VASCULAR PLANT COMMUNITY CLASSIFICATION FOR

STONES RIVER 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
October 2004

NatureServe is a non-profit organization providing the scientific knowledge that forms the basis for effective conservation action.

A NatureServe Technical Report
Prepared for the National Park Service under Cooperative Agreement H 5028 01 0435.

Citation:
Nordman, Carl. 2004. *Vascular Plant Community Classification for Stones River National Battlefield.* Durham, North Carolina: NatureServe.

NatureServe
6114 Fayetteville Road, Suite 109
Durham, NC 27713
919-484-7857

International Headquarters
1101 Wilson Boulevard, 15th Floor
Arlington, Virginia 22209
www.natureserve.org

National Park Service
Southeast Regional Office
Atlanta Federal Center
1924 Building
100 Alabama Street, S.W.
Atlanta, GA 30303

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

Cover photo: STRI plot 13, the Slaughter Pen. Photo by Carl Nordman.

Acknowledgments

I wish to thank all park employees, co-workers, volunteers, and academics who helped with aspects of the preparation, fieldwork, specimen identification, and report writing for this project.

Gib Backlund and Terri Hogan at the Stones River National Battlefield were especially helpful when we were getting started, and with information needs during the project. Their knowledge of the battlefield and its current and past natural resource management were very helpful. Terri Hogan was also very helpful to us in the field. Kyle Hurt and Dwayne Coleman's field assistance enabled us to complete more fieldwork.

Claude Bailey and Roger McCoy of the Tennessee Division of Natural Heritage formed a separate field team. They collected numerous plants new to Stones River National Battlefield. Having been botanist for the Tennessee Division of Natural Heritage for a number of years, I was happy to have a chance to work with Claude and Roger again on this project.

Phyllis Jackson of the University of Georgia, Center for Remote Sensing and Mapping Science (CRMS) worked on vegetation mapping for Stones River National Battlefield. She was helpful to us in the field and in her thoughtful comments on the National Vegetation Classification for Stones River National Battlefield. She was also especially helpful in pointing out areas of various vegetation types, which needed to be documented at Stones River National Battlefield.

This report was prepared for Stones River National Battlefield in cooperation with the Inventory and Monitoring Division of the Cumberland/Piedmont Network, National Park Service, Department of the Interior. Teresa Leibfreid of the network provided logistical help throughout the year while supporting the project in an encouraging, thoughtful manner. In addition, Sammi Jo Doyle expertly transferred our data into the correct format for the database NPSpecies.

Staff at the University of North Carolina – Chapel Hill Herbarium were especially helpful, patient, and considerate. Erin Lunsford proofed our plant specimens for identification mistakes and mounted most of the specimens in the collection. Assistant Curator Carol Ann McCormick supplied all the necessary tools for identification (rulers, magnifying lenses, parking permits, coffee). Curator Alan Weakley contributed time in helping with the most challenging plant identification issues.

Finally, we thank the entire NatureServe South team for their support throughout the project. Judy Teague used her invaluable ArcView skills to provide us with all plot locations and maps needed to complete the project. Mary Russo entered and managed the plot and species data. All members of the team contributed a great deal to the final product.

Table of Contents

Acknowledgments ..... **iii**

Summary **1**

Introduction **2**

- **Study Area** **2**
- **Land History** **3**

Methods **4**

- **Permanent plot establishment** **4**
- **Vegetation classification** **5**
- **Vascular plant inventory** **5**
- **Vegetation mapping** **6**

Results **7**

Discussion/Conclusions **9**

- **Species Inventory** **9**
- **Vegetation community analysis** **10**
- **Ecological Community Summary** **24**
- **Overview** **25**

Literature Cited **26**

List of Figures

Figure 1a. Map of Stones River National Battlefield with all permanent points marked at their actual locations. 30

Figure 1b. Map of Stones River National Battlefield Artillery Monument with all permanent points marked at their actual locations. 31

Figure 1c. Map of Stones River National Battlefield Main Park with all permanent points marked at their actual locations. 32

Figure 1d. Map of Stones River National Battlefield Redoubt Brannan / Fortress Rosecrans with all permanent points marked at their actual locations. 33

Figure 2. Species area curves for Stones River National Battlefield 34

List of Tables

Table 1. Plot numbers and locations for all permanent plots established at Stones River National Battlefield..... 35

Table 2. List of all plants documented for park ordered alphabetically by scientific name. 36

Table 3. List of vouchers that were collected at Stones River National Battlefield..... 57

Table 4. Tables of vascular plant diversity measures and species total estimates..... 60

Table 5. Association numbers, plot numbers, Ecological Systems, and global ranks of all associations identified at Stones River National Battlefield. 61

Table 6. Plot photo names and photo descriptions for Stones River National Battlefield..... 63

Appendices

Appendix 1 - Example field form
Appendix 2 - National Vegetation Classification for Stones River National Battlefield
Appendix 3 - Plot photos
Appendix 4 - Key to the NVC Associations for Stones River National Battlefield

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. The NatureServe team established a baseline for Stones River National Battlefield in three ways:

1) Ecologists from NatureServe and the Tennessee Natural Heritage Program established eleven permanently marked one-hectare circular plots within the park in a grid system and another five one hectare circular plots in ecological areas that were not covered by the initial grid-based plot layout. These 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 unique vegetation communities within the park and identified fifteen natural, four successional, and three exotic plant dominated vegetation associations within the park boundary. Each vegetation association is "a plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy"(Grossman, et. al., 1998). The four vegetation associations, which are part of the Nashville Basin Limestone Glade ecological system, warrant special attention due to their relatively high global rank/rarity. The Southern Interior Low Plateau Dry Oak Forest (three vegetation associations) also warrants special attention for the same reason. Together these seven associations constitute all the natural non-successional upland vegetation associations present at Stones River National Battlefield.
3) Ecologists collected and vouchered 34 new species to add to the list of species generated by Theresa L. Hogan and Michele Webber. We now count 615 documented species, varieties, or subspecies of vascular plants in the park (611 species). We estimate that over 90% of the vascular flora of the park is now documented. Species of note include the many rare or endemic cedar glade plants.

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 July 2002, NatureServe began work on the vascular plant inventory portion of the project at Stones River National Battlefield.

Although Stones River National Battlefield is known for its historic importance in the Civil War, the park contains significant natural resources, especially in its limestone cedar glades. The research emphasis here, however, has traditionally focused on the human history of the land. Theresa L. Hogan and Michele Webber began the floristic study in 1997. Additional collections have been made since that time. 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, NatureServe, 2004).
3) Collect any species found in plots that were not already collected by Theresa L. Hogan or Michele Webber.

NatureServe also worked with Phyllis Jackson, photointerpreter from the University of Georgia Center for Remote Sensing and Mapping Science (CRMS) to complete a vegetation map of all of the communities in the park.

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

Stones River National Battlefield is located on the outskirts of Murfreesboro, Tennessee. It preserves part of the site of a major Civil War battle, which took place on December 31, 1862 and January 2, 1863. In the Battle of Stones River, there were nearly 24,000 casualties. The main unit of Stones River National Battlefield, and the Artillery Monument site preserve important parts of the original battlefield. After the battle, Confederate forces withdrew, leaving

Mufreesboro and the important railroad from Nashville to the Federals. During the first half of 1863 Fortress Rosecrans was built (NPS 2000). It was a huge fortified depot, built to supply the Union's advance to Chattanooga. The Redoubt Brannan and Fortress Rosecrans units of Stones River National Battlefield preserve two small parts of what was the 200-acre Fortress Rosecrans site. Most of the area that was Fortress Rosecrans and much of the original Civil War battlefield is on private land, which is now developed.

The Stones River National Battlefield site is approximately 300 hectares (700 acres). The park has a diversity of soils derived from Ordovician limestone; a type of limestone that frequently occurs as outcrops. There are 19 soil types within the park, from the shallow, rocky, dry soil of limestone cedar glades to deeper, rich floodplain soils by the West Fork Stones River (Hogan and Webber 1999). There are a variety of forest types on the uplands and bottomlands. Nashville Basin limestone glades on the Main Park are characterized by grassy openings, with a shrub-dominated edge. In addition to native glades, there are cultivated fields. The National Cemetery has a maintained lawn and many ornamental trees and shrubs. All of the Stones River National Battlefield is within the watershed of the West Fork Stones River. Elevation ranges from approximately 525 feet at the West Fork Stones River in the northwest part of the Artillery Monument to approximately 595 feet along the west part of the Loop Road on the Main Park and approximately 595 feet along the ridge at the Fortress Rosecrans site.

Stones River National Battlefield occurs in the Inner Nashville Basin Subsection of the Interior Low Plateau, Highland Rim Section (Keys, et al 1995) of the Eastern Broadleaf Forest (Continental) Province (Bailey 1994). The West Fork Stones River is a tributary of the Stones River and Cumberland River. It has characteristics typical of the Inner Nashville Basin, including the frequent outcropping of Ordovician limestone. It is a small to medium sized river with a floodplainthat varies in width.

Stones River National Battlefield is in Rutherford County, Tennessee. Rutherford County's climate consists of mild wet winters and hot dry summers. There is no climate station on site, but records from the area show that the mean annual temperature is 60 degrees F. The average rainfall is 48 to 52 inches annually (Springer and Elder 1980), and the annual snowfall averages 6.2 inches.

Land History

Stones River National Battlefield was established in 1927 to preserve parts of the Civil War battlefield and earthworks on the site (Hogan and Webber 1999). The land upon which the park is located was settled earlier in the 19th century. Tillable land was farmed. Areas where the soil was too thin and rocky to farm were maintained as "cedar brakes" or were used as hog lots. (Hogan and Webber 1999). Parts of Stones River National Battlefield were logged for cedar numerous times prior to the establishment of the national park. The Nashville Basin limestone glades at Stones River National Battlefield are an important natural resource and have been a focus of conservation and management activities.

Methods

The inventory and monitoring project covers four main areas: permanent plot establishment for future research in the park, a vegetation classification of all the vegetation associations within the park according to the National Vegetation Classification (Grossman et al. 1998, NatureServe 2004), a vascular plant inventory within the park boundary that builds upon the existing plant list for the park, and a cooperative relationship with the mapping team from the University of Georgia to assure that the vegetation communities within the park are mapped in accordance with National Park Service standards.

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, an evenly spaced grid system was established (we chose the approximate grid size of 530 meters by 530 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 slopes and bottomlands near the West Fork Stones River. 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 the summer of 2002 and the spring of 2003, we established eleven plots on the grid system and an additional five plots off of the grid in habitats not covered by any of the grid points (Figure 1). Using the GPS units (Garmin Corp. 1999), we attempted to position ourselves within at least five meters of the "real" map location (the hypothetical location that we created in the lab prior to visiting the site). Once we were within five meters, we monumented each plot with a one foot long piece of steel conduit and a small blue anodized aluminum tag with a distinctive number attached to an adjacent distinctive tree. General written directions to each permanent plot exist on the vegetation plot sheets filled out during the course of fieldwork and can also be found in the Access database archive of plot information held by the National Park Service. Due to variation in signal strength, accuracy may be more than five meters in some cases. In 2002 and 2003, we recorded additional data at each point and worked in other locations as part of the vegetation mapping work.

Vegetation classification

After the establishment of each permanent one-hectare plot, we visually surveyed the area. We chose a representative and relatively homogenous 20 by 50-meter section of the hectare in which to place our standardized vegetation monitoring plot. Within the plot, we measured environmental characteristics and identified every vascular plant within the plot (see Appendix 1 for a blank version of the data sheets used). We assigned each species a cover value by strata and an overall cover value for the plot based on a modified Braun Blanquet cover class scale. In addition, we searched for and identified any species within the full hectare that were not represented in the 20 by 50-meter sample. Finally, we returned in the spring of 2003 to resample the plots to attempt to document any species that we had missed the previous summer. The original plot sheets are archived. Please contact the archivist or resource manager at the park for details and specific plot locations.

We proofed the plot sheets, entered the data into the National Park Service PLOTS database, and assigned each plot to an association based on floristic composition and environmental factors using the National Vegetation Classification (Anderson et al. 1998, Grossman et al. 1998, NatureServe 2004). We compared the plots with similar plots in other parks 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 for Stones River National Battlefield. We collected any new specimens encountered within the plots and recorded the GPS coordinates using our Garmin GPS unit. We pressed and thoroughly dried all specimens, identified any unknowns that could be identified, and then vouchered all new species according to National Park Service standards using the Integrated Taxonomic Information System (ITIS) as the naming standard.

Although we were not asked to do a complete inventory of the entire park, we still hoped to use the data we collected to assess how complete the vascular plant list was in this park. 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.

Vegetation mapping

In 2003, we returned to Stones River National Battlefield to follow-up on the first three goals and to cooperate with the University of Georgia Center for Remote Sensing and Mapping Science on their project to map all vegetation communities in the park. We supplied Phyllis Jackson from the University of Georgia with plot data and a dichotomous key to the National Vegetation Classification (NVC) associations of the park and we walked throughout the park to help identify mapping units. Since photointerpreters rely heavily on canopy species composition, understory species composition, and disturbance to classify polygons and ecologists also rely on the shrub and herb layer to classify types, the mapping units and the vegetation classification units do not always crosswalk or match up perfectly. The last step of the project was to reconcile mapping units with vegetation associations to produce mapping units that match up well with the ecological units of the National Vegetation Classification (NVC). We continue to work with Phyllis Jackson of the University of Georgia on the mapping; the vegetation map will be produced separately by the Center for Remote Sensing and Mapping Science and will include any crosswalk as specified in the cooperative agreement.

Results

During the species inventory work, we encountered and collected specimens (Tables 2,3) of 34 species that had not been confirmed previously from the park. We created 34 vouchers for the herbarium at Stones River National Battlefield (Table 3) from the plants we collected and photographed. These specimens are in addition to plants collected since 1997 by Theresa Hogan and Michele Webber under a separate project.

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 and taxa observed and documented but not collected, researchers have documented 611 species for the park. We estimated the total number of plant species in the park using PC-ORD software. Based on the plot data taken throughout the park, the estimates of the total number of plant species were 630 using all 17 full plots and the first-order jackknife method, and 711 using all 17 plots and the second-order jackknife method. Using just the eleven gridded plots and the first-order jackknife method we estimated 514 species, and using just the eleven gridded plots and the second-order jackknife method (Table 4) we estimated 600 species. 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 80.5, the beta value was 5.7, and the gamma value was 462.

Using the information gathered in each plot, we attributed plots to National Vegetation Classification alliances and associations. These are the two finest-scale units of vegetation communities in NatureServe's National Vegetation Classification (NVC), and are referred to as the floristic units of the National Vegetation Classification (NatureServe 2004). Attributions of plots were generally made first to the alliance level, then to an association (the finest unit) within that alliance. This was done based on the similarities between the species composition, dominant species, physical environment and geographic location of the plot and those same aspects of the described alliance and association. Edits were made to the descriptions of associations based on the new and detailed information from these plots. Four distinct ecological systems were determined to be present at Stones River National Battlefield (Table 5). They are the Southern Interior Low Plateau Dry Oak Forest, South-Central Interior Small Stream and Riparian, South-Central Interior Large Floodplain, and Nashville Basin Limestone Glade. These are part of NatureServe's standard Classification of Ecological Systems (NatureServe 2004). The attribution of plots to ecological systems was done following the existing attributions of described associations to ecological systems. Twenty distinct vegetation associations were identified, as defined by the United States National Vegetation Classification (Table 5) (NatureServe 2004). Thirteen of the identified vegetation associations are considered natural. One of these (Floating Water-primrose Aquatic Marsh) occurs only at Stones River National Battlefield in a man-made pond. The other twelve of these natural associations (Table 5), are each represented by one of the four ecological systems found at Stones River National Battlefield (Comer, et al. 2003). Four associations are considered successional, and three associations are exotic species dominated. The eight associations which are early successional, occur in a man-made pond or are exotic species dominated are not represented by an ecological system unit.

The common names of all of the communities are as follows (* indicates a natural association), the codes following the common names are NatureServe's Global Community Element Codes:

Red-cedar Successional Forest (CEGL007124)
Nashville Basin Sugarberry, Northern Hackberry Successional Forest (CEGL004697)
Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest (*) (CEGL003876)
Interior Low Plateau Chinquapin Oak - Mixed Oak Forest (*) (CEGL007699)
Interior Plateau Chinquapin Oak - Shumard Oak Forest (*) (CEGL007808)
Southern Interior Box-elder Riparian Forest (*) (CEGL004690)
Southern Green Ash - Elm - Sugarberry Forest (*) (CEGL002427)
Black Willow Riparian Forest (*) (CEGL002103)
Chinese Privet Upland Shrubland (CEGL003807)
Chinese Privet Temporarily Flooded Shrubland (CEGL003837)
Carolina Willow Shrubland (*) (CEGL003899)
Central Basin Limestone Glade Margin Shrubland (*) (CEGL003938)
Blackberry – Greenbrier Successional Shrubland Thicket (CEGL004732)
Successional Broomsedge Vegetation (CEGL004044)
Cultivated meadow (CEGL004048)
Central Limestone Glade (*) (CEGL005131)
Water-willow Rocky Bar and Shore (*) (CEGL004286)
Floating Water-primrose Aquatic Marsh (*) (CEGL007835)
Limestone Annual Grass Glades (*) (CEGL004340)
Interior Low Plateau Limestone Glade Ephemeral Pool (*) (CEGL004346)

While working in the park, we also captured digital images of plots and plants. These images are indexed (Table 6) and a selection of them can be seen in Appendix 3.

Finally, we have included the key to associations (Appendix 4). This tool helps those with a basic understanding of plant communities to classify vegetation associations within Stones River National Battlefield quickly and easily.

Discussion/Conclusions

Species Inventory

The fieldwork from this project added over 30 species to the list of species already known to be present within Stones River National Battlefield (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 514 to 711. Excluding varieties, subspecies, and unidentifiable collections, researchers past and present have confirmed 611 species within the park. First-order jackknife estimates often underestimate number of species as evidenced by the lowest estimate in our first-order jackknife, whereas second-order jackknife estimates often overestimate the number of species (McCune and Grace 2002). Using only the gridded plots we estimated that between 102% and 119% of the species in the park had been documented. Using all of the plot data (Figure 2), we found that between 86 and 97% of the species in the park have been documented. Based on our own knowledge of the park and our belief that we have supplemented well the work of Theresa Hogan and Michele Webber, we feel that over 90% of the vascular flora of the park is documented. These numbers should only be used as an estimate, since tests of these indices have shown even the best ones to routinely underestimate the number of species in a park. Since we did sample systematically and without bias, we most likely have a more accurate number than if we had sampled only in areas that were of similar vegetation or only focused on particular parts of the park (Palmer 1990, McCune and Grace 2002).

Stones River National Battlefield supports a concentration of rare plant species, most of which are part of the Nashville Basin Limestone Glade ecological system. The glade rare plant species indigenous to the National Battlefield include Tennessee milk-vetch (*Astragalus tennesseensis*), Limestone fameflower (*Talinum calcaricum*), Evolvulus (*Evolvulus nuttallianus*), and Glade-cress (*Leavenworthia exigua* var. *exigua*). There are a number of occurrences of these rare plants within the park boundary (Hogan and Webber 1999). In addition, two federally listed endangered plants occur at Stones River National Battlefield. These are Pyne's ground-plum (*Astragalus bibullatus*) and Tennessee coneflower (*Echinacea tennesseensis).* Both occur at Stones River National Battlefield as the result of successful reintroductions. These two plant species were not known to occur on the National Battlefield prior to the reintroductions. There are four planted colonies of Tennessee coneflower (*Echinacea tennesseensis*), all located in the central portion of the Main Park (Hogan and Webber 1999). The largest colony, the Original Colony, contained over 3000 individuals, with nearly 500 flowering in 1997 (Hogan and Webber 1999). These colonies have become more important for conservation as they have thrived and many natural occurrences in the area have been lost to private development. The Pyne's ground-plum (*Astragalus bibullatus*) was planted more recently and there are not very many individuals of it that have persisted. The protection and management of rare plants at Stones River National Battlefield provides an important part of regional conservation efforts. Rutherford County is very rapidly growing and developing, so the relative importance of the rare plants at Stones River National Battlefield will continue to increase.

Of the 507 plant species or lesser taxa documented in the National Battlefield in 1999, 141 or 28% were cultivars or introduced species (Hogan and Webber, 1999). Exotic species associated with homesites can be found throughout the Main Park, and some of the battlefield's most aggressive exotic species are found here (Hogan and Webber 1999). Of the introduced (non-native) species present, 44 are considered to be invasive by the Tennessee Exotic Pest Plant Council (TN-EPPC, 2001). Eighteen of these are considered a severe threat (Table 2), noted as EPPC-1. In addition 20 more are considered to be a significant threat (Table 2) and are noted as EPPC-2. Twelve more are considered a lesser threat (Table 2) and are noted as EPPC-3, and 4 more are on the Watch List A (TN-EPPC, 2001). Invasive plant management efforts should be focused on those 38 species considered to be a severe or significant threat. These species found within the park are considered aggressive or potentially aggressive invasive species that are outcompeting and replacing native species in other parts of the Southeast or even within the park (Hogan and Webber 1999). The exotic pest plant species listed as severe threat are probably the biggest single threat to the overall ecological health of the park at this point in time. Among these the successful control of Kudzu (*Pueraria montana* var. *lobata*) at Fortress Rosecrans can be considered a major natural resource management success. In the interior woods and forests, shrubs and vines such as Amur honeysuckle (*Lonicera maackii*), Japanese honeysuckle (*Lonicera japonica*), Climbing euonymus (*Euonymus fortunei*), Common or European privet (*Ligustrum vulgare*), and Chinese privet (*Ligustrum sinense*) all have begun to colonize areas of the understory. Much of the floodplain of the West Fork Stones River that runs through the park, is heavily dominated by Chinese privet (*Ligustrum sinense*). In fields and newly cleared areas, Johnson grass (*Sorghum halepense*), and Sericea lespedeza (*Lespedeza cuneata*) have colonized areas and seem to be expanding in cover over time. Other species may need management and/or monitoring attention to ensure that they are not spreading. Also known from the park and listed as severe threat by the Tennessee Exotic Pest Plant Council are Tree-of-heaven (*Ailanthus altissima*), Silktree (*Albizia julibrissin*), Garlic mustard (*Alliaria petiolata*), Chinese yam (*Dioscorea oppositifolia*), Thorny olive (*Elaeagnus pungens*), English ivy (*Hedera helix*), Sweet breath of spring (*Lonicera fragrantissima*), Nepalese browntop (*Microstegium vimineum*), Princess tree (*Paulownia tomentosa*), and Multiflora rose (*Rosa multiflora*). 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. Certain plants listed as sgnificant threat (Table 2) may also warrant management or control efforts. Among these are Nodding thistle (*Carduus nutans*), and Crown vetch (*Coronilla varia*).

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 2 can be very useful as a management and monitoring tool for the parks. Once identified to the association level, it is possible for land managers on a local scale to use the ecological community information gathered by researchers throughout the association's range to make more informed decisions about how to manage locally. In addition to the information contained in Appendix 2, we have included the NatureServe ecological system to which each association belongs. Ecological systems represent recurring groups of biological

communities that are found in similar physical environments and are influenced by similar dynamic ecological processes, such as fire or flooding. These are practical, mid-scale ecological units designed to inform conservation and resource management decisions. (Comer, et al. 2003). Also included are global and local descriptions 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:

Red-cedar Successional Forest (CEGL007124)

At Stones River National Battlefield, this association occurs in areas where cedar dominates and historically has been periodically cut and harvested. These are edges of fields and old pastures, which have grown up. Soils are rocky and influenced by limestone, probably too rocky to have been plowed.

Stands are dominated by Eastern red-cedar (*Juniperus virginiana var. virginiana*) in the canopy and sub-canopy. Shagbark hickory (*Carya ovata)* and Carolina shagbark hickory *(Carya carolinae-septemtrionalis)* and important in the canopy at Stones River (pers. com., Phyllis Jackson). Osage orange (*Maclura pomifera*) which is native to Arkansas but not Tennessee, Northern hackberry (*Celtis occidentalis),* Sugarberry (*Celtis laevigata),* Willow oak *(Quercus phellos),* Chinquapin oak *(Quercus muehlenbergii),* Shumard oak *(Quercus shumardii),* Honey locust (*Gleditsia triacanthos),* and White ash (*Fraxinus americana*) also can occur in the canopy or sub-canopy. Shrubs include Eastern red-cedar (*Juniperus virginiana var. virginiana)* and Coralberry *(Symphoricarpus orbiculatus),* in addition to the exotic plants Chinese privet *(Ligustrum sinense)* and Amur honeysuckle (*Lonicera maackii).* Virginia creeper (*Parthenocissus quinquefolia),* Poison ivy (*Toxicodendron radicans),* and the exotic vine Japanese honeysuckle *(Lonicera japonica)* are common vining across the ground (in the low shrub stratum). The most abundant herbaceous plants are the exotics Sericea lespedeza (*Lespedeza cuneata),* Beefsteak plant (*Perilla frutescens),*and Nepalese browntop (*Microstegium vimineum).* Beggars-ticks (*Bidens bipinnata)* and Canada leafcup (*Polymnia canadensis)* are common native herbaceous plants.

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.

Nashville Basin Sugarberry, Northern Hackberry Successional Forest (CEGL004697)

At Stones River National Battlefield, this association is found along old fencerows, at old homesites, and other upland areas, which have been disturbed and are grown up.

The canopy is dominated by Sugarberry (*Celtis laevigata)* with White ash (*Fraxinus americana)* and Slippery elm (*Ulmus rubra).* Important subcanopy trees are Eastern red-cedar (*Juniperus virginiana var. virginiana)* with <25% cover, Sugarberry *(Celtis laevigata),*Winged elm *(Ulmus alata),*White ash *(Fraxinus americana),* Sugar maple *(Acer saccharum var. saccharum)* and Northern red oak (*Quercus rubra).* Important shrubs are Eastern red-cedar (*Juniperus virginiana var. virginiana)* with <25% cover, Sugarberry *(Celtis laevigata),* Winged elm (*Ulmus alata),* Staghorn sumac (*Rhus typhina),* Fragrant sumac (*Rhus aromatica)* and the exotic species Amur honeysuckle (*Lonicera maackii),* Japanese honeysuckle (*Lonicera japonica),* European privet (*Ligustrum vulgare),* and Osage orange (*Maclura pomifera),* which is native to Arkansas, but not Tennessee. Ebony spleenwort (*Asplenium platyneuron)* is a common fern. Vines include Japanese honeysuckle (*Lonicera japonica)* and Supplejack (*Berchemia scandens).* This vegetation was documented from one plot, but was observed elsewhere on Stones River National Battlefield. Black walnut (*Juglans nigra)* was not found in the plot, but was part of this

association elsewhere at Stones River National Battlefield. Ohio buckeye (*Aesculus glabra)* occurs infrequently at Stones River, it may be present in some examples of this type there.

This is a second-growth forest of woodlots and fencerows. Despite its distinctive composition, it is not an element of conservation concern.

Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest (*) (CEGL003876)

This forest is found in small patches on flat to rolling uplands on Stones River National Battlefield. It occurs on rich soils derived from Ordovician limestone with a small amount of limestone at the surface as small rocks. The area where this is documented may have karst features.

The canopy of this forest is dominated by Shingle oak (*Quercus imbricaria)* and Chinquapin oak (*Quercus muehlenbergii)* with Post oak (*Quercus stellata),* and Shumard oak *(Quercus shumardii)* also as important canopy trees. Southern red oak (*Quercus falcata),* White ash *(Fraxinus americana),* Shagbark hickory *(Carya ovata),* and Black cherry (*Prunus serotina)* are less important but may be present in the canopy. Sugarberry (*Celtis occidentalis),* Osage orange (*Maclura pomifera),* and Eastern red-cedar (*Juniperus virginiana* var. *virginiana)* are present in the understory. Coralberry (*Symphoricarpus orbiculatus*) and Virginia creeper *(Parthenocissus quinquefolia)* are important low shrubs. Dwarf stinging nettle (*Urtica chamaedryoides),* Canada leafcup *(Polymnia canadensis),* Common chickweed *(Stellaria media),* and Purple-rocket *(Iodanthus pinnatifidus)* are present in the herbaceous layer.

This association is considered to be rare globally (Global Rank is G3?). The range is probably limited to the Interior Low Plateau of Tennessee and Bluegrass of Kentucky. In the Nashville Basin (where it is known), upland forests remain mostly in small stands, threatened by development pressures and invasion by the exotic plants Japanese honeysuckle (*Lonicera japonica)* and Amur honeysuckle (*Lonicera maackii).* This type is limited to an area where the nominal species (those used in the name) all occur.

Interior Low Plateau Chinquapin Oak - Mixed Oak Forest (*) (CEGL007699)

At Stones River National Battlefield, this association occurs as rocky woods over limestone, which are flat to gently sloping.

This vegetation at Stones River National Battlefield is usually dominated by Post oak (*Quercus stellata*), Shagbark hickory (*Carya ovata),* and Carolina shagbark hickory (*Carya carolinae-septentrionalis*) (pers. com., Phyllis Jackson) or dominated by Chinquapin oak (*Quercus muehlenbergii),* Slippery elm (*Ulmus rubra),* and White ash (*Fraxinus americana)* in the canopy. The sub-canopy is dominated by Northern hackberry (*Celtis occidentalis),* Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* Slippery elm (*Ulmus rubra),* and Winged elm (*Ulmus alata).* The tall shrub stratum is dominated by Red mulberry (*Morus rubra),* Northern hackberry (*Celtis occidentalis),* and Redbud *(Cercis canadensis),* with Chinese privet (*Ligustrum sinense)*

an invasive exotic shrub. The short shrub stratum is dominated by Coralberry (*Symphoricarpus orbiculatus)* with the invasive exotic vine Japanese honeysuckle (*Lonicera japonica).* Virginia creeper (*Parthenocissus quinquefolia)* is an important native climbing vine.

Examples of this association in Tennessee's Nashville Basin occur in areas of rapid human population growth, and remaining unprotected examples are threatened by timber removal and land conversion. This association is considered to be rare globally (Global Rank is G3). Kentucky examples are more scattered in several regions of the state, but many are small examples on isolated ridges. Some are found within the proclamation boundaries of the Daniel Boone National Forest but may lack protection.

Interior Plateau Chinquapin Oak - Shumard Oak Forest (*) (CEGL007808)

At Stones River National Battlefield this association occurs as rocky upland woods over limestone, which are flat to gently sloping.

The forest canopy is dominated by Chinquapin oak (*Quercus muehlenbergii)* and Shumard oak (*Quercus shumardii)* with Shagbark hickory (*Carya ovata),* Carolina Shagbark hickory (*Carya carolinae-septentrionalis),* Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* and Sugarberry (*Celtis laevigata).* Other canopy species include Northern hackberry (*Celtis occidentalis),* Post oak (*Quercus stellata),* Honey locust *(Gleditsia triacanthos),* White ash (*Fraxinus americana),* and Sugar maple (*Acer saccharum).* There are patches of 50% - 100% Shagbark Hickory (*Carya ovata)* in areas of this association. Sub-canopy trees include Chinquapin oak (*Quercus muehlenbergii),* Shumard oak (*Quercus shumardii),* Carolina shagbark hickory *(Carya carolinae-septentrionalis),* Eastern red-cedar *(Juniperus virginiana* var. *virginiana),* and Sugarberry (*Celtis laevigata).* Shrubs include Chinquapin oak (*Quercus muehlenbergii),* Carolina buckthorn (*Frangula caroliniana),* Stiff dogwood *(Cornus foemina),* Glade privet (*Forestiera ligustrina),* Winged elm (*Ulmus alata),* Golden St. John's-wort (*Hypericum frondosum),* Redbud (*Cercis canadensis),* Poison ivy (*Toxicodendron radicans),* Shumard oak (*Quercus shumardii),* Fragrant sumac (*Rhus aromatica),* Coralberry (*Symphoricarpus orbiculatus),* and the exotic species Amur honeysuckle (*Lonicera maackii),* Japanese honeysuckle (*Lonicera japonica),* Chinese privet (*Ligustrum sinense),* Common privet (*Ligustrum vulgare),* Climbing euonymus (*Euonymus fortunei),* and Tree-of-heaven (*Ailanthus altissima).* Ebony spleenwort (*Asplenium platyneuron)* is a common herbaceous fern.

This association is considered to be rare globally (Global Rank is G3). This oak-dominated forest association occurs in Alabama, Georgia, Kentucky, and Tennessee, on soils derived from limestones or other basic substrates, on upper to mid slopes. Some examples may be protected on TVA, Army Corps of Engineers, and U.S. Forest Service lands. It is documented from the Nashville Basin of Tennessee, the Ridge and Valley of Georgia, and the Cumberlands of Alabama. Most, if not all, high-quality examples have been eliminated or severely impacted by timber removal, grazing, soil erosion, and fire suppression. Other current threats include windthrow, microclimate modification from intensive silvicultural practices on adjacent uplands, forest type conversion, and herbicide use.

Southern Interior Box-elder Riparian Forest (*) (CEGL004690)

At Stones River National Battlefield this association occurs on the edge of the West Fork Stones River and on the narrow first floodplain terrace. The next terrace up has lots of Eastern red-cedar (*Juniperus virginiana* var. *virginiana).* A lot of bare, exposed soil was found here, due to flooding.

This forest is dominated by Box-elder (*Acer negundo)* with Silver maple (*Acer saccharinum),* and Green ash (*Fraxinus pennsylvanica)* also important in the canopy. Black walnut (*Juglans nigra)* and American elm (*Ulmus americana),* Slippery elm (*Ulmus rubra),* and Winged elm (*Ulmus alata)* are also found in the canopy, but are less common. The sub-canopy is dominated by Osage orange (*Maclura pomifera),* which is native to Arkansas, not Tennessee. The shrub strata are dominated by Chinese privet (*Ligustrum sinense),* an exotic. Nepalese browntop (*Microstegium vimineum)* is the dominant herbaceous species. It is an Asian annual grass. The common vines are Poison ivy (*Toxicodendron radicans),*Virginia creeper *(Parthenocissus quinquefolia)* and Chinese yam or Air-potato (*Dioscorea oppositifolia),* an exotic.

This is an early successional type, which has numerous, but poorly documented, occurrences. This is not considered a globally rare association (Global rank is G4). The rangewide occurrence of this type is complicated by the 'weedy' nature of Box-elder (*Acer negundo).* Decline has been moderate, primarily caused by disruption of the flooding regime by impoundments or by water withdrawals and interbasin transfers. The actual range of the type is probably greater than the data indicate. Many states do not track this vegetation as it is early successional. It may not be adequately distinguished in the data or the literature from the related (CEGL005033) type of larger rivers.

Southern Green Ash - Elm - Sugarberry Forest (*) (CEGL002427)

This association occurs on the higher part of the floodplain of the West Fork Stones River, at Redoubt Brannon and north of the Artillery Monument. This is a moderate sized river.

Dominant trees of this type at Stones River National Battlefield are American elm (*Ulmus americana),* Sugarberry *(Celtis laevigata),* Box-elder *(Acer negundo),* Northern hackberry *(Celtis occidentalis),* Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* Osage orange *(Maclura pomifera)* and Honey-locust (*Gleditsia triacanthos).* Other trees include Sycamore *(Platanus occidentalis)* and White ash *(Fraxinus americana).* There is a diversity of shrubs, including tree species not noted in the canopy or sub-canopy and several exotic shrubs. Common shrubs include Chinese privet (*Ligustrum sinense),* Northern hackberry *(Celtis occidentalis),* Black elder (*Sambucus nigra* ssp. *canadensis),* Bitternut hickory *(Carya cordiformis),* and Amur honeysuckle (*Lonicera maackii).* The vines; Poison ivy (*Toxicodendron radicans),* Virginia creeper *(Parthenocissus quinquefolia),* and Japanese honeysuckle (*Lonicera japonica)* are common. Prominent herbs include Virginia wild rye (*Elymus virginicus),* Purple passion flower (*Passiflora incarnata),* Clearweed *(Pilea pumila),* Canada leafcup *(Polymnia canadensis),* Rock Muhly *(Muhlenbergia sobolifera),* and Beggars-ticks (*Bidens polylepis).*

The West Fork Stones River is a moderate sized river, not a major river, the typical habitat of this association. This may explain some of the deviation of the vegetation here at Stones River from the global description of the type. This is not considered a globally rare association (Global rank is G4G5).

Black Willow Riparian Forest (*) (CEGL002103)

At Stones River National Battlefield, this association occurs primarily in low wet areas at the Redoubt Brannon site.

The Black Willow Riparian 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 Black willow (*Salix nigra).* Associates may include Eastern cottonwood (*Populus deltoides),* Planertree (*Planera aquatica),* River birch (*Betula nigra),* Sycamore (*Platanus occidentalis),* Sugarberry (*Celtis laevigata),* Green ash (*Fraxinus pennsylvanica),* Pecan (*Carya illinoinensis),* Persimmon *(Diospyros virginiana),* Roughleaf dogwood *(Cornus drummondii),* American elm (*Ulmus americana),* Red maple *(Acer rubrum),* Box-elder *(Acer negundo),* and Silver maple (*Acer saccharinum).* Shrubs and herbaceous plants are absent to fairly dense. They include Peppervine (*Ampelopsis arborea),* Climbing hempvine *(Mikania scandens),* Poison ivy (*Toxicodendron radicans),* Smartweeds (*Polygonum* spp), American burnweed (*Erechtites hieraciifolia),* False nettle *(Boehmeria cylindrica),* Virginia dayflower *(Commelina virginica),* Pokeweed (*Phytolacca americana),* and Ebony spleenwort (*Asplenium platyneuron).* In Kentucky, stands may contain Variable witchgrass (*Dichanthelium commutatum).*

The Black willow (*Salix nigra*) forest type is found sporadically across the eastern United States, ranging from Ohio west to Iowa, south to Arkansas, Louisiana and Texas, east to Florida and North Carolina. This is not considered a globally rare association (Global rank is G4).

Chinese Privet Upland Shrubland (CEGL003807)

Upland areas heavily infested with Chinese privet (*Ligustrum sinense*) and sometimes Common privet (*Ligustrum vulgare*) where canopy tree cover is less than 25%. This community occurs in uplands where Chinese privet (*Ligustrum sinense*) has become established as the dominant plant and is preventing regeneration of the native species of the previously occurring natural community type.

Since this community is dominated by invasive exotic plants, it is not of conservation value as a vegetation association. As a matter of fact, it is important to find ways to control the spread of Chinese privet so that this community type does not expand in the landscape in the future since it is one of the least diverse plant communities in the park.

Chinese Privet Temporarily Flooded Shrubland (CEGL003837)

Temporarily flooded areas heavily infested with Chinese privet (*Ligustrum sinense*) and sometimes Common privet (*Ligustrum vulgare*) where canopy tree cover is less than 25%. This community occurs in bottomlands where Chinese privet (*Ligustrum sinense*) has become established as the dominant plant and is preventing regeneration of the native species of the previously occurring natural community type.

Since this community is dominated by invasive exotic plants, it is not of conservation value as a vegetation association. As a matter of fact, it is important to find ways to control the spread of Chinese privet so that this community type does not expand in the landscape in the future since it is one of the least diverse plant communities in the park.

Carolina Willow Shrubland (*) (CEGL003899)

This association occurs in the wet, low floodplain of the West Fork Stones River, just northwest of the Thompson Lane Bridge. Standing water was present (due to flooding) when surveyed.

This shrubland has very sparse canopy height trees; Sycamore (*Platanus occidentalis),* Silver maple *(Acer saccharinum),* and also sparse subcanopy trees; Carolina willow (*Salix caroliniana),* Sycamore *(Platanus occidentalis),* Silver maple *(Acer saccharinum),* and to a lesser extent Green ash (*Fraxinus pennsylvanica),* Sugarberry *(Celtis laevigata),* and Eastern cottonwood (*Populus deltoides).* The vegetation is dominated by Carolina willow (*Salix caroliniana)* in both the tall and short shrub strata. Other tall shrubs are Buttonbush (*Cephalanthus occidentalis),* Green ash (*Fraxinus pennsylvanica),* and Sycamore *(Platanus occidentalis).* Buttonbush *(Cephalanthus occidentalis)* is a codominant short shrub, with Carolina willow (*Salix caroliniana).* Other short shrubs include Poison ivy (*Toxicodendron radicans),* Eastern cottonwood (*Populus deltoides),* Box-elder *(Acer negundo)* and Sugarberry (*Celtis laevigata).* Rice cutgrass (*Leersia oryzoides)* is the dominant herbaceous plant, Swamp dayflower (*Commelina virginica),* False nettle (*Boehmeria cylindrica),* and Common water-willow (*Justicia americana)* are also important herbaceous plants. Other herbaceous plants include Cardinal flower (*Lobelia cardinalis),* Gattinger's bluestar (*Amsonia tabernaemontana* var. *gattingeri),* Clearweed *(Pilea pumila),* Violet (*Viola* sp.*),* Eastern rosemallow *(Hibiscus moscheutos),* Virginia buttonweed (*Diodia virginiana),* Goldenrod (*Solidago* sp.*),* Lizard's-tail (*Saururus cernuus),* and Nepalese browntop (*Microstegium vimineum),* an Asian grass.

This Carolina Willow Shrubland type is found widely throughout the southeastern United States, from Arkansas (and possibly Missouri), east to North Carolina and possibly Virginia, and south to Florida. This is not considered a globally rare association (Global rank is G4?).

Central Basin Limestone Glade Margin Shrubland (*) (CEGL003938)

At Stones River National Battlefield, this association is found in areas near open glades, but where the soil is somewhat deeper and able to support shrubs rather than just grasses. It occurs along the edges of glades, where much limestone is near or at the surface, but between the open glades and deeper soil area, which is forested. Found around glades in the main part of Stones River National Battlefield, particularly in the vicinity of the west part of the loop road.

This shrubland vegetation is dominated by Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* in the tall and short shrub strata. Other shrubs include Carolina buckthorn (*Frangula caroliniana),* Flowering dogwood *(Cornus florida),* Winged elm *(Ulmus alata),* White ash (*Fraxinus americana),* Golden St. John's-wort *(Hypericum frondosum),* Round-seed St. John's-wort *(Hypericum sphaerocarpum),* Redbud (*Cercis canadensis),* Glade privet *(Forestiera ligustrina),* Shingle oak *(Quercus imbricaria),* American holly *(Ilex opaca),* Black cherry *(Prunus serotina),* Smooth sumac *(Rhus glabra),* Spotted St. John's-wort *(Hypericum punctatum),* Poison ivy (*Toxicodendron radicans),* Sugar maple *(Acer saccharum var. saccharum),* and Bristly dewberry *(Rubus hispidus).* Common broomsedge (*Andropogon virginicus* var. *virginicus),* Elliott's beardgrass *(Andropogon gyrans),* Splitbeard bluestem (*Andropogon ternarius),* Little bluestem *(Schizachyrium scoparium),* and Poverty oatgrass (*Danthonia spicata)* are the dominant grasses, in order of abundance. *Cladonia* lichens are also common. Many forb species are present, in trace amounts. Rare species found in this habitat include Tennessee conflower (*Echinacea tennesseensis)* and Pyne's ground-plum (*Astragalus bibullatus*).

This vegetation type is restricted to dry limestone substrates in the Nashville Basin of Tennessee and related areas of Alabama and Kentucky. This association may be considered a globally rare association (Global rank is G3G4). Although this shrubland type can be dominant at some extensive glade sites and is more stable than some other glade communities, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in this area of rapidly increasing human population. Examples not conserved on nature preserves, state forests, or Corps of Engineers lands, are highly vulnerable to development pressure. This shrub zone does not typically provide habitat for rare plant species, but it is an important component of this threatened landscape. Tennessee conflower (*Echinacea tennesseensis)* or Pyne's ground-plum (*Astragalus bibullatus*) are rare plants, which could be found in this habitat at the edges of more open glades. Alabama and Kentucky examples of this association are rare and limited in extent.

Blackberry – Greenbrier Successional Shrubland Thicket (CEGL004732)

Stands of this successional community develop following disturbance (complete forest canopy removal) or succession in old fields. These stands are dominated by Greenbrier species (*Smilax glauca, Smilax rotundifolia*) and Southern blackberries or Southern dewberries (*Rubus argutus, Rubus trivialis*). Many examples include a great variety of tree saplings and other woody species such as Oaks (*Quercus* spp.), Sweetgum (*Liquidambar styraciflua),* Red maple (*Acer rubrum*),

Persimmon (*Diospyros virginiana*), Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* and Winged sumac (*Rhus copallina*). Herbs include Goldenrods (*Solidago* spp.), Sunflowers (*Helianthus* spp.), St. John's-wort (*Hypericum* spp.), Cinquefoil (*Potentilla* spp.), and grasses such as Common broomsedge (*Andropogon virginicus*) and Witchgrass species (*Dichanthelium* sp.), etc. Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have Japanese honeysuckle as a codominant vine overtopping much of the blackberry and greenbrier.

This community derives from successional old fields that have not been mowed for at least 3-5 years. This community occurs as an embedded feature within cultivated meadows of the park. This association is considered a human modified community and thus is of low conservation concern. It is a common type in this area due to the abandonment of farmland.

Management of the invasive exotics within this community may prevent the spread of these exotics into adjacent higher priority communities.

Successional Broomsedge Vegetation (CEGL004044)

This association includes vegetation that occurs on old fields, pastures, and rocky sites which is dominated by Common broomsedge (*Andropogon virginicus var. virginicus)* along with other native species typical of old fields. This is a very common and wide-ranging association. Additional components include typical pioneer species; these and other associated species will vary with geography and habitat. This association may develop temporarily following clear-cutting, and will persist indefinitely under a regular mowing regime, e.g., in powerline corridors. If undisturbed, these grasslands will rapidly succeed to shrubs, and eventually to tree species.

This association is considered a human modified community and thus is of little conservation concern. However, old fields dominated by native species can often add quite a lot to the overall biodiversity of a small park. It is a common type in this area due to the abandonment of farmland.

This community is easily invaded by exotic species such as Japanese honeysuckle (*Lonicera japonica*) and Chinese privet (*Ligustrum sinense*). Although this community is of low conservation concern, management of the invasive exotics within this community may prevent the spread of these exotics into adjacent communities of higher conservation priority.

Stands of this alliance are dominated by Common broomsedge (*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 Tall redtop (*Tridens flavus),* Yellow foxtail grass *(Setaria parviflora = Setaria geniculata),* Purple lovegrass (*Eragrostis spectabilis),* and Beaked panicgrass (*Panicum anceps)* (NatureServe unpubl. data). On the eastern Highland Rim of Tennessee (Arnold Air Force Base), associated species include Common broomsedge *(Andropogon virginicus),* Rough buttonweed *(Diodia teres),* Forktip three-awn *(Aristida dichotoma),* Prairie three-awn *(Aristida oligantha), Packera anonyma (= Senecio anonymus),* Field crowngrass (*Paspalum laeve),* Wand lespedeza

(*Lespedeza virginica),* and Pale-seed plantain (*Plantago virginica)*. Southern blackberry (*Rubus argutus)* and Greenbriers (*Smilax* spp.) may be locally abundant but are not dominant. In clearcuts, Little bluestem (*Schizachyrium scoparium),* Poverty oatgrass (*Danthonia spicata),* and Witchgrass species (*Dichanthelium* spp.) are also common, as are occasional Oaks (*Quercus* spp.) and Southern blackberry (*Rubus argutus).*

Cultivated meadow (CEGL004048)

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 fescue (*Lolium arundinaceum)* or Meadow fescue (*Lolium pratense)* of uncertain and controversial generic placement (i.e. also called *Festuca arundinacea, Festuca pratense, Schedonorus arundinaceus, Schedonorus pratensis).* 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.

This community occurs at Stones River National Battlefield in areas kept open by mowing or bush hogging. This association is considered a human modified community and thus is of no conservation concern. It is a common type in this area.. In Middle Tennessee, there are many areas which may have historically been naturally open with thin soil and which were grazed by livestock. Many of these areas were planted in these European Fescues as part of pasture impovement efforts.

This community is easily invaded by invasive exotic species such as Japanese honeysuckle (*Lonicera japonica)* and Nepalese browntop (*Microstegium vimineum*). Although this community is not of conservation concern, management of the invasive exotic plants within this community may prevent the spread of these invasive exotic plants into adjacent higher priority communities.

Central Limestone Glade (*) (CEGL005131)

At Stones River National Battlefield this association occurs in an open area at Fortress Rosecrans, in area of earthworks and warm season grass restoration. The community found there approximates this association.

The vegetation is in an open area, dominated by several grasses; Yellow indiangrass (*Sorghastrum nutans),* Little bluestem *(Schizachyrium scoparium),* Tall redtop (*Tridens flavus),* Beaked panicgrass *(Panicum anceps),* and Foxtail grass *(Setaria* sp.) Forbs include Common wingstem (*Verbesina alternifolia),* Annual ragweed (*Ambrosia artemisiifolia),* Passionflower *(Passiflora incarnata),* Prairie-tea (*Croton monanthogynus),* and Carolina thistle (*Cirsium carolinianum).*

This association is considered a globally rare association (Global rank is G2G3). There are probably over 100 occurrences rangewide. Eighty-three have been documented: 32 in Illinois (S2), 48 in Indiana (S2S3), and 3 in Ohio (S2). Although no other occurrences are documented, the community is also reported in Alabama, Georgia, Kentucky, Tennessee, West Virginia, and Virginia (all S?). It is found in 15 ecoregional subsections. The present range of this community is probably very close to its presettlement range, but lack of fire permits increased dominance by woody species. This limestone glade or barrens community is found in the central and eastern United States, ranging from southern Illinois, Kentucky, Tennessee and Alabama, east to Georgia, western Virginia, West Virginia, and Ohio.

Water-willow Rocky Bar and Shore (*) (CEGL004286)

This association occurs on very shallow shoals and rocky areas in the West Fork Stones River, near the Thompson Lane Bridge. It probably occurs in other similar areas at Stones River National Battlefield.

At Stones River National Battlefield, this association is dominated by Common water-willow (*Justicia americana).* It occurs with Black willow (*Salix nigra),* False nettle (*Boehmeria cylindrica),* Virginia buttonweed (*Diodia virginiana),* Eastern cottonwood (*Populus deltoides),* and Devil's-pitchfork (*Bidens frondosa).*

This association is not considered a globally rare association (Global rank is G4G5). It is found primarily in the Piedmont, Interior Low Plateau, Cumberland Plateau, Ozarks, Ouachita Mountains, and adjacent provinces. It ranges from Alabama, Georgia and the Carolinas west to Arkansas and Oklahoma and north to Ohio, Pennsylvania, and Delaware. This association has been threatened by impoundments, and probably many examples on shoals of the Stones River have been lost.

Floating Water-primrose Aquatic Marsh (*) (CEGL007835)

This association occurs in a pond dominated by Floating water-primrose (*Ludwigia peploides* ssp. *glabrescens),* with Duckweed species (*Lemna* sp.*),* and Rice cutgrass (*Leersia oryzoides).* Algae are also abundant in the pond. Additionally, along the shallow edges of the pond are Broadleaf cattail (*Typha latifolia),* False daisy *(Eclipta prostrata),* Frank's sedge (*Carex frankii),* Fox sedge (*Carex vulpinoidea),* Blunt spikerush (*Eleocharis obtusa),* Rusty flatsedge (*Cyperus odoratus),* and Rufous bulrush (*Scirpus pendulus)* (Hogan & Webber, 1999).

While this is a natural plant association, at Stones River National Battlefield it is found only in a man-made pond south of Artillery Monument on the Vaughter Tract (Hogan & Webber, 1999). This association is not considered a globally rare association (Global rank is G4G5). This association provides important wildlife habitat and adds to the habitat diversity of Stones River National Battlefield.

Limestone Annual Grass Glades (*) (CEGL004340)

This association is found in the middle of limestone glades on Stones River National Battlefield, Main Park. It mainly occurs in the vicinity of the west part of the Loop Road. This association occurs in very thin soil areas over limestone where there is not sufficient soil to support a dominant cover of perennial grasses or woody plants. These areas tend to be wetter in the winter and early spring, but dry out quickly in the summer.

The vegetation is dominated by Poverty dropseed (*Sporobolus vaginiflorus* var. *vaginiflorus),* Purple-tassels (*Dalea gattingeri)* and (on plot STRI.14) Round-seed St. John's-wort (*Hypericum sphaerocarpum).* Other common plants are Low wild petunia (*Ruellia humilis* var. *humilis),* Prairie fleabane (*Erigeron strigosus),* Wiry panicgrass *(Panicum flexile),* Hogwort *(Croton capitatus),* Small's groundsel *(Packera anonyma).* Herbaceous species present only in trace amounts include Open flower rosette-grass (*Dichanthelium laxiflorum),* Tapered rosette-grass *(Dichanthelium acuminatum),* Narrowleaf summer bluets (*Hedyotis nigricans),* Black-eyed Susan (*Rudbeckia hirta),* Common wingstem *(Verbesina alternifolia),* Pasture heliotrope (*Heliotropium tenellum),* Limestone fameflower (*Talinum calcaricum),* Lyreleaf sage *(Salvia lyrata),* Spotted sandmat (*Chamaesyce maculata),* and Eastern prickly-pear (*Opuntia humifusa).* Some other scattered low shrubs are present; Eastern red-cedar (*Juniperus virginiana* var. *virginiana),* Glade privet (*Forestiera ligustrina),* Golden St. John's-wort (*Hypericum frondosum),* Fragrant sumac (*Rhus aromatica),* Carolina buckthorn *(Frangula caroliniana),* and Winged elm (*Ulmus alata).* There are several rare plants which occur in these habitats Tennessee milk-vetch (*Astragalus tennesseensis* -G3), Pyne's ground-plum *(Astragalus bibullatus* -G1), Pruple-tessels (*Dalea gattingeri* -G3G4),and Tennessee coneflower (*Echinacea tennesseensis* -G2).

The Limestone Annual Grass Glades are considered a globally rare association, with a GRank of G3 (00-12-20). This annual herbaceous community is restricted to the Nashville Basin (Tennessee) and Moulton Valley (Alabama) Limestone Cedar Glades. It may cover large parts of some glade sites. Succession is limited on the thin soils on which this type is found, so it is relatively stable. However, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in areas of rapidly increasing human population (e.g., the Nashville Basin). Threats include destruction by recreational off-road vehicle traffic, gravel and mineral surface mining, and land-use change related to suburban development. It is restricted to the Inner Nashville Basin subsection of Tennessee and a few limited areas of Alabama and Kentucky. Examples that are not conserved on nature preserves, state forests, National Forests, or U.S. Corps of Engineers lands, are highly vulnerable to development pressure.

Interior Low Plateau Limestone Glade Ephemeral Pool (*) (CEGL004346)

This association is found in the middle of limestone glades on Stones River National Battlefield. This association occurs in very thin soil areas, which become wet in rainy periods, especially in the winter and spring, but are generally very dry in the summer.

The characteristic plants are the annuals Widow's-cross (*Sedum pulchellum)* and Gladecress species (*Leavenworthia* spp.), and the perennial Limestone fameflower (*Talinum calcaricum).* The Common nostoc (*Nostoc commune)* algae form mats, which are most prominent in the spring.

This association is considered a globally rare association (Global rank is G3). This community is restricted to the Inner Nashville Basin subsection of Tennessee, the Moulton Valley of Alabama, and a few limited areas of Kentucky. It may cover large parts of some glade sites and is more stable than some other glade communities. However, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in this area of rapidly increasing human population. Threats include destruction or degradation by recreational off-road vehicle traffic, gravel and mineral surface mining, and land-use change related to suburban development. Examples that are not on nature preserves, state forests, National Forests, or U.S. Corps of Engineers lands, are highly vulnerable to development pressure.

Ecological Community Summary

Of the twenty associations described above, twelve are considered representative of natural ecological systems (NatureServe, 2004). Four associations are considered successional, one occurs only at Stones River National Battlefield in a man-made pond, and three associations are exotic plant dominated. The twelve natural association types occur in areas that have not been plowed (perhaps due to rockiness), have been fallow for many decades, or occur in bottomland areas that recover more quickly from stand initiating disturbance. These associations are the Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest, Interior Low Plateau Chinquapin Oak - Mixed Oak Forest, Interior Plateau Chinquapin Oak - Shumard Oak Forest, Southern Interior Box-elder Riparian Forest, Southern Green Ash - Elm - Sugarberry Forest, Black Willow Riparian Forest, Carolina Willow Shrubland, Central Basin Limestone Glade Margin Shrubland, Central Limestone Glade, Water-willow Rocky Bar and Shore, Limestone Annual Grass Glades, and the Interior Low Plateau Limestone Glade Ephemeral Pool. When considering priorities for preservation or land management activities, such as ecological restoration or invasive exotic plant control, these twelve associations and the natural ecological systems they represent, should take higher priority than the successional and exotic plant dominated associations.

Each National Vegetation Classification association is assigned a global rank (GRANK) on a scale of G1 to G5, with G5 being demonstrably widespread, abundant and secure throughout its range, and G1 being very rare or critically imperiled throughout its range (NatureServe, 2004). A global rank of G1-G3 is considered to indicate global rarity.

Those natural associations at Stones River National Battlefield, which are representative of the upland ecological systems, are all globally rare (see Table 5). The first of these is the Southern Interior Low Plateau Dry Oak Forest Ecological System, which (at Stones River National Battlefield) includes these associations, Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest (G3?), Interior Low Plateau Chinquapin Oak - Mixed Oak Forest (G3), and Interior Plateau Chinquapin Oak - Shumard Oak Forest (G3). The second is the Nashville Basin Limestone Glade Ecological System, which (at Stones River National Battlefield) includes these associations, Central Basin Limestone Glade Margin Shrubland (G3G4), Central Limestone Glade (G2G3), Limestone Annual Grass Glades (G3), and the Interior Low Plateau Limestone Glade Ephemeral Pool (G3). The number of rare associations underscores the regional conservation importance of Stones River National Battlefield.

Overview

Some of the recommendations for the park found in this document are summarized below:

1) Control invasive exotic plants in various communities. Chinese privet (*Ligustrum sinense*) may be the most important species to focus control efforts on. Other plants, listed as severe threat may also need management.
2) Continue to build capacity to use prescribed fire to manage the Nashville Basin Limestone Glade Ecological System, and restore certain areas of Red-cedar Successional Forest to open woodlands characteristic of the Nashville Basin Limestone Glade Ecological System.
3) Continue to protect and manage high quality examples of the twelve natural associations, which are; Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest, Interior Low Plateau Chinquapin Oak - Mixed Oak Forest, Interior Plateau Chinquapin Oak - Shumard Oak Forest, Southern Interior Box-elder Riparian Forest, Southern Green Ash - Elm - Sugarberry Forest, Black Willow Riparian Forest, Carolina Willow Shrubland, Central Basin Limestone Glade Margin Shrubland, Central Limestone Glade, Water-willow Rocky Bar and Shore, Limestone Annual Grass Glades, and the Interior Low Plateau Limestone Glade Ephemeral Pool.

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, E. L. 1950. Deciduous forests of eastern North America. Hafner Press, New York. 596 pp.

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.

Chester, E.W., B.E. Wofford, and R. Kral. 1997. Atlas of Tennessee vascular plants. Volume 2. angiosperms: dicots: Misc. Pub. No. 13. The Center for Field Biology, Austin Peay State University, Clarksville, Tennessee.

Chester, E.W., B.E. Wofford, R. Kral, H.R. DeSelm, and A.M. Evans. 1993. Atlas of Tennessee vascular plants. Volume 1.Pteridophytes, gymnosperms, angiosperms: monocots: Misc. Pub. No. 9. The Center for Field Biology, Austin Peay State University, Clarksville, Tennessee.

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.

Cronquist, A. 1980. Vascular flora of the southeastern United States. Volume I Asteraceae. Univ. of North Carolina Press, Chapel Hill. 261 p.

Garmin Corporation. 1999. Garmin GPS III Plus Owner's Manual and Reference. Garmin International, Olathe, Kansas, USA.

Gleason, H. A., and A. Cronquist. 1991. Manual of vascular plants of northeastern United States and adjacent Canada. New York Botanical Garden, Bronx, NY. 910 pp.

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.

Holmgren, N. H. 1998. Illustrated companion to Gleason and Cronquist's manual. Illustrations of the vascular plants of northeastern United States and adjacent Canada. The New York Botanical Garden, Bronx, NY.

Heltshe, J.F., and N.E. Forrester. 1983. Estimating species richness using the jackknife procedure. Biometrics 39: 1-12.

Hogan, Theresa L. and Michele Webber. 1999. Vascular Flora of Stones River National Battlefield including Notes on Natural Communities and Rare Species. Report to the National Park Service.

Hogan, Theresa, Rob Sutter and Nathan Rudd. 1995. Vascular plant inventory, baseline and photopoint monitoring, and rare species monitoring of the calcareous glades of Stones River National Battlefield. The Nature Conservancy. Unpublished report to the National Park Service. 48 p + appendices.

Integrated Taxonomic Information System on-line database. 2003. http://www.itis.usda.gov

Isley, D. 1990. Vascular flora of the southeastern United States, vol. 3, part 2: Leguminosae (Fabaceae). Univ. of North Carolina Press. 258 p.

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.

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. Bargeron. 2000. Invasive Plants of the Thirteen Southern States. http://www.invasive.org/seweeds.cfm. (Accessed: October 20, 2003).

National Park Service. 2000 (Reprint). Stones River Official Map and Guide. Government Printing Office. 1 p.

Natural Resources Conservation Service (PLANTS database). 1991. PLOTS database. The Nature Conservancy/ National Park Service.

NatureServe. [2004]. International Ecological Classification Standard: International Vegetation Classification. Central Databases. NatureServe, Arlington, VA.

NatureServe. [2004]. International Ecological Classification Standard: International Terrestrial Ecological System Classification. Central Databases. NatureServe, Arlington, VA.

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.

Palmer, M.W. 1990. The estimation of species richness by extrapolation. Ecol. 71.

Quarterman, E. 1950. Major plant communities of Tennessee cedar glades. Ecology 31:234-254.

Quarterman, E. 1989. Structure and dynamics of limestone cedar glades in Tennessee. J. Tenn. Acad. Sci. 64:155-158.

Quarterman, E., M. P. Burbanck, and D. J. Shure. 1993. Rock outcrop communities: Limestone, sandstone, and granite. Pages 35-86 in: W. H. Martin, S. G. Boyce, and A. C. Echternacht, editors. Biodiversity of the southeastern United States: Upland terrestrial communities. John Wiley and Sons, New York.

Rollins, S.C. 1997. Calcareous glade communities in the Central Basin of Tennessee: the effects of scale on community classification. Master's Thesis. University of North Carolina, Chapel Hill. p. 142.

Springer, M.E. and J.A. Elder. 1980. Soils of Tennessee. The University of Tennessee Ag. Sta., Knoxville. USDA Soil Conservation Service Bulletin. 596. 62 p.

Tennessee Exotic Pest Plant Council. 2001. Invasive Exotic Pest Plants in Tennessee, Report from the Tennessee Exotic Pest Plant Council. <http://www.tneppc.org/Invasive_Exotic_Plant_List/The_List.htm>

U.S. Department of Agriculture. 1977. Soil Survey of Rutherford County, Tennessee. U.S. Department of Agriculture, Soil Conservation Service in cooperation with the University of Tennessee Agricultural Experiment Station. 136 pp.

University of Tennessee Herbarium. 2003. http://tenn.bio.utk.edu/vascular/vascular.html

Figure 1a. Map of Stones River National Battlefield with all permanent points marked at their actual locations.

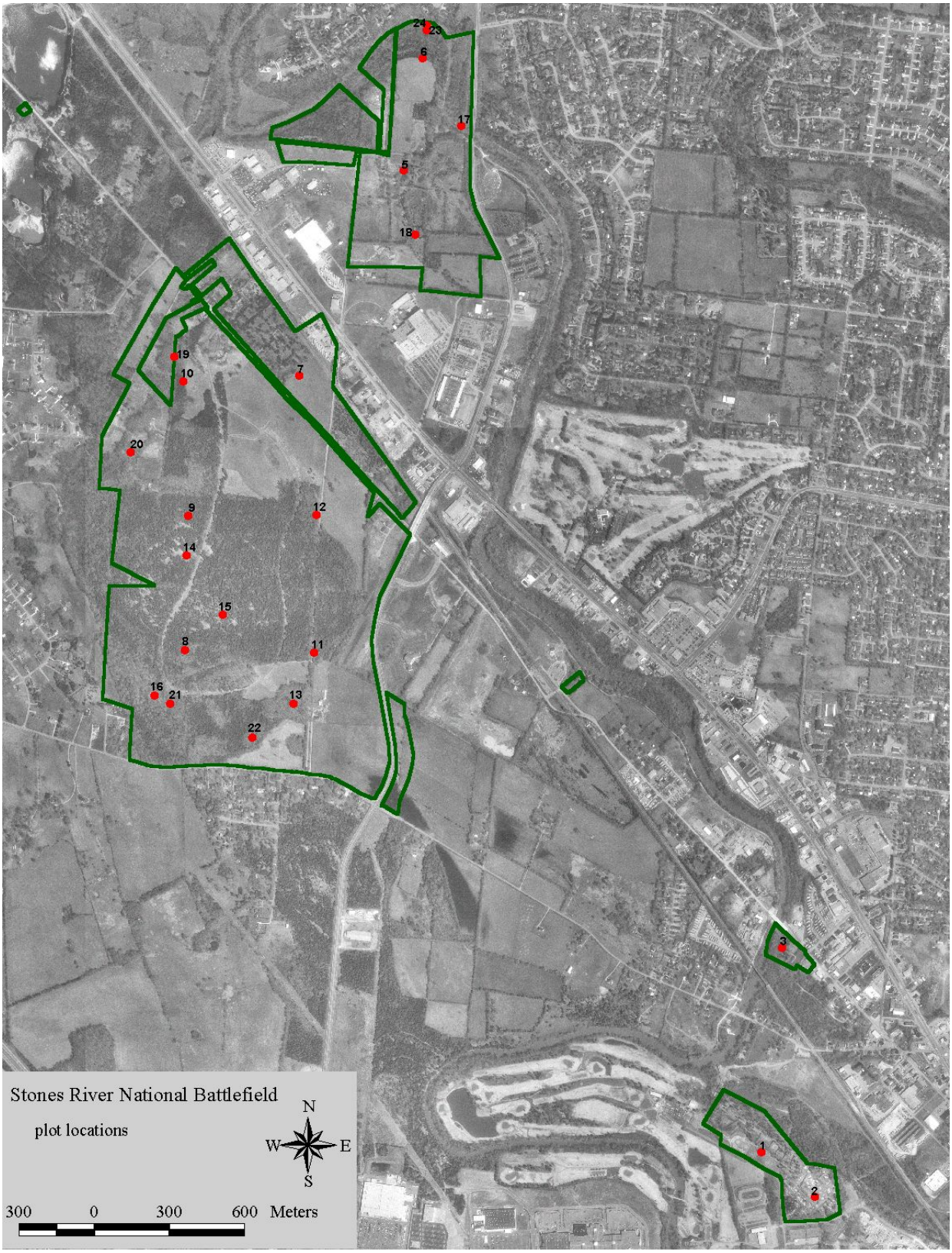


Figure 1b. Map of Stones River National Battlefield Artillery Monument with all permanent points marked at their actual locations.

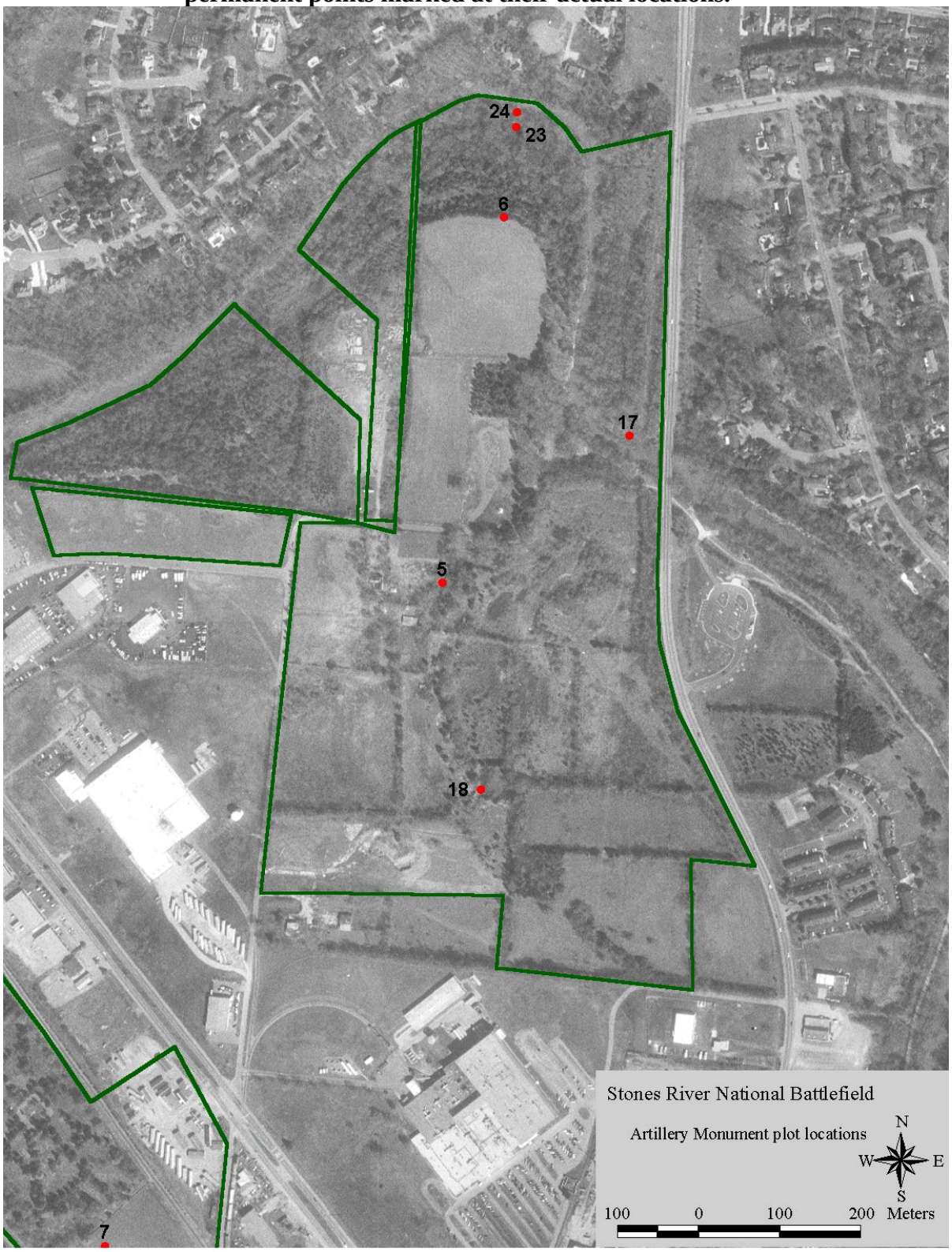


Figure 1c. Map of Stones River National Battlefield Main Park with all permanent points marked at their actual locations.

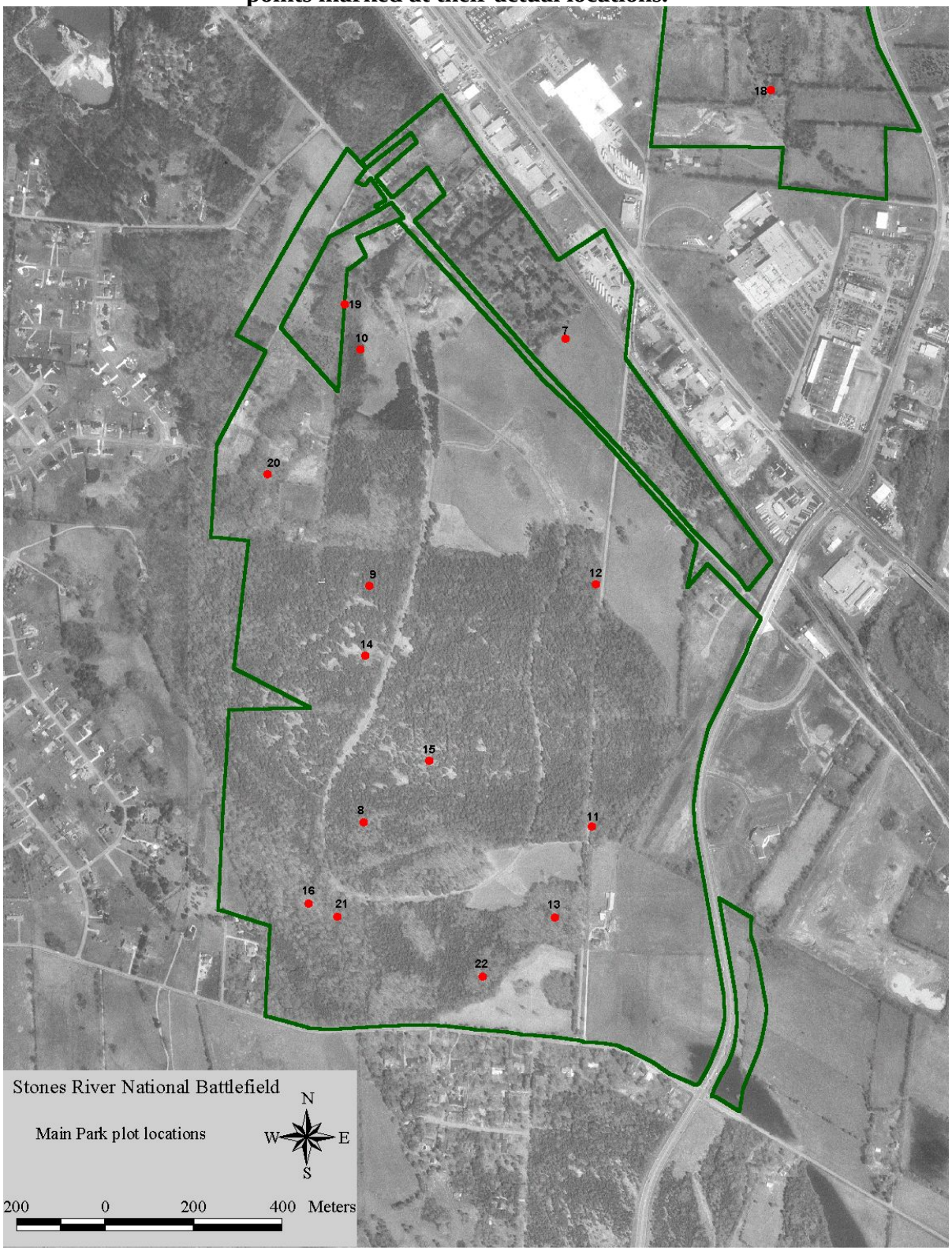
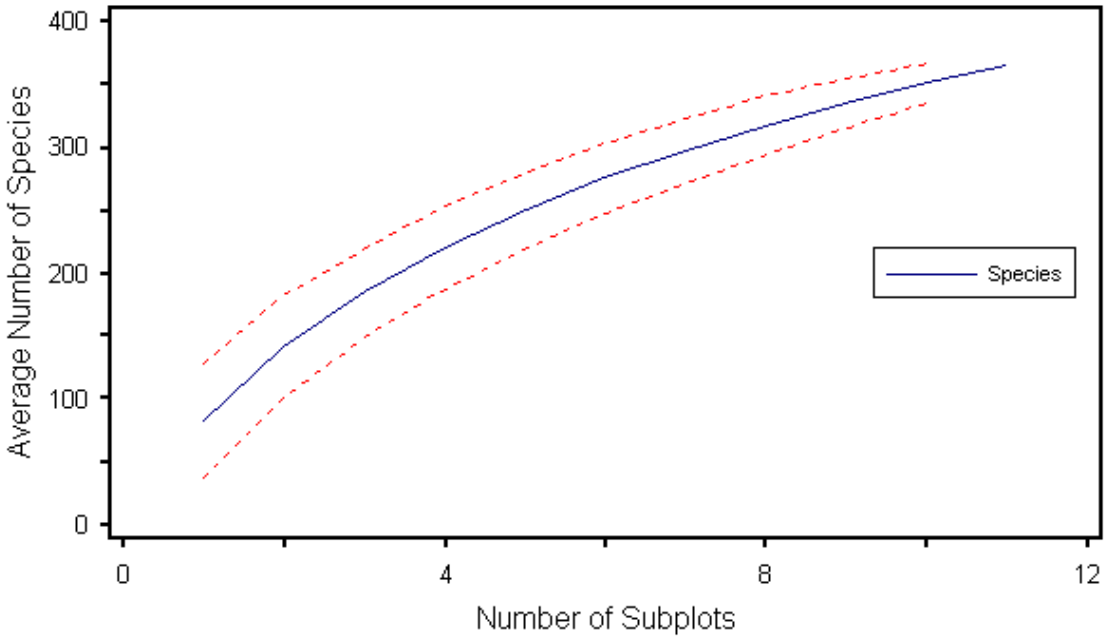


Figure 1d. Map of Stones River National Battlefield Redoubt Brannan / Fortress Rosecrans with all permanent points marked at their actual locations.

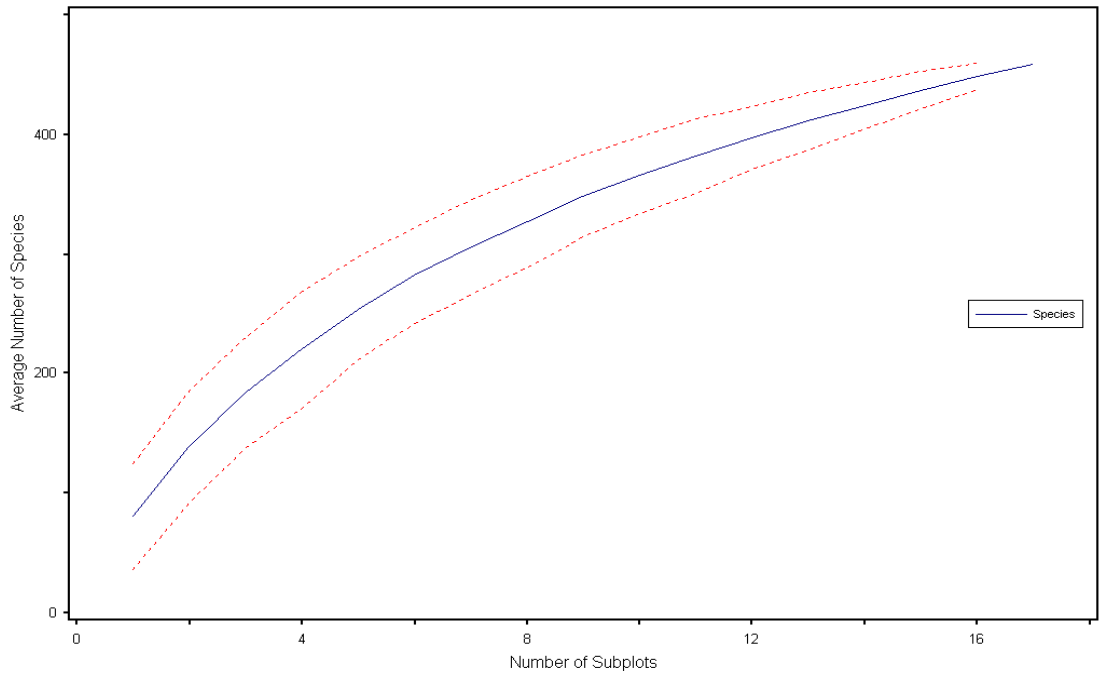
Figure 2. Species area curves for Stones River National Battlefield

a) derived using data from just the 11 gridded plots in the park



First-order jackknife estimate of number of species in park = 514.2
Second-order jackknife estimate of number of species in park = 599.7

b) derived using data from all 17 plots



First-order jackknife estimate of number of species in park = 630.3
Second-order jackknife estimate of number of species in park = 711.5

Table 1. Plot numbers and locations for all permanent plots established at Stones River National Battlefield.

Plot Number	X Coordinate	Y Coordinate	Projection	Zone	Type of plot
1	553168.9	3967692.6	NAD83	16	FULL
2	553382.2	3967515.4	NAD83	16	FULL
3	553251.2	3968504.7	NAD83	16	FULL
5	551744.2	3971592.2	NAD83	16	FULL
6	551819.0	3972040.0	NAD83	16	FULL
7	551329.1	3970778.1	NAD83	16	FULL
8	550873.9	3969687.8	NAD83	16	FULL
9	550886.8	3970221.0	NAD83	16	FULL
10	550866.8	3970754.0	NAD83	16	FULL
11	551387.8	3969678.9	NAD83	16	FULL
12	551396.8	3970224.0	NAD83	16	FULL
13	551303.8	3969473.7	NAD83	16	FULL
14	550878.1	3970063.9	NAD83	16	FULL
15	551021.8	3969826.7	NAD83	16	FULL
16	550750.0	3969506.2	NAD83	16	FULL
17	551973.1	3971772.0	NAD83	16	FULL
18	551791.2	3971337.8	NAD83	16	FULL
19	550831.4	3970854.4	NAD83	16	QUICKPLOT
20	550656.8	3970472.6	NAD83	16	QUICKPLOT
21	550815	3969476	NAD83	16	QUICKPLOT
22	551142	3969342	NAD83	16	QUICKPLOT
23	551834	3972151	NAD83	16	QUICKPLOT
24	551835	3972169	NAD83	16	QUICKPLOT

Table 2. List of all plants documented for park ordered alphabetically by scientific name.

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
481-SRNB	Abutilon theophrasti Medik.			south Asia		
	Acalypha gracilens Gray	Slender three-seed-Mercury		native		NPS - not collected
Cat #4474	Acalypha ostryifolia Riddell	Pineland three-seed-Mercury	28189	native		NatureServe 2002-2003
253-SRNB	Acalypha virginica L. var. virginica	Virginia three-seed-Mercury	28195	native	G5	Hogan and Webber 1999
305-SRNB	Acalypha virginica var. rhomboidea (Raf.) Cooperrider			native		
172-SRNB	Acer negundo L.	Box-elder	28749	native	G5	Hogan and Webber 1999
078-SRNB	Acer rubrum L.	Red maple	28728	native	G5	Hogan and Webber 1999
645-SRNB	Acer saccharinum L.			native		
646-SRNB	Acer saccharum Marsh.	Sugar maple	28731	native	G5	Hogan and Webber 1999
268-SRNB	Achillea millefolium L.	Common yarrow	35423	native	G5	Hogan and Webber 1999
083-SRNB	Aesculus glabra Willd.	Ohio buckeye	28718	native	G5	Hogan and Webber 1999
623-SRNB	Agalinis tenuifolia (Vahl) Raf.	Slenderleaf false foxglove	33036	native	G5	Hogan and Webber 1999
602-SRNB	Ageratina altissima (L.) King & H. E. Robins var. altissima	White snakeroot	36466	native	G5	Hogan and Webber 1999
461-SRNB	Agrimonia pubescens Wallr.	Soft grooveburr	25099	native	G5	Hogan and Webber 1999
Cat #4475	Agrimonia rostellata		25100	native		NatureServe 2002-2003
	Ailanthus altissima (Mill.) Swingle	Tree-of-heaven		E. Asia EPPC-1		NPS - not collected
438-SRNB	Albizia julibrissin Durz.	Silktree	26449	tropical Asia EPPC-1	G?	Hogan and Webber 1999
017-SRNB	Alliaria petiolata (Bieb.) Cavara & Grande	Garlic mustard	184481	Europe EPPC-1		
416-SRNB	Allium canadense L.			Europe		
142-SRNB	Allium canadense L. var. canadense	Meadow garlic	42635	native	G5	Plant list compiled by BONAP from its County Database, and converted to NPSpecies by I&M Office.
296-SRNB	Allium oleraceum L.		42689	Europe		
321-SRNB	Allium sativum L.		42652	w. Asia		
405-SRNB	Allium vineale L.		42637	Europe EPPC-3		
Cat #4476	Amaranthus hybridus		20735	exotic		NatureServe 2002-2003
Cat #4477	Amaranthus palmeri		20740	exotic		NatureServe 2002-2003
	Amaranthus spinosus	Spiny amaranth		exotic		NPS - not collected
	Ambrosia artemisiifolia L.	Annual ragweed		native		NPS - not collected
514-SRNB	Ambrosia trifida L. var. trifida		36521	native		
173-SRNB	Amsonia tabernaemontana Walter var. gattingeri Woodson			native		
610-SRNB	Andropogon gerardii Vitman	Big bluestem	40462	native/planted	G5	Hogan and Webber 1999
541-SRNB	Andropogon gyrans Ashe	Elliott's beardgrass	182527	native	G5	Hogan and Webber 1999
409-SRNB	Andropogon ternarius Michx.			native		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
533-SRNB	Andropogon virginicus L.	Common broomsedge	40456	native	G5	Hogan and Webber 1999
248-SRNB	Anemone virginiana L.	Tall thimbleweed	18451	native	G5	Hogan and Webber 1999
Cat #4478	Anoda cristata		21689	exotic		NatureServe 2002-2003
162-SRNB	Antennaria solitaria Rydb.		36756	native		
095-SRNB	Anthemis arvensis L.		36331	Europe		
213-SRNB	Anthemis cotula L.		36330	Europe, naturalized		
501-SRNB	Apocynum cannabinum L.	Indian-hemp	30157	native	G5	Hogan and Webber 1999
205-SRNB	Aquilegia canadensis L.	Eastern columbine	18730	native	G5	Hogan and Webber 1999
113-SRNB	Arabidopsis thaliana (L.) Heynh.		23041			
018-SRNB	Arabis laevigata (Muhl. ex Willd.) Poir. var. laevigata			native		
473-SRNB	Arctium minus Bernh.		36546	Eurasia		
256-SRNB	Arisaema dracontium (L.) Schott	Green dragon	42529	native	G5	Hogan and Webber 1999
	Arisaema triphyllum	Jack-in-the-pulpit		native		NPS - not collected
531-SRNB	Aristida longespica Poir.	Slimspike three-awn	41423	native	G5	Hogan and Webber 1999
368-SRNB	Aristida oligantha Michx.	Prairie three-awn	41405	native	G5	Hogan and Webber 1999
	Aristolochia serpentaria	Virginia snakeroot		native		NPS - not collected
	Arundinaria gigantea (Walt.) Muhl. ssp. gigantea	Giant cane		native		NPS - not collected
	Asclepias incarnata L.	Swamp milkweed		native		NPS - not collected
339-SRNB	Asclepias syriaca L.			native		
194-SRNB	Asclepias tuberosa L.	Butterfly milkweed	30313	native	G5?	Hogan and Webber 1999
290-SRNB	Asclepias verticillata L.	Whorled milkweed	30320	native	G5	Hogan and Webber 1999
	Asimina triloba (L.) Dunal	Paw-paw		native		NPS - not collected
195-SRNB	Asparagus officinalis L.			Europe		
262-SRNB	Asplenium platyneuron (L.) B.S.P.	Ebony spleenwort	17355	native	G5	Hogan and Webber 1999
	Asplenium resilens Kunze.			native		collected by D. Estes
	Asplenium rhizophyllum L.			native		collected by D. Estes
603-SRNB	Aster pilosus Willd. var. pilosus			native		
599-SRNB	Aster shortii Lindl.		35652	native		
	Astragalus bibullatus Barneby & Bridges	Limestone-glade milk-vetch		native		NPS - not collected
110-SRNB	Astragalus tennesseensis Gray ex Chapman	Tennessee milk-vetch	25698	native	G3	Hogan and Webber 1999
Cat #4479	Avena sativa	Oats	41459	Eurasia		NatureServe 2002-2003
	Belamcanda chinensis (L.) DC.	Blackberry lily		naturalized Asia		NPS - not collected
160-SRNB	Berchemia scandens (Hill) K. Koch	Supplejack	28447	native	G5	Hogan and Webber 1999
552-SRNB	Bidens aristosa (Michx.) Britt.	Bearded beggarticks	35713	native	G5	Hogan and Webber 1999
366-SRNB	Bidens bipinnata L.		500993	native		
522-SRNB	Bidens frondosa L.	Devil's-pitchfork	35707	native	G5	Hogan and Webber 1999
	Bignonia capreolata L.	Cross-vine		native		NPS - not collected
170-SRNB	Blephilia ciliata (L.) Benth.	Downy pagoda-plant	32460	native	G5	Hogan and Webber 1999
563-SRNB	Boehmeria cylindrica (L.) Sw.	False nettle	19121	native	G5	Hogan and Webber 1999
Cat #4480	Bothriochloa laguroides (DC.) Herter subsp. torreyana (Steud.) Allred & Gould	Silver-beard grass	523690	native to southeastern US and		NatureServe 2002-2003

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				Mexico but not to Tennessee		
	Botrychium dissectum Spreng.	Cut-leaf grape fern		native		NPS - not collected
111-SRNB	Botrychium virginianum (L.) Sw.	Rattlesnake Fern	17173	native	G5	Hogan and Webber 1999
252-SRNB	Bouteloua curtipendula (Michx.) Torr.	Sideoats grama	41500	native	G5	Hogan and Webber 1999
028-SRNB	Brassica rapa L.			Europe		
618-SRNB	Brickellia eupatorioides (L.) Shinner	False boneset	36875	native	G5	Hogan and Webber 1999
425-SRNB	Bromus arvensis L.		40494	south Europe		
423-SRNB	Bromus japonicus Thunb. ex Murr.	Japanese brome	40479	Old World EPPC-2	G?	Hogan and Webber 1999
Cat #4506	Bromus sterilis		40522	Exotic EPPC-A		NatureServe 2002-2003
261-SRNB	Bromus tectorum L.	Cheatgrass	40524	Europe EPPC-2	G?	Hogan and Webber 1999
	Buglossoides arvense	Corn-gromwell		Eurasia EPPC-3		collected by D. Estes
	Buplureum rotundifolium			Exotic EPPC-A		NPS - not collected
554-SRNB	Calamintha nepeta (L.) Savi. ssp. nepeta			Europe		
275-SRNB	Calystegia sepium (L.) R. Br.	Hedge false bindweed	30650	Eurasia & N. America, both forms present	G5	Hogan and Webber 1999
387-SRNB	Campanula americanum (L.) Small			native		
278-SRNB	Campsis radicans (L.) Seem. ex Bureau	Trumpetvine	34309	native	G5	Hogan and Webber 1999
045-SRNB	Capsella bursa-pastoris (L.) Medik.		22766	s. Europe		
004-SRNB	Cardamine concatenata (Michx.) Sw.	Cutleaf toothwort	22787	native	G5	Hogan and Webber 1999
069-SRNB	Cardamine hirsuta L.		22797	Old World		
	Cardiospermum halicababum			Exotic EPPC-3		
044-SRNB	Carduus nutans L.	Nodding thistle	35787	Europe EPPC-2		
Cat #4507	Carex albicans var. australis		527065	native		NatureServe 2002-2003
135-SRNB	Carex albolutescens Schwein.		39371	native		
480-SRNB	Carex amphibola Steud.			native		
234-SRNB	Carex blanda Dewey			native		
237-SRNB	Carex cephalophora Muhl. ex Willd.	Oval-leaf sedge	39383	native	G5	Hogan and Webber 1999
590-SRNB	Carex cherokeensis Schwein.	Cherokee sedge	39545	native	G4G5	Hogan and Webber 1999
104-SRNB	Carex complanata Torr. & Hook	Hirsute sedge	39551	native	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
149-SRNB	Carex crawei Dewey			native		
404-SRNB	Carex davisii Schwein. & Torr.	Davis' sedge	39569	native	G4	Hogan and Webber 1999
105-SRNB	Carex flaccosperma Dewey		39605	native		
211-SRNB	Carex frankii Kunth		39393	native		
146-SRNB	Carex granularis Muhl.	Limestone meadow sedge	39398	native	G5	Hogan and Webber 1999
214-SRNB	Carex grayi Carey	Gray's sedge	39622	native	G4	Hogan and Webber 1999
Cat #4508	Carex jamesii		39404	native		NatureServe 2002-2003
Cat #4509	Carex oligocarpa		39728	native		NatureServe 2002-2003
109-SRNB	Carex oxylepis Torr. & Hook	Sharp-scale sedge	39424	native	G5?	Hogan and Webber 1999
106-SRNB	Carex pensylvanica Lam.			native		
Cat #4510	Carex retroflexa		39782	native		NatureServe 2002-2003
134-SRNB	Carex rosea Schkuhr ex Willd.	Rosy sedge	39429	native	G5	Hogan and Webber 1999
Cat #4511	Carex texensis		39842	native		NatureServe 2002-2003
143-SRNB	Carex vulpinoidea Michx.	Fox sedge	39442	native	G5	Hogan and Webber 1999
282-SRNB	Carya alba (L.) Nutt. ex Ell.	Mockernut hickory	501306	native	G5	Hogan and Webber 1999
390-SRNB	Carya carolinae-septentrionalis (Ashe) Engl. & Graebn.	Carolina shagbark hickory	501307	native	G5?	Hogan and Webber 1999
328-SRNB	Carya cordiformis (Wangenh.) K. Koch	Bitternut hickory	19227	native	G5	Hogan and Webber 1999
499-SRNB	Carya ovalis (Wangenh.) Sarg.	Red hickory	19241	native	G5	Hogan and Webber 1999
498-SRNB	Carya ovata (P. Mill.) K. Koch	Shagbark hickory	19242	native	G5	Hogan and Webber 1999
391-SRNB	Catalpa bignonioides Walt.		34313	native		
598-SRNB	Celtis laevigata Willd.	Sugarberry	19042	native	G5	Hogan and Webber 1999
Cat #4512	Celtis occidentalis	Northern hackberry	19040	native		NatureServe 2002-2003
	Celtis tenuifolia Nutt.	Dwarf hackberry		native		NPS - not collected
	Cenchrus longespinus (Hack.) Fern.	Innocent-weed		native		NPS - not collected
093-SRNB	Centaurea cyanus L.		36954	Old World-Mediterranean region EPPC-3		
Cat #4481	Cephalanthus occidentalis	Buttonbush	34786	native		NatureServe 2002-2003
007-SRNB	Cercis canadensis L.	Redbud	25782	native	G5	Hogan and Webber 1999
024-SRNB	Chaerophyllum tainturieri Hook.	Hairy-fruit chervil	29617	native	G5	Hogan and Webber 1999
341-SRNB	Chamaecrista fasciculata (Michx.) Greene	Sleepingplant	501383	native	G5	Hogan and Webber 1999
539-SRNB	Chamaecyparis thyoides (L.) B.S.P.	Atlantic white-cedar	18046	native, chiefly coastal plain	G4	Hogan and Webber 1999
570-SRNB	Chamaesyce maculata (L.) Small		501435	native		
126-SRNB	Chamaesyce nutans (Lag.)		501442	native		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
264-SRNB	Chasmanthium latifolium (Michx.) Yates	River-oats	41547	native	G5	Hogan and Webber 1999
Cat #4482	Chenopodium album		20592	exotic		NatureServe 2002-2003
	Chenopodium ambrosioides L. var. ambrosioides	Mexican-tea		Tropical America		NPS - not collected
	Cichorium intybus			Exotic EPPC-3		NPS - not collected
455-SRNB	Cirsium discolor (Muhl. ex Willd.) Spreng.		36362	native		
	Clematis catesbyana Pursh.	Satincurls		native		NPS - not collected
334-SRNB	Clematis terniflora DC.		18712	Japan, escaped EPPC-2		
453-SRNB	Clematis viorna L.	Vasevine	18715	native	G5	Hogan and Webber 1999
	Clematis virginiana L.	Devil's-darning-needles		native		NPS - not collected
327-SRNB	Cocculus carolinus (L.) DC.	Carolina coralbead	18864	native	G5	Hogan and Webber 1999
601-SRNB	Collinsonia verticillata Baldw.			native		
624-SRNB	Commelina communis L.	Asiatic dayflower	39127	east Asia	G5	Hogan and Webber 1999
633-SRNB	Commelina diffusa Burm. f.	Climbing dayflower	39131	Old World	G5	Hogan and Webber 1999
512-SRNB	Commelina virginica L.	Swamp dayflower	39128	native	G5	Hogan and Webber 1999
167-SRNB	Conium maculatum L.		29473	Eurasia EPPC-2		
353-SRNB	Conyza canadensis (L.) Cronq. var. canadensis			native		
184-SRNB	Cornus drummondii C.A. Mey.	Roughleaf dogwood	27807	native	G5	Hogan and Webber 1999
226-SRNB	Cornus florida L.	Flowering dogwood	27806	native	G5	Hogan and Webber 1999
389-SRNB	Cornus racemosa Lam. or Cornus foemina P. Mill.	Gray dogwood	501635	native	G5?	Hogan and Webber 1999
313-SRNB	Coronilla varia L.	Crown vetch	26553	Mediterranean EPPC-2		
297-SRNB	Corylus americana Walt.	American hazelnut	19506	native	G5	Hogan and Webber 1999
258-SRNB	Crepis pulchra L.		37202	Eurasia		
294-SRNB	Croton capitatus Michx.	Hogwort	28266	native	G5	Hogan and Webber 1999
626-SRNB	Croton glandulosus L. var. septentrionalis Muell. Arg.		527541	native		
279-SRNB	Croton monanthogynus Michx.	Prairie-tea	28283	native	G5	Hogan and Webber 1999
292-SRNB	Crotonopsis elliptica Willd.		28304	native		
137-SRNB	Cruciata pedemontana (Bellardi) Ehrend.		502717	Europe		
217-SRNB	Cryptotaenia canadensis (L.) DC.	Canadian honewort	29475	native	G5	Hogan and Webber 1999
621-SRNB	Cuphea viscosissima Jacq.		501842	native		
525-SRNB	Cuscuta sp.		30710	native, probably		
Cat #4513	Cyclospermum leptophyllum		507572	exotic		NatureServe 2002-2003
Cat #4483	Cynanchum laeve (Michx.) Pers.		501893	native to US, not to TN		NatureServe 2002-2003
Cat #4484	Cyperus echinatus		501920	native		NatureServe 2002-2003
324-SRNB	Cyperus echinatus (L.) A. W.		501917	native		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
	Wood					
323-SRNB	Cyperus lancastriensis Porter ex A. Gray		39901	native		
555-SRNB	Cyperus odoratus L.	Rusty flatsedge	39894	native	G5	Hogan and Webber 1999
277-SRNB	Cyperus refractus Engelm. ex Boeckl		39897	native		
374-SRNB	Cyperus strigosus L.			native		
443-SRNB	Dactylis glomerata L.	Orchard grass	193446	Europe	G?	Hogan and Webber 1999
165-SRNB	Dalea gattingeri (Heller) Barneby	Purple-tassels	26618	native	G3G4	Hogan and Webber 1999
307-SRNB	Danthonia spicata (L.) Beauv ex Roemer & J. A. Schultes	Poverty oatgrass	41642	native	G5	Hogan and Webber 1999
043-SRNB	Daucus carota L.	Queen Anne's-lace	29477	Eurasia	G?	Hogan and Webber 1999
272-SRNB	Delphinium ambiguum L.		512130	Europe		
122-SRNB	Delphinium carolinianum Walt. ssp. calciphilum Warnock		523944	native		
436-SRNB	Desmanthus illinoensis (Michx.) MacM. ex B. L. Robins. & Fern.	Prairie bundle-flower	26661	native	G5	Hogan and Webber 1999
365-SRNB	Desmodium canescens (L.) DC.		25792	native		
169-SRNB	Dianthus armeria L.		20276	Europe		
	Dicentra cucullaria (L.) Bernh.	Dutchman's britches		native		collected by D. Estes
468-SRNB	Dichanthelium acuminatum (Sw.) Gould & C. A. Clark var. acuminatum			native		
511-SRNB	Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. fasciculatum (Torr.) Freckmann	Rough rosette grass	502034	native	G4?Q	Hogan and Webber 1999
Cat #4485	Dichanthelium acuminatum var. acuminatum		527684	native		NatureServe 2002-2003
Cat #4514	Dichanthelium clandestinum		41656	native		NatureServe 2002-2003
Cat #4486	Dichanthelium commutatum		41647	native		NatureServe 2002-2003
469-SRNB	Dichanthelium commutatum (Schult.) Gould			native		
465-SRNB	Dichanthelium dicotomum (L.) Gould var. dichotomum			native		
464-SRNB	Dichanthelium dicotomum (Schult.) Gould		527691	native		
466-SRNB	Dichanthelium laxiflorum (Lam.) Gould	Open-flower rosette grass	41661	native	G5	Hogan and Webber 1999
471-SRNB	Dichanthelium malacophyllum (Nash) Gould			native		
Cat #4515	Dichanthelium ovale		41649	native		NatureServe 2002-2003
Cat #4487	Dichanthelium sphaerocarpon var. sphaerocarpon		527702	native		NatureServe 2002-2003
476-SRNB	Dichanthelium villosissimum (Nash) Frekmann		502040	native		
Cat #4505	Dichondra carolinensis		30834	exotic		NatureServe 2002-2003
386-SRNB	Digitaria ciliaris (Retz.) Koel.			tropical America, north to Virginia, southern Indiana,		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				Missouri, and southern Nebraska		
639-SRNB	Digitaria ischaemum (Schreb.) Muhl. var. ischaemum			Eurasia		
Cat #4488	Digitaria sanguinalis		40604	exotic		NatureServe 2002-2003
385-SRNB	Digitaria sanguinalis (L.) Scop.		40619	tropical America, north to Virginia, southern Indiana, Missouri, and southern Nebraska		
379-SRNB	Diodia teres Walt.	Rough buttonweed	34789	native	G5	Hogan and Webber 1999
	Dioscorea oppositifolia(L.)	Chinese yam		Asian EPPC-1		collected by D. Estes
228-SRNB	Dioscorea villosa L.	Wild yam	43367	Native	G4G5	Hogan and Webber 1999
187-SRNB	Diospyros virginiana L.	Eastern persimmon	23855	Native	G5	Hogan and Webber 1999
330-SRNB	Dipsacus fullonum ssp. sylvestris (Huds.) Chapham		524924	Europe EPPC-2		
	Dodecatheon media	Shooting star		native/planted		NPS - not collected
	Draba brachycarpa Nutt.			native		collected by D. Estes
021-SRNB	Draba verna L.		22923	Eurasia		
009-SRNB	Duchesnea indica (Andr.) Focke		25163	Asia		
302-SRNB	Echinacea tennessensis (Beadle) Small		37284	native		
490-SRNB	Echinochloa muricata (Beauv.) Fern. var. muricata		527842	native		
556-SRNB	Eclipta prostrata (L.) L.		196226	native		
	Elaeagnus pungens Thunb.			E. Asia EPPC-1		collected by D. Estes
451-SRNB	Eleocharis engelmanii Steud.			native		
446-SRNB	Eleocharis obtusa (Willd.) Schultes	Blunt spikerush	40017	native	G5	Hogan and Webber 1999
364-SRNB	Elephantopus carolinianus Raeusch.	Carolina elephant's-foot	37297	native	G5	Hogan and Webber 1999
186-SRNB	Eleusine indica (L.) Gaertn.		41692	Old World, now pantropical		
	Elymus canadensis L.	Canada wild rye		native		NPS - not collected
315-SRNB	Elymus riparius Wieg.	Riverbank wild rye	40706	native	G5	Hogan and Webber 1999
312-SRNB	Elymus villosus Muhl. ex Willd.	Hairy wild rye	40714	native	G5	Hogan and Webber 1999
Cat #4489	Elymus virginicus L.	Virginia wild rye	40681	native		NatureServe 2002-2003
	Eragrostis curvula (Schrader)	Weeping lovegrass		South		NPS - not collected

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
	Nees.			Africa		
372-SRNB	Eragrostis frankii C.A. Mey. ex Steud.		40741	native		
Cat #4490	Eragrostis intermedia		40745	native		NatureServe 2002-2003
239-SRNB	Eragrostis pectinaceae (Michx.) Nees. ex Steud.		40723	native		
367-SRNB	Eragrostis spectabilis (Pursh) Streud.	Purple lovegrass	40717	native	G5	Hogan and Webber 1999
583-SRNB	Erechtites hieraciifolia (L.) Raf. ex DC. var hieraciifolia			native		
225-SRNB	Erigeron annuus (L.) Pers.	Eastern daisy fleabane	35804	native	G5	Hogan and Webber 1999
015-SRNB	Erigeron philadelphicus L.		35809	native		
	Erigeron strigosus Muhl. ex Willd. var. calcicola J. Allison	Limestone daisy fleabane		native to Midwest		NPS - not collected
263-SRNB	Erigeron strigosus Muhl. ex Willd. var. strigosus			native		
	Erysimum repandum L.			European		collected by D. Estes
041-SRNB	Erythronium albidum Nutt.	Trout-lily	196365	native	G5	Hogan and Webber 1999
	Euonymus alata (Thunb.) Sieb.	Winged spindletree		east Asia EPPC-2		collected by D. Estes
179-SRNB	Euonymus americana L.		502577	native		
269-SRNB	Euonymus atropurpurea L.	Eastern wahoo	502579	native	G5	Hogan and Webber 1999
	Euonymus fortunei (Turcz.) Hand.-Maz.	Climbing euonymous		China EPPC-1		NPS - not collected
529-SRNB	Eupatorium altissimum L.	Tall thoroughwort	502498	native	G5	Hogan and Webber 1999
606-SRNB	Eupatorium capillifolium (Lam.) Small	Dog-fennel	35978	native	G5	Hogan and Webber 1999
382-SRNB	Eupatorium coelestinum L.		502504	native		
Cat #4491	Eupatorium hyssopifolium		35979	native		NatureServe 2002-2003
Cat #4492	Eupatorium incarnatum		37385	native		NatureServe 2002-2003
383-SRNB	Eupatorium serotinum Michx.	Late thoroughwort	35981	native	G5	Hogan and Webber 1999
	Euphorbia bluplorium			exotic		NPS - not collected
196-SRNB	Euphorbia dentata Michx.	Toothed spurge	502535	native	G5	Hogan and Webber 1999
462-SRNB	Euphorbia pubentissima Michx.	False flowering spurge	28125	native	G5	Hogan and Webber 1999
049-SRNB	Euphorbia spathulata Lam.		28138	native		
426-SRNB	Euthamia leptocephala (Torr. & Gray) Greene	Bushy goldentop	37354	native	G5	Hogan and Webber 1999
434-SRNB	Evolvulus nutallianus J. A. Schultes	Shaggy dwarf morning-glory	502573	native	G5	Hogan and Webber 1999
447-SRNB	Festuca arundinacea Schreb.		40810	Eurasia EPPC-2		
430-SRNB	Festuca pratensis Huds.			Eurasia EPPC-2		
427-SRNB	Festuca subverticillata (Pers.) E.B. Alexeev	Nodding fescue	502612	Eurasia	G5	Hogan and Webber 1999
	Forestiera ligustrina (Michx.) Poiret.	Native privet, Glade privet		native		NPS - not collected
046-SRNB	Forsythia viridissima Lindl.		32963	Eurasia		
103-SRNB	Fragaria virginiana Duchesne	Virginia strawberry	24639	native	G5	Hogan and Webber 1999
577-SRNB	Frangula caroliniana (Walt.) Gray	Carolina buckthorn	506986	native	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
579-SRNB	Fraxinus americana L.	White ash	32931	native	G5	Hogan and Webber 1999
578-SRNB	Fraxinus pennsylvanica Marsh.	Green ash	32929	native	G5	Hogan and Webber 1999
	Fraxinus quadrangulata Michx.	Blue ash		native		NPS - not collected
346-SRNB	Galactia volubilis (L.) Britt.		26703	native		
428-SRNB	Galeopsis ladanum L.			native		
316-SRNB	Galinsoga quadriradiata Ruiz & Pav.		37415	Canada, S. America		
208-SRNB	Galium aperine L.	Sticky-willy	34797	native	G5	Hogan and Webber 1999
281-SRNB	Galium circaezans Michx.	Licorice bedstraw	34800	native	G5	Hogan and Webber 1999
506-SRNB	Galium pilosum Aiton	Hairy bedstraw	34907	native	G5	Hogan and Webber 1999
054-SRNB	Galium triflorum Michx.	Sweet-scent bedstraw	34933	native	G5	Hogan and Webber 1999
197-SRNB	Gamochaeta purpurea (L.) Cabrera	Spoonleaf purple everlasting	37421	native	G5	Hogan and Webber 1999
052-SRNB	Geranium carolinianum L.			native		
060-SRNB	Geranium dissectum L.	Cutleaf crane's-bill	29135	Europe	G?	Hogan and Webber 1999
068-SRNB	Geranium molle L.		29110	Europe and western Asia		
180-SRNB	Geum canadense Jacq.	Canada avens	24645	native	G5	Hogan and Webber 1999
056-SRNB	Geum vernum (Raf.) Torr. & Gray		24664	native		
181-SRNB	Geum virginianum L.		24665	native		
545-SRNB	Ginkgo biloba L.		183269	Asia		
098-SRNB	Glandularia canadensis (L.) Nutt.	Rose mock vervain	502784	native	G5	Hogan and Webber 1999
085-SRNB	Glechoma hederacea L.		502801	Eurasia EPPC-3		
575-SRNB	Gleditsia tricanthos L.	Honey-locust	26714	native	G5	Hogan and Webber 1999
616-SRNB	Gnaphalium obtusifolium L. var. obtusifolium		528261	native		
	Grindelia lanceolata	Narrowleaf gumweed		native		NPS - not collected
107-SRNB	Hedeoma hispida Pursh	Rough false pennyroyal	502890	native	G5	Hogan and Webber 1999
Cat #4493	Hedera helix L.	English ivy	29393	Europe EPPC-1		NatureServe 2002-2003
	Hedyotis crassifolia Raf.			native		NPS - not collected
415-SRNB	Helenium amarum (Raf.) H. Rock var. amarum			native		
528-SRNB	Helianthus tuberosus L.			native		
283-SRNB	Heliotropium tenellum (Nutt.) Torr.	Pasture heliotrope	31652	native	G5	Hogan and Webber 1999
304-SRNB	Hemerocallis fulva (L.) L.		42943	Eurasia		
560-SRNB	Heterotheca camporum (Greene) Shinner		502969	native to Midwest		
361-SRNB	Heterotheca subaxillaris (Lam.) Britt. & Rusby	Camphor goldenaster	37686	native	G5	Hogan and Webber 1999
497-SRNB	Hibiscus moscheutos L. ssp. moscheutos		21614	native		
628-SRNB	Hibiscus syriacus L.		21638	east Asia EPPC-A		
	Holosteum umbellatum L.			Eurasia		collected by D. Estes

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
418-SRNB	Hordeum pusillum Nutt.	Little barley	40866	native	G5	Hogan and Webber 1999
260-SRNB	Houstonia purpurea L.	Venus' pride	35051	native	G5	Hogan and Webber 1999
199-SRNB	Houstonia purpurea L. var. calycosa Gray		196212	native		
019-SRNB	Houstonia pusilla Schoepf.	Quaker-ladies	35038	native	G5	Hogan and Webber 1999
246-SRNB	Hypericum frondosum Michx.	Golden St. John's-wort	21440	native	G4	Hogan and Webber 1999
	Hypericum prolificum L.			native		NPS - not collected
320-SRNB	Hypericum punctatum Lam.	Spotted St. John's-wort	21422	native	G5	Hogan and Webber 1999
303-SRNB	Hypericum sphaerocarpum Michx.	Round-seed St. John's-wort	21460	native	G5	Hogan and Webber 1999
076-SRNB	Hypoxis hirsuta (L.) Coville	Eastern yellow star-grass	503146	native	G5	Hogan and Webber 1999
	Ilex decidua Walter	Deciduous holly		native		NPS - not collected
609-SRNB	Ilex glabra (L.) A. Gray			native to southeastern us, Gulf Coastal Plain		
536-SRNB	Ilex opaca Ait.	American holly	27982	native	G5	Hogan and Webber 1999
166-SRNB	Impatiens capensis Meerb.	Orange jewelweed	29182	native	G5	Hogan and Webber 1999
102-SRNB	Iodanthus pinnatifidus (Michx.) Steud.		23149	native		
331-SRNB	Ipomoea hederacea Jacq.		503177	native		
229-SRNB	Ipomoea pandurata (L.) G.F.W. Mey.	Man-of-the-earth	30786	native	G5	Hogan and Webber 1999
486-SRNB	Ipomoea purpurea (L.) Roth		30789	Tropical America		
	Isoetes butleri Engelm.			native		collected by D. Estes
558-SRNB	Iva annua L.			native		
286-SRNB	Juglans cinerea L.	Butternut	19250	native	G3G4	Hogan and Webber 1999
251-SRNB	Juglans nigra L.			native		
488-SRNB	Juncus dicotomus Ell.	Forked rush	39264	native	G5	Hogan and Webber 1999
	Juncus effusus L.	Lamp rush		native		NPS - not collected
472-SRNB	Juncus filipendulous Buckl.		39270	native		
243-SRNB	Juncus tenuis Willd.	Grassleaf rush	39289	native	G5	Hogan and Webber 1999
311-SRNB	Juniperus virginiana L. var. virginiana		194806	native		
299-SRNB	Justicia americana (L.) Vahl.	Common water-willow	34352	native	G5	Hogan and Webber 1999
127-SRNB	Krigia caespitosa Raf. Chambers			native		
	Kummerowia stipulacea (Maxim.) Makino			Asia EPPC-3		
397-SRNB	Kummerowia striata (Thunb.) Schindl.		503294	east Asia EPPC-3		
332-SRNB	Lactuca canadensis L.		36596			
333-SRNB	Lactuca saligna L.		36606	Europe, now found here and there in our range		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
092-SRNB	Lamium amplexicaule L.		32539	Eurasia, North Africa		
006-SRNB	Lamium purpureum L.		32543	Eurasia		
298-SRNB	Larix occidentalis Nutt.	Western larch	183417	western U.S.	G5	Hogan and Webber 1999
503-SRNB	Lathyrus latifolius L.		25856	southern Europe		
033-SRNB	Leavenworthia exigua (Michx.) Britt. var. exigua	Tennessee gladecress	503349	native	G4	Hogan and Webber 1999
036-SRNB	Leavenworthia stylosa (Michx.) Britt.	Cedar gladecress	503350	native	G4	Hogan and Webber 1999
108-SRNB	Leavenworthia uniflora (Michx.) Britt.			native		
463-SRNB	Leersia virginica Willd.	White cutgrass	40890	native	G5	Hogan and Webber 1999
099-SRNB	Lepidium campestre (L.) Ait. F.		22954	Europe		
407-SRNB	Lepidium virginicum var. virginicum L.		528742	native		
	Leptochloa panicea (Retz.) Ohwi ssp. brachiata (Steudl.) N. Snow	Needle sprangletop		native		NPS - not collected
362-SRNB	Lespedeza cuneata (Dum.-Cours.) G. Don		25898	east Asia EPPC-1		
619-SRNB	Lespedeza violacea (L.) Pers.	Violet bushclover	25914	native	G5	Hogan and Webber 1999
053-SRNB	Leucanthemum vulgare Lam.		37903	Eurasia EPPC-3		
026-SRNB	Leucospora multifida (Michx.) Nutt.		33632	native		
	Ligustrum sinense Lour.	Chinese privet		Asia EPPC-1		NPS - not collected
249-SRNB	Ligustrum vulgare L.		32980	Old World EPPC-1		
	Liparis lilifolia (L.) Rich. ex Lindl.			native		NPS - not collected
591-SRNB	Liquidambar styraciflua L.	Sweetgum	19027	native	G5	Hogan and Webber 1999
Cat #4494	Liriope spicatum		503502	exotic		NatureServe 2002-2003
062-SRNB	Lithospermum tuberosum Rugel ex DC.	Southern stoneseed	31954	native	G4	Hogan and Webber 1999
156-SRNB	Lobelia appendiculata A. DC. var. gattingeri (Gray) McVaugh		528843	native		
513-SRNB	Lobelia cardinalis L. var. cardinalis		524251	native		
566-SRNB	Lobelia inflata L.	Indian tobacco	34524	native	G5	Hogan and Webber 1999
291-SRNB	Lobelia spicata Lam. var. spicata		528862	native		
016-SRNB	Lolium perenne L. var. aristatum		536912	Europe		
	Lonicera fragrantissima Lindl. & Paxton			Eastern China EPPC-1		NPS - not collected
155-SRNB	Lonicera japonica Thunb.	Japanese honeysuckle	35283	east Asia	G?	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				Asia EPPC-1		
059-SRNB	Lonicera maackii (Rupr.) Maxim.	Amur honeysuckle	35298	Asia EPPC-1	G?	Hogan and Webber 1999
159-SRNB	Lonicera sempervirens L.	Trumpet honeysuckle	35303	Native	G5	Hogan and Webber 1999
449-SRNB	Ludwigia peploides (Kunth) Raven ssp. glabrescens		524268	Native		
572-SRNB	Maclura pomifera (Raf.) Schneid.	Osage orange	19102	Native	G2G4	Hogan and Webber 1999
176-SRNB	Magnolia grandiflora L.	Southern magnolia	18074	Native	G5	Hogan and Webber 1999
	Mahonia sp.			Exotic		collected by D. Estes
482-SRNB	Malva neglecta Wallr.		21836	Eurasia and north Africa		
265-SRNB	Manfreda virginica (L.) Salisb. ex Rose			Native		
241-SRNB	Marrubium vulgare L.		32561	Eurasia		
178-SRNB	Matelea gonocarpos (Walt.) Shinners	Angular-fruit milkvine	503702	Native	G5	Hogan and Webber 1999
065-SRNB	Mecardonia acuminata (Walt.) Small	Axil-flower	33645	Native	G5	Hogan and Webber 1999
Cat #4495	Medicago lupulina L.		503721	Eurasia		NatureServe 2002-2003
112-SRNB	Melica mutica Walt.	Two-flower melicgrass	41858	Native	G5	Hogan and Webber 1999
177-SRNB	Melilotus alba Medik.		26149	Eurasia EPPC-2		
608-SRNB	Melilotus officinalis (L.) Lam.			Eurasia EPPC-2		
569-SRNB	Melothria pendula L.		22339	Native		
596-SRNB	Microstegium vimineum (Trin.) A. Camus	Nepalese browntop	503829	tropical Asia EPPC-1	G?	Hogan and Webber 1999
020-SRNB	Minuartia patula (Michx.) Mattf. var. patula			Native		
Cat #4496	Mollugo verticillata L.	Green carpetweed	19899	tropical America		NatureServe 2002-2003
	Monarda punctata L. ssp. punctata var. punctata	Spotted beebalm		Native		collected by D. Estes
206-SRNB	Morus alba L.		19066	east Asia		
157-SRNB	Morus rubra L.	Red mulberry	19070	native	G5	Hogan and Webber 1999
595-SRNB	Muhlenbergia shreberi J.F. Gmel.		41939	native		
347-SRNB	Muhlenbergia sobolifera (Muhl. ex. Willd.) Trin.		41941	native		
001-SRNB	Muscari botryoides (L.) P. Mill.		42977	Europe EPPC-A		
	Muscari neglectum Guss. ex Ten.			exotic		
090-SRNB	Myosotis macrosperma Engelm.		31695	native		
089-SRNB	Myosotis verna Nutt.	Spring forget-me-not	31699	native	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
308-SRNB	Nandina domestica Thunb.		18848	escaped cultivar EPPC-2		
087-SRNB	Narcissus poeticus L.		503929	Europe		
058-SRNB	Narcissus pseudonarcissus L.		503930	Europe		
096-SRNB	Nemophila aphylla (L.) Brummitt		31422	native		
Cat #4497	Nepeta cataria		32623	exotic		NatureServe 2002-2003
048-SRNB	Nothoscordum bivalve (L.) Britt.			native		
192-SRNB	Oenothera laciniata Hill		27371	native		
393-SRNB	Oenothera parviflora L.		504007	native		
158-SRNB	Oenothera speciosa Nutt.	Pinkladies	27415	Mo. & Kans. to Tex. and introduced . eastward	G5	Hogan and Webber 1999
088-SRNB	Oenothera triloba Nutt.		27420	native		
223-SRNB	Onosmodium molle Michx. ssp. molle			native		
220-SRNB	Ophioglossum engelmannii Prantl	Limestone adder's-tongue	504032	native	G5	Hogan and Webber 1999
061-SRNB	Ophioglossum vulgatum L.	Southern adder's-tongue	17195	native	G5	Hogan and Webber 1999
	Opuntia humifusa	Prickly-pear cactus		native		NPS - not collected
081-SRNB	Ornithogalum umbellatum L.		42754	Europe EPPC-3		
	Ostrya virginiana(P. Mill.) K. Koch			native		NPS - not collected
070-SRNB	Oxalis dillenii Jacq.	Slender yellow wood sorrel	29074	native	G5	Hogan and Webber 1999
150-SRNB	Oxalis pricea Small var. pricea		524397	native		
348-SRNB	Panicum anceps Michx.	Beaked panicgrass	40904	native	G5	Hogan and Webber 1999
422-SRNB	Panicum capillare L.	Common panicgrass	40914	native	G5	Hogan and Webber 1999
	Panicum dichotomiflorum Michx. var. dichotomiflorum	Fall panicgrass		native		NPS - not collected
530-SRNB	Panicum flexile (Gattinger) Scribn.	Wiry panicgrass	40918	native	G5	Hogan and Webber 1999
193-SRNB	Panicum virgatum L.	Switchgrass	40913	native	G5	Hogan and Webber 1999
611-SRNB	Parietaria pensylvanica Muhl. ex Willd.	Pennsylvania pellitory	19169	native	G5	Hogan and Webber 1999
067-SRNB	Parthenocissus quinquifolium (L.) Planch.	Virginia creeper	28602	native	G5	Hogan and Webber 1999
495-SRNB	Paspalum dilatatum Poir		40997	South America		
Cat #4498	Paspalum laeve		41024	native		NatureServe 2002-2003

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
483-SRNB	Paspalum setaceum Michx.	Slender crowngrass	41042	native	G5	Hogan and Webber 1999
413-SRNB	Passiflora incarnata L.		504139	native		
561-SRNB	Passiflora lutea L.	Yellow passionflower	22226	native	G5	Hogan and Webber 1999
	Paulownia tomentosa (Thunb.) Sieb. & Zucc. ex Steud.	Princess tree		China EPPC-1		NPS - not collected
032-SRNB	Pediomelum subacaule (Torr. & Gray) Rydb.	White-rim indian breadroot	504187	native	G4	Hogan and Webber 1999
309-SRNB	Pellaea atropurpurea (L.) Link	Purple cliffbrake	17641	native	G5	Hogan and Webber 1999
Cat #4499	Pennisetum glaucum		565385	exotic		NatureServe 2002-2003
168-SRNB	Penstemon calycosus Small		33845	native		
183-SRNB	Penstemon smallii Heller			native		
132-SRNB	Penstemon tenuiflorus Pennell	Eastern white-flower beardtongue	33780	native	G3?	Hogan and Webber 1999
524-SRNB	Perilla frutescens (L.) Britt.	Beefsteak plant	32634	India to Japan, escaped into waste places and roadsides	G?	Hogan and Webber 1999
022-SRNB	Phacelia dubia (L.) Trel.	Small-flower scorpionweed	31441	native	G5	Hogan and Webber 1999
200-SRNB	Phacelia purshii Buckl.		504279	native		
247-SRNB	Philadelphus pubescens Loisel. var. pubescens		529607	native		
011-SRNB	Phleum pratense L.	Timothy	41062	Europe	G?	Hogan and Webber 1999
363-SRNB	Phyla lanceolata (Michx.) Greene	Common frogfruit	32196	native	G5	Hogan and Webber 1999
384-SRNB	Physalis longifolia var. subglabrata (Mckenzie & Bush) Cronq.		529629	native		
318-SRNB	Physalis pubescens L. var. integrifolia (Dunal) Waterfall		529634	native		
	Physocarpos opulifolius (L.) Maxim. var. opulifolius	Atlantic ninebark		native		NPS - not collected
238-SRNB	Phytolacca americana L.	American pokeweed	19523	native	G5	Hogan and Webber 1999
547-SRNB	Picea engelmannii Parry ex Engelm	Engelmann spruce	183291	northern North America	G5	Hogan and Webber 1999
322-SRNB	Picea glauca (Moench) Voss	White spruce	183295	western North America	G5	Hogan and Webber 1999
565-SRNB	Pilea pumila (L.) Gray var. pumila			native		
344-SRNB	Pinus strobus L.	Eastern white pine	183385	native	G5	Hogan and Webber 1999
	Pinus taedaL.	Loblolly pine		southeastern US		NPS - not collected
212-SRNB	Plantago aristata Michx.	Large-bract plantain	32875	native from	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				Illinois to Louisiana and Texas, now naturalized e. U.S. & Canada		
171-SRNB	Plantago lanceolata L.		32874	Eurasia		
484-SRNB	Plantago rugelii Dcne.		504439	native		
130-SRNB	Plantago virginica L.		32895	native		
537-SRNB	Platanus occidentalis L.	Sycamore	19020	native	G5	Hogan and Webber 1999
	Poa compressa L.			Europe		NPS - not collected
433-SRNB	Poa pratensis L.	Kentucky bluegrass	41088	Europe	G?	Hogan and Webber 1999
421-SRNB	Poa sylvestris Gray	Woodland bluegrass	41162	native	G5	Hogan and Webber 1999
148-SRNB	Podophyllum peltatum L.	May-apple	18850	native	G5	Hogan and Webber 1999
373-SRNB	Polanisia dodecandra (L.) DC.	Red-whisker clammyweed	22652	native	G5	Hogan and Webber 1999
505-SRNB	Polygala verticillata L.	Whorled milkwort	29320	native	G5	Hogan and Webber 1999
147-SRNB	Polygonatum biflorum (Walter) Elliot	King Solomon's-seal	43006	native	G5	Hogan and Webber 1999
516-SRNB	Polygonum aviculare L.	Yard knotweed	20876	exotic	G?	Hogan and Webber 1999
408-SRNB	Polygonum cespitosum Blume var. longisetum (deBruyn) A. N. Steward			east Asia EPPC-2		
326-SRNB	Polygonum convolvulus L.			Europe		
337-SRNB	Polygonum lapathifolium L.	Pale smartweed	20860	native	G5	Hogan and Webber 1999
Cat #4500	Polygonum pensylvanicum		20861	native		NatureServe 2002-2003
474-SRNB	Polygonum persicaria L.	Spotted lady's-thumb	20915	Europe EPPC-3	G3G5	Hogan and Webber 1999
557-SRNB	Polygonum punctatum Ell. var. punctatum		529787	native		
182-SRNB	Polymnia canadensis L.	Canada leafcup	36438	native	G5	Hogan and Webber 1999
644-SRNB	Populus deltoides Marsh.	Eastern cottonwood	22445	native	G5	Hogan and Webber 1999
153-SRNB	Potentilla recta L.		24742	Europe		
240-SRNB	Potentilla simplex Michx.	Oldfield cinquefoil	24751	native	G5	Hogan and Webber 1999
354-SRNB	Prunella vulgaris L. var. lanceolata			native and European variety		
079-SRNB	Prunus angustifolia Marsh.	Chickasaw plum	24768	native	G5	Hogan and Webber 1999
	Prunus caroliniana (P. Mill.) Ait.	Carolina laurel cherry		southeastern US,		NPS - not collected

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				not TN		
	Prunus mahaleb L.	Perfumed cherry		cultivar		NPS - not collected
084-SRNB	Prunus serotina Ehrh.	Black cherry	24764	native	G5	Hogan and Webber 1999
573-SRNB	Pseudotsuga menziesii (Mirbel) Franco	Douglas-fir	183424	western North America	G5	Hogan and Webber 1999
551-SRNB	Ptelea trifoliata L.	Hoptree	28992	native	G5	Hogan and Webber 1999
174-SRNB	Pueraria montana (Willd.) Ohwi			Asia EPPC-1		
401-SRNB	Pyrrhopappus carolinianus (Walt.) DC.		38324	native		
Cat #4501	Pyrus communis		25295	Eurasia		NatureServe 2002-2003
546-SRNB	Quercus acutissima Carruthers		195162	Asia		
538-SRNB	Quercus alba L.	White oak	19290	native	G5	Hogan and Webber 1999
	Quercus egglestonii Trel. (Q. imbricaria x shumardii)			native		collected by D. Estes
597-SRNB	Quercus falcata Michx.	Southern red oak	19277	native	G5	Hogan and Webber 1999
581-SRNB	Quercus imbricaria Michx.	Shingle oak	19359	native	G5	Hogan and Webber 1999
571-SRNB	Quercus macrocarpa Michx.	Bur oak	19287	native	G5	Hogan and Webber 1999
400-SRNB	Quercus muehlenbergii Engelm.	Chinquapin oak	504714	native	G5	Hogan and Webber 1999
544-SRNB	Quercus palustris Muench.	Pin oak	19281	native	G5	Hogan and Webber 1999
580-SRNB	Quercus shumardii Buckl.			native		
592-SRNB	Quercus stellata Wang	Post oak	19422	native	G5	Hogan and Webber 1999
594-SRNB	Quercus velutina Lam.	Black oak	19447	native	G5	Hogan and Webber 1999
Cat #4502	Quercus X joorii Trelease (Q. falcata x shumardii)		504712	native		NatureServe 2002-2003
119-SRNB	Ranunculus abortivus L.		18559	native		
077-SRNB	Ranunculus micranthus Nutt.		18628	native		
129-SRNB	Ranunculus sardous Crantz			Europe		
	Ratibida pinnata	Prairie coneflower		native/planted		NPS - not collected
071-SRNB	Rhamnus lanceolata Pursh ssp glabrata (Gleason) Kartesz & Gandhi		525000	native		
064-SRNB	Rhus aromatica Ait.	Fragrant sumac	28779	native	G5	Hogan and Webber 1999
576-SRNB	Rhus copallinum L.	Winged sumac	504754	native	G5	Hogan and Webber 1999
319-SRNB	Rhus glabra L.	Smooth sumac	28782	native	G5	Hogan and Webber 1999
	Rhus typhina L.	Staghorn sumac		native		NPS - not collected
	Robinia pseudoacacia L.			native		NPS - not collected
224-SRNB	Rorippa palustris (L.) Bess ssp. glabra var. fernaldiana			native		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
161-SRNB	Rosa carolina L.	Carolina rose	24808	native	G4G5	Hogan and Webber 1999
185-SRNB	Rosa eglanteria L.	Sweetbrier	24825	Europe	G?	Hogan and Webber 1999
124-SRNB	Rosa multiflora Thunb.	Multiflora rose	24833	east Asia EPPC-1		
209-SRNB	Rosa setigera Michx. ex Murr.	Climbing rose	24839	native	G5	Hogan and Webber 1999
284-SRNB	Rosa wichuraiana Crepin		24846	east Asia		
163-SRNB	Rubus argutus Link	Southern blackberry	24877	native	G5	Hogan and Webber 1999
459-SRNB	Rubus bifrons Vest ex Tratt	Himalayan blackberry	24852	Europe	G?	Hogan and Webber 1999
164-SRNB	Rubus hispidus L.	Bristly dewberry	24943	native	G5	Hogan and Webber 1999
414-SRNB	Rudbeckia hirta L. var. pulcherrima Faw.		530172	native		
300-SRNB	Rudbeckia triloba L.	Brown-eyed Susan	36784	native	G4	Hogan and Webber 1999
245-SRNB	Ruellia humilis Nutt. var. humilis			native		
271-SRNB	Ruellia strepens L.			native		
266-SRNB	Rumex altissimus Wood	Pale dock	20949	native	G5	Hogan and Webber 1999
417-SRNB	Rumex conglomeratus Murr.		20936	Europe		
485-SRNB	Rumex crispus L.	Curly dock	20937	Europe	G?	Hogan and Webber 1999
504-SRNB	Sabatia angularis (L.) Pursh	Square-stem sabatia	30005	native	G5	Hogan and Webber 1999
620-SRNB	Salix caroliniana Michx.	Carolina willow	22516	native	G5	Hogan and Webber 1999
410-SRNB	Salix nigra Marsh.	Black willow	22484	native	G5	Hogan and Webber 1999
091-SRNB	Salvia lyrata L.	Lyreleaf sage	32690	native	G5	Hogan and Webber 1999
136-SRNB	Sambucus canadensis L.		35317	native		
198-SRNB	Sanicula canadensis L.			native		
276-SRNB	Saponaria officinalis L.		20039	Old World		
376-SRNB	Sassafras albidum (Nutt.) Ness	Sassafras	18158	native	G5	Hogan and Webber 1999
012-SRNB	Saxifraga virginiensis Michx.	Early saxifrage	24303	native	G5	Hogan and Webber 1999
	Schizachyrium scoparium (Michx.) Nash. var. scoparium	Little bluestem		native		NPS - not collected
444-SRNB	Scirpus pendulus Muhl.	Rufous bulrush	40273	native	G5	Hogan and Webber 1999
440-SRNB	Scleria pauciflora Muhl. ex Willd.	Papillose nutrush	40315	native	G5	Hogan and Webber 1999
584-SRNB	Scrophularia marilandica L.	Carpenter's-square	34037	native	G5	Hogan and Webber 1999
116-SRNB	Scutellaria parvula Michx. var. parvula	Small skullcap	32776	native	G4	Hogan and Webber 1999
118-SRNB	Sedum pulchellum Michx.	Widow's-cross	24157	native	G5	Hogan and Webber 1999
	Sedum sarmtentosum Bunge	Stringy stonecrop		exotic		NPS - not collected
215-SRNB	Sedum ternatum Michx.	Woodland stonecrop	24184	native	G5	Hogan and Webber 1999
131-SRNB	Senecio anonymus Wood		36095	native		

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
202-SRNB	Senecio glabellus Poir.		36138	native		
066-SRNB	Senecio obovatus Muhl. ex Willd.		36164	native		
Cat #4517	Senna hebecarpa		505155	native		NatureServe 2002-2003
201-SRNB	Senna marilandica (L.) Link	Maryland wild sensitive plant	505160	native	G5	Hogan and Webber 1999
478-SRNB	Setaria faberi R.A.W. Herrm.		41244	East Asia EPPC-2		
640-SRNB	Setaria parviflora (Poir.) Kerguelen			tropical North America		
139-SRNB	Setaria viridis (L.) P. Beauv. var. viridis			Eurasia EPPC-2		
207-SRNB	Sherardia arvensis L.		35237	W. Eurasia, N. Africa		
496-SRNB	Sida spinosa L.		21732	pantropical		
613-SRNB	Sideroxylon lycioides L.	Buckthorn bumelia	505220	native	G5	Hogan and Webber 1999
216-SRNB	Sisymbrium officinale (L.) Scop.		23316	Eurasia, now naturalized		
074-SRNB	Sisyrinchium albidum Raf.	White blue-eyed-grass	43241	native	G5?	Hogan and Webber 1999
123-SRNB	Sisyrinchium angustifolium P. Mill.		43240	native		
Cat #4503	Smilax bona-nox L.	Fringed greenbrier	43341	native		NatureServe 2002-2003
	Smilax glauca Walt.	Sawbrier		native		NPS - not collected
210-SRNB	Smilax herbacea L. var. herbecea			native		
244-SRNB	Smilax rotundifolia L.	Common greenbrier	43346	native	G5	Hogan and Webber 1999
	Smilax tamnoides L.	Bristly greenbrier, Chinaroot		native		NPS - not collected
128-SRNB	Solanum carolinense L.		30413	native		
406-SRNB	Solanum nigrum L.		30448	Europe		
553-SRNB	Solidago canadensis L. var. scabra Torr. & Gray		530448	native		
345-SRNB	Solidago juncea Ait.	Early goldenrod	36270	native	G5	Hogan and Webber 1999
534-SRNB	Solidago nemoralis Ait.	Gray goldenrod	36281	native	G5	Hogan and Webber 1999
	Solidago odora Ait.			native		NPS - not collected
641-SRNB	Solidago rugosa P. Mill. ssp. aspera (Ait.) Cronq.		36301	native		
050-SRNB	Sonchus asper (L.) Hill		38424	Europe		
607-SRNB	Sorghastrum nutans (L.) Nash	Yellow Indiangrass	42102	native	G5	Hogan and Webber 1999
412-SRNB	Sorghum halepense (L.) Pers.	Johnson grass	42111	Mediterranean EPPC-1	G?	Hogan and Webber 1999
420-SRNB	Sphenopholis intermedia (Rydb.) Rydb.			native		
121-SRNB	Sphenopholis nitida (Biehler) Scribn.			native		
431-SRNB	Sphenopholis obtusata (Michx.) Scribn. var. major (Torr.) K.S. Erdman			native		
402-SRNB	Spigelia marilandica (L.) L.	Woodland pinkroot	505330	native	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
218-SRNB	Spiraea prunifolia Sieb. & Zucc.		25337	east Asia		
	Spiranthes cernua (L.) L.C. Rich	White nodding ladies'-tresses		native		NPS - not collected
526-SRNB	Spiranthes lacera (Raf.) Raf. var. gracilis (Bigelow) Luer		530529	native		
456-SRNB	Spirodela polyrrhiza (L.) Schleid.	Common duckmeat	505347	native	G5	Hogan and Webber 1999
532-SRNB	Sporobolus compositus (Poir.) Merr. var. compositus		531124	native		
	Sporobolus heterolepis A. Gray	Prairie dropseed		planted, native to TN		
439-SRNB	Sporobolus vaginiflorus (Torr. ex Gray) Wood	Poverty dropseed	42126	native	G5	Hogan and Webber 1999
025-SRNB	Stellaria media (L.) Vill.	Common chickweed	20169	Old World, naturalized	G?	Hogan and Webber 1999
370-SRNB	Symphoricarpos orbiculatus Moench	Coralberry	35337	native	G5	Hogan and Webber 1999
073-SRNB	Syringa vulgaris L.		32996	Southeast Europe		
306-SRNB	Talinum calcaricum Ware	Limestone fameflower	505427	native	G3	Hogan and Webber 1999
002-SRNB	Taraxacum officinale G.H. Weber ex Wiggers	Common dandelion	36213	Eurasia	G5	Hogan and Webber 1999
144-SRNB	Thalictrum dioicum L.	Early meadowrue	18669	native	G5	Hogan and Webber 1999
010-SRNB	Thalictrum thalictroides (L.) Eames & Boivin	Rue-anemone	18683	native	G5	Hogan and Webber 1999
Cat #4518	Thaspium trifoliatum		29890	native		NatureServe 2002-2003
031-SRNB	Thlaspi arvense L.		23422	Europe		
540-SRNB	Thuja occidentalis L.	Northern white-cedar	505490	native	G5	Hogan and Webber 1999
222-SRNB	Torilis arvensis (Huds.) Link		29894	Europe EPPC-2		
	Toxicodendron radicans (L.) Kuntze	Poison ivy		native		NPS - not collected
518-SRNB	Tragia cordata Michx.			native		
154-SRNB	Tragopogon dubius Scop.	Meadow goat's-beard	38564	Europe EPPC-3	G?	Hogan and Webber 1999
437-SRNB	Tragopogon pratensis L.			Europe		
429-SRNB	Trichostema brachiatum L.		32372	native		
398-SRNB	Tridens flavus (L.) A. S. Hitchc.	Tall redtop	42227	native	G5	Hogan and Webber 1999
100-SRNB	Trifolium campestre Schreb.		26231	Eurasia and North Africa		
369-SRNB	Trifolium incarnatum L.		26262	Europe		
527-SRNB	Trifolium pratense L.		26313	Europe		
101-SRNB	Trifolium repens L.		26206	Eurasia		
035-SRNB	Trillium cuneatum Raf.	Little sweet Betsy	43056	native	G4G5	Hogan and Webber 1999
	Trillium sessile	Toadshade		native		NPS - not collected
152-SRNB	Triodanis perfoliata (L.) Nieuwl.		34615	native		
Cat #4519	Triodanis perfoliata var. biflora		530742	native		NatureServe 2002-2003
Cat #4520	Triticum aestivum		42237	Eurasia		NatureServe 2002-2003
343-SRNB	Tsuga canadensis (L.) Carr.	Eastern hemlock	183397	N.E.	G5	Hogan and Webber 1999

Collection #	Scientific Name	Common Name	TSN	Exotic / native	Grank	Data source
				U.S. and in mountains to Georgia and Alabama		
411-SRNB	Typha latifolia L.	Broadleaf cattail	42326	native	G5	Hogan and Webber 1999
013-SRNB	Ulmus alata Michx.	Winged elm	19051	native	G5	Hogan and Webber 1999
040-SRNB	Ulmus americana L.	American elm	19049	native	G5?	Hogan and Webber 1999
435-SRNB	Ulmus rubra Muhl.	Slippery elm	19050	native	G5	Hogan and Webber 1999
375-SRNB	Ulmus serotina Sarg.	September elm	19058	native/planted	G4	Hogan and Webber 1999
037-SRNB	Urtica chamaedryoides Pursh	Dwarf stinging nettle	19156	native	G4G5	Hogan and Webber 1999
Cat #4521	Valerianella radiata		35397	native		NatureServe 2002-2003
203-SRNB	Valerianella umbilicata (Sullivant) Wood		505639	native		
188-SRNB	Verbascum blattaria L.		33389	Eurasia		
355-SRNB	Verbascum thapsus L.	Great mullein	33394	Europe EPPC-2	GNR	Hogan and Webber 1999
274-SRNB	Verbena simplex Lehm.	Narrowleaf vervain	32123	native	G5	Hogan and Webber 1999
457-SRNB	Verbena utricifolia L.	White vervain	32127	native	G5	Hogan and Webber 1999
586-SRNB	Verbesina alternifolia (L.) Britt. ex Kearney	Common wingstem	38597	native	G5	Hogan and Webber 1999
356-SRNB	Verbesina virginica L. var. virginica		530792	native		
371-SRNB	Vernonia gigantea (Walter) Trel.	Giant ironweed	38634	native	G5	Hogan and Webber 1999
057-SRNB	Veronica arvensis L.		33411	Eurasia		
014-SRNB	Veronica hederifolia L.		33418	Europe		
	Viburnum prunifolium L.			native		collected by D. Estes
082-SRNB	Viburnum rufidulum Raf.	Rusty blackhaw	35274	native	G5	Hogan and Webber 1999
233-SRNB	Vicia sativa ssp. nigra (L.) Ehrh.		524809	Europe EPPC-2		
023-SRNB	Vinca minor L.		30238	Europe EPPC-2		
086-SRNB	Viola arvensis Murr.		22037	Europe		
039-SRNB	Viola bicolor Pursh		22047	native		
115-SRNB	Viola egglestonii Brainerd		22072	native		
047-SRNB	Viola septemloba Le Conte		22165	native		
005-SRNB	Viola sororia Willd.	Hooded blue violet	22169	native	G5	Hogan and Webber 1999
Cat #4504	Vitis cinerea var. baileyana		530854	native		NatureServe 2002-2003
335-SRNB	Vitis rotundifolia Michx.		28609	native		
	Vitis vulpina	Frost-grape		native		NPS - not collected
448-SRNB	Vulpia octoflora (Walt.) Rydb.	Eight-flower six-weeks grass	42264	native	G5	Hogan and Webber 1999
280-SRNB	Woodsia obtusa (Spreng.) Torr.	Common cliff fern	17744	native	G5	Hogan and Webber 1999
325-SRNB	Yucca filamentosa L.	Spanish bayonet	43140	native	G5	Hogan and Webber 1999

Tennessee Exotic Pest Plant Council Ranks (EPPC)
May 2001 (First Revision)
http://www.tneppc.org/Invasive_Exotic_Plant_List/The_List.htm

EPPC-1 = **Severe Threat:** Exotic plant species that possess characteristics of invasive species and spread easily into native plant communities and displace native vegetation.
EPPC-2 = **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 **Rank 1**.
EPPC-3 = **Lesser Threat:** Exotic plant species that spread in or near disturbed areas; and are not presently considered a threat to native plant communities.
EPPC-A = **Watch List A:** Exotic plants that naturalize and may become a problem in the future; includes species that are or could become widespread in Tennessee. At this time more information is needed, and there is no consensus about their status.

Global Ranks:
G# = 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#G# = Numeric range rank
- G? = Unranked
- GU = Unrankable
- GH = Historical
- GX = Extirpated

- GC = Cultural (planted/cultivated)
- GM=Modified
- GW= Ruderal
- GNR = Not ranked (usually because it is an exotic species)
- GNRTNR = 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 Stones River National Battlefield

New Name	TSN #	Plot#	Date Coll	Cat#	Collector	Habitat
Acalypha ostryifolia	28189	12	7/29/2002	4474	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Agrimonia rostellata	25100	10	7/30/2002	4475	C. Nordman, R. Evans	Red-cedar Successional Forest
Amaranthus hybridus	20735	7	7/30/2002	4476	R. McCoy, C. Bailey, F. Evans	Soybean field
Amaranthus palmeri	20740	17	7/31/2002	4477	C. Nordman, M. Webber, J. Spiess	Carolina Willow Temporarily Flooded Shrubland
Anoda cristata	21689	12	7/30/2002	4478	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Avena sativa	41459	7	7/30/2002	4479	R. McCoy, C. Bailey, F. Evans	Soybean field
Bothriochloa laguroides ssp. torreyana	523690	1	7/30/2002	4480	C. Nordman, R. Evans	Restoration site
Bromus sterilis	40522	3	5/27/2003	4506	C. Nordman, R. Evans	Southern Green Ash - Elm - Sugarberry Forest
Carex albicans var. australis	527065	16	5/26/2003	4507	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak - Mixed Oak Forest
Carex jamesii	39404	1	5/26/2003	4508	C. Nordman, R. Evans	Restoration site
Carex oligocarpa	39728	13	5/26/2003	4509	C. Nordman, R. Evans	Nashville Basin Sugar Maple Hickory Forest
Carex retroflexa	39782	5	5/27/2003	4510	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Carex texensis	39842	7	5/27/2003	4511	R. McCoy, C. Bailey, F. Evans	Soybean field
Celtis occidentalis	19040	19	5/27/2003	4512	C. Nordman, R. Evans, P. Jackson	Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest
Cephalanthus occidentalis	34786	n/a	7/31/2002	4481	C. Nordman, R. Evans	
Chenopodium album	20592	11	7/29/2002	4482	C. Nordman, R. Evans	Nashville Basin Black Walnut Successional Forest
Cyclospermum leptophyllum	507572	5	5/27/2003	4513	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Cynanchum laeve	501893	17	7/31/2002	4483	C. Nordman, M. Webber, J. Spiess	Carolina Willow Temporarily Flooded Shrubland
Cyperus echinatus	501920	5	7/30/2002	4484	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Dichanthelium acuminatum var. acuminatum	527684	15	7/31/2002	4485	R. Evans, T. Hogan, K. Wansing	Central Basin Limestone Glade Margin Shrubland
Dichanthelium clandestinum	41656	3	5/27/2003	4514	C. Nordman, R. Evans	Southern Green Ash - Elm - Sugarberry Forest
Dichanthelium commutatum	41647	1	7/30/2002	4486	C. Nordman, R. Evans	Restoration site
Dichanthelium ovale	41649	2	5/26/2003	4515	C. Nordman, R. Evans	Central Limestone Glade
Dichanthelium sphaerocarpon	41671	15	5/27/2003	4516	R. Evans, T. Hogan, K. Wansing	Central Basin Limestone Glade Margin Shrubland
Dichanthelium sphaerocarpon v. sphaerocarpon	527702	15	7/31/2002	4487	R. Evans, T. Hogan, K. Wansing	Central Basin Limestone Glade Margin Shrubland

New Name	TSN #	Plot#	Date Coll	Cat#	Collector	Habitat
Dichondra carolinensis	30834	7	5/27/2003	4505	R. McCoy, C. Bailey, F. Evans	Soybean field
Digitaria sanguinalis	40604	12	7/29/2002	4488	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Elymus virginicus	40681	10	7/30/2002	4489	C. Nordman, R. Evans	Red-cedar Successional Forest
Eragrostis intermedia	40745	1	7/30/2002	4490	C. Nordman, R. Evans	Restoration site
Eupatorium hyssopifolium	35979	15	7/31/2002	4491	R. Evans, T. Hogan, K. Wansing	Central Basin Limestone Glade Margin Shrubland
Eupatorium incarnatum	37385	13	7/30/2002	4492	C. Nordman, R. Evans	Nashville Basin Sugar Maple Hickory Forest
Hedera helix	29393	7	7/30/2002	4493	R. McCoy, C. Bailey, F. Evans	Soybean field
Liriope spicatum	503502	6	7/30/2002	4494	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Medicago lupulina	503721	12	7/30/2002	4495	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Mollugo verticillata	19899	7	7/30/2002	4496	R. McCoy, C. Bailey, F. Evans	Soybean field
Nepeta cataria	32623	10	7/30/2002	4497	C. Nordman, R. Evans	Red-cedar Successional Forest
Paspalum laeve	41024	1	7/30/2002	4498	C. Nordman, R. Evans	Restoration site
Pennisetum glaucum	565385	7	7/30/2002	4499	R. McCoy, C. Bailey, F. Evans	Soybean field
Polygonum pensylvanicum	20861	7	7/30/2002	4500	R. McCoy, C. Bailey, F. Evans	Soybean field
Pyrus communis	25295	5	7/30/2002	4501	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Quercus falcata x shumardii?		1	7/30/2002	4502	C. Nordman, R. Evans	Restoration site
Senna hebecarpa	505155	12	5/26/2003	4517	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Smilax bona-nox	43341	8	7/30/2002	4503	R. McCoy, C. Bailey, F. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Thaspium trifoliatum	29890	6	5/27/2003	4518	R. McCoy, C. Bailey, F. Evans	Red-cedar Successional Forest
Triodanis perfoliata var. biflora	530742	18	5/27/2003	4519	C. Nordman, J. Spiess, P. Jackson	Floating Water-primrose Aquatic Marsh
Triticum aestivum	42237	12	5/26/2003	4520	C. Nordman, R. Evans	Interior Low Plateau Chinquapin Oak – Shumard Oak Forest
Valerianella radiata	35397	2	5/26/2003	4521	C. Nordman, R. Evans	Central Limestone Glade
Vitis cinerea var. baileyana	530854	10	7/30/2002	4504	C. Nordman, R. Evans	Red-cedar Successional Forest

Table 4. Tables of vascular plant diversity measures and species total estimates

	Diversity Measures			
	N	alpha	beta	Gamma
Gridded plots only	11	82.5	4.4	366
All plots	17	80.5	5.7	462
Total for park				611

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

	Estimate of # of species in park	If estimate is correct, % of species confirmed for park (based on 611 species confirmed)
First-order jackknife estimate (all plots)	630	97%
Second-order jackknife estimate (all plots)	711	86%
First-order jackknife estimate (gridded plots)	514	119%
Second-order jackknife estimate (gridded plots)	600	102%

Table 5. Association numbers, plot numbers, Ecological Systems, and global ranks of all associations identified at Stones River National Battlefield.

Elcode	Ecological System	NVC Association (Scientific name)	NVC Association (Name #2)	NVC Association (Name #3)	Plots	Global Rank
7124	Early Successional *	Juniperus virginiana var. virginiana - (Quercus spp.) Forest	Eastern Red-cedar - (Oak species) Forest	Red-cedar Successional Forest	5, 6, 10	GD
4697	Early Successional *	Celtis (laevigata, occidentalis) - Juglans nigra - (Aesculus glabra) Forest	(Sugarberry, Northern Hackberry) - Black Walnut - (Ohio Buckeye) Forest	Nashville Basin Sugarberry, Northern Hackberry Successional Forest	11	GD
3876	Southern Interior Low Plateau Dry Oak Forest	Quercus imbricaria – Quercus shumardii - Quercus muehlenbergii / Celtis occidentalis / Urtica chamaedryoides Forest	Shingle Oak – Shumard Oak - Chinquapin Oak / Northern Hackberry / Heart-Leaf Nettle Forest	Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest	19, 20	G3?
7699	Southern Interior Low Plateau Dry Oak Forest	Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest	Chinquapin Oak - (Southern Red Oak, Shumard Oak, Post Oak) / Redbud / Rusty Blackhaw Forest	Interior Low Plateau Chinquapin Oak - Mixed Oak Forest	16	G3
7808	Southern Interior Low Plateau Dry Oak Forest	Quercus muehlenbergii - Quercus shumardii - Carya (carolinae-septentrionalis, ovata) Forest	Chinquapin Oak - Shumard Oak - (Carolina Shagbark Hickory, Shagbark Hickory) Forest.	Interior Plateau Chinquapin Oak - Shumard Oak Forest	8, 12, 13,21, 22	G3
4690	South-Central Interior Small Stream and Riparian	Acer negundo - (Platanus occidentalis, Populus deltoides) Forest	Box-elder - (Sycamore, Eastern Cottonwood) Forest	Southern Interior Box-elder Riparian Forest	24	G4
2427	South-Central Interior Large Floodplain	Fraxinus pennsylvanica - Ulmus americana - Celtis laevigata / Ilex decidua Forest	Green Ash - American Elm - Sugarberry / Possum-haw Forest	Southern Green Ash - Elm - Sugarberry Forest	3,23	G4G5
2103	South-Central Interior Large Floodplain	Salix nigra Forest	Black Willow Forest	Black Willow Riparian Forest	PJ	G4
3807	Exotic Species Dominated *	Ligustrum sinense Upland Shrubland	Chinese Privet Upland Shrubland			GW
3837	Exotic Species Dominated *	Ligustrum sinense Temporarily Flooded Shrubland	Chinese Privet Temporarily Flooded Shrubland			GW
3899	South-Central Interior Large Floodplain	Salix caroliniana Temporarily Flooded Shrubland	Carolina Willow Temporarily Flooded Shrubland	Carolina Willow Shrubland	17	G4
3938	Nashville Basin Limestone Glade	Juniperus virginiana var. virginiana - Forestiera ligustrina - Rhus aromatica - Hypericum frondosum Shrubland	Eastern Red-cedar - Glade Privet - Fragrant Sumac - Golden St. John's-wort Shrubland	Central Basin Limestone Glade Margin Shrubland	15	G3G4

Elcode	Ecological System	NVC Association (Scientific name)	NVC Association (Name #2)	NVC Association (Name #3)	Plots	Global Rank
4732	Early Successional *	Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia) Shrubland	(Southern Blackberry, Southern Dewberry) - (Whiteleaf Greenbrier, Common Greenbrier) Shrubland	Blackberry - Greenbrier Successional Shrubland Thicket	PJ	GD
4044	Early Successional *	Andropogon virginicus var. virginicus Herbaceous Vegetation	Common Broomsedge Herbaceous Vegetation	Successional Broomsedge Vegetation	PJ	GD
4048	Exotic Species Dominated *	Lolium (arundinaceum, pratense) Herbaceous Vegetation	(Tall Fescue, Meadow Fescue) Herbaceous Vegetation	Cultivated meadow		GW
5131	Nashville Basin Limestone Glade	Quercus muehlenbergii - Juniperus virginiana / Schizachyrium scoparium - Manfreda virginica Wooded Herbaceous Vegetation	Chinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation	Central Limestone Glade	2	G2G3
4286	South-Central Interior Small Stream and Riparian	Justicia americana Herbaceous Vegetation	Common Water-willow Herbaceous Vegetation	Water-willow Rocky Bar and Shore		G4G5
7835	Impoundment Pond (human created) *	Ludwigia peploides Herbaceous Vegetation	Floating Water-primrose Herbaceous Vegetation	Floating Water-primrose Aquatic Marsh	18	G4G5
4340	Nashville Basin Limestone Glade	Sporobolus (neglectus, vaginiflorus) - Aristida longispica - Panicum flexile - Panicum capillare Herbaceous Vegetation	(Barrens Dropseed, Poverty Dropseed) - Slimspike Three-awn - Wiry Panicgrass - Common Panicgrass Herbaceous Vegetation	Limestone Annual Grass Glades	9, 14	G3
4346	Nashville Basin Limestone Glade	Sedum pulchellum - Talinum calcaricum - Leavenworthia spp. / Nostoc commune Herbaceous Vegetation	Widow's-cross - Limestone Fameflower - Gladecress species / Common Nostoc Herbaceous Vegetation	Interior Low Plateau Limestone Glade Ephemeral Pool		G3

* Not a unit in NatureServe's Classification of Ecological Systems (NatureServe 2004)

Table 6. Plot photo names and photo descriptions for Stones River National Battlefield

Photo file name	Date taken	Description of photo
stri1_140d.jpg	7/30/02	Plot 1, @ 140 degrees from conduit
stri1_e.jpg	7/30/02	Plot 1, east from conduit
stri1_n.jpg	7/30/02	Plot 1, north from conduit
stri1_s.jpg	7/30/02	Plot 1, south from conduit
stri1_w.jpg	7/30/02	Plot 1, west from conduit
stri10_e.jpg	7/30/02	Plot 10, east from conduit
stri10_n.jpg	7/30/02	Plot 10, north from conduit
stri10_s.jpg	7/30/02	Plot 10, south from conduit
stri10_transect180d.jpg	7/30/02	Plot 10 transect @ 180 degrees
stri10_w.jpg	7/30/02	Plot 10, west from conduit
stri11_220d.jpg	7/29/02	Plot 11, transect @ 220 degrees
stri11_e.jpg	7/29/02	Plot 11, east from conduit
stri11_n.jpg	7/29/02	Plot 11, north from conduit
stri11_s.jpg	7/29/02	Plot 11, south from conduit
stri11_w.jpg	7/29/02	Plot 11, west from conduit
stri12_e.jpg	7/29/02	Plot 12, east from conduit
stri12_n.jpg	7/29/02	Plot 12, north from conduit
stri12_s.jpg	7/29/02	Plot 12, south from conduit
stri12_w.jpg	7/29/02	Plot 12, west from conduit
stri13_e.jpg	7/30/02	Plot 13, east from conduit
stri13_n.jpg	7/30/02	Plot 13, north from conduit
stri13_rocky_hummocks.jpg	7/30/02	Plot 13, rocky hummocks
stri13_s.jpg	7/30/02	Plot 13, south from conduit
stri13_tagged_tree.jpg	7/30/02	Plot 13, tagged tree
stri13_w.jpg	7/30/02	Plot 13, west from conduit
stri14_e.jpg	7/31/02	Plot 14, east from conduit
stri14_n.jpg	7/31/02	Plot 14, north from conduit
stri14_s.jpg	7/31/02	Plot 14, south from conduit
stri14_transect.jpg	7/31/02	Plot 14, transect @ 25 degrees
stri14_w.jpg	7/31/02	Plot 14, west from conduit
stri15_e.jpg	7/31/02	Plot 15, east from conduit
stri15_n.jpg	7/31/02	Plot 15, north from conduit
stri15_s.jpg	7/31/02	Plot 15, south from conduit
stri15_transect320d.jpg	7/31/02	Plot 15, transect @ 320 degrees
stri15_w.jpg	7/31/02	Plot 15, west from conduit
stri16_e.jpg	7/31/02	Plot 16, east from conduit
stri16_n.jpg	7/31/02	Plot 16, north from conduit
stri16_s.jpg	7/31/02	Plot 16, south from conduit
stri16_transect18d.jpg	7/31/02	Plot 16, transect @ 18 degrees
stri16_w.jpg	7/31/02	Plot 16, west from conduit

Table 6 (continued)

Photo file name	Date taken	Description of photo
stri17_e.jpg	7/31/02	Plot 17, east from conduit
stri17_n.jpg	7/31/02	Plot 17, north from conduit
stri17_s.jpg	7/31/02	Plot 17, south from conduit
stri17_transect298d.jpg	7/31/02	Plot 17, transect @ 298 degrees
stri17_w.jpg	7/31/02	Plot 17, west from conduit
stri18_e.jpg	7/30/02	Plot 18, east from conduit
stri18_n.jpg	7/30/02	Plot 18, north from conduit
stri18_s.jpg	7/30/02	Plot 18, south from conduit
stri18_transect~45d.jpg	7/30/02	Plot 18, transect @ ~45 degrees
stri18_w.jpg	7/30/02	Plot 18, west from conduit
stri2_335d.jpg	7/30/02	Plot 2, transect @ 335 degrees
stri2_e.jpg	7/30/02	Plot 2, east from conduit
stri2_n.jpg	7/30/02	Plot 2, north from conduit
stri2_s.jpg	7/30/02	Plot 2, south from conduit
stri2_w.jpg	7/30/02	Plot 2, west from conduit
stri3_e.jpg	7/31/02	Plot 3, east from conduit
stri3_n.jpg	7/31/02	Plot 3, north from conduit
stri3_s.jpg	7/31/02	Plot 3, south from conduit
stri3_transect28d.jpg	7/31/02	Plot 3, transect @ 28 degrees
stri3_w.jpg	7/31/02	Plot 3, west from conduit
stri5_e.jpg	7/30/02	Plot 5, east from conduit
stri5_n.jpg	7/30/02	Plot 5, north from conduit
stri5_s.jpg	7/30/02	Plot 5, south from conduit
stri5_w.jpg	7/30/02	Plot 5, west from conduit
stri6_e.jpg	7/30/02	Plot 6, east from conduit
stri6_n.jpg	7/30/02	Plot 6, north from conduit
stri6_s.jpg	7/30/02	Plot 6, south from conduit
stri6_w.jpg	7/30/02	Plot 6, west from conduit
stri7_e.jpg	7/30/02	Plot 7, east from conduit
stri7_n.jpg	7/30/02	Plot 7, north from conduit
stri7_s.jpg	7/30/02	Plot 7, south from conduit
stri7_w.jpg	7/30/02	Plot 7, west from conduit
stri9_e.jpg	7/29/02	Plot 9, east from conduit
stri9_n.jpg	7/29/02	Plot 9, north from conduit
stri9_s.jpg	7/29/02	Plot 9, south from conduit
stri9_transect290d.jpg	7/29/02	Plot 9, transect @ 28 degrees
stri9_w.jpg	7/29/02	Plot 9, west from conduit

Appendix 1. 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_____
Classifyer _____ Date_____

*TUSNVC Elcode*_____ *EONum-Suffix*_____

Sublocation (I.D.able feature on topo map)_____

USGS Quad name_____ *Quad code (if known)* _____

Survey date:_____ Surveyors:_____

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

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

_Digital photos _Regular camera _No pictures taken Roll# or disc #_____ Frame #_____

Plot representativeness (is the matrix the same?)_____

_____

_____

____ UTM ____ Lat/long (If lat/long, then values are _____ N _____ W

GPS Techniques/Equipment _____ GPS file name ___ ___ ___ ___ ___ ___ ___ ___

Field UTM X ___ ___ ___ ___ ___ ___ m E **Corrected UTM X ___ ___ ___ ___ ___ ___ m E**

Field UTM Y ___ ___ ___ ___ ___ ___ ___ m N **Corrected UTM Y ___ ___ ___ ___ ___ ___ ___ m N**

Coordinate accuracy _____ m / ft UTM Zone_____ GPS location with respect to permanent marker if not 0,0: x___ y___
_ *Estimated position marked on Topo. Sheet.* **Elevation _____ m / ft** topo map? altimeter? DEM? GPS?

ENVIRONMENTAL / SITE INFORMATION

Measured Slope _____ °
_ Flat 0 ° 0 %
_ Gentle 0-5 ° 1-9%
_ Mod 6-14 ° 10-25%
_ Somewhat steep
15-25 ° 26-49%
_ Steep27-45 ° 50-100%
_ Very steep
45-69 ° 101-275%
_ Abrupt
70-100 ° 276-300%
_ overhanging/sheltered
>100 ° >300%

Measured Aspect __ __ ° (N=0 °)
_ Flat
_ Variable
_ N 338-22 °
_ NE 23-67 °
_ E 68-112 °
_ SE 113-157 °
_ S 158-202 °
_ SW 203-247 °
_ W 248-292 °
_ NW 293-337 °

Compass: magnetic ? / corrected?

Topographic Postion

_ Interfluve (Ridge, summit or crest)
_ High Slope (upper slope, convex slope)
_ Midslope (middle slope)
_ Lowslope (lower slope, footslope)
_ Toeslope (alluvial toeslope)
_ Low level (terrace)
_ Channel bed

Cowardin System

_ *Upland* _ *Palustrine*
- Estuarine _ *Lacustrine*
_Riverine

Landform (check most applicable)

_ Alluvial flat
_ Alluvial terrace
_ Bank
_ Bar
_ Bench
_ Cliff
_ Colluvial Slope
_ Cove
_ Debris slide
_ Draw
_ Floodplain
_ Gap
_ Hanging valley
_ Knob
_ Midslope
_ Mima mound
_ Nose slope
_ Ravine
_ Ridge
_ Ridgetop bedrock outcrop
_ Saddle
_ Scour
_ Seep
_ Toe slope
_ Slope
_ Streambed
_ Slough
_ Streamhead
_
_

Geology

Igneous Rocks:

_ Granitic(Granite, Schyolite, Syenite, Trachyte)
_ Dioritic (Diorite, Dacite, Andesite)
_ Gabbroic (Gabbro, Basalt, Pyroxenite, Peridotite Diabase, Traprock)

Sedimentary Rocks:

_Conglomerates and Breccias
_Sandstone & conglomerate
_Siltstone (calcareous or noncalc)
_Shale (calcareous or noncalc)
_Limestone and Dolomite
_Gypsum
_Marl

Metamorphic Rocks:

_ Gneiss
_Schist
_Slate and Phyllite
_Marble
_ Serpentine (Ultramafic)

Y Other _____

Hydrologic Regime (check only for wetlands)

_ Intermittently flooded
_ Permanently flooded
_ Semipermanently flooded
_ Temporarily Flooded (e.g. floodplains)
_ Seasonally Flooded (e.g. seasonal ponds)
_ Saturated (e.g. bogs, perennial seeps)
_ Unknown
_ Not a wetland (Upland: XERIC : DRY - MESIC : MESIC)

_ Permanently flooded – Tidal
_ Tidally flooded
_ Irregularly flooded
_ Irregularly exposed

Salinity/Halinity Modifiers:

Upland (N/A)
Coastal Tidal: Saltwater- Tidal
Coastal Tidal – Brackish
Coastal Tidal – Freshwater
Inland Saltwater
Inland Brackish seeps)
Unknown

Hydrology Evidence (Describe the hydrological factors that caused you to assign the type to the hydrologic regime that you chose.):

Environmental comments:

_____

Landscape comments:

Soil Texture:

_ Sand
_ Sandy loam
_ Loam
_ Silt loam
_ Clay loam
_ Clay
_ Peat
_ Muck

Soil Taxon Description:

_____
_____
_____

Drainage:

_ Rapidly drained
_ Well drained
_ Moderately well drained
_ Somewhat poorly drained
_ Poorly drained
_ Very poorly drained

Soil depth (optional):_____

Ground cover

(adds to 100%)

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

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

Leaf phenology (dominant stratum)

- Evergreen
_ Cold-deciduous
_ Drought-deciduous
_ Mixed evergreen-cold-deciduous
_ Mixed evergreen drought deciduous
_ Herb - Annual
_ Herb - Perennial

Physiognomic Class

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

DISTURBANCE

Natural and Anthropogenic Disturbance
_ logging _ fire _ Hydrologic
_ erosion _ trails/roads _ Agriculture
_ grazing _ wind/ice damage _ Old Growth
_ pine bk beetle _ exotic plants _ Fire Suppression
_ dogwood anthracnose _ adelgid
_ RCW _ ORV _ feral hogs

Disturbance in plot, of type and severity (0-5, 0=no disturbance, 5= extreme disturbance):

___*human:*_____

___*natural:*_____

___ *fire:when?*_____

___ *clear-cut: when?*_____

___
*animal*_____

Disturbance comments:

Current land use:

Former land use:

Qualitative Assessment (Write a brief word picture of community. Describe variation within occurrence in terms of veg structure and environment. Describe dominant and characteristic species and inclusion communities (if present). If community occurs as a mosaic describe spatial distribution and associated community types . Describe to what degree the example by the assigned classification unit Include landscape context information (adjacent communities):

QUANTITATIVE VEGETATION SAMPLE

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

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

SPECIES COMP AND COVER CLASS BY STRATUM (enter cover values for each stratum AND for Total cover)

T1	T2	T3	S1	S2	H	N	V	E	Total Cover	Name (7 letter code or full name)	Collected? Spec #?	Diagnostic?

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

SPECIES COMPOSITION AND COVER/ABUNDANCE CLASS BY STRATUM

T1	T2	T3	S1	S2	H	N	V	E	Total cover	Name (7 letter acronym or full name)	Collected? Spec #?	Diagnostic?

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

T1: Emergent

T2: Tree Can

T3 Subcanopy

S1 Tall Shrub (>1m; to 5m)

S2 Short Shrub (< 1m)

H Herbaceous

N Nonvascular

V Vines (lianas)

E Epiphytes

Appendix 2. Descriptions of alliances and associations found at Stones River National Battlefield.

INTERNATIONAL ECOLOGICAL CLASSIFICATION STANDARD:

TERRESTRIAL ECOLOGICAL CLASSIFICATIONS

Stones River National Battlefield

Tennessee

25 August 2004

by

NatureServe

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

This subset of the International Ecological Classification Standard covers vegetational associations and alliances attributed to Stones River 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 Marry Russo (mary_russo@natureserve.org) or Carl Nordman (carl_nordman@natureserve.org).

Citations:

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

NatureServe. 2004. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 25 October 2004.

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

These data are extracted from:

NatureServe. 2004. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 25 August 2004.

This document may be generally cited as follows:

NatureServe[1]. 2004. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA and NatureServe Ecology South, Durham, NC. Data current as of 25 August 2004.

[1] NatureServe is an international organization including NatureServe regional offices, a NatureServe central office, U.S. State Natural Heritage Programs, and Conservation Data Centres (CDC) in Canada and Latin America and the Caribbean. Ecologists from the following organizations have contributed the development of the ecological systems classification:

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

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

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

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

Table of Contents

I. FOREST 3

I.A.8.N.c. Conical-crowned temperate or subpolar needle-leaved evergreen forest 3
I.A.8.N.c.2. JUNIPERUS VIRGINIANA FOREST ALLIANCE 3
Juniperus virginiana var. virginiana - (Quercus spp.) Forest 3
I.B.2.N.a. Lowland or submontane cold-deciduous forest 6
I.B.2.N.a.20. JUGLANS NIGRA - AESCULUS GLABRA - CELTIS (LAEVIGATA, OCCIDENTALIS) FOREST ALLIANCE 6
Celtis (laevigata, occidentalis) - Juglans nigra - (Aesculus glabra) Forest 7
I.B.2.N.a.101. QUERCUS MUEHLENBERGII - (ACER SACCHARUM) FOREST ALLIANCE 9
Quercus imbricaria – Quercus shumardii - Quercus muehlenbergii / Celtis occidentalis / Urtica chamaedryoides Forest 10
Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest 12
Quercus muehlenbergii - Quercus shumardii - Carya (carolinae-septentrionalis, ovata) Forest .. 15
I.B.2.N.d. Temporarily flooded cold-deciduous forest 18
I.B.2.N.d.3. A.278—ACER NEGUNDO TEMPORARILY FLOODED FOREST ALLIANCE .. 18
Acer negundo - (Platanus occidentalis, Populus deltoides) Forest 19
I.B.2.N.d.11. FRAXINUS PENNSYLVANICA - ULMUS AMERICANA - CELTIS (OCCIDENTALIS, LAEVIGATA) TEMPORARILY FLOODED FOREST ALLIANCE 22
Fraxinus pennsylvanica - Ulmus americana - Celtis laevigata / Ilex decidua Forest 23
I.B.2.N.d.22. SALIX NIGRA TEMPORARILY FLOODED FOREST ALLIANCE 27
Salix nigra Forest 28

III. SHRUBLAND 30

III.B.2.N.a. Temperate cold-deciduous shrubland 30
III.B.2.N.a.15 RUBUS (ARGUTUS, TRIVIALIS) SHRUBLAND ALLIANCE 30
Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia) Shrubland 30
III.B.2.N.d. Temporarily flooded cold-deciduous shrubland 32
III.B.2.N.d.5. SALIX CAROLINIANA TEMPORARILY FLOODED SHRUBLAND ALLIANCE 32
Salix caroliniana Temporarily Flooded Shrubland 32
III.C.2.N.a. Mixed evergreen - cold-deciduous shrubland 35
III.C.2.N.a.2. JUNIPERUS VIRGINIANA - RHUS AROMATICA SHRUBLAND ALLIANCE 35
Juniperus virginiana var. virginiana - Forestiera ligustrina - Rhus aromatica - Hypericum frondosum Shrubland 35

V. HERBACEOUS VEGETATION 38

V.A.5.N.c. Medium-tall sod temperate or subpolar grassland 38
A.1208—ANDROPOGON VIRGINICUS HERBACEOUS ALLIANCE (V.A.5.N.c.3) 38
Andropogon virginicus var. virginicus Herbaceous Vegetation 38

V.A.6.N.q. Bedrock temperate or subpolar grassland with a sparse tree layer 40
V.A.6.N.q.101. (JUNIPERUS VIRGINIANA) / SCHIZACHYRIUM SCOPARIUM - (BOUTELOUA CURTIPENDULA) WOODED HERBACEOUS ALLIANCE 40
Quercus muehlenbergii - Juniperus virginiana / Schizachyrium scoparium - Manfreda virginica Wooded Herbaceous Vegetation 41
V.B.2.N.d. Temporarily flooded temperate perennial forb vegetation 45
V.B.2.N.d.2. JUSTICIA AMERICANA TEMPORARILY FLOODED HERBACEOUS ALLIANCE 45
Justicia americana Herbaceous Vegetation 45
V.B.2.N.e. Semipermanently flooded temperate perennial forb vegetation 48
V.B.2.N.e.100. LUDWIGIA PEPLOIDES SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE 48
Ludwigia peploides Herbaceous Vegetation 49
V.D.2.N.d. Short temperate annual grassland 51
V.D.2.N.d.3. SPOROBOLUS (NEGLECTUS, VAGINIFLORUS) HERBACEOUS ALLIANCE 51
Sporobolus (neglectus, vaginiflorus) - Aristida longispica - Panicum flexile - Panicum capillare Herbaceous Vegetation 51
V.D.2.N.i. Saturated temperate annual forb vegetation 53
V.D.2.N.i.2. SEDUM PULCHELLUM SATURATED HERBACEOUS ALLIANCE 53
Sedum pulchellum - Talinum calcaricum - Leavenworthia spp. / Nostoc commune Herbaceous Vegetation 54

I. FOREST

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

I.A.8.N.c.2. JUNIPERUS VIRGINIANA FOREST ALLIANCE

Eastern Red-cedar Forest Alliance

ALLIANCE CONCEPT

Summary: Forests in this alliance are strongly dominated by *Juniperus virginiana var. virginiana* on usually high pH, fire-suppressed sites or old fields, but also mature (100+ year) stands, on limestone or chalk, mostly in blacklands, but occasionally on sandstone (e.g., in Oklahoma). This alliance is most common in old fields and pastures, successional cleared land, and other various disturbed areas, especially on calcareous rocks. The growth of *Juniperus virginiana var. virginiana* may be very dense, and the stature may be rather low. Other species that may occur in the canopy of Tennessee stands include *Carya alba, Carya ovata, Cercis canadensis,* and *Pinus virginiana*. Various oaks (including *Quercus coccinea, Quercus falcata,* and *Quercus phellos*) also may be present. The midstory is typically sparse, with canopy species as well as *Cornus florida, Ilex opaca, Liquidambar styraciflua*, and *Prunus serotina var. serotina. Frangula caroliniana* may occur in several strata. Herb distribution is patchy, and typical species include *Asplenium platyneuron, Chasmanthium laxum, Eupatorium* spp., *Polystichum acrostichoides*, and *Carex* spp. This vegetation is also found in the Blackbelt of Alabama, on the margins of Chalk Prairies. In the central and upper midwestern United States, stands of semi-natural vegetation dominated by *Juniperus virginiana var. virginiana* typically occur in old fields and other disturbed places. The vegetation may vary in structure from open-canopy woodland (particularly as it invades herbaceous old fields) to dense, closed-canopy forest. *Rhus typhina* may be an associate. This semi-natural red-cedar forest type is expected to be found in locally disturbed areas.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Iowa, Missouri, Virginia (?), West Virginia (?), Massachusetts, New York, Ontario (Canada), and possibly elsewhere.

Nations: CA US

States/Provinces: AL AR GA IA KY LA MA MO MS NC NY OK ON SC TN TX VA? WV?

TNC Ecoregions: 32:C, 33:C, 35:P, 36:P, 37:C, 38:C, 39:C, 40:C, 43:C, 44:C, 46:P, 48:P, 50:P, 51:?, 52:?, 53:P, 59:C, 62:C

USFS Ecoregions: 221Aa:CCP, 221Ab:CCC, 221Ac:CCP, 221Ad:CCP, 221Ae:CC?, 221Aj:CCP, 221Ak:CCP, 221Jb:CCC, 221Jc:CCC, 222Ak:CCP, 222Ca:CCC, 222Cb:CCC, 222Cg:CCC, 222Da:CCC, 222Db:CCC, 222Dc:CCC, 222Dj:CCC, 222Ea:CCC, 222Eb:CCC, 222Ec:CCC, 222Ej:CCC, 222Ek:CCC, 222En:CCC, 222Eo:CCC, 222Fc:CCC, 222Fd:CCC, 222Lc:CCP, 222Me:CCP, 231Aa:CC?, 231Ab:CC?, 231Ac:CC?, 231Ad:CC?, 231Ae:CCC, 231Af:CC?, 231Ag:CC?, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Ak:CC?, 231Al:CC?, 231Am:CCC, 231An:CC?, 231Ao:CCC, 231Ap:CCC, 231Ba:CCC, 231Bb:CCP, 231Bc:CCP, 231Bd:CC?, 231Be:CC?, 231Bf:CC?, 231Bg:CC?, 231Bh:CC?, 231Bi:CC?, 231Bj:CC?, 231Bk:CC?, 231Ca:CC?, 231Cb:CC?, 231Cc:CC?, 231Cd:CC?, 231Ce:CC?, 231Cf:CCC, 231Cg:CC?, 231Da:CCC, 231Db:CC?, 231Dc:CC?, 231Dd:CC?, 231De:CCP, 231Ee:CCP, 231Ej:CC?, 231Ga:CCP, 231Gb:CCP, 232Aa:CCC, 232Ac:CCP, 232Bb:CC?, 232Bc:CCP, 232Bj:CCC, 251Cc:CC?, 251Ch:CCP, 251E:CC, 251F:CC, 255Ad:CCC, 311A:CC, 332E:CC, M221Ab:CCC, M221Be:CCC, M222A:CC, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP

Federal Lands: COE (J. Percy Priest); DOD (Arnold, Camp Gruber); NPS (Cape Cod, Chickamauga-Chattanooga, Chickasaw NRA, Cowpens, Fire Island, Russell Cave, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Cherokee?, Daniel Boone, Ouachita, Ozark)

ALLIANCE SOURCES

Authors: D.J. ALLARD, RW, Midwest **Identifier:** A.137

References: Andreu and Tukman 1995, Eyre 1980, Foti et al. 1994

Juniperus virginiana var. virginiana - (Quercus spp.) ForestEastern Red-cedar - (Oak species) Forest

Red-cedar Successional Forest

Ecological Group (SCS;MCS): Semi-natural Wooded Uplands (900-40; 8.0.0.1)

ELEMENT CONCEPT

GLOBAL SUMMARY: This is a forest with dense *Juniperus virginiana var. virginiana* canopy (75-100% total cover) and sparse subcanopy, shrub and herb strata. Other species that may occur in the canopy are *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:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Occurs in areas where cedar has been periodically cut and harvested. These are edges of fields and old pasture, which have grown up. Soils are rocky and influenced by limestone, probably too rocky to have been plowed.

Global Environment: This community occurs in areas impacted in the past by agriculture and/or heavy logging.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Stands are dominated by *Juniperus virginiana var. virginiana* in the canopy and sub-canopy. *Maclura pomifera* (native to Arkansas but not Tennessee), *Celtis occidentalis, Celtis laevigata, Carya ovata, Carya carolinae-septentrionalis, Quercus phellos, Quercus muehlenbergii, Quercus shumardii, Gleditsia tricanthos,* and *Fraxinus americana* also can occur in the canopy or sub-canopy. Shrubs include *Juniperus virginiana var. virginiana* and *Symphoricarpus orbiculatus,* in addition to the exotic plants *Ligustrum sinense* and *Lonicera maackii. Parthenocissus quinquefolia, Toxicodendron radicans,* and the exotic plant *Lonicera japonica* are common vining across the ground (in the low shrub stratum). The most abundant herbaceous plants are the exotics *Lespedeza cuneata, Perilla frutescens,*and *Microstegium vimineum. Bidens bipinnata* and *Polymnia canadensis* are common native herbaceous plants.

Global Vegetation: Stands are dominated by *Juniperus virginiana var. virginiana*. Other 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. 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. The exotics *Lonicera japonica* and *Microstegium vimineum* may also be present.

Global Dynamics: In most cases, this community only occurs in areas with a recent history of plowing or clearcut.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Juniperus virginiana var. virginiana, Maclura pomifera*
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana, Celtis occidentalis, Celtis laevigata*
TALL SHRUB	*Juniperus virginiana var. virginiana*
SHORT SHRUB	*Ligustrum sinense, Symphoricarpus orbiculatus, Parthenocissus quinquefolia, Toxicodendron radicans*
FORB	*Lespedeza cuneata, Perilla frutescens, Microstegium vimineum*

Global

Stratum	Species
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana*

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Juniperus virginiana var. virginiana*
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana*

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Juniperus virginiana Midwest Forest (CEGL002593)

SYNONYMY [OtherName (short citation) relationship. Note]:

- Red cedar, RV (Pyne 1994) B
- IB5a. Eastern Red Cedar Woodland (Allard 1990)
- Eastern Redcedar: 46 (Eyre 1980) B
- (Allard 1990) N90ALL01ICEC
- (Andreu and Tukman 1995) N95AND01ICEC
- (Evans 1991) N91EVA01ICEC
- (Eyre 1980) B80EYR01ICEC
- (Hoagland 2000) A00HOA01ICEC
- (NatureServe Ecology - Southeastern U.S. unpubl. data) UNDNAT01ICEC
- (Pyne 1994) G94PYN01ICEC
- (Rice 1960) A60RIC01ICEC
- (Rosson 1995) G95ROS01ICEC

GRank & Reasons: GD (02-09-03). 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 COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: The vegetation of this association here shows a calcareous influence. Species coomposition (other than *Juniperus virginiana var. virginiana)* is quite different from the global description, lacking acid loving species.

Global Classif Comments: Originally described from Tellico Pilot Project (Ridge and Valley of Tennessee, northeastern Monroe County; 10 stands sampled), where this type was found over eroded soils on abandoned agricultural land, at 820 to 940 feet elevation (Andreu and Tukman 1995). Currently, this type includes the *Juniperus virginiana var. virginiana* woodland from Tellico Lake (Andreu and Tukman 1995), which occurs on

drier sites with shallow, rocky soils. At Arnold Air Force Base, Coffee County, Tennessee, planted pines (*Pinus strobus, Pinus taeda*, and *Pinus virginiana*) may invade from adjacent plantations. 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 has increased from presettlement. 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. This type should also be compared to *Juniperus virginiana Midwest Forest (CEGL002593)* of Ontario, Canada.

Internal Comments: RW 3-03: Plot 13 from COWP assigned to this community, but it is not representative of this community so should not be looked upon as a representative sample of this community in SC. SC? changed to SC. MP 8-02: the extent of occurrence at Shiloh NMP is not known. MP 7-01: Arnold added. 12/98 CAP Monroe county WV, has old field closed canopy forest. The Global rank of this association needs to be re-evaluated in light of the Volume 1 Grank definitions. Is this better ranked as GD, GM, or G5? 12/98 CAP Closed-canopy conifer forests dominated by *Juniperus virginiana*. Associates: *Pinus virginiana, Carya alba, Carya ovata, Cercis canadensis, Quercus coccinea*. Sparse shrub layer: *Cornus florida, Ilex opaca, Liquidambar styraciflua, Prunus serotina*. Patchy herb layer: *Asplenium platyneuron, Chasmanthium laxum, Eupatorium spp., Polystichum acrostichoides*, and *Carex spp*. Environmental setting: Old fields, pastures, successional cleared land, typically on calcareous bedrock.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Occurs in areas from where cedar has been periodically cut and harvested. These are edges of fields and old pasture, which have grown up.

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

Nations: US
States/Provinces: AL:S?, AR:S?, GA:S?, KY:S?, LA:S?, MS:S?, NC:S?, OK:S?, SC:S?, TN:S?, VA?, WV?
TNC Ecoregions: 39:P, 43:C, 44:C, 50:P, 51:?, 52:?, 53:P, 59:C
USFS Ecoregions: 221:C, 222Ak:CCP, 222Cg:CCC, 222Eb:CCC, 222Ej:CCC, 222En:CCC, 222Eo:CCC, 222Lc:CCP, 222Me:CCP, 231:C, 251Cc:CC?, 251Ch:CCP, M221Be:CCC
Federal Lands: COE (J. Percy Priest); DOD (Arnold, Camp Gruber); NPS (Chickamauga-Chattanooga, Chickasaw NRA, Cowpens, Russell Cave, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Cherokee?, Daniel Boone, Ouachita)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: K.D. Patterson, SCS **Confidence:** 3 **Identifier:** CEGL007124
REFERENCES (type in full citation below if reference is new): Allard 1990, Andreu and Tukman 1995, Evans 1991, Eyre 1980, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Pyne 1994, Rice 1960, Rosson 1995

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

I.B.2.N.a.20. JUGLANS NIGRA - AESCULUS GLABRA - CELTIS (LAEVIGATA, OCCIDENTALIS) FOREST ALLIANCE

Black Walnut - Ohio Buckeye - (Sugarberry, Northern Hackberry) Forest Alliance

ALLIANCE CONCEPT

Summary: Second-growth forests on deep soils of woodlots and fencerows of calcium-rich areas in the Bluegrass Basin of Kentucky and the Nashville Basin of Tennessee. The canopy of Bluegrass Basin examples is dominated by *Juglans nigra, Aesculus glabra, Celtis laevigata*, and/or *Celtis occidentalis*, with *Fraxinus americana, Prunus serotina var. serotina, Robinia pseudoacacia*, and scattered *Ulmus americana*. In the Nashville Basin of Tennessee, the canopy is dominated by *Celtis* spp. (*Celtis laevigata, Celtis occidentalis*) with substantial *Juglans nigra* in some examples. *Aesculus glabra* may also be present. The understory may include *Prunus serotina var. serotina* and *Quercus imbricaria*.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Kentucky and Tennessee. It includes second-growth forests in the Bluegrass Basin of Kentucky and the Nashville Basin of Tennessee, as well as equivalent mature and stable types, where these have been developed. Related vegetation could possibly be found in Indiana (?) and Ohio (?).
Nations: US
States/Provinces: KY TN
TNC Ecoregions: 44:C
USFS Ecoregions: 221Hc:XXX, 222Ec:CCP, 222Ed:CCC, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Fe:CCP
Federal Lands: DOD (Lexington-Bluegrass); NPS (Stones River)

ALLIANCE SOURCES

Authors: J. CAMPBELL/M. PYNE 3-97, RW, Southeast **Identifier:** A.232
References: Campbell 1980

Celtis (laevigata, occidentalis) - Juglans nigra - (Aesculus glabra) Forest(Sugarberry, Northern Hackberry) - Black Walnut - (Ohio Buckeye) Forest

Nashville Basin Sugarberry, Northern Hackberry Successional Forest
Ecological Group (SCS;MCS): Semi-natural Wooded Uplands (900-40; 8.0.0.1)

ELEMENT CONCEPT

GLOBAL SUMMARY: This association includes second-growth forests on deep soils of upland woodlots and fencerows of calcium-rich areas in the Nashville Basin of Tennessee. The canopy is dominated by *Celtis laevigata* and/or *Celtis occidentalis* with substantial *Juglans nigra* in some examples. *Aesculus glabra* and *Ulmus rubra* may also be present. Some examples lack *Juglans nigra* and *Aesculus glabra.* The understory may include *Prunus serotina var. serotina, Juniperus virginiana var. virginiana* (with <25% cover), *Celtis laevigata, Ulmus alata, Fraxinus americana* and *Quercus imbricaria*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: This is found along old fencerows and hoglots, at old homesites, and other (mainly upland) areas, which have been disturbed and are growing up or are grown up in trees. It also occurs in some areas subject to short duration flooding (Phyllis Jackson, pers. comm.)

Global Environment: These are second-growth forests on deep soils of upland woodlots and fencerows of calcium-rich areas in the Nashville Basin of Tennessee. This is found along old fencerows, at old homesites, and other upland areas, which have been disturbed and are grown up.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: The canopy is dominated by *Celtis laevigata* with *Fraxinus americana* and *Ulmus rubra. Prunus serotina var. serotina* and *Sassafras albidum* are present or codominant in some examples. Important subcanopy trees are *Juniperus virginiana var. virginiana* (with <25% cover), *Celtis laevigata, Ulmus alata, Fraxinus americana, Acer saccharum var. saccharum, Prunus serotina var. serotina, Maclura pomifera, Gleditsia tricanthos* and *Quercus rubra.* Important shrubs are *Juniperus virginiana var. virginiana* (with <25% cover), *Celtis laevigata, Ulmus alata, Rhus typhina, Rhus aromatica* and the exotic species *Lonicera maackii, Lonicera japonica, Ligustrum vulgare,* and *Maclura pomifera* (native to Arkansas, but not Tennessee). *Asplenium platyneuron* is a common fern. Vines include *Lonicera japonica, Vitis* spp. and *Berchemia scandens.* This vegetation was documented from one plot, but was observed elsewhere on Stones River National Battlefield. *Juglans nigra* was not found in the plot, but was part of this association elsewhere at Stones River National Battlefield. *Aesculus glabra* occurs infrequently at Stones River, it may be present in some examples of this type there.

Global Vegetation: The canopy of stands of this type is dominated by *Celtis* spp. (*Celtis laevigata, Celtis occidentalis*) with substantial *Juglans nigra* in some examples. *Aesculus glabra* and *Ulmus rubra* may also be present. The understory may include *Prunus serotina var. serotina* and *Quercus imbricaria*. In an example at

Stones River National Battlefield (NPS) the canopy is dominated by *Celtis laevigata* with *Fraxinus americana*. Important subcanopy trees are *Juniperus virginiana var. virginiana* (with <25% cover), *Celtis laevigata, Ulmus alata, Fraxinus americana, Acer saccharum var. saccharum* and *Quercus rubra.* Important shrubs are *Juniperus virginiana var. virginiana* (with <25% cover), *Celtis laevigata, Ulmus alata, Rhus typhina, Rhus aromatica* and the exotic species *Lonicera maackii, Lonicera japonica, Ligustrum vulgare,* and *Maclura pomifera* (native to Arkansas, but not Tennessee). *Asplenium platyneuron* is a common fern. Vines include *Lonicera japonica* and *Berchemia scandens.* This vegetation was documented from one plot, but was observed elsewhere on Stones River National Battlefield. *Juglans nigra* was not found in the plot, but was part of this association elsewhere at Stones River National Battlefield. *Aesculus glabra* occurs infrequently at Stones River, it is presumably present in some examples of this type there.

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	**Species**
TREE CANOPY	*Celtis laevigata, Fraxinus americana*
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana, Celtis laevigata*
TALL SHRUB	*Ligustrum vulgare, Celtis laevigata, Juniperus virginiana var. virginiana, Lonicera maackii*
SHORT SHRUB	*Ligustrum vulgare*

Global

Stratum	**Species**

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	**Species**

Global

Stratum	**Species**

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	**Species**
TREE CANOPY	*Juglans nigra*

Global

Stratum	**Species**

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Juglans nigra - Celtis occidentalis Forest (CEGL004693)--is another successional type with overlapping species composition from Kentucky Bluegrass region.

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: GD (03-01-31). This is a second-growth forest of woodlots and fencerows. Despite its distinctive composition, it is not an element of conservation concern. Grank changed from GW to GD 2003-01-03 MP.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: *Juglans nigra* was not found in the plot, but was part of this association elsewhere at Stones River National Battlefield.

Global Classif Comments:

Internal Comments: CWN 3-03: Stones River (STRI.11) added.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: This is found along old fencerows and hoglots, at old homesites, and other (mainly upland) areas, which have been disturbed and are grown up..

Global Range: This association occurs in the Nashville Basin of Tennessee.

Nations: US
States/Provinces: TN:S?
TNC Ecoregions: 44:C
USFS Ecoregions: 222Ec:CCP, 222Ed:CCC
Federal Lands: NPS (Stones River)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: SCS **Confidence:** 3 **Identifier:** CEGL004697
REFERENCES (type in full citation below if reference is new):

I.B.2.N.a.101. QUERCUS MUEHLENBERGII - (ACER SACCHARUM) FOREST ALLIANCE

Chinquapin Oak - (Sugar Maple) Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes a variety of dry, dry-mesic, and mesic forests, dominated by *Quercus muehlenbergii* and possibly *Acer saccharum*, the canopy often also including other hardwood species associated with high base substrates (e.g., limestone or dolomite) under a variety of moisture conditions. These include *Quercus alba, Quercus shumardii, Fraxinus americana, Fraxinus quadrangulata, Acer barbatum, Tilia americana, Carya* spp., *Juglans nigra*, and *Liriodendron tulipifera* (in the more interior portions of the alliance's distribution), and *Quercus sinuata var. sinuata* and *Carya myristiciformis* (in the southwestern, Coastal Plain portion of the alliance's distribution). The habitat of this alliance includes mesic and dry-mesic forests over limestones in the Nashville Basin of Tennessee, dry-mesic slopes associated with prairie openings in Louisiana, moist limestone slopes in the Edwards Plateau of Texas, blackland soils in the upper West Gulf Coastal Plain of Arkansas, lowlands and mesic slopes of Oklahoma and adjacent Arkansas, as well as related habitats in states farther east (e.g., Alleghenies and lower Cumberland Plateau escarpment). Forests in Kentucky and Tennessee have *Quercus shumardii* and *Frangula caroliniana* and occur over limestone on south-facing slopes. There are scattered occurrences on benches and clifftops on the Daniel Boone National Forest. In the Coastal Plain of Virginia, this alliance is represented by somewhat open canopy 'shell barren' forests dominated by *Quercus muehlenbergii* with *Acer barbatum*. On rare occurrences of limestone in the Southern Blue Ridge of North Carolina, *Quercus muehlenbergii* occurs with *Juglans nigra, Fraxinus americana*, and *Acer saccharum*. Understory species may include *Cornus florida, Cercis canadensis, Calycanthus floridus, Cornus alternifolia, Ostrya virginiana*, and *Hydrangea arborescens*. In the Northeast, the shrub layer is sparse and may contain *Hamamelis virginiana, Zanthoxylum americanum*, and *Cornus alternifolia*. In some more southerly examples, shrubs may include *Forestiera ligustrina, Frangula caroliniana*, and *Symphoricarpos orbiculatus*. The herbaceous layer may contain *Asclepias quadrifolia, Clematis occidentalis (= Clematis verticillaris)* (in northeastern examples), *Packera obovata (= Senecio obovatus), Phryma leptostachya, Saxifraga virginiensis, Arabis laevigata*, and *Triosteum aurantiacum*. Two unusual communities of this alliance are lowland forests from the Upper West Gulf Coastal Plain of Arkansas. In the Northeast, the habitat is characterized as upper slopes or summits of limestone or marble ridges with dry soil-moisture regimes. Limestone outcrops or boulders may be present, as well as Karst collapse features. In the Southeast, mesic to dry limestone-derived soils may occur as well on flatter landforms, as in the Nashville Basin of Tennessee. In the Southeast, this vegetation is known from the Ridge and Valley, lower Cumberland Plateau escarpment, Highland Rim escarpment, and Nashville Basin in Tennessee; the Highland Rim, Bluegrass and Dripping Springs escarpment in Kentucky; the Cumberland Plateau in Alabama; as well as rarely in the Southern Blue Ridge and Coastal Plain. Isolated occurrences are reported in northern Arkansas on moderately shallow soils, often on glade margins. It also occurs in the Arbuckle Mountains of Oklahoma and the Edwards Plateau of Texas. If this alliance occurs in the Upper East Gulf Coastal Plain, stands would contain *Acer barbatum* instead of *Acer saccharum*.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance may be found in Alabama, Arkansas, Kentucky, Louisiana, North Carolina, Oklahoma, South Carolina (?), Tennessee, Texas, Connecticut, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Vermont, Virginia, West Virginia, Illinois, Indiana, Michigan (?), Missouri, Nebraska (?), and Ohio, and in Canada in Ontario. In the Southeast, this vegetation is known from the Ridge and Valley, lower Cumberland Plateau escarpment, Highland Rim escarpment, and Central Basin in Tennessee; the Highland Rim, Bluegrass and Dripping Springs escarpment in Kentucky; the Cumberland Plateau in Alabama; as well as rarely in the Southern Blue Ridge and coastal plain. Isolated occurrences are reported in northern Arkansas on moderately shallow soils, often on glade margins. It also occurs in the Arbuckle Mountains of Oklahoma and the Edwards Plateau of Texas.
Nations: CA US
States/Provinces: AL AR CT GA IL? IN KY LA MA MD MI? MS? NC NJ NY OH OK ON PA SC? TN TX VA VT WV
TNC Ecoregions: 29:C, 32:C, 33:C, 37:C, 38:C, 39:C, 40:C, 41:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 57:C, 58:C, 59:C, 60:?, 61:C, 63:C, 64:C
USFS Ecoregions: 212B:CC, 212E:CC, 212Fa:C??, 212Ga:C??, 212Gb:C??, 221A:CC, 221B:CC, 221Dc:CC?, 221Ea:CCC, 221Hb:CCC, 221Hc:CCC, 221Hd:CCP, 221Ja:CCC, 221Jb:CCC, 221Jc:CCP, 222An:CC?, 222Cg:CCC, 222Df:CCP, 222Dg:CCC, 222Ea:CC?, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ee:CCC, 222Ef:CCC, 222Eg:CCC, 222Eh:CCC, 222Ej:CCC, 222En:CCC, 222Eo:CCP, 222Fa:CCP, 222Fb:CCC, 222Fc:CC?, 222Fd:CCC, 222Fe:CCP, 222Ff:CCP, 222Ha:CCC, 222Hb:CCC, 222Hc:CCC, 222I:CC, 231Ba:CP?, 231Be:CP?, 231Cc:CCP, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Dc:CCP, 231De:CCC, 231Ea:CCP, 231Eb:CCC, 231Gc:CCC, 232Br:CCC, 232Ch:C??, 232Fa:CCC, 251Ea:P??, 251Eb:P??, 251Ec:P??, 251Ed:P??, 255Af:CCC, 311A:CC, 315D:CC, M212B:CC, M212C:CC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Bd:CC?, M221Be:CCP, M221Ca:CC?, M221Cb:CCP, M221Cc:CC?, M221Ce:CCC, M221Da:CCC, M221Db:CC?, M221Dc:CCC, M221Dd:CCC
Federal Lands: COE (J. Percy Priest?, Lake Millwood); NPS (Colonial, Cumberland Gap?, Great Smoky Mountains?, Russell Cave?, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Jefferson, Kisatchie, Ozark, Pisgah); USFWS (Wichita Mountains)

ALLIANCE SOURCES

Authors: D.J. ALLARD/D. FABER-LANG, MP, Southeast **Identifier:** A.1912
References: Allard 1990, Andreu and Tukman 1995, Bowen et al. 1995, Campbell 1980, Crites and Clebsch 1986, Diamond 1993, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Fike 1999, Fowells 1965, Hoagland 1997, Hoagland 1998a, Pyne 1994, Schafale and Weakley 1990, Smith 1991, Swain and Kearsley 2001, Ware and Ware 1992

Quercus imbricaria – Quercus shumardii - Quercus muehlenbergii / Celtis occidentalis / Urtica chamaedryoides ForestShingle Oak –Shumard Oak - Chinquapin Oak / Northern Hackberry / Heart-Leaf Nettle Forest

Nashville Basin Shingle Oak – Shumard Oak - Chinquapin Oak Forest
Ecological Group (SCS;MCS): Interior Highlands Dry-mesic Circumneutral Hardwood Forests and Woodlands (402-30; 2.5.3.8)

ELEMENT CONCEPT

GLOBAL SUMMARY: Forest dominated by *Quercus imbricaria, Quercus shumardii* and *Quercus muehlenbergii* with *Quercus stellata. Celtis occidentalis* is important as an understory species and *Urtica chamaedryoides* is a characteristic herbaceous species. Found on somewhat rocky upland soils which are derived from Ordovician limesone in the Interior Low Plateau of Tennessee and propably Kentucky.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: This forest is found in small patches on flat to rolling uplands on Stones River National Battlefield. It is on rich soils derived from Ordovician limestone with a small amount of limestone at the surface as small rocks. The area where this is documented may have karst features.

Global Environment: This forest is found in small patches on flat to rolling uplands in the Nashville Basin. It is on rich soils derived from Ordovician limestone with a small amount of limestone at the surface as small rocks. The area where this is documented may have karst features.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Forest dominated by *Quercus imbricaria, Quercus shumardii* and *Quercus muehlenbergii* with *Quercus stellata,* also important as a canopy tree. *Quercus falcata, Fraxinus americana, Carya ovata,* and *Prunus serotina* are less important but may be present in the canopy. *Celtis occidentalis, Maclura pomifera,* and *Juniperus virginiana* are present in the understory. *Symphoricarpus orbiculatus* and *Parthenocissus quinquefolia* are important low shrubs. *Urtica chamaedryoides, Polymnia canadensis, Stellaria media, Iodanthus pinnatifidus* are present in the herbaceous layer.

Global Vegetation: Forest dominated by *Quercus imbricaria, Quercus shumardii* and *Quercus muehlenbergii* with *Quercus stellata,* also important as a canopy tree. *Quercus falcata, Fraxinus americana, Carya ovata,* and *Prunus serotina* are less important but may be present in the canopy. *Celtis occidentalis, Maclura pomifera,* and *Juniperus virginiana* are present in the understory. *Symphoricarpus orbiculatus* and *Parthenocissus quinquefolia* are important low shrubs. *Urtica chamaedryoides, Polymnia canadensis, Stellaria media, Iodanthus pinnatifidus* are present in the herbaceous layer.

Global Dynamics: *Juniperus virginiana* and the exotic plants *Lonicera japonica* and *Lonicera maackii* have apparently increased following disturbance.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Quercus imbricaria, Quercus muehlenbergii, Quercus stellata, Quercus shumardii*
TREE SUB-CANOPY	*Carya ovata*
TALL SHRUB	*Celtis occidentalis*
FORB	***Urtica chamaedryoides***

Global

Stratum	Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest (CEGL007699) does not have Quercus imbricaria as an important component
- Quercus muehlenbergii – Quercus shumardii – Carya (carolinae-septentrionalis, ovata) Forest (CEGL007808) does not have Quercus imbricaria as an important component

SYNONYMY [OtherName (short citation) relationship. Note]:

- IA6j. Interior Calcareous Oak - Hickory Forest (Allard 1990) ?. in part?
- IA6l. Cedar - Oak - Hackberry Elm Forest (Allard 1990) B. in part

GRank & Reasons: G3? (04-02-05). The range is probably the Interior Low Plateau of Tennessee and Bluegrass of Kentucky. In the Nashville Basin (where it is known), upland forests remain mostly in small stands, threatened by development pressures and invasion by the exotic plants *Lonicera japonica* and *Lonicera maackii*. This type is limited to an area where the nominal species all occur.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: Documented and described from Stones River National Battlefield.

Global Classif Comments:

Internal Comments: CWN 04-02: Documented and described from Stones River quick plots STRI.19 and STRI.20.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found on western side of main area of Stones RiverNational Battlefield, west of the loop road.

Global Range: Interior Low Plateau of Tennessee and probably Kentucky.

Nations: US
States/Provinces: KY:S?, TN:S?
TNC Ecoregions: 44:C
USFS Ecoregions: 222Ec:CC?, 222Ed:CCC
Federal Lands: COE (J. Percy Priest?); NPS (Stones River)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: Nordman, Carl. **Confidence:** 2 **Identifier:** CEGL003876
REFERENCES (type in full citation below if reference is new):

Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum ForestChinquapin Oak - (Southern Red Oak, Shumard Oak, Post Oak) / Redbud / Rusty Blackhaw Forest
Interior Low Plateau Chinquapin Oak - Mixed Oak Forest
Ecological Group (SCS;MCS): Interior Highlands Dry-mesic Circumneutral Hardwood Forests and Woodlands (402-30; 2.5.3.8)

ELEMENT CONCEPT

GLOBAL SUMMARY: This chinquapin oak - mixed oak forest association is found in the inner Nashville Basin of central Tennessee and related areas of the Interior Low Plateau of Kentucky, Illinois and Indiana, and in Virginia. Stands include dry to subxeric forests of flat to rolling topography. Some stands in the Shawnee Hills may have a southerly exposure with thin loess-derived soils. The vegetation is dominated by a mixture of *Quercus muehlenbergii, Quercus falcata, Quercus shumardii*, and *Quercus stellata*, with *Quercus velutina* in smaller amounts. *Carya carolinae-septentrionalis, Carya glabra*, and *Fraxinus americana* may also be present in the canopy, which is typically somewhat open. The relatively open subcanopy contains *Acer saccharum, Fraxinus americana, Fraxinus quadrangulata, Ulmus alata, Ulmus serotina*, and *Celtis laevigata*. *Juniperus virginiana var. virginiana, Viburnum rufidulum, Frangula caroliniana, Cercis canadensis, Ostrya virginiana, Sideroxylon lycioides, Prunus americana*, and *Prunus angustifolia* are present as tall shrubs or small trees. Coverage of *Juniperus* in the subcanopy may be dense in some examples, but this vegetation is treated here rather than as a mixed forest. Low shrubs include *Rhus aromatica, Forestiera ligustrina, Viburnum rufidulum, Hypericum frondosum, Ptelea trifoliata*, and *Symphoricarpos orbiculatus*. Herbs present include *Andropogon* spp., *Antennaria plantaginifolia, Symphyotrichum shortii (= Aster shortii), Cheilanthes lanosa, Cunila origanoides, Diarrhena americana, Dichanthelium boscii, Galium circaezans, Heuchera americana, Monarda fistulosa, Schizachyrium scoparium, Scutellaria ovata, Solidago missouriensis, Solidago sphacelata*, and *Verbesina virginica*. A prominent woody vine is *Bignonia capreolata*. In Tennessee's Nashville Basin, this association is found over Ordovician limestones (Lebanon, Ridley) at about 200 m elevation. This type also includes examples from slopes above

limestone cliffs, e.g., bordering the Ohio River in Harrison County (southern Indiana) and possibly adjacent Kentucky (the former CEGL005020), where *Quercus muehlenbergii* is found with *Fraxinus americana* and *Fraxinus quadrangulata*. This specific example is assumed to be compatible with *Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest (CEGL007699).*

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Rocky woods over limestone, flat to gently sloping.

Global Environment: Stands include dry to subxeric forests of flat to rolling topography. Some stands in the Shawnee Hills may have a southerly exposure with thin loess-derived soils (TNC 1995a). In Tennessee's Nashville Basin, this association is found over Ordovician limestones (Lebanon, Ridley) at about 200 m elevation.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: This vegetation at Stones River National Battlefield is usually dominated by *Quercus stellata, Carya ovata, and Carya carolinae-septentrionalis* (pers. com., Phyllis Jackson) or dominated by *Quercus muehlenbergii, Ulmus rubra,* and *Fraxinus americana* in the canopy. The sub-canopy is dominated by *Celtis occidentalis, Juniperus virginiana var. virginiana, Ulmus rubra,* and *Ulmus alata. Quercus imbricaria* can occur in the canopy of sub-canopy. The tall shrub stratum is dominated by *Morus rubra, Celtis occidentalis,* and *Cercis canadensis,* with *Ligustrum sinense* an exotic shrub. The short shrub stratum is dominated by *Symphoricarpus orbiculatus* with the exotic vine *Lonicera japonica. Parthenocissus quinquefolia* is an important native climbing vine.

Global Vegetation: The vegetation is dominated by a mixture of *Quercus muehlenbergii, Quercus falcata, Quercus shumardii,* and *Quercus stellata,* with *Quercus velutina* in smaller amounts. *Carya carolinae-septentrionalis, Carya glabra,* and *Fraxinus americana* may also be present in the canopy, which is typically somewhat open. The relatively open subcanopy contains *Acer saccharum, Fraxinus americana, Fraxinus quadrangulata, Ulmus alata, Ulmus serotina,* and *Celtis laevigata*. *Juniperus virginiana var. virginiana, Viburnum rufidulum, Frangula caroliniana, Cercis canadensis, Ostrya virginiana, Sideroxylon lycioides, Prunus americana,* and *Prunus angustifolia* are present as tall shrubs or small trees. Coverage of *Juniperus* in the subcanopy may be dense in some examples, but this vegetation is treated here rather than as a mixed forest. Low shrubs include *Rhus aromatica, Forestiera ligustrina, Viburnum rufidulum, Hypericum frondosum, Ptelea trifoliata,* and *Symphoricarpos orbiculatus*. Herbs present include *Andropogon* spp., *Antennaria plantaginifolia, Symphyotrichum shortii (= Aster shortii), Cheilanthes lanosa, Cunila origanoides, Diarrhena americana, Dichanthelium boscii, Galium circaezans, Heuchera americana, Monarda fistulosa, Schizachyrium scoparium, Scutellaria ovata, Solidago missouriensis, Solidago sphacelata,* and *Verbesina virginica*. A prominent woody vine is *Bignonia capreolata*. This type also includes examples from slopes above limestone cliffs along the Ohio River in Harrison County (southern Indiana) and possibly adjacent Kentucky (the former CEGL005020), where *Quercus muehlenbergii* is found with *Fraxinus americana* and *Fraxinus quadrangulata*.

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Ulmus rubra, Fraxinus americana, Quercus muehlenbergii*
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana, Ulmus rubra, Ulmus alata*
TALL SHRUB	*Morus rubra, Celtis occidentalis, Cercis canadensis*
SHORT SHRUB	*Symphoricarpus orbiculatus*
VINE/LIANA	*Parthenocissus quinquefolia*

Global
Stratum Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:
- Acer saccharum - Quercus muehlenbergii / Cercis canadensis Forest (CEGL006017)

SYNONYMY [OtherName (short citation) relationship. Note]:
- IA6j. Interior Calcareous Oak - Hickory Forest (Allard 1990) ?. in part?
- IA6l. Cedar - Oak - Hackberry Elm Forest (Allard 1990) B. in part
- *Quercus shumardii - Quercus muehlenbergii / Juniperus virginiana - Viburnum rufidulum / Sanicula odorata - Bignonia capreolata* Forest (VADNH n.d.)
- (Allard 1990) N90ALL01ICEC
- (Fleming et al. 2001) G01FLE01ICEC
- (TNC 1995a) N95TNC01ICEC
- (VADNH n.d.) UNDVIR01ICEC

GRank & Reasons: G3 (98-11-16). Examples of this association in Tennessee's Nashville Basin occur in areas of rapid human population growth, and remaining unprotected examples are threatened by timber removal and land conversion. Kentucky examples are more scattered in several regions of the state, but many are small examples on isolated ridges. Some are found within the proclamation boundaries of the Daniel Boone National Forest but may lack protection.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: This community at the quickplot STRI.22 is less oak dominated than the global description of the type indicates. The data for the local description comes from this plot, however there are more typical areas on Stones River National Battlefield, which are more oak dominated and better fit the global description of the association.

Global Classif Comments: See also the II.B.2.N.a *Quercus muehlenbergii Woodland Alliance (A.621)* and the II.B.2.N.a *Fraxinus quadrangulata - (Juniperus virginiana) Woodland Alliance (A.1913). Acer saccharum - Quercus muehlenbergii / Cercis canadensis Forest (CEGL006017)* is a type with a somewhat overlapping distribution, but is typically found more eastward toward and in the Appalachian region.

Internal Comments: CWN 2-04: plot STRI.16 at Stones River. KP 4-02: VA added. MP/DFL 2-01: Daniel Boone? deleted. MP 12-00: Daniel Boone? added.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found by the loop road in the SE part of the main park area..

Global Range: This chinquapin oak - mixed oak forest association is found in the inner Central Basin of central Tennessee and related areas of the Interior Low Plateau, such as the northern edge of the Pennyroyal Karst Plain of Kentucky, and Shawnee Hills in Indiana and Illinois, as well as limestone ridges in the Eastern Knobs region, the Palisades of the Inner Bluegrass, and the eastern edge of the Mississippian Plateaus region of Kentucky. In southwestern Virginia (Lee County), this forest covers large areas.

Nations: US

States/Provinces: AL?, IL?, IN:S?, KY:S?, TN:S?, VA:S?
TNC Ecoregions: 44:C, 50:C
USFS Ecoregions: 222Df:CPP, 222Eb:CC?, 222Ec:CC?, 222Ed:CCC, 222Eh:CCC, 222Ej:CCC, 222En:CCC, 222Fa:CCP, 222Fb:CCC, 231Ce:???
Federal Lands: COE (J. Percy Priest?); NPS (Stones River); TVA (Columbia)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes: STRI.22 quickplot
Authors: M. Pyne, mod. D. Faber-Langendoen, SCS **Confidence:** 2 **Identifier:** CEGL007699
REFERENCES (type in full citation below if reference is new): Allard 1990, Fleming et al. 2001, TNC 1995a, VADNH n.d.

Quercus muehlenbergii - Quercus shumardii - Carya (carolinae-septentrionalis, ovata) Forest Chinquapin Oak - Shumard Oak - (Carolina Shagbark Hickory, Shagbark Hickory) Forest

Interior Plateau Chinquapin Oak - Shumard Oak Forest

Ecological Group (SCS;MCS): Appalachian Highlands Dry-mesic Circumneutral Hardwood Forests and Woodlands (401-17; 2.5.3.z)

ELEMENT CONCEPT

GLOBAL SUMMARY: This association includes dry-mesic forests dominated by varying proportions of *Quercus muehlenbergii* and *Quercus shumardii*. It occurs in the Interior Low Plateau of Alabama, Kentucky and Tennessee, and also extends into the Ridge and Valley and Cumberland Plateau of Alabama and Georgia, on soils derived from limestones or other basic substrates, on gently rolling to rolling topography or on upper to mid slopes. In addition to the nominal species, the canopy may also contain some mixture of *Acer saccharum, Carya glabra, Fraxinus americana, Fraxinus quadrangulata,* and *Ulmus serotina*. Particularly towards the southern portion of the association's distribution, *Carya carolinae-septentrionalis* joins or replaces *Carya ovata* as the predominant hickory. Subcanopy species include *Quercus stellata, Aesculus glabra, Gleditsia triacanthos, Juniperus virginiana var. virginiana, Ulmus alata, Ulmus americana, Ulmus serotina* (to the south), *Ulmus thomasii* (to the north), *Cercis canadensis var. canadensis, Celtis laevigata var. laevigata, Ostrya virginiana, Fraxinus quadrangulata, Prunus mexicana,* and *Juglans nigra*. Shrubs include *Forestiera ligustrina, Frangula caroliniana, Hypericum frondosum, Rhus aromatica var. aromatica, Sideroxylon lycioides, Symphoricarpos orbiculatus,* and *Viburnum rufidulum. Bignonia capreolata* is a prominent liana. Other woody vines include *Lonicera sempervirens* and *Parthenocissus quinquefolia*. Herbs, a mixture of submesic and xeric limestone species, include *Fleischmannia incarnata, Lithospermum tuberosum, Polygonatum biflorum, Polymnia canadensis, Scutellaria ovata, Sedum pulchellum, Packera anonyma (= Senecio anonymus), Tragia cordata, Ruellia humilis, Ruellia strepens, Matelea gonocarpos, Arabis laevigata var. laevigata, Cuphea viscosissima, Galium* sp., *Diarrhena americana (= var. americana), Elymus* sp., *Senna marilandica (= Cassia marilandica), Chimaphila maculata, Salvia urticifolia, Tiarella cordifolia, Triosteum angustifolium, Asplenium platyneuron,* and *Asplenium resiliens*. Examples of this association may grade into *Juniperus virginiana var. virginiana - Fraxinus quadrangulata / Polymnia canadensis - (Astranthium integrifolium) Woodland (CEGL003754), Quercus alba - Quercus rubra - Quercus muehlenbergii / Cercis canadensis Forest (CEGL002070),* or *Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest (CEGL007699).* Most examples observed seem to be generally subxeric. More mesic examples, formerly regarded as a 'mesic variant' of this association, are now accommodated as *Quercus shumardii - Quercus muehlenbergii - Acer (barbatum, leucoderme, saccharum) / Ostrya virginiana Forest (CEGL008442).*

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Rocky upland woods over limestone, flat to gently sloping.

Global Environment: This association occurs in the Interior Low Plateau of Alabama, Kentucky and Tennessee, on soils derived from limestones or other basic substrates, on gently rolling topography or on upper to mid slopes.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Forest canopy is dominated by *Quercus muehlenbergii* and *Quercus shumardii* with *Carya ovata, Carya carolinae-septemtrionalis, Juniperus virginiana var. virginiana,* and *Celtis laevigata*. Other canopy species include *Celtis occidentalis, Quercus stellata, Gleditsia tricanthos, Fraxinus americana,* and *Acer saccharum.* Sub-canopy trees include *Quercus muehlenbergii, Quercus shumardii, Carya carolinae-septemtrionalis, Juniperus virginiana var. virginiana,* and *Celtis laevigata.* There are patches of 50% - 100% *Carya ovata* in areas of this association. Shrubs include *Quercus muehlenbergii, Frangula caroliniana, Cornus foemina, Forestiera ligustrina, Ulmus alata, Hypericum frondosum, Cercis canadensis, Toxicodendrom radicans, Quercus shumardii, Rhus aromatica, Symphoricarpus orbiculatus,* and the exotic species *Lonicera maackii, Lonicera japonica, Ligustrum sinense, Ligustrum vulgare,Euonymus fortunei,* and *Ailanthus altissima. Asplenium platyneuron* is a common herbaceous fern.

Global Vegetation: In addition to *Quercus muehlenbergii* and *Quercus shumardii*, the canopy may also contain some mixture of *Acer saccharum, Carya glabra, Fraxinus americana, Fraxinus quadrangulata,* and *Ulmus serotina*. In some examples, the *Carya* sp. present may be *Carya carolinae-septentrionalis*. Subcanopy species include *Quercus stellata, Aesculus glabra, Gleditsia triacanthos, Juniperus virginiana var. virginiana, Ulmus alata, Ulmus americana, Cercis canadensis var. canadensis, Celtis laevigata var. laevigata, Fraxinus quadrangulata, Prunus mexicana,* and *Juglans nigra*. Shrubs and woody vines include *Bignonia capreolata, Forestiera ligustrina, Frangula caroliniana, Hypericum frondosum, Lonicera sempervirens, Parthenocissus quinquefolia, Rhus aromatica var. aromatica, Sideroxylon lycioides, Symphoricarpos orbiculatus,* and *Viburnum rufidulum.* Herbs, a mixture of submesic and xeric limestone species, include *Fleischmannia incarnata, Lithospermum tuberosum, Polygonatum biflorum, Polymnia canadensis, Scutellaria ovata, Sedum pulchellum, Packera anonyma (= Senecio anonymus), Tragia cordata, Ruellia humilis, Ruellia strepens, Matelea gonocarpos, Arabis laevigata var. laevigata, Cuphea viscosissima, Galium* sp., *Elymus* sp., *Senna marilandica (= Cassia marilandica), Chimaphila maculata, Salvia urticifolia, Tiarella cordifolia, Triosteum angustifolium, Asplenium platyneuron,* and *Asplenium resiliens*. Some additional spring-aspect herbs at Cedars of Lebanon State Park, Tennessee, include *Trillium cuneatum, Podophyllum peltatum, Cardamine concatenata, Cardamine douglassii, Claytonia virginica,* and *Ranunculus fascicularis.*

Global Dynamics: This association may grade into *Juniperus virginiana var. virginiana - Fraxinus quadrangulata / Polymnia canadensis - (Astranthium integrifolium) Woodland (CEGL003754), Quercus alba - Quercus rubra - Quercus muehlenbergii / Cercis canadensis Forest (CEGL002070),* or *Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest (CEGL007699).* Most examples observed seem to be generally subxeric. An example of a "mesic variant" (this stand now regarded as attributable to *Quercus shumardii - Quercus muehlenbergii / Acer (barbatum, leucoderme, saccharum) - Ostrya virginiana Forest (CEGL008442)*) observed at Warner Park, Nashville, Tennessee, is dominated by large individuals of the nominal species with *Quercus macrocarpa, Ulmus americana,* and *Diospyros virginiana*.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Carya ovata, Quercus muehlenbergi, Quercus shumardii, Carya carolinaea-septentrionalis*
TREE SUB-CANOPY	*Juniperus virginiana var. virginiana, Quercus muehlenbergii, Carya carolinaea-septentrionalis*
TALL SHRUB	*Forestiera ligustrina, Cercis canadensis, Ulmus alata*
SHORT SHRUB	*Symphoricarpus orbiculatus, Hypericum frondosum*
FORB	*Asplenium platyneuron*
VINE/LIANA	*Parthenocissus quinquefolia*

Global
Stratum Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Quercus muehlenbergii - Quercus shumardii Forest (CEGL004602)--occurs west of the Mississippi River.
- Quercus shumardii - Quercus muehlenbergii - Acer (barbatum, leucoderme, saccharum) / Ostrya virginiana Forest (CEGL008442)--is slightly more mesic.
- Juniperus virginiana var. virginiana - Fraxinus quadrangulata / Polymnia canadensis - (Astranthium integrifolium) Woodland (CEGL003754)--is a drier limestone woodland.
- Quercus alba - Quercus rubra - Quercus muehlenbergii / Cercis canadensis Forest (CEGL002070)--is white oak-dominated.
- Quercus muehlenbergii - Quercus (falcata, shumardii, stellata) / Cercis canadensis / Viburnum rufidulum Forest (CEGL007699)--is a related, drier forest.

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: G3 (98-12-11). This oak-dominated forest association occurs in Alabama, Georgia, Kentucky, and Tennessee, on soils derived from limestones or other basic substrates, on upper to mid slopes. Some examples may be protected on TVA, Army Corps of Engineers, and U.S. Forest Service lands. It is documented from the Nashville Basin of Tennessee, the Ridge and Valley of Georgia, and the Cumberlands of Alabama. Most, if not all, high-quality examples have been eliminated or severely impacted by timber removal, grazing, soil erosion, and fire suppression. Other current threats include windthrow, microclimate modification from intensive silvicultural practices on adjacent uplands, forest type conversion, and herbicide use.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments: This concept originated with the more xeric manifestation of *Quercus muehlenbergii - Quercus shumardii*-dominated vegetation of limestone slopes in Tennessee and Kentucky, in particular the Inner or Outer Nashville Basin of Tennessee (subsections 222Ec and 222Ed). Examples have subsequently been located in the Cumberland Plateau of Alabama. This association should be found on the Somerset Ranger District of the Daniel Boone National Forest (Kentucky), as well as in the Kentucky Palisades and the Dripping Springs Escarpment. Additional information is needed regarding landscape position, variation, and floristics of this association across its range. Forests dominated by these nominal oaks seem to range from xeric to relatively mesic. The more mesic examples, formerly regarded as a "mesic variant" of this association, are now (2000-06) placed in *Quercus shumardii - Quercus muehlenbergii - Acer (barbatum, leucoderme, saccharum) / Ostrya virginiana Forest (CEGL008442)*. The relationship of these associations to each other and to their western relative, *Quercus muehlenbergii - Quercus shumardii Forest (CEGL004602)*, is under investigation. Related vegetation west of the Mississippi River in Arkansas and Oklahoma will be found in *Quercus muehlenbergii - Quercus shumardii Forest (CEGL004602)*.

Internal Comments: CWN 3-03: Stones River added. ASW 6-00: GA? added.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Widespread in forested parts of the park.

Global Range: This oak-dominated forest association occurs in Alabama, Georgia, Kentucky, and Tennessee; it is documented from the Nashville Basin of Tennessee, the Ridge and Valley of Georgia, and the Cumberlands of Alabama.

Nations: US
States/Provinces: AL:S2S3, GA?, KY:S?, TN:S?
TNC Ecoregions: 44:C, 50:C
USFS Ecoregions: 221Hc:CCC, 222Eb:CC?, 222Ec:CCC, 222Ed:CCC, 222Ee:CCC, 222Ef:CC?, 222Eg:CCP, 222Eh:CCP, 222Fa:CP?, 222Fb:CP?, 222Fc:CP?, 222Fd:CP?, 231Cd:CCC, 231Ce:CCP
Federal Lands: COE (J. Percy Priest?); NPS (Stones River); TVA (Columbia?); USFS (Bankhead, Daniel Boone)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes: Plots STRI.8, STRI.12, STRI.13 and quickplots STRI.21, and STRI.22.
Authors: SCS **Confidence:** 2 **Identifier:** CEGL007808
REFERENCES (type in full citation below if reference is new):

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

I.B.2.N.d.3. A.278—ACER NEGUNDO TEMPORARILY FLOODED FOREST ALLIANCE

Box-elder Temporarily Flooded Forest Alliance

ALLIANCE CONCEPT

Summary: Temporarily flooded, early successional forests dominated by *Acer negundo*. This alliance is widespread but sporadic in the southeastern United States, and occurs at scattered locations in the Western Great Plains, lower montane Rocky Mountains, and Intermountain West. Characteristic species include *Platanus occidentalis, Acer rubrum, Liquidambar styraciflua, Acer saccharinum, Ulmus alata, Celtis laevigata,* and *Populus deltoides*. These forests are common on large rivers in the active floodplain and on sandbars. The shrub and herb layers range from sparse to relatively lush, and the vine component often is heavy. Forests dominated by *Carya illinoinensis* often succeed these forests within the range of the species. Pure stands occur on the Mississippi River batture on second ridges with heavy vine cover of *Berchemia scandens* and *Vitis* spp. These forests also occur in the Arkansas River Valley, with marginal examples on larger rivers in the Ouachita Mountains, and the Mississippi River Alluvial Plain, and also in the Nashville Basin of Tennessee and the Bluegrass Basin of Kentucky. Forests dominated by *Acer negundo* occur from near sea level in the Southeast to over 2300 m (ca. 7500 feet) in elevation in western Colorado. The presence of this alliance in the Southeastern Coastal Plains is apparently somewhat sporadic. It would be expected on the Apalachicola River in Florida and adjacent Georgia.
Dynamics: In the Southeast, forests dominated by *Carya illinoinensis* often succeed these forests. The rangewide occurrence of this type is complicated by the 'weedy' nature of *Acer negundo*. For example, disturbed stands in the (A.286) often become dominated by *Acer negundo*.

Hydrologic regimes and disturbance are important factors in the ecological functions of these systems. In the Rocky Mountains, many stands of this alliance are composed of large, mature cottonwood and box-elder trees. Channel migration and meander movement along these rivers result in stands being immediately adjacent to, but 1-3 m above, the channel. Only along actively flooding rivers, with an unaltered flood regime and depositional features such as point bars, will seedlings of cottonwood become established and possibly develop into stands of this alliance. Little information is available on the regeneration requirements of box-elder. Also, the dominance of *Acer negundo* varies with the stand age. In mid-seral stages, *Acer negundo* is often subdominant to *Populus* spp. until the *Populus* decline with age. Then *Acer negundo* becomes dominant in late-seral stages.

Disturbance from grazing can greatly impact the density and composition of the understory as well as the density of the tree canopy cover. Moderate grazing reduces the abundance of the shade-tolerant herbaceous layer and reduces tree regeneration. Damage to saplings and poles and reductions in regeneration results in an opening up of the tree canopy. Understory shrub and herbaceous species composition shifts to shade-intolerant species such as *Symphoricarpos* spp. and *Poa pratensis*. Continued heavy grazing will result in conversion from a forest type.

ALLIANCE DISTRIBUTION

Range: This alliance is widespread across the southeastern United States and occurs at scattered locations in the Western Great Plains, lower montane Rocky Mountains, and the Intermountain West. It ranges from Maryland and Virginia sporadically south through Kentucky, South Carolina, Alabama, and Georgia, and west into Arkansas, Missouri, and Oklahoma. These forests also occur in the Arkansas River Valley, with marginal examples on larger

rivers in the Ouachita Mountains, the Mississippi River Alluvial Plain, the Nashville Basin of Tennessee, and the Bluegrass Basin of Kentucky. Its presence in the Southeastern Coastal Plains is apparently somewhat sporadic. It would be expected on the Apalachicola River in Florida and adjacent Georgia, and the lower Chattahoochee River (Alabama/Georgia stateline). It is also reported from Colorado, Utah, Idaho, Montana, South Dakota, Wyoming, and possibly Arizona.
Nations: US
States/Provinces: AL AR CO GA IA ID KY LA MD MO MS MT OK SC SD TN TX? UT VA WV WY
TNC Ecoregions: 10:C, 18:C, 19:C, 20:C, 25:C, 26:C, 31:?, 32:P, 36:C, 39:C, 40:C, 41:P, 42:C, 43:C, 44:C, 50:C, 53:C, 56:?, 57:?, 58:?, 59:P, 6:C, 9:C
USFS Ecoregions: 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221Hd:CC?, 221He:CCC, 221Ja:CP?, 221Jb:CP?, 221Jc:CP?, 222Ca:CC?, 222Cb:CC?, 222Cc:CCC, 222Cd:CC?, 222Ce:CC?, 222Cf:CC?, 222Cg:CCC, 222Ch:CC?, 222Ea:CCP, 222Eb:CCC, 222Ec:CCP, 222Ed:CCP, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Eh:CCP, 222Ei:CCP, 222Ej:CCC, 222Ek:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CP?, 222Fb:CP?, 222Fc:CP?, 222Fd:CP?, 222Ff:CP?, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCC, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCP, 231Dc:CCP, 231Dd:CCP, 231De:CCP, 231Ea:CC?, 231Eb:CCP, 231Ec:CC?, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:C??, 231Fb:C??, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Bj:CP?, 232Bs:CPP, 232Dc:CP?, 234Aa:CCC, 234Ab:CCC, 234Ac:CCC, 234Ad:CCC, 234Ae:CCC, 234Af:CCC, 234Ag:CCC, 234Ah:CCC, 234Ai:CCC, 234Aj:CCC, 234Ak:CCC, 234Al:CCC, 234Am:CCC, 234An:CCC, 331D:CC, 331G:CC, 341B:CC, 342A:CC, 342B:CC, 342G:CC, M221Cd:CCC, M231A:CC, M331B:CC, M331D:CC, M331G:CC, M331H:CC, M334A:CC, M341B:CC
Federal Lands: : COE (Arkansas River); NPS (Jewel Cave, Russell Cave, Shiloh, Stones River, Wind Cave); USFS (Black Hills, Daniel Boone, St. Francis, Tuskegee); USFWS (Holla Bend, Little River)

ALLIANCE SOURCES

Authors: D.J. ALLARD, MOD. D. CULV **Identifier:** A.278
References: Evans 1991, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hansen et al. 1988b, Hansen et al. 1991, Hansen et al. 1995, Hoagland 1997, Hoagland 1998a, Jones and Walford 1995, Kittel and Lederer 1993, Kittel et al. 1994, Kittel et al. 1999a, Padgett et al. 1989, Richard et al. 1996, Szaro 1989, Youngblood et al. 1985a

Acer negundo - (Platanus occidentalis, Populus deltoides) ForestBox-elder - (Sycamore, Eastern Cottonwood) Forest

Southern Interior Box-elder Riparian Forest
Ecological Group (SCS;MCS): Appalachian Highlands Riverfront and Levee Forests and Shrublands (422-30; 1.6.3.4)

ELEMENT CONCEPT

GLOBAL SUMMARY: Forests on narrow floodplains, along streams and medium-sized rivers in Kentucky, Tennessee, Alabama, and possibly Arkansas, where *Acer negundo* dominates, possibly with emergent *Platanus occidentalis* and/or *Populus deltoides*. This association explicitly covers *Acer negundo*-dominated vegetation of streams, as opposed to *Acer negundo Forest (CEGL005033)*, a type of larger rivers which has a greater documented distribution. This association (CEGL004690) covers smaller areas and may have a greater transition zone to other communities and consequently higher diversity. More information is needed on species composition and dynamics of this association in order to better distinguish it from CEGL005033. Composition is variable. In central Kentucky, a simple strip of *Acer negundo* and *Platanus occidentalis*, plus *Ulmus americana*, etc., is common along all medium-sized streams, with almost no *Acer saccharinum* or *Populus deltoides*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Edge of West Fork Stones River and narrow first floodplain terrace. The next terrace up has lots of *Juniperus virginiana var. virginiana.* A lot of bare, exposed soil was found here, due to flooding.

Global Environment: : Stands occur on floodplains of streams and medium-sized rivers. They are typically temporarily flooded in the spring.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Forest dominated by *Acer negundo* with *Acer saccharinum,* and *Fraxinus pennsylvanica* also important in the canopy. Some emergent *Populus deltoides* and *Platanus occidentalis* are present. *Juglans nigra, Celtis laevigata* and *Ulmus americana, Ulmus rubra,* and *Ulmus alata* are also found in the canopy, but are less common. The sub-canopy is dominted by *Maclura pomifera,* which is native to Arkansas, not Tennessee. The shrub strata are dominted by *Ligustrum sinense,* an exotic. *Microstegium vimineum* is the dominant herbaceous species, it is an Asian annual grass. The common vines are *Toxicodendron radicans, Parthenocissus quinquefolia* and *Dioscorea oppositifolia,* an exotic.

Global Vegetation: Stands are dominated by *Acer negundo*, possibly with emergent *Platanus occidentalis* and/or *Populus deltoides*. In addition, *Ulmus americana* may also be a canopy component in Kentucky, and *Acer saccharinum* and *Populus deltoides* will typically be lacking (J. Campbell pers. comm.). More information is needed on species composition, variation, and dynamics of this association in order to better distinguish it from *Acer negundo Forest (CEGL005033),* a type of larger rivers which has a greater documented distribution.

Global Dynamics: This association covers smaller areas and may have a greater transition zone to other communities and consequently higher diversity (T. Foti pers. comm.). In central Kentucky, a simple strip of *Acer negundo* and *Platanus occidentalis*, plus *Ulmus americana*, etc., is common along all medium-sized streams, with almost no *Acer saccharinum* or *Populus deltoides* (J. Campbell pers. comm.). Decline of this type has been moderate, primarily caused by disruption of the flooding regime by impoundments or by water withdrawals and interbasin transfers. Natural disturbance by temporary flooding. Understory dominance by non-native plants *Ligustrum sinense, Maclura pomifera, Microstegium vimieum* was documented in middle Tennessee.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Acer negundo, Acer saccharinum, Fraxinus pennsylvanica*
TREE SUB-CANOPY	*Maclura pomifera*
TALL SHRUB	*Ligustrum sinense*
SHORT SHRUB	*Ligustrum sinense*
GRAMINOID	*Microstegium vimineum*
VINE/LIANA	*Toxicodendron radicans*

Global

Stratum	Species
TREE CANOPY	
TREE SUB-CANOPY	
TALL SHRUB	
VINE/LIANA	

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Acer negundo*

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species
TREE CANOPY	

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Acer negundo Forest (CEGL005033)

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: G4 (99-12-17). This is an early successional type, which has numerous, but poorly documented, occurrences. The rangewide occurrence of this type is complicated by the 'weedy' nature of *Acer negundo*. Decline has been moderate, primarily caused by disruption of the flooding regime by impoundments or by water withdrawals and interbasin transfers. The actual range of the type is probably greater than the data indicate. Many states do not track this vegetation as it is early successional. It may not be adequately distinguished in the data or the literature from the related CEGL005033, a type of larger rivers. Admittedly it is unclear what the EOrank criteria are for an early successional type. The Grank was changed from the ambiguous G3G5 to G4, based on information from state ecologists, which clarified the concept and allowed it to be conceptually differentiated from CEGL005033.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: Understory at West Fork Stones River dominated by exotic species.

Global Classif Comments: More information is needed on species composition and environmental variables to better distinguish this type (CEGL004690) and *Acer negundo Forest (CEGL005033)*. Tom Foti (pers. comm.) states that the small stream *Acer negundo* type (CEGL004690) covers small areas and may have a greater transition zone to other communities and consequently higher diversity. In contrast, the big river *Acer negundo* type (CEGL005033) can cover hundreds of acres with relatively little ecotone and may consist of pure *Acer negundo*. In central Kentucky, a simple strip of *Acer negundo* and *Platanus occidentalis*, plus *Ulmus americana*, etc., is common along all medium-sized streams, with almost no *Acer saccharinum* or *Populus deltoides* (J. Campbell pers. comm.). Most Natural Heritage programs do not track this successional type, and relatively little information is available on its detailed composition and dynamics. Its apparently limited range may simply be due to its failure to be distinguished from the big river type or from other small stream floodplain associations.

Internal Comments: CWN 2-2004: Stones River added based on quickplot (STRI.24) bottoms of West Fork Stones River. MP 3-03: AL & Tuskegee added. Small-scale successional *Acer negundo* stands seen in Tuskegee National Forest (ECO43; 231Bd). MP/DFL 2-01: USFS (Daniel Boone). SL 5-00: VA? added to distribution per Gary Fleming.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Occurs on the riverbank and first terrace of the West Fork Stones River.

Global Range: This *Acer negundo* small stream floodplain forest is best documented in central Kentucky; its full distribution is not known. It presumably occurs in Tennessee and is reported from Alabama and Arkansas. It could be found sporadically on small stream floodplains in the southern, eastern, and midwestern United States throughout the range of *Acer negundo*. The actual range of the type is probably greater than the data indicate. Many states do not track this vegetation as it is early successional. It may not be adequately distinguished in the data or the literature from the related CEGL005033, a type of larger rivers.

Nations: US
States/Provinces: AL:S?, AR?:SP, KY:S5, TN:S?, VA?:SP
TNC Ecoregions: 40:?, 43:C, 44:C, 50:C
USFS Ecoregions: 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221Hd:CC?, 221He:CCC, 221Ja:CP?, 221Jb:CP?, 221Jc:CP?, 222Ca:CC?, 222Cb:CC?, 222Cc:CC?, 222Cd:CC?, 222Ce:CC?, 222Cf:CC?, 222Cg:CCC, 222Ch:CC?, 222Ea:CC?, 222Eb:CCC, 222Ec:CC?, 222Ed:CCC, 222Ee:CC?, 222Ef:CC?, 222Eg:CC?, 222Eh:CC?, 222Ei:CC?, 222Ej:CCC, 222Ek:CC?, 222En:CCC, 222Eo:CCC, 222Fa:CP?, 222Fb:CP?, 222Fc:CP?, 222Fd:CP?, 222Ff:CP?, 231Bd:CCC, M221Cd:CCC
Federal Lands: NPS (Stones River), USFS (Daniel Boone, Tuskegee)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: K.D. Patterson and J. Campbell **Confidence:** 2 **Identifier:** CEGL004690
REFERENCES (type in full citation below if reference is new): Campbell pers. comm., Evans 1991, Foti pers. comm.

I.B.2.N.d.11. FRAXINUS PENNSYLVANICA - ULMUS AMERICANA - CELTIS (OCCIDENTALIS, LAEVIGATA) TEMPORARILY FLOODED FOREST ALLIANCE

Green Ash - American Elm - (Northern Hackberry, Sugarberry) Temporarily Flooded Forest Alliance

ALLIANCE CONCEPT

Summary: Forests of this alliance occur on base-rich alluvial sites in floodplains of large and small, generally alluvial or brownwater rivers, on low ridges, flats, and sloughs of first bottoms; and terrace flats and sloughs. Species composition differs somewhat with geography and topographic position. Dominant species in these forests are some combination of *Celtis laevigata, Celtis occidentalis, Fraxinus pennsylvanica,* and *Ulmus americana*. Characteristic canopy and subcanopy species include *Carya aquatica, Quercus texana, Quercus phellos, Quercus nigra, Quercus lyrata, Quercus laurifolia, Quercus muehlenbergii, Taxodium distichum, Sideroxylon lanuginosum, Liquidambar styraciflua, Ulmus alata, Ulmus crassifolia, Ulmus rubra, Nyssa biflora, Diospyros virginiana, Gleditsia aquatica, Gleditsia triacanthos, Acer rubrum, Acer negundo, Acer saccharinum, Platanus occidentalis, Populus deltoides, Salix nigra, Carya illinoinensis, Morus rubra, Carpinus caroliniana, Asimina triloba, Planera aquatica, Cornus foemina,* and *Crataegus viridis*. Common shrubs include *Cornus drummondii* and *Ilex decidua*. Vines are especially common in these forests, and species that may be present include *Berchemia scandens, Campsis radicans, Smilax bona-nox, Bignonia capreolata, Vitis rotundifolia, Brunnichia ovata, Cocculus carolinus,* and *Toxicodendron radicans*. Common herbaceous species include *Carex grayi, Carex lupulina, Carex retroflexa, Carex intumescens, Pilea pumila, Viola affinis, Galium tinctorium, Carex bromoides, Elymus virginicus, Packera glabella (= Senecio glabellus), Hydrocotyle verticillata,* and *Stellaria prostrata*. Occasionally, small occurrences of this community may be composed of almost pure *Fraxinus pennsylvanica* particularly on moist flats or in shallow sloughs; likewise occurrences on fronts are more likely to be dominated by *Celtis* spp. *Celtis laevigata* is common in the southern portion of the alliance's range, while *Celtis occidentalis* is more common in the north. This is a very widely distributed alliance that occurs in suitable habitat from the Prairie Parkland of North Dakota, Saskatchewan, and Manitoba to the Coastal Plain of Florida. It occurs on the Atlantic Coastal Plain and Piedmont as far north as Virginia, and is common as well in the Interior Low Plateau. It is attributed to the Cumberlands/Southern Ridge and Valley, but without complete information. In the leveed Mississippi River Alluvial Plain, this alliance was found to succeed from Black Willow Riverfront Forest away from the levee, from Sycamore - Sweetgum - American Elm Bottomland Forest following repeated disturbance, and from Sweetgum - Mixed Bottomland Oak Forest following repeated selective harvests.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found from the southeastern and south-central United States to the northern Great Plains and southern Great Lakes region. Its distribution includes North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Alabama, Arkansas, Florida (?), Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia; and in Canada in Saskatchewan, Manitoba, and Ontario.

Nations: CA US

States/Provinces: AL AR FL? GA IA IL IN KS KY LA MB MI MN MO MS NC ND NE OH? OK ON SC SD TN TX VA? WI

TNC Ecoregions: 32:C, 33:C, 34:C, 35:C, 36:C, 37:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:P, 44:C, 45:C, 46:C, 47:C, 48:C, 49:C, 50:C, 52:C, 53:C, 56:P, 57:C, 58:P

USFS Ecoregions: 212Hb:CC?, 212He:CCP, 212Hm:CCP, 212Hq:CCC, 212Hr:CCP, 212Hs:CCP, 212Ht:CCP, 212Hu:CCP, 212Hx:CCP, 212Hy:CCP, 212Ja:CPP, 212Jb:CPP, 212Jc:CPP, 212Jl:CPP, 212Jm:CPP, 212Jn:CPP, 212Jo:CPP, 212Kb:CCC, 212Mb:CCC, 212Na:CCC, 212Nb:CCP, 212Nc:CCC, 212Nd:CCC, 221D:CC, 221Ec:CCP, 221Ed:CCP, 221Ef:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222Ao:CCP, 222Ca:CCP, 222Cb:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CC?, 222Cg:CC?, 222Ch:CCP, 222Da:CC?, 222Dc:CCC, 222Dd:CC?, 222Dg:CC?, 222Di:CCP, 222Ee:CC?, 222Ef:CC?, 222Eg:CC?, 222Eh:CC?, 222Ek:CCC, 222Em:CCP, 222Fd:CCC, 222Fe:CCC, 222Ha:CCC, 222Hb:CCC, 222Hf:CCC, 222If:CCC, 222Jb:CCC, 222Jc:CCC, 222Jg:CCC, 222Jh:CCC, 222Ji:CCC, 222Lc:CCC, 222Lf:CCC, 222Ma:CCC, 222Mb:CCC, 222Mc:CCC, 222Md:CCC, 222Me:CCC, 222Na:CCC, 231Aa:CCC, 231Ab:CC?, 231Ac:CC?, 231Ad:CC?, 231Ae:CCC, 231Af:CCC, 231Ag:CC?, 231Ah:CC?, 231Ai:CC?, 231Aj:CC?, 231Am:CC?, 231An:CC?, 231Ao:CC?, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCC, 231Bk:CCP, 231Bl:CCC,

231Ca:CP?, 231Cb:CP?, 231Cc:CP?, 231Cd:CP?, 231Ce:CP?, 231Cf:CP?, 231Cg:CP?, 231Da:CP?, 231Db:CP?, 231Dc:CP?, 231Dd:CP?, 231De:CP?, 231Ea:CCC, 231Eb:CCP, 231Ec:CCC, 231Ed:CCC, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCC, 231Em:CCC, 231Fa:C??, 231Fb:C??, 231Ga:CCC, 231Gc:CC?, 232Ba:CCP, 232Bb:CCC, 232Bc:CCP, 232Bd:CCP, 232Bg:CC?, 232Bh:CCP, 232Bi:CCP, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCC, 232Cb:CCC, 232Cc:CCP, 232Cd:CCP, 232Ce:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Ci:CCP, 232Cj:CCP, 232D:CP, 232Ea:CP?, 232Eb:CP?, 232Fa:CCP, 232Fb:CCP, 232Fc:CCC, 232Fd:CCP, 232Fe:CCP, 234Aa:CCC, 234Ac:CCC, 234Ad:CCC, 234Ae:CCP, 234Af:CCC, 234Ag:CCC, 234Ah:CCC, 234Ai:CCC, 234Aj:CCC, 234Ak:CCC, 234Al:CCC, 234Am:CCC, 234An:CCC, 251Aa:CCC, 251Ab:CCC, 251Ba:CCC, 251Bb:CCC, 251Be:CCC, 251Cd:CCP, 251Cp:CCC, 251Cq:CCC, 251Eb:CCC, 251Fd:CCC, 251G:CC, 255Aa:CC?, 255Ab:CC?, 255Ac:CC?, 255Ad:CC?, 255Ae:CC?, 255Af:CC?, 255Ag:CCP, 255Ah:CC?, 255Ai:CC?, 255Aj:CC?, 255Ak:CC?, 255Ba:CCC, 255Ce:CCC, 332:P, M231A:CC

Federal Lands: DOD (Fort Benning, Pine Bluff Arsenal); DOE (Oak Ridge); NPS (Chickasaw NRA, Congaree Swamp, Shiloh?, Stones River, Theodore Roosevelt); USFS (Angelina, Apalachicola?, Bienville, Davy Crockett, Delta, Kisatchie, Oconee, Sabine NF, Sam Houston, St. Francis, Tombigbee?, Tuskegee, Uwharrie); USFWS (Eufaula, Hatchie, Little River, Lower Hatchie?, Reelfoot?)

ALLIANCE SOURCES

Authors: D. FABER-LANGENDOEN/D.J., MP, Midwest **Identifier:** A.286

References: Allard 1990, Burgess et al. 1973, Bush and Van Auken 1983, Diamond 1993, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Hoagland 1998a, Jackson and Thomas 1983, Klimas 1988a, McWilliams and Rosson 1990, Rice and Peet 1997, Schafale and Weakley 1990, Smith 1996a, Smith and Craig 1990, Thieret 1971, Vankat 1990, Weaver 1960, Wharton et al. 1982, Whipple et al. 1981

Fraxinus pennsylvanica - Ulmus americana - Celtis laevigata / Ilex decidua ForestGreen Ash - American Elm - Sugarberry / Possum-haw Forest

Southern Green Ash - Elm - Sugarberry Forest

Ecological Group (SCS;MCS): Southeastern Coastal Plain Large River Bottomland Hardwood Forests (385-20; 1.6.4.2)

ELEMENT CONCEPT

GLOBAL SUMMARY: This Green Ash – American Elm - Sugarberry community is found throughout the central and southern United States. Stands occur in floodplains of major rivers where water is absent for most of the growing season. Soils are moist alluvial clay or silt loams. *Ulmus americana* was once the most prominent member of this forest, but Dutch elm disease (*Ceratostomella ulmi*) and logging have eliminated many of the largest mature *Ulmus* spp. from most of the species natural range. *Fraxinus pennsylvanica* dominates on moist flats and shallow sloughs, while *Celtis laevigata* is most prevalent on new land or front sites. Other species commonly encountered include *Carya aquatica, Quercus lyrata, Liquidambar styraciflua*, and *Acer negundo*. The subcanopy is often dense and dominated by *Fraxinus pennsylvanica* which sprouts prolifically. Shrubs typical of this forest include *Cornus drummondii, Ilex decidua*, and *Crataegus* spp. The herbaceous layer is dense and diverse, dominated by *Galium* spp., *Viola* spp., *Carex* spp., *Leersia* spp., *Boehmeria cylindrica, Laportea canadensis, Pilea pumila, Impatiens capensis (= Impatiens biflora)*, and *Impatiens pallida*. Vines most often encountered include *Toxicodendron radicans, Campsis radicans*, and *Parthenocissus quinquefolia*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Occurs on the higher part of the floodplain of the West Fork Stones River. This is a moderate sized river, not a major river; the typical habitat of this association.

Global Environment: This community occurs in floodplains of major rivers, generally alluvial or brownwater rivers, on low ridges, flats, and sloughs; terrace flats and sloughs; and occasionally on new lands or fronts. In terms of hydrology, this is a Zone IV community (Wharton et al. 1982). Soils are clay or silt loams that are seasonally inundated or saturated for 1 or 2 months during the growing season, with a 50-100% annual frequency (Eyre 1980,

Smith and Craig 1990). Alluvial deposition and nutrient input occurs, but less than in more frequently flooded forest types (Schafale and Weakley 1990).

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Dominant trees of this type at Stones River are *Ulmus americana, Celtis laevigata, Acer negundo, Celtis occidentalis, Juniperus virginiana var. virginiana, Maclura pomifera* and *Gleditsia tricanthos.* Other trees include *Platanus occidentalis* and *Fraxinus americana.* There is a diversity of shrubs, including tree species not noted in the canopy or sub-canopy and several exotic shrubs. Common shrubs include *Ligustrum sinense, Celtis occidentalis, Sambucus canadensis, Carya cordiformis,* and *Lonicera maackii.* The vines *Toxicodendron radicans, Parthenocissus quinquefolia,* and *Lonicera japonica* are common. Prominent herbs include *Elymus virginicus, Passiflora incarnata, Pilea pumila, Polymnia canadensis, Muehlenbergia sobolifera,* and *Bidens polylepis.*

Global Vegetation: This community is a broadleaf deciduous floodplain forest which exhibits high canopy diversity and good herbaceous diversity (although lower herbaceous diversity than mesic floodplain forest). *Ulmus americana* was once the most prominent member of this forest, but Dutch elm disease (*Ceratostomella ulmi*) and logging have eliminated many of the largest mature *Ulmus* spp. from most of the species natural range (Collingwood and Brush 1984). *Fraxinus pennsylvanica* dominates on moist flats and shallow sloughs, while *Celtis laevigata* is most prevalent on new land or front sites. Other species commonly encountered include *Carya aquatica, Quercus lyrata, Liquidambar styraciflua,* and *Acer negundo*. The subcanopy is often dense and dominated by *Fraxinus pennsylvanica* which sprouts prolifically. *Fraxinus pennsylvanica*, however, is considered a pioneer species and does not maintain its canopy position under intense shading found in later successional stages (Voigt and Mohlenbrock 1964). Shrubs typical of this forest include *Cornus drummondii, Ilex decidua,* and *Crataegus* spp. The herbaceous layer is dense and diverse, dominated by *Galium* spp., *Viola* spp., *Carex* spp., *Leersia* spp., *Boehmeria cylindrica, Laportea canadensis, Pilea pumila, Impatiens capensis (= Impatiens biflora),* and *Impatiens pallida*. Vines most often encountered include *Toxicodendron radicans, Campsis radicans,* and *Parthenocissus quinquefolia* (TNC 1995a).

Global Dynamics: Although this community can be early-successional, occurring on river fronts and other recently disturbed areas, this is a generally long-lived type (Eyre 1980, Diamond 1993). This community is usually located in transitional areas between the *Quercus (michauxii, pagoda, shumardii) - Liquidambar styraciflua Forest Alliance (A.291)* and the *Quercus lyrata - (Carya aquatica) Seasonally Flooded Forest Alliance (A.328).*

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Celtis laevigata, Ulmus americana*
TREE SUB-CANOPY	*Celtis laevigata, Celtis occidentalis, Maclura pomifera, Acer negundo*
TALL SHRUB	*Ligustrum sinense*
VINE/LIANA	*Parthenocissus quinquefolia, Toxicodendron radicans*

Global

Stratum Species

TREE CANOPY *Carya aquatica, Celtis laevigata, Fraxinus pennsylvanica, Quercus lyrata, Quercus nigra, Quercus phellos, Ulmus americana*
TREE SUB-CANOPY *Celtis laevigata, Ulmus americana*
TALL SHRUB *Cornus drummondii, Ilex decidua*
VINE/LIANA *Campsis radicans, Parthenocissus quinquefolia, Toxicodendron radicans*

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global

Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global

Stratum Species

TREE CANOPY *Quercus texana*

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Fraxinus pennsylvanica - Ulmus spp. - Celtis occidentalis Forest (CEGL002014)
- Acer (rubrum, saccharinum) - Fraxinus spp. - Ulmus americana Forest (CEGL005038)--is often non-floodplain.
- Acer saccharinum - Celtis laevigata - Carya illinoinensis Forest (CEGL002431)

SYNONYMY [OtherName (short citation) relationship. Note]:

- UNESCO FORMATION CODE: I.B.3d (UNESCO 1973) B
- Palustrine: Palustrine Forested Wetland (Cowardin et al. 1979) F
- Eastern Broadleaf and Needleleaf Forests: 113: Southern Floodplain Forest (*Quercus-Nyssa-Taxodium*) (Kuchler 1964) B
- Southern Green Ash - Elm - Sugarberry Forest. [common name]
- IIA6d. Sugarberry - American Elm - Green Ash Bottomland Forest (Allard 1990) B. in part
- P1B3cIV9a. *Celtis laevigata - Fraxinus pennsylvanica - Ulmus americana* (Foti et al. 1994)
- Sugaryberry - American Elm - Green Ash: 93 (Eyre 1980) B. in part
- Terrestrial: Forest: Hardwood (TNC 1985) B
- Brownwater Levee Forest (Medium Levee Subtype) (Schafale 2000)
- (Allard 1990) N90ALL01ICEC
- (Collingwood and Brush 1984) B84COL01ICEC
- (Cowardin et al. 1979) G79COW01ICEC
- (Diamond 1993) N93DIA01ICEC
- (Eyre 1980) B80EYR01ICEC
- (Foti 1994b) G94FOT02ICEC
- (Foti et al. 1994) A94FOT01ICEC
- (Hoagland 1997) G97HOA01ICEC
- (Hoagland 2000) A00HOA01ICEC
- (Kuchler 1964) B64KUC01ICEC
- (Nelson 1985) B85NEL01ICEC
- (Penfound 1948) A48PEN01ICEC
- (Penfound 1953) A53PEN01ICEC
- (Rice and Penfound 1956) A56RIC01ICEC
- (Rosson 1995) G95ROS01ICEC
- (Schafale 2000) N00SCH01ICEC
- (Schafale and Weakley 1990) G90SCH01ICEC
- (Smith and Craig 1990) G90SMI01ICEC
- (TNC 1985) N85THE01ICEC

- (TNC 1995a) N95TNC01ICEC
- (UNESCO 1973) A73UNE01ICEC
- (Voigt and Mohlenbrock 1964) B64VOI01ICEC
- (Wharton et al. 1982) G82WHA01ICEC
- (White and Madany 1978) A78WHI02ICEC

GRank & Reasons: G4G5 (97-08-15).

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: The West Fork Stones River is a moderate sized river, not a major river; the typical habitat of this association. This may explain some of the deveation (from the global description of the type) of the vegetation here at Stones River.

Global Classif Comments: The Southeast Regional Office is in the process of describing the Mississippi River Alluvial Plain portion of this type, which includes southern Illinois, as a separate type.

Internal Comments: CWN 3-03: Stones River added (STRI.3) and quickplot STRI.23. JT 6-01: This type was removed from ECO31 because similar vegetation including *Ulmus crassifolia* and *Quercus virginiana* (Ulmus crassifolia - Carya illinoinensis - Celtis laevigata / Chasmanthium sessiliflorum - Carex cherokeensis Forest CEGL002388, Quercus virginiana / Ilex vomitoria - Sabal minor / Carex cherokeensis - Malvaviscus arboreus var. drummondii Forest CEGL007830, Fraxinus pennsylvanica - (Carya aquatica) / Forestiera acuminata / Phanopyrum gymnocarpon Depression Forest CEGL007926) were more suitable. MP 2001-02-14: determined that this type is not in Daniel Boone NF. MP 12-00: Daniel Boone added (See J. Campbell data). MP 10-00: This name is used in Peet and Rice (1997), but this now separated as CEGL007806. MCS: This type was described as part of a survey of southern Illinois vegetation, with subsequent rangewide literature and TNC regional office review. Thus the CCA still requires additional rangewide survey, analysis, and review. (TNC 1995) Douglas Zollner (ARFO) points out that this is a very broad concept and advocates the recognition of regional variants (northern vs. southern and an eastern vs. western).

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Occurs on the higher part of the floodplain of the West Fork Stones River, and along the railraod track at Redoubt Brannon and north of the Artillery Monument.

Global Range: This Green Ash – Amreican Elm - Sugarberry community is found throughout the central and southern United States on floodplains of major rivers from Texas, Oklahoma, Arkansas, north to southern Illinois and adjacent Indiana, east to Tennessee, and south to Louisiana. The range formerly included states of the Atlantic Coastal Plain, but now see *Fraxinus pennsylvanica - Ulmus americana / Carpinus caroliniana / Boehmeria cylindrica Forest (CEGL007806).*

Nations: US
States/Provinces: AR:S?, IL:S?, IN?, KY:S?, LA:S4, MO:S?, MS:S?, OK:S?, TN:S?, TX?
TNC Ecoregions: 39:C, 40:C, 41:C, 42:C, 43:P, 44:C, 50:P, 52:C, 53:C
USFS Ecoregions: 221D:CC, 222C:CC, 222D:CP, 222E:CP, 231Ba:CPP, 231C:CP, 231D:CP, 231E:CC, 231G:C?, 232D:CP, 232F:CC, 234A:CC, M231A:CP
Federal Lands: DOE (Oak Ridge); NPS (Stones River); USFS (Bienville, Delta, Kisatchie, St. Francis); USFWS (Hatchie, Lower Hatchie?, Reelfoot?)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: M. Guetersloh, mod. M. Pyne and D. Faber-Langendoen, SCS **Confidence:** 2 **Identifier:** CEGL002427
REFERENCES (type in full citation below if reference is new): Allard 1990, Collingwood and Brush 1984, Cowardin et al. 1979, Diamond 1993, Eyre 1980, Foti 1994b, Foti et al. 1994, Hoagland 1997, Hoagland 2000, Kuchler 1964, Nelson 1985, Penfound 1948, Penfound 1953, Rice and Penfound 1956, Rosson 1995, Schafale 2000, Schafale and Weakley 1990, Smith and Craig 1990, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, Wharton et al. 1982, White and Madany 1978

I.B.2.N.d.22. SALIX NIGRA TEMPORARILY FLOODED FOREST ALLIANCE

Black Willow Temporarily Flooded Forest Alliance

ALLIANCE CONCEPT

Summary This alliance contains vegetation that is dominated by *Salix nigra* and that occurs in temporarily flooded sites, i.e., surface water is present for brief periods during the growing season, but the water table usually lies well below soil surface. Other canopy species that may be present include *Populus deltoides, Planera aquatica, Betula nigra, Platanus occidentalis, Celtis laevigata, Fraxinus pennsylvanica, Carya illinoinensis, Diospyros virginiana, Quercus nigra, Cornus drummondii, Ulmus americana, Acer rubrum, Acer negundo, Acer saccharinum* (in the Mississippi River Alluvial Plain north of Memphis, Tennessee), *Catalpa bignonioides* (in range), and *Morus rubra*. The herbaceous and shrub strata may be absent to fairly dense, and species that may be present include *Ampelopsis arborea, Mikania scandens, Toxicodendron radicans, Polygonum* spp., *Erechtites hieraciifolia, Boehmeria cylindrica, Commelina virginica, Eupatorium serotinum, Phytolacca americana, Asplenium platyneuron*, and others. This alliance is common on the fronts of both small rivers and streams and larger rivers where it is a component of point bar succession. This alliance is common throughout the southeastern and southern midwestern United States.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Iowa, Missouri, Virginia, West Virginia, Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas, and in Ontario, Canada. In addition, it is possibly found in Illinois (?), Indiana (?),Ohio (?), and Oklahoma (?).
Nations: CA US
States/Provinces: AL AR FL GA IA IL? IN? KY LA MS NC OH? OK? ON SC TN TX VA WV
TNC Ecoregions: 30:C, 31:C, 32:C, 33:C, 37:C, 38:P, 39:C, 40:P, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:P, 53:C, 55:P, 56:P, 57:C, 58:P, 59:P
USFS Ecoregions: 221Db:CCP, 221Eb:CCP, 221Ec:CCP, 221Ed:CC?, 221Ef:CC?, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221Hd:CCP, 221He:CCC, 221Ja:CCP, 221Jb:CCC, 221Jc:CCP, 222Ab:CCP, 222Ag:CCP, 222Ah:CCP, 222Al:CCP, 222Am:CCP, 222An:CCP, 222Ca:CCP, 222Cb:CCP, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CCP, 222Cg:CCP, 222Ch:CCP, 222Da:CCP, 222Db:CCP, 222Dc:CCP, 222Dd:CCP, 222De:CCP, 222Dg:CCP, 222Di:CCP, 222Dj:CCP, 222Ea:CCP, 222Eb:CCC, 222Ec:CCP, 222Ed:CCP, 222Ee:CCP, 222Ef:CCP, 222Eg:CCP, 222Eh:CCP, 222Ei:CCP, 222Ej:CCP, 222Ek:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCP, 222Fb:CCP, 222Fc:CCP, 222Fd:CCP, 222Ff:CCP, 231Aa:CCP, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCC, 231Bd:CCP, 231Be:CCP, 231Bf:CCP, 231Bg:CCP, 231Bh:CCP, 231Bi:CCP, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCP, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCP, 231Db:CCP, 231Dc:CCP, 231Dd:CCP, 231De:CCP, 231Ea:CCP, 231Eb:CCP, 231Ec:CCP, 231Ed:CCP, 231Ee:CCP, 231Ef:CCP, 231Eg:CCP, 231Eh:CCP, 231Ei:CCP, 231Ej:CCP, 231Ek:CCP, 231El:CCP, 231Em:CCP, 231En:CCP, 231Fa:CCP, 231Fb:CCP, 231Ga:CCC, 231Gb:CCC, 231Gc:CCP, 232Ba:CCP, 232Bb:CCP, 232Bc:CCP, 232Bd:CCP, 232Bg:CCP, 232Bh:CCP, 232Bi:CCP, 232Bj:CCP, 232Bk:CCP, 232Bl:CCP, 232Bm:CCC, 232Bn:CCP, 232Bo:CCP, 232Bp:CCP, 232Bq:CCC, 232Br:CCP, 232Bs:CCC, 232Bt:CCP, 232Bu:CCP, 232Bv:CCP, 232Bx:CCP, 232Bz:CCP, 232Ca:CCP, 232Cb:CCP, 232Cc:CCP, 232Cd:CCP, 232Cf:CCP, 232Cg:CCP, 232Ch:CCP, 232Cj:CCP, 232Dc:CCP, 232Ee:CCP, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 232Fe:CCP, 234Aa:CC?, 234Ac:CCC, 234Ad:CCP, 234Af:CC?, 234Ag:CCC, 234Ah:CC?, 234Ai:CC?, 234Aj:CCP, 234Ak:CC?, 234Al:CC?, 234Am:CCC, 234An:CCC, 251Ea:CCP, 251Ec:CCP, 251Ed:CCP, 251Fb:CCP, 251Fc:CCP, 255Aa:CCP, 255Ab:CCP, 255Ac:CCP, 255Ad:CCP, 255Ae:CCP, 255Af:CCP, 255Ag:CCP, 255Ah:CCP, 255Ai:CCP, 255Aj:CCP, 255Ak:CCP, 255Ba:CCP, 255Ca:CCP, 255Cb:CCP, 255Cc:CCP, 255Cd:CCP, 255Ce:CCP, 255D:CC, 311A:CC, 315E:CC, 332E:CC, M221Aa:CCP, M221Ab:CCP, M221Ba:CCP, M221Bd:CCP, M221Be:CCP, M221Ca:CCP, M221Cb:CCP, M221Cc:CCP, M221Cd:CCC, M221Ce:CCP, M221Da:CCP, M221Db:CCP, M221Dc:CCP, M221Dd:CCP, M222Aa:CCP, M222Ab:CCP, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP
Federal Lands: COE (Arkansas River); DOD (Arnold, Fort Benning); DOE (Savannah River Site); NPS (Congaree Swamp, Ninety Six, Stones River); TVA (Tellico); USFS (Angelina, Apalachicola, Bienville, Cherokee?, Conecuh, Daniel Boone, Davy Crockett, Delta, De Soto, Francis Marion, Holly Springs, Kisatchie, Nantahala, Ocala?, Pisgah, Sabine NF, Sam Houston, St. Francis, Sumter?, Talladega, Tombigbee, Tuskegee); USFWS (Chickasaw NWR, Lower Rio Grande Valley, Santa Ana)

ALLIANCE SOURCES

Authors: D.J. ALLARD, MOD. S. SIMO **Identifier:** A.297
References: Allard 1990, Burns and Honkala 1990b, Evans 1991, Eyre 1980, Faber-Langendoen et al. 1996, Foti 1994b, Foti et al. 1994, Klimas 1988b, Schafale and Weakley 1990, Van Auken and Bush 1988, Wharton et al. 1982

Salix nigra ForestBlack Willow Forest
Black Willow Riparian Forest
Ecological Group (SCS;MCS): Southeastern Coastal Plain Riverfront and Levee Forests and Shrublands (385-30; 1.6.4.4)

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 illinoinensis, 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.* In Kentucky, stands may contain *Dichanthelium commutatum.*

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment:

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

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation:

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 illinoinensis, 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* (Central Appalachian Ecoregional Team pers. comm. 1998).

Global Dynamics: Flooding is typically brief during the growing season.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TREE CANOPY	*Salix nigra*
TREE SUB-CANOPY	*Salix nigra*
TALL SHRUB	
VINE/LIANA	

Global
Stratum Species

CHARACTERISTIC SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:
- Populus deltoides - Salix nigra Forest (CEGL002018)--overlaps in concept.
- Salix nigra Large River Floodplain Forest (CEGL007410) - of larger rivers but (formerly) placed in seasonally flooded.

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: G4 (02-10-15).

CLASSIFICATION COMMENTS
STONES RIVER NATIONAL BATTLEFIELD National Park

Global Classif Comments:

Internal Comments: CWN: 3-2004: Stones River added, Phyllis Jackson (pers. comm.) TALO.42 [not this -- reassigned to CEGL007373] REE 10-02: There are apparently North Carolina Vegetation Survey plots attributable to this type (Peet et al. 2002). JT 4-01: TX? changed to TX. MP 2001-03-08: Attributed to Fort Benning, Georgia, based on the use of its alliance as a mapping unit. Its occurrence has been confirmed (2002-08). MP 2001-02-14: CEGL007410 was formerly called "seasonally flooded" but has been renamed and moved to temp. MP 2001-02-01: The states, ecoregions, and subsections of Salix nigra - Acer (rubrum, saccharinum) / Alnus serrulata - Cephalanthus occidentalis Forest (CEGL007703) which were not already part of the range of this type have been added, as CEGL007703 was moved to Seasonally Flooded, and these attributes need to remain attached to an association since they belong to the alliance. MP/DFL 2-01: AL?, KY & TN and Daniel Boone added. Which TVA lands? LS 7-00: Not recognized by CAP group; Salix nigra forests recognized in WV only in western part of state. Rick Turner 8-99: Isn't this covered by CEGL007410? [actually the other way `round - CEGL007410 may be merged into this! MP]

ELEMENT DISTRIBUTION
STONES RIVER NATIONAL BATTLEFIELD National Park Range:

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:SP, AR:S?, FL:S?, GA:S?, IA:S?, IL?:SP, IN?:SP, KY:S?, LA:S4, NC:S?, OH?:SP, OK?:SP, ON:S?, TN:S?, TX?:SP, VA:S?, WV:S?
TNC Ecoregions: 31:C, 32:C, 33:C, 37:C, 38:P, 39:C, 40:P, 41:C, 42:C, 43:P, 44:C, 50:C, 51:P, 52:?, 53:C, 55:P
USFS Ecoregions: 221Ec:CPP, 221Ed:CP?, 221Ef:CP?, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222A:CC, 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: COE (Arkansas River); DOD (Fort Benning); NPS (Ninety Six, Stones River); USFS (Daniel Boone, Talladega)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: Great Plains Program, mod. D. Faber-Langendoen **Confidence:** 3 **Identifier:** CEGL002103
REFERENCES (type in full citation below if reference is new): 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. 2002, Penfound 1953, Penfound 1961, Penfound 1965, Petranka and Holland 1980

III. SHRUBLAND

III.B.2.N.a. Temperate cold-deciduous shrubland

III.B.2.N.a.15 RUBUS (ARGUTUS, TRIVIALIS) SHRUBLAND ALLIANCE

(Southern Blackberry, Southern Dewberry) Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance includes successional vegetation which develops following disturbance (complete forest canopy removal) dominated by *Rubus argutus* and/or *Rubus trivialis*. Many examples also contain *Smilax* spp. and a great variety of tree saplings and other woody species. In central Tennessee, these may include *Quercus* spp., *Liquidambar styraciflua, Acer rubrum*, and *Rhus copallinum*. Herbs in central Tennessee examples may include *Solidago* spp., Asteraceae spp., *Helianthus* spp., *Hypericum* spp., *Potentilla simplex*; grasses may include *Andropogon* spp., *Dichanthelium* spp., *Panicum* spp., *Schizachyrium scoparium*, and *Sorghastrum nutans*.
Dynamics: Stands of this alliance are successional and develop following disturbance (complete forest canopy removal).

ALLIANCE DISTRIBUTION

Range: This alliance is found from Tennessee and the Carolinas south into Mississippi, Alabama, and Georgia. Its full distribution has not been documented.
Nations: US
States/Provinces: AL? GA MS? NC SC TN
TNC Ecoregions: 43:C, 44:C, 50:C, 52:C
USFS Ecoregions: 221Ae:CCC, 222Eb:CCC, 222Ed:CCC, 231Aa:CCC, 231Ae:CCC
Federal Lands: DOD (Arnold); NPS (Cowpens, Ninety Six, Stones River); USFS (Ouachita, Ozark, Talladega, Tuskegee?)

ALLIANCE SOURCES

Authors: M.J. RUSSO 2-97, MOD. M. **Identifier:** A.908
References:

Rubus (argutus, trivialis) - Smilax (glauca, rotundifolia) Shrubland(Southern Blackberry, Southern Dewberry) - (Whiteleaf Greenbrier, Common Greenbrier) Shrubland
Blackberry - Greenbrier Successional Shrubland Thicket
Ecological Group (SCS;MCS): Semi-natural Wooded Uplands (900-40; 8.0.0.1)

ELEMENT CONCEPT

GLOBAL SUMMARY: Stands of this successional community develop following disturbance (complete forest canopy removal). These stands are dominated by greenbrier species (*Smilax glauca, Smilax rotundifolia*) and blackberries/dewberries (*Rubus argutus, Rubus trivialis*). Many examples include a great variety of tree saplings and other woody species (*Quercus* spp., *Liquidambar styraciflua, Acer rubrum, Diospyros virginiana, Juniperus virginiana var. virginiana, Rhus copallinum*), herbs (*Solidago* spp., Asteraceae spp., *Helianthus* spp., *Hypericum* spp., *Potentilla simplex*), and grasses (*Andropogon* spp., *Dichanthelium* spp., *Panicum* spp., *Schizachyrium scoparium, Lolium* spp., and *Sorghastrum nutans*). Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have *Lonicera japonica* as a codominant vine overtopping much of the blackberry and greenbrier.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: This community can exist in both lowlands and uplands that have been cleared but have not been further disturbed by continued mowing or plowing for 3-5 years.

Global Environment: This community can exist in both lowlands and uplands that have been cleared but have not been further disturbed by continued mowing or plowing for 3-5 years.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation:

Global Vegetation: Stands of this association are dominated by greenbrier species (*Smilax glauca, Smilax rotundifolia*) and blackberries/dewberries (*Rubus argutus, Rubus trivialis*). They also contain a great variety of tree saplings and other woody species (e.g., *Quercus* spp., *Liquidambar styraciflua, Acer rubrum, Rhus copallinum*). Some herbs in central Tennessee examples may include *Solidago* spp., Asteraceae spp., *Helianthus* spp., *Hypericum* spp., *Potentilla simplex*; grasses may include *Andropogon* spp., *Dichanthelium* spp., *Panicum* spp., *Schizachyrium scoparium, Lolium* spp., and *Sorghastrum nutans*. Communities that are surrounded by relatively intact ecosystems will tend to have more native species. Those surrounded by old fields or fragmented by development tend to have *Lonicera japonica* as a codominant vine overtopping much of the blackberry and greenbrier.

Global Dynamics: Stands of this successional community develop following disturbance (complete forest canopy removal) followed by a period of no disturbance of 3-5 years.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

SHORT SHRUB

Global

Stratum Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global

Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum Species

Global

Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: GD (01-10-03). This type represents ruderal successional vegetation dominated by species native to North America. GRank changed from GW to GD to reflect this composition.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park:

Global Classif Comments: In sandy parts of the southeastern U.S. Coastal Plain (e.g., Fort Benning, Georgia) the common blackberry is *Rubus cuneifolius*, and it does not form monocultural stands worthy of recognition as a vegetation type. At Arnold Air Force Base, Coffee and Franklin counties, Tennessee, this community is often found in powerline corridors and other areas that have experienced total canopy removal.

Internal Comments: CWN 4-04: Stones River attributed (Phyllis Jackson, pers. com.) RW 3-03: Part of plot KIMO.20 from KIMO assigned to this association (NatureServe SE Ecology unpubl. data 2002). RW 03-03: All of

plot COWP.12 and parts of plot COWP.2 and COWP.3 are assigned to this community from Cowpens (NatureServe SE Ecology data 2002). NC? changed to NC and SC? changed to SC. REE 10-02: There are apparently North Carolina Vegetation Survey plots attributable to this type (Peet et al. 2002). MP 9-01: Fort Benning deleted. MP 4-01: GA? changed to GA and Fort Benning added. MP 8-00: AL?, GA?, MS?, NC?, SC? added.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range:

Global Range: This ruderal successional vegetation could be found throughout the upper southern United States.

Nations: US
States/Provinces: AL?:SP, GA:S?, MS?:SP, NC:S?, SC:S?, TN:S?
TNC Ecoregions: 43:C, 44:C, 50:C, 52:C
USFS Ecoregions: 222Eb:CCC, 222Ed:CCC, 231Aa:CCC, 231Ae:CCC
Federal Lands: DOD (Arnold); NPS (Cowpens, Ninety Six, Stones River); USFS (Talladega?, Tuskegee?)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: M.J. Russo **Confidence:** 2 **Identifier:** CEGL004732
REFERENCES (type in full citation below if reference is new): NatureServe Ecology - Southeastern U.S. unpubl. data, Peet et al. 2002, TNC 1998a

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

III.B.2.N.d.5. SALIX CAROLINIANA TEMPORARILY FLOODED SHRUBLAND ALLIANCE

Carolina Willow Temporarily Flooded Shrubland Alliance

ALLIANCE CONCEPT

Summary: Young, or frequently disturbed, thickets of *Salix caroliniana* with temporarily flooded hydrology. This vegetation is often found along blackwater streams, and on riverbanks, sand bars, and other wet sites. In the Ouachita Mountains, this shrubland occurs as a narrow fringe near the low water level or in scour zones of most streams and rivers, where it is associated with a rocky substrate of cobbles or bedrock. The alliance occurs in the Arkansas Valley, Ouachita Highlands of Arkansas and Missouri, Atlantic Coastal Plain from Virginia to Florida, and in the Interior Low Plateau of Tennessee, Kentucky, and northern Alabama; it is rare in the Piedmont and Appalachian Mountains.
Dynamics:

ALLIANCE DISTRIBUTION

Range: The alliance occurs in the Arkansas Valley, Ouachita Highlands of Arkansas and Missouri, Atlantic Coastal Plain from Virginia to Florida, and in the Interior Low Plateau of Tennessee, Kentucky, and northern Alabama; it is rare in the Piedmont and Appalachian Mountains. The distribution of this alliance in Kansas needs to be verified and its distribution along the Ochlockonee River is uncertain (A. Johnson pers. comm.).
Nations: US
States/Provinces: AL? AR FL GA KY MO? NC SC TN VA?
TNC Ecoregions: 38:C, 39:C, 43:P, 44:P, 50:P, 52:P, 53:?, 55:C, 56:C
USFS Ecoregions: 221H:PP, 222Aa:CPP, 222Ae:CP?, 222Af:CPP, 222Ag:CP?, 231Gb:CCC, 232Bq:CCC, M222:C, M231A:CC
Federal Lands: DOD (Fort Gordon); NPS (Stones River); USFS (Daniel Boone?, Ouachita, Ozark)

ALLIANCE SOURCES

Authors: L.M. SMITH/A.S. WEAKLEY/J, MP, Southeast **Identifier:** A.946
References: Allard 1990, Ambrose 1990a, Faber-Langendoen et al. 1996, Foti et al. 1994, Johnson pers. comm.

Salix caroliniana Temporarily Flooded ShrublandCarolina Willow Temporarily Flooded Shrubland

Carolina Willow Shrubland

Ecological Group (SCS;MCS): Southeastern Coastal Plain Riverfront and Levee Forests and Shrublands (385-30; 1.6.4.4)

ELEMENT CONCEPT

GLOBAL SUMMARY: This Carolina willow shrubland type is found widely throughout the southeastern United States. This is a broadly defined type for riverside and streamside thickets dominated by *Salix caroliniana*. Further information is needed to characterize this type.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: RIVERINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Wet, low floodplain of the West Fork Stones River, standing water was present (due to flooding) when surveyed.

Global Environment: This is a broadly defined type accommodates *Salix caroliniana* stands in a variety of temporarily flooded habitats, including riverside and streamside thickets. Some examples may be somewhat ruderal or successional, e.g., where *Salix caroliniana* thickets develop along streams in pastures or other wet areas where the natural forest canopy has been removed.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: This shrubland has very sparse canopy height trees; *Platanus occidentalis, Acer sacharinum,* and also sparse subcanopy trees; *Salix caroliniana, Platanus occidentalis, Acer sacharinum,* and to a lesser extent *Fraxinus pennsylvanica, Celtis laevigata,* and *Populus deltoides.* The vegetation is dominated by *Salix caroliniana* in both the tall and short shrub strata. Other tall shrubs are *Cephalanthus occidentalis, Fraxinus pennsylvanica,* and *Platanus occidentalis. Cephalanthus occidentalis* is a codominant short shrub, with *Salix caroliniana*. Other short shrubs include *Toxicodendron radicans, Populus deltoides, Acer negundo* and *Celtis laevigata. Leersia oryzoides* is the dominant herbaceous plant, *Commelina virginica, Boehmeria cylindrica,* and *Justicia americana* are also important herbaceous plants. Other herbaceous plants include *Lobelia cardinalis, Amsonia taebernaemontana* var. *gattingeri, Pilea pumila, Viola sp., Hibiscus moscheutos, Diodia virginiana, Solidago sp., Saururus cernuus,* and *Microstegium viminium (*an Asian grass).

Global Vegetation: This is a broadly defined community covering thickets dominated by *Salix caroliniana*. A number of other shrub species may also be present, with some variability between geographic location and specific habitat type. In north-central Florida other shrubs include *Sambucus canadensis, Baccharis halimifolia,* and *Morella cerifera (= Myrica cerifera)* (Patton and Judd 1986). Further information is needed to characterize this type.

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
SUB-CANOPY	*Salix caroliniana, Platanus occidentalis, Acer sacharinum*
TALL SHRUB	*Salix caroliniana*
SHORT SHRUB	*Salix caroliniana, Cephalanthus occidentalis*

Global
Stratum Species

CHARACTERISTIC SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:
- Hamamelis vernalis - Cornus obliqua - Hypericum prolificum Shrubland (CEGL003898)

SYNONYMY [OtherName (short citation) relationship. Note]:
- (NatureServe Ecology - Southeastern U.S. unpubl. data) UNDABI01ICEC
- (Patton and Judd 1986) A86PAT01ICEC
- (Schafale and Weakley 1990) G90SCH01ICEC

GRank & Reasons: G4? (01-09-19).

CLASSIFICATION COMMENTS
STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments: Missouri suggests that this type be lumped with *Hamamelis vernalis - Cornus obliqua - Hypericum prolificum Shrubland (CEGL003898)* as part of a more complex gravel wash shrub type.

Internal Comments: CWN 3-03: Stones River added, plot STRI.17. MP 12-00: Daniel Boone? added. KP 4-00: See sample Glover-2 from 1998 Ozark-Ouachita work. See also internal comment on CEGL003898. MO changed to MO? DFL 3-00. Missouri suggests that this type be lumped with *Hamamelis vernalis - Cornus amomum ssp. obliqua - Hypericum prolificum* Shrubland (CEGL003898) as part of a more complex gravel wash shrub type.

ELEMENT DISTRIBUTION
STONES RIVER NATIONAL BATTLEFIELD National Park Range: Occurs on the east side of West Fork Stones River, just northwest of the Thompson Lane bridge.

Global Range: This Carolina willow shrubland type is found widely throughout the southeastern United States, from Arkansas (and possibly Missouri), east to North Carolina and possibly Virginia, and south to Florida.

Nations: US
States/Provinces: AL?, AR:S?, FL:S?, GA:S?, KY:S?, MO?, NC:S5, SC:S?, TN:S?, VA?
TNC Ecoregions: 38:C, 39:C, 43:P, 44:P, 50:P, 52:P, 53:?, 55:C, 56:C
USFS Ecoregions: 221H:PP, 222Aa:CPP, 222Ae:CP?, 222Af:CPP, 222Ag:CP?, 231:C, 232Bq:CCC, M222:C, M231:C
Federal Lands: DOD (Fort Gordon); NPS (Stones River); USFS (Daniel Boone?, Ozark, Ouachita)

ELEMENT SOURCES
STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: K.D. Patterson?, SCS **Confidence:** 2 **Identifier:** CEGL003899
REFERENCES (type in full citation below if reference is new): NatureServe Ecology - Southeastern U.S. unpubl. data, Patton and Judd 1986, Schafale and Weakley 1990

III.C.2.N.a. Mixed evergreen - cold-deciduous shrubland

III.C.2.N.a.2. JUNIPERUS VIRGINIANA - RHUS AROMATICA SHRUBLAND ALLIANCE

Eastern Red-cedar - Fragrant Sumac Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance, encompassing shrubland zones of calcareous glades and rocky cliffs, is a zonal component of these systems; it occupies deeper soil zones around herbaceous-dominated flatrock glades or exposed areas at the tops of cliffs. It may occur as islands in herbaceous-dominated areas or as a marginal zone varying from 5-30 m in width. Examples are known from the limestone glades of the Central Basin of Tennessee, limestone outcrops of the Alabama Cumberland Plateau, dolostone glades associated with the Cahaba River in Bibb County, Alabama, the Moulton Valley glade systems of northern Alabama, or rocky limestone cliffs in central Kentucky. Characteristic shrubs include *Juniperus virginiana var. virginiana, Rhus aromatica var. aromatica, Frangula caroliniana, Forestiera ligustrina, Berchemia scandens, Hypericum frondosum, Sideroxylon lycioides*, and stunted individuals of *Acer saccharum, Quercus muehlenbergii, Quercus shumardii* (in Tennessee examples), *Quercus austrina* (in Bibb County, Alabama, examples), *Fraxinus americana*, and *Ulmus alata*. Typically grades into open, herbaceous-dominated glades or into woodlands or forests commonly dominated by *Quercus muehlenbergii, Quercus stellata, Fraxinus americana, Fraxinus quadrangulata*, and/or *Celtis laevigata*.
Dynamics:

ALLIANCE DISTRIBUTION

Range: Examples of this alliance are known from the limestone glades of the Central Basin of Tennessee, limestone outcrops of the Alabama Cumberland Plateau, dolostone glades associated with the Cahaba River in Bibb County, Alabama, the Moulton Valley glade systems of northern Alabama, or rocky limestone cliffs in central Kentucky.
Nations: US
States/Provinces: AL KY TN
TNC Ecoregions: 43:P, 44:C, 50:C
USFS Ecoregions: 221Ed:CCC, 221Hb:CCC, 221Hc:CCC, 221Ja:CPP, 222Eb:CCC, 222Ec:CCP, 222Ed:CCC, 222Ee:CC?, 222Ef:CCP, 222Eg:CCP, 222En:CCC, 222Eo:CCC, 222Fa:C??, 222Fb:C??, 231Ba:CCP, 231Bc:CC?, 231Bd:CCC, 231Ca:CCP, 231Cb:CC?, 231Cc:CCP, 231Cd:CCC, 231Ce:CCC, 231Da:CC?, 231Db:CC?, 231Dc:CCC, 231Dd:CC?, 231De:CC?
Federal Lands: COE (J. Percy Priest); NPS (Stones River); TVA (Columbia); USFS (Bankhead, Daniel Boone)

ALLIANCE SOURCES

Authors: J.R. ALLISON/A.R. SCHOTZ/, MP, Southeast **Identifier:** A.1049
References: Evans 1991, Eyre 1980, Pyne 1994, Quarterman 1950

Juniperus virginiana var. virginiana - Forestiera ligustrina - Rhus aromatica - Hypericum frondosum ShrublandEastern Red-cedar - Glade Privet - Fragrant Sumac - Golden St. John's-wort Shrubland

Central Basin Limestone Glade Margin Shrubland

Ecological Group (SCS;MCS): Interior Highlands Carbonate Glades and Barrens (440-10; 2.3.4.2)

ELEMENT CONCEPT

GLOBAL SUMMARY: This shrubland is a zonal component of Central Basin (Tennessee) limestone cedar glades; also found on limestone outcrops of Alabama Cumberland Plateau and Moulton Valley glade systems, as well as on the Pennyroyal Karst Plain of Kentucky. Characteristic shrubs include *Juniperus virginiana var. virginiana, Rhus aromatica var. aromatica, Frangula caroliniana, Forestiera ligustrina, Berchemia scandens, Hypericum frondosum, Sideroxylon lycioides*, and stunted individuals of *Acer saccharum, Quercus muehlenbergii, Quercus shumardii, Fraxinus americana*, and *Ulmus alata*. Alabama occurrences may contain an occasional *Aesculus pavia*. A low 'herbaceous' stratum is dominated by *Cheilanthes lanosa, Pleurochaete squarrosa, Thuidium delicatulum, Climacium americanum, Cladonia* spp., and *Opuntia humifusa*. Typically grades into open, herbaceous-dominated glades, or into woodlands or forests commonly dominated by *Quercus muehlenbergii, Fraxinus americana*, and *Celtis laevigata*. The substrate consists of broken fragments of flat-bedded sedimentary limestone, with accumulations of shallow soil. Alabama and Kentucky occurrences are rare and of restricted distribution and limited extent.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Found in areas near open glades, but where the soil is somewhat deeper and able to support shrubs rather than just grasses. Edges of glades, where much limestone is near or at the surface, but between the open glades and deeper soil area which are forested.

Global Environment: This shrubland is a zonal component of Central Basin (Tennessee) limestone cedar glades; also found on limestone outcrops of Alabama Cumberland Plateau and Moulton Valley glade systems, as well as on the Pennyroyal Karst Plain of Kentucky. The substrate consists of broken fragments of flat-bedded sedimentary limestone, with accumulations of shallow soil. Alabama and Kentucky occurrences are rare and of restricted distribution and limited extent. This vegetation typically grades into open, herbaceous-dominated glades, or into woodlands or into forests commonly dominated by *Quercus muehlenbergii*, *Fraxinus americana*, and *Celtis laevigata*.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Shrubland vegetation dominated by *Juniperus virginiana var. virginiana* in the tall and short shrub strata. Other shrubs include *Frangula caroliniana, Cornus florida, Ulmus alata, Fraxinus americana, Hypericum frondosum, Hypericum sphaerocarpum, Cercis canadensis, Forestiera ligustrina, Quercus imbricaria, Ilex opaca, Prunus serotina, Rhus glabra, Hypericum punctatum, Toxicodendron radicans, Acer saccharum var. saccharum,* and *Rubus hispidus. Andropogon virginicus, Andropogon gyrans, Andropogon ternarius, Schizachyrium scoparium,* and *Danthonia spicata* are the dominant grasses, in order of abundance. *Cladonia* lichens are also common. Many forb species are present, in trace amounts.

Global Vegetation: Characteristic shrubs in stands of this association include *Juniperus virginiana var. virginiana, Rhus aromatica var. aromatica, Frangula caroliniana, Forestiera ligustrina, Berchemia scandens, Hypericum frondosum, Sideroxylon lycioides,* and stunted individuals of *Acer saccharum, Quercus muehlenbergii, Quercus shumardii, Fraxinus americana*, and *Ulmus alata*. Alabama occurrences may contain an occasional *Aesculus pavia*. A low 'herbaceous' stratum is dominated by *Cheilanthes lanosa, Pleurochaete squarrosa, Thuidium delicatulum, Climacium americanum, Cladonia* spp., and *Opuntia humifusa*. This vegetation typically grades into open, herbaceous-dominated glades, or into woodlands or into forests commonly dominated by *Quercus muehlenbergii, Fraxinus americana*, and *Celtis laevigata*.

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TALL SHRUB	*Juniperus virginiana var. virginiana*
SHORT SHRUB	*Juniperus virginiana var. virginiana, Frangula caroliniana, Cornus florida*
GRAMINOID	*Andropogon virginicus, Andropogon gyrans, Andropogon ternarius, Schizachyrium scoparium*

Global

Stratum	Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
TALL SHRUB	*Juniperus virginiana var. virginiana*
SHORT SHRUB	*Juniperus virginiana var. virginiana, Forestiera ligustrina, Rhus aromatica, Hypericum frondosum*

Global
Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:
- Rhus aromatica - Celtis tenuifolia / Carex eburnea Shrubland (CEGL004393)--of limestone cliff edges in Kentucky.

SYNONYMY [OtherName (short citation) relationship. Note]:
- Central Basin Limestone Glade Complex, Shrub Zone (Pyne 1994)
- (Evans 1991) N91EVA01ICEC
- (Palmer-Ball et al. 1988) G88PAL02ICEC
- (Pyne 1994) G94PYN01ICEC
- (Quarterman 1950) A50QUA02ICEC

GRank & Reasons: G3G4 (99-12-14). This vegetation type is restricted to dry limestone substrates in the Nashville Basin of Tennessee and related areas of Alabama and Kentucky. Although this shrubland type can be dominant at some extensive glade sites and is more stable than some other glade communities, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in this area of rapidly increasing human population. Examples which are not conserved on nature preserves, state forests, or Corps of Engineers lands are highly vulnerable to development pressure. This shrub zone does not typically provide habitat for rare plant species, but it is an important component of this threatened landscape. Alabama and Kentucky examples are rare and limited in extent.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: Plot STRI.15 is overwhelingly dominated by *Juniperus virginiana var. virginiana*.

Global Classif Comments:

Internal Comments: CWN 4-04: Stones River plot STRI.15. MP/DFL 2-01: Daniel Boone deleted. MP 12-00: Daniel Boone added.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found around glades in the main part of Stones River National Battlefield, particularly in the vicinity of the west part of the loop road..

Global Range: This association is most abundant in the Nashville Basin of Tennessee. Examples in Alabama and Kentucky are rare and of limited extent.

Nations: US
States/Provinces: AL:S2, KY:S1, TN:S?
TNC Ecoregions: 44:C, 50:C
USFS Ecoregions: 222Ec:CC?, 222Ed:CCC, 222Ee:CC?, 222Ef:CC?, 222Eg:CC?, 222Fa:C??, 222Fb:C??, 231Cd:CCC, 231Ce:CCC
Federal Lands: COE (J. Percy Priest); NPS (Stones River); TVA (Columbia); USFS (Bankhead)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: SCS **Confidence:** 1 **Identifier:** CEGL003938
REFERENCES (type in full citation below if reference is new): Evans 1991, Palmer-Ball et al. 1988, Pyne 1994, Quarterman 1950

V. HERBACEOUS VEGETATION

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

A.1208—ANDROPOGON VIRGINICUS HERBACEOUS ALLIANCE (V.A.5.N.c.3)

Common Broomsedge Herbaceous Alliance

ALLIANCE CONCEPT

Summary This alliance includes vegetation dominated by *Andropogon virginicus var. virginicus* that occurs on old fields, pastures, and rocky sites. Associated species vary with geography and habitat and include typical pioneer species. This is a very wide-ranging alliance. There is no known natural vegetation in this alliance.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and Missouri, and possibly Illinois (?), Indiana (?), and elsewhere.
Nations: US
States/Provinces: AL AR GA IL IN? KY LA MO? MS NC OK SC TN TX VA
TNC Ecoregions: 31:C, 32:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:P, 53:C, 56:C, 57:C, 59:C
USFS Ecoregions: 221C:CP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 231Aa:CCC, 231Ae: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, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

ALLIANCE SOURCES

Authors: A.S. WEAKLEY **Identifier:** A.1208
References: Hoagland 1998a

Andropogon virginicus var. virginicus Herbaceous VegetationCommon Broomsedge Herbaceous Vegetation

Successional Broomsedge Vegetation
Ecological Group (SCS;MCS): Semi-natural Upland Herbaceous Vegetation (900-50; 8.0.0.3)

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:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: This vegetation typically occurs on old fields, pastures, and rocky sites.

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

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Dominated by *Andropogon virginicus var. virginicus.*

Global Vegetation: Stands of this alliance 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 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*.

Global Dynamics: This association may develop temporarily following clear-cutting, and will persist indefinitely under a regular mowing regime, e.g., in powerline corridors and maintained fields. If undisturbed, these grasslands will rapidly succeed to shrubs, and eventually to tree species.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
GRAMINOID	*Andropogon virginicus var. virginicus*

Global

Stratum	Species
GRAMINOID	*Andropogon virginicus var. virginicus*

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:

GRank & Reasons: GD (00-08-08).

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments:

Internal Comments: CWN 3-04: Stones River added, Phyllis Jackson (pers. comm.). RW 3-03: Cowpens plot COWP.2 [this assigned to CEGL004732 in PLOTS], COWP.3[this assigned to CEGL004732 in PLOTS], and COWP.11 (in part) are assigned to this community type (NatureServe SE Ecology unpubl. data 2002). MP 8-02: Shiloh added plot SHIL.1. MP 5-02: Cherokee added. KP 7-01: GW/Jeff added. JT 12-00: TX and USFWS (Anahuac, Brazoria) added. 12/98 CAP May exist in CAP as old fields but not used as a target for ecoregional planning.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: This vegetation typically occurs on old fields, pastures, and rocky sites.

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

Nations: US
States/Provinces: AL:S?, AR:S?, GA:S?, IL:S?, IN?:SP, KY:S?, LA:S?, MO?:SP, MS:S?, NC:S?, OK:S?, SC:S?, TN:S?, TX:S?, VA:S?
TNC Ecoregions: 38:C, 39:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 59:C, 60:C, 61:C
USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 231Aa:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:C??, M221Bd:C??, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: DOD (Arnold, Fort Benning, Fort Gordon); NPS (Cowpens, Fort Donelson, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: A.S. Weakley **Confidence:** 2 **Identifier:** CEGL004044
REFERENCES (type in full citation below if reference is new): Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Penfound 1953, TNC 1998a, Tarr et al. 1980

V.A.6.N.q. Bedrock temperate or subpolar grassland with a sparse tree layer

V.A.6.N.q.101. (JUNIPERUS VIRGINIANA) / SCHIZACHYRIUM SCOPARIUM - (BOUTELOUA CURTIPENDULA) WOODED HERBACEOUS ALLIANCE

(Eastern Red-cedar) / Little Bluestem - (Sideoats Grama) Wooded Herbaceous Alliance

ALLIANCE CONCEPT

Summary: Perennial grasslands (variously locally called barrens, glades, and/or prairies) dominated by *Schizachyrium scoparium*, possibly also *Bouteloua curtipendula*, with a scattered canopy of needle-leaved trees, or mixed needle-leaved evergreen and broad-leaved deciduous trees, particularly one or more of *Juniperus virginiana var. virginiana, Quercus muehlenbergii*, and/or *Quercus stellata*. Specimens of *Juniperus virginiana* are relatively short and compact. The open grown canopy oaks have short trunks, spreading limbs, and rounded crowns with many branches. These trees can be found scattered individually or in isolated clumps and patches. *Juniperus ashei* may replace *Juniperus virginiana var. virginiana* in the southwestern-most portion of the alliance's range. The subcanopy is absent or very sparse. Commonly encountered shrubs include *Cornus florida, Ulmus alata, Rhus copallinum*, and *Symphoricarpos orbiculatus*. *Toxicodendron radicans* also displays a shrubby growth form. Herbaceous cover is very uneven, ranging from very dense in some areas to absent in others. Characteristic species include *Andropogon gerardii, Bouteloua curtipendula, Schizachyrium scoparium, Sorghastrum nutans, Helianthus divaricatus, Manfreda virginica, Silphium* spp., *Liatris* spp., *Rudbeckia* spp., *Sabatia angularis*, and *Verbesina alternifolia*. In the western portion of the alliance's range, some characteristic species may include *Rudbeckia missouriensis, Draba reptans, Mentzelia oligosperma, Physalis pumila, Astragalus distortus, Erysimum capitatum, Castilleja purpurea, Lesquerella filiformis, Nothocalais cuspidata, Penstemon cobaea*, and *Clematis fremontii*. *Smilax bona-nox* and *Smilax glauca* are the most frequently encountered vines and may form dense mats when present. Aspect is variable; stands occur primarily on south- and southwest-facing slopes. Soils which support stands of this alliance are stony, shallow to moderately deep, neutral to alkaline, and primarily composed of weathered mineral matter, loess, and organic debris which collects in cracks and crevices of the bedrock. Parent material is limestone rock, cherty limestone, dolomite, or calcareous shale which is exposed at the surface, resulting in a very shallow, well-drained substrate. The soils may contain a homogenous mixture of rock fragments of various sizes. Organic matter is low, and there is little or no horizon development. These soils are nutrient poor, and are extremely susceptible to erosion, partly due to freeze-thaw and subsequent mass wasting. Although predominantly droughty and excessively drained, these sites can be seasonally wet, and water is occasionally ponded in shallow depressions.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Connecticut, Georgia, Kentucky, Oklahoma, New Jersey, New York, Pennsylvania, Tennessee, Virginia, West Virginia, Illinois, Indiana, Kansas, Missouri, Ohio, and possibly in Maryland (?), Louisiana (?) and Texas (?).
Nations: US

States/Provinces: AL AR CT GA IL IN KS KY LA? MA? MD? MO NJ NY OH OK PA TN TX? VA WV
TNC Ecoregions: 32:C, 36:C, 37:C, 38:C, 39:C, 40:C, 43:C, 44:C, 45:?, 46:C, 49:C, 50:C, 59:?, 61:C
USFS Ecoregions: 221A:CC, 221Ea:CCP, 221Ec:CCC, 221Hb:CCP, 221Ja:CCP, 222Aa:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCP, 222Aj:CCC, 222Ak:CCC, 222Al:CCC, 222Am:CCC, 222An:CC?, 222Aq:CCC, 222De:CCC, 222Df:CCC, 222Dg:CCC, 222Dh:CCC, 222Di:CCC, 222Eg:CCC, 222Ei:CCC, 222Ek:CCC, 222El:CCC, 222En:CCP, 222Eo:CCC, 222Fa:CCC, 222Fc:CCC, 222Fd:CCC, 222Fe:CCC, 231Be:CCC, 231Ce:CCC, 231Dc:CCC, 231Eb:CCC, 251Cd:CCP, 251Ce:CCP, 251Cf:CCC, 251Ci:CCC, 251Ea:CCP, 255:C, M222Aa:CCP, M222Ab:CCC, M231Aa:CCP, M231Ab:CCC, M231Ac:CCP, M231Ad:CCP
Federal Lands: COE (J. Percy Priest?, Lake Millwood?); NPS (Stones River); TVA (Columbia); USFS (Bankhead?, Daniel Boone, Mark Twain, Ouachita, Ozark)

ALLIANCE SOURCES

Authors: MCS/SCS, MP, Southeast **Identifier:** A.1919
References: Allard 1990, Carpenter 1996, DeSelm 1988, Faber-Langendoen et al. 1996, Fehrenbacher et al. 1982, Fike 1999, Foti 1994b, Fralish 1987, Hoagland 1998a, Nelson 1985, Smith 1991, White and Madany 1978

Quercus muehlenbergii - Juniperus virginiana / Schizachyrium scoparium - Manfreda virginica Wooded Herbaceous VegetationChinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation

Central Limestone Glade

Ecological Group (SCS;MCS): Interior Highlands Carbonate Glades and Barrens (440-10; 2.3.4.2)

ELEMENT CONCEPT

GLOBAL SUMMARY: This limestone glade or barrens community is found in the central and eastern United States. Stands occur on gentle to steep slopes of hills, knobs, ridges, bluffs along streams, and broad terraces. Aspect is variable, but this vegetation is generally best developed on southern and western exposures. Parent material is limestone, cherty limestone, dolomite, or calcareous shale which is exposed at the surface, resulting in a very shallow, well-drained substrate. Soils are neutral to alkaline, shallow to moderately deep, and contain a homogenous mixture of rock fragments of various sizes. Herbaceous cover is very uneven, ranging from very dense in some areas to absent in others. Some dominant or characteristic grasses include *Schizachyrium scoparium, Sorghastrum nutans, Aristida* spp., and *Sporobolus compositus*. In deeper soil areas *Andropogon gerardii* may be present. At some sites *Bouteloua curtipendula* is present, but it may be rare or absent at others. Forbs vary in dominance by site and include *Asclepias verticillata, Comandra umbellata, Coreopsis tripteris, Croton monanthogynus, Echinacea simulata, Galactia regularis, Hexalectris spicata, Helianthus divaricatus, Helianthus hirsutus, Hypericum dolabriforme, Hypericum sphaerocarpum, Euphorbia corollata, Gaura* spp., *Lespedeza hirta, Lespedeza virginica, Liatris aspera, Liatris cylindracea, Liatris squarrosa, Lithospermum canescens, Lobelia spicata (var. leptostachys), Manfreda virginica, Matelea obliqua, Ophioglossum engelmannii, Physostegia virginiana, Ratibida pinnata, Rudbeckia hirta, Ruellia humilis, Sabatia angularis, Scutellaria parvula, Silphium trifoliatum, Solidago nemoralis, Verbesina helianthoides, Verbesina virginica*, and *Zizia aptera*. *Quercus muehlenbergii* and *Juniperus virginiana var. virginiana* can form a sparse canopy. *Quercus stellata* may be common in parts of the range. Other scattered trees which may be present include *Cercis canadensis, Fraxinus quadrangulata, Quercus velutina, Quercus alba, Quercus marilandica*, and *Liriodendron tulipifera*. The subcanopy is absent or very sparse. Commonly encountered shrubs include *Celtis tenuifolia, Cornus florida, Ulmus alata, Rhus aromatica, Rhus copallinum*, and *Symphoricarpos orbiculatus*. This vegetation may exist as more extensive areas, or in some southeastern cases, it may be limited to a more narrow zone between vegetation dominated by woody plants and that dominated by annual grasses.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Open area at Fortress Rosencrans, in area of earthworks and warm season grass restoration.

Global Environment: This community occurs on gentle to steep slopes of hills, knobs, ridges, bluffs along streams, and broad terraces. Aspect is variable, but the community is generally best developed on southern and western exposures. Parent material is limestone, cherty limestone, dolomite, or calcareous shale, which is exposed at

the surface, resulting in a very shallow, well-drained substrate. Soils are neutral to alkaline, shallow to moderately deep, and contain a homogenous mixture of rock fragments of various sizes. They can erode easily, partly due to freeze-thaw and subsequent mass wasting (TNC 1995a).

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Open area, dominated by the grasses *Sorghastrum nutans, Schizachyrium scoparium, Tridens flavus, Panicum anceps*, and *Setaria* sp. Forbs include *Verbesina alternifolia, Ambrosia artemisiifolia, Passiflora incarnata, Croton monanthogynus*, and *Cirsium carolinianum.*

Global Vegetation: Herbaceous cover is very uneven, ranging from very dense in some areas to absent in others. Some dominant or characteristic grasses include *Schizachyrium scoparium, Sorghastrum nutans, Aristida* spp., and *Sporobolus compositus*. In deeper soil areas *Andropogon gerardii* may be present. At some sites *Bouteloua curtipendula* is present, but it may be rare or absent at others. Forbs vary in dominance by site and include *Asclepias verticillata, Comandra umbellata, Coreopsis tripteris, Croton monanthogynus, Echinacea simulata, Galactia regularis, Hexalectris spicata, Helianthus divaricatus, Helianthus hirsutus, Hypericum dolabriforme, Hypericum sphaerocarpum, Euphorbia corollata, Gaura* spp., *Lespedeza hirta, Lespedeza virginica, Liatris aspera, Liatris cylindracea, Liatris squarrosa, Lithospermum canescens, Lobelia spicata var. leptostachys, Manfreda virginica, Matelea obliqua, Ophioglossum engelmannii, Physostegia virginiana, Ratibida pinnata, Rudbeckia hirta, Ruellia humilis, Sabatia angularis, Scutellaria parvula, Silphium trifoliatum, Solidago nemoralis, Verbesina helianthoides, Verbesina virginica*, and *Zizia aptera*. *Quercus muehlenbergii* and *Juniperus virginiana var. virginiana* can form a sparse canopy. *Quercus stellata* may be common in parts of the range. Other scattered trees which may be present include *Cercis canadensis, Fraxinus quadrangulata, Quercus velutina, Quercus alba, Quercus marilandica*, and *Liriodendron tulipifera*. The subcanopy is absent or very sparse. Commonly encountered shrubs include *Celtis tenuifolia, Cornus florida, Ulmus alata, Rhus aromatica, Rhus copallinum*, and *Symphoricarpos orbiculatus*. This vegetation may exist as more extensive areas, or in some southeastern cases, it may be limited to a more narrow zone between vegetation dominated by woody plants and that dominated by annual grasses (TNC 1995a, Dave Minney pers. comm. 2000).

Global Dynamics: Natural disturbance includes periodic fire, wind, storm, and drought. Environmental extremes including rapidly drained, thin, stony soils, summer droughts lasting 3-5 weeks or more, and limited water availability for most of the growing season favor the establishment of this association. Periodic fire may help to maintain this community, especially after disturbance from logging or grazing. Fire suppression encourages a transition from woodland to forest. Herds of elk, deer, and bison once roamed these hills, and their grazing and browsing provided a primary mechanism for maintaining the "barrens" or glade character.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
GRAMINOID	*Sorghastrum nutans, Schizachyrium scoparium, Tridens flavus, Panicum anceps*
FORB	*Verbesina alternifolia, Ambrosia artemisiifolia*

Global

Stratum	Species
TREE CANOPY	*Juniperus virginiana, Quercus muehlenbergii, Quercus stellata*
TREE SUB-CANOPY	*Cercis canadensis*
SHORT SHRUB	*Manfreda virginica*
GRAMINOID	*Andropogon gerardii, Schizachyrium scoparium, Sorghastrum nutans*
FORB	*Helianthus divaricatus*
VINE/LIANA	*Smilax bona-nox*

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species
TREE CANOPY	*Cotinus obovatus*
FORB	*Astragalus crassicarpus var. trichocalyx, Astragalus distortus, Berchemia scandens, Berlandiera betonicifolia, Erysimum capitatum, Galium arkansanum, Hypericum dolabriforme, Leavenworthia uniflora, Polygala senega, Zizia aptera*

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

- Quercus stellata - Quercus marilandica - Quercus velutina - Carya texana / Schizachyrium scoparium Woodland (CEGL002149)
- Quercus stellata - Quercus marilandica / Schizachyrium scoparium Wooded Herbaceous Vegetation (CEGL002391)
- Quercus muehlenbergii - Quercus (alba, velutina) Bluff Woodland (CEGL002144)--is the more northern equivalent of this type.
- Juniperus virginiana / Schizachyrium scoparium - Silphium terebinthinaceum var. luciae-brauniae - Carex juniperorum - Castilleja coccinea Wooded Herbaceous Vegetation (CEGL004464)--is a zonal component within this type.

SYNONYMY [OtherName (short citation) relationship. Note]:

- UNESCO FORMATION CODE: V.B.1c (UNESCO 1973) B
- Central and Eastern Grassland and Forest Combinations: 83: Cedar Glades (*Quercus-Juniperus-Sporobolus*) (Kuchler 1964) B
- Xeric Limestone Prairie (Baskin et al. 1994)
- Barrens type (Hutchison et al. 1986). is sometimes treated broadly as a barrens type
- Barrens type (Hutchison 1994). is sometimes treated broadly as a barrens type
- Eastern Redcedar: 46 (Eyre 1980) B
- Post Oak - Blackjack Oak: 40 (Eyre 1980) B
- Terrestrial: Savanna (TNC 1985) B
- *Juniperus virginiana / Schizachyrium scoparium - Bouteloua curtipendula - Sisyrinchium albidum - Packera millefolia* Wooded Herbaceous Vegetation (Fleming pers. comm.)
- (Baskin and Baskin 1982) N82BAS01ICEC
- (Baskin et al. 1994) A94BAS01ICEC
- (Evans 1991) N91EVA01ICEC
- (Eyre 1980) B80EYR01ICEC
- (Fleming et al. 2001) G01FLE01ICEC
- (Fleming pers. comm.) PNDFLE01ICEC
- (Fralish 1987) A87FRA01ICEC
- (Heikens and Robertson 1994) A94HEI02ICEC

- (Heikens et al. 1994) A94HEI01ICEC
- (Homoya 1994) A94HOM01ICEC
- (Hutchison 1994) A94HUT01ICEC
- (Hutchison et al. 1986) N86HUT01ICEC
- (Kuchler 1964) B64KUC01ICEC
- (Nelson 1985) B85NEL01ICEC
- (Quarterman and Powell 1978) N78QUA01ICEC
- (TNC 1985) N85THE01ICEC
- (TNC 1995a) N95TNC01ICEC
- (UNESCO 1973) A73UNE01ICEC
- (Voigt and Mohlenbrock 1964) B64VOI01ICEC
- (White and Madany 1978) A78WHI02ICEC

GRank & Reasons: G2G3 (99-11-02). There are probably over 100 occurrences rangewide. Eighty-three have been documented: 32 in Illinois (S2), 48 in Indiana (S2S3), and 3 in Ohio (S2). Although no other occurrences are documented, the community is also reported in Alabama, Georgia, Kentucky, Tennessee, West Virginia, and Virginia (all S?). It is found in 15 ecoregional subsections. The present range of this community is probably very close to its presettlement range, but lack of fire permits increased dominance by woody species.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: Occurs at restoration site, community approximates this association.

Global Classif Comments: In Indiana, *Quercus stellata* is typical, *Bouteloua curtipendula* is rare, and *Sorghastrum nutans* is common. In Illinois, *Sorghastrum nutans* is more common than *Bouteloua curtipendula*. This type was developed in the Midwest and attributed to various southeastern states. Its relation to other eastern and southeastern alkaline glades needs further investigation. In Tennessee, this community might be called a limestone barren, as the term "glade" is restricted to bedrock-defined openings that are mostly flat, pavement-like, and dominated by annual grasses rather than perennial ones. In Indiana, this community is commonly called a cedar glade because stands of *Juniperus virginiana* border many of the sites of the community. *Juniperus virginiana*, which occurs with *Quercus stellata*, was probably rare in this community before the time of European settlement and consequent fire suppression. *Quercus muehlenbergii - Quercus (alba, velutina) Bluff Woodland (CEGL002144)* is the more northern equivalent of this type. In southeastern Ohio, this type also contains a distinctive zone tracked as a separate type, the *Juniperus virginiana / Schizachyrium scoparium - Silphium terebinthinaceum var. luciae-brauniae - Carex juniperorum - Castilleja coccinea Wooded Herbaceous Vegetation (CEGL004464)*.

In the Ozark Hills region of southern Illinois, a variant of this type occurs on very steep slopes. The herbaceous layer is quite variable because of soil erosion.

Internal Comments: CWN 3-03: Stones River added, plot STRI.2. LAS 1-14-2003: comments from WAP ecology group state "the statement concerning herbivores as a primary mechanism in maintaining the barrens should be removed. It is misleading and incorrect". MCS: This type was described as part of a survey of southern Illinois vegetation, with subsequent rangewide literature and TNC review. (TNC 1995) This community can have canopy closure in excess of that typical of these open communities. Field ecologists must rely on site-specific community characteristics, which are still being developed, to establish classification status. Currently, this type definition is based on a limited geographic range, primarily within the Interior Low Plateau. The states of WI and IA were formerly included in the range of this type; this similar vegetation has been placed in CEGL002144.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Open area at Fortress Rosencrans, in area of earthworks and warm season grass restoration.

Global Range: This limestone glade or barrens community is found in the central and eastern United States, ranging from southern Illinois, Kentucky, Tennessee and Alabama, east to Georgia, western Virginia, West Virginia, and Ohio.

Nations: US
States/Provinces: AL:S?, GA:S?, IL:S2, IN:S2S3, KY:S2S3, OH:S?, TN:S?, VA:S?, WV:S?

TNC Ecoregions: 36:C, 38:C, 43:?, 44:C, 49:C, 50:C, 59:?
USFS Ecoregions: 221Ec:CCC, 222Aq:CCC, 222De:CCC, 222Df:CCC, 222Dh:CCC, 222Di:CCC, 222Ei:CCC, 222Ek:CCC, 222El:CCC, 222Fc:CCC, 222Fd:CCC, 222Fe:CCC, 251Cf:CCC, 251Ci:CCC
Federal Lands: COE (J. Percy Priest?); NPS (Stones River); TVA (Columbia); USFS (Bankhead?)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: M. Guetersloh, MCS **Confidence:** 2 **Identifier:** CEGL005131
REFERENCES (type in full citation below if reference is new): Baskin and Baskin 1982, Baskin et al. 1994, Evans 1991, Eyre 1980, Fleming et al. 2001, Fleming pers. comm., Fralish 1987, Heikens and Robertson 1994, Heikens et al. 1994, Homoya 1994, Hutchison 1994, Hutchison et al. 1986, Kuchler 1964, Nelson 1985, Quarterman and Powell 1978, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

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

V.B.2.N.d.2. JUSTICIA AMERICANA TEMPORARILY FLOODED HERBACEOUS ALLIANCE

Common Water-willow Temporarily Flooded Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance covers rocky river shoals dominated by *Justicia americana* with *Orontium aquaticum, Podostemum ceratophyllum, Leersia* spp., *Lemna minor, Saururus cernuus*, and others. A sparse canopy may be present, and species may include *Carpinus caroliniana ssp. caroliniana, Fagus grandifolia*, and *Fraxinus pennsylvanica*. There is some apparent regional variation in the associated species. More Appalachian examples may contain *Orontium aquaticum* as a codominant. In parts of the Ridge and Valley and Piedmont, *Hymenocallis caroliniana (= Hymenocallis coronaria)* is codominant. In the Edwards Plateau of central Texas, associated with *Justicia americana* are *Bacopa monnieri, Fuirena simplex, Eleocharis geniculata (= Eleocharis caribaea), Eleocharis montevidensis,* and *Cyperus* spp.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is distributed in the Edwards Plateau of Texas, Ozark Highlands, Boston Mountains, Ouachita Mountains, Interior Low Plateau, Cumberland Plateau, Piedmont, and Arkansas Valley. It is found in Ohio, Alabama, Arkansas, Georgia, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Virginia (?).
Nations: US
States/Provinces: AL AR DE GA KY MD? NC OH OK PA SC TN TX VA? WV
TNC Ecoregions: 29:C, 38:C, 39:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 59:C, 60:C, 61:C
USFS Ecoregions: 212Fa:CCP, 212Fb:CCC, 212Ga:CCP, 212Gb:CCP, 221Am:CCP, 221Ba:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Eb:CCC, 222Eg:CCC, 222Ej:CCP, 222En:CCC, 222Eo:CCC, 222Ha:CCC, 231Af:CCC, 231B:CC, 231Cd:CCC, 231Dc:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 315D:CC, 321B:PP, M221Aa:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Cd:CCC, M221Da:CCC, M221Dc:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: NPS (Natchez Trace, Stones River); USFS (Bankhead, Cherokee, Daniel Boone, Oconee?, Ouachita, Ozark, Pisgah, Sumter, Uwharrie); USFWS (Cahaba River)

ALLIANCE SOURCES

Authors: A.S. WEAKLEY, MP, Southeast **Identifier:** A.1657
References: Allard 1990, Faber-Langendoen et al. 1996, Fike 1999, Foti et al. 1994, Hoagland 2000, Nelson 1986, Schafale and Weakley 1990, Schmalzer and DeSelm 1982

Justicia americana Herbaceous VegetationCommon Water-willow Herbaceous Vegetation

Water-willow Rocky Bar and Shore
Ecological Group (SCS;MCS): Rocky Riverbeds (457-30; 2.2.3.1)

ELEMENT CONCEPT

GLOBAL SUMMARY: This association is found primarily in the Piedmont, Cumberland Plateau, Interior Low Plateau, Ozarks, Ouachita Mountains, and adjacent provinces. Stands occur on the shoals or bars of rocky streams and riverbeds. It provides habitat in some portions of its range for globally rare dragonflies and herbs. *Justicia americana* is the characteristic dominant. Other herbaceous species that may be present include *Diodia teres, Gratiola brevifolia, Leersia* sp., *Lemna minor, Orontium aquaticum, Podostemum ceratophyllum, Scirpus* sp., *Saururus cernuus,* and *Xyris difformis var. difformis*. A sparse canopy layer, which can include *Carpinus caroliniana ssp. caroliniana, Salix interior, Fagus grandifolia,* and *Fraxinus pennsylvanica* among other species, may be present.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Occurs on shoals and rocky area in West Fork Stones River, near Thompson Lane bridge.

Global Environment: This association occurs on the shoals or bars of rocky streams and riverbeds, or gravelly sands.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Dominated by *Justicia americana,* with *Salix nigra, Boehmeria cylindrica, Diodia virginiana, Populus deltoides,* and *Bidens frondosa.*

Global Vegetation: *Justicia americana* is the characteristic dominant. Other herbaceous species that may be present include *Diodia teres, Gratiola brevifolia, Leersia* sp., *Lemna minor, Orontium aquaticum, Podostemum ceratophyllum, Saururus cernuus,* and *Xyris difformis var. difformis*. In Ohio, *Justicia* usually grows in nearly pure patches, so that few other species are associated with it. *Bidens* spp., *Cuscuta gronovii, Mimulus ringens, Polygonum* spp., *Rumex* spp., and *Salix interior* can occur (Anderson 1982). A sparse canopy layer may be present, which can include *Carpinus caroliniana, Fagus grandifolia,* and *Fraxinus pennsylvanica*, among others. In the Cumberland Plateau of Alabama, *Justicia americana* is present in dense patches with some interspersion of other species including *Pilea pumila, Boehmeria cylindrica, Eclipta prostrata (= Eclipta alba), Juncus coriaceus, Mikania scandens, Ludwigia palustris, Leersia* sp. and *Bidens* sp. Schmalzer and DeSelm (1982) discuss *Orontium aquaticum* growing along streambanks or in shallow riffles "along or with" *Justicia americana* in the Obed River in the Cumberland Plateau of Tennessee.

Global Dynamics: Stands in some situations may be obliterated by ongoing river channeling. Anderson (1982) describes some of the life-history characteristics of *Justicia americana* that allow it to persist in river channels.

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
FORB	*Justicia americana*

Global
Stratum Species

CHARACTERISTIC SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES
STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:
- IIE3a. Riverside Shoal and Stream Bar Complex (Allard 1990) B. in part
- Aquatic Types (Schmalzer and DeSelm 1982) B. in part
- Rocky Bar and Shore (Water Willow Subtype) (Schafale 1998b)
- Water-willow Aquatic Bed. [common name]
- (Allard 1990) N90ALL01ICEC
- (Anderson 1982) G82AND01ICEC
- (Anderson 1996) N96AND01ICEC
- (Fike 1999) G99FIK01ICEC
- (Fleming et al. 2001) G01FLE01ICEC
- (Hoagland 1997) G97HOA01ICEC
- (Hoagland 2000) A00HOA01ICEC
- (Major et al. 1999) G99MAJ01ICEC
- (McCoy 1958) A58MCC01ICEC
- (Nelson 1986) G86NEL01ICEC
- (Palmer-Ball et al. 1988) G88PAL02ICEC
- (Peet et al. 2002) U02PEE01ICEC
- (Penfound 1953) A53PEN01ICEC
- (Schafale 1998b) N98SCH02ICEC
- (Schafale and Weakley 1990) G90SCH01ICEC
- (Schmalzer and DeSelm 1982) G82SCH02ICEC

GRank & Reasons: G4G5 (97-09-12).

CLASSIFICATION COMMENTS
STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments: This type, in Ohio, often forms pure patches, but consistent identification may require a simple cutoff rule, such as at least 50% cover of *Justicia* (Anderson 1982). However, Anderson (1996) no longer recognizes this type.

Internal Comments: REE 10-02: There are apparently North Carolina Vegetation Survey plots attributable to this type (Peet et al. 2002). MP 2001-08-19: recorded at Nolichucky Cliffs in the Cherokee National Forest by TNHP (Major et al. 1999). MP 2001-06-11: some examples are apparently more or less pure *Justicia*, some commonly have associated *Orontium*. Is this variation worthy of recognition? MP 12-00: Daniel Boone added. JT 5-00: See Bankhead Survey (Rock Creek no. 3). 12/98 CAP Rocky river shoals dominated by *Justicia americana* with *Orontium aquaticum, Podostemum ceratophyllum, Leersia spp., Lemna minor, Saururus cernuus, Polygonum amphibium*, and others. Overhanging trees are typical.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Shoals and rocky shallow areas on the West Fork Stones River.

Global Range: This type is found primarily in the Piedmont, Interior Low Plateau, Cumberland Plateau, Ozarks, Ouachita Mountains, and adjacent provinces. It ranges from Alabama, Georgia and the Carolinas west to Arkansas and Oklahoma and north to Ohio, Pennsylvania, and Delaware.

Nations: US
States/Provinces: AL:S?, AR:S?, DE:S?, GA:S?, KY:S?, MD?, NC:S5, OH:S4, OK:S?, PA:S?, SC?, TN:S?, VA?, WV:S?
TNC Ecoregions: 38:C, 39:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 51:C, 52:C, 59:C, 60:C, 61:C
USFS Ecoregions: 212Fa:CCP, 212Fb:CCC, 212Ga:CCP, 212Gb:CCP, 221Am:CCP, 221Ba:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Ha:CCC, 221Hb:CCC, 221Hc:CCC, 221He:CCC, 222Eb:CCC, 222Ej:CCP, 222En:CCC, 222Eo:CCC, 222Ha:CCC, 231Af:CCC, 231B:CC, 231Cd:CCC, 231D:CC, M221Aa:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Bd:CCC, M221Be:CCC, M221Bf:CCC, M221Cd:CCC, M221Da:CCC, M221Dc:CCC, M222A:CC, M231A:CC
Federal Lands: NPS (Natchez Trace, Stones River); USFS (Bankhead, Cherokee, Daniel Boone, Oconee?, Ouachita, Ozark, Pisgah, Sumter?, Uwharrie)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes: Second vegetation within the hectare at STRI.17.
Authors: A.S. Weakley, mod. D. Faber-Langendoen, SCS **Confidence:** 2 **Identifier:** CEGL004286
REFERENCES (type in full citation below if reference is new): Allard 1990, Anderson 1982, Anderson 1996, Fike 1999, Fleming et al. 2001, Hoagland 1997, Hoagland 2000, Major et al. 1999, McCoy 1958, Nelson 1986, Palmer-Ball et al. 1988, Peet et al. 2002, Penfound 1953, Schafale 1998b, Schafale and Weakley 1990, Schmalzer and DeSelm 1982

V.B.2.N.e. Semipermanently flooded temperate perennial forb vegetation

V.B.2.N.e.100. LUDWIGIA PEPLOIDES SEMIPERMANENTLY FLOODED HERBACEOUS ALLIANCE

Floating Water-primrose Semipermanently Flooded Herbaceous Alliance

ALLIANCE CONCEPT

Summary: Vegetation in this alliance consists of floating or stranded mats of the nominal species, which occurs in shallow water of flats in slow-moving streams, shallow lakes, natural and artificial impoundments, etc. It is dominated by *Ludwigia peploides* (including *var. glabrescens* and/or *var. peploides*). Vegetation of this alliance would be expected to occur in the Coastal Plain and adjacent interior provinces from possibly Georgia south and west to Texas, in the upper Coastal Plain at least to Kentucky, in the Central Basin of Tennessee, and west to eastern and central Oklahoma. The nominal species is recorded from some states to the north to this projected range, but its occurrence there may be sporadic or of limited extent. Other species which could occur in examples of this alliance include *Cephalanthus occidentalis, Hibiscus laevis, Nelumbo lutea, Polygonum hydropiperoides,* and *Sagittaria latifolia,* as well as *Ammannia* spp., *Callitriche* spp., *Hydrolea quadrivalvis, Lycopus* spp., *Proserpinaca* spp., *Veronica* spp., and other mat-forming obligate wetland species.
Dynamics:

ALLIANCE DISTRIBUTION

Range: Vegetation of this alliance would be expected to occur in the Coastal Plain and adjacent interior provinces from possibly Georgia south and west to Texas, in the upper coastal plain at least to Kentucky, in the Central Basin of Tennessee, and west to eastern and central Oklahoma. The nominal species is recorded from some states to the north to this projected range, but its occurrence there may be sporadic or of limited extent. This alliance is found in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, and possibly Arkansas (?).
Nations: US
States/Provinces: AL AR? FL GA KY LA MS OK TN TX
TNC Ecoregions: 31:P, 32:C, 40:P, 41:P, 42:C, 43:P, 44:C, 52:P, 53:C, 56:C, 57:C

USFS Ecoregions: 222C:CP, 222E:CC, 231A:PP, 231B:PP, 231E:PP, 232B:CC, 232C:CC, 232D:CC, 232E:CP, 232F:CP, 234An:CCC, 255A:CC
Federal Lands: NPS (Stones River); USFS (Oconee?); USFWS (Reelfoot)

ALLIANCE SOURCES

Authors: M. PYNE, MP, Southeast **Identifier:** A.1928
References: Blair 1938, Hoagland 1998a, Hoagland 2000, Penfound 1953, Radford et al. 1968

Ludwigia peploides Herbaceous VegetationFloating Water-primrose Herbaceous Vegetation
Floating Water-primrose Aquatic Marsh
Ecological Group (SCS;MCS): Eastern Open Ponds and Marshes (480-10; 1.4.1.1)

ELEMENT CONCEPT

GLOBAL SUMMARY: Floating or stranded mats of *Ludwigia peploides* (including *ssp. glabrescens* and/or *ssp. peploides*), occurring in shallow water of flats in slow-moving streams, shallow lakes, natural and artificial impoundments. Some common associates include *Ammannia* spp., *Callitriche* spp., *Hydrolea quadrivalvis, Lycopus* spp., *Proserpinaca* spp., *Veronica* spp., and other mat-forming obligate wetland species. Oklahoma associates include *Cephalanthus occidentalis, Hibiscus laevis, Nelumbo lutea, Polygonum hydropiperoides,* and *Sagittaria latifolia*.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Pond, origin unclear.

Global Environment: This vegetation occurs in shallow water of flats in slow-moving streams, shallow lakes, natural and artificial impoundments.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Pond dominated by *Ludwigia peploides ssp. glabrescens,* with *Lemna sp.,* and *Leersia oryzoides.* Algae is also abundant in the pond.

Global Vegetation: This association is primarily dominated by *Ludwigia peploides* (including *ssp. glabrescens* and/or *ssp. peploides*). Some common associates include *Ammannia* spp., *Callitriche* spp., *Hydrolea quadrivalvis, Lycopus* spp., *Proserpinaca* spp., *Veronica* spp., and other mat-forming, obligate wetland species. Oklahoma associates include *Cephalanthus occidentalis, Hibiscus laevis, Nelumbo lutea, Polygonum hydropiperoides*, and *Sagittaria latifolia* (Hoagland 2000).

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
FORB	*Ludwigia peploides ssp. glabrescens*

Global
Stratum **Species**

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum **Species**

Global
Stratum **Species**

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum **Species**

Global
Stratum **Species**

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:

- (Blair 1938) A38BLA01ICEC
- (Hoagland 2000) A00HOA01ICEC
- (Penfound 1953) A53PEN01ICEC
- (Weakley 2002) N02WEA01ICEC

GRank & Reasons: G4G5 (98-12-14).

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments:

Internal Comments: CWN 3-03: Stones River added, plot STRI.18. MPS 3-03: The nominal species is S1 in NC, is listed as very rare by Weakley (2002), and is noted in only 2 NC and no SC counties in Radford et al. (1968). MP 3-03: NC, SC, VA deleted.

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found in pond south of Artillery Monument.

Global Range: This vegetation would be expected to occur in the Coastal Plain and adjacent interior provinces from possibly Georgia south and west to Texas, in the Upper Coastal Plain at least to Kentucky, in the Central Basin of Tennessee, and west to eastern and central Oklahoma. The nominal species is recorded from some states to the north to this projected range, but its occurrence there may be sporadic or of limited extent. It is found in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas, and possibly Arkansas (?).

Nations: US
States/Provinces: AL:S?, AR?, FL:S?, GA:S?, KY:S?, LA:S?, MS:S?, OK:S?, TN:S?, TX:S?
TNC Ecoregions: 31:P, 32:C, 40:P, 41:P, 42:C, 43:P, 44:C, 52:P, 53:C, 56:C, 57:C
USFS Ecoregions: 222C:CP, 222E:CC, 231A:PP, 231B:PP, 231E:PP, 232B:CC, 232C:CC, 232D:CC, 232E:CP, 232F:CP, 234An:CCC, 255A:CC
Federal Lands: NPS (Stones River); USFS (Oconee?); USFWS (Reelfoot)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: SCS **Confidence:** 2 **Identifier:** CEGL007835
REFERENCES (type in full citation below if reference is new): Blair 1938, Hoagland 2000, Penfound 1953, Weakley 2002

V.D.2.N.d. Short temperate annual grassland

V.D.2.N.d.3. SPOROBOLUS (NEGLECTUS, VAGINIFLORUS) HERBACEOUS ALLIANCE

(Barrens Dropseed, Poverty Dropseed) Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance consists of calcareous (limestone and dolostone) and mafic (diabase) glades dominated by the annual grasses *Sporobolus neglectus, Sporobolus vaginiflorus var. vaginiflorus*, and/or *Sporobolus vaginiflorus var. ozarkanus (= Sporobolus ozarkanus)*. Other annual grasses and forbs are often prominent, as well. In Arkansas, associated species include *Penstemon cobaea, Echinacea simulata, Echinacea pallida, Echinacea paradoxa var. paradoxa*, and *Lithospermum canescens*. In Tennessee, some of the co-occurring perennial forbs are the endemic or near-endemic *Dalea gattingeri* and *Pediomelum subacaule*, along with *Croton capitatus, Grindelia lanceolata, Hedyotis nigricans, Heliotropium tenellum, Isanthus brachiatus, Manfreda virginica*, and *Ruellia humilis*. A zonal component of Arkansas Upper West Gulf Coastal Plain Nepheline Syenite glades is also placed here. This vegetation is dominated by early flowering species that complete their life cycles before the glades dry up in the early summer, as well as fall-flowering annual grasses (e.g., *Sporobolus clandestinus*). These species include *Amsonia ciliata var. ciliata, Astragalus distortus (var. engelmannii, var. distortus), Clinopodium arkansanum (= Calamintha arkansana), Cheilanthes lanosa, Chamaesyce missurica (= Euphorbia missurica), Oenothera linifolia, Phacelia hirsuta, Plantago pusilla, Sabatia campestris, Salvia azurea, Schizachyrium scoparium, Sporobolus clandestinus, Talinum calycinum, Cladonia* spp. (lichens), *Grimmia* spp. (mosses), and *Nostoc* spp. (blue-green algae).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Georgia, Kentucky, North Carolina, Oklahoma, Tennessee, and possibly Virginia (?).

Nations: US

States/Provinces: AL AR GA KY NC OK? TN VA?

TNC Ecoregions: 38:C, 39:?, 40:C, 44:C, 50:C, 52:C

USFS Ecoregions: 221Ja:CCC, 221Jb:CCP, 222Ab:CCC, 222Ag:CCC, 222An:CCC, 222Ec:CCC, 222Ed:CCP, 222Fa:CC?, 222Fb:CCP, 222Fc:CCC, 231Ao:CCC, 231Ce:CCC, 231Da:CCC, 231Ea:CCC

Federal Lands: COE (J. Percy Priest); NPS (Chickamauga-Chattanooga, Stones River); TVA (Columbia); USFS (Bankhead)

ALLIANCE SOURCES

Authors: A.S. WEAKLEY, MP, Southeast **Identifier:** A.1815

References: Baskin and Baskin 1996, Foti 1994b, Gallyoun et al. 1996, Kral 1983, Pell and Rettig 1983, Rogers et al. 1993, Rollins 1997, Somers 1986, TNC 1996a

Sporobolus (neglectus, vaginiflorus) - Aristida longispica - Panicum flexile - Panicum capillare Herbaceous Vegetation(Barrens Dropseed, Poverty Dropseed) - Slimspike Three-awn - Wiry Panicgrass - Common Panicgrass Herbaceous Vegetation

Limestone Annual Grass Glades

Ecological Group (SCS;MCS): Interior Highlands Carbonate Glades and Barrens (440-10; 2.3.4.2)

ELEMENT CONCEPT

GLOBAL SUMMARY: This annual herbaceous community is a zonal component of Nashville Basin (Tennessee) and Moulton Valley (Alabama) Limestone Cedar Glades. Much of this vegetation is a mixture of annual grasses and perennial forbs, with enormous seasonal variation in dominance. Additional associations may be named. Relations with related vegetation in other ecoregions needs further investigation. Stands are dominated by *Sporobolus neglectus, Sporobolus vaginiflorus var. vaginiflorus*, and/or *Sporobolus vaginiflorus var. ozarkanus (= Sporobolus ozarkanus)*. Some of the co-occurring forbs are the endemic or near-endemic *Dalea gattingeri* and *Pediomelum subacaule*, along with *Croton capitatus, Grindelia lanceolata, Hedyotis nigricans var. nigricans, Heliotropium tenellum, Isanthus brachiatus, Manfreda virginica*, and *Ruellia humilis*. *Dalea gattingeri* is present in most examples of this vegetation type. *Grindelia lanceolata* has become abundant in some examples; this may merit recognition as an association, or it may be a symptom of disturbance.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Found in the middle of limestone glades on Stones River National Battlefield. This association occurs in very thin soil areas.

Global Environment: Middle Tennessee glades occur on Ordovician limestones, Moulton Valley examples on Mississippian strata.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Dominated by *Sporobolus vaginiflorus var. vaginiflorus, Dalea gattingeri* and (on plot STRI.14) *Hypericum sphaerocarpum.* Other common plants are *Ruellia humilis var. humilis, Erigeron strigosus, Panicum flexile, Croton capitatus, Senecio anonymus.* Herbaceous species present only in trace amounts include *Dichanthelium laxiflorum, Dichanthelium acuminatum, Hedyotis nigricans, Rudbeckia hirta, Verbesina alternifolia, Heliotropium tenellum, Talinum calcaricum, Salvia lyrata, Chamaesyce maculata,* and *Opuntia humifusa.* Some other scattered low shrubs are present; *Juniperus virginiana var. virginiana, Forestiera ligustrina, Hypericum frondosum, Rhus aromatica, Frangula caroliniana,* and *Ulmus alata.*

Global Vegetation: Stands are dominated by *Sporobolus neglectus, Sporobolus vaginiflorus var. vaginiflorus,* and/or *Sporobolus vaginiflorus var. ozarkanus (= Sporobolus ozarkanus).* Some of the co-occurring forbs are the endemic or near-endemic *Dalea gattingeri* and *Pediomelum subacaule,* along with *Croton capitatus, Grindelia lanceolata, Hedyotis nigricans var. nigricans, Heliotropium tenellum, Isanthus brachiatus, Manfreda virginica,* and *Ruellia humilis*. In addition, *Grindelia lanceolata* has become abundant in some examples. Middle Tennessee examples also include more endemic species such as *Astragalus tennesseensis* and *Echinacea tennesseensis*.

Global Dynamics: *Grindelia lanceolata* has become abundant in some examples; this may merit recognition as an association, or it may be a symptom of disturbance (Baskin and Baskin 1996).

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
LOW SHRUB	*Hypericum sphaerocarpum*
GRAMINOID	*Sporobolus vaginiflorus var. vaginiflorus*
FORB	*Dalea gattingeri*

Global

Stratum	Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species

Global

Stratum	Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:

- Central Basin Limestone Glade Complex, Annual Grass/Gravel/Thin Soil Zone. [common name]
- (Baskin and Baskin 1996) A96BAS01ICEC
- (Kral 1983) G83KRA01ICEC
- (Rollins 1997) N97ROL01ICEC

- (Somers 1986) A86SOM01ICEC

GRank & Reasons: G3 (00-12-20). This annual herbaceous community is restricted to the Nashville Basin (Tennessee) and Moulton Valley (Alabama) Limestone Cedar Glades. It may cover large parts of some glade sites. Succession is limited on the thin soils on which this type is found, so it is relatively stable. However, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in areas of rapidly increasing human population (e.g., the Nashville Basin). Threats include destruction by recreational off-road vehicle traffic, gravel and mineral surface mining, and land-use change related to suburban development. It is restricted to the Inner Nashville Basin subsection of Tennessee and a few limited areas of Alabama and Kentucky. Examples which are not conserved on nature preserves, state forests, National Forests, or U.S. Corps of Engineers lands are highly vulnerable to development pressure.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: .

Global Classif Comments: Need to clarify the identity of the annual *Sporobolus* species which are present.

Internal Comments: CWN 4-04 Stones River plots (STRI.9, STRI.14). JT 7-00: This community was documented on the Bankhead National Forest at the Indian Tomb Hollow survey site (1999).

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found in the middle of limestone glades on Stones River National Battlefield. Mainly occurs in the vicinity of the west part of the Loop Road.

Global Range: This annual herbaceous community is found in Nashville Basin (Tennessee) and Moulton Valley (Alabama).

Nations: US
States/Provinces: AL:S?, TN:S?
TNC Ecoregions: 44:C, 50:C
USFS Ecoregions: 222Ec:CCC, 222Ed:CCP, 231Ce:CCC
Federal Lands: COE (J. Percy Priest); NPS (Stones River); TVA (Columbia); USFS (Bankhead)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes:
Authors: SCS **Confidence:** 2 **Identifier:** CEGL004340
REFERENCES (type in full citation below if reference is new): Baskin and Baskin 1996, Kral 1983, Rollins 1997, Somers 1986

V.D.2.N.i. Saturated temperate annual forb vegetation

V.D.2.N.i.2. SEDUM PULCHELLUM SATURATED HERBACEOUS ALLIANCE

Widow's-cross Saturated Herbaceous Alliance

ALLIANCE CONCEPT

Summary: This alliance consists of shallow-soil glades of the southeastern United States. *Sedum pulchellum* is characteristic, and it often forms dense mats. In addition to *Sedum pulchellum* (which has been characterized as being annual, biennial, or perennial), the vegetation consists largely of annuals (*Leavenworthia*) or nonvascular plants (e.g., *Nostoc*, a blue-green alga or cyanobacterium). *Talinum calcaricum* is actually a perennial. In Arkansas examples, herbaceous associates include *Croton willdenowii, Plantago aristata, Coreopsis lanceolata, Agrostis elliottiana, Danthonia spicata, Hordeum pusillum*, and *Ruellia humilis*. Vernal pools or depressions in the substrate which hold moisture play an important role in the dynamics and persistence of this vegetation. In Tennessee and Texas, this alliance occurs over limestone or glauconite; in Arkansas, it occurs over shale.
Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Arkansas, Kentucky, Oklahoma, Tennessee, and Texas.
Nations: US
States/Provinces: AL AR KY OK? TN TX
TNC Ecoregions: 29:C, 39:C, 40:C, 41:C, 44:C, 50:C

USFS Ecoregions: 222Eb:CCP, 222Ec:CCP, 222Ed:CCC, 222Eg:CCP, 231Ba:CP?, 231Ce:CCC, 231Ea:CCP, 231Eg:CCC, 232Fe:CCC, 315D:CC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC
Federal Lands: COE (J. Percy Priest); NPS (Stones River); TVA (Columbia); USFS (Bankhead?, Ouachita?, Sabine NF?)

ALLIANCE SOURCES

Authors: K.D. PATTERSON, MP, Southeast **Identifier:** A.1820
References: Hoagland 1998a, Hoagland 1998b, Nixon et al. 1983b, Nixon et al. 1990, Rollins 1997, USFWS 1992

Sedum pulchellum - Talinum calcaricum - Leavenworthia spp. / Nostoc commune Herbaceous Vegetation Widow's-cross - Limestone Fameflower - Gladecress species / Common Nostoc Herbaceous Vegetation

Interior Low Plateau Limestone Glade Ephemeral Pool

Ecological Group (SCS;MCS): Interior Highlands Carbonate Glades and Barrens (440-10; 2.3.4.2)

ELEMENT CONCEPT

GLOBAL SUMMARY: This herbaceous community is a zonal component of Nashville Basin (Tennessee) and Moulton Valley (Alabama) Cedar Glades. This vegetation characteristically occupies depressions in the limestone, which hold water in the winter and early spring. These areas become desiccated and baked in the heat of summer. Characteristic plants are the annuals *Sedum pulchellum* and *Leavenworthia* spp., and the perennial *Talinum calcaricum*. The characteristic endemic *Leavenworthia* spp. in Tennessee are *Leavenworthia stylosa*, *Leavenworthia torulosa*, and *Leavenworthia exigua*. The blue-green alga *Nostoc commune* forms mats. Related vegetation is found in Simpson and Warren counties of Kentucky.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: PALUSTRINE

STONES RIVER NATIONAL BATTLEFIELD National Park Environment: Found in the middle of limestone glades on Stones River National Battlefield. This association occurs in very thin soil areas, which become wet in rainy periods, especially in the winter and spring, but are generally very dry in the summer.

Global Environment: This herbaceous community is a zonal component of Nashville Basin (Tennessee) and Moulton Valley (Alabama) Cedar Glades. This vegetation characteristically occupies depressions in the limestone, which hold water in the winter and early spring. These areas become desiccated and baked in the heat of summer.

VEGETATION DESCRIPTION

STONES RIVER NATIONAL BATTLEFIELD National Park Vegetation: Characteristic plants are the annuals *Sedum pulchellum* and *Leavenworthia* spp., and the perennial *Talinum calcaricum*. *Nostoc commune* (the algae) forms mats, most prominent in the spring.

Global Vegetation: Characteristic plants are the annuals *Sedum pulchellum* and *Leavenworthia* spp., and the perennial *Talinum calcaricum*. The characteristic endemic *Leavenworthia* spp. in Tennessee are *Leavenworthia stylosa*, *Leavenworthia torulosa*, and *Leavenworthia exigua*. The blue-green alga *Nostoc commune* forms mats.

Global Dynamics:

MOST ABUNDANT SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park

Stratum	Species
FORB	*Sedum pulchellum*, *Leavenworthia* spp., *Talinum calcaricum*
NON-VASCULAR	*Nostoc commune*

Global
Stratum Species

CHARACTERISTIC SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

OTHER NOTEWORTHY SPECIES

STONES RIVER NATIONAL BATTLEFIELD National Park
Stratum Species

Global
Stratum Species

GLOBAL SIMILAR ASSOCIATIONS [NVC association gname (CEGL code)]:

SYNONYMY [OtherName (short citation) relationship. Note]:

- Limestone Glade Ephemeral Pool. [common name]
- (Evans 1991) N91EVA01ICEC
- (Rollins 1997) N97ROL01ICEC

GRank & Reasons: G3 (99-12-15). This community is restricted to the Inner Nashville Basin subsection of Tennessee, the Moulton Valley of Alabama, and a few limited areas of Kentucky. It may cover large parts of some glade sites and is more stable than some other glade communities. However, its overall coverage of the landscape is limited, and it is threatened by development and land-use conversion in this area of rapidly increasing human population. Threats include destruction or degradation by recreational off-road vehicle traffic, gravel and mineral surface mining, and land-use change related to suburban development. Examples which are not conserved on nature preserves, state forests, national forests, or U.S. Corps of Engineers lands are highly vulnerable to development pressure.

CLASSIFICATION COMMENTS

STONES RIVER NATIONAL BATTLEFIELD National Park: Characteristic dominant species are winter annuals, plot data from the early spring would be best to document these species and their cover.

Global Classif Comments:

Internal Comments: CWN 4-04: Stones River; not documented in a separate plot, but as inclusions in plot STRI.14 which was classified as (CEGL004340).

ELEMENT DISTRIBUTION

STONES RIVER NATIONAL BATTLEFIELD National Park Range: Found in the middle of limestone glades on Stones River National Battlefield. Mainly occurs in the vicinity of the west part of the Loop Road..

Global Range: This vegetation type is restricted to the Nashville Basin of Tennessee, the Moulton Valley of Alabama, and limited areas of Kentucky.

Nations: US
States/Provinces: AL:S?, KY:S1, TN:S?
TNC Ecoregions: 44:C, 50:C
USFS Ecoregions: 222Ed:CCC, 231Ce:CCC
Federal Lands: COE (J. Percy Priest); NPS (Stones River); TVA (Columbia); USFS (Bankhead?)

ELEMENT SOURCES

STONES RIVER NATIONAL BATTLEFIELD National Park Inventory Notes: Not documented in a separate plot, but as inclusions in plot STRI.14 (CEGL004340)
Authors: SCS **Confidence:** 2 **Identifier:** CEGL004346
REFERENCES (type in full citation below if reference is new): Evans 1991, Rollins 1997

Appendix 3. Photos of selected plots of Stones River National Battlefield.

Plot 1 at Stones River National Battlefield
stri1_140d.jpg

Plot 9 at Stones River National Battlefield
stri9_transect290d.jpg (taken along transect)

Plot 3 at Stones River National Battlefield
stri3_transect28d.jpg

Plot 2 at Stones River National Battlefield
stri2_w.jpg

Plot 11 (facing S) stri11_s.jpg

Plot 16 (taken along transect @ 18 degrees) stri16_transect18d.jpg

Plot 13 (facing W) stri13_w.jpg

Plot 15 (facing N) stri15_n.jpg

Appendix 4. Key to EcoGroups and Ecological Communities of Stones River National Battlefield.

Key to the National Vegetation Classification (NVC) Associations, which occur or potentially occur at Stones River National Battlefield, Mufreesboro, TN

Associations, which are documented from Stones River National Battlefield are in **bold type**. Those, which are potential, but undocumented, are in normal type.

KEY TO KEYS

1. Vegetation dominated by trees, either closed forests or open woodlands **2**

1. Vegetation not dominated by trees, trees are absent or very sparse..... **3**

2. Forest, dominated by trees, which provide >60% cover.....***KEY A - FORESTS***

2. Vegetation not forested; open woodlands in which trees cover is <60%..... ***KEY B - WOODLANDS***

3. Shrublands, deciduous or evergreen (includes cane and bamboo shrublands up to 10 m or 33' tall and vine dominated areas (with few or no trees) **4**

3. Vegetation dominated by herbaceous plants..... **5**

4. Evergreen or mixed evergreen – deciduous shrublands
..... ***KEY C - EVERGREEN & MIXED SHRUBLANDS***

4. Deciduous shrublands (or deciduous vine dominated areas) ... ***KEY D – DECIDUOUS SHRUBLANDS***

5. Vegetation dominated or characterized by grasses or grass-like plants (perenial or annual)
.....***KEY E – GRAMINOID VEGETATION***

5. Vegetation dominated by forbs (broadleaf plants)..... ***KEY F – FORB (BROADLEAF) VEGETATION***

KEY A – FORESTS

1. Evergreen forest, dominated (> 60%) by Eastern red cedar (*Juniperus virginiana*) .....
.....***Red-cedar Successional Forest*** **(CEGL007124)**

1. Deciduous forest or mixed (<60%) Eastern red cedar (*Juniperus virginiana)* evergreen – deciduous forest **2**

2. Temporarily flooded deciduous or mixed Eastern red cedar (*Juniperus virginiana)* evergreen - deciduous forests..... **3**

2. Upland deciduous or mixed Eastern-red cedar (*Juniperus virginiana)* evergreen - deciduous forests..... **7**

3. Dominated by willow (*Salix caroliniana* or *Salix nigra*), near river or stream **5**

3. Dominated by either Green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), Sugarberry (*Celtis laevigata*), or Box-elder (*Acer negundo*) or some combination of these trees **4**

4. Dominated by either Green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), Sugarberry (*Celtis laevigata*) or some combination of these trees ..... ***Southern Green Ash – Elm – Sugarberry Forest*** **(CEGL002427)**

4. Box-elder (*Acer negundo*) dominated..... ***Southern Interior Box-elder Riparian Forest*** **(CEGL004690)**

5. Forest dominated by Black willow (*Salix nigra*) ..... ***Black Willow Riparian Forest*** **(CEGL002103)**

5. Forest or shrubland dominated by Carolina willow (*Salix caroliniana*)..... **6**

6. Forest dominated by canopy sized Carolina willow (*Salix caroliniana*), near river or stream..... ..... *Carolina Willow Temporarily Flooded Forest* (CEGL007373)

6. Shrubland dominated by shrub sized Carolina willow (*Salix caroliniana*), near river or stream..... ..... ***Carolina Willow Temporarily Flooded Shrubland*** **(CEGL003899)**

7. Forest dominated by Oaks (*Quercus* spp.)..... **9**

7. Forest dominated by deciduous trees other than Oaks (*Quercus* spp.) **8**

8. Forest dominated by Northern Hackberry (*Celtis occidentalis*), Sugarberry (*Celtis laevigata*), Black walnut (*Juglans nigra)*, and/or Ohio buckeye (*Aesculus glabra*) in some combination..... ..... ***Nashville Basin Sugarberry, Northern Hackberry Successional Forest*** **(CEGL004697)**

8. Forest dominiated by Black walnut (*Juglans nigra)*, Sugar maple (*Acer saccharum)*, and/or Shagbark hickory (*Carya ovata*) in some combination. The high predominance of Sugar maple (*Acer saccharum)* in preference to Oaks (*Quercus* spp.) may, in some cases, be the result of the removal of Oaks (*Quercus* spp.) by logging.. .... *Nashville Basin Sugar Maple Hickory Forest* (CEGL004741)

9. Forest with Shingle oak (*Quercus imbricaria*) as a major component or codominant..... ..... ***Nashville Basin Shingle Oak – Shumard Oak – Chinquapin Oak Forest*** **(CEGL003876)**

9. Forest without Shingle oak (*Quercus imbricaria*) as a major component or codominant..... **10**

10. Forest dominated by a mixture of Chinquapin oak (*Quercus muhlenbergii*), Southern red oak (*Quercus falcata*), Shumard oak (*Quercus shumardii*), and Post oak (*Quercus stellata*)..... ..... ***Interior Low Plateau Chinquapin Oak – Mixed Oak Forest*** **(CEGL007699)**

10. Forest dominated by Chinquapin oak (*Quercus muhlenbergii*), Shumard oak (*Quercus shumardii*), and other hardwoods other than Oak (*Quercus* spp.), generally lacking Southern red oak (*Quercus falcata*), and Post oak (*Quercus stellata*)..... **11**

11. Forest canopy containing Carolina shagbark hickory (*Carya carolinae-septentrionalis*), and/or Shagbark hickory (*Carya ovata*) as important components, in addition to Oaks (*Quercus* spp.) ..... ***Interior Low Plateau Chinquapin Oak – Shumard Oak Forest*** **(CEGL007808)**

11. Mesic forest usually containing Southern sugar maple (*Acer barbatum*) or Sugar maple (*Acer saccharum)* as important components, in addition to Oaks (*Quercus* spp.) .... *Shumard Oak – Chinquapin Oak Mesic Limestone Forest* (CEGL008442)

KEY B - WOODLANDS

1. Woodland with, or dominated by Blue ash *(Fraxinus quadrangulata*) and/or Eastern red-cedar (*Juniperus virginiana*) .....*Red-cedar – Blue Ash Limestone Woodland* (CEGL003754)

1. Woodland dominated by Post oak (*Quercus stellata)*, Eastern red-cedar (*Juniperus virginiana*) may be a subcanopy tree.....*Nashville Basin Post Oak Woodland* (CEGL003712)

KEY C - EVERGREEN & MIXED SHRUBLANDS

1. Vegetation dominated by cane or bamboo, shrublands up to 10 m or 33' tall..... **2**

1. Vegetation not dominated by cane or bamboo, evergreen or mixed shrublands **3**

2. Vegetation dominated by non-native Golden bamboo (*Phyllostachys aurea)* up to 10m or 33' tall .....*Golden Bamboo Shrubland* (CEGL008560)

2. Vegetation dominated by native Giant cane (*Arundinaria gigantea)* .....*Floodplain Canebreak* (CEGL003836)

3. Vegetation dominated by Chinese privet (*Ligustrum sinense)* or Common privet (*ligustrum vulgare*) **4**

3. Vegetation not dominated by Chinese privet (*Ligustrum sinense)* or Common privet (*ligustrum vulgare*)..... **5**

4. Wetlands or bottomlands .....***Chinese Privet Temporarily Flooded Shrubland* (CEGL003837)**

4. Uplands, not generally subject to flooding .....***Chinese Privet Upland Shrubland* (CEGL003807)**

5. Vegetation dominated by Eastern red-cedar (*Juniperus virginiana* var. *virginiana)*, Glade-privet *(Forestiera ligustrina*), Fragrant sumac (*Rhus aromatica)*, and/or Golden St. John's-wort (*Hypericum frondosum*) in some combiniation.....***Central Basin Limestone Glade Margin Shrubland* (CEGL003938)**

5. Vegetation dominated by Southern blackberry (*Rubus argutus)*, Southern dewberry (*Rubus trivialis)* and Greenbriers (*Smilax* spp.)..... ..... ***Blackberry - Greenbrier Successional Shrubland Thicket* (CEGL004732)**

KEY D – DECIDUOUS SHRUBLANDS

1. Temporarily flooded deciduous shrublands (occur in floodplain areas near rivers or creeks) **2**

1. Upland deciduous shrublands (generally not subject to flooding), includes vine areas..... **3**

2. Shrubland dominated by shrub sized Carolina willow (*Salix caroliniana*), near river or stream .....***Carolina Willow Temporarily Flooded Shrubland* (CEGL003899)**

2. Shrubland dominated by Smooth alder (*Alnus serrulata*), near a river or stream
..... *Interior Alder Shrubland* (CEGL003894)

3. Vegetation dominated by Kudzu (*Pueraria montana* var. *lobata*), with few or no trees
.....*Kudzu Vineland* (CEGL003882)

3. Upland deciduous shrublands dominated by native species (may include grasses and small trees), occurring on disturbed or successional sites **4**

4. Vegetation dominated by blackberries/dewberries (*Rubus argutus, Rubus trivialis*) and Greenbrier species (*Smilax glauca, Smilax rotundifolia*). May have a variety of tree saplings, other shrubs, herbs, and grasses. Successional, generally occurs following canopy removal
.....***Blackberry – Greenbrier Successional Shrubland Thicket*** **(CEGL004732)**

4.Vegetation usually dominated by thickets of Roughleaf dogwood (*Cornus drummondii)* and Smooth sumac (*Rhus glabra)*, dominant in places are, Plums (*Prunus americana, Prunus angustifolia, Prunus mexicana*), Fragrant sumac (*Rhus aromatica*), and Coralberry (*Symphoricarpus orbiculatus*)
.....*Rough Dogwood – Plum – Sumac Shrubland* (CEGL007933)

KEY E – GRAMINOID VEGETATION

1. Open, generally flat limestone glade with annual grass much of which is Annual dropseed (*Sporobolus vaginiflorus*) only a few inches high (<10 cm) in the thin soil areas, but forbs and higher annual grasses can be in areas with thicker soil. .....***Limestone Annual Grass Glades*** **(CEGL004340)**

1. Vegetation not with the above combination of characteristics **2**

2. Vegetation mainly non-native perennial grasses (or grasses mixed with forbs), may be kept open by mowing or bushhogging **3**

2. Vegetation not with the above combination of characteristics, mainly dominated by native plants **4**

3. Grassland pastures and hayfields, more-or-less cultural, but may no longer be actively maintained, dominated by European tall fescue or Meadow fescue (*Lolium arundinaceum, pratense*)
..... ***Cultivated Meadow*** **(CEGL004048)**

3. Grass lawns or frequently mowed areas with perennial grasses and forbs (weedy lawns)..... ***Lawns***

4. Vegetation dominated by Common broomsedge (*Andropogon virginicus* var. *virginicus*), a blond colored grass which gets about 1 m tall .....***Successional Broomsedge Vegetation*** **(CEGL004044)**

4. Vegetation not dominated by Common broomsedge (*Andropogon virginicus* var. *virginicus*) **5**

5. Vegetation is characterized by saturation or temporary flooding, mainly in winter or early spring..... **7**

5. Vegetation is not characterized by saturation or temporary flooding, uplands..... **6**

6. Natural vegetation on limestone glades, may be characterized by scattered trees, such as Chinquapin oak *(Quercus muhlenbergii*) and Eastern red-cedar (*Juniperus virginiana*). Perennial grasses such as Little bluestem (*Schizachyrium scoparium)* are characteristic ...***Central Limestone Glade*** **(CEGL005131)**

6. Restored vegetation in vicinity of earthworks or other ecological restoration sites, vegetation characterized by a wide variety of grasses, forbs and vines, mainly native..... ***Ecological Restoration Site***

7. Open herbaceous glade dominated by some combination of Flat spikerush (*Eleocharis compressa*), Yellow sunnybell (*Schoenolirion croceum*), Crawe's sedge (*Carex crawei*), and/or Nodding onion (*Allium cernuum*) .....*Limestone Seep Glade* (CEGL004169)

7. Vegetation with robust grasses such as Big bluestem (*Andropogon gerardii)*, Yellow Indiangrass (*Sorghastrum nutans)*, River-oats (*Chasmanthium latifolium)* as well as Willowleaf bluestar (*Amsonia tabernaemontana* var. *gattingeri* or var. *salicifolia*)..... *Duck River Scour Prairie* (CEGL004739)

KEY F – FORB (BROADLEAF) VEGETATION

1. Vegetation during the growing season dominated by Soybean (*Glycine max)*.....***Soybean Field***

1. Vegetation without Soybean (*Glycine max)* during the growing season **2**

2. Vegetation flooded (at least temporarily), associated with a river, creek, or pond..... **3**

2. Vegetation may be saturated, especially in early spring, but not flooded..... **4**

3. Rocky bar or shore of river or creek dominated by Common Water-willow (*Justicia americana*) ..... ***Water-willow Rocky Bar and Shore*** **(CEGL004286)**

3. Floating water-primrose (*Ludwigia peploides* ssp. *glabrescens*) mats in slow moving water or ponds and lakes ..... ***Floating Water-primrose Aquatic Marsh*** **(CEGL007835)**

4. Restored vegetation in vicinity of earthworks or other ecological restoration sites, vegetation characterized by a wide variety of grasses, forbs and vines, mainly native..... ***Ecological Restoration Site***

4. Natural vegetation associated with limestone glades, or patches within limestone glade habitats..... **5**

5. Open vegetation characterized by scattered small spring succulent plants, open flat limestone, and (seasonally) patches of the brown gelatinous algae Common nostoc (*Nostoc commune*) ..... ***Interior Low Plateau Limestone Glade Ephemeral Pool*** **(CEGL004346)**

5. Small ephemeral washes in limestone cedar glades, dominated by Axil-flower (*Mecardonia acuminata*), Caribean miterwort (*Mitreola petiolata*), and sometimes Leafy prarie-clover (*Dalea foliosa)* .....*Limestone Glade Streamside Meadow* (CEGL004292)