

**VASCULAR PLANT INVENTORY AND PLANT  
COMMUNITY CLASSIFICATION FOR FORT  
DONELSON NATIONAL BATTLEFIELD**



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

Prepared by NatureServe for the National Park Service  
Southeast Regional Office  
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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](http://www.natureserveexplorer.org).

**Cover photo:** Early morning mist near the historic site of Fort Donelson. Photo by Rob Evans.

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## Summary

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

- 1) Ecologists from NatureServe established eleven permanently marked one-hectare circular plots within the park in a grid system and another four circular plots in unique ecological areas that were not covered by the initial grid-based plot layout. In addition, ecologists established six observation points. The permanently marked plots are available to be used by researchers on studies ranging from bird point counts to individual plant monitoring.
- 2) Ecologists collected data on all unique vegetation communities within the park and identified four natural and nine human-modified or successional vegetation associations (unique ecological assemblages of plants) within the park boundary. No rare communities were identified for the park, but the globally uncommon Cherrybark Oak / Eastern Hop-hornbeam Forest (G3) is found throughout the park.
- 3) Ecologists collected and vouchered ten species new to the park. These species were added to the exhaustive list of existing vouchers collected by Dr. Edward Chester at Austin Peay State University. These vouchers were delivered to NPS with the delivery of this report and will reside with the rest of the collection currently at Austin Peay State University Herbarium. The species count for the park stands now at 665 documented species (this number does not include subspecies or varieties). NatureServe ecologists estimate that close to 100% of the vascular species of the park are documented. The most highly ranked species in terms of global rarity in the park include Price’s potato-bean (*Apios priceana*) and barbed rattlesnake root (*Prenanthes barbata*). Price’s potato-bean is considered federally threatened.

## Introduction

Effective management of natural resources in our national parks relies upon ready access to comprehensive and scientifically credible information on species and habitats found within park boundaries. Currently, only a few units have compiled the baseline information needed to begin to assess the current state of natural resources at specific parks. Fewer still have begun to track and assess trends over time. With the passage of the National Parks Omnibus Management Act of 1998 by Congress, the National Park Service was given the mandate to “undertake a program of inventory and monitoring of National Park System resources to establish baseline information and to provide information on the long-term trends and the condition of National Park system resources.” Funding for this initiative was appropriated in fiscal year 2000. In Summer 2002, NatureServe began work on the ecological community inventory portion of the project at Fort Donelson National Battlefield.

Although Fort Donelson National Battlefield is managed mostly as a site of historic importance, the park contains some significant natural resources, especially in its oak forests and the population of Price’s potato-bean within the park. After assessing the past and current state of research in the park, we began to work on accomplishing three primary objectives:

- 1) Establish at least 15 permanent plots throughout the park for present and future monitoring purposes.
- 2) Document all ecological communities on the site as defined by the United States National Vegetation Classification (Grossman et al. 1998, Anderson et al. 1998).
- 3) Collect any species found in plots that were not already collected by Dr. Edward Chester.

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*

Fort Donelson National Battlefield is located on bluffs overlooking what was once the main channel of the Cumberland River and is now the impounded Lake Barkley. It is located in Stewart County, Tennessee just west of downtown Dover, Tennessee

The site is approximately 226 ha (559 acres), composed primarily of second growth forests and old fields. A substantial portion of the park contains forests that are fairly young and are now recovering from past disturbances such as cultivation and logging.

Fort Donelson National Battlefield occurs in the Interior Low Plateau ecoregion (Bailey 1994). All creeks in the park eventually flow into the Cumberland River watershed.

### ***Land History***

Fort Donelson was designated as a national military park in 1928 and as a national battlefield in 1985. Between the time of the war and the establishment of the park, the area served as pastureland, cropland, sites for homes, and land claimed by the damming of the Cumberland River. The land upon which the park is located was sparsely settled at the time of battle and consisted of woodland, field, and forest prior to the Civil War. Since the establishment of the park, many former agricultural fields have matured into successional forests.

## Methods

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

### *Permanent plot establishment*

In order to set up a gridded system of one-hectare circular plots within the park boundary as mandated by the *Study Plan for Vertebrate and Vascular Plant Inventories* (Nichols 2000), Judy Teague from NatureServe used GIS layers supplied by the National Park Service's Cumberland Piedmont Network. She manipulated the GIS layers supplied to us with the program ArcView (ArcView 1992). We chose a 56-meter buffer around the current park boundary since each point represents the center of a one-hectare circular plot and we did not wish to sample any private holdings outside of the park. With this buffer in place, Judy established an evenly spaced grid system (we chose the approximate grid size of 400 meters by 400 meters *a priori* based on observations made by a team of park service personnel in 2000 (Nichols 2000)). At each north-south and east-west line, we recorded the coordinates for one grid point (Figure 1 and Table 1).

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

Once at the park, we met with park personnel and local researchers, described the project's goals, and asked for their collaboration in the project. Through this process, we identified priority areas of the park for additional plot establishment and species inventory. In 2002 and 2003, we established eleven plots on the grid system and an additional four plots off of the grid in habitats not covered by any of the grid points (Figure 1). Using the GPS units (Garmin Corp. 1999), we attempted to position ourselves within at least five meters of the "real" map location (the hypothetical location that we created in the lab prior to visiting the site). Once we were within five meters of the "real" map location, we monumented each plot with a one foot piece of iron conduit and a small blue anodized and numbered aluminum tag that we 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 (the NPS PLOTS database). Due to variation in signal strength, accuracy may be more than five meters in some cases. In 2003 and 2004, we recorded additional data at each point.

### *Vegetation classification*

After the establishment of each permanent one-hectare plot, we visually surveyed the area. We chose a representative and relatively homogenous 20 by 50-meter quadrat within the hectare in which to place our standardized vegetation monitoring plot. Within the quadrat, we measured environmental characteristics and identified every vascular plant and estimated cover values for all plants. In addition, we identified every vascular plant in the larger one hectare plot (see Appendix I for a blank version of the data sheets used). We assigned each species a cover value by strata and an overall cover value for the plot based on a modified Braun Blanquet cover class scale (Braun-Blanquet 1928). In addition, we searched for and identified any species within the full hectare plot that were not represented in the 20 by 50-meter sample. Finally, we returned in the spring of 2003 and 2004 to resample the plots to attempt to document any species that we had missed the previous summer. Please contact the archivist or resource manager at the park for details and specific plot locations.

We proofed the plot sheets, entered the data into the National Park Service PLOTS database (NPS/NatureServe 2005), 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 Interior Low Plateau and with written descriptions of each related classification unit. These comparisons, combined with a thorough review of all classification possibilities and a review of the literature for some of these association types, allowed us to produce the current park vegetation classification.

### *Vascular plant inventory*

While gathering plot data, we occasionally discovered plant species within the plots that had not already been documented. We collected any new specimens encountered within the plots and recorded the GPS coordinates using our Garmin GPS unit. We pressed and thoroughly dried all specimens, identified any unknowns that could be identified, and then vouchered all new species according to National Park Service standards using the Integrated Taxonomic Information System (<http://www.itis.gov>) 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 ten species (Tables 2,3) that had not been confirmed previously from the park. We created ten vouchers for the herbarium at Fort Donelson National Battlefield (Table 3) from the plants we collected and photographed. These specimens are in addition to plants collected by Dr. Edward Chester (Chester 1986) and housed at Austin Peay State University.

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 665 species for the park. The estimates of the number of total species in the park that we generated using PC-ORD based on the plot data taken throughout the park were 501 using all 15 full plots and the first-order jackknife method, 580 using all plots and the second-order jackknife method, 418 using just the 11 gridded plots and the first-order jackknife method, and 464 using just the gridded plots and the second-order jackknife method (Table 4). In addition, we calculated alpha (average species richness per plot), beta (measure of the heterogeneity of the data (alpha/gamma)), and gamma (total species overall plots) diversity values for the park based on information gathered from the plot data (Table 4). The alpha value for all plots combined was 74, the beta value was 4.9, and the gamma value was 363.

Using the information gathered in each plot, we discerned 13 distinct vegetation associations within four distinct ecological systems (not including human modified or exotic community types), as defined by the United States National Vegetation Classification (Table 5). Only four of the communities identified are considered “natural” as opposed to “semi-natural”, “human modified/successional” or “exotic species dominated”. The common names of all of the communities are as follows (\* = natural community; *italics* = not documented in park, but present according to the photointerpretation crew):

Interior Mid- to Late-Successional Loblolly Pine Forest (CEGL007105)  
Red-Cedar Successional Forest (CEGL007124)  
\*Central Interior Beech - White Oak Forest (CEGL007881)  
Interior Mid- to Late-Successional Sweetgum - Oak Forest (CEGL007217)  
Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)  
\*White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070)  
\*Central Interior Upland Cherrybark Oak Forest (CEGL003871)  
*Successional Sweetgum Floodplain Forest (CEGL007330)*  
\*Sycamore - Silver Maple Calcareous Floodplain Forest (CEGL007334)  
Black Willow Riparian Forest (CEGL002103)  
Broomsedge Old Field (CEGL004044)  
Cultivated meadow (CEGL004048)  
Tennessee Valley Impoundment Mud Flat Vegetation (CEGL004049)

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

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

## Discussion/Conclusions

### *Species Inventory*

The plot data collection from this project took us to areas in the park where we found and documented 10 park record plant species and added them to a list of 655 species already present within the current boundary of the park (Table 2). One goal of the Inventory and Monitoring program of the National Park Service is to document at least 90% of the vascular flora of the park. Using various estimates and assumptions, the estimate for total number of species in the park ranged from 418 to 580. Excluding varieties, subspecies, and unidentifiable collections, researchers past and present have confirmed 665 species within the park. First-order jackknife estimates often underestimate number of species as evidenced by the lowest estimate in our first-order jackknife (McCune and Grace 2002). In this case, it appears that all of the estimates were underestimates since our actual park species list is well over 100% of the jackknife estimates. Since the jackknife estimates failed us (either because there were too few plots to perform this analysis properly or because the estimate isn't precise enough for our work), we must base our assessment of whether we have documented 90% of the flora on other more subjective criteria. Based on our own knowledge of the park and our belief that Dr. Edward Chester had thoroughly documented close to 100% of the park's flora before the start of our project, we feel that close to 100% of the vascular flora of the park is documented.

Fort Donelson National Battlefield has a relatively low number of "natural" ecological community types. These types range from temporarily flooded bottomlands to dry-mesic woodland slopes and ridgetops. A significant amount of acreage within the park is still early successional, but there are stands within the park that are well over 70 years of age. No rare communities were identified for the park, but the globally uncommon Cherrybark Oak / Eastern Hop-hornbeam Forest (G3) is common throughout the park. This community is one of the dominant communities in the park. Although not considered a "natural community", the old fields within the park's historic battlefields deserve management attention due to their high level of biodiversity.

There is one occurrence of a federally listed species. This species, Price's potato-bean (G2, S2), is found in only a handful of sites in Alabama, Kentucky, Tennessee, Mississippi, and Illinois, most of them with only a few flowering individuals. This is perhaps the most important conservation target in the park. It will be important to focus some effort on monitoring the current population and exploring ways to increase the viability of the population in the park.

Star of Bethlehem (*Ornithogalum umbellatum*) and osage orange (*Maclura pomifera*) are considered globally rare in their native habitats. However, these species are most likely not native to the park and are well outside of their natural ranges, so they are not considered a high conservation priority.

Other species of conservation concern in the park include ginseng (*Panax quinquefolius*) (G3G4, S3S4) and barbed rattlesnake root (*Prenanthes barbata*) (G3, S2). Both plants are considered “of special concern” by the Tennessee Department of Environment and Conservation. In addition, ginseng is considered “commercially exploited” because of the high harvesting pressure for this medicinal plant in some regions.

At least 16% (109 species) of the plant species in the park are not native to the continent (or in some cases, the region). Most of these species were plantings or are harmless present day components of the flora that found their way into natural areas from plantings or errant seed mixes. However, at least 26 species found within the park are considered aggressive invasive species that are significant or severe threats and are actively outcompeting and replacing native species in other parts of the Southeast (Miller 2000, Tennessee Exotic Pest Plants Council 2001, Kentucky Exotic Pest Plants Council 2001). These species are probably the biggest single threat to the overall ecological health of the park at this point in time. Some species such as crown vetch (*Coronilla varia*), Johnson grass (*Sorghum halepense*), bromus species (*Bromus commutatus*, *Bromus japonicus*, *Bromus tectorum*), nodding thistle (*Carduus nutans*), Queen Anne’s lace (*Daucus carota*), goose grass (*Eleusine indica*), foxtail grasses (*Setaria faberi* and *viridis*), common mullein (*Verbascum thaspus*), sericea lespedeza (*Lespedeza cuneata*), and bicolor lespedeza (*Lespedeza bicolor*) were introduced into fallow fields and eroding steep banks and have since outcompeted native old field species. Other plants, such as mimosa (*Albizia julibrissin*), English ivy (*Hedera helix*), sweet autumn clematis (*Clematis terniflora*), and princess tree (*Paulownia tomentosa*) take advantage of light gaps in the interior of forests and edges and threaten to displace native successional tree species and the edges of forests. In the interior woods and forests, shrubs and vines such as Japanese honeysuckle (*Lonicera japonica*), privet (*Ligustrum sinense*), autumn olive (*Elaeagnus umbellata*), burning bush (*Euonymus alata*), climbing euonymus (*Euonymus fortunei*), common periwinkle (*Vinca minor*), and English ivy (*Hedera helix*), all have begun to colonize areas of the understory. Much of the floodplain for the creeks that run through the park is heavily dominated by a combination of exotics, but especially Japanese stiltgrass (*Microstegium vimineum*), multiflora rose (*Rosa multiflora*), jointgrass (*Arthraxon hispidus*), and privet. Japanese knotweed (*Polygonum cuspidatum*) is a species that isn’t yet widespread but could potentially be a very aggressive invader of flooded and riparian areas. Hedgeparsley (*Torilis japonica*) is another plant that is considered aggressive but is currently limited to scattered localities on wasteground in the park. In areas where exotics have become a monoculture, removal should occur in conjunction with planting and seeding of natives to help prevent quick recolonization by the same or new invasive exotic species. The invasive exotic species whose removal would most benefit ecological processes because of their high impact on native flora in the park are probably the wetland species such as privet, Japanese stiltgrass, multiflora rose, and jointgrass in addition to the upland species autumn olive, English ivy, Johnson grass, and lespedeza spp.

### *Vegetation community analysis*

The unit of association is the finest level of the vegetation classification and is defined as “a plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy” (Grossman et al. 1998). Ecological community information such as that gathered for this project and described in Appendix II can be very useful as a management and monitoring tool for the parks. Once identified to the association level, it is possible for 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. For additional information on these community types please see Appendix II, which includes 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. The community types (associations) identified for this park are:

- \* Interior Mid- to Late-Successional Loblolly Pine Forest (CEGL007105)
- \*Red-Cedar Successional Forest (CEGL007124)
- Central Interior Beech - White Oak Forest (CEGL007881)
- \* Interior Mid- to Late-Successional Sweetgum - Oak Forest (CEGL007217)
- \* Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)
- White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070)
- Central Interior Upland Cherrybark Oak Forest (CEGL003871)
- \*Successional Sweetgum Floodplain Forest (CEGL007330)
- Sycamore - Silver Maple Calcareous Floodplain Forest (CEGL007334)
- \*Black Willow Riparian Forest (CEGL002103)
- \*Broomsedge Old Field (CEGL004044)
- \*Cultivated meadow (CEGL004048)
- \*Tennessee Valley Impoundment Mud Flat Vegetation (CEGL004049)

### **Interior Mid- to Late-Successional Loblolly Pine Forest**

Identifier: CEGL007105

At Fort Donelson, this community exists in upland areas that were cultivated or grazed, then abandoned and replanted with loblolly pine 30-70 years ago.

Local examples of this type are strongly dominated by loblolly pine. Due to successional processes, red maple strongly dominates the understory and even reaches the canopy in some stands. The herbaceous layer is sparse but does contain small amounts of Japanese honeysuckle, Christmas fern, rattlesnake plantain, and ground pine.

This community type is the only pine dominated forest in the park and therefore is easy to pick out both in the field and on aerial photographs.

Pine forests are scattered throughout the park's upland areas in abandoned farm/grazing areas.

**Red-cedar Successional Forest**

Identifier: C EGL007124

At Fort Donelson, this community occurs on eroded calcareous upland soils on agricultural land abandoned 15-60 years ago.

This variable successional type can be an older, dense, closed-canopy forest of red cedar or a fairly open and young forest/woodland stand with a much higher cover and diversity of herbaceous species. Besides red-cedar, dogwood, winged elm, sweetgum, redbud, and tuliptree may be common. The herbaceous layer can be sparse or dense depending upon the canopy coverage but often has substantial amounts of ebony spleenwort, wooly beardgrass (*Saccharum alopecuroidum*), trailing bush clover (*Lespedeza procumbens*), and many other species that may be holdovers from the early stages of old-field succession.

This community can be a forest or woodland and is the only type in the park dominated by red-cedar. Because red-cedar is present, this community is easily identified both on the ground and from aerial photographs.

This type occurs in small patches throughout the park, especially adjacent to powerlines and in areas that were grazed or plowed in the past.

**Central Interior Beech-White Oak Forest**

Identifier: C EGL007881

This community type occurs on the most mesic, broadly north-facing (also NW and NE facing), mid to lower steep slopes along drainages in the park.

The vegetation is dominated by at least 40% beech along with some oaks, especially northern red oak. Some examples may be dominated by 100% beech. The herbaceous layer is not exceedingly rich but often does contain a large number of spring ephemerals such as mayapple (*Podophyllum peltatum*), rue anemone (*Thalictrum thalictroides*), and aniseroot (*Osmorhiza longistylis*), as well as sedges. Understory species include sugar maple (*Acer saccharum*), beech, and sassafras (*Sassafras albidum*). Common shrub species include ironwood (*Carpinus caroliniana*), pawpaw (*Asimina triloba*), and hophornbeam (*Ostrya virginiana*).

This forest can be distinguished from other hardwood forest types by the presence of beech in the understory and/or in the canopy and by its presence mostly on steep north facing slopes.

This community is limited to small patches of protected, steep, broadly north-facing slopes along creeks in the park.

### **Interior Mid- to Late-Successional Sweetgum- Oak Forest**

Identifier: CEGL007217

This community occurs in upland areas that were probably originally oak-hickory forests prior to having been heavily disturbed by human activity in the recent past. Generally speaking, disturbance such as plowing or timbering probably occurred between 40 and 60 years ago.

This community is generally dominated by sweetgum with other associated canopy species such as tuliptree, oak, and hickory species as minor components of the canopy and dominants in the subcanopy. The herbaceous layer is generally sparse but may contain sedges and Christmas fern.

Although there are other sweetgum dominated forests in the park, this is the only upland forest with any substantial sweetgum component.

This community occurs in patches throughout the uplands of the park where disturbance to the original forest occurred.

### **Successional Tuliptree Forest (Circumneutral Type)**

Identifier: CEGL007220

At Fort Donelson, this is the most common successional forest type. It occurs on neutral to basic soils that were under cultivation, cut, and/or grazed 50-90 years ago. These forests are often older than those dominated by pine, sweetgum, or red cedar in the park, but they are still recovering visibly from past disturbance. Some examples in the park are extremely disturbed, and trash and old bottles from past inhabitants of the area are still visible among the leaf litter and roots of some examples.

Vegetation in examples of this type within the park varies drastically. Stands can be dominated completely by tuliptree or dominated by southern hackberry (*Celtis laevigata*) and black walnut (*Juglans nigra*) with a smaller tuliptree component. The subcanopy and shrub layers tend to be moderate to heavy density with such species as hophornbeam, pawpaw, spicebush (*Lindera benzoin*), and other indicators of neutral to basic soil. In addition, the herbaceous layer varies from sparse to moderate coverage. Some species present include Christmas fern, Canada black snakeroot (*Sanicula canadensis*), horse-balm (*Collinsonia canadensis*), Japanese stiltgrass (*Microstegium vimineum*), etc. Despite its successional status, plots of this type are often very species diverse.

Stands are generally dominated by tuliptree. Many stands are codominated by dry-mesic oak species, especially southern red oak (*Quercus falcata*) but also chestnut oak (*Quercus prinus*), black oak (*Quercus velutina*), scarlet oak (*Quercus coccinea*), and white oak

(*Quercus alba*) as well as the ubiquitous red maple and sweetgum. Within the park, some examples of this community type are up to 60% oak, but the oak individuals are very young. The herbaceous stratum can vary widely and may include only a handful of dry-site species.

There are multiple types of tuliptree-dominated forests in the park. This forest is distinguished by the others because it is an upland type on calcareous soils.

This community occurs throughout the park in patches that are intermediate in age. It is perhaps the most common community in the park.

### **White Oak – Mixed Oak Dry-Mesic Alkaline Forest**

Identifier: CEGL002070

At Fort Donelson, this community exists in a transitional zone between the driest ridges and the more mesic ravine communities. It can range up to the ridgetops in areas where the soil is a bit deeper and the exposure to extremes in temperature and moisture is limited.

The canopy of this community is usually dominated by white oak (*Quercus alba*) but with a substantial component of shagbark hickory (*Carya ovata*), tuliptree, and other oak species also possible. It is distinguished from other oak types by the dominance of white oak. The community may contain beech in the subcanopy, but stands codominated by beech in the canopy would be classified as *Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest (CEGL007881). The herbaceous layer may be sparse to rich but usually has a higher diversity of spring ephemerals and summer herbs than adjacent drier communities. Sedge species are usually an important component of this community.

Although there are other oak dominated community types in the park, this type is the only one that is usually dominated by white oak and northern red oak with less than 25% southern red oak.

This community occurs in patches on midslopes and occasional ridgetops in the park.

### **Central Interior Upland Cherrybark Oak Forest**

Identifier: CEGL003871

This community is the most common natural community in the park, occurring on low to upper slopes and ridgetops of various aspects. The forest varies a great deal in character but is generally relatively dry with a low cover of herbaceous species in the understory.

It occurs in mid- to late-successional stands, and composition can vary greatly depending upon the age of the stand and the exposure/aspect of the site. Younger stands may contain mixtures of tuliptree and other early-successional tree species. Stands on ridgetops may have a high component or be dominated by cherrybark oak (*Quercus pagoda*) or southern red oak (*Quercus falcata*). Other canopy species may include Shumard's oak (*Quercus shumardii*), northern red oak, white oak, hickory spp., etc. Most stands contain at least some hophornbeam and/or ironwood in the understory or shrub layer.

This community is the only forest usually dominated by cherrybark or southern red oak in the park. Its range often overlaps with that of C EGL002070 and mixtures with traits of these two types are regularly seen in the park.

This type occurs throughout the park's acreage, especially on low to upper slopes and sometimes ridgetops.

### **Successional Sweetgum Floodplain Forest**

Identifier: C EGL007330

This early-successional community occurs along some wide flat areas of creeks in the park.

This community can be dominated by either sweetgum or tuliptree. Herbaceous and shrub composition varies widely depending upon disturbance history.

It is the only bottomland/streamside community dominated by sweetgum. It can be distinguished from its upland counterpart by its location near a streambed or flat wet area.

This association is known to occur along the small streams that occur throughout the park on flat aspects.

### **Sycamore- Silver Maple Calcareous Floodplain Forest**

Identifier: C EGL007334

At Fort Donelson, this community occurs where the U.S. Army Corps of Engineers impoundment floodplain meets creek outflow areas to form flat, frequently flooded areas of vegetation.

This community is dominated by silver maple (*Acer saccharinum*) with small amounts of sycamore (*Platanus occidentalis*), box elder (*Acer negundo*), and other species.

This is the only community dominated by species such as silver maple, sycamore, and box elder in the park.

It is limited to the flat, frequently flooded areas between the water impoundment and creek outflows.

### **Black Willow Riparian Forest**

Identifier: C EGL002103

This community occurs in floodplain areas frequently flooded by rain events and runoff.

This community type consists of black willow (*Salix nigra*) and very little else. Sites where it occurs are flooded too frequently to sustain a very robust herbaceous layer. False nettle (*Boehmeria cylindrica*) and annuals such as pokeweed (*Phytolacca americana*) and fireweed (*Erechtites hieraciifolia*) are the most common herbaceous plants.

It is found in the broad floodplains of the park and is the only community dominated by willow.

It occurs on the most frequently flooded sections of land near the water impoundment.

### **Successional Broomsedge Vegetation**

Identifier: C EGL004044

At Fort Donelson, this type occurs on sites mowed yearly or more often.

This community is dominated by a combination of broomsedge (*Andropogon virginicus* var. *virginicus*) and other mostly native species such as goldenrod (*Solidago* sp.) and aster species. It is distinguished from *Lolium* (*arundinaceum*, *pratense*) Herbaceous Vegetation (CEGL004048) in the park by the dominance of native rather than non-native species.

It is very similar to C EGL004048. The only difference is that this type contains more native species and fewer old field exotics than C EGL004048.

This community occurs mainly in mowed areas, especially around the old earthworks near the Cumberland River bluff area.

### **Cultivated Meadow**

Identifier: C EGL004048

This community can occur in any section of the park that has been cultivated and is mowed at least yearly.

It consists primarily of exotic old-field species, especially ryegrass (*Lolium*) species. It may also contain a significant amount of native species, but the majority is exotic.

This community is very similar to C EGL004044 but has fewer native species and more non-native grasses typical of old farmed and plowed fields.

### **Tennessee Valley Impoundment Mud Flat Vegetation**

Identifier: C EGL004049

In the park, this community type occurs on mudflats influenced by fluctuations in water levels of the water impoundment.

This community is dominated by a mixture of herbaceous species. Composition depends heavily upon the depth of the standing water and the longevity of the water inundation. Distinct zonation in vegetation can be seen as one walks out towards deeper water. Water-willow (*Justicia americana*) dominates the areas with the most persistent standing water. Halberd leaf rose mallow (*Hibiscus laevis*) dominates farther inland, and persimmon (*Diospyros virginiana*) is a shrub that sometimes dominates areas that are less inundated.

Although this community can often be very close to the black willow type, it is distinguished by the lack of woody plants present to shade the herbaceous layer and its presence for much of the year of standing water.

This type is found in areas inundated by the water impoundment.

### *Ecological Community Summary*

Of the 13 associations described above, only four associations are considered natural/not successional. These four associations occur in areas that have been fallow for more than 70 years or occur in bottomland areas that recover more quickly from stand initiating disturbance. When considering priorities for land management, exotic invasive control, preservation, etc., these communities should take higher priority than the successional and exotic-dominated communities, except in cases where Price's potato-bean occurs in successional or exotic-dominated areas.

Of all the natural communities, the most globally rare community in the park appears to be the Central Piedmont Upland Cherrybark Oak Forest. This community appears to be on the edge of its range in the park, with a center of distribution in the East Gulf Coastal Plain. It is very common in the park and does not appear to have significant management challenges facing it. At the most, it should be monitored for problems with invasive exotic species.

Forest types that are particularly in need of management include all of the forested wetland types. These types are especially susceptible to invasion by invasive exotics such as Japanese stiltgrass (*Microstegium vimineum*) and privet (*Ligustrum sinense*).

Some recommendations for future management of these community types and vegetation at the park include:

- 1) control invasive exotics in all communities, but especially those natural communities in and near floodplains. These areas have high plant diversity, but are also most susceptible to invasion by a number of invasive exotics, especially privet and Japanese stiltgrass.
- 2) Continue to protect high quality versions of all four natural communities within the park. Although many natural communities in the park are globally common, there are few high quality versions of these forests in this highly altered and impacted ecoregion.
- 3) Focus some management on the successional fields that have the highest concentration of native species. These communities are high in biodiversity and potentially are very good areas to re-introduce native grasses and forbs into the landscape. They could also potentially be very susceptible to invasion by unwanted exotic species such as Johnson grass.

## Literature Cited

- Anderson, M., P. Bourgeron, M.T. Bryer, R. Crawford, L. Engelking, D. Faber-Langendoen, M. Gallyoun, K. Goodin, D.H. Grossman, S. Landaal, K. Metzler, K.D. Patterson, M. Pyne, M. Reid, L. Sneddon, and A.S. Weakley. 1998. International classification of ecological communities: terrestrial vegetation of the United States. Volume II. The National Vegetation Classification System: list of types. The Nature Conservancy, Arlington, Virginia, USA.
- ArcView GIS 3.2. 1992. Environmental Systems Research Institute, Inc. Redlands, CA.
- Bailey, R. G.; Avers, P. E.; King, T.; McNab, W. H., eds. 1994. Ecoregions and subregions of the United States (map). Washington, DC: USDA Forest Service. 1:7,500,000. With supplementary table of map unit descriptions, compiled and edited by W. H. McNab and R. G. Bailey.
- Braun-Blanquet, J. 1928. Pflanzensozioologie: Grundzüge der Vegetationskunde. Springer. Berlin, Germany.
- Chester, E.W. 1986. The Vascular Flora of Fort Donelson National Battlefield, Stewart County, Tennessee. University of Tennessee, Knoxville. Research/Resources Management Report SER-80. 86 p.
- Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003. *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*. NatureServe, Arlington, Virginia.
- Critchfield, W.B. and E.L. Little, Jr. 1996. Geographic Distribution of the Pines of the World, USDA Forest Service Misc. Publication 991.
- Garmin Corporation 1999. Garmin GPS III Plus Owner's Manual and Reference. Garmin International, Olathe, Kansas, USA.
- Grossman, D.H., D. Faber-Langendoen, A.S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International classification of ecological communities: terrestrial vegetation of the United States. Volume 1. The National Vegetation Classification System: development, status, and applications. The Nature Conservancy, Arlington, Virginia, USA.
- Haragan, P.D. 1991. Weeds of Kentucky and Adjacent States: A Field Guide. The University Press of Kentucky. Lexington, Kentucky. 278 pp.
- Heltshe, J.F., and N.E. Forrester. 1983. Estimating species richness using the jackknife

- procedure. *Biometrics* 39: 1-12.
- Kartesz, J.T. 1999. A synonymized checklist and atlas with biological attributes for the vascular flora of the United States, Canada, and Greenland. First edition. In J.T. Kartesz and C.A. Meacham. *Synthesis of the North American Flora, Version 1.0*. North Carolina Botanical Garden, Chapel Hill.
- Kentucky Exotic Pest Plant Council. 2001. *Invasive Exotic Pest Plants in Kentucky* (<http://www.se-eppc.org/ky/list.htm>) accessed on March 1, 2005. Research Committee of the Kentucky Exotic Pest Plant Council.
- McCune, B., and J.B. Grace. 2002. *Analysis of Ecological Communities*. MjM Software Design, Gleneden Beach, Oregon.
- McCune, B., and M.J. Mefford. 1999. *PC-ORD, Multivariate analysis and ecological data, Version 4*. MjM Software Design, Gleneden Beach, Oregon.
- Miller, James H., Erwin B. Chambliss, and Charles T. Barger. 2000. *Invasive Plants of the Thirteen Southern States*. <http://www.invasive.org/seweeds.cfm>. (Accessed: October 20, 2003).
- NatureServe 2004. *International Classification of Ecological Communities: Terrestrial Vegetation*. Natural Heritage Central Databases. NatureServe, Arlington, VA.
- NatureServe 2004. *NatureServe Explorer: An online encyclopedia of life [web application]*. Version 1.8. NatureServe, Arlington, Virginia. Available <http://www.natureserveexplorer.org>. (Accessed: November 8, 2004 ).
- Nichols, Becky, M. Jenkins, J. Rock, K. Langdon, and T. Leibfreid. 2000. *Study plan for vertebrate and vascular plant inventories*. Appalachian Highlands Network and Cumberland Piedmont Network, National Park Service.
- NPS/NatureServe 2005. *NPS PLOTS Database produced by NatureServe*. Version 2.0. Arlington, VA.
- Palmer, M.W. 1990. The estimation of species richness by extrapolation. *Ecol.* 71.
- Radford, A.E., Ahles, H.E., Bell, C.R. 1965. *Atlas of the Vascular Flora of the Carolinas* Technical Bulletin. 165: North Carolina Agr. Experiment Station.
- Southeast Exotic Pest Plant Council. 1996. *Invasive Exotic Pest Plants in Tennessee* (<http://www.tneppc.org/>, October 19, 1999). Research Committee of the Tennessee Exotic Pest Plant Council. Tennessee.
- Southern Weed Science Society. 1998. *Weeds of the United States and Canada*. CD-ROM. Southern Weed Science Society. Champaign, Illinois.

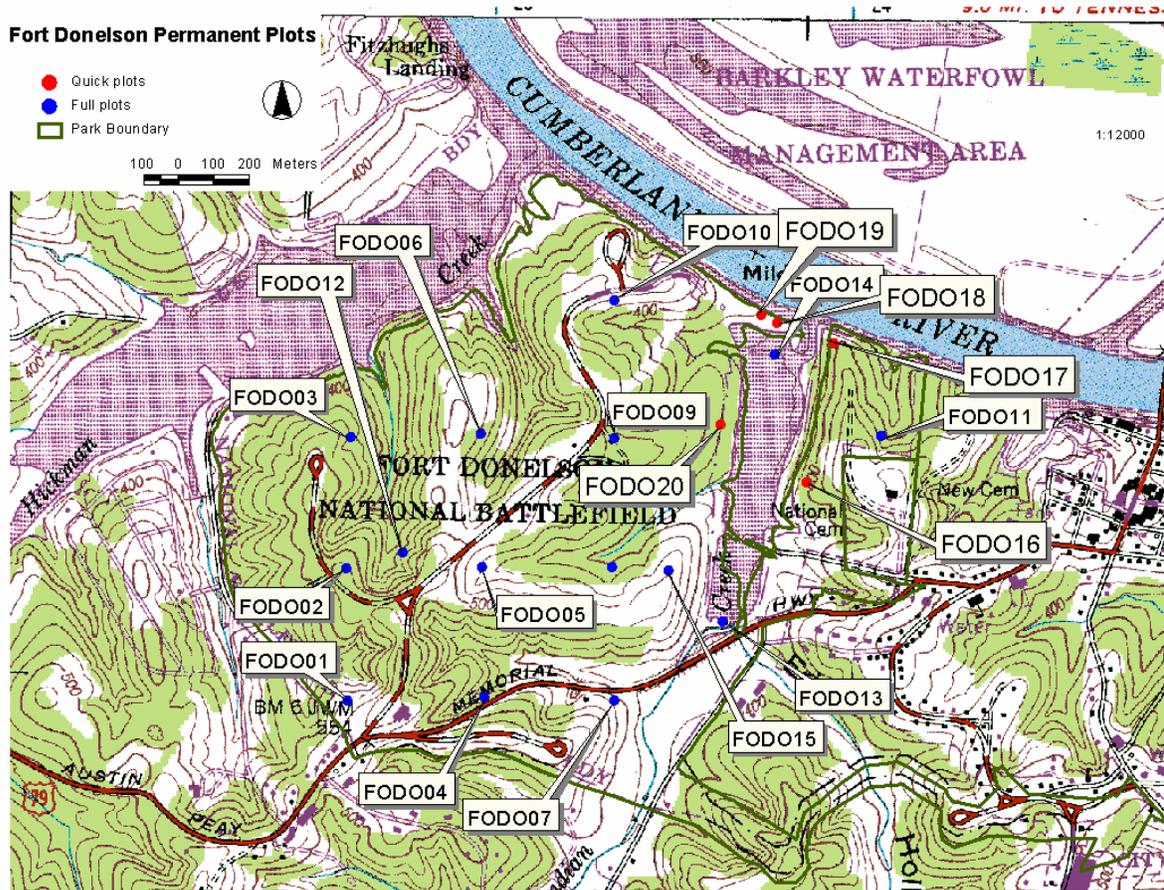
Tennessee Exotic Pest Plant Council. 2001. Invasive Exotic Pest Plants in Tennessee (<http://www.tneppc.org/>) accessed on March 1, 2005.

Research Committee of the Tennessee Exotic Pest Plant Council.

USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.



**Figure 1. Map of Fort Donelson National Battlefield with all permanent points marked at their actual locations.**

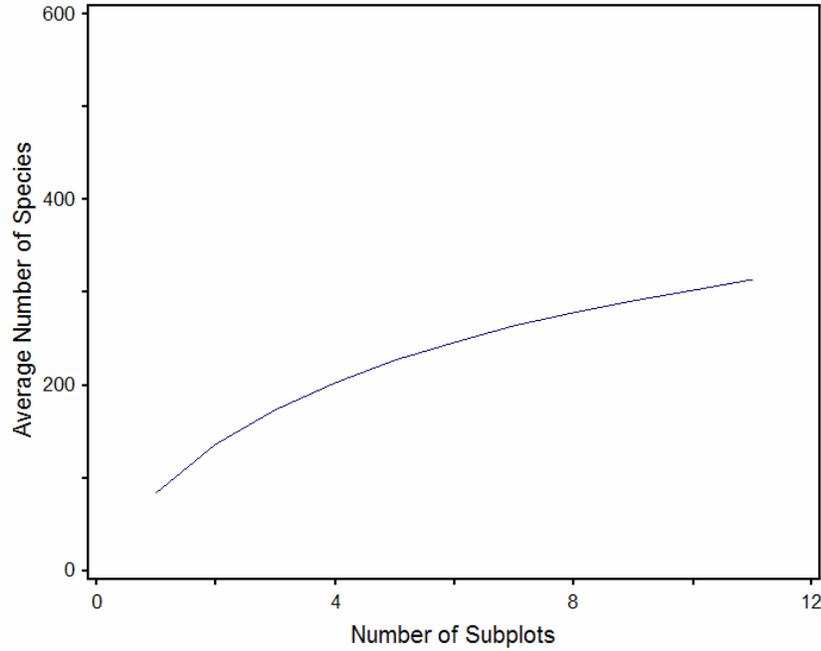


Date: 11-11-04

Image generated by Rickie White

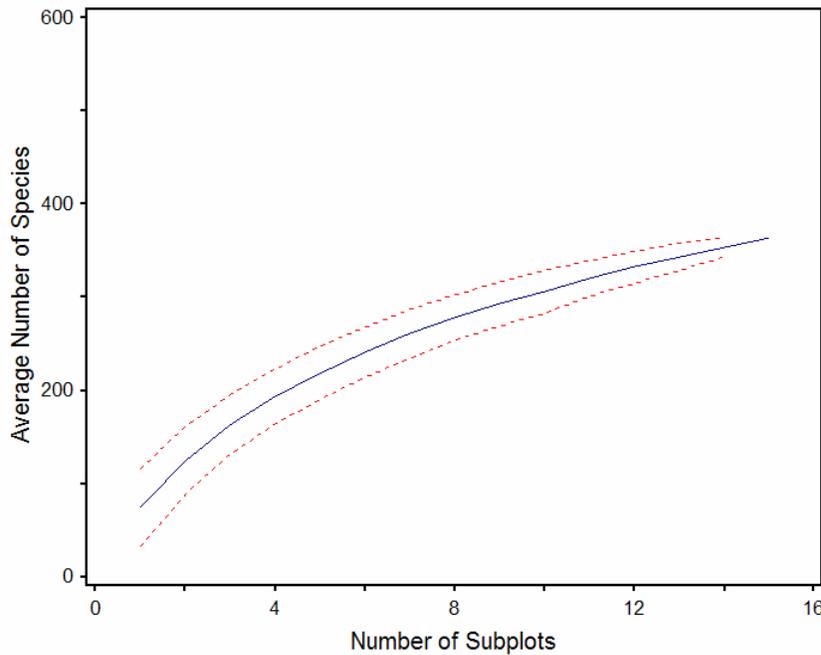
**Figure 2. Species area curves for Fort Donelson National Battlefield derived using data from a) just the 11 gridded plots in the park and b) all 15 plots.**

**a)**



First-order jackknife estimate of number of species in park = 418  
Second-order jackknife estimate of number of species in park = 464  
Sample size is too small for confidence intervals

**b)**



First-order jackknife estimate of number of species in park = 501  
Second-order jackknife estimate of number of species in park = 580

Table 1. Plot numbers and locations for all permanent plots established at Fort Donelson National Battlefield.

<b>Plot Number</b>	<b>X Coordinate</b>	<b>Y Coordinate</b>	<b>Projection</b>	<b>Zone</b>	<b>Type of plot</b>
FODO.1	422581	4037835	NAD 83	16	Full
FODO.2	422578	4038205	NAD 83	16	Full
FODO.3	422591	4038574	NAD 83	16	Full
FODO.4	422965	4037844	NAD 83	16	Full
FODO.5	422960	4038209	NAD 83	16	Full
FODO.6	422956	4038584	NAD 83	16	Full
FODO.7	423328	4037834	NAD 83	16	Full
FODO.8	423321	4038208	NAD 83	16	Full
FODO.9	423328	4038571	NAD 83	16	Full
FODO.10	423330	4038955	NAD 83	16	Full
FODO.11	424079	4038577	NAD 83	16	Full
FODO.12	422738	4038249	NAD 83	16	Full
FODO.13	423634	4038057	NAD 83	16	Full
FODO.14	423781	4038804	NAD 83	16	Full
FODO.15	423482	4038200	NAD 83	16	Full
FODO.16	423867	4038447	NAD 83	16	Observation
FODO.17	423945	4038835	NAD 83	16	Observation
FODO.18	423787	4038891	NAD 83	16	Observation
FODO.19	423742	4038913	NAD 83	16	Observation
FODO.20	423626	4038608	NAD 83	16	Observation
FODO.21	423291	4038542	NAD 83	16	Observation

Table 2. List of all plants documented for Fort Donelson National Battlefield ordered alphabetically by scientific name.

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Acalypha ostryifolia</i>	threeseed mercury	28189	Euphorbiaceae	Chester 1986	G5
<i>Acalypha virginica</i>	Virginia threeseed mercury	28195	Euphorbiaceae	Chester 1986	G5
<i>Acer negundo</i>	box elder	28749	Aceraceae	Chester 1986	G5
<i>Acer rubrum</i>	red maple	28728	Aceraceae	Chester 1986	G5
<i>Acer saccharinum</i>	silver maple	28757	Aceraceae	Chester 1986	G5
<i>Acer saccharum</i>	sugar maple	28731	Aceraceae	Chester 1986	G5
<i>Achillea millefolium</i>	common yarrow	35423	Asteraceae	Chester 1986	G5
<i>Actaea pachypoda</i>	doll's eye	18722	Ranunculaceae	Chester 1986	G5
<i>Adiantum pedatum</i>	northern maidenhair fern	17311	Pteridaceae	Chester 2002	G5
<i>Agalinis tenuifolia</i>	Slender Foxglove	33036	Scrophulariaceae	Chester 1986	G5
<i>Agrimonia pubescens</i>	hairy harvest lice	25099	Rosaceae	Chester 1986	G5
<i>Agrimonia rostellata</i>	beaked harvest lice	25100	Rosaceae	Chester 1986	G5
<i>Agrostis eliottiana</i>	Elliott's bentgrass	40397	Poaceae	Chester 1986	G5
<i>Agrostis gigantea</i>	redtop	40414	Poaceae	Chester 1986	G4G5
<i>Agrostis hyemalis</i>	ticklegass	40394	Poaceae	Chester 1986	G5
<i>Agrostis perennans</i>	upland bentgrass	40423	Poaceae	Chester 1986	G5
<i>Aira elegans</i>	elegant hairgrass	41377	Poaceae	Chester 1986	GNR
<i>Albizia julibrissin</i>	mimosa	26449	Fabaceae	Chester 1986; Rogers, 2000; BONAP County Database	GNR
<i>Allium canadense</i>	wild onion	42635	Liliaceae	Chester 1986	G5
<i>Allium vineale</i>	field garlic	42637	Liliaceae	Chester 1986	GNR
<i>Alnus serrulata</i>	alder	19468	Betulaceae	Chester 1986	G5
<i>Alopecurus carolinianus</i>	Carolina foxtail	40440	Poaceae	Chester 1986	G5
<i>Amaranthus spinosus</i>	spiny amaranth	20748	Amaranthaceae	Chester 1986	G5
<i>Amaranthus tuberculatus</i>	water-hemp	20750	Amaranthaceae	Chester 1986	G4G5
<i>Ambrosia artemisiifolia</i>	common ragweed	36496	Asteraceae	Chester 1986	G5
<i>Ambrosia trifida</i>	giant ragweed	36521	Asteraceae	Chester 1986	G5
<i>Amelanchier arborea</i>	serviceberry	25110	Rosaceae	Chester 1986	G5
<i>Ammannia coccinea</i>	long-leaved ammannia	27091	Lythraceae	Chester 1986	G5
<i>Amorpha fruticosa</i>	false indigo	25368	Fabaceae	Chester 2002	G5
<i>Ampelopsis arborea</i>	peppervine	28631	Vitaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Ampelopsis cordata</i>	heartleaf ampelopsis	28633	Vitaceae	Chester 1986	G5
<i>Amphicarpaea bracteata</i>	hog-peanut	182067	Fabaceae	Chester 1986;BONAP County Database	G5
<i>Amsonia tabernaemontana</i>	Blue Dogbane	30148	Apocynaceae	Chester 1986	G5
<i>Andropogon gyrans</i>	Elliott's broomsedge	182527	Poaceae	Chester 1986	G5
<i>Andropogon ternarius</i>	silver broomsedge	40455	Poaceae	Chester 1986	G5
<i>Andropogon virginicus</i>	common broomsedge	40456	Poaceae	Chester 1986	G5
<i>Anemone virginiana</i>	thimbleweed	18451	Ranunculaceae	Chester 1986	G5
<i>Angelica venenosa</i>	angelica	29453	Apiaceae	Chester 1986	G5
<i>Antennaria plantaginifolia</i>	plantainleaf pussytoes	36717	Asteraceae	Chester 1986	G5
<i>Antennaria solitaria</i>	solitary pussy toes	36756	Asteraceae	Chester 1986	G5
<i>Anthemis cotula</i>	mayweed	36330	Asteraceae	Chester 1986	G5
<i>Apios priceana</i>	Price's potato- bean	25391	Fabaceae	Chester 2002	G2
<i>Apocynum cannabinum</i>	Indian hemp	30157	Apocynaceae	Chester 1986	G5
<i>Arabis laevigata</i>	smooth rockcress	22706	Brassicaceae	Chester 1986	G5
<i>Aralia spinosa</i>	devil's walkingstick	29378	Araliaceae	Chester 1986	G5
<i>Arenaria serpyllifolia</i>	thymeleaf sandwort	20270	Caryophyllaceae	Chester 2002	GNR
<i>Arisaema dracontium</i>	green dragon	42529	Araceae	Chester 1986	G5
<i>Arisaema triphyllum</i>	Jack-in-the-pulpit	42525	Araceae	Chester 1986	G5
<i>Aristida longispica</i>	spiked needlegrass	41423	Poaceae	Chester 1986	G5
<i>Aristida oligantha</i>	few-flowered needlegrass	41405	Poaceae	Chester 1986	G5
<i>Aristida purpurascens</i>	purple needlegrass	41428	Poaceae	Chester 1986	G5
<i>Aristolochia serpentaria</i>	Virginia snakeroot	18342	Aristolochiaceae	Chester 2002	G4
<i>Aristolochia tomentosa</i>	dutchman's pipevine	18343	Aristolochiaceae	Chester 2002	G5
<i>Arthraxon hispidus</i>	jointgrass	41445	Poaceae	Chester 1986	GNR
<i>Arundinaria gigantea</i>	River Cane	40477	Poaceae	Chester 1986	G5
<i>Asarum canadense</i>	Canadian wildginger	18353	Aristolochiaceae	Chester 2002	G5
<i>Asclepias amplexicaulis</i>	clasping-leaved milkweed	30244	Asclepiadaceae	Chester 2002	G5
<i>Asclepias incarnata</i>	swamp milkweed	30241	Asclepiadaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Asclepias purpurascens</i>	purple milkweed	30296	Asclepiadaceae	Chester 2002	G4G5
<i>Asclepias syriaca</i>	common milkweed	30310	Asclepiadaceae	Chester 1986	G5
<i>Asclepias tuberosa</i>	butterflyweed	30313	Asclepiadaceae	Chester 1986	G5?
<i>Asclepias variegata</i>	variegated milkweed	30319	Asclepiadaceae	Chester 2002	G5
<i>Asimina triloba</i>	pawpaw	18117	Annonaceae	Chester 1986	G5
<i>Asplenium platyneuron</i>	ebony spleenwort	17355	Aspleniaceae	Chester 1986	G5
<i>Asplenium rhizophyllum</i>	walking fern	17359	Aspleniaceae	Chester 1986	G5
<i>Aureolaria flava</i>	yellow false foxglove	33484	Scrophulariaceae	Chester 1986	G5
<i>Barbarea vulgaris</i>	yellowrocket	22741	Brassicaceae	Chester 1986	GNR
<i>Berberis thunbergii</i>	Japanese barberry	18835	Berberidaceae	Chester 2002	GNR
<i>Betula nigra</i>	river birch	19480	Betulaceae	Chester 2002	G5
<i>Bidens aristosa</i>	scaled sticktights	35713	Asteraceae	Chester 1986	G5
<i>Bidens bipinnata</i>	Spanish needles	500993	Asteraceae	Chester 1986	G5
<i>Bidens cernua</i>	nodding sticktights	35710	Asteraceae	Chester 1986	G5
<i>Bidens discoidea</i>	small beggarticks	35719	Asteraceae	Chester 2002	G5
<i>Bidens frondosa</i>	leafy sticktights	35707	Asteraceae	Chester 1986	G5
<i>Bidens tripartita</i>	three-parted sticktights	35709	Asteraceae	Chester 1986	G5
<i>Bignonia capreolata</i>	crossvine	34307	Bignoniaceae	Chester 1986	G5
<i>Blephilia ciliata</i>	wood-mint	32460	Lamiaceae	Chester 1986	G5
<i>Blephilia hirsuta</i>	hairy wood-mint	32461	Lamiaceae	Chester 2002	G5?
<i>Boehmeria cylindrica</i>	false nettle	19121	Urticaceae	Chester 1986	G5
<i>Boltonia asteroides</i>	aster-like boltonia	36853	Asteraceae	Chester 1986	G5
<i>Botrychium biternatum</i>	southern grape fern	17175	Ophioglossaceae	Chester 1986	G5
<i>Botrychium dissectum</i>	dissected grape fern	17171	Ophioglossaceae	Chester 1986	G5
<i>Botrychium virginianum</i>	rattlesnake fern	17173	Ophioglossaceae	Chester 1986	G5
<i>Brachyelytrum erectum</i>	Huskgrass	41527	Poaceae	Chester 1986	G5
<i>Brassica rapa</i>	common turnip	23063	Brassicaceae	Chester 1986	GNR
<i>Bromus commutatus</i>	common brome grass	40497	Poaceae	Chester 1986	GNR
<i>Bromus japonicus</i>	Japanese bromegrass	40479	Poaceae	Chester 1986	GNR
<i>Bromus pubescens</i>	woodland brome	40514	Poaceae	Chester 2002	G5
<i>Bromus tectorum</i>	Brome Grass	40524	Poaceae	Chester 1986	GNR
<i>Calycocarpum lyonii</i>	cupseed	18862	Menispermaceae	Chester 1986	G5
<i>Calystegia sepium</i>	hedge bindweed	30650	Convolvulaceae	Chester 2002	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Campsis radicans</i>	trumpet creeper	34309	Bignoniaceae	Chester 1986	G5
<i>Capsella bursa-pastoris</i>	shepherd's purse	22766	Brassicaceae	Chester 1986	GNR
<i>Cardamine hirsuta</i>	bittercress	22797	Brassicaceae	Chester 1986	GNR
<i>Cardiospermum halicacabum</i>	balloon vine	28667	Sapindaceae	Chester 1986	G5
<i>Carduus nutans</i>	nodding thistle	35787	Asteraceae	Rogers, 2000; Chester 1986	GNR
<i>Carex abscondita</i>	Hidden-Fruited Sedge	39475	Cyperaceae	Chester 2002	G4G5
<i>Carex albicans</i>	covered sedge	565042	Cyperaceae	Chester 2002	G5
<i>Carex albursina</i>	white bear sedge	39487	Cyperaceae	Chester 2002	G5
<i>Carex albursina</i>	pale sedge	39487	Cyperaceae	Chester 2002	G5
<i>Carex amphibola</i>	amphibious sedge	39491	Cyperaceae	Chester 1986	G5
<i>Carex annectens</i>	connected sedge	39373	Cyperaceae	Chester 1986	G5
<i>Carex blanda</i>	charming sedge	39379	Cyperaceae	Chester 1986	G5?
<i>Carex bushii</i>	Bush's sedge	39536	Cyperaceae	NatureServe 2002-2003	G4
<i>Carex cephalophora</i>	headed sedge	39383	Cyperaceae	Chester 1986	G5
<i>Carex crus-corvi</i>	ravenfoot sedge	39562	Cyperaceae	Chester 2002	G5
<i>Carex debilis</i>	white edge sedge	39572	Cyperaceae	NatureServe 2002-2003	G5
<i>Carex digitalis</i>	slender sedge	39576	Cyperaceae	Chester 1986	G5
<i>Carex festucacea</i>	fescue-like sedge	39391	Cyperaceae	Chester 1986	G5
<i>Carex frankii</i>	Frank's sedge	39393	Cyperaceae	Chester 2002	G5
<i>Carex grayi</i>	Gray's sedge	39622	Cyperaceae	Chester 1986	G4
<i>Carex hirsutella</i>	hairy sedge	39636	Cyperaceae	Chester 1986	G5
<i>Carex jamesii</i>	James' sedge	39404	Cyperaceae	Chester 1986	G5
<i>Carex leavenworthii</i>	Leavenworth's sedge	39663	Cyperaceae	Chester 2002	G5
<i>Carex muehlenbergii</i>	Muhlenberg's Sedge	39423	Cyperaceae	Chester 2002	G5
<i>Carex normalis</i>	angled sedge	39720	Cyperaceae	Chester 1986	G5
<i>Carex oxylepis</i>	sharp-scale sedge	39424	Cyperaceae	Chester 2002	G5?
<i>Carex retroflexa</i>	reflexed sedge	39782	Cyperaceae	Chester 1986	G5
<i>Carex rosea</i>	rose-like sedge	39429	Cyperaceae	Chester 1986	G5
<i>Carex squarrosa</i>	squarrose sedge	39815	Cyperaceae	Chester 2002	G4G5
<i>Carex tribuloides</i>	tribulus-like sedge	39438	Cyperaceae	Chester 1986	G5
<i>Carex typhina</i>	cattail sedge	39439	Cyperaceae	Chester 1986	G5
<i>Carex vulpinoidea</i>	foxtail sedge	39442	Cyperaceae	Chester 1986	G5
<i>Carpinus caroliniana</i>	blue beech	19504	Betulaceae	Chester 1986	G5
<i>Carya cordiformis</i>	bitternut hickory	19227	Juglandaceae	Chester 1986	G5
<i>Carya glabra</i>	pignut hickory	19231	Juglandaceae	Chester 1986	G5
<i>Carya illinoensis</i>	pecan	19234	Juglandaceae	Chester 2002	G5
<i>Carya laciniosa</i>	big shellbark hickory	19235	Juglandaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Carya ovalis</i>	red hickory	19241	Juglandaceae	Chester 1986	G5
<i>Carya ovata</i>	shagbark hickory	19242	Juglandaceae	Chester 1986	G5
<i>Catalpa speciosa</i>	catalpa	34315	Bignoniaceae	Chester 1986	G3G4
<i>Celtis laevigata</i>	southern hackberry	19042	Ulmaceae	Chester 1986	G5
<i>Celtis occidentalis</i>	northern hackberry	19040	Ulmaceae	Chester 1986	G5
<i>Cephalanthus occidentalis</i>	buttonbush	34786	Rubiaceae	Chester 1986	G5
<i>Cerastium brachypetalum</i>	short-petaled mouse ear chickweed	19949	Caryophyllaceae	Chester 1986	GNR
<i>Cerastium glomeratum</i>	sticky mouse ear chickweed	19955	Caryophyllaceae	Chester 2002	GNR
<i>Cerastium vulgatum</i>	common mouse ear chickweed	19968	Caryophyllaceae	Chester 1986	GNR
<i>Cercis canadensis</i>	redbud	25782	Fabaceae	Chester 1986	G5
<i>Chaerophyllum tainturieri</i>	rough chervil	29617	Apiaceae	Chester 1986	G5
<i>Chamaecrista fasciculata</i>	partridge pea	501383	Fabaceae	Chester 2002	G5
<i>Chamaecrista nictitans</i>	wild sensitive senna	501388	Fabaceae	Chester 2002	G5
<i>Chamaelirium luteum</i>	fairywand	42894	Liliaceae	Chester 1986	G5
<i>Chamaesyce maculata</i>	eyebane	565061	Euphorbiaceae	Chester 2002	G5?
<i>Chamaesyce supina</i>	milk purslane	510751	Euphorbiaceae	Chester 2002	GNR
<i>Chasmanthium latifolium</i>	wild oats	41547	Poaceae	Chester 1986	G5
<i>Chenopodium album</i>	lamb's quarters	20592	Chenopodiaceae	Chester 1986	G5
<i>Chenopodium ambrosioides</i>	Mexican tea	20590	Chenopodiaceae	Chester 1986	GNR
<i>Cinna arundinacea</i>	sweet woodreed	40583	Poaceae	Chester2002	G5
<i>Circaea lutetiana</i>	Enchanter's nightshade	27567	Onagraceae	Chester 1986	G5
<i>Cirsium altissimum</i>	tall thistle	36337	Asteraceae	Chester 2002	G5
<i>Cirsium discolor</i>	two-colored thistle	36362	Asteraceae	Chester 1986	G5
<i>Cirsium horridulum</i>	horrid thistle	36379	Asteraceae	Chester 1986	G5
<i>Claytonia virginica</i>	spring beauty	20382	Portulacaceae	Chester 1986	G5
<i>Clematis terniflora</i>	sweet autumn clematis	18712	Ranunculaceae	Chester 1986	GNR
<i>Clematis virginiana</i>	virgin's bower	18716	Ranunculaceae	Chester 1986	G5
<i>Clitoria mariana</i>	Atlantic pigeonwings	26542	Fabaceae	Chester 2002	G5
<i>Cocculus carolinus</i>	redberry moonseed	18864	Menispermaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Collinsonia canadensis</i>	Horse-Balm	32474	Lamiaceae	Chester 1986	G5
<i>Commelina communis</i>	dayflower	39127	Commelinaceae	Chester 1986	G5
<i>Commelina diffusa</i>	climbing dayflower	39131	Commelinaceae	Chester 2002	G5
<i>Commelina virginica</i>	Virginia dayflower	39128	Commelinaceae	Chester 1986	G5
<i>Conyza canadensis</i>	horseweed	37113	Asteraceae	Chester 1986	G5
<i>Coreopsis major</i>	large tickseed	37143	Asteraceae	Chester 1986	G5
<i>Coreopsis tripteris</i>	tall tickseed	37154	Asteraceae	Chester 1986	G5
<i>Cornus amomum</i>	swamp dogwood	27799	Cornaceae	Chester 1986	G5
<i>Cornus florida</i>	flowering dogwood	27806	Cornaceae	Chester 1986	G5
<i>Coronilla varia</i>	crown vetch	26553	Fabaceae	Chester 1986	GNR
<i>Corylus americana</i>	hazelnut	19506	Betulaceae	Chester 1986	G5
<i>Crataegus calpodendron</i>	pear hawthorn	24547	Rosaceae	Chester 2002	G5
<i>Crataegus phaenopyrum</i>	Washington hawthorn	24593	Rosaceae	Chester 1986	G4?
<i>Crataegus viridis</i>	green hawthorn	24612	Rosaceae	Chester 1986	G5
<i>Croton monanthogynus</i>	prairie tea	28283	Euphorbiaceae	Chester 1986	G5
<i>Cruciata pedemontana</i>	pedmont bedstraw	502717	Rubiaceae	Chester 1986	GNR
<i>Cryptotaenia canadensis</i>	honestwort	29475	Apiaceae	Chester 1986	G5
<i>Cunila origanoides</i>	dittany	32483	Lamiaceae	Chester 1986	G5
<i>Cuphea viscosissima</i>	blue waxweed	501842	Lythraceae	Chester 2002	G5?
<i>Cynanchum laeve</i>	honeysuckle	501893	Asclepiadaceae	Chester 1986	G5
<i>Cynodon dactylon</i>	Bermudagrass	41619	Poaceae	Chester 1986	GNR
<i>Cynoglossum virginianum</i>	hound's tongue	31891	Boraginaceae	Chester 1986	G5
<i>Cyperus echinatus</i>	egg-shaped sedge	501920	Cyperaceae	Chester 1986	G5
<i>Cyperus erythrorhizos</i>	red-rooted sedge	39887	Cyperaceae	Chester 1986	G5
<i>Cyperus esculentus</i>	yellow nutsedge	39888	Cyperaceae	Chester 1986	G5
<i>Cyperus flavicomus</i>	white-margined sedge	501923	Cyperaceae	Chester 1986	G5
<i>Cyperus odoratus</i>	rusty sedge	39894	Cyperaceae	Chester 1986	G5
<i>Cyperus squarrosus</i>	aristate sedge	501940	Cyperaceae	Chester 1986	G5
<i>Cyperus strigosus</i>	strigose sedge	39901	Cyperaceae	Chester 1986	G5
<i>Cystopteris bulbifera</i>	bulblet bladderfern	17481	Dryopteridaceae	Chester 1986	G5
<i>Cystopteris protrusa</i>	southern fragile fern	17485	Dryopteridaceae	Chester 1986	G5
<i>Dactylis glomerata</i>	orchard grass	193446	Poaceae	Chester 1986	GNR
<i>Danthonia spicata</i>	poverty grass	41642	Poaceae	Chester 1986	G5
<i>Datura stramonium</i>	jimsonweed	30520	Solanaceae	Chester 1986	GNR
<i>Daucus carota</i>	Queen Anne's	29477	Apiaceae	Chester 1986	GNR

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
	lace				
Delphinium tricorne	larkspur	18515	Ranunculaceae	Chester 1986	G5
Deparia acrostichoides	silvery glade fern	501994	Dryopteridaceae	Chester 1986	G5
Desmanthus illinoensis	prairie mimosa	26661	Fabaceae	Chester 1986	G5
Desmodium canescens	hoary tickclover	25792	Fabaceae	Chester 1986	G5
Desmodium ciliare	ciliate tick clover	25793	Fabaceae	Chester 1986	G5
Desmodium marilandicum	Maryland tickclover	25809	Fabaceae	Chester 1986	G5
Desmodium nudiflorum	naked-stemmed tick clover	25812	Fabaceae	Chester 1986	G5
Desmodium paniculatum	panicled tickclover	25815	Fabaceae	Chester 1986	G5
Desmodium pauciflorum	fewflower ticktrefoil	25816	Fabaceae	Chester 2002	G5
Desmodium perplexum	perplexing tick clover	25785	Fabaceae	Chester 1986	G5
Desmodium rotundifolium	round-leaved tick clover	502020	Fabaceae	Chester 1986	G5
Dianthus armeria	Deptford pink	20276	Caryophyllaceae	Chester 1986	GNR
Dichanthelium boscii	Bosc's panicgrass	41655	Poaceae	Chester 2002	G5
Dichanthelium clandestinum	deertongue panicgrass	41656	Poaceae	Chester 2002	G5?
Dichanthelium commutatum	changeable panic grass	41647	Poaceae	Chester 1986	G5
Dichanthelium dichotomum	forking panic grass	41659	Poaceae	Chester 2002	G5
Dichanthelium laxiflorum	loose-flowered panic grass	41661	Poaceae	Chester 1986	G5
Dichanthelium scabriusculum	woolly panic grass	41670	Poaceae	Chester 1986	G4
Digitaria ischaemum	smooth crab grass	40637	Poaceae	Chester 1986	GNR
Digitaria sanguinalis	hairy crab grass	40604	Poaceae	Chester 1986	G5
Diodia teres	poor joe	34789	Rubiaceae	Chester 1986	G5
Diodia virginiana	Virginia buttonweed	34790	Rubiaceae	Chester 1986	G5
Dioscorea villosa	wild yam	43367	Dioscoreaceae	Chester 1986	G4G5
Diospyros virginiana	persimmon	23855	Ebenaceae	Chester 1986	G5
Draba brachycarpa	shortpod whitlowgrass	22865	Brassicaceae	Chester 2002	G4G5
Draba verna	whitlowgrass	22923	Brassicaceae	Chester 1986	GNR
Duchesnea indica	Indian strawberry	25163	Rosaceae	Chester 2002	G5
Echinochloa crus-galli	barnyard grass	502210	Poaceae	Chester 1986	GNR

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Eclipta prostrata</i>	yerba de tago	196226	Asteraceae	Chester 1986	G5
<i>Elaeagnus umbellata</i>	autumn olive	27776	Elaeagnaceae	Chester 1986; Rogers, 2000	GNR
<i>Eleocharis acicularis</i>	needle spikerush	40025	Cyperaceae	Chester 2002	G5
<i>Eleocharis obtusa</i>	blunt spikesedge	40017	Cyperaceae	Chester 1986	G5
<i>Elephantopus carolinianus</i>	Carolina elephantsfoot	37297	Asteraceae	Chester 1986	G5
<i>Elephantopus tomentosus</i>	devil's grandmother	37300	Asteraceae	Chester 2002	G5
<i>Eleusine indica</i>	goose grass	41692	Poaceae	Chester 1986	GNR
<i>Elymus hystrix</i>	bottlebrush grass	40698	Poaceae	Chester 1986	G5
<i>Eragrostis capillaris</i>	lace grass	40774	Poaceae	Chester 1986	G5
<i>Eragrostis cilianensis</i>	stink grass	40719	Poaceae	Chester 1986	GNR
<i>Eragrostis frankii</i>	Frank's lovegrass	40741	Poaceae	Chester 1986	G5
<i>Eragrostis hypnoides</i>	creeping lovegrass	40721	Poaceae	Chester 1986	G5
<i>Eragrostis pilosa</i>	pilose lovegrass	40755	Poaceae	Chester 1986	G4
<i>Eragrostis spectabilis</i>	tumble grass	40717	Poaceae	Chester 1986	G5
<i>Erechtites hieraciifolia</i>	fireweed	37320	Asteraceae	Chester 1986	G5
<i>Erigenia bulbosa</i>	harbinger of spring	29661	Apiaceae	Chester 1986	G5
<i>Erigeron annuus</i>	daisy fleabane	35804	Asteraceae	Chester 1986	G5
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	35809	Asteraceae	Chester 1986	G5
<i>Erigeron pulchellus</i>	robin's plantain	35808	Asteraceae	Chester 1986	G5
<i>Erigeron strigosus</i>	daisy fleabane	35951	Asteraceae	Chester 1986	G5
<i>Eryngium prostratum</i>	creeping eryngo	29502	Apiaceae	Chester 2002	G5
<i>Erythronium albidum</i>	white dog's-tooth violet	42927	Liliaceae	Chester 2002	G5
<i>Euonymus alata</i>	burning bush	27946	Celastraceae	Chester 2002	GNR
<i>Euonymus atropurpurea</i>	eastern wahoo	502579	Celastraceae	Chester 2002	G5
<i>Euonymus fortunei</i>	climbing euonymus	27950	Celastraceae	Chester 1986; Rogers, 2000; BONAP database from contributed material.	GNR
<i>Eupatorium altissimum</i>	tall thoroughwort	502498	Asteraceae	Chester 1986	G5
<i>Eupatorium coelestinum</i>	mist flower	502504	Asteraceae	Chester 1986	G5
<i>Eupatorium fistulosum</i>	Joe Pye weed	502509	Asteraceae	Chester 2002	G5?
<i>Eupatorium hyssopifolium</i>	hyssopleaf thoroughwort	35979	Asteraceae	Chester 2002	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Eupatorium incarnatum</i>	white thoroughwort	502514	Asteraceae	Chester 1986	G5
<i>Eupatorium perfoliatum</i>	boneset	35980	Asteraceae	Chester 1986	G5
<i>Eupatorium purpureum</i>	sweet Joe Pye weed	502522	Asteraceae	Chester 1986	G5
<i>Eupatorium rotundifolium</i>	rough-leaved thoroughwort	36001	Asteraceae	Chester 1986	G5
<i>Eupatorium serotinum</i>	lateflowering thoroughwort	35981	Asteraceae	Chester 1986	G5
<i>Eupatorium sessilifolium</i>	upland boneset	36004	Asteraceae	Chester 2002	G5
<i>Euphorbia corollata</i>	flowering spurge	28057	Euphorbiaceae	Chester 1986	G5
<i>Euphorbia dentata</i>	wild poinsettia	502535	Euphorbiaceae	Chester 1986	G5
<i>Fagus grandifolia</i>	American beech	19462	Fagaceae	Chester 1986	G5
<i>Festuca arundinacea</i>	common tall fescue	40810	Poaceae	Chester 2002	GNR
<i>Festuca rubra</i>	red fescue	40796	Poaceae	Chester 1986	G5
<i>Fimbristylis autumnalis</i>	autumnal fimbristylis	40111	Cyperaceae	Chester 1986	G5
<i>Fimbristylis vahlii</i>	Vahl's fimbristylis	40122	Cyperaceae	Chester 1986	G5
<i>Forsythia viridissima</i>	forsythia	32963	Oleaceae	Chester 1986	GNR
<i>Fragaria virginiana</i>	wild strawberry	24639	Rosaceae	Chester 1986	G5
<i>Frangula caroliniana</i>	Carolina buckthorn	506986	Rhamnaceae	Chester 2002	G5
<i>Frasera caroliniensis</i>	American columbo	502651	Gentianaceae	Chester 2002	G5
<i>Fraxinus americana</i>	American ash	32931	Oleaceae	Chester 1986	G5
<i>Fraxinus pennsylvanica</i>	green ash	32929	Oleaceae	Chester 1986	G5
<i>Galactia volubilis</i>	downy milkpea	26703	Fabaceae	NatureServe 2002-2003	G5
<i>Galium aparine</i>	bedstraw	34797	Rubiaceae	Chester 1986	G5
<i>Galium circaezans</i>	wild licorice	34800	Rubiaceae	Chester 1986	G5
<i>Galium obtusum</i>	obtuse-leaved bedstraw	34802	Rubiaceae	Chester 1986	G5
<i>Galium pilosum</i>	hairy bedstraw	34907	Rubiaceae	Chester 1986	G5
<i>Galium tinctorium</i>	swamp bedstraw	34803	Rubiaceae	Chester 1986	G5
<i>Galium triflorum</i>	sweetscented bedstraw	34933	Rubiaceae	Chester 1986	G5
<i>Geranium carolinianum</i>	cranesbill	29105	Geraniaceae	Chester 1986	G5
<i>Geranium dissectum</i>	dissect-leaf geranium	29135	Geraniaceae	Chester 2002	GNR
<i>Geranium maculatum</i>	wild geranium	29107	Geraniaceae	Chester 1986	G5
<i>Geum canadense</i>	Canada Avens	24645	Rosaceae	Chester 1986	G5
<i>Geum vernum</i>	vernal avens	24664	Rosaceae	Chester 1986	G5
<i>Glechoma</i>	groundivy	502801	Lamiaceae	Chester 2002	GNR

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
hederacea					
Gleditsia triacanthos	honey locust	26714	Fabaceae	Chester 1986	G5
Glyceria striata	fowl mannagrass	40833	Poaceae	Chester 2002	G5
Gnaphalium obtusifolium	catfoot	36694	Asteraceae	Chester 2002	G5
Gymnopogon ambiguus	beardgrass	41749	Poaceae	Chester 2002	G4
Hedeoma pulegioides	pennyroyal	32520	Lamiaceae	Chester 1986	G5
Hedera helix	English ivy	29393	Araliaceae	Rogers, 2000; Chester 1986	GNR
Helenium amarum	slender-leaved sneezeweed	36007	Asteraceae	Chester 1986	G5
Helenium flexuosum	flexed sneezeweed	36016	Asteraceae	Chester 1986	G5
Helianthus microcephalus	small wood sunflower	36654	Asteraceae	Chester 1986	G5
Helianthus mollis	soft sunflower	36655	Asteraceae	Chester 1986	G4G5
Heliotropium indicum	turnsole	31638	Boraginaceae	Chester 1986	G5
Hemerocallis fulva	orange day lily	42943	Liliaceae	Chester 1986	GNR
Heuchera americana	American alumroot	24340	Saxifragaceae	Chester 1986	G5
Hibiscus laevis	halberd leaf rose mallow	21632	Malvaceae	Chester 2002	G5
Hibiscus moscheutos	swamp cotton	21612	Malvaceae	Chester 1986	G5
Hibiscus syriacus	rose-of-sharon	21638	Malvaceae	Chester 1986	GNR
Hieracium gronovii	hawkweed	37710	Asteraceae	Chester 1986	G5
Holcus lanatus	velvet grass	41773	Poaceae	Chester 1986	GNR
Holosteum umbellatum	jagged chickweed	503057	Caryophyllaceae	Chester 1986	GNR
Hordeum pusillum	little barley	40866	Poaceae	Chester 1986	G5
Houstonia purpurea	purple bluets	35051	Rubiaceae	Chester 1986	G5
Houstonia pusilla	Small Bluets	35052	Rubiaceae	Chester 1986	G5
Hybanthus concolor	greenviolet	22026	Violaceae	Chester 1986	G5
Hydrangea arborescens	hydrangea	24195	Hydrangeaceae	Chester 1986	G5
Hydrophyllum macrophyllum	largeleaf waterleaf	31393	Hydrophyllaceae	Chester 1986	G5
Hymenocallis caroliniana	spiderlily	503104	Liliaceae	Chester 1986	G4
Hypericum drummondii	nits and lice	21436	Clusiaceae	Chester 1986	G5
Hypericum mutilum	slender St. Johnswort	21421	Clusiaceae	Chester 1986	G5
Hypericum punctatum	dotted St. Johnswort	21422	Clusiaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Ilex decidua</i>	deciduous holly	27998	Aquifoliaceae	Chester 1986	G5
<i>Ilex opaca</i>	American holly	27982	Aquifoliaceae	Chester 1986	G5
<i>Impatiens capensis</i>	spotted touch-me-not	29182	Balsaminaceae	Chester 1986	G5
<i>Iodanthus pinnatifidus</i>	purple rocket	23149	Brassicaceae	Chester 2002	G5
<i>Ipomoea hederacea</i>	common morning-glory	503177	Convolvulaceae	Chester 1986	G5
<i>Ipomoea lacunosa</i>	white morningglory	30776	Convolvulaceae	Chester 1986	G5?
<i>Ipomoea pandurata</i>	wild potato-vine	30786	Convolvulaceae	Chester 1986	G5
<i>Iris cristata</i>	dwarf crested iris	43204	Iridaceae	Chester 1986	G5
<i>Iris germanica</i>	garden iris	43207	Iridaceae	Chester 1986	GNR
<i>Iva annua</i>	marsh elder	36031	Asteraceae	Chester 1986	G5
<i>Juglans nigra</i>	black walnut	19254	Juglandaceae	Chester 1986	G5
<i>Juncus tenuis</i>	path rush	39243	Juncaceae	Chester 1986	G5
<i>Juniperus virginiana</i>	red cedar	18048	Cupressaceae	Chester 1986	G5
<i>Justicia americana</i>	water willow	34352	Acanthaceae	Chester 1986	G5
<i>Kickxia elatine</i>	canker root	33625	Scrophulariaceae	Chester 1986	GNR
<i>Krigia biflora</i>	dwarf dandelion	37810	Asteraceae	Chester 1986	G5
<i>Krigia dandelion</i>	potato dandelion	37812	Asteraceae	Chester 1986	G5
<i>Kummerowia stipulacea</i>	Korean lespedeza	503293	Fabaceae	Chester 2002	GNR
<i>Kummerowia striata</i>	Japanese lespedeza	503294	Fabaceae	Chester 2002	GNR
<i>Lactuca canadensis</i>	Canada wild lettuce	36596	Asteraceae	Chester 1986	G5
<i>Lactuca floridana</i>	blue lettuce	36599	Asteraceae	Chester 1986	G5
<i>Lactuca serriola</i>	prickly wild lettuce	36608	Asteraceae	Chester 1986	GNR
<i>Lamium amplexicaule</i>	henbit	32539	Lamiaceae	Chester 1986	GNR
<i>Lamium purpureum</i>	deadnettle	32543	Lamiaceae	Chester 1986	GNR
<i>Laportea canadensis</i>	wood-nettle	19127	Urticaceae	Chester 1986	G5
<i>Lathyrus latifolius</i>	sweet pea	25856	Fabaceae	Chester 1986	GNR
<i>Lechea tenuifolia</i>	pinweed	22298	Cistaceae	Chester 1986;BONAP County Database	G5
<i>Leersia oryzoides</i>	rice cutgrass	40886	Poaceae	Chester 1986	G5
<i>Leersia virginica</i>	Virginia cutgrass	40890	Poaceae	Chester 1986	G5
<i>Lepidium campestre</i>	cow-cress	22954	Brassicaceae	Chester 1986	GNR
<i>Lepidium virginicum</i>	peppergrass	22955	Brassicaceae	Chester 1986	G5
<i>Leptochloa mucronata</i>	feather grass	507046	Poaceae	Chester 2002	G5
<i>Leptochloa panicoides</i>	meadow grass	41823	Poaceae	Chester 1986	G5
<i>Lespedeza bicolor</i>	bicolor lespedeza	25895	Fabaceae	Chester 2002	GNR
<i>Lespedeza cuneata</i>	sericea lespedeza	25898	Fabaceae	Chester 1986; Rogers, 2000	GNR

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Lespedeza hirta</i>	hairy bush clover	25900	Fabaceae	Chester 1986	G5
<i>Lespedeza procumbens</i>	trailing bush clover	25907	Fabaceae	Chester 1986	G5
<i>Lespedeza repens</i>	creeping bush clover	503402	Fabaceae	Chester 1986	G5
<i>Lespedeza virginica</i>	Virginia bush clover	25915	Fabaceae	Chester 1986	G5
<i>Lesquerella lescurii</i>	Nashville Mustard	23203	Brassicaceae	Chester 1986	G4
<i>Leucanthemum vulgare</i>	oxeye daisy	37903	Asteraceae	Chester 1986	GNR
<i>Leucojum aestivum</i>	snowflake	503422	Liliaceae	Chester 2002	GNR
<i>Leucospora multifida</i>	clefted conobea	33632	Scrophulariaceae	Chester 1986	G5
<i>Ligustrum sinense</i>	privet	32979	Oleaceae	Chester 1986	GNR
<i>Lilium michiganense</i>	Michigan lily	503458	Liliaceae	Chester 1986	G5
<i>Lindera benzoin</i>	spicebush	18147	Lauraceae	Chester 1986	G5
<i>Linum virginianum</i>	Virginia flax	29202	Linaceae	Chester 1986	G4G5
<i>Liparis liliifolia</i>	lily-leaved twayblade	43622	Orchidaceae	NatureServe 2002-2003	G5
<i>Lipocarpa micrantha</i>	smallflower hemicarpha	503499	Cyperaceae	Chester 1986	G4
<i>Liquidambar styraciflua</i>	sweetgum	19027	Hamamelidaceae	Chester 1986	G5
<i>Liriodendron tulipifera</i>	tuliptree	18086	Magnoliaceae	Chester 1986	G5
<i>Lobelia cardinalis</i>	cardinal flower	34505	Campanulaceae	Chester 1986	G5
<i>Lobelia inflata</i>	Indian tobacco	34524	Campanulaceae	Chester 1986	G5
<i>Lobelia puberula</i>	downy lobelia	34529	Campanulaceae	Chester 1986	G5
<i>Lobelia siphilitica</i>	great blue lobelia	34531	Campanulaceae	Chester 1986	G5
<i>Lolium perenne</i>	common ryegrass	40893	Poaceae	Chester 1986	GNR
<i>Lonicera japonica</i>	Japanese honeysuckle	35283	Caprifoliaceae	Chester 1986; Rogers, 2000;	GNR
<i>Lonicera sempervirens</i>	trumpet honeysuckle	35303	Caprifoliaceae	Chester 1986	G5
<i>Ludwigia decurrens</i>	decurrent-leaved primrose willow	27343	Onagraceae	Chester 1986	G5
<i>Ludwigia leptocarpa</i>	slender-fruited primrose willow	27349	Onagraceae	Chester 1986	G5
<i>Ludwigia palustris</i>	marsh purslane	27336	Onagraceae	Chester 1986	G5
<i>Luzula bulbosa</i>	bulbous woodrush	39338	Juncaceae	Chester 1986	G5
<i>Luzula echinata</i>	common woodrush	39342	Juncaceae	Chester 1986	G5
<i>Lycopersicon esculentum</i>	tomato	30554	Solanaceae	Chester 1986	GNR
<i>Lycopus americanus</i>	American waterhorehound	32254	Lamiaceae	Chester 2002	G5
<i>Lycopus virginicus</i>	bugleweed	32255	Lamiaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
Lysimachia lanceolata	lance-leaved loosestrife	23991	Primulaceae	Chester 1986	G5
Lysimachia nummularia	moneywort	23993	Primulaceae	Chester 2002	GNR
Maclura pomifera	osage orange	19102	Moraceae	Chester 1986	G2G4
Magnolia grandiflora	southern magnolia	18074	Magnoliaceae	Chester 1986	G5
Malus pumila	paradise apple	25262	Rosaceae	NatureServe 2002-2003	G5
Matelea gonocarpos	milkvine	503702	Asclepiadaceae	Chester 2002	G5
Medicago lupulina	black medic	503721	Fabaceae	Chester 1986	GNR
Medicago sativa	alfalfa	183623	Fabaceae	Chester 1986	GNR
Melica mutica	melic grass	41858	Poaceae	Chester 1986	G5
Melilotus officinalis	yellow sweetclover	26150	Fabaceae	Chester 1986	G5
Mertensia virginica	bluebells	31673	Boraginaceae	Chester 1986	G5
Mimulus alatus	monkeyflower	33234	Scrophulariaceae	Chester 1986	G5
Mollugo verticillata	carpetweed	19899	Molluginaceae	Chester 1986	GNR
Monarda fistulosa	wildbergamot	32284	Lamiaceae	Chester 1986	G5
Monotropa uniflora	Indian pipe	23778	Monotropaceae	Chester 1986	G5
Morus alba	white mulberry	19066	Moraceae	Chester 1986	GNR
Morus rubra	red mulberry	19070	Moraceae	Chester 1986	G5
Muhlenbergia frondosa	leafy muhly	41915	Poaceae	Chester 1986	G5
Muhlenbergia schreberi	nimble will	41939	Poaceae	Chester 1986	G5
Muhlenbergia tenuiflora	slender flowered muhly	41943	Poaceae	Chester 1986	G5
Muscari botryoides	grape hyacinth	42977	Liliaceae	Chester 1986	GNR
Myosotis macrosperma	scorpion grass	31695	Boraginaceae	Chester 1986	G5
Myosurus minimus	mousetail	18786	Ranunculaceae	Chester 1986	G5
Narcissus poeticus	white narcissus	503929	Liliaceae	Chester 1986	GNR
Narcissus pseudonarcissus	daffodil	503930	Liliaceae	Chester 1986	GNR
Nemophila aphylla	baby blue eyes	31422	Hydrophyllaceae	Chester 2002	G5
Nyssa sylvatica	black gum	27821	Nyssaceae	Chester 1986	G5
Obolaria virginica	pennywort	30104	Gentianaceae	Chester 1986	G5
Oenothera biennis	evening primrose	27368	Onagraceae	Chester 1986	G5
Oenothera laciniata	ragged-leaved evening primrose	27371	Onagraceae	Chester 1986	G5
Onoclea sensibilis	sensitive fern	17637	Dryopteridaceae	Chester 2002	G5
Ophioglossum vulgatum	southeastern adder's tongue	17195	Ophioglossaceae	Chester 1986	G5
Ornithogalum umbellatum	star of Bethlehem	42754	Liliaceae	Chester 2002	G2?
Osmorhiza	aniseroor	29791	Apiaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
longistylis					
Ostrya virginiana	hop hornbeam	19511	Betulaceae	Chester 1986	G5
Oxalis grandis	giant wood sorrel	29083	Oxalidaceae	Chester 1986	G4G5
Oxalis stricta	yellow wood sorrel	29095	Oxalidaceae	Chester 1986	G5
Oxalis violacea	violet woodsorrel	29098	Oxalidaceae	Chester 1986	G5
Oxydendrum arboreum	sourwood	23690	Ericaceae	Chester 1986	G5
Pachysandra procumbens	Allegheny-spurge	28027	Buxaceae	Chester 1986	G4G5
Panax quinquefolius	ginseng	29399	Araliaceae	Chester 1986	G4
Panicum anceps	two edged panic grass	40904	Poaceae	Chester 1986	G5
Panicum capillare	witchgrass	40914	Poaceae	Chester 1986	G5
Panicum dichotomiflorum	forked-flowered panic grass	40908	Poaceae	Chester 1986	G5
Panicum flexile	pliant panic grass	40918	Poaceae	Chester 1986	G5
Parietaria pennsylvanica	pellitory	19169	Urticaceae	Chester 1986	G5
Parthenium integrifolium	wild quinine	38166	Asteraceae	Chester 1986	G5
Parthenocissus quinquefolia	Virginia creeper	28602	Vitaceae	Chester 1986	G5
Paspalum boscianum	bull grass	41012	Poaceae	Chester 1986	G5
Paspalum dilatatum	dallis gras	40997	Poaceae	Chester 1986	GNR
Paspalum fluitans	river knotgrass	40998	Poaceae	Chester 1986	G5
Paspalum laeve	smooth knotgrass	41024	Poaceae	Chester 1986	G4G5
Paspalum pubiflorum	hairy-flowered knotgrass	40994	Poaceae	Chester 1986	G5
Passiflora incarnata	passion flower	504139	Passifloraceae	Chester 1986	G5
Passiflora lutea	small passion flower	22226	Passifloraceae	Chester 1986	G5
Paulownia tomentosa	princess tree	33460	Scrophulariaceae	Chester 1986; Rogers, 2000	GNR
Penstemon calycosus	purple beardtongue	33845	Scrophulariaceae	Chester 1986	G5
Penstemon laevigatus	smooth beardtongue	33929	Scrophulariaceae	Chester 1986	G5
Penthorum sedoides	ditch stonecrop	504241	Crassulaceae	Chester 1986	G5
Perilla frutescens	beefsteak plant	32634	Lamiaceae	Chester 1986	GNR
Phacelia purshii	Pursh's Phacelia	504279	Hydrophyllaceae	Chester 1986	G5
Phegopteris hexagonoptera	broad beechfern	504296	Thelypteridaceae	Chester 1986	G5
Philadelphus pubescens	hairy mock-orange	24443	Hydrangeaceae	Chester 1986	G5?
Phlox divaricata	blue phlox	30934	Polemoniaceae	Chester 1986	G5
Phlox pilosa	hairy phlox	30974	Polemoniaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
Phoradendron leucarpum	mistletoe	504341	Viscaceae	Chester 2002	G5
Phryma leptostachya	lopseed	504348	Verbenaceae	Chester 1986	G5
Phyla lanceolata	fogfruit	32196	Verbenaceae	Chester 2002	G5
Phyllanthus caroliniensis	Carolina leafflower	28368	Euphorbiaceae	Chester 2002	G5
Physalis angulata	angled ground cherry	30590	Solanaceae	Chester 1986	G5
Physalis heterophylla	variable-leaved ground cherry	30601	Solanaceae	Chester 1986	G5
Phytolacca americana	pokeweed	19523	Phytolaccaceae	Chester 1986	G5
Picea abies	Norway spruce	183289	Pinaceae	Chester 1986	GNR
Pinus echinata	shortleaf pine	183335	Pinaceae	Chester 1986	G5
Pinus strobus	eastern white pine	183385	Pinaceae	Chester 1986	G5
Pinus taeda	loblolly pine	18037	Pinaceae	Chester 1986	G5
Plantago aristata	bracted plantain	32875	Plantaginaceae	Chester 1986	G5
Plantago lanceolata	buckhorn	32874	Plantaginaceae	Chester 1986	G5
Plantago pusilla	small plantain	32889	Plantaginaceae	Chester 1986	G5
Plantago rugelii	Rugel's plantain	504439	Plantaginaceae	Chester 1986	G5
Plantago virginica	Virginia plantain	32895	Plantaginaceae	Chester 1986	G5
Platanus occidentalis	sycamore	19020	Platanaceae	Chester 1986	G5
Pleopeltis polypodioides	resurrection fern	504451	Polypodiaceae	Chester 2002	G5
Pluchea camphorata	camphor weed	36061	Asteraceae	Chester 1986	G5
Poa annua	low speargrass	41107	Poaceae	Chester 1986	GNR
Poa compressa	Canada bluegrass	41082	Poaceae	Chester 1986	GNR
Poa pratensis	Kentucky bluegrass	41088	Poaceae	Chester 1986	GNR
Poa sylvestris	woodland bluegrass	41162	Poaceae	Chester 1986	G5
Podophyllum peltatum	mayapple	18850	Berberidaceae	Chester 1986	G5
Polemonium reptans	Jacob's Ladder	31003	Polemoniaceae	Chester 1986	G5
Polygala sanguinea	milkwort	29314	Polygalaceae	Chester 1986	G5
Polygala verticillata	whorled milkwort	29320	Polygalaceae	Chester 2002	G5
Polygonatum biflorum	Solomon's seal	43006	Liliaceae	Chester 1986	G5
Polygonum aviculare	knotweed	20876	Polygonaceae	Chester 1986	GNR
Polygonum convolvulus	black bindweed	20853	Polygonaceae	Chester 1986	GNR
Polygonum cuspidatum	Japanese knotweed	20889	Polygonaceae	Chester 1986; Rogers, 2000;	GNR
Polygonum erectum	erect knotweed	20893	Polygonaceae	Chester 1986	G5
Polygonum hydropiperoides	water pepper	20857	Polygonaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Polygonum lapathifolium</i>	dock-leaf smartweed	20860	Polygonaceae	Chester 1986	G5
<i>Polygonum pensylvanicum</i>	pink smartweed	20861	Polygonaceae	Chester 1986	G5
<i>Polygonum persicaria</i>	lady's thumb	20915	Polygonaceae	Chester 1986	G3G5
<i>Polygonum punctatum</i>	water smartweed	20862	Polygonaceae	Chester 1986	G5
<i>Polygonum scandens</i>	climbing false buckwheat	20924	Polygonaceae	Chester 1986	G5
<i>Polygonum virginianum</i>	jumpseed	20931	Polygonaceae	Chester 2002	G5
<i>Polystichum acrostichoides</i>	Christmas fern	17675	Dryopteridaceae	Chester 1986	G5
<i>Populus deltoides</i>	cottonwood	22445	Salicaceae	Chester 1986	G5
<i>Portulaca oleracea</i>	purslane	20422	Portulacaceae	Chester 1986	GNR
<i>Potentilla recta</i>	five-finger	24742	Rosaceae	Chester 1986	GNR
<i>Potentilla simplex</i>	cinquefoil	24751	Rosaceae	Chester 1986	G5
<i>Prenanthes altissima</i>	tall rattlesnake root	38273	Asteraceae	Chester 1986;	G5?
<i>Prenanthes barbata</i>	barbed rattlesnake root	38276	Asteraceae	Chester 1986	G3
<i>Prunella vulgaris</i>	heal all	32381	Lamiaceae	Chester 1986	G5
<i>Prunus americana</i>	American plum	24763	Rosaceae	Chester 1986	G5
<i>Prunus angustifolia</i>	Chickasaw plum	24768	Rosaceae	Chester 1986	G5
<i>Prunus persica</i>	common peach	24765	Rosaceae	Chester 1986	G5
<i>Prunus serotina</i>	wild cherry	24764	Rosaceae	Chester 1986	G5
<i>Pycnanthemum incanum</i>	gray mountainmint	32662	Lamiaceae	Chester 1986	G5
<i>Pycnanthemum tenuifolium</i>	slender-leaved mountainmint	32668	Lamiaceae	Chester 1986	G5
<i>Pycnanthemum virginianum</i>	Virginia mountainmint	32670	Lamiaceae	Chester 1986	G5
<i>Pyrhopappus carolinianus</i>	false dandelion	38324	Asteraceae	Chester 1986	G5
<i>Pyrus communis</i>	common pear	25295	Rosaceae	Chester 1986	G5
<i>Quercus alba</i>	white oak	19290	Fagaceae	Chester 1986	G5
<i>Quercus falcata</i>	southern red oak	19277	Fagaceae	Chester 1986	G5
<i>Quercus imbricaria</i>	shingle oak	19359	Fagaceae	Chester 1986	G5
<i>Quercus macrocarpa</i>	bur oak	19287	Fagaceae	Chester 1986	G5
<i>Quercus macrocarpa</i>	mossycup oak	19287	Fagaceae	Chester 1986	G5
<i>Quercus michauxii</i>	swamp chestnut oak	19279	Fagaceae	Chester 1986	G5
<i>Quercus muehlenbergii</i>	chinkapin oak	504714	Fagaceae	Chester 1986	G5
<i>Quercus pagoda</i>	cherrybark oak	195195	Fagaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Quercus palustris</i>	pin oak	19281	Fagaceae	Chester 1986	G5
<i>Quercus phellos</i>	willow oak	19282	Fagaceae	Chester 1986	G5
<i>Quercus rubra</i>	northern red oak	19408	Fagaceae	Chester 1986	G5
<i>Quercus stellata</i>	post oak	19422	Fagaceae	Chester 1986	G5
<i>Quercus velutina</i>	black oak	19447	Fagaceae	Chester 1986	G5
<i>Ranunculus abortivus</i>	early spring buttercup	18559	Ranunculaceae	Chester 1986	G5
<i>Ranunculus hispidus</i>	bristly buttercup	18613	Ranunculaceae	Chester 2002	G5
<i>Ranunculus parviflorus</i>	small-flowered crowfoot	18656	Ranunculaceae	Chester 1986	GNR
<i>Ranunculus recurvatus</i>	recurved buttercup	18641	Ranunculaceae	Chester 1986	G5
<i>Ranunculus sardous</i>	European crowfoot	18645	Ranunculaceae	Chester 1986	GNR
<i>Rhus copallinum</i>	shining sumac	504754	Anacardiaceae	Chester 1986	G5
<i>Rhus glabra</i>	smooth sumac	28782	Anacardiaceae	Chester 1986	G5
<i>Rhodotypos scandens</i>	Jetbead	25298	Rosaceae	NatureServe 2002-2003	GNR
<i>Robinia hispida</i>	bristly locust	26191	Fabaceae	Chester 2002	G4
<i>Robinia pseudoacacia</i>	black locust	504804	Fabaceae	Chester 1986	G5
<i>Rorippa sessiliflora</i>	yellow cress	23013	Brassicaceae	Chester 1986	G5
<i>Rosa carolina</i>	Carolina rose	24808	Rosaceae	Chester 1986	G4G5
<i>Rosa multiflora</i>	multiflora rose	24833	Rosaceae	Chester 1986; Rogers, 2000	GNR
<i>Rosa setigera</i>	prairie rose	24839	Rosaceae	Chester 1986	G5
<i>Rotala ramosior</i>	toothcup	27115	Lythraceae	Chester 1986	G5
<i>Rubus argutus</i>	blackberry	24877	Rosaceae	Chester 1986	G5
<i>Rudbeckia hirta</i>	black-eyed Susan	36765	Asteraceae	Chester 1986	G5
<i>Rudbeckia triloba</i>	lobed-leaf coneflower	36784	Asteraceae	Chester 1986	G4
<i>Ruellia caroliniensis</i>	Carolina wild petunia	34373	Acanthaceae	Chester 1986	G5
<i>Ruellia strepens</i>	smooth wild petunia	34390	Acanthaceae	Chester 1986	G4G5
<i>Rumex acetosella</i>	sheep sorrel	20934	Polygonaceae	Chester 1986	GNR
<i>Rumex altissimus</i>	pale dock	20949	Polygonaceae	Chester 1986	G5
<i>Rumex conglomeratus</i>	clustered dock	20936	Polygonaceae	Chester 2002	GNR
<i>Rumex crispus</i>	curly dock	20937	Polygonaceae	Chester 1986	GNR
<i>Sabatia angularis</i>	rosepink	30005	Gentianaceae	Chester 1986	G5
<i>Saccharum alopecuroidum</i>	wooly beardgrass	504929	Poaceae	Chester 1986	G5
<i>Sagittaria calycina</i>	arrowhead	38915	Alismataceae	Chester 1986	G5
<i>Salix caroliniana</i>	Carolina willow	22516	Salicaceae	Chester 1986	G5
<i>Salix nigra</i>	black willow	22484	Salicaceae	Chester 1986	G5
<i>Salvia lyrata</i>	lyre leaf sage	32690	Lamiaceae	Chester 1986	G5
<i>Sambucus</i>	elderberry	35317	Caprifoliaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
canadensis					
Samolus parviflorus	brookweed	24037	Primulaceae	Chester 1986	G5
Sanguinaria canadensis	bloodroot	18990	Papaveraceae	Chester 1986	G5
Sanicula canadensis	Canada black snakeroot	29850	Apiaceae	Chester 1986	G5
Sanicula odorata	black snakeroot	505004	Apiaceae	Chester 1986	G5
Sassafras albidum	sassafras	18158	Lauraceae	Chester 1986	G5
Saxifraga virginensis	early saxifrage	24303	Saxifragaceae	Chester 2002	G5
Schizachyrium scoparium	little bluestem	42076	Poaceae	Chester 1986	G5
Scutellaria elliptica	hairy skullcap	32796	Lamiaceae	Chester 1986	G5
Scutellaria nervosa	veiny skullcap	32808	Lamiaceae	Chester 1986;BONAP County Database	G5
Scutellaria parvula	small skullcap	32776	Lamiaceae	Chester 2002	G4
Secale cereale	common rye	42090	Poaceae	Chester 1986	GNR
Sedum ternatum	stonecrop	24184	Crassulaceae	Chester 1986	G5
Selaginella apoda	spikemoss	17066	Selaginellaceae	Chester 1986	G5
Senecio anonymus	Small's groundsel	36095	Asteraceae	Chester 2002	G5
Senecio glabellus	butterweed	36138	Asteraceae	Chester 1986	G5
Senna marilandica	wild senna	505160	Fabaceae	Chester 2002	G5
Sericarpus linifolius	white-topped aster	35656	Asteraceae	Chester 2002	G5
Setaria faberi	tall foxtail grass	41244	Poaceae	Chester 1986	GNR
Setaria parviflora	bristly foxtail grass	505191	Poaceae	Chester 1986	G5
Setaria viridis	green foxtail grass	41231	Poaceae	Chester 1986	GNR
Sherardia arvensis	field madder	35237	Rubiaceae	Chester 1986	GNR
Sibara virginica	arabis	23307	Brassicaceae	Chester 1986	G5
Sicyos angulatus	bur cucumber	22402	Cucurbitaceae	Chester 1986	G5
Sida spinosa	prickly sida	21732	Malvaceae	Chester 1986	G5?
Silene antirrhina	sleepy catchfly	20045	Caryophyllaceae	Chester 1986	G5
Silene stellata	starry campion	20127	Caryophyllaceae	Chester 1986	G5
Silene virginica	fire pink	20141	Caryophyllaceae	Chester 1986	G5
Silphium integrifolium	rosinweed	38400	Asteraceae	Chester 1986	G4G5
Silphium perfoliatum	cupleaf rosinweed	38403	Asteraceae	Chester 1986	G5
Sisymbrium officinale	hedge mustard	23316	Brassicaceae	Chester 1986	GNR
Sisyrinchium albidum	blue-eyed grass	43241	Iridaceae	Chester 1986	G5?
Smilax bona-nox	china-brier	43341	Smilacaceae	Chester 1986	G5
Smilax glauca	sawbrier	43342	Smilacaceae	Chester 1986	G5
Smilax herbacea	carrion-flower	43356	Smilacaceae	Chester 1986	G5
Smilax rotundifolia	common	43346	Smilacaceae	Chester 1986	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
	greenbrier				
<i>Smilax tamnoides</i>	bristly greenbrier	43348	Smilacaceae	Chester 1986	G5
<i>Solanum americanum</i>	American nightshade	30416	Solanaceae	Chester 1986	G5
<i>Solanum carolinense</i>	horsenettle	30413	Solanaceae	Chester 1986	G5
<i>Solidago altissima</i>	tall goldenrod	36228	Asteraceae	Chester 2002	G5
<i>Solidago caesia</i>	bluestem goldenrod	36238	Asteraceae	Chester 1986	G5
<i>Solidago erecta</i>	erect goldenrod	36252	Asteraceae	Chester 1986	G5
<i>Solidago flexicaulis</i>	zigzag goldenrod	36257	Asteraceae	Chester 1986	G5
<i>Solidago gigantea</i>	large goldenrod	36259	Asteraceae	Chester 1986	G5
<i>Solidago hispida</i>	hairy goldenrod	36266	Asteraceae	Chester 1986	G5
<i>Solidago juncea</i>	early goldenrod	36270	Asteraceae	Chester 1986	G5
<i>Solidago nemoralis</i>	gray goldenrod	36281	Asteraceae	Chester 1986	G5
<i>Solidago rugosa</i>	wrinkleleaf goldenrod	36299	Asteraceae	Chester 1986	G5
<i>Solidago ulmifolia</i>	elmleaf goldenrod	36225	Asteraceae	Chester 1986	G5
<i>Sonchus asper</i>	sow thistle	38424	Asteraceae	Chester 1986	GNR
<i>Sorghum halepense</i>	Johnson grass	42111	Poaceae	Rogers, 2000; Chester 1986	GNR
<i>Spermacoce glabra</i>	Buttonweed	35241	Rubiaceae	Chester 1986	G4G5
<i>Sphenopholis obtusata</i>	obtuse wedge grass	41279	Poaceae	Chester 1986	G5
<i>Spigelia marilandica</i>	Indian pink	505330	Loganiaceae	Chester 1986	G5
<i>Spiraea prunifolia</i>	bridal wreath	25337	Rosaceae	Chester 1986	G5
<i>Spiraea thunbergii</i>	Thunberg's bridal wreath	25341	Rosaceae	Chester 1986	GNR
<i>Spiranthes ovalis</i>	October ladies'-tresses	43451	Orchidaceae	NatureServe 2002-2003	G5
<i>Spiranthes tuberosa</i>	little ladies'-tresses	505346	Orchidaceae	Chester 1986	G5
<i>Sporobolus vaginiflorus</i>	poverty dropseed	42126	Poaceae	Chester 2002	G5
<i>Stachys tenuifolia</i>	hedge nettle	32323	Lamiaceae	Chester 1986	G5
<i>Staphylea trifolia</i>	bladdernut	28646	Staphyleaceae	Chester 1986	G5
<i>Stellaria pubera</i>	giant chickweed	20193	Caryophyllaceae	Chester 1986	G5
<i>Strophostyles helvula</i>	yellow wild bean	505392	Fabaceae	Chester 1986	G5
<i>Stylosanthes biflora</i>	pencil flower	26973	Fabaceae	Chester 1986	G5
<i>Symphoricarpos orbiculatus</i>	coralberry	35337	Caprifoliaceae	Chester 1986	G5
<i>Symphyotrichum dumosum</i> var. <i>dumosum</i>	bushy aster	35511	Asteraceae	Chester 2002	G5
<i>Symphyotrichum pilosum</i> var. <i>pilosum</i>	hairy aster	35630	Asteraceae	Chester 2002	G5

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
Symphyotrichum shortii	Short's aster	35652	Asteraceae	Chester 2002	G4G5
Taraxacum officinale	common dandelion	36213	Asteraceae	Chester 1986	G5
Taxodium distichum	baldcypress	18041	Taxodiaceae	Chester 2002	G5
Tephrosia virginiana	Virginia tephrosia	26998	Fabaceae	Chester 2002	G5
Tephrosia virginiana	rabbit's-pea	26998	Fabaceae	Chester 2002	G5
Teucrium canadense	American germander	32352	Lamiaceae	Chester 1986	G5
Thalictrum thalictroides	rue anemone	18683	Ranunculaceae	Chester 2002	G5
Tipularia discolor	crane fly orchid	43703	Orchidaceae	Chester 1986	G4G5
Torilis japonica	hedgearsley	29895	Apiaceae	Chester 1986	GNR
Toxicodendron radicans	poison ivy	28821	Anacardiaceae	Chester 1986	G5
Tradescantia subaspera	harsh spiderwort	39176	Commelinaceae	Chester 1986	G5
Tragia cordata	heartleaf noseburn	28428	Euphorbiaceae	Chester 2002	G4
Trichostema dichotomum	blue curls	32364	Lamiaceae	Chester 2002	G5
Tridens flavus	purple-top	42227	Poaceae	Chester 1986	G5
Trifolium campestre	hop clover	26231	Fabaceae	Chester 1986	GNR
Trifolium dubium	low hop clover	26205	Fabaceae	Chester 1986	GNR
Trifolium hybridum	alsike clover	26261	Fabaceae	Chester 1986	GNR
Trifolium incarnatum	crimson clover	26262	Fabaceae	Chester 1986	GNR
Trifolium pratense	red clover	26313	Fabaceae	Chester 1986	GNR
Trifolium repens	white clover	26206	Fabaceae	Chester 1986	GNR
Trillium flexipes	white trillium	43071	Liliaceae	Chester 1986	G5
Trillium recurvatum	recurved trillium	43059	Liliaceae	Chester 1986	G5
Triodanis perfoliata	Venus' lookingglass	34615	Campanulaceae	Chester 2002	G5
Tripsacum dactyloides	gama-grass	41287	Poaceae	Chester 1986	G5
Triticum aestivum	common wheat	42237	Poaceae	Chester 1986	GNR
Tsuga canadensis	eastern hemlock	183397	Pinaceae	Chester 1986	G5
Ulmus alata	winged elm	19051	Ulmaceae	Chester 1986	G5
Ulmus americana	American elm	19049	Ulmaceae	Chester 1986	G5?
Ulmus rubra	slippery elm	19050	Ulmaceae	Chester 1986	G5
Uvularia grandiflora	bellwort	43109	Liliaceae	Chester 1986	G5
Vaccinium arboreum	sparkleberry	23580	Ericaceae	Chester 2002	G5
Vaccinium stamineum	huckleberry	23615	Ericaceae	Chester 1986	G5
Valerianella locusta	cornsalad	35392	Valerianaceae	Chester 2002	G5
Valerianella radiata	cornsalad	35397	Valerianaceae	Chester 1986	G5
Verbascum blattaria	moth mullein	33389	Scrophulariaceae	Chester 1986	GNR

Latin Name	CommonName	tsn	FamilyName	Data Source	Grank
<i>Verbascum thapsus</i>	common mullein	33394	Scrophulariaceae	Chester 1986; Rogers, 2000	GNR
<i>Verbena simplex</i>	blue vervain	32123	Verbenaceae	Chester 1986	G5
<i>Verbena urticifolia</i>	white vervain	32127	Verbenaceae	Chester 1986	G5
<i>Verbesina alternifolia</i>	wingstem	38597	Asteraceae	Chester 1986	G5
<i>Verbesina helianthoides</i>	crown-beard	38604	Asteraceae	Chester 1986	G5
<i>Verbesina virginica</i>	white crownbeard	38613	Asteraceae	Chester 2002	G4G5
<i>Vernonia gigantea</i>	ironweed	38634	Asteraceae	Chester 1986	G5
<i>Veronica arvensis</i>	common speedwell	33411	Scrophulariaceae	Chester 1986	GNR
<i>Veronica peregrina</i>	neckweed	33421	Scrophulariaceae	Chester 1986	G5
<i>Veronica serpyllifolia</i>	thyme-leaf speedwell	33423	Scrophulariaceae	Chester 1986	G5
<i>Veronicastrum virginicum</i>	Culver's-root	34073	Scrophulariaceae	Chester 1986	G4
<i>Viburnum rufidulum</i>	blackhaw	35274	Caprifoliaceae	Chester 1986	G5
<i>Vinca minor</i>	common periwinkle	30238	Apocynaceae	Rogers, 2000; Chester 1986	GNR
<i>Viola priceana</i>	confederate violet	523326	Violaceae	Chester 2002	GNR
<i>Viola pubescens</i>	downy yellow violet	22144	Violaceae	Chester 2002	G5
<i>Viola sororia</i>	common blue violet	22169	Violaceae	Chester 2002	G5
<i>Vitis aestivalis</i>	summer grape	28607	Vitaceae	Chester 1986	G5
<i>Vitis vulpina</i>	frost grape	28610	Vitaceae	Chester 1986	G5
<i>Wisteria frutescens</i>	American wisteria	27021	Fabaceae	Chester 1986	G5
<i>Xanthium strumarium</i>	cocklebur	38692	Asteraceae	Chester 1986	G5
<i>Yucca filamentosa</i>	Spanish Bayonet	43140	Agavaceae	Chester 1986	G5

#### Numeric rank

G1 = Critically imperiled globally

G2 = Imperiled globally

G3 = Rare or uncommon

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

G5 = Demonstrably widespread, abundant and secure

G? = Unranked

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

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

#### Qualifiers:

? = Inexact numeric rank

Q = Questionable taxonomy

Table 3. List of vouchers that were collected at Fort Donelson National Battlefield.

Latin Name	Common Name	TSN	Catalog#	Accession#	Collector	Habitat
<i>Athyrium filix-femina</i> ssp. <i>asplenioides</i>	southern ladyfern	17415	FODO 01652	FODO-0102	R. Evans, R. White	Central Interior Beech – White Oak Forest (CEGL007881)
<i>Carex bushii</i>	Bush's sedge	39536	FODO 01653	FODO-0102	R. Evans	Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)
<i>Carex debilis</i>	white edge sedge	39572	FODO 01654	FODO-0102	R. Evans, R. White	Successional Sweetgum – Oak Forest (CEGL007217)
<i>Corallorrhiza odontorrhiza</i>	autumn coralroot	43525	FODO 01655	FODO-0102	R. Evans, R. White	Central Interior Upland Cherrybark Oak Forest (CEGL003871)
<i>Dichanthelium acuminatum</i> var. <i>acuminatum</i>	tapered rosette grass	527684	FODO 01656	FODO-0102	R. Evans, C. Nordman	Road cut
<i>Galactia volubilis</i>	downy milkpea	26703	FODO 01657	FODO-0102	R. Evans, R. White	Broomsedge Old field (CEGL004044)
<i>Liparis liliifolia</i>	lily-leaved twayblade	43622	FODO 01659	FODO-0102	R. Evans, R. White	Central Interior Upland Cherrybark Oak Forest (CEGL003871)
<i>Malus pumila</i>	paradise apple	25262	FODO 01660	FODO-0102	R. Evans, R. White	Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)
<i>Rhodotypos scandens</i>	Jetbead	25245	FODO 01658	FODO-0102	R. Evans, R. White	Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)
<i>Spiranthes ovalis</i>	October ladiestresses	43451	FODO 01661	FODO-0102	R. Evans, R. White	Central Interior Upland Cherrybark Oak Forest (CEGL003871)

Table 4. Tables of vascular plant diversity measures and species total estimates for Fort Donelson National Battlefield

	Diversity Measures			
	N	alpha	beta	Gamma
Gridded plots only	11	83	3.8	313
All plots	15	74	4.9	363
Total for park				665

alpha = average species richness per plot  
 beta = measure of the heterogeneity of the data  
 (gamma/alpha)  
 gamma = total species for all plots/park

	Estimate of # of species in park	If estimate is correct, % of species confirmed for park (based on 519 species confirmed)
First-order jackknife estimate (all plots)	501	133%
Second-order jackknife estimate (all plots)	580	114%
First-order jackknife estimate (gridded plots)	418	159%
Second-order jackknife estimate (gridded plots)	464	143%

Table 5. Exotic plant species at Fort Donelson National Battlefield.

Latin Name	CommonName	tsn	Threat?	Source
<i>Aira elegans</i>	elegant hairgrass	41377	Not considered a threat currently	
<i>Albizia julibrissin</i>	mimosa	26449	Severe threat	Tennessee Exotic Pest Plants Council 2001
<i>Allium vineale</i>	field garlic	42637	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Arenaria serpyllifolia</i>	thymeleaf sandwort	20270	Not considered a threat currently	
<i>Arthraxon hispidus</i>	jointgrass	41445	Severe Threat	Southern Weed Science Society 1998
<i>Barbarea vulgaris</i>	yellowrocket	22741	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
<i>Berberis thunbergii</i>	Japanese barberry	18835	Significant threat	Tennessee Exotic Pest Plants Council 2001
<i>Brassica rapa</i>	common turnip	23063	Not considered a threat currently	
<i>Bromus commutatus</i>	common brome grass	40497	Significant threat	Tennessee Exotic Pest Plants Council 2002
<i>Bromus japonicus</i>	Japanese brome grass	40479	Significant threat	Tennessee Exotic Pest Plants Council 2001
<i>Bromus tectorum</i>	Brome Grass	40524	Significant threat	Tennessee Exotic Pest Plants Council 2001
<i>Capsella bursa-pastoris</i>	shepherd's purse	22766	Not considered a threat currently	
<i>Cardamine hirsuta</i>	bittercress	22797	Not considered a threat currently	
<i>Carduus nutans</i>	nodding thistle	35787	Significant threat	Tennessee Exotic Pest Plants Council 2001
<i>Cerastium brachypetalum</i>	short-petaled mouse ear chickweed	19949	Not considered a threat currently	
<i>Cerastium glomeratum</i>	sticky mouse ear chickweed	19955	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Cerastium vulgatum</i>	common mouse ear chickweed	19968	Not a threat currently	

Latin Name	CommonName	tsn	Threat?	Source
Chamaesyce supina	milk purslane	510751	Not considered a threat currently	
Chenopodium ambrosioides	Mexican tea	20590	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Clematis terniflora	sweet autumn clematis	18712	Significant threat	Tennessee Exotic Pest Plants Council 2001
Coronilla varia	crown vetch	26553	Severe threat	Kentucky Exotic Pest Plants Council 2001
Cruciata pedemontana	piedmont bedstraw	502717	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Cynodon dactylon	Bermudagrass	41619	Not considered a threat currently	
Dactylis glomerata	orchard grass	193446	Not considered a threat currently	
Datura stramonium	jimsonweed	30520	Not considered a threat currently	
Daucus carota	Queen Anne's lace	29477	Significant threat	Tennessee Exotic Pest Plants Council 2001
Dianthus armeria	Deptford pink	20276	Not considered a threat currently	
Digitaria ischaemum	smooth crab grass	40637	On list for So. Weed Society	Southern Weed Science Society 1998
Draba verna	whitlowgrass	22923	Not considered a threat currently	
Echinochloa crus-galli	barnyard grass	502210	Not considered a threat currently	
Elaeagnus umbellata	autumn olive	27776	Severe threat	Tennessee Exotic Pest Plants Council 2001
Eleusine indica	goose grass	41692	Significant threat	Kentucky Exotic Pest Plants Council 2001
Eragrostis cilianensis	stink grass	40719	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Euonymus alata	burning bush	27946	Significant threat	Tennessee Exotic Pest Plants Council 2001
Euonymus fortunei	climbing euonymus	27950	Severe threat	Tennessee Exotic Pest Plants Council 2001

Latin Name	CommonName	tsn	Threat?	Source
<i>Festuca arundinacea</i>	common tall fescue	40810	Not considered a threat currently	
<i>Forsythia viridissima</i>	forsythia	32963	Not considered a threat currently	
<i>Geranium dissectum</i>	dissect-leaf geranium	29135	Not considered a threat currently	
<i>Glechoma hederacea</i>	groundivy	502801	Lesser Threat	Tennessee Exotic Pest Plants Council 2001
<i>Hedera helix</i>	English ivy	29393	Severe threat	Tennessee Exotic Pest Plants Council 2001; Miller 1996
<i>Hemerocallis fulva</i>	orange day lily	42943	Not considered a threat currently	
<i>Hibiscus syriacus</i>	rose-of-sharon	21638	Not considered a threat currently	
<i>Holcus lanatus</i>	velvet grass	41773	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
<i>Holosteum umbellatum</i>	jagged chickweed	503057	Not considered a threat currently	
<i>Iris germanica</i>	garden iris	43207	Not considered a threat currently	
<i>Kickxia elatine</i>	canker root	33625	Not considered a threat currently	
<i>Kummerowia stipulacea</i>	Korean lespedeza	503293	Lesser Threat	Tennessee Exotic Pest Plants Council 2001
<i>Kummerowia striata</i>	Japanese lespedeza	503294	Lesser threat	Tennessee Exotic Pest Plants Council 2001
<i>Lactuca serriola</i>	prickly wild lettuce	36608	Not considered a threat currently	
<i>Lamium amplexicaule</i>	henbit	32539	On list for So. Weed Society	Southern Weed Science Society 1998
<i>Lamium purpureum</i>	deadnettle	32543	Not a threat currently	

Latin Name	CommonName	tsn	Threat?	Source
Lathyrus latifolius	sweet pea	25856	Not considered a threat currently	
Lepidium campestre	cow-cress	22954	Not considered a threat currently	
Lespedeza bicolor	bicolor lespedeza	25895	Significant threat	Tennessee Exotic Pest Plants Council 2001
Lespedeza cuneata	sericea lespedeza	25898	Severe threat	Tennessee Exotic Pest Plants Council 2001; Miller 2000
Leucanthemum vulgare	oxeye daisy	37903	Not considered a threat currently	
Leucojum aestivum	snowflake	503422	Not considered a threat currently	
Ligustrum sinense	privet	32979	Severe threat	Tennessee Exotic Pest Plants Council 2001; Miller 2000
Lolium perenne	common ryegrass	40893	Not considered a threat currently	
Lonicera japonica	Japanese honeysuckle	35283	Severe threat	Tennessee Exotic Pest Plants Council 2001; Miller 2000
Lycopersicon esculentum	tomato	30554	Not considered a threat currently	
Lysimachia nummularia	moneywort	23993	Not considered a threat currently	
Maclura pomifera	osage orange	19102	Not considered a threat currently	Out of range but native to U.S.
Medicago lupulina	black medic	503721	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Medicago sativa	alfalfa	183623	Not considered a threat currently	
Mollugo verticillata	carpetweed	19899	Not considered a threat currently	
Morus alba	white mulberry	19066	Lesser Threat	Kentucky Exotic Pest Plants Council 2001

Latin Name	CommonName	tsn	Threat?	Source
Muscari botryoides	grape hyacinth	42977	Not considered a threat currently	
Narcissus poeticus	white narcissus	503929	Not considered a threat currently	
Narcissus pseudonarcissus	daffodil	503930	Not considered a threat currently	
Ornithogalum umbellatum	star of Bethlehem	42754	Not considered a threat currently	Out of range but native to U.S.
Paspalum dilatatum	dallis gras	40997	Not considered a threat currently	
Paulownia tomentosa	princess tree	33460	Severe threat	Tennessee Exotic Pest Plants Council 2001
Perilla frutescens	beefsteak plant	32634	On list for So. Weed Society	Southern Weed Science Society 1998
Picea abies	Norway spruce	183289	Not considered a threat currently	
Poa annua	low speargrass	41107	Not considered a threat currently	
Poa compressa	Canada bluegrass	41082	Not considered a threat currently	
Poa pratensis	Kentucky bluegrass	41088	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Polygonum aviculare	knotweed	20876	Not considered a threat currently	
Polygonum convolvulus	black bindweed	20853	Not considered a threat currently	
Polygonum cuspidatum	Japanese knotweed	20889	Severe threat	Tennessee Exotic Pest Plants Council 2001
Portulaca oleracea	purslane	20422	Not considered a threat currently	

Latin Name	CommonName	tsn	Threat?	Source
Potentilla recta	five-finger	24742	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Ranunculus parviflorus	small-flowered crowfoot	18656	Not considered a threat currently	
Ranunculus sardous	European crowfoot	18645	On list for So. Weed Society	Southern Weed Science Society 1998
Rhodotypos scandens	Jetbead	25245	Watch List A	Tennessee Exotic Pest Plant Council
Rosa multiflora	multiflora rose	24833	Severe threat	Tennessee Exotic Pest Plants Council 2001
Rumex acetosella	sheep sorrel	20934	Lesser Threat	Kentucky Exotic Pest Plants Council 2001
Rumex conglomeratus	clustered dock	20936	Not considered a threat currently	
Rumex crispus	curly dock	20937	On list for So. Weed Society	Southern Weed Science Society 1998
Secale cereale	common rye	42090	Not considered a threat currently	
Setaria faberi	tall foxtail grass	41244	Significant threat	Tennessee Exotic Pest Plants Council 2001
Setaria viridis	green foxtail grass	41231	Significant threat	Tennessee Exotic Pest Plants Council 2001
Sherardia arvensis	field madder	35237	Not considered a threat currently	
Sisymbrium officinale	hedge mustard	23316	Not considered a threat currently	
Sonchus asper	sow thistle	38424	Not considered a threat currently	
Sorghum halepense	Johnson grass	42111	Severe threat	Tennessee Exotic Pest Plants Council 2001
Spiraea thunbergii	Thunberg's bridal wreath	25341	Not considered a threat currently	
Torilis japonica	hedgeparisley	29895	Significant threat	Tennessee Exotic Pest Plants Council 2001

Latin Name	CommonName	tsn	Threat?	Source
Trifolium campestre	hop clover	26231	Not considered a threat currently	
Trifolium dubium	low hop clover	26205	Not considered a threat currently	
Trifolium hybridum	alsike clover	26261	Not considered a threat currently	
Trifolium incarnatum	crimson clover	26262	Not considered a threat currently	
Trifolium pratense	red clover	26313	Not considered a threat currently	
Trifolium repens	white clover	26206	Not considered a threat currently	
Triticum aestivum	common wheat	42237	Not considered a threat currently	
Verbascum blattaria	moth mullein	33389	Not considered a threat currently	
Verbascum thapsus	common mullein	33394	Significant threat	Tennessee Exotic Pest Plants Council 2001
Veronica arvensis	common speedwell	33411	Not considered a threat currently	
Vinca minor	common periwinkle	30238	Significant threat	Tennessee Exotic Pest Plants Council 2001

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

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

Table 6. Association numbers, plot numbers, and global ranks of all associations identified at Fort Donelson National Battlefield.

CEGL #	Systems	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
7105	Human Modified / Successional	<i>Pinus taeda</i> - <i>Liriodendron tulipifera</i> / <i>Acer saccharum</i> Successional Forest	Loblolly Pine - Tuliptree / Sugar Maple Successional Forest	Interior Mid-to Late-Successional Loblolly Pine Forest	15	GNA
7124	Human Modified / Successional	<i>Juniperus virginiana</i> var. <i>virginiana</i> – ( <i>Quercus</i> sp.) Forest	Eastern Red Cedar – (Oak Sp.) Forest	Red-Cedar Successional Forest	1	GNA
7881	South-Central Interior Mesophytic Forest	<i>Fagus grandifolia</i> - <i>Quercus alba</i> / <i>Cornus florida</i> Forest	American Beech - White Oak / Flowering Dogwood Forest	Central Interior Beech - White Oak Forest	12 (in part)	G4
7217	Human Modified / Successional	<i>Liquidambar styraciflua</i> - <i>Quercus</i> ( <i>alba</i> , <i>falcata</i> ) Forest	Sweetgum - (White Oak, Southern Red Oak) Forest	Interior Mid-to Late-Successional Sweetgum - Oak Forest	6	GNA
7220	Southern Interior Low Plateau Dry Oak Forest or Human Modified / Successional	<i>Liriodendron tulipifera</i> / ( <i>Cercis canadensis</i> ) / ( <i>Lindera benzoin</i> ) Forest	Tuliptree / (Redbud) / (Northern Spicebush) Forest	Successional Tuliptree Forest (Circumneutral Type)	7, 8 (in part), 9, 11 (in part)	GNA
2070	Southern Interior Low Plateau Dry Oak Forest	<i>Quercus alba</i> - <i>Quercus rubra</i> - <i>Quercus muehlenbergii</i> / <i>Cercis canadensis</i> Forest	White Oak - Northern Red Oak - Chinquapin Oak / Redbud Forest	White Oak - Mixed Oak Dry-Mesic Alkaline Forest	2, 12 (in part)	G4G5
3871	Southern Interior Low Plateau Dry Oak Forest	<i>Quercus pagoda</i> / <i>Ostrya virginiana</i> Forest	Cherrybark Oak / Eastern Hop-hornbeam Forest	Central Interior Upland Cherrybark Oak Forest	3, 5, 8 & 11 (in part), 16, 17, 20, 21	G3?

CEGL #	Systems	Ecological Associations (Scientific name)	Ecological Associations (Name #2)	Ecological Associations (Name #3)	Plots	Global Rank
7330	South-Central Interior Small Stream and Riparian or Human Modified / Successional	<i>Liquidambar styraciflua</i> – ( <i>Liriodendron tulipifera</i> ) Temporarily Flooded Forest	Sweetgum – (Tuliptree) Temporarily Flooded Forest	Successional Sweetgum Floodplain Forest	Photointerpreters documented	GNA
7334	South-Central Interior Large Floodplain	<i>Platanus occidentalis</i> - <i>Acer saccharinum</i> - <i>Juglans nigra</i> - <i>Ulmus rubra</i> Forest	Sycamore - Silver Maple - Black Walnut - Slippery Elm Forest	Sycamore - Silver Maple Calcareous Floodplain Forest	18	G4
2103	South-Central Interior Large Floodplain OR Human Modified / Successional	<i>Salix nigra</i> Forest	Black Willow Forest	Black Willow Riparian Forest	13	G4
4044	Human Modified / Successional	<i>Andropogon virginicus</i> var. <i>virginicus</i> Herbaceous Veg	Broomsedge Herbaceous Vegetation	Broomsedge Old Field	10	GNA
4048	Human Modified / Successional	<i>Lolium</i> ( <i>arundinaceum</i> , <i>pratense</i> ) Herbaceous Vegetation	(Tall Fescue, Meadow Fescue) Herbaceous Vegetation	Cultivated Meadow	19	GNA
4049	Human Modified / Successional OR South-Central Interior Large Floodplain	Tennessee Valley Impoundment Mud Flat Vegetation	Tennessee Valley Impoundment Mud Flat Vegetation	Tennessee Valley Impoundment Mud Flat Vegetation	14	GNA

## Numeric rank

G1 = Critically imperiled globally

G2 = Imperiled globally

G3 = Rare or uncommon

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

G5 = Demonstrably widespread, abundant and secure

GNA = Not ranked (usually because an exotic species dominated type or human modified)

## Qualifiers:

? = Inexact numeric rank

Q = Questionable taxonomy

Table 7. Plot photo names and photo descriptions for Fort Donelson National Battlefield.

<b>Photo file name</b>	<b>Date taken</b>	<b>Description of photo</b>
FODO01East.jpg	9-10-02	Plot 1
FODO01North.jpg	9-10-02	Plot 1
FODO01Southa.jpg	9-10-02	Plot 1
FODO01Southb.jpg	9-10-02	Plot 1
FODO01West.jpg	9-10-02	Plot 1
FODO02East.jpg	9-10-02	Plot 2
FODO02North.jpg	9-10-02	Plot 2
FODO02South.jpg	9-10-02	Plot 2
FODO02West.jpg	9-10-02	Plot 2
FODO03East.jpg	9-9-02	Plot 3
FODO03North.jpg	9-9-02	Plot 3
FODO03South.jpg	9-9-02	Plot 3
FODO03West.jpg	9-9-02	Plot 3
FODO03Westb.jpg	9-9-02	Plot 3
FODO04East.jpg	9-11-02	Plot 4
FODO04fromroadlookingeast.jpg	9-11-02	Plot 4
FODO04fromroadlookingnorth.jpg	9-11-02	Plot 4
FODO04fromroadlookingsouth.jpg	9-11-02	Plot 4
FODO04fromroadlookingwest.jpg	9-11-02	Plot 4
FODO04North.jpg	9-11-02	Plot 4
FODO04South.jpg	9-11-02	Plot 4
FODO04West.jpg	9-11-02	Plot 4
FODO05East.jpg	9-10-02	Plot 5
FODO05North.jpg	9-10-02	Plot 5
FODO05South.jpg	9-10-02	Plot 5
FODO05West.jpg	9-10-02	Plot 5
FODO06East.jpg	9-10-02	Plot 6
FODO06North.jpg	9-10-02	Plot 6
FODO06South.jpg	9-10-02	Plot 6
FODO06West.jpg	9-10-02	Plot 6
FODO07East.jpg	9-11-02	Plot 7
FODO07North.jpg	9-11-02	Plot 7
FODO07South.jpg	9-11-02	Plot 7
FODO07West.jpg	9-11-02	Plot 7
FODO08East.jpg	9-11-02	Plot 8
FODO08North.jpg	9-11-02	Plot 8
FODO08South.jpg	9-11-02	Plot 8
FODO09Eastish.jpg	9-10-02	Plot 9
FODO09Northish.jpg	9-10-02	Plot 9
FODO09Southish.jpg	9-10-02	Plot 9

<b>Photo file name</b>	<b>Date taken</b>	<b>Description of photo</b>
FODO09Westish.jpg	9-10-02	Plot 9
FODO10East.jpg	9-10-02	Plot 10
FODO10North.jpg	9-10-02	Plot 10
FODO10South.jpg	9-10-02	Plot 10
FODO10West.jpg	9-10-02	Plot 10
FODO11-47.jpg	9-11-02	Plot 11
FODO11-48.jpg	9-11-02	Plot 11
FODO11-49.jpg	9-11-02	Plot 11
FODO11-50.jpg	9-11-02	Plot 11
FODO11-51.jpg	9-11-02	Plot 11
FODO11-52.jpg	9-11-02	Plot 11
FODO11-53.jpg	9-11-02	Plot 11
FODO12East.jpg	9-11-02	Plot 12
FODO12ground.jpg	9-11-02	Plot 12
FODO12North.jpg	9-11-02	Plot 12
FODO12South.jpg	9-11-02	Plot 12
FODO12West.jpg	9-11-02	Plot 12
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FODO14-67.jpg	9-12-02	Plot 14
FODO14-68.jpg	9-12-02	Plot 14
FODO14-69.jpg	9-12-02	Plot 14
FODO14-70.jpg	9-12-02	Plot 14
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FODO15East.jpg	9-12-02	Plot 15
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FODO15South.jpg	9-12-02	Plot 15
FODO15West.jpg	9-12-02	Plot 15



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



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

**Provisional community name** \_\_\_\_\_  
 Classified community name \_\_\_\_\_  
 Classifier \_\_\_\_\_ Date \_\_\_\_\_  
*TUSNVC Ecode* \_\_\_\_\_ *EONum-Suffix* \_\_\_\_\_

**Sublocation (I.D.able feature on topo map)** \_\_\_\_\_

**USGS Quad name** \_\_\_\_\_ *Quad code (if known)* \_\_\_\_\_  
 Survey date: \_\_\_\_\_ Surveyors: \_\_\_\_\_

---

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

---

*Vegetation Plot length (m)* \_\_\_\_\_ *Plot width (m)* \_\_\_\_\_ *Plot shape (rectangle?)* \_\_\_\_\_ *Permanent? Y or N*  
 **Digital photos**  **Regular camera**  **No pictures taken** **Roll# or disc #** \_\_\_\_\_ **Frame #** \_\_\_\_\_

**Plot representativeness** (is the matrix the same?) \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_ **UTM** \_\_\_\_\_ **Lat/long** (If lat/long, then values are \_\_\_\_\_ **N** \_\_\_\_\_ **W**)

**GPS Techniques/Equipment** \_\_\_\_\_ **GPS file name** \_\_\_\_\_

**Field UTM X** \_\_\_\_\_ **m E** **Corrected UTM X** \_\_\_\_\_ **m E**  
**Field UTM Y** \_\_\_\_\_ **m N** **Corrected UTM Y** \_\_\_\_\_ **m N**

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

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

**ENVIRONMENTAL / SITE INFORMATION**

<p><b>Measured Slope</b> _____</p> <p><input type="checkbox"/> Flat 0° 0%</p> <p><input type="checkbox"/> Gentle 0-5° 1-9%</p> <p><input type="checkbox"/> Mod 6-14° 10-25%</p> <p><input type="checkbox"/> Somewhat steep 15-25° 26-49%</p> <p><input type="checkbox"/> Steep 27-45° 50-100%</p> <p><input type="checkbox"/> Very steep 45-69° 101-275%</p> <p><input type="checkbox"/> Abrupt 70-100° 276-300%</p> <p><input type="checkbox"/> overhanging/sheltered &gt;100° &gt;300%</p>	<p><b>Measured Aspect</b> _____ ° (N=0°)</p> <p><input type="checkbox"/> Flat</p> <p><input type="checkbox"/> Variable</p> <p><input type="checkbox"/> N 338-22°</p> <p><input type="checkbox"/> NE 23-67°</p> <p><input type="checkbox"/> E 68-112°</p> <p><input type="checkbox"/> SE 113-157°</p> <p><input type="checkbox"/> S 158-202°</p> <p><input type="checkbox"/> SW 203-247°</p> <p><input type="checkbox"/> W 248-292°</p> <p><input type="checkbox"/> NW 293-337°</p> <p><b>Compass:</b> magnetic ? / corrected?</p>	<p><b>Topographic Position</b></p> <p><input type="checkbox"/> Interfluve (Ridge, summit or crest)</p> <p><input type="checkbox"/> High Slope (upper slope, convex slope)</p> <p><input type="checkbox"/> Midslope (middle slope)</p> <p><input type="checkbox"/> Lowslope (lower slope, footslope)</p> <p><input type="checkbox"/> Toeslope (alluvial toeslope)</p> <p><input type="checkbox"/> Low level (terrace)</p> <p><input type="checkbox"/> Channel bed</p> <p><i>Cowardin System</i></p> <p><input type="checkbox"/> <i>Upland</i> <input type="checkbox"/> <i>Palustrine</i></p> <p><input type="checkbox"/> <i>Estuarine</i> <input type="checkbox"/> <i>Lacustrine</i></p> <p><input type="checkbox"/> <i>Riverine</i></p>
--	---	---

<b>Landform</b> (check most applicable)		
<input type="checkbox"/> Alluvial flat	<input type="checkbox"/> Draw	<input type="checkbox"/> Saddle
<input type="checkbox"/> Alluvial terrace	<input type="checkbox"/> Floodplain	<input type="checkbox"/> Scour
<input type="checkbox"/> Bank	<input type="checkbox"/> Gap	<input type="checkbox"/> Seep
<input type="checkbox"/> Bar	<input type="checkbox"/> Hanging valley	<input type="checkbox"/> Toe slope
<input type="checkbox"/> Bench	<input type="checkbox"/> Knob	<input type="checkbox"/> Slope
<input type="checkbox"/> Cliff	<input type="checkbox"/> Midslope	<input type="checkbox"/> Streambed
<input type="checkbox"/> Colluvial Slope	<input type="checkbox"/> Mima mound	<input type="checkbox"/> Slough
<input type="checkbox"/> Cove	<input type="checkbox"/> Nose slope	<input type="checkbox"/> Streamhead
<input type="checkbox"/> Debris slide	<input type="checkbox"/> Ravine	<input type="checkbox"/>
<input type="checkbox"/> Depression	<input type="checkbox"/> Ridge	<input type="checkbox"/>
	<input type="checkbox"/> Ridgetop bedrock outcrop	<input type="checkbox"/>

<b>Geology</b>		
<b>Igneous Rocks:</b>	<b>Sedimentary Rocks:</b>	<b>Metamorphic Rocks:</b>
<input type="checkbox"/> Granitic (Granite, Schyolite, Syenite, Trachyte)	<input type="checkbox"/> Conglomerates and Breccias	<input type="checkbox"/> Gneiss
<input type="checkbox"/> Dioritic (Diorite, Dacite, Andesite)	<input type="checkbox"/> Sandstone & conglomerate	<input type="checkbox"/> Schist
<input type="checkbox"/> Gabbroic (Gabbro, Basalt, Pyroxenite, Peridotite Diabase, Traprock)	<input type="checkbox"/> Siltstone (calcareous or noncalc)	<input type="checkbox"/> Slate and Phyllite
	<input type="checkbox"/> Shale (calcareous or noncalc)	<input type="checkbox"/> Marble
	<input type="checkbox"/> Limestone and Dolomite	<input type="checkbox"/> Serpentine (Ultramafic)
	<input type="checkbox"/> Gypsum	
	<input type="checkbox"/> Marl	<input type="checkbox"/> Other _____

<b>Hydrologic Regime (check only for wetlands)</b> <input type="checkbox"/> Intermittently flooded <input type="checkbox"/> Permanently flooded <input type="checkbox"/> Semipermanently flooded <input type="checkbox"/> Temporarily Flooded (e.g. floodplains) <input type="checkbox"/> Seasonally Flooded (e.g. seasonal ponds) <input type="checkbox"/> Saturated (e.g. bogs, perennial seeps) <input type="checkbox"/> Unknown <input type="checkbox"/> Not a wetland (Upland: XERIC : DRY - MESIC : MESIC)  <input type="checkbox"/> Permanently flooded – Tidal <input type="checkbox"/> Tidally flooded <input type="checkbox"/> Irregularly flooded <input type="checkbox"/> Irregularly exposed	<b>Salinity/Halinity Modifiers:</b> Upland (N/A) Coastal Tidal: Saltwater- Tidal Coastal Tidal – Brackish Coastal Tidal – Freshwater Inland Saltwater Inland Brackish seeps) Unknown	<b>Hydrology Evidence</b> (Describe the hydrological factors that caused you to assign the type to the hydrologic regime that you chose.):
	_____ _____ _____	

<b>Environmental comments:</b>  _____ _____
<b>Landscape comments:</b>  _____ _____

<b>Soil Texture:</b>  <input type="checkbox"/> Sand <input type="checkbox"/> Sandy loam <input type="checkbox"/> Loam <input type="checkbox"/> Silt loam <input type="checkbox"/> Clay loam <input type="checkbox"/> Clay <input type="checkbox"/> Peat <input type="checkbox"/> Muck	<b>Soil Taxon Description:</b>  _____ _____ _____  <b>Drainage:</b> <input type="checkbox"/> Rapidly drained <input type="checkbox"/> Somewhat poorly drained <input type="checkbox"/> Well drained <input type="checkbox"/> Poorly drained <input type="checkbox"/> Moderately well drained <input type="checkbox"/> Very poorly drained  <b>Soil depth (optional):</b> _____
--	---









Appendix II: Descriptions of alliances and associations found at Fort Donelson National Battlefield



**INTERNATIONAL ECOLOGICAL  
CLASSIFICATION STANDARD:  
TERRESTRIAL ECOLOGICAL CLASSIFICATIONS  
Fort Donelson National Battlefield**

10 January 2005

by

NatureServe

1101 Wilson Blvd., 15<sup>th</sup> floor  
Arlington, VA 22209

This subset of the International Ecological Classification Standard covers vegetation association attributed to Fort Donelson National Battlefield. 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, Durham, NC <mary\_russo@natureserve.org> and Rickie White, National Coordinator, USGS/NPS Vegetation Mapping Program, Arlington, VA <rickie\_white@natureserve.org>.



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

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<sup>1</sup> 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, Query Heights, Panama; Centro de Datos para la Conservacion de Paraguay, San Lorenzo, Paraguay; Centro de Datos para la Conservacion de Peru, Lima, Peru; Centro de Datos para la Conservacion de Sonora, Hermosillo, Sonora, Mexico; Netherlands Antilles Natural Heritage Program, Curacao, Netherlands Antilles; Puerto Rico-Departamento De Recursos Naturales Y Ambientales, Puerto Rico; Virgin Islands Conservation Data Center, St. Thomas, Virgin Islands.

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

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## I. Forest

### I.A.8.N.b. Rounded crowned temperate or sub-polar needle leaved evergreen forest

#### *Pinus taeda* Forest Alliance

#### Interior Mid- to Late-Successional Loblolly Pine Forest

#### *Pinus taeda* - *Liriodendron tulipifera* / *Acer saccharum* Successional Forest

#### Loblolly Pine - Tuliptree / Sugar Maple Successional Forest

Identifier: CEG007105

#### 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* - *Liriodendron tulipifera* / *Acer saccharum* Successional Forest

Association (English name) Loblolly Pine - Tuliptree / Sugar Maple Successional Forest

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

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

#### ELEMENT CONCEPT

**Global Summary:** This successional forest dominated by *Pinus taeda* has low levels of hardwoods present in the overstory and a potentially well-developed subcanopy. *Liriodendron tulipifera* and *Acer saccharum* are characteristic species of this community that broadly indicate stands found in the most interior portions of the range of *Pinus taeda* in the southeastern United States; more southerly stands with *Liquidambar styraciflua* are covered by another association [see CEG008462]. *Liriodendron tulipifera* reaches the canopy but generally comprises less than 25% of total cover. A variety of other canopy and subcanopy species are possible. The herbaceous and shrub strata may contain *Toxicodendron radicans*, *Smilax rotundifolia*, *Goodyera pubescens*, *Chimaphila maculata*, *Galium circaezans*, *Galium pilosum*, *Parthenocissus quinquefolia*, *Polystichum acrostichoides*, *Pleopeltis polypodioides*, *Matelea* sp., and *Vaccinium* spp.

#### ENVIRONMENTAL DESCRIPTION

#### USFWS Wetland System:

**Fort Donelson National Battlefield Environment:** At Fort Donelson, this community exists in upland areas that were cultivated or grazed, then abandoned and replanted with *Pinus taeda* 30-70 years ago.

**Global Environment:** This upland community occurs in areas formerly cut, then cultivated or grazed and abandoned. It often occurs outside the native range of loblolly pine and is a result of reforestation or replanting efforts. Stands are generally between 30 and 70 years old and tend to convert to oak, maple, and/or tuliptree domination as the stand approaches greater age.

### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** Examples of this type at Fort Donelson are strongly dominated by *Pinus taeda*. *Acer rubrum* strongly dominated the understory and even reaches the canopy in some stands. The herbaceous layer is sparse but does contain small amounts of *Lonicera japonica*, *Polystichum acrostichoides*, *Goodyera pubescens*, and *Lycopodium digitatum* (= *Diphasiastrum digitatum*).

**Global Vegetation:** Examples are strongly dominated by *Pinus taeda*. The canopy also includes some hardwoods, but generally less than 25% of the total cover. In addition to *Liriodendron tulipifera*, a variety of other canopy species are possible. Other woody species documented in plots include *Acer rubrum*, *Prunus serotina* var. *serotina*, *Quercus velutina*, *Juniperus virginiana* var. *virginiana*, *Cornus florida*, and *Carya* spp. (NatureServe Ecology unpubl. data).

### MOST ABUNDANT SPECIES

#### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus taeda</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i>

#### Global

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

### CHARACTERISTIC SPECIES

#### Fort Donelson National Battlefield:

##### Global:

### OTHER NOTEWORTHY SPECIES

#### Fort Donelson National Battlefield:

##### Global:

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GNA (modified/managed) (22-Dec-2000). This is a successional forest. It is composed of species that are native to the southeastern United States. However, this community does exist outside the original native range of *Pinus taeda* and therefore could be considered an exotic-dominated type.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

#### Fort Donelson National Battlefield Comments:

**Global Comments:** Originally described from the work of Andreu and Tukman (1995), the bulk of their examples were found on low slopes or stream bottoms (Ridge and Valley of Tennessee from Tellico Pilot Project; northeastern Monroe County, Tennessee; 19 stands sampled). On the Bankhead National Forest in the Cumberland Plateau of northern Alabama, this association is found on streamside terraces that are presumed to have been previously farmed. More work needs to be done to determine the range of this type. This community is distinguished from other successional pine types by its presence in the Interior Low Plateau and Upper East Gulf Coastal Plain.

#### Global Similar Associations:

- *Pinus taeda* / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011)—of the Piedmont and related areas.
- *Pinus taeda* / *Schizachyrium scoparium* - *Tephrosia virginiana* Forest (CEGL007110)—consists of a more diverse and less "successional" understory.
- *Pinus taeda* Planted Forest (CEGL007179)—applies to young, dense, monospecific, stands with plantation structure (rows of trees).

**Global Related Concepts:**

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Fort Donelson National Battlefield Range:** This community is scattered throughout the park's upland areas in abandoned farm/grazing areas.

**Global Range:** This association is known from the Southern Ridge and Valley of Tennessee and the Cumberland Plateau of Alabama. It is also found in northern Georgia in areas peripheral to these ecoregions, as well as the Interior Low Plateau and the Upper East Gulf Coastal Plain of Tennessee.

**Nations:** US

**States/Provinces:** AL, GA, TN

**USFS Ecoregions:** 221Jb:CCC, 222Eg:CCC, 231Cd:CCC

**Federal Lands:** NPS (Fort Donelson); TVA (Tellico); USFS (Bankhead, Chattahoochee)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.15.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** M. Andreu and M. Tukman, mod. M. Pyne and R.E. Evans

**References:** Andreu and Tukman 1995, Southeastern Ecology Working Group n.d.

**I.A.8.N.c. Conical-crowned temperate or subpolar needle-leaved evergreen forest  
*Juniperus virginiana* Forest Alliance**

Red-cedar Successional Forest

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

Eastern Red-cedar - (Oak species) Forest

Identifier: CEG007124

**NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Evergreen forest (I.A.)

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

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

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

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

Alliance (English name) Eastern Red-cedar Forest Alliance

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

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

Association (Common name) Red-cedar Successional Forest

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

**ELEMENT CONCEPT**

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

**ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** At Fort Donelson, this community occurs on eroded calcareous upland soils on abandoned agricultural land. The land was abandoned and grew up into this type over the last 15-60 years.

**Global Environment:** This community occurs in a variety of disturbed areas such as eroded soils on abandoned agricultural land (Andreu and Tukman 1995). In Kentucky this vegetation occurs throughout the state (Bluegrass region, Highland Rim, East Gulf Coastal Plain) on calcareous substrates or on abandoned agricultural land; acreage of this type has increased from presettlement. This type also includes the *Juniperus virginiana* var. *virginiana* woodland from Tellico Lake (Andreu and Tukman 1995) which occurs on drier sites with shallow, rocky soils.

### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** This variable successional type can be an older, dense, closed-canopy forest of *Juniperus virginiana* var. *virginiana* or a fairly open and young forest/woodland stand with a much higher cover and diversity of herbaceous species. Other woody species that may be present include *Cornus florida*, *Ulmus alata*, *Liquidambar styraciflua*, *Cercis canadensis*, and *Liriodendron tulipifera*. The herbaceous layer can be sparse or dense depending upon the canopy coverage but often has substantial amounts of *Asplenium resiliens*, *Saccharum alopecuroidum*, *Lespedeza procumbens*, and many other species that may be holdovers from the early stages of old-field succession.

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

### MOST ABUNDANT SPECIES

#### Fort Donelson National Battlefield

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

#### Global

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

### CHARACTERISTIC SPECIES

#### Fort Donelson National Battlefield:

#### Global:

### OTHER NOTEWORTHY SPECIES

#### Fort Donelson National Battlefield:

#### Global:

### CONSERVATION STATUS RANK

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

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

#### Fort Donelson National Battlefield Comments:

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

#### Global Similar Associations:

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

#### Global Related Concepts:

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

#### OTHER COMMENTS

##### Other Comments:

#### ELEMENT DISTRIBUTION

**Fort Donelson National Battlefield Range:** This forest occurs in small patches throughout the park, especially adjacent to powerlines and in areas that were grazed or plowed in the past and eroded.

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

**Nations:** US

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

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

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

#### ELEMENT SOURCES

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.01.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** K.D. Patterson

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

**I.B.2.N.a. Lowland or submontane cold-deciduous forest*****Fagus grandifolia* - *Quercus rubra* - *Quercus alba* Forest Alliance****Central Interior Beech - White Oak Forest*****Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest****American Beech - White Oak / Flowering Dogwood Forest****Identifier: CEGL007881****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* / *Cornus florida* Forest

Association (English name) American Beech - White Oak / Flowering Dogwood Forest

Association (Common name) Central Interior Beech - White Oak Forest

**Ecological System(s):** South-Central Interior Mesophytic Forest (CES202.887)**ELEMENT CONCEPT**

**Global Summary:** This beech-white oak forest is found in the Interior Low Plateau of Tennessee, the Cumberland region of Kentucky, and adjacent areas of the Upper East Gulf Coastal Plain. Stands occur on mesic mid to lower slopes in moderately dissected terrain. Stand positions vary from north-facing slopes and low slopes to high terraces along streams. The vegetation is generally dominated by *Fagus grandifolia* with more or less *Quercus alba* depending on past logging history. Associated canopy and subcanopy species can include *Acer saccharum*, *Quercus muehlenbergii*, *Acer rubrum*, *Cornus florida*, *Ostrya virginiana*, and *Ilex opaca*. Shrubs which may be present include *Vaccinium stamineum*, *Viburnum acerifolium*, *Euonymus americana*, and, in some occurrences, *Kalmia latifolia*. The herb layer can be relatively lush with such species as *Polystichum acrostichoides*, *Galium circaezans*, *Desmodium nudiflorum*, *Erythronium americanum*, *Hepatica nobilis* var. *obtusata*, *Epifagus virginiana*, *Tiarella cordifolia* var. *collina*, *Heuchera americana*, *Stellaria pubera*, *Podophyllum peltatum*, *Botrychium virginianum*, and others.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** This community type occurs on the most mesic, broadly north-facing (but also NE and NW facing), mid to lower steep slopes along drainages in the park.

**Global Environment:** Stands occur on mesic mid to lower slopes in moderately dissected terrain. Stand positions vary from north-facing slopes and low slopes to more rocky stands (Franklin et al. 1993). At Land Between the Lakes, this community is restricted to deep limestone-derived soils of the Baxter Series and silty soils of the Brandon Series, generally on lower slopes with northwest, north, to southeast aspects (Franklin 1990).

**VEGETATION DESCRIPTION**

**Fort Donelson National Battlefield Vegetation:** The vegetation is dominated by at least 40% *Fagus grandifolia* along with some other oaks, especially *Quercus rubra*. Some examples may

be dominated by 100% *Fagus grandifolia*. The herbaceous layer is not exceedingly rich but often does contain a large number of spring ephemerals such as *Podophyllum peltatum*, *Thalictrum thalictroides*, and *Osmorhiza longistylis*, as well as sedges. Understory species include *Acer saccharum*, *Fagus grandifolia*, and *Sassafras albidum*. Common shrub species include *Carpinus caroliniana*, *Asimina triloba*, and *Ostrya virginiana*.

**Global Vegetation:** The vegetation is dominated by at least 40% *Fagus grandifolia* with more or less *Quercus alba* depending on past logging history. Associated canopy and subcanopy species can include *Liriodendron tulipifera*, *Acer saccharum*, *Quercus pagoda*, *Quercus rubra*, *Quercus coccinea*, *Cornus florida*, *Nyssa sylvatica*, *Sassafras albidum*, and *Ostrya virginiana* (Franklin 1990, NatureServe Ecology unpubl. data). Other potential species include *Quercus muehlenbergii*, *Acer rubrum*, and *Ilex opaca*. Shrubs which may be present include *Vaccinium stamineum*, *Viburnum acerifolium*, *Euonymus americana*, and in some occurrences, *Kalmia latifolia*. The herb layer can be relatively lush with such species as *Polystichum acrostichoides*, *Galium circaezans*, *Desmodium nudiflorum*, *Erythronium americanum*, *Hepatica nobilis* var. *obtusata*, *Epifagus virginiana*, *Tiarella cordifolia* var. *collina*, *Heuchera americana*, *Stellaria pubera*, *Podophyllum peltatum*, *Botrychium virginianum*, and others. Campbell (2001) provides an extensive list of species for eastern Kentucky; see also NatureServe Ecology unpublished data from Fort Donelson.

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Fagus grandifolia</i>

##### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Fagus grandifolia</i>

#### CHARACTERISTIC SPECIES

**Fort Donelson National Battlefield:** *Podophyllum peltatum*

**Global:**

#### OTHER NOTEWORTHY SPECIES

**Fort Donelson National Battlefield:**

**Global:**

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4 (15-Dec-1999). This is not an inherently rare forest type, and many examples are still believed to be extant. The lack of element occurrences of this type does not reflect its relative abundance. Patch size may be small, but this is a somewhat widespread association (and may be merged with others as classification is resolved); many examples are still extant. 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. The Rank has been changed from G3G4 to G4 to reflect its true abundance.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

**Fort Donelson National Battlefield Comments:**

**Global Comments:** This association is similar to *Quercus alba* - *Fagus grandifolia* / *Hydrangea quercifolia* - *Viburnum acerifolium* / *Carex picta* - *Polystichum acrostichoides* Forest (CEGL007213), found in northern Alabama, but is more broadly defined and geographically distinct from it. The associations have been kept separate until more detailed floristic and range

information can be obtained for this type (CEGL007881). CEGL007881 is often less species-rich than the current concept of CEGL007213. *Fagus grandifolia* - *Liriodendron tulipifera* / *Euonymus americana* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007201) is somewhat similar but lacks codominance by *Quercus* species. Information on species from stands in eastern Kentucky is provided by Campbell (2001), who tentatively crosswalks his 5C3 to this type. Further review is needed before incorporating his description.

**Global Similar Associations:**

- *Fagus grandifolia* - *Acer saccharum* - *Liriodendron tulipifera* Unglaciated Forest (CEGL002411)
- *Fagus grandifolia* - *Liriodendron tulipifera* / *Euonymus americana* / *Athyrium filix-femina* ssp. *asplenioides* Forest (CEGL007201)
- *Fagus grandifolia* Ridge and Valley Forest (CEGL007200)
- *Quercus alba* - (*Liriodendron tulipifera*, *Liquidambar styraciflua*) / *Acer leucoderme* / *Calycanthus floridus* / *Athyrium filix-femina* Forest (CEGL008428)—of the southern Ridge and Valley.
- *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:**

- *Acer saccharum* - *Quercus alba* - *Fagus grandifolia* type (Franklin et al. 1993) ?

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Fort Donelson National Battlefield Range:** This community is limited to small patches of protected, steep, north-facing slopes along creeks in the park.

**Global Range:** This association was defined for the Interior Low Plateau of Tennessee. It ranges to the Cumberlands of Kentucky, and Upper East Gulf Coastal Plain in Tennessee, but more information is needed to determine its full range.

**Nations:** US

**States/Provinces:** AL?, IN?, KY, TN

**USFS Ecoregions:** 221Ha:CCC, 221He:CCC, 222Cg:CCC, 222Eb:CCP, 222Eg:CCC, 222Eh:CCP, 222Ei:CCP, 222Ek:CCP, 222Em:CCP, 222En:CCP, 222Eo:CCP

**Federal Lands:** NPS (Cumberland Gap, Fort Donelson, Natchez Trace, Shiloh); USFS (Daniel Boone, Land Between the Lakes)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.12 (in part).

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** M. Pyne, mod. C.W. Nordman

**References:** Campbell 2001, Evans 1991, Franklin et al. 1993, Franklin pers. comm., Southeastern Ecology Working Group n.d.

## ***Liquidambar styraciflua* Forest Alliance**

### **Interior Mid- to Late-Successional Sweetgum - Oak Forest**

***Liquidambar styraciflua* - *Quercus (alba, falcata)* Forest**

**Sweetgum - (White Oak, Southern Red Oak) Forest**

**Identifier: C EGL007217**

#### **NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

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

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

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

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

Alliance (English name) Sweetgum Forest Alliance

Association *Liquidambar styraciflua* - *Quercus (alba, falcata)* Forest

Association (English name) Sweetgum - (White Oak, Southern Red Oak) Forest

Association (Common name) Interior Mid- to Late-Successional Sweetgum - Oak Forest

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

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

#### **ELEMENT CONCEPT**

**Global Summary:** Stands of this successional forest association are dominated by *Liquidambar styraciflua* but also support additional species in the overstory such as *Quercus alba*, *Liriodendron tulipifera*, and/or *Quercus falcata*. This forest is somewhat later successional and/or more diverse than pure *Liquidambar styraciflua* forests [see *Liquidambar styraciflua* Forest (CEGL007216)]. This type may arise following disturbance of mixed *Quercus* - *Carya* forests. This vegetation type would be more prevalent or more likely to be encountered to the north of the range of *Quercus nigra*, i.e., in the interior and Piedmont rather than in the Coastal Plain.

#### **ENVIRONMENTAL DESCRIPTION**

##### **USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** This community occurs in upland areas that were probably oak-hickory forests that have been disturbed in the recent past. Generally speaking, disturbance probably occurred between 40 and 60 years ago.

**Global Environment:** This type may arise following disturbance of mixed *Quercus* - *Carya* forests. This vegetation type would be more prevalent or more likely to be encountered to the north of the range of *Quercus nigra*, i.e., in the interior and Piedmont rather than in the Coastal Plain.

#### **VEGETATION DESCRIPTION**

**Fort Donelson National Battlefield Vegetation:** This community is generally dominated by *Liquidambar styraciflua*, with other associated canopy species such as *Liriodendron tulipifera*, *Quercus* spp., and *Carya* spp. as minor components of the canopy and dominants in the subcanopy. The herbaceous layer is generally sparse but may contain *Carex* spp. and *Polystichum acrostichoides*.

**Global Vegetation:** The overstory of stands of this association are usually dominated by *Liquidambar styraciflua*, but may also support other species such as *Quercus alba*, *Liriodendron tulipifera*, and *Quercus falcata*. Other woody species encountered in plots attributed to this type

include *Fraxinus americana*, *Cornus florida*, *Diospyros virginiana*, *Quercus velutina*, *Quercus rubra*, and *Carya* spp. (NatureServe Ecology unpubl. data).

At Shiloh National Military Park, this vegetation is documented from a plot (SHIL.4) which was disturbed by a tornado in 1971 or 1972 (D. Turnbo pers. comm. 2003). There are stumps and tip-up mounds from the tornado and the salvage logging which followed. The dominant tree is *Liquidambar styraciflua* with *Acer rubrum* canopy subdominant. *Carya alba* and *Quercus alba* are also important, with *Quercus falcata*, *Prunus serotina*, *Nyssa sylvatica*, and *Carya glabra*. *Cornus florida*, *Carya pallida*, and *Quercus rubra* are important primarily in the subcanopy and tall-shrub strata. *Vaccinium stamineum* and *Ilex decidua* are tall shrubs; most of the *Quercus* spp. and *Carya* spp. also occur as tall shrubs. Short shrubs include *Quercus phellos*, *Ulmus alata*, *Rosa carolina*, *Vitis rotundifolia*, *Lonicera japonica*, *Mimosa microphylla*, *Hypericum hypericoides*, *Juniperus virginiana*, *Ligustrum sinense*, *Vaccinium stamineum*, *Diospyros virginiana*, *Nyssa sylvatica*, *Smilax glauca*, *Carya glabra*, *Vaccinium arboreum*, and *Rubus argutus*. The herbaceous stratum has 30% cover, but there are no dominant species. The most abundant herbaceous species are *Dichanthelium boscii* and *Botrychium biternatum*. Other herbaceous species are *Scutellaria elliptica*, *Houstonia purpurea*, *Elephantopus tomentosus*, *Asplenium platyneuron*, *Polystichum acrostichoides*, *Dichanthelium laxiflorum*, *Viola X palmata*, *Galium circaezans*, *Sanicula canadensis*, *Athyrium filix-femina* ssp. *asplenioides*, *Conoclinium coelestinum*, *Lobelia puberula*, *Cirsium horridulum*, *Lycopodium digitatum* (= *Diphasiastrum digitatum*), *Chasmanthium laxum*, *Lespedeza repens*, *Ruellia strepens*, and *Pycnanthemum verticillatum* var. *pilosum* (= *Pycnanthemum pilosum*).

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

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

##### Global

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

##### Fort Donelson National Battlefield:

##### Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

##### Global:

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GNA (ruderal) (8-Aug-2000). This forest represents successional vegetation. Consequently it is not of conservation concern and does not receive a conservation status rank.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

##### Fort Donelson National Battlefield Comments:

**Global Comments:** This community is composed of at least 40% *Liquidambar styraciflua* in the canopy, but it differs from earlier successional *Liquidambar styraciflua* in that it has a minor or major component of oaks and hickories and other later-successional trees in the subcanopy and canopy. However, unlike less-disturbed, more natural *Liquidambar styraciflua* types, it is not located in a floodplain and it has a very low-diversity herbaceous layer.

**Global Similar Associations:**

- *Liquidambar styraciflua* - *Quercus (nigra, phellos)* - *Pinus taeda* / *Vaccinium elliottii* - *Morella cerifera* Forest (CEGL007726)—which is more likely and more prevalent in the southern Coastal Plain.
- *Liquidambar styraciflua* Forest (CEGL007216)—terms (prior to the appearance of oak saplings in the canopy and subcanopy).

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

**Fort Donelson National Battlefield Range:** This community occurs in patches throughout the uplands of the park where disturbance to the original forest occurred.

**Global Range:** This early successional sweetgum forest has been defined from the Interior Highlands of the central United States and from the Piedmont of the southeastern United States, but is likely much more widespread.

**Nations:** US

**States/Provinces:** AL?, AR, GA?, SC, TN

**USFS Ecoregions:** 222A:CC, 222Cg:CCC, 222Eg:CCC, 231:C, M222A:CC, M231A:CC

**Federal Lands:** NPS (Fort Donelson, Natchez Trace, Shiloh); USFS (Holly Springs, Oconee?, Ouachita, Ozark, Talladega?, Tuskegee?)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.06.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** R.E. Evans, mod. C.W. Nordman

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

## ***Liriodendron tulipifera* Forest Alliance**

### **Successional Tuliptree Forest (Circumneutral Type)**

***Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Forest  
Tuliptree / (Redbud) / (Northern Spicebush) Forest**

**Identifier: CEGL007220**

#### **NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

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

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

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

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

Alliance (English name) Tuliptree Forest Alliance

Association *Liriodendron tulipifera* / (*Cercis canadensis*) / (*Lindera benzoin*) Forest

Association (English name) Tuliptree / (Redbud) / (Northern Spicebush) Forest

Association (Common name) Successional Tuliptree Forest (Circumneutral Type)

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

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

#### **ELEMENT CONCEPT**

**Global Summary:** This semi-natural or successional community dominated by *Liriodendron tulipifera* occurs in the Ridge and Valley and Interior Low Plateau of Tennessee, and the Central Appalachian, Piedmont and Inner Coastal Plain regions of Virginia, West Virginia, and Maryland. It may also occur in similar regions of Pennsylvania, Kentucky and Delaware. It is distinguished from other upland communities dominated by *Liriodendron tulipifera* by the presence of species associated with soils with moderately high-base saturation levels (rich soils). Species found in stands attributable to this type may be fairly diverse and result in a varied composition. In addition to *Liriodendron tulipifera*, other canopy species may include *Liquidambar styraciflua*, *Acer saccharum*, *Robinia pseudoacacia*, *Juglans nigra*, *Fraxinus americana*, *Ulmus rubra*, *Quercus imbricaria*, *Quercus muehlenbergii*, and *Carya ovata*. Species often found in the subcanopy include *Acer saccharum*, *Cercis canadensis*, *Ulmus alata*, *Morus rubra*, and *Cornus florida*. Shrubs include saplings of the subcanopy and canopy species, as well as *Lindera benzoin*, *Symphoricarpos orbiculatus*, *Asimina triloba*, *Staphylea trifolia*, *Acer negundo*, and *Juniperus virginiana* var. *virginiana*. Common herbaceous species include the exotics *Microstegium vimineum*, *Rubus phoenicolasius*, *Alliaria petiolata*, *Veronica hederifolia*, and *Lonicera japonica*, as well as *Toxicodendron radicans*, *Parthenocissus quinquefolia*, and *Polystichum acrostichoides*. Examples in Fort Donelson that have been very heavily disturbed may have local dominance by *Celtis laevigata* and *Juglans nigra*.

#### **ENVIRONMENTAL DESCRIPTION**

##### **USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** At Fort Donelson, this is the most common successional type. It occurs on base-rich soils that were under cultivation, cut, and/or grazed 50-90 years ago. These forest are often older than the *Pinus taeda*, *Liquidambar styraciflua*, and *Juniperus virginiana* var. *virginiana* stands in the park, but they are still recovering visibly from past disturbance. Some examples in the park are extremely disturbed, and trash and old bottles from past inhabitants of the area are still visible among the leaf litter and roots.

**Global Environment:** These forests are found on disturbed mesic areas underlain by rich soils with moderately high base saturation levels. Soils may be underlain by a variety of geologic strata that weather to base-rich soils including limestone, dolomite, calcareous shale, shell deposits, metabasalts and granitic complexes. In Kentucky this association may occur on calcareous substrates in the Dripping Springs Escarpment. At Shenandoah National Park in Virginia, this community is underlain by Catoctin metabasalt or a pyroxene-bearing granitic complex.

#### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** Vegetation in the park varies drastically. Stands can be dominated completely by *Liriodendron tulipifera* or dominated by *Celtis laevigata* and *Juglans nigra* with a smaller *Liriodendron tulipifera* component. The subcanopy and shrub layers tend to be moderate to heavy with such species as *Ostrya virginiana*, *Asimina triloba*, *Lindera benzoin*, and other indicators of neutral to basic soil. In addition, the herbaceous layer varies from sparse to moderate coverage. Some species present include *Polystichum acrostichoides*, *Sanicula canadensis*, *Collinsonia canadensis*, *Microstegium vimineum*, etc. Despite its successional status, plots of this type are often very species diverse.

**Global Vegetation:** Stands are dominated by *Liriodendron tulipifera* but also include various other species, including ones indicative of rich or circumneutral environments. Other species include *Liquidambar styraciflua*, *Acer saccharum*, *Robinia pseudoacacia*, *Juglans nigra*, *Fraxinus americana*, *Ulmus rubra*, *Quercus imbricaria*, *Quercus muehlenbergii*, and *Carya ovata* (NatureServe Ecology unpubl. data, VADNH unpubl. data). Species often found in the subcanopy include *Acer saccharum*, *Cercis canadensis*, *Ulmus alata*, *Morus rubra*, and *Cornus florida*. *Cercis canadensis* is often abundant on soils underlain by carbonate strata. Shrubs include saplings of the subcanopy and canopy species, as well as *Symphoricarpos orbiculatus*, *Lindera benzoin*, *Asimina triloba*, and *Juniperus virginiana* var. *virginiana*. *Lindera benzoin* is often abundant in occurrences of this community in the Central Appalachian, Piedmont and Inner Coastal Plain regions of Virginia, West Virginia, and Maryland. Common herbaceous species include the exotics *Microstegium vimineum*, *Rubus phoenicolasius*, *Alliaria petiolata*, *Veronica hederifolia*, and *Lonicera japonica*, as well as *Toxicodendron radicans*, *Parthenocissus quinquefolia*, and *Polystichum acrostichoides* (Andreu and Tukman 1995, NatureServe Ecology unpubl. data, VADNH unpubl. data).

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

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

##### Global

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

#### CHARACTERISTIC SPECIES

##### Fort Donelson National Battlefield:

**Global:**

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

**Global:**

**CONSERVATION STATUS RANK**

**Global Rank & Reasons:** GNA (ruderal) (28-Oct-2003). This forest represents early-successional vegetation and is thus not of conservation concern. It is composed largely of native species, though exotics may be locally abundant. Its conservation value is limited, but mature examples could provide buffer for communities of greater conservation value.

**CLASSIFICATION**

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Fort Donelson National Battlefield Comments:**

**Global Comments:** This type was originally described from the work of Andreu and Tukman (1995) but was later modified to emphasize stands with moderately high base saturation levels. It is apparently a widespread successional forest of relatively fertile substrates in all provinces of the Mid-Atlantic states and in parts of the Southeast.

**Global Similar Associations:**

- *Liriodendron tulipifera* - *Pinus taeda* Forest (CEGL007521)—supports a significant pine component.
- *Liriodendron tulipifera* - *Quercus* spp. Forest (CEGL007221)—lacks species affiliated with circumneutral conditions.
- *Liriodendron tulipifera* Forest (CEGL007218)—is less diverse and earlier successional.

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

**Fort Donelson National Battlefield Range:** This community occurs throughout the park in patches that are intermediate in age. It is perhaps the most common community in the park.

**Global Range:** This type occurs in the Ridge and Valley of Tennessee and the Central Appalachian, Piedmont and Inner Coastal Plain regions of Virginia, West Virginia, Maryland and possibly Pennsylvania, Kentucky and Delaware. Its full range is unknown.

**Nations:** US

**States/Provinces:** DE?, KY?, MD, PA?, TN, VA, WV

**USFS Ecoregions:** 221Jb:CCC, 222Eg:CCC, 231Ae:CCC, 231Al:CCC, 231Ap:CCC, 232Ad:CCC, M221Ab:CCC, M221Da:CCC

**Federal Lands:** NPS (Blue Ridge Parkway?, C&O Canal, Catocin, Cumberland Gap, Fort Donelson, George Washington Parkway, Harpers Ferry, National Capital-East, Rock Creek, Shenandoah); TVA (Tellico); USFS (Cherokee?)

**ELEMENT SOURCES****Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.7, FODO.8 (in part), FODO.09, FODO.11 (in part).

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** R.E. Evans, mod. M. Pyne and J. Teague

**References:** Andreu and Tukman 1995, Lea 2003, Martin 1989, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

***Quercus alba* - (*Quercus rubra*, *Carya* spp.) Forest Alliance****White Oak - Mixed Oak Dry-Mesic Alkaline Forest*****Quercus alba* - *Quercus rubra* - *Quercus muehlenbergii* / *Cercis canadensis* Forest****White Oak - Northern Red Oak - Chinquapin Oak / Redbud Forest****Identifier: CEGL002070****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

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

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

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

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

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

Association *Quercus alba* - *Quercus rubra* - *Quercus muehlenbergii* / *Cercis canadensis* Forest

Association (English name) White Oak - Northern Red Oak - Chinquapin Oak / Redbud Forest

Association (Common name) White Oak - Mixed Oak Dry-Mesic Alkaline Forest

**Ecological System(s):** Southern Interior Low Plateau Dry Oak Forest (CES202.898)**ELEMENT CONCEPT**

**Global Summary:** This dry-mesic white oak - mixed oak alkaline forest community is found in unglaciated areas of the Interior Highlands of the east-central United States. Stands occur on gentle to steep slopes with moderately to well-drained moist loamy/sandy, relatively neutral to basic soils, which are underlain by bedrock of limestone and less commonly sandstone, siltstone, or shale. Soils may be shallow to somewhat deep (20-100 cm), with rock fragments present. The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer, especially in the spring. Typical tree dominants include *Quercus alba*, *Quercus rubra*, *Quercus velutina*, and *Quercus muehlenbergii*. Typical associates include *Carya ovata*, *Carya alba*, and *Liriodendron tulipifera*. Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (or possibly *Acer barbatum* to the south), *Ulmus rubra*, *Juglans nigra*, *Fraxinus americana*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Amelanchier arborea*. *Quercus muehlenbergii* is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. Typical shrubs include *Aesculus glabra*, *Asimina triloba*, *Cercis canadensis*, *Cornus florida*, *Euonymus americana*, *Frangula caroliniana*, and *Viburnum rufidulum*. Woody vines include *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Anemone virginiana*, *Arisaema triphyllum*, *Botrychium virginianum*, *Carex jamesii*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Desmodium glutinosum*, *Desmodium rotundifolium*, *Dioscorea quaternata*, *Goodyera pubescens*, *Hybanthus concolor*, *Iris cristata*, *Maianthemum racemosum*, *Passiflora lutea*, and *Sanicula canadensis*. These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** At Fort Donelson, this community exists in a transitional zone between the driest ridges and the more mesic ravine communities. It can range

up to the ridgetops where the soil is still deep and the exposure to harsh extremes in temperature and moisture is limited.

**Global Environment:** Stands occur on gentle to steep slopes with moderately to well-drained moist loamy/sandy, relatively neutral to basic soils, which are underlain by bedrock of limestone and less commonly sandstone, siltstone, or shale. Soils may be shallow to somewhat deep (20-100 cm), with rock fragments present. In Illinois, this community occurs on thin, sandy/loamy soils underlain by sedimentary rock (mostly Pennsylvanian age sandstone). Limestone and shale are commonly found where erosion has removed resistant sandstone layers near the surface (TNC 1995a). In Missouri, non-cherty limestones and dolomites prevail (Nelson 1985). In Alabama, this type occurs on mixed limestone and sandstone substrate, providing a subcalcareous substrate.

#### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** The canopy of this community is usually dominated by *Quercus alba* but with a substantial component of *Carya ovata*, *Liriodendron tulipifera*, and other *Quercus* species also possible. It is distinguished from other oak types by the dominance of *Quercus alba*. The community may contain *Fagus grandifolia* in the subcanopy, but stands codominated by *Fagus grandifolia* in the canopy would be classified as *Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest (CEGL007881). The herbaceous layer may be sparse to rich but usually has a higher diversity of spring ephemerals and summer herbs than adjacent drier communities. *Carex* species are usually an important component of this community.

**Global Vegetation:** The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer. Typical tree dominants include *Quercus alba*, *Quercus rubra*, *Quercus velutina*, and *Quercus muehlenbergii*. Typical associates include *Carya ovata* and *Carya alba*. Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (and/or *Acer barbatum* or *Acer leucoderme* to the south), *Ulmus rubra*, *Juglans nigra*, *Fraxinus americana*, *Ostrya virginiana*, *Carpinus caroliniana*, and *Amelanchier arborea*. *Quercus muehlenbergii* is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. *Juniperus virginiana* may be present. Typical shrubs include *Aesculus glabra*, *Asimina triloba*, *Cercis canadensis*, *Cornus florida*, *Euonymus americana*, *Frangula caroliniana*, and *Viburnum rufidulum*. Woody vines include *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Anemone virginiana*, *Arisaema triphyllum*, *Botrychium virginianum*, *Carex jamesii*, *Actaea racemosa* (= *Cimicifuga racemosa*), *Desmodium glutinosum*, *Desmodium rotundifolium*, *Dioscorea quaternata*, *Goodyera pubescens*, *Hybanthus concolor*, *Iris cristata*, *Maianthemum racemosum*, *Passiflora lutea*, and *Sanicula canadensis*. These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems (Nelson 1985, TNC 1995a).

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i>
Herb (field)	Graminoid	<i>Carex jamesii</i>

##### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> , <i>Quercus muehlenbergii</i> , <i>Quercus rubra</i>
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i>

Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> , <i>Smilax bona-nox</i> , <i>Toxicodendron radicans</i>
Herb (field)	Forb	<i>Arisaema dracontium</i> , <i>Hybanthus concolor</i>
Herb (field)	Graminoid	<i>Carex jamesii</i>

#### CHARACTERISTIC SPECIES

#### Fort Donelson National Battlefield:

##### Global:

#### OTHER NOTEWORTHY SPECIES

#### Fort Donelson National Battlefield:

**Global:** *Agkistrodon contortrix*, *Callirhytis quercuspunctata*, *Caprimulgus vociferus*, *Chionaspis corni*, *Cyanocitta cristata*, *Dendroica cerulea*, *Dryocopus pileatus*, *Eumeces laticeps*, *Eurytides marcellus*, *Glaucomys volans*, *Hylocichla mustelina*, *Isotria medeoloides*, *Juglans cinerea*, *Lynx rufus*, *Melanerpes carolinus*, *Melanerpes erythrocephalus*, *Meleagris gallopavo*, *Myotis sodalis*, *Nymphalis antiopa*, *Odocoileus virginianus*, *Piranga olivacea*, *Sayornis phoebe*, *Schizura badia*, *Sciurus carolinensis*, *Sciurus niger*, *Tamias striatus*, *Thryothorus ludovicianus*

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4G5 (22-Jun-1998).

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

#### Fort Donelson National Battlefield Comments:

**Global Comments:** Concept of this type relies, in part, on Missouri's "dry-mesic limestone/dolomite forest" (Nelson 1985). Stands in Illinois and Indiana may not have strongly contrasting alkaline and acidic rocks compared to those in the Ozarks. This type may also occur in the south-central glaciated portion of Illinois. Examples from Arkansas may lack *Quercus rubra*. Neither *Quercus muehlenbergii* nor *Cercis canadensis* may be very common in this type. Extensive selective logging of *Quercus alba* and *Quercus rubra* for sawtimber has severely impacted this community. Stands placed in this type in northern Alabama (Bankhead National Forest) and the Nashville Basin of Tennessee are not a perfect match, but seem similar enough to classify here.

#### Global Similar Associations:

- *Fagus grandifolia* - *Quercus alba* / *Cornus florida* Forest (CEGL007881)—contains a high concentration of *Fagus grandifolia* in the canopy.
- *Quercus alba* - *Quercus rubra* - *Carya (alba, ovata)* / *Cornus florida* Acid Forest (CEGL002067)—is very similar, but has a more acidic character.
- *Quercus alba* - *Quercus rubra* - *Carya ovata* / *Cercis canadensis* - *Juniperus virginiana* var. *virginiana* Forest (CEGL007240)
- *Quercus alba* - *Quercus rubra* - *Carya ovata* Glaciated Forest (CEGL002068)
- *Quercus alba* - *Quercus stellata* / *Ostrya virginiana* - *Acer barbatum* / *Chasmanthium sessiliflorum* Forest (CEGL008443)
- *Quercus alba* / *Cornus florida* Unglaciated Forest (CEGL002066)
- *Quercus falcata* - *Quercus alba* - *Quercus stellata* - *Quercus velutina* Forest (CEGL005018)—occurs on drier sites and contains *Quercus falcata*, which this community does not have in large amounts.
- *Quercus muehlenbergii* - *Quercus shumardii* - *Carya (carolinae-septentrionalis, ovata)* Forest (CEGL007808)
- *Quercus prinus* - *Quercus rubra* - *Carya* spp. - *Fraxinus americana* / *Cercis canadensis* / *Solidago sphacelata* Forest (CEGL008549)
- *Quercus rubra* / *Ostrya virginiana* / *Ptelea trifoliata* - *Ribes curvatum* / *Helianthus divaricatus* Woodland (CEGL007828)
- *Quercus velutina* - *Quercus alba* - *Carya (glabra, ovata)* Forest (CEGL002076)—occurs where soils are drier and thick to very thin over bedrock which is often exposed, and on hillsides with clay soils where sand is absent.

**Global Related Concepts:**

- *Quercus rubra* - *Quercus alba* mesic lower slope community type (Robertson et al. 1984) =
- Dry-Mesic Limestone/Dolomite Forest (Nelson 1985) B
- Dry-mesic Upland Forest (S) (White and Madany 1978) B
- Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) B
- Northern Red Oak: 55 (Eyre 1980) B Terrestrial: Forest: Hardwood (TNC 1985) B
- UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B
- White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) B
- White Oak: 53 (Eyre 1980) B

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

**Fort Donelson National Battlefield Range:** This community occurs in patches on midslopes and occasional ridgetops in the park.

**Global Range:** This white oak - red oak, dry-mesic alkaline forest community is found in calcareous regions of Interior Highlands of the east-central United States, ranging from Missouri and Arkansas east to Indiana, south to Kentucky, Tennessee and northern Alabama, and possibly in Oklahoma. Moisture availability and geologic characteristics are largely responsible for the distribution of this community.

**Nations:** US

**States/Provinces:** AL, AR, IL, IN, KY, MO:S4S5, OK?, TN

**USFS Ecoregions:** 221Hb:CCC, 221Hc:CCC, 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ae:CCP, 222Af:CC?, 222Ag:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Ao:CCC, 222Aq:CCC, 222Ch:CCC, 222De:CC?, 222Df:CCC, 222Dh:CCC, 222Di:CCC, 222Ec:CCC, 222Ed:CCC, 222Eg:CCC, 222Ej:CCP, 222Ek:CCC, 222Em:CCP, 222Eo:CCC, 222Fa:CCP, 222Fb:CCC, 222Fe:CCC, 231Cd:CCC, 231Gb:CCC, 251Cd:CCC, 251Ce:CCC, 251Ea:CCC, M222Aa:PPP

**Federal Lands:** NPS (Buffalo, Fort Donelson, Mammoth Cave); USFS (Bankhead, Daniel Boone, Mark Twain, Ouachita?, Ozark, Shawnee)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.02, FODO.12 (in part).

**Local Description Authors:** R. White

**Global Description Authors:** M. Guetersloh, mod. M. Pyne and D. Faber-Langendoen

**References:** Evans 1991, Eyre 1980, Fralish 1987, Fralish et al. 1991, Kuchler 1964, Midwestern Ecology Working Group n.d., NatureServe Ecology - Southeastern U.S. unpubl. data, Nelson 1985, Robertson and Heikens 1994, Robertson et al. 1984, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

## ***Quercus shumardii* - *Quercus pagoda* Forest Alliance**

### **Central Interior Upland Cherrybark Oak Forest**

***Quercus pagoda* - (*Quercus falcata*) / *Ostrya virginiana* Forest**

**Cherrybark Oak - (Southern Red Oak) / Eastern Hop-hornbeam Forest**

**Identifier: CEGL003871**

#### **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 shumardii* - *Quercus pagoda* Forest Alliance (A.252)

Alliance (English name) Shumard Oak - Cherrybark Oak Forest Alliance

Association *Quercus pagoda* - (*Quercus falcata*) / *Ostrya virginiana* Forest

Association (English name) Cherrybark Oak - (Southern Red Oak) / Eastern Hop-hornbeam Forest

Association (Common name) Central Interior Upland Cherrybark Oak Forest

**Ecological System(s):** Southern Interior Low Plateau Dry Oak Forest (CES202.898)

#### **ELEMENT CONCEPT**

**Global Summary:** This dry-mesic forest community is restricted to apparently calcareous-influenced or basic soils associated with high terraces and adjacent slopes in western Tennessee, Kentucky, and possibly adjacent areas in both the East Gulf Coastal Plain and adjacent Interior Low Plateau near the Tennessee and Cumberland rivers. These are upland stands with a significant, if not dominant, component of *Quercus pagoda* and occasionally dominated or codominated by *Quercus falcata* in Interior Low Plateau stands. A number of other hardwoods may also be present, such as *Quercus velutina*, *Liquidambar styraciflua*, *Carya ovalis*, *Liriodendron tulipifera*, *Quercus rubra*, and *Quercus imbricaria*. The subcanopy may be heavily dominated by *Ostrya virginiana* and may also contain *Ulmus alata*, *Juniperus virginiana*, *Fraxinus americana*, and *Acer rubrum*. These forests are on distinctly upland areas isolated from the river floodplains and may also occur on small ridgetops overlooking the floodplains.

#### **ENVIRONMENTAL DESCRIPTION**

##### **USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** This community is the most common natural community in the park, occurring on low to upper slopes and ridgetops of various aspects. The forest varies a great deal in character but is generally relatively dry with a low cover of herbaceous species in the understory.

**Global Environment:** These forests are on distinctly upland areas isolated from river floodplains, such as the Tennessee River (NatureServe Ecology unpubl. data). This dry-mesic forest community is restricted to apparently calcareous-influenced or basic soils associated with high terraces and adjacent slopes in western Tennessee, Kentucky, and possibly adjacent areas in both the East Gulf Coastal Plain and adjacent Interior Low Plateau near the Tennessee and Cumberland rivers.

#### **VEGETATION DESCRIPTION**

**Fort Donelson National Battlefield Vegetation:** This forest type is the most common "natural" forest type in the park. It occurs in mid- to late-successional stands, and composition can vary

greatly depending upon the age of the stand and the exposure/aspect of the site. Younger stands may contain mixtures of *Liriodendron tulipifera* and other early-successional tree species. Stands on ridgetops may have a high component or be dominated by *Quercus falcata*. Other canopy species may include *Quercus shumardii*, *Quercus rubra*, *Quercus alba*, *Carya* spp., etc. Most stands contain at least some *Ostrya virginiana* in the understory or shrub layer.

**Global Vegetation:** These are upland stands with a significant, if not dominant, component of *Quercus pagoda* and occasionally dominated or codominated by *Quercus falcata* in Interior Low Plateau stands. A number of other hardwoods may also be present, such as *Quercus velutina*, *Liquidambar styraciflua*, *Carya ovalis*, *Liriodendron tulipifera*, *Quercus rubra*, and *Quercus imbricaria*. The subcanopy may be heavily dominated by *Ostrya virginiana* and may also contain *Ulmus alata*, *Juniperus virginiana*, *Fraxinus americana*, and *Acer rubrum*.

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus pagoda</i>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Ostrya virginiana</i>

##### Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus pagoda</i>
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Ostrya virginiana</i>

#### CHARACTERISTIC SPECIES

##### Fort Donelson National Battlefield:

##### Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

##### Global:

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G3? (25-Feb-2004). The full range of this type is not known; it is based on a small number of samples. The forest is apparently confined to the upper portions of the East Gulf Coastal Plain and also from the adjacent Interior Low Plateau in Tennessee. Distribution in the Interior Low Plateau in Tennessee is very limited, as indicated by the distribution of *Quercus pagoda* in the state (Chester et al. 1997). This type is found on sheltered slopes near large rivers (i.e., Cumberland and Tennessee) which have mesic conditions and a moderate microclimate. Known examples are rare. *Quercus pagoda* is a commercially valuable species (Krinard 1990), so examples on unprotected private land are threatened by timbering. The question mark in the Global Rank is to indicate the lack of certainty about the distribution of the type, especially in the states of Alabama, Mississippi, and Kentucky. Additional information about the distribution and/or abundance of the type in these states will be helpful in revising the Global Rank.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

##### Fort Donelson National Battlefield Comments:

**Global Comments:** This type may be renamed as the data are fully integrated. It is based on few samples, and more information is needed on its complete range and its relationship to similar vegetation.

##### Global Similar Associations:

- *Quercus muehlenbergii* - *Carya* spp. / *Ostrya virginiana* Upper East Gulf Coastal Plain Forest (CEGL003903)—related forest dominated by *Quercus muehlenbergii*.

**Global Related Concepts:**

- IA6j. Interior Calcareous Oak - Hickory Forest (Allard 1990) B

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

**Fort Donelson National Battlefield Range:** This type occurs throughout the park's acreage, especially on low to upper slopes and sometimes ridgetops.

**Global Range:** This forest association is described from western Tennessee and could occur in adjacent Alabama, Kentucky and/or Mississippi. More information is needed on the complete range of this type.

**Nations:** US

**States/Provinces:** AL?, KY?, MS?, TN

**USFS Ecoregions:** 222Cg:CCC, 222Eg:CCC, 231Be:???

**Federal Lands:** NPS (Fort Donelson, Shiloh)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.03, FODO.05, FODO.08 (in part), FODO.11 (in part), FODO.16, FODO.17, FODO.20, FODO.21.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** M. Pyne, mod. C.W. Nordman and R. White

**References:** Allard 1990, Chester et al. 1997, Krinard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

**I.B.2.N.d. Temporarily flooded cold-deciduous forest*****Liquidambar styraciflua* Forest Alliance****Successional Sweetgum Floodplain Forest*****Liquidambar styraciflua* - (*Liriodendron tulipifera*) Temporarily Flooded Forest****Sweetgum - (Tuliptree) Temporarily Flooded Forest****Identifier: C EGL007330****NVC Classification**

Physiognomic Class Forest (I)

Physiognomic Subclass Deciduous forest (I.B.)

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

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

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

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

Alliance

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

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

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

Association (Common name) Successional Sweetgum Floodplain Forest

**Ecological System(s):** South-Central Interior Small Stream and Riparian**ELEMENT CONCEPT**

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

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:** Palustrine

**Fort Donelson National Battlefield Environment:** This early-successional community occurs along some wide flat areas of creeks in the park.

**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

**Fort Donelson National Battlefield Vegetation:** This community can be dominated by either *Liquidambar styraciflua* or *Liriodendron tulipifera*. Herbaceous and shrub composition varies widely depending upon disturbance history.

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

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

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

##### Global

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

#### CHARACTERISTIC SPECIES

##### Fort Donelson National Battlefield:

Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

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

**Fort Donelson National Battlefield Comments:**

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

**Global Similar Associations:**

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

**Global Related Concepts:**

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

**OTHER COMMENTS**

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Fort Donelson National Battlefield Range:** In the park, this community is restricted to wide flat areas along the park's creeks.

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

**Nations:** US

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

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

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

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** None.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** mod. R. White

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

***Platanus occidentalis* - (*Fraxinus pennsylvanica*, *Celtis laevigata*, *Acer saccharinum*) Temporarily Flooded Forest Alliance**

**Sycamore - Silver Maple Calcareous Floodplain Forest**

*Platanus occidentalis* - *Acer saccharinum* - *Juglans nigra* - *Ulmus rubra* Forest

**Sycamore - Silver Maple - Black Walnut - Slippery Elm Forest**

**Identifier: C EGL007334**

**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 *Platanus occidentalis* - (*Fraxinus pennsylvanica*, *Celtis laevigata*, *Acer saccharinum*) (A.288)

Temporarily Flooded Forest Alliance

Alliance (English name) Sycamore - (Green Ash, Sugarberry, Silver Maple) Temporarily Flooded Forest Alliance

Association *Platanus occidentalis* - *Acer saccharinum* - *Juglans nigra* - *Ulmus rubra* Forest

Association (English name) Sycamore - Silver Maple - Black Walnut - Slippery Elm Forest

Association (Common name) Sycamore - Silver Maple Calcareous Floodplain Forest

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

**ELEMENT CONCEPT**

**Global Summary:** This sycamore - silver maple floodplain forest occurs along riverfronts in calcareous areas of the east-central United States. Stands are dominated by *Platanus occidentalis*, with a mixture of other species, including *Acer negundo*, *Acer saccharinum*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Juglans nigra*, *Ulmus americana*, and *Ulmus rubra*. Shrubs include *Asimina triloba* and *Lindera benzoin*. Vines may be abundant, including *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Arisaema triphyllum*, *Asarum canadense*, *Boehmeria cylindrica*, *Elymus virginicus*, *Pilea pumila*, *Polygonum virginianum*, and others.

**ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Fort Donelson National Battlefield Environment:** At Fort Donelson, this community occurs where the U.S. Army Corps of Engineers impoundment floodplain meets creek outflow areas to form flat, frequently flooded areas of vegetation.

**Global Environment:** This association occurs along riverfronts in calcareous areas, including forests along small streams (Weakley et al. 1998). The creation in 2000 of *Platanus occidentalis* - *Celtis laevigata* - *Liriodendron tulipifera* / *Lindera benzoin* - *Arundinaria gigantea* / *Amphicarpaea bracteata* Forest (CEGL008429) may dictate that the use of this type (CEGL007334), at least in their range of overlap, would be more appropriate for large rivers rather than "small streams."

### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** At Fort Donelson, this community is dominated by *Acer saccharinum* with small amounts of *Platanus occidentalis*, *Acer negundo*, and other species.

**Global Vegetation:** Stands are dominated by *Platanus occidentalis*, with a mixture of other species, including *Acer negundo*, *Acer saccharinum*, *Fraxinus americana*, *Fraxinus pennsylvanica*, *Juglans nigra*, *Ulmus americana*, and *Ulmus rubra*. Shrubs include *Asimina triloba* and *Lindera benzoin*. Vines may be abundant, including *Parthenocissus quinquefolia* and *Toxicodendron radicans*. Herbaceous species include *Arisaema triphyllum*, *Asarum canadense*, *Boehmeria cylindrica*, *Elymus virginicus*, *Pilea pumila*, *Polygonum virginianum*, and others (Van Kley et al. 1995, Weakley et al. 1998). *Acer saccharinum* may be a differential species in relation to some of the other associations in this alliance, as it is apparently absent from the southeastern Atlantic Coastal Plain and at the edge of its range in the southern Piedmont.

### MOST ABUNDANT SPECIES

#### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Acer saccharinum</i>

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

### CHARACTERISTIC SPECIES

#### Fort Donelson National Battlefield:

**Global:** *Acer negundo*, *Acer saccharinum*, *Alliaria petiolata*, *Asimina triloba*, *Chaerophyllum procumbens*, *Fraxinus pennsylvanica*, *Mertensia virginica*, *Platanus occidentalis*, *Verbesina alternifolia*

### OTHER NOTEWORTHY SPECIES

#### Fort Donelson National Battlefield:

**Global:** *Erythronium albidum*, *Maianthemum stellatum*

### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4 (4-Jan-2001). This type is apparently somewhat restricted in habitat, but with a wide range, and not highly threatened. Timber removal will cause disruption, but permanent conversion to other forest types is less likely. This community, and other types of floodplain forests, are threatened by alteration of the hydroperiod by artificial impoundments or river diversion projects, or the disruption of the floodplain communities by forestry or agriculture.

### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 2 - Moderate

#### Fort Donelson National Battlefield Comments:

**Global Comments:** This type could be in Illinois and Missouri. It is not well characterized yet and may be difficult to distinguish from other floodplain forests where *Platanus* is conspicuous without being dominant. For example, see *Acer saccharinum* - *Ulmus americana* - (*Populus deltoides*) Forest (CEGL002586), *Fraxinus pennsylvanica* - *Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest (CEGL002410), *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis laevigata* / *Ilex decidua* Forest (CEGL002427), and *Fraxinus pennsylvanica* - *Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014). It is possible that CEGL002410 could be merged with this type, depending on level of dominance required for *Platanus*.

**Global Similar Associations:**

- *Acer saccharinum* - *Ulmus americana* - (*Populus deltoides*) Forest (CEGL002586)
- *Fraxinus pennsylvanica* - *Celtis* spp. - *Quercus* spp. - *Platanus occidentalis* Bottomland Forest (CEGL002410)
- *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis laevigata* / *Ilex decidua* Forest (CEGL002427)
- *Fraxinus pennsylvanica* - *Ulmus* spp. - *Celtis occidentalis* Forest (CEGL002014)
- *Platanus occidentalis* - *Celtis laevigata* - *Liriodendron tulipifera* / *Lindera benzoin* - *Arundinaria gigantea* / *Amphicarpaea bracteata* Forest (CEGL008429)—on small to medium-sized terraces of small streams.

### Global Related Concepts:

- ELTP 61: *Platanus* / *Asarum*, Wet-mesic Bottomlands (Van Kley et al. 1995) =
- IIA6e. Southern Appalachian Alluvial Forest (Allard 1990) B
- Silver Maple - Sycamore Forest on Base-rich Alluvium (Palmer-Ball et al. 1988) =
- Sycamore-green ash floodplain forest (CAP pers. comm. 1998) ?

### OTHER COMMENTS

#### Other Comments:

#### ELEMENT DISTRIBUTION

**Fort Donelson National Battlefield Range:** This community is limited to the flat, frequently flooded areas between the U.S. Army Corps of Engineers impoundment and creek outflows.

**Global Range:** This association occurs in river and large stream floodplains in calcareous areas of the east-central United States from Indiana and Kentucky and North Carolina, and possibly Ohio.

**Nations:** US

**States/Provinces:** IN, KY, OH, TN

**USFS Ecoregions:** 221Ec:CC, 221Ed:CCP, 221Ef:CCP, 221Eg:CCC, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222Cg:CCC, 222De:CCP, 222Eb:CCC, 222Eg:CCC, 222Em:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Hb:CCC, 222Hf:CCC, 231Aa:CCP, 231Ae:CCP, 231Ak:CCP, 231Al:CCC, 231Ap:CCC, 232Ad:CCC

**Federal Lands:** NPS (Blue Ridge Parkway?, Fort Donelson, Mammoth Cave, Natchez Trace, Shiloh); USFS (Daniel Boone)

#### ELEMENT SOURCES

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** None.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** D. Faber-Langendoen, mod. K.D. Patterson

**References:** Allard 1990, CAP pers. comm. 1998, Palmer-Ball et al. 1988, Schafale and Weakley 1990, Southeastern Ecology Working Group n.d., Van Kley et al. 1995, Weakley et al. 1998

## ***Salix nigra* Temporarily Flooded Forest Alliance**

### **Black Willow Riparian Forest**

***Salix nigra* Forest**

**Black Willow Forest**

**Identifier: C EGL002103**

#### **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 *Salix nigra* Temporarily Flooded Forest Alliance (A.297)

Alliance (English name) Black Willow Temporarily Flooded Forest Alliance

Association *Salix nigra* Forest

Association (English name) Black Willow Forest

Association (Common name) Black Willow Riparian Forest

**Ecological System(s):** South-Central Interior Large Floodplain (CES202.705)  
Semi-natural Forest (CES203.285)

#### **ELEMENT CONCEPT**

**Global Summary:** The black willow forest type is found widely but sporadically across the eastern United States. Stands occur on the banks of small to large rivers where they are a component of point bar succession. It may also be present in the inflows of manmade lakes where similar sand bars may develop over time and where the seasonal draining patterns of the lake may mimic similar natural processes. Surface water is present for brief periods during the growing season, but the water table usually lies well below soil surface. The vegetation is a closed-canopy forest dominated by *Salix nigra*. Associates may include *Populus deltoides*, *Planera aquatica*, *Betula nigra*, *Platanus occidentalis*, *Celtis laevigata*, *Fraxinus pennsylvanica*, *Carya illinoensis*, *Diospyros virginiana*, *Quercus nigra*, *Cornus drummondii*, *Ulmus americana*, *Acer rubrum*, *Acer negundo*, and *Acer saccharinum*. Shrubs and herbaceous plants are absent to fairly dense. They include *Ampelopsis arborea*, *Mikania scandens*, *Toxicodendron radicans*, *Polygonum* spp., *Erechtites hieracifolia*, *Boehmeria cylindrica*, *Commelina virginica*, *Phytolacca americana*, and *Asplenium platyneuron*. In Kentucky, stands may contain *Dichanthelium commutatum*.

#### **ENVIRONMENTAL DESCRIPTION**

**USFWS Wetland System:** Palustrine

**Fort Donelson National Battlefield Environment:** This community occurs in floodplain areas frequently flooded by rain events and runoff.

**Global Environment:** Stands occur on the banks of small to large rivers where they are a component of point bar succession. Surface water is present for brief periods during the growing season, but the water table usually lies well below soil surface (Central Appalachian Ecoregional Team pers. comm. 1998).

#### **VEGETATION DESCRIPTION**

**Fort Donelson National Battlefield Vegetation:** This community type consists of *Salix nigra* and very little else. Sites where it occurs are flooded too frequently to sustain a very robust

herbaceous layer. *Boehmeria cylindrica* and annuals such as *Phytolacca americana* and *Erechtites hieraciifolia* are the most common herbaceous plants.

**Global Vegetation:** The vegetation is a closed-canopy forest dominated by *Salix nigra*. Associates include *Populus deltoides*, *Planera aquatica*, *Betula nigra*, *Platanus occidentalis*, *Celtis laevigata*, *Fraxinus pennsylvanica*, *Carya illinoensis*, *Diospyros virginiana*, *Quercus nigra*, *Cornus drummondii*, *Ulmus americana*, *Acer rubrum*, *Acer negundo*, and *Acer saccharinum*. Shrubs and herbaceous plants are absent to fairly dense. They include *Ampelopsis arborea*, *Mikania scandens*, *Toxicodendron radicans*, *Polygonum* spp., *Erechtites hieraciifolia*, *Boehmeria cylindrica*, *Commelina virginica*, *Phytolacca americana*, and *Asplenium platyneuron* (Central Appalachian Ecoregional Team pers. comm. 1998).

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Salix nigra</i>

##### Global

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

##### Fort Donelson National Battlefield:

##### Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

##### Global:

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** G4 (15-Oct-2002). This association is currently broadly described to cover a large geographic range. It occurs sporadically on the banks of small to large rivers. There is a need for further inventory and description of this community to determine its relationship to similar communities, but it is assumed to be under no severe threats and its wide distribution means that it is not a rare community type.

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

##### Fort Donelson National Battlefield Comments:

**Global Comments:** This type needs a thorough rangewide assessment to standardize its concept. In Missouri, stands of this nature are included in the *Populus deltoides* - *Salix nigra* Forest (CEGL002018).

##### Global Similar Associations:

- *Populus deltoides* - *Salix nigra* Forest (CEGL002018)—overlaps in concept.
- *Salix nigra* - (*Fraxinus pennsylvanica*, *Acacia farnesiana*) Forest (CEGL008481)
- *Salix nigra* - *Platanus occidentalis* Forest (CEGL004626)
- *Salix nigra* Large River Floodplain Forest (CEGL007410)—of larger rivers but (formerly) placed in seasonally flooded.

##### Global Related Concepts:

#### OTHER COMMENTS

##### Other Comments:

#### ELEMENT DISTRIBUTION

**Fort Donelson National Battlefield Range:** This community occurs on the most frequently flooded sections of land near the U.S. Army Corps of Engineers impoundment.

**Global Range:** The black willow forest type is found widely, but sporadically across the eastern United States, ranging from Ohio west to Iowa, south to Arkansas, Louisiana and Texas, east to Florida and North Carolina.

**Nations:** CA, US

**States/Provinces:** AL?, AR, FL, GA, IA, IL?, IN?, KY, LA, NC, OH?, OK?, ON, TN, TX?, VA, WV

**USFS Ecoregions:** 221Ec:CPP, 221Ed:CP?, 221Ef:CP?, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222A:CC, 222Eg:CCC, 222En:CCC, 222Eo:CCC, 231Bc:CCC, 231Ga:CCC, 231Gb:CCC, 232Bq:CCC, 251E:CC, 251F:CC, 255A:CC, 255C:CC, 255D:CC, 311A:CC, 332E:CC, M221Cd:CCC, M222A:CC, M231A:CC

**Federal Lands:** DOD (Arkansas River, Fort Benning); NPS (Fort Donelson, Ninety Six, Stones River); USFS (Daniel Boone, Talladega)

#### ELEMENT SOURCES

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.13.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:**

**References:** Baalman 1965, Blair 1938, Blair and Hubbell 1938, CAP pers. comm. 1998, Fleming et al. 2001, Hefley 1937, Hoagland 2000, Johnson 1984, Kelting and Penfound 1950, McCoy 1958, NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. unpubl. data 2002, Penfound 1953, Penfound 1961, Penfound 1965, Petranka and Holland 1980, Southeastern Ecology Working Group n.d.

## V. Herbaceous Vegetation

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

*Andropogon virginicus* Herbaceous Alliance

### Successional Broom-sedge Vegetation

*Andropogon virginicus* var. *virginicus* Herbaceous Vegetation

Common Broom-sedge Herbaceous Vegetation

Identifier: C EGL004044

#### NVC Classification

Physiognomic Class Herbaceous Vegetation (V)

Physiognomic Subclass Perennial graminoid vegetation (V.A.)

Physiognomic Group Temperate or subpolar grassland (V.A.5.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)

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

Alliance *Andropogon virginicus* Herbaceous Alliance (A.1208)

Alliance (English name) Common Broomsedge Herbaceous Alliance

Association *Andropogon virginicus* var. *virginicus* Herbaceous Vegetation

Association (English name) Common Broom-sedge Herbaceous Vegetation

Association (Common name) Successional Broom-sedge Vegetation

**Ecological System(s):** Human Modified/ Successional

#### ELEMENT CONCEPT

**Global Summary:** This association includes herbaceous-dominated vegetation that has been anthropogenically altered and/or maintained, especially on old fields, and pastures. Examples support predominately native species, one of the most dominant or characteristic species being *Andropogon virginicus* var. *virginicus*. This is a very common and wide-ranging association and can be quite variable in terms of species composition. Additional components are other perennial grasses and herbaceous species, most with pioneer or weedy tendencies, the exact composition of which will vary with geography, management history, and habitat.

#### ENVIRONMENTAL DESCRIPTION

##### USFWS Wetland System:

**Fort Donelson National Battlefield Environment:** This community occurs on sites mowed yearly or more often.

**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

**Fort Donelson National Battlefield Vegetation:** This community is dominated by a combination of *Andropogon virginicus* var. *virginicus* and other mostly native species such as *Solidago* species and Asteraceae species. It is distinguished from *Lolium* (*arundinaceum*, *pratense*) Herbaceous Vegetation (CEGL004048) in the park by the dominance of native rather than non-native species.

**Global Vegetation:** Stands of this community are dominated by *Andropogon virginicus* var. *virginicus*. Associated species vary with geography and habitat and include typical pioneer species. Other species with high cover values in plot samples attributed to this type include *Tridens flavus*, *Setaria parviflora* (= *Setaria geniculata*), *Eragrostis spectabilis*, and *Panicum*

*anceps* (NatureServe Ecology unpubl. data). On the eastern Highland Rim of Tennessee (Arnold Air Force Base), associated species include *Andropogon virginicus*, *Diodia teres*, *Aristida dichotoma*, *Aristida oligantha*, *Packera anonyma* (= *Senecio anonymus*), *Paspalum laeve*, *Lespedeza virginica*, and *Plantago virginica*. *Rubus argutus* and *Smilax* spp. may be locally abundant but are not dominant. In clearcuts, *Schizachyrium scoparium*, *Danthonia spicata*, and *Dichanthelium* spp. are also common, as are occasional *Quercus* spp. and *Rubus argutus*.

The plot at Shiloh National Military Park (western Tennessee) was a mowed field of mostly native species, dominated by *Andropogon virginicus* var. *virginicus*. *Paspalum setaceum* and *Tridens flavus* were codominant (with less cover). Other herbaceous plants with high cover values were *Setaria parviflora* (= *Setaria geniculata*), *Diodia teres*, *Schizachyrium scoparium*, and less common were *Packera anonyma*, *Sorghum halepense*, and *Cyperus retrorsus*. At less than 1% cover were *Polypremum procumbens*, *Oxalis stricta*, *Eragrostis spectabilis*, *Salvia lyrata*, *Solanum carolinense*, *Digitaria sanguinalis*, *Panicum anceps*, *Croton willdenowii* (= *Crotonopsis elliptica*), *Trifolium pratense*, *Kummerowia striata*, *Coreopsis pubescens*, *Plantago lanceolata*, and *Mecardonia acuminata*. At only a trace amount of cover were *Conyza canadensis*, *Acalypha virginica*, *Solidago* sp., *Erigeron annuus*, *Sida spinosa*, *Hypericum drummondii*, *Polygala verticillata*, *Eupatorium capillifolium*, *Passiflora incarnata*, and *Asclepias amplexicaulis*.

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Graminoid	<i>Andropogon virginicus</i> var. <i>virginicus</i>

<u>Global Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Graminoid	<i>Andropogon virginicus</i> var. <i>virginicus</i>

#### CHARACTERISTIC SPECIES

##### Fort Donelson National Battlefield:

##### Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

##### 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

**Fort Donelson National Battlefield Comments:**

**Global Comments:**

**Global Similar Associations:**

**Global Related Concepts:**

#### OTHER COMMENTS

**Other Comments:**

**ELEMENT DISTRIBUTION**

**Fort Donelson National Battlefield Range:** This community occurs mainly in mowed areas, especially around the old earthworks near the Cumberland River bluff area.

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

**Nations:** US

**States/Provinces:** AL, AR, GA, IL, IN, KY, LA, MO?, MS, NC, OK, SC, TN, TX, VA

**USFS Ecoregions:** 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 222Eg:CCC, 231Aa:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:C??, M221Bd:C??, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

**Federal Lands:** DOD (Arnold, Fort Benning, Fort Gordon); NPS (Cowpens, Fort Donelson, Kings Mountain, Little River Canyon?, Mammoth Cave, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.10, FODO.14.

**Local Description Authors:** R.E. Evans and R. White

**Global Description Authors:** A.S. Weakley, mod. C.W. Nordman

**References:** Fleming and Coulling 2001, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Penfound 1953, Southeastern Ecology Working Group n.d., TNC 1998a, Tarr et al. 1980

***Lolium (arundinaceum, pratense)* Herbaceous Alliance****Cultivated Meadow*****Lolium (arundinaceum, pratense)* Herbaceous Vegetation  
(Tall Fescue, Meadow Fescue) Herbaceous Vegetation****Identifier: C EGL004048****NVC Classification**

Physiognomic Class Herbaceous Vegetation (V)

Physiognomic Subclass Perennial graminoid vegetation (V.A.)

Physiognomic Group Temperate or subpolar grassland (V.A.5.)

Physiognomic Subgroup Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)

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

Alliance *Lolium (arundinaceum, pratense)* Herbaceous Alliance (A.1213)

Alliance (English name) (Tall Fescue, Meadow Fescue) Herbaceous Alliance

Association *Lolium (arundinaceum, pratense)* Herbaceous Vegetation

Association (English name) (Tall Fescue, Meadow Fescue) Herbaceous Vegetation

Association (Common name) Cultivated Meadow

**Ecological System(s):** Exotic-dominated Community (CES203.287)**ELEMENT CONCEPT**

**Global Summary:** This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained. The dominant species in this type are the European "tall or meadow fescues" of uncertain and controversial generic placement. These communities are sometimes nearly monospecific but can also be very diverse and contain many native species of grasses, sedges, and forbs. This vegetation is currently defined for the southern Appalachians, Ozarks, Ouachita Mountains, and parts of the Piedmont and Interior Low Plateau, but it is possible throughout much of the eastern United States and southern Canada.

**ENVIRONMENTAL DESCRIPTION****USFWS Wetland System:**

**Fort Donelson National Battlefield Environment:** This community can occur in any section of the park that has been cultivated and is mowed at least yearly.

**Global Environment:** This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained.

**VEGETATION DESCRIPTION**

**Fort Donelson National Battlefield Vegetation:** This community consists primarily of exotic old-field species, especially *Lolium* species. It may also contain a significant amount of native species, but the majority is exotic.

**Global Vegetation:** The dominant species in this association are the European "tall or meadow fescues" of uncertain and controversial generic placement. Although traditionally treated as *Festuca pratensis* (= *Festuca elatior*) and *Festuca arundinacea*, these two closely related species are now usually treated as either *Lolium pratense* and *Lolium arundinaceum* (Kartesz 1999) or as *Schedonorus pratensis* and *Schedonorus arundinaceus*. These communities are sometimes nearly monospecific but can also be very diverse and contain many native species of grasses, sedges, and forbs. In the Black Belt region of Alabama and Mississippi, it is commonly found in mixture with *Paspalum dilatatum* (dallisgrass) (Bransby n.d.). The exotics *Lespedeza cuneata* and *Bromus tectorum* may be present in stands.

**MOST ABUNDANT SPECIES****Fort Donelson National Battlefield**

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

**CHARACTERISTIC SPECIES****Fort Donelson National Battlefield:****Global:****OTHER NOTEWORTHY SPECIES****Fort Donelson National Battlefield:****Global:****CONSERVATION STATUS RANK**

**Global Rank & Reasons:** GNA (invasive) (5-Jan-2000). This vegetation is dominated by an exotic species, is of anthropogenic origin, and is thus not a conservation priority.

**CLASSIFICATION****Status:** Standard**Classification Confidence:** 2 - Moderate**Fort Donelson National Battlefield Comments:**

**Global Comments:** *Lolium pratense* and *Lolium arundinaceum* are two closely related species which were traditionally treated as *Festuca pratensis* (= *Festuca elatior*) and *Festuca arundinacea*, and could alternately be treated as *Schedonorus pratensis* and *Schedonorus arundinaceus*. Conversion to Kartesz (1999) standard has necessitated the shift to the *Lolium* names from *Festuca*.

**Global Similar Associations:**

- *Dactylis glomerata* - *Rumex acetosella* Herbaceous Vegetation (CEGL006107)

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

**Fort Donelson National Battlefield Range:** This community occurs throughout the park in areas that were plowed and are now mowed yearly.

**Global Range:** This association is possible throughout much of the eastern United States and southern Canada.

**Nations:** CA?, US**States/Provinces:** AL, AR, GA, KY, MO, MS, NB?, NC, NS?, OK, QC?, SC, TN, VA, WV**USFS Ecoregions:** 221:C, 222Eg:CCC, 231Ae:CCC, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC, M231A:CC

**Federal Lands:** NPS (Blue Ridge Parkway, Buffalo, Carl Sandburg Home, Cowpens, Cumberland Gap, Fort Donelson, Great Smoky Mountains, Guilford Courthouse, Kings Mountain, Mammoth Cave, Ninety Six, Shiloh, Stones River); USFS (Cherokee, Ouachita, Ozark)

**ELEMENT SOURCES****Fort Donelson National Battlefield Inventory Notes:****Fort Donelson National Battlefield Plots:** FODO.19.**Local Description Authors:** R.E. Evans and R. White**Global Description Authors:** A.S. Weakley

**References:** Bransby n.d., Heath et al. 1973, Hoagland 2000, Kartesz 1999, NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d.

## VII. Sparse Vegetation

### VII.C.4.N.c. Seasonally / temporarily flooded mud flats

#### Non-tidal Mud Flat Seasonally/Temporarily Flooded Sparsely Vegetated Alliance

#### Tennessee Valley Impoundment Mud Flat Vegetation

##### Tennessee Valley Impoundment Mud Flat Vegetation

Identifier: CEGL004049

##### NVC Classification

Physiognomic Class Sparse Vegetation (VII)

Physiognomic Subclass Unconsolidated material sparse vegetation (VII.C.)

Physiognomic Group Sparsely vegetated soil flats (VII.C.4.)

Physiognomic Subgroup Natural/Semi-natural sparsely vegetated soil flats (VII.C.4.N.)

Formation Seasonally / temporarily flooded mud flats (VII.C.4.N.c.)

Alliance Non-tidal Mud Flat Seasonally/Temporarily Flooded Sparsely Vegetated Alliance (A.1878)

Alliance (English name) Non-tidal Mud Flat Seasonally/Temporarily Flooded Sparsely Vegetated Alliance

Association Tennessee Valley Impoundment Mud Flat Vegetation

Association (English name) Tennessee Valley Impoundment Mud Flat Vegetation

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

##### ELEMENT CONCEPT

**Global Summary:** This association represents shoreline vegetation typical of large mainstream and tributary reservoirs in western Tennessee and adjacent areas. This type occurs on sites which are subject to high water levels and complete inundation for much of the year, but that are drawn down in the early to mid summer. Lake margins with suitable substrate (generally silt or clay) are colonized by a variety of plant species adapted to intermittent inundation and saturated soils that are capable of completing their life cycle in a compressed growing season between drawdown and frost. The composition and structure of the vegetation is highly variable among locations and from year to year. In general, a number of short-statured annuals are characteristic, including *Rotala ramosior*, *Lindernia dubia*, *Fimbristylis autumnalis*, *Eragrostis hypnoides*, *Lipocarpa micrantha* (= *Hemicarpha micrantha*), *Eleocharis obtusa*, *Fimbristylis miliacea*, and others. Several perennial species may also be encountered, especially along the upper edges and boundaries of mudflats. Species can include *Alternanthera philoxeroides*, *Symphyotrichum lanceolatum* var. *lanceolatum* (= *Aster simplex*), *Juncus acuminatus*, *Justicia americana*, *Leersia oryzoides*, *Ludwigia* spp., *Panicum rigidulum* (= *Panicum agrostoides*), and others.

##### ENVIRONMENTAL DESCRIPTION

##### USFWS Wetland System:

**Fort Donelson National Battlefield Environment:** In the park, this community type occurs on mudflats influenced by fluctuations in water levels of the U.S. Army Corps of Engineers impoundment.

**Global Environment:** This association is typical of large mainstream and tributary reservoirs in western Tennessee and adjacent areas, including Alabama and Kentucky and possibly other states. These areas are subject to high water levels and complete inundation for much of the year

but are subject to drawdown in the early to mid summer (Webb et al 1988). Lake margins with suitable substrate (generally silt or clay) are colonized by a variety of plant species adapted to intermittent inundation and saturated soils that are capable of completing their life cycle in a compressed growing season between drawdown and frost (Webb et al. 1988).

#### VEGETATION DESCRIPTION

**Fort Donelson National Battlefield Vegetation:** This community is dominated by a mixture of herbaceous species. Composition depends heavily upon the depth of the standing water and the longevity of the water inundation. Distinct zonation in vegetation can be seen as one walks out towards deeper water. *Justicia americana* dominates the areas with the most persistent standing water. *Hibiscus laevis* dominates farther inland, and *Diospyros virginiana* is a shrub that sometimes dominates areas that are less inundated.

**Global Vegetation:** The composition and structure of the vegetation is highly variable among locations and from year to year. The flora of these sites has been well-documented by Webb et al. (1988). In general, a number of short-statured annuals are characteristic, including *Rotala ramosior*, *Lindernia dubia*, *Fimbristylis autumnalis*, *Eragrostis hypnoides*, *Lipocarpha micrantha* (= *Hemicarpha micrantha*), *Eleocharis obtusa*, *Fimbristylis miliacea*, and others. Several perennial species may also be encountered, especially along the upper edges and boundaries of mudflats. Species can include *Alternanthera philoxeroides*, *Symphyotrichum lanceolatum* var. *lanceolatum* (= *Aster simplex*), *Juncus acuminatus*, *Justicia americana*, *Leersia oryzoides*, *Ludwigia* spp., *Panicum rigidulum* (= *Panicum agrostoides*), and others.

#### MOST ABUNDANT SPECIES

##### Fort Donelson National Battlefield

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Forb	<i>Justicia americana</i>

##### Global

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

##### Fort Donelson National Battlefield:

Global:

#### OTHER NOTEWORTHY SPECIES

##### Fort Donelson National Battlefield:

Global:

#### CONSERVATION STATUS RANK

**Global Rank & Reasons:** GNR (21-Apr-2004).

#### CLASSIFICATION

**Status:** Standard

**Classification Confidence:** 3 - Weak

**Fort Donelson National Battlefield Comments:**

**Global Comments:**

**Global Similar Associations:**

**Global Related Concepts:**

#### OTHER COMMENTS

**Other Comments:**

#### ELEMENT DISTRIBUTION

**Fort Donelson National Battlefield Range:** This type is found in areas inundated by the U.S. Army Corps of Engineers impoundment.

**Global Range:**

**Nations:** US

**States/Provinces:** AL, KY, TN

**USFS Ecoregions:**

**Federal Lands:** NPS (Fort Donelson); USFS (Land Between the Lakes?)

**ELEMENT SOURCES**

**Fort Donelson National Battlefield Inventory Notes:**

**Fort Donelson National Battlefield Plots:** FODO.14.

**Local Description Authors:** R. Evans and R. White

**Global Description Authors:** R. Evans

**References:** NatureServe Ecology - Southeastern U.S. unpubl. data, Southeastern Ecology Working Group n.d., Webb et al. 1988

**Bibliography for Fort Donelson National Battlefield's Ecological Community Classification**

- Allard, D. J. 1990. Southeastern United States ecological community classification. Interim report, Version 1.2. The Nature Conservancy, Southeast Regional Office, Chapel Hill, NC. 96 pp.
- Allen, W. H. 1993a. The rise of the botanical database. *BioScience* 43:274-280.
- Ambrose, J. 1990a. Georgia's natural communities--A preliminary list. Unpublished document. Georgia Natural Heritage Inventory. 5 pp.
- Ambrose, Jon. Personal communication. Georgia Natural Heritage Program, Wildlife Resources Division, Georgia Department of Natural Resources, Social Circle.
- Andreu, M. G., and M. L. Tukman. 1995. Forest communities of the Tellico Lake Area, East Tennessee. M.F. project report, Duke University, School of the Environment. Durham, NC. 66 pp. plus appendices.
- Baalman, R. J. 1965. Vegetation of the Salt Plains National Wildlife Refuge, Jet, Oklahoma. Unpublished Ph.D. dissertation, University of Oklahoma, Norman.
- Bacon, C. W., and M. R. Siegel. 1988. Endophyte parasitism of tall fescue. *Journal of Production Agriculture* 1:45-55.
- Blair, W. F. 1938. Ecological relationships of the mammals of the Bird Creek region, northeastern Oklahoma. *The American Midland Naturalist* 20:473-526.
- Blair, W. F., and T. H. Hubbell. 1938. The biotic districts of Oklahoma. *The American Midland Naturalist* 20:425-454.
- Bransby, D. L. No date. Herbaceous biomass sources for the southeastern United States: Have all the options been properly evaluated? Department of Agronomy and Soils, Auburn University. [Abstract]
- Burns, R. M., and B. H. Honkala, technical coordinators. 1990b. *Silvics of North America. Volume 2: Hardwoods. Agriculture Handbook 654.* USDA Forest Service, Washington, DC. 877 pp.
- CAP [Central Appalachian Forest Working Group]. 1998. Central Appalachian Working group discussions. The Nature Conservancy, Boston, MA.
- Cain, M. D., and M. G. Shelton. 1994. Indigenous vegetation in a southern Arkansas pine-hardwood forest after a half century without catastrophic disturbances. *Natural Areas Journal* 14:165-174.
- Campbell, J. 2001. Native vegetation types of Appalachian Kentucky. Unpublished report. The Nature Conservancy, Lexington, KY. 210 pp.
- Campbell, Julian J. N. Personal communication. Kentucky Field Office, The Nature Conservancy.
- Chester, E. W., B. E. Wofford, and R. Kral. 1997. *Atlas of Tennessee vascular plants. Volume 2: Angiosperms: Dicots.* Miscellaneous Publication No. 13. Center for Field Biology, Austin Peay State University, Clarksville, TN.
- Diamond, D. D. 1993. Classification of the plant communities of Texas (series level). Unpublished document. Texas Natural Heritage Program, Austin. 25 pp.
- Duble, R. L. No date. Tall fescue. Texas Agricultural Extensions Service Publication. 3 pp.
- Evans, M. 1991. Kentucky ecological communities. Draft report to the Kentucky Nature Preserves Commission. 19 pp.
- Eyre, F. H., editor. 1980. *Forest cover types of the United States and Canada.* Society of American Foresters, Washington, DC. 148 pp.
- FNAI [Florida Natural Areas Inventory]. 1992a. Natural communities. Unpublished document. The Nature Conservancy, Florida Natural Areas Inventory, Tallahassee. 6 pp.
- FNAI [Florida Natural Areas Inventory]. 1992b. Natural community classification. Unpublished document. The Nature Conservancy, Florida Natural Areas Inventory, Tallahassee. 16 pp.
- Faber-Langendoen, D., and Midwest State Natural Heritage Program Ecologists. 1996. Terrestrial vegetation of the midwest United States. *International classification of ecological communities: Terrestrial vegetation of the United States.* The Nature Conservancy, Arlington, VA.

- Felix, A. C., III, T. L. Sharik, B. S. McGinnes, and W. C. Johnson. 1983. Succession in loblolly pine plantations converted from second growth forest in the central Piedmont of Virginia. *The American Midland Naturalist* 110:365-380.
- Fleming, G. P., P. P. Coulling, D. P. Walton, K. M. McCoy, and M. R. Parrish. 2001. The natural communities of Virginia: Classification of ecological community groups. First approximation. Natural Heritage Technical Report 01-1. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA. Unpublished report. January 2001. 76 pp.
- Fleming, G. P., and P. P. Coulling. 2001. Ecological communities of the George Washington and Jefferson national forests, Virginia. Preliminary classification and description of vegetation types. Virginia Department of Conservation and Recreation, Division of Natural Heritage, Richmond, VA. 317 pp.
- Foti, T. 1994a. Natural communities of Arkansas (terrestrial and palustrine). Unpublished document. Arkansas Natural Heritage Commission, Little Rock. 2 pp.
- Foti, T., M. Blaney, X. Li, and K. G. Smith. 1994. A classification system for the natural vegetation of Arkansas. *Proceedings of the Arkansas Academy of Science* 48:50-53.
- Foti, T., compiler. 1994b. Natural vegetation classification system of Arkansas, draft five. Unpublished document. Arkansas Natural Heritage Commission, Little Rock. 8 pp.
- Foti, Tom. Personal communication. Ecologist. Arkansas Natural Heritage Commission, Little Rock.
- Fountain, M. S., and J. M. Sweeney. 1985. Ecological assessment of the Roaring Branch Research Natural Area. USDA Forest Service, Southern Forest Experiment Station. Research Paper SO-213. New Orleans, LA. 15 pp.
- Fralish, J. S. 1987. Forest stand basal area and its relationship to individual soil and topographic factors in the Shawnee Hills. *Transactions of the Illinois Academy of Science* 80(3 and 4):183-194.
- Fralish, J. S. 1988b. Predicting potential stand composition from site characteristics in the Shawnee Hills Forest of Illinois. *The American Midland Naturalist* 120(1):79-101.
- Fralish, J. S., F. B. Crooks, J. L. Chambers, and F. M. Harty. 1991. Comparison of presettlement, second-growth and old-growth forest on six site types in the Illinois Shawnee Hills. *The American Midland Naturalist* 125:294-309.
- Franklin, S. B., P. A. Robertson, J. S. Fralish, and S. M. Kettler. 1993. Overstory vegetation and successional trends of Land Between the Lakes, USA. *Journal of Vegetation Science* 4:509-520.
- Franklin, S. Personal communication.
- Gallyoun, M., G. Meyer, A. Andreu, and W. Slocumb. 1996. Mapping vegetation communities with The Nature Conservancy's vegetation classification system on five small national parks in the southeastern USA. Unpublished report. The Nature Conservancy, Southeast Regional Office, Conservation Science Department, Chapel Hill, NC.
- Golden, M. S. 1974. Forest vegetation and site relationships in the central portion of the Great Smoky Mountains National Park. Ph.D. dissertation, University of Tennessee, Knoxville. 275 pp.
- Golden, M. S. 1979. Forest vegetation of the lower Alabama Piedmont. *Ecology* 60:770-782.
- Hansen, P. L., R. D. Pfister, K. Boggs, B. J. Cook, J. Joy, and D. K. Hinckley. 1995. Classification and management of Montana's riparian and wetland sites. Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Miscellaneous Publication No. 54. 646 pp. + posters.
- Hansen, P. L., S. W. Chadde, and R. D. Pfister. 1988b. Riparian dominance types of Montana. University of Montana Miscellaneous Publication 49. Montana Forest and Conservation Experiment Station, Missoula. 411 pp.
- Hansen, P., K. Boggs, and R. Pfister. 1991. Classification and management of riparian and wetland sites in Montana. Unpublished draft version prepared for Montana Riparian Association, Montana Forest and Conservation Experiment Station, School of Forestry, University of Montana, Missoula. 478 pp.
- Heath, M. E., D. S. Metcalfe, and R. E. Barnes. 1973. Forages: the science of grassland agriculture. Iowa State University Press, Ames.

- Hefley, H. M. 1937. Ecological studies on the Canadian River floodplain in Cleveland County, Oklahoma. *Ecological Monographs* 7:347-402.
- Hoagland, B. 2000. The vegetation of Oklahoma: A classification for landscape mapping and conservation planning. *The Southwestern Naturalist* 45(4):385-420.
- Hoagland, B. W. 1997. Preliminary plant community classification for Oklahoma. Unpublished draft document, version 35629. University of Oklahoma, Oklahoma Natural Heritage Inventory, Norman. 47 pp.
- Hoagland, B. W. 1998a. Classification of Oklahoma vegetation types. Working draft. University of Oklahoma, Oklahoma Natural Heritage Inventory, Norman. 43 pp.
- Horn, J. C. 1980. Short-term changes in vegetation after clearcutting in the southern Appalachians. *Castanea* 45:88-96.
- Johnson, F. L. 1984. Vegetational changes in a black willow forest over a 23 year period. *Proceedings of the Oklahoma Academy of Science* 64:11-13.
- Jones, G. P., and G. M. Walford. 1995. Major riparian vegetation types of eastern Wyoming. Submitted to Wyoming Department of Environmental Quality, Water Quality Division. Wyoming Natural Diversity Database, Laramie, WY. 245 pp.
- Jones, S. M. 1988a. Old-growth forests within the Piedmont of South Carolina. *Natural Areas Journal* 8:31-37.
- Jones, S. M. 1988b. Old-growth, steady state forests within the Piedmont of South Carolina. Ph.D. dissertation, Clemson University, Clemson, SC. 94 pp.
- Jones, S. M., D. H. Van Lear, and S. K. Cox. 1981b. Major forest community types of the Savannah River Plant: A field guide. USDE Savannah River Plant, National Environmental Research Park Program. Report No. SRO-NERP-9. 79 pp. plus 24 illustrations.
- Kartesz, J. T. 1999. A synonymized checklist and atlas with biological attributes for the vascular flora of the United States, Canada, and Greenland. First edition. In: J. T. Kartesz and C. A. Meacham. *Synthesis of the North American Flora, Version 1.0*. North Carolina Botanical Garden, Chapel Hill, NC.
- Kelting, R. W., and W. T. Penfound. 1950. The vegetation of stock pond dams in central Oklahoma. *American Midland Naturalist* 44:69-75.
- Kittel, G. M., and N. D. Lederer. 1993. A preliminary classification of the riparian vegetation of the Yampa and San Miguel/Dolores river basins. Unpublished report prepared for Colorado Department of Health and the Environmental Protection Agency by The Nature Conservancy, Colorado Field Office, Boulder.
- Kittel, G., E. Van Wie, M. Damm, R. Rondeau, S. Kettler, and J. Sanderson. 1999a. A classification of the riparian plant associations of the Rio Grande and Closed Basin watersheds, Colorado. Unpublished report prepared by the Colorado Natural Heritage Program, Colorado State University, Fort Collins.
- Kittel, G., R. Rondeau, N. Lederer, and D. Randolph. 1994. A classification of the riparian vegetation of the White and Colorado River basins, Colorado. Final report submitted to Colorado Department of Natural Resources and the Environmental Protection Agency. Colorado Natural Heritage Program, Boulder. 166 pp.
- Klimas, C. V. 1988b. Forest vegetation of the leveed floodplain of the lower Mississippi River. U.S. Army Corps of Engineers, Waterways Experimental Station, Lower Mississippi River Environmental Program. Report No. 11. Vicksburg, MS. 281 pp.
- Krinard, R. M. 1990. *Quercus falcata* var *pagodifolia* Ell. Cherrybark oak. Pages 644-649 in: R. M. Burns and B. H. Honkala, technical coordinators. *Silvics of North America: 2. Hardwoods*. Agricultural Handbook 654.
- Kuchler, A. W. 1964. Potential natural vegetation of the conterminous United States. *American Geographic Society Special Publication* 36. New York, NY. 116 pp.
- Lea, C. 2003. Vegetation types in National Capital Region Parks. Working draft of report submitted to NatureServe. 114 pp.
- Martin, D. L., and L. M. Smith. 1991. A survey and description of the natural plant communities of the Kisatchie National Forest, Winn and Kisatchie districts. Louisiana Department of Wildlife and Fisheries, Baton Rouge, LA. 372 pp.

- Martin, D. L., and L. M. Smith. 1993. A survey and description of the natural plant communities of the Kisatchie National Forest, Evangeline and Catahoula districts. Louisiana Department of Wildlife and Fisheries, Baton Rouge. 274 pp.
- Martin, W. H. 1989. Forest patterns in the Great Valley of Tennessee. *Journal of the Tennessee Academy of Science* 64:137-144.
- McCoy, D. A. 1958. Vascular plants of Pontotoc County, Oklahoma. *American Midland Naturalist* 59:371-396.
- McGee, C. E., and R. M. Hooper. 1970. Regeneration after clearcutting in the southern Appalachians. USDA Forest Service. Research Paper SE-70. 12 pp.
- McKinney, Landon E. Personal communication.
- McLeod, D. E. 1988. Vegetation patterns, floristics, and environmental relationships in the Black and Craggy mountains of North Carolina. Ph.D. dissertation, University of North Carolina, Chapel Hill. 222 pp.
- Midwestern Ecology Working Group of NatureServe. No date. International Ecological Classification Standard: International Vegetation Classification. Terrestrial Vegetation. NatureServe, Minneapolis, MN.
- Monk, C. D., D. W. Imm, R. L. Potter, and G. G. Parker. 1989. A classification of the deciduous forest of eastern North America. *Vegetatio* 80:167-181.
- Monk, C. D., D. W. Imm, and R. L. Potter. 1990. Oak forests of eastern North America. *Castanea* 55(2):77-96.
- NatureServe Ecology - Southeastern United States. No date. Unpublished data. NatureServe, Durham, NC.
- NatureServe Ecology - Southeastern United States. No date. Unpublished data. NatureServe, Durham, NC.
- Nelson, J. B. 1986. The natural communities of South Carolina: Initial classification and description. South Carolina Wildlife and Marine Resources Department, Division of Wildlife and Freshwater Fisheries, Columbia, SC. 55 pp.
- Nelson, P. W. 1985. The terrestrial natural communities of Missouri. Missouri Natural Areas Committee, Jefferson City. 197 pp. Revised edition, 1987.
- Oakley, S. C., H. E. LeGrand, Jr., and M. P. Schafale. 1995. An inventory of mafic natural areas in the North Carolina Piedmont. North Carolina Department of Environment, Health, and Natural Resources, Division of Parks and Recreation, Natural Heritage Program, Raleigh. 252 pp.
- Oosting, H. J. 1942. An ecological analysis of the plant communities of Piedmont, North Carolina. *The American Midland Naturalist* 28:1-127.
- Padgett, W. G., A. P. Youngblood, and A. H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. USDA Forest Service, Intermountain Region. Report R4-ECOL-89-01. Ogden, UT. 191 pp.
- Palmer-Ball, B., Jr., J. J. N. Campbell, M. E. Medley, D. T. Towles, J. R. MacGregor, and R. R. Cicerello. 1988. Cooperative inventory of endangered, threatened, sensitive and rare species, Daniel Boone National Forest, Somerset Ranger District. USDA Forest Service, Daniel Boone National Forest, Berea, KY. 244 pp.
- Patterson, K. D., D. J. Allard, and S. Landaal. 1994. Rare plant communities of the conterminous United States: Southeastern region. Pages 105-210 in: D. H. Grossman, K. Lemon Goodin, and C. L. Reuss, editors. Rare plant communities of the conterminous United States: An initial survey. The Nature Conservancy, Arlington, VA.
- Peet, R. K., T. R. Wentworth, M. P. Schafale, and A.S. Weakley. 2002. Unpublished data of the North Carolina Vegetation Survey. University of North Carolina, Chapel Hill.
- Penfound, W. T. 1953. Plant communities of Oklahoma lakes. *Ecology* 34:561-583.
- Penfound, W. T. 1961. The composition of a black willow forest in south central Oklahoma. *Proceedings of the Oklahoma Academy of Science* 41:30-31.
- Penfound, W. T. 1965. Vegetational changes in a black willow forest over a four-year period. *Proceedings of the Oklahoma Academy of Science* 45:39.
- Petranka, J. W., and R. Holland. 1980. A quantitative analysis of bottomland communities in south-central Oklahoma. *Southwestern Naturalist* 25:207-214.

- Phillips, D. L., and D. J. Shure. 1990. Patch-size effects on early succession in southern Appalachian forests. *Ecology* 71:204-212.
- Pyne, M. 1994. Tennessee natural communities. Unpublished document. Tennessee Department of Conservation, Ecology Service Division, Nashville. 7 pp.
- Rawinski, T. J. 1992. A classification of Virginia's indigenous biotic communities: Vegetated terrestrial, palustrine, and estuarine community classes. Unpublished document. Virginia Department of Conservation and Recreation, Division of Natural Heritage. Natural Heritage Technical Report No. 92-21. Richmond, VA. 25 pp.
- Rayburn, E. B. 1993. Tall fescue management. Forage Management, West Virginia University Extension Service. [<http://www.caf.wvu.edu/~forage/tallfesc.htm>] (Accessed May 8, 2003)
- Ribbeck, K. Personal communication. Louisiana Department of Forestry.
- Rice, E. L. 1960. The microclimate of a relict stand of sugar maple in Devil's Canyon in Canadian County, Oklahoma. *Ecology* 41:445-452.
- Richard, C., G. Kittel, and S. Kettler. 1996. A classification of the riparian vegetation of the San Juan National Forest. Draft 1 report. Colorado Natural Heritage Program, Colorado State University, Fort Collins.
- Robertson, P. A., M. D. MacKenzie, and L. F. Elliott. 1984. Gradient analysis and classification of the woody vegetation for four sites in southern Illinois and adjacent Missouri. *Vegetatio* 58:87-104.
- Robertson, P. A., and A. L. Heikens. 1994. Fire frequency in oak-hickory forests of southern Illinois. *Castanea* 59(3):286-291.
- Rosson, J. F. 1995. The timberland and woodland resources of central and western Oklahoma. Southern Forest Experiment Station, U.S. Department of Agriculture, New Orleans, LA.
- Schafale, M. P., and A. S. Weakley. 1990. Classification of the natural communities of North Carolina. Third approximation. North Carolina Department of Environment, Health, and Natural Resources, Division of Parks and Recreation, Natural Heritage Program, Raleigh. 325 pp.
- Schmalzer, P. A. 1978. Classification and analysis of forest communities in several coves of the Cumberland Plateau in Tennessee. M.S. thesis, University of Tennessee, Knoxville. 24 pp.
- Smith, L. M., N. M. Gilmore, R. P. Martin, and G. D. Lester. 1989. Keiffer calcareous prairie/forest complex: A research report and preliminary management plan. Louisiana Department of Wildlife and Fisheries, Natural Heritage Program, Baton Rouge. 44 pp.
- Southeastern Ecology Working Group of NatureServe. No date. International Ecological Classification Standard: International Vegetation Classification. Terrestrial Vegetation. NatureServe, Durham, NC.
- Swain, P. C., and J. B. Kearsley. 2001. Classification of natural communities of Massachusetts. September 2001 draft. Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.
- Szaro, R. C. 1989. Riparian forest and scrubland community types of Arizona and New Mexico. *Desert Plants Special Issue* 9(3-4):70-139.
- TNC [The Nature Conservancy]. 1985. Global Vertebrate Characterization Abstract Habitats. Unpublished document. The Nature Conservancy, Arlington, VA.
- TNC [The Nature Conservancy]. 1995a. A classification and description of plant communities in southern Illinois. Report by the Southern Illinois Field Office, Ullin, IL, and the Midwest Regional Office, Minneapolis, MN.
- TNC [The Nature Conservancy]. 1998a. An investigation and assessment of the vegetation of Arnold Air Force Base. Coffee and Franklin counties, Tennessee. The Nature Conservancy, Tennessee Field Office, Nashville. 37 pp. plus appendices.
- Tarr, J., G. Botkin, E. L. Rice, E. Carpenter, and M. Hart. 1980. A broad analysis of fifteen sites in the tall-grass prairie of Oklahoma. *Proceedings of the Oklahoma Academy of Science* 60:39-42.
- Thomas, R. D. 1966. The vegetation and flora of Chilhowee Mountain. Ph.D. dissertation, University of Tennessee, Knoxville. 355 pp.
- Turnbo, Dennis. Personal communication. Retired. National Park Service, Shiloh National Military Park, Shiloh, TN.

- UNESCO [United Nations Educational, Scientific and Cultural Organization]. 1973. International classification and mapping of vegetation. Series 6, Ecology and Conservation. United Nations Educational, Scientific, and Cultural Organization. Paris. 93 pp.
- USFS [U.S. Forest Service]. 1990. Establishment record for Dismal Hollow Research Natural Area within Ozark National Forest, Newton County, Arkansas. Unpublished document. USDA Forest Service, Ozark National Forest, Russellville, AR. 20 pp. plus map.
- Van Auken, O. W., and J. K. Bush. 1988. Dynamics of establishment, growth, and development of black willow and cottonwood in the San Antonio River forest. *Texas Journal of Science* 40:269-277.
- Van Kley, J. E., G. R. Parker, D. P. Franzmeier, and J. C. Randolph. 1995. Field Guide - Ecological classification of the Hoosier National Forest and surrounding areas of Indiana. USDA Forest Service, Hoosier National Forest.
- Voigt, J. W., and R. H. Mohlenbrock. 1964. Plant communities of southern Illinois. Southern Illinois University Press, Carbondale. 202 pp.
- Washburn, B. E., T. G. Barnes, and C. C. Rhoades. 2002. Using imazapic and prescribed fire to enhance native warm-season grasslands in Kentucky, USA. *Natural Areas Journal* 22(1):20-27.
- Weakley, A. S., K. D. Patterson, S. Landaal, M. Pyne, and others, compilers. 1998. International classification of ecological communities: Terrestrial vegetation of the Southeastern United States. Working draft of March 1998. The Nature Conservancy, Southeast Regional Office, Southern Conservation Science Department, Community Ecology Group. Chapel Hill, NC. 689 pp.
- Webb, D. H., W. M. Dennis, and A. L. Bates. 1988. An analysis of the plant community of mudflats of TVA mainstream reservoirs. Pages 177-198 in: D. H. Snyder, editor. Proceedings of first annual symposium on the natural history of the lower Tennessee and Cumberland river valleys. Austin Peay St. University, Clarksville, TN. 328 pp.
- Wharton, C. H. 1978. The natural environments of Georgia. Georgia Department of Natural Resources, Atlanta. 227 pp.
- Wharton, C. H., W. M. Kitchens, E. C. Pendleton, and T. W. Sipe. 1982. The ecology of bottomland hardwood swamps of the Southeast: A community profile. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-81/37. Washington, DC.
- White, J., and M. Madany. 1978. Classification of natural communities in Illinois. Pages 311-405 in: Natural Areas Inventory technical report: Volume I, survey methods and results. Illinois Natural Areas Inventory, Urbana, IL.
- Wieland, R. W. 2000a. Ecology and vegetation of LeFleur's Bluff State Park, Jackson, Mississippi. *Journal of the Mississippi Academy of Sciences* 45(3):150-183.
- Youngblood, A. P., W. G. Padgett, and A. H. Winward. 1985a. Riparian community type classification of eastern Idaho-western Wyoming. USDA Forest Service, Intermountain Region. R4-Ecol-85-01. Ogden, UT. 78 pp.

Appendix III. Photos of selected plots of Fort Donelson National Battlefield





Plot 3 at Fort Donelson National Battlefield



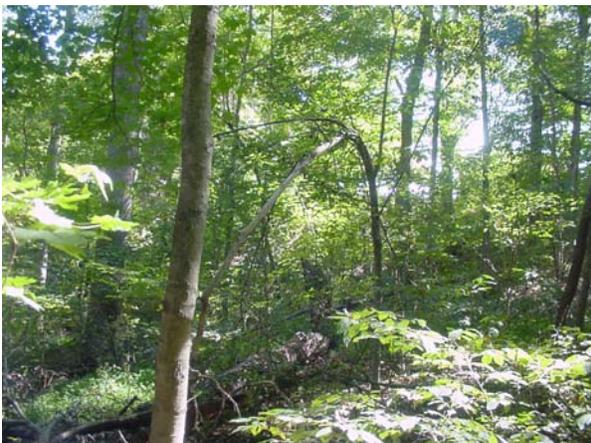
Plot 6 at Fort Donelson National Battlefield



Plot 8 at Fort Donelson National Battlefield



Plot 10 at Fort Donelson National Battlefield



Plot 11 at Fort Donelson National Battlefield



Plot 14 at Fort Donelson National Battlefield



Appendix IV. Key to EcoGroups and Ecological Communities of Fort Donelson National Battlefield.



This key was developed for Fort Donelson National Battlefield and is intended to allow field workers and naturalists to quickly identify community types while in the field. Due to the small size of the park and the limited habitat types available within the park boundary, this key does not cover all of the ecosystems of the adjacent region. However, within the boundary, we believe this key represents the range of variation of existing vegetation.

The document is structured like a dichotomous key. The user must make a series of choices based on the structure, composition, and environment of the vegetation to arrive at the correct association. If the key leads to a choice that is not reasonable, consider returning to the beginning of the key and reviewing your decisions to confirm that you are confident in all your choices. It may be useful to walk around the area in question to get a feel for the composition of the area. This exercise may help you arrive at the correct place in the key since small-scale variations within a matrix community may be misleading. In addition, ecotones between ecological communities may have traits of both communities and so may need to be classified as both communities.

Where appropriate, the name of the NatureServe Ecological Group appears in [brackets]. The EcoGroup is a broader concept than the association level, so similar communities may fall out in one ecogroup. The full association name and code (e.g. CEG002591) appears alongside an underlined title of the type. The CEG code may be used to refer back to the document or to look association names and information up in other references that use the National Vegetation Classification. The “common name” of the community also appears with the scientific name of the association.

**[ALL CAPS AND BRACKETS]** signifies an ecological system.

**Bold faced words** signify an NVC ecological community type.

*Italics* signify a community type that hasn't been documented with a plot, but that we suspect is in the park based on past studies.

I.Successional upland communities regenerating after heavy human disturbance (usually clearcutting or mowing or flooding from lake impoundment) 1-50 years ago.

[HUMAN MODIFIED/SUCCESSIONAL]

A.Upland

1.Old field (<20% canopy cover)

a.Old field mostly dominated by broomsedge and other native plants (<50% cover of non-natives such as fescue. Caution: broomsedge is more visible in late fall and early spring before mowing and less visible during the summer growing season.

**Successional Broomsedge Vegetation (4044)**

b.Old field mostly dominated by non native plants, esp. fescue (usually at least 50% non-native plants).

**Cultivated Meadow (CEGL004048)**

2.Young upland forest or shrubland or woodland succeeding into forest vegetation and dominated by usually even aged stands of redcedar, tuliptree, sweetgum, pine, or other species considered early successional.

a. Forest canopy dominated by tuliptree or occasionally walnut, hackberry, or elm.

**Successional Tuliptree/Redbud Forest (CEGL007220)**

b. Canopy not dominated by tuliptree, but instead dominated by conifers or sweetgum.

1. Either a forest or shrubland dominated by conifers (at least 50% of canopy)

a. Canopy dominated by redcedar (>50% canopy cover of cedar)

**Red-cedar Successional Forest (CEGL007124)**

b. Canopy dominated by loblolly pine (>50% pine in canopy)

**Loblolly Pine / Tuliptree – Sugar Maple Successional Forest (CEGL007105)**

2. Canopy dominated by a combination of sweetgum and oak (usually sweetgum is at least 50% of canopy) – don't confuse with lowland successional sweetgum in floodplains!

**Interior Successional Sweetgum - Oak Forest (CEGL007217)**

**B. Wetland**

1. Herbaceous dominated mudflat (<20% woody cover) inundated by fluctuating levels of the impoundment for much of the year.

[HUMAN MODIFIED/SUCCESSIONAL]

**Tennessee Valley Impoundment Mudflat (CEGL004049)**

2. Shrubland/forest (>20% woody cover) only inundated for short periods of time each year.

a. Dominated by black willow shrubs/trees (>50% cover of willow trees/shrubs combined)

[SOUTH-CENTRAL INTERIOR LARGE FLOODPLAIN]

**Black Willow Riparian Forest (CEGL002103)**

b. Dominated by trees other than willow (<50% cover of willow)

1. Dominated by sweetgum (>50% cover of sweetgum in canopy/shrub layer) but sometimes also with high cover of tuliptree (up to 50% of canopy)

[SOUTH-CENTRAL INTERIOR SMALL STREAM AND RIPARIAN]

**Successional Sweetgum Floodplain Forest (CEGL007330)**

2. Canopy not dominated by sweetgum or tuliptree. Young bottomland hardwood forest usually with a diverse canopy that may be dominated or co-dominated by sycamore, boxelder, elm, ash, hackberry. Usually >10% sycamore and >10% boxelder. Silver maple is usually dominant, but may not be present in some examples of this type.

[SOUTH-CENTRAL INTERIOR LARGE FLOODPLAIN]  
**Sycamore-Silver Maple Calcareous Floodplain Forest  
(CEGL007334)**

II. Upland and wetland communities not subjected to human caused cutting or mowing over the last 50 years (although possibly were cultivated >50 years ago and are second growth stands). Either oak-hickory or beech-oak forests or stands influenced by flooding.

A. Wetland

Bottomland hardwood forest usually with a diverse canopy that may be dominated or co-dominated by sycamore, boxelder, elm, ash, hackberry. Usually >10% sycamore and >10% boxelder. Silver maple may or may not be present.

[SOUTH-CENTRAL INTERIOR LARGE FLOODPLAIN]

**Sycamore-Silver Maple Calcareous Floodplain Forest (CEGL007334)**

B. Upland forest

1. Beech or white oak/beech forest (beech at least 25% of canopy coverage).

[SOUTH-CENTRAL INTERIOR MESOPHYTIC FOREST]

**Central Interior Beech - White Oak Forest (CEGL007881)**

2. Oak forest with <25% beech in canopy.

[SOUTHERN INTERIOR LOW PLATEAUDRY OAK FOREST]

a. Canopy dominated by white oak and sometimes northern red oak (>50% white oak and/or northern red oak, <25% southern red oak) Mesic/dry-mesic side slopes up to and sometimes including ridgetops with white oak (>50% white oak) and shagbark hickory (*Carya ovata*). Shrub layer and herbaceous layer is sparse to rich and generally has a circumneutral component. >25% cover of redbud and/or pawpaw and/or spicebush in shrub layer. Beech can often dominate understory.

**White Oak - Mixed Oak Dry-Mesic Alkaline Forest (2070)**

b. Dry-mesic forest of slopes and only occasionally ridgetops. Canopy usually with >50% cherrybark oak (*Quercus pagoda*) plus red hickory *Carya ovalis* combined (and occasionally with >50% coverage of southern red oak. Other trees often present in high amounts include shingle oak (*Quercus imbricaria*, northern red oak, Shumard oak (*Quercus shumardii*), chinquapin oak (*Quercus muehlenbergii*). Shrub layer often has a significant component of ironwood (*Carpinus caroliniana*).

**Central Interior Upland Cherrybark Oak Forest (CEGL003871)**