__ Midslope __ Low level (terrace)
__ Lowslope (lower/footslope) __ Channel bed

Cowardin System
_ Upland _ Palustrine
_ Estuarine _ Lacustrine _ Riverine

Landform (check most applicable)

__ Alluvial flat	__ Cove	__ Ridge
__ Alluvial terrace	__ Depression	__ Ridgetop bedrock outcrop
__ Bald	__ Draw	__ Saddle
__ Bank	__ Exogenous dome	__ Seep
__ Bar	__ Floodplain	__ Toe slope
__ Bench	__ Gap	__ Slope
__ Bottomlands	__ Gorge	__ Streambed
__ Cliff	__ Hillslope bedrock outcrop	__ Streamhead
	__ Midslope	__ Periglacial boulderfield
	Nose slope	Ravine

Rock types present:

Hydrologic Regime (check only for wetlands)
__ Not a wetland (Upland: XERIC : DRY - MESIC : MESIC)
__ Intermittently flooded __ Permanently flooded __ Semipermanently flooded __ Temporarily Flooded (e.g. floodplains)
__ Seasonally Flooded (e.g. seasonal ponds) __ Saturated (e.g. bogs, perennial seeps) __ Unknown __ Irregularly flooded _ Irrglrly exposed

QUALITATIVE ASSESSMENT:

A) HYDROLOGY:

B) LANDSCAPE AND LANDUSE HISTORY (including disturbance history and possible threats to sustainability):

Soil Texture:
__ Sand __ Peat __ Silt loam __Muck
__ Sandy loam __ Loam __ Clay loam __Clay

Drainage:
__ Rapidly drained __ Moderately well drained __Somewhat poorly drained
__ Well drained __ Poorly drained __Very poorly drained

Ground cover
____% Bedrock
____% Large rocks (cobbles, boulders >10cm)
____% Small rocks (gravel, 0.2-10 cm)
____% Sand (0.1-2 mm)
____% Litter, duff
____% Wood (> 1 cm)
____% Water
____% Bare soil
____% Other _____

Leaf type:
__Broad-leaved
__Needle-leaved
__Microphyllous
__Graminoid
__Broad-leaved herbaceous
__Pteridophyte
__Extremely xeromorphic
__Mixed

Leaf phenology (dominant stratum)
__ Evergreen
__ Cold-deciduous
__ Drought-deciduous
__ Mixed evergreen-cold-deciduous
__ Mixed evergreen drought deciduous
__ Herb - Annual
__ Herb - Perennial

Physiognomic Class
__ Forest (closed tree canopy)
__ Woodland (open tree canopy)
__ Shrubland
__ Dwarf Shrubland
__ Herbaceous (less than 25% woody layers)
__ Nonvascular
__ Sparse Vegetation

Natural and Anthropogenic Disturbance

_ logging	_ fire	_ Hydrologic
_ erosion	_ trails/roads	_ Agriculture
_ grazing/browsing	_ wind/ice damage	_ Old Growth
_ pine bark beetle	_ exotic plants	_ Fire Suppression
dogwood anthr	ORV	

Disturbance and animal use comments:

Community Survey
Page 2

SEVENTEEN PARKS PROJECT: Permanent Plot *Sampling Form* **Page** 3

County:_____ **Location (Park) Code**_____ **Plot Code:**____ **Jurisdiction (State):**___ **Location org:** NPS_

QUANTITATIVE VEGETATION SAMPLE

STRATA	STRATA HEIGHT	COVER CLASS	DOMINANT/DIAGNOSTIC SPECIES	Height scale	Cover cls for strata
Emergent – T1				01 < .5m	5%
Tree Canopy T2				02 .5-1m	10%
Understory T3				03 1-2m	20%
Tall shrub S1				04 2-5m	30%
Short shrub S2				05 5-10m	40%
Herbaceous				06 10-15m	50%
Non-vascular				07 15-20m	60%
Vine/liana				08 20-35m	70%
Other notable species (indicators of distinctive conditions, e.g. high pH soil, elevation, geographic region, other particularly abundant species):				09 35-50m	80%
				10 >50m	90%
					100%

***T1**: Emergent | **T2**: Tree Canopy | **T3** Subcanopy | **S1** Tall Shrub (>1m; to 5m) | **S2** Short Shrub (< 1m) | **H** Herbaceous | **N** Nonvascular | **V** Vines (lianas) | **E** Epiphytes*

SPECIES COMPOSITION AND COVER/ABUNDANCE CLASS BY STRATUM (enter cover values for each stratum AND for Total cover)

T 1	T 2	T 3	S 1	S 2	H	N	V	E	Total Cover	Name (7 letter code or full name)	Collected? Spec #?	Discarded ?

Cover cls
1 trace
2 0.1-1%
3 1-2%
4 2-5%
5 5-10%
6 10-25%
7 25-50%
8 50-75%
9 75-95%
10 >95%

SEVENTEEN PARKS PROJECT: Permanent Plot *Sampling Form* **Page 4**

County:______________ **Location (Park) Code**_______ **Plot Code:**_____ **Jurisdiction (State):**___ **Location org:_NPS_**

SPECIES COMPOSITION AND COVER/ABUNDANCE CLASS BY STRATUM

T 1	T 2	T 3	S 1	S 2	H	N	V	E	Total cover	Name (7 letter acronym or full name)	Collected? Spec #?	Discar ded?

Cover classes
1. trace
2. 0.1-1%
3. 1-2%
4. 2-5%
5. 5-10%
6. 10-25%
7. 25-50%
8. 50-75%
9. 75-95%
10. >95%

T1: Emergent
T2: Tree Can
T3 Subcanopy
S1 Tall Shrub (>1m; to 5m)
S2 Short Shrub (< 1m)
H Herbaceous
N Nonvascular
V Vines (lianas)
E Epiphytes

Use bottom of this sheet or additional pages for other species in 1 ha plot

Appendix II. USNVC Classification of Plant Associations at Little River Canyon National Preserve

U.S. NATIONAL VEGETATION CLASSIFICATION STANDARD:

TERRESTRIAL ECOLOGICAL CLASSIFICATIONS

Alliances and Associations
Little River Canyon National Preserve

30 November 2007

by

NatureServe

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

6114 Fayetteville St, Suite 109
Durham, NC 27713

This subset of the U.S. National Vegetation Classification Standard covers Alliances and Associations attributed to Little River Canyon National Preserve. This classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Comments and suggestions regarding the contents of this subset should be directed to Mary J. Russo, Central Ecology Data Manager, NatureServe, Durham, NC <mary_russo@natureserve.org> and Milo Pyne, Senior Regional Ecologist, NatureServe, Durham, NC <milo_pyne@natureserve.org>.

Citations:

The following citation should be used in any published materials which reference ecological system and/or International Vegetation Classification (IVC hierarchy) and association data:

NatureServe. 2007. U.S. National Vegetation Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 30 November 2007.

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These data are extracted from:

NatureServe. 2007. U.S. National Vegetation Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 30 November 2007.

This document may be generally cited as follows:

NatureServe[1]. 2007. U.S. National Vegetation Classification Standard: Terrestrial Ecological Classifications. Alliances and Associations of Little River Canyon National Preserve. NatureServe Central Databases. Arlington, VA. Data current as of 30 November 2007.

[1] NatureServe 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 ecological systems classification:

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, Querry 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-Departmento 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.

TABLE OF CONTENTS

*Note: The following successional communities are included on the Little River map, but were not sampled during this portion of the project and thus are not included in the vegetation classification:

(CEGL006011) Loblolly Pine / Sweetgum - Red Maple / Deerberry Forest
(CEGL008568) Chinese Wisteria Vine-Shrubland
(CEGL004048) (Tall Fescue, Meadow Fescue) Herbaceous Vegetation

I. Forest

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

A.119–*Pinus echinata* Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes forests dominated by *Pinus echinata* (shortleaf pine), which on very dry sites may be virtually the only tree species present. This is a wide-ranging alliance; it is currently known from wide areas of the eastern United States from the Central Appalachians south through the Southern Blue Ridge and Cumberland Plateau and Mountains, extending into the Piedmont, and in the central United States in the Ouachita Mountains and Ozarks, extending south into the Gulf Coastal Plain. Other pine species may be present in small amounts; these vary with geography and include *Pinus taeda* (loblolly pine), *Pinus virginiana* (Virginia pine), *Pinus pungens* (Table Mountain pine), and *Pinus rigida* (pitch pine). Typical hardwood associates include *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), *Quercus marilandica* (blackjack oak), *Nyssa sylvatica* (blackgum), *Liquidambar styraciflua* (sweetgum), *Carya alba* (mockernut hickory), and *Carya glabra* (pignut hickory). Understory species vary across the range of the alliance, but some common components are *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Symplocos tinctoria* (common sweetleaf), *Ulmus alata* (winged elm), *Diospyros virginiana* (common persimmon), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood). One association in the West Gulf Coastal Plain of Arkansas has *Vaccinium elliottii* (Elliott's blueberry), *Aesculus pavia var. pavia* (red buckeye), and *Chasmanthium laxum* (slender woodoats). Common herbaceous species in this Coastal Plain association include *Smilax glauca* (cat greenbrier), *Silphium compositum* (kidneyleaf rosinweed), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Scleria oligantha* (littlehead nutrush), *Piptochaetium avenaceum* (blackseed speargrass), and *Tephrosia virginiana* (Virginia tephrosia). Some associations can result from natural or anthropogenic disturbances such as fire or windstorms, while others occur naturally on the landscape, are maintained by edaphic situations, and may even represent "climax" vegetation on these sites. Soils of these forests are acidic and are derived from sandstone, chert or granitic rock situated on ravines, ridges, and steep, often south-facing, slopes; the surface is often rocky. In the Coastal Plain, this alliance is particularly typical of clay soils, on hillsides, ridges, flats, and low hills. In the Ouachita Mountains and Ozarks, forests of this alliance typically occur on south-facing slopes and saddles, and rocky outcrops and bluffs, but may also occur on lower, north-facing slopes and flat uplands, especially in the Piedmont.

Classification Comments: Stands have suffered some damage from the southern pine beetle (*Dendroctonus frontalis*).

Similar Alliances:

Pinus echinata Woodland Alliance (A.515)

Similar Alliance Comments:

Related Concepts:

Pinus echinata forest alliance (Hoagland 1998a) I
Dry Shortleaf Pine - Oak Forest (Foti 1994b) I
IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) I
IA7a. Xeric Shortleaf Pine - Oak Forest (Allard 1990) I
Pine--Oak/Heath (Nelson 1986) I
Shortleaf Pine - Oak: 76 (Eyre 1980) I
Shortleaf Pine CP, BR, RV (Pyne 1994) ?
Shortleaf Pine: 75 (Eyre 1980) I

T1A9bI1a. *Pinus echinata* (Foti et al. 1994) ?

ALLIANCE DESCRIPTION

Environment: In the more interior provinces, the soils of these forests are acidic and are derived from sandstone, chert or granitic rock situated on ravines, ridges, and steep, often south-facing, slopes; the surface is often rocky. In the Coastal Plain and Piedmont, this alliance is particularly typical of clay soils, on hillsides, ridges, flats, and low hills. These associations typically occur on south-facing slopes and saddles in the Ouachita Mountains and southern Arkansas Ozarks but may also occur on lower, north-facing slopes. In the northern Arkansas Ozarks, *Pinus echinata* forests occur naturally on steep slopes, over cherty residuum of the Boone Formation. Stands have suffered some damage from the southern pine beetle (*Dendroctonus frontalis*).
Vegetation: Forests are dominated by *Pinus echinata* (shortleaf pine), which on very dry sites may be virtually the only tree species present. Other pine species may be present in small amounts and include *Pinus taeda* (loblolly pine), *Pinus virginiana* (Virginia pine), *Pinus pungens* (Table Mountain pine), and *Pinus rigida* (pitch pine). Typical hardwood associates include *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), *Quercus marilandica* (blackjack oak), *Nyssa sylvatica* (blackgum), *Liquidambar styraciflua* (sweetgum), *Carya alba* (mockernut hickory), and *Carya glabra* (pignut hickory). *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Symplocos tinctoria* (common sweetleaf), *Ulmus alata* (winged elm), *Diospyros virginiana* (common persimmon), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood) are common in the understory. One association in the West Gulf Coastal Plain of Arkansas has *Vaccinium elliottii* (Elliott's blueberry), *Aesculus pavia var. pavia* (red buckeye), and *Chasmanthium laxum* (slender woodoats). Common herbaceous species include *Smilax glauca* (cat greenbrier), *Silphium compositum* (kidneyleaf rosinweed), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Scleria oligantha* (littlehead nutrush), *Piptochaetium avenaceum* (blackseed speargrass), and *Tephrosia virginiana* (Virginia tephrosia).
Dynamics: Some associations can result from natural or anthropogenic disturbances such as fire, windstorms, plowing, or clearcuts, while others occur naturally on the landscape, are maintained by edaphic situations, and may even represent "climax" vegetation on these sites. Stands may have suffered damage from the southern pine beetle (*Dendroctonus frontalis*).

ALLIANCE DISTRIBUTION

Range: This is a wide-ranging alliance; it is currently known from wide areas of the eastern United States from the Central Appalachians south, through the Southern Blue Ridge and Cumberland Plateau and Mountains, extending into the Piedmont, and in the central United States in the Ouachita Mountains and Ozarks, extending south into the Gulf Coastal Plain. Associations in this alliance are found in southern Missouri, Alabama, Arkansas, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly in West Virginia.
Nations: US
Subnations: AL, AR, DE, GA, KY, LA, MD, MO, MS, NC, OK, SC, TN, TX, WV?
TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 51:C, 52:P, 53:C, 58:C, 59:C
USFS Ecoregions: 221Db:CCC, 221Ha:CCP, 221Hc:CCC, 221He:CCC, 221Jb:CCC, 221Jc:CCP, 222A:CC, 222Ej:CPP, 222En:CP?, 222Eo:CPP, 222Hc:CCC, 231Aa:CCC, 231Ab:CCP, 231Ac:CCP, 231Ad:CC?, 231Ae:CCC, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCC, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCC, 231Be:CCP, 231Bg:CC?, 231Bk:CC?, 231Ca:CC?, 231Cc:CCC, 231Da:CP?, 231Dc:CPP, 231Ea:CCC, 231Ef:CCC, 231Ej:CCC, 231Fa:CPP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ba:CCC, 232Bb:CCP, 232Bd:CC?, 232Bj:CC?, 232Bk:CC?, 232Bm:CCC, 232Fe:CCC, 234Ab:CCC, M221A:CC, M221B:C?, M221Ca:CC?, M221Cd:CCP, M221Ce:CCC, M221Dc:CCC, M221Dd:CCC, M222A:CC, M231Aa:CCP, M231Ab:CCC, M231Ac:CCC
Federal Lands: BIA (Eastern Band Cherokee); DOD (Camp Robinson); NPS (Buffalo River, Cowpens, Great Smoky Mountains, Kings Mountain, Little River Canyon, Mammoth Cave, Natchez Trace?, Ozark, Shiloh); TVA (Tellico); USFS (Angelina, Bienville, Chattahoochee, Cherokee?, Daniel Boone, Davy Crockett, Holly Springs,

Mark Twain, Nantahala, Oconee?, Ouachita, Ozark, Sabine, Sam Houston, St. Francis, Sumter, Talladega?, Tombigbee, Tuskegee?)

(CEGL006327) Shortleaf Pine Early-Successional Forest
***Pinus echinata* Early-Successional Forest**
Shortleaf Pine Early-Successional Forest

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) Southern Appalachian Low-Elevation Pine Forest (CES202.332)

ELEMENT CONCEPT

Global Summary: This association represents early-successional *Pinus echinata* (shortleaf pine)-dominated vegetation. This broadly defined type has a wide distribution throughout the native range of *Pinus echinata* (shortleaf pine) 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* (shortleaf pine) are able to seed into the newly disturbed area and colonize before other species such as *Pinus taeda* (loblolly pine). 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* (shortleaf pine) is clearly the single most dominant tree, other "old-field" *Pinus* (pine) species (e.g., *Pinus taeda* (loblolly pine), *Pinus virginiana* (Virginia pine)) and/or other early-successional deciduous trees (e.g., *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree)) 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* (oak) spp. and *Carya* (hickory) spp. may begin to replace senescent *Pinus echinata* (shortleaf pine) individuals.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: The presence of this association at the preserve is an artifact of either natural or human-derived disturbance. Owing to vegetation succession, a mixed pine (namely *Pinus echinata*) - hardwood forest will ultimately be attained, a forest cover characteristic of upper slopes and mountain summits throughout the region.

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

Little River Canyon National Preserve Vegetation: This association is poorly represented at Little River Canyon National Preserve where it is characterized as an early-successional forest dominated by *Pinus echinata* (shortleaf pine). Various oaks, most notably *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak), are also present suggesting a gradual transition to a hardwood-dominated climax stage. The understory is generally open and contains smaller examples of the foregoing canopy species, as well as *Pinus taeda* (loblolly pine), *Vaccinium arboreum* (farkleberry), and an occasional *Carya* (hickory) sp. The herb layer is relatively sparse, with *Schizachyrium scoparium* (little bluestem), *Polygala* (polygala) sp., *Solidago* (goldenrod) sp., *Allium* (onion) sp., and various bryophytes serving as principal species.

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

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Pinus echinata* (shortleaf pine)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global: *Pinus echinata* (shortleaf pine)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve Comments:
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

Little River Canyon National Preserve Range: Apparently rare in the preserve, with only one occurrence documented, approximately 0.5 air mile north-northeast of the junction of State Route 35 and County Road 103.

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

Nations: US

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

TNC Ecoregions:

USFS Ecoregions: 221J:CC, 222:C, 231A:CC, 231Bd:CCC, 231Cc:CCC, 231E:CP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Bm:CCC, M221A:C?, M221B:C?, M221Dd:CCC, M222A:CC

Federal Lands: BIA (Eastern Band Cherokee); NPS (Cowpens, Kings Mountain, Little River Canyon, Mammoth Cave, Natchez Trace?, Shiloh); TVA (Tellico); USFS (Bienville?, Chattahoochee, Chattahoochee (Piedmont)?, Chattahoochee (Southern Blue Ridge), Daniel Boone, Holly Springs?, Mark Twain, Oconee?, Ouachita, Ouachita (Coastal Plain), Ouachita (Mountains), Ozark, St. Francis, Sumter (Piedmont)?, Sumter?, Talladega?, Tombigbee?, Tuskegee?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.70.

Local Description Authors: A. Schotz

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, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

A.130–*Pinus taeda* Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes both successional forests, following cropping or site conversion, and natural forests in the Piedmont, Cumberlands and Ridge and Valley, and Coastal Plain of the southeastern United States. Other canopy and subcanopy species that may be present in successional stands are *Liriodendron tulipifera* (tuliptree), *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Pinus virginiana* (Virginia pine), *Juniperus virginiana var. virginiana* (eastern redcedar), *Quercus stellata* (post oak), *Quercus velutina* (black oak), *Ulmus rubra* (slippery elm), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Ulmus alata* (winged elm),

Cornus florida (flowering dogwood), *Prunus serotina var. serotina* (black cherry), and *Carya* (hickory) spp. *Vaccinium* (blueberry) spp., especially *Vaccinium stamineum* (deerberry), are common in these forests. One association in this alliance occurs on barrier islands in the Mid-Atlantic Coastal Plain. Along with the dominant *Pinus taeda* (loblolly pine), canopy associates often include *Quercus falcata* (southern red oak), *Acer rubrum* (red maple), *Prunus serotina var. serotina* (black cherry), and *Sassafras albidum* (sassafras). The tall-shrub layer is comprised of *Morella cerifera* (wax myrtle) and *Vaccinium formosum* (southern blueberry). Vines and lianas are always present in abundance; *Vitis rotundifolia* (muscadine) is most commonly present, but *Toxicodendron radicans* (eastern poison ivy), *Smilax rotundifolia* (roundleaf greenbrier), *Smilax glauca* (cat greenbrier), and *Parthenocissus quinquefolia* (Virginia creeper) are usually present in abundance as well. The herbaceous layer may be sparse, particularly if shrubs and vines are dense, but *Chasmanthium laxum* (slender woodoats) may be fairly abundant in this community. Other herbs include *Panicum amarum var. amarulum* (bitter panicgrass), *Eupatorium hyssopifolium* (hyssopleaf thoroughwort), and *Elephantopus nudatus* (smooth elephantsfoot). In southern Virginia and North Carolina, *Quercus virginiana* (live oak) and *Gelsemium sempervirens* (evening trumpetflower) may also be present, but *Quercus virginiana* (live oak) is never abundant and when present is usually restricted to the understory. *Pinus taeda* (loblolly pine) may occur rarely in the Ouachita Mountains and Ozarks of Arkansas where the species is becoming naturalized, expanding from its native range in the Coastal Plain, where it naturally occurs in low, moist areas (e.g., deep, well-drained soils of floodplains). However, a natural *Pinus taeda* (loblolly pine) forest association is not recognized for the Ozark or Ouachita region.

Classification Comments: On the Bankhead National Forest in the Cumberland Plateau of northern Alabama, this alliance includes streamside terraces that are presumed to have been previously farmed. Associations occurring as plantations are classed in *Pinus taeda* Planted Forest Alliance (A.99).

Similar Alliances:

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

Pinus taeda - Quercus (phellos, nigra, laurifolia) Temporarily Flooded Forest Alliance (A.437)--mixed, temporarily flooded.

Pinus taeda - Quercus nigra Forest Alliance (A.406)

Pinus taeda Planted Forest Alliance (A.99)--includes monospecific, dense, plantation stands only.

Pinus taeda Woodland Alliance (A.526)

Similar Alliance Comments:

Related Concepts:

Loblolly Pine: 81 (Eyre 1980) I

Lowland Pine - Oak Forest (Foti 1994b) ?

T1A9bII2a. *Pinus taeda* (Foti et al. 1994) ?

Upland Mixed Forest (FNAI 1992a) ?

Upland Mixed Forest, Gumbo Loblolly Forest subtype (FNAI 1992b) ?

ALLIANCE DESCRIPTION

Environment: This alliance includes both successional forests, following cropping or site conversion, and natural forests in the Piedmont, Cumberlands and Ridge and Valley, and Coastal Plain of the southeastern United States.

Vegetation: Canopy and subcanopy species that may be present in successional stands are *Liriodendron tulipifera* (tuliptree), *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Pinus virginiana* (Virginia pine), *Juniperus virginiana var. virginiana* (eastern redcedar), *Quercus stellata* (post oak), *Quercus velutina* (black oak), *Ulmus rubra* (slippery elm), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Prunus serotina var. serotina* (black cherry), and *Carya* (hickory) spp. *Vaccinium* (blueberry) spp., especially *Vaccinium stamineum* (deerberry), are common in these forests. One association in this alliance occurs on barrier islands in the Mid-Atlantic Coastal Plain. Along with the dominant *Pinus taeda* (loblolly pine), canopy associates often include *Quercus falcata* (southern red oak), *Acer rubrum* (red maple), *Prunus serotina var. serotina* (black cherry), and *Sassafras albidum* (sassafras). The tall-shrub layer is comprised of *Morella cerifera* (wax myrtle) and *Vaccinium formosum* (southern blueberry). Vines and lianas are

always present in abundance; *Vitis rotundifolia* (muscadine) is most commonly present, but *Toxicodendron radicans* (eastern poison ivy), *Smilax rotundifolia* (roundleaf greenbrier), *Smilax glauca* (cat greenbrier), and *Parthenocissus quinquefolia* (Virginia creeper) are usually present in abundance as well. The herbaceous layer may be sparse, particularly if shrubs and vines are dense, but *Chasmanthium laxum* (slender woodoats) may be fairly abundant in this community. Other herbs include *Panicum amarum var. amarulum* (bitter panicgrass), *Eupatorium hyssopifolium* (hyssopleaf thoroughwort), and *Elephantopus nudatus* (smooth elephantsfoot). In southern Virginia and North Carolina, *Quercus virginiana* (live oak) and *Gelsemium sempervirens* (evening trumpetflower) may also be present, but *Quercus virginiana* (live oak) is never abundant and when present is usually restricted to the understory. *Pinus taeda* (loblolly pine) forests may occur rarely in the Ouachita Mountains and Ozarks of Arkansas where the species is becoming naturalized, expanding from its native range in the Coastal Plain, where it naturally occurs in low, moist areas (e.g., deep, well-drained soils of floodplains).

Dynamics: The understory of the heavily disturbed examples of this alliance is often dominated by exotic species, to the exclusion of natives. Common invasives are *Lonicera japonica* and *Microstegium vimineum*. Due to the dominance of these species, stand dynamics often shift so that there are less seedlings and saplings in the understory.

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Cumberland Plateau, Piedmont, Interior Low Plateau, and Coastal Plains of the southeastern United States, from Delaware and Maryland south and west to Texas, and in the interior to Tennessee and possibly West Virginia.

Nations: US

Subnations: AL, AR, DE, FL, GA, LA, MD, MS, NC, OK, SC, TN, TX, VA

TNC Ecoregions: 31:P, 39:C, 40:C, 41:C, 42:P, 43:C, 44:C, 50:C, 52:C, 53:C, 55:?, 56:C, 57:C, 58:C, 59:C, 62:C

USFS Ecoregions: 221D:CC, 221Jb:CCC, 222Cb:CCC, 222Dc:CCC, 222Dd:CCC, 222Eb:CCC, 222Ec:CCC, 222Ef:CCC, 222Eg:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCC, 231Ai:CCC, 231Aj:CCC, 231Ak:CCC, 231Al:CCC, 231Am:CCC, 231An:CCC, 231Ao:CCP, 231Ba:CCC, 231Bb:CCC, 231Bc:CCP, 231Bd:CCC, 231Be:CCC, 231Bf:CCP, 231Bg:CCC, 231Bh:CCC, 231Bi:CCC, 231Bj:CCC, 231Bk:CCC, 231Bl:CCC, 231Ca:CCP, 231Cb:CCP, 231Cc:CCC, 231Cd:CCC, 231Ce:CCC, 231Cf:CCC, 231Cg:CCP, 231Da:CCP, 231Dc:CCC, 231De:CC?, 231Ea:CCC, 231Eb:CC?, 231Ec:CC?, 231Ed:CC?, 231Ef:CC?, 231Eg:CCP, 231Eh:CCC, 231Ei:CC?, 231Ej:CC?, 231Ek:CCP, 231En:CC?, 231Fa:CPP, 231Fb:CP?, 232Ac:CCC, 232Ad:CCC, 232Ba:CCC, 232Bb:CCC, 232Bc:CC?, 232Bd:CC?, 232Be:CC?, 232Bg:CCC, 232Bh:CC?, 232Bi:CC?, 232Bj:CCC, 232Bk:CC?, 232Bl:CC?, 232Bm:CCC, 232Bn:CC?, 232Bo:CC?, 232Bp:CC?, 232Bq:CCC, 232Br:CCC, 232Bt:CC?, 232Bu:CC?, 232Bv:CC?, 232Bx:CCC, 232Bz:CCC, 232Ca:CCC, 232Cb:CCC, 232Cc:CC?, 232Ce:CCC, 232Cf:CC?, 232Cg:CC?, 232Ci:CC?, 232Da:CC?, 232Dc:CCC, 232Fa:CC?, 232Fb:CC?, 232Fe:CCC, 255Da:PPP, M221D:??

Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon); NPS (Assateague Island, Cape Hatteras, Chickamauga-Chattanooga, Colonial, Cowpens, Fort Donelson, George Washington Birthplace, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Little River Canyon, Natchez Trace, Ninety Six, Petersburg, Richmond, Shiloh); TVA (Tellico); USFS (Angelina, Apalachicola, Bankhead, Bienville, Chattahoochee, Conecuh?, Croatan, Davy Crockett, Kisatchie, Land Between the Lakes?, Oconee, Ouachita, Sabine, Sam Houston, Sumter, Talladega, Tuskegee, Uwharrie); USFWS (Back Bay?, Blackwater, Chesapeake Marshlands, Chincoteague, Prime Hook)

(CEGL008462) Loblolly Pine - Sweetgum Semi-natural Forest

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

Mid- to Late-Successional Loblolly Pine - Sweetgum Forest

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

ELEMENT CONCEPT

Global Summary: This community type is broadly defined to accommodate mid- to late-successional upland forests strongly codominated by *Pinus taeda* (loblolly pine) and *Liquidambar styraciflua* (sweetgum), 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:

Little River Canyon National Preserve Environment: As discussed under global environment, examples at Little River Canyon are also the result of former anthropogenic disturbance. This association will gradually succeed into an oak-hickory-pine-dominated forest.

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. Stands on poorly drained sites have often been subjected to ditching activities.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: While poorly represented at Little River Canyon National Preserve, on-site examples follow similar patterns in age structure, floral composition, and the ability to occupy a broad spectrum of edaphic conditions, as elsewhere within the range of this association. *Pinus taeda* (loblolly pine) and, to a slightly lesser degree, *Liquidambar styraciflua* (sweetgum) are the principal canopy and subcanopy species. Other taxa found in these strata include *Pinus virginiana* (Virginia pine), *Carya alba* (mockernut hickory), *Nyssa sylvatica* (blackgum), *Acer rubrum* (red maple), and various *Quercus* (oak) spp. The shrub component is generally diverse, assuming a highly variable level of density based on stand maturity; whence diversity and abundance of shrubs decrease as the stand matures. Characteristic species of the shrub stratum include *Cornus florida* (flowering dogwood), *Ilex opaca* (American holly), *Sassafras albidum* (sassafras), *Viburnum dentatum* (southern arrowwood), and *Rhus copallinum* (flameleaf sumac), as well as immature specimens of the foregoing canopy species. Herb diversity is also heterogeneous, with younger stands often containing a greater floral richness than older, more mature stands. Common herbs include *Andropogon virginicus* (broomsedge bluestem), *Saccharum giganteum* (sugarcane plumegrass), *Tephrosia virginiana* (Virginia tephrosia), *Rubus argutus* (sawtooth blackberry), *Mitchella repens* (partridgeberry), *Solidago ulmifolia* (elmleaf goldenrod), *Elephantopus tomentosus* (devil's grandmother), *Eupatorium rotundifolium* (roundleaf thoroughwort), and *Eupatorium serotinum* (lateflowering thoroughwort). *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), and *Parthenocissus quinquefolia* (Virginia creeper) are common vines, often trailing along the ground surface.

Global Vegetation: Stands of this community type are strongly codominated by *Pinus taeda* (loblolly pine) and *Liquidambar styraciflua* (sweetgum). Some other species which may be present in stands of this association include *Quercus phellos* (willow oak), *Quercus nigra* (water oak), *Ulmus alata* (winged elm), *Acer rubrum* (red maple),

Quercus michauxii (swamp chestnut oak), *Nyssa sylvatica* (blackgum), and *Prunus serotina* (black cherry), along with *Vitis rotundifolia* (muscadine), *Toxicodendron radicans* (eastern poison ivy), *Rubus argutus* (sawtooth blackberry), *Smilax rotundifolia* (roundleaf greenbrier), *Eupatorium capillifolium* (dogfennel), *Eupatorium hyssopifolium* (hyssopleaf thoroughwort), *Erigeron strigosus* (prairie fleabane), *Solidago gigantea* (giant goldenrod), *Ambrosia artemisiifolia* (annual ragweed), *Juncus effusus* (common rush), *Juncus subcaudatus* (woodland rush), and the exotics *Lespedeza cuneata* (Chinese lespedeza) and *Ligustrum sinense* (Chinese privet). Examples of this association in low-lying areas may also have a dense herbaceous layer of *Microstegium vimineum* (Nepalese browntop).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Pinus taeda* (loblolly pine)
Tree canopy	Broad-leaved deciduous tree	*Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve Comments:
Global Comments: This community likely occurs along the northern periphery of the Gulf Coast Prairies and Marshes Ecoregion of eastern Texas. The similarity of this association with *Pinus taeda / Liquidambar styraciflua - Acer rubrum var. rubrum / Vaccinium stamineum* Forest (CEGL006011) suggests that a merge with that type should be considered.
Global Similar Associations:
Liriodendron tulipifera - Pinus taeda Forest (CEGL007521)--with greater dominance by *Liriodendron*.
Pinus echinata Early-Successional Forest (CEGL006327)
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 an earlier successional stage of this association and is distinguished by a lack of *Liquidambar styraciflua* in the canopy and a well-developed hardwood understory.
Pinus taeda / Saccharum alopecuroidum - (Andropogon spp.) Forest (CEGL007109)--a related *Pinus taeda*-dominated type placed in evergreen.
Pinus virginiana Successional Forest (CEGL002591)
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

Little River Canyon National Preserve Range: Currently known from the preserve north of State Route 35 on either side of Little River.
Global Range: This altered forest type is widespread in the lowland portions of the southeastern to mid-Atlantic United States, particularly on the Coastal Plain, but also on adjacent inland provinces.
Nations: US
States/Provinces: AL, AR, DE, GA, LA, MD, MS, NC, OK, SC, TN, TX, VA
TNC Ecoregions:
USFS Ecoregions: 222Ef:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Bd:CCC, 231Bg:CCC, 231Bi:CCC, 231Bk:CCC, 231Cc:CCC, 231Fa:CPP, 232Ac:CCC, 232Bm:CCC, 232Bx:CCC, 232Cb:CCC, 232F:CC, 255Da:PPP
Federal Lands: DOD (Fort Benning?); NPS (Chickamauga-Chattanooga, George Washington Birthplace, Guilford Courthouse, Kings Mountain, Little River Canyon, Natchez Trace, Ninety Six, Petersburg, Richmond, Shiloh); USFS (Angelina, Bienville, Conecuh?, Croatan, Davy Crockett, Kisatchie, Oconee, Ouachita, Ouachita (Coastal Plain), Ouachita (Mountains), Sabine, Sam Houston, Talladega, Talladega (Oakmulgee), Talladega (Talladega), Tuskegee?, Uwharrie); USFWS (Blackwater, Chesapeake Marshlands, Prime Hook)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.1, LIRI.20.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley, mod. R. White and E. Largay
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, Schotz pers. comm., Southeastern Ecology Working Group n.d., USFS 1988, Zanoni et al. 1979

A.131–*Pinus virginiana* Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes forests dominated by *Pinus virginiana* (Virginia pine) occurring in the Piedmont from Pennsylvania south to Alabama, and ranging west into the Appalachians, Ridge and Valley, the Cumberland Plateau, and at scattered locales in the Interior Low Plateau. Forests in this alliance may have admixtures of *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine), *Pinus pungens* (Table Mountain pine), and/or *Pinus rigida* (pitch pine). These other species, if present, can have canopy coverage between 1 and 50%. Other associated species vary with the geographic distribution of the alliance. In many associations, a dense ericaceous shrub stratum is typical. This alliance includes both early-successional forests resulting from natural or anthropogenic disturbances and natural forests in edaphically extreme situations. Typically, *Pinus virginiana* (Virginia pine) communities are short-lived as a forest and are more common as woodland communities [see *Pinus (rigida*, *pungens*, *virginiana) - Quercus prinus* Woodland Alliance (A.677)]. Associated species vary with the geographic distribution of the alliance.

Classification Comments: Appalachian pine-dominated associations need to be revisited in relation to the ecology of shortleaf pine, *Pinus echinata*. Are some stands of this type ones that historically were dominated by shortleaf pine? (MP 2002-03).
Similar Alliances:
Pinus (rigida, pungens, virginiana) - Quercus prinus Woodland Alliance (A.677)
Pinus virginiana Planted Forest Alliance (A.100)
Similar Alliance Comments:
Related Concepts:
Appalachian pine-oak forest (Evans 1991) I
IA7a. Xeric Shortleaf Pine - Oak Forest (Allard 1990) I
Pine--Oak/Heath (Nelson 1986) I
Pine--Oak/Heath (Schafale and Weakley 1990) I
Virginia Pine - Mixed Oaks HR (Pyne 1994) ?
Virginia Pine CUPL, BR, RV (Pyne 1994) ?
Virginia Pine: 79 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: This alliance includes both early-successional forests resulting from natural or anthropogenic disturbances and natural forests in edaphically extreme situations.
Vegetation: This alliance includes evergreen forests dominated by *Pinus virginiana* (Virginia pine). These forests are usually dense and can contain admixtures of *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine), *Pinus pungens* (Table Mountain pine), and/or *Pinus rigida* (pitch pine), and, particularly in fire-suppressed examples, small stems of deciduous species. Associated species vary with the geographic distribution of the alliance. In many associations, a dense ericaceous shrub stratum is typical. Types resulting from anthropogenic disturbance may have a greater admixture of deciduous species. In the Piedmont common associates include *Liquidambar styraciflua* (sweetgum), *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine), and *Quercus* (oak) spp., while on extreme sites in the southern Appalachians, *Pinus pungens* (Table Mountain pine) and *Pinus rigida* (pitch pine) are more typical. In areas with calcareous geology, *Juniperus virginiana* (eastern redcedar) is a typical associate. In many associations, a dense ericaceous shrub stratum is typical and can include species such as *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium arboreum* (farkleberry), *Vaccinium angustifolium* (lowbush blueberry), *Vaccinium myrtilloides* (velvetleaf huckleberry), *Gaylussacia baccata* (black huckleberry), *Gaylussacia ursina* (bear huckleberry), *Kalmia latifolia* (mountain laurel), *Rhododendron catawbiense* (Catawba rosebay), and *Rhododendron maximum* (great laurel). Dry-mesic successional examples may contain other *Pinus* (pine) species (e.g., *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine)) or other early successional deciduous trees (e.g., *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree)). The subcanopy may contain *Acer saccharum* (sugar maple) and *Cornus florida* (flowering dogwood); other associated species may include *Cercis canadensis* (eastern redbud), *Parthenocissus quinquefolia* (Virginia creeper), *Lycopodium digitatum* (fan clubmoss), as well as the exotics *Lonicera japonica* (Japanese honeysuckle) and *Microstegium vimineum* (Nepalese browntop) (Andreu and Tukman 1995).
Dynamics: This alliance includes both early successional forests resulting from natural or anthropogenic disturbance and natural forests in edaphically extreme situations. Typically, *Pinus virginiana* communities are short-lived as a forest and are more common as woodland communities [see *Pinus (rigida, pungens, virginiana) - Quercus prinus* Woodland Alliance (A.677)].

ALLIANCE DISTRIBUTION

Range: Forests in this alliance are possible in the Piedmont from Pennsylvania south to Alabama, and ranging west into the Appalachians, Ridge and Valley, the Cumberland Plateau, and at scattered locales in the Interior Low Plateau.
Nations: US
Subnations: AL, DE, GA, IN, KY, MD, NC, NH, NJ, OH, PA, SC, TN, VA, WV

TNC Ecoregions: 43:C, 44:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 61:C, 62:C, 63:C
USFS Ecoregions: 221Da:CCC, 221Db:CCC, 221Ea:CC?, 221Eb:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCC, 221Eg:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 221Ja:CCC, 221Jb:CCC, 221Jc:CCC, 222Cg:CCC, 222Da:CCC, 222Dc:CCC, 222Dd:CCC, 222Dg:CCC, 222Dj:CCC, 222Eb:CCC, 222Eg:CCC, 222Eh:CCC, 222Ej:CCC, 222El:CCC, 222En:CCC, 222Eo:CCC, 222Fc:CCC, 222Fd:CCC, 222Ff:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCP, 231Ad:CCC, 231Ae:CCC, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCC, 231Al:CCP, 231Am:CCP, 231An:CCC, 231Ao:CCP, 231Ap:CCP, 231Bc:CCC, 231Be:CCC, 231Ca:CCP, 231Cb:CCP, 231Cc:CCC, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCC, 231Dc:CCC, 232Ab:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CCP, M221Be:CCP, M221Ca:CCP, M221Cb:CCC, M221Cc:CCC, M221Cd:CCC, M221Ce:CCC, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Appomattox Court House, Big South Fork, Blue Ridge Parkway, Bluestone, Booker T. Washington, Chickamauga-Chattanooga, Cumberland Gap, Fredericksburg-Spotsylvania, Gettysburg, Great Smoky Mountains, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Natchez Trace, New River Gorge, Obed, Shenandoah, Shiloh, Thomas Stone); TVA (Land Between the Lakes?, Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Jefferson, Nantahala, Pisgah, Sumter, Talladega, Uwharrie?, Wayne); USFWS (Chesapeake Marshlands)

(CEGL007119) Virginia Pine - (Pitch Pine, Shortleaf Pine) - (Chestnut Oak) / Hillside Blueberry Forest

***Pinus virginiana - Pinus (rigida, echinata) - (Quercus prinus) / Vaccinium pallidum* Forest**
Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest

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) - (Chestnut Oak) / Hillside Blueberry Forest
Association (Common name)	Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest
Ecological System(s):	Cumberland Sandstone Glade and Barrens (CES202.337) Central Interior Highlands Dry Acidic Glade and Barrens (CES202.692) Southern Appalachian Montane Pine Forest and Woodland (CES202.331) Southern Appalachian Low-Elevation Pine Forest (CES202.332) Central Appalachian Dry Oak-Pine Forest (CES202.591) Cumberland Acidic Cliff and Rockhouse (CES202.309) Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)

ELEMENT CONCEPT

Global Summary: This community includes *Pinus virginiana* (Virginia pine)-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* (Virginia pine) is the canopy dominant throughout the range of the type. In some parts of the range, other *Pinus* (pine) species may be significant canopy associates, as well as dry-site *Quercus* (oak) species (e.g., *Quercus prinus* (chestnut oak), *Quercus coccinea* (scarlet oak)). Deciduous species may form a subcanopy or sapling stratum, particularly in areas where fire has been excluded. Common shrub dominants include *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Gaylussacia baccata* (black huckleberry), and *Kalmia latifolia* (mountain laurel). Herbs vary with geography but are typical of infertile, xeric habitats. Some typical herbs in this forest are *Baptisia tinctoria* (horseflyweed), *Chimaphila maculata* (striped prince's pine), *Dichanthelium commutatum* (variable panicgrass), *Epigaea repens* (trailing arbutus), *Euphorbia corollata* (flowering spurge), *Galax urceolata* (beetleweed), *Gaultheria procumbens* (eastern teaberry), *Hypoxis hirsuta* (common goldstar), *Iris verna* (dwarf violet iris), *Pityopsis graminifolia var. latifolia* (narrowleaf silkgrass), *Pteridium aquilinum var. latiusculum* (western brackenfern), and *Schizachyrium scoparium* (little bluestem).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: As throughout its range, the distribution of this association in Little River Canyon National Preserve is restricted to well-drained shallow soils along the canyon rim and on upper slopes and ridgetops elsewhere in the preserve. The underlying substrate is chiefly comprised of the Pottsville Formation, a thick-bedded sandstone matrix extending from approximately 274 to 366 m (900-1200 feet) in elevation.

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 850 m (2800 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. Along the edges of cliff tops, there is usually a narrow zone of exposed bedrock pavement and patches of very shallow soil, but soils become progressively deeper back from the cliff edge. At least in West Virginia, portions of the stands along the cliff edge are likely to be edaphic climax communities, but farther back from the edge, they are likely to be successional following fire.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Examples of this association at Little River Canyon National Preserve are relatively consistent and represented by a prominence of *Pinus virginiana* (Virginia pine) in the canopy and various deciduous species in the subcanopy and shrub layers. As the community matures, specifically in areas where fire has been excluded, a greater incidence of hardwoods will become apparent in the canopy, most notably *Quercus prinus* (chestnut oak), *Quercus falcata* (southern red oak), *Carya alba* (mockernut hickory), and *Nyssa sylvatica* (blackgum). Additionally, *Pinus echinata* (shortleaf pine) is sparse but seldom absent from the canopy. The shrub component is relatively dense, containing smaller examples of the foregoing deciduous species, in addition to a suite of common and characteristic shrubs, including *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Kalmia latifolia* (mountain laurel),

Oxydendrum arboreum (sourwood), *Ilex opaca* (American holly), *Sassafras albidum* (sassafras), and *Chionanthus virginicus* (white fringetree). Herbs are generally sparse but assume some abundance in canopy gaps and shallow soils associated with sandstone outcrops. Principal herbs, in approximate decreasing order of frequency, include *Schizachyrium scoparium* (little bluestem), *Danthonia sericea* (downy danthonia), *Mitchella repens* (partridgeberry), *Iris verna var. smalliana* (dwarf violet iris), *Deschampsia flexuosa* (wavy hairgrass), *Krigia biflora* (twoflower dwarfdandelion), and *Dichanthelium commutatum* (variable panicgrass). Common vines are *Gelsemium sempervirens* (evening trumpetflower), *Smilax rotundifolia* (roundleaf greenbrier), and *Smilax glauca* (cat greenbrier).

Global Vegetation: This community is a needle-leaved evergreen forest with a usually somewhat open (occasionally closed) canopy. The canopy is typically short (<20 m) with tree height and canopy cover decreasing with increasing severity of the microsite. A deciduous subcanopy may be present, especially in areas where fire has been excluded. The shrub layers can be sparse but are more often dense 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* (Virginia pine) 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* (pitch pine), *Pinus echinata* (shortleaf pine), or *Pinus strobus* (eastern white pine). Within its range, *Pinus pungens* (Table Mountain pine) may be present as a very minor component. Regeneration of *Pinus virginiana* (Virginia pine) is concentrated along cliff edges and tends to drop off inward from the edge. Small stems of *Quercus prinus* (chestnut oak), *Quercus coccinea* (scarlet oak), *Acer rubrum* (red maple), *Nyssa sylvatica* (blackgum), and *Oxydendrum arboreum* (sourwood) are common in the subcanopy and sapling strata, particularly in areas where fire has been excluded, and may occur in the canopy as well. In the Southern Blue Ridge/Piedmont and Southern Blue Ridge/Ridge and Valley transition regions, *Quercus marilandica* (blackjack oak), *Quercus falcata* (southern red oak), and *Quercus stellata* (post oak) can be deciduous components. Common shrub dominants include *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Gaylussacia baccata* (black huckleberry), and *Kalmia latifolia* (mountain laurel). Other typical shrubs can include *Gaylussacia ursina* (bear huckleberry), *Kalmia latifolia* (mountain laurel), *Sassafras albidum* (sassafras), and *Vaccinium hirsutum* (hairy blueberry) (southwestern North Carolina and southeastern Tennessee only). *Smilax glauca* (cat greenbrier) and *Smilax rotundifolia* (roundleaf greenbrier) can be common vines. In the sparse herb layer, characteristic species from the Southern Blue Ridge and Southern Ridge and Valley include *Baptisia tinctoria* (horseflyweed), *Chimaphila maculata* (striped prince's pine), *Dichanthelium commutatum* (variable panicgrass), *Danthonia spicata* (poverty oatgrass), *Epigaea repens* (trailing arbutus), *Euphorbia corollata* (flowering spurge), *Galax urceolata* (beetleweed), *Gaultheria procumbens* (eastern teaberry), *Hypoxis hirsuta* (common goldstar), *Iris verna* (dwarf violet iris), *Pityopsis graminifolia var. latifolia* (narrowleaf silkgrass), *Pteridium aquilinum var. latiusculum* (western brackenfern), and *Schizachyrium scoparium* (little bluestem). Typical herbs from examples in the western portion of the range (Interior Low Plateau) include *Antennaria plantaginifolia* (woman's tobacco), *Antennaria solitaria* (singlehead pussytoes), *Carex albicans var. albicans* (whitetinge sedge), *Danthonia spicata* (poverty oatgrass), *Dichanthelium dichotomum* (cypress panicgrass), *Lespedeza violacea* (violet lespedeza), *Hieracium gronovii* (queendevil), *Hieracium venosum* (rattlesnakeweed), *Krigia biflora* (twoflower dwarfdandelion), *Solidago erecta* (showy goldenrod), and *Tephrosia virginiana* (Virginia tephrosia) (M. Homoya pers. comm. 1999). In some of these examples *Opuntia humifusa* (devil's-tongue), *Calamagrostis porteri ssp. insperata* (Porter's reedgrass), and *Solidago squarrosa* (stout goldenrod) may occur locally.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	**Lifeform**	**Species**

Global

Stratum	**Lifeform**	**Species**
Tree canopy	Needle-leaved tree	*Pinus virginiana* (Virginia pine)
Tree canopy	Broad-leaved deciduous tree	*Quercus prinus* (chestnut oak)

Tall shrub/sapling	Broad-leaved evergreen shrub	*Kalmia latifolia* (mountain laurel)
Short shrub/sapling	Broad-leaved deciduous shrub	*Gaylussacia baccata* (black huckleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global: *Comptonia peregrina* (sweet fern), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (eastern teaberry), *Pinus virginiana* (Virginia pine), *Pteridium aquilinum* (western brackenfern), *Sassafras albidum* (sassafras)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Coreopsis pulchra* (woodland tickseed), *Helianthus longifolius* (longleaf sunflower), *Sabatia capitata* (Appalachian rose gentian)
Global: *Buckleya distichophylla* (piratebush), *Calamagrostis porteri* ssp. *insperata* (Porter's reedgrass), *Cleistes bifaria* (small spreading pogonia), *Penstemon deamii* (Deam's beardtongue), *Thermopsis villosa* (Aaron's rod), *Vaccinium hirsutum* (hairy blueberry)

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
Little River Canyon National Preserve Comments:
Global Comments: Some vegetation formerly placed (at least conceptually) in the *Pinus virginiana - Quercus (coccinea, prinus)* Forest Alliance (A.408) 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, shaly slopes and have stunted canopies and sparse herb and shrub strata, characterized by species adapted to shaly 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 (rigida, echinata) - Quercus coccinea / Ilex opaca Woodland (CEGL006115)
Pinus echinata Early-Successional Forest (CEGL006327)
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 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 (prinus, coccinea) / Kalmia latifolia / (Galax urceolata, Gaultheria procumbens) Forest (CEGL006271)

Quercus prinus - Quercus (alba, coccinea, velutina) / Viburnum acerifolium - (Kalmia latifolia) Forest (CEGL005023)

Global Related Concepts:

Pinus virginiana - (Quercus spp.) / *Nyssa sylvatica / Gaultheria procumbens* forest (Vanderhorst 2002b) =
Pinus virginiana - Quercus prinus - Nyssa sylvatica Forest (Walton et al. 1997) ?
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 Type (Schmalzer and DeSelm 1982) 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

Little River Canyon National Preserve Range: Most frequently associated with semi-shallow soils near the rim of Little River Canyon, but also widely distributed in the northern section of the preserve.

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 recorded from the states of Georgia, North Carolina, South Carolina, Tennessee, Kentucky, Pennsylvania, Indiana, Ohio, Maryland, Virginia, and West Virginia.

Nations: US

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

TNC Ecoregions:

USFS Ecoregions: 221Ea:CC?, 221Eb:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCC, 221Eg:CCC, 221Ha:CCC, 221Hc:CCC, 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, 231Cc:CCC, 231Cd:CCC, 231Da:CCC, 231Dc:CCC, M221Aa:CCP, M221Ab:CCC, M221Ac:CCC, M221Bb:CCC, M221Bd:CCP, M221Be:CCP, M221Cb:CCC, M221Cd:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga, Great Smoky Mountains, Kennesaw Mountain, Kings Mountain?, Little River Canyon, Mammoth Cave, New River Gorge, Obed); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, Land Between the Lakes?, Nantahala, Pisgah, Sumter, Sumter (Mountains), Sumter (Piedmont), Talladega, Talladega (Oakmulgee), Talladega (Talladega), Wayne)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.2, LIRI.55, LIRI.77, LIRI.78.

Local Description Authors: A. Schotz
Global Description Authors: K.D. Patterson, mod. R. White and S.C. Gawler
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, Harrison 2004, Homoya pers. comm., Malter 1977, Maxwell 2006, 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, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, Vanderhorst 2002b, Vanderhorst et al. 2007a, Walton et al. 1997, Whittaker 1956

(CEGL002591) Virginia Pine Successional Forest
***Pinus virginiana* Successional Forest**
Virginia Pine Successional Forest

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-Elevation Pine Forest (CES202.332)

ELEMENT CONCEPT

Global Summary: This successional Virginia pine forest of the southeastern states occurs in areas where canopy removal has created dry, open conditions and bare mineral soil, allowing for the establishment of *Pinus virginiana* (Virginia pine). These habitats include old fields, old pastures, clearcuts, and burned or eroded areas. This forest typically has a very dense canopy of *Pinus virginiana* (Virginia pine) and little understory vegetation. The dense canopy may also include admixtures of other *Pinus* (pine) species (e.g., *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine)) or other early-successional deciduous trees (e.g., *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Prunus serotina* (black cherry), *Liriodendron tulipifera* (tuliptree)). 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:
Little River Canyon National Preserve Environment: This association is restricted to the summit and upper slopes of Lookout Mountain along either side of Little River Canyon, originating on exposed mineral soil where the vegetation was cleared as a result of natural (fire, ice damage) and/or anthropogenic disturbances. This natural community is an early-successional forest, gradually succeeding into a climax forest comprised primarily of oak, hickory, and (shortleaf) pine.
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

Little River Canyon National Preserve Vegetation: The examples at Little River Canyon National Preserve are primarily comprised of young successional *Pinus virginiana* (Virginia pine), accented by a suite of early-successional hardwood species, including *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Nyssa sylvatica* (blackgum), *Prunus serotina* (black cherry), and *Acer rubrum* (red maple). The shrub layer is typically sparse but is occasionally comprised of small pockets of dense vegetation, particularly in canopy openings, represented by immature examples of the above-mentioned hardwood species, as well as *Oxydendrum arboreum* (sourwood), *Cornus florida* (flowering dogwood), *Sassafras albidum* (sassafras), *Asimina parviflora* (smallflower pawpaw), *Castanea dentata* (American chestnut), *Vaccinium arboreum* (farkleberry), *Ilex opaca* (American holly), and *Carpinus caroliniana* (American hornbeam). Herbs and vines are sparse, with *Chimaphila maculata* (striped prince's pine), *Solidago caesia* (wreath goldenrod), *Hexastylis arifolia var. ruthii* (Ruth's littlebrownjug), *Smilax rotundifolia* (roundleaf greenbrier), and *Vitis rotundifolia* (muscadine) appearing to be most common.
Global Vegetation: This forest typically has a very dense canopy of *Pinus virginiana* (Virginia pine) and little understory vegetation. *Pinus taeda* (loblolly pine) or *Pinus echinata* (shortleaf pine) may co-occur with *Pinus virginiana* (Virginia pine) in the canopy. The canopy can also have significant admixtures of early-successional deciduous trees (e.g., *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Prunus serotina* (black cherry), *Liriodendron tulipifera* (tuliptree)). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species; *Lonicera japonica* (Japanese honeysuckle) and *Rosa multiflora* (multiflora rose) are common. Shrub and herb strata are absent to sparse in coverage. In eastern Tennessee, the subcanopy may contain *Acer saccharum* (sugar maple) and *Cornus florida* (flowering dogwood); other associated species may include *Cercis canadensis* (eastern redbud), *Parthenocissus quinquefolia* (Virginia creeper), *Lonicera japonica* (Japanese honeysuckle), and *Microstegium vimineum* (Nepalese browntop) (Andreu and Tukman 1995). In the Central Appalachians, associates include *Pinus taeda* (loblolly pine), *Pinus echinata* (shortleaf pine), and *Pinus rigida* (pitch pine). Some stands may have a dense ericaceous shrub stratum containing *Vaccinium* (blueberry) spp., *Gaylussacia* (huckleberry) spp., *Kalmia latifolia* (mountain laurel), and *Rhododendron* (rhododendron) spp.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Pinus virginiana* (Virginia pine)
Tree subcanopy	Needle-leaved tree	*Juniperus virginiana* (eastern redcedar)
Tree subcanopy	Broad-leaved deciduous tree	*Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood)
Tall shrub/sapling	Broad-leaved deciduous tree	*Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood)

Tall shrub/sapling	Broad-leaved evergreen tree	*Vaccinium arboreum* (farkleberry)
Tall shrub/sapling	Broad-leaved deciduous shrub	*Vaccinium stamineum* (deerberry)
Short shrub/sapling	Broad-leaved deciduous tree	*Cercis canadensis* (eastern redbud), *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), *Quercus alba* (white oak), *Sassafras albidum* (sassafras)
Herb (field)	Vine/Liana	*Lonicera japonica* (Japanese honeysuckle), *Smilax glauca* (cat greenbrier), *Toxicodendron radicans* (eastern poison ivy)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global: *Pinus virginiana* (Virginia pine)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve 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:
Pinus virginiana forest (Vanderhorst 2001b) =
IA7c. Xeric Virginia Pine Ridge Forest (Allard 1990) B
Pine-Oak Association of the Western Shore District (Shreve et al. 1910) B

Unclassified Old-Field Successional Forest (Fleming and Moorhead 2000) ?
Virginia Pine - Oak: 78 (Eyre 1980) B
Virginia Pine Type (Schmalzer and DeSelm 1982) B
Virginia Pine, RV (Pyne 1994) B
Virginia Pine: 79 (Eyre 1980) B
Virginia pine successional forest (Collins and Anderson 1994) =
Xeric Pine Forest (Ambrose 1990a) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Summit and upper slopes of Lookout Mountain, either side of Little River Canyon. Association appears best developed in the southern portion of the preserve, primarily within the vicinity of Ebarhart Point and the former Canyonlands Park.
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, DE, GA, IN, KY, MD, NC, NH, NJ, PA, SC, TN, VA, WV
TNC Ecoregions:
USFS Ecoregions: 221Da:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 221J:CC, 222Cg:CCC, 222Eg:CCC, 222Ej:CCC, 222En:CCC, 222Eo:CCC, 231Ae:CCC, 231Ak:CCC, 231An:CCC, 231Be:CCC, 231Cc:CCC, 231Cd:CCC, 232Br:CCC, 232Bt:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ca:CCP, M221Cb:CCC, M221Cc:CCP, M221Cd:CCC, M221Ce:CCP, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Appomattox Court House, Big South Fork, Blue Ridge Parkway?, Bluestone, Booker T. Washington, Cumberland Gap, Fredericksburg-Spotsylvania, Gettysburg, Great Smoky Mountains, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Natchez Trace, New River Gorge, Obed, Shenandoah, Shiloh, Thomas Stone); TVA (Tellico); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, George Washington, Jefferson, Sumter, Sumter (Mountains), Sumter (Piedmont), Uwharrie?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.13.
Local Description Authors: A. Schotz
Global Description Authors: M. Andreu and M. Tukman, mod. K.D. Patterson and S.C. Gawler
References: Allard 1990, Ambrose 1990a, Andreu and Tukman 1995, Collins and Anderson 1994, Coxe 2007, Eyre 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 2000, Hall and Mathews 1974, Nelson 1986, Patterson et al. 1999, Pyne 1994, Schmalzer and DeSelm 1982, Schotz pers. comm., Shreve et al. 1910, Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1998, Vanderhorst 2001b, Vanderhorst et al. 2007a

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

A.222–*Albizia julibrissin* Forest Alliance

ALLIANCE CONCEPT

Summary: Old fields and waste areas colonized by *Albizia julibrissin* (silktree) with dense to rather sparse cover. Stands are mostly 3-7 m tall.

Classification Comments: It is limited northward by the relative lack of cold-hardiness of the above-ground stems of *Albizia*.
Similar Alliances:
Similar Alliance Comments:
Related Concepts:

ALLIANCE DESCRIPTION

Environment:
Vegetation:
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the southeastern United States. It is limited northward by the relative lack of cold-hardiness of the above-ground stems of *Albizia*.
Nations: US
Subnations: AL, AR, FL, GA?, KY, MS, TN
TNC Ecoregions: 50:C
USFS Ecoregions: 231Cc:CCC, 232:C
Federal Lands: NPS (Little River Canyon)

(CEGL007192) Silktree Forest
***Albizia julibrissin* Forest**
Successional Silktree Forest

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	*Albizia julibrissin* Forest Alliance (A.222)
Alliance (English name)	Silktree Forest Alliance
Association	*Albizia julibrissin* Forest
Association (English name)	Silktree Forest
Association (Common name)	Successional Silktree Forest

Ecological System(s):

ELEMENT CONCEPT

Global Summary: Forests dominated by scattered to dense *Albizia julibrissin* (silktree), an exotic tree. These forests occur on mesic substrates, in disturbed situations on slopes, urban abandoned lands, and other situations where this exotic has taken over a disturbed, mesic to dry-mesic site. Stands are mostly 3-7 m tall.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:
Little River Canyon National Preserve Environment: This community type has become established in cleared areas as a result of anthropogenic disturbance.
Global Environment:

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: One example is currently known from the preserve, characterized by a prominence of *Albizia julibrissin* (silktree), with *Pinus virginiana* (Virginia pine) occurring as a minor component.
Global Vegetation:

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (invasive) (22-Sep-2000).

CLASSIFICATION

Status: Standard
Classification Confidence:
Little River Canyon National Preserve Comments:
Global Comments: The range of this type is limited northward by the relative lack of cold-hardiness of the above-ground stems of *Albizia*.
Global Similar Associations:
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: One example is currently known, from the vicinity of Ebarhart Point.
Global Range:
Nations: US
States/Provinces: AL, AR, FL, GA?, KY, MS, TN
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC, 232:C
Federal Lands: NPS (Little River Canyon)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.87.
Local Description Authors: A. Schotz
Global Description Authors: Southeastern Ecology Group
References: Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

A.229–*Fagus grandifolia - Quercus rubra - Quercus alba* Forest Alliance

ALLIANCE CONCEPT

Summary: Forests in this alliance occur in non-montane or low-elevation montane mesic situations. These forests often occur on concave and sheltered landforms, such as north-facing slopes, low slopes, high terraces along streams, and possibly other situations. The core concept of the range of this alliance includes areas inland from the Coastal Plain, as *Quercus rubra* (northern red oak) is absent from large areas of the Coastal Plain (as in North Carolina). Forests in this alliance occur in the Cumberlands and Southern Ridge and Valley, Piedmont and Interior Low Plateau, and on protected slopes and ravines in the Ozarks, central Ouachita Mountains, and Arkansas Valley. They are dominated by *Fagus grandifolia* (American beech) typically with some combination of *Quercus rubra* (northern red oak) and/or *Quercus alba* (white oak). Associated canopy and subcanopy species can include *Liriodendron tulipifera* (tuliptree), *Acer saccharum* (sugar maple), *Magnolia tripetala* (umbrella-tree), *Magnolia acuminata* (cucumber-tree) (Ozarks), *Tilia americana var. americana* (American basswood) (Ozarks), *Tilia americana var. heterophylla* (American basswood), *Quercus muehlenbergii* (chinkapin oak), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Ostrya virginiana* (hophornbeam), *Aesculus sylvatica* (painted buckeye), and *Ilex opaca* (American holly). Some of these forests, particularly in the Piedmont of South Carolina, the southern Ridge and Valley of Alabama, or in Arkansas, may contain *Acer barbatum* (southern sugar maple) instead of *Acer saccharum* (sugar maple). Shrubs in this alliance include *Vaccinium stamineum* (deerberry), *Viburnum rafinesquianum* (downy arrowwood), *Euonymus americanus* (strawberry bush), and, in some occurrences, *Kalmia latifolia* (mountain laurel). The herb layer can be relatively lush with such species as *Polystichum acrostichoides* (Christmas fern), *Galium circaezans* (licorice bedstraw), *Hexastylis arifolia* (littlebrownjug), *Hexastylis minor* (little heartleaf), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Erythronium umbilicatum ssp. umbilicatum* (dimpled troutlily), *Hepatica nobilis var. obtusa* (roundlobe hepatica), *Epifagus virginiana* (beechdrops), *Tiarella cordifolia var. collina* (heartleaf foamflower), *Trillium* (trillium) spp., *Heuchera americana* (American alumroot), *Stellaria pubera* (star chickweed), *Podophyllum peltatum* (mayapple), *Botrychium virginianum* (rattlesnake fern), and others present.

Classification Comments: The relationship between this alliance and the *Fagus grandifolia - Quercus alba* Forest Alliance (A.228) needs to be clarified. There may be some problems with assignment of associations where *Quercus rubra* does, in fact, enter the Coastal Plain, as in parts of Virginia, Alabama, and western Georgia. Vegetation from this alliance is known from Ozark and Ouachita national forests RNAs (Roaring Branch and Dismal Hollow) and occurs on the Shoal Creek District of the Talladega National Forest. One association, the "Piedmont American Beech Heath Bluff" (CEGL004539) ranges peripherally into the Coastal Plain (ECO57).

Similar Alliances:

Betula alleghaniensis - Fagus grandifolia - Aesculus flava Forest Alliance (A.266)

Fagus grandifolia - Acer saccharum - (Liriodendron tulipifera) Forest Alliance (A.227)

Fagus grandifolia - Quercus alba Forest Alliance (A.228)--is an equivalent alliance found in the Coastal Plain and generally outside of the range of *Quercus rubra*.

Fagus grandifolia Temporarily Flooded Forest Alliance (A.284)

Similar Alliance Comments:

Related Concepts:

Appalachian mesophytic forest (Evans 1991) I

Beech - Sugar Maple: 60 (Eyre 1980) I

Beech RV (Pyne 1994) ?

Coastal Forest/Woodland (Swain and Kearsley 2001) ?

IA5g. Typic Mesic Piedmont Forest (Allard 1990) I

Maritime Oak - Holly Forest / Woodland (Swain and Kearsley 2001) ?

Mesic Mixed Hardwood Forest, Piedmont Subtype (Schafale and Weakley 1990) ?

Mixed Mesophytic Forest (Foti 1994b) I

Northern Red Oak: 55 (Eyre 1980) I

Piedmont Mesic Broad-leaved Deciduous Forest (Ambrose 1990a) ?

T1B4aI1a. *Fagus grandifolia - Magnolia tripetala* (Foti et al. 1994) ?

T1B4aI1b. *Fagus grandifolia - Acer saccharum - Quercus* spp. (*alba, muehlenbergii, rubra*) (Foti et al. 1994) ?

ALLIANCE DESCRIPTION

Environment: These forests often occur on concave and sheltered landforms such as north-facing slopes, low slopes, high terraces along streams, and possibly other situations.

Vegetation: Forests in this alliance occur in non-montane or low-elevation montane mesic situations and are dominated by *Fagus grandifolia* (American beech) typically with some combination of *Quercus rubra* (northern red oak) and/or *Quercus alba* (white oak). Associated canopy and subcanopy species can include *Liriodendron tulipifera* (tuliptree), *Acer saccharum* (sugar maple), *Magnolia tripetala* (umbrella-tree), *Magnolia acuminata* (cucumber-tree) (Ozarks), *Tilia americana var. americana* (American basswood) (Ozarks), *Tilia americana var. heterophylla* (American basswood), *Quercus muehlenbergii* (chinkapin oak), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Ostrya virginiana* (hophornbeam), *Aesculus sylvatica* (painted buckeye), and *Ilex opaca* (American holly). Some of these forests, especially in the Piedmont of South Carolina, the southern Ridge and Valley of Alabama, or in Arkansas, may contain *Acer barbatum* (southern sugar maple) instead of *Acer saccharum* (sugar maple). Shrubs in this alliance include *Vaccinium stamineum* (deerberry), *Viburnum rafinesquianum* (downy arrowwood), *Euonymus americanus* (strawberry bush), and, in some occurrences, *Kalmia latifolia* (mountain laurel). The herb layer can be relatively lush with such species as *Polystichum acrostichoides* (Christmas fern), *Galium circaezans* (licorice bedstraw), *Hexastylis arifolia* (littlebrownjug), *Hexastylis minor* (little heartleaf), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Erythronium umbilicatum ssp. umbilicatum* (dimpled troutlily), *Hepatica nobilis var. obtusa* (roundlobe hepatica), *Epifagus virginiana* (beechdrops), *Tiarella cordifolia var. collina* (heartleaf foamflower), *Trillium* (trillium) spp., *Heuchera americana* (American alumroot), *Stellaria pubera* (star chickweed), *Podophyllum peltatum* (mayapple), *Botrychium virginianum* (rattlesnake fern), and others present.

On Crowley's Ridge, Arkansas (Cross County south through Phillips County), canopies are dominated by *Fagus grandifolia* (American beech), *Quercus alba* (white oak), and *Liriodendron tulipifera* (tuliptree), with associates including *Fraxinus americana* (white ash), *Sassafras albidum* (sassafras), *Ulmus rubra* (slippery elm), *Quercus michauxii* (swamp chestnut oak), *Acer saccharum* (sugar maple), *Magnolia acuminata* (cucumber-tree), *Carya illinoinensis* (pecan); and *Liquidambar styraciflua* (sweetgum), *Juglans cinerea* (butternut), *Ilex opaca* (American holly), *Tilia americana* (American basswood), *Gymnocladus dioicus* (Kentucky coffeetree), *Quercus pagoda* (cherrybark oak), and *Carya cordiformis* (bitternut hickory) in the deep moist gullies. Understory species include *Asimina triloba* (pawpaw), *Ostrya virginiana* (hophornbeam), *Hydrangea arborescens* (wild hydrangea), *Lindera benzoin* (northern spicebush), *Cornus florida* (flowering dogwood), *Carpinus caroliniana* (American hornbeam), *Cercis canadensis* (eastern redbud), *Ilex decidua* (possumhaw), and *Aralia spinosa* (devil's walkingstick); smaller shrubs include *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and *Vaccinium pallidum* (Blue Ridge blueberry). *Schisandra glabra* (bay starvine) often forms a lush sprawling groundcover, sometimes reaching the canopy. Other herbaceous species include *Phegopteris hexagonoptera* (broad beechfern), *Polystichum acrostichoides* (Christmas fern), *Diplazium pycnocarpon* (glade fern), *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis* (royal fern), *Asarum canadense* (Canadian wildginger), *Podophyllum peltatum* (mayapple), *Arisaema dracontium* (green dragon), *Arisaema triphyllum* (Jack in the pulpit), *Actaea pachypoda* (white baneberry), *Uvularia* (bellwort) spp., *Maianthemum racemosum* (feathery false lily of the valley), *Polygonatum* (Solomon's seal) spp., *Trillium* (trillium) spp., and *Smilax* (greenbrier) spp. These stands were formerly assigned to an association in the related (but more southerly) *Fagus grandifolia - Quercus alba* Forest Alliance (A.228).

Dynamics:

ALLIANCE DISTRIBUTION

Range: The core concept of the range of this alliance includes areas inland from the Coastal Plain, as *Quercus rubra* is absent from large areas of this region. Forests in this alliance occur in the Cumberlands and Southern Ridge and Valley, Piedmont, and Interior Low Plateau, and on protected slopes and ravines in the Ozarks, central Ouachita Mountains, and Arkansas Valley. This alliance is known from the states of Alabama, Arkansas, Delaware, Georgia,

Kentucky, Massachusetts, Maryland, North Carolina, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and West Virginia. It may possibly occur in southern Indiana and Connecticut.
Nations: US
Subnations: AL, AR, DC, DE, GA, IN?, KY, MA, MD, MS, NC, NJ, NY, OK, PA, RI, SC, TN, VA, WV
TNC Ecoregions: 38:C, 39:C, 42:C, 43:C, 44:C, 49:C, 50:C, 51:C, 52:C, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions: 212Fc:CCC, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCP, 221Am:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 221Ea:CCC, 221Ef:CCP, 221Eg:CCP, 221Ha:CCC, 221Hc:CCC, 221Hd:CCP, 221He:CCC, 221Ja:CCP, 221Jb:CC?, 221Jc:CCP, 222Ab:CCC, 222Ag:CCC, 222An:CCC, 222Cb:CCC, 222Cc:CCC, 222Cd:CC?, 222Ce:CC?, 222Cf:CC?, 222Cg:CCC, 222Da:CCP, 222Db:CCP, 222Dc:CCP, 222Dd:CCP, 222De:CCP, 222Dg:CC?, 222Di:CC?, 222Dj:CC?, 222Ea:CCC, 222Eb:CCC, 222Ec:CC?, 222Ee:CCP, 222Ef:CCP, 222Eg:CCC, 222Eh:CCP, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222Em:CCP, 222En:CCP, 222Eo:CCP, 222F:CC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCC, 231Ai:CCC, 231Aj:CCC, 231Ak:CCC, 231Al:CCC, 231Am:CCP, 231An:CCC, 231Ao:CCC, 231Ap:CCC, 231Ba:CC?, 231Bb:CC?, 231Bc:CCC, 231Be:CC?, 231Bg:CCC, 231Bh:CCC, 231Bi:CC?, 231Bk:CC?, 231Ca:CCP, 231Cb:CCP, 231Cc:CCC, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCC, 231Db:CCC, 231Dc:CCC, 231Dd:CCC, 231Gb:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCP, 232Bz:CCC, 232Ch:CCC, 232Cj:CCC, 234Ab:CCC, M221Cc:CCC, M221Da:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC
Federal Lands: COE (Falls Lake, Jordan Lake, Kerr Reservoir); DOD (Fort A.P. Hill, Fort Belvoir, Fort Benning, Fort Dix, Fort Pickett, Yorktown); NPS (Appomattox Court House, Big South Fork, Buffalo River, C&O Canal, Cape Cod, Chickamauga-Chattanooga, Colonial, Cumberland Gap, Fort Donelson, Fredericksburg-Spotsylvania, George Washington Parkway, Guilford Courthouse, Little River Canyon, Mammoth Cave, Morristown, Natchez Trace, National Capital-East, Ninety Six, Petersburg, Prince William, Richmond, Rock Creek, Sagamore Hill, Shenandoah, Shiloh, Thomas Stone, Upper Delaware); TVA (Land Between the Lakes, Tellico); USFS (Bankhead, Chattahoochee, Cherokee?, Daniel Boone, Holly Springs, Jefferson?, Oconee?, Ouachita, Ozark, St. Francis, Sumter, Talladega, Uwharrie); USFWS (Great Swamp, James River, Lake Isom, Prime Hook)

(CEGL004539) American Beech - White Oak / Mountain Laurel - (Horsesugar, Catawba Rhododendron) / Galax Forest
***Fagus grandifolia - Quercus alba / Kalmia latifolia - (Symplocos tinctoria, Rhododendron catawbiense) / Galax urceolata* Forest**
Piedmont Beech / Heath Bluff

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	*Fagus grandifolia - Quercus rubra - Quercus alba* Forest Alliance (A.229)
Alliance (English name)	American Beech - Northern Red Oak - White Oak Forest Alliance
Association	*Fagus grandifolia - Quercus alba / Kalmia latifolia - (Symplocos tinctoria, Rhododendron catawbiense) / Galax urceolata* Forest
Association (English name)	American Beech - White Oak / Mountain Laurel - (Horsesugar, Catawba Rhododendron) / Galax Forest
Association (Common name)	Piedmont Beech / Heath Bluff

Ecological System(s): Southern Piedmont Mesic Forest (CES202.342)
South-Central Interior Mesophytic Forest (CES202.887)

ELEMENT CONCEPT

Global Summary: This association includes heath bluffs on steep north-facing slopes in the lower Piedmont and upper Coastal Plain of North Carolina, Virginia, and other southeastern states. Disjunct examples of this type are found in northern Alabama and may occur in Georgia and/or South Carolina. Generally, these communities occur in areas of thin and rocky soils but may also occur in areas of soft material exposed by undercutting by a stream. These sites experience a combination of dry conditions caused by shallow, well-drained soils and cool, moist microclimates caused by northern aspects. Sites may be heterogeneous with dry microsites intermixed with wet seepage areas. These communities are dominated by a dense shrub layer of *Kalmia latifolia* (mountain laurel) (most common), *Rhododendron catawbiense* (Catawba rosebay) or *Rhododendron maximum* (great laurel). Other shrubs may include *Hamamelis virginiana* (American witchhazel), *Symplocos tinctoria* (common sweetleaf), and *Vaccinium* (blueberry) spp. The tree canopy is open to very sparse, with trees such as *Fagus grandifolia* (American beech), *Quercus alba* (white oak), *Quercus prinus* (chestnut oak), *Pinus virginiana* (Virginia pine), *Pinus taeda* (loblolly pine), *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), and *Amelanchier arborea* (common serviceberry) characteristic. A variety of trees from surrounding areas may also be present. Herbs are generally sparse under the shrubs, with acid-loving species, such as *Galax urceolata* (beetleweed), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (eastern teaberry), *Chimaphila maculata* (striped prince's pine), *Hexastylis minor* (little heartleaf), and *Mitchella repens* (partridgeberry), typical. These communities generally border a floodplain forest or a stream channel and may grade to such communities through a talus slope at the base. These communities are distinguished by having an open tree canopy and closed, often dense, shrub layer. There is little open substrate for rock outcrop or weedy species.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This association is represented as small, widely distributed occurrences that occupy shallow and rocky, sandstone-based soils of steep upper slopes, often occurring just below the canyon rim. Some examples also inhabit steep-sided streambanks.

Global Environment: Heath bluffs typically occur on steep north-facing slopes in the lower Piedmont and upper Coastal Plain. Generally, these communities occur in areas of hard rock but may occur in areas of soft material exposed by undercutting by a stream. Soils are thin and rocky and include Goldston (Ruptic-Ultic Dystrochrept), Tatum (Typic Hapludult), Wedowee (Typic Hapludult), and Wilkee (Typic Hapludult). These sites experience a combination of dry conditions caused by shallow, well-drained soils and cool, moist microclimates caused by northern aspects. Sites may be heterogeneous with dry microsites intermixed with wet seepage areas. These communities generally border a floodplain forest or a stream channel and may grade to such communities through a talus slope at the base. There is little open substrate for rock outcrop or weedy species.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association is characterized by having a dense, nearly impenetrable shrub stratum shaded by an open canopy of pine and various hardwoods, most notably *Pinus virginiana* (Virginia pine), *Pinus echinata* (shortleaf pine), *Quercus prinus* (chestnut oak), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Fagus grandifolia* (American beech), *Oxydendrum arboreum* (sourwood), *Nyssa sylvatica* (blackgum), and *Acer rubrum* (red maple). The shrub component is dominated by *Kalmia latifolia* (mountain laurel) and, to a slightly lesser degree, *Rhododendron catawbiense* (Catawba rosebay), often in accompaniment with a suite of secondary species, including *Hamamelis virginiana* (American witchhazel), *Chionanthus virginicus* (white fringetree), *Rhododendron canescens* (mountain azalea), *Lyonia ligustrina* (maleberry), *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), *Viburnum acerifolium* (mapleleaf viburnum), and *Amelanchier arborea* (common serviceberry). As an artifact of dense shade, herbs are sparse and of low diversity, with the following appearing most representative: *Epigaea repens* (trailing arbutus),

Galax urceolata (beetleweed), *Mitchella repens* (partridgeberry), *Lysimachia quadrifolia* (whorled yellow loosestrife), *Antennaria plantaginifolia* (woman's tobacco), *Hieracium venosum* (rattlesnakeweed), *Krigia biflora* (twoflower dwarfdandelion), and *Dichanthelium dichotomum* (cypress panicgrass).

Global Vegetation: These communities are distinguished by having an open tree canopy and closed, often dense, shrub layer. These communities are dominated by a dense shrub layer of *Kalmia latifolia* (mountain laurel) (most common), *Rhododendron catawbiense* (Catawba rosebay) or *Rhododendron maximum* (great laurel). Other shrubs may include *Hamamelis virginiana* (American witchhazel), *Symplocos tinctoria* (common sweetleaf), and *Vaccinium* (blueberry) spp. The tree canopy is open to very sparse, with trees such as *Fagus grandifolia* (American beech), *Quercus alba* (white oak), *Quercus prinus* (chestnut oak), *Pinus virginiana* (Virginia pine), *Pinus taeda* (loblolly pine), *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), and *Amelanchier arborea* (common serviceberry) characteristic. A variety of trees from surrounding areas may be present. Herbs are generally sparse under the shrubs, with acid-loving species, such as *Galax urceolata* (beetleweed), *Epigaea repens* (trailing arbutus), *Gaultheria procumbens* (eastern teaberry), *Chimaphila maculata* (striped prince's pine), *Hexastylis minor* (little heartleaf), and *Mitchella repens* (partridgeberry), typical. Alabama examples (Al Schotz pers. comm. 2001) occur on steep rocky slopes along Hatchet Creek in Coosa County (Piedmont Ecoregion). The canopy is relatively open (ranging from 30-60% closure) with *Quercus prinus* (chestnut oak) serving as the principal species. Other characteristic canopy species include *Quercus falcata* (southern red oak), *Pinus echinata* (shortleaf pine), *Pinus palustris* (longleaf pine), and occasionally *Carya alba* (mockernut hickory), *Quercus stellata* (post oak), and *Oxydendrum arboreum* (sourwood). The shrub layer is represented by a very dense ericaceous component dominated by *Kalmia latifolia* (mountain laurel), *Rhododendron minus* (piedmont rhododendron), and to a lesser degree, *Symplocos tinctoria* (common sweetleaf) and *Vaccinium* (blueberry) spp. Herbs are generally very sparse with *Galax urceolata* (beetleweed), *Tiarella cordifolia* (heartleaf foamflower), *Hexastylis arifolia*, and *Polystichum acrostichoides* (Christmas fern) appearing most prominent. Some examples exhibit greater canopy closure (50-80%). In southeastern Virginia, the most characteristic species are *Fagus grandifolia* (American beech), *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus nigra* (water oak), *Oxydendrum arboreum* (sourwood), *Symplocos tinctoria* (common sweetleaf), *Kalmia latifolia* (mountain laurel), and *Vitis rotundifolia* (muscadine). Although *Galax urceolata* (beetleweed) occurs in a minority of stands, it often forms large colonies where found.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Pyrularia pubera* (buffalo nut), *Ribes curvatum* (granite gooseberry), *Stewartia ovata* (mountain camellia)

Global: *Hexastylis naniflora* (dwarfflower heartleaf), *Monotropsis odorata* (pygmypipes), *Nestronia umbellula* (leechbrush)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3 (22-Feb-2007). This heath bluff association is restricted to steep north-facing slopes in the lower Piedmont and upper Coastal Plain of North Carolina and other southeastern states, north to extreme southeastern Virginia. Generally, these communities occur in areas of hard rock but may occur in areas of soft material exposed by undercutting by a stream. These sites experience a combination of dry conditions caused by

shallow, well-drained soils and cool, moist microclimates caused by northern aspects. This unusual and specific combination of conditions means that the available habitat for this type is rare. Stands of this association may be affected by removal of more valuable timber species (e.g., *Quercus alba*).

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: There are a few indications that this type may be too broadly defined. First, Alabama examples currently included in this concept may represent a drier variant which supports a greater natural pine density, which is apparently absent from northern examples. Secondly, North Carolina Piedmont examples with *Rhododendron catawbiense* may represent a distinctive variant which may deserve recognition. Occurrences of this species in the Piedmont of North Carolina have been taxonomically recognized as forma *insularis* (Coker 1919, Weakley 2005; cited incorrectly as "insulare" in Small 1933). More information is needed to evaluate the significance of these variations. This association was formerly attributed to Alabama based on a comment by A. Schotz (pers. comm.), who stated: "This association is represented by two examples in Alabama which occur on steep rocky slopes along Hatchet Creek in Coosa County (Piedmont Ecoregion)."This example is more properly affiliated with CEGL004415 (q.v.).
Global Similar Associations:
Fagus grandifolia - (Liquidambar styraciflua) / Oxydendrum arboreum / Kalmia latifolia Forest (CEGL004636)
Fagus grandifolia - Quercus (alba, velutina, prinus) / Kalmia latifolia Forest (CEGL006919)--chestnut oak - beech forest of the Coastal Plain and Piedmont from south-central Virginia to New Jersey; lacks species of southern distribution such as *Galax urceolata, Symplocos tinctoria, Oxydendrum arboreum, Hexastylis minor*.
Quercus prinus - Quercus alba / Oxydendrum arboreum / Kalmia latifolia Forest (CEGL004415)--chestnut oak-dominated Piedmont heath bluff.
Quercus prinus / Rhododendron catawbiense - Kalmia latifolia Forest (CEGL008524)--montane oak/heath vegetation occupying similar habitats in the Central Appalachians; less floristically diverse and completely lacking *Fagus grandifolia* and Piedmont species.
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Primarily confined to two environments throughout the preserve: steep, upper slopes, often just below the canyon rim, and less frequently on steep-sided slopes along drainage courses.
Global Range: This community occurs in the lower Piedmont and upper Coastal Plain of North Carolina and other southeastern states.
Nations: US
States/Provinces: AL, GA?, NC, SC?, VA
TNC Ecoregions:
USFS Ecoregions: 231Af:CCC, 231Cc:CCC, 232Br:CCC, 232C:CC
Federal Lands: NPS (Little River Canyon); USFS (Uwharrie)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.7, LIRI.9, LIRI.65, LIRI.68, LIRI.74, LIRI.86, LIRI.97.
Local Description Authors: A. Schotz
Global Description Authors: M.P. Schafale and A.S. Weakley, mod. M. Pyne and G.P. Fleming

References: Coker 1919, Fleming et al. 2001, Patterson pers. comm., Schafale and Weakley 1990, Small 1933, Southeastern Ecology Working Group n.d.

(CEGL008428) White Oak - (Tuliptree, Sweetgum) / Sweet-shrub / Common Ladyfern Forest

***Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina* Forest**

Cumberland-Southern Ridge and Valley Mesic White Oak Forest

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	*Fagus grandifolia - Quercus rubra - Quercus alba* Forest Alliance (A.229)
Alliance (English name)	American Beech - Northern Red Oak - White Oak Forest Alliance
Association	*Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina* Forest
Association (English name)	White Oak - (Tuliptree, Sweetgum) / Sweet-shrub / Common Ladyfern Forest
Association (Common name)	Cumberland-Southern Ridge and Valley Mesic White Oak Forest
Ecological System(s):	South-Central Interior Small Stream and Riparian (CES202.706) South-Central Interior Mesophytic Forest (CES202.887)

ELEMENT CONCEPT

Global Summary: This association includes mesic hardwood forests in coves and draws, in ravines along small streams, and on small stream terraces and related habitats in the southern Ridge and Valley of Georgia, extending into the western fringe of the Southern Blue Ridge, and in the adjacent Cumberland Plateau from southern Kentucky into Tennessee and possibly Alabama. The canopy is dominated by *Quercus alba* (white oak) with codominance by *Liriodendron tulipifera* (tuliptree), *Liquidambar styraciflua* (sweetgum), and/or *Fagus grandifolia* (American beech). Some examples may have large individuals of *Pinus taeda* (loblolly pine) blending in from forests on adjacent, higher slopes, or as an artifact of past disturbance. The subcanopy is dominated by *Acer leucoderme* (chalk maple), but other common subcanopy trees include *Cornus florida* (flowering dogwood), *Hamamelis virginiana* (American witchhazel), and *Oxydendrum arboreum* (sourwood). The shrub stratum can be dense and continuous or patchy. The most constant shrub species are *Calycanthus floridus* (eastern sweetshrub), *Rhododendron alabamense* (Alabama azalea), and *Euonymus americanus* (strawberry bush). The herbaceous stratum is sparse to patchy and composed of mesic forbs and grasses. The most constant herbs are *Amphicarpaea bracteata* (American hogpeanut), *Athyrium filix-femina* (common ladyfern), *Lobelia cardinalis* (cardinalflower), *Mitchella repens* (partridgeberry), and *Polystichum acrostichoides* (Christmas fern), although many other species may occur and may be more diagnostic of the community.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This association is primarily restricted to riparian zones along small streams, generally at altitudes of 244 to 290 m (800-950 feet).

Global Environment: These are mesic hardwood forests found in coves and draws, in ravines along small streams, and on small stream terraces and related habitats.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This closed-canopy forest is commonly codominated by *Quercus alba* (white oak), *Quercus rubra* (northern red oak), and *Liriodendron tulipifera* (tuliptree), with lesser

amounts of *Quercus prinus* (chestnut oak), *Quercus velutina* (black oak), *Carya alba* (mockernut hickory), *Acer rubrum* (red maple), and *Pinus taeda* (loblolly pine). The subcanopy is fairly open, containing smaller examples of the foregoing canopy species, as well as *Ostrya virginiana* (hophornbeam), *Diospyros virginiana* (common persimmon), *Prunus serotina* (black cherry), *Oxydendrum arboreum* (sourwood), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), and a prominence of *Acer leucoderme* (chalk maple) and *Liquidambar styraciflua* (sweetgum). Shrubs are plentiful, but the most abundant and widespread species, in approximate decreasing order of frequency, are *Kalmia latifolia* (mountain laurel), *Acer leucoderme* (chalk maple), *Hamamelis virginiana* (American witchhazel), *Calycanthus floridus* (eastern sweetshrub), *Rhododendron canescens* (mountain azalea), *Ostrya virginiana* (hophornbeam), *Vaccinium elliottii* (Elliott's blueberry), and *Hydrangea quercifolia* (oakleaf hydrangea). The herb layer is generally sparse, but occasionally assumes some abundance, particularly in canopy gaps. The most constant species appear to be *Asplenium platyneuron* (ebony spleenwort), *Chasmanthium sessiliflorum* (longleaf woodoats), *Hexastylis arifolia var. ruthii* (Ruth's littlebrownjug), *Geranium maculatum* (spotted geranium), *Maianthemum racemosum ssp. racemosum* (feathery false lily of the valley), *Chimaphila maculata* (striped prince's pine), *Mitchella repens* (partridgeberry), *Dioscorea villosa* (wild yam), and *Solidago flaccidifolia* (mountain goldenrod). Vines are frequent and are represented by *Vitis rotundifolia* (muscadine), *Parthenocissus quinquefolia* (Virginia creeper), and *Toxicodendron radicans* (eastern poison ivy), with the last named also being well-established as a ground cover.

Global Vegetation: This association is a mesic deciduous forest with a closed canopy, well-developed subcanopy, and a variable shrub and herbaceous layer. The canopy is dominated by *Quercus alba* (white oak) with codominance by *Liriodendron tulipifera* (tuliptree), *Liquidambar styraciflua* (sweetgum), and/or *Fagus grandifolia* (American beech). Some examples may have large individuals of *Pinus taeda* (loblolly pine) blending in from forests on adjacent, higher slopes, or as an artifact of past disturbance. Some stands may have up to 25% cover by *Quercus prinus.* The subcanopy of stands varies across its range and with past disturbance history. Some frequent taxa include *Acer rubrum* (red maple), *Magnolia macrophylla* (bigleaf magnolia), *Sassafras albidum* (sassafras), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood). In stands within its range, some subcanopies are dominated by *Acer leucoderme* (chalk maple). Other canopy and subcanopy species that may be present, but are not constant or dominant among occurrences in northwestern Georgia, are *Acer barbatum* (southern sugar maple), *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Carya ovata* (shagbark hickory), *Fraxinus americana* (white ash), *Magnolia acuminata* (cucumber-tree), *Nyssa sylvatica* (blackgum), *Ostrya virginiana* (hophornbeam), *Pinus echinata* (shortleaf pine), *Pinus strobus* (eastern white pine), *Quercus rubra* (northern red oak), *Tilia americana var. heterophylla* (American basswood), *Tsuga canadensis* (eastern hemlock), and *Ulmus rubra* (slippery elm). The shrub stratum can be dense and continuous or patchy. The most constant shrub species are *Calycanthus floridus* (eastern sweetshrub), *Rhododendron alabamense* (Alabama azalea), and *Euonymus americanus* (strawberry bush). Other shrubs that may be present, but are not constant among documented examples, are *Arundinaria gigantea* (giant cane), *Diospyros virginiana* (common persimmon), *Hydrangea cinerea* (ashy hydrangea), *Itea virginica* (Virginia sweetspire), *Kalmia latifolia* (mountain laurel), *Stewartia ovata* (mountain camellia), *Hamamelis virginiana* (American witchhazel), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), and *Viburnum acerifolium* (mapleleaf viburnum). The herbaceous stratum is sparse to patchy and composed of mesic forbs and grasses. The most constant herbs in northwestern Georgia examples are *Amphicarpaea bracteata* (American hogpeanut), *Athyrium filix-femina* (common ladyfern), *Lobelia cardinalis* (cardinalflower), *Mitchella repens* (partridgeberry), and *Polystichum acrostichoides* (Christmas fern). Other herbaceous species may include *Dennstaedtia punctilobula* (eastern hayscented fern), *Dryopteris intermedia* (intermediate woodfern), *Thelypteris hexagonoptera*, *Thelypteris noveboracensis* (New York fern), *Hexastylis arifolia var. ruthii* (Ruth's littlebrownjug), *Maianthemum canadense* (Canada mayflower), *Medeola virginiana* (Indian cucumber), and *Uvularia perfoliata.* Other species may also occur and may be more diagnostic of the community.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (13-Jun-2000). This hardwood forest is found in mesic environments such as protected slopes, ravines, and upper floodplain terraces in the southern Cumberland Plateau and adjacent Ridge and Valley from Kentucky south to Tennessee, Georgia and possibly Alabama. It is not an inherently rare forest type, but large intact examples are rare. Some examples are present on the Chattahoochee National Forest (and possibly other national forests) and the Big South Fork National River and Recreational Area (and possibly other National Park Service units), and these could be conserved. Some stands have been impacted by removal of more valuable timber species (e.g., *Quercus alba*) and loss of herbaceous species diversity from the disturbance effects of logging. In all probability, most examples which are not on public land have been repeatedly logged and their composition altered thereby. Remaining unprotected examples are threatened by timber removal, conversion to other managed forest types, and/or development into residential or commercial real estate.

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: This association was defined based on examples from the southern Ridge and Valley in northwestern Georgia. With further review, it may be expanded to cover a greater geographic area, or be combined with a similar association to create a more general concept. *Acer leucoderme* is very limited in its distribution in Tennessee; examples in that state may or may not have this taxon present; *Acer saccharum* could replace it there.
Global Similar Associations:
Acer saccharum - Liriodendron tulipifera - Fraxinus americana / Staphylea trifolia Forest (CEGL006201)
Fagus grandifolia - Quercus alba / Cornus florida Forest (CEGL007881)--of the Interior Low Plateau.
Fagus grandifolia - Quercus spp. / *Kalmia latifolia - Hamamelis virginiana / Galax urceolata* Forest (CEGL004549)
Quercus alba - Fagus grandifolia / Hydrangea quercifolia - Viburnum acerifolium / Carex picta - Polystichum acrostichoides Forest (CEGL007213)
Quercus rubra - Tilia americana var. *heterophylla - Carya carolinae-septentrionalis / Acer (barbatum, leucoderme) / Hydrangea quercifolia* Forest (CEGL008488)
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Frequently scattered throughout the preserve.
Global Range: This association is found in the southern Ridge and Valley of Georgia, extending into the western fringe of the Southern Blue Ridge, and in the adjacent Cumberland Plateau from southern Kentucky into Tennessee and possibly Alabama.

Nations: US
States/Provinces: AL, GA, KY, TN?
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 231Cc:CCC, 231Dc:CCC, M221Dd:CCC
Federal Lands: NPS (Big South Fork, Little River Canyon); USFS (Chattahoochee, Chattahoochee (Southern Blue Ridge), Cherokee?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.14, LIRI.16, LIRI.35, LIRI.36, LIRI.57, LIRI.61, LIRI.66, LIRI.80, LIRI.85.
Local Description Authors: A. Schotz
Global Description Authors: K.D. Patterson, mod. M. Pyne
References: NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

(CEGL008488) Northern Red Oak - Appalachian Basswood - Carolina Shagbark Hickory / (Southern Sugar Maple, Chalk Maple) / Oakleaf Hydrangea Forest

***Quercus rubra - Tilia americana* var. *heterophylla - Carya carolinae-septentrionalis / Acer (barbatum, leucoderme) / Hydrangea quercifolia* Forest**
Southern Ridge and Valley Basic Mesic Hardwood Forest

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	*Fagus grandifolia - Quercus rubra - Quercus alba* Forest Alliance (A.229)
Alliance (English name)	American Beech - Northern Red Oak - White Oak Forest Alliance
Association	*Quercus rubra - Tilia americana* var. *heterophylla - Carya carolinae-septentrionalis / Acer (barbatum, leucoderme) / Hydrangea quercifolia* Forest
Association (English name)	Northern Red Oak - Appalachian Basswood - Carolina Shagbark Hickory / (Southern Sugar Maple, Chalk Maple) / Oakleaf Hydrangea Forest
Association (Common name)	Southern Ridge and Valley Basic Mesic Hardwood Forest
Ecological System(s):	South-Central Interior Mesophytic Forest (CES202.887)

ELEMENT CONCEPT

Global Summary: This is a rich basic cove or mixed hardwood forest from the Southern Ridge and Valley of Alabama. This is north of the range of *Magnolia grandiflora* (southern magnolia), south of the range of *Acer saccharum* (sugar maple) and *Aesculus flava* (yellow buckeye), and within the range of *Quercus rubra* (northern red oak), *Tilia americana var. heterophylla* (American basswood), and *Acer barbatum* (southern sugar maple). The canopy of stands is dominated by *Tilia americana var. heterophylla* (American basswood), *Fagus grandifolia* (American beech), *Quercus rubra* (northern red oak) and/or *Quercus alba* (white oak), *Carya carolinae-septentrionalis* (southern shagbark hickory), and *Quercus muehlenbergii* (chinkapin oak). Some stands may contain *Quercus prinus* (chestnut oak), *Quercus shumardii* (Shumard's oak), *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Carya carolinae-septentrionalis* (southern shagbark hickory), *Carya cordiformis* (bitternut hickory), *Carya glabra* (pignut hickory), *Carya ovata* (shagbark hickory), *Juglans nigra* (black walnut), *Nyssa sylvatica* (blackgum), *Prunus serotina* (black cherry), *Diospyros virginiana* (common persimmon), and/or *Acer*

barbatum (southern sugar maple) in their canopies. Some other subcanopy and tall-shrub components include *Acer leucoderme* (chalk maple), *Asimina triloba* (pawpaw), *Cercis canadensis* (eastern redbud), *Frangula caroliniana* (Carolina buckthorn), *Sassafras albidum* (sassafras), *Ulmus rubra* (slippery elm), *Morus rubra* (red mulberry), *Prunus serotina* (black cherry), *Magnolia tripetala* (umbrella-tree), *Ostrya virginiana* (hophornbeam), *Oxydendrum arboreum* (sourwood), *Halesia tetraptera* (mountain silverbell), *Hamamelis virginiana* (American witchhazel), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Aesculus pavia* (red buckeye), *Viburnum acerifolium* (mapleleaf viburnum), *Styrax grandifolius* (bigleaf snowbell), *Euonymus americanus* (strawberry bush), and *Cornus alternifolia* (alternateleaf dogwood). The shrub layers may contain the aforementioned species, as well as a fair abundance of *Acer barbatum* (southern sugar maple) and *Aesculus parviflora* (bottlebrush buckeye). Some additional shrubs include *Lindera benzoin* (northern spicebush), *Aralia spinosa* (devil's walkingstick), *Forestiera ligustrina* (upland swampprivet), *Sideroxylon lycioides* (buckthorn bully), *Euonymus atropurpureus* (eastern wahoo), *Staphylea trifolia* (American bladdernut), *Calycanthus floridus* (eastern sweetshrub), *Sambucus canadensis* (common elderberry), *Crataegus calpodendron* (pear hawthorn), *Crataegus spathulata* (littlehip hawthorn), and *Crataegus marshallii* (parsley hawthorn), along with patches of *Hydrangea quercifolia* (oakleaf hydrangea) and *Hydrangea arborescens* (wild hydrangea). Woody vines include *Berchemia scandens* (Alabama supplejack), *Bignonia capreolata* (crossvine), *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (eastern poison ivy), *Vitis aestivalis* (summer grape), and *Vitis rotundifolia* (muscadine). The herbaceous component is luxuriant and diverse. Some typical herbs include *Actaea pachypoda* (white baneberry), *Actaea racemosa* (black bugbane), *Phryma leptostachya* (American lopseed), *Scutellaria elliptica* (hairy skullcap), *Trillium* (trillium) spp. (e.g., *Trillium cuneatum* (little sweet Betsy), *Trillium decumbens* (trailing wakerobin), *Trillium flexipes* (nodding wakerobin)), *Sanguinaria canadensis* (bloodroot), *Phlox divaricata* (wild blue phlox), *Luzula acuminata* (hairy woodrush), *Polystichum acrostichoides* (Christmas fern), *Packera obovata* (roundleaf ragwort), and *Carex willdenowii* (*sensu lato*) (Willdenow's sedge). *Croomia pauciflora* (croomia) may be quite abundant in some stands. Stands are typically found on mid to lower slopes (typically steep) on rich calcareous substrates, such as sedimentary limestones, in the Southern Ridge and Valley of Alabama.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This association is restricted to calcareous substrates derived of Bangor and Monteagle limestones, on moderate to steep slopes characterized by a mosaic of rocky outcrops and silty loams mixed with residue from eroded sandstone washed down from upslope on Lookout Mountain. Natural community examples are located at roughly midslope, falling within an elevation of 268 to 305 m (880-1000 feet).

Global Environment: Stands are typically found on mid to lower slopes (typically steep) on rich calcareous substrates, such as sedimentary limestones, in the Southern Ridge and Valley of Alabama.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association is distinguished by a codominance of *Quercus rubra* (northern red oak), *Tilia americana var. heterophylla* (American basswood), and *Fagus grandifolia* (American beech) in the canopy. These species are complimented with slightly lesser amounts of *Acer saccharum* (sugar maple), *Carya ovata* (shagbark hickory), *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Betula lenta* (sweet birch), and where stands begin to blend with more acidic soil types, *Quercus prinus* (chestnut oak) and *Quercus velutina* (black oak). The subcanopy and shrub strata are relatively diverse, with the following appearing most representative: *Acer leucoderme* (chalk maple), *Cercis canadensis* (eastern redbud), *Cladrastis kentukea* (Kentucky yellowwood), *Euonymus atropurpureus* (eastern wahoo), *Morus rubra* (red mulberry), *Ostrya virginiana* (hophornbeam), *Carpinus caroliniana* (American hornbeam), *Cornus alternifolia* (alternateleaf dogwood), *Cornus florida* (flowering dogwood), *Ulmus alata* (winged elm), *Calycanthus floridus* (eastern sweetshrub), and *Hamamelis virginiana* (American witchhazel). The herbaceous component is rich and diverse containing one of the highest concentrations of forbs and graminoids found in the preserve. Some of the more noteworthy species include *Asplenium rhizophyllum* (walking fern), *Trillium cuneatum* (little sweet Betsy),

Arisaema triphyllum (Jack in the pulpit), *Hybanthus concolor* (eastern greenviolet), *Geranium maculatum* (spotted geranium), *Phacelia bipinnatifida* (fernleaf phacelia), *Phlox divaricata* (wild blue phlox), *Panax quinquefolius* (American ginseng), *Cypripedium parviflorum var. pubescens* (greater yellow lady's slipper), and *Viola labradorica* (alpine violet). Characteristic vines are *Vitis rotundifolia* (muscadine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax* (greenbrier) spp., and *Toxicodendron radicans* (eastern poison ivy), with the last named being equally at home in the herb layer.

Global Vegetation: The canopy of stands is dominated by *Tilia americana var. heterophylla* (American basswood), *Fagus grandifolia* (American beech), *Quercus rubra* (northern red oak) and/or *Quercus alba* (white oak), *Carya carolinae-septentrionalis* (southern shagbark hickory), and *Quercus muehlenbergii* (chinkapin oak). Some stands may contain *Quercus prinus* (chestnut oak), *Quercus shumardii* (Shumard's oak), *Fraxinus americana* (white ash), *Liriodendron tulipifera* (tuliptree), *Carya carolinae-septentrionalis* (southern shagbark hickory), *Carya cordiformis* (bitternut hickory), *Carya glabra* (pignut hickory), *Carya ovata* (shagbark hickory), *Juglans nigra* (black walnut), *Nyssa sylvatica* (blackgum), *Prunus serotina* (black cherry), *Diospyros virginiana* (common persimmon), and/or *Acer barbatum* (southern sugar maple) in their canopies. Some other subcanopy and tall-shrub components include *Acer leucoderme* (chalk maple), *Asimina triloba* (pawpaw), *Cercis canadensis* (eastern redbud), *Frangula caroliniana* (Carolina buckthorn), *Sassafras albidum* (sassafras), *Ulmus rubra* (slippery elm), *Morus rubra* (red mulberry), *Prunus serotina* (black cherry), *Magnolia tripetala* (umbrella-tree), *Ostrya virginiana* (hophornbeam), *Oxydendrum arboreum* (sourwood), *Halesia tetraptera* (mountain silverbell), *Hamamelis virginiana* (American witchhazel), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Aesculus pavia* (red buckeye), *Viburnum acerifolium* (mapleleaf viburnum), *Styrax grandifolius* (bigleaf snowbell), *Euonymus americanus* (strawberry bush), and *Cornus alternifolia* (alternateleaf dogwood). The shrub layers may contain the aforementioned species, as well as a fair abundance of *Acer barbatum* (southern sugar maple) and *Aesculus parviflora* (bottlebrush buckeye). Some additional shrubs include *Lindera benzoin* (northern spicebush), *Aralia spinosa* (devil's walkingstick), *Forestiera ligustrina* (upland swampprivet), *Sideroxylon lycioides* (buckthorn bully), *Euonymus atropurpureus* (eastern wahoo), *Staphylea trifolia* (American bladdernut), *Calycanthus floridus* (eastern sweetshrub), *Sambucus canadensis* (common elderberry), *Crataegus calpodendron* (pear hawthorn), *Crataegus spathulata* (littlehip hawthorn), and *Crataegus marshallii* (parsley hawthorn), along with patches of *Hydrangea quercifolia* (oakleaf hydrangea) and *Hydrangea arborescens* (wild hydrangea). Woody vines include *Berchemia scandens* (Alabama supplejack), *Bignonia capreolata* (crossvine), *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (eastern poison ivy), *Vitis aestivalis* (summer grape), and *Vitis rotundifolia* (muscadine). The herbaceous component is luxuriant and diverse. Some typical herbs include *Actaea pachypoda* (white baneberry), *Actaea racemosa* (black bugbane), *Phryma leptostachya* (American lopseed), *Scutellaria elliptica* (hairy skullcap), *Trillium* (trillium) spp. (e.g., *Trillium cuneatum* (little sweet Betsy), *Trillium decumbens* (trailing wakerobin), *Trillium flexipes* (nodding wakerobin)), *Sanguinaria canadensis* (bloodroot), *Phlox divaricata* (wild blue phlox), *Luzula acuminata* (hairy woodrush), *Polystichum acrostichoides* (Christmas fern), *Packera obovata* (roundleaf ragwort), and *Carex willdenowii* (Willdenow's sedge) (*sensu lato*). Some additional herbs include *Asclepias quadrifolia* (fourleaf milkweed), *Carex* (sedge) sp., *Collinsonia canadensis* (richweed), *Cynoglossum virginianum* (wild comfrey), *Desmodium nudiflorum* (nakedflower ticktrefoil), *D*

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	***Lifeform***	***Species***

Global

Stratum	***Lifeform***	***Species***

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Cladrastis kentukea* (Kentucky yellowwood), *Panax quinquefolius* (American ginseng)

Global: *Aesculus parviflora* (bottlebrush buckeye), *Croomia pauciflora* (croomia)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3 (17-May-2002). As described, this type is restricted to an area in the Ridge and Valley of Alabama which is within the range of *Tilia americana var. heterophylla* and *Acer barbatum* (but south of the range of *Acer saccharum*). Except for examples on U.S. Forest Service lands, most high-quality stands have been eliminated or degraded. Many of these highly productive sites have had the most valuable timber repeatedly removed, altering the composition. Most remaining examples of this association are now limited to steep slopes and ravines which are difficult to enter with logging equipment. Current threats include increased erosion, windthrow, microclimate modification from intensive silvicultural practices on adjacent uplands, forest type conversion, herbicide use, and vegetation damage by feral hogs.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Little River Canyon National Preserve Comments:

Global Comments: Depending on how finely this type is conceived, it may be restricted to an area in the Ridge and Valley of Alabama which is in the range of *Acer barbatum* (and south of the range of *Acer saccharum*), but within the range of *Tilia americana var. heterophylla*. The site from which this type was originally described is a mesic, old growth forest that occupies the lower and perhaps the mid slopes of a site in the Southern Ridge and Valley of Alabama (A. Schotz pers. comm., L. Brasher pers. comm.). The primary floristic survey was done during mid summer when many herbs had vanished for the season; more floristic data are needed to fully characterize this type.

It may be of interest that historically *Castanea dentata* was at least an occasional canopy tree of the lower slopes and common on the upper slopes. This is corroborated by sprouts, remaining large decayed logs, and personal recollections of locals who remember that all the chestnuts died together between 1930-1932. Examples are known from Brasher Woods and Fitzhugh's Woods, on Red Mountain in Alabama. The latter of these sites was selectively logged (pretty heavily) for the first time in 1942, but they missed a couple of spots (maybe an acre or two each) and the community there matches this community. Fitzhugh's Woods, by the way, has the *Magnolia tripetala* and *Halesia* that is oddly missing in Brasher Woods (L. Brasher pers. comm.). This site (Brashers Woods) lies on the north face of the ridge that rises about 137 m (450 feet) from the level of Clear Creek to the top. At Brasher Woods, the lower two-thirds of the ridge is underlain by limestone. The top third is sandstone. Even so, many basic species appear up in the visible sandstone stratum. In any case, the first 15- to 18-m (50- to 60-foot) rise above the creek level is limestone outcrops that have never been fully cleared. Then above there is a "bench" that was fields (abandoned 75 years ago). Above the old fields--that are coming back nicely in hardwoods--is the virgin old-growth where Al Schotz sampled. This is to say that the association in the 60-foot limestone outcrops near the creek is essentially the same as the old-growth on limestone above the old fields. Most of the *Trillium flexipes, Carya cordiformis, Calycanthus floridus*, etc. is in the limestone outcrops near the level of the creek.

Global Similar Associations:

Fagus grandifolia - Liriodendron tulipifera / Euonymus americanus / Athyrium filix-femina ssp. *asplenioides* Forest (CEGL007201)--lacking *Quercus alba* dominance.

Fagus grandifolia - Quercus alba / Cornus florida Forest (CEGL007881)--of the Interior Low Plateau.

Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina Forest (CEGL008428)--of the Southern Ridge and Valley of Georgia.

Quercus alba - Fagus grandifolia / Hydrangea quercifolia - Viburnum acerifolium / Carex picta - Polystichum acrostichoides Forest (CEGL007213)--apparently more acidic and in the Cumberlands.

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Examples sporadically occur from slightly upstream of the Lower Two Mile Trail, south side of Little River, extending downstream to near the confluence of Bear Creek.
Global Range: This association is known from the southern Ridge and Valley of Alabama.
Nations: US
States/Provinces: AL
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC, 231Da:CCC, 231Db:CCP, 231Dc:CCP, 231Dd:CCC
Federal Lands: NPS (Little River Canyon); USFS (Talladega, Talladega (Talladega))

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.32, LIRI.75, LIRI.76.
Local Description Authors: A. Schotz
Global Description Authors: A. Schotz and M. Pyne
References: Brasher pers. comm., NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d.

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

ALLIANCE CONCEPT

Summary: This alliance is widely distributed in the eastern United States and portions of adjacent Canada and includes dry mesic to mesic upland oak forests dominated by *Quercus alba* (white oak) and/or *Quercus rubra* (northern red oak), with or without *Carya* (hickory) species. Stands are found on gentle to moderately steep lower to upper slopes on uplands and on steep valley sides. The soils are moderately deep to deep and vary from silts to clays and loams. The parent material ranges from glaciated till to limestone, shale, sandstone and other bedrock types. In the midwestern United States, many stands are succeeding to types dominated by *Acer saccharum* (sugar maple), *Tilia americana* (American basswood), *Acer rubrum* (red maple), and other mesic tree associates. This succession may be delayed by fire and grazing. In the eastern and southeastern United States, *Liriodendron tulipifera* (tuliptree), *Liquidambar styraciflua* (sweetgum), *Fraxinus americana* (white ash), *Acer rubrum* (red maple), and other mesic associates often increase after disturbances, such as clearcutting or windstorms, especially in the absence of fire and in areas adjacent to creeks and rivers. Stands are 15-25 m tall, with a closed, deciduous canopy. The shrub and herbaceous strata are typically well-developed. *Quercus alba* (white oak) usually dominates, either alone or in combination with *Quercus rubra* (northern red oak) (especially on moister sites) and sometimes *Quercus velutina* (black oak) and *Quercus falcata* (southern red oak) (especially on drier sites). Some associations in this alliance are dominated by *Quercus rubra* (northern red oak), although *Quercus alba* (white oak) is usually also a canopy component. *Carya* (hickory) species (particularly *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory) or *Carya ovata* (shagbark hickory)) are typically common either in the canopy or subcanopy. In the southeastern United States, this alliance covers dry-mesic forests of the Piedmont, low Appalachian Mountains, and the Cumberland and Interior Low Plateau, and mesic oak-hickory forests of the Blue Ridge and the interior highlands of the Ozarks and Ouachita Mountains. Associated species include *Carya glabra* (pignut hickory), *Carya ovata* (shagbark hickory), *Carya alba* (mockernut hickory), *Fraxinus americana* (white ash), *Acer rubrum* (red maple), *Acer leucoderme* (chalk maple), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Ostrya virginiana* (hophornbeam), *Calycanthus floridus* (eastern sweetshrub), *Pyrularia pubera* (buffalo nut), *Tilia americana var. caroliniana* (Carolina basswood), *Oxydendrum arboreum* (sourwood), *Kalmia latifolia* (mountain laurel), and others. This alliance is found throughout the midwestern United States on moderately rich, upland sites.

Typical associates include *Fraxinus americana* (white ash), *Ulmus americana* (American elm), *Tilia americana* (American basswood), *Acer saccharum* (sugar maple), *Acer rubrum* (red maple), and more locally, *Quercus macrocarpa* (bur oak) and *Quercus ellipsoidalis* (northern pin oak).

Classification Comments:

Similar Alliances:

Carya (glabra, ovata) - Fraxinus americana - Quercus (alba, rubra) Forest Alliance (A.258)
Quercus alba - (Quercus nigra) Forest Alliance (A.238)
Quercus alba - Quercus (falcata, stellata) Forest Alliance (A.241)
Quercus alba Montane Forest Alliance (A.271)--forests dominated by *Quercus alba* in extreme montane landscapes.
Quercus rubra - (Acer saccharum) Forest Alliance (A.251)--mesic forests dominated by *Quercus rubra*.
Quercus rubra Montane Forest Alliance (A.272)--forests dominated by *Quercus rubra* in extreme montane landscapes.
Quercus velutina - Quercus alba - (Quercus coccinea) Forest Alliance (A.1911)--includes floristically and structurally similar stands, typically drier that A.239.

Similar Alliance Comments:

Related Concepts:

Acidic mesophytic forest (Evans 1991) I
Basic Oak - Hickory Forest (Nelson 1986) ?
Basic Oak--Hickory Forest, Mafic Substrate Variant (Schafale and Weakley 1990) I
Calcareous mesophytic forest (Evans 1991) I
Dry-Mesic Oak--Hickory Forest (Schafale and Weakley 1990) ?
IA6j. Interior Calcareous Oak - Hickory Forest (Allard 1990) I
Mesic Oak - Hickory Forest (Foti 1994b) I
Montane Oak--Hickory Forest (Schafale and Weakley 1990) I
Oak - Chestnut - Hickory Forest (Ambrose 1990a) I
Oak - Hickory Forest (Swain and Kearsley 2001) ?
Oak--Hickory Forest (Nelson 1986) I
Permesotrophic Forest (Rawinski 1992) I
Submesic broadleaf deciduous forest (Ambrose 1990a) I
T1B4aIII. *Quercus rubra - Quercus* spp. (Foti et al. 1994) ?
White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) I
White Oak: 53 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: Stands are found on gentle to moderately steep slopes on uplands and on steep valley sides. The soils are moderately deep to deep and vary from silts to clays and loams. The parent material ranges from glaciated till to limestone, shale, sandstone and other bedrock types. In the Midwest, many stands are succeeding to types dominated by *Acer saccharum, Tilia americana, Acer rubrum*, and other mesic tree associates. This succession may be delayed by fire and grazing. In the East and Southeast, *Liriodendron tulipifera, Fraxinus americana, Liquidambar styraciflua*, and other mesic associates often increase after disturbances, such as clearcutting or windstorms, especially in the absence of fire (Eyre 1980) and in areas adjacent to creeks and rivers.

Vegetation: This alliance is widely distributed in the eastern United States and portions of adjacent Canada and includes dry mesic to mesic upland oak forests dominated by *Quercus alba* (white oak) and *Quercus rubra* (northern red oak), with or without *Carya* (hickory) species. Stands are 15-25 m tall, with a closed deciduous canopy. The shrub and herbaceous strata are typically well-developed. *Quercus alba* (white oak) usually dominates stands, either alone or in combination with *Quercus rubra* (northern red oak) (especially on moister sites) and sometimes *Quercus velutina* (black oak) (especially on drier sites). Some associations in this alliance are dominated by *Quercus rubra* (northern red oak), although *Quercus alba* (white oak) is usually also a canopy component. *Carya* (hickory) species (particularly *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory) or *Carya ovata* (shagbark hickory))

are typically common either in the canopy or subcanopy. In the southeastern United States, this alliance covers dry-mesic forests of the Piedmont, low Appalachian Mountains, and Interior Low Plateau, and mesic oak-hickory forests of Blue Ridge and interior highlands of the Ozarks and Ouachita Mountains. Associated species in the southeastern United States include *Carya glabra* (pignut hickory), *Carya ovata* (shagbark hickory), *Carya alba* (mockernut hickory), *Fraxinus americana* (white ash), *Acer rubrum* (red maple), *Acer leucoderme* (chalk maple), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Ostrya virginiana* (hophornbeam), *Calycanthus floridus* (eastern sweetshrub), *Pyrularia pubera* (buffalo nut), *Kalmia latifolia* (mountain laurel), *Tilia americana var. caroliniana* (Carolina basswood), *Oxydendrum arboreum* (sourwood), and others. In the midwestern United States, this alliance is found throughout the region on moderately rich, upland sites. Typical associates include *Fraxinus americana* (white ash), *Ulmus americana* (American elm), *Tilia americana* (American basswood), *Acer saccharum* (sugar maple), *Acer rubrum* (red maple), and more locally, *Quercus macrocarpa* (bur oak) and *Quercus ellipsoidalis* (northern pin oak).

Dynamics: In the midwestern United States, many stands are succeeding to types dominated by *Acer saccharum, Tilia americana, Acer rubrum*, and other mesic tree associates. This succession may be delayed by fire and grazing. In the eastern and southeastern United States, *Liriodendron tulipifera, Fraxinus americana, Acer rubrum*, and other mesic associates often increase after disturbances, such as clearcutting or windstorms, especially in the absence of fire.

ALLIANCE DISTRIBUTION

Range: This alliance ranges from Ontario, Canada, throughout the midwestern and eastern United States, south to the very northern edges of the Western and Eastern Gulf coastal plains.

Nations: CA, US

Subnations: AL, AR, CT, DC, DE, GA, IA, IL, IN, KS, KY, MA, MD, ME, MI, MN, MO, MS, NC, NE, NH, NJ, NY, OH, OK, ON, PA, RI, SC, TN, VA, VT, WI, WV

TNC Ecoregions: 32:P, 35:C, 36:C, 37:C, 38:C, 39:C, 40:C, 42:C, 43:C, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 51:C, 52:C, 53:?, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C, 64:C

USFS Ecoregions: 212Ec:CCC, 212Ed:CCC, 212Fb:CCP, 212Fc:CCC, 212Fd:CC?, 212Ga:CC?, 212Gb:CC?, 212Ht:CPP, 212Hx:CPP, 212Jj:C??, 212Ka:CC?, 212Kb:CCC, 212Mb:C??, 212Na:CCP, 212Nb:CC?, 212Nc:CCC, 212Nd:CC?, 221Aa:CCP, 221Ab:CCC, 221Ad:CCP, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 221Ea:CCC, 221Eb:CCC, 221Ec:CCC, 221Ed:CCC, 221Ee:CCC, 221Ef:CCC, 221Eg:CCC, 221Fa:CCC, 221Fb:CCP, 221Fc:CCC, 221Ha:CCC, 221Hc:CCC, 221Hd:CCC, 221He:CCC, 221Ja:CCP, 221Jb:CCC, 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Al:CCP, 222Am:CCC, 222An:CCC, 222Ao:CCC, 222Ap:CCC, 222Aq:CCC, 222Cb:CCC, 222Cc:CCC, 222Cd:CCC, 222Ce:CCC, 222Cf:CCC, 222Cg:CCC, 222Ch:CCC, 222Da:CCP, 222Db:CCC, 222Dc:CCC, 222Dd:CCP, 222De:CCC, 222Df:CCC, 222Dg:CCP, 222Dh:CCC, 222Di:CCC, 222Dj:CCP, 222Ea:CCC, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ee:CCC, 222Ef:CCC, 222Eg:CCC, 222Eh:CCC, 222Ei:CCC, 222Ej:CCP, 222Ek:CCC, 222Em:CCC, 222En:CCC, 222Eo:CCC, 222Fa:CCP, 222Fb:CCC, 222Fd:CCC, 222Fe:CCC, 222Ff:CCC, 222Ga:CCC, 222Gb:CCC, 222Gc:CCC, 222Ha:CCC, 222Hb:CCC, 222Hf:CCC, 222Id:CCP, 222If:CCC, 222Ja:CCC, 222Jb:CCC, 222Jc:CCC, 222Jg:CCC, 222Jh:CCC, 222Ji:CCC, 222Jj:CCC, 222Ke:CCC, 222Kf:CCC, 222Kg:CCC, 222Kh:CCC, 222Kj:CCC, 222Lb:CCC, 222Lc:CCC, 222Le:CCC, 222Lf:CCC, 222Ma:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 222Qb:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCC, 231Ak:CCC, 231Al:CCC, 231Am:CCC, 231An:CCC, 231Ao:CCC, 231Ap:CCC, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCC, 231Be:CCC, 231Bg:CCC, 231Bh:CCP, 231Bk:CCC, 231Ca:CCC, 231Cb:CCC, 231Cc:CCC, 231Cd:CCC, 231Cf:CCC, 231Cg:CCC, 231Da:CCC, 231Dc:CCC, 231Dd:CCC, 231De:CCC, 231E:CC, 231Gb:CCC, 232Aa:CCC, 232Ac:CCP, 232Ad:CCC, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bv:CCC, 232Bx:CCC, 232Ca:CCC, 232Cb:CCC, 232Ch:CCC, 232Cj:CCC, 234Ac:PPP, 251Aa:CCC, 251Ba:CCC, 251Be:CCC, 251Ca:CC?, 251Cb:CCC,

251Cc:CCC, 251Cd:CCC, 251Ce:CCC, 251Cf:CCC, 251Cg:CCC, 251Ch:CCC, 251Cj:CCC, 251Ck:CCC, 251Cn:CC?, 251Co:CC?, 251Cp:CCC, 251Cq:CCC, 251Dc:CCC, 251Dd:CCC, 251De:CCC, 251Df:CCC, 251Dh:CCP, 251Ea:CCC, M212Bd:CCC, M212Cb:CCC, M212Cc:CCC, M212Ea:CC?, M212Eb:CC?, M221Aa:CCC, M221Ac:CCC, M221Bd:C??, M221Cc:CCC, M221Cd:CCC, M221Ce:CCC, M221Da:CCC, M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: BIA (Eastern Band Cherokee); COE (Dale Hollow?, Kerr Reservoir); DOD (Arnold, Fort Benning, Fort Pickett); DOE (Oak Ridge); NPS (Appomattox Court House, Big South Fork, Blue Ridge Parkway, Booker T. Washington, Boston Harbor Islands, Buffalo River, C&O Canal, Cape Cod, Carl Sandburg Home, Chickamauga-Chattanooga, Colonial, Cowpens, Cumberland Gap, Delaware Water Gap, Effigy Mounds, Fort Donelson, Fort Necessity, Fredericksburg-Spotsylvania, George Washington Parkway, Gettysburg, Great Smoky Mountains, Guilford Courthouse, Indiana Dunes, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Manassas, Minute Man, Morristown, Natchez Trace, Ninety Six, Obed, Ozark, Petersburg, Prince William, Richmond, Rock Creek, Russell Cave, Sagamore Hill, Saratoga, Shenandoah, Shiloh, Upper Delaware, Weir Farm); TVA (Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Chippewa, Daniel Boone, Finger Lakes, George Washington, Hoosier, Huron-Manistee, Jefferson, Land Between the Lakes, Manistee, Mark Twain, Nantahala, Oconee, Ouachita?, Ozark, Pisgah, Shawnee, St. Francis, Sumter, Uwharrie, Wayne); USFWS (Assabet River, Great Meadows)

(CEGL004098) (White Oak, Scarlet Oak, Southern Red Oak, Black Oak) / Mountain Laurel Temporarily Flooded Forest

***Quercus (alba, coccinea, falcata, velutina) / Kalmia latifolia* Temporarily Flooded Forest**
Southern Cumberland High-Energy River Oak Terrace Forest

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, coccinea, falcata, velutina) / Kalmia latifolia* Temporarily Flooded Forest
Association (English name)	(White Oak, Scarlet Oak, Southern Red Oak, Black Oak) / Mountain Laurel Temporarily Flooded Forest
Association (Common name)	Southern Cumberland High-Energy River Oak Terrace Forest

Ecological System(s):

ELEMENT CONCEPT

Global Summary: This community consists of deciduous forests on terraces 1-3 m (3-10 feet) above the banks of medium-sized, high-energy rivers in the Cumberlands and Ridge and Valley regions of Alabama and possibly Tennessee. These forests are unusual in that they are flooded yearly, yet they retain a canopy dominated by oaks more common on drier slopes. Any combination of *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), and *Quercus velutina* (black oak) dominates along with more traditional bottomland tree species such as *Liriodendron tulipifera* (tuliptree) and *Liquidambar styraciflua* (sweetgum). The shrub layer has at least 30% cover and tends to be dominated by *Kalmia latifolia* (mountain laurel) with other shrubs such as *Calycanthus floridus* (eastern sweetshrub), *Corylus cornuta* (beaked hazelnut), *Hamamelis virginiana* (American

witchhazel), *Viburnum* (viburnum) spp., and others. The herbaceous stratum is sparse to moderate and contains *Chasmanthium sessiliflorum* (longleaf woodoats) (at least 10% cover).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This association occupies riverine terraces along Little River, where annual flooding occurs in response to seasonal precipitation.

Global Environment: This community consists of deciduous forests on terraces 1-3 m (3-10 feet) above the banks of medium-sized, high-energy rivers in the Cumberlands and Ridge and Valley regions of Alabama and possibly Tennessee. These forests are unusual in that they are flooded yearly, yet they retain a canopy dominated by oaks more common on drier slopes.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Oaks, most notably *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus velutina* (black oak), and *Quercus stellata* (post oak), predominate the canopy layers along with an equal abundance of upland and bottomland species, including *Liriodendron tulipifera* (tuliptree), *Acer rubrum* (red maple), *Liquidambar styraciflua* (sweetgum), *Oxydendrum arboreum* (sourwood), *Nyssa sylvatica* (blackgum), *Prunus serotina* (black cherry), *Carya alba* (mockernut hickory), and *Pinus taeda* (loblolly pine). Shrub density varies among sites, but the most constant taxa appear to be *Alnus serrulata* (hazel alder), *Acer leucoderme* (chalk maple), *Hamamelis virginiana* (American witchhazel), *Calycanthus floridus* (eastern sweetshrub), *Pyrularia pubera* (buffalo nut), *Ilex opaca* (American holly), *Asimina parviflora* (smallflower pawpaw), and a prominence of ericads, namely *Kalmia latifolia* (mountain laurel), *Rhododendron arborescens* (smooth azalea), *Rhododendron canescens* (mountain azalea), *Vaccinium arboreum* (farkleberry), *Vaccinium corymbosum* (highbush blueberry), and *Vaccinium pallidum* (Blue Ridge blueberry). The herbaceous component is generally sparse, but can have patches of localized dominance by *Chasmanthium sessiliflorum* (longleaf woodoats), *Danthonia sericea* (downy danthonia), and *Thelypteris noveboracensis* (New York fern).

Global Vegetation: Any combination of *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), and *Quercus velutina* (black oak) dominates along with more traditional bottomland tree species such as *Liriodendron tulipifera* (tuliptree) and *Liquidambar styraciflua* (sweetgum). The shrub layer has at least 30% cover and tends to be dominated by *Kalmia latifolia* (mountain laurel) with other shrubs such as *Calycanthus floridus* (eastern sweetshrub), *Corylus cornuta* (beaked hazelnut), *Hamamelis virginiana* (American witchhazel), *Viburnum* (viburnum) spp., and others. The herbaceous stratum is sparse to moderate and contains *Chasmanthium sessiliflorum* (longleaf woodoats) (at least 10% cover).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Pyrularia pubera* (buffalo nut)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4? (9-Sep-2004). This community represents a rare forest that has yet to be studied extensively. Its range is probably currently underestimated. Due to its location adjacent to rivers, its conservation value is high as a buffer between the river and human activities.

CLASSIFICATION

Status: Standard
Classification Confidence: 3 - Weak
Little River Canyon National Preserve Comments:
Global Comments: Placement in the "upland" alliance is less of a problem under hierarchy changes being contemplated.
Global Similar Associations:
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Restricted to the riparian zone of Little River, north of State Route 35.
Global Range: This association is known from the southern Cumberlands of Alabama and probably also occurs in similar environments throughout the Ridge and Valley and Cumberland ecoregion of Alabama and Tennessee.
Nations: US
States/Provinces: AL, NC, TN?
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC
Federal Lands: NPS (Blue Ridge Parkway, Little River Canyon)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.37, LIRI.38, LIRI.39, LIRI.40, LIRI.50, LIRI.51, LIRI.83.
Local Description Authors: A. Schotz
Global Description Authors: R. White
References: NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

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(CEGL008430) White Oak - (Chestnut Oak) / (Oakleaf Hydrangea) - Mapleleaf Viburnum / Painted Sedge - Eastern Speargrass Forest

***Quercus alba* - (*Quercus prinus*) / (*Hydrangea quercifolia*) - *Viburnum acerifolium* / *Carex picta* - *Piptochaetium avenaceum* Forest**

Cumberland Plateau Dry-Mesic White Oak Forest

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 prinus) / (Hydrangea quercifolia) - Viburnum acerifolium / Carex picta - Piptochaetium avenaceum* Forest
Association (English name)	White Oak - (Chestnut Oak) / (Oakleaf Hydrangea) - Mapleleaf Viburnum / Painted Sedge - Eastern Speargrass Forest
Association (Common name)	Cumberland Plateau Dry-Mesic White Oak Forest
Ecological System(s):	Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)

ELEMENT CONCEPT

Global Summary: This association includes dry-mesic white oak forests of the southern Cumberland Plateau in Alabama and Tennessee. This forest occurs mostly over sandstone-derived soils, on middle to high slopes and ridges; also included are areas influenced by calcareous rocks or soils. Diagnostic features of this association are canopy dominance by *Quercus alba* (white oak), with an overall dry-mesic species composition, signified by the prominence of *Quercus prinus* (chestnut oak), *Vaccinium* (blueberry) spp., *Oxydendrum arboreum* (sourwood), *Cornus florida* (flowering dogwood), and by the absence or low coverage of mesophytic forest species (e.g., *Fagus grandifolia* (American beech), *Tilia americana var. heterophylla* (American basswood), *Ilex opaca var. opaca* (American holly), *Liriodendron tulipifera* (tuliptree), *Magnolia acuminata* (cucumber-tree), *Euonymus americanus* (strawberry bush)). In the Bankhead National Forest of Alabama, where the type was initially identified, the high constancy of *Magnolia macrophylla* (bigleaf magnolia), *Hydrangea quercifolia* (oakleaf hydrangea), and Carex picta serve to help identify this type, but these taxa are not necessarily good indicators throughout its range, Additionally, *Pinus taeda* (loblolly pine) and/or *Pinus virginiana* (Virginia pine) (especially on higher slopes) may also be present but may indicate past disturbance. The most common subcanopy species are *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), and *Magnolia macrophylla* (bigleaf magnolia) (within its range). On higher slopes and ridges *Nyssa sylvatica* (blackgum) and *Carya glabra* (pignut hickory) become additional, important subcanopy components. In areas with a calcareous influence, *Ostrya virginiana* (hophornbeam) may be dominant in the subcanopy. The shrub strata vary in density from site to site, but the constant shrub species are *Hydrangea quercifolia* (oakleaf hydrangea) and *Viburnum acerifolium* (mapleleaf viburnum). On high slopes and ridges, *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and *Vaccinium pallidum* (Blue Ridge blueberry) become shrub components, sometimes dominating the shrub layers. The herbaceous stratum can be sparse but often has patches of local dominance by *Carex picta* (Boott's sedge) (within its range), especially on lower to middle slopes. *Piptochaetium avenaceum* (blackseed speargrass) and *Vitis rotundifolia* (muscadine) are characteristic of occurrences on high slopes and ridges. Additional herbs with high constancy are *Polystichum acrostichoides* (Christmas fern) and *Chimaphila maculata* (striped prince's pine), although other species may be present in more mesic examples of this forest.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: The distribution of this community in Little River Canyon National Preserve is relatively widespread, occupying a broad spectrum of elevations and topographic variants, but chiefly on middle to upper slopes.

Global Environment: This forest can occur on all slope positions but is mostly found on middle to high slopes and ridges. Examples are typically supported by sandstone-derived soils, although some examples may have a calcareous influence (NatureServe Ecology unpubl. data).

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Examples at Little River Canyon National Preserve are represented by a prominence of hardwoods and a rich diversity of shrubs, vines, and herbs. The canopy is characterized by a codominance of tall, straight *Quercus alba* (white oak) and *Quercus prinus* (chestnut oak). While of secondary importance, *Carya glabra* (pignut hickory) and *Quercus rubra* (northern red oak) are also well-established in the canopy, occasionally attaining localized dominance. The subcanopy contains a greater floral diversity than the canopy layer, with no apparent species assuming a principal status. Common species of the

subcanopy include *Oxydendrum arboreum* (sourwood), *Nyssa sylvatica* (blackgum), and *Cornus florida* (flowering dogwood). The diversity and density of the shrub stratum is highly variable, typically occurring as a mosaic of dense thickets and open, sparsely vegetated areas. Characteristic shrubs are *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and *Viburnum acerifolium* (mapleleaf viburnum). The herbaceous component is generally sparse

Global Vegetation: This is a closed-canopy, deciduous forest with sparse, open to patchy shrub strata, and a variable herbaceous stratum. The canopy is always dominated by *Quercus alba* (white oak), with *Quercus prinus* (chestnut oak) usually codominating or occurring as a prominent canopy tree. *Quercus stellata* (post oak) may be present in some examples. *Pinus taeda* (loblolly pine) or, on higher slopes, *Pinus virginiana* (Virginia pine) may blend in from adjacent forests or occur as an artifact of past disturbance. The most common subcanopy species are *Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood), and *Magnolia macrophylla* (bigleaf magnolia) (within its range). On higher slopes and ridges *Nyssa sylvatica* (blackgum) and *Carya glabra* (pignut hickory) become additional, important subcanopy components. In areas with a calcareous influence, *Ostrya virginiana* (hophornbeam) may be dominant in the subcanopy. Other minor canopy and subcanopy trees may include *Acer leucoderme* (chalk maple), *Acer rubrum* (red maple), *Amelanchier arborea* (common serviceberry), *Fagus grandifolia* (American beech), *Prunus serotina* (black cherry), *Quercus coccinea* (scarlet oak), and *Quercus falcata* (southern red oak). The shrub strata vary in density from site to site, but the constant shrub species are *Hydrangea quercifolia* (oakleaf hydrangea) (in Alabama) and *Viburnum acerifolium* (mapleleaf viburnum). On high slopes and ridges, *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and *Vaccinium pallidum* (Blue Ridge blueberry) become shrub components, sometimes dominating the shrub layers. On more mesic sites, *Acer leucoderme* (chalk maple), *Acer rubrum* (red maple), and *Amelanchier arborea* (common serviceberry) are shrubs. The herbaceous stratum can be sparse but often has patches of local dominance by *Carex picta* (Boott's sedge) (within its range), especially on lower to middle slopes. *Piptochaetium avenaceum* (blackseed speargrass) and *Vitis rotundifolia* (muscadine) are characteristic of occurrences on high slopes and ridges. Additional herbs with high constancy are *Polystichum acrostichoides* (Christmas fern) and *Chimaphila maculata* (striped prince's pine), although other species may be present in more mesic and calcareous examples of this forest. Sparse coverage by species such as *Actaea racemosa* (black bugbane), *Collinsonia canadensis* (richweed), *Phryma leptostachya* (American lopseed), *Maianthemum racemosum* (feathery false lily of the valley), and *Geranium maculatum* (spotted geranium) are possible in such examples.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global: *Scutellaria montana* (largeflower skullcap)

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (5-Jan-2001). This is a hardwood forest found on slopes and ridges in the Cumberland Plateau in Tennessee and Alabama and possibly other states; it is not an inherently rare forest type. It is at least moderately widespread, and it is presumed to be relatively common throughout its range, although its full range is not known. It is not restricted to any highly specific geologic substrates. It is poorly documented through EOs, and not much data are available on the specific condition of examples of this type. Some examples are present

on the Obed River, Big South Fork and Bankhead National Forest of Alabama, and these could receive some protection. Some stands have been impacted by removal of more valuable timber species (e.g., *Quercus alba*) and loss of herbaceous species diversity from the disturbance effects of logging. In all probability, most examples which are not on public land have been repeatedly logged and their composition altered thereby. Remaining unprotected examples are threatened by timber removal, conversion to other managed forest types, and/or development into residential or commercial real estate.

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: Examples of this association in more protected situations begin to resemble *Quercus alba - Fagus grandifolia / Hydrangea quercifolia - Viburnum acerifolium / Carex picta - Polystichum acrostichoides* Forest (CEGL007213). Overall this association (CEGL008430) is different from CEGL007213 and *Quercus alba - (Liriodendron tulipifera, Liquidambar styraciflua) / Calycanthus floridus / Athyrium filix-femina* Forest (CEGL008428) because it is on drier habitats and because of the absence or low coverage of mesophytic forest species (e.g., *Fagus grandifolia, Tilia americana var. heterophylla, Ilex opaca var. opaca, Liriodendron tulipifera, Magnolia acuminata, Euonymus americanus*). A very similar association defined from the Interior Low Plateau of Tennessee is *Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta)* Forest (CEGL007795), but differs by its lack of *Quercus prinus* and many of the character species (e.g., *Magnolia macrophylla, Hydrangea quercifolia*) found in this type (CEGL008430).
Global Similar Associations:
Quercus alba - Carya alba - (Quercus velutina) / Desmodium nudiflorum - (Carex picta) Forest (CEGL007795)
Quercus alba - Fagus grandifolia / Hydrangea quercifolia - Viburnum acerifolium / Carex picta - Polystichum acrostichoides Forest (CEGL007213)
Quercus prinus - Quercus (alba, coccinea, velutina) / Viburnum acerifolium - (Kalmia latifolia) Forest (CEGL005023)
Global Related Concepts:
Chestnut Oak - White Oak Type (Schmalzer and DeSelm 1982) =

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Distributed throughout the preserve, but more frequent north of State Route 35.
Global Range: This community occurs in the southern Cumberland Plateau of the southeastern United States. It is currently defined as occurring in Alabama and Tennessee, but it may extend into adjacent states (in particular Kentucky).
Nations: US
States/Provinces: AL, TN
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 231Ca:CCC, 231Cc:CCC, 231Cd:CCC
Federal Lands: NPS (Big South Fork, Chickamauga-Chattanooga, Little River Canyon, Obed); USFS (Bankhead)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.11, LIRI.12, LIRI.45, LIRI.56, LIRI.58, LIRI.72, LIRI.73, LIRI.79, LIRI.100.
Local Description Authors: A. Schotz
Global Description Authors: K.D. Patterson, mod. C.W. Nordman and M. Pyne

References: NatureServe Ecology - Southeastern U.S. unpubl. data, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

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

ALLIANCE CONCEPT

Summary: This alliance contains vegetation that can be described as dry oak and oak-hickory forests. These often are successional forests following logging and/or agricultural cropping (and possibly also chestnut blight in the southern Appalachians). Some examples occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season. Other occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. Karst topography can be found in areas where this alliance occurs. Soils are most often a well-drained sandy loam, although clay loams are not uncommon. Forests of this alliance may occupy narrow bands of dry-mesic habitat transitional between lower and midslope mesic communities and xeric ridgetops. This alliance is found in the Upper East Gulf Coastal Plain, Piedmont, low mountains (including Cumberlands, Ridge and Valley, and low parts of the Southern Blue Ridge), and Interior Low Plateau. Distribution in the Atlantic Coastal Plain, East Gulf Coastal Plain, and Upper West Gulf Coastal Plain needs assessment. In the Shawnee Hills, Knobs, Coastal Plain, and Appalachian Plateau regions of Kentucky, these forests form a common matrix vegetation over acid sandstone and shales. These Kentucky forests are dominated by *Quercus alba* (white oak) with little or no *Quercus falcata* (southern red oak) and occupy middle to upper slope positions. In the southern Illinois portion of the range, examples occur on south- to west-facing slopes where increased temperatures favor *Quercus falcata* (southern red oak) over *Quercus rubra* (northern red oak). These forests are usually dominated by a mixture of *Quercus alba* (white oak) and *Quercus falcata* (southern red oak); *Quercus stellata* (post oak) may be dominant or codominant. In addition, *Quercus coccinea* (scarlet oak), *Quercus velutina* (black oak), *Quercus marilandica* (blackjack oak), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Carya pallida* (sand hickory), *Carya carolinae-septentrionalis* (southern shagbark hickory), *Carya ovata* (shagbark hickory), and *Fraxinus americana* (white ash) often are present. Common subcanopy and shrub species include *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), *Ulmus alata* (winged elm), *Juniperus virginiana var. virginiana* (eastern redcedar), *Vaccinium arboreum* (farkleberry), *Cornus florida* (flowering dogwood), *Sassafras albidum* (sassafras), *Gaylussacia frondosa* (blue huckleberry), *Gaylussacia baccata* (black huckleberry), *Vaccinium pallidum* (Blue Ridge blueberry), and *Vaccinium stamineum* (deerberry). Herbaceous species that may be present include *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Tephrosia virginiana* (Virginia tephrosia), *Sanicula canadensis* (Canadian blacksnakeroot), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Desmodium nuttallii* (Nuttall's ticktrefoil), *Symphyotrichum urophyllum* (white arrowleaf aster)?, *Symphyotrichum patens* (late purple aster), *Solidago ulmifolia* (elmleaf goldenrod), and *Hieracium venosum* (rattlesnakeweed).

Classification Comments:

Similar Alliances:

Pinus echinata - Quercus (alba, falcata, stellata, velutina) Forest Alliance (A.394)
Quercus alba - (Quercus nigra) Forest Alliance (A.238)
Quercus alba - (Quercus rubra, Carya spp.) Forest Alliance (A.239)
Quercus alba - Quercus stellata - Quercus velutina - (Quercus falcata) Woodland Alliance (A.613)
Quercus falcata Forest Alliance (A.243)
Quercus velutina - Quercus alba - (Quercus coccinea) Forest Alliance (A.1911)

Similar Alliance Comments: These forests are drier than those of the *Quercus alba - (Quercus rubra, Carya* spp.) Forest Alliance (A.239) and the *Quercus velutina - Quercus alba - (Quercus coccinea)* Forest Alliance (A.1911) and often occur on poorer soils or on south- and west-facing slopes. Related forests, drier than those of this alliance, are placed in the more southerly ranging *Quercus falcata* Forest Alliance (A.243). This alliance could occur in the Ozarks and Ouachita Mountains, but associations are yet to be defined. Distribution of vegetation in this alliance is patchy, occurring on south- to west-facing slopes where *Quercus falcata* is favored over *Quercus rubra*. Stands of

this alliance are similar to, and can grade into, stands of other dry-mesic *Quercus* spp.-dominated alliances such as the *Quercus alba - (Quercus rubra, Carya* spp.) Forest Alliance (A.239), the *Quercus velutina - Quercus alba - (Quercus coccinea)* Forest Alliance (A.1911), and the *Quercus alba - Quercus stellata - Quercus velutina - (Quercus falcata)* Woodland Alliance (A.613). Dominance by *Quercus falcata* typically serves to separate this alliance from others in the Midwest.

Related Concepts:

Acidic sub-xeric forest (Evans 1991) I
Coastal Forest/Woodland (Swain and Kearsley 2001) ?
Dry-Mesic Oak--Hickory Forest (Schafale and Weakley 1990) I
Eastern Serpentine Barren (Smith 1991) I
IA6i. Interior Upland Dry-Mesic Oak - Hickory Forest (Allard 1990) I
Maritime Oak - Holly Forest / Woodland (Swain and Kearsley 2001) ?
Post Oak-Black Hickory Series (Diamond 1993) ?
Serpentine pitch pine - oak forest (Fike 1999) ?
Southern Red Oak RV (Pyne 1994) ?
Submesic Oak - Hickory Forest (Foti 1994b) I
T1B4aIV. *Quercus falcata - Quercus* spp. (Foti et al. 1994) ?
White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) I
Xerohydric flatwoods (Evans 1991) I

ALLIANCE DESCRIPTION

Environment: These often are successional forests following logging and/or agricultural cropping. Some examples occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season. Other occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. Karst topography can be found in areas where this alliance occurs. Soils are most often a well-drained sandy loam, although clay loams are not uncommon. Forests of this alliance may occupy narrow bands of dry-mesic habitat transitional between lower and midslope mesic communities and xeric ridgetops. In the Shawnee Hills, Knobs, Coastal Plain, and Appalachian Plateau regions of Kentucky, these forests form a common matrix vegetation over acid sandstone and shales. They are dominated by *Quercus alba* with little or no *Quercus falcata* and occupy middle to upper slope positions. In the southern Illinois portion of the range, examples occur on south- to west-facing slopes where increased temperatures favor *Quercus falcata* over *Quercus rubra*.

Vegetation: This alliance contains vegetation that can be described as dry oak and oak-hickory forests. These are usually dominated by a mixture of *Quercus alba* (white oak) and *Quercus falcata* (southern red oak); *Quercus stellata* (post oak) may be dominant or codominant. In addition, *Quercus coccinea* (scarlet oak), *Quercus velutina* (black oak), *Quercus marilandica* (blackjack oak), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Carya pallida* (sand hickory), *Carya carolinae-septentrionalis* (southern shagbark hickory), *Carya ovata* (shagbark hickory), and *Fraxinus americana* (white ash) often are present. Common subcanopy and shrub species include *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), *Ulmus alata* (winged elm), *Juniperus virginiana var. virginiana* (eastern redcedar), *Vaccinium arboreum* (farkleberry), *Cornus florida* (flowering dogwood), *Sassafras albidum* (sassafras), *Gaylussacia frondosa* (blue huckleberry), *Gaylussacia baccata* (black huckleberry), *Vaccinium pallidum* (Blue Ridge blueberry), and *Vaccinium stamineum* (deerberry). Herbaceous species that may be present include *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Tephrosia virginiana* (Virginia tephrosia), *Sanicula canadensis* (Canadian blacksnakeroot), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Desmodium nuttallii* (Nuttall's ticktrefoil), *Symphyotrichum urophyllum* (white arrowleaf aster)?, *Symphyotrichum patens* (late purple aster), *Solidago ulmifolia* (elmleaf goldenrod), and *Hieracium venosum* (rattlesnakeweed).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Upper East Gulf Coastal Plain, Piedmont, low mountains, and Interior Low Plateau. Distribution in the Atlantic Coastal Plain, East Gulf Coastal Plain, and Upper West Gulf Coastal Plain needs assessment. In the Shawnee Hills, Knobs, Coastal Plain, and Appalachian Plateau regions of Kentucky, these forests form a common matrix vegetation over acid sandstone and shales.
Nations: US
Subnations: AL, AR, CT, DC?, DE, GA, IL, IN?, KY, LA?, MA, MD, MO?, MS, NC, NJ, NY, OK?, PA, SC, TN, TX?, VA
TNC Ecoregions: 32:P, 40:C, 41:P, 42:C, 43:C, 44:C, 50:C, 51:C, 52:C, 53:P, 56:C, 57:P, 58:C, 59:P, 61:C, 62:C
USFS Ecoregions: 221Ad:CPP, 221Dc:CC?, 221Ha:CCP, 221Hc:CCC, 221Hd:CCP, 221He:CCP, 221Jb:CCC, 222Ca:CCP, 222Cb:CCC, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CC?, 222Cg:CCC, 222Ch:CC?, 222Da:CCC, 222Dc:CCP, 222Dd:CCP, 222De:CCC, 222Df:CCP, 222Dg:CCC, 222Dh:CCC, 222Di:CCP, 222Dj:CCC, 222Ea:CCC, 222Eb:CCC, 222Ec:CCP, 222Ee:CCC, 222Ef:CCC, 222Eg:CCC, 222Eh:CCC, 222Ei:CCC, 222Ej:CCC, 222El:CCC, 222En:CCC, 231Aa:CCC, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCP, 231Ai:CCC, 231Aj:CCP, 231Ak:CCC, 231Al:CCC, 231Am:CCC, 231An:CCC, 231Ao:CCC, 231Ap:CCC, 231Ba:CCP, 231Bb:CCC, 231Bc:CCP, 231Bd:CCP, 231Be:CC?, 231Bg:CCC, 231Bh:CCC, 231Bj:CCC, 231Bk:CCC, 231Ca:CCP, 231Cb:CCP, 231Cc:CCC, 231Cd:CCC, 231Ce:CCP, 231Cg:CCP, 231Da:CCC, 231Dc:CCC, 231De:CCC, 231Ea:CC?, 231Eb:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bv:CCP, 232Bx:CCC, 232Bz:CCC, 232Ca:CC?, 232Ch:CCC, 232Fa:CP?, 234Aa:CC?, 234Ab:CCC, 234Ac:CCP, 234Ae:CCC, 234Ag:CC?, 234Ah:CCP, M221Aa:CC?, M221Ab:CCC, M221Da:CCC, M221Dd:CCC
Federal Lands: DOD (Arnold, Fort A.P. Hill, Fort Benning, Fort Gordon, Yorktown); DOE (Oak Ridge); NPS (Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga, Cowpens, Fire Island, Fredericksburg-Spotsylvania, George Washington Parkway, Great Smoky Mountains, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Natchez Trace, National Capital-East, Ninety Six, Petersburg, Richmond, Shiloh); TVA (Land Between the Lakes?, Tellico); USFS (Bankhead, Chattahoochee?, Cherokee, Daniel Boone, Holly Springs?, Oconee, Shawnee, St. Francis, Sumter, Talladega, Tombigbee?, Tuskegee?, Uwharrie); USFWS (Blackwater, Chesapeake Marshlands, Eufaula, Prime Hook)

(CEGL007244) Southern Red Oak - White Oak - Mockernut Hickory / Sourwood / Deerberry Forest

***Quercus falcata - Quercus alba - Carya alba / Oxydendrum arboreum / Vaccinium stamineum* Forest**
Southern Red Oak - White Oak Mixed Oak Forest

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-Mesic 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* (oak) spp. and lesser amounts of *Carya* (hickory) spp. The canopy is continuous, and several species of *Quercus* (oak) may be present or codominant (e.g., *Quercus falcata* (southern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), and *Quercus stellata* (post oak)). 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* (red maple), *Liriodendron tulipifera* (tuliptree), *Oxydendrum arboreum* (sourwood), *Liquidambar styraciflua* (sweetgum), *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Juniperus virginiana var. virginiana* (eastern redcedar), and *Vaccinium arboreum* (farkleberry). The tall-shrub stratum may contain *Rhododendron canescens* (mountain azalea) and *Vaccinium arboreum* (farkleberry). The low-shrub stratum can be sparse to moderate and may be dominated by various ericaceous shrubs such as *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium fuscatum* (black highbush blueberry), and *Gaylussacia baccata* (black huckleberry). *Smilax glauca* (cat greenbrier) and *Vitis rotundifolia* (muscadine) are common vines. Herbaceous species that may be present include *Aristolochia serpentaria* (Virginia snakeroot), *Symphyotrichum dumosum* (rice button aster), *Clitoria mariana* (Atlantic pigeonwings), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Euphorbia corollata* (flowering spurge), *Galium circaezans* (licorice bedstraw), *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Potentilla simplex* (common cinquefoil), *Porteranthus stipulatus* (Indian physic), *Pteridium aquilinum* (western brackenfern), *Lespedeza* (lespedeza) spp., *Dichanthelium* (rosette grass) spp., and *Hieracium venosum* (rattlesnakeweed).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This natural community frequently occurs throughout Little River Canyon National Preserve, preferring well-drained soils along upper slopes and ridgetops. This association likely represents the principal climax forest (given the absence of natural and/or anthropogenic disturbances) on the preserve following the succession of pine-dominated vegetation types.

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. In western Tennessee (Shiloh National Military Park) it occurs on silt loam and loam soils on moderate to gentle slopes and ridgetops.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This hardwood-dominated association is chiefly comprised of various oaks and hickories. While *Quercus* (oak) is the principal group, two species of *Carya* (hickory) (*Carya alba* (mockernut hickory) and, to a lesser extent, *Carya glabra* (pignut hickory)) are also commonly present, occasionally attaining some dominance in the canopy. Characteristic oaks are chiefly comprised of *Quercus alba* (white oak), *Quercus prinus* (chestnut oak), and *Quercus falcata* (southern red oak), with *Quercus rubra* (northern red oak) and *Quercus velutina* (black oak), while sparse, seldom absent from the canopy. Additional canopy species

include *Pinus echinata* (shortleaf pine), *Nyssa sylvatica* (blackgum), and *Liriodendron tulipifera* (tuliptree). The shrub component is generally well-developed, attaining its greatest presence in canopy openings and along drainage courses. Taxa present nearly always include *Kalmia latifolia* (mountain laurel), *Rhododendron canescens* (mountain azalea), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Cornus florida* (flowering dogwood), *Calycanthus floridus* (eastern sweetshrub), *Hamamelis virginiana* (American witchhazel), and *Viburnum acerifolium* (mapleleaf viburnum). The herbaceous stratum is open and consistently includes *Pteridium aquilinum* (western brackenfern), *Chasmanthium sessiliflorum* (longleaf woodoats), *Dioscorea villosa* (wild yam), *Hexastylis arifolia var. ruthii* (Ruth's littlebrownjug), *Trillium catesbaei* (bashful wakerobin), *Uvularia sessilifolia* (sessileleaf bellwort), *Chimaphila maculata* (striped prince's pine), *Coreopsis major* (greater tickseed), and *Solidago odora* (anisescented goldenrod). Typical vines are *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), *Smilax rotundifolia* (roundleaf greenbrier), and *Smilax glauca* (cat greenbrier).
Global Vegetation: The vegetation is dominated by *Quercus* (oak) spp. and lesser amounts of *Carya* (hickory) spp. The canopy is continuous, and several species of *Quercus* (oak) may be present (e.g., *Quercus falcata* (southern red oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), and *Quercus stellata* (post oak)). 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* (red maple), *Liriodendron tulipifera* (tuliptree), *Oxydendrum arboreum* (sourwood), *Liquidambar styraciflua* (sweetgum), *Ulmus alata* (winged elm), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), *Juniperus virginiana var. virginiana* (eastern redcedar), and *Vaccinium arboreum* (farkleberry). The tall-shrub stratum may contain *Rhododendron canescens* (mountain azalea) and *Vaccinium arboreum* (farkleberry). The low-shrub stratum is dominated by various ericaceous shrubs such as *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium fuscatum* (black highbush blueberry), and *Gaylussacia baccata* (black huckleberry). *Smilax glauca* (cat greenbrier) and *Vitis rotundifolia* (muscadine) are common vines. Herbaceous species that may be present include *Aristolochia serpentaria* (Virginia snakeroot), *Symphyotrichum dumosum* (rice button aster), *Clitoria mariana* (Atlantic pigeonwings), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Euphorbia corollata* (flowering spurge), *Galium circaezans* (licorice bedstraw), *Chimaphila maculata* (striped prince's pine), *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Potentilla simplex* (common cinquefoil), *Porteranthus stipulatus* (Indian physic), *Pteridium aquilinum* (western brackenfern), *Lespedeza* (lespedeza) spp., *Dichanthelium* (rosette grass) spp., and *Hieracium venosum* (rattlesnakeweed).

At Shiloh (western Tennessee) this association is documented from 3 plots; the canopy is dominated by *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Ulmus alata* (winged elm), and *Carya alba* (mockernut hickory). *Quercus muehlenbergii* (chinkapin oak) is also present as a canopy species in one of the plots. Subcanopy dominants are *Liquidambar styraciflua* (sweetgum), *Ulmus alata* (winged elm), *Nyssa sylvatica* (blackgum), *Fraxinus americana* (white ash), and *Carya glabra* (pignut hickory). Other subcanopy trees are *Quercus rubra* (northern red oak), *Quercus alba* (white oak), *Carya alba* (mockernut hickory), *Juniperus virginiana var. virginiana* (eastern redcedar), *Carya ovalis* (red hickory), *Diospyros virginiana* (common persimmon), and *Fagus grandifolia* (American beech). The most abundant tall shrubs are *Carya alba* (mockernut hickory), *Quercus falcata* (southern red oak), *Ulmus alata* (winged elm), and *Liquidambar styraciflua* (sweetgum). Other tall shrubs are *Carya ovalis* (red hickory), *Sassafras albidum* (sassafras), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Vaccinium arboreum* (farkleberry), *Vaccinium stamineum* (deerberry), and less abundant *Quercus velutina* (black oak), *Quercus rubra* (northern red oak), *Fagus grandifolia* (American beech), *Fraxinus americana* (white ash), *Acer rubrum* (red maple), *Smilax rotundifolia* (roundleaf greenbrier), and *Ilex opaca* (American holly). Short shrubs are diverse; *Quercus falcata* (southern red oak), *Vitis rotundifolia* (muscadine), *Vaccinium stamineum* (deerberry), and *Carya alba* (mockernut hickory) are the most abundant. Other short shrubs are *Quercus velutina* (black oak), *Ulmus alata* (winged elm), *Quercus alba* (white oak), *Nyssa sylvatica* (blackgum), *Parthenocissus quinquefolia* (Virginia creeper), *Prunus serotina* (black cherry), and *Sassafras albidum* (sassafras).

Short shrubs which are sparse include *Amelanchier arborea* (common serviceberry), *Vaccinium arboreum* (farkleberry), *Juniperus virginiana var. virginiana* (eastern redcedar), *Diospyros virginiana* (common persimmon), *Hypericum hypericoides* (St. Andrew's cross), *Fraxinus americana* (white ash), *Smilax rotundifolia* (roundleaf greenbrier), *Ilex opaca* (American holly), *Acer rubrum* (red maple), *Quercus phellos* (willow oak), *Celtis occidentalis* (common hackberry), *Rubus argutus* (sawtooth blackberry), *Morus rubra* (red mulberry), *Smilax bona-nox* (saw greenbrier), *Ilex decidua* (possumhaw), *Toxicodendron radicans* (eastern poison ivy), and *Carya ovalis* (red hickory). In one of the plots *Chasmanthium sessiliflorum* (longleaf woodoats) is the dominant herb, in the other plots there is no single dominant and herbs are all sparse. Other herbs include *Dichanthelium boscii* (Bosc's panicgrass), *Carex complanata* (hirsute sedge), *Dichanthelium laxiflorum* (openflower rosette grass), *Danthonia spicata* (poverty oatgrass), *Lespedeza repens* (creeping lespedeza), *Lespedeza procumbens* (trailing lespedeza), *Carex leavenworthii* (Leavenworth's sedge), *Schizachyrium scoparium* (little bluestem) and present a in trace amounts *Carex swanii* (Swan's sedge), *Dichanthelium dichotomum var. dichotomum* (cypress panicgrass), *Sericocarpus linifolius* (narrowleaf whitetop aster), *Galium circaezans* (licorice bedstraw), *Panicum anceps* (beaked panicgrass), *Tridens flavus* (purpletop tridens), *Aristolochia serpentaria* (Virginia snakeroot), *Dichanthelium acuminatum var. acuminatum* (tapered rosette grass), *Galium pilosum* (hairy bedstraw), *Solidago rugosa* (wrinkleleaf goldenrod), *Erechtites hieraciifolia* (American burnweed), *Sanicula canadensis* (Canadian blacksnakeroot), *Asplenium platyneuron* (ebony spleenwort), *Acalypha rhomboidea* (Virginia threeseed mercury), *Mimosa microphylla* (littleleaf sensitive-briar), *Conyza canadensis* (Canadian horseweed), and *Penstemon calycosus* (longsepal beardtongue).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Broad-leaved deciduous tree	*Carya alba* (mockernut hickory), *Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus velutina* (black oak)
Tree subcanopy	Broad-leaved deciduous tree	*Cornus florida* (flowering dogwood), *Oxydendrum arboreum* (sourwood)
Short shrub/sapling	Broad-leaved deciduous shrub	*Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:

Global: *Amorpha schwerinii* (Schwerin's false indigo), *Brickellia cordifolia* (Flyr's nemesis), *Corallorhiza wisteriana* (spring coralroot), *Hexastylis lewisii* (Lewis' heartleaf), *Monotropsis odorata* (pygmypipes), *Nestronia umbellula* (leechbrush), *Onosmodium virginianum* (wild Job's tears), *Porteranthus stipulatus* (Indian physic), *Prunus umbellata* (hog plum), *Rhus michauxii* (false poison sumac), *Thermopsis mollis* (Allegheny Mountain goldenbanner), *Yucca filamentosa* (Adam's needle)

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
Little River Canyon National Preserve 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 americanus / Hexastylis arifolia Forest (CEGL006227)--a more mesic type with range overlap in the southern Piedmont.
Quercus alba - Quercus falcata / Vaccinium (arboreum, hirsutum, pallidum) Forest (CEGL008567)--more eastern and montane in distribution.
Quercus alba - Quercus rubra - Carya alba / Cornus florida / Vaccinium stamineum / Desmodium nudiflorum Piedmont Forest (CEGL008475)--has a higher proportion of *Quercus alba* to other oak species.
Quercus falcata - Quercus alba - Quercus stellata - Quercus velutina Forest (CEGL005018)
Quercus stellata - Quercus marilandica - Carya (glabra, texana) / Vaccinium arboreum Forest (CEGL002075)
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

Little River Canyon National Preserve Range: Frequent throughout the preserve, most commonly at middle to upper elevations.
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
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 222Cg:CCC, 222Eb:CCC, 222Ef:CCC, 222Eg:CCC, 231Aa:CCC, 231Ae:CCC, 231Bb:CCC, 231Bg:CCC, 231Bh:CCC, 231Bj:CCC, 231Bk:CCC, 231Cc:CCC
Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon?); DOE (Oak Ridge); NPS (Cowpens, Guilford Courthouse, Kings Mountain, Little River Canyon, Natchez Trace, Ninety Six, Shiloh); USFS (Daniel Boone, Holly Springs?, Oconee, Sumter, Sumter (Piedmont), Talladega, Talladega (Oakmulgee), Talladega (Talladega), Tombigbee?, Tuskegee?, Uwharrie); USFWS (Eufaula)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.5, LIRI.10, LIRI.54, LIRI.62, LIRI.69.
Local Description Authors: A. Schotz

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, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

A.243–*Quercus falcata* Forest Alliance

ALLIANCE CONCEPT

Summary: Dry oak forests with canopies characteristically dominated by *Quercus falcata* (southern red oak), typically with some combination of *Quercus stellata* (post oak), *Quercus velutina* (black oak), and *Quercus coccinea* (scarlet oak). The relative dominance of these four species is variable between associations across the range of this alliance. *Quercus alba* (white oak) may be present (although more likely in the understory than in the canopy), but it will rarely contribute to the dominance. Within its range, some examples have strong dominance by *Quercus coccinea* (scarlet oak). In the Atlantic Coastal Plain, *Quercus nigra* (water oak) may be the other oak sharing dominance with *Quercus falcata* (southern red oak). *Vaccinium* (blueberry) spp. are common in the understory of some stands (including successional ones on subxeric, intermediate sites). Some typical occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. Some other examples are found on sites with unusual soil conditions, such as hardpans with retarded drainage. These typically occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season. The range of forests of this alliance is throughout the East Gulf Coastal Plain, West Gulf Coastal Plain, Upper West Gulf Coastal Plain, Piedmont, Carolina Sandhills, low mountains, and Cumberland and Interior Low plateaus. The overall distribution in the Atlantic Coastal Plain and Ouachita Mountains needs assessment.
Classification Comments: This alliance is found in central and western Tennessee and Kentucky, rather than the montane portions of these states. There is a *Quercus coccinea*-dominated association in Tennessee (S. Major pers. comm.). Former *Quercus falcata - Fagus grandifolia - Pinus taeda* Forest Alliance (A.409) merged in here, its only association (CEGL007540) also moved here.
Similar Alliances:
Pinus taeda - Quercus nigra Forest Alliance (A.406)
Quercus alba - (Quercus nigra) Forest Alliance (A.238)
Quercus alba - Quercus (falcata, stellata) Forest Alliance (A.241)
Similar Alliance Comments: Compare to *Quercus alba - Quercus (falcata, stellata)* Forest Alliance (A.241). Some stands with *Quercus alba, Quercus falcata*, and *Quercus nigra* could be difficult to place among these three alliances.
Related Concepts:
Quercus falcata forest alliance (Hoagland 1998a) ?
Acidic xeric forest (Evans 1991) I
Dry Oak--Hickory Forest, Coastal Plain Sand Variant (Schafale and Weakley 1990) ?
Post Oak-Black Hickory Series (Diamond 1993) ?
Southern Red Oak RV (Pyne 1994) ?
Xerohydric flatwoods (Evans 1991) I

ALLIANCE DESCRIPTION

Environment: Some typical occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. These are generally subxeric, intermediate sites. Some other examples are found on sites with unusual soil conditions, such as hardpans with retarded drainage. These typically occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season.

Vegetation: Stands of this alliance are dry oak forests with canopies characteristically dominated by *Quercus falcata* (southern red oak), typically with some combination of *Quercus stellata* (post oak), *Quercus velutina* (black oak), and *Quercus coccinea* (scarlet oak). The relative dominance of these four species is variable between associations across the range of this alliance. *Quercus alba* (white oak) may be present (although more likely in the understory than in the canopy), but it will rarely contribute to the dominance. Within its range, some examples have strong dominance by *Quercus coccinea* (scarlet oak). In the Atlantic Coastal Plain, *Quercus nigra* (water oak) may be the other oak sharing dominance with *Quercus falcata* (southern red oak). *Vaccinium* (blueberry) spp. are common in the understory of often successional stands on subxeric, intermediate sites.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found from Oklahoma, Kentucky, and North Carolina, south to Louisiana, Mississippi, and South Carolina, in the East Gulf Coastal Plain, Upper West Gulf Coastal Plain, Piedmont, Cumberland Plateau, Carolina Sandhills, low mountains, Interior Low Plateau, Ozarks, and Ouachitas. Its distribution and extent in the Atlantic Coastal Plain needs assessment. It is also reported from the Chesapeake Bay Region and the Northern Piedmont.
Nations: US
Subnations: AL, AR, DC, DE, GA, IN?, KY, LA, MD, MO?, MS, NC, NJ, OK, SC, TN, TX
TNC Ecoregions: 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 52:P, 53:C, 56:C, 57:C, 58:C, 62:C
USFS Ecoregions: 221Hc:CPP, 221Ja:CCP, 221Jb:CCC, 222Cb:CCC, 222Cc:CCP, 222Ce:CCP, 222Cg:CCC, 222Da:CCC, 222Dc:CC?, 222Dg:CCC, 222Eb:CCC, 222Ef:CCC, 222Eg:CCC, 222Ej:CCC, 222El:CCC, 231Aa:CCC, 231Ae:CC?, 231Ba:CCC, 231Bb:CCC, 231Be:CCC, 231Bg:CCC, 231Bi:CCC, 231Bk:CCC, 231Cc:CCC, 231Cd:CCC, 231Ea:CCC, 232Ab:CCC, 232Ac:CCP, 232Ad:CCC, 232Ba:CCP, 232Bb:CCP, 232Bh:CCP, 232Bi:CC?, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCP, 232Bt:CCC, 232Bu:CCP, 232Bv:CC?, 232Bx:CCC, 232Bz:CCP, 232Ca:CC?, 232Ce:CC?, 232Ci:CCC, 232Fa:CCP, 232Fb:CCP, 232Fe:CCC, 234Aa:CCP, 234Ab:CCC, 234Ac:CCC, 234Ae:CCC, 234Ag:CCP, 234Ah:CC?, 234Am:CC?, 234An:CCP, M222Ab:CCC, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP
Federal Lands: DOD (Arnold, Fort Benning); NPS (Chickamauga-Chattanooga, Little River Canyon, Mammoth Cave, Natchez Trace, National Capital-East, Shiloh); TVA (Tellico); USFS (Angelina, Bankhead, Bienville, Cherokee?, Conecuh, Davy Crockett, De Soto, Holly Springs, Homochitto, Kisatchie?, Ouachita, Sabine, Sam Houston, St. Francis, Talladega, Tombigbee, Tuskegee); USFWS (Chesapeake Marshlands, Prime Hook)

(CEGL007247) Southern Red Oak - (Scarlet Oak, Post Oak) / (Hillside Blueberry, Deerberry) Forest

***Quercus falcata - Quercus (coccinea, stellata) / Vaccinium (pallidum, stamineum)* Forest**
Southeastern Interior Southern Red Oak - Post Oak Forest

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 falcata* Forest Alliance (A.243)
Alliance (English name)	Southern Red Oak Forest Alliance
Association	*Quercus falcata - Quercus (coccinea, stellata) / Vaccinium (pallidum, stamineum)* Forest
Association (English name)	Southern Red Oak - (Scarlet Oak, Post Oak) / (Hillside Blueberry, Deerberry) Forest

Association (Common name) Southeastern Interior Southern Red Oak - Post Oak Forest
Ecological System(s): Allegheny-Cumberland Dry Oak Forest and Woodland (CES202.359)
Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)

ELEMENT CONCEPT

Global Summary: This oak forest is at least a moderately widespread type, present in the Interior Low Plateau and Cumberlands/Southern Ridge and Valley from Kentucky to Alabama. It is typically codominated by *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), and/or *Quercus stellata* (post oak). Other canopy associates vary across its range. Additional *Quercus* (oak) species may be present in the canopy and/or subcanopy (e.g., *Quercus velutina* (black oak) and *Quercus marilandica* (blackjack oak) in the Cumberland and Interior Low plateaus; *Quercus alba* (white oak), *Quercus rubra* (northern red oak), or *Quercus muehlenbergii* (chinkapin oak) in the Ridge and Valley or other more montane or submontane situations) along with several *Carya* (hickory) species (e.g., *Carya alba* (mockernut hickory), *Carya ovata* (shagbark hickory), *Carya carolinae-septentrionalis* (southern shagbark hickory), or *Carya glabra* (pignut hickory)). The canopy may contain substantial coverage by *Pinus* (pine) spp. (e.g., *Pinus virginiana* (Virginia pine), *Pinus echinata* (shortleaf pine)), as well as *Liriodendron tulipifera* (tuliptree), *Fraxinus americana* (white ash), *Acer barbatum* (southern sugar maple), and/or *Acer saccharum* (sugar maple). The subcanopy is relatively dense, with coverage of 25-60%. Subcanopy species may include *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Fraxinus americana* (white ash), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), *Prunus serotina var. serotina* (black cherry), and *Sassafras albidum* (sassafras). *Juniperus virginiana var. virginiana* (eastern redcedar) may be prominent in the subcanopy and shrub layers of fire-suppressed examples. Shrubs may include *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium arboreum* (farkleberry), *Gaylussacia baccata* (black huckleberry), and rarely *Gaylussacia dumosa* (dwarf huckleberry). Calcareous examples may have coverage by *Frangula caroliniana* (Carolina buckthorn) and *Symphoricarpos orbiculatus* (coralberry). Herbaceous species present nearly always include *Smilax glauca* (cat greenbrier), *Rhus copallinum* (flameleaf sumac), *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), and *Chimaphila maculata* (striped prince's pine). Other typical herbs include *Aristolochia serpentaria* (Virginia snakeroot), *Symphyotrichum dumosum* (rice button aster), *Clitoria mariana* (Atlantic pigeonwings), *Cypripedium acaule* (moccasin flower), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Euphorbia corollata* (flowering spurge), *Galium circaezans* (licorice bedstraw), *Ipomoea pandurata* (man of the earth), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Potentilla simplex* (common cinquefoil), *Porteranthus stipulatus* (Indian physic), *Pteridium aquilinum* (western brackenfern), *Piptochaetium avenaceum* (blackseed speargrass), *Lespedeza* (lespedeza) spp., *Dichanthelium* (rosette grass) spp., *Coreopsis major* (greater tickseed), *Mimosa microphylla* (littleleaf sensitive-briar), and *Hypericum hypericoides* (St. Andrew's cross).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This association occupies soil derived from sandstone of the Pottsville Formation, on relatively level topography characterized by a mosaic of rocky outcrops and silty loams mixed with residue from eroded sandstone, coals, and shales. Natural community examples are located on the summit of Lookout Mountain, generally in close proximity to the canyon rim at an elevation of approximately 366 m (1200 feet).

Global Environment: This association occurs on flat to gently rolling topography in the Interior Low Plateau of Tennessee and on xeric, lower slopes in Tennessee's Ridge and Valley. In the Cumberland Plateau of Alabama it is found on flat, sandstone nose slopes with a calcareous influence.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: The closed canopy is dominated by *Quercus falcata* (southern red oak), *Quercus rubra* (northern red oak), *Fagus grandifolia* (American beech), and *Liriodendron tulipifera* (tuliptree), and less frequently *Fraxinus americana* (white ash), *Carya ovata* (shagbark hickory), *Carya*

alba (mockernut hickory), and *Celtis laevigata* (sugarberry). Characteristic subcanopy species include *Ulmus rubra* (slippery elm), *Morus rubra* (red mulberry), and *Sassafras albidum* (sassafras), as well as smaller individuals of the foregoing canopy species. The shrub layer is generally sparse (less than 35% cover) containing immature examples of taxa found in the overstory, in addition to *Frangula caroliniana* (Carolina buckthorn), *Ostrya virginiana* (hophornbeam), *Cornus florida* (flowering dogwood), *Callicarpa americana* (American beautyberry), *Lindera benzoin* (northern spicebush), *Euonymus americanus* (strawberry bush), and *Asimina triloba* (pawpaw). Principal and otherwise noteworthy herbs are *Polystichum acrostichoides* (Christmas fern), *Carex digitalis* (slender woodland sedge), *Actaea pachypoda* (white baneberry), *Silene stellata* (widowsfrill), *Panax quinquefolius* (American ginseng), *Podophyllum peltatum* (mayapple), *Phlox divaricata* (wild blue phlox), and *Arisaema triphyllum* (Jack in the pulpit), among others.

Global Vegetation: Stands of this forest are typically codominated by *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), and/or *Quercus stellata* (post oak). Other *Quercus* (oak) species may be present in the canopy and/or subcanopy (*Quercus velutina* (black oak) and *Quercus marilandica* (blackjack oak) in the Cumberland and Interior Low plateaus; *Quercus alba* (white oak), *Quercus rubra* (northern red oak), or *Quercus muehlenbergii* (chinkapin oak) in the Ridge and Valley or other more montane or submontane situations) along with several *Carya* (hickory) species (*Carya alba* (mockernut hickory), *Carya ovata* (shagbark hickory), *Carya carolinae-septentrionalis* (southern shagbark hickory), or *Carya glabra* (pignut hickory)). The canopy, particularly of Ridge and Valley examples, may contain *Pinus virginiana* (Virginia pine) and/or *Pinus echinata* (shortleaf pine), as well as *Liriodendron tulipifera* (tuliptree), *Fraxinus americana* (white ash), and *Acer saccharum* (sugar maple). The subcanopy is relatively dense, with a coverage of 25-60%. Subcanopy species may include *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Fraxinus americana* (white ash), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), *Prunus serotina var. serotina* (black cherry), and *Sassafras albidum* (sassafras). *Juniperus virginiana var. virginiana* (eastern redcedar) is prominent in the subcanopy and shrub layers of fire-suppressed Ridge and Valley examples. The low-shrub layer of Interior Low Plateau examples may be sparse or dense, consisting mostly of ericaceous shrubs such as *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium arboreum* (farkleberry), *Gaylussacia baccata* (black huckleberry), and rarely *Gaylussacia dumosa* (dwarf huckleberry). Herbaceous species nearly always present include *Smilax glauca* (cat greenbrier), *Rhus copallinum* (flameleaf sumac), *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), and *Chimaphila maculata* (striped prince's pine). Other typical herbs include *Aristolochia serpentaria* (Virginia snakeroot), *Symphyotrichum dumosum* (rice button aster), *Clitoria mariana* (Atlantic pigeonwings), *Cypripedium acaule* (moccasin flower), *Desmodium nudiflorum* (nakedflower ticktrefoil), *Euphorbia corollata* (flowering spurge), *Galium circaezans* (licorice bedstraw), *Ipomoea pandurata* (man of the earth), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Potentilla simplex* (common cinquefoil), *Porteranthus stipulatus* (Indian physic), *Pteridium aquilinum* (western brackenfern), *Lespedeza* (lespedeza) spp., *Dichanthelium* (rosette grass) spp., *Coreopsis major* (greater tickseed), *Mimosa microphylla* (littleleaf sensitive-briar), and *Hypericum hypericoides* (St. Andrew's cross).

In the Bankhead National Forest of Alabama, this is a dry ridge forest with a canopy dominated by *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Carya alba* (mockernut hickory), *Pinus echinata* (shortleaf pine), and *Pinus virginiana* (Virginia pine). *Quercus prinus* (chestnut oak), *Quercus velutina* (black oak), and *Quercus alba* (white oak) can also have a minor presence in the canopy. The subcanopy is dominated by *Carya alba* (mockernut hickory), *Cornus florida* (flowering dogwood), and *Nyssa sylvatica* (blackgum). The shrub layer indicates a possible calcareous influence with *Celtis occidentalis* (common hackberry), *Chionanthus virginicus* (white fringetree), and *Frangula caroliniana* (Carolina buckthorn). Other shrubs are *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), and *Viburnum acerifolium* (mapleleaf viburnum). Vines include *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (eastern poison ivy), and *Vitis rotundifolia* (muscadine). The herb stratum is sparse and includes *Sericocarpus asteroides* (toothed whitetop aster), *Dioscorea quaternata* (fourleaf yam), *Piptochaetium avenaceum* (blackseed speargrass), *Pityopsis graminifolia*

(narrowleaf silkgrass), *Ruellia caroliniensis* (Carolina wild petunia), *Silphium trifoliatum* (whorled rosinweed), and *Solidago odora var. odora* (anisescented goldenrod).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4 (14-Jan-2000). This is not an inherently rare forest type. It is at least a moderately widespread type and is presumed to be relatively common throughout its range, although its full range is not known. It occurs on a variety of aspects and elevations, and it is not restricted to any highly specific geologic substrates. This type is poorly documented through EOs, and not much data are available on the specific condition of its examples. Some stands have been impacted by removal of more valuable timber species (e.g., *Quercus falcata*) and the loss of herbaceous species diversity from the disturbance effects of logging. The Grank was formerly G3G4. Changing this to G4 helps to clarify its status and indicates that it is not a rare type.

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: This association was originally defined from flat to gently rolling topography at Arnold Air Force Base, Coffee County, Tennessee, and later expanded to include TVA Tellico lands, where it is a common successional forest type on xeric lower slopes below 900 feet. It was subsequently expanded to include *Quercus falcata - Quercus stellata* forests found on sandstone ridges in Alabama's Cumberland Plateau.
Global Similar Associations:
Quercus falcata - Quercus alba - Quercus stellata - Quercus velutina Forest (CEGL005018)
Quercus falcata - Quercus stellata - Carya alba / Vaccinium spp. Coastal Plain Forest (CEGL007246)--of the Coastal Plain.
Global Related Concepts:
Southern Red Oak, RV (Pyne 1994) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Examples of this natural community are located on the summit of Lookout Mountain, generally in close proximity to the canyon rim at an elevation of approximately 366 m (1200 feet).
Global Range: This is at least a moderately widespread type, present in the Interior Low Plateau and Cumberlands/Southern Ridge and Valley at least from Kentucky to Alabama.
Nations: US
States/Provinces: AL, GA, KY, TN

TNC Ecoregions:
USFS Ecoregions: 222Dg:CCC, 222Eb:CCC, 222Ej:CCC, 222El:CCC, 231Cc:CCC, 231Cd:CCC
Federal Lands: DOD (Arnold); NPS (Chickamauga-Chattanooga, Little River Canyon, Mammoth Cave); TVA (Tellico); USFS (Bankhead, Cherokee?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.95.
Local Description Authors: A. Schotz
Global Description Authors: M. Pyne and A.S. Weakley, mod. T. Govus
References: Evans 1991, Pyne 1994, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1998a

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

ALLIANCE CONCEPT

Summary: This alliance includes xeric oak forests strongly dominated by *Quercus prinus* (chestnut oak) or *Quercus prinus* (chestnut oak) with admixtures of *Quercus coccinea* (scarlet oak) and/or *Quercus velutina* (black oak), occurring in the southern and central Appalachians, Ridge and Valley, Cumberland Plateau, Piedmont, Interior Low Plateau, and possibly in the northern Appalachians. These forests occur on convex, upper slopes and ridgetops, south-facing slopes, over thin, rocky, infertile soils in the Appalachians, typically below 1066 m (3500 feet) where windthrow and ice damage are common natural disturbances. In the Piedmont these forests occur on low mountains and hills, on rocky, well-drained, acidic soils, sometimes associated with outcrops of quartzite or other resistant rock. In the Piedmont and Ridge and Valley, and in areas transitional to these provinces, *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak) may be canopy associates. Other canopy/subcanopy associates include *Acer rubrum* (red maple), *Amelanchier arborea* (common serviceberry), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Cornus florida* (flowering dogwood), *Hamamelis virginiana* (American witchhazel), *Magnolia fraseri* (mountain magnolia), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), *Pinus rigida* (pitch pine), *Pinus strobus* (eastern white pine), *Quercus alba* (white oak), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), and *Sassafras albidum* (sassafras). In the Appalachians, a dense ericaceous shrub layer is characteristic, with species such as *Gaylussacia baccata* (black huckleberry), *Gaylussacia ursina* (bear huckleberry), *Kalmia latifolia* (mountain laurel), *Leucothoe recurva* (redtwig doghobble), *Rhododendron maximum* (great laurel), *Vaccinium pallidum* (Blue Ridge blueberry), and *Vaccinium stamineum* (deerberry). In the upper Piedmont *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), and *Vaccinium pallidum* (Blue Ridge blueberry) are common. In the montane distribution of this alliance, forests of this alliance have replaced forests formerly dominated or codominated by *Castanea dentata* (American chestnut), and chestnut sprouts are common in the understory. Other shrub species found in forests of this alliance include *Chionanthus virginicus* (white fringetree), *Diospyros virginiana* (common persimmon), *Robinia hispida* (bristly locust), *Sassafras albidum* (sassafras), *Styrax grandifolius* (bigleaf snowbell), *Symplocos tinctoria* (common sweetleaf), *Viburnum acerifolium* (mapleleaf viburnum), *Viburnum prunifolium* (blackhaw), and *Viburnum rufidulum* (rusty blackhaw). Herbaceous cover is typically sparse in these dry, rocky forests and species vary with geographic location.
Classification Comments:
Similar Alliances:
Acer rubrum - Nyssa sylvatica - Magnolia fraseri Forest Alliance (A.2009)
Pinus strobus - Quercus (alba, rubra, velutina) Forest Alliance (A.401)
Pinus strobus - Quercus (coccinea, prinus) Forest Alliance (A.402)
Quercus prinus - Quercus (alba, falcata, rubra, velutina) Forest Alliance (A.249)
Quercus prinus - Quercus rubra Forest Alliance (A.250)--occurs on more mesic sites, have a more diverse canopy, and have an overall more diverse species composition than forests in this alliance.

Similar Alliance Comments: Forests in this alliance (A.248) differ from forests in *Quercus prinus - Quercus rubra* Forest Alliance (A.250) by lacking dominance by *Quercus rubra* and occurring on more extreme sites.

Related Concepts:

Quercus prinus - Quercus velutina / Vaccinium stamineum Association (Fleming and Moorhead 1996) ?
Appalachian sub-xeric forest (Evans 1991) I
Chestnut Oak Forest (Schafale and Weakley 1990) I
Chestnut Oak: 44 (Eyre 1980) I
Dry oak - heath forest (Fike 1999) ?
IA6d. Chestnut Oak Slope and Ridge Forest (Allard 1990) ?
IA7d. Piedmont Monadnock Forest (Allard 1990) ?
Mixed Oak Forest (Swain and Kearsley 2001) ?
Oligotrophic Forest (Rawinski 1992) I
Piedmont Monadnock Forests (Schafale and Weakley 1990) I
Ridgetop Chestnut Oak (Swain and Kearsley 2001) ?
Xeric Central Hardwood Forest (Smith 1991) ?

ALLIANCE DESCRIPTION

Environment: These forests occur on convex, upper slopes and ridgetops, south-facing slopes, over thin, rocky, infertile soils in the Appalachians, typically below 1066 m (3500 feet), where windthrow and ice damage are common natural disturbances. In the Piedmont these forests occur on low mountains and hills, on rocky, well-drained, acidic soils, sometimes associated with outcrops of quartzite or other resistant rock.

Vegetation: This alliance consists of xeric oak forests in the Appalachians, Interior Plateau, and Piedmont, dominated by pure *Quercus prinus* (chestnut oak) or *Quercus prinus* (chestnut oak) with admixtures of *Quercus coccinea* (scarlet oak) and/or *Quercus velutina* (black oak). In the Piedmont and Ridge and Valley, and in areas transitional to these provinces, *Quercus stellata* (post oak) and *Quercus marilandica* (blackjack oak) may be canopy associates. Other canopy/subcanopy associates include *Acer rubrum* (red maple), *Amelanchier arborea* (common serviceberry), *Carya alba* (mockernut hickory), *Carya glabra* (pignut hickory), *Cornus florida* (flowering dogwood), *Hamamelis virginiana* (American witchhazel), *Magnolia fraseri* (mountain magnolia), *Nyssa sylvatica* (blackgum), *Oxydendrum arboreum* (sourwood), *Pinus rigida* (pitch pine), *Pinus strobus* (eastern white pine), *Quercus alba* (white oak), *Quercus rubra* (northern red oak), *Robinia pseudoacacia* (black locust), and *Sassafras albidum* (sassafras). In the Appalachians, a dense ericaceous shrub layer is characteristic, with species such as *Gaylussacia baccata* (black huckleberry), *Gaylussacia ursina* (bear huckleberry), *Kalmia latifolia* (mountain laurel), *Leucothoe recurva* (redtwig doghobble), *Rhododendron maximum* (great laurel), *Vaccinium pallidum* (Blue Ridge blueberry), and *Vaccinium stamineum* (deerberry). In the upper Piedmont *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), and *Vaccinium pallidum* (Blue Ridge blueberry) are common. In the montane distribution of this alliance, forests of this alliance have replaced forests formerly dominated or codominated by *Castanea dentata* (American chestnut), and chestnut sprouts are common in the understory. Other shrub species found in forests of this alliance include *Chionanthus virginicus* (white fringetree), *Diospyros virginiana* (common persimmon), *Robinia hispida* (bristly locust), *Sassafras albidum* (sassafras), *Styrax grandifolius* (bigleaf snowbell), *Symplocos tinctoria* (common sweetleaf), *Viburnum acerifolium* (mapleleaf viburnum), *Viburnum prunifolium* (blackhaw), and *Viburnum rufidulum* (rusty blackhaw). Herbaceous cover is typically sparse in these dry, rocky forests and species vary with geographic location. Some typical herbaceous species include *Antennaria plantaginifolia* (woman's tobacco), *Aureolaria laevigata* (entireleaf yellow false foxglove), *Chamaelirium luteum* (fairywand), *Chimaphila maculata* (striped prince's pine), *Danthonia spicata* (poverty oatgrass), *Dichanthelium commutatum* (variable panicgrass), *Dichanthelium dichotomum* (cypress panicgrass), *Dioscorea quaternata* (fourleaf yam), *Epigaea repens* (trailing arbutus), *Galax urceolata* (beetleweed), *Galium latifolium* (purple bedstraw), *Gaultheria procumbens* (eastern teaberry), *Goodyera pubescens* (downy rattlesnake plantain), *Hieracium venosum* (rattlesnakeweed), *Lysimachia quadrifolia* (whorled yellow loosestrife), *Medeola virginiana* (Indian cucumber), *Monotropa uniflora* (Indianpipe), *Potentilla canadensis* (dwarf cinquefoil), *Pteridium aquilinum*

(western brackenfern), *Stenanthium gramineum* (eastern featherbells), *Uvularia puberula* (mountain bellwort), and *Uvularia sessilifolia* (sessileleaf bellwort).
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the southern and central Appalachians, Ridge and Valley, Cumberland Plateau, Piedmont, Interior Low Plateau, and possibly in the northern Appalachians. It ranges from Illinois east to Maine, south to Virginia and possibly Florida, and west to Kentucky. It also occurs in Ontario, Canada.
Nations: CA, US
Subnations: AL, CT, DC, DE, GA, IL, IN, KY, MA, MD, ME, NC, NH, NJ, NY, OH, ON, PA, RI, SC, TN, VA, VT, WV
TNC Ecoregions: 38:C, 43:P, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 60:C, 61:C, 63:C, 64:C
USFS Ecoregions: 212A:CC, 212D:CC, 212Ec:CCC, 212Fa:CCP, 212Fb:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCC, 221Aa:CC?, 221Ac:CCP, 221Ad:CCP, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCP, 221Al:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 221Ea:CCC, 221Eb:CCC, 221Ec:CCC, 221Ed:CCC, 221Ee:CCC, 221Ef:CCC, 221Eg:CCC, 221Fa:CCC, 221Fb:CCP, 221Hc:CCC, 221He:CCC, 221Ja:CCP, 221Jb:CCC, 221Jc:CCP, 222Aq:CCC, 222Cf:CCP, 222Cg:CCP, 222Da:CCP, 222Db:CCC, 222Dc:CCP, 222De:CCC, 222Dg:CCP, 222Dh:CCP, 222Dj:CCP, 222Eb:CCC, 222Eg:CCC, 222Ei:CCC, 222Ek:CCP, 222El:CCC, 222Em:CCC, 222Eo:CCC, 222Fd:CCC, 222Hb:CCC, 231Aa:CCP, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Aj:CCC, 231Ak:CCC, 231Al:CCC, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Be:CPP, 231Cc:CCC, 231Cd:CCC, 231Dc:CCC, 232Aa:CCP, 232Ac:CCP, 232Ad:CCC, 232Ba:CP?, 232Bc:CP?, 232Bd:CPP, 232Br:CPP, 232Ch:CPP, M212Ba:CCP, M212Bb:CCP, M212Ca:CCC, M212Cb:CCC, M212Cc:CCC, M212Cd:CCP, M212De:CCC, M212Ea:CCC, M212Eb:CCP, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Ca:CCP, M221Cb:CCC, M221Cc:CCP, M221Cd:CCP, M221Ce:CCP, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); DOD (Camp Dawson, Fort Knox); NPS (Big South Fork, Blue Ridge Parkway, C&O Canal, Carl Sandburg Home, Catoctin Mountain, Chickamauga-Chattanooga, Cumberland Gap, Delaware Water Gap, George Washington Parkway, Gettysburg, Great Smoky Mountains, Harpers Ferry, Kings Mountain, Little River Canyon, Mammoth Cave, National Capital-East, New River Gorge, Obed, Rock Creek, Russell Cave, Shenandoah, Upper Delaware, Valley Forge, Weir Farm); TVA (Land Between the Lakes, Tellico); USFS (Allegheny, Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Hoosier, Jefferson, Monongahela, Nantahala, Oconee?, Pisgah, Shawnee, Sumter, Talladega?, Uwharrie, Wayne)

(CEGL008431) Chestnut Oak - (Scarlet Oak) / Sand Hickory / Farkleberry - Hillside Blueberry Forest

***Quercus prinus - (Quercus coccinea) / Carya pallida / Vaccinium arboreum - Vaccinium pallidum* Forest**
Xeric Ridgetop Chestnut Oak Forest

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)	Chestnut Oak - (Scarlet Oak, Black Oak) Forest Alliance

Association	*Quercus prinus - (Quercus coccinea) / Carya pallida / Vaccinium arboreum - Vaccinium pallidum* Forest
Association (English name)	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* (chestnut oak), sometimes sharing dominance with *Quercus coccinea* (scarlet oak). Other oaks in the canopy can include *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Quercus alba* (white oak), although these oaks are not dominant. Hickories (e.g., *Carya glabra* (pignut hickory), *Carya pallida* (sand hickory)) may be present in the canopy and/or subcanopy. Some examples may have coverage of pine in the canopy, most commonly *Pinus virginiana* (Virginia pine) and *Pinus echinata* (shortleaf pine). The most common subcanopy trees are *Acer rubrum* (red maple), *Carya pallida* (sand hickory), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), and *Oxydendrum arboreum* (sourwood). The most constant shrub species are *Chimaphila maculata* (striped prince's pine), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Diospyros virginiana* (common persimmon), and *Sassafras albidum* (sassafras). Herb coverage is sparse, with little constancy among examples. Some of the more typical herb species are *Euphorbia corollata* (flowering spurge), *Hieracium venosum* (rattlesnakeweed), *Carex nigromarginata* (black edge sedge), and *Solidago odora* (anisescented goldenrod), but many other species may occur.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This community is confined to the summit and upper slopes of Lookout Mountain where it occurs at an elevational range of 366 to 427 m (1200-1400 feet). As with most of the Cumberland Plateau in Alabama and adjacent Tennessee, the soils are classified as the Muskingum series, a fine sandy loam derived from the Pottsville Formation, being chiefly comprised of sandstone but also with varying amounts of siltstone, shale, and coal.

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 range from 225 to 732 m (740-2400 feet) elevation, with most examples occurring over 274 m (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 732 m (2400 feet).

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association is characterized as a closed-canopy deciduous forest dominated by *Quercus prinus* (chestnut oak) with an admixture of *Quercus coccinea* (scarlet oak), *Quercus alba* (white oak), *Quercus velutina* (black oak), and *Carya alba* (mockernut hickory). *Carya glabra* (pignut hickory), *Nyssa sylvatica* (blackgum), and *Pinus echinata* (shortleaf pine) are also present but are generally of secondary importance. The subcanopy is commonly represented by *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), and *Quercus stellata* (post oak), as well as several species of the foregoing canopy cover. Although seldom absent from either stratum, *Quercus marilandica* (blackjack oak),

Fagus grandifolia (American beech), and *Sassafras albidum* (sassafras) are occasional and often widely distributed. The shrub component is relatively diverse but generally open, with *Rhododendron canescens* (mountain azalea), *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Chimaphila maculata* (striped prince's pine), and *Diospyros virginiana* (common persimmon) appearing most typical. Several species of herbs, though sparse, are well-represented, with the more frequently encountered taxa being *Coreopsis major* (greater tickseed), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Danthonia spicata* (poverty oatgrass), *Aristolochia serpentaria* (Virginia snakeroot), *Asclepias variegata* (redring milkweed), *Viola X palmata* (early blue violet), and *Hieracium venosum* (rattlesnakeweed). Characteristic vines include *Vitis rotundifolia* (muscadine), *Smilax rotundifolia* (roundleaf greenbrier), and *Smilax glauca* (cat greenbrier).

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* (chestnut oak) sometimes sharing dominance with *Quercus coccinea* (scarlet oak) (and in some Piedmont examples, with *Quercus coccinea* (scarlet oak) as the dominant canopy tree). Other oaks in the canopy can include *Quercus velutina* (black oak), *Quercus stellata* (post oak), and *Quercus alba* (white oak), although these oaks are not dominant. Hickories (e.g., *Carya glabra* (pignut hickory), *Carya pallida* (sand hickory)) may be present in the canopy and/or subcanopy. Some examples may have coverage of pine in the canopy, most commonly *Pinus virginiana* (Virginia pine) and *Pinus echinata* (shortleaf pine). The most common subcanopy trees are *Acer rubrum* (red maple), *Carya pallida* (sand hickory), *Cornus florida* (flowering dogwood), *Nyssa sylvatica* (blackgum), and *Oxydendrum arboreum* (sourwood). Other minor species in the canopy and subcanopy can include *Carya glabra* (pignut hickory), *Castanea dentata* (American chestnut), and *Magnolia macrophylla* (bigleaf magnolia). The most constant shrub species are *Chimaphila maculata* (striped prince's pine), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Diospyros virginiana* (common persimmon), and *Sassafras albidum* (sassafras). Other shrubs that can occur in examples of this community are *Lyonia ligustrina* (maleberry), *Castanea pumila* (chinkapin), *Viburnum acerifolium* (mapleleaf viburnum), *Rhododendron alabamense* (Alabama azalea), and *Rhododendron canescens* (mountain azalea). Herb coverage is sparse, with little constancy among examples. Some of the more typical herb species are *Euphorbia corollata* (flowering spurge), *Hieracium venosum* (rattlesnakeweed), *Carex nigromarginata* (black edge sedge), and *Solidago odora* (anisescented goldenrod), but many other species may occur. In the lower Piedmont of Georgia, some additional herbs may include *Schizachyrium scoparium* (little bluestem), *Dichanthelium boscii* (Bosc's panicgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Tephrosia virginiana* (Virginia tephrosia), *Verbesina virginica* (white crownbeard), *Hypoxis hirsuta* (common goldstar), *Tragia urticifolia* (nettleleaf noseburn), *Brickellia eupatorioides* (false boneset), *Scutellaria elliptica* (hairy skullcap), *Arnoglossum atriplicifolium* (pale Indian plaintain), *Pityopsis aspera* (pineland silkgrass), and *Coreopsis major* (greater tickseed).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	**Lifeform**	**Species**

Global

Stratum	**Lifeform**	**Species**
Tree canopy	Broad-leaved deciduous tree	*Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak)
Tree subcanopy	Broad-leaved deciduous tree	*Acer rubrum* (red maple)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global: *Acer rubrum* (red maple), *Oxydendrum arboreum* (sourwood), *Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve 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 (prinus, 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

Little River Canyon National Preserve Range: Throughout the preserve on the summit and upper slopes of Lookout Mountain.
Global Range: This association occurs in the southern Cumberland Plateau and southern Ridge and Valley of Georgia, Tennessee 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?, SC, TN
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 231Aj:CCC, 231Cc:CCC, 231Cd:CCC, 231Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Big South Fork, Chickamauga-Chattanooga, Kings Mountain, Little River Canyon, Obed, Russell Cave); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.3, LIRI.21, LIRI.22, LIRI.23, LIRI.24, LIRI.27, LIRI.52, LIRI.71.
Local Description Authors: A. Schotz
Global Description Authors: mod. R. White
References: Chapman 1957, Govus 2002, Lipps 1966, Lipps and DeSelm 1969, NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

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

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

ALLIANCE CONCEPT

Summary: This southeastern alliance includes a variety of bottomland communities of moderately wet floodplains of the lower Piedmont, Interior Low Plateau, and Coastal Plain, extending north and west into the Cumberland Plateau and Ridge and Valley, as well as the Ouachita Mountains and Ozarks. This alliance is fairly common in the lower Piedmont of Georgia, as well as on small stream floodplains and bottoms in all of the Interior Low Plateau of Kentucky (except the Bluegrass region) where it is somewhat successional. *Liriodendron tulipifera* (tuliptree) is dominant in disturbed areas of Kentucky and is common on well-drained floodplains of Kentucky without *Liquidambar styraciflua* (sweetgum). Conversely, *Liriodendron tulipifera* (tuliptree) is absent in Ouachita - Ozark examples. Stands are dominated by *Liquidambar styraciflua* (sweetgum) with or without some combination of *Liriodendron tulipifera* (tuliptree) and *Acer rubrum* (red maple) as codominants. Canopy and subcanopy associates vary with geography and substrate, but may include *Acer barbatum* (southern sugar maple), *Ilex opaca var. opaca* (American holly), *Aesculus sylvatica* (painted buckeye), *Quercus nigra* (water oak), *Carya cordiformis* (bitternut hickory), *Platanus occidentalis* (American sycamore), *Betula nigra* (river birch), *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), *Fagus grandifolia* (American beech), *Juglans nigra* (black walnut), *Morus rubra var. rubra* (red mulberry), *Ostrya virginiana var. virginiana* (hophornbeam), *Oxydendrum arboreum* (sourwood), *Pinus echinata* (shortleaf pine), *Prunus serotina var. serotina* (black cherry), *Quercus alba* (white oak), *Quercus rubra var. rubra* (northern red oak), *Ulmus rubra* (slippery elm), *Ulmus americana* (American elm), *Ulmus alata* (winged elm), *Juniperus virginiana var. virginiana* (eastern redcedar), *Nyssa sylvatica* (blackgum), *Fraxinus americana* (white ash), and *Fraxinus pennsylvanica* (green ash). The shrub layer often is well-developed and includes *Euonymus americanus* (strawberry bush), *Lindera benzoin var. benzoin* (northern spicebush), *Corylus americana* (American hazelnut), *Viburnum acerifolium* (mapleleaf viburnum), *Viburnum nudum var. nudum* (possumhaw), *Viburnum prunifolium* (blackhaw), *Viburnum rufidulum* (rusty blackhaw), *Hamamelis virginiana* (American witchhazel), *Asimina triloba* (pawpaw), and *Ilex decidua* (possumhaw) among others. Vines are prominent and species include *Vitis rotundifolia* (muscadine), *Apios americana* (groundnut), *Campsis radicans* (trumpet creeper), *Aristolochia serpentaria* (Virginia snakeroot), *Bignonia capreolata* (crossvine), *Dioscorea quaternata* (fourleaf yam), *Gelsemium sempervirens* (evening trumpetflower), *Parthenocissus quinquefolia* (Virginia creeper), *Campsis radicans* (trumpet creeper), *Passiflora lutea* (yellow passionflower), *Smilax bona-nox* (saw greenbrier), *Smilax glauca* (cat greenbrier), *Smilax hugeri* (Huger's carrionflower), *Smilax rotundifolia* (roundleaf greenbrier), and *Toxicodendron radicans ssp. radicans* (eastern poison ivy). The herbaceous layer can be species-rich and often has good sedge development. Common

species in this layer include *Thalictrum thalictroides* (rue anemone), *Trillium cuneatum* (little sweet Betsy), *Arisaema triphyllum ssp. triphyllum* (Jack in the pulpit), *Asplenium platyneuron var. platyneuron* (ebony spleenwort), *Botrychium virginianum* (rattlesnake fern), *Carex* (sedge) spp., *Carex impressinervia* (ravine sedge), *Carex striatula* (lined sedge), *Galium circaezans* (licorice bedstraw), *Geum canadense* (white avens), *Polystichum acrostichoides* (Christmas fern), and *Scutellaria integrifolia* (helmet flower) among many others. Soils are relatively acid. The exotics *Microstegium vimineum* (Nepalese browntop), *Ligustrum sinense* (Chinese privet), and *Lonicera japonica* (Japanese honeysuckle) may be common in examples of this alliance.

Classification Comments: Need association that is one version of a small stream swamp forest with the nominals (J. Ambrose pers. comm.).

Similar Alliances:

Liquidambar styraciflua - (Acer rubrum) Seasonally Flooded Forest Alliance (A.321)
Liquidambar styraciflua Forest Alliance (A.234)
Liriodendron tulipifera Forest Alliance (A.236)
Pinus taeda - Liquidambar styraciflua - Nyssa biflora Temporarily Flooded Forest Alliance (A.433)
Pinus taeda - Liriodendron tulipifera Temporarily Flooded Forest Alliance (A.434)--includes related associations with longer hydroperiods.

Similar Alliance Comments:

Related Concepts:

Lowland Oak - Sweetgum Forest (Foti 1994b) I
Piedmont/Low Mountain Alluvial Forest (Schafale and Weakley 1990) I

ALLIANCE DESCRIPTION

Environment: This alliance includes a variety of bottomland communities of moderately wet floodplains. It is fairly common in the lower Piedmont of Georgia (J. Ambrose pers. comm.), as well as on small stream floodplains and bottoms in all of the Interior Low Plateau of Kentucky (except the Bluegrass region) where it is somewhat successional (L. McKinney pers. comm.).

Vegetation: This alliance includes a variety of bottomland communities dominated by *Liquidambar styraciflua* (sweetgum) with or without some combination of *Liriodendron tulipifera* (tuliptree) and *Acer rubrum* (red maple) as codominants. Canopy and subcanopy associates vary with geography and substrate, but may include *Acer barbatum* (southern sugar maple), *Ilex opaca var. opaca* (American holly), *Aesculus sylvatica* (painted buckeye), *Quercus nigra* (water oak), *Carya cordiformis* (bitternut hickory), *Platanus occidentalis* (American sycamore), *Betula nigra* (river birch), *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Cornus florida* (flowering dogwood), *Fagus grandifolia* (American beech), *Juglans nigra* (black walnut), *Morus rubra var. rubra* (red mulberry), *Ostrya virginiana var. virginiana* (hophornbeam), *Oxydendrum arboreum* (sourwood), *Pinus echinata* (shortleaf pine), *Prunus serotina var. serotina* (black cherry), *Quercus alba* (white oak), *Quercus rubra var. rubra* (northern red oak), *Ulmus rubra* (slippery elm), *Ulmus americana* (American elm), *Ulmus alata* (winged elm), *Juniperus virginiana var. virginiana* (eastern redcedar), *Nyssa sylvatica* (blackgum), *Fraxinus americana* (white ash), and *Fraxinus pennsylvanica* (green ash). *Liriodendron tulipifera* (tuliptree) is dominant in disturbed areas of Kentucky and is common on well-drained floodplains of Kentucky without *Liquidambar styraciflua* (sweetgum). Conversely, *Liriodendron tulipifera* (tuliptree) is absent in Ouachita - Ozark examples. Some stands may exhibit dominance by *Acer rubrum* (red maple). The shrub layer often is well-developed and species include *Euonymus americanus* (strawberry bush), *Lindera benzoin var. benzoin* (northern spicebush), *Corylus americana* (American hazelnut), *Viburnum acerifolium* (mapleleaf viburnum), *Viburnum nudum var. nudum* (possumhaw), *Viburnum prunifolium* (blackhaw), *Viburnum rufidulum* (rusty blackhaw), *Hamamelis virginiana* (American witchhazel), *Asimina triloba* (pawpaw), and *Ilex decidua* (possumhaw) among others. Vines are prominent and species include *Vitis rotundifolia* (muscadine), *Apios americana* (groundnut), *Campsis radicans* (trumpet creeper), *Aristolochia serpentaria* (Virginia snakeroot), *Bignonia capreolata* (crossvine), *Dioscorea quaternata* (fourleaf yam), *Gelsemium sempervirens* (evening trumpetflower), *Parthenocissus quinquefolia* (Virginia creeper), *Campsis radicans* (trumpet creeper),

Passiflora lutea (yellow passionflower), *Smilax bona-nox* (saw greenbrier), *Smilax glauca* (cat greenbrier), *Smilax hugeri* (Huger's carrionflower), *Smilax rotundifolia* (roundleaf greenbrier), and *Toxicodendron radicans ssp. radicans* (eastern poison ivy). The herbaceous layer can be species-rich and often has good sedge development. Common species in this layer include *Thalictrum thalictroides* (rue anemone), *Trillium cuneatum* (little sweet Betsy), *Arisaema triphyllum ssp. triphyllum* (Jack in the pulpit), *Asplenium platyneuron var. platyneuron* (ebony spleenwort), *Botrychium virginianum* (rattlesnake fern), *Carex* (sedge) spp., *Carex impressinervia* (ravine sedge), *Carex striatula* (lined sedge), *Galium circaezans* (licorice bedstraw), *Geum canadense* (white avens), *Polystichum acrostichoides* (Christmas fern), and *Scutellaria integrifolia* (helmet flower) among many others. Soils are relatively acid. The exotics *Microstegium vimineum* (Nepalese browntop), *Ligustrum sinense* (Chinese privet), and *Lonicera japonica* (Japanese honeysuckle) may be common in examples of this alliance.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is fairly common in the lower Piedmont of Georgia (J. Ambrose pers. comm.), as well as on small stream floodplains and bottoms in all of the Interior Low Plateau of Kentucky (except the Bluegrass Region) where it is somewhat successional (L. McKinney pers. comm.). Its range extends north and west into the Cumberland Plateau and Ridge and Valley, as well as the Ouachita Mountains and Ozarks.

Nations: US

Subnations: AL, AR, DC, FL?, GA, KY, MD, MS, NC, NJ, OK, SC, TN, VA

TNC Ecoregions: 38:C, 39:C, 43:C, 44:C, 50:C, 52:C, 53:?, 56:C, 57:C, 58:C

USFS Ecoregions: 221Hc:CCC, 222Ab:CCC, 222Ag:CCC, 222An:CCC, 222Cb:CCP, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCC, 222Da:CCP, 222Db:CCP, 222Dc:CCP, 222Dd:CCP, 222De:CCP, 222Dg:CCP, 222Di:CCP, 222Ea:CC?, 222Eb:CCC, 222Ec:CC?, 222Ed:CC?, 222Ee:CC?, 222Ef:CC?, 222Eg:CCC, 222Eh:CC?, 222Ei:CC?, 222Ej:CC?, 222Ek:CC?, 222En:CC?, 222Eo:CC?, 231Aa:CCC, 231Ab:CC?, 231Ac:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ag:CC?, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Ak:CCC, 231Al:CC?, 231Am:CC?, 231An:CCC, 231Ao:CC?, 231Ap:CC?, 231Ba:CCC, 231Bb:CC?, 231Bc:CC?, 231Bd:CCC, 231Be:CCC, 231Bf:CC?, 231Bg:CCC, 231Bh:CC?, 231Bi:CCC, 231Bj:CC?, 231Bk:CCC, 231Bl:CC?, 231Ca:CC?, 231Cb:CC?, 231Cc:CCC, 231Cd:CCC, 231Ce:CC?, 231Cf:CC?, 231Cg:CCC, 231Da:CC?, 231Db:CC?, 231Dc:CC?, 231Dd:CC?, 231De:CC?, 231Ga:CCP, 231Gb:CCP, 231Gc:CCC, 232Ad:CCC, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCC, 232Be:CCP, 232Bf:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCC, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Cg:CCC, 234Ab:PP?, 234An:PPP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Arnold, Fort Belvoir, Fort Benning, Fort Gordon); DOE (Oak Ridge?, Savannah River Site); NPS (Big South Fork, Buffalo River?, Carl Sandburg Home, Chickamauga-Chattanooga, Colonial, Cowpens, Fort Donelson, Fredericksburg-Spotsylvania, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Little River Canyon, Mammoth Cave, Natchez Trace, National Capital-East, Ninety Six, Petersburg, Prince William, Richmond, Shiloh, Thomas Stone); USFS (Bankhead?, Bienville?, Daniel Boone, De Soto?, Delta?, Francis Marion?, Holly Springs?, Homochitto?, Oconee, Ouachita, Ozark, Sumter?, Talladega?, Tombigbee?, Tuskegee?, Uwharrie)

(CEGL007330) Sweetgum - (Tuliptree) Temporarily Flooded Forest
***Liquidambar styraciflua - (Liriodendron tulipifera)* Temporarily Flooded Forest**
Successional Sweetgum Floodplain Forest

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 Alliance (A.287)
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 Large River Floodplain Forest (CES203.489) East Gulf Coastal Plain Small Stream and River Floodplain Forest (CES203.559) Southern Piedmont Small Floodplain and Riparian Forest (CES202.323) South-Central Interior Small Stream and Riparian (CES202.706)

ELEMENT CONCEPT

Global Summary: This widespread association of the southeastern United States is dominated by *Liquidambar styraciflua* (sweetgum), but can be dominated by *Liriodendron tulipifera* (tuliptree) 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* 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* (red maple) 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* (white oak), *Quercus phellos* (willow oak), *Quercus nigra* (water oak), *Nyssa sylvatica* (blackgum), and *Cornus florida* (flowering dogwood). Stands in the Inner Coastal Plain of South Carolina typically contain *Persea palustris* (swamp bay) and *Magnolia virginiana* (sweetbay). The shrub layer can contain *Carpinus caroliniana* (American hornbeam), *Itea virginica* (Virginia sweetspire), *Vitis rotundifolia* (muscadine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), and/or *Rubus* (blackberry) sp., in addition to canopy/subcanopy species. *Lonicera japonica* (Japanese honeysuckle) is often abundant in the understory. On disturbed sites, the shrub layer is often dominated by *Ligustrum sinense* (Chinese privet), and the ground layer is typically solid *Microstegium vimineum* (Nepalese browntop) or a tangle of *Smilax rotundifolia* (roundleaf greenbrier) and *Rubus* (blackberry) sp. The herbaceous layer may include *Chasmanthium laxum* (slender woodoats), *Carex* (sedge) spp., *Boehmeria cylindrica* (smallspike false nettle), and *Botrychium biternatum* (sparselobe grapefern), sometimes growing on hummocks in standing water.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Little River Canyon National Preserve Environment: This association occurs on terraces along Little River, upstream from the canyon. The topography is relatively level, having developed through periodic flooding where alluvial sediments derived of weathered substrates from Lookout Mountain and adjacent areas are deposited.

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

Little River Canyon National Preserve Vegetation: The canopy of this deciduous forest association is dominated by *Liquidambar styraciflua* (sweetgum) and *Liriodendron tulipifera* (tuliptree), which are frequently accompanied

by a suite of secondary species typical of bottomlands in the region. In addition to the above-mentioned taxa, the canopy also contains *Quercus alba* (white oak) and *Pinus taeda* (loblolly pine). Subcanopy species include the canopy components highlighted above, as well as *Acer rubrum* (red maple) and, to a lesser degree, *Nyssa sylvatica* (blackgum). Shrubs and vines, which are generally patchy in distribution, are primarily represented by *Rhododendron canescens* (mountain azalea), *Vaccinium corymbosum* (highbush blueberry), *Cornus florida* (flowering dogwood), *Vitis rotundifolia* (muscadine), and immature specimens of the foregoing canopy species. *Ligustrum sinense* (Chinese privet) has become well-established in portions of this association just beyond the boundaries of the preserve, having out-competed native vegetation. A rich and diverse herbaceous component is readily apparent throughout most of the growing season, often presenting a colorful display of wildflowers.
Global Vegetation: The canopy of this association is dominated by *Liquidambar styraciflua* (sweetgum) but can be dominated by *Liriodendron tulipifera* (tuliptree) in some cases. *Acer rubrum* (red maple) 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* (white oak), *Quercus phellos* (willow oak), *Quercus nigra* (water oak), *Fraxinus americana* (white ash), *Carya* (hickory) spp., *Nyssa sylvatica* (blackgum), and *Cornus florida* (flowering dogwood). Stands in the Inner Coastal Plain of South Carolina typically contain *Persea palustris* (swamp bay) and *Magnolia virginiana* (sweetbay) (Jones et al. 1981b). The shrub layer contains *Carpinus caroliniana* (American hornbeam), *Itea virginica* (Virginia sweetspire), *Vitis rotundifolia* (muscadine), *Parthenocissus quinquefolia* (Virginia creeper), *Smilax rotundifolia* (roundleaf greenbrier), and *Rubus* (blackberry) sp., in addition to canopy/subcanopy species. *Lonicera japonica* (Japanese honeysuckle) is often abundant in the understory. On disturbed sites, the shrub layer is often dominated by *Ligustrum sinense* (Chinese privet), and the ground layer is typically solid *Microstegium vimineum* (Nepalese browntop) or a tangle of *Smilax rotundifolia* (roundleaf greenbrier) and *Rubus* (blackberry) sp. The herbaceous layer may include *Chasmanthium laxum* (slender woodoats), *Carex* (sedge) spp., *Boehmeria cylindrica* (smallspike false nettle), and *Botrychium biternatum* (sparselobe grapefern), sometimes growing on hummocks in standing water. Various *Carex* (sedge) species may be present.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Broad-leaved deciduous tree	*Liquidambar styraciflua* (sweetgum)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global: *Boehmeria cylindrica* (smallspike false nettle), *Smilax rotundifolia* (roundleaf greenbrier)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve Comments:
Global Comments: At Arnold Air Force Base (Tennessee), 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 Forest (CEGL004418)--may be difficult to distinguish from older versions of this community; trees are older, uneven-aged, and the herbaceous layer more diverse in this association (CEGL004418).

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

Little River Canyon National Preserve Range: Widely scattered throughout the preserve, confined to bottomlands along Little River.

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, NJ, SC, TN, VA

TNC Ecoregions:

USFS Ecoregions: 221Hc:CCC, 222Cg:CCC, 222Eb:CCC, 222Eg:CCC, 231Aa:CCC, 231Ae:CCC, 231Ak:CCC, 231An:CCC, 231Ba:CCC, 231Bd:CCC, 231Be:CCC, 231Bg:CCC, 231Bi:CCC, 231Bk:CCC, 231Cc:CCC, 231Cd:CCC, 231D:CC, 232Bd:CCC, 232Br:CCC, 232Cg:CCC

Federal Lands: DOD (Arnold, Fort Benning?); DOE (Savannah River Site); NPS (Big South Fork, Chickamauga-Chattanooga?, Cowpens, Fort Donelson, Fredericksburg-Spotsylvania, Kings Mountain, Little River Canyon, Mammoth Cave, Natchez Trace, Shiloh); USFS (Bankhead?, Bienville?, Daniel Boone, De Soto?, Delta?, Francis Marion?, Holly Springs?, Homochitto?, Oconee?, Sumter (Piedmont)?, Talladega (Oakmulgee)?, Talladega?, Tombigbee?, Tuskegee?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.90.

Local Description Authors: A. Schotz

Global Description Authors: mod. R. White

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

I.B.2.N.e. Seasonally flooded cold-deciduous forest

A.321–*Liquidambar styraciflua - (Acer rubrum)* Seasonally Flooded Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance encompasses forests dominated by *Liquidambar styraciflua* (sweetgum) with seasonally flooded hydrology. Known examples occur in seasonally flooded depressions and not on floodplains. Some stands may be dominated or codominated by *Acer rubrum* (red maple). Other woody species that may be present include *Planera aquatica* (planertree), *Salix nigra* (black willow), *Quercus palustris* (pin oak), *Quercus lyrata* (overcup oak), *Fraxinus pennsylvanica* (green ash), *Quercus phellos* (willow oak), and *Cornus foemina* (stiff dogwood). Shrubs that may be present include *Ilex opaca* (American holly), *Magnolia virginiana* (sweetbay), *Cephalanthus occidentalis* (common buttonbush), *Clethra alnifolia* (coastal sweetpepperbush), *Leucothoe racemosa* (swamp doghobble), and *Vaccinium corymbosum* (highbush blueberry). *Sphagnum* (sphagnum) spp. are common in the herbaceous layer.

Classification Comments: There is a *Liquidambar styraciflua*-dominated type in ponded areas and shallow sloughs in Pond Creek Bottoms in southwestern Arkansas, Sevier and Little River counties (J. Campbell pers. comm., D. Zollner pers. comm. cited in Weakley et al. 1996). Other woody species include *Salix nigra, Planera aquatica, Quercus lyrata, Cephalanthus occidentalis, Cornus foemina, Styrax americanus, Brunnichia ovata*, and *Cardiospermum halicacabum*. Herbs include *Carex joorii, Cyperus erythrorhizos, Hydrocotyle verticillata, Triadenum walteri, Limnobium spongia, Lycopus rubellus, Mikania scandens, Polygonum hydropiperoides, Proserpinaca palustris, Rhynchospora corniculata*, and *Saururus cernuus*. See *Liquidambar styraciflua - (Acer rubrum)* Seasonally Flooded Forest [Provisional] (CEGL007387).

Similar Alliances:

Liquidambar styraciflua - (Liriodendron tulipifera, Acer rubrum) Temporarily Flooded Forest Alliance (A.287)
Liquidambar styraciflua Saturated Forest Alliance (A.350)
Quercus alba - (Nyssa sylvatica) Seasonally Flooded Forest Alliance (A.1996)

Similar Alliance Comments:

Related Concepts:

Coastal Plain Forest (Smith 1991) ?
Red maple - magnolia Coastal Plain palustrine forest (Fike 1999) ?

ALLIANCE DESCRIPTION

Environment: Known examples of this alliance occur in seasonally flooded depressions and not on floodplains.

Vegetation: Stands of these forests are dominated by *Liquidambar styraciflua* (sweetgum) with seasonally flooded hydrology. Some stands may be dominated or co-dominated by *Acer rubrum* (red maple). Other woody species that may be present include *Planera aquatica* (planertree), *Salix nigra* (black willow), *Quercus palustris* (pin oak), *Quercus lyrata* (overcup oak), *Fraxinus pennsylvanica* (green ash), *Quercus phellos* (willow oak), and *Cornus foemina* (stiff dogwood). Shrubs that may be present include *Ilex opaca* (American holly), *Magnolia virginiana* (sweetbay), *Cephalanthus occidentalis* (common buttonbush), *Clethra alnifolia* (coastal sweetpepperbush), *Leucothoe racemosa* (swamp doghobble), and *Vaccinium corymbosum* (highbush blueberry). *Sphagnum* (sphagnum) spp. are common in the herbaceous layer.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the southeastern United States from New York to Florida, west to Tennessee and possibly Louisiana, and elsewhere.

Nations: US

Subnations: AL, AR, DC, DE, FL, GA, LA?, MD, NC, NJ, NY, PA, SC, TN, VA

TNC Ecoregions: 32:P, 40:C, 49:C, 50:C, 51:C, 52:C, 53:P, 56:C, 57:C, 58:C, 59:C, 61:C, 62:C

USFS Ecoregions: 221Ae:CCC, 221Dc:CCC, 221Eb:C??, 221F:C?, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ak:CCC, 231An:CCC, 231Cc:CCC, 231Cd:CCC, 231E:CC, 231Ga:CC?, 231Gb:CC?, 231Gc:CC?, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Bj:CCC, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, 232Cb:CCC, 232Ce:CCC, 232Ch:CCC, 232Ci:CCC, 232Cj:CCC, 232F:CC, 234Ac:PPP, 234An:PPP, 255A:PP, M221B:C?, M221C:C?, M221Dd:CCC

Federal Lands: DOD (Fort Belvoir, Fort Gordon, Yorktown); NPS (Colonial, Fredericksburg-Spotsylvania, Great Smoky Mountains, Little River Canyon, National Capital-East, Thomas Stone, Timucuan); USFS (Bankhead, Chattahoochee, Uwharrie); USFWS (Back Bay?, Chesapeake Marshlands, Prime Hook)

(CEGL007388) Sweetgum - Red Maple / Sedge species - Peatmoss species Forest
***Liquidambar styraciflua - Acer rubrum / Carex* spp. - *Sphagnum* spp. Forest**
Upland Sweetgum - Red Maple Pond

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	Seasonally flooded cold-deciduous forest (I.B.2.N.e.)
Alliance	*Liquidambar styraciflua - (Acer rubrum)* Seasonally Flooded Forest Alliance (A.321)
Alliance (English name)	Sweetgum - (Red Maple) Seasonally Flooded Forest Alliance
Association	*Liquidambar styraciflua - Acer rubrum / Carex* spp. - *Sphagnum* spp. Forest
Association (English name)	Sweetgum - Red Maple / Sedge species - Peatmoss species Forest
Association (Common name)	Upland Sweetgum - Red Maple Pond
Ecological System(s):	Central Interior Highlands and Appalachian Sinkhole and Depression Pond (CES202.018) Piedmont Upland Depression Swamp (CES202.336)

ELEMENT CONCEPT

Global Summary: This association is designed to accommodate a variety of isolated, poorly understood seasonally flooded forests of upland depressions in the Southern Blue Ridge and the adjacent and submontane Piedmont. This includes an example in Cades Cove in the Great Smokies National Park, an example in the Piedmont portion of the Chattahoochee National Forest (Georgia), the Bankhead National Forest (Alabama). Stands assigned to this concept are dominated by some combination of *Liquidambar styraciflua* (sweetgum) and/or *Acer rubrum* (red maple), possibly with *Nyssa sylvatica* (blackgum) and/or *Liriodendron tulipifera* (tuliptree). Some shrubs that may be found include *Cornus amomum* (silky dogwood), *Cornus foemina* (stiff dogwood), and *Alnus serrulata* (hazel alder). Some woody vines which are possible components include *Berchemia scandens* (Alabama supplejack), *Decumaria barbara* (woodvamp), and *Smilax laurifolia* (laurel greenbrier). Herbs (which may be abundant to sparse) include *Carex intumescens* (greater bladder sedge), *Carex* (sedge) spp., *Chasmanthium sessiliflorum* (longleaf woodoats), *Dichanthelium dichotomum var. dichotomum* (cypress panicgrass), *Dichanthelium* (rosette grass) spp., *Leersia* (cutgrass) spp., *Rhynchospora capitellata* (brownish beaksedge), *Mitchella repens* (partridgeberry), and *Arisaema triphyllum* (Jack in the pulpit). Some sites may have ground layers dominated by vascular plants (especially graminoids), others dominated by *Sphagnum* (sphagnum) spp. One of the *Sphagnum* (sphagnum) species associated with these forests may be a disjunct Coastal Plain species, *Sphagnum cuspidatum* (toothed sphagnum). The variable composition of stands assigned here and the lack of understanding of the dynamics of this type (successional trends, disturbance, hydrology) mean that the type is somewhat poorly defined. More information is needed.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine
Little River Canyon National Preserve Environment: Community occurs in shallow, seasonally flooded depressions that occupy the summit of Lookout Mountain.
Global Environment: Stands assigned to this association occur in a variety of upland depressions in the Southern Blue Ridge and Piedmont.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association occupies small depressions that are characterized by an open to closed canopy of *Liquidambar styraciflua* (sweetgum), *Nyssa sylvatica* (blackgum), and *Acer rubrum* (red maple). While occurrences at Little River Canyon National Preserve are dominated by *Liquidambar styraciflua* (sweetgum), examples elsewhere in the region are occasionally represented by a prominence of *Nyssa sylvatica* (blackgum) and/or *Acer rubrum* (red maple). The shrub, vine, and herb layers are sparse and are usually best developed on tree trunks and stumps and along peripheral areas adjacent to the shoreline. Typical species of these strata include *Vaccinium corymbosum* (highbush blueberry), *Smilax walteri* (coral greenbrier), *Osmunda regalis var. spectabilis* (royal fern), *Chasmanthium laxum* (slender woodoats), *Dichanthelium dichotomum* (cypress panicgrass), and *Sphagnum* (sphagnum) sp.

Global Vegetation: Stands assigned to this concept are dominated by some combination of *Liquidambar styraciflua* (sweetgum) and/or *Acer rubrum* (red maple), possibly with *Nyssa sylvatica* (blackgum) and/or *Liriodendron tulipifera* (tuliptree). Some shrubs that may be found include *Cornus amomum* (silky dogwood), *Cornus foemina* (stiff dogwood), and *Alnus serrulata* (hazel alder). Some woody vines which are possible components include *Berchemia scandens* (Alabama supplejack), *Decumaria barbara* (woodvamp), and *Smilax laurifolia* (laurel greenbrier). Herbs (which may be abundant to sparse) include *Carex intumescens* (greater bladder sedge), *Carex* (sedge) spp., *Chasmanthium sessiliflorum* (longleaf woodoats), *Dichanthelium dichotomum var. dichotomum* (cypress panicgrass), *Dichanthelium* (rosette grass) spp., *Leersia* (cutgrass) spp., *Rhynchospora capitellata* (brownish beaksedge), *Mitchella repens* (partridgeberry), and *Arisaema triphyllum* (Jack in the pulpit). Some sites may have ground layers dominated by vascular plants (especially graminoids), others dominated by *Sphagnum* (sphagnum) spp. One of the *Sphagnum* (sphagnum) species associated with these forests may be a disjunct Coastal Plain species, *Sphagnum cuspidatum* (toothed sphagnum).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3Q (23-Feb-2007). There is an incomplete understanding of the ecological limits and acceptable variability of this association concept. It was originally based on only one site, but additional stands from several states have been assigned here. The variable composition of stands assigned here and the lack of understanding of the dynamics of this type (successional trends, disturbance, hydrology) mean that the type is somewhat poorly defined. More information is needed.

CLASSIFICATION

Status: Standard
Classification Confidence: 3 - Weak
Little River Canyon National Preserve Comments:
Global Comments: This association concept was originally based on one site in Cades Cove (Gum Swamp) at 535 m (1750 feet) elevation. The area is heavily browsed by deer. A similar site upslope has *Acer rubrum (var. trilobum*?) occurring with *Liquidambar styraciflua*. One of the *Sphagnum* species associated with these forests may

be a disjunct Coastal Plain species, *Sphagnum cuspidatum (= var. floridanum*?) (B. Dellinger pers. comm.). More information is needed about the naturalness of these examples. The cited vegetation at Uwharrie National Forest is not actually an upland depression swamp and is thought to be successional vegetation (M. Schafale pers. comm. 2007). The status of a purported example at Duke Forest (Durham or Orange counties, North Carolina) is not known. The naturalness of vegetation at these Piedmont locations is unclear (M. Schafale pers. comm. 2001); this may represent a degraded form of *Quercus phellos / Carex (albolutescens, intumescens, joorii) / Climacium americanum* Forest (CEGL007403). This association (with an expanded and generalized concept) is being utilized for a sample from the Chattahoochee National Forest (Georgia Piedmont). Data are also available from the Bankhead National Forest (Work Center Gum Pond).

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Two occurrences are known from the preserve, one on either side of Little River, north of State Route 35.

Global Range: The full range of this association is unknown, but it is thought to occur in the Piedmont, Southern Blue Ridge, and Cumberland Plateau of Alabama, Georgia, North Carolina, and Tennessee.

Nations: US

States/Provinces: AL, GA, NC, TN

TNC Ecoregions:

USFS Ecoregions: 231Ad:CCC, 231Af:CCC, 231Cc:CCC, 231Cd:CCC, M221Dd:CCC

Federal Lands: NPS (Great Smoky Mountains, Little River Canyon); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge))

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.34.

Local Description Authors: A. Schotz

Global Description Authors: M. Pyne

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

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

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

ALLIANCE CONCEPT

Summary: This alliance covers deciduous forested acidic seeps, saturated swamp forests, and "basin swamps" of the eastern and southeastern United States. These wetland forests occur where surface water is seldom present, but the substrate is saturated to the surface for extended periods during the growing season. They include forested acidic seeps on hillsides or streamheads, on edges of floodplains, and other poorly drained depressions. Individual occurrences of these forests tend to be small in extent and can provide habitat for rare plant species. Forests in this alliance have variable canopy composition, but *Acer rubrum* (red maple) and *Nyssa sylvatica* (blackgum) are common components. Canopy composition differs from the surrounding upland and varies with geography. Typical canopy species across the range of this alliance include *Acer rubrum var. trilobum* (red maple), *Nyssa sylvatica* (blackgum), and *Liquidambar styraciflua* (sweetgum). Understory and shrub species include *Alnus serrulata* (hazel alder), *Ilex opaca var. opaca* (American holly), *Photinia pyrifolia* (red chokeberry), and *Ilex verticillata* (common

winterberry). Characteristic herbaceous species are *Osmunda cinnamomea* (cinnamon fern) and *Osmunda regalis* (royal fern). *Sphagnum* (sphagnum) spp. are typical.
Classification Comments: This alliance may only cover a portion of the variation in wooded seeps in Arkansas, where a calcareous shale and a sandstone seep type need to be defined (D. Zollner pers. comm.).
Similar Alliances:
Acer rubrum - Fraxinus pennsylvanica Saturated Forest Alliance (A.3035)
Acer rubrum Saturated Woodland Alliance (A.657)
Magnolia virginiana - Nyssa biflora - (Quercus laurifolia) Saturated Forest Alliance (A.378)
Nyssa biflora - Acer rubrum - (Liriodendron tulipifera) Saturated Forest Alliance (A.351)--includes similar forests, but with *Nyssa biflora*.
Pinus rigida - Acer rubrum Saturated Forest Alliance (A.3005)
Quercus laurifolia - Nyssa biflora Saturated Forest Alliance (A.352)
Similar Alliance Comments:
Related Concepts:
Acidic Broadleaf Swamp (Smith 1991) ?
Appalachian acid seep (Evans 1991) I
Black Gum Swamp (Swain and Kearsley 2001) ?
Boggy Streamside Seep (Schafale pers. comm.) ?
Circumneutral Broadleaf Swamp (Smith 1991) I
Coastal Plain / Piedmont Acidic Seepage Swamp (Schafale pers. comm.) ?
Cretaceous Hills forested acid seep (Evans 1991) ?
IIA9a. Forested Mountain Seep (Allard 1990) I
Low Elevation Seep (Schafale and Weakley 1990) ?
Red Maple Swamp (Swain and Kearsley 2001) ?
Red maple - black gum palustrine forest (Fike 1999) ?
Wooded Seep (Foti 1994b) I

ALLIANCE DESCRIPTION

Environment: These wetland forests occur where surface water is seldom present, but the substrate is saturated to the surface for extended periods during the growing season, and include forested acidic seeps on hillsides or streamheads, on edges of floodplains, and other poorly drained depressions. Individual occurrences of these forests tend to be small in extent, and can provide habitat for rare plant species.
Vegetation: Forests in this alliance have variable canopy composition, but *Acer rubrum* (red maple) and *Nyssa sylvatica* (blackgum) are common components. Canopy composition differs from the surrounding upland and varies with geography. Typical canopy species across the range of this alliance include *Acer rubrum var. trilobum* (red maple), *Nyssa sylvatica* (blackgum), and *Liquidambar styraciflua* (sweetgum). Understory and shrub species include *Alnus serrulata* (hazel alder), *Ilex opaca var. opaca* (American holly), *Photinia pyrifolia* (red chokeberry), and *Ilex verticillata* (common winterberry). Characteristic herbaceous species are *Osmunda cinnamomea* (cinnamon fern) and *Osmunda regalis* (royal fern). *Sphagnum* (sphagnum) spp. are typical.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is known from the Cumberland Plateau of Alabama, Kentucky and Tennessee; the Allegheny Plateau of Kentucky; the Upper East Gulf Coastal Plain of Kentucky and Tennessee; the Piedmont of North Carolina, South Carolina, and Virginia; the Arkansas River Valley; and the Coastal Plain of North Carolina, New Jersey, Pennsylvania, Delaware, Maryland, and Virginia. It is also found in Georgia, Oklahoma, Connecticut, Massachusetts, Maine, New Hampshire, New York, Rhode Island, Vermont, West Virginia, and possibly Illinois and Louisiana.
Nations: US

Subnations: AL, AR, CT, DC, DE, GA, IL?, KY, LA?, MA, MD, ME, NC, NH, NJ, NY, OK, PA, RI, SC, TN, VA, VT, WV
TNC Ecoregions: 32:P, 38:P, 39:C, 40:C, 41:C, 43:C, 44:C, 49:C, 50:C, 51:C, 52:C, 53:P, 56:P, 57:C, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C, 64:C
USFS Ecoregions: 212Aa:CCP, 212Ab:CCP, 212Ba:CCP, 212Bb:CCP, 212Ca:CCP, 212Cb:CCP, 212Da:CCP, 212Db:CCP, 212Dc:CCP, 212Ec:CPP, 212Ed:CP?, 212Fa:CCC, 212Fb:CCC, 212Fc:CCC, 212Fd:CCC, 212Ga:CCC, 212Gb:CCC, 221Aa:CCC, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCP, 221Al:CCC, 221Am:CCC, 221Ba:CCP, 221Bb:CCC, 221Bc:CCP, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 221Ea:CCP, 221Eb:CCP, 221Fa:CPP, 221Fb:CPP, 221Hc:CCC, 221He:CCC, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Ca:CC?, 222Cb:CCC, 222Ce:CCC, 222Cg:CCC, 222Dc:CCP, 222Dg:CCP, 222Eg:CC?, 222Eo:CCC, 222G:CC, 222Ia:CPP, 231Aa:CCC, 231Ad:CCC, 231Ae:CCC, 231Af:CCC, 231Ak:CCC, 231Al:CCC, 231An:CCC, 231Ao:CCP, 231Bc:CCC, 231Be:CCC, 231Ca:CCC, 231Cc:CCC, 231Cd:CCC, 231Db:CCC, 231Dc:CCC, 231De:CCC, 231Ec:CCC, 231F:CC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Aa:CCP, 232Ab:CCC, 232Ac:CCP, 232Ad:CCC, 232Ae:CCC, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bz:CCC, 232Ch:CP?, M212Aa:CC?, M212Ab:CC?, M212Ac:CCP, M212Ad:CCP, M212Bb:CCC, M212Bc:CCP, M212Bd:CCC, M212Cb:CCC, M212Cc:CCP, M212Eb:CCP, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCP, M221Bc:CCC, M221Bd:CCP, M221Be:CCC, M221Bf:CCP, M221Ca:CC?, M221Cb:CCC, M221Cc:CC?, M221Ce:CC?, M221Da:CCC, M221Db:CC?, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: BIA (Eastern Band Cherokee); DOD (Fort A.P. Hill, Fort Belvoir, Fort Jackson, Pine Bluff Arsenal); NPS (Assateague Island, Big South Fork, Blue Ridge Parkway, Boston Harbor Islands, Cape Cod, Catoctin Mountain, Delaware Water Gap, Fire Island, Fredericksburg-Spotsylvania, Gateway, George Washington Birthplace, George Washington Parkway?, Kings Mountain, Little River Canyon, Mammoth Cave, Minute Man, Natchez Trace, National Capital-East, New River Gorge, Petersburg, Prince William, Richmond, Shenandoah, Shiloh, Thomas Stone, Weir Farm); USFS (Allegheny, Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Green Mountain, Monongahela, Ouachita, Ozark, Talladega?, Uwharrie, White Mountain); USFWS (Assabet River, Felsenthal?, Great Meadows, Great Swamp, Mountain Longleaf, Overflow?, Oxbow, Parker River, Pond Creek?)

(CEGL007443) Carolina Red Maple - Blackgum / Cinnamon Fern - Slender Spikegrass - Greater Bladder Sedge / Yellow Peatmoss Forest
***Acer rubrum* var. *trilobum* - *Nyssa sylvatica* / *Osmunda cinnamomea* - *Chasmanthium laxum* - *Carex intumescens* / *Sphagnum lescurii* Forest**
Cumberland Forested Acidic Seep

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* - *Nyssa sylvatica* / *Osmunda cinnamomea* - *Chasmanthium laxum* - *Carex intumescens* / *Sphagnum lescurii* Forest
Association (English name)	Carolina Red Maple - Blackgum / Cinnamon Fern - Slender Spikegrass - Greater Bladder Sedge / Yellow Peatmoss Forest

Association (Common name) Cumberland Forested Acidic Seep
Ecological System(s): Cumberland Seepage Forest (CES202.361)
Southern and Central Appalachian Bog and Fen (CES202.300)
South-Central Interior Small Stream and Riparian (CES202.706)

ELEMENT CONCEPT

Global Summary: These forested acidic seeps occur in the Cumberland Plateau, the Ridge and Valley, areas of the western portions of the Southern Blue Ridge at lower elevations, as well as in the Appalachian Plateaus of Kentucky (Cliff section), and western Kentucky at the edge of the Shawnee Hills. These forests are found primarily in streamhead swales on broad ridges on sandy, saturated soils derived from shales and sandstones. This community develops where a perched water table is present, as opposed to seepage from the base of a slope [for vegetation related to this latter condition, see *Acer rubrum var. trilobum - Nyssa sylvatica / Rhododendron canescens - Viburnum nudum var. nudum / Woodwardia areolata* Forest (CEGL004425)]. Canopy coverage can be moderately dense to quite open. Canopy composition is highly variable, but *Acer rubrum var. trilobum* (red maple), *Nyssa sylvatica* (blackgum), *Liriodendron tulipifera* (tuliptree), and *Liquidambar styraciflua* (sweetgum) are common. Subcanopy trees can include *Ilex opaca var. opaca* (American holly), *Carpinus caroliniana* (American hornbeam), and (within range) *Magnolia macrophylla* (bigleaf magnolia). Tall shrubs are scattered and may be locally dominant. Typical shrubs include *Ilex verticillata* (common winterberry), *Alnus serrulata* (hazel alder), *Rhododendron maximum* (great laurel), *Photinia melanocarpa* (black chokeberry), *Vaccinium simulatum* (upland highbush blueberry), *Viburnum nudum var. nudum* (possumhaw), and *Cornus foemina* (stiff dogwood). In examples from the Southern Blue Ridge, *Viburnum nudum var. cassinoides* (withe-rod) will replace *Viburnum nudum var. nudum* (possumhaw) in this type. Woody vines can be common and include *Toxicodendron radicans* (eastern poison ivy) and (especially towards the southern part of the association's distribution), *Decumaria barbara* (woodvamp) and *Bignonia capreolata* (crossvine). Typical herbaceous species include *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis var. spectabilis* (royal fern), *Chasmanthium laxum* (slender woodoats), *Thelypteris noveboracensis* (New York fern), *Woodwardia areolata* (netted chainfern), *Oxypolis rigidior* (stiff cowbane), *Carex intumescens* (greater bladder sedge), *Carex debilis* (white edge sedge), *Carex crinita* (fringed sedge), *Medeola virginiana* (Indian cucumber), *Lobelia cardinalis* (cardinalflower), *Juncus effusus var. pylaei* (common rush), *Scirpus polyphyllus* (leafy bulrush), *Rubus hispidus* (bristly dewberry), *Solidago patula var. patula* (roundleaf goldenrod), *Athyrium filix-femina ssp. asplenioides* (asplenium ladyfern), and *Viola X primulifolia* (primroseleaf violet). *Platanthera integrilabia* (monkeyface) and *Platanthera clavellata* (small green wood orchid) are also known from these forested seeps but are more typical in more open woodland seeps [see *Acer rubrum* (red maple) Saturated Woodland Alliance (A.657)]. Patches of *Sphagnum* (sphagnum) spp. are common and *Sphagnum lescurii* (Lescur's sphagnum) is typical. In the Daniel Boone National Forest (Kentucky), some stands can contain *Tsuga canadensis* (eastern hemlock) and be transitional to *Tsuga canadensis - Acer rubrum - (Liriodendron tulipifera*, *Nyssa sylvatica) / Rhododendron maximum / Sphagnum* spp. Forest (CEGL007565).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine
Little River Canyon National Preserve Environment: This closed-canopy hardwood forest occupies seepage areas at or near the upper end of drainage courses that originate on the summit of Lookout Mountain. The soils are partially *Sphagnum*-derived organic soils that remain permanently saturated.
Global Environment: These forests are found primarily in streamhead swales on broad ridges on sandy, saturated soils derived from shales and sandstones. This community develops where a perched water table is present, as opposed to seepage from the base of a slope.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Canopy cover is closed and the shrub layer is generally well-developed. Herb cover varies but may be as high as 85-90% The bryoid layer is usually patchy but is well-represented, with *Sphagnum* (sphagnum) spp. assuming the greatest dominance. *Acer rubrum var. trilobum* (red

maple) and *Nyssa sylvatica* (blackgum) are the dominant trees; canopy associates include *Pinus taeda* (loblolly pine), *Quercus alba* (white oak), and *Liquidambar styraciflua* (sweetgum). The shrub layer is dominated by *Acer rubrum var. trilobum* (red maple), *Alnus serrulata* (hazel alder), *Liquidambar styraciflua* (sweetgum), *Rhododendron canescens* (mountain azalea), and *Vaccinium corymbosum* (highbush blueberry), with *Ilex verticillata* (common winterberry), *Xanthorhiza simplicissima* (yellowroot), *Viburnum dentatum* (southern arrowwood), and *Cephalanthus occidentalis* (common buttonbush) occurring less frequently. The herbaceous layer consistently includes *Osmunda cinnamomea* (cinnamon fern), *Arundinaria gigantea ssp. gigantea* (giant cane), *Leersia virginica* (whitegrass), *Carex intumescens* (greater bladder sedge), *Rhynchospora inexpansa* (nodding beaksedge), *Mitchella repens* (partridgeberry), *Viola X primulifolia* (primroseleaf violet), and *Eupatorium fistulosum* (trumpetweed).

Global Vegetation: Canopy coverage can be moderately dense to quite open. Canopy composition is highly variable, but *Acer rubrum var. trilobum* (red maple), *Nyssa sylvatica* (blackgum), *Liriodendron tulipifera* (tuliptree), and *Liquidambar styraciflua* (sweetgum) are common. Subcanopy trees can include *Ilex opaca var. opaca* (American holly), *Carpinus caroliniana* (American hornbeam), and (within range) *Magnolia macrophylla* (bigleaf magnolia). Tall shrubs are scattered and may be locally dominant. Typical shrubs include *Ilex verticillata* (common winterberry), *Alnus serrulata* (hazel alder), *Rhododendron maximum* (great laurel), *Photinia melanocarpa* (black chokeberry), *Photinia pyrifolia* (red chokeberry), *Vaccinium simulatum* (upland highbush blueberry), *Viburnum nudum var. nudum* (possumhaw), *Arundinaria gigantea* (giant cane), and *Cornus foemina* (stiff dogwood). In examples from the Southern Blue Ridge, *Viburnum nudum var. cassinoides* (withe-rod) will replace *Viburnum nudum var. nudum* (possumhaw) in this type. Woody vines can be common, and include *Toxicodendron radicans* (eastern poison ivy) and (especially towards the southern part of the association's distribution), *Decumaria barbara* (woodvamp) and *Bignonia capreolata* (crossvine). Typical herbaceous species include *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis var. spectabilis* (royal fern), *Chasmanthium laxum* (slender woodoats), *Thelypteris noveboracensis* (New York fern), *Woodwardia areolata* (netted chainfern), *Woodwardia virginica* (Virginia chainfern), *Oxypolis rigidior* (stiff cowbane), *Carex intumescens* (greater bladder sedge), *Carex debilis* (white edge sedge), *Carex crinita* (fringed sedge), *Medeola virginiana* (Indian cucumber), *Lobelia cardinalis* (cardinalflower), *Oxypolis rigidior* (stiff cowbane), *Juncus effusus var. pylaei* (common rush), *Scirpus polyphyllus* (leafy bulrush), *Rubus hispidus* (bristly dewberry), *Solidago patula var. patula* (roundleaf goldenrod), *Lycopus uniflorus* (northern bugleweed), *Athyrium filix-femina ssp. asplenioides* (asplenium ladyfern), and *Viola X primulifolia* (primroseleaf violet). *Platanthera integrilabia* (monkeyface) and *Platanthera clavellata* (small green wood orchid) are also known from these forested seeps but are more typical in the more open woodland seeps [see *Acer rubrum* (red maple) Saturated Woodland Alliance (A.657)]. Patches of *Sphagnum* (sphagnum) spp. are common and *Sphagnum lescurii* (Lescur's sphagnum) is typical. These forests are found primarily in streamhead swales on broad ridges on sandy, saturated soils derived from shales and sandstones. This community develops where a perched water table is present, as opposed to seepage from the base of a slope [for vegetation related to this latter condition, see *Acer rubrum var. trilobum - Nyssa sylvatica / Rhododendron canescens - Viburnum nudum var. nudum / Woodwardia areolata* Forest (CEGL004425)]. In the Daniel Boone National Forest (Kentucky), some stands can contain *Tsuga canadensis* (eastern hemlock), and be transitional to *Tsuga canadensis - Acer rubrum - (Liriodendron tulipifera*, *Nyssa sylvatica) / Rhododendron maximum / Sphagnum* spp. Forest (CEGL007565).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global: *Cypripedium kentuckiense* (Kentucky lady's slipper), *Hexastylis shuttleworthii* var. *harperi* (largeflower heartleaf), *Platanthera integra* (yellow fringeless orchid), *Platanthera integrilabia* (monkeyface)

CONSERVATION STATUS RANK

Global Rank & Reasons: G3? (1-Dec-1997).

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: Examples are known from the Somerset and Stearns ranger districts of the Daniel Boone National Forest, in the Appalachian Plateaus, Cliff section of Kentucky. Similar seeps are known from western Kentucky, at the edge of the Shawnee Hills; they are included here for now. Related vegetation from the Cretaceous Gravel Hills of the Mississippi Embayment, which occurs at the bases of slopes rather than in streamheads on broad ridges, is accommodated in *Acer rubrum var. trilobum - Nyssa sylvatica / Rhododendron canescens - Viburnum nudum var. nudum / Woodwardia areolata* Forest (CEGL004425). This association is known from Tennessee in the southwestern portion of the southern Blue Ridge. A similar woodland community is *Acer rubrum var. trilobum / Alnus serrulata / Calamagrostis coarctata* Saturated Woodland (CEGL003737). In general, stands of this association (CEGL007443) have greater canopy cover and thereby denser shade, as well as being in a finer-textured, mucky substrate - in contrast to the more open canopy and coarser-textured, sandier substrate of CEGL003737.
Global Similar Associations:
Acer rubrum var. *trilobum - Nyssa sylvatica / Rhododendron canescens - Viburnum nudum* var. *nudum / Woodwardia areolata* Forest (CEGL004425)--is related to seepage at the base of a slope.
Acer rubrum var. *trilobum / Alnus serrulata / Calamagrostis coarctata* Saturated Woodland (CEGL003737)--is more open and on coarser substrates.
Global Related Concepts:
IIA9a. Forested Mountain Seep (Allard 1990) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: In the preserve, confined to the summit of Lookout Mountain, north of State Route 35.
Global Range: This community is known from the Cumberland Plateau of Alabama, Tennessee and Kentucky, the adjacent Ridge and Valley, as well as lower elevation areas of the western portions of the Southern Blue Ridge in Tennessee and Georgia, the Appalachian Plateaus of Kentucky (Cliff section), and at the edge of the Shawnee Hills in western Kentucky.
Nations: US
States/Provinces: AL, GA, KY, TN
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eo:CCC, 222G:CC, 231Ca:CCC, 231Cc:CCC, 231Cd:CCC, 231Db:CCC, 231Dc:CCC, 231De:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Little River Canyon, Mammoth Cave); USFS (Bankhead, Chattahoochee, Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, Talladega (Talladega)?); USFWS (Mountain Longleaf)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.8, LIRI.43, LIRI.49, LIRI.89.
Local Description Authors: A. Schotz
Global Description Authors: J. Campbell and K.D. Patterson
References: Allard 1990, Evans 1991, NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

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

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

ALLIANCE CONCEPT

Summary: This alliance occurs in the southeastern United States from the Inner Coastal Plain and Piedmont, ranging north and west through the Cumberland Plateau, Ridge and Valley, and low-elevation Blue Ridge, and from eastern Texas and Louisiana, through the Ouachita Mountains and Ozarks. Forests in this alliance occur on dry hilltops, upper slopes, and ridges on acidic soils. The alliance also includes associations from some more non-acidic substrates, including hilltops and upper slopes in Louisiana associated with the Cook Mountain Formation and with calcareous prairies on the Fleming Formation in eastern Texas. It includes mesic to dry-mesic forests with mixed evergreen and deciduous canopies where *Pinus echinata* (shortleaf pine) and one or more of the nominal *Quercus* (oak) spp. occur in varying ratios. In some associations *Pinus taeda* (loblolly pine) may be a dominant evergreen canopy component. *Quercus rubra* (northern red oak) codominates in associations in the Ozarks and Ouachita Mountains. Other common species vary greatly with geography, but can include *Carya alba* (mockernut hickory), *Carya texana* (black hickory), *Sassafras albidum* (sassafras), *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), *Nyssa sylvatica* (blackgum), *Cornus florida* (flowering dogwood), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Chimaphila maculata* (striped prince's pine), *Tephrosia virginiana* (Virginia tephrosia), *Coreopsis major* (greater tickseed), and others.
Classification Comments: This alliance has an overall more mesophytic species composition than shortleaf pine - oak forests found in *Pinus echinata - Quercus (coccinea, prinus)* Forest Alliance (A.395). This alliance (A.394) is recognized as distinct in both Arkansas and the Midwest. It contains oaks such as *Quercus alba, Quercus falcata, Quercus stellata, Quercus velutina, Quercus rubra*, plus *Carya texana* and *Carya alba*. In Arkansas, there are many forests dominated by *Pinus echinata* and *Quercus rubra*, as described in *Pinus echinata - Quercus (alba, rubra) / Vaccinium (arboreum, pallidum) / Schizachyrium scoparium - Chasmanthium sessiliflorum - Solidago ulmifolia* Forest (CEGL007489). Even though *Quercus rubra* is not an alliance nominal, these forests fit within the alliance concept and are placed in this alliance. This alliance was not observed on the Bankhead National Forest. However dry-mesic shortleaf pine vegetation is potentially on the Bankhead and, if found, should be classed in this alliance. The foregoing statements imply that the primary intended distinction between A.394 and A.395 is one of moisture regime rather than biogeography; however, the nominal oaks of A.395 also give it an "Appalachian" (in the broad sense) distribution as opposed to an Ozarkian one (as *Quercus prinus* does not go west of the Mississippi River nor into much of the coastal plains, and *Quercus coccinea* is absent from the Ozarks and Ouachitas of Arkansas, but present in Missouri).

Similar Alliances:
Pinus (echinata, taeda) - Quercus (stellata, marilandica, falcata) Woodland Alliance (A.2011)--of West Gulf Coastal Plain.
Pinus echinata - Quercus (alba, falcata, stellata, velutina) Woodland Alliance (A.679)
Pinus echinata - Quercus (coccinea, prinus) Forest Alliance (A.395)
Pinus taeda - Pinus echinata Forest Alliance (A.129)
Pinus taeda - Quercus (alba, falcata, stellata) Forest Alliance (A.404)--other similar mixed forests with loblolly pine dominant.
Pinus taeda - Quercus nigra Forest Alliance (A.406)--other similar mixed forests.
Pinus taeda Forest Alliance (A.130)

Pinus taeda Woodland Alliance (A.526)
Quercus alba - Quercus (falcata, stellata) Forest Alliance (A.241)
Similar Alliance Comments: This alliance (A.394) has overall more mesophytic species composition than shortleaf pine - oak forests found in A.395 and woodlands in A.2011.
Related Concepts:
Pinus echinata forest alliance (Hoagland 1998a) I
Dry Oak--Hickory Forest (Schafale and Weakley 1990) I
Dry Shortleaf Pine - Oak Forest (Foti 1994b) ?
IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) I
Mixed Oaks-Shortleaf Pine HR (Pyne 1994) ?
Shortleaf Pine - Oak: 76 (Eyre 1980) I
Shortleaf Pine-Oak Series (Diamond 1993) I
Shortleaf Pine-White Oak CUPL (Pyne 1994) ?
T1B3aII3b. *Quercus alba - Pinus echinata - Quercus (velutina, falcata)* (Foti et al. 1994) ?

ALLIANCE DESCRIPTION

Environment: Forests in this alliance occur primarily on dry hilltops, upper slopes, and ridges on acidic soils. The alliance also includes associations from some more non-acidic substrates, including hilltops and upper slopes in Louisiana associated with the Cook Mountain Formation and with calcareous prairies on the Fleming Formation in eastern Texas. In the Ozarks, an association occurs on upper to middle, south-facing slopes, saddles, and flatter ridgelines over soils derived from a variety of sandstone, mixed sandstone-shale, or chert substrates.
Vegetation: This alliance includes dry-mesic forests with mixed evergreen and deciduous canopies where *Pinus echinata* (shortleaf pine) and one or more of *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), and *Quercus velutina* (black oak) occur in varying ratios. In some associations *Pinus taeda* (loblolly pine) may be a dominant evergreen canopy component. Associated species include *Carya texana* (black hickory), *Sassafras albidum* (sassafras), *Oxydendrum arboreum* (sourwood), *Acer rubrum* (red maple), *Nyssa sylvatica* (blackgum), *Cornus florida* (flowering dogwood), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Chimaphila maculata* (striped prince's pine), *Tephrosia virginiana* (Virginia tephrosia), *Coreopsis major* (greater tickseed), and others.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the southeastern United States from the Inner Coastal Plain and Piedmont, ranging north and west through the Cumberland Plateau, Ridge and Valley, and low-elevation Blue Ridge, and from eastern Texas and Louisiana through the Ouachita Mountains and Ozarks. It extends roughly from Illinois east to possibly Virginia, south to possibly Florida, and west to Texas.
Nations: US
Subnations: AL, AR, FL?, GA, IL, KY, LA, MO, MS, NC, OH?, OK, SC, TN, TX, VA?, WV?
TNC Ecoregions: 32:C, 38:C, 39:C, 40:C, 41:C, 43:C, 44:C, 49:P, 50:C, 51:C, 52:C, 53:C, 56:C, 57:P
USFS Ecoregions: 221Ea:CP?, 221Eb:CP?, 221Ec:CPP, 221Hc:CCC, 221He:CCC, 221J:CP, 222Aa:CCC, 222Ab:CCC, 222Ad:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Al:CCC, 222An:CCC, 222Aq:CCC, 222D:CP, 222Eg:CCC, 222F:C?, 231Aa:CCP, 231Ab:CCC, 231Ac:CCC, 231Ad:CCP, 231Ae:CCC, 231Af:CCC, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Ba:CCC, 231Bb:CCC, 231Bc:CCC, 231Bd:CCC, 231Be:CCC, 231Bf:CCP, 231Bg:CCC, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bk:CCC, 231Bl:CCC, 231Ca:CCP, 231Cb:CCP, 231Cc:CCC, 231Cd:CCP, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCC, 231Dc:CCC, 231Dd:CCC, 231De:CCP, 231Ea:CCC, 231Eb:CC?, 231Ee:CC?, 231Ef:CCC, 231Eg:CC?, 231Eh:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ba:CCC, 232Bj:CCP, 232Fa:CCC, 232Fb:CCC, 232Fc:CCC, 232Fd:CCC, 232Fe:CCC, 234Ab:PPP, M221Cc:CCP, M221Cd:CCP, M221Ce:CCP,

M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: BIA (Eastern Band Cherokee); DOD (Fort Benning); NPS (Big South Fork, Blue Ridge Parkway?, Buffalo River, Carl Sandburg Home, Hot Springs, Kennesaw Mountain, Kings Mountain, Little River Canyon, Natchez Trace, Obed, Ozark, Shiloh); USFS (Angelina, Chattahoochee, Cherokee, Daniel Boone, Davy Crockett, Holly Springs, Kisatchie, Land Between the Lakes, Mark Twain, Oconee?, Ouachita, Ozark, Sabine, Sam Houston, Shawnee, Sumter, Talladega, Tombigbee, Tuskegee?, Uwharrie); USFWS (Noxubee)

(CEGL008427) Shortleaf Pine - White Oak / Hillside Blueberry / Arrowleaf Heartleaf - Striped Pipsissewa Forest
***Pinus echinata - Quercus alba / Vaccinium pallidum / Hexastylis arifolia - Chimaphila maculata* Forest**
Appalachian Shortleaf Pine - Mesic Oak Forest

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 Pipsissewa Forest
Association (Common name)	Appalachian Shortleaf Pine - Mesic Oak Forest
Ecological System(s):	Southern Appalachian Low-Elevation Pine Forest (CES202.332)

ELEMENT CONCEPT

Global Summary: This association includes forests dominated by a mixture of *Pinus echinata* (shortleaf pine) and mesophytic and dry-mesophytic oaks (e.g., *Quercus alba* (white oak), *Quercus rubra* (northern red oak), *Quercus velutina* (black oak)) 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* (shortleaf pine) and *Quercus alba* (white oak), sometimes with high coverage of other *Quercus* (oak) spp. (*Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus rubra* (northern red oak)). Xerophytic *Quercus* (oak) spp. such as *Quercus prinus* (chestnut oak), *Quercus stellata* (post oak), 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* (red maple), *Nyssa sylvatica* (blackgum), *Carya glabra* (pignut hickory), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood). The shrub stratum is sparse to patchy with low shrubs (*Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium arboreum* (farkleberry), *Chimaphila maculata* (striped prince's pine)) and vines (*Vitis rotundifolia* (muscadine)). The herb stratum is patchy to absent. *Hexastylis arifolia* (littlebrownjug) is a typical herb. Stands without fire management may experience invasion by *Acer rubrum* (red maple). *Piptochaetium avenaceum* (blackseed speargrass) may be an important grass in more open stands.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This is a low- to mid-elevation community that occupies a broad range of gradients on Lookout Mountain. Soils are well-drained, moist silty loams containing numerous rock fragments, underlain by sandstone, siltstone, and shale.

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

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association represents a dense-canopied forest containing the nominal species, as well as *Quercus falcata* (southern red oak) and, less commonly, *Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak), and *Quercus rubra* (northern red oak). A similar suite of species also characterizes the subcanopy, which is often associated with additional taxa having a tolerance of shade, including *Acer rubrum* (red maple), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood). While sparse, *Liriodendron tulipifera* (tuliptree) is seldom absent from view, typically favoring areas with greater canopy openings. The shrub component assumes a patchy distribution where *Rhododendron canescens* (mountain azalea), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Sassafras albidum* (sassafras), and smaller individuals of the above-mentioned canopy associates serve as principal species. Woody vines include *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), and *Smilax glauca* (cat greenbrier), all of which frequently function as ground cover. The herb layer is relatively sparse and includes *Polystichum acrostichoides* (Christmas fern), *Asplenium platyneuron* (ebony spleenwort), *Piptochaetium avenaceum* (blackseed speargrass), *Hexastylis arifolia var. ruthii* (Ruth's littlebrownjug), and *Chimaphila maculata* (striped prince's pine).

Global Vegetation: The mixed evergreen - deciduous canopy of stands is dominated by *Pinus echinata* (shortleaf pine) and *Quercus alba* (white oak), sometimes with high coverage by other *Quercus* (oak) spp. (*Quercus velutina* (black oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak), *Quercus rubra* (northern red oak)). Xerophytic *Quercus* (oak) spp. such as *Quercus prinus* (chestnut oak), *Quercus stellata* (post oak), 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* (red maple), *Nyssa sylvatica* (blackgum), *Carya glabra* (pignut hickory), *Cornus florida* (flowering dogwood), and *Oxydendrum arboreum* (sourwood). The shrub stratum is sparse to patchy with low shrubs (*Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), *Vaccinium arboreum* (farkleberry), *Chimaphila maculata* (striped prince's pine)) and vines (*Vitis rotundifolia* (muscadine)). The herb stratum is patchy to absent. *Hexastylis arifolia* (littlebrownjug) is a typical herb. Stands without fire management may experience invasion by *Acer rubrum* (red maple). *Piptochaetium avenaceum* (blackseed speargrass) 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* (scarlet oak), *Pinus echinata* (shortleaf pine); other canopy components include *Quercus velutina* (black oak), *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Liriodendron tulipifera* (tuliptree), *Pinus taeda* (loblolly pine), *Carya glabra* (pignut hickory), and *Liquidambar styraciflua* (sweetgum). The patchy shrub layer includes *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Viburnum acerifolium* (mapleleaf viburnum), and *Acer rubrum* (red maple). The sparse herbaceous layer is characterized by *Piptochaetium avenaceum* (blackseed speargrass), which may be an important grass in more open stands.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Pinus echinata* (shortleaf pine)

Tree canopy	Broad-leaved deciduous tree	*Quercus alba* (white oak), *Quercus coccinea* (scarlet oak), *Quercus falcata* (southern red oak)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global: *Pinus echinata* (shortleaf pine), *Quercus falcata* (southern red oak), *Quercus stellata* (post oak)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (23-Oct-2002). Although this association has a reasonably wide potential natural range, *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 inhibits the reproduction of *Pinus echinata* and causes 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
Little River Canyon National Preserve 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*. Subdivision of this broad type may be warranted as more data become available.
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 (prinus, stellata) Piedmont Forest [Provisional] (CEGL004148)
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 drier, more open, grassy variant (when fire-managed).
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

Little River Canyon National Preserve Range: Rather infrequent, sporadically distributed along Little River Canyon.
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?
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 221J:CP, 222E:PP, 231Ab:CCC, 231Cc:CCC, 231Db:CCC, 231Dc:CCC, M221C:CP, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway?, Carl Sandburg Home, Kennesaw Mountain?, Kings Mountain, Little River Canyon, Obed); USFS (Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, Oconee?, Sumter, Sumter (Mountains), Sumter (Piedmont), Talladega, Talladega (Talladega))

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.67, LIRI.99.
Local Description Authors: A. Schotz
Global Description Authors: K.D. Patterson and A.S. Weakley, mod. R. White
References: NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

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

ALLIANCE CONCEPT

Summary: This alliance includes mixed *Pinus echinata - Quercus* spp. forests of the low mountains in the Blue Ridge/Piedmont transition, extending into the southern Ridge and Valley and Cumberland Plateau of the southeastern United States. There are also examples in the Uwharrie National Forest (North Carolina Piedmont). These forests occur on exposed, rocky ridges and upper, convex slopes, as well as more protected sites. Species composition varies with bedrock geology and exposure. *Pinus echinata* (shortleaf pine) and some combination of the nominal oaks (*Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak)) are dominant. Associated species include *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya pallida* (sand hickory), *Oxydendrum arboreum* (sourwood), and *Cornus florida* (flowering dogwood) in the canopy and subcanopy. *Pinus virginiana* (Virginia pine) may also be a component. *Gaylussacia baccata* (black huckleberry), *Gaylussacia ursina* (bear huckleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), and *Kalmia latifolia* (mountain laurel) are typical shrubs. Herbaceous species that are common to these forests include *Chimaphila maculata* (striped prince's pine), *Iris verna* (dwarf violet iris), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Silphium compositum* (kidneyleaf rosinweed), *Smilax glauca* (cat greenbrier), *Goodyera pubescens* (downy rattlesnake plantain), *Schizachyrium scoparium* (little bluestem), *Dichanthelium dichotomum* (cypress panicgrass), and *Danthonia sericea* (downy danthonia).
Classification Comments: Originally defined from the Chattooga Basin Project, where quantitative analysis showed this alliance concept to apply to a large percentage of the vegetation sampled in this tri-state watershed (S. Simon pers. comm.). This concept was later expanded in range and concept to include shortleaf pine - dry site oak forests of the greater southern Appalachian region (including the southern Ridge and Valley and Cumberland Plateau), and has an overall xerophytic species composition.
Similar Alliances:
Pinus echinata - Quercus (alba, falcata, stellata, velutina) Forest Alliance (A.394)

Similar Alliance Comments:
Related Concepts:
Appalachian pine-oak forest (Evans 1991) ?
Dry Oak--Hickory Forest (Schafale and Weakley 1990) I
IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) I
Mixed Oaks-Shortleaf Pine HR (Pyne 1994) ?
Shortleaf Pine - Oak: 76 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: These forests occur on exposed, rocky ridges and upper, convex slopes, as well as more protected sites. Species composition varies with bedrock geology and exposure.
Vegetation: *Pinus echinata* (shortleaf pine) and some combination of the nominal oaks (*Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak)) are dominant. Associated species include *Quercus falcata* (southern red oak), *Quercus stellata* (post oak), *Quercus marilandica* (blackjack oak), *Carya pallida* (sand hickory), *Oxydendrum arboreum* (sourwood), and *Cornus florida* (flowering dogwood) in the canopy and subcanopy. *Pinus virginiana* (Virginia pine) may also be a component. *Gaylussacia baccata* (black huckleberry), *Gaylussacia ursina* (bear huckleberry), *Vaccinium pallidum* (Blue Ridge blueberry), *Vaccinium stamineum* (deerberry), and *Kalmia latifolia* (mountain laurel) are typical shrubs. Herbaceous species that are common to these forests include *Chimaphila maculata* (striped prince's pine), *Iris verna* (dwarf violet iris), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Silphium compositum* (kidneyleaf rosinweed), *Smilax glauca* (cat greenbrier), *Goodyera pubescens* (downy rattlesnake plantain), *Schizachyrium scoparium* (little bluestem), *Dichanthelium dichotomum* (cypress panicgrass), and *Danthonia sericea* (downy danthonia).
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the low mountains of the Blue Ridge/Piedmont transition, extending into the Piedmont, southern Ridge and Valley and Cumberland Plateau of the southeastern United States. It is known from the states of Alabama, Georgia, Kentucky, North Carolina, South Carolina, and Tennessee.
Nations: US
Subnations: AL, GA, KY, NC, SC, TN?
TNC Ecoregions: 50:C, 51:C, 52:C
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 221J:CP, 222Eo:PPP, 231Aa:CCC, 231Ae:CCP, 231Ag:CCC, 231Cc:CCC, 231Dc:CCC, 231Dd:CCC, 234Ab:???, M221Cd:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway?, Chickamauga-Chattanooga, Great Smoky Mountains, Kings Mountain, Little River Canyon, Natchez Trace); USFS (Bankhead?, Chattahoochee, Cherokee?, Daniel Boone, Nantahala, Sumter, Talladega, Uwharrie)

(CEGL007493) Shortleaf Pine - (Chestnut Oak, Southern Red Oak) / Sourwood / Hillside Blueberry Forest

***Pinus echinata - Quercus (prinus, falcata) / Oxydendrum arboreum / Vaccinium pallidum* Forest**
Southern Blue Ridge Escarpment Shortleaf Pine - Oak Forest

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, Chestnut Oak) Forest Alliance
Association	*Pinus echinata - Quercus (prinus, falcata) / Oxydendrum arboreum / Vaccinium pallidum* Forest
Association (English name)	Shortleaf Pine - (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-Elevation 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* (shortleaf pine) 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* (shortleaf pine) and combinations of dry-site oaks that may include *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak), *Quercus stellata* (post oak), and *Quercus velutina* (black oak). 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* (sourwood), *Ilex opaca var. opaca* (American holly), *Cornus florida* (flowering dogwood), *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), and *Carya pallida* (sand hickory). The shrub stratum varies in composition and density but is typically dominated by *Vaccinium pallidum* (Blue Ridge blueberry). Other shrubs may include *Vaccinium stamineum* (deerberry), *Gaylussacia ursina* (bear huckleberry), *Gaylussacia baccata* (black huckleberry), *Rhododendron calendulaceum* (flame azalea), *Rhododendron minus* (piedmont rhododendron), *Castanea pumila* (chinkapin), and *Kalmia latifolia* (mountain laurel). On some sites *Symplocos tinctoria* (common sweetleaf) can be important. *Vitis rotundifolia* (muscadine) and *Smilax glauca* (cat greenbrier) are common vines. The herb stratum is poorly developed with scattered species such as *Chimaphila maculata* (striped prince's pine), *Iris verna* (dwarf violet iris), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Goodyera pubescens* (downy rattlesnake plantain), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Tipularia discolor* (crippled cranefly), *Schizachyrium scoparium* (little bluestem), *Pityopsis graminifolia var. latifolia* (narrowleaf silkgrass), *Tephrosia virginiana* (Virginia tephrosia), *Silphium compositum* (kidneyleaf rosinweed), *Dichanthelium* (rosette grass) spp., and *Galax urceolata* (beetleweed).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: In Little River Canyon National Preserve, this association occurs from the upper slope to the rim of the canyon, as well as gentle slopes and ridges, generally at an elevation of 320 to 351 m (1050-1150 feet). The soils are characterized as residue from weathered sandstone that has been greatly influenced by siltstone and shale sediments washed down from higher slopes. For the most part, because of steep and rugged topographic features, external drainage is likely to be rapid, decreasing in velocity on gently sloping benches.

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 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.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This mixed pine-hardwood forest is characterized by a prominence of moderately tall, somewhat contorted individuals of *Pinus echinata* (shortleaf pine), *Quercus falcata* (southern red oak), and *Quercus prinus* (chestnut oak) accented, in slightly lesser abundance, by *Quercus stellata* (post oak) and *Carya alba* (mockernut hickory). The shrub and herbaceous layers are relatively sparse, with small stems of the foregoing overstory species in addition to *Quercus marilandica* (blackjack oak), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), and various herbs such as *Pteridium aquilinum* (western brackenfern), *Schizachyrium scoparium* (little bluestem), *Dioscorea villosa* (wild yam), and *Hieracium venosum* (rattlesnakeweed) serving as typical associates. Principal vines include *Vitis rotundifolia* (muscadine), *Toxicodendron radicans* (eastern poison ivy), and *Smilax* (greenbrier) spp., which often sprawl along the ground.
Global Vegetation: Canopies are codominated by *Pinus echinata* (shortleaf pine) and combinations of dry-site oaks that may include *Quercus falcata* (southern red oak), *Quercus coccinea* (scarlet oak), *Quercus prinus* (chestnut oak), *Quercus stellata* (post oak), and *Quercus velutina* (black oak). 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* (sourwood), *Ilex opaca var. opaca* (American holly), *Cornus florida* (flowering dogwood), *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), and *Carya pallida* (sand hickory). The shrub stratum varies in composition and density but is typically dominated by *Vaccinium pallidum* (Blue Ridge blueberry). Other shrubs may include *Vaccinium stamineum* (deerberry), *Gaylussacia ursina* (bear huckleberry), *Gaylussacia baccata* (black huckleberry), *Rhododendron calendulaceum* (flame azalea), *Rhododendron minus* (piedmont rhododendron), *Castanea pumila* (chinkapin), and *Kalmia latifolia* (mountain laurel). On some sites *Symplocos tinctoria* (common sweetleaf) can be important. *Vitis rotundifolia* (muscadine) and *Smilax glauca* (cat greenbrier) are common vines. The herb stratum is poorly developed with scattered species such as *Chimaphila maculata* (striped prince's pine), *Iris verna* (dwarf violet iris), *Pteridium aquilinum var. latiusculum* (western brackenfern), *Goodyera pubescens* (downy rattlesnake plantain), *Hexastylis arifolia* (littlebrownjug), *Coreopsis major* (greater tickseed), *Tipularia discolor* (crippled cranefly), *Schizachyrium scoparium* (little bluestem), *Pityopsis graminifolia var. latifolia* (narrowleaf silkgrass), *Tephrosia virginiana* (Virginia tephrosia), *Silphium compositum* (kidneyleaf rosinweed), *Dichanthelium* (rosette grass) spp., and *Galax urceolata* (beetleweed).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve 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 (prinus, stellata) Piedmont Forest [Provisional] (CEGL004148)
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

Little River Canyon National Preserve Range: Infrequently distributed along the canyon rim in the southern portion (south of State Route 35) of the preserve, and more frequently on gentle slopes and ridges north of State Route 35.
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: AL, GA, KY, NC, SC, TN?
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 231Ae:CCP, 231Ag:CCC, 231Cc:CCC, 231Dc:CCC, M221Cd:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway?, Chickamauga-Chattanooga, Great Smoky Mountains, Kings Mountain, Little River Canyon); USFS (Chattahoochee, Chattahoochee (Piedmont)?, Chattahoochee (Southern Blue Ridge), Cherokee?, Daniel Boone, Nantahala, Sumter, Sumter (Mountains), Sumter (Piedmont)?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.53.
Local Description Authors: A. Schotz
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, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

(CEGL007500) Shortleaf Pine - Post Oak - Chestnut Oak - Pignut Hickory / (Poverty Oatgrass, Eastern Speargrass) Forest

***Pinus echinata - Quercus stellata - Quercus prinus - Carya glabra / (Danthonia spicata, Piptochaetium avenaceum)* Forest**
Appalachian Shortleaf Pine - Xeric Oak Forest

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, Chestnut Oak) Forest Alliance
Association	*Pinus echinata - Quercus stellata - Quercus prinus - Carya glabra / (Danthonia spicata, Piptochaetium avenaceum)* Forest
Association (English name)	Shortleaf Pine - Post Oak - Chestnut Oak - Pignut Hickory / (Poverty Oatgrass, Eastern Speargrass) Forest
Association (Common name)	Appalachian Shortleaf Pine - Xeric Oak Forest
Ecological System(s):	Southern Appalachian Low-Elevation Pine Forest (CES202.332)

ELEMENT CONCEPT

Global Summary: This forest, dominated by *Pinus echinata* (shortleaf pine), *Quercus stellata* (post oak), *Quercus prinus* (chestnut oak), and *Carya glabra* (pignut hickory), is found on broad ridges in the southern end of the Appalachian Mountains in northeastern Alabama and northwestern Georgia. It also extends into the Cumberland Plateau of Kentucky and presumably Tennessee. *Vaccinium pallidum* (Blue Ridge blueberry) is the dominant short shrub; the herbaceous stratum typically contains *Piptochaetium avenaceum* (blackseed speargrass) (to the south), and/or *Danthonia spicata* (poverty oatgrass) (to the north).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:
Little River Canyon National Preserve Environment: This association occupies gentle ridges and sideslopes on the summit of Lookout Mountain, where it is underlain by a fine sandy loam derived of sediments from sandstone.
Global Environment: This forest is found on broad ridges in the southern end of the Appalachian Mountains in northeastern Alabama. It also extends into the Cumberland Plateau of Kentucky and presumably Tennessee.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This association is characterized as a closed-canopy pine-deciduous forest dominated by *Pinus echinata* (shortleaf pine), *Quercus prinus* (chestnut oak), *Quercus stellata* (post oak), and *Quercus alba* (white oak). *Quercus coccinea* (scarlet oak), *Carya glabra* (pignut hickory), *Carya alba* (mockernut hickory), and *Pinus taeda* (loblolly pine) are also present but are generally of secondary

importance. The subcanopy is commonly represented by *Oxydendrum arboreum* (sourwood), *Cornus florida* (flowering dogwood), and *Nyssa sylvatica* (blackgum), as well as several species of the foregoing canopy cover. Although seldom absent from either stratum, *Acer rubrum* (red maple), *Fagus grandifolia* (American beech), and *Sassafras albidum* (sassafras) are occasional and often widely distributed. The shrub component is relatively diverse but generally open, with *Corylus cornuta* (beaked hazelnut), *Rhododendron canescens* (mountain azalea), *Lyonia ligustrina* (maleberry), *Vaccinium arboreum* (farkleberry), *Vaccinium pallidum* (Blue Ridge blueberry), and *Diospyros virginiana* (common persimmon) appearing most typical. Several species of herbs, although sparse, are well-represented, with the more frequently encountered taxa being *Pteridium aquilinum* (western brackenfern), *Coreopsis major* (greater tickseed), *Solidago odora* (anisescented goldenrod), *Tephrosia virginiana* (Virginia tephrosia), *Danthonia spicata* (poverty oatgrass), *Piptochaetium avenaceum* (blackseed speargrass), *Aristolochia serpentaria* (Virginia snakeroot), *Viola X palmata* (early blue violet), *Pityopsis graminifolia var. latifolia* (narrowleaf silkgrass), and *Krigia biflora* (twoflower dwarfdandelion). Characteristic vines include *Vitis rotundifolia* (muscadine), *Smilax rotundifolia* (roundleaf greenbrier), and *Smilax glauca* (cat greenbrier).

Global Vegetation: Stands of this forest association are dominated by *Pinus echinata* (shortleaf pine), *Quercus stellata* (post oak), *Quercus prinus* (chestnut oak), and *Carya glabra* (pignut hickory). The short shrub stratum is dominated by *Vaccinium pallidum* (Blue Ridge blueberry); the herbaceous stratum is typically dominated by perennial grasses. In particular, *Piptochaetium avenaceum* (blackseed speargrass) is characteristic of examples in the southern Daniel Boone National Forest (Kentucky), but not in its northern portions, where *Danthonia spicata* (poverty oatgrass) replaces it. In an example from the Talladega National Forest, Talladega Ranger District, *Pinus echinata* (shortleaf pine) and *Carya glabra* (pignut hickory) dominate the closed canopy, which also contains *Quercus prinus* (chestnut oak), *Quercus velutina* (black oak), and *Quercus stellata* (post oak). The shrub layer is dominated by *Vaccinium pallidum* (Blue Ridge blueberry); other shrubs include *Cornus florida* (flowering dogwood), *Vaccinium arboreum* (farkleberry), and *Vaccinium stamineum* (deerberry). The open herbaceous stratum includes *Piptochaetium avenaceum* (blackseed speargrass), *Coreopsis major* (greater tickseed), *Symphyotrichum concolor* (eastern silver aster), *Symphyotrichum patens* (late purple aster), *Antennaria plantaginifolia* (woman's tobacco), *Helianthus microcephalus* (small woodland sunflower), and *Schizachyrium scoparium* (little bluestem). Some stands may have *Quercus coccinea* (scarlet oak) instead of *Quercus stellata* (post oak). The canopy of an example from the Chattahoochee National Forest, Armuchee Ranger District, is dominated by *Pinus echinata* (shortleaf pine) and *Quercus prinus* (chestnut oak); other canopy components of this stand include *Quercus coccinea* (scarlet oak), *Carya glabra* (pignut hickory), *Pinus virginiana* (Virginia pine), and *Nyssa sylvatica* (blackgum). The shrub layer includes *Vaccinium pallidum* (Blue Ridge blueberry) and *Vaccinium stamineum* (deerberry). The herbaceous layer in this example is very sparse.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3? (15-Aug-1997).

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments:
Global Similar Associations:
Pinus echinata - Quercus (prinus, falcata) / Oxydendrum arboreum / Vaccinium pallidum Forest (CEGL007493)--a less open, shrubby variant.
Pinus echinata - Quercus alba / Vaccinium pallidum / Hexastylis arifolia - Chimaphila maculata Forest (CEGL008427)
Pinus echinata - Quercus prinus - Quercus stellata / Vaccinium pallidum / Pityopsis graminifolia var. *latifolia* Woodland (CEGL004445)--of Virginia, a related woodland.
Pinus palustris - Pinus echinata - (Pinus virginiana) / Quercus marilandica - (Quercus prinus) / Vaccinium pallidum Woodland (CEGL008437)
Global Related Concepts:
IA6a. Dry Shortleaf Pine - Oak - Hickory Forest (Allard 1990) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Distributed throughout the preserve.
Global Range: This association ranges from northeastern Alabama and northwestern Georgia to the Cumberland Plateau of Kentucky and presumably Tennessee.
Nations: US
States/Provinces: AL, GA, KY, TN?
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eo:PPP, 231Cc:CCC, 231Dc:CCC, 231Dd:CCC
Federal Lands: NPS (Little River Canyon, Natchez Trace); USFS (Bankhead?, Chattahoochee, Chattahoochee (Southern Blue Ridge), Daniel Boone, Talladega, Talladega (Talladega))

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.4, LIRI.25, LIRI.26, LIRI.92, LIRI.98.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley, mod. M. Pyne
References: Allard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d.

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

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

ALLIANCE CONCEPT

Summary: This alliance includes forests that occur in floodplains primarily in the Piedmont and Inner Coastal Plain; this vegetation follows major disturbances such as blowdowns, logging, and agriculture. The canopy is typically dominated by *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tuliptree). Other woody species that may be present include *Liquidambar styraciflua* (sweetgum), *Platanus occidentalis* (American sycamore), *Cornus*

florida (flowering dogwood), *Acer rubrum* (red maple), *Quercus alba* (white oak), *Fagus grandifolia* (American beech), *Morus rubra* (red mulberry), *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Ilex opaca* (American holly), *Lindera benzoin* (northern spicebush), and *Asimina parviflora* (smallflower pawpaw). Woody species common in the Piedmont portion of the range include *Aesculus sylvatica* (painted buckeye) and *Acer negundo* (boxelder). Herbaceous and woody vine species that may occur include *Carex crinita* (fringed sedge), *Botrychium virginianum* (rattlesnake fern), *Eupatorium purpureum* (sweetscented joepyeweed), *Polystichum acrostichoides* (Christmas fern), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison ivy), *Asplenium platyneuron* (ebony spleenwort), *Woodwardia areolata* (netted chainfern), *Osmunda cinnamomea* (cinnamon fern), *Ophioglossum vulgatum* (southern adderstongue), *Actaea racemosa* (black bugbane), *Dulichium arundinaceum* (threeway sedge), *Carex albolutescens* (greenwhite sedge), *Hypericum nudiflorum* (early St. Johnswort), *Corydalis flavula* (yellow fumewort), and others. The exotics *Ligustrum sinense* (Chinese privet) and *Lonicera japonica* (Japanese honeysuckle) commonly occur in forests of this alliance.

Classification Comments:

Similar Alliances:

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

Liriodendron tulipifera Forest Alliance (A.236)

Pinus taeda - Liquidambar styraciflua - Nyssa biflora Temporarily Flooded Forest Alliance (A.433)--also a successional forest alliance, with some distributional and floristic overlaps.

Pinus taeda - Quercus (phellos, nigra, laurifolia) Temporarily Flooded Forest Alliance (A.437)

Similar Alliance Comments:

Related Concepts:

Bottomland Hardwoods (Nelson 1986) I

IIA8c. Lowland Pine - Oak Forest (Allard 1990) I

Loblolly Pine - Hardwood: 82 (Eyre 1980) I

Loblolly pine - Swamp gum - Naked withe-rod Community? (Jones et al. 1981b) ?

ALLIANCE DESCRIPTION

Environment: This alliance includes forests that occur in floodplains primarily in the Piedmont and Inner Coastal Plain; this vegetation follows major disturbances such as blowdowns, logging, and agriculture. Its environment includes highly productive floodplains and upper stream terraces (Jones et al. 1981b).

Vegetation: The canopy in stands of this alliance is typically dominated by *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tuliptree). Other woody species that may be present include *Liquidambar styraciflua* (sweetgum), *Platanus occidentalis* (American sycamore), *Cornus florida* (flowering dogwood), *Acer rubrum* (red maple), *Quercus alba* (white oak), *Fagus grandifolia* (American beech), *Morus rubra* (red mulberry), *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Ilex opaca* (American holly), *Lindera benzoin* (northern spicebush), and *Asimina parviflora* (smallflower pawpaw). Woody species common in the Piedmont portion of the range include *Aesculus sylvatica* (painted buckeye) and *Acer negundo* (boxelder). Herbaceous and woody vine species that may occur include *Carex crinita* (fringed sedge), *Botrychium virginianum* (rattlesnake fern), *Eupatorium purpureum* (sweetscented joepyeweed), *Polystichum acrostichoides* (Christmas fern), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison ivy), *Asplenium platyneuron* (ebony spleenwort), *Woodwardia areolata* (netted chainfern), *Osmunda cinnamomea* (cinnamon fern), *Ophioglossum vulgatum* (southern adderstongue), *Actaea racemosa* (black bugbane), *Dulichium arundinaceum* (threeway sedge), *Carex albolutescens* (greenwhite sedge), *Hypericum nudiflorum* (early St. Johnswort), *Corydalis flavula* (yellow fumewort), and others. The exotics *Ligustrum sinense* (Chinese privet) and *Lonicera japonica* (Japanese honeysuckle) commonly occur in forests of this alliance. These floristics were included in a 1995 CCA for the *Pinus taeda - Liriodendron tulipifera / Lindera benzoin / Carex crinita* Successional Forest (1C03B020.01F). It is not clear where these data originated.

Apparently related vegetation from the Savannah River Site cited in Jones et al. (1981b) indicates dominance of some stands by *Pinus taeda* (loblolly pine), *Nyssa biflora* (swamp tupelo), and *Liriodendron tulipifera* (tuliptree) in the canopy, with *Persea palustris* (swamp bay), *Magnolia virginiana* (sweetbay), *Acer rubrum* (red maple), and *Nyssa biflora* (swamp tupelo) in the subcanopy. Other species present include *Vaccinium formosum* (southern blueberry), *Viburnum nudum* (possumhaw), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison ivy), *Mitchella repens* (partridgeberry), *Osmunda cinnamomea* (cinnamon fern), and *Onoclea sensibilis* (sensitive fern). This should be also be compared to vegetation of related alliances (e.g., *Pinus taeda - Liquidambar styraciflua - Nyssa biflora* Temporarily Flooded Forest Alliance (A.433)).
Dynamics: This vegetation follows major disturbances such as blowdowns, logging, and agriculture.

ALLIANCE DISTRIBUTION

Range: This alliance includes forests that occur in floodplains primarily in the Piedmont and Inner Coastal Plain. It has also been observed on previously farmed stream terraces in the Cumberland Plateau of northern Alabama. It is found in Georgia, North Carolina, South Carolina, and Virginia, and Alabama.
Nations: US
Subnations: AL, GA, NC, SC, VA
TNC Ecoregions: 43:P, 50:C, 52:C, 53:P, 56:C, 57:C, 58:P
USFS Ecoregions: 231Aa:CCC, 231Ae:CCC, 231Af:CCC, 231An:CCC, 231Ao:CCP, 231Cc:CCC, 231Cd:CCC, 232Br:CCC
Federal Lands: DOE (Savannah River Site); NPS (Kennesaw Mountain, Kings Mountain, Little River Canyon); USFS (Bankhead, Oconee?, Sumter, Uwharrie)

(CEGL007546) Loblolly Pine - Tuliptree / Northern Spicebush / Fringed Sedge Forest

***Pinus taeda - Liriodendron tulipifera / Lindera benzoin / Carex crinita* Forest**
Loblolly Pine - Tuliptree Successional Bottomland Forest

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 / Lindera 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):	South-Central Interior Small Stream and Riparian (CES202.706) Southern Piedmont Small Floodplain and Riparian Forest (CES202.323)

ELEMENT CONCEPT

Global Summary: This broadly defined, successional wetland forest is dominated by *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tuliptree), but many other canopy species are usually present. *Lindera benzoin* (northern spicebush) is a typical shrub, and *Carex crinita* (fringed sedge) 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

Little River Canyon National Preserve Environment: This association occupies terraced alluvial flats along Little River, where sediments derived of weathered sandstone, siltstone, and shale from Lookout Mountain and adjacent areas are deposited.

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

Little River Canyon National Preserve Vegetation: Examples at Little River Canyon National Preserve are closed-canopy forests dominated by *Pinus taeda* (loblolly pine), *Liriodendron tulipifera* (tuliptree), and *Quercus alba* (white oak). Other canopy components are *Fraxinus americana* (white ash), *Fagus grandifolia* (American beech), *Quercus prinus* (chestnut oak), *Carya ovata* (shagbark hickory), and *Liquidambar styraciflua* (sweetgum). While occurrences are small, vegetation is diverse, containing a suite of early-successional species that will be gradually replaced with more shade-tolerant taxa as stands mature. Characteristic taxa of the shrub, vine, and herb layers include, but are not limited to, *Acer leucoderme* (chalk maple), *Acer rubrum* (red maple), *Nyssa sylvatica* (blackgum), *Lindera benzoin* (northern spicebush), *Rhododendron canescens* (mountain azalea), *Calycanthus floridus* (eastern sweetshrub), *Alnus serrulata* (hazel alder), *Cornus amomum* (silky dogwood), *Vaccinium corymbosum* (highbush blueberry), *Smilax rotundifolia* (roundleaf greenbrier), *Toxicodendron radicans* (eastern poison ivy), *Vitis rotundifolia* (muscadine), *Thelypteris noveboracensis* (New York fern), *Chasmanthium latifolium* (Indian woodoats), *Elymus virginicus* (Virginia wildrye), *Carex glaucescens* (southern waxy sedge), *Iris cristata* (dwarf crested iris), *Viola sororia* (common blue violet), *Lycopus virginicus* (Virginia water horehound), *Lobelia cardinalis* (cardinalflower), *Elephantopus carolinianus* (Carolina elephantsfoot), *Symphyotrichum lateriflorum* (calico aster), *Verbesina occidentalis* (yellow crownbeard), and *Sphagnum* (sphagnum) spp. The exotic *Ligustrum sinense* (Chinese privet) is also present but sparse.

Global Vegetation: This successional vegetation is dominated by *Pinus taeda* (loblolly pine) and *Liriodendron tulipifera* (tuliptree), but many other canopy species are usually present. *Lindera benzoin* (northern spicebush) is a typical shrub, and *Carex crinita* (fringed sedge) 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* (sweetgum), *Platanus occidentalis* (American sycamore), *Cornus florida* (flowering dogwood), *Acer rubrum* (red maple), *Nyssa biflora* (swamp tupelo), *Quercus alba* (white oak), *Fagus grandifolia* (American beech), *Morus rubra* (red mulberry), *Betula nigra* (river birch), *Fraxinus americana* (white ash), *Ilex opaca* (American holly), *Lindera benzoin* (northern spicebush), and *Asimina parviflora* (smallflower pawpaw). Woody species common in the Piedmont portion of the range include *Aesculus sylvatica* (painted buckeye) and *Acer negundo* (boxelder). Herbaceous and woody vine species that may occur include *Carex crinita* (fringed sedge), *Botrychium virginianum* (rattlesnake fern), *Eupatorium purpureum* (sweetscented joepyeweed), *Polystichum acrostichoides* (Christmas fern), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison ivy), *Asplenium platyneuron* (ebony spleenwort), *Woodwardia areolata* (netted chainfern), *Osmunda cinnamomea* (cinnamon fern), *Ophioglossum vulgatum* (southern adderstongue), *Actaea racemosa* (black bugbane), *Dulichium arundinaceum* (threeway sedge), *Carex albolutescens* (greenwhite sedge), *Hypericum nudiflorum* (early St. Johnswort), *Corydalis flavula* (yellow fumewort), and others. The exotics *Ligustrum sinense* (Chinese privet) and *Lonicera japonica* (Japanese honeysuckle) 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* (sweetscented joepyeweed)) 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* (loblolly pine), *Nyssa biflora* (swamp tupelo), and *Liriodendron tulipifera* (tuliptree) in the canopy, with *Persea palustris* (swamp bay), *Magnolia virginiana* (sweetbay), *Acer rubrum* (red maple), and *Nyssa biflora* (swamp tupelo) in the subcanopy. Other species present include *Vaccinium formosum* (southern blueberry), *Viburnum nudum* (possumhaw), *Arundinaria gigantea* (giant cane), *Toxicodendron radicans ssp. radicans* (eastern poison ivy), *Mitchella repens* (partridgeberry), *Osmunda cinnamomea* (cinnamon fern), and *Onoclea sensibilis* (sensitive fern).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tree canopy	Needle-leaved tree	*Pinus taeda* (loblolly pine)
Tree canopy	Broad-leaved deciduous tree	*Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Platanus occidentalis* (American sycamore)
Tree subcanopy	Broad-leaved deciduous tree	*Cornus florida* (flowering dogwood)
Tree subcanopy	Broad-leaved evergreen tree	*Ilex opaca* (American holly)
Shrub/sapling (tall & short)	Vine/Liana	*Lonicera japonica* (Japanese honeysuckle), *Toxicodendron radicans* ssp. *radicans* (eastern poison ivy)
Tall shrub/sapling	Broad-leaved deciduous tree	*Lindera benzoin* (northern spicebush)
Tall shrub/sapling	Broad-leaved deciduous shrub	*Asimina parviflora* (smallflower pawpaw)
Herb (field)	Forb	*Eupatorium purpureum* (sweetscented joepyeweed)
Herb (field)	Graminoid	*Arundinaria gigantea* (giant cane), *Carex crinita* (fringed sedge)
Herb (field)	Fern or fern ally	*Botrychium virginianum* (rattlesnake fern), *Polystichum acrostichoides* (Christmas fern)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Monarda clinopodia* (white bergamot), *Rudbeckia heliopsidis* (sunfacing coneflower)
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
Little River Canyon National Preserve 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

Little River Canyon National Preserve Range: Riverine habitat and lower slopes along Little River throughout the preserve.
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
TNC Ecoregions:
USFS Ecoregions: 231Aa:CCC, 231Ae:CCC, 231Af:CCC, 231An:CCC, 231Ao:CCP, 231Cc:CCC, 231Cd:CCC, 232Br:CCC
Federal Lands: DOE (Savannah River Site); NPS (Kennesaw Mountain, Kings Mountain, Little River Canyon); USFS (Bankhead, Oconee?, Sumter, Sumter (Piedmont), Uwharrie)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.15, LIRI.46, LIRI.60, LIRI.63, LIRI.64, LIRI.82, LIRI.88, LIRI.93.
Local Description Authors: A. Schotz
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, Schotz pers. comm., Southeastern Ecology Working Group n.d., USFS 1988, Weakley et al. 1998

II. Woodland

II.A.4.N.a. Rounded-crowned temperate or subpolar needle-leaved evergreen woodland

A.526–*Pinus taeda* Woodland Alliance

ALLIANCE CONCEPT

Summary: This alliance includes woodlands of the Atlantic and Gulf coastal plains dominated by *Pinus taeda* (loblolly pine). In the Atlantic Coastal Plain, natural examples of this alliance include maritime woodlands of barrier islands that occur on foredunes. Trees in these maritime woodlands often have multiple trunks and spreading branches. Herbaceous cover is usually low. Canopy associates include *Quercus phellos* (willow oak), *Quercus falcata* (southern red oak), and *Quercus virginiana* (live oak). One rare community in this alliance occurs on swamp islands protected from fire in the Atlantic and Gulf coastal plains. Associated species include *Quercus hemisphaerica* (Darlington oak), *Osmanthus americanus var. americanus* (devilwood), *Ilex glabra* (inkberry), *Ilex opaca var. opaca* (American holly), *Persea palustris* (swamp bay), and *Quercus nigra* (water oak). Other associations, including some vegetation of Louisiana, result from thinning of plantations or disturbance by fire of *Pinus taeda* (loblolly pine) forests. One other semi-natural example occurs on military reservations and is, at least in part, the result of fires set by military training. It may occur both within or outside of the natural range of *Pinus palustris* (longleaf pine). In the former case, it is present where *Pinus palustris* (longleaf pine) has failed to regenerate.

Classification Comments: This alliance is not very unified ecologically and needs review.

Similar Alliances:

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

Pinus taeda Forest Alliance (A.130)

Similar Alliance Comments:

Related Concepts:

Loblolly Pine: 81 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: In the Atlantic Coastal Plain, natural examples of this alliance is comprised of maritime woodlands of barrier islands that occur on foredunes. In the Florida Panhandle it occurs associated with rivers and creeks. Other examples, including some vegetation of Louisiana, result from thinning of plantations, or disturbance by fire of *Pinus taeda* forests. One other semi-natural example occurs on military reservations and is at least in part the result of fires set by military training.

Vegetation: The open canopy is dominated by *Pinus taeda* (loblolly pine), while other canopy associates include *Quercus phellos* (willow oak), *Quercus falcata* (southern red oak), and *Quercus virginiana* (live oak). Herb cover is typically sparse. Other associated species include *Quercus hemisphaerica* (Darlington oak), *Osmanthus americanus var. americanus* (devilwood), *Ilex glabra* (inkberry), *Serenoa repens* (saw palmetto), *Ilex opaca var. opaca* (American holly), *Persea palustris* (swamp bay), and *Quercus nigra* (water oak).

Dynamics: Other associations, including some vegetation of Louisiana, result from thinning of plantations, or disturbance by fire of *Pinus taeda* forests. Other examples, including some vegetation of Louisiana, result from thinning of plantations, or disturbance by fire of *Pinus taeda* forests. One other semi-natural example occurs on military reservations and is at least in part the result of fires set by military training.

ALLIANCE DISTRIBUTION

Range: This alliance occurs in the Mid-Atlantic and southeastern coastal plains from Delaware south to Florida and west to Alabama.

Nations: US

Subnations: AL, DE, FL, GA, MD, NC, SC, VA

TNC Ecoregions: 40:P, 41:C, 43:P, 50:C, 52:C, 53:C, 56:C, 57:C, 58:C, 62:C
USFS Ecoregions: 231B:CP, 231Cc:CCC, 231Ef:CP?, 231Eg:CP?, 231Ei:CP?, 232Ac:CCC, 232Ad:CCC, 232Ba:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, 232Bz:CCC, 232Ch:CCC, 232Dc:CCC, 232Fa:CCC, 234Ah:???
Federal Lands: DOD (Fort A.P. Hill, Fort Benning, Fort Pickett); NPS (Assateague Island, Little River Canyon); USFS (Apalachicola, Tuskegee?); USFWS (Back Bay?, Blackwater, Chesapeake Marshlands, St. Marks?)

(CEGL003618) Loblolly Pine - (Shortleaf Pine) / Little Bluestem Woodland
***Pinus taeda - (Pinus echinata) / Schizachyrium scoparium* Woodland**
Loblolly Pine - Shortleaf Pine Managed Woodland

NVC Classification

Physiognomic Class	Woodland (II)
Physiognomic Subclass	Evergreen woodland (II.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen woodland (II.A.4.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.)
Formation	Rounded-crowned temperate or subpolar needle-leaved evergreen woodland (II.A.4.N.a.)
Alliance	*Pinus taeda* Woodland Alliance (A.526)
Alliance (English name)	Loblolly Pine Woodland Alliance
Association	*Pinus taeda - (Pinus echinata) / Schizachyrium scoparium* Woodland
Association (English name)	Loblolly Pine - (Shortleaf Pine) / Little Bluestem Woodland
Association (Common name)	Loblolly Pine - Shortleaf Pine Managed Woodland

Ecological System(s):

ELEMENT CONCEPT

Global Summary: These are woodlands with semi-open to very open canopies composed of *Pinus taeda* (loblolly pine), with or without *Pinus echinata* (shortleaf pine). The structure and composition of this community are maintained by fires set by military training; the relationship of this vegetation to naturally occurring vegetation is not completely clear.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:
Little River Canyon National Preserve Environment: This semi-managed community has been documented from well-drained sites along a river flat.
Global Environment:

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Stands at Little River Canyon are characterized by partially open (40-50% cover) canopies comprised of *Pinus taeda* (loblolly pine), *Pinus virginiana* (Virginia pine), *Pinus echinata* (shortleaf pine), and a lesser abundance of oaks and other hardwoods, most notably *Quercus alba* (white oak), *Quercus falcata* (southern red oak), *Quercus rubra* (northern red oak), *Quercus stellata* (post oak), *Juglans nigra* (black walnut), and *Liquidambar styraciflua* (sweetgum). Shrubs are widely scattered (likely manually cleared by bush-hogging or mowing) and are represented by the following: *Vaccinium arboreum* (farkleberry), *Vaccinium elliottii* (Elliott's blueberry), *Sassafras albidum* (sassafras), *Cornus florida* (flowering dogwood), *Callicarpa americana* (American beautyberry), *Hypericum hypericoides* (St. Andrew's cross), and a minimal incursion of the exotic *Ligustrum sinense* (Chinese privet). Herbs are plentiful and diverse, with the majority of taxa appearing to be comprised of the grass (Poaceae), legume (Fabaceae), and aster (Asteraceae) families. The more characteristic and noteworthy herbaceous species documented are *Sorghastrum nutans* (Indiangrass), *Schizachyrium scoparium* (little

bluestem), *Eragrostis hirsuta* (bigtop lovegrass), *Gymnopogon ambiguus* (bearded skeletongrass), *Piptochaetium avenaceum* (blackseed speargrass), *Dichanthelium laxiflorum* (openflower rosette grass), *Danthonia sericea* (downy danthonia), *Tridens flavus* (purpletop tridens), *Desmodium marilandicum* (smooth small-leaf ticktrefoil), *Galactia volubilis* (downy milkpea), *Tephrosia spicata* (spiked hoarypea), *Chrysopsis mariana* (Maryland goldenaster), *Silphium asteriscus* (starry rosinweed), *Solidago erecta* (showy goldenrod), *Symphyotrichum pilosum* (hairy white oldfield aster), *Euphorbia corollata* (flowering spurge), *Salvia lyrata* (lyreleaf sage), *Silene caroliniana ssp. wherryi* (Wherry's catchfly), and *Phlox amoena* (hairy phlox). Exotic species, most notably *Microstegium vimineum* (Nepalese browntop), *Lolium pratense* (meadow ryegrass), *Lespedeza cuneata* (Chinese lespedeza), and *Lonicera japonica* (Japanese honeysuckle), are common, having colonized several areas within the floodplain.
Global Vegetation: These woodlands have semi-open to very open canopies composed of *Pinus taeda* (loblolly pine), with or without *Pinus echinata* (shortleaf pine).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Helianthus longifolius* (longleaf sunflower), *Silene caroliniana* ssp. *wherryi* (Wherry's catchfly)
Global: *Phaseolus polystachios* var. *sinuatus* (thicket bean), *Quercus arkansana* (Arkansas oak)

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (modified/managed) (30-Jul-2002). This vegetation type is composed of native species and results from the ingrowth of off-site loblolly pine onto longleaf pine sites. Its conservation value is limited, but it may cover large portions of the landscape. Mature examples provide buffer for communities of greater conservation value and/or harbor valuable native ground cover species and species assemblages.

CLASSIFICATION

Status: Standard
Classification Confidence: 3 - Weak
Little River Canyon National Preserve Comments:
Global Comments:
Global Similar Associations:
Pinus taeda / Schizachyrium scoparium Woodland (CEGL003620)--of Virginia Piedmont.
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: River flat within picnic area at Canyon Mouth Park.
Global Range: This woodland results from dominance of *Pinus taeda* on sites formerly occupied by *Pinus palustris*. It is known from the coastal plains of Georgia and probably adjacent Alabama.
Nations: US
States/Provinces: AL, GA
TNC Ecoregions:

USFS Ecoregions: 231B:CP, 231Cc:CCC, 232B:CC
Federal Lands: DOD (Fort Benning); NPS (Little River Canyon); USFS (Tuskegee?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.31, LIRI.59.
Local Description Authors: A. Schotz
Global Description Authors: M. Pyne
References: Schotz pers. comm., Southeastern Ecology Working Group n.d.

III. Shrubland

III.A.2.N.a. Temperate broad-leaved evergreen shrubland

A.738–*Ligustrum sinense* Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance mostly consists of moist upland areas which are dominated by the exotic *Ligustrum sinense* (Chinese privet), with little or no canopy. The density of the shrub layer may be such that there is no development of the herbaceous stratum. *Ligustrum sinense* (Chinese privet) is a serious weedy species in the southeastern United States. It generally occurs as a shrub-layer dominant under tree canopies, especially in floodplains. Such sites are considered degraded occurrences of the equivalent natural forest community.
Classification Comments:
Similar Alliances:
Ligustrum sinense Temporarily Flooded Shrubland Alliance (A.796)--includes wetland privet.
Similar Alliance Comments:
Related Concepts:

ALLIANCE DESCRIPTION

Environment:
Vegetation: Stands are dominated by *Ligustrum sinense* (Chinese privet), without a tree canopy. This plant is a serious weedy species in the southeastern United States. It generally occurs as a shrub-layer dominant under tree canopies, especially in floodplains. These latter types of stands would not be placed in this alliance.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the southeastern United States from Virginia to Florida and west to Tennessee and Louisiana.
Nations: US
Subnations: AL, AR, FL, GA, LA, MS, NC?, SC, TN, VA
TNC Ecoregions: 39:C, 41:C, 43:C, 44:C, 50:C, 52:C
USFS Ecoregions: 221:C, 222E:CC, 231Aa:CCC, 231Ba:CCC, 231Cc:CCC, 231Ga:CCC, 231Gc:CCC, 232:C, 234Ah:CC?, 234Ak:CC?, 234An:CCC, M231:C
Federal Lands: DOD (Fort Benning); NPS (Chickamauga-Chattanooga?, Little River Canyon, Natchez Trace, Ninety Six, Stones River)

(CEGL003807) Chinese Privet Upland Shrubland
***Ligustrum sinense* Upland Shrubland**

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 (III.A.2.N.a.)
Alliance	*Ligustrum sinense* Shrubland Alliance (A.738)
Alliance (English name)	Chinese Privet Shrubland Alliance
Association	*Ligustrum sinense* Upland Shrubland
Association (English name)	Chinese Privet Upland Shrubland

Ecological System(s):

ELEMENT CONCEPT

Global Summary: This shrubland association comprises upland and wetland areas heavily infested with the exotic *Ligustrum sinense* (Chinese privet) to the exclusion of canopy trees.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:
Little River Canyon National Preserve Environment: This shrub has become established at intervals in alluvial soils along Little River, often to the near exclusion of other vegetation.
Global Environment: This community exists in disturbed bottomlands and uplands, usually highly fragmented, where they can establish and exclude almost all native species.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: This shrubland is characterized by dense, nearly monospecific stands of *Ligustrum sinense* (Chinese privet). An occasional *Liriodendron tulipifera* (tuliptree) and *Liquidambar styraciflua* (sweetgum) are also present.
Global Vegetation: This community is usually a monoculture of *Ligustrum sinense* (Chinese privet).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Shrub/sapling (tall & short)	Broad-leaved evergreen shrub	*Ligustrum sinense* (Chinese privet)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (invasive) (1-Dec-1997).

CLASSIFICATION

Status: Standard
Classification Confidence: 3 - Weak
Little River Canyon National Preserve Comments:
Global Comments:
Global Similar Associations:
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Near western edge of the preserve off park road just north of County Road 295, north of State Route 35.
Global Range: This invasive community is found throughout the southeastern United States from Virginia to Florida and west to Arkansas and Louisiana.
Nations: US
States/Provinces: AL, AR, FL, GA, LA, MS, NC?, SC, TN, VA
TNC Ecoregions:
USFS Ecoregions: 221:C, 222E:CC, 231Aa:CCC, 231Ba:CCC, 231Cc:CCC, 231Ga:CCC, 231Gc:CCC, 232:C, 234A:CC, M231:C
Federal Lands: DOD (Fort Benning); NPS (Chickamauga-Chattanooga?, Little River Canyon, Natchez Trace, Ninety Six, Stones River)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.84.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley
References: Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

III.B.2.N.d. Temporarily flooded cold-deciduous shrubland

A.943–*Alnus serrulata* Temporarily Flooded Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance includes temporarily flooded shrub thickets dominated by *Alnus serrulata* (hazel alder) along rivers and streams on rocky shoals and gravel bars. Other common species include *Cephalanthus occidentalis* (common buttonbush), *Cornus amomum* (silky dogwood), *Cornus obliqua* (silky dogwood), *Cornus foemina* (stiff dogwood), *Hypericum prolificum* (shrubby St. Johnswort), *Lyonia ligustrina* (maleberry), *Viburnum nudum* (possumhaw), *Physocarpus opulifolius* (common ninebark), *Amorpha fruticosa* (desert false indigo), *Xanthorhiza simplicissima* (yellowroot), and others.
Classification Comments:
Similar Alliances:
Alnus serrulata - Salix sericea - Rhododendron (catawbiense, maximum) Saturated Shrubland Alliance (A.1880)
Alnus serrulata Saturated Shrubland Alliance (A.1014)
Alnus serrulata Seasonally Flooded Shrubland Alliance (A.994)
Similar Alliance Comments:
Related Concepts:
Alnus serrulata shrubland alliance (Hoagland 1998a) ?
Alnus/Xanthorhiza rocky stream margin (Newell and Peet 1995) ?
Alder - ninebark wetland (Fike 1999) ?
Circumneutral Shrub Swamp (Smith 1991) I
IIE3a. Riverside Shoal and Stream Bar Complex (Allard 1990) ?
Mountain River (Wharton 1978) I
Mountain stream-edge shrub/scrub vegetation (Ambrose 1990a) ?
Rocky Bar and Shore (Schafale and Weakley 1990) ?
Sand and Mud Bar (Schafale and Weakley 1990) ?
Shoal and Stream Bar (Nelson 1986) ?

ALLIANCE DESCRIPTION

Environment: Stands of this alliance are found along rivers and streams on rocky shoals and gravel bars.
Vegetation: Stands of this alliance are dominated by *Alnus serrulata* (hazel alder). Other common species include *Cephalanthus occidentalis* (common buttonbush), *Cornus amomum* (silky dogwood), *Cornus obliqua* (silky dogwood), *Cornus foemina* (stiff dogwood), *Hypericum prolificum* (shrubby St. Johnswort), *Lyonia ligustrina* (maleberry), *Viburnum nudum* (possumhaw), *Physocarpus opulifolius* (common ninebark), *Amorpha fruticosa* (desert false indigo), *Xanthorhiza simplicissima* (yellowroot), and others. Some herbaceous associates may include *Osmunda regalis* (royal fern), *Decodon verticillatus* (swamp loosestrife), *Utricularia* (bladderwort) spp., *Limnobium spongia* (American spongeplant), *Oxypolis rigidior* (stiff cowbane), *Chelone glabra* (white turtlehead), and *Cicuta bulbifera* (bulblet-bearing water hemlock).
Dynamics:

ALLIANCE DISTRIBUTION

Range: Currently this alliance is defined for the Chesapeake Bay Lowlands, Southern Blue Ridge, Ozarks, Ouachitas, Cumberland Plateau, the southern Alleghenies, and the northern Ridge and Valley. It is possible in the upper West and East Gulf coastal plains. This alliance is found in Alabama, Arkansas, Georgia, Kentucky, North Carolina, Oklahoma, South Carolina, Tennessee, Missouri, Louisiana, Maryland, Delaware, New York, Pennsylvania, West Virginia, and possibly Virginia.
Nations: US
Subnations: AL, AR, DE, GA, KY, LA, MD, MO, NC, NH, NY, OH, OK, PA, SC, TN, VA?, WV
TNC Ecoregions: 32:P, 38:C, 39:C, 40:?, 43:P, 44:P, 49:C, 50:C, 51:C, 52:P, 53:P, 58:C, 59:C, 60:P, 63:C, 64:P
USFS Ecoregions: 212F:CP, 212G:CP, 221Bd:CCP, 221Ea:CCC, 221Eb:CC?, 221Ef:CCC, 221Eg:CCP, 221Fa:CCC, 221Fb:CCP, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222E:PP, 231B:CP, 231Cc:CCC, 231Cd:CCC, 231Dc:CCC, 231E:CP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CP, 234Ab:CCC, 255Ac:CCP, 255Ad:CCP, M212Ea:CCP, M212Eb:CCP, M221Aa:CCP, M221Ac:CCC, M221Ba:CP?, M221Bd:CP?, M221Cb:CC?, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: BIA (Eastern Band Cherokee); DOD (Fort Benning); NPS (Allegheny Portage Railroad, Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga?, Great Smoky Mountains, Little River Canyon, Obed); USFS (Allegheny, Bankhead, Chattahoochee, Daniel Boone, Green Mountain, Mark Twain, Monongahela?, Nantahala, Ouachita, Ozark, Pisgah, Sumter); USFWS (Cahaba River, Little River)

(CEGL003895) Smooth Alder - Yellowroot Shrubland

***Alnus serrulata - Xanthorhiza simplicissima* Shrubland**
Rocky Bar and Shore (Alder - Yellowroot Type)

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	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	*Alnus serrulata* Temporarily Flooded Shrubland Alliance (A.943)
Alliance (English name)	Smooth Alder Temporarily Flooded Shrubland Alliance
Association	*Alnus serrulata - Xanthorhiza simplicissima* Shrubland
Association (English name)	Smooth Alder - Yellowroot Shrubland
Association (Common name)	Rocky Bar and Shore (Alder - Yellowroot Type)
Ecological System(s):	South-Central Interior Small Stream and Riparian (CES202.706)
	Cumberland Riverscour (CES202.036)
	South-Central Interior Large Floodplain (CES202.705)

ELEMENT CONCEPT

Global Summary: This association includes shrublands on rocky or gravelly substrates along narrow river margins in the southeastern Blue Ridge Escarpment gorges, ranging into the Cumberland Plateau. Vegetation composition, density, and height vary with frequency of flooding, substrate, and soil depth. The nominal shrubs are common and characteristic but not always dominant. Other shrubs may include *Arundinaria gigantea* (giant cane), *Diervilla sessilifolia* (southern bush honeysuckle), *Salix nigra* (black willow), *Salix sericea* (silky willow), *Rhododendron arborescens* (smooth azalea), *Rhododendron viscosum* (swamp azalea), *Rhododendron maximum* (great laurel), *Rhododendron periclymenoides* (pink azalea), *Kalmia latifolia* (mountain laurel), *Leucothoe fontanesiana* (highland doghobble), *Cornus foemina* (stiff dogwood), *Cornus amomum* (silky dogwood), *Physocarpus opulifolius* (common ninebark), *Itea virginica* (Virginia sweetspire), and *Viburnum nudum var. cassinoides* (withe-rod). Arborescent species that occur as tall shrubs (or as occasional trees, less than 10% cover) include *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Diospyros virginiana* (common persimmon), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Platanus occidentalis* (American sycamore), and *Tsuga canadensis* (eastern hemlock). Open areas dominated by grasses and forbs include species such as *Agrostis perennans* (upland bentgrass), *Boykinia aconitifolia* (Allegheny brookfoam), *Carex torta* (twisted sedge), *Holcus lanatus* (common velvetgrass) (exotic), *Lycopus virginicus* (Virginia water horehound), *Trautvetteria caroliniensis* (Carolina bugbane), *Houstonia serpyllifolia* (thymeleaf bluet), *Impatiens capensis* (jewelweed), *Hypericum mutilum* (dwarf St. Johnswort), *Viola X primulifolia* (primroseleaf violet), and *Eupatorium fistulosum* (trumpetweed). Adjacent alluvial forests in the Blue Ridge are dominated by *Tsuga canadensis* (eastern hemlock), *Liriodendron tulipifera* (tuliptree), *Betula lenta* (sweet birch), and, at lower elevations, below 610 m (2000 feet), *Platanus occidentalis* (American sycamore) and *Liquidambar styraciflua* (sweetgum).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Riverine

Little River Canyon National Preserve Environment: This community occurs as a narrow zone (≤2 m width) along the margin of Little River and also partially extends upstream along some of the larger tributaries. Because of scouring, vegetation is typically stunted, dense, and somewhat contorted.

Global Environment: This association includes shrublands on rocky or gravelly substrates along narrow river margins in the southeastern Blue Ridge Escarpment gorges, ranging into the Cumberland Plateau. Vegetation composition, density, and height vary with frequency of flooding, substrate, and soil depth. The occurrences can be in very narrow bands of 1-2 m or wider bars of up to 10-20 m wide adjacent to large creeks and small rivers.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: *Alnus serrulata* (hazel alder) and *Xanthorhiza simplicissima* (yellowroot) are generally common, but *Kalmia latifolia* (mountain laurel), *Rhododendron arborescens* (smooth azalea), *Vaccinium elliottii* (Elliott's blueberry), *Cornus amomum* (silky dogwood), and *Ilex verticillata* (common winterberry) are also abundant and often assume localized dominance. Owing to the frequency and abrasive force of flooding, trees and tall shrubs are sparse, consisting of no more than 15% of the total cover. Herbs are relatively scarce, attaining their greatest development in openings; characteristic taxa include *Iris cristata* (dwarf crested iris), *Galax urceolata* (beetleweed), *Ipomoea pandurata* (man of the earth), *Mitchella repens* (partridgeberry), *Viola* (violet) x *primulifolia*, and *Eupatorium fistulosum* (trumpetweed).

Global Vegetation: The nominal shrubs are common and characteristic but not always dominant. Other shrubs may include *Arundinaria gigantea* (giant cane), *Diervilla sessilifolia* (southern bush honeysuckle), *Salix nigra* (black willow), *Salix sericea* (silky willow), *Rhododendron arborescens* (smooth azalea), *Rhododendron viscosum* (swamp azalea), *Rhododendron maximum* (great laurel), *Rhododendron periclymenoides* (pink azalea), *Kalmia latifolia* (mountain laurel), *Leucothoe fontanesiana* (highland doghobble), *Cornus foemina* (stiff dogwood), *Cornus amomum* (silky dogwood), *Physocarpus opulifolius* (common ninebark), *Itea virginica* (Virginia sweetspire), and *Viburnum nudum var. cassinoides* (withe-rod). Arborescent species that occur as tall shrubs (or as occasional trees, less than 10% cover) include *Acer rubrum* (red maple), *Carpinus caroliniana* (American hornbeam), *Diospyros virginiana* (common persimmon), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Platanus*

occidentalis (American sycamore), and *Tsuga canadensis* (eastern hemlock). Open areas dominated by grasses and forbs include species such as *Agrostis perennans* (upland bentgrass), *Boykinia aconitifolia* (Allegheny brookfoam), *Carex torta* (twisted sedge), *Holcus lanatus* (common velvetgrass) (exotic), *Lycopus virginicus* (Virginia water horehound), *Trautvetteria caroliniensis* (Carolina bugbane), *Houstonia serpyllifolia* (thymeleaf bluet), *Impatiens capensis* (jewelweed), *Hypericum mutilum* (dwarf St. Johnswort), *Viola X primulifolia* (primroseleaf violet), and *Eupatorium fistulosum* (trumpetweed). Adjacent alluvial forests in the Blue Ridge are dominated by *Tsuga canadensis* (eastern hemlock), *Liriodendron tulipifera* (tuliptree), *Betula lenta* (sweet birch), and, at lower elevations, below 610 m (2000 feet), *Platanus occidentalis* (American sycamore) and *Liquidambar styraciflua* (sweetgum).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Tall shrub/sapling	Broad-leaved deciduous tree	*Alnus serrulata* (hazel alder)
Short shrub/sapling	Semi-shrub	*Xanthorhiza simplicissima* (yellowroot)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global: *Alnus serrulata* (hazel alder), *Carpinus caroliniana* (American hornbeam), *Diospyros virginiana* (common persimmon), *Leucothoe fontanesiana* (highland doghobble), *Liquidambar styraciflua* (sweetgum), *Liriodendron tulipifera* (tuliptree), *Platanus occidentalis* (American sycamore), *Tsuga canadensis* (eastern hemlock), *Xanthorhiza simplicissima* (yellowroot)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:

Global: *Diervilla rivularis* (mountain bush honeysuckle), *Spiraea virginiana* (Virginia meadowsweet)

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (17-Dec-1999). This community is naturally restricted in terms of geography and habitat, thus could be vulnerable to elimination. However, this community is often overlooked in inventories or not separately distinguished, and is likely much more common than the number of documented occurrences suggests. Threats to this community include alteration of the natural flooding regime due to damming of rivers and invasion by exotic species carried on river courses.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Little River Canyon National Preserve Comments: At Little River National Preserve, this association appears to be relatively frequent, being sporadically distributed along Little River, as well as the larger tributaries. No plot data were obtained, as this type is a small-scale feature present in a linear arrangement along drainage courses, and it becomes included with, and subsumed into, samples of other communities when sampled at larger scales.

Global Comments: This association is known from the Bankhead National Forest, but further inventory is needed to fully describe the variation of this type on the Bankhead and elsewhere in the Cumberland Plateau.

Global Similar Associations:

Global Related Concepts:

Alnus/Xanthorhiza rocky stream margin (Newell and Peet 1995) ?

IIE3a. Riverside Shoal and Stream Bar Complex (Allard 1990) B

Rocky Bar And Shore (Alder-Yellowwood Subtype) (Schafale 1998b) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Sporadically distributed along the margin of Little River and larger tributaries.
Global Range: This association is found along montane rivers in the southeastern Blue Ridge Escarpment gorges and in the Cumberland Plateau of Kentucky south to Alabama.
Nations: US
States/Provinces: AL, GA, KY, NC, SC, TN
TNC Ecoregions:
USFS Ecoregions: 221Ha:CCC, 221Hc:CCC, 221He:CCC, 231Cc:CCC, 231Cd:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga?, Great Smoky Mountains, Little River Canyon, Obed); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont)?, Chattahoochee (Southern Blue Ridge), Daniel Boone, Nantahala, Pisgah, Sumter, Sumter (Mountains), Sumter (Piedmont)?)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: None.
Local Description Authors: A. Schotz
Global Description Authors: R. White
References: Allard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1986, Newell and Peet 1995, Peet et al. unpubl. data 2002, Schafale 1998b, Schafale 2002, Schafale and Weakley 1990, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data

(CEGL008495) Bushy St. John's-wort - Smooth Alder / Eastern Gammagrass Shrubland
***Hypericum densiflorum - Alnus serrulata / Tripsacum dactyloides* Shrubland**

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	Temporarily flooded cold-deciduous shrubland (III.B.2.N.d.)
Alliance	*Alnus serrulata* Temporarily Flooded Shrubland Alliance (A.943)
Alliance (English name)	Smooth Alder Temporarily Flooded Shrubland Alliance
Association	*Hypericum densiflorum - Alnus serrulata / Tripsacum dactyloides* Shrubland
Association (English name)	Bushy St. John's-wort - Smooth Alder / Eastern Gammagrass Shrubland
Ecological System(s):	Cumberland Riverscour (CES202.036)
	South-Central Interior Large Floodplain (CES202.705)

ELEMENT CONCEPT

Global Summary: These temporarily flooded riparian shrublands are found in the United States in the southern end of the Ridge and Valley province of Alabama. Stands occur near moderately sized rivers, on bedrock and cobble of dolomite. This community is maintained by flashy, high-velocity flows. These shrublands are of modest stature (1-3 m, 3-10 feet). The dominant shrubs are *Alnus serrulata* (hazel alder) and *Hypericum densiflorum* (bushy St. Johnswort) (a narrow-leaved form sometimes known as *Hypericum interior*). Associated shrubs and scattered short trees include *Betula nigra* (river birch), *Catalpa bignonioides* (southern catalpa), *Cephalanthus occidentalis*

(common buttonbush), *Cornus amomum* (silky dogwood), *Diospyros virginiana* (common persimmon), *Itea virginica* (Virginia sweetspire), *Platanus occidentalis* (American sycamore), *Salix caroliniana* (coastal plain willow), and *Ulmus rubra* (slippery elm). Typical species in the herbaceous layer include *Anemone virginiana* (tall thimbleweed), *Commelina virginica* (Virginia dayflower), *Conoclinium coelestinum* (blue mistflower), *Elephantopus carolinianus* (Carolina elephantsfoot), *Helenium autumnale* (common sneezeweed), *Hydrocotyle* (hydrocotyle) sp., *Ludwigia leptocarpa* (anglestem primrose-willow), *Lycopus* (waterhorehound) sp., *Orontium aquaticum* (goldenclub), *Oxypolis rigidior* (stiff cowbane), *Phlox carolina* (thickleaf phlox), *Rhynchospora colorata* (starrush whitetop), *Rudbeckia laciniata* (cutleaf coneflower), *Tripsacum dactyloides* (eastern gamagrass), and *Vernonia gigantea* (giant ironweed).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Riverine

Little River Canyon National Preserve Environment: This association intermittently extends as a 1- to 3-m densely vegetated zone along the margin of Little River where frequent scouring from high water levels discourages the establishment of large trees and shrubs.

Global Environment: Stands occur near moderately sized rivers, on bedrock and cobble of dolomite. This community is maintained by flashy, high-velocity flows.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Frequent scouring from Little River has developed and maintained this association as a boulder- and cobble-strewn substrate vegetated with a luxuriant growth of dense shrubbery and low-growing trees interspersed with small herbaceous openings. Floristically, ericads, primarily *Kalmia latifolia* (mountain laurel), *Rhododendron arborescens* (smooth azalea), *Rhododendron catawbiense* (Catawba rosebay), *Vaccinium arboreum* (farkleberry), and *Vaccinium elliottii* (Elliott's blueberry), serve as the principal vegetation component, with all species combined constituting nearly 65% of the total cover. Other common and characteristic shrubs are *Viburnum dentatum* (southern arrowwood), *Cephalanthus occidentalis* (common buttonbush), and *Cornus amomum* (silky dogwood). *Hypericum densiflorum* (bushy St. Johnswort), although present, is typically rare. Trees that survive the scouring action of Little River are generally stunted and contorted, bearing testimony to the ecological importance and abrasive force of flooding. Typical trees include *Oxydendrum arboreum* (sourwood), *Nyssa sylvatica* (blackgum), *Betula nigra* (river birch), *Acer rubrum* (red maple), *Liriodendron tulipifera* (tuliptree), and *Liquidambar styraciflua* (sweetgum). Though of lesser significance, herbaceous species also serve to distinguish this association, most of which are widely scattered. Typical herbs include *Schizachyrium scoparium* (little bluestem), *Tripsacum dactyloides* (eastern gamagrass), *Boehmeria cylindrica* (smallspike false nettle), *Angelica venenosa* (hairy angelica), *Trautvetteria caroliniensis* (Carolina bugbane), *Galax urceolata* (beetleweed), *Scutellaria lateriflora* (blue skullcap), *Marshallia trinervia* (broadleaf Barbara's buttons), *Eupatorium fistulosum* (trumpetweed), and *Solidago erecta* (showy goldenrod). *Vitis rotundifolia* (muscadine), *Smilax rotundifolia* (roundleaf greenbrier), *Parthenocissus quinquefolia* (Virginia creeper), and *Toxicodendron radicans* (eastern poison ivy) are common vines, often trailing along the ground surface.

Global Vegetation: These shrublands are of modest stature (1-3 m, 3-10 feet). The dominant shrubs are *Alnus serrulata* (hazel alder) and *Hypericum densiflorum* (bushy St. Johnswort) (a narrow-leaved form sometimes known as *Hypericum interior*). Associated shrubs and scattered short trees include *Betula nigra* (river birch), *Catalpa bignonioides* (southern catalpa), *Cephalanthus occidentalis* (common buttonbush), *Cornus amomum* (silky dogwood), *Diospyros virginiana* (common persimmon), *Itea virginica* (Virginia sweetspire), *Platanus occidentalis* (American sycamore), *Salix caroliniana* (coastal plain willow), and *Ulmus rubra* (slippery elm). Typical species in the herbaceous layer include *Anemone virginiana* (tall thimbleweed), *Commelina virginica* (Virginia dayflower), *Conoclinium coelestinum* (blue mistflower), *Elephantopus carolinianus* (Carolina elephantsfoot), *Helenium autumnale* (common sneezeweed), *Hydrocotyle* (hydrocotyle) sp., *Ludwigia leptocarpa* (anglestem primrose-willow), *Lycopus* (waterhorehound) sp., *Orontium aquaticum* (goldenclub), *Oxypolis rigidior* (stiff cowbane), *Phlox carolina* (thickleaf phlox), *Rhynchospora colorata* (starrush whitetop), *Rudbeckia laciniata* (cutleaf coneflower), *Tripsacum dactyloides* (eastern gamagrass), and *Vernonia gigantea* (giant ironweed).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Diervilla rivularis* (mountain bush honeysuckle), *Fothergilla major* (mountain witchalder), *Marshallia trinervia* (broadleaf Barbara's buttons), *Polygonella americana* (southern jointweed), *Rudbeckia heliopsidis* (sunfacing coneflower)
Global: *Catalpa bignonioides* (southern catalpa)

CONSERVATION STATUS RANK

Global Rank & Reasons: G1G2 (29-Jun-2001). This association is known only from the southern end of the Ridge and Valley in Alabama, where it occurs on dolomite substrates along moderately sized rivers. It is apparently highly restricted.

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: Examples are known from along the Cahaba River (Bibb County, Alabama).
Global Similar Associations:
Hypericum densiflorum - Alnus serrulata / Jamesianthus alabamensis - Xyris tennesseensis Shrubland (CEGL008494)
Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Intermittently scattered along the margin of Little River.
Global Range: These temporarily flooded riparian shrubland occur in the Ridge and Valley of central Alabama.
Nations: US
States/Provinces: AL
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC, 231Dc:CCC
Federal Lands: NPS (Little River Canyon); USFWS (Cahaba River)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.6, LIRI.17, LIRI.42, LIRI.44, LIRI.47.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley
References: NatureServe Ecology - Southeastern U.S. unpubl. data, Schotz pers. comm., Southeastern Ecology Working Group n.d.

III.C.2.N.e. Saturated mixed evergreen - cold-deciduous shrubland

A.1880–*Alnus serrulata - Salix sericea - Rhododendron (catawbiense, maximum)* Saturated Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance includes mostly montane, non-alluvial, palustrine vegetation dominated by shrubs and often, but not always, with substantial *Sphagnum* (sphagnum) cover. Occurrences of this alliance can have small to moderately large herbaceous openings, as well, but where open herbaceous patches are large and well-developed, communities in V.A.5.N.m. should be considered. Communities in this alliance are saturated shrublands with *Alnus serrulata* (hazel alder) as a nearly constant component, but many other shrub species are typical and may dominate or codominate, including *Salix sericea* (silky willow), *Salix humilis* (prairie willow), *Spiraea alba* (white meadowsweet), *Spiraea tomentosa* (steeplebush), *Ilex verticillata* (common winterberry), *Ilex collina* (longstalk holly), *Ilex montana* (mountain holly), *Rhododendron catawbiense* (Catawba rosebay), *Rhododendron maximum* (great laurel), *Rhododendron viscosum* (swamp azalea), *Rhododendron arborescens* (smooth azalea), *Lyonia ligustrina var. ligustrina* (maleberry), *Kalmia latifolia* (mountain laurel), *Menziesia pilosa* (minniebush), *Kalmia carolina* (Carolina laurel), *Viburnum nudum var. nudum* (possumhaw), *Viburnum nudum var. cassinoides* (withe-rod), *Lonicera canadensis* (American fly honeysuckle), and *Lonicera dioica* (limber honeysuckle). This alliance includes shrub bogs and bogs with well-developed shrub zones, scattered in the southern Blue Ridge, and extending to the Cumberland Mountains and northern Ridge and Valley (Central Appalachians).

Classification Comments: The alliances A.1880 and A.1014 may at one time have been thought of as being "acidic" and less so, respectively; they are now conceived of as being more and less "montane" respectively. A.1880 is presently treated as "mixed" because of the typical presence of evergreen *Kalmia* and *Rhododendron*. The nominal *Salix sericea* may not be present in all associations.

Similar Alliances:

Alnus serrulata Saturated Shrubland Alliance (A.1014)--of less "montane" floristics.

Alnus serrulata Temporarily Flooded Shrubland Alliance (A.943)--includes temporarily flooded *Alnus serrulata* shrublands of riparian habitats.

Carex (atlantica, echinata) - Eriophorum virginicum - Rhynchospora capitellata - Solidago patula Saturated Herbaceous Alliance (A.1450)--includes less shrubby seepage wetlands of the Southern Appalachians.

Rhododendron maximum Shrubland Alliance (A.745)

Similar Alliance Comments:

Related Concepts:

IIE1b. Southern Appalachian Bog Complex (Allard 1990) I
Scrub/Shrub Swamp (Smith 1996a) I
Southern Appalachian Bog, Northern Subtype (Schafale and Weakley 1990) I
Southern Appalachian Bog, Southern Subtype (Schafale and Weakley 1990) I
mountain bog/seep herbaceous vegetation (Ambrose 1990a) ?
mountain bog/seep shrub/scrub vegetation (Ambrose 1990a) ?

ALLIANCE DESCRIPTION

Environment: Stands of this alliance are generally found on shallow slopes with a saturated palustrine hydrology, fed by seepage from the adjacent substrate. Some examples are nearly flat and occur in the higher (rarely or never flooded) portions of the floodplains of creeks or small rivers, and receive minimal seepage.

Vegetation: This alliance includes mostly montane, non-alluvial, palustrine vegetation dominated by shrubs and often, but not always, with substantial *Sphagnum* (sphagnum) cover. Occurrences of this alliance can have small to moderately large herbaceous openings, as well, but where open herbaceous patches are large and well-developed, communities in V.A.5.N.m. should be considered. Communities in this alliance are saturated shrublands with *Alnus serrulata* (hazel alder) as a nearly constant component, but many other shrub species are typical and may dominate or codominate, including *Salix sericea* (silky willow), *Salix humilis* (prairie willow), *Spiraea alba* (white

meadowsweet), *Spiraea tomentosa* (steeplebush), *Ilex verticillata* (common winterberry), *Ilex collina* (longstalk holly), *Ilex montana* (mountain holly), *Rhododendron catawbiense* (Catawba rosebay), *Rhododendron maximum* (great laurel), *Rhododendron viscosum* (swamp azalea), *Rhododendron arborescens* (smooth azalea), *Lyonia ligustrina var. ligustrina* (maleberry), *Kalmia latifolia* (mountain laurel), *Menziesia pilosa* (minniebush), *Kalmia carolina* (Carolina laurel), *Viburnum nudum var. nudum* (possumhaw), *Viburnum nudum var. cassinoides* (withe-rod), *Lonicera canadensis* (American fly honeysuckle), and *Lonicera dioica* (limber honeysuckle).
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance includes shrub bogs and bogs with well-developed shrub zones, scattered in the Southern Blue Ridge, and extending to the Cumberland Mountains and northern Ridge and Valley (Central Appalachians). This alliance is found in Georgia, Kentucky, North Carolina, South Carolina, Tennessee, Virginia. It could potentially range into Alabama and West Virginia.
Nations: US
Subnations: AL, GA, KY, NC, SC, TN, VA, WV?
TNC Ecoregions: 50:C, 51:C, 59:C
USFS Ecoregions: 221:C, 231Cc:CCC, M221Aa:CCC, M221Ba:CCP, M221Bd:CCP, M221Be:CCP, M221Db:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: NPS (Blue Ridge Parkway, Great Smoky Mountains?, Little River Canyon); USFS (Chattahoochee, Cherokee, Jefferson, Nantahala, Pisgah, Sumter?)

(CEGL003914) Smooth Alder - Smooth Azalea / Green Pitcherplant - Few-flower Beaksedge Shrubland

***Alnus serrulata - Rhododendron arborescens / Sarracenia oreophila - Rhynchospora rariflora* Shrubland**
Southern Appalachian Low Mountain Seepage Bog

NVC Classification

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Mixed evergreen-deciduous shrubland (III.C.)
Physiognomic Group	Mixed evergreen - cold-deciduous shrubland (III.C.2.)
Physiognomic Subgroup	Natural/Semi-natural mixed evergreen - cold-deciduous shrubland (III.C.2.N.)
Formation	Saturated mixed evergreen - cold-deciduous shrubland (III.C.2.N.e.)
Alliance	*Alnus serrulata - Salix sericea - Rhododendron (catawbiense, maximum)* Saturated Shrubland Alliance (A.1880)
Alliance (English name)	Smooth Alder - Silky Willow - (Catawba Rhododendron, Great Rhododendron) Saturated Shrubland Alliance
Association	*Alnus serrulata - Rhododendron arborescens / Sarracenia oreophila - Rhynchospora rariflora* Shrubland
Association (English name)	Smooth Alder - Smooth Azalea / Green Pitcherplant - Few-flower Beaksedge Shrubland
Association (Common name)	Southern Appalachian Low Mountain Seepage Bog
Ecological System(s):	Southern and Central Appalachian Bog and Fen (CES202.300)

ELEMENT CONCEPT

Global Summary: This non-alluvial, montane wetland is primarily shrubby, with open herb-dominated areas. Common species in the 1- to 2-m shrub stratum include *Alnus serrulata* (hazel alder), *Rhododendron arborescens* (smooth azalea), *Lyonia ligustrina* (maleberry), *Photinia pyrifolia* (red chokeberry), and *Rosa palustris* (swamp rose). *Osmunda cinnamomea* (cinnamon fern) and *Sarracenia oreophila* (green pitcherplant) are conspicuous and occur as clumps in herbaceous openings. Other typical herb species include *Rhynchospora rariflora* (fewflower

beaksedge), *Thelypteris palustris var. pubescens* (eastern marsh fern), *Sagittaria latifolia* (broadleaf arrowhead), *Rhexia virginica* (handsome Harry), *Rhexia mariana* (Maryland meadowbeauty), *Eryngium integrifolium* (blueflower eryngo), *Helianthus angustifolius* (swamp sunflower), *Eupatorium perfoliatum* (common boneset), *Eupatorium pilosum* (rough boneset), *Eupatorium rotundifolium var. ovatum* (roundleaf thoroughwort), *Eupatorium fistulosum* (trumpetweed), *Eriophorum virginicum* (tawny cottongrass), *Sanguisorba canadensis* (Canadian burnet), and *Juncus caesariensis* (New Jersey rush). Other characteristic species include *Andropogon glomeratus* (bushy bluestem), *Symphyotrichum dumosum* (rice button aster), *Betula nigra* (river birch), *Cinna arundinacea* (sweet woodreed), *Drosera capillaris* (pink sundew), *Eleocharis tuberculosa* (cone-cup spikerush), *Eriocaulon decangulare* (tenangle pipewort), *Eryngium integrifolium* (blueflower eryngo), *Fuirena squarrosa* (hairy umbrella-sedge), *Gratiola pilosa* (shaggy hedgehyssop), *Juncus canadensis* (Canadian rush), *Panicum virgatum* (switchgrass), *Polygala cruciata* (drumheads), *Rhynchospora gracilenta* (slender beaksedge), *Scleria muehlenbergii* (Muehlenberg's nutrush), *Saccharum giganteum* (sugarcane plumegrass), *Scleria ciliata* (fringed nutrush), and *Xyris jupicai* (Richard's yelloweyed grass). Fire may have been a natural disturbance in this community type, suggested by the large suite of species more typical of fire-maintained communities of the Coastal Plain. Known examples, from Clay County, North Carolina, and Towns County, Georgia, are on shallow slopes, at about 500 m (1500-1800 feet) elevation, and have a palustrine hydrology, fed by acidic seepage. Few examples are known and all have been altered considerably by grazing, fire, cultivation, and drainage efforts.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Little River Canyon National Preserve Environment: Occurrences are found in seepage areas that occupy gentle slopes on and near the summit of Lookout Mountain.

Global Environment: Known examples are on shallow slopes, at about 500 meters (1500-1800 feet) elevation, and have a palustrine hydrology, fed by acidic seepage.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Examples at Little River Canyon are densely vegetated, often by a nearly impenetrable mixture of trees, shrubs, and vines. Herbaceous openings are frequent, however, containing a broad suite of species not commonly encountered elsewhere in the region. While *Sarracenia oreophila* (green pitcherplant) has come to symbolize the identity and significance of this association, an array of other herbs are as equally indicative, including *Osmunda cinnamomea* (cinnamon fern), *Woodwardia areolata* (netted chainfern), *Carex glaucescens* (southern waxy sedge), *Rhynchospora glomerata* (clustered beaksedge), *Chasmanthium laxum* (slender woodoats), *Arundinaria gigantea ssp. gigantea* (giant cane), *Platanthera ciliaris* (yellow fringed orchid), *Cleistes bifaria* (small spreading pogonia), *Bartonia virginica* (yellow screwstem), *Gentiana saponaria* (harvestbells), *Lobelia nuttallii* (Nuttall's lobelia), *Viola* (violet) x *primulifolia*, and *Sphagnum* (sphagnum) spp. Common and characteristic woody vegetation includes *Acer rubrum* (red maple), *Alnus serrulata* (hazel alder), *Nyssa sylvatica* (blackgum), *Lyonia ligustrina* (maleberry), *Rhododendron arborescens* (smooth azalea), *Vaccinium corymbosum* (highbush blueberry), *Photinia pyrifolia* (red chokeberry), *Viburnum nudum var. cassinoides* (withe-rod), *Smilax rotundifolia* (roundleaf greenbrier), and *Liquidambar styraciflua* (sweetgum).

Global Vegetation: Owing to disturbance of the only known examples, the original vegetation structure of this community is unknown. This non-alluvial, montane wetland is primarily shrubby, with open, herb-dominated areas. Common species in the 1- to 2-m shrub stratum include *Alnus serrulata* (hazel alder), *Rhododendron arborescens* (smooth azalea), *Lyonia ligustrina* (maleberry), *Photinia pyrifolia* (red chokeberry), and *Rosa palustris* (swamp rose). *Osmunda cinnamomea* (cinnamon fern) and *Sarracenia oreophila* (green pitcherplant) are conspicuous and occur as clumps in herbaceous openings. Other typical herb species include *Rhynchospora rariflora* (fewflower beaksedge), *Eriocaulon decangulare* (tenangle pipewort), *Thelypteris palustris var. pubescens* (eastern marsh fern), *Sagittaria latifolia* (broadleaf arrowhead), *Rhexia virginica* (handsome Harry), *Rhexia mariana* (Maryland meadowbeauty), *Eryngium integrifolium* (blueflower eryngo), *Helianthus angustifolius* (swamp sunflower), *Eupatorium perfoliatum* (common boneset), *Eupatorium pilosum* (rough boneset), *Eupatorium rotundifolium var.*

ovatum (roundleaf thoroughwort), *Eupatorium fistulosum* (trumpetweed), *Eriophorum virginicum* (tawny cottongrass), *Sanguisorba canadensis* (Canadian burnet), and *Juncus caesariensis* (New Jersey rush).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Short shrub/sapling	Broad-leaved deciduous tree	*Alnus serrulata* (hazel alder)
Short shrub/sapling	Broad-leaved deciduous shrub	*Lyonia ligustrina* (maleberry), *Photinia pyrifolia* (red chokeberry), *Rhododendron arborescens* (smooth azalea), *Rosa palustris* (swamp rose)
Herb (field)	Forb	*Sarracenia oreophila* (green pitcherplant)
Herb (field)	Graminoid	*Rhynchospora rariflora* (fewflower beaksedge)
Herb (field)	Fern or fern ally	*Osmunda cinnamomea* (cinnamon fern)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global: *Andropogon glomeratus* (bushy bluestem), *Betula nigra* (river birch), *Cinna arundinacea* (sweet woodreed), *Drosera capillaris* (pink sundew), *Eleocharis tuberculosa* (cone-cup spikerush), *Eriocaulon decangulare* (tenangle pipewort), *Eryngium integrifolium* (blueflower eryngo), *Eupatorium pilosum* (rough boneset), *Fuirena squarrosa* (hairy umbrella-sedge), *Gratiola pilosa* (shaggy hedgehyssop), *Helianthus angustifolius* (swamp sunflower), *Juncus canadensis* (Canadian rush), *Panicum virgatum* (switchgrass), *Polygala cruciata* (drumheads), *Rhynchospora gracilenta* (slender beaksedge), *Saccharum giganteum* (sugarcane plumegrass), *Scleria ciliata* (fringed nutrush), *Scleria muehlenbergii* (Muehlenberg's nutrush), *Symphyotrichum dumosum* (rice button aster), *Xyris jupicai* (Richard's yelloweyed grass)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Rudbeckia heliopsidis* (sunfacing coneflower), *Sarracenia oreophila* (green pitcherplant)

Global: *Juncus caesariensis* (New Jersey rush), *Platanthera integrilabia* (monkeyface), *Rudbeckia laciniata* var. *humilis* (greenhead coneflower), *Sarracenia oreophila* (green pitcherplant)

CONSERVATION STATUS RANK

Global Rank & Reasons: G1 (15-Jun-1995). This community is known only from two to three sites in Clay County, North Carolina, and Towns County, Georgia. All known sites are heavily altered by grazing, fire, cultivation, and drainage efforts. There is little or no chance of finding enough additional sites to warrant any rank other than G1.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Little River Canyon National Preserve Comments:

Global Comments: Similar non-alluvial wetland vegetation occurs in the Piedmont of Georgia and Alabama. These Piedmont bogs lack the mountain species component that distinguishes the community described here. Little is known about these Piedmont wetland communities and their classification is uncertain at this time.

Global Similar Associations:

Global Related Concepts:

IIE1b. Southern Appalachian Bog Complex (Allard 1990) B

Low Mountain Seepage Bog (Schafale 1998a) ?

Low Mountain Seepage Bog (Weakley and Schafale 1994) ?

Mountain Bog/Seep Herbaceous Vegetation (Ambrose 1990a) B
Mountain Bog/Seep Shrub/Scrub Vegetation (Ambrose 1990a) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Widely distributed throughout the preserve, but two notable examples occur near the junction of State Routes 35 and 176 and on the west-northwest side of State Route 176 at a point roughly 1.0 mile south of State Route 35.
Global Range: This type is known only from Clay County, North Carolina, and Towns County, Georgia. It should be sought in nearby counties. This community also occurs in Alabama along the Little River.
Nations: US
States/Provinces: AL, GA, NC, TN
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC, M221Dd:CCC
Federal Lands: NPS (Little River Canyon); USFS (Chattahoochee, Chattahoochee (Southern Blue Ridge))

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.29, LIRI.33.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley, mod. K.D. Patterson
References: Allard 1990, Ambrose 1990a, Norquist pers. comm., Schafale 1998a, Schafale 2002, Schafale and Weakley 1990, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, Weakley and Schafale 1994

V. Herbaceous Vegetation

V.A.5.N.c. Medium-tall sod temperate or subpolar grassland

A.1208–*Andropogon virginicus* Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance includes vegetation dominated by *Andropogon virginicus var. virginicus* (broomsedge bluestem) that occurs on old fields, pastures, and rocky sites. Associated species vary with geography and habitat and include typical pioneer species. This is a very wide-ranging alliance. There is no known natural vegetation in this alliance.
Classification Comments:
Similar Alliances:
Similar Alliance Comments:
Related Concepts:
Andropogon virginicus herbaceous alliance (Hoagland 1998a) ?

ALLIANCE DESCRIPTION

Environment: Stands of this alliance occur on old fields, pastures, and rocky sites.
Vegetation: Stands of this alliance are dominated by *Andropogon virginicus var. virginicus* (broomsedge bluestem). Associated species vary with geography and habitat and include typical pioneer species.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and Missouri, and possibly Illinois, Indiana, and elsewhere.

Nations: US
Subnations: AL, AR, CT, GA, IL, IN, KY, LA, MA, ME, MO?, MS, NC, NH, NJ, NY, OK, PA, RI, SC, TN, TX, VA, VT, WV
TNC Ecoregions: 31:C, 32:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:P, 53:C, 56:C, 57:C, 59:C, 60:C, 61:C, 62:C
USFS Ecoregions: 212Fc:CCC, 221Ab:CCC, 221Bc:CCC, 221Bd:CCC, 221C:CP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 222Eg:CCC, 231Aa:CCC, 231Ae:CCC, 231Ba:CCC, 231Be:CCC, 231Cc:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Aa:CCC, 232Ac:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CC?, 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, Camp Dawson, Fort Benning, Fort Gordon); NPS (Big South Fork, Boston Harbor Islands, Cape Cod, Chickamauga-Chattanooga?, Cowpens, Delaware Water Gap, Fire Island, Fort Donelson, Gateway, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Natchez Trace, Ninety Six, Saratoga, Shiloh, Stones River, Upper Delaware, Weir Farm); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria, Great Swamp)

(CEGL004044) Broomsedge Bluestem Herbaceous Vegetation
***Andropogon virginicus* var. *virginicus* Herbaceous Vegetation**
Successional Broom-sedge Vegetation

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)	Broomsedge Bluestem Herbaceous Alliance
Association	*Andropogon virginicus* var. *virginicus* Herbaceous Vegetation
Association (English name)	Broomsedge Bluestem Herbaceous Vegetation
Association (Common name)	Successional Broom-sedge 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 or a mixture of native and exotic species, one of the most dominant or characteristic species being *Andropogon virginicus var. virginicus* (broomsedge bluestem). *Lolium pratense* (meadow ryegrass) can dominate fields early in the season. This is a very common and wide-ranging association that 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:
Little River Canyon National Preserve Environment: Examples at Little River occupy utility corridors and old fields.

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

Little River Canyon National Preserve Vegetation: This association is represented by a dense stand of *Andropogon virginicus var. virginicus* (broomsedge bluestem) accented by a sparse occurrence of *Packera anonyma* (Small's ragwort), *Lolium arundinaceum* (tall fescue), *Conyza canadensis* (Canadian horseweed), *Phytolacca americana* (American pokeweed), *Valerianella radiata* (beaked cornsalad), *Plantago aristata* (largebracted plantain), *Mimosa microphylla* (littleleaf sensitive-briar), and several other species beginning to invade from adjoining forested areas. Woody vegetation, while generally scarce, is exemplified by a good diversity of species, specifically opportunistic and invasive taxa such as *Quercus stellata* (post oak), *Lonicera japonica* (Japanese honeysuckle), *Rhus copallinum* (flameleaf sumac), *Ailanthus altissima* (tree of heaven), and *Juniperus virginiana var. virginiana* (eastern redcedar), among many others.

Global Vegetation: Stands of this community are dominated by *Andropogon virginicus var. virginicus* (broomsedge bluestem), sometimes codominant with *Lolium pratense* (meadow ryegrass). Associated species vary with geography and habitat and include typical pioneer species. Species with high cover values in plot samples attributed to this type include *Tridens flavus* (purpletop tridens), *Setaria parviflora* (marsh bristlegrass), *Eragrostis spectabilis* (purple lovegrass), and *Panicum anceps* (beaked panicgrass) (NatureServe Ecology unpubl. data). On the eastern Highland Rim of Tennessee (Arnold Air Force Base), associated species include *Diodia teres* (poorjoe), *Aristida dichotoma* (churchmouse threeawn), *Aristida oligantha* (prairie threeawn), *Packera anonyma* (Small's ragwort), *Paspalum laeve* (field paspalum), *Lespedeza virginica* (slender lespedeza), and *Plantago virginica* (Virginia plantain). *Rubus argutus* (sawtooth blackberry) and *Smilax* (greenbrier) spp. may be locally abundant but are not dominant. In clearcuts, *Schizachyrium scoparium* (little bluestem), *Danthonia spicata* (poverty oatgrass), and *Dichanthelium* (rosette grass) spp. are also common, as are occasional *Quercus* (oak) spp. and *Rubus argutus* (sawtooth blackberry). The plot at Shiloh National Military Park (western Tennessee) was a mowed field of mostly native species, dominated by *Andropogon virginicus var. virginicus* (broomsedge bluestem). *Paspalum setaceum* (thin paspalum) and *Tridens flavus* (purpletop tridens) were codominant (with less cover). Other herbaceous plants with high cover values were *Setaria parviflora* (marsh bristlegrass), *Diodia teres* (poorjoe), *Schizachyrium scoparium* (little bluestem), and less common were *Packera anonyma* (Small's ragwort), *Sorghum halepense* (Johnsongrass), and *Cyperus retrorsus* (pine barren flatsedge). At less than 1% cover were *Polypremum procumbens* (juniper leaf), *Oxalis stricta* (common yellow oxalis), *Eragrostis spectabilis* (purple lovegrass), *Salvia lyrata* (lyreleaf sage), *Solanum carolinense* (Carolina horsenettle), *Digitaria sanguinalis* (hairy crabgrass), *Panicum anceps* (beaked panicgrass), *Croton willdenowii* (Willdenow's croton), *Trifolium pratense* (red clover), *Kummerowia striata* (Japanese clover), *Coreopsis pubescens* (star tickseed), *Plantago lanceolata* (narrowleaf plantain), and *Mecardonia acuminata* (axilflower). At only a trace amount of cover were *Conyza canadensis* (Canadian horseweed), *Acalypha virginica* (Virginia threeseed mercury), *Solidago* (goldenrod) sp., *Erigeron annuus* (eastern daisy fleabane), *Sida spinosa* (prickly fanpetals), *Hypericum drummondii* (nits and lice), *Polygala verticillata* (whorled milkwort), *Eupatorium capillifolium* (dogfennel), *Passiflora incarnata* (purple passionflower), and *Asclepias amplexicaulis* (clasping milkweed). In West Virginia, common associates include *Sorghastrum nutans* (Indiangrass), *Dichanthelium clandestinum* (deertongue), *Anthoxanthum odoratum* (sweet vernalgrass), *Phleum pratense* (timothy), *Dactylis glomerata* (orchardgrass), *Daucus carota* (Queen Anne's lace), *Lotus corniculatus* (birdfoot deervetch), *Trifolium pratense* (red clover), *Leucanthemum vulgare* (oxeye daisy), *Solidago canadensis* (Canada goldenrod), *Solidago rugosa* (wrinkleleaf goldenrod), and *Solidago nemoralis* (gray goldenrod).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Herb (field)	Graminoid	*Andropogon virginicus* var. *virginicus* (broomsedge bluestem)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:
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
Little River Canyon National Preserve Comments:
Global Comments: Phenology can affect apparent composition: in West Virginia, fields visited early in the season had high cover of *Lolium pratense*, while those sampled later in the season were dominated by *Andropogon virginicus*.
Global Similar Associations:
Global Related Concepts:
Old fields (Vanderhorst 2001a) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Above the canyon near Ebarhart Point.
Global Range: This community ranges throughout most or all of the southeastern United States, extending north to Virginia and West Virginia.
Nations: US
States/Provinces: AL, AR, GA, IL, IN, KY, LA, MO?, MS, NC, OK, SC, TN, TX, VA, WV
TNC Ecoregions:
USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 222Eg:CCC, 231Aa:CCC, 231Ba:CCC, 231Be:CCC, 231Cc:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CC?, 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, Camp Dawson, Fort Benning, Fort Gordon); NPS (Big South Fork, Chickamauga-Chattanooga?, Cowpens, Fort Donelson, Kings Mountain, Lincoln Birthplace, Little River Canyon, Mammoth Cave, Natchez Trace, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita (Coastal Plain)?, Ouachita (Mountains)?, Ouachita?, Ozark?, Talladega (Oakmulgee)?, Talladega (Talladega)?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:

Little River Canyon National Preserve Plots: LIRI.19.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley, mod. C.W. Nordman and S.C. Gawler
References: Fleming and Coulling 2001, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Penfound 1953, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1998a, Tarr et al. 1980, Vanderhorst 2001a, White and Madany 1978

V.B.2.N.b. Low temperate or subpolar perennial forb vegetation

A.1617–*Bigelowia nuttallii* Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance consists of Coastal Plain saline prairies and sandstone glades of central and northern Louisiana, eastern Texas, central Georgia, the Cumberland Plateau of Alabama, and Panhandle Florida, dominated by *Bigelowia nuttallii* (Nuttall's rayless goldenrod), and a mixture of forbs and grasses, including many diminutive annuals. The community types in this alliance are generally distinguished by their herbaceous cover being associated with exposed sandstone boulders, flats, and ledges, intermixed with dense, herbaceous patches, scattered, stunted trees and shrubs, and fruticose lichens. Most examples occur within a matrix of open *Pinus palustris* (longleaf pine) woodlands (except for Cumberland Plateau Alabama examples). Much of the soil and rock is unvegetated. The alliance is dominated by prairie-like vegetation with *Bigelowia nuttallii* (Nuttall's rayless goldenrod), *Schizachyrium scoparium* (little bluestem), *Aristida longispica* (slimspike threeawn), *Croton michauxii* (Michaux's croton), and (in western examples) *Sporobolus silveanus* (Silveus' dropseed) as primary components. The herbaceous flora is rich in endemic and disjunct species. In western types, other typical herbaceous species include *Minuartia drummondii* (Drummond's stitchwort), *Chaetopappa asteroides* (Arkansas leastdaisy), *Astragalus nuttallianus* (smallflowered milkvetch), *Diodia teres* (poorjoe), *Fimbristylis puberula* (hairy fimbry), *Houstonia pusilla* (tiny bluet), *Hypericum drummondii* (nits and lice), *Krigia occidentalis* (western dwarfdandelion), *Lechea san-sabeana* (San Saba pinweed), *Linum medium* (stiff yellow flax), *Marshallia caespitosa* (puffballs), *Nothoscordum bivalve* (crowpoison), *Phacelia glabra* (smooth phacelia), *Polygala mariana* (Maryland milkwort), *Rhynchospora globularis* (globe beaksedge), *Saxifraga texana* (Texas saxifrage), *Isolepis carinata* (keeled bulrush), and *Stylosanthes biflora* (sidebeak pencilflower). Typical woody species that may be scattered in these communities include *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), *Pinus palustris* (longleaf pine), *Pinus echinata* (shortleaf pine), *Pinus taeda* (loblolly pine), *Ilex vomitoria* (yaupon), and *Morella cerifera* (wax myrtle). The herbaceous flora is diverse and varies considerably seasonally. Occurrences may appear almost devoid of vegetation during the dry summers, while the spring and autumn are periods of peak flowering. Soils are strongly acid, sandy loams and silty clay loams, with high aluminum content. These soils can be saturated during the cooler, wetter months, but are extremely dry and hard during summer droughts.
Classification Comments:
Similar Alliances:
Similar Alliance Comments:
Related Concepts:
Schizachyrium - Bigelowia Clayey Dry-Mesic Catahoula Barrens (Turner et al. 1999) ?
IE7f. Catahoula Barren (Allard 1990) I
Little Bluestem-Nuttall's Rayless Goldenrod Series (Diamond 1993) ?

ALLIANCE DESCRIPTION

Environment: Soils are strongly acid, sandy loams and silty clay loams, with high aluminum content. These soils can be saturated during the cooler, wetter months, but are extremely dry and hard during summer droughts.
Vegetation: This alliance is dominated by *Bigelowia nuttallii* (Nuttall's rayless goldenrod) and a mixture of forbs and grasses, including many diminutive annuals. The community types in this alliance are generally distinguished by their herbaceous cover being associated with exposed sandstone boulders, flats, and ledges, intermixed with dense,

herbaceous patches, scattered, stunted trees and shrubs, and fruticose lichens. Most examples occur within a matrix of open *Pinus palustris* (longleaf pine) woodlands (except for Cumberland Plateau Alabama examples). Much of the soil and rock is unvegetated. The alliance is dominated by prairie-like vegetation with *Bigelowia nuttallii* (Nuttall's rayless goldenrod), *Schizachyrium scoparium* (little bluestem), *Aristida longispica* (slimspike threeawn), *Croton michauxii* (Michaux's croton), and (in western examples) *Sporobolus silveanus* (Silveus' dropseed) as primary components. The herbaceous flora is rich in endemic and disjunct species. In western types, other typical herbaceous species include *Minuartia drummondii* (Drummond's stitchwort), *Chaetopappa asteroides* (Arkansas leastdaisy), *Astragalus nuttallianus* (smallflowered milkvetch), *Diodia teres* (poorjoe), *Fimbristylis puberula* (hairy fimbry), *Houstonia pusilla* (tiny bluet), *Hypericum drummondii* (nits and lice), *Krigia occidentalis* (western dwarfdandelion), *Lechea san-sabeana* (San Saba pinweed), *Linum medium* (stiff yellow flax), *Marshallia caespitosa* (puffballs), *Nothoscordum bivalve* (crowpoison), *Phacelia glabra* (smooth phacelia), *Polygala mariana* (Maryland milkwort), *Rhynchospora globularis* (globe beaksedge), *Saxifraga texana* (Texas saxifrage), *Isolepis carinata* (keeled bulrush), and *Stylosanthes biflora* (sidebeak pencilflower). Typical woody species that may be scattered in these communities include *Quercus marilandica* (blackjack oak), *Quercus stellata* (post oak), *Pinus palustris* (longleaf pine), *Pinus echinata* (shortleaf pine), *Pinus taeda* (loblolly pine), *Ilex vomitoria* (yaupon), and *Morella cerifera* (wax myrtle).
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in central and northern Louisiana, eastern Texas, central Georgia, the Cumberland Plateau of Alabama, and Panhandle Florida.
Nations: US
Subnations: AL, AR, FL, GA, LA, TX
TNC Ecoregions: 32:P, 40:C, 41:C, 50:C, 53:C, 56:C
USFS Ecoregions: 231Cc:CCC, 231Eh:CCC, 232Bg:CCP, 232Bh:CCC, 232Br:CCC, 232Fa:CCC, 232Fe:CCC
Federal Lands: NPS (Little River Canyon); USFS (Angelina, Kisatchie, Sabine)

(CEGL004622) Nuttall's Rayless-goldenrod - Woodland Tickseed - Small-head Blazingstar Herbaceous Vegetation

***Bigelowia nuttallii - Coreopsis pulchra - Liatris microcephala* Herbaceous Vegetation**
Alabama Cumberland Sandstone Glade

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial forb vegetation (V.B.)
Physiognomic Group	Temperate or subpolar perennial forb vegetation (V.B.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar perennial forb vegetation (V.B.2.N.)
Formation	Low temperate or subpolar perennial forb vegetation (V.B.2.N.b.)
Alliance	*Bigelowia nuttallii* Herbaceous Alliance (A.1617)
Alliance (English name)	Nuttall's Rayless-goldenrod Herbaceous Alliance
Association	*Bigelowia nuttallii - Coreopsis pulchra - Liatris microcephala* Herbaceous Vegetation
Association (English name)	Nuttall's Rayless-goldenrod - Woodland Tickseed - Small-head Blazingstar Herbaceous Vegetation
Association (Common name)	Alabama Cumberland Sandstone Glade
Ecological System(s):	Cumberland Sandstone Glade and Barrens (CES202.337)

ELEMENT CONCEPT

Global Summary: This community is characteristic of shallow soils associated with sandstone outcrops on Lookout and Sand mountains in northeastern Alabama, ranging sporadically southwestward to the vicinity of

Birmingham. Occurrences of this community type can attain dimensions as large as 4-5 acres. Typically, a scattering of small trees and shrubs, including *Pinus virginiana* (Virginia pine), *Acer rubrum* (red maple), *Chionanthus virginicus* (white fringetree), *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), and *Quercus* (oak) spp., inhabit deeper soils that may have accumulated in crevices. The herbaceous component is represented by a high diversity of graminoids and forbs, with the following species being typical: *Bigelowia nuttallii* (Nuttall's rayless goldenrod), *Schizachyrium scoparium* (little bluestem), *Andropogon ternarius* (splitbeard bluestem), *Aristida longispica* (slimspike threeawn), *Panicum virgatum* (switchgrass), *Tephrosia virginiana* (Virginia tephrosia), *Hypericum hypericoides* (St. Andrew's cross), *Agalinis tenuifolia* (slenderleaf false foxglove), *Castilleja coccinea* (scarlet Indian paintbrush), *Symphyotrichum patens* (late purple aster), *Symphyotrichum concolor* (eastern silver aster), *Coreopsis major* (greater tickseed), *Coreopsis pulchra* (woodland tickseed), *Helianthus divaricatus* (woodland sunflower), *Liatris microcephala* (smallhead blazing star), *Pityopsis graminifolia* (narrowleaf silkgrass), and *Solidago erecta* (showy goldenrod). Several regional endemics and rare species are restricted to this community, including *Allium speculae* (Little River Canyon onion), *Coreopsis pulchra* (woodland tickseed), *Cuscuta harperi* (Harper's dodder), *Diervilla rivularis* (mountain bush honeysuckle), *Helianthus longifolius* (longleaf sunflower), *Quercus boyntonii* (Boynton sand post oak), *Schoenolirion wrightii* (Texas sunnybell), and *Talinum mengesii* (Menges' fameflower). This community occurs in Jackson, DeKalb, Cherokee, Marshall, and Etowah counties, Alabama. In a southern outlier of this type (Jefferson County, Alabama, in the vicinity of Birmingham), herbaceous species include *Bigelowia nudata* (pineland rayless goldenrod), *Hypericum gentianoides* (orangegrass), *Liatris microcephala* (smallhead blazing star), *Talinum mengesii* (Menges' fameflower), *Schizachyrium scoparium* (little bluestem), *Opuntia humifusa* (devil's-tongue), *Seymeria cassioides* (yaupon blacksenna), *Cuscuta harperi* (Harper's dodder), *Pteridium aquilinum* (western brackenfern), and *Solidago erecta* (showy goldenrod). The scattered woody species include *Pinus virginiana* (Virginia pine), *Pinus palustris* (longleaf pine), *Quercus falcata* (southern red oak), *Quercus georgiana* (Georgia oak), *Ulmus alata* (winged elm), *Amelanchier arborea* (common serviceberry), *Vaccinium arboreum* (farkleberry), *Vaccinium elliottii* (Elliott's blueberry), and the woody vines *Smilax bona-nox* (saw greenbrier), *Gelsemium sempervirens* (evening trumpetflower), and *Vitis rotundifolia* (muscadine).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Little River Canyon National Preserve Environment: This community is characteristic of shallow soils associated with sandstone outcrops along Little River Canyon and, to a lesser extent, elsewhere in the preserve. Typically, a scattering of small trees and shrubs serve to readily distinguish this association from others in the preserve.

Global Environment:

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Known examples of this association in the preserve contain a high diversity of graminoids and forbs. Characteristic herbs include *Andropogon ternarius* (splitbeard bluestem), *Schizachyrium scoparium* (little bluestem), *Danthonia sericea* (downy danthonia), *Bulbostylis capillaris* (densetuft hairsedge), *Diamorpha smallii* (elf orpine), *Hypericum gentianoides* (orangegrass), *Croton willdenowii* (Willdenow's croton), *Minuartia glabra* (Appalachian stitchwort), *Trichostema dichotomum* (forked bluecurls), *Opuntia humifusa* (devil's-tongue), and *Nuttallanthus canadensis* (Canada toadflax). Typically, a scattering of small trees and shrubs, including *Pinus virginiana* (Virginia pine), *Quercus marilandica* (blackjack oak), *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), *Chionanthus virginicus* (white fringetree), *Rhus copallinum* (flameleaf sumac), *Acer rubrum* (red maple), and *Amelanchier arborea* (common serviceberry), inhabit crevices and shallow depressions that have sufficiently accumulated a layer of soil to sustain arborescent taxa. Several regional endemics and rare species are restricted to this community, many of which occur in the preserve, including *Allium speculae* (Little River Canyon onion), *Coreopsis pulchra* (woodland tickseed), *Cuscuta harperi* (Harper's dodder), *Diervilla rivularis* (mountain bush honeysuckle), *Helianthus longifolius* (longleaf sunflower), *Schoenolirion wrightii* (Texas sunnybell), and *Phemeranthus mengesii*.

Global Vegetation: Stands of this association contain a high diversity of graminoids and forbs. The following species are typical: *Bigelowia nuttallii* (Nuttall's rayless goldenrod), *Schizachyrium scoparium* (little bluestem), *Andropogon ternarius* (splitbeard bluestem), *Aristida longispica* (slimspike threeawn), *Panicum virgatum* (switchgrass), *Tephrosia virginiana* (Virginia tephrosia), *Hypericum gentianoides* (orangegrass), *Hypericum hypericoides* (St. Andrew's cross), *Agalinis tenuifolia* (slenderleaf false foxglove), *Castilleja coccinea* (scarlet Indian paintbrush), *Seymeria cassioides* (yaupon blacksenna), *Talinum mengesii* (Menges' fameflower), *Symphyotrichum patens* (late purple aster), *Symphyotrichum concolor* (eastern silver aster), *Coreopsis major* (greater tickseed), *Coreopsis pulchra* (woodland tickseed), *Helianthus divaricatus* (woodland sunflower), *Liatris microcephala* (smallhead blazing star), *Pityopsis graminifolia* (narrowleaf silkgrass), *Solidago erecta* (showy goldenrod), *Opuntia humifusa* (devil's-tongue), *Cuscuta harperi* (Harper's dodder), and *Pteridium aquilinum* (western brackenfern). Typically, a scattering of small trees and shrubs, including *Pinus virginiana* (Virginia pine), *Pinus palustris* (longleaf pine), *Quercus falcata* (southern red oak), *Quercus georgiana* (Georgia oak), *Ulmus alata* (winged elm), *Amelanchier arborea* (common serviceberry), *Acer rubrum* (red maple), *Chionanthus virginicus* (white fringetree), *Kalmia latifolia* (mountain laurel), *Vaccinium arboreum* (farkleberry), and *Vaccinium elliottii* (Elliott's blueberry), inhabit deeper soils that may have accumulated in crevices. The woody vines *Smilax bona-nox* (saw greenbrier), *Gelsemium sempervirens* (evening trumpetflower), and *Vitis rotundifolia* (muscadine) may also be present. Several regional endemics and rare species are restricted to this community, including *Allium speculae* (Little River Canyon onion), *Coreopsis pulchra* (woodland tickseed), *Cuscuta harperi* (Harper's dodder), *Diervilla rivularis* (mountain bush honeysuckle), *Helianthus longifolius* (longleaf sunflower), *Quercus boyntonii* (Boynton sand post oak), *Schoenolirion wrightii* (Texas sunnybell), and *Talinum mengesii* (Menges' fameflower).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:
Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Allium speculae* (Little River Canyon onion), *Coreopsis pulchra* (woodland tickseed), *Cuscuta harperi* (Harper's dodder), *Diervilla rivularis* (mountain bush honeysuckle), *Fimbristylis brevivaginata* (glade fimbry), *Helianthus longifolius* (longleaf sunflower), *Schoenolirion croceum* (yellow sunnybell), *Schoenolirion wrightii* (Texas sunnybell), *Talinum mengesii* (Menges' fameflower)
Global: *Allium speculae* (Little River Canyon onion), *Coreopsis pulchra* (woodland tickseed), *Cuscuta harperi* (Harper's dodder), *Diervilla rivularis* (mountain bush honeysuckle), *Helianthus longifolius* (longleaf sunflower), *Liatris microcephala* (smallhead blazing star), *Quercus boyntonii* (Boynton sand post oak), *Schoenolirion wrightii* (Texas sunnybell), *Talinum mengesii* (Menges' fameflower)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2 (14-Dec-1998). This community is characteristic of shallow soils associated with sandstone outcrops on Lookout Mountain and Sand Mountain in northeastern Alabama, ranging sporadically southwestward to the vicinity of Birmingham. Occurrences of this community type can attain dimensions as large as 4 to 5 acres. This community is very restricted in distribution and areal extent but has few threats.

CLASSIFICATION

Status: Standard
Classification Confidence: 1 - Strong
Little River Canyon National Preserve Comments:

Global Comments: Perkins (1981) reports *Bigelowia* as dominating "basins, small vegetation islands, and edges of vegetation mats" on sandstone outcrops above Little River Canyon, Alabama (Lookout Mountain, Table Plateau Subsection). It is reported as "often the only herb in the samples ... (s)ometimes parasitizing *Bigelowia* was the rare dodder *Cuscuta harperi*." Al Schotz (pers. comm.) reports that the three nominal species "almost always co-exist with one another in this kind of habitat" and that, in addition, "a sizable number of regional endemics" are also present. Examples are known from Lake Guntersville State Park and Chitwood Bog TNC Preserve.
Global Similar Associations:
Global Related Concepts:
IE8a. Interior Upland Sandstone Glade (Allard 1990) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Distributed throughout the preserve, but most frequent along the rim of Little River Canyon.
Global Range: This community is characteristic of shallow soils associated with sandstone outcrops on Lookout and Sand mountains in northeastern Alabama, ranging sporadically southwestward to the vicinity of Birmingham.
Nations: US
States/Provinces: AL:S2
TNC Ecoregions:
USFS Ecoregions: 231Cc:CCC, 232:C
Federal Lands: NPS (Little River Canyon)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.28, LIRI.30, LIRI.81.
Local Description Authors: A. Schotz
Global Description Authors: A. Schotz
References: Allard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Perkins 1981, Schotz pers. comm., Southeastern Ecology Working Group n.d.

V.B.2.N.d. Temporarily flooded temperate perennial forb vegetation

A.1657–*Justicia americana* Temporarily Flooded Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance covers rocky river shoals dominated by *Justicia americana* (American water-willow) with *Orontium aquaticum* (goldenclub), *Podostemum ceratophyllum* (hornleaf riverweed), *Leersia* (cutgrass) spp., *Lemna minor* (common duckweed), *Saururus cernuus* (lizard's tail), and others. A sparse canopy may be present, and species may include *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Fagus grandifolia* (American beech), and *Fraxinus pennsylvanica* (green ash). There is some apparent regional variation in the associated species. More Appalachian examples may contain *Orontium aquaticum* (goldenclub) as a codominant. In parts of the Ridge and Valley and Piedmont, *Hymenocallis caroliniana* (Carolina spiderlily) is codominant. In the Edwards Plateau of central Texas, associated with *Justicia americana* (American water-willow) are *Bacopa monnieri* (herb of grace), *Fuirena simplex* (western umbrella-sedge), *Eleocharis geniculata* (Canada spikesedge), *Eleocharis montevidensis* (sand spikerush), and *Cyperus* (flatsedge) spp.
Classification Comments:
Similar Alliances:
Similar Alliance Comments:
Related Concepts:

Justicia americana herbaceous alliance (Hoagland 2000) ?
IIE3a. Riverside Shoal and Stream Bar Complex (Allard 1990) I
Rocky Bar and Shore (Schafale and Weakley 1990) I
Shoal and Stream Bar (Nelson 1986) I
Water-willow (*Justicia americana*) - smart-weed riverbed community (Fike 1999) ?

ALLIANCE DESCRIPTION

Environment: This alliance occurs on the shoals or bars of rocky streams and riverbeds.
Vegetation: This alliance, found primarily in the southeastern United States, is made up of riverside herbaceous communities dominated by *Justicia americana* (American water-willow) with *Orontium aquaticum* (goldenclub), *Podostemum ceratophyllum* (hornleaf riverweed), *Leersia* (cutgrass) spp., *Lemna minor* (common duckweed), *Saururus cernuus* (lizard's tail), and others. A sparse tree canopy may be present, and species may include *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Fagus grandifolia* (American beech), and *Fraxinus pennsylvanica* (green ash). There is some apparent regional variation in the associated species. More Appalachian examples may contain *Orontium aquaticum* (goldenclub) as a codominant (Schmalzer and DeSelm 1982). In parts of the Ridge and Valley and Piedmont, *Hymenocallis caroliniana* (Carolina spiderlily) is codominant. In the Edwards Plateau of central Texas, associated with *Justicia americana* (American water-willow) are *Bacopa monnieri* (herb of grace), *Fuirena simplex* (western umbrella-sedge), *Eleocharis geniculata* (Canada spikesedge), *Eleocharis montevidensis* (sand spikerush), and *Cyperus* (flatsedge) spp. Further study is needed to characterize this alliance and document its regional variability.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is distributed in the Edwards Plateau of Texas, Ozark Highlands, Boston Mountains, Ouachita Mountains, Interior Low Plateau, Cumberland Plateau, Piedmont, and Arkansas Valley. It is found from Pennsylvania to Ohio, south to Georgia and west to Texas and Oklahoma.
Nations: US
Subnations: AL, AR, GA, KY, MD, NC, NJ, NY, OH, OK, PA, SC, TN, TX, VA, WV
TNC Ecoregions: 29:C, 38:C, 39:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 59:C, 60:C, 61:C
USFS Ecoregions: 212Fa:CCP, 212Fb:CCC, 212Fc:CCC, 212Ga:CCP, 212Gb:CCP, 221Am:CCP, 221Ba:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Ea:CCP, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Eb:CCC, 222Eg:CCC, 222Ej:CCP, 222En:CCC, 222Eo:CCC, 222Ha:CCC, 231Af:CCC, 231B:CC, 231Cc:CCC, 231Cd:CCC, 231Dc:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 315D:CC, 321B:PP, M221Aa:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Cb:CCC, M221Cd:CCC, M221Da:CCC, M221Dc:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: DOD (Fort Hood); NPS (Big South Fork, Blue Ridge Parkway?, C&O Canal, Delaware Water Gap, George Washington Parkway, Harpers Ferry, Little River Canyon, Mammoth Cave, Manassas, Natchez Trace, New River Gorge, Obed, Stones River, Upper Delaware); USFS (Bankhead, Cherokee, Daniel Boone, Oconee?, Ouachita, Ozark, Pisgah, Sumter, Uwharrie, Wayne); USFWS (Cahaba River)

(CEGL004286) American Water-willow Herbaceous Vegetation
***Justicia americana* Herbaceous Vegetation**
Water-willow Rocky Bar and Shore

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial forb vegetation (V.B.)

Physiognomic Group	Temperate or subpolar perennial forb vegetation (V.B.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar perennial forb vegetation (V.B.2.N.)
Formation	Temporarily flooded temperate perennial forb vegetation (V.B.2.N.d.)
Alliance	*Justicia americana* Temporarily Flooded Herbaceous Alliance (A.1657)
Alliance (English name)	American Water-willow Temporarily Flooded Herbaceous Alliance
Association	*Justicia americana* Herbaceous Vegetation
Association (English name)	American Water-willow Herbaceous Vegetation
Association (Common name)	Water-willow Rocky Bar and Shore
Ecological System(s):	Central Appalachian River Floodplain (CES202.608) Central Appalachian Stream and Riparian (CES202.609) South-Central Interior Small Stream and Riparian (CES202.706) Southern Piedmont Small Floodplain and Riparian Forest (CES202.323) Cumberland Riverscour (CES202.036) South-Central Interior Large Floodplain (CES202.705) Ozark-Ouachita Riparian (CES202.703)

ELEMENT CONCEPT

Global Summary: This association is found primarily in the Piedmont, Central Appalachians, Cumberland Plateau, Interior Low Plateau, Ozarks, Ouachita Mountains, and adjacent provinces. Stands occur on the shoals or bars of rocky streams and riverbeds, where they are subject to frequent high-energy floods. It provides habitat in some portions of its range for globally rare dragonflies and herbs. *Justicia americana* (American water-willow) is the characteristic dominant. *Saururus cernuus* (lizard's tail) is often present and may be codominant. Other herbaceous species that may be present include *Leersia oryzoides* (rice cutgrass), *Leersia virginica* (whitegrass), *Lemna minor* (common duckweed), *Orontium aquaticum* (goldenclub), *Podostemum ceratophyllum* (hornleaf riverweed), *Scirpus* (bulrush) sp., *Schoenoplectus pungens* (common threesquare), *Schoenoplectus tabernaemontani* (softstem bulrush), *Cyperus* (flatsedge) spp., *Eleocharis* (spikerush) spp., *Diodia teres* (poorjoe), *Gratiola brevifolia* (sticky hedgehyssop), *Bidens* (beggarticks) spp., *Polygonum caespitosum var. longisetum* (oriental ladysthumb), and *Xyris difformis var. difformis* (bog yelloweyed grass). Exotics include *Lythrum salicaria* (purple loosestrife) and *Lysimachia vulgaris* (garden yellow loosestrife). A sparse canopy layer, which can include *Carpinus caroliniana ssp. caroliniana* (American hornbeam), *Salix interior* (sandbar willow), *Acer saccharinum* (silver maple), *Platanus occidentalis* (American sycamore), *Betula nigra* (river birch), *Fagus grandifolia* (American beech), and *Fraxinus pennsylvanica* (green ash), among other species, may be present. Scattered shrub seedlings of *Salix nigra* (black willow), *Betula nigra* (river birch), *Acer saccharinum* (silver maple), or *Platanus occidentalis* (American sycamore) may also be present.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Little River Canyon National Preserve Environment: Examples are frequently distributed in shoals and gravelly sands along Little River.

Global Environment: This association occurs on the shoals or bars of rocky streams and riverbeds, on bedrock, boulders, cobble, gravel, and sands. They are subject to frequent high energy floods, and are entirely submerged by most flood events. During extreme low water periods, the soil below the beds can be exposed, showing a varied mixture of sand, gravel and cobbles, often with deposits of silt and muck. Stands commonly occur on the edge of the river and at the heads and tails of islands and may sometimes occur on deposition bars in the middle of the river. Substrate pH was circumneutral (6.0 - 6.5) in two samples. Slopes range from level to moderate but are typically gentle. Elevations of West Virginia stands range from 73 to at least 654 m; the type occurs at lower elevations in the Piedmont and Coastal Plain.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: While *Justicia americana* (American water-willow) is prominent, this association is distinguished by a suite of other aquatic herbs, including *Orontium aquaticum* (goldenclub), *Podostemum ceratophyllum* (hornleaf riverweed), and the globally imperiled *Ptilimnium nodosum* (piedmont mock bishopweed) (federally listed as endangered) and *Sagittaria secundifolia* (Little River arrowhead) (federally listed as threatened).

Global Vegetation: *Justicia americana* (American water-willow) is the dominant(and sometimes the only) species, forming lawnlike stands in shallow reaches of rivers. Cover by *Justicia americana* (American water-willow) ranges from 40 to 85%. *Saururus cernuus* (lizard's tail) is often present and may be codominant. Other herbaceous species may be present but rarely achieve more than 1% cover; they include *Leersia oryzoides* (rice cutgrass), *Leersia virginica* (whitegrass), *Lemna minor* (common duckweed), *Orontium aquaticum* (goldenclub), *Podostemum ceratophyllum* (hornleaf riverweed), *Scirpus* (bulrush) sp., *Schoenoplectus pungens* (common threesquare), *Schoenoplectus tabernaemontani* (softstem bulrush), *Cyperus* (flatsedge) spp., *Elodea* (waterweed) sp., *Eleocharis* (spikerush) spp., *Equisetum arvense* (field horsetail), *Bidens* (beggarticks) spp., *Polygonum caespitosum var. longisetum* (oriental ladysthumb), *Diodia teres* (poorjoe), *Gratiola brevifolia* (sticky hedgehyssop), and *Xyris difformis var. difformis* (bog yelloweyed grass). Exotics include *Lythrum salicaria* (purple loosestrife) and *Lysimachia vulgaris* (garden yellow loosestrife). In some areas, *Justicia* (water-willow) usually grows in nearly pure patches, so that few other species are associated with it. *Bidens* (beggarticks) spp., *Cuscuta gronovii* (scaldweed), *Mimulus ringens* (Allegheny monkeyflower), *Polygonum* (knotweed) spp., *Rumex* (dock) spp., and *Salix interior* (sandbar willow) can occur (Anderson 1982). Some stands have low cover by scattered flood-suppressed trees or an overhanging canopy. Trees in plots include *Acer saccharinum* (silver maple), *Betula nigra* (river birch), *Fraxinus pennsylvanica* (green ash), and *Platanus occidentalis* (American sycamore). A sparse canopy layer may be present, which can include *Carpinus caroliniana* (American hornbeam), *Fagus grandifolia* (American beech), and *Fraxinus pennsylvanica* (green ash), among others. Scattered shrub seedlings of *Salix nigra* (black willow), *Betula nigra* (river birch), *Acer saccharinum* (silver maple), or *Platanus occidentalis* (American sycamore) may also be present. In the Cumberland Plateau of Alabama, *Justicia americana* (American water-willow) is present in dense patches with some interspersion of other species, including *Pilea pumila* (Canadian clearweed), *Boehmeria cylindrica* (smallspike false nettle), *Eclipta prostrata* (false daisy), *Juncus coriaceus* (leathery rush), *Mikania scandens* (climbing hempvine), *Ludwigia palustris* (marsh seedbox), *Leersia* (cutgrass) sp., and *Bidens* (beggarticks) sp. Schmalzer and DeSelm (1982) discuss *Orontium aquaticum* (goldenclub) growing along streambanks or in shallow riffles "along or with" *Justicia americana* (American water-willow) in the Obed River in the Cumberland Plateau of Tennessee. In 29 plots sampled in the Potomac River watershed (Piedmont, Blue Ridge and Ridge and Valley provinces), *Justicia* (water-willow) was overwhelmingly dominant (50-75% mean cover), and no associated species occurred in more than 48% of the plots. Vascular plant species richness in sampled plots is low (typically 6-14 taxa). The exotic invasive *Lythrum salicaria* (purple loosestrife) was found in one West Virginia plot but has not been observed in abundance in this community, possibly due to intolerance of high-energy flooding.

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Herb (field)	Forb	*Justicia americana* (American water-willow)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global: *Justicia americana* (American water-willow), *Leersia oryzoides* (rice cutgrass), *Leersia virginica* (whitegrass), *Polygonum amphibium* (water knotweed), *Polygonum caespitosum* var. *longisetum* (oriental ladysthumb), *Saururus cernuus* (lizard's tail), *Schoenoplectus pungens* (common threesquare)

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve: *Ptilimnium nodosum* (piedmont mock bishopweed), *Sagittaria secundifolia* (Little River arrowhead)
Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4G5 (12-Sep-1997).

CLASSIFICATION

Status: Standard
Classification Confidence: 2 - Moderate
Little River Canyon National Preserve Comments:
Global Comments: This type, in Ohio, often forms pure patches, but consistent identification may require a simple cutoff rule, such as at least 50% cover of *Justicia* (Anderson 1982). However, Anderson (1996) no longer recognizes this type.
Global Similar Associations:
Hymenocallis coronaria - Justicia americana Herbaceous Vegetation (CEGL004285)
Justicia americana - Peltandra virginica Herbaceous Vegetation [Provisional] (CEGL006579)
Peltandra virginica - Saururus cernuus - Boehmeria cylindrica / Climacium americanum Herbaceous Vegetation (CEGL007696)
Global Related Concepts:
Justicia americana riparian herbaceous vegetation (Vanderhorst 2001b) =
Aquatic Types (Schmalzer and DeSelm 1982) B
IIE3a. Riverside Shoal and Stream Bar Complex (Allard 1990) B
Lizard's tail emergent bed (Perles et al. 2004) ?
Rocky Bar and Shore (Water Willow Subtype) (Schafale 1998b) ?
Water willow emergent bed (Perles et al. 2004) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Frequently distributed along the entire length of Little River in the preserve.
Global Range: This type is found primarily in the Piedmont, Interior Low Plateau, Cumberland Plateau, Ozarks, Ouachita Mountains, and adjacent provinces. It ranges from Alabama, Georgia and the Carolinas west to Arkansas and Oklahoma and north to Ohio, Pennsylvania, and Delaware.
Nations: US
States/Provinces: AL, AR, GA, KY, MD, NC, NJ, NY, OH:S4, OK, PA:S5, SC?, TN, VA, WV
TNC Ecoregions:
USFS Ecoregions: 212Fa:CCP, 212Fb:CCC, 212Fc:CCC, 212Ga:CCP, 212Gb:CCP, 221Am:CCP, 221Ba:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Ea:CCP, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222Eb:CCC, 222Eg:CCC, 222Ej:CCP, 222En:CCC, 222Eo:CCC, 222Ha:CCC, 231Af:CCC, 231B:CC, 231Cc:CCC, 231Cd:CCC, 231D:CC, M221Aa:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Cb:CCC, M221Cd:CCC, M221Da:CCC, M221Dc:CCC, M222A:CC, M231A:CC
Federal Lands: NPS (Big South Fork, C&O Canal, Delaware Water Gap, George Washington Parkway, Harpers Ferry, Little River Canyon, Mammoth Cave, Manassas, Natchez Trace, New River Gorge, Obed, Stones River, Upper Delaware); USFS (Bankhead, Cherokee, Daniel Boone, Oconee?, Ouachita, Ouachita (Mountains), Ozark, Pisgah, Sumter (Mountains)?, Sumter (Piedmont)?, Sumter?, Uwharrie, Wayne)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: LIRI.18.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley, mod. D. Faber-Langendoen and S.C. Gawler
References: Allard 1990, Anderson 1982, Anderson 1996, Fike 1999, Fleming et al. 2001, Harrison 2004, Hoagland 1997, Hoagland 2000, Major et al. 1999, McCoy 1958, Nelson 1986, ONHD unpubl. data, Palmer-Ball et al. 1988, Peet et al. unpubl. data 2002, Penfound 1953, Perles et al. 2004, Schafale 1998b, Schafale 2002, Schafale and Weakley 1990, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC and WPC 2004, Vanderhorst 2001b, Vanderhorst et al. 2007a

V.B.2.N.f. Saturated temperate perennial forb vegetation

A.1696–*Vittaria appalachiana - Heuchera parviflora* Saturated Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance accommodates saturated communities associated with overhanging to vertical rocks and a seasonal to perennial waterfall as a source of aqueous aerosol. One association includes sparse to moderately dense vegetation of sandstone rockhouses in portions of the Cumberland Plateau, where seasonal waterfalls and strongly overhanging erosion features called rockhouses provide moist conditions. *Vittaria appalachiana* (Appalachian shoestring fern) and *Heuchera parviflora* (littleflower alumroot) are dominant and characteristic. Endemics such as *Ageratina luciae-brauniae* (Lucy Braun's snakeroot) and *Solidago albopilosa* (whitehair goldenrod) are associated with the floors of the rockhouses and often dominate the vegetative cover, and the endemic *Minuartia cumberlandensis* (Cumberland stitchwort) also sometimes occupies the floor but is more characteristic of somewhat drier sandstone exposures. *Thalictrum mirabile* (little mountain meadow-rue) is also endemic to this community but is more characteristic of seepages on the rockhouse walls. In the Southern Blue Ridge escarpment region, this alliance includes herbaceous vegetation on rock substrates associated with waterfalls, on nearly vertical rock surfaces and ledges, slopes, and crevices with shallow soils which are constantly saturated.
Classification Comments:
Similar Alliances:
Asplenium montanum Sparsely Vegetated Alliance (A.1831)
Heuchera bracteata Herbaceous Alliance (A.1646)
Similar Alliance Comments:
Related Concepts:
Cumberland Plateau sandstone glade (Evans 1991) I
IID5a. Wet Acidic Cliff (Allard 1990) I
Moist sandstone cliff (Evans 1991) I
Spray Cliff (Nelson 1986) I
Spray Cliff (Schafale and Weakley 1990) ?

ALLIANCE DESCRIPTION

Environment: This alliance accommodates saturated communities associated with overhanging to vertical rocks and a seasonal to perennial waterfall as a source of aqueous aerosol. One association includes sparse to moderately dense vegetation of sandstone rockhouses in portions of the Cumberland Plateau, where seasonal waterfalls and strongly overhanging erosion features called rockhouses provide moist conditions.
Vegetation: *Vittaria appalachiana* (Appalachian shoestring fern) and *Heuchera parviflora* (littleflower alumroot) are dominant and characteristic. Endemics such as *Ageratina luciae-brauniae* (Lucy Braun's snakeroot) and *Solidago albopilosa* (whitehair goldenrod) are associated with the floors of the rockhouses and often dominate the

vegetative cover, and the endemic *Minuartia cumberlandensis* (Cumberland stitchwort) also sometimes occupies the floor but is more characteristic of somewhat drier sandstone exposures. *Thalictrum mirabile* (little mountain meadow-rue) is also endemic to this community but is more characteristic of seepages on the rockhouse walls. In the Southern Blue Ridge escarpment region, this alliance includes herbaceous vegetation on rock substrates associated with waterfalls, on nearly vertical rock surfaces and ledges, slopes, and crevices with shallow soils which are constantly saturated. Other characteristic species include *Huperzia porophila* (rock clubmoss), *Asplenium montanum* (mountain spleenwort), *Asplenium trichomanes ssp. trichomanes* (maidenhair spleenwort), *Asplenium monanthes* (singlesorus spleenwort), *Cystopteris protrusa* (lowland bladderfern), *Polypodium virginianum* (rock polypody), *Trichomanes boschianum* (Appalachian bristle fern), *Grammitis nimbata* (West Indian dwarf polypody), *Hymenophyllum tayloriae* (Taylor's filmy fern), *Trichomanes intricatum* (weft fern), *Phegopteris connectilis* (long beechfern), *Adiantum pedatum* (northern maidenhair), *Saxifraga careyana* (golden eye saxifrage), *Saxifraga caroliniana* (Carolina saxifrage), *Impatiens capensis* (jewelweed), *Hydrocotyle americana* (American marshpennywort), *Thalictrum* (meadow-rue) spp., *Oxalis montana* (mountain woodsorrel), *Carex biltmoreana* (stiff sedge), *Galax urceolata* (beetleweed), *Sphagnum quinquefarium* (sphagnum), *Sphagnum girgensohnii* (Girgensohn's sphagnum), *Plagiomnium carolinianum* (Carolina plagiomnium moss), *Plagiomnium ciliare* (plagiomnium moss), *Mnium marginatum* (olivegreen calcareous moss), *Pseudotaxiphyllum distichaceum* (pseudotaxiphyllum moss), *Bryocrumia vivicolor* (bryocrumia moss), *Thamnobryum alleghaniense* (Allegany thamnobryum moss), *Oncophorus raui* (oncophorus moss), *Hyophila involuta* (hyophila moss), *Dichodontium pellucidum* (dichodontium moss), *Plagiochila sharpii ssp. sharpii*, *Plagiochila caduciloba*, *Plagiochila sullivantii*, *Plagiochila austini*, *Fissidens osmundioides* (osmund fissidens moss), *Bazzania denudata*, *Conocephalum conicum*, *Pellia epiphylla*, *Pellia neesiana*, and *Riccardia multifida*.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Georgia, Kentucky, North Carolina, South Carolina, and Tennessee, and Alabama.
Nations: US
Subnations: AL, GA, KY, MS, NC, SC, TN
TNC Ecoregions: 43:C, 50:C, 51:C, 52:C
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eo:CCC, 231Be:CCC, 231Cc:CCC, 231Cd:CCC, M221Dc:CCC, M221Dd:CCC
Federal Lands: BIA (Eastern Band Cherokee); NPS (Big South Fork, Blue Ridge Parkway?, Great Smoky Mountains, Little River Canyon, Natchez Trace, Obed); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, Nantahala, Pisgah, Sumter)

(CEGL004301) Cave Alumroot - Appalachian Bristle Fern - Rockhouse Meadowrue - (Rockhouse White Snakeroot, Rockhouse Goldenrod) Herbaceous Vegetation

***Heuchera parviflora* var. *parviflora* - *Trichomanes boschianum* - *Thalictrum mirabile* - *(Ageratina luciae-brauniae, Solidago albopilosa)* Herbaceous Vegetation**
Cumberland Plateau Rockhouse

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial forb vegetation (V.B.)
Physiognomic Group	Temperate or subpolar perennial forb vegetation (V.B.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar perennial forb vegetation (V.B.2.N.)
Formation	Saturated temperate perennial forb vegetation (V.B.2.N.f.)
Alliance	*Vittaria appalachiana - Heuchera parviflora* Saturated Herbaceous Alliance (A.1696)
Alliance (English name)	Appalachian Shoestring Fern - Cave Alumroot Saturated Herbaceous Alliance

Association	*Heuchera parviflora* var. *parviflora - Trichomanes boschianum - Thalictrum mirabile - (Ageratina luciae-brauniae, Solidago albopilosa)* Herbaceous Vegetation
Association (English name)	Cave Alumroot - Appalachian Bristle Fern - Rockhouse Meadowrue - (Rockhouse White Snakeroot, Rockhouse Goldenrod) Herbaceous Vegetation
Association (Common name)	Cumberland Plateau Rockhouse
Ecological System(s):	Cumberland Acidic Cliff and Rockhouse (CES202.309)

ELEMENT CONCEPT

Global Summary: This association includes sparse to moderately dense vegetation of heavily shaded sandstone overhangs and ledges in portions of the Cumberland Plateau. These areas include rockhouses, where seasonal waterfalls and strongly overhanging erosion features provide moist conditions, and also include other large rock overhangs of sufficient size to create similar microclimates. Vegetation is variable in composition and cover, but generally includes mats of nonvascular plants (mosses, liverworts, and fern gametophytes) requiring high and nearly constant humidity, specialized herbs, such as *Heuchera parviflora var. parviflora* (littleflower alumroot), *Vittaria appalachiana* (Appalachian shoestring fern), *Thalictrum mirabile* (little mountain meadow-rue), *Ageratina luciae-brauniae* (Lucy Braun's snakeroot), *Solidago albopilosa* (whitehair goldenrod), and scattered woody vines and shrubs, such as *Toxicodendron radicans* (eastern poison ivy), *Parthenocissus quinquefolia* (Virginia creeper), and *Decumaria barbara* (woodvamp). *Heuchera parviflora var. parviflora* (littleflower alumroot) is the most constant indicator. Some noteworthy mosses in these habitats include *Syrrhopodon texanus* (Texan syrrhopodon moss) and *Diphyscium cumberlandianum* (Cumberland diphyscium moss).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Little River Canyon National Preserve Environment: This association occupies vertical sandstone cliffs typically just below the canyon rim, where cliffs assume various height dimensions extending from approximately 1.5 to 12 m (5-40 feet). Although generally dry and sparsely vegetated (about 80% unvegetated), crevices and the undersides of ledges often have higher moisture-retention capacities, lending themselves to support a greater prominence of flora, most notably nonvascular plants. As intimated throughout the region, these cliffs are typically shaded by a mixture of hardwoods and pine, with minimal exposure to the sun.

Global Environment: Sparse to moderately dense vegetation of sandstone rockhouses in portions of the Cumberland Plateau, where seasonal waterfalls and strongly overhanging erosion features called rockhouses provide moist conditions.

VEGETATION DESCRIPTION

Little River Canyon National Preserve Vegetation: Because of harsh growing conditions, the vegetation is often very sparse, covering approximately 20% of the rock surface. Vascular vegetation is restricted to rock shelves and crevices where soil accumulation is sufficient to sustain a low diversity of shrubs and herbs. *Kalmia latifolia* (mountain laurel), *Heuchera parviflora var. parviflora* (littleflower alumroot), *Mitchella repens* (partridgeberry), and *Dichanthelium dichotomum* (cypress panicgrass) serve as principal species, while *Vaccinium pallidum* (Blue Ridge blueberry), *Hydrangea cinerea* (ashy hydrangea), *Parthenocissus quinquefolia* (Virginia creeper), *Porteranthus trifoliatus* (Bowman's root), and *Carex virescens* (ribbed sedge) occur in lesser abundance and are therefore recognized as of secondary importance. Nonvascular plants attain their greatest development in crevices and along the undersides of ledges where favorable moisture conditions allow several species to flourish.

Global Vegetation: Vegetation is variable in composition and cover, but generally includes mats of nonvascular plants (mosses, liverworts, and fern gametophytes) requiring high and nearly constant humidity, specialized herbs, such as *Heuchera parviflora var. parviflora* (littleflower alumroot), *Vittaria appalachiana* (Appalachian shoestring fern), *Thalictrum mirabile* (little mountain meadow-rue) (generally rooted on the rockhouse floor), *Ageratina luciae-brauniae* (Lucy Braun's snakeroot), *Solidago albopilosa* (whitehair goldenrod), and scattered woody vines and shrubs, such as *Toxicodendron radicans* (eastern poison ivy), *Parthenocissus quinquefolia* (Virginia creeper), and *Decumaria barbara* (woodvamp). *Heuchera parviflora var. parviflora* (littleflower alumroot) is the most constant

indicator. Endemics, such as *Ageratina luciae-brauniae* (Lucy Braun's snakeroot) and *Solidago albopilosa* (whitehair goldenrod), are associated with the floors of the rockhouses in portions of the association's distribution, and often dominate the vegetative cover. The endemics *Minuartia cumberlandensis* (Cumberland stitchwort) and *Silene rotundifolia* (roundleaf catchfly) sometimes occupy the floor but are more characteristic of somewhat drier sandstone exposures. *Thalictrum mirabile* (little mountain meadow-rue) is also endemic to this community but is more characteristic of seepages on the rockhouse walls. Scattered shrubs and tree seedlings often root in crevices, and include *Kalmia latifolia* (mountain laurel), *Hydrangea quercifolia* (oakleaf hydrangea), *Hydrangea arborescens* (wild hydrangea), *Clethra acuminata* (mountain sweetpepperbush), *Acer rubrum* (red maple), *Hamamelis virginiana* (American witchhazel), and *Ilex opaca var. opaca* (American holly). Woody vines are often conspicuous, rooted either in crevices, in developed soil mats, or outside the rockhouse proper, and characteristically include *Parthenocissus quinquefolia* (Virginia creeper), *Toxicodendron radicans* (eastern poison ivy), and (in southern portions of the association's distribution) *Decumaria barbara* (woodvamp). Other herbs are recruited from adjacent areas, but often include *Arisaema triphyllum* (Jack in the pulpit), *Eurybia divaricata* (white wood aster), *Athyrium filix-femina ssp. asplenioides* (asplenium ladyfern), *Medeola virginiana* (Indian cucumber), *Mitchella repens* (partridgeberry), *Osmunda cinnamomea* (cinnamon fern), *Osmunda regalis var. spectabilis* (royal fern), *Polystichum acrostichoides* (Christmas fern), *Selaginella apoda* (meadow spikemoss), *Tiarella cordifolia* (heartleaf foamflower), *Viola blanda* (sweet white violet), and *Viola X primulifolia* (primroseleaf violet). Composition tends to be very variable from rockhouse to rockhouse, depending on the mixture of microhabitats there, the geographic location of the rockhouse, and accidents of colonization and persistence. Some noteworthy mosses in these habitats include *Syrrhopodon texanus* (Texan syrrhopodon moss) and *Diphyscium cumberlandianum* (Cumberland diphyscium moss) (D. Taylor pers. comm.).

MOST ABUNDANT SPECIES

Little River Canyon National Preserve

Stratum	Lifeform	Species

Global

Stratum	Lifeform	Species
Herb (field)	Forb	*Heuchera parviflora* var. *parviflora* (littleflower alumroot)

CHARACTERISTIC SPECIES

Little River Canyon National Preserve:

Global:

OTHER NOTEWORTHY SPECIES

Little River Canyon National Preserve:

Global: *Ageratina luciae-brauniae* (Lucy Braun's snakeroot), *Cheilolejeunea evansii* (Evan's cheilolejeunea), *Huperzia porophila* (rock clubmoss), *Hymenophyllum tayloriae* (Taylor's filmy fern), *Minuartia cumberlandensis* (Cumberland stitchwort), *Radula sullivantii* (a liverwort), *Silene rotundifolia* (roundleaf catchfly), *Solidago albopilosa* (whitehair goldenrod), *Tetrodontium brownianum* (Brown's tetrodontium moss), *Thalictrum mirabile* (little mountain meadow-rue), *Trichomanes boschianum* (Appalachian bristle fern), *Trichomanes intricatum* (weft fern), *Vittaria appalachiana* (Appalachian shoestring fern)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2 (10-Jun-2000). This community is naturally rare and geographically restricted to portions of the Cumberland Plateau of eastern Kentucky, eastern Tennessee, and northern Alabama, where it is associated with seasonal waterfalls and strongly overhanging erosion features called rockhouses. There are many hundreds of rockhouses across the range of this association, and many are on federal lands, but occurrences represent little acreage, and most occurrences are threatened by trampling and degradation caused by heavy recreational use and by looting of associated archeological resources.

CLASSIFICATION

Status: Standard
Classification Confidence: 1 - Strong
Little River Canyon National Preserve Comments:
Global Comments: Other rockhouse vegetation, not covered in this concept, occurs in western Kentucky associated with Pennsylvanian sandstone. *Dodecatheon frenchii* is indicative of this western Kentucky association. Sandstone rockhouses in the Bankhead National Forest are provisionally placed here. This association differs from *Vittaria appalachiana - Heuchera parviflora var. parviflora - Houstonia serpyllifolia / Plagiochila* spp. Herbaceous Vegetation (CEGL004302) in having Cumberland Plateau endemics (*Thalictrum mirabile, Solidago albopilosa, Ageratina luciae-brauniae, Minuartia cumberlandensis, Silene rotundifolia*), in lacking some associates of Blue Ridge spray cliffs, and by occurring in sandstone rockhouses with usually seasonal waterfalls or seepage (as opposed to metamorphic rock cliffs with usually permanent waterfall spray).
Global Similar Associations:
Asplenium montanum - Heuchera parviflora var. *parviflora - Silene rotundifolia* Sparse Vegetation (CEGL004392)--a drier type.
Vittaria appalachiana - Heuchera parviflora var. *parviflora - Houstonia serpyllifolia / Plagiochila* spp. Herbaceous Vegetation (CEGL004302)
Global Related Concepts:
Palustrine: Herbaceous Wetland (TNC 1985) B
Wet Sandstone/Shale Cliffs (Schmalzer and DeSelm 1982) =

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Little River Canyon National Preserve Range: Along Little River Canyon just below the canyon rim.
Global Range: This association is distributed through the Cumberland Plateau from Kentucky south through Tennessee to northern Alabama.
Nations: US
States/Provinces: AL, KY, MS, TN
TNC Ecoregions:
USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eo:CCC, 231Be:CCC, 231Cc:CCC, 231Cd:CCC
Federal Lands: NPS (Big South Fork, Little River Canyon, Natchez Trace, Obed); USFS (Bankhead, Daniel Boone)

ELEMENT SOURCES

Little River Canyon National Preserve Inventory Notes:
Little River Canyon National Preserve Plots: None.
Local Description Authors: A. Schotz
Global Description Authors: A.S. Weakley
References: Evans 1991, Farrar 1998, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1985, Walck et al. 1996

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Appendix III. Photos of selected plots on Little River Canyon National Preserve

Plot 2 Little River Canyon: Appalachian Low-Elevation Mixed Pine / Hillside Blueberry Forest

Plot 7 Little River Canyon: Piedmont Beech / Heath Bluff

Plot 8 Little River Canyon: Cumberland Forested Acidic Seep

Plot 22 Little River Canyon: Xeric Ridgetop Chestnut Oak Forest

Little River Canyon: Southern Appalachian Low Mountain Seepage Bog

Little River Canyon: Alabama Cumberland Sandstone Glade

Little River Canyon: Little River during 2002 drought

Little River Canyon: tributary of Little River

Little River Canyon: *Amsonia tabernaemontata*

Little River Canyon: *Iris cristata*

Little River Canyon: *Pedicularis canadensis*

Little River Canyon: *Sarracenia oreophila*

Appendix IV. Key to plant associations at Little River Canyon National Preserve.

Key to the National Vegetation Classification (NVC) Associations which occur, or potentially occur, at Little River Canyon National Preserve

Associations which are documented from Little River Canyon are in **bold type**. Those which are potential, but undocumented for any of the plots in this project, are in normal type. For each association, the common name is given, with the Element Code in brackets [CEGL00####].

1. Communities in river or on floodplain of river or creek tributaries **2**

1. Upland communities or wetland communities isolated from river or creek tributaries (such as depression ponds).....**13**

2. Shrublands, herbaceous, or sparse herbaceous communities.....**3**

2. Forests or woodlands **7**

3. Aquatic community regularly inundated, becoming dry only during extreme drought; often dominated by *Justicia americana* and frequently contains the rare Kral's water-plantain (*Sagittaria secundifolia*) as a secondary species .... **Water-Willow Rocky Bar and Shore [CEGL004286]**

3. Community occasionally inundated by water but is usually above water's edge.....**4**

4. Fern-dominated community primarily limited as riverside occurrences that are patchy and very small.....Cumberland Royal Fern Seep [CEGL008404]

4. Shrub-dominated community.....**5**

5. Dense exotic shrub cover along creeks dominated by *Ligustrum sinense*..... .....**Privet Shrubland [CEGL003807]**

5. Sparse to dense shrub cover not dominated by *Ligustrum sinense*, but comprised of various native species **6**

6. Dense shrub cover of *Alnus serrulata* with *Xanthorhiza simplicissima* in low shrub layer below. Generally occurs as a thin linear community along the river bank..... .....**Rocky Bar and Shore (Alder-Yellowroot type) [CEGL003895]**

6. Sparse to relatively dense shrub cover of various shrubs including *Alnus serrulata*, *Kalmia latifolia*, *Rhododendron* spp., *Vaccinium elliottii*, *Fothergilla major*, *Viburnum dentatum*, and *Cephalanthus occidentalis*, among others (sometimes very sparse where little soil exists, with as low as 10% cover and 90% exposed rock). Most frequently occurs along banks or on boulder-

strewn areas in the middle of channels, but occasionally occupies the understory of transitional oak forest types on the lower portions of steep stream banks and old beaver impoundments .... **Rocky Bar and Shore (Cumberland / Ridge and Valley Type) [CEGL008495]**

7. Seepage forest dominated by *Acer rubrum* and *Quercus alba* along flat secondary waterways, where the soil is typically saturated or at least moist as a result of a continuous supply of groundwater ..... **Cumberland Forested Acid Seep [CEGL007443]**

7. Forest on occasionally flooded terraces or floodplains along Little River or one of its main tributaries **8**

8. Woodland with approximately 40% coverage of canopy species and nearly 100% herbaceous cover. This community contains oak species usually associated with sandy coastal plain habitats such as *Quercus margarettiae* and *Quercus incana* and also has high levels of *Carya pallida*. In addition, this community contains a prominence of *Pinus echinata* and *Pinus taeda* in the canopy. High vegetation diversity is presently maintained by mowing and/or fire .... **Loblolly Pine – Shortleaf Pine Managed Woodland [CEGL003618]**

8. Forest with 80% to nearly 100% canopy closure and less than 100% herbaceous cover..... **9**

9. Forest dominated by *Pinus taeda* and occasionally *Pinus echinata* and *Pinus virginiana* (at least 40% canopy of pine), with *Liriodendron tulipifera* occupying at least 10% of the canopy. The canopy can also contain substantial *Fagus grandifolia* and other mesophytic tree species. Greater than 50% cover of shrubs. Moderate herbaceous cover (0-25%). Similar to CEGL004098 (below), but with more *Pinus taeda*..... ..... **Loblolly Pine – Tuliptree Successional Bottomland Forest [CEGL007546]**

9. Forest not dominated by *Pinus taeda* (less than 40% in canopy) **10**

10. Forest dominated by the exotic species, silktree (*Albizia julibrissin*) .... **Successional Silktree Forest [CEGL007192]**

10. Forest not dominated by silktree, but instead dominated by native species **11**

11. Forest dominated by *Liriodendron tulipifera* and/or *Liquidambar styraciflua* **12**

11. Forest dominated by oaks (usually a combination of *Quercus alba*, *Q. velutina*, *Q. coccinea*, and/or *Q. falcata* comprise at least 40% of the canopy). Other species include pines and mesic species such as *Liriodendron tulipifera* and *Liquidambar styraciflua*. Shrub layer generally has at least 40% total cover dominated by *Kalmia latifolia*. Herbaceous cover varies, but usually has 10% or more cover of *Chasmanthium sessiliflorum*..... ..... **Southern Cumberland High-Energy River Oak Terrace Forest [CEGL004098]**

12. Successional community that includes young *Liriodendron tulipifera* and/or *Liquidambar styraciflua* stands along creeks and rivers within the park .... **Successional Sweetgum Floodplain Forest [CEGL007330]**

12. Late successional/older forest occurs in bottomland areas along Little River that were cultivated 30-80 years ago and now contains large amounts of *Liriodendron tulipifera*, *Liquidambar styraciflua*, and *Magnolia acuminata*. Most examples of this type are dominated by *Liriodendron tulipifera* and are flat! Occasionally *Quercus falcata* and *Quercus alba* are co-dominants..... Montane Sweetgum Alluvial Flat [CEGL007880]

13. Wetland (isolated bog or ephemeral pond)..... **14**

13. Non-wetland..... **15**

14. Ephemeral pond, either natural or caused by backup from a backcountry road. Canopy includes *Liquidambar styraciflua* (usually more than 50% cover) with *Pinus taeda* (about 25%) and *Nyssa sylvatica* or *Acer rubrum* (about 25%) serving as secondary species .... **Upland Sweetgum – Red Maple Pond [CEGL007388]**

14. Swale, not a pond, containing pitcher-plants (*Sarracenia oreophila*) and other wetland species, though the area is dry for part of the year. Examples may contain *Pinus taeda* and various hardwoods in the canopy, especially if not regularly burned. Sphagnum is present in the herbaceous layer – bog.... **Southern Appalachian Low Mountain Seepage Bog [CEGL003914]**

15. Forested (forest or woodland)..... **16**

15. Non-forested (herb-dominated or sparsely vegetated)..... **31**

16. Pine-dominated or co-dominated community (usually more than 40% pine in the canopy)... **17**

16. Hardwood-dominated (at least 60% hardwoods in the canopy) **23**

17. Even aged stand dominated almost exclusively by young-mid aged pine trees (generally less than 50 years of age) with a poorly developed herbaceous layer. Successional..... **18**

17. Uneven aged stand dominated by pines, but usually with a significant component of oaks. Generally tree ages are greater than 60 years **20**

18. Dominated by *Pinus virginiana* (at least 50% of the canopy). Usually very dense trees on the edge of the canyon where disturbance may have recently occurred..... ..... **Virginia Pine Successional Forest [CEGL002591]**

18. Dominated by either *Pinus echinata* or *Pinus taeda* **19**

19. Virtually 100% *Pinus echinata* with a scattering of oaks and successional vegetation. Occasionally shared dominance of *Pinus virginiana* or *Pinus taeda*. ..... **Shortleaf Pine – Early Successional Forest [CEGL006327]**

19. Containing greater than 70% *Pinus taeda* often with various amounts of *Liquidambar styraciflua* ..... **Mid to Late Successional Loblolly Pine-Sweetgum Forest [CEGL008462]**

20. Forest stand comprised of at least 25% *Pinus echinata* in the canopy **21**

20. Community comprised of less than 25% *Pinus echinata* in the canopy. Most examples exist along the rim of the canyon and exposed south-facing slopes usually and can coexist of anywhere from 30% to 100% canopy coverage mostly of *Pinus virginiana*, but also occasionally with a *Quercus prinus* component and a prominence of *Pinus taeda* in disturbed examples. Some examples are dominated by *Vaccinium arboreum* (near 100% cover) or *Deschampsia flexuosa* (near 100% cover) in the shrub and herb layers, respectively; *Quercus marilandica* can often be a small part of the canopy..... **Appalachian Low Elevation Mixed Pine / Hillside Blueberry Forest [CEGL007119]**

21. *Pinus echinata* and often *Pinus virginiana* usually constitute more than 50% of the canopy with *Quercus alba*, *Quercus rubra*, and *Quercus velutina*, but without a large component of dry-site oaks such as *Quercus coccinea* or *Quercus prinus*. The understory is often heavily invaded by *Acer rubrum* in fire suppressed areas. Shrub and herb layers are very sparse except in some cases where *Piptochaetium avenaceum* is dominant. *Carya alba* is sometimes also present in the canopy..... **Appalachian Shortleaf Pine – Mesic Oak Forest [CEGL008427]**

21. Forest comprised of at least 25% Pinus echinata and less than 10% Pinus virginiana.....**22**

22. Forest comprised of at least 25% *Pinus echinata* and between 0 and 50% *Quercus prinus*, *Quercus falcata*, *Quercus coccinea*, or *Quercus stellata*, also without a thick component of *Oxydendrum arboreum* in the understory and dense stands of *Vaccinium pallidum* in the shrub layer. Usually on the most exposed slopes, but occasionally occurs on other aspects in less extreme situations and can occur on low slopes on north aspects..... .....**Southern Blue Ridge Escarpment Shortleaf Pine – Oak Forest [CEGL007493]**

22. *Pinus echinata*-dominated forest, with *Quercus alba*, *Quercus coccinea*, *Quercus falcata*, and/or *Quercus stellata* serving as co-dominants. Similar to CEGL007493 above, but contains a prominence (>75%) of dry-site herbs in the understory, generally as a result frequent burning or high grading. Examples are confined to broad ridges and upper slopes..... .....**Appalachian Shortleaf Pine – Xeric Oak Forest [CEGL007500]**

23. Forest of dry to mesic moderately protected to exposed ridgetops and upper ravines on acidic soils **24**

23. Forest of mesic lower to mid slopes or of bouldery steep streams cascading down the slopes (or occasionally protected slopes just below the cliff line). Canopy is composed of at least some mesophytic forest species **29**

24. Contains greater than 50% *Quercus prinus* and/or *Quercus coccinea* in the canopy.....**25**

24. Contains less than 50% *Quercus prinus* and/or *Quercus coccinea* in the canopy.....**28**

25. Mesic north- to east-facing slopes or protected slopes just below the cliff line dominated by *Quercus prinus* in the canopy and at least 25% shrub cover of either *Rhododendron catawbiense* or *Kalmia latifolia*. Sometimes *Pinus* spp. or *Liriodendron tulipifera* dominate. *Rhododendron catawbiense* is always present. .....**Piedmont Beech Heath Bluff [CEGL004539]**

25. *Quercus prinus* and/or *Quercus coccinea*-dominated forest containing less than 25% *Rhododendron catawbiense* and/or *Kalmia latifolia* in the shrub layer **26**

26. Dry-mesic slope forest often with *Quercus alba* as a canopy species and *Hydrangea quercifolia* and/or *Viburnum acerifolium* in the shrub layer .... **Cumberland Plateau Dry-Mesic White Oak Forest [CEGL008430]**

26. Dry forest of ridgetops and upper slopes seldom, if ever, contains *Hydrangea quercifolia* and/or *Viburnum acerifolium* in the shrub layer.....**27**

27. Xeric ridgetop or upper slope forest with *Quercus prinus* and/or *Quercus coccinea*, with *Quercus alba* dominating in some examples. Herb layer varies from sparse to heavy depending upon canopy closure. *Vaccinium pallidum* usually present – some *Pinus echinata* but less than 40% - *Piptochaetium avenaceum* and/or *Danthonia spicata* can form a significant cover where fire has been present. High graded examples often have a dense herbaceous cover..... .....**Xeric Ridgetop Chestnut Oak Forest [CEGL008431]**

27. Dry-mesic ridgetops and gentle upper slopes co-dominated by a partially open to sparse cover of *Quercus falcata*, *Quercus coccinea*, and *Quercus prinus* in the canopy, with a dense understory comprised of *Quercus marilandica*, *Carya* spp., and sometimes *Quercus stellata* and *Fagus grandifolia* (namely in fire-excluded examples) in the understory .... **Southeastern Interior Southern Red Oak – Scarlet Oak Forest [CEGL007247]**

28. Found on flat to gently sloping land in the backcountry. Dominated by a combination of *Quercus falcata*, *Quercus velutina*, *Quercus alba*, with an occasional *Quercus stellata* and *Quercus rubra*. This community is sometimes part of a bog complex where an open version of this form, thinned out by fire, surrounds the bog..... .....**Southern Red Oak – White Oak Mixed Oak Forest [CEGL007244]**

28. Mesic slope forest dominated by *Quercus alba* and/or various *Carya* spp. in the canopy and with *Hydrangea quercifolia* and/or *Viburnum acerifolium* in the shrub layer. This is the most common slope forest in the preserve and exhibits a great deal of variation in the canopy, shrub, and herb layers ..... **Cumberland Plateau Dry-Mesic White Oak Forest [CEGL008430]**

29. Community usually a very narrow band of vegetation adjacent to streams and/or occupies boulderfields, occasionally occupying lower slopes that dissect the canyon walls or where streams meet terraces. *Quercus alba* and/or *Quercus rubra* usually >25%, along with mesophytic species such as *Fagus grandifolia* in the canopy. The subcanopy nearly always contains *Acer leucoderme* and *Calycanthus floridus* (at least 10% cover) in the shrub layer; the herb layer is diverse with at least 20% cover. *Hydrangea quercifolia* and *Viburnum acerifolium* are generally absent. Sometimes a heavy *Pinus taeda* component is present, which may intergrade with CEGL008430 on steep slopes adjacent to stream beds ..... **Southern Ridge and Valley Small Stream Hardwood Forest [CEGL008428]**

29. Community broad, neither consisting of a narrow band of vegetation along streams nor is confined to boulderfields **30**

30. Diverse hardwood canopy that includes *Quercus rubra*, *Tilia americana* var. *heterophylla*, *Betula lenta*, and *Liriodendron tulipifera*, along with the occasional *Quercus alba*. *Tilia* and/or *Betula* are usually key indicators, as the herbaceous understory, which tends to be comprised of species that prefer basic soils. This forest occupies bands of limestone geology on the lower to mid slopes within the southern portion of the canyon ..... **Southern Ridge and Valley Basic Mesic Hardwood Forest [CEGL008488]**

30. Mesic north- to east-facing slopes or protected slopes just below the cliff line dominated by *Quercus prinus* in the canopy and at least 25% shrub cover comprised of either *Rhododendron catawbiense* or *Kalmia latifolia*. Sometimes various *Pinus* spp. or *Liriodendron tulipifera* dominate. *Rhododendron catawbiense* is always present..... **Piedmont Beech Heath Bluff [CEGL004539]**

31. Successional old field dominated by *Andropogon* spp. and other weedy herbaceous vegetation..... **Successional Broomsedge Vegetation [CEGL004044]**

31. More 'natural' stands **32**

32. Terrain relatively level to moderately steep (about 30% slope), characterized by sparse vegetation, nearly 100% herbaceous cover, and contains areas with scrub *Pinus virginiana* on sandstone..... **Cumberland Sandstone Glade [CEGL004622]**

32. Terrain consisting of overhangs and vertical rock faces called "rockhouses," sparsely vegetated with *Heuchera parviflora* var. *parviflora* serving as an indicator species ..... **Cumberland Acidic Cliff and Rockhouse [CEGL004301]**