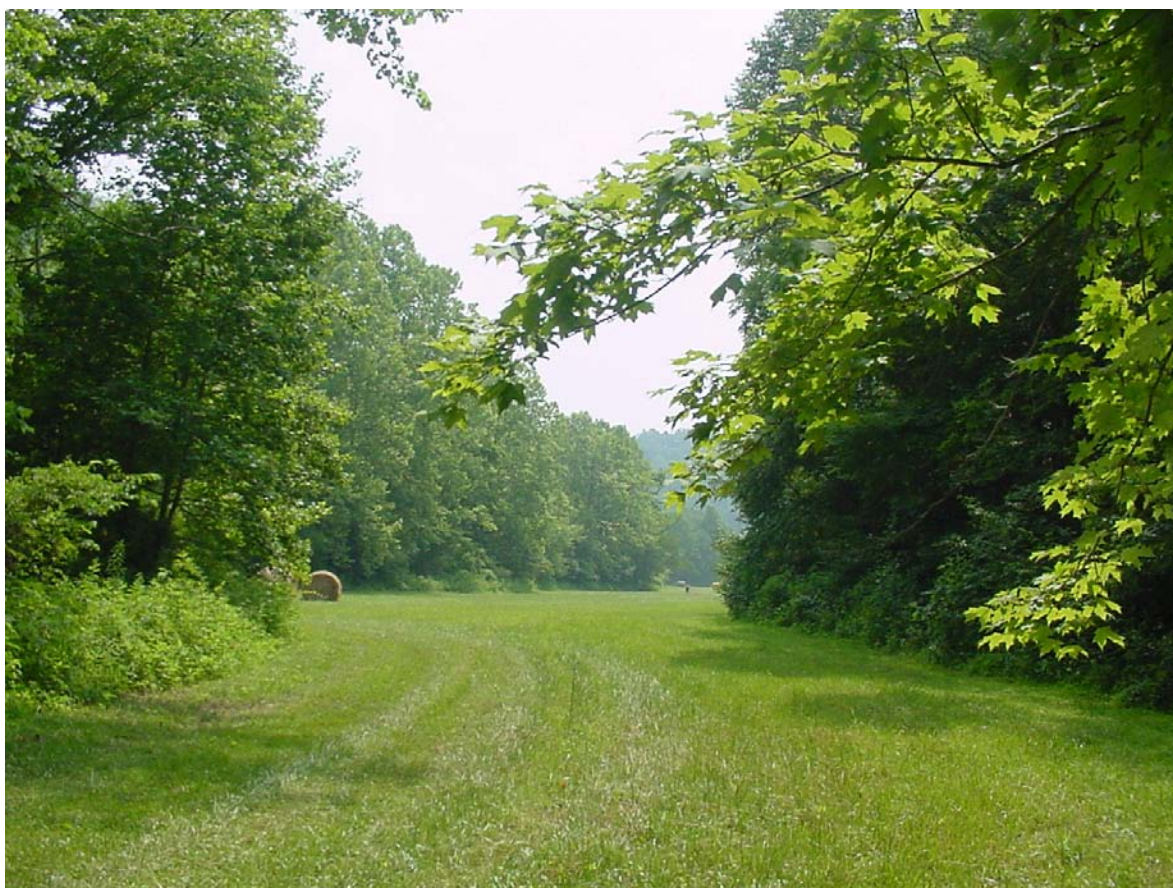


VASCULAR PLANT INVENTORY AND PLANT COMMUNITY CLASSIFICATION

FOR ABRAHAM LINCOLN BIRTHPLACE NATIONAL HISTORIC SITE



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

Prepared by NatureServe for the National Park Service
Southeast Regional Office
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for effective conservation action.*

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

Cover photo: Narrow cultivated valley surrounded by rich forested slopes at Knob Creek Farm where Abraham Lincoln grew up (Boyhood Home Unit). Photo by Erin Lunsford Jones.

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Following are the roles the NatureServe Ecology South team took on for this project: Rickie White – project management, fieldwork, plant identification, community classification and GIS work including placement of the gridded plots, Erin Lunsford Jones – fieldwork, plant ID, voucher specimen mounting, GIS work, data entry and management, community classification, and final revision to the key to communities; Carl Nordman – plant ID and early development of the key to communities, Milo Pyne – community classification and plant ID, Heather Summer – analysis and management, Mary Russo – local description development and responding to database needs, Brigitte O'Donoghue – fieldwork. All members of the team contributed a great deal to the final product.

**Vascular Plant Inventory and Plant Community Classification for
Abraham Lincoln Birthplace National Historic Site**

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SUMMARY

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

- 1) Ecologists from NatureServe established 11 permanently marked one-hectare circular plots within the park in a grid system and another 6 permanently marked plots in unique ecological areas that were not covered by the initial grid-based plot layout. The permanently marked plots are available to be used by researchers on studies ranging from bird point counts to individual plant monitoring. Ten additional quickplots (non-permanent) were established to further document unusual or ecologically significant associations.
- 2) Ecologists collected data on all unique vegetation communities within the park and identified 7 natural and 6 human-modified or successional vegetation associations (unique ecological assemblages of plants) within the park boundary. Other ecological communities may occur within the park, but we are confident that we have documented at least 90% of the communities from our field work. The most globally rare communities in the park appear to be the Central Limestone Glade (G2G3) and the Highland Rim Limestone Cliff/Talus Seep (G3). These exposed limestone communities warrant special attention due to their relatively high global rank/rarity and the habitat that they can provide for species ranked globally or locally vulnerable.
- 3) Ecologists collected and vouchered 350 species new to the park. These vouchered species and a handful of unvouchered observations were added to an existing list of 211 species that included vouchers from projects done by earlier researchers. We now count 568 documented species, varieties, or subspecies of vascular plants in the park (553 if not including varieties and subspecies). We estimate that between 92.5% and 100% of the vascular flora of the park is now documented. Several species considered vulnerable in the state of Kentucky were found during sampling. At least 65 of the species documented were non-native.

INTRODUCTION

Effective management of natural resources in our national parks relies upon ready access to comprehensive and scientifically credible information on species and habitats found within park boundaries. National Park Service units are currently compiling the information needed to assess the current state of natural resources at specific parks. Some 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 April 2002, NatureServe began work on the vascular plant inventory portion of the project at Abraham Lincoln Birthplace National Historic Site.

Although Abraham Lincoln Birthplace National Historic Site is better known for its historic importance, the park contains certain significant natural resources, especially its limestone cedar glades and a large calcareous seep. After assessing the past and current state of research in the park, we began to work on accomplishing three primary objectives:

- 1) Establish a minimum of 15 permanent plots throughout the park for present and future monitoring purposes.
- 2) Document all ecological communities on the site as defined by the United States National Vegetation Classification (Grossman et al. 1998, Anderson et al. 1998).

- 3) Collect any species of vascular plants found in plots that were not already documented by previous research such as Landon E. McKinney's 1993 study.

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 and Land Use History

Abraham Lincoln Birthplace National Historic Site currently consists of 2 land parcels totaling about 344 acres in what is now Larue County, Kentucky, in the Interior Plateau, about an hour south of Louisville. Both units of the Park occur in a limestone karst region – one unit (The Birthplace Unit) characterized by sinkholes, and the other (The Boyhood Home Unit) by knobs.

The Birthplace Unit (south of Hodgenville) is located within the historical Sinking Spring Farm where Abraham Lincoln, 16th president of the United States, was born in 1809. Now approximately 116 acres (47 hectares), and divided by U.S. 31E, the parcel was deeded to the Federal government in 1916 as a memorial park. Prior to this transfer, the Lincoln Farm Association had erected a memorial building with formal landscaping on the site. Most of the unit is managed for public visitation, and includes buildings, picnic areas, trails, lawns, and pastoral landscapes. It retains few of its historical features from the early 1800's, and still fewer features of undisturbed natural forest communities. The topography of the site itself was altered to some extent during the efforts to memorialize the property over the years.

The Birthplace Unit is located in the relatively flat terrain of the Mitchell Plain (71b) subsection of the Interior Plateau Ecoregion (as defined by the EPA), which is characterized by unglaciated rolling karst plain with depressions that may be seasonally ponded, and by sinking creeks, and springs (Woods et al. 2002). Much of the vegetation at the Birthplace Unit is in a fairly early-successional condition, with certain areas currently infested with invasive species. Many of these areas are growing back into oak-hickory forests wherever turf and plantings do not maintain the memorial landscape design. Numerous depressions and sinkholes or sinking springs (including the one for which the farm was named) are still evident. A patch of old growth oak forest is present in the northeastern extreme of the Birthplace Unit.

The Boyhood Home Unit at the historic Knob Creek Farm, where the Lincoln family lived from 1811 to 1816, displays a very different topography and vegetation than that of the Birthplace Unit. This 228 acre undeveloped farm was acquired by the park in 2001, and efforts are being made to interpret the cultural and natural resources in a manner consistent with the land's historical past. Though only 10 miles to the northeast of the Birthplace Unit on U.S. 31E, the Boyhood Home Unit is located in the more rugged Knobs ecological region (71c of EPA – Woods et al. 2002), and has more forested, natural and semi-natural vegetation. It has striking dissected geological features with steep forested knobs (small rounded hills arising starkly above adjacent landforms), mesic gorges, narrow valleys with rich agricultural soil, and ecologically important limestone slope glades. Elevations vary from about 540 feet to 843 feet atop the highest knob on the park.

The climate in central Kentucky consists of mildly cold winters and warm/hot summers. Climate records from the National Weather Service show that the average daily minimum winter temperature is about 28 whereas the average daily maximum summer temperature is about 86 degrees F. The average rainfall is about 44.5 inches annually, and the snow cover averages about 14 inches annually (National Weather Service 2007). Various severe storm events have impacted the Abraham Lincoln Birthplace National Historic Site in recent years.

METHODS

The inventory and monitoring project covers two main areas: permanent plot establishment for future research in the park; and a classification of all the vegetation communities ('associations') within the park according to the U.S. National Vegetation Classification (Grossman et al. 1998). In addition, our team collected any observed vascular plants (in good enough condition to voucher) that were not already documented on the existing list for this park (see McKinney 1993, and the National Park Service's NPSpecies database prior to 2002).

Permanent plot establishment

Rickie White from NatureServe used GIS layers supplied by the National Park Service's Cumberland Piedmont Network to set up a gridded system of one-hectare circular plots within the park boundaries, as mandated by the *Study Plan for Vertebrate and Vascular Plant Inventories* (Nichols 2000). He manipulated the GIS layers supplied to us using the software program ArcView GIS 3.3 (ESRI 2002). Before selecting points to sample, we chose a 56-meter buffer inside the current park boundaries, 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, Rickie established an evenly spaced grid system for each park unit. (We chose the approximate grid size of 180 meters by 180 meters *a priori* based on observations made by a team of park service personnel in 2000 (Nichols 2000).) At each of the 11 north-south and east-west line intersection, we recorded the coordinates for one grid point where we would sample the vegetation.

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 ecological communities not represented by the gridded points. We flagged these areas for visits and later established plots there and in other suitable habitat we found that was not represented by the 11 gridded plots. Among the habitats we sampled off the grid were the limestone glade and limestone seep of the Boyhood Home Unit, the white oak forest at the Birthplace Unit, bottomland and unusual successional habitats. Maps of all plot numbers and locations are shown in Figures 1 and 2, and plot coordinates are recorded in Table 1.

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. During the field seasons of 2002, 2003, 2004 and 2005 we established eleven plots on the grid and an additional six permanently marked plots and ten "quickplots" off of the grid in habitats not covered by any of the pre-established points. Three of the gridded plots were established at the Birthplace Unit, along with two additional off-grid plots, and seven "quickplots" (Figure 1, Table 1a). At the newly acquired Boyhood Home Unit, eight gridded plots were established, along with four additional off-grid plots, and three "quickplots" (Figure 2, Table 1b). For gridded plots, using the GPS units (Garmin Corp. 1999), we attempted to position ourselves within no more than five meters of the "real" map location (the hypothetical location that we created in the lab prior to visiting the site). [Note: Due to variation in GPS signal strength, positional error may be more than five meters in some cases.] Once we were within five meters, we monumented each plot with a one foot piece of aluminum conduit pounded into the ground, and a small blue anodized aluminum tag with a unique 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 Microsoft Access database archive of plot information held by the National Park Service (the PLOTS database). During return visits to each full plot and certain of the "quickplots," we recorded additional data regarding spring ephemerals or other plants not recorded during the initial visit.

Vegetation Classification

After the establishment of each permanent one-hectare plot, we visually surveyed the area. We chose a representative and relatively homogenous 20 by 50-meter section of the hectare in which to place our standardized vegetation monitoring plot. Within the plot, we measured environmental characteristics and identified every vascular plant within the plot (see Appendix I for a blank version of the data sheets used). We assigned each species a cover value by strata and an overall cover value for the plot based on a modified Braun-Blanquet cover class scale. In addition, we searched for and identified any species within the full hectare that were not represented in the 20 by 50-meter sample. Finally, we returned in a different season to resample the plots in an attempt to document any species that we had missed during the initial visit, normally due to seasonal variation. Detailed location information for each plot was recorded on the data sheets and is archived to assist with relocation of plots.

Our team of ecologists and data managers proofed the plot sheets, entered the data into the National Park Service PLOTS database (NatureServe 2004). Using the U.S. National Vegetation Classification (Anderson et al. 1998, Grossman et al. 1998), we assigned each plot to a vegetation association based on its floristic composition and environmental factors. We compared the plots with similar plots in other parks in the Interior Low Plateau and with written descriptions of each related classification unit. These comparisons, combined with a thorough review of all classification possibilities and a review of the literature for some of these association types, allowed us to produce the current park vegetation classification (Appendix III).

Vascular Plant Inventory

Ecologists completed the species inventory for the park so that at least 90% of the estimated vascular plant species in the park were documented/vouchered. While gathering plot data, we discovered hundreds of plant species within the plots that had not already been documented. We collected new specimens encountered within the plots (and sometimes outside of the plots) and recorded the GPS coordinates using a 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 USDA and NRCS's The PLANTS Database, version 3.5 as the naming standard (USDA, NRCS, 2004).

To assess the success of species inventories to date, 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 (plots), "r1" is the number of species present in only one quadrat, and "n" is the number of quadrats sampled. First-order jackknife estimates often underestimate number of species (McCune and Grace 2002), so we used both first- and second-order jackknife methods to attempt to find the best estimate of overall species diversity for the park.

RESULTS

Vascular Plant Inventory

During the species inventory work, we encountered and collected hundreds of plant species that had not been confirmed previously from the park, adding to the list of 211 species already documented, for a new park total of 568 species, varieties and subspecies (Table 2a). Excluding varieties and subspecies, the new park total is 553 species. We created 350 vouchers for the herbarium at Mammoth Cave National Park (Table 3) from the plants we collected and photographed at the two units of the Abraham Lincoln Birthplace National Historic Site. 33 of the new vouchers came from the Birthplace Unit. These specimens supplement 211 other plants collected or documented at this unit by McKinney (1993), Rogers (2000), and Johnson (2000). The other 317 new voucher specimens came from the Boyhood Home Unit of the park, newly acquired in 2001. A total of 460 taxa were identified at the Boyhood Home Unit (Table 2b), but only species new to the park as a whole were vouchered. This represents the initial floristic inventory performed at the Boyhood Home Unit.

In addition to collecting the new plants encountered within the plots and elsewhere, we estimated the percentage of the flora in the park that is now documented. We used PC-ORD to generate estimates of the total number of species in the park, based on the plot data taken across the park. The estimates were between 498 and 598 species using all 17 full plots, and between 375 and 437 species using just the 11 gridded full plots (Figure 3, Table 4). Excluding distinctions below the species level (varieties and subspecies), and questionable identifications, we believe that researchers past and present have documented 553 species for the park. Using this figure, the species area curve jackknife method (using all plots) estimates that we have documented between 92.5 and 100% of the species currently within the boundaries of the park (Table 4). In addition, we calculated alpha (average species richness per plot), beta (measure of the heterogeneity of the data (alpha/gamma)), and gamma (total species overall plots) diversity values for the park based on information gathered from the plot data (Table 4). The alpha value for all plots combined was 48.6, the beta value was 6.9, and the gamma value was 336.

Because exotic invasive plants are a cause for concern in managed areas, we have included a list of the 65 exotic plants found at Abraham Lincoln Birthplace National Historic Site, with the severity of each of their threats in Kentucky (or Tennessee, if data was unavailable for KY) identified (Table 5).

Vegetation Classification

Our plant community sampling effort at the Birthplace and Boyhood Home Units of the park identified thirteen distinct vegetation associations as defined by the United States National Vegetation Classification (NatureServe, 2007), and the potential for ecological restoration to a fourteenth association. Plots sampled were also assigned to one of six distinct ecological systems. (For more information on the US NVC, see Grossman et al. 1998. For more information on Ecological Systems, see Comer et al. 2003). Table 6 lists all vegetation associations and ecological systems identified at the park, and the plots where they were sampled.

Seven of the thirteen associations identified during this effort are considered “natural” as opposed to “semi-natural,” “human modified/successional,” or “exotic species dominated.” Each of the 7 natural community types was documented with at least one vegetation plot. In addition, small patches of giant cane, infested with multiflora rose, was found in floodplains. Although none of the occurrences we found of this giant cane community were of sufficient size or quality to qualify as intact examples of Floodplain Canebrake as described by the USNVC, there is potential for restoration of this additional natural community. Five of the six human modified/successional communities were documented with one or more plots. It was decided not to attempt to classify to the US NVC every patch of regenerating (human-impacted) vegetation found at the park, because of the high variability and unpredictability of

composition. In particular, at the Birthplace unit along Hwy31E, on the east side of the road at the south end of the park unit, there were numerous unique patches that did not lend themselves to classification. Each consisted of different bewildering blends of some of the following tree or sapling species: *Juglans nigra* (Black walnut), *Cercis canadensis* (Redbud), *Ulmus* (Elm), *Celtis* (Hackberry) and *Robinia pseudoacacia* (Black Locust).

The common names of all of the vegetation associations are as follows (presented alphabetically):

- Beech - Maple Unglaciaded Forest - CEGL002411
- Central Limestone Glade - CEGL005131
- *Floodplain Canebrake* - CEGL003836 (*low-quality occurrences with restoration potential*)
- Highland Rim Limestone Cliff/Talus Seep - CEGL004708
- Interior Low Plateau Mesic Sugar Maple - Hickory Forest - CEGL004741
- Rich Levee Mixed Hardwood Bottomland Forest - CEGL008429
- Southern Red Oak - Mixed Oak Forest - CEGL005018
- White Oak - Mixed Oak Dry-Mesic Alkaline Forest - CEGL002070
- **Cultivated Meadow* - CEGL004048
- *Red-cedar Successional Forest - CEGL007124
- *Southeastern Successional Black Cherry Forest - CEGL004133
- *Successional Broom-sedge Vegetation - CEGL004044
- *Successional Tuliptree Forest (Circumneutral Type) - CEGL007220
- *Virginia Pine Successional Forest - CEGL002591

(* = human modified/successional; *italics* = not sampled in park, but present)

A brief description of the Park-specific characteristics of each association can be found in the Discussion/Conclusions section of this report. Appendix III presents the complete US NVC classification of all the vegetation communities, describing in detail the rangewide characteristics of the Associations and Alliances found at Abraham Lincoln National Historic Site.

Also in the Discussion/Conclusions section of this report are Management Considerations for certain of the ecological communities, and for exotic invasive species.

A Field Key for identifying vegetation associations in the park is presented in Appendix IV. This tool helps biologists identify community types within the park based on vegetation composition and environment.

While working in the park, we captured digital images of plots and plants. These images are indexed (Table 7), and a selection of them can be seen in Appendix II. The entire collection of images is supplied to NPS on a CD accompanying this report.

DISCUSSION/CONCLUSIONS

Vascular Plant Inventory

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 498 to 598, using all full plots. First-order jackknife estimates often underestimate the number of species, as evidenced by the lowest estimate in our first-order jackknife (498), whereas second-order jackknife estimates often overestimate the number of species (McCune and Grace 2002). The field work from this project added 350 new specimens to the vouchered plants at the park and brought the total list of species documented in the two park units to 568 (or 553, excluding varieties and subspecies). Using all of the plot data (Figure 3 and Table 4), according to the jackknife estimates we have documented between 92.5% and 100% of the species in the park. Based on our own knowledge of the park and the fact that we have supplemented the work of previous researchers [McKinney (1993), and others], we believe that the goal of documenting at least 90% of the vascular flora of the park has been achieved. The species area curve numbers we generated should only be used as an estimate, since tests of these indices have shown even the best ones to routinely underestimate the number of species in a park. 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).

At least 11% (65 species) of the plant species in the park are not native to the region or continent. Many of these species were plantings (included in the cultivated meadows, for instance), or are harmless present day components of the flora that found their way into natural areas from plantings or errant seed mixes. However, at least 35 of the 65 exotic species found within the park are considered aggressive invasive species that are severe or significant threats and are actively out-competing and replacing native species in other parts of the Southeast (KYEPPC 2007 and TNEPPC 2007). See the Management Considerations section below for further discussion of this threat.

Vegetation Community Analysis

For a small park set aside principally for historic preservation, the Abraham Lincoln Birthplace National Historic Site has a good diversity of natural ecological community types, ranging from rich forested slopes and a calcareous seep, to very dry/xeric calcareous glades. This is so in spite of the fact that a significant amount of acreage within the park is moderately early successional or mowed or maintained grassland. Much of the diversity of natural communities is found at the Boyhood Home Unit.

The most globally rare communities in the park are the Central Limestone Glade, and the Highland Rim Limestone Cliff/Talus Seep. These unique communities warrant special attention due to their high global rank/rarity (G2G3 and G3 respectively), and the potential for species of special concern. The landscape surrounding the dry Central Limestone Glade appears to show evidence of fire suppression, and woody plants could encroach upon this community to some extent (though the shallow, dry soils make this undesirable habitat for many species). This is habitat in which several plants that would be easily out-competed in richer environments have a chance to hang on; consequently, some of the limestone glade occurrences in the park may contain species rare to the state of Kentucky or globally. Limestone slope glades are considered to be vulnerable to imperiled in the state of Kentucky (Kentucky State Nature Preserves Commission, 2007). The other highly ranked community is the Highland Rim Limestone Cliff/Talus Seep (G3), which is prime habitat for the Kentucky state-Threatened fern, *Adiantum capillus-*

veneris (S2). The steep, slippery condition of the limestone slope made it nearly impossible to do a complete floristic inventory of this community, but this species may be present there.

The association is the finest level of the vegetation classification and is defined as “a plant community type of definite floristic composition, uniform habitat conditions, and uniform physiognomy” (Grossman et al. 1998). Ecological community information such as that gathered for this project and described in Appendix III 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. The “ecological system” or broad ecological unit to which each association belongs (given in Table 6) can be used in the same way in management planning, at a broader scale. In the information contained in Appendix III, we have included a global and local description for each association, specific information on the status of each association both globally and within the park, possible threats to the association in the park, plants of concern found in the park, and management concerns where they apply. In the section below called Vegetation Community Summaries with Park-specific characteristics, we focus on the local characteristics of each community. In the Management Considerations section below, we have highlighted certain management concerns, including possible threats to certain associations in the park.

It is important to keep in mind the extensive historical human manipulation that has impacted the composition of the vegetation at Abraham Lincoln Birthplace National Historic Site. What we see today, especially at the Birthplace Unit, are not entirely natural forest communities, but regrowth of trees after significant human impact from farming and the memorialization of the farm. According to documentation in the 2004 NPS publication Abraham Lincoln Birthplace Unit, ABLI Cultural Landscape Report, in 1928 the eastern portion of the Birthplace unit was swampy drainage land, and much of the unit was in a state of early successional reforestation – with quite a bit of red cedar, and dense briary undergrowth. Other hardwoods were also represented – including (in order of frequency) various oaks, wild cherry, wild plum, sycamore, maple, ash, [yellow?] poplar, and black locust. Replanting of native trees was recommended, along with sources for the trees: from elsewhere on the farm, from Fort Henry Knox (some 30 miles away), and from the Kentucky Forest Service. While it is unclear to what extent these recommendations were carried out, it is a good reminder that possibly very few of today’s forests at the Birthplace Unit are completely natural. One can therefore expect to see unique features in Associations described for this Park that don’t conform perfectly to the regionally defined forest Associations in NatureServe’s U.S. National Vegetation Classification. Moreover, it was decided not to attempt to create a new US NVC association for every novel patch of regenerating vegetation found at the park, because of the high variability of composition. Along Hwy31E at the Birthplace Unit, on the east side of the road at the south end of the park unit, there were multiple diverse successional patches. Each consisted of different bewildering blends of some or all of the following tree or sapling species: *Juglans nigra* (Black walnut), *Cercis canadensis* (Redbud), *Ulmus* (Elm), *Celtis* (Hackberry) and *Robinia pseudoacacia* (Black Locust). These were left unclassified, and were mapped simply as “Successional.”

It is also important to realize that forest types (associations) are not units that have sharp geographical edges; rather, one forest type grades into other types higher or lower on the slope (for instance), where the soils, moisture and other conditions change. As an observer stands in a forest at Abraham Lincoln Birthplace National Historic Site, it is not unusual to see characteristics of 2 or more of the following community types intermingling where forest types transition into each other.

Vegetation Community Descriptions, with Park-specific characteristics

The following are abbreviated descriptions of each of the vegetation associations identified at Abraham Lincoln Birthplace National Historic Site. For more technical and rangewide information on each vegetation type, see Appendix III.

The order in which the communities are presented here follows that of Table 6.

FORESTS

Rich Levee Mixed Hardwood Bottomland (CEGL008429)

[Sycamore - Sugarberry - Tuliptree / Northern Spicebush - Giant Cane / American Hog-peanut Forest] G4?

Range: This forest type is found along streams at both the Birthplace Unit and the Boyhood Home Unit, and in the bottoms of certain sinkholes scattered throughout the Birthplace Unit.

Environment: This association was sampled along streams at both park units, and in sinkhole depressions at the Birthplace Unit. Streamside sites range from flat to gently sloping east- and southeast-facing channel streambeds. The elevation at one site is 165 m (539 feet). Soils are somewhat poorly to poorly drained silty clay and sandy loam. The unvegetated surface is made up of leaf litter (3-90% cover), large rocks (0-50%), small rocks (0-50%), sand (0-10%), wood (0-15%), and bare soil (0-10%). Evidence of disturbance includes the presence of exotic plants. A walking trail passes through a large sinkhole depression where this association was sampled along the eastern boundary of the Birthplace Unit. This sinkhole seems to have standing water for a period of days after rainstorms, which makes its vegetation character similar to that along streams at ABLI. Soils are somewhat poorly to poorly drained silty clay. The unvegetated surface is made up of leaf litter (85-95% cover), and wood (5-15%). Evidence of disturbance includes the presence of exotic plants, in addition to the walking trail.

Vegetation: The sparse to moderately dense (20-70% cover) tree canopy, 15-35 m tall, may be dominated by *Platanus occidentalis* (Sycamore) and sometimes *Liriodendron tulipifera*, and may include *Acer negundo* (Box-elder), *Juglans nigra* (Black Walnut), *Celtis* (Hackberry), *Quercus imbricaria* (Shingle Oak), *Fagus grandifolia* (American Beech) and *Prunus serotina* var. *serotina* (Black Cherry). The very sparse to moderate (5-50%) subcanopy (5-20 m) includes canopy species as well as *Acer saccharum* (Sugar Maple), *Fraxinus pennsylvanica* (Green Ash), and *Ulmus* (Elm). The very sparse to moderate (5-40%) tall-shrub layer (2-5 m) may contain *Acer negundo* (Box-elder), *Liriodendron tulipifera* (Tuliptree), *Prunus serotina* var. *serotina* (Black Cherry), *Sambucus canadensis* (American Elder), *Ulmus rubra* (Slippery Elm), and the exotic *Rosa multiflora* (Multiflora Rose). The very sparse to very dense (5-90%) short-shrub layer (0.5-2 m) is dominated by *Sambucus canadensis* (American Elder), *Symphoricarpos orbiculatus* (Coralberry), and *Toxicodendron radicans* (Eastern Poison-ivy), with *Lindera benzoin* (Northern Spicebush). The sparse to dense (10-80%) herbaceous layer includes *Hydrophyllum macrophyllum* (largeleaf waterleaf), *Geum virginianum* (Cream Avens), *Laportea canadensis* (Canadian Wood-nettle), and exotics *Lonicera japonica* (Japanese Honeysuckle), *Duchesnea indica* (Indian strawberry), and *Microstegium vimineum* (Japanese Stiltgrass).

Beech - Maple Unglaciaded Forest (CEGL002411)

[American Beech - Sugar Maple - Tuliptree Unglaciaded Forest] G4?

Range: This rich community occupies mesic slopes of the "knobs" at the Boyhood Home Unit.

Environment: The one site at the Boyhood Home Unit where this forest association was sampled is a steep, north-facing lower midslope of a knob with mesic loam soil. The unvegetated surface is dominated by leaf litter (97% cover) with a little wood (2%) and bedrock (1%). Lichens cover about 5% of the surface. Very little soil disturbance is evident, but the site was likely logged long ago.

Vegetation: The dense (80% cover) tree canopy, 20-35 m tall, and sparse (20%) subcanopy (15-20 m) are dominated by *Acer saccharum* (Sugar Maple) and *Fagus grandifolia* (American Beech). The canopy also includes lesser amounts of *Fraxinus* (Ash) sp. and *Liriodendron tulipifera* (Tuliptree). The

subcanopy includes *Liriodendron tulipifera* (Tuliptree), *Aesculus glabra* (Ohio Buckeye), and *Cornus florida* (Flowering Dogwood). Both the tall-shrub layer (2-5 m) and short-shrub layer (0.5-1 m) are sparse (20%) and dominated by *Asimina triloba* (Common Pawpaw) and *Lindera benzoin* (Northern Spicebush). The moderately sparse (40%) but rich herbaceous layer is dominated by the ferns *Adiantum pedatum* (Northern Maidenhair), *Osmunda cinnamomea* (Cinnamon Fern), and *Polystichum acrostichoides* (Christmas Fern). In spring, these slopes are a breath-taking display of delicate flowers. *Jeffersonia diphylla* (Twinleaf), *Dicentra canadensis* (Squirrel-corn), *Caulophyllum thalictroides* (Blue Cohosh), *Delphinium tricornis* (Dwarf Larkspur), and *Arisaema triphyllum* (Jack-in-the-Pulpit) are just some of the over 70 herbaceous species encountered at the plot sampled.

Interior Low Plateau Mesic Sugar Maple - Hickory Forest (CEGL004741)

[Sugar Maple - Shagbark Hickory - Black Walnut / Coralberry / Licorice Bedstraw Forest] G3G4

Range: This mesic sugar maple - hickory limestone forest occurs in small patches across the knobs at the Boyhood Home Unit, in a matrix of either White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070) or the more mesic Beech - Maple Unglaciaded Forest (CEGL002411). At the Birthplace Unit, a disturbed variant of this community occurs scattered throughout the park.

Environment: This forest association was sampled twice in the Boyhood Home Unit of the park. One site is located beside an old road high atop a knob on a gentle ridge with an eastern aspect. The second site is on a steep, south-facing lower slope at 227 m elevation that is fairly protected by its low position opposite an adjacent knob, and therefore somewhat mesic for a south-facing slope. Soils are moderately well- to well-drained, dry-mesic clay loams. The unvegetated surface is made up of leaf litter (80-92% cover), wood (0-10%), and bare soil (8-10%). Disturbance includes animal browsing and probable past clearing for agriculture (on flatter surfaces) and logging (on steep slopes). Logging for oaks may have given Sugar Maple its foothold in these areas. Evidence of disturbance in the ridgetop sample includes an old fenceline, with larger trees in the fenceline. This community was also observed at the Birthplace Unit.

Vegetation: The moderate (40-60% cover) tree canopy, 15-35 m tall, is dominated by *Acer saccharum* (Sugar Maple) and *Carya alba* (Mockernut Hickory), as are the dense (80%) subcanopy (10-20 m) and moderately sparse to moderate (30-50%) tall-shrub layer (2-5 m). The canopy also includes lesser amounts of *Quercus prinus* (Chestnut Oak) and *Quercus rubra* (Northern Red Oak), and the subcanopy includes *Carya cordiformis* (Bitternut Hickory) and *Quercus velutina* (Black Oak). The tall-shrub layer also contains *Cornus florida* (Flowering Dogwood) and *Viburnum rufidulum* (Rusty Blackhaw). The sparse to moderately sparse (10-30%) but relatively diverse (37 species recorded) short-shrub layer (0.5-1 m) is made up of species of the upper layers, as well as *Nyssa sylvatica* (Blackgum), *Fraxinus americana* (White Ash), *Staphylea trifolia* (American Bladdernut), *Asimina triloba* (Common Pawpaw), and *Lindera benzoin* (Northern Spicebush). The herbaceous layer (0-60%) is quite diverse with over 200 taxa recorded for two plots; dominants include the graminoids *Dichanthelium boscii* (Bosc's Witchgrass) and *Elymus hystrix* (Bottlebrush Grass).

Southern Red Oak - Mixed Oak Forest (CEGL005018)

[Southern Red Oak - White Oak - Post Oak - Black Oak Forest] G3G5

Range: This forest type with *Quercus falcata* was found scattered all about the Birthplace Unit, and especially concentrated along the eastern border. A drier variant lacking *Quercus falcata* (Southern Red Oak) was observed in one relatively small patch in the southeastern corner of the Boyhood Home Unit, on a dry upper slope of a knob, above limestone glades. It is probably quite uncommon in this mostly limestone park unit and occurs in patches too small to be mapped.

Environment: This oak-hickory forest was sampled twice at the Birthplace Unit. One site is on a gentle, southeast-facing high slope not far from the picnic area; the other is on a gentle summit. Leaf litter forms a continuous layer (75-100% cover) on the unvegetated ground surface along with some wood (0-5%) and bare soil (0-20%). At the Boyhood Home Unit, this forest association was sampled once on a moderate, southwest-facing upper slope with very dry loam soils. The unvegetated surface is dominated by leaf litter

(90% cover) with some large rocks (5%) and wood (5%). Hybrid American chestnuts were planted here around 2003, but most had died by 2005.

Vegetation: **At the Birthplace Unit**, the dense (90% cover) tree canopy, 20-35 m tall, is typically dominated by *Quercus falcata* (Southern Red Oak), *Carya alba* (Mockernut Hickory), and *Carya glabra* (Pignut Hickory), *Quercus coccinea* (Scarlet Oak), and *Acer saccharum* (Sugar Maple). The sparse to moderate (20-60%) subcanopy (10-15 m) is dominated by *Acer saccharum* (Sugar Maple) and sometimes *Liriodendron tulipifera* (Tuliptree) and *Fraxinus* (Ash) sp. The sparse (10-20%) tall-shrub layer (2-5 m) is dominated by *Acer saccharum* (Sugar Maple) and sometimes *Juniperus virginiana* (Eastern Red-cedar), the sparse to moderate (10-50%) short-shrub layer (0.5-1 m) by *Acer saccharum* (Sugar Maple), *Carya alba* (Mockernut Hickory), *Fagus grandifolia* (American Beech), and *Toxicodendron radicans* (Eastern Poison-ivy). The only herbaceous species recorded is the exotic vine *Lonicera japonica* (Japanese Honeysuckle). **At the Boyhood Home Unit**, the dense (80% cover) tree canopy, 20-35 m tall, is dominated by oak species (*Quercus alba* (White Oak), *Quercus coccinea* (Scarlet Oak), *Quercus stellata* (Post Oak), *Quercus velutina* (Black Oak)) and *Nyssa sylvatica* (Blackgum). The sparse (20%) subcanopy (10-15 m) includes *Juniperus virginiana* (Eastern Red-cedar), *Acer rubrum* (Red Maple), *Acer saccharum* (Sugar Maple), *Quercus alba* (White Oak), and *Quercus coccinea* (Scarlet Oak). The moderate (60%) tall-shrub layer (2-5 m) is dominated by *Cercis canadensis* (Eastern Redbud), and *Vaccinium arboreum* (Farkleberry), the sparse (20%) short-shrub layer (0.5-1 m) by *Sassafras albidum* (Sassafras) and *Vaccinium pallidum* (Hillside Blueberry). The sparse (10%) herbaceous layer includes *Aureolaria virginica* (Downy Yellow False Foxglove), *Hypericum hypericoides* ssp. *multicaule* (St. Andrew's-cross), and *Danthonia spicata* (Poverty Oatgrass).

White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070)

[White Oak - Northern Red Oak - Chinquapin Oak / Eastern Redbud Forest] G4G5

Range: This forest community is found in the northeastern corner of the Birthplace Unit (northeast of Keith Road). At the Boyhood Home Unit, it is the matrix forest found on the mid- to upper slopes and ridges of the knobs. More acidic variants of this community, identified by their less rich/diverse herbaceous layer, are found over small patches of slightly more acidic soils within this matrix. On the southeast-facing top of the northernmost knob at the Boyhood Home Unit, there is a forest whose identity has been uncomfortably placed here as well, although the canopy is almost entirely Hickory and Sassafras, with Sugar maple in the understory. Presumably, the oaks have been logged out, and the result is more moisture for Sugar maples to thrive.

Environment: This forest community was sampled once at the Birthplace Unit, and at several locations in the Boyhood Home Unit of the park. At the latter, it is found on knob formations, on moderate to somewhat steep, mid- to upper slopes with eastern, southern, southeastern, and southwestern aspects at recorded elevations of 220 to 235 m (723-770 feet). Soils are dry-mesic to mesic loams and clay loams underlain mostly by limestone. The unvegetated surface is a nearly continuous layer of leaf litter (96-100% cover) with some large rocks (0-3%) and wood (0-10%). (Several subcanopy blow-downs in 2005 had increased the unvegetated surface cover of wood at one site significantly.) These sites were likely logged and sometimes cleared for agriculture in the past. Some sites may have been logged and burned within the past 60 years (which may explain the lower than expected oak cover in certain occurrences.) There are signs of animal grazing and the presence of exotic plants. Old roads and a utility right-of-way occur nearby. Soils may vary in depth and moisture, with resulting slight variations in the forest. Where this type grades into a limestone cedar glade, for instance, soils may be more thin, and dry species such as *Juniperus virginiana* (Eastern Red-cedar) occur.

Vegetation: The moderate to dense (60-80% cover) tree canopy, 20-35 m tall, is typically dominated by *Quercus alba* (White Oak) and *Quercus rubra* (Northern Red Oak), and sometimes *Carya* (Hickory) spp. (where oaks have been logged out). Occasionally *Sassafras albidum* (Sassafras) co-dominates with Hickory. Typical associates include *Carya* (Hickory) spp. and *Fraxinus quadrangulata* (Blue Ash). The sparse to dense (20-80%) subcanopy (10-20 m) is dominated by *Acer saccharum* (Sugar Maple) (constant) and may include canopy species along with *Cercis canadensis* (Eastern Redbud), *Juniperus*

virginiana (Eastern Red-cedar), and *Liriodendron tulipifera* (Tuliptree). The sparse to dense (20-80%) tall-shrub layer (2-5 m) is dominated by species found in the upper layers, especially *Acer saccharum* (Sugar Maple), and additionally *Cornus florida* (Flowering Dogwood), *Fagus grandifolia* (American Beech) and *Ostrya virginiana* (Eastern Hop-hornbeam); a total of 23 taxa were recorded in this layer in five plots. Although absent to sparse (0-20%), the short-shrub layer (0.5-1 m) is rather diverse and made up species of the upper layers, as well as *Fraxinus americana* (White Ash), *Frangula caroliniana* (Carolina buckthorn), and *Symphoricarpos orbiculatus* (Coralberry); occasionally *Quercus muehlenbergii* (Chinquapin Oak) can be found. At the Birthplace Unit site, *Parthenocissus virginiana* (Virginia Creeper) provided abundant cover (75%) in this layer. A total of 40 taxa were recorded in this layer. The sparse to moderate (5-60%) and sometimes diverse herbaceous layer includes *Polystichum acrostichoides* (Christmas Fern) (constant), *Adiantum pedatum* (Northern Maidenhair), *Jeffersonia diphylla* (Twinleaf), *Podophyllum peltatum* (Mayapple), and *Dichanthelium boscii* (Bosc's Witchgrass); nearly 180 species were recorded in this rich layer in five plots. Vines include *Smilax* (Greenbrier) spp.

SHRUBLANDS

Highland Rim Limestone Cliff/Talus Seep (CEGL004708)

[Smooth Hydrangea / (Orange Jewelweed, Yellow Jewelweed) - Rock Alumroot Shrubland] G3

Range: This rare Hydrangea shrubland is believed to occur only once in the park, at the base of a north-facing slope of a knob in the extreme north of the Boyhood Home Unit.

Environment: The site where this shrubland was sampled is a nearly vertical face of limestone draining off the north side of a knob into a creek running west to east at the extreme northern edge of the Boyhood Home Unit. This is an unusually large stand of hydrangea shrubland, extending approximately 10 m upslope by 50 m wide. Seepage coming down over the surface of the limestone was observed in April 2005. There is a shalelike quality to the limestone which has resulted in much fragmentation into the creekbed. Sandy Brue noted rough holes in fragmented and eroded limestone shale where embedded geodes had broken loose. Jennie Jones noted numerous crinoid fossils in the creekbed. The unvegetated surface is made up of bedrock (70% cover) with some limestone bedrock and some fragmented shale, large rocks (10%), leaf litter (18%), and water (2%) from seepage.

Vegetation: There is a very sparse (5% cover) emergent (20-35 m) tree canopy of *Aesculus glabra* (Ohio Buckeye) and *Fraxinus americana* (White Ash) and a very sparse (5%) tall-shrub layer (2-5 m) of *Carpinus caroliniana* (American Hornbeam) with *Tilia americana* var. *americana* (American Basswood). The dominant layer (60%) is the short-shrub layer (1-2 m) of *Hydrangea arborescens* (Smooth Hydrangea). The sparse (10%) herbaceous layer includes *Hepatica nobilis* var. *acuta* (Sharp-lobe Liverleaf), *Hydrophyllum canadense* (Mapleleaf Waterleaf), *Maianthemum racemosum* ssp. *racemosum* (Feathery False Lily-of-the-valley), *Impatiens pallida* (Yellow Jewelweed), and *Mitella diphylla* (Twoleaf Miterwort); a total of 22 herbaceous species were recorded in the plot. Calcareous seeps are known habitat for the Kentucky state-threatened species *Adiantum capillus-veneris* (Southern Maidenhair). An *Adiantum* (Maidenhair) was seen on the limestone seep above eye level but was out of reach for positive identification as *Adiantum capillus-veneris* (Southern Maidenhair).

Floodplain Canebrake (CEGL003836)

[Giant Cane Shrubland] G2?

At the Boyhood Home Unit, small patches of *Arundinaria gigantea* (Giant Cane), sometimes infested by *Rosa multiflora* (Multiflora Rose), exist along the edges of floodplains and fields. The present size and low integrity of these patches disqualify them as representative occurrences of this somewhat globally rare community. However, if some of these bottomland floodplains at the Boyhood Home Unit were managed for presettlement conditions, the opportunity exists for restoration of examples of Floodplain Canebrake.

HERBACEOUS VEGETATION

Central Limestone Glade (CEGL005131)

[Chinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation] G2G3

Range: This somewhat globally rare limestone glade or barrens community occurs at the Boyhood Home Unit on south- to southwest-facing slopes of the knobs. It is typically surrounded by dry oak-hickory communities higher upslope and more species-rich communities below.

Environment: This wooded herbaceous vegetation was sampled once on a steep, south-facing upper limestone slope at 228 m elevation. Soils are shallow sandy loams over rock and very dry due to the southern exposure of the site. The unvegetated surface is made up of leaf litter (55% cover), bedrock (5%), and bare soil (40%). Little disturbance was noted; however, fire suppression may be impacting the site.

Vegetation: The sparse (10% cover) and stunted tree canopy (5-10 m) is dominated by *Juniperus virginiana* (Eastern Red-cedar) and *Ostrya virginiana* (Eastern Hop-hornbeam), as are the sparse (10% each) tall-shrub (2-5 m) and short-shrub (0.5-1 m) layers. Other dominants include *Cercis canadensis* (Eastern Redbud) in the tall-shrub layer and *Rhus aromatica* (Fragrant Sumac) in the short-shrub layer. The dominant (70%) and diverse herbaceous layer is made up of *Andropogon gerardii* (Big Bluestem), with lesser amounts of *Allium cernuum* (Nodding Onion), *Croton capitatus* var. *capitatus*, and *Hedyotis nigricans* (Narrowleaf Summer Bluets), among others. Other typical limestone glade associates found here include *Hypericum dolabriforme* (Straggling St. John's-wort), *Echinacea pallida* (Pale Purple Coneflower), and *Opuntia humifusa* (Eastern Prickly-pear). A total of 150 herbaceous taxa were recorded in one plot.

SUCCESSIONAL / HUMAN-MODIFIED VEGETATION

Cultivated Meadow (CEGL004048)

[(Tall Fescue, Meadow Fescue) Herbaceous Vegetation] GNA

Range: Long, narrow hayfields or pasturelands are maintained at the Boyhood Home Unit in the bottomland areas between the steep knobs, above the floodplain of Knob Creek.

Environment: This community was observed but not sampled in the park. During the period of this study, the low, flat areas just above the floodplains of Knob Creek in the long, narrow bottomlands between the knob formations, were being maintained as hayfields by systematic mowing/haying, symbolic of the farming Abraham Lincoln's father engaged in on his rented 30 acres of Knob Creek Farm. Further interpretation of the historic landscape may lead to diversification of the farmed land. The bottomland here is base-rich.

Vegetation: These hayfields are characterized by fescues, with orchard grass, alfalfa, clovers, sweetclover, and various other exotic and native herbaceous species.

Successional Broom-sedge Vegetation (CEGL004044)

[Broomsedge Bluestem Herbaceous Vegetation] GNA

Range: This community was found under powerline corridors. At the Boyhood Home Unit, it is also found in old fields or clearings atop knobs, fringing formerly cleared land that is now giving way to successional woodlands and forests. At the Birthplace Unit, it may also be found in areas formerly maintained as lawns or cleared areas, where the vegetation is being left to revert to forest. No attempt was made to distinguish this vegetation type from Cultivated Meadow (CEGL004048) on the vegetation map.

Environment: This herbaceous vegetation was sampled at one location at the Boyhood Home Unit. The site is a gently sloping ridge on a knob at 216 m elevation with an eastern aspect. The soil is a dry-mesic sandy loam. The unvegetated surface is made up entirely of leaf litter (100% cover). This site and other

patches like it were cleared or farmed in the recent past and have the appearance of abandoned or infrequently mowed fields. Evidence of disturbance includes the presence of exotic plants.

Vegetation: There is a very sparse (5% cover) emergent shrub layer, 1-2 m tall, that includes *Sassafras albidum* (Sassafras), *Quercus velutina* (Black Oak), and others; a total of 16 species were recorded. However, the dominant layer is the herbaceous layer with 90% cover. Dominant species include *Andropogon virginicus* (Broomsedge Bluestem), *Panicum anceps* (Beaked Panicgrass), and *Solidago juncea* (Early Goldenrod); a total of 121 herbaceous species were recorded in the plot. The substantial cover of *Andropogon virginicus* (Broomsedge Bluestem) identifies this community.

Red-cedar Successional Forest (CEGL007124)

[Eastern Red-cedar - (Oak species) Forest] GNA

Range: This community is found at both units of the park. At the Birthplace Unit, it was sampled east of Highway 31E, directly across from the park entrance, adjacent to a mowed field. It is also frequent in large patches on the western half of the Birthplace Unit, west of the residences, and along the road leading to them. At the Boyhood Home Unit, this association is common atop knobs where old fields are being left alone to revert to forest.

Environment: This successional community is frequent in both units of the park, including on the previously farmed tops of knobs. Wherever the soils are deep enough, other tree species may eventually predominate; on drier sites with rocky, shallow calcareous soils, stands dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-Cedar) may persist. It was sampled only once in the park, in a disturbed area beside the highway at the Birthplace Unit, adjacent to a mowed field at 232 m elevation.

Vegetation: In the sampled plot, the stunted vegetation is dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) and *Rhus copallinum* (Winged Sumac) in the sparse (10% cover) tall-shrub layer (2-5 m tall). The dense (80%) short-shrub layer (0.5-1 m) dominates the site with the exotics *Celastrus orbiculata* (Asian Bittersweet) and *Lonicera japonica* (Japanese Honeysuckle). The moderately sparse (30%) herbaceous layer is dominated by *Festuca rubra* (Red Fescue). In occurrences atop knobs at the Boyhood Home, quite a bit of *Pinus virginiana* (Virginia Pine) is often mixed in with the *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar).

Virginia Pine Successional Forest (CEGL002591)

[Virginia Pine Successional Forest] GNA

Range: This successional community is common on the more recently cleared or farmed uplands of the Boyhood Home Unit atop the knobs, sometimes adjacent to land kept as open fields.

Environment: A common community of formerly farmed uplands at the Boyhood Home Unit, this successional forest was sampled once in the park. The site is a gentle, north-facing midslope at 260 m (848 feet) elevation with mesic soils. The unvegetated surface is comprised of leaf litter (89% cover), wood (5%), bare soil (5%), and lichens (<1%). The site was logged in the past.

Vegetation: More recently abandoned fields are clearly dominated by *Pinus virginiana* (Virginia Pine) of varying heights. In the more mature sample taken, the moderately sparse (40% cover) tree canopy, 20-35 m tall, is dominated by *Pinus virginiana* (Virginia Pine) and *Liriodendron tulipifera* (Tuliptree), along with *Carya alba* (Mockernut Hickory) and *Quercus velutina* (Black Oak). The moderately dense (70%) subcanopy (10-15 m) is dominated by *Carya alba* (Mockernut Hickory) and *Fagus grandifolia* (American Beech), along with lesser amounts of *Acer rubrum* (Red Maple), *Cornus florida* (Flowering Dogwood), *Pinus virginiana* (Virginia Pine), *Quercus muehlenbergii* (Chinquapin Oak), and *Quercus velutina* (Black Oak). The moderately sparse (30%) shrub layer (2-5 m) is dominated by *Ostrya virginiana* (Eastern Hop-hornbeam) and *Fagus grandifolia* (American Beech), along with lesser amounts of *Acer saccharum* (Sugar Maple) and *Acer rubrum* (Red Maple). *Lycopodium digitatum* (Fan Clubmoss) dominates the sparse (10%) herbaceous layer; a total of 52 taxa were recorded.

Southeastern Successional Black Cherry Forest (CEGL004133)

[Black Cherry - Sassafras - (White Ash) / Eastern Red-cedar Forest] GNA

Range: This successional community occurs extensively at the Birthplace Unit of the park, in the western area behind the monument, and on other formerly disturbed sites, including a flat area near Keith Road in the eastern portion of the unit.

Environment: This newly described association was sampled at multiple locations in the park. Sites are generally flat interfluvies or gently sloping bottomlands, one with a northeastern aspect. The unvegetated surface is predominantly leaf litter (90-100% cover) with some wood (0-10%). The presence of this community suggests heavy past disturbance; the current mix of trees involves early successional species. Current disturbance of a lesser nature is not uncommon either. A well-trafficked gravel footpath passes through one area not far from the western boundary fence beyond which is a cleared area and big pond. Another site near Keith Road contains an exotic viburnum that suggests some human disturbance.

Vegetation: The moderately dense (70% cover) tree canopy, 20-35 m tall, is usually dominated by *Prunus serotina* var. *serotina* (Black Cherry), with lesser amounts of *Acer saccharum* (Sugar Maple), *Sassafras albidum* (Sassafras), *Liriodendron tulipifera* (Tuliptree), *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), and *Quercus imbricaria* (Shingle Oak). [A variant of this community type, found in plot ABLI.23, has a canopy comprised of nearly all *Fraxinus americana* (White Ash). This anomalous small patch is surrounded by the more typical mix of canopy trees in this community type.] The sparse to moderate (10-40%) subcanopy (10-20 m) is sometimes dominated by *Juniperus virginiana* (Eastern Red-cedar). The very sparse to moderate (5-60%) tall-shrub layer (2-10 m) can be dominated by *Acer saccharum* (Sugar Maple), *Prunus serotina* var. *serotina* (Black Cherry), *Lindera benzoin* (Northern Spicebush), and/or *Sassafras albidum* (Sassafras). The very sparse to dense (5-80%) short-shrub layer (0.1-2 m) is dominated by *Toxicodendron radicans* (Eastern Poison-ivy) and the exotic *Rosa multiflora* (Multiflora Rose). The herbaceous layer (30-80%) often contains patches of *Podophyllum peltatum* (Mayapple), *Parthenocissus quinquefolia* (Virginia Creeper) and the exotic *Lonicera japonica* (Japanese Honeysuckle).

Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)

[Tuliptree / (Eastern Redbud) / (Northern Spicebush) Forest] GNA

Range: At both the Birthplace Unit and the Boyhood Home Unit, this association was often found in mesic areas between the floodplain community Rich Levee Mixed Hardwood Bottomland Forest (CEGL008429) and various upland associations. It was occasionally also found on mesic slopes of the knobs of the Boyhood Home Unit, and sometimes in sinkholes and depressions scattered throughout the Birthplace Unit.

Environment: This semi-natural or successional community was sampled at two locations. One site is a fairly mesic, somewhat disturbed, southwest-facing midslope that faces the Birthplace Visitor Center and is adjacent to a mesic ravine. This site has an unusually high component of *Quercus imbricaria* (Shingle Oak). The other site is a somewhat steep, northeast-facing, mesic lowslope of a knob adjacent to a mowed field. No elevations were recorded. The unvegetated surface is dominated by leaf litter (90-97% cover) with some wood (2%), bare soil (0-10%), and lichens (1-5%). Evidence of disturbance includes past logging, trails and roads, clearing for agriculture, and many exotic plants. Part of the site near the Visitor Center was sprayed with herbicide in 2005 to combat invasion by *Hedera helix*.

Vegetation: The moderate (50-70% cover) tree canopy, 20-35 m tall, is clearly dominated by *Liriodendron tulipifera* (Tuliptree); other taxa can include *Fraxinus americana* (White Ash), *Juglans nigra* (Black Walnut), *Platanus occidentalis* (Sycamore), and at the Birthplace Unit, *Quercus imbricaria* (Shingle Oak). The moderate to dense (50-80%) subcanopy (10-20 m) is dominated by *Juniperus virginiana* (Eastern Red-cedar), along with lesser amounts of *Celtis occidentalis* (Common Hackberry), *Cornus florida* (Flowering Dogwood), *Fraxinus americana* (White Ash), and *Liriodendron tulipifera* (Tuliptree), among others. The sparse to moderate (30-40%) tall-shrub layer (2-10 m) can be dominated by *Aesculus glabra* (Ohio Buckeye), *Celtis occidentalis* (Common Hackberry), *Juniperus virginiana* (Eastern Red-cedar), and/or *Lindera benzoin* (Northern Spicebush). The sparse (20-30%) short-shrub

layer (0.5-1 m) contains taxa found in the upper layers along with *Symphoricarpos orbiculatus* (Coralberry) and *Toxicodendron radicans* (Eastern Poison-ivy). The moderately dense (70-80%) herbaceous layer includes *Toxicodendron radicans* (Eastern Poison-ivy), *Jeffersonia diphylla* (Twinleaf), *Podophyllum peltatum* (Mayapple), and the fern *Polystichum acrostichoides* (Christmas Fern); 131 taxa were recorded in this layer in one plot.

Management Considerations

At Abraham Lincoln Birthplace National Historic Site, ecologists/botanists with this project identified thirteen (fourteen potential) ecological community types or associations (described above). Of these, seven are considered fairly natural, and occur in areas that have probably not been severely disturbed for more than 70 years, or occur in bottomland areas that recover more quickly from disturbance. When considering priorities for land management, exotic invasive control, preservation, etc., these natural communities should take higher priority than the successional and exotic-dominated communities. Floodplain Canebrake is a potential eighth natural community, which would require restoration activities.

Of all the natural communities present, the most globally rare communities in the park are those associated with either extremely dry or extremely moist exposed limestone. The first is the xeric Central Limestone Glade (G2G3) at the Boyhood Home Unit. These glades are restricted to unusual geologic conditions (outcrops and shallow soil over limestone) and are widely scattered in central Kentucky. These infrequently occurring associations with their complementary suite of glade endemics are worthy of special management consideration. Similar glades are found in the Nashville Basin of central Tennessee and the Moulton Valley of northern Alabama. Woody species such as Eastern red-cedar could threaten glades in the park over time. It is assumed that under natural conditions these glades would occasionally burn on a regular fire return interval, thus maintaining the characteristic open woodland structure. Since the establishment of this site as a National Historic Site, these areas have been protected from wildfires (as most public lands have been). Without fire, only the areas with the shallowest soils have remained open. With too much growth of Eastern red-cedars or other trees/shrubs, the development of grass and forb species within the grassland will be reduced and likely would facilitate encroachment of more woody species into the glades. Reintroducing fire to the woodlands that surround these glades will, in our opinion, be advisable in the future.

The other most unusual community is the Highland Rim Limestone Cliff/Talus Seep (G3), a large and well-protected example of which is found on the northern boundary of the Boyhood Home Unit. It is an unusually large (~100 meters wide) occurrence of a *Hydrangea arborescens* (Smooth hydrangea) shrubland on exposed wet limestone. (Typical patches are about one-tenth this size.) Calcareous seeps are habitat for interesting to unusual vegetation, including the state-imperiled *Adiantum capillus-veneris* (Southern maidenhair). This site is on a north-facing slope of a knob over an east/west running creek that parallels the northern property boundary. At present, the land just north of it is privately owned and undeveloped, and the area gets very little human traffic. We would recommend that effort be made to procure a permanent buffer around this area.

Two management units were examined during this inventory: The Birthplace Unit, and the Boyhood Home Unit. Both are heavily influenced by their history of extensive human impact, and especially the Birthplace Unit. Only small areas with natural integrity occur there and early successional species and non-native invasive species often dominate. One mature forest in this area is the White Oak – Mixed Oak Dry-Mesic Alkaline Forest in the northeast corner of the property. Because of its proximity to a neighborhood, some of the community has been invaded by exotic vines and herbaceous species. At the Boyhood Home Unit, there are many rich natural areas that were undoubtedly logged or disturbed in the past, but with careful management, have excellent potential of restoration to quality occurrences of the ecological communities they represent.

Invasive species may be the biggest single threat to the overall ecological health of the park at this point in time. In the interior woods and forests, shrubs and vines such as Japanese honeysuckle (*Lonicera japonica*) [17 plots] and multiflora rose (*Rosa multiflora*) [15 plots] have begun to colonize areas of the

understory. Some of the floodplain for the creeks that run through the park is impacted by a combination of exotics, but especially Japanese stilt grass (*Microstegium vimineum*). Japanese stilt grass was also found in several upland plots. Several other vines and shrubs such as Winter creeper (*Euonymus fortunei*), Amur bush honeysuckle (*Lonicera maackii*), and Oriental bittersweet (*Celastrus orbiculatus*) may need monitoring and attention to ensure that they are not spreading, but the ones mentioned above seem to be the most likely early candidates for control in the future. Garlic mustard (*Alliaria petiolata*) was not observed during this study. This is a seriously invasive species, however, new to the southeast, and efforts should be made to identify locations and destroy incipient populations if they are found to exist. 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.

Abraham Lincoln Birthplace National Historic Site's natural resources are a great asset to the park system; few sites boast such fascinating geological features as the calcareous knobs of the Boyhood Home Unit. Because of the multiple microclimates that the extreme dissected geology provides, this park has a great number of natural communities for such a small park. Some of the recommendations for this park in terms of sustaining and promoting increased plant biodiversity include:

- 1) Control invasive exotics in all communities, but especially those in and near the limestone glades.
- 2) Consider the re-introduction of fire in order to manage the Central Limestone Glades. The sparse woodland maintained by a regular fire regime allows for greater light in the understory and thereby promotes a higher cover of native herbaceous plant species.
- 3) Continue to protect high quality versions of all natural communities within the park. Although some natural communities in the park are globally common, with continued protection and management, they can become some of the best high quality examples of these forests in the immediate area.
- 4) Consider whether managing some of the bottomland floodplains for presettlement conditions is in keeping with the interpretive goals for the Boyhood Home Unit. If so managed, the opportunity exists for restoration of examples of Giant Cane Shrubland alongside portions of the creek.
- 5) Attempt to monitor any potential development outside the northern boundary of the Boyhood Home Unit near the Highland Rim Limestone Cliff/Talus Seep to ensure that no unintended impacts occur.

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Figure 1. Map of Abraham Lincoln Birthplace National Historic Site, Birthplace Unit, with plot locations.

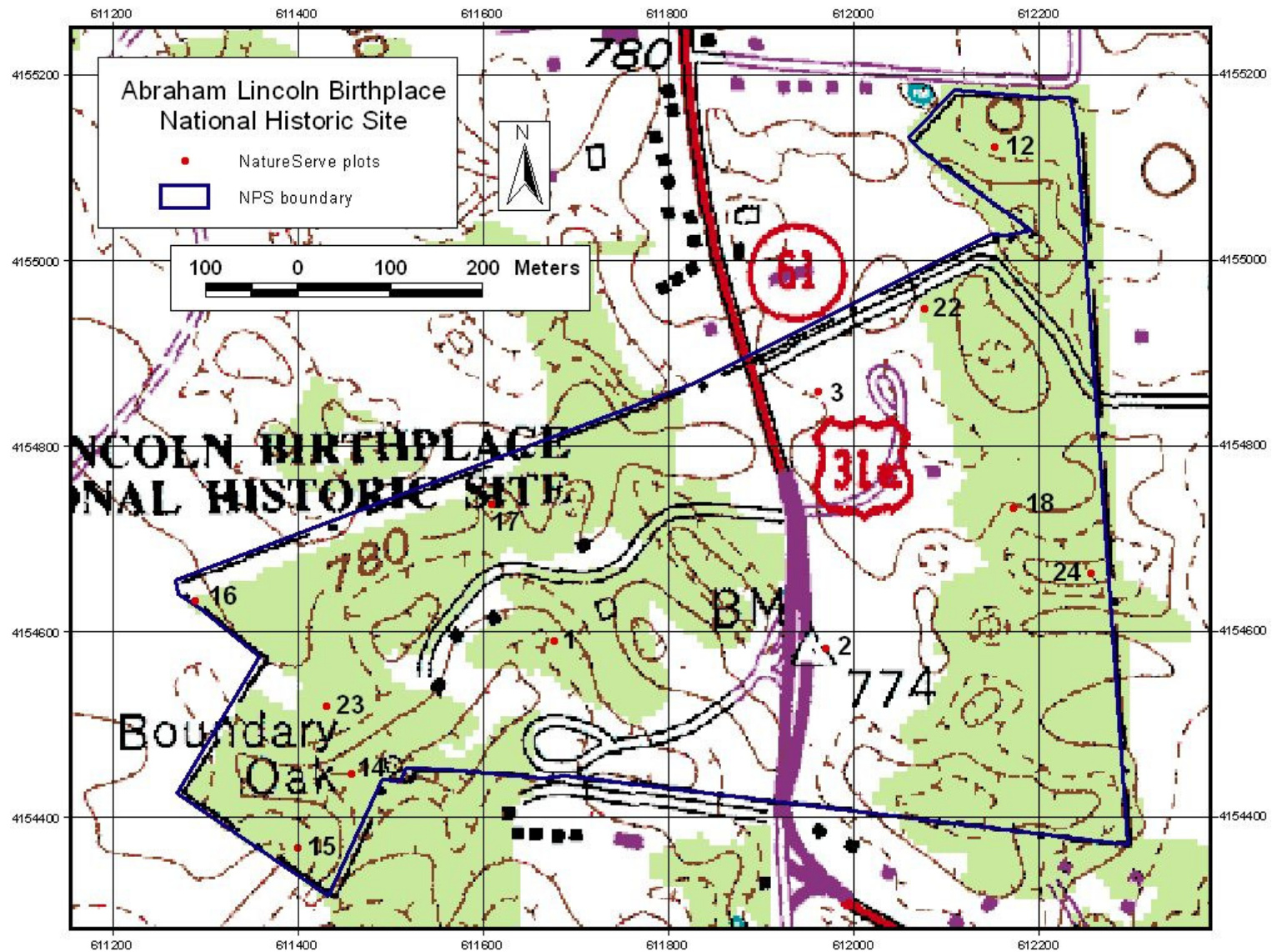


Figure 2. Map of Abraham Lincoln Birthplace National Historic Site, Boyhood Home Unit, with plot locations.

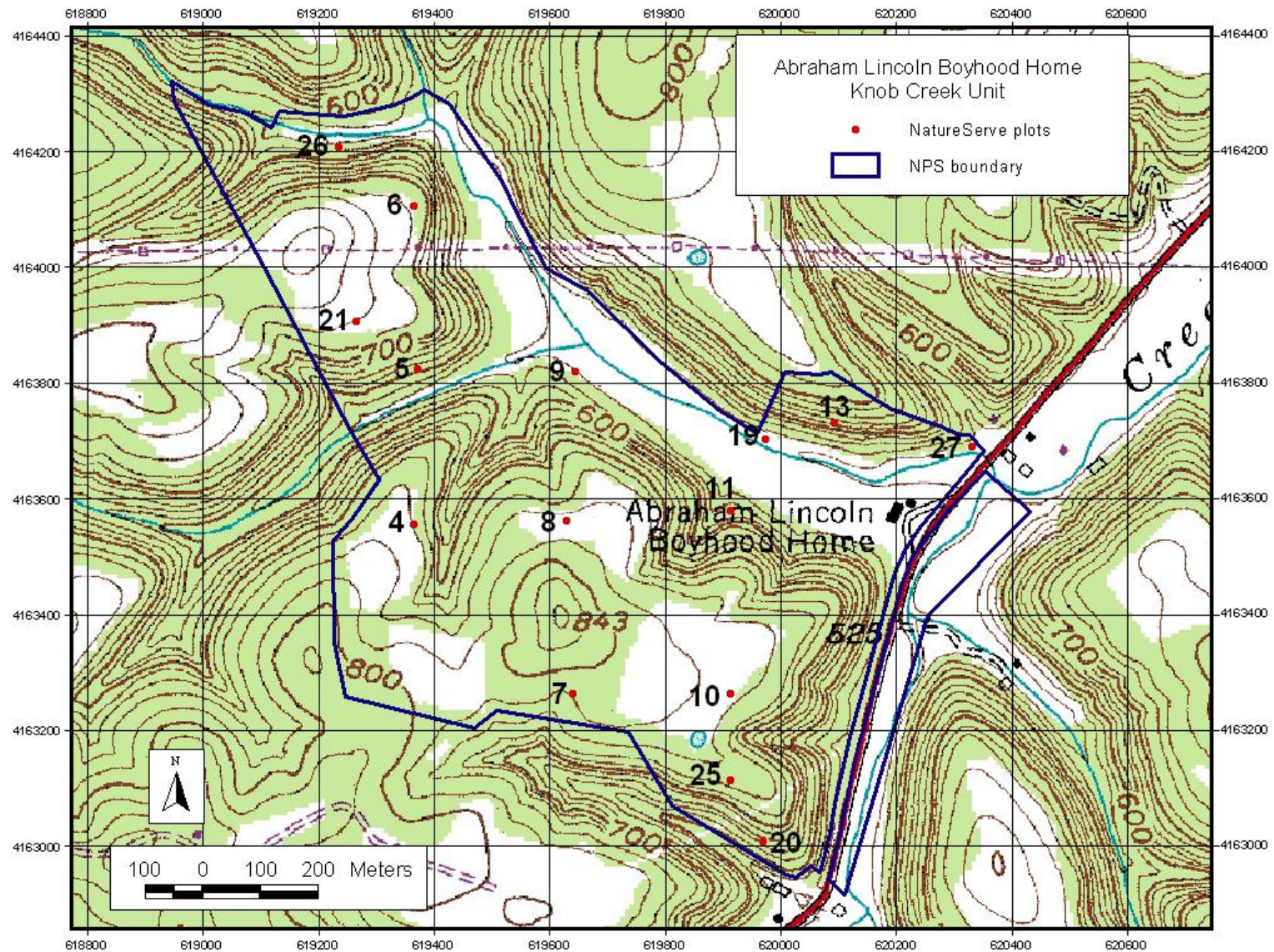


Table 1a. Plots established at Abraham Lincoln Birthplace National Historic Site – Birthplace Unit

Plot number	LAT	LONG	UTM Y Coordinate	UTM X Coordinate	Datum	Zone	Type of Plot	Park Unit
1	37.53153	-85.736	4154590	611677	NAD 83	16	FULL	Birthplace
2	37.53142	-85.7327	4154582	611970	NAD 83	16	FULL	Birthplace
3	37.53391	-85.7328	4154858	611962	NAD 83	16	FULL	Birthplace
12	37.53627	-85.7306	4155122	612152	NAD 83	16	FULL	Birthplace
14	37.53026	-85.7385	4154446	611458	NAD 83	16	Quick	Birthplace
15	37.52955	-85.7392	4154367	611400	NAD 83	16	Quick	Birthplace
16	37.53196	-85.7404	4154632	611289	NAD 83	16	Quick	Birthplace
17	37.53286	-85.7368	4154736	611609	NAD 83	16	Quick	Birthplace
18	37.53275	-85.7304	4154732	612172	NAD 83	16	Quick	Birthplace
22	37.5347	-85.7315	4154947	612077	NAD 83	16	Quick	Birthplace
23	37.53092	-85.7388	4154519	611431	NAD 83	16	Quick	Birthplace
24	37.53212	-85.7295	4154663	612256	NAD 83	16	FULL	Birthplace

Table 1b. Plots established at Abraham Lincoln Birthplace National Historic Site – Boyhood Home Unit

Plot number	LAT	LONG	UTM Y Coordinate	UTM X Coordinate	Datum	Zone	Type of Plot	Park Unit
4	37.61135	-85.6476	4163555	619366	NAD 83	16	FULL	Boyhood Home
5	37.61378	-85.6475	4163824	619372	NAD 83	16	FULL	Boyhood Home
6	37.61631	-85.6475	4164105	619366	NAD 83	16	FULL	Boyhood Home
7	37.60869	-85.6445	4163264	619641	NAD 83	16	FULL	Boyhood Home
8	37.61137	-85.6446	4163561	619630	NAD 83	16	FULL	Boyhood Home
9	37.61369	-85.6444	4163818	619644	NAD 83	16	FULL	Boyhood Home
10	37.60865	-85.6414	4163263	619914	NAD 83	16	FULL	Boyhood Home
11	37.6115	-85.6414	4163579	619913	NAD 83	16	FULL	Boyhood Home
13	37.61283	-85.6393	4163730	620094	NAD 83	16	FULL	Boyhood Home
19	37.6126	-85.6407	4163702	619975	NAD 83	16	Quick	Boyhood Home
20	37.60633	-85.6408	4163006	619970	NAD 83	16	Quick	Boyhood Home
21	37.61453	-85.6486	4163906	619267	NAD 83	16	Quick	Boyhood Home
25	37.6073	-85.6414	4163113	619913	NAD 83	16	FULL	Boyhood Home
26	37.61724	-85.649	4164206	619235	NAD 83	16	FULL	Boyhood Home
27	37.61245	-85.6366	4163690	620331	NAD 83	16	FULL	Boyhood Home

Table 2a. List of all plants historically documented at Abraham Lincoln Birthplace National Historic Site (both units)

Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Acalypha</i>	copperleaf			28178	NatureServe 2001-2007**
<i>Acer negundo</i>	box-elder	G5	S5	28749	NatureServe 2001-2007
<i>Acer rubrum</i>	red maple	G5	S5	28728	NatureServe 2001-2007
<i>Acer saccharinum</i>	silver maple	G5	S5	28757	NatureServe 2001-2007*
<i>Acer saccharum</i>	sugar maple	G5	S5	28731	NatureServe 2001-2007
<i>Achillea millefolium</i>	common yarrow	G5	SNA	35423	NatureServe 2001-2007
<i>Actaea pachypoda</i>	white baneberry	G5	S5	18722	NatureServe 2001-2007*
<i>Actaea racemosa</i> var. <i>racemosa</i>	black bugbane	G4T4	SNR	-501896	NatureServe 2001-2007*
<i>Adiantum capillus-veneris</i>	common maidenhair	G5	S2	17308	NatureServe 2001-2007***^^
<i>Adiantum pedatum</i>	northern maidenhair	G5	S4	17311	NatureServe 2001-2007*
<i>Aesculus glabra</i> var. <i>glabra</i>	Ohio buckeye	G5T5	S5	28719	NatureServe 2001-2007*
<i>Agalinis tenuifolia</i>	slenderleaf false foxglove	G5	S4	33036	NatureServe 2001-2007*
<i>Agastache nepetoides</i>	giant hyssop	G5	S4?	32443	NatureServe 2001-2007** ^
<i>Ageratina altissima</i> var. <i>altissima</i>	white snakeroot	G5T5	S5	182398	NatureServe 2001-2007
<i>Agrimonia parviflora</i>	harvestlice	G5	S5	25098	NatureServe 2001-2007*
<i>Agrimonia pubescens</i>	soft agrimony	G5	S5	25099	NatureServe 2001-2007*
<i>Agrimonia rostellata</i>	beaked agrimony	G5	S5	25100	NatureServe 2001-2007
<i>Aletris farinosa</i>	white colicroot	G5	S3S4	42769	NatureServe 2001-2007*
<i>Allium canadense</i>	meadow garlic	G5	S4	42635	NatureServe 2001-2007*
<i>Allium cernuum</i>	nodding onion	G5	S3S4	42721	NatureServe 2001-2007*
<i>Allium oleraceum</i>	field garlic	GNR	SNA	42689	McKinney 1993
<i>Allium tricoccum</i>	wild leek	G5	S4	42672	NatureServe 2001-2007*
<i>Allium vineale</i> ssp. <i>vineale</i>	wild garlic	GNR TNR	SNA	182599	NatureServe 2001-2007
<i>Ambrosia artemisiifolia</i>	annual ragweed	G5	S5	36496	NatureServe 2001-2007
<i>Ambrosia trifida</i> var. <i>trifida</i>	great ragweed	G5T5	S5	182422	NatureServe 2001-2007*
<i>Amelanchier arborea</i> var. <i>arborea</i>	common serviceberry	G5T5	SNR	182037	McKinney 1993
<i>Amphicarpaea bracteata</i>	American hogpeanut	G5	S5	182067	NatureServe 2001-2007*
<i>Andropogon gerardii</i>	big bluestem	G5	S5	40462	NatureServe 2001-2007*
<i>Andropogon gyrans</i> var. <i>gyrans</i>	Elliott's bluestem	G5T5	S5	182528	NatureServe 2001-2007*
<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	G5T5	S5	182523	NatureServe 2001-2007
<i>Anemone virginiana</i> var. <i>virginiana</i>	tall thimbleweed	G5T5	S5	181868	NatureServe 2001-2007
<i>Antennaria parlinii</i> ssp. <i>parlinii</i>	Parlin's pussytoes	G4G5 T5?	S4	185168	NatureServe 2001-2007*
<i>Antennaria plantaginifolia</i>	woman's tobacco	G5	S5	36717	NatureServe 2001-2007**
<i>Antennaria solitaria</i>	singlehead pussytoes	G5	S4S5	36756	NatureServe 2001-2007*
<i>Anthemis arvensis</i>	corn chamomile	GNR	SNA	36331	McKinney 1993
<i>Apocynum cannabinum</i>	Indianhemp	G5	SNA	30157	NatureServe 2001-2007*

* Vouchered by NatureServe. ** First documented by NatureServe, but not vouchered.

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^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

No asterisk means previously documented in Park, and NatureServe also documented.

List of all plants documented at ABLI (both units)

Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Arabis laevigata</i>	smooth rockcress	G5	S5	22706	NatureServe 2001-2007*
<i>Aralia racemosa</i> ssp. <i>racemosa</i>	American spikenard	G4G5 T4T5	S4	184743	NatureServe 2001-2007*
<i>Aralia spinosa</i>	devil's walkingstick	G5	S5	29378	NatureServe 2001-2007*
<i>Arisaema dracontium</i>	green dragon	G5	S4S5	42529	NatureServe 2001-2007*
<i>Arisaema triphyllum</i>	Jack in the pulpit	G5	S5	42525	NatureServe 2001-2007
<i>Aristolochia serpentaria</i>	Virginia snakeroot	G4	S4S5	18342	NatureServe 2001-2007*
<i>Arnoglossum muehlenbergii</i>	great Indian plantain	G4	S4?	501100	NatureServe 2001-2007*
<i>Artemisia vulgaris</i> var. <i>vulgaris</i>	common wormwood	GUTU	SNA	183744	NatureServe 2001-2007**
<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	giant cane	G5T5?	SNR	185285	NatureServe 2001-2007*
<i>Asarum canadense</i>	Canadian wildginger	G5	S5	18353	NatureServe 2001-2007*
<i>Asclepias quadrifolia</i>	fourleaf milkweed	G5	S4	30297	NatureServe 2001-2007*
<i>Asclepias tuberosa</i>	butterfly milkweed	G5?	S5	30313	NatureServe 2001-2007*
<i>Asclepias verticillata</i>	whorled milkweed	G5	S4?	30320	NatureServe 2001-2007*
<i>Asimina triloba</i>	pawpaw	G5	S5	18117	NatureServe 2001-2007*
<i>Asplenium platyneuron</i>	ebony spleenwort	G5	S5	17355	NatureServe 2001-2007
<i>Aureolaria virginica</i>	downy yellow false foxglove	G5	S5	33490	NatureServe 2001-2007*
<i>Berberis thunbergii</i>	Japanese barberry	GNR	SNA	18835	Kristine Johnson 2000
<i>Bidens aristosa</i>	bearded beggarticks	G5	S5	35713	NatureServe 2001-2007*
<i>Blephilia ciliata</i>	downy pagoda-plant	G5	S4	32460	NatureServe 2001-2007*
<i>Blephilia hirsuta</i> var. <i>hirsuta</i>	hairy pagoda-plant	G5?T5 ?	SNR	526935	NatureServe 2001-2007*
<i>Boehmeria cylindrica</i>	smallspike false nettle	G5	S5	19121	NatureServe 2001-2007**
<i>Botrychium dissectum</i>	cutleaf grapefern	G5	S5	17171	NatureServe 2001-2007
<i>Botrychium virginianum</i>	rattlesnake fern	G5	S5	17173	NatureServe 2001-2007
<i>Brachyelytrum erectum</i>	bearded shorthusk	G5	S5	41527	NatureServe 2001-2007*
<i>Bromus commutatus</i>	meadow brome	GNR	SNA	40497	NatureServe 2001-2007* ^
<i>Bromus japonicus</i>	Japanese brome	GNR	SNA	40479	NatureServe 2001-2007*
<i>Bromus nottowanus</i>	Nottoway Valley brome	G3G5	SNA	40509	NatureServe 2001-2007*
<i>Buglossoides arvensis</i>	corn gromwell	GNR	SNA	501090	NatureServe 2001-2007*
<i>Calystegia sepium</i>	hedge false bindweed	G5	SNA	30650	NatureServe 2001-2007*
<i>Campanulastrum americanum</i>	American bellflower	G5	S5	501172	NatureServe 2001-2007
<i>Campsis radicans</i>	trumpet creeper	G5	S5	34309	NatureServe 2001-2007
<i>Cardamine concatenata</i>	cutleaf toothwort	G5	S5	22787	NatureServe 2001-2007
<i>Cardamine dissecta</i>	forkleaf toothwort	G4?	S5	501194	NatureServe 2001-2007*
<i>Cardamine douglassii</i>	limestone bittercress	G5	S5	22793	NatureServe 2001-2007*
<i>Cardamine hirsuta</i>	hairy bittercress	GNR	SNA	22797	NatureServe 2001-2007
<i>Carduus nutans</i>	nodding plumeless thistle	GNR	SNA	35787	McKinney 1993
<i>Carex albicans</i>	whitetinge sedge	G5	S5?	565042	McKinney 1993
<i>Carex albicans</i> var. <i>albicans</i>	whitetinge sedge	G5 T4T5	SNR	527064	Natureserve 2001-2007**

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Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Carex albursina</i>	white bear sedge	G5	S5?	39487	NatureServe 2001-2007*
<i>Carex amphibola</i>	eastern narrowleaf sedge	G5	S5	39491	NatureServe 2001-2007
<i>Carex blanda</i>	eastern woodland sedge	G5?	S5	39379	NatureServe 2001-2007
<i>Carex careyana</i>	Carey's sedge	G4G5	S4?	39541	NatureServe 2001-2007*
<i>Carex glaucodea</i>	blue sedge	G5	SNR	39616	NatureServe 2001-2007*
<i>Carex gracilescens</i>	slender looseflower sedge	G5?	S5	39618	NatureServe 2001-2007*
<i>Carex granularis</i>	limestone meadow sedge	G5	S5	39398	NatureServe 2001-2007*
<i>Carex gravida</i>	heavy sedge	G5	S5	39621	McKinney 1993
<i>Carex hirsutella</i>	fuzzy wuzzy sedge	G5	S5	39636	NatureServe 2001-2007
<i>Carex jamesii</i>	James' sedge	G5	S5	39404	NatureServe 2001-2007
<i>Carex laxiculmis</i>	spreading sedge	G5	S3S4	39411	NatureServe 2001-2007*
<i>Carex laxiculmis</i> var. <i>laxiculmis</i>	spreading sedge	G5 T4T5	SNR	527109	NatureServe 2001-2007*
<i>Carex laxiflora</i>	broad looseflower sedge	G5	S5	39662	NatureServe 2001-2007
<i>Carex leavenworthii</i>	Leavenworth's sedge	G5	S4S5	39663	McKinney 1993
<i>Carex pensylvanica</i>	Pennsylvania sedge	G5	S5	39749	Natureserve 2001-2007**
<i>Carex plantaginea</i>	plantainleaf sedge	G5	S5	39759	NatureServe 2001-2007*
<i>Carex retroflexa</i>	reflexed sedge	G5	S5	39782	McKinney 1993
<i>Carex rosea</i>	rosy sedge	G5	S5	39429	NatureServe 2001-2007*
<i>Carex tonsa</i> var. <i>rugosperma</i>	parachute sedge	G5T5	S2?	566213	McKinney 1993
<i>Carex vulpinoidea</i>	fox sedge	G5	S5	39442	McKinney 1993
<i>Carpinus caroliniana</i>	American hornbeam	G5	S5	19504	NatureServe 2001-2007
<i>Carya alba</i>	mockernut hickory	G5	S4	501306	NatureServe 2001-2007*
<i>Carya cordiformis</i>	bitternut hickory	G5	S5	19227	NatureServe 2001-2007
<i>Carya glabra</i>	pignut hickory	G5	S5	19231	NatureServe 2001-2007
<i>Carya ovata</i>	shagbark hickory	G5	S5	19243	NatureServe 2001-2007
<i>Carya pallida</i>	sand hickory	G5	S4	19244	NatureServe 2001-2007*
<i>Castanea</i> (hybrid)	chestnut			19451	NatureServe 2001-2007**
<i>Catalpa speciosa</i>	northern catalpa	G4?	S3S4	34315	NatureServe 2001-2007*
<i>Caulophyllum thalictroides</i>	blue cohosh	G4G5	S4S5	18840	NatureServe 2001-2007*
<i>Celastrus orbiculatus</i>	Asian bittersweet	GNR	SNA	506068	NatureServe 2001-2007
<i>Celastrus scandens</i>	American bittersweet	G5	S5	27974	McKinney 1993
<i>Celtis laevigata</i>	sugarberry	G5	S5	19042	NatureServe 2001-2007*
<i>Celtis occidentalis</i>	common hackberry	G5	S5	19040	NatureServe 2001-2007
<i>Centaurea biebersteinii</i>	spotted knapweed	GNR	SNR	501347	NatureServe 2001-2007*
<i>Cephalanthus occidentalis</i>	common buttonbush	G5	S5	34786	Natureserve 2001-2007**
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	big chickweed	GNR TNR	SNR	523831	NatureServe 2001-2007*
<i>Cerastium nutans</i> var. <i>nutans</i>	nodding chickweed	G5T5?	SNR	527239	NatureServe 2001-2007*
<i>Cercis canadensis</i> var. <i>canadensis</i>	eastern redbud	G5T5	SNR	527241	NatureServe 2001-2007

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List of all plants documented at ABLI (both units)

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<i>Chaerophyllum procumbens</i>	spreading chervil	G5	S5	29616	McKinney 1993
<i>Chamaecrista fasciculata</i> var. <i>fasciculata</i>	sleepingplant	G5 T4T5	SNR	566216	NatureServe 2001-2007*
<i>Chamaesyce nutans</i>	eyebane	G5	S5	501442	NatureServe 2001-2007*
<i>Chasmanthium latifolium</i>	Indian woodoats	G5	S5	41547	NatureServe 2001-2007*
<i>Chasmanthium laxum</i>	slender woodoats	G5	S5	41548	NatureServe 2001-2007**
<i>Chimaphila maculata</i>	striped prince's pine	G5	S5	23767	NatureServe 2001-2007
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	broadleaf enchanter's nightshade	G5T5	SNR	27569	NatureServe 2001-2007**
<i>Cirsium altissimum</i>	tall thistle	G5	S5	36337	NatureServe 2001-2007*
<i>Cirsium discolor</i>	field thistle	G5	SNA	36362	NatureServe 2001-2007*
<i>Cirsium vulgare</i>	bull thistle	GNR	SNA	36428	NatureServe 2001-2007**
<i>Claytonia virginica</i>	Hammond's claytonia	G5	S5	20382	NatureServe 2001-2007*
<i>Clematis glaucophylla</i>	whiteleaf leather flower	G4?	S3?	18698	NatureServe 2001-2007*
<i>Clematis virginiana</i>	devil's darning needles	G5	S5	18716	NatureServe 2001-2007*
<i>Collinsia verna</i>	spring blue eyed Mary	G5	S4	33524	NatureServe 2001-2007*
<i>Collinsonia canadensis</i>	richweed	G5	S5	32474	NatureServe 2001-2007**
<i>Commelina communis</i>	Asiatic dayflower	G5	SNA	39127	McKinney 1993
<i>Conoclinium coelestinum</i>	blue mistflower	G5	S5	511282	NatureServe 2001-2007*
<i>Conopholis americana</i>	American squawroot	G5	S5	34274	NatureServe 2001-2007*
<i>Conyza canadensis</i>	Canadian horseweed	G5	S5	37113	NatureServe 2001-2007
<i>Cornus drummondii</i>	roughleaf dogwood	G5	S5	27807	NatureServe 2001-2007*
<i>Cornus florida</i>	flowering dogwood	G5	S5	27806	NatureServe 2001-2007
<i>Cornus racemosa</i>	gray dogwood	G5?	S2?	501635	NatureServe 2001-2007*
<i>Corydalis flavula</i>	yellow fumewort	G5	S5	19005	NatureServe 2001-2007*
<i>Corylus americana</i>	American hazelnut	G5	S5	19506	NatureServe 2001-2007
<i>Crataegus</i>	hawthorn			24539	NatureServe 2001-2007**
<i>Croton capitatus</i> var. <i>capitatus</i>	hogwort	G5T5?	SNR	527534	NatureServe 2001-2007*
<i>Croton monanthogynus</i>	prairie tea	G5	S5	28283	NatureServe 2001-2007*
<i>Cryptotaenia canadensis</i>	Canadian honewort	G5	S5	29475	NatureServe 2001-2007
<i>Cynanchum laeve</i>	honeyvine	G5	S5	501893	NatureServe 2001-2007*
<i>Cynodon dactylon</i>	Bermudagrass	GNR	SNA	41619	NatureServe 2001-2007
<i>Cynoglossum virginianum</i> var. <i>virginianum</i>	wild comfrey	G5T5	S5	527625	NatureServe 2001-2007
<i>Cystopteris bulbifera</i>	bulblet bladderfern	G5	S5	17481	NatureServe 2001-2007
<i>Cystopteris protrusa</i>	lowland bladderfern	G5	S5	17485	NatureServe 2001-2007*
<i>Dactylis glomerata</i> ssp. <i>glomerata</i>	orchardgrass	GNR TNR	SNA	193447	NatureServe 2001-2007
<i>Danthonia spicata</i>	poverty oatgrass	G5	S5	41642	NatureServe 2001-2007*
<i>Daucus carota</i>	Queen Anne's lace	GNR	SNA	29477	NatureServe 2001-2007
<i>Delphinium tricornes</i>	dwarf larkspur	G5	S5	18515	NatureServe 2001-2007*
<i>Deparia acrostichoides</i>	silver false spleenwort	G5	S5	501994	NatureServe 2001-2007*
<i>Desmodium canescens</i>	hoary ticktrefoil	G5	SNR	25792	NatureServe 2001-2007*

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<i>Desmodium cuspidatum</i> var. <i>cuspidatum</i>	largebract ticktrefoil	G5T5?	SNR	527673	NatureServe 2001-2007*
<i>Desmodium glabellum</i>	Dillenius' ticktrefoil	G5	SNR	25799	NatureServe 2001-2007
<i>Desmodium marilandicum</i>	smooth small-leaf ticktrefoil	G5	S5	25809	NatureServe 2001-2007*
<i>Desmodium nudiflorum</i>	nakedflower ticktrefoil	G5	S5	25812	NatureServe 2001-2007
<i>Desmodium paniculatum</i> var. <i>paniculatum</i>	panicledleaf ticktrefoil	G5T5	SNR	527679	NatureServe 2001-2007*
<i>Desmodium rotundifolium</i>	prostrate ticktrefoil	G5	S5	502020	NatureServe 2001-2007*
<i>Dianthus armeria</i>	Deptford pink	GNR	SNA	20276	NatureServe 2001-2007*
<i>Diarrhena americana</i>	American beakgrain	G4?	S5	41644	NatureServe 2001-2007*
<i>Dicentra canadensis</i>	squirrel corn	G5	S5	18943	NatureServe 2001-2007*
<i>Dicentra cucullaria</i>	dutchman's breeches	G5	S5	18945	NatureServe 2001-2007*
<i>Dichanthelium acuminatum</i> var. <i>acuminatum</i>	tapered rosette grass	G5T5	SNR	527684	NatureServe 2001-2007*
<i>Dichanthelium boscii</i>	Bosc's panicgrass	G5	SNR	41655	NatureServe 2001-2007*
<i>Dichanthelium clandestinum</i>	deertongue	G5?	SNR	41656	NatureServe 2001-2007*
<i>Dichanthelium commutatum</i>	variable panicgrass	G5	SNR	41647	NatureServe 2001-2007*
<i>Dichanthelium depauperatum</i>	starved panicgrass	G5	SNR	41658	NatureServe 2001-2007*
<i>Dichanthelium dichotomum</i>	cypress panicgrass	G5	SNR	41659	NatureServe 2001-2007**
<i>Dichanthelium dichotomum</i> var. <i>dichotomum</i>	cypress panicgrass	G5T5	SNR	527691	NatureServe 2001-2007*
<i>Dichanthelium laxiflorum</i>	openflower rosette grass	G5	SNR	41661	NatureServe 2001-2007*
<i>Dichanthelium ovale</i> var. <i>ovale</i>	eggleaf rosette grass	G5T5	SNR	527698	NatureServe 2001-2007*
<i>Dichanthelium scabriusculum</i>	woolly rosette grass	G4		41670	NatureServe 2001-2007*
<i>Dichanthelium sphaerocarpon</i> var. <i>isophyllum</i>	roundseed panicgrass	G5T5	SNR	527701	NatureServe 2001-2007*
<i>Digitaria ischaemum</i>	smooth crabgrass	GNR	SNR	40637	McKinney 1993
<i>Digitaria sanguinalis</i>	hairy crabgrass	G5	SNA	40604	NatureServe 2001-2007
<i>Diodia virginiana</i>	Virginia buttonweed	G5	S5	34790	NatureServe 2001-2007*
<i>Dioscorea quaternata</i>	fourleaf yam	G5	S5	43371	NatureServe 2001-2007*
<i>Dioscorea villosa</i>	wild yam	G4G5	S5	43367	Natureserve 2001-2007**
<i>Diospyros virginiana</i>	common persimmon	G5	S5	23855	NatureServe 2001-2007*
<i>Diplazium pycnocarpon</i>	glade fern	G5	S4?	502095	NatureServe 2001-2007*
<i>Dipsacus fullonum</i>	Fuller's teasel	GNR	SNA	35404	NatureServe 2001-2007*
<i>Draba verna</i>	spring draba	GNR	SNA	22923	NatureServe 2001-2007
<i>Dryopteris carthusiana</i>	spinulose woodfern	G5	S3	502157	McKinney 1993
<i>Duchesnea indica</i>	Indian strawberry	G5	SNA	25163	NatureServe 2001-2007

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<i>Echinacea pallida</i>	pale purple coneflower	G4	SNA	37279	NatureServe 2001-2007*
<i>Elaeagnus umbellata</i> var. <i>parvifolia</i>	autumn olive	GNR TNR	SNA	527844	Rogers 2000
<i>Elephantopus carolinianus</i>	Carolina elephantsfoot	G5	S5	37297	NatureServe 2001-2007
<i>Elephantopus tomentosus</i>	devil's grandmother	G5	S3	37300	NatureServe 2001-2007**^^
<i>Elymus hystrix</i>	eastern bottlebrush grass	G5	S5	40698	NatureServe 2001-2007
<i>Elymus villosus</i>	hairy wildrye	G5	S5	40714	NatureServe 2001-2007*
<i>Elymus virginicus</i> var. <i>virginicus</i>	Virginia wildrye	G5T5	SNR	527870	NatureServe 2001-2007
<i>Enemion biternatum</i>	eastern false rue anemone	G5	S5	18769	NatureServe 2001-2007*
<i>Epifagus virginiana</i>	beechdrops	G5	S5	34276	Natureserve 2001-2007**
<i>Equisetum arvense</i>	field horsetail	G5	S5	17152	NatureServe 2001-2007*
<i>Eragrostis spectabilis</i>	purple lovegrass	G5	S5?	40717	Natureserve 2001-2007** ^
<i>Erechtites hieraciifolia</i> var. <i>hieraciifolia</i>	American burnweed	G5T5	SNR	196276	Natureserve 2001-2007*
<i>Erigeron annuus</i>	eastern daisy fleabane	G5	S5	35804	NatureServe 2001-2007
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	G5	S5	35809	NatureServe 2001-2007
<i>Erigeron pulchellus</i>	robin's plantain	G5	S5	35808	NatureServe 2001-2007*
<i>Erigeron strigosus</i>	prairie fleabane	G5	S5	35951	NatureServe 2001-2007*
<i>Erythronium umbilicatum</i> ssp. <i>umbilicatum</i>	dimpled troutlily	G5T5	SNR	524060	NatureServe 2001-2007*
<i>Euonymus alata</i>	winged burning bush	GNR	SNA	502576	NatureServe 2001-2007*
<i>Euonymus americana</i>	strawberry bush	G5	S5	502577	NatureServe 2001-2007
<i>Euonymus atropurpurea</i>	eastern wahoo	G5	S5	502579	NatureServe 2001-2007*
<i>Euonymus fortunei</i> var. <i>radicans</i>	winter creeper	GNR TNR	SNA	528151	NatureServe 2001-2007*
<i>Euonymus obovata</i>	running strawberry bush	G5	S5	502583	Natureserve 2001-2007*
<i>Eupatorium fistulosum</i>	trumpetweed	G5?	S5	502509	Natureserve 2001-2007** ^
<i>Eupatorium hyssopifolium</i>	hyssopleaf thoroughwort	G5	S5	35979	NatureServe 2001-2007*
<i>Eupatorium serotinum</i>	lateflowering thoroughwort	G5	S5	35981	NatureServe 2001-2007*
<i>Eupatorium sessilifolium</i>	upland boneset	G5	S5	36004	NatureServe 2001-2007*
<i>Eupatorium sessilifolium</i> var. <i>sessilifolium</i>	upland boneset	G5T5	SNR	528124	NatureServe 2001-2007*
<i>Euphorbia corollata</i>	flowering spurge	G5	S5	28057	NatureServe 2001-2007*
<i>Euphorbia pubentissima</i>	false flowering spurge	G5	SNA	28125	NatureServe 2001-2007*
<i>Eurybia divaricata</i>	white wood aster	G5	S5	513440	Natureserve 2001-2007**
<i>Eurybia macrophylla</i>	bigleaf aster	G5	S5	513449	NatureServe 2001-2007*
<i>Fagus grandifolia</i>	American beech	G5	S5	19462	NatureServe 2001-2007
<i>Festuca rubra</i>	red fescue	G5	SNR	40796	NatureServe 2001-2007
<i>Festuca subverticillata</i>	nodding fescue	G5	SNA	502612	NatureServe 2001-2007*
<i>Festuca trachyphylla</i>	hard fescue	GNR	SNA	502613	McKinney 1993
<i>Fragaria virginiana</i>	Virginia strawberry	G5	S5	24639	NatureServe 2001-2007
<i>Frangula caroliniana</i>	Carolina buckthorn	G5	SNA	506986	NatureServe 2001-2007

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<i>Frasera carolinensis</i>	American columbo	G5	S5	502651	NatureServe 2001-2007*
<i>Fraxinus americana</i>	white ash	G5	S5	32931	NatureServe 2001-2007
<i>Fraxinus pennsylvanica</i>	green ash	G5	S5	32929	Natureserve 2001-2007**
<i>Fraxinus quadrangulata</i>	blue ash	G5	S5	32947	NatureServe 2001-2007*
<i>Galinsoya quadriradiata</i>	shaggy-soldier	GNR	SNA	37415	NatureServe 2001-2007*
<i>Galium aparine</i>	stickywilly	G5	S5	34797	NatureServe 2001-2007
<i>Galium circaezans</i>	licorice bedstraw	G5	SNA	34800	NatureServe 2001-2007
<i>Galium circaezans</i> var. <i>hypomalacum</i>	licorice bedstraw	G5T5	SNR	528210	NatureServe 2001-2007*
<i>Galium concinnum</i>	shining bedstraw	G5	S5	34848	NatureServe 2001-2007*
<i>Galium pilosum</i>	hairy bedstraw	G5	S5	34907	NatureServe 2001-2007
<i>Galium pilosum</i> var. <i>pilosum</i>	hairy bedstraw	G5T5?	S5	528213	NatureServe 2001-2007**
<i>Galium triflorum</i>	fragrant bedstraw	G5	S5	34933	NatureServe 2001-2007*
<i>Gamochaeta purpurea</i>	spoonleaf purple everlasting	G5	SNA	37421	NatureServe 2001-2007*
<i>Gentiana villosa</i>	striped gentian	G4	S4?	29990	NatureServe 2001-2007*
<i>Gentianella quinquefolia</i>	agueweed	G5	S3S4	30069	Natureserve 2001-2007** ^
<i>Geranium dissectum</i>	cutleaf geranium	GNR	SNA	29135	McKinney 1993
<i>Geranium maculatum</i>	spotted geranium	G5	S5	29107	NatureServe 2001-2007** ^
<i>Geum canadense</i> var. <i>canadense</i>	white avens	G5T5	SNR	195814	NatureServe 2001-2007*
<i>Geum vernum</i>	spring avens	G5	S5	24664	McKinney 1993
<i>Geum virginianum</i>	cream avens	G5	S5	24665	NatureServe 2001-2007*
<i>Glechoma hederacea</i>	ground ivy	GNR	SNA	502801	NatureServe 2001-2007
<i>Gleditsia triacanthos</i>	honeylocust	G5	S5	26714	NatureServe 2001-2007*
<i>Glyceria striata</i>	fowl mannagrass	G5	S5	40833	NatureServe 2001-2007*
<i>Goodyera pubescens</i>	downy rattlesnake plantain	G5	S5	43594	Natureserve 2001-2007**
<i>Gymnocladus dioicus</i>	Kentucky coffeetree	G5	S5	502851	McKinney 1993
<i>Hackelia virginiana</i>	beggarslice	G5	S5	31921	NatureServe 2001-2007*
<i>Hamamelis virginiana</i>	American witchhazel	G5	S5	19033	McKinney 1993
<i>Hedera helix</i>	English ivy	GNR	SNA	29393	NatureServe 2001-2007
<i>Hedyotis nigricans</i>	diamondflowers	G5	S5	502909	NatureServe 2001-2007*
<i>Helenium flexuosum</i>	purplehead sneezeweed	G5	S5	36016	NatureServe 2001-2007*
<i>Helianthus decapetalus</i>	thinleaf sunflower	G5	S5	502923	NatureServe 2001-2007*
<i>Helianthus divaricatus</i>	woodland sunflower	G5	S5	36636	Natureserve 2001-2007** ^
<i>Helianthus microcephalus</i>	small woodland sunflower	G5	S5	36654	NatureServe 2001-2007*
<i>Heliopsis helianthoides</i>	smooth oxeye	G5	S5	37605	NatureServe 2001-2007*
<i>Hemerocallis fulva</i>	orange daylily	GNA	SNA	42943	NatureServe 2001-2007**
<i>Hepatica nobilis</i> var. <i>acuta</i>	sharplobe hepatica	G5T5	S5	528378	NatureServe 2001-2007*
<i>Heuchera americana</i> var. <i>americana</i>	American alumroot	G5T5	SNR	528400	NatureServe 2001-2007*
<i>Hexalectris spicata</i>	spiked crested coralroot	G5	S4	43608	NatureServe 2001-2007*
<i>Hieracium gronovii</i>	queendevil	G5	S5	37710	NatureServe 2001-2007*

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<i>Hieracium venosum</i>	rattlesnakeweed	G5	S4	37734	NatureServe 2001-2007*
<i>Houstonia caerulea</i>	azure bluet	G5	S5	35038	McKinney 1993
<i>Houstonia canadensis</i>	Canadian summer bluet	G4G5	S5	35039	NatureServe 2001-2007*
<i>Houstonia purpurea</i>	Venus' pride	G5	S5	35051	NatureServe 2001-2007
<i>Houstonia purpurea</i> var. <i>purpurea</i>	Venus' pride	G5T5	SNR	196210	NatureServe 2001-2007*
<i>Hybanthus concolor</i>	eastern greenviolet	G5	S5	22026	NatureServe 2001-2007*
<i>Hydrangea arborescens</i>	wild hydrangea	G5	S5	24195	NatureServe 2001-2007
<i>Hydrophyllum canadense</i>	bluntleaf waterleaf	G5	S5	31390	NatureServe 2001-2007*
<i>Hydrophyllum macrophyllum</i>	largeleaf waterleaf	G5	S5	31393	NatureServe 2001-2007
<i>Hypericum dolabriforme</i>	straggling St. Johnswort	G4	S4	21435	NatureServe 2001-2007*
<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>	St. Andrew's cross	G5T4	SNR	524170	NatureServe 2001-2007*
<i>Hypericum mutilum</i>	dwarf St. Johnswort	G5	SNR	21421	McKinney 1993
<i>Hypericum punctatum</i>	spotted St. Johnswort	G5	S5	21422	NatureServe 2001-2007
<i>Hypoxis hirsuta</i>	common goldstar	G5	S5	503146	NatureServe 2001-2007*
<i>Ilex opaca</i> var. <i>opaca</i>	American holly	G5T5	S5	27983	NatureServe 2001-2007**
<i>Impatiens capensis</i>	jewelweed	G5	S5	29182	NatureServe 2001-2007
<i>Impatiens pallida</i>	pale touch-me-not	G5	S5	29189	NatureServe 2001-2007**
<i>Ipomoea pandurata</i>	man of the earth	G5	S5	30786	NatureServe 2001-2007*
<i>Ipomoea purpurea</i>	tall morning-glory	GNR	SNA	30789	NatureServe 2001-2007** ^
<i>Iris cristata</i>	dwarf crested iris	G5	S4	43204	NatureServe 2001-2007*
<i>Isanthus brachiatus</i>	fluxweed	G5	SNR	515269	NatureServe 2001-2007*
<i>Jeffersonia diphylla</i>	twinleaf	G5	S5	18844	NatureServe 2001-2007*
<i>Juglans nigra</i>	black walnut	G5	S5	19254	NatureServe 2001-2007
<i>Juncus effusus</i>	common rush	G5	S5	39232	McKinney 1993
<i>Juncus tenuis</i>	poverty rush	G5	S5	39243	McKinney 1993
<i>Juniperus virginiana</i> var. <i>virginiana</i>	eastern redcedar	G5T5	SNR	194806	NatureServe 2001-2007
<i>Krigia biflora</i>	twoflower dwarfdandelion	G5	S5	37810	NatureServe 2001-2007*
<i>Kummerowia striata</i>	Japanese clover	GNR	SNA	503294	NatureServe 2001-2007*
<i>Lactuca canadensis</i>	Canada lettuce	G5	S4S5	36596	NatureServe 2001-2007
<i>Lamium amplexicaule</i>	henbit deadnettle	GNR	SNA	32539	NatureServe 2001-2007** ^
<i>Laportea canadensis</i>	Canadian woodnettle	G5	S5	19127	NatureServe 2001-2007
<i>Leersia virginica</i>	whitegrass	G5	S5	40890	NatureServe 2001-2007*
<i>Lepidium virginicum</i> var. <i>virginicum</i>	Virginia pepperweed	G5T5	SNR	528742	NatureServe 2001-2007*
<i>Lespedeza cuneata</i>	Chinese lespedeza	GNR	SNA	25898	McKinney 1993
<i>Lespedeza hirta</i> ssp. <i>hirta</i>	hairy lespedeza	G5T5?	SNR	25901	NatureServe 2001-2007*
<i>Lespedeza procumbens</i>	trailing lespedeza	G5	S4S5	25907	NatureServe 2001-2007
<i>Lespedeza violacea</i>	violet lespedeza	G5	S4S5	25914	NatureServe 2001-2007*
<i>Leucanthemum vulgare</i>	oxeye daisy	GNR	SNA	37903	NatureServe 2001-2007
<i>Liatris squarrosa</i>	scaly blazing star	G5	S4?	37945	NatureServe 2001-2007*

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Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Liatris squarrosa</i> var. <i>hirsuta</i>	scaly blazing star	G5T4?	SNR	528794	NatureServe 2001-2007*
<i>Liatris squarrosa</i> var. <i>squarrosa</i>	scaly blazing star	G5T5	SNR	528795	NatureServe 2001-2007*
<i>Ligustrum sinense</i>	Chinese privet	GNR	SNA	32979	NatureServe 2001-2007*
<i>Lindera benzoin</i>	northern spicebush	G5	S5	18147	NatureServe 2001-2007
<i>Linum medium</i> var. <i>texanum</i>	stiff yellow flax	G5T5	SNR	528821	NatureServe 2001-2007*
<i>Liparis liliifolia</i>	brown widelip orchid	G5	S4	43622	NatureServe 2001-2007*
<i>Liquidambar styraciflua</i>	sweetgum	G5	S5	19027	NatureServe 2001-2007
<i>Liriodendron tulipifera</i>	tuliptree	G5	S5	18086	NatureServe 2001-2007
<i>Lithospermum canescens</i>	hoary puccoon	G5	S4	31945	NatureServe 2001-2007*
<i>Lithospermum tuberosum</i>	tuberous stoneseed	G4	S3S4	31954	NatureServe 2001-2007*
<i>Lobelia inflata</i>	Indian-tobacco	G5	S5	34524	NatureServe 2001-2007
<i>Lobelia puberula</i>	downy lobelia	G5	S4	34529	NatureServe 2001-2007*
<i>Lobelia siphilitica</i> var. <i>siphilitica</i>	great blue lobelia	G5T5	SNR	528854	NatureServe 2001-2007*
<i>Lobelia spicata</i>	palespike lobelia	G5	S4S5	34532	NatureServe 2001-2007*
<i>Lobelia spicata</i> var. <i>spicata</i>	palespike lobelia	G5 T4T5	SNR	528862	NatureServe 2001-2007*
<i>Lolium arundinaceum</i>	tall fescue	GNR	SNA	507979	NatureServe 2001-2007*
<i>Lolium pratense</i>	meadow ryegrass	G5	SNA	507983	McKinney 1993
<i>Lonicera japonica</i>	Japanese honeysuckle	GNR	SNA	35283	NatureServe 2001-2007
<i>Lonicera maackii</i>	Amur honeysuckle	GNR	SNA	35298	NatureServe 2001-2007*
<i>Luzula echinata</i>	hedgehog woodrush	G5	S4?	39342	NatureServe 2001-2007*
<i>Luzula multiflora</i>	common woodrush	G5	S4?	39333	NatureServe 2001-2007
<i>Lycopodium digitatum</i>	fan clubmoss	G5	S5	17028	NatureServe 2001-2007*
<i>Lysimachia quadrifolia</i>	whorled yellow loosestrife	G5	S5	23997	NatureServe 2001-2007*
<i>Maianthemum racemosum</i> ssp. <i>racemosum</i>	feathery false lily of the valley	G5T5	SNR	524297	NatureServe 2001-2007**
<i>Malus pumila</i>	paradise apple	G5	SNA	25262	NatureServe 2001-2007*
<i>Manfreda virginica</i>	false aloe	G5	S4	503687	NatureServe 2001-2007*
<i>Matelea gonocarpos</i>	angularfruit milkvine	G5	S5?	503702	NatureServe 2001-2007*
<i>Matelea obliqua</i>	climbing milkvine	G4?	S4?	30375	NatureServe 2001-2007*
<i>Medeola virginiana</i>	Indian cucumber	G5	SNR	42963	NatureServe 2001-2007** ^
<i>Medicago sativa</i> ssp. <i>sativa</i>	alfalfa	GNR TNR	SNA	524303	NatureServe 2001-2007**
<i>Melica mutica</i>	twoflower melicgrass	G5	S4?	41858	NatureServe 2001-2007*
<i>Melica nitens</i>	threeflower melicgrass	G5	S3S4	41859	NatureServe 2001-2007*
<i>Melilotus albus</i>	white sweetclover	G5	SNA	516979	NatureServe 2001-2007
<i>Melilotus officinalis</i>	yellow sweetclover	GNR	SNA	26150	NatureServe 2001-2007*
<i>Menispermum canadense</i>	common moonseed	G5	S5	18871	NatureServe 2001-2007
<i>Microstegium vimineum</i>	Nepalese browntop	GNR	SNA	503829	NatureServe 2001-2007
<i>Mitella diphylla</i>	twoleaf miterwort	G5	S5	24407	NatureServe 2001-2007*
<i>Monarda clinopodia</i>	white bergamot	G5	S5	32288	NatureServe 2001-2007*
<i>Monarda didyma</i>	scarlet beebalm	G5	S4S5	32283	NatureServe 2001-2007*

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<i>Monarda fistulosa</i>	wild bergamot	G5	S5	565311	NatureServe 2001-2007*
<i>Monarda fistulosa</i> var. <i>mollis</i>	wild bergamot	G5T5?	SNR	566739	NatureServe 2001-2007*
<i>Morus alba</i>	white mulberry	GNR	SNA	19066	NatureServe 2001-2007*
<i>Morus rubra</i> var. <i>rubra</i>	red mulberry	G5T5	SNR	529232	NatureServe 2001-2007*
<i>Muhlenbergia cuspidata</i>	plains muhly	G4	S2	41904	McKinney 1993
<i>Muhlenbergia schreberi</i>	nimblewill	G5	S5	41939	NatureServe 2001-2007*
<i>Muhlenbergia sobolifera</i>	rock muhly	G5	S5	41941	NatureServe 2001-2007
<i>Nyssa sylvatica</i>	blackgum	G5	S5	27821	NatureServe 2001-2007*
<i>Obolaria virginica</i>	Virginia pennywort	G5	S5	30104	NatureServe 2001-2007*
<i>Ophioglossum vulgatum</i>	southern adderstongue	G5	SNR	565333	NatureServe 2001-2007*
<i>Opuntia humifusa</i>	prickly pear cactus	G5	SNR	19710	NatureServe 2001-2007*
<i>Orbexilum pedunculatum</i> var. <i>pedunculatum</i>	Sampson's snakeroot	G5T5?	S4S5	529302	NatureServe 2001-2007*
<i>Ornithogalum umbellatum</i>	sleepydick	G2?	SNA	42754	McKinney 1993
<i>Osmorhiza claytonii</i>	Clayton's sweetroot	G5	S5	29789	NatureServe 2001-2007*
<i>Osmorhiza longistylis</i>	longstyle sweetroot	G5	S5	29791	NatureServe 2001-2007*
<i>Osmunda cinnamomea</i> var. <i>cinnamomea</i>	cinnamon fern	G5T5	SNR	529311	NatureServe 2001-2007*
<i>Ostrya virginiana</i>	Chisos hophornbeam	G5	S5	19511	NatureServe 2001-2007*
<i>Oxalis stricta</i>	common yellow oxalis	G5	S5	29095	NatureServe 2001-2007*
<i>Oxalis violacea</i>	violet woodsorrel	G5	S5	29098	NatureServe 2001-2007*
<i>Packera anonyma</i>	Small's ragwort	G5	S4S5	518137	NatureServe 2001-2007*
<i>Packera aurea</i>	golden ragwort	G5	S4S5	518139	NatureServe 2001-2007*
<i>Packera glabella</i>	butterweed	G5	S5	565358	McKinney 1993
<i>Packera obovata</i>	roundleaf ragwort	G5	S5	565368	NatureServe 2001-2007*
<i>Panax quinquefolius</i>	American ginseng	G3G4	S5	29399	NatureServe 2001-2007*
<i>Panicum anceps</i>	beaked panicgrass	G5	S4	40904	NatureServe 2001-2007
<i>Panicum flexile</i>	wiry panicgrass	G5	S5	40918	NatureServe 2001-2007*
<i>Paronychia canadensis</i>	smooth forked nailwort	G5	S4?	20325	NatureServe 2001-2007*
<i>Parthenocissus quinquefolia</i>	Virginia creeper	G5	S5	28602	NatureServe 2001-2007
<i>Paspalum setaceum</i>	thin paspalum	G5	SNR	41042	NatureServe 2001-2007*
<i>Passiflora lutea</i>	yellow passionflower	G5	S5	22226	NatureServe 2001-2007*
<i>Pedicularis canadensis</i> ssp. <i>canadensis</i>	Canadian lousewort	G5T5	SNR	524407	NatureServe 2001-2007*
<i>Pellaea atropurpurea</i>	purple cliffbrake	G5	S4S5	17641	NatureServe 2001-2007*
<i>Penstemon laevigatus</i>	eastern smooth beardtongue	G5	S4?	33929	NatureServe 2001-2007*
<i>Penstemon pallidus</i>	pale beardtongue	G5	S5	33967	NatureServe 2001-2007
<i>Perilla frutescens</i>	beefsteakplant	GNR	SNA	32634	NatureServe 2001-2007
<i>Phalaris arundinacea</i>	reed canarygrass	G5	S5?	41335	McKinney 1993
<i>Phegopteris hexagonoptera</i>	broad beechfern	G5	S5	504296	NatureServe 2001-2007*
<i>Phleum pratense</i>	timothy	GNR	SNA	41062	NatureServe 2001-2007*
<i>Phlox divaricata</i>	wild blue phlox	G5	S5	30934	NatureServe 2001-2007*
<i>Phryma leptostachya</i>	American lopseed	G5	S5	504348	NatureServe 2001-2007

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<i>Physalis virginiana</i> var. <i>virginiana</i>	Virginia groundcherry	G5T5	SNR	529641	NatureServe 2001-2007*
<i>Physostegia virginiana</i>	obedient plant	G5	S5	32391	NatureServe 2001-2007*
<i>Phytolacca americana</i> var. <i>americana</i>	American pokeweed	G5T5	SNR	531101	NatureServe 2001-2007
<i>Pilea pumila</i>	Canadian clearweed	G5	S5	19130	NatureServe 2001-2007
<i>Pinus strobus</i>	eastern white pine	G5	S3	183385	NatureServe 2001-2007
<i>Pinus virginiana</i>	Virginia pine	G5	S5	183394	NatureServe 2001-2007*
<i>Plantago aristata</i>	largebracted plantain	G5	S5	32875	NatureServe 2001-2007*
<i>Plantago lanceolata</i>	narrowleaf plantain	G5	SNA	32874	NatureServe 2001-2007
<i>Plantago rugelii</i>	blackseed plantain	G5	S5	504439	NatureServe 2001-2007
<i>Platanus occidentalis</i>	American sycamore	G5	S5	19020	NatureServe 2001-2007
<i>Poa annua</i>	annual bluegrass	GNR	SNA	41107	NatureServe 2001-2007
<i>Poa chapmaniana</i>	Chapman's bluegrass	G5	S5	41118	NatureServe 2001-2007*
<i>Poa compressa</i>	Canada bluegrass	GNR	SNA	41082	NatureServe 2001-2007*
<i>Poa pratensis</i>	Kentucky bluegrass	G5	SNA	41088	NatureServe 2001-2007
<i>Poa sylvestris</i>	woodland bluegrass	G5	S5	41162	McKinney 1993
<i>Podophyllum peltatum</i>	mayapple	G5	S5	18850	NatureServe 2001-2007
<i>Polemonium reptans</i>	Greek valerian	G5	S5	31003	NatureServe 2001-2007*
<i>Polygala verticillata</i>	whorled milkwort	G5	S5	29320	NatureServe 2001-2007*
<i>Polygonatum biflorum</i> var. <i>commutatum</i>	smooth Solomon's seal	G5T5	SNR	529769	NatureServe 2001-2007
<i>Polygonum caespitosum</i> var. <i>longisetum</i>	oriental ladythumb	GNR	SNA	566299	NatureServe 2001-2007**
<i>Polygonum convolvulus</i>	black bindweed	GNR	SNA	20853	NatureServe 2001-2007*
<i>Polygonum punctatum</i>	dotted smartweed	G5	S5	20862	McKinney 1993
<i>Polygonum setaceum</i>	bog smartweed	G5	SNR	20926	NatureServe 2001-2007*
<i>Polygonum virginianum</i>	jumpseed	G5	S5	20931	NatureServe 2001-2007
<i>Polymnia canadensis</i>	whiteflower leafcup	G5	S5	36438	NatureServe 2001-2007*
<i>Polystichum acrostichoides</i> var. <i>acrostichoides</i>	Christmas fern	G5T5	SNR	529799	NatureServe 2001-2007
<i>Porteranthus stipulatus</i>	Indian physic	G5	S5	25284	NatureServe 2001-2007*
<i>Potentilla recta</i>	sulphur cinquefoil	GNR	SNA	24742	McKinney 1993
<i>Potentilla simplex</i>	common cinquefoil	G5	S5	24751	NatureServe 2001-2007
<i>Prenanthes trifoliolata</i>	gall of the earth	G5	SNA	504596	NatureServe 2001-2007*
<i>Prunella vulgaris</i>	common selfheal	G5	SNA	32381	NatureServe 2001-2007
<i>Prunus americana</i>	American plum	G5	S5	24763	NatureServe 2001-2007*
<i>Prunus avium</i>	sweet cherry	GNR	SNA	24770	NatureServe 2001-2007*
<i>Prunus serotina</i> var. <i>serotina</i>	black cherry	G5	S5	529886	NatureServe 2001-2007**
<i>Pseudognaphalium obtusifolium</i> ssp. <i>obtusifolium</i>	rabbittobacco	G5T5	SNR	525057	NatureServe 2001-2007*
<i>Pycnanthemum pycnanthemoides</i> var. <i>pycnanthemoides</i>	southern mountainmint	G5TNR	SNR	529933	NatureServe 2001-2007

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<i>Pycnanthemum tenuifolium</i>	narrowleaf mountainmint	G5	S5	32668	NatureServe 2001-2007*
<i>Quercus alba</i>	white oak	G5	S5	19290	NatureServe 2001-2007
<i>Quercus coccinea</i> var. <i>coccinea</i>	scarlet oak	G5T5	S5	195062	NatureServe 2001-2007**
<i>Quercus falcata</i>	southern red oak	G5	S5	19277	NatureServe 2001-2007
<i>Quercus imbricaria</i>	shingle oak	G5	S5	19359	NatureServe 2001-2007
<i>Quercus lyrata</i>	overcup oak	G5	S5	19278	NatureServe 2001-2007
<i>Quercus marilandica</i>	blackjack oak	G5	S5	19374	McKinney 1993
<i>Quercus muehlenbergii</i>	chinquapin oak	G5	S5	504714	NatureServe 2001-2007*
<i>Quercus palustris</i>	pin oak	G5	S5	19281	NatureServe 2001-2007
<i>Quercus prinus</i>	chestnut oak	G5	S5	19398	NatureServe 2001-2007*
<i>Quercus rubra</i> var. <i>rubra</i>	northern red oak	G5T5	S5	195130	NatureServe 2001-2007
<i>Quercus shumardii</i>	Shumard's oak	G5	S5	19417	NatureServe 2001-2007** ^
<i>Quercus stellata</i>	post oak	G5	S5	19422	NatureServe 2001-2007*
<i>Quercus velutina</i>	black oak	G5	S5	19447	NatureServe 2001-2007
<i>Ranunculus abortivus</i>	littleleaf buttercup	G5	S5	18559	McKinney 1993
<i>Ranunculus micranthus</i>	rock buttercup	G5	S4S5	18628	NatureServe 2001-2007*
<i>Ranunculus recurvatus</i>	blisterwort	G5	SNA	18641	NatureServe 2001-2007
<i>Ratibida pinnata</i>	pinnate prairie coneflower	G5	S4	38343	NatureServe 2001-2007*
<i>Rhexia mariana</i>	Maryland meadowbeauty	G5	S4?	27685	NatureServe 2001-2007*
<i>Rhododendron catawbiense</i>	Catawba rosebay	G5	S2S3	23714	McKinney 1993
<i>Rhus aromatica</i> var. <i>aromatica</i>	fragrant sumac	G5T5	SNR	530004	NatureServe 2001-2007*
<i>Rhus copallinum</i> var. <i>latifolia</i>	winged sumac	G5T5	SNR	530007	NatureServe 2001-2007
<i>Robinia pseudoacacia</i>	black locust	G5	S5	504804	McKinney 1993
<i>Rosa carolina</i> var. <i>carolina</i>	Carolina rose	G5T5	SNR	530107	NatureServe 2001-2007
<i>Rosa multiflora</i>	multiflora rose	GNR	SNA	24833	NatureServe 2001-2007
<i>Rosa setigera</i>	climbing rose	G5	S5	24839	NatureServe 2001-2007** ^
<i>Rotala ramosior</i>	lowland rotnala	G5	S4	27115	NatureServe 2001-2007*
<i>Rubus argutus</i>	sawtooth blackberry	G5	S5	24877	NatureServe 2001-2007
<i>Rubus flagellaris</i>	northern dewberry	G5	S5	24921	NatureServe 2001-2007
<i>Rubus occidentalis</i>	black raspberry	G5	S5	24854	NatureServe 2001-2007
<i>Rubus phoenicolasius</i>	wine raspberry	G5	SNR	25017	NatureServe 2001-2007**
<i>Rudbeckia hirta</i>	blackeyed Susan	G5	S5	36765	NatureServe 2001-2007*
<i>Rudbeckia laciniata</i> var. <i>laciniata</i>	cutleaf coneflower	G5T5	SNR	530178	NatureServe 2001-2007**
<i>Ruellia caroliniensis</i>	Carolina wild petunia	G5	S5	34373	NatureServe 2001-2007
<i>Ruellia humilis</i>	fringeleaf wild petunia	G5	S5	565466	NatureServe 2001-2007*
<i>Rumex acetosella</i>	common sheep sorrel	GNR	SNA	20934	NatureServe 2001-2007
<i>Rumex obtusifolius</i>	bitter dock	GNR	SNA	20939	McKinney 1993
<i>Salvia lyrata</i>	lyreleaf sage	G5	S5	32690	NatureServe 2001-2007
<i>Sambucus nigra</i> ssp. <i>canadensis</i>	common elderberry	G5T5	S5	525079	NatureServe 2001-2007

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<i>Sanguinaria canadensis</i>	bloodroot	G5	S5	18990	NatureServe 2001-2007*
<i>Sanicula canadensis</i>	Canadian blacksnakeroot	G5	S5	29850	NatureServe 2001-2007
<i>Sanicula odorata</i>	clustered blacksnakeroot	G5	S4?	505004	NatureServe 2001-2007*
<i>Sanicula smallii</i>	Small's blacksnakeroot	G5	S5	29860	NatureServe 2001-2007*
<i>Saponaria officinalis</i>	bouncingbet	GNR	SNA	20039	NatureServe 2001-2007
<i>Sassafras albidum</i>	sassafras	G5	S5	18158	NatureServe 2001-2007
<i>Saxifraga virginensis</i>	early saxifrage	G5	S5	24303	NatureServe 2001-2007*
<i>Schizachyrium scoparium</i>	little bluestem	G5	S5	42076	NatureServe 2001-2007*
<i>Scirpus polyphyllus</i>	leafy bulrush	G5	S4S5	40274	NatureServe 2001-2007*
<i>Scleria oligantha</i>	littlehead nutrush	G5	S4S5	40314	NatureServe 2001-2007*
<i>Scutellaria ovata</i> ssp. <i>ovata</i>	heartleaf skullcap	G5T5	SNR	32773	NatureServe 2001-2007*
<i>Sedum ternatum</i>	woodland stonecrop	G5	S5	24184	NatureServe 2001-2007*
<i>Senna marilandica</i>	Maryland senna	G5	S5	505160	NatureServe 2001-2007*
<i>Setaria faberi</i>	Japanese bristlegrass	GNR	SNA	41244	NatureServe 2001-2007*
<i>Setaria parviflora</i>	marsh bristlegrass	G5	SNR	505191	NatureServe 2001-2007*
<i>Setaria pumila</i>	yellow bristlegrass	GNR	SNA	505192	NatureServe 2001-2007
<i>Sida spinosa</i>	prickly fanpetals	G5?	SNA	21732	NatureServe 2001-2007*
<i>Silene stellata</i>	widowsfrill	G5	S4S5	20127	NatureServe 2001-2007*
<i>Silene virginica</i>	fire pink	G5	S5	20141	NatureServe 2001-2007*
<i>Sisyrinchium albidum</i>	white blue-eyed grass	G5?	S5	43241	NatureServe 2001-2007*
<i>Sisyrinchium montanum</i>	strict blue-eyed grass	G5		43269	McKinney 1993
<i>Smallanthus uvedalius</i>	hairy leafcup	G4G5	S5	505252	NatureServe 2001-2007*
<i>Smilax bona-nox</i>	saw greenbrier	G5	S5	43341	NatureServe 2001-2007
<i>Smilax glauca</i>	cat greenbrier	G5	S5	43342	NatureServe 2001-2007*
<i>Smilax herbacea</i>	smooth carrionflower	G5	S5	43356	NatureServe 2001-2007
<i>Smilax rotundifolia</i>	roundleaf greenbrier	G5	S5	43346	NatureServe 2001-2007*
<i>Smilax tamnoides</i>	bristly greenbrier	G5	S5	43348	NatureServe 2001-2007*
<i>Solanum carolinense</i> var. <i>carolinense</i>	Carolina horsenettle	G5T5	S5?	530413	NatureServe 2001-2007
<i>Solidago bicolor</i>	white goldenrod	G5	S5?	36234	NatureServe 2001-2007*
<i>Solidago caesia</i>	wreath goldenrod	G5	S5	36238	NatureServe 2001-2007*
<i>Solidago flexicaulis</i>	zigzag goldenrod	G5	S5	36257	NatureServe 2001-2007*
<i>Solidago gigantea</i>	giant goldenrod	G5	S5	36259	NatureServe 2001-2007*
<i>Solidago juncea</i>	early goldenrod	G5	S4S5	36270	NatureServe 2001-2007
<i>Solidago odora</i> var. <i>odora</i>	anisescented goldenrod	G5T5	SNR	530467	NatureServe 2001-2007** ^
<i>Solidago rugosa</i> ssp. <i>rugosa</i> var. <i>rugosa</i>	wrinkleleaf goldenrod	G5T5	SNR	531821	NatureServe 2001-2007*
<i>Solidago sphacelata</i>	autumn goldenrod	G4G5	S4	36312	NatureServe 2001-2007*
<i>Solidago ulmifolia</i> var. <i>ulmifolia</i>	elmleaf goldenrod	G5T5	S5	530489	NatureServe 2001-2007*
<i>Sorghum halepense</i>	Johnsongrass	GNR	SNA	42111	NatureServe 2001-2007
<i>Sphenopholis nitida</i>	shiny wedgescale	G5	S4S5	41281	NatureServe 2001-2007*
<i>Sphenopholis obtusata</i>	prairie wedgescale	G5	S5?	41279	McKinney 1993

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List of all plants documented at ABLI (both units)

Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Spiranthes cernua</i>	nodding ladies'-tresses	G5	S5	43444	McKinney 1993
<i>Staphylea trifolia</i>	American bladdernut	G5	S5	28646	NatureServe 2001-2007*
<i>Stellaria media</i>	common chickweed	GNR	SNA	20169	NatureServe 2001-2007
<i>Stellaria pubera</i>	star chickweed	G5	S5	20193	NatureServe 2001-2007*
<i>Stylophorum diphyllum</i>	celandine poppy	G5	S5	18994	NatureServe 2001-2007
<i>Stylosanthes biflora</i>	sidebeak pencilflower	G5	S5	26973	NatureServe 2001-2007*
<i>Symphoricarpos orbiculatus</i>	coralberry	G5	S5	35337	NatureServe 2001-2007
<i>Symphyotrichum cordifolium</i>	common blue wood aster	G5	S5	522193	NatureServe 2001-2007*
<i>Symphyotrichum dumosum</i>	rice button aster	G5	S5	522200	NatureServe 2001-2007*
<i>Symphyotrichum dumosum</i> var. <i>dumosum</i>	rice button aster	G5 T3T5	SNR	566329	NatureServe 2001-2007*
<i>Symphyotrichum lateriflorum</i>	calico aster	G5	S5	522220	NatureServe 2001-2007*
<i>Symphyotrichum novae-angliae</i>	New England aster	G5	S5	522226	NatureServe 2001-2007*
<i>Symphyotrichum ontarione</i>	bottomland aster	G5	S5	522229	McKinney 1993
<i>Symphyotrichum pilosum</i> var. <i>pilosum</i>	hairy white oldfield aster	G5T5	SNR	566340	McKinney 1993
<i>Symphyotrichum shortii</i>	Short's aster	G5	S5	522246	NatureServe 2001-2007*
<i>Symphyotrichum undulatum</i>	waxy leaf aster	G5	SNR	522257	NatureServe 2001-2007*
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	common dandelion	G5T5	SNA	524742	NatureServe 2001-2007
<i>Teucrium canadense</i> var. <i>canadense</i>	Canada germander	G5T5	SNA	530630	NatureServe 2001-2007*
<i>Thalictrum dioicum</i>	early meadow-rue	G5	S5	18669	NatureServe 2001-2007*
<i>Thalictrum thalictroides</i>	rue anemone	G5	S5	18683	NatureServe 2001-2007*
<i>Thaspium barbinode</i> var. <i>angustifolium</i>	hairy joint meadowparsnip (narrow leaf variety)	GNR	SNR	541239	NatureServe 2001-2007*
<i>Thaspium trifoliatum</i>	purple meadowparsnip	G5	SNR	29890	NatureServe 2001-2007*
<i>Thelypteris noveboracensis</i>	New York fern	G5	S5	17261	NatureServe 2001-2007**
<i>Tiarella cordifolia</i>	heartleaf foamflower	G5	S5	24530	NatureServe 2001-2007**
<i>Tilia americana</i> var. <i>americana</i>	American basswood	G5T5	SNR	530690	NatureServe 2001-2007*
<i>Tipularia discolor</i>	crippled crane fly	G4G5	S5	43703	McKinney 1993
<i>Toxicodendron radicans</i>	eastern poison ivy	G5	S5	28821	NatureServe 2001-2007
<i>Tradescantia virginiana</i>	Virginia spiderwort	G5	S5	39178	NatureServe 2001-2007*
<i>Tragia cordata</i>	heartleaf noseburn	G4	S3S4	28428	NatureServe 2001-2007*
<i>Tridens flavus</i> var. <i>flavus</i>	purpletop tridens	G5T5?	S5	530720	NatureServe 2001-2007
<i>Trifolium campestre</i>	field clover	GNR	SNA	26231	NatureServe 2001-2007
<i>Trifolium dubium</i>	suckling clover	GNR	SNA	26205	McKinney 1993
<i>Trifolium pratense</i>	red clover	GNR	SNA	26313	NatureServe 2001-2007

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List of all plants documented at ABLI (both units)

Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Trifolium repens</i>	white clover	GNR	SNA	26206	NatureServe 2001-2007
<i>Trillium flexipes</i>	nodding wakerobin	G5	SNR	43071	NatureServe 2001-2007*
<i>Trillium sessile</i>	toadshade	G4G5	S5	43088	NatureServe 2001-2007*
<i>Typha angustifolia</i>	narrowleaf cattail	G5	SNR	42325	NatureServe 2001-2007*
<i>Ulmus alata</i>	winged elm	G5	S5	19051	NatureServe 2001-2007*
<i>Ulmus americana</i>	American elm	G5?	S5	19049	NatureServe 2001-2007
<i>Ulmus rubra</i>	slippery elm	G5	S5	19050	NatureServe 2001-2007
<i>Uvularia perfoliata</i>	perfoliate bellwort	G5	S5	43110	NatureServe 2001-2007*
<i>Vaccinium arboreum</i>	farkleberry	G5	S5	23580	NatureServe 2001-2007*
<i>Vaccinium pallidum</i>	Blue Ridge blueberry	G5	S5	23610	NatureServe 2001-2007*
<i>Vaccinium stamineum</i>	deerberry	G5	S5	23615	NatureServe 2001-2007*
<i>Valeriana pauciflora</i>	largeflower valerian	G4	S5	35364	NatureServe 2001-2007*
<i>Valerianella locusta</i>	Lewiston cornsalad	G5	SNA	35392	NatureServe 2001-2007*
<i>Valerianella radiata</i>	beaked cornsalad	G5	S5	35397	NatureServe 2001-2007*
<i>Verbena simplex</i>	narrowleaf vervain	G5	S5	32123	NatureServe 2001-2007*
<i>Verbena urticifolia</i>	white vervain	G5	S5	32127	NatureServe 2001-2007
<i>Verbesina alternifolia</i>	wingstem	G5	S5	38597	NatureServe 2001-2007*
<i>Verbesina helianthoides</i>	gravelweed	G5	S5	38604	NatureServe 2001-2007*
<i>Verbesina virginica</i> var. <i>virginica</i>	white crownbeard	G5?T5? ?	SNR	530792	NatureServe 2001-2007*
<i>Veronica agrestis</i>	green field speedwell	GNR	SNA	33409	McKinney 1993
<i>Veronica arvensis</i>	corn speedwell	GNR	SNA	33411	NatureServe 2001-2007*
<i>Veronica officinalis</i> var. <i>officinalis</i>	common gypsyweed	G5TNR	SNR	530795	McKinney 1993
<i>Veronica persica</i>	birdeye speedwell	GNR	SNA	33405	McKinney 1993
<i>Viburnum acerifolium</i>	mapleleaf viburnum	G5	S5	35255	NatureServe 2001-2007
<i>Viburnum carlesii</i>	Koreanspice viburnum	GNA	SNA	-1	NatureServe 2001-2007*
<i>Viburnum opulus</i>	European cranberrybush	G5	SNA	35270	NatureServe 2001-2007*
<i>Viburnum prunifolium</i>	blackhaw	G5	S5?	35253	McKinney 1993
<i>Viburnum rufidulum</i>	rusty blackhaw	G5	S5	35274	NatureServe 2001-2007
<i>Vicia caroliniana</i>	Carolina vetch	G5	S5	26334	NatureServe 2001-2007*
<i>Vinca minor</i>	common periwinkle	GNR	SNA	30238	NatureServe 2001-2007
<i>Viola affinis</i>	sand violet	G5	SNR	22035	NatureServe 2001-2007*
<i>Viola canadensis</i> var. <i>canadensis</i>	Canadian white violet	G5T5	SNR	530825	NatureServe 2001-2007*
<i>Viola palmata</i> var. <i>palmata</i>	violet	G5T5?	SNR	531142	NatureServe 2001-2007*
<i>Viola pubescens</i> var. <i>pubescens</i>	downy yellow violet	G5T5	SNR	530837	McKinney 1993
<i>Viola pubescens</i> var. <i>scabriuscula</i>	downy yellow violet	G5	SNA	531467	NatureServe 2001-2007*
<i>Viola sororia</i>	common blue violet	G5	S5	22169	NatureServe 2001-2007
<i>Vitis aestivalis</i>	summer grape	G5	S5	28607	NatureServe 2001-2007*
<i>Vitis cinerea</i>	graybark grape	G4G5	S4?	28615	McKinney 1993
<i>Vitis cinerea</i> var. <i>cinerea</i>	graybark grape	G4G5 TNR	SNR	530855	NatureServe 2001-2007** ^
<i>Vitis labrusca</i>	fox grape	G5	S2S3	28608	McKinney 1993
<i>Vitis riparia</i>	riverbank grape	G5	S5	28624	McKinney 1993

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List of all plants documented at ABLI (both units)

Scientific Name	Common Name	GRank	SRank	TSN	Most recent Data Source
<i>Vitis rotundifolia</i>	muscadine	G5	S5	28609	NatureServe 2001-2007*
<i>Vitis vulpina</i>	frost grape	G5	S5	28610	NatureServe 2001-2007*
<i>Wolffia</i>	watermeal			42601	NatureServe 2001-2007*
<i>Yucca filamentosa</i>	Adam's needle	G5	SNR	43140	NatureServe 2001-2007

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Table 2b. List of all plants documented at the Boyhood Home Unit by NatureServe

Scientific Name	Common name	Family
<i>Acalypha</i>	copperleaf	Euphorbiaceae
<i>Acer negundo</i>	boxelder	Aceraceae
<i>Acer rubrum</i>	red maple	Aceraceae
<i>Acer saccharinum</i>	silver maple	Aceraceae
<i>Acer saccharum</i>	sugar maple	Aceraceae
<i>Achillea millefolium</i>	common yarrow	Asteraceae
<i>Actaea pachypoda</i>	white baneberry	Ranunculaceae
<i>Adiantum capillus-veneris</i> ^^	common maidenhair	Pteridaceae
<i>Adiantum pedatum</i>	northern maidenhair	Pteridaceae
<i>Aesculus glabra</i> var. <i>glabra</i>	Ohio buckeye	Hippocastanaceae
<i>Agalinis tenuifolia</i>	slenderleaf false foxglove	Scrophulariaceae
<i>Agastache</i> c.f. <i>nepetoides</i>	giant hyssop	Lamiaceae
<i>Ageratina altissima</i> var. <i>altissima</i>	white snakeroot	Asteraceae
<i>Agrimonia pubescens</i>	soft agrimony	Rosaceae
<i>Agrimonia rostellata</i>	beaked agrimony	Rosaceae
<i>Aletris farinosa</i>	white colicroot	Liliaceae
<i>Allium canadense</i>	meadow garlic	Liliaceae
<i>Allium cernuum</i>	nodding onion	Liliaceae
<i>Allium tricoccum</i>	wild leek	Liliaceae
<i>Allium vineale</i> ssp. <i>vineale</i>	wild garlic	Liliaceae
<i>Ambrosia artemisiifolia</i>	annual ragweed	Asteraceae
<i>Ambrosia trifida</i> var. <i>trifida</i>	great ragweed	Asteraceae
<i>Amelanchier</i>	serviceberry	Rosaceae
<i>Amphicarpaea bracteata</i>	American hogpeanut	Fabaceae
<i>Andropogon gerardii</i>	big bluestem	Poaceae
<i>Andropogon gyrans</i> var. <i>gyrans</i>	Elliott's bluestem	Poaceae
<i>Andropogon virginicus</i> var. <i>virginicus</i>	broomsedge bluestem	Poaceae
<i>Anemone virginiana</i> var. <i>virginiana</i>	tall thimbleweed	Ranunculaceae
<i>Antennaria parlinii</i> ssp. <i>parlinii</i>	Parlin's pussytoes	Asteraceae
<i>Antennaria plantaginifolia</i>	woman's tobacco	Asteraceae
<i>Antennaria solitaria</i>	singlehead pussytoes	Asteraceae
<i>Apocynum cannabinum</i>	Indianhemp	Apocynaceae
<i>Arabis laevigata</i>	smooth rockcress	Brassicaceae
<i>Aralia racemosa</i> ssp. <i>racemosa</i>	American spikenard	Araliaceae
<i>Aralia spinosa</i>	devil's walkingstick	Araliaceae
<i>Arisaema dracontium</i>	green dragon	Araceae
<i>Arisaema triphyllum</i>	Jack in the pulpit	Araceae
<i>Aristolochia serpentaria</i>	Virginia snakeroot	Aristolochiaceae
<i>Arnoglossum muehlenbergii</i>	great Indian plaintain	Asteraceae
<i>Arundinaria gigantea</i> ssp. <i>gigantea</i>	giant cane	Poaceae
<i>Asarum canadense</i>	Canadian wildginger	Aristolochiaceae
<i>Asclepias quadrifolia</i>	fourleaf milkweed	Asclepiadaceae
<i>Asclepias tuberosa</i>	butterfly milkweed	Asclepiadaceae
<i>Asclepias verticillata</i>	whorled milkweed	Asclepiadaceae
<i>Asimina triloba</i>	pawpaw	Annonaceae

Scientific Name	Common name	Family
<i>Asplenium platyneuron</i>	ebony spleenwort	Aspleniaceae
<i>Aureolaria virginica</i>	downy yellow false foxglove	Scrophulariaceae
<i>Bidens aristosa</i>	bearded beggarticks	Asteraceae
<i>Blephilia ciliata</i>	downy pagoda-plant	Lamiaceae
<i>Blephilia hirsuta</i> var. <i>hirsuta</i>	hairy pagoda-plant	Lamiaceae
<i>Boehmeria cylindrica</i>	smallspike false nettle	Urticaceae
<i>Botrychium dissectum</i>	cutleaf grapefern	Ophioglossaceae
<i>Botrychium virginianum</i>	rattlesnake fern	Ophioglossaceae
<i>Brachyelytrum erectum</i>	bearded shorthusk	Poaceae
<i>Bromus</i> cf. <i>commutatus</i>	brome	Poaceae
<i>Bromus japonicus</i>	Japanese brome	Poaceae
<i>Bromus nottowayanus</i>	Nottoway Valley brome	Poaceae
<i>Buglossoides arvensis</i>	corn gromwell	Boraginaceae
<i>Calystegia sepium</i>	hedge false bindweed	Convolvulaceae
<i>Campanulastrum americanum</i>	American bellflower	Campanulaceae
<i>Cardamine concatenata</i>	cutleaf toothwort	Brassicaceae
<i>Cardamine dissecta</i>	forkleaf toothwort	Brassicaceae
<i>Cardamine douglassii</i>	limestone bittercress	Brassicaceae
<i>Cardamine hirsuta</i>	hairy bittercress	Brassicaceae
<i>Carex albicans</i> var. <i>albicans</i>	whitening sedge	Cyperaceae
<i>Carex albursina</i>	white bear sedge	Cyperaceae
<i>Carex amphibola</i>	eastern narrowleaf sedge	Cyperaceae
<i>Carex blanda</i>	eastern woodland sedge	Cyperaceae
<i>Carex careyana</i>	Carey's sedge	Cyperaceae
<i>Carex glaucoidea</i>	blue sedge	Cyperaceae
<i>Carex gracilescens</i>	slender looseflower sedge	Cyperaceae
<i>Carex granularis</i>	limestone meadow sedge	Cyperaceae
<i>Carex hirsutella</i>	fuzzy wuzzy sedge	Cyperaceae
<i>Carex laxiculmis</i>	spreading sedge	Cyperaceae
<i>Carex pensylvanica</i>	Pennsylvania sedge	Cyperaceae
<i>Carex plantaginea</i>	plantainleaf sedge	Cyperaceae
<i>Carex rosea</i>	rosy sedge	Cyperaceae
<i>Carpinus caroliniana</i>	American hornbeam	Betulaceae
<i>Carya alba</i>	mockernut hickory	Juglandaceae
<i>Carya cordiformis</i>	bitternut hickory	Juglandaceae
<i>Carya glabra</i>	pignut hickory	Juglandaceae
<i>Carya ovata</i>	shagbark hickory	Juglandaceae
<i>Carya pallida</i>	sand hickory	Juglandaceae
<i>Castanea</i> (hybrid)	chestnut	Fagaceae
<i>Catalpa speciosa</i>	northern catalpa	Bignoniaceae
<i>Caulophyllum thalictroides</i>	blue cohosh	Berberidaceae
<i>Celastrus orbiculatus</i>	oriental bittersweet	Celastraceae
<i>Celtis laevigata</i>	sugarberry	Ulmaceae
<i>Celtis occidentalis</i>	common hackberry	Ulmaceae
<i>Centaurea biebersteinii</i>	spotted knapweed	Asteraceae
<i>Cephalanthus occidentalis</i>	common buttonbush	Rubiaceae
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	big chickweed	Caryophyllaceae

List of all plants documented at the Boyhood Home Unit by NatureServe

Scientific Name	Common name	Family
<i>Cercis canadensis</i> var. <i>canadensis</i>	eastern redbud	Fabaceae
<i>Chamaecrista fasciculata</i> var. <i>fasciculata</i>	sleepingplant	Fabaceae
<i>Chasmanthium latifolium</i>	Indian woodoats	Poaceae
<i>Chasmanthium laxum</i>	slender woodoats	Poaceae
<i>Chimaphila maculata</i>	striped prince's pine	Pyrolaceae
<i>Actaea racemosa</i> var. <i>racemosa</i>	black bugbane	Ranunculaceae
<i>Circaea lutetiana</i> ssp. <i>canadensis</i>	broadleaf enchanter's nightshade	Onagraceae
<i>Cirsium altissimum</i>	tall thistle	Asteraceae
<i>Cirsium discolor</i>	field thistle	Asteraceae
<i>Claytonia virginica</i>	Hammond's claytonia	Portulacaceae
<i>Claytonia virginica</i>	Virginia springbeauty	Portulacaceae
<i>Clematis glaucophylla</i>	whiteleaf leather flower	Ranunculaceae
<i>Clematis virginiana</i>	devil's darning needles	Ranunculaceae
<i>Collinsia verna</i>	spring blue eyed Mary	Scrophulariaceae
<i>Collinsonia canadensis</i>	richweed	Lamiaceae
<i>Conoclinium coelestinum</i>	blue mistflower	Asteraceae
<i>Conopholis americana</i>	American squawroot	Orobanchaceae
<i>Cornus drummondii</i>	roughleaf dogwood	Cornaceae
<i>Cornus florida</i>	flowering dogwood	Cornaceae
<i>Cornus racemosa</i>	gray dogwood	Cornaceae
<i>Corydalis flavula</i>	yellow fumewort	Fumariaceae
<i>Corylus americana</i>	American hazelnut	Betulaceae
<i>Crataegus</i>	hawthorn	Rosaceae
<i>Croton capitatus</i> var. <i>capitatus</i>	hogwort	Euphorbiaceae
<i>Croton monanthogynus</i>	prairie tea	Euphorbiaceae
<i>Cryptotaenia canadensis</i>	Canadian honewort	Apiaceae
<i>Cynanchum laeve</i>	honeysuckle	Asclepiadaceae
<i>Cynoglossum virginianum</i> var. <i>virginianum</i>	wild comfrey	Boraginaceae
<i>Cystopteris bulbifera</i>	bulblet bladderfern	Dryopteridaceae
<i>Cystopteris protrusa</i>	lowland bladderfern	Dryopteridaceae
<i>Dactylis glomerata</i> ssp. <i>glomerata</i>	orchardgrass	Poaceae
<i>Danthonia spicata</i>	poverty oatgrass	Poaceae
<i>Daucus carota</i>	Queen Anne's lace	Apiaceae
<i>Delphinium tricornis</i>	dwarf larkspur	Ranunculaceae
<i>Deparia acrostichoides</i>	silver false spleenwort	Dryopteridaceae
<i>Desmodium cuspidatum</i> var. <i>cuspidatum</i>	largebract ticktrefoil	Fabaceae
<i>Desmodium marilandicum</i>	smooth small-leaf ticktrefoil	Fabaceae
<i>Desmodium nudiflorum</i>	nakedflower ticktrefoil	Fabaceae
<i>Desmodium paniculatum</i> var. <i>paniculatum</i>	panicledleaf ticktrefoil	Fabaceae
<i>Desmodium rotundifolium</i>	prostrate ticktrefoil	Fabaceae
<i>Dianthus armeria</i>	Deptford pink	Caryophyllaceae
<i>Diarrhena americana</i>	American beakgrass	Poaceae
<i>Dicentra canadensis</i>	squirrel corn	Fumariaceae
<i>Dicentra cucullaria</i>	dutchman's breeches	Fumariaceae
<i>Dichanthelium acuminatum</i> var. <i>acuminatum</i>	tapered rosette grass	Poaceae
<i>Dichanthelium boscii</i>	Bosc's panicgrass	Poaceae
<i>Dichanthelium clandestinum</i>	deertongue	Poaceae

Scientific Name	Common name	Family
<i>Dichanthelium commutatum</i>	variable panicgrass	Poaceae
<i>Dichanthelium depauperatum</i>	starved panicgrass	Poaceae
<i>Dichanthelium dichotomum</i>	cypress panicgrass	Poaceae
<i>Dichanthelium laxiflorum</i>	openflower rosette grass	Poaceae
<i>Dichanthelium ovale</i> var. <i>ovale</i>	eggleaf rosette grass	Poaceae
<i>Dichanthelium scabriusculum</i>	woolly rosette grass	Poaceae
<i>Dichanthelium sphaerocarpon</i> var. <i>isophyllum</i>	roundseed panicgrass	Poaceae
<i>Digitaria sanguinalis</i>	hairy crabgrass	Poaceae
<i>Dioscorea quaternata</i>	fourleaf yam	Dioscoreaceae
<i>Dioscorea villosa</i>	wild yam	Dioscoreaceae
<i>Diospyros virginiana</i>	common persimmon	Ebenaceae
<i>Diplazium pycnocarpon</i>	glade fern	Dryopteridaceae
<i>Dipsacus fullonum</i>	Fuller's teasel	Dipsacaceae
<i>Echinacea pallida</i>	pale purple coneflower	Asteraceae
<i>Elaeagnus umbellata</i> var. <i>parvifolia</i>	autumn olive	Elaeagnaceae
<i>Elephantopus carolinianus</i> ^^	Carolina elephantsfoot	Asteraceae
<i>Elephantopus tomentosus</i>	devil's grandmother	Asteraceae
<i>Elymus hystrix</i>	eastern bottlebrush grass	Poaceae
<i>Elymus villosus</i>	hairy wildrye	Poaceae
<i>Enemion biternatum</i>	eastern false rue anemone	Ranunculaceae
<i>Epifagus virginiana</i>	beechdrops	Orobanchaceae
<i>Equisetum arvense</i>	field horsetail	Equisetaceae
<i>Eragrostis spectabilis</i> ^	purple lovegrass	Poaceae
<i>Erigeron annuus</i>	eastern daisy fleabane	Asteraceae
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	Asteraceae
<i>Erigeron pulchellus</i>	robin's plantain	Asteraceae
<i>Erigeron strigosus</i>	prairie fleabane	Asteraceae
<i>Erythronium umbilicatum</i> ssp. <i>umbilicatum</i>	dimpled troutlily	Liliaceae
<i>Euonymus americana</i>	strawberry bush	Celastraceae
<i>Euonymus atropurpurea</i>	eastern wahoo	Celastraceae
<i>Euonymus obovata</i>	running strawberry bush	Celastraceae
<i>Eupatorium fistulosum</i> ^	trumpetweed	Asteraceae
<i>Eupatorium hyssopifolium</i>	hyssopleaf thoroughwort	Asteraceae
<i>Eupatorium serotinum</i>	lateflowering thoroughwort	Asteraceae
<i>Eupatorium sessilifolium</i>	upland boneset	Asteraceae
<i>Euphorbia corollata</i>	flowering spurge	Euphorbiaceae
<i>Euphorbia pubentissima</i>	false flowering spurge	Euphorbiaceae
<i>Eurybia divaricata</i>	white wood aster	Asteraceae
<i>Eurybia macrophylla</i>	bigleaf aster	Asteraceae
<i>Fagus grandifolia</i>	American beech	Fagaceae
<i>Festuca subverticillata</i>	nodding fescue	Poaceae
<i>Fragaria virginiana</i>	Virginia strawberry	Rosaceae
<i>Frangula caroliniana</i>	Carolina buckthorn	Rhamnaceae
<i>Frasera caroliniensis</i>	American columbo	Gentianaceae
<i>Fraxinus americana</i>	white ash	Oleaceae
<i>Fraxinus pennsylvanica</i>	green ash	Oleaceae
<i>Fraxinus quadrangulata</i>	blue ash	Oleaceae

List of all plants documented at the Boyhood Home Unit by NatureServe

Scientific Name	Common name	Family
<i>Galinsoga quadriradiata</i>	shaggy-soldier	Asteraceae
<i>Galium aparine</i>	stickywilly	Rubiaceae
<i>Galium circaezans</i>	licorice bedstraw	Rubiaceae
<i>Galium circaezans</i> var. <i>hypomalacum</i>	licorice bedstraw	Rubiaceae
<i>Galium pilosum</i>	hairy bedstraw	Rubiaceae
<i>Galium triflorum</i>	fragrant bedstraw	Rubiaceae
<i>Gentiana villosa</i>	striped gentian	Gentianaceae
<i>Geranium maculatum</i> ^	spotted geranium	Geraniaceae
<i>Geum canadense</i> var. <i>canadense</i>	white avens	Rosaceae
<i>Geum virginianum</i>	cream avens	Rosaceae
<i>Glechoma hederacea</i>	ground ivy	Lamiaceae
<i>Gleditsia triacanthos</i>	honeylocust	Fabaceae
<i>Glyceria striata</i>	fowl mannagrass	Poaceae
<i>Goodyera pubescens</i>	downy rattlesnake plantain	Orchidaceae
<i>Hackelia virginiana</i>	beggarslice	Boraginaceae
<i>Hedyotis nigricans</i>	diamondflowers	Rubiaceae
<i>Helenium flexuosum</i>	purplehead sneezeweed	Asteraceae
<i>Helianthus decapetalus</i>	thinleaf sunflower	Asteraceae
<i>Helianthus divaricatus</i> ^	woodland sunflower	Asteraceae
<i>Helianthus microcephalus</i>	small woodland sunflower	Asteraceae
<i>Heliopsis helianthoides</i>	smooth oxeye	Asteraceae
<i>Hemerocallis fulva</i>	orange daylily	Liliaceae
<i>Hepatica nobilis</i> var. <i>acuta</i>	sharplobe hepatica	Ranunculaceae
<i>Heuchera americana</i> var. <i>americana</i>	American alumroot	Saxifragaceae
<i>Hexaletris spicata</i>	spiked crested coralroot	Orchidaceae
<i>Hieracium gronovii</i>	queendevil	Asteraceae
<i>Hieracium venosum</i>	rattlesnakeweed	Asteraceae
<i>Houstonia canadensis</i>	Canadian summer bluet	Rubiaceae
<i>Houstonia purpurea</i>	Venus' pride	Rubiaceae
<i>Hybanthus concolor</i>	eastern greenviolet	Violaceae
<i>Hydrangea arborescens</i>	smooth hydrangea	Hydrangeaceae
<i>Hydrophyllum canadense</i>	bluntleaf waterleaf	Hydrophyllaceae
<i>Hydrophyllum macrophyllum</i>	largeleaf waterleaf	Hydrophyllaceae
<i>Hypericum dolabriforme</i>	straggling St. Johnswort	Clusiaceae
<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>	St. Andrew's cross	Clusiaceae
<i>Hypericum punctatum</i>	spotted St. Johnswort	Clusiaceae
<i>Hypoxis hirsuta</i>	common goldstar	Iridaceae
<i>Impatiens capensis</i>	jewelweed	Balsaminaceae
<i>Impatiens pallida</i>	pale touch-me-not	Balsaminaceae
<i>Ipomoea pandurata</i>	man of the earth	Convolvulaceae
<i>Ipomoea purpurea</i> ^	tall morning-glory	Convolvulaceae
<i>Iris cristata</i>	dwarf crested iris	Iridaceae
<i>Isanthus brachiatus</i>	fluxweed	Lamiaceae
<i>Jeffersonia diphylla</i>	twinleaf	Berberidaceae
<i>Juglans nigra</i>	black walnut	Juglandaceae
<i>Juniperus virginiana</i> var. <i>virginiana</i>	eastern redcedar	Cupressaceae
<i>Krigia biflora</i>	twoflower dwarf dandelion	Asteraceae

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Scientific Name	Common name	Family
<i>Kummerowia striata</i>	Japanese clover	Fabaceae
<i>Lactuca canadensis</i>	Canada lettuce	Asteraceae
<i>Lamium amplexicaule</i> ^	henbit deadnettle	Lamiaceae
<i>Laportea canadensis</i>	Canadian woodnettle	Urticaceae
<i>Leersia virginica</i>	whitegrass	Poaceae
<i>Lespedeza hirta</i> ssp. <i>hirta</i>	hairy lespedeza	Fabaceae
<i>Lespedeza procumbens</i>	trailing lespedeza	Fabaceae
<i>Lespedeza violacea</i>	violet lespedeza	Fabaceae
<i>Leucanthemum vulgare</i>	oxeye daisy	Asteraceae
<i>Liatris squarrosa</i> var. <i>hirsuta</i>	scaly blazing star	Asteraceae
<i>Liatris squarrosa</i> var. <i>squarrosa</i>	scaly blazing star	Asteraceae
<i>Ligustrum sinense</i>	Chinese privet	Oleaceae
<i>Lindera benzoin</i>	northern spicebush	Lauraceae
<i>Linum medium</i> var. <i>texanum</i>	stiff yellow flax	Linaceae
<i>Liparis liliifolia</i>	brown widelip orchid	Orchidaceae
<i>Liriodendron tulipifera</i>	tuliptree	Magnoliaceae
<i>Lithospermum canescens</i>	hoary puccoon	Boraginaceae
<i>Lithospermum tuberosum</i>	tuberous stone seed	Boraginaceae
<i>Lobelia inflata</i>	Indian-tobacco	Campanulaceae
<i>Lobelia puberula</i>	downy lobelia	Campanulaceae
<i>Lobelia siphilitica</i> var. <i>siphilitica</i>	great blue lobelia	Campanulaceae
<i>Lobelia spicata</i>	pale spike lobelia	Campanulaceae
<i>Lolium arundinaceum</i>	tall fescue	Poaceae
<i>Lonicera japonica</i>	Japanese honeysuckle	Caprifoliaceae
<i>Luzula echinata</i>	hedgehog woodrush	Juncaceae
<i>Luzula multiflora</i>	common woodrush	Juncaceae
<i>Lycopodium digitatum</i>	fan clubmoss	Lycopodiaceae
<i>Lysimachia quadrifolia</i>	whorled yellow loosestrife	Primulaceae
<i>Maianthemum racemosum</i> ssp. <i>racemosum</i>	feathery false lily of the valley	Liliaceae
<i>Malus pumila</i>	paradise apple	Rosaceae
<i>Manfreda virginica</i>	false aloe	Agavaceae
<i>Matelea gonocarpos</i>	angular fruit milkvine	Asclepiadaceae
<i>Matelea obliqua</i>	climbing milkvine	Asclepiadaceae
<i>Medeola virginiana</i> ^	Indian cucumber	Liliaceae
<i>Medicago sativa</i> ssp. <i>sativa</i>	alfalfa	Fabaceae
<i>Melica mutica</i>	two flower melicgrass	Poaceae
<i>Melica nitens</i>	three flower melicgrass	Poaceae
<i>Melilotus officinalis</i>	yellow sweetclover	Fabaceae
<i>Menispermum canadense</i>	common moonseed	Menispermaceae
<i>Microstegium vimineum</i>	Nepalese browntop	Poaceae
<i>Mitella diphylla</i>	two leaf miterwort	Saxifragaceae
<i>Monarda clinopodia</i>	white bergamot	Lamiaceae
<i>Monarda didyma</i>	scarlet beebalm	Lamiaceae
<i>Monarda fistulosa</i>	wild bergamot	Lamiaceae
<i>Monarda fistulosa</i> var. <i>mollis</i>	wild bergamot	Lamiaceae
<i>Morus alba</i>	white mulberry	Moraceae
<i>Morus rubra</i> var. <i>rubra</i>	red mulberry	Moraceae

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Scientific Name	Common name	Family
<i>Muhlenbergia schreberi</i>	nimblewill	Poaceae
<i>Muhlenbergia sobolifera</i>	rock muhly	Poaceae
<i>Nyssa sylvatica</i>	blackgum	Nyssaceae
<i>Obolaria virginica</i>	Virginia pennywort	Gentianaceae
<i>Opuntia humifusa</i>	devil's-tongue	Cactaceae
<i>Orbexilum pedunculatum</i> var. <i>pedunculatum</i>	Sampson's snakeroot	Fabaceae
<i>Osmorhiza claytonii</i>	Clayton's sweetroot	Apiaceae
<i>Osmorhiza longistylis</i>	longstyle sweetroot	Apiaceae
<i>Osmunda cinnamomea</i> var. <i>cinnamomea</i>	cinnamon fern	Osmundaceae
<i>Ostrya virginiana</i>	hophornbeam	Betulaceae
<i>Oxalis stricta</i>	common yellow oxalis	Oxalidaceae
<i>Oxalis violacea</i>	violet woodsorrel	Oxalidaceae
<i>Packera anonyma</i>	Small's ragwort	Asteraceae
<i>Packera aurea</i>	golden ragwort	Asteraceae
<i>Packera obovata</i>	roundleaf ragwort	Asteraceae
<i>Panax quinquefolius</i>	American ginseng	Araliaceae
<i>Panicum anceps</i>	beaked panicgrass	Poaceae
<i>Panicum flexile</i>	wiry panicgrass	Poaceae
<i>Paronychia canadensis</i>	smooth forked nailwort	Caryophyllaceae
<i>Parthenocissus quinquefolia</i>	Virginia creeper	Vitaceae
<i>Paspalum setaceum</i>	thin paspalum	Poaceae
<i>Passiflora lutea</i>	yellow passionflower	Passifloraceae
<i>Pedicularis canadensis</i> ssp. <i>canadensis</i>	Canadian lousewort	Scrophulariaceae
<i>Pellaea atropurpurea</i>	purple cliffbrake	Pteridaceae
<i>Penstemon laevigatus</i>	eastern smooth beardtongue	Scrophulariaceae
<i>Penstemon pallidus</i>	pale beardtongue	Scrophulariaceae
<i>Perilla frutescens</i>	beefsteakplant	Lamiaceae
<i>Phegopteris hexagonoptera</i>	broad beechfern	Thelypteridaceae
<i>Phleum pratense</i>	timothy	Poaceae
<i>Phlox divaricata</i>	wild blue phlox	Polemoniaceae
<i>Phryma leptostachya</i>	American lopseed	Verbenaceae
<i>Physalis virginiana</i> var. <i>virginiana</i>	Virginia groundcherry	Solanaceae
<i>Physostegia virginiana</i>	obedient plant	Lamiaceae
<i>Phytolacca americana</i> var. <i>americana</i>	American pokeweed	Phytolaccaceae
<i>Pilea pumila</i>	Canadian clearweed	Urticaceae
<i>Pinus virginiana</i>	Virginia pine	Pinaceae
<i>Plantago aristata</i>	largebracted plantain	Plantaginaceae
<i>Plantago lanceolata</i>	narrowleaf plantain	Plantaginaceae
<i>Plantago rugelii</i>	blackseed plantain	Plantaginaceae
<i>Platanus occidentalis</i>	American sycamore	Platanaceae
<i>Poa compressa</i>	Canada bluegrass	Poaceae
<i>Poa pratensis</i>	Kentucky bluegrass	Poaceae
<i>Podophyllum peltatum</i>	mayapple	Berberidaceae
<i>Polemonium reptans</i>	Greek valerian	Polemoniaceae
<i>Polygala verticillata</i>	whorled milkwort	Polygalaceae
<i>Polygonatum biflorum</i> var. <i>commutatum</i>	smooth Solomon's seal	Liliaceae
<i>Polygonum caespitosum</i> var. <i>longisetum</i>	oriental ladythumb	Polygonaceae

Scientific Name	Common name	Family
<i>Polygonum convolvulus</i>	black bindweed	Polygonaceae
<i>Polygonum setaceum</i>	bog smartweed	Polygonaceae
<i>Polygonum virginianum</i>	jumpseed	Polygonaceae
<i>Polymnia canadensis</i>	whiteflower leafcup	Asteraceae
<i>Polystichum acrostichoides</i> var. <i>acrostichoides</i>	Christmas fern	Dryopteridaceae
<i>Porteranthus stipulatus</i>	Indian physic	Rosaceae
<i>Potentilla simplex</i>	common cinquefoil	Rosaceae
<i>Prenanthes trifoliolata</i>	gall of the earth	Asteraceae
<i>Prunella vulgaris</i>	common selfheal	Lamiaceae
<i>Prunus americana</i>	American plum	Rosaceae
<i>Prunus serotina</i> var. <i>serotina</i>	black cherry	Rosaceae
<i>Pseudognaphalium obtusifolium</i> ssp. <i>obtusifolium</i>	rabbittobacco	Asteraceae
<i>Pycnanthemum pycnanthemoides</i> var. <i>pycnanthemoides</i>	southern mountainmint	Lamiaceae
<i>Pycnanthemum tenuifolium</i>	narrowleaf mountainmint	Lamiaceae
<i>Quercus alba</i>	white oak	Fagaceae
<i>Quercus coccinea</i> var. <i>coccinea</i>	scarlet oak	Fagaceae
<i>Quercus muehlenbergii</i>	chinquapin oak	Fagaceae
<i>Quercus prinus</i>	chestnut oak	Fagaceae
<i>Quercus rubra</i> var. <i>rubra</i>	northern red oak	Fagaceae
<i>Quercus stellata</i>	post oak	Fagaceae
<i>Quercus velutina</i>	black oak	Fagaceae
<i>Ranunculus micranthus</i>	rock buttercup	Ranunculaceae
<i>Ranunculus recurvatus</i>	blisterwort	Ranunculaceae
<i>Ratibida pinnata</i>	pinnate prairie coneflower	Asteraceae
<i>Rhexia mariana</i>	Maryland meadowbeauty	Melastomataceae
<i>Rhus aromatica</i> var. <i>aromatica</i>	fragrant sumac	Anacardiaceae
<i>Rhus copallinum</i> var. <i>latifolia</i>	flameleaf sumac	Anacardiaceae
<i>Rosa carolina</i> var. <i>carolina</i>	Carolina rose	Rosaceae
<i>Rosa multiflora</i>	multiflora rose	Rosaceae
<i>Rosa setigera</i> ^	climbing rose	Rosaceae
<i>Rotala ramosior</i>	lowland rotnala	Lythraceae
<i>Rubus argutus</i>	sawtooth blackberry	Rosaceae
<i>Rubus flagellaris</i>	northern dewberry	Rosaceae
<i>Rubus occidentalis</i>	black raspberry	Rosaceae
<i>Rubus phoenicolasius</i>	wine raspberry	Rosaceae
<i>Rudbeckia hirta</i>	blackeyed Susan	Asteraceae
<i>Ruellia caroliniensis</i>	Carolina wild petunia	Acanthaceae
<i>Ruellia humilis</i>	fringeleaf wild petunia	Acanthaceae
<i>Salvia lyrata</i>	lyreleaf sage	Lamiaceae
<i>Sambucus nigra</i> ssp. <i>Canadensis</i>	common elderberry	Caprifoliaceae
<i>Sanguinaria canadensis</i>	bloodroot	Papaveraceae
<i>Sanicula canadensis</i>	Canadian blacksnakeroot	Apiaceae
<i>Sanicula odorata</i>	clustered blacksnakeroot	Apiaceae
<i>Sanicula smallii</i>	Small's blacksnakeroot	Apiaceae
<i>Saponaria officinalis</i>	bouncingbet	Caryophyllaceae

Scientific Name	Common name	Family
<i>Sassafras albidum</i>	sassafras	Lauraceae
<i>Saxifraga virginensis</i>	early saxifrage	Saxifragaceae
<i>Schizachyrium scoparium</i>	little bluestem	Poaceae
<i>Scirpus polyphyllus</i>	leafy bulrush	Cyperaceae
<i>Scleria oligantha</i>	littlehead nutrush	Cyperaceae
<i>Scutellaria ovata</i> ssp. <i>ovata</i>	heartleaf skullcap	Lamiaceae
<i>Sedum ternatum</i>	woodland stonecrop	Crassulaceae
<i>Senna marilandica</i>	Maryland senna	Fabaceae
<i>Setaria faberi</i>	Japanese bristlegrass	Poaceae
<i>Setaria parviflora</i>	marsh bristlegrass	Poaceae
<i>Setaria pumila</i>	yellow bristlegrass	Poaceae
<i>Sida spinosa</i>	prickly fanpetals	Malvaceae
<i>Silene stellata</i>	widowsfrill	Caryophyllaceae
<i>Silene virginica</i>	fire pink	Caryophyllaceae
<i>Sisyrinchium albidum</i>	white blue-eyed grass	Iridaceae
<i>Smallanthus uvedalius</i>	hairy leafcup	Asteraceae
<i>Smilax bona-nox</i>	saw greenbrier	Smilacaceae
<i>Smilax glauca</i>	cat greenbrier	Smilacaceae
<i>Smilax herbacea</i>	smooth carrionflower	Smilacaceae
<i>Smilax rotundifolia</i>	roundleaf greenbrier	Smilacaceae
<i>Smilax tamnoides</i>	bristly greenbrier	Smilacaceae
<i>Solanum carolinense</i> var. <i>carolinense</i>	Carolina horsenettle	Solanaceae
<i>Solidago bicolor</i>	white goldenrod	Asteraceae
<i>Solidago caesia</i>	wreath goldenrod	Asteraceae
<i>Solidago flexicaulis</i>	zigzag goldenrod	Asteraceae
<i>Solidago gigantea</i>	giant goldenrod	Asteraceae
<i>Solidago juncea</i>	early goldenrod	Asteraceae
<i>Solidago odora</i> var. <i>odora</i> ^	anisescented goldenrod	Asteraceae
<i>Solidago rugosa</i> ssp. <i>rugosa</i> var. <i>rugosa</i>	wrinkleleaf goldenrod	Asteraceae
<i>Solidago sphacelata</i>	autumn goldenrod	Asteraceae
<i>Solidago ulmifolia</i> var. <i>ulmifolia</i>	elmleaf goldenrod	Asteraceae
<i>Sorghum halepense</i>	Johnsongrass	Poaceae
<i>Sphenopholis nitida</i>	shiny wedgescale	Poaceae
<i>Spiranthes</i>	ladies'-tresses	Orchidaceae
<i>Staphylea trifolia</i>	American bladdernut	Staphyleaceae
<i>Stellaria media</i>	common chickweed	Caryophyllaceae
<i>Stellaria pubera</i>	star chickweed	Caryophyllaceae
<i>Stylophorum diphyllum</i>	celandine poppy	Papaveraceae
<i>Stylosanthes biflora</i>	sidebeak pencilflower	Fabaceae
<i>Symphoricarpos orbiculatus</i>	coralberry	Caprifoliaceae
<i>Symphyotrichum cordifolium</i>	common blue wood aster	Asteraceae
<i>Symphyotrichum dumosum</i>	rice button aster	Asteraceae
<i>Symphyotrichum lateriflorum</i>	calico aster	Asteraceae
<i>Symphyotrichum novae-angliae</i>	New England aster	Asteraceae
<i>Symphyotrichum shortii</i>	Short's aster	Asteraceae
<i>Symphyotrichum undulatum</i>	waxy leaf aster	Asteraceae
<i>Taraxacum officinale</i> ssp. <i>officinale</i>	common dandelion	Asteraceae

Scientific Name	Common name	Family
<i>Teucrium canadense</i> var. <i>canadense</i>	Canada germander	Lamiaceae
<i>Thalictrum dioicum</i>	early meadow-rue	Ranunculaceae
<i>Thalictrum thalictroides</i>	rue anemone	Ranunculaceae
<i>Thaspium barbinode</i> var. <i>angustifolium</i>	hairyjoint meadow parsnip	Apiaceae
<i>Thaspium trifoliatum</i>	purple meadowparsnip	Apiaceae
<i>Thelypteris noveboracensis</i>	New York fern	Thelypteridaceae
<i>Tiarella cordifolia</i>	heartleaf foamflower	Saxifragaceae
<i>Tilia americana</i> var. <i>americana</i>	American basswood	Tiliaceae
<i>Toxicodendron radicans</i>	eastern poison ivy	Anacardiaceae
<i>Tradescantia virginiana</i>	Virginia spiderwort	Commelinaceae
<i>Tragia cordata</i>	heartleaf noseburn	Euphorbiaceae
<i>Tridens flavus</i> var. <i>flavus</i>	purpletop tridens	Poaceae
<i>Trifolium pratense</i>	red clover	Fabaceae
<i>Trifolium repens</i>	white clover	Fabaceae
<i>Trillium flexipes</i>	nodding wakerobin	Liliaceae
<i>Trillium sessile</i>	toadshade	Liliaceae
<i>Typha angustifolia</i>	narrowleaf cattail	Typhaceae
<i>Ulmus alata</i>	winged elm	Ulmaceae
<i>Ulmus americana</i>	American elm	Ulmaceae
<i>Ulmus rubra</i>	slippery elm	Ulmaceae
<i>Uvularia perfoliata</i>	perfoliate bellwort	Liliaceae
<i>Vaccinium arboreum</i>	farkleberry	Ericaceae
<i>Vaccinium pallidum</i>	Blue Ridge blueberry	Ericaceae
<i>Vaccinium stamineum</i>	deerberry	Ericaceae
<i>Valeriana pauciflora</i>	largeflower valerian	Valerianaceae
<i>Valerianella locusta</i>	Lewiston cornsalad	Valerianaceae
<i>Valerianella radiata</i>	beaked cornsalad	Valerianaceae
<i>Verbena simplex</i>	narrowleaf vervain	Verbenaceae
<i>Verbena urticifolia</i>	white vervain	Verbenaceae
<i>Verbesina alternifolia</i>	wingstem	Asteraceae
<i>Verbesina helianthoides</i>	gravelweed	Asteraceae
<i>Verbesina virginica</i> var. <i>virginica</i>	white crownbeard	Asteraceae
<i>Veronica arvensis</i>	corn speedwell	Scrophulariaceae
<i>Viburnum rufidulum</i>	rusty blackhaw	Caprifoliaceae
<i>Vicia caroliniana</i>	Carolina vetch	Fabaceae
<i>Viola canadensis</i> var. <i>canadensis</i>	Canadian white violet	Violaceae
<i>Viola palmata</i> var. <i>palmata</i>	early blue violet	Violaceae
<i>Viola pubescens</i> var. <i>scabriuscula</i>	downy yellow violet	Violaceae
<i>Viola sororia</i>	common blue violet	Violaceae
<i>Vitis aestivalis</i>	summer grape	Vitaceae
<i>Vitis rotundifolia</i>	muscadine	Vitaceae
<i>Vitis vulpina</i>	frost grape	Vitaceae
<i>Wolffia</i>	watermeal	Lemnaceae

Table 3. List of all vouchers collected by NatureServe at Abraham Lincoln Birthplace National Historic Site.

Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Acer saccharinum</i>	silver maple	28757	ABLI 1422	E. Lunsford	Row planting in mowed lawn
<i>Actaea pachypoda</i>	white baneberry	18722	ABLI 495	R. White, HW, G. Talley	Mesic hardwood slope
<i>Adiantum pedatum</i>	northern maidenhair	17311	ABLI 496	R. White, HW, G. Talley	Mesic hardwood slope
<i>Aesculus glabra</i>	Ohio buckeye	28718	ABLI 762	E. Lunsford, S. Brue	Bank of creek
<i>Agalinis tenuifolia</i>	slenderleaf false foxglove	33036	ABLI 498	R. White, K. Feeman	Successional hickory-maple forest
<i>Agrimonia parviflora</i>	harvestlice	25098	ABLI 1423	E. Lunsford	Moist bottomland
<i>Agrimonia pubescens</i>	soft agrimony	25099	ABLI 1424	E. Lunsford	Rich, mesic wooded mid-slope
<i>Aletris farinosa</i>	white colicroot	42769	ABLI 569	R. White, B. O'Donoghue	Mixed mesophytic forest on steep slope
<i>Aletris farinosa</i>	white colicroot	42769	ABLI 499	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Allium canadense</i>	meadow garlic	42635	ABLI 605	R. White, B. O'Donoghue	Japanese honeysuckle thicket
<i>Allium cernuum</i>	nodding onion	42721	ABLI 500	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Allium tricoccum</i>	wild leek	42672	ABLI 642	R. White, B. O'Donoghue	Steep slope above stream
<i>Ambrosia trifida</i>	great ragweed	36521	ABLI 1425	E. Lunsford	Bottom of wooded slope
<i>Amphicarpaea bracteata</i>	American hogpeanut	182067	ABLI 501	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Andropogon gerardii</i>	big bluestem	40462	ABLI 502	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Andropogon gyrans</i>	Elliott's bluestem	182527	ABLI 503	R. White, K. Feeman	Successional hickory-maple forest
<i>Antennaria parlinii</i> ssp. <i>parlinii</i>	Parlin's pussytoes	185168	ABLI 504	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Antennaria solitaria</i>	singlehead pussytoes	36756	ABLI 1426	E. Lunsford	Dry oak slope
<i>Apocynum cannabinum</i>	Indianhemp	30157	ABLI 505	R. White, K. Langdon, T. Leibfreid	Power line right of way
<i>Arabis laevigata</i>	smooth rockcress	22706	ABLI 506	R. White, G. Talley	Rich tulip poplar slope
<i>Aralia racemosa</i>	American spikenard	29377	ABLI 507	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Aralia spinosa</i>	devil's walkingstick	29378	ABLI 1427	E. Lunsford	Dry south-facing oak slope
<i>Arisaema dracontium</i>	green dragon	42529	ABLI 1472	E. Lunsford	Successional hickory-maple forest
<i>Aristolochia serpentaria</i>	Virginia snakeroot	18342	ABLI 1428	E. Lunsford	Flat wooded area
<i>Arnoglossum muehlenbergii</i>	great Indian plantain	501100	ABLI 508	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Arundinaria gigantea</i>	giant cane	40477	ABLI 509	R. White, G. Talley	Rich tulip poplar slope
<i>Asarum canadense</i>	Canadian wildginger	18353	ABLI 510	R. White, HW, G. Talley	Mesic hardwood slope
<i>Asclepias quadrifolia</i>	fourleaf milkweed	30297	ABLI 511	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Asclepias tuberosa</i>	butterfly milkweed	30313	ABLI 512	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Asclepias verticillata</i>	whorled milkweed	30320	ABLI 513	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Asimina triloba</i>	pawpaw	18117	ABLI 514	R. White, HW, G. Talley	Mesic hardwood slope

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List of NatureServe vouchers

Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Aureolaria virginica</i>	downy yellow false foxglove	33490	ABLI 516	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Bidens aristosa</i>	bearded beggarticks	35713	ABLI 517	R. White, K. Feeman	Dry oak-hickory slope
<i>Blephilia ciliata</i>	downy pagoda-plant	32460	ABLI 518	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Blephilia hirsuta</i>	hairy pagoda-plant	32461	ABLI 519	R. White, G. Talley	Rich tulip poplar slope
<i>Brachyelytrum erectum</i>	bearded shorthusk	41527	ABLI 520	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Bromus</i> (cf. <i>commutatus</i>)	brome	40478	ABLI 1430	E. Lunsford	Wooded edge between creek and field
<i>Bromus japonicus</i>	Japanese brome	40479	ABLI 521	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Bromus nottowanus</i>	Nottoway Valley brome	40509	ABLI 755	R. White, E. Lunsford	Dry oak-hickory slope
<i>Buglossoides arvensis</i>	corn gromwell	501090	ABLI 522	R. White, G. Talley	Rich tulip poplar slope
<i>Calystegia sepium</i>	hedge false bindweed	30650	ABLI 1473	E. Lunsford	Bank above seasonally dry creekbed
<i>Calystegia</i> sp.	false bindweed	30649	ABLI 523	R. White, G. Talley	White oak - hickory upland
<i>Cardamine dissecta</i>	forkleaf toothwort	501194	ABLI 651	R. White, B. O'Donoghue	Old field edge
<i>Cardamine douglassii</i>	limestone bittercress	22793	ABLI 757	R. White, E. Lunsford	Successional hickory-maple forest
<i>Carex albursina</i>	white bear sedge	39487	ABLI 524	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Carex careyana</i>	Carey's sedge	39541	ABLI 1431	R. White, B. O'Donoghue	Old field edge
<i>Carex glaucoidea</i>	blue sedge	39616	ABLI 758	R. White, E. Lunsford	Successional hickory-maple forest
<i>Carex gracilescens</i>	slender looseflower sedge	39618	ABLI 525	R. White, G. Talley	Rich tulip poplar slope
<i>Carex granularis</i>	limestone meadow sedge	39398	ABLI 759	R. White, E. Lunsford	Dry oak-hickory slope
<i>Carex laxiculmis</i>	spreading sedge	39411	ABLI 526	R. White, G. Talley	Rich tulip poplar slope
<i>Carex laxiculmis</i> var. <i>laxiculmis</i>	spreading sedge	527109	ABLI 527	R. White, K. Feeman	Successional hickory-maple forest
<i>Carex plantaginea</i>	plantainleaf sedge	39759	ABLI 528	R. White, HW, G. Talley	Mesic hardwood slope
<i>Carex rosea</i>	rosy sedge	39429	ABLI 529	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Carex</i> sp.	sedge	39369	ABLI 531	R. White, K. Feeman	Dry oak-hickory slope
<i>Carex</i> sp.	sedge	39369	ABLI 530	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Carex</i> sp. section <i>Acrocystis</i> (Montanae)	sedge	39369	ABLI 533	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Carex</i> sp. section <i>Acrocystis</i> (Montanae)	sedge	39369	ABLI 532	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Carya alba</i>	mockernut hickory	501306	ABLI 1432	E. Lunsford	Dry upper slope
<i>Carya pallida</i>	sand hickory	19244	ABLI 534	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Catalpa speciosa</i>	northern catalpa	34315	ABLI 1433	E. Lunsford	Bank above seasonally dry creekbed

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List of NatureServe vouchers

Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Caulophyllum thalictroides</i>	blue cohosh	18840	ABLI 535	R. White, HW, G. Talley	Mesic hardwood slope
<i>Celtis laevigata</i>	sugarberry	19042	ABLI 536	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Centaurea biebersteinii</i>	spotted knapweed	501347	ABLI 537	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	big chickweed	523831	ABLI 538	R. White	Cultivated meadow
<i>Cerastium nutans</i>	nodding chickweed	19958	ABLI 1434	E. Lunsford	Cultivated meadow
<i>Chamaecrista fasciculata</i> var. <i>fasciculata</i>	sleepingplant	566216	ABLI 539	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Chamaesyce nutans</i>	eyebane	501442	ABLI 540	R. White	Cultivated meadow
<i>Chasmanthium latifolium</i>	Indian woodoats	41547	ABLI 541	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Cimicifuga racemosa</i>	black bugbane	18757	ABLI 542	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Cirsium altissimum</i>	tall thistle	36337	ABLI 543	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Cirsium discolor</i>	field thistle	36362	ABLI 544	R. White, K. Feeman	Successional hickory-maple forest
<i>Claytonia virginica</i>	Hammond's claytonia	20382	ABLI 545	R. White, HW, G. Talley	Mesic hardwood slope
<i>Clematis glaucophylla</i>	whiteleaf leather flower	18698	ABLI 546	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Clematis virginiana</i>	devil's darning needles	18716	ABLI 547	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Collinsia verna</i>	spring blue eyed Mary	33524	ABLI 760	R. White, E. Lunsford	
<i>Conoclinium coelestinum</i>	blue mistflower	511282	ABLI 548	R. White, K. Feeman	Successional hickory-maple forest
<i>Conopholis americana</i>	American squawroot	34274	ABLI 1435	E. Lunsford	Dry south-facing oak slope
<i>Cornus drummondii</i>	roughleaf dogwood	27807	ABLI 549	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Cornus racemosa</i>	gray dogwood	501635	ABLI 550	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Corydalis flavula</i>	yellow fumewort	19005	ABLI 761	R. White, E. Lunsford	
<i>Croton capitatus</i> var. <i>capitatus</i>	hogwort	527534	ABLI 551	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Croton monanthogynus</i>	prairie tea	28283	ABLI 552	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Cynanchum laeve</i>	honeysuckle	501893	ABLI 553	R. White, G. Talley	Rich tulip poplar slope
<i>Cystopteris protrusa</i>	lowland bladderfern	17485	ABLI 554	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Danthonia spicata</i>	poverty oatgrass	41642	ABLI 556	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Danthonia spicata</i>	poverty oatgrass	41642	ABLI 555	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Delphinium tricornis</i>	dwarf larkspur	18515	ABLI 557	R. White, HW, G. Talley	Mesic hardwood slope
<i>Deparia acrostichoides</i>	silver false spleenwort	501994	ABLI 1436	E. Lunsford	Mesic hardwood slope
<i>Desmodium canescens</i>	hoary ticktrefoil	25792	ABLI 558	R. White	Japanese honeysuckle thicket
<i>Desmodium cuspidatum</i> var. <i>cuspidatum</i>	largebract ticktrefoil	527673	ABLI 559	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Desmodium marilandicum</i>	smooth small-leaf ticktrefoil	25809	ABLI 560	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Desmodium paniculatum</i>	panicledleaf ticktrefoil	25815	ABLI 561	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest

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List of NatureServe vouchers

Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Desmodium rotundifolium</i>	prostrate ticktrefoil	502020	ABLI 562	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Dianthus armeria</i>	Deptford pink	20276	ABLI 563	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Diarrhena americana</i>	American beakgrain	41644	ABLI 564	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Dicentra canadensis</i>	squirrel corn	18943	ABLI 565	R. White, HW, G. Talley	Mesic hardwood slope
<i>Dicentra cucullaria</i>	dutchman's breeches	18945	ABLI 702	R. White, B. O'Donoghue	Old field edge
<i>Dichanthelium acuminatum</i> var. <i>acuminatum</i>	tapered rosette grass	527684	ABLI 566	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Dichanthelium boscii</i>	Bosc's panicgrass	41655	ABLI 567	R. White, K. Feeman	Successional hickory-maple forest
<i>Dichanthelium clandestinum</i>	deertongue	41656	ABLI 568	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Dichanthelium commutatum</i>	variable panicgrass	41647	ABLI 763	R. White, E. Lunsford	Cedar glade
<i>Dichanthelium depauperatum</i>	starved panicgrass	41658	ABLI 764	R. White, E. Lunsford	Successional hickory-maple forest
<i>Dichanthelium dichotomum</i> var. <i>dichotomum</i>	cypress panicgrass	527691	ABLI 678	R. White	Cultivated meadow
<i>Dichanthelium laxiflorum</i>	openflower rosette grass	41661	ABLI 718	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Dichanthelium ovale</i>	eggleaf rosette grass	41649	ABLI 766	R. White, E. Lunsford	Successional hickory-maple forest
<i>Dichanthelium scabriusculum</i>	woolly rosette grass	41670	ABLI 570	R. White, K. Feeman	Cedar glade
<i>Dichanthelium sphaerocarpon</i> var. <i>isophyllum</i>	roundseed panicgrass	527701	ABLI 571	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Diodia virginiana</i>	Virginia buttonweed	34790	ABLI 572	R. White	Cultivated meadow
<i>Dioscorea quaternata</i>	fourleaf yam	43371	ABLI 573	R. White	
<i>Diospyros virginiana</i>	common persimmon	23855	ABLI 574	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Diplazium pycnocarpon</i>	glade fern	502095	ABLI 575	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Dipsacus fullonum</i>	Fuller's teasel	35404	ABLI 1474	E. Lunsford	Wooded edge between creek and field
<i>Echinacea pallida</i>	pale purple coneflower	37279	ABLI 576	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Elymus villosus</i>	hairy wildrye	40714	ABLI 577	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Enemion biternatum</i>	eastern false rue anemone	18769	ABLI 765	E. Lunsford	Creekside terrace
<i>Equisetum arvense</i>	field horsetail	17152	ABLI 1437	E. Lunsford, J. Jones	Seasonally dry creekbed
<i>Erechtites hieraciifolia</i>	American burnweed	37320	ABLI 578	R. White	Cultivated meadow
<i>Erigeron pulchellus</i>	robin's plantain	35808	ABLI 579	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Erigeron strigosus</i>	prairie fleabane	35951	ABLI 767	R. White, E. Lunsford	Successional hickory-maple forest
<i>Erythronium umbilicatum</i> ssp. <i>umbilicatum</i>	dimpled troutlily	524060	ABLI 580	R. White, HW, G. Talley	Mesic hardwood slope
<i>Euonymus alata</i>	winged burning bush	502576	ABLI 733	E. Lunsford	Red cedar successional forest with dogwood
<i>Euonymus atropurpurea</i>	eastern wahoo	502579	ABLI 1439	E. Lunsford	Rich, mesic wooded lower slope

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List of NatureServe vouchers

Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Euonymus atropurpurea</i>	eastern wahoo	27948	ABLI 581	R. White	Cedar- tulip poplar successional forest
<i>Euonymus fortunei</i>	winter creeper	27950	ABLI 754	E. Lunsford	Sycamore bottomland woods
<i>Euonymus obovatus</i>	running strawberry bush	27951	ABLI 582	R. White, K. Feeman	Dry oak-hickory slope
<i>Eupatorium hyssopifolium</i>	hyssopleaf thoroughwort	35979	ABLI 583	R. White, K. Feeman	Successional hickory-maple forest
<i>Eupatorium serotinum</i>	lateflowering thoroughwort	35981	ABLI 584	R. White, K. Feeman	Successional hickory-maple forest
<i>Eupatorium sessilifolium</i>	upland boneset	36004	ABLI 585	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Euphorbia corollata</i>	flowering spurge	28057	ABLI 586	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Euphorbia pubentissima</i>	false flowering spurge	28125	ABLI 1440	E. Lunsford	Rich, mesic wooded mid-slope
<i>Eurybia macrophylla</i>	bigleaf aster	513449	ABLI 515	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Festuca subverticillata</i>	nodding fescue	502612	ABLI 587	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Frasera carolinensis</i>	American columbo	502651	ABLI 768	R. White, E. Lunsford	Dry oak-hickory slope
<i>Fraxinus quadrangulata</i>	blue ash	32947	ABLI 588	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Galinsoga quadriradiata</i>	shaggy-soldier	37415	ABLI 589	R. White, M. Webber	Rich tulip poplar slope
<i>Galium circaezans</i> var. <i>hypomalacum</i>	licorice bedstraw	528210	ABLI 590	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Galium concinnum</i>	shining bedstraw	34848	ABLI 1441	E. Lunsford	Wooded trailside just below road near top of sinkhole
<i>Galium triflorum</i>	fragrant bedstraw	34933	ABLI 591	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Gamochaeta purpurea</i>	spoonleaf purple everlasting	37421	ABLI 592	R. White	Cultivated meadow
<i>Gentiana villosa</i>	striped gentian	29990	ABLI 593	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Geum canadense</i>	white avens	24645	ABLI 594	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Geum virginianum</i>	cream avens	24665	ABLI 595	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Gleditsia triacanthos</i>	honeylocust	26714	ABLI 596	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Glyceria</i> sp.	mannagrass	40831	ABLI 597	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Glyceria striata</i>	fowl mannagrass	40833	ABLI 598	R. White, HW, G. Talley	Mesic hardwood slope
<i>Hackelia virginiana</i>	beggarslice	31921	ABLI 600	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Hedyotis nigricans</i>	diamondflowers	502909	ABLI 601	R. White, K. Feeman	Cedar glade
<i>Helenium flexuosum</i>	purplehead sneezeweed	36016	ABLI 603	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Helianthus decapetalus</i>	thinleaf sunflower	502923	ABLI 604	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Helianthus microcephalus</i>	small woodland sunflower	36654	ABLI 606	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Heliopsis helianthoides</i>	smooth oxeye	37605	ABLI 1442	E. Lunsford	Unmowed field edge with <i>Ratibida pinnata</i>

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<i>Hepatica nobilis</i> var. <i>acuta</i>	sharplobe hepatica	528378	ABLI 607	R. White, HW, G. Talley	Mesic hardwood slope
<i>Heuchera americana</i>	American alumroot	24340	ABLI 608	R. White, HW, G. Talley	Mesic hardwood slope
<i>Hexalectris spicata</i>	spiked crested coralroot	43608	ABLI 609	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Hieracium gronovii</i>	queendevil	37710	ABLI 610	R. White, K. Feeman	Successional hickory-maple forest
<i>Hieracium venosum</i>	rattlesnakeweed	37734	ABLI 769	R. White, E. Lunsford	Dry oak-hickory slope
<i>Houstonia canadensis</i>	Canadian summer bluet	35039	ABLI 770	R. White, E. Lunsford	Dry oak-hickory slope
<i>Houstonia purpurea</i> var. <i>purpurea</i>	Venus' pride	196210	ABLI 602	R. White, K. Feeman	Cedar glade
<i>Hybanthus concolor</i>	eastern greenviolet	22026	ABLI 611	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Hydrophyllum canadense</i>	bluntleaf waterleaf	31390	ABLI 1443	E. Lunsford	Mesic hardwood slope
<i>Hydrophyllum canadense</i>	bluntleaf waterleaf	31390	ABLI 612	R. White, HW, G. Talley	Mesic hardwood slope
<i>Hypericum dolabriforme</i>	straggling St. Johnswort	21435	ABLI 1444	E. Lunsford	Dry upper slope
<i>Hypericum dolabriforme</i>	straggling St. Johnswort	21435	ABLI 613	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Hypericum hypericoides</i> ssp. <i>multicaule</i>	St. Andrew's cross	524170	ABLI 614	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Hypoxis hirsuta</i>	common goldstar	503146	ABLI 771	R. White, E. Lunsford	Dry oak-hickory slope
<i>Ipomoea pandurata</i>	man of the earth	30786	ABLI 1445	E. Lunsford	Cedar- tulip poplar successional forest
<i>Iris cristata</i>	dwarf crested iris	43204	ABLI 615	R. White, HW, G. Talley	Mesic hardwood slope
<i>Isanthus brachiatus</i>	fluxweed	515269	ABLI 616	R. White, K. Feeman	Cedar glade
<i>Jeffersonia diphylla</i>	twinleaf	18844	ABLI 617	R. White, HW, G. Talley	Mesic hardwood slope
<i>Krigia biflora</i>	twoflower dwarfdandelion	37810	ABLI 772	R. White, E. Lunsford	Dry oak-hickory slope
<i>Kummerowia striata</i>	Japanese clover	503294	ABLI 618	R. White, K. Feeman	Successional hickory-maple forest
<i>Kummerowia striata</i>	Japanese clover	503294	ABLI 619	R. White	Cultivated meadow
<i>Lactuca</i> cf. <i>floridana</i>	lettuce	36594	ABLI 1446	E. Lunsford	Rich, mesic wooded lower slope
<i>Lactuca</i> sp.	lettuce	36594	ABLI 620	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Lactuca</i> sp.	lettuce	36594	ABLI 621	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Leersia virginica</i>	whitegrass	40890	ABLI 622	R. White, M. Webber	Successional pine-tulip poplar forest
<i>Lepidium virginicum</i>	Virginia pepperweed	22955	ABLI 623	R. White	Cultivated meadow
<i>Lespedeza hirta</i>	hairy lespedeza	25900	ABLI 624	R. White, K. Feeman	Successional hickory-maple forest
<i>Lespedeza violacea</i>	violet lespedeza	25914	ABLI 625	R. White, K. Feeman	Successional hickory-maple forest
<i>Liatris squarrosa</i>	scaly blazing star	37945	ABLI 626	R. White, K. Feeman	Cedar glade
<i>Liatris squarrosa</i> var. <i>hirsuta</i>	scaly blazing star	528794	ABLI 627	R. White, K. Feeman	Successional hickory-maple forest
<i>Liatris squarrosa</i> var. <i>squarrosa</i>	scaly blazing star	528795	ABLI 628	R. White, K. Langdon, T. Leibfreid	Power line right of way

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Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Ligustrum sinense</i>	Chinese privet	32979	ABLI 629	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Linum medium</i> var. <i>texanum</i>	stiff yellow flax	528821	ABLI 630	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Liparis liliifolia</i>	brown widelip orchid	43622	ABLI 631	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Lithospermum canescens</i>	hoary puccoon	31945	ABLI 773	R. White, E. Lunsford	Cedar glade
<i>Lithospermum canescens</i>	hoary puccoon	31945	ABLI 632	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Lithospermum tuberosum</i>	tuberous stone seed	31954	ABLI 633	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Lobelia puberula</i>	downy lobelia	34529	ABLI 634	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Lobelia siphilitica</i> var. <i>siphilitica</i>	great blue lobelia	528854	ABLI 635	R. White, M. Webber	Rich tulip poplar slope
<i>Lobelia spicata</i>	palespike lobelia	34532	ABLI 636	R. White, K. Feeman	Cedar glade
<i>Lobelia spicata</i> var. <i>spicata</i>	palespike lobelia	528862	ABLI 637	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Lolium arundinaceum</i>	tall fescue	507979	ABLI 638	R. White, G. Talley	Rich tulip poplar slope
<i>Lonicera maackii</i>	Amur honeysuckle	35298	ABLI 1447	E. Lunsford	Flat wooded area
<i>Luzula echinata</i>	hedgehog woodrush	39342	ABLI 774	R. White, E. Lunsford	Cedar glade
<i>Lycopodium digitatum</i>	fan clubmoss	17028	ABLI 639	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Lysimachia quadrifolia</i>	whorled yellow loosestrife	23997	ABLI 775	R. White, E. Lunsford	Cedar glade
<i>Malus pumila</i>	paradise apple	25262	ABLI 1448	E. Lunsford	Edge of mowed field
<i>Manfreda virginica</i>	false aloe	503687	ABLI 640	R. White, K. Feeman	Dry oak-hickory slope
<i>Matelea gonocarpos</i>	angularfruit milkvine	503702	ABLI 641	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Matelea obliqua</i>	climbing milkvine	30375	ABLI 776	R. White, E. Lunsford	Cedar glade
<i>Melica mutica</i>	twoflower melicgrass	41858	ABLI 643	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Melica nitens</i>	threeflower melicgrass	41859	ABLI 777	R. White, E. Lunsford	Cedar glade
<i>Melilotus officinalis</i>	yellow sweetclover	26150	ABLI 644	R. White, K. Langdon, T. Leibfreid	Power line right of way
<i>Mitella diphylla</i>	twoleaf miterwort	24407	ABLI 731	R. White, B. O'Donoghue	Old field edge
<i>Monarda clinopodia</i>	white bergamot	32288	ABLI 645	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Monarda didyma</i>	scarlet beebalm	32283	ABLI 646	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Monarda fistulosa</i> ssp. <i>fistulosa</i> var. <i>mollis</i>	wild bergamot	566739	ABLI 647	R. White, K. Langdon, T. Leibfreid	Power line right of way
<i>Morus alba</i>	white mulberry	19066	ABLI 648	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Morus rubra</i>	red mulberry	19070	ABLI 649	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Muhlenbergia schreberi</i>	nimblewill	41939	ABLI 650	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Nyssa sylvatica</i>	blackgum	27821	ABLI 1449	E. Lunsford	Flat wooded area
<i>Obolaria virginica</i>	Virginia pennywort	30104	ABLI 778	R. White, E. Lunsford	Successional hickory-maple forest
<i>Ophioglossum vulgatum</i>	southern adderstongue	565333	ABLI 652	R. White	Cedar- tulip poplar successional forest
<i>Opuntia humifusa</i>	devil's-tongue	19710	ABLI 753	R. White	Cedar glade

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<i>Orbexilum pedunculatum</i> var. <i>pedunculatum</i>	Sampson's snakeroot	529302	ABLI 779	R. White, E. Lunsford	Dry oak-hickory slope
<i>Osmorhiza claytonii</i>	Clayton's sweetroot	29789	ABLI 653	R. White, M. Webber	Rich tulip poplar slope
<i>Osmorhiza longistylis</i>	longstyle sweetroot	29791	ABLI 654	R. White, HW, G. Talley	Mesic hardwood slope
<i>Osmunda cinnamomea</i>	cinnamon fern	17219	ABLI 655	R. White, HW, G. Talley	Mesic hardwood slope
<i>Ostrya virginiana</i>	Chisos hophornbeam	19511	ABLI 656	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Oxalis stricta</i>	common yellow oxalis	29095	ABLI 657	R. White, M. Webber	Rich tulip poplar slope
<i>Oxalis stricta</i>	common yellow oxalis	29095	ABLI 780	R. White, E. Lunsford	Cedar glade
<i>Oxalis violacea</i>	violet woodsorrel	29098	ABLI 658	R. White, G. Talley	Rich tulip poplar slope
<i>Packera anonyma</i>	Small's ragwort	518137	ABLI 659	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Packera aurea</i>	golden ragwort	518139	ABLI 1450	E. Lunsford	Seasonally dry creekbed
<i>Packera obovata</i>	roundleaf ragwort	565368	ABLI 1451	E. Lunsford	Rich, mesic wooded mid-slope
<i>Panax quinquefolius</i>	American ginseng	29399	ABLI 1452	E. Lunsford	Mesic hardwood slope
<i>Panicum flexile</i>	wiry panicgrass	40918	ABLI 660	R. White, K. Feeman	Cedar glade
<i>Paronychia canadensis</i>	smooth forked nailwort	20325	ABLI 661	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Paspalum setaceum</i> var. <i>muehlenbergii</i>	thin paspalum	538379	ABLI 662	R. White, M. Webber	Rich tulip poplar slope
<i>Paspalum</i> sp.	crowngrass	40990	ABLI 663	R. White	Cultivated meadow
<i>Passiflora lutea</i>	yellow passionflower	22226	ABLI 664	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Pedicularis canadensis</i>	Canadian lousewort	33362	ABLI 1453	E. Lunsford	Unmowed field edge with <i>Ratibida pinnata</i>
<i>Pellaea atropurpurea</i>	purple cliffbrake	17641	ABLI 666	R. White, K. Feeman	Dry oak-hickory slope
<i>Pellaea atropurpurea</i>	purple cliffbrake	17641	ABLI 665	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Penstemon laevigatus</i>	eastern smooth beardtongue	33929	ABLI 1454	E. Lunsford	Wooded edge between creek and field
<i>Phegopteris hexagonoptera</i>	broad beechfern	504296	ABLI 667	R. White, HW, G. Talley	Mesic hardwood slope
<i>Phleum pratense</i>	timothy	41062	ABLI 668	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Phlox divaricata</i>	wild blue phlox	30934	ABLI 669	R. White, HW, G. Talley	Mesic hardwood slope
<i>Physalis virginiana</i>	Virginia groundcherry	30612	ABLI 781	R. White, E. Lunsford	Cedar glade
<i>Physostegia virginiana</i>	obedient plant	32391	ABLI 670	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Pinus virginiana</i>	Virginia pine	183394	ABLI 671	R. White, K. Langdon, T. Leibfreid	Power line right of way
<i>Plantago aristata</i>	largebracted plantain	32875	ABLI 672	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Poa chapmaniana</i>	Chapman's bluegrass	41118	ABLI 1455	E. Lunsford	Cultivated meadow
<i>Poa compressa</i>	Canada bluegrass	41082	ABLI 782	R. White, E. Lunsford	Successional hickory-maple forest
<i>Poaceae</i> sp.	unknown grass	40351	ABLI 673	R. White	Cedar- tulip poplar successional forest

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<i>Polemonium reptans</i>	Greek valerian	31003	ABLI 674	R. White, HW, G. Talley	Mesic hardwood slope
<i>Polygala verticillata</i>	whorled milkwort	29320	ABLI 675	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Polygonum convolvulus</i>	black bindweed	20853	ABLI 676	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Polygonum setaceum</i>	bog smartweed	20926	ABLI 677	R. White, G. Talley	Rich tulip poplar slope
<i>Polymnia canadensis</i>	whiteflower leafcup	36438	ABLI 1456	E. Lunsford	Wooded edge between creek and field
<i>Porteranthus stipulatus</i>	Indian physic	25284	ABLI 783	R. White, E. Lunsford	Dry oak-hickory slope
<i>Prenanthes trifoliolata</i>	gall of the earth	504596	ABLI 679	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Prunus americana</i>	American plum	24763	ABLI 680	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Prunus avium</i>	sweet cherry	24770	ABLI 732	R. White, B. O'Donoghue	Japanese honeysuckle thicket
<i>Pseudognaphalium obtusifolium</i>	rabbittobacco	507657	ABLI 599	R. White, K. Feeman	Successional hickory-maple forest
<i>Pycnanthemum tenuifolium</i>	narrowleaf mountainmint	32668	ABLI 681	R. White, K. Langdon, T. Leibfreid	Power line right of way
<i>Quercus muehlenbergii</i>	chinkapin oak	504714	ABLI 682	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Quercus prinus</i>	chestnut oak	19398	ABLI 683	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Quercus stellata</i>	post oak	19422	ABLI 684	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Ranunculus micranthus</i>	rock buttercup	18628	ABLI 685	R. White, G. Talley	Rich tulip poplar slope
<i>Ratibida pinnata</i>	pinnate prairie coneflower	38343	ABLI 686	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Rhexia mariana</i>	Maryland meadowbeauty	27685	ABLI 687	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Rhus aromatica</i>	fragrant sumac	28779	ABLI 688	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Rotala ramosior</i>	lowland rotnala	27115	ABLI 796	R. White, Webber, M.	Old man-made pond
<i>Rudbeckia hirta</i>	blackeyed Susan	36765	ABLI 689	R. White, Webber, M.	Rich tulip poplar slope
<i>Ruellia humilis</i>	fringeleaf wild petunia	565466	ABLI 690	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Sanguinaria canadensis</i>	bloodroot	18990	ABLI 691	R. White, HW, G. Talley	Mesic hardwood slope
<i>Sanicula odorata</i>	clustered blacksnakeroot	505004	ABLI 1458	E. Lunsford, J. Jones	Creekside terrace with tall forbs and graminoids
<i>Sanicula smallii</i>	Small's blacksnakeroot	29860	ABLI 692	R. White	Cedar- tulip poplar successional forest
<i>Saxifraga virginensis</i>	early saxifrage	24303	ABLI 693	R. White, K. Feeman	Dry oak-hickory slope
<i>Schizachyrium scoparium</i>	little bluestem	42076	ABLI 1459	E. Lunsford	Glade-like area beside mown trail
<i>Scirpus polyphyllus</i>	leafy bulrush	40274	ABLI 784	R. White, E. Lunsford	Dry oak-hickory slope
<i>Scleria oligantha</i>	littlehead nutrush	40314	ABLI 694	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Scutellaria ovata</i> ssp. <i>ovata</i>	heartleaf skullcap	32773	ABLI 695	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Sedum ternatum</i>	woodland stonecrop	24184	ABLI 696	R. White, HW, G. Talley	Mesic hardwood slope
<i>Senna marilandica</i>	Maryland senna	505160	ABLI 697	R. White, K. Langdon, T. Leibfreid	Cedar glade

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<i>Setaria faberi</i>	Japanese bristlegrass	41244	ABLI 698	R. White, M. Webber	Rich tulip poplar slope
<i>Setaria parviflora</i>	marsh bristlegrass	505191	ABLI 699	R. White, K. Feeman	Successional hickory-maple forest
<i>Sida spinosa</i>	prickly fanpetals	21732	ABLI 700	R. White, M. Webber	Rich tulip poplar slope
<i>Silene stellata</i>	widowsfrill	20127	ABLI 701	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Silene virginica</i>	fire pink	20141	ABLI 785	R. White, E. Lunsford	Cedar glade
<i>Sisyrinchium albidum</i>	white blue-eyed grass	43241	ABLI 786	R. White, E. Lunsford	Cedar glade
<i>Smallanthus uvedalius</i>	hairy leafcup	505252	ABLI 1460	E. Lunsford	Wooded edge between creek and field
<i>Smilax glauca</i>	cat greenbrier	43342	ABLI 703	R. White, G. Talley	White oak - hickory upland
<i>Smilax rotundifolia</i>	roundleaf greenbrier	43346	ABLI 704	R. White	Cedar- tulip poplar successional forest
<i>Smilax tamnoides</i>	bristly greenbrier	43348	ABLI 705	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Solidago bicolor</i>	white goldenrod	36234	ABLI 706	R. White, K. Feeman	Successional hickory-maple forest
<i>Solidago caesia</i>	wreath goldenrod	36238	ABLI 707	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Solidago flexicaulis</i>	zigzag goldenrod	36257	ABLI 1461	E. Lunsford	Mesic hardwood slope
<i>Solidago gigantea</i>	giant goldenrod	36259	ABLI 708	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Solidago rugosa</i> ssp. <i>rugosa</i> var. <i>rugosa</i>	wrinkleleaf goldenrod	566814	ABLI 709	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Solidago</i> sp.	goldenrod	36223	ABLI 710	R. White	Cedar- tulip poplar successional forest
<i>Solidago</i> sp.	goldenrod	36223	ABLI 713	R. White, G. Talley	Rich tulip poplar slope
<i>Solidago</i> sp.	goldenrod	36223	ABLI 712	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Solidago</i> sp.	goldenrod	36223	ABLI 711	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Solidago sphacelata</i>	autumn goldenrod	36312	ABLI 714	R. White, K. Feeman	Cedar glade
<i>Solidago ulmifolia</i>	elmleaf goldenrod	36225	ABLI 715	R. White, K. Feeman	Dry oak-hickory slope
<i>Sphenopholis nitida</i>	shiny wedgescale	41281	ABLI 788	R. White, E. Lunsford	Cedar glade
<i>Staphylea trifolia</i>	American bladdernut	28646	ABLI 716	R. White, HW, G. Talley	Mesic hardwood slope
<i>Stellaria pubera</i>	star chickweed	20193	ABLI 1462	E. Lunsford	Mesic hardwood slope
<i>Stylosanthes biflora</i>	sidebeak pencilflower	26973	ABLI 717	R. White, T. Leibfreid, K. Langdon, G. Talley	Cultivated meadow
<i>Symphyotrichum cordifolium</i>	common blue wood aster	522193	ABLI 1463	E. Lunsford	Rich tulip poplar slope
<i>Symphyotrichum dumosum</i>	rice button aster	522200	ABLI 719	R. White, G. Talley	Rich tulip poplar slope
<i>Symphyotrichum dumosum</i> var. <i>dumosum</i>	rice button aster	566329	ABLI 720	R. White, K. Feeman	Successional hickory-maple forest
<i>Symphyotrichum lateriflorum</i>	calico aster	522220	ABLI 721	R. White, M. Webber	Rich tulip poplar slope
<i>Symphyotrichum novae-angliae</i>	New England aster	522226	ABLI 722	R. White, K. Feeman	Cedar glade

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<i>Symphyotrichum novae-angliae</i>	New England aster	522226	ABLI 723	R. White, K. Langdon, T. Leibfreid	Cedar glade
<i>Symphyotrichum shortii</i>	Short's aster	522246	ABLI 724	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Symphyotrichum undulatum</i>	waxyleaf aster	522257	ABLI 725	R. White, K. Feeman	Dry oak-hickory slope
<i>Teucrium canadense</i>	Canada germander	32352	ABLI 1464	E. Lunsford	Edge of seasonally dry creekbed
<i>Thalictrum dioicum</i>	early meadow-rue	18669	ABLI 727	R. White, K. Langdon, T. Leibfreid	Mesic hardwood slope
<i>Thalictrum thalictroides</i>	rue anemone	18683	ABLI 787	E. Lunsford	Oak-hickory slope
<i>Thaspium barbinode</i> var. <i>angustifolium</i>	hairyjoint meadow parsnip	541239	ABLI 1465	E. Lunsford	Wooded edge between creek and field
<i>Thaspium trifoliatum</i>	purple meadowparsnip	29890	ABLI 789	R. White, E. Lunsford	Cedar glade
<i>Tilia americana</i> var. <i>americana</i>	American basswood	530690	ABLI 1466	E. Lunsford, J. Jones	Steep hydrangea-covered limestone seep
<i>Tradescantia virginiana</i>	Virginia spiderwort	39178	ABLI 790	R. White, E. Lunsford	Cedar glade
<i>Tragia cordata</i>	heartleaf noseburn	28428	ABLI 728	R. White, K. Feeman	Cedar glade
<i>Trillium flexipes</i>	nodding wakerobin	43071	ABLI 729	R. White, G. Talley	Rich tulip poplar slope
<i>Trillium sessile</i>	toadshade	43088	ABLI 730	R. White, G. Talley	Rich tulip poplar slope
<i>Typha angustifolia</i>	narrowleaf cattail	42325	ABLI 795	R. White, M. Webber	Old man-made pond
<i>Ulmus alata</i>	winged elm	19051	ABLI 1467	E. Lunsford	Dry upper slope
<i>Uvularia perfoliata</i>	perfoliate bellwort	43110	ABLI 734	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Vaccinium arboreum</i>	farkleberry	23580	ABLI 735	R. White, K. Feeman	Dry oak-hickory slope
<i>Vaccinium pallidum</i>	Blue Ridge blueberry	23610	ABLI 736	R. White, K. Feeman	Dry oak-hickory slope
<i>Vaccinium stamineum</i>	deerberry	23615	ABLI 737	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Valeriana pauciflora</i>	largeflower valerian	35364	ABLI 739	R. White, M. Webber	Rich tulip poplar slope
<i>Valeriana pauciflora</i>	largeflower valerian	35364	ABLI 738	R. White, G. Talley	Rich tulip poplar slope
<i>Valerianella locusta</i>	Lewiston cornsalad	35392	ABLI 740	R. White, G. Talley	Rich tulip poplar slope
<i>Valerianella radiata</i>	beaked cornsalad	35397	ABLI 791	R. White, E. Lunsford	Successional hickory-maple forest
<i>Verbena simplex</i>	narrowleaf vervain	32123	ABLI 792	R. White, E. Lunsford	Successional hickory-maple forest
<i>Verbesina alternifolia</i>	wingstem	38597	ABLI 741	R. White, G. Talley	Rich tulip poplar slope
<i>Verbesina helianthoides</i>	gravelweed	38604	ABLI 1468	E. Lunsford	Dry upper slope
<i>Verbesina helianthoides</i>	gravelweed	38604	ABLI 742	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Verbesina virginica</i>	white crownbeard	38613	ABLI 743	R. White, K. Feeman	Successional hickory-maple forest
<i>Veronica arvensis</i>	corn speedwell	33411	ABLI 744	R. White, G. Talley	Rich tulip poplar slope
<i>Viburnum carlesii</i>	Koreanspice viburnum		ABLI 1469	E. Lunsford	Red cedar successional forest with Black cherry
<i>Viburnum opulus</i>	European cranberrybush	35270	ABLI 1470	E. Lunsford	Red cedar successional forest with dogwood; trailside
<i>Vicia caroliniana</i>	Carolina vetch	26334	ABLI 745	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

List of NatureServe vouchers

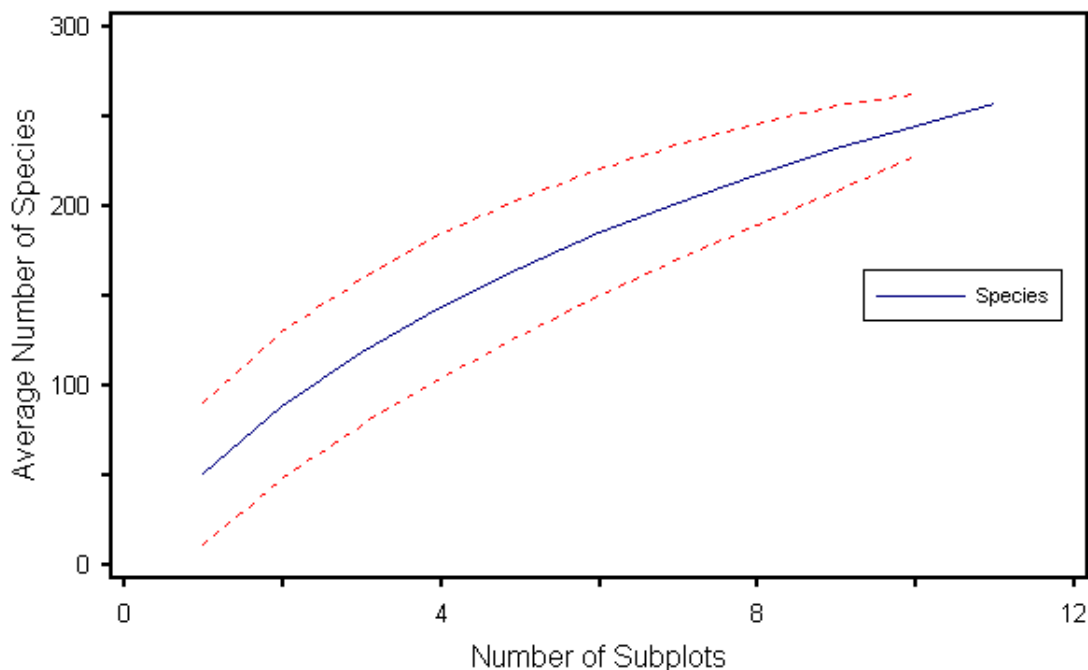
Documented Latin Name	Common Name	TSN	Catalog	Collector	Habitat
<i>Viola affinis</i>	sand violet	22035	ABLI 756	E. Lunsford	Sycamore bottomland woods
<i>Viola canadensis</i>	Canadian white violet	22053	ABLI 746	R. White, HW, G. Talley	Mesic hardwood slope
<i>Viola canadensis</i> var. <i>canadensis</i>	Canadian white violet	530825	ABLI 747	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Viola palmata</i>	early blue violet	22125	ABLI 793	R. White, E. Lunsford	Dry oak-hickory slope
<i>Viola palmata</i> var. <i>palmata</i>	violet	531142	ABLI 748	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Viola pubescens</i> var. <i>scabriuscula</i>	downy yellow violet	531467	ABLI 749	R. White, G. Talley	Rich tulip poplar slope
<i>Viola</i> sp.	violet	22030	ABLI 750	R. White, HW, G. Talley	Mesic hardwood slope
<i>Vitis aestivalis</i>	summer grape	28607	ABLI 1471	E. Lunsford	Edge of seasonally dry creekbed and banks
<i>Vitis rotundifolia</i>	muscadine	28609	ABLI 751	R. White	Cultivated meadow
<i>Vitis vulpina</i>	frost grape	28610	ABLI 752	R. White, K. Langdon, T. Leibfreid	Mixed mesophytic forest
<i>Wolffia</i>	watermeal	42601	ABLI 794	R. White, M. Webber	Old man-made pond

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

Figure 3. Species area curves for Abraham Lincoln Birthplace National Historic Site

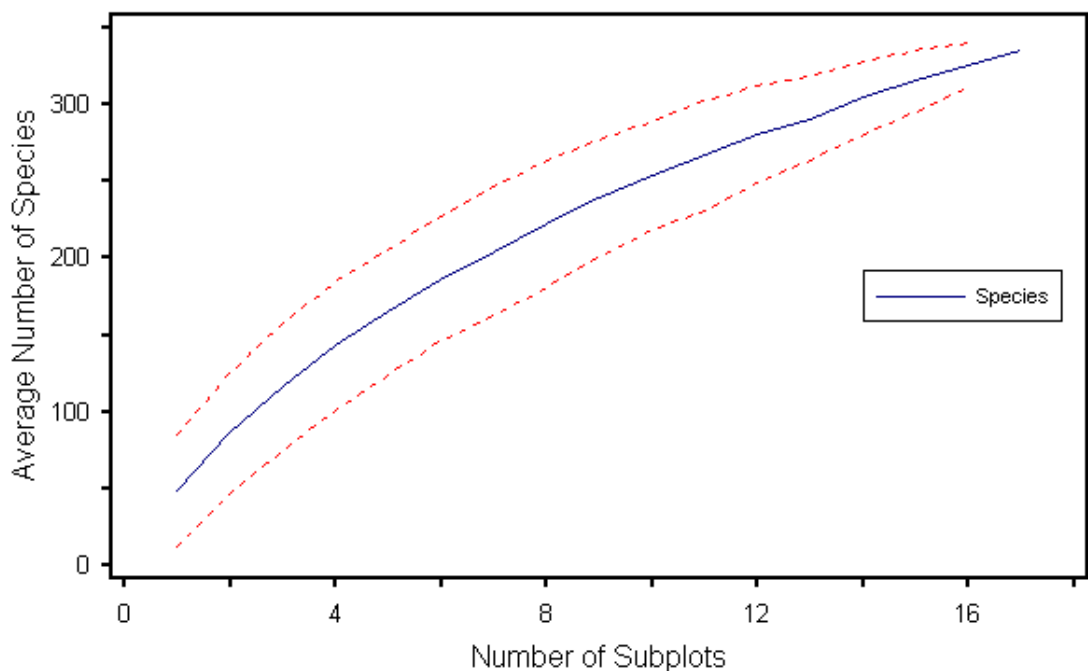
a) from only the 11 gridded plots in the park, and b) from all 17 full plots.

a)



First-order jackknife estimate of number of species in park = 375.2
Second-order jackknife estimate of number of species in park = 436.6

b)



First-order jackknife estimate of number of species in park = 497.9
Second-order jackknife estimate of number of species in park = 597.5

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

	Diversity Measures			
	N	alpha	beta	Gamma
Gridded plots only	11	51.3	5	257
Plots off grid only	6	43.8	4	175
All plots	17	48.6	6.9	336

alpha = average species richness per plot

beta = measure of the heterogeneity of the data (gamma/alpha)

gamma = total # of species

	Jackknife estimate of # of species in park	If estimate is correct, % of species confirmed for park (based on 553 species documented)
First-order jackknife estimate (all plots)	497.9	111%
Second-order jackknife estimate (all plots)	597.5	92.5%
First-order jackknife estimate (gridded plots only)	375.2	147%
Second-order jackknife estimate (gridded plots only)	436.6	127%

Table 5. List of exotic species documented from Abraham Lincoln Birthplace National Historic Site

Scientific Name	Common name	TSN	Threat?	Source
<i>Achillea millefolium</i>	common yarrow	35423		http://plants.usda.gov 2007
<i>Allium oleraceum</i>	field garlic	42689		http://plants.usda.gov 2007
<i>Allium vineale</i>	wild garlic	42637	Lesser Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Anthemis arvensis</i>	corn chamomile	36331		http://plants.usda.gov 2007
<i>Artemisia vulgaris</i>	common wormwood	35505	Significant Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Berberis thunbergii</i>	Japanese barberry	18835	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Bromus commutatus</i>	meadow brome	40497	Significant Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Bromus japonicus</i>	Japanese brome	40479	Significant Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Buglossoides arvensis</i>	corn gromwell	501090	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Calystegia sepium</i>	hedge false bindweed	30650		Weeds of KY and Adjacent States, 1991
<i>Cardamine hirsuta</i>	hairy bittercress	22797		Weeds of KY and Adjacent States, 1991
<i>Carduus nutans</i>	nodding plumeless thistle	35787	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Celastrus orbiculatus</i>	oriental bittersweet	27975	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Centaurea biebersteinii</i>	spotted knapweed	501347	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Cerastium fontanum</i> ssp. <i>vulgare</i>	big chickweed	523831		Weeds of KY and Adjacent States, 1991
<i>Cirsium vulgare</i>	bull thistle	36428	Significant Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Commelina communis</i>	Asiatic dayflower	39127	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Cynodon dactylon</i>	Bermudagrass	41619		Weeds of KY and Adjacent States, 1991il
<i>Dactylis glomerata</i> ssp. <i>glomerata</i>	orchardgrass	193447		http://plants.usda.gov 2007
<i>Daucus carota</i>	Queen Anne's lace	29477	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Dianthus armeria</i>	Deptford pink	20276	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Digitaria ischaemum</i>	smooth crabgrass	40637		http://plants.usda.gov 2007
<i>Dipsacus fullonum</i>	Fuller's teasel	35404	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Draba verna</i>	spring draba	22923		Weeds of KY and Adjacent States, 1991
<i>Duchesnea indica</i>	Indian strawberry	25163	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Elaeagnus umbellata</i>	autumn olive	27776	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Euonymus alata</i>	burning bush	502576	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Euonymus fortunei</i>	winter creeper	27950	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Festuca trachyphylla</i>	hard fescue	502613		http://plants.usda.gov 2007
<i>Galinsoga quadriradiata</i>	shaggy-soldier	37415		Weeds of KY and Adjacent States, 1991
<i>Geranium dissectum</i>	cutleaf geranium	29135		http://plants.usda.gov 2007
<i>Glechoma hederacea</i>	ground ivy	502801	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Hedera helix</i>	English ivy	29393	Significant Threat	Kentucky Exotic Pest Plant Council, 2007

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

List of exotic species found at ABLI

Scientific Name	Common name	TSN	Threat?	Source
<i>Hemerocallis fulva</i>	orange daylily	42943	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Ipomoea purpurea</i>	tall morning-glory	30789	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Kummerowia striata</i>	Japanese clover	503294	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Lamium amplexicaule</i>	henbit deadnettle	32539	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Lespedeza cuneata</i>	Chinese lespedeza	25898		http://plants.usda.gov 2007
<i>Leucanthemum vulgare</i>	oxeye daisy	37903	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Ligustrum sinense</i>	Chinese privet	32979	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Lolium arundinaceum</i>	tall fescue	507979	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Lolium pratense</i>	meadow ryegrass	507983		http://plants.usda.gov 2007
<i>Lonicera japonica</i>	Japanese honeysuckle	35283	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Lonicera maackii</i>	Amur honeysuckle	35298	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Malus pumila</i>	paradise apple	25262		http://plants.usda.gov 2007
<i>Medicago sativa</i> ssp. <i>sativa</i>	alfalfa	524303		http://plants.usda.gov 2007
<i>Melilotus albus</i>	white sweetclover	26149	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Melilotus officinalis</i>	yellow sweetclover	26150	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Microstegium vimineum</i>	Nepalese browntop	503829	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Morus alba</i>	white mulberry	19066	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Ornithogalum umbellatum</i>	sleepydick	42754	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Perilla frutescens</i>	beefsteakplant	32634	Significant Threat	http://threatsummary.foresthreats.org/threats/threatSummaryViewer.cfm?threatID=227
<i>Phleum pratense</i>	timothy	41062		http://plants.usda.gov 2007
<i>Plantago lanceolata</i>	narrowleaf plantain	32874		Weeds of KY and Adjacent States, 1991
<i>Poa annua</i>	annual bluegrass	41107	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Poa compressa</i>	Canada bluegrass	41082	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Poa pratensis</i>	Kentucky bluegrass	41088	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Polygonum caespitosum</i>	oriental ladythumb	20852	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Polygonum convolvulus</i>	black bindweed	20853		http://plants.usda.gov 2007
<i>Potentilla recta</i>	sulphur cinquefoil	24742	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Prunella vulgaris</i>	common selfheal	32381	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Prunus avium</i>	sweet cherry	24770		http://plants.usda.gov 2007
<i>Rosa multiflora</i>	multiflora rose	24833	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Rubus phoenicolasius</i>	wine raspberry	25017	Lesser Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Rumex acetosella</i>	common sheep sorrel	20934	Lesser Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Rumex obtusifolius</i>	bitter dock	20939		http://plants.usda.gov 2007

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

List of exotic species found at ABLI

Scientific Name	Common name	TSN	Threat?	Source
<i>Saponaria officinalis</i>	bouncingbet	20039		Weeds of KY and Adjacent States, 1991
<i>Setaria faberi</i>	Japanese bristlegrass	41244	Significant Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Setaria pumila</i>	yellow bristlegrass	505192	Significant Threat	Tennessee Exotic Pest Plant Council, 2007
<i>Sorghum halepense</i>	Johnsongrass	42111	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Stellaria media</i>	common chickweed	20169	Severe Threat	Kentucky Exotic Pest Plant Council, 2007
<i>Taraxacum officinale</i>	common dandelion	36213		Weeds of KY and Adjacent States, 1991
<i>Trifolium campestre</i>	field clover	26231		Weeds of KY and Adjacent States, 1991
<i>Trifolium dubium</i>	suckling clover	26205		http://plants.usda.gov 2007
<i>Trifolium pratense</i>	red clover	26313		http://plants.usda.gov 2007
<i>Trifolium repens</i>	white clover	26206		http://plants.usda.gov 2007
<i>Typha angustifolia</i>	narrowleaf cattail	42325	Possible threat	Flora of North America, Volume 22
<i>Valerianella locusta</i>	Lewiston cornsalad	35392		http://plants.usda.gov 2007
<i>Veronica agrestis</i>	green field speedwell	33409		http://plants.usda.gov 2007
<i>Veronica arvensis</i>	corn speedwell	33411		http://plants.usda.gov 2007
<i>Veronica persica</i>	birdeye speedwell	33405		http://plants.usda.gov 2007
<i>Viburnum carlesii</i>	Koreanspice viburnum	-1		http://plants.usda.gov 2007
<i>Viburnum opulus</i>	European cranberrybush	35270		http://plants.usda.gov 2007
<i>Vinca minor</i>	common periwinkle	30238	Significant Threat	Kentucky Exotic Pest Plant Council, 2007

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

Table 6. Ecological Associations and affiliated plots at ABLI

All ecological associations identified and potentially occurring at Abraham Lincoln Birthplace National Historic Site, with their code, names, global rank, and affiliated plots.

CEGL #	Ecological Association Common Name	Scientific Name	Translated Name	Ecological System	Plots	Global Rank
Forest						
CEGL008429	Rich Levee Mixed Hardwood Bottomland Forest	<i>Platanus occidentalis</i> - <i>Celtis laevigata</i> - <i>Liriodendron tulipifera</i> / <i>Lindera benzoin</i> - <i>Arundinaria gigantea</i> / <i>Amphicarpaea bracteata</i> Forest	Sycamore - Sugarberry - Tuliptree / Northern Spicebush - Giant Cane / American Hog-peanut Forest	South-Central Interior Small Stream and Riparian (CES202.706)	ABLI.14 ABLI.17 ABLI.19 ABLI.24 ABLI.27	G4?
CEGL002411	Beech - Maple Unglaciaded Forest	<i>Fagus grandifolia</i> - <i>Acer saccharum</i> - <i>Liriodendron tulipifera</i> Unglaciaded Forest	American Beech - Sugar Maple - Tuliptree Unglaciaded Forest	South-Central Interior Mesophytic Forest (CES202.887)	ABLI.11	G4?
CEGL004741	Interior Low Plateau Mesic Sugar Maple - Hickory Forest	<i>Acer saccharum</i> - <i>Carya ovata</i> - <i>Juglans nigra</i> / <i>Symphoricarpos orbiculatus</i> / <i>Polymnia canadensis</i> - <i>Bromus pubescens</i> Forest	Maple - Shagbark Hickory - Black Walnut / Coralberry / Canada Leafcup - Common Eastern Brome Forest	South-Central Interior Mesophytic Forest (CES202.887)	ABLI.5 ABLI.10	G3G4
CEGL005018	Southern Red Oak - Mixed Oak Forest	<i>Quercus falcata</i> - <i>Quercus alba</i> - <i>Quercus stellata</i> - <i>Quercus velutina</i> Forest	Southern Red Oak - White Oak - Post Oak - Black Oak Forest	Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)	ABLI.16 ABLI.18 ABLI.25	G3G5
CEGL002070	White Oak - Mixed Oak Dry-Mesic Alkaline Forest	<i>Quercus alba</i> - <i>Quercus rubra</i> - <i>Quercus muehlenbergii</i> / <i>Cercis canadensis</i> Forest	White Oak - Northern Red Oak - Chinquapin Oak / Eastern Redbud Forest	Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)	ABLI.6 ABLI.7 ABLI.12 ABLI.20 ABLI.21	G4G5

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

Ecological Associations at ABLI

CEGL #	Ecological Association Common Name	Scientific Name	Translated Name	Ecological System	Plots	Global Rank
Shrubland						
CEGL004708	Highland Rim Limestone Cliff/Talus Seep	<i>Hydrangea arborescens</i> / <i>Impatiens (capensis, pallida)</i> - <i>Heuchera villosa</i> Shrubland	Smooth Hydrangea / (Orange Jewelweed, Yellow Jewelweed) - Rock Alumroot Shrubland	Central Interior Calcareous Cliff and Talus (CES202.690)	ABLI.26	G3
CEGL003836	Floodplain Canebrake	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i> Shrubland	Giant Cane Shrubland	South-Central Interior Small Stream and Riparian (CES202.706)	Potential for restoration	G2?
Herbaceous vegetation						
CEGL005131	Central Limestone Glade	<i>Quercus muehlenbergii</i> - <i>Juniperus virginiana</i> / <i>Schizachyrium scoparium</i> - <i>Manfreda virginica</i> Wooded Herbaceous Vegetation	Chinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation	Central Interior Highlands Calcareous Glade and Barrens (CES202.691)	ALBI.13	G2G3
Successional / Human-modified						
CEGL004048	Cultivated Meadow	<i>Lolium (arundinaceum, pratense)</i> Herbaceous Vegetation	(Tall Fescue, Meadow Fescue) Herbaceous Vegetation	Human Modified/ Successional	no plot; present	GNA
CEGL004044	Successional Broom-sedge Vegetation	<i>Andropogon virginicus</i> var. <i>virginicus</i> Herbaceous Vegetation	Broomsedge Bluestem Herbaceous Vegetation	Human Modified/ Successional	ABLI.4	GNA
CEGL007124	Red-cedar Successional Forest	<i>Juniperus virginiana</i> var. <i>virginiana</i> - (<i>Quercus</i> spp.) Forest	Eastern Red-cedar - (Oak species) Forest	Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)	ABLI.2	GNA
CEGL002591	Virginia Pine Successional Forest	<i>Pinus virginiana</i> Successional Forest	Virginia Pine Successional Forest	Southern Appalachian Low-Elevation Pine Forest (CES202.332)	ABLI.8	GNA

^ Probably present (ID may be uncertain). ^^ Unconfirmed (ID uncertain).

Ecological Associations at ABLI

CEGL #	Ecological Association Common Name	Scientific Name	Translated Name	Ecological System	Plots	Global Rank
Successional / Human-modified, cont.						
CEGL004133	Southeastern Successional Black Cherry Forest	<i>Prunus serotina</i> - <i>Sassafras albidum</i> - (<i>Fraxinus americana</i>) / <i>Juniperus virginiana</i> Forest	Black Cherry - Sassafras - (White Ash) / Eastern Red-cedar Forest	Southern Interior Low Plateau Dry- Mesic Oak Forest (CES202.898)	ABLI.15 ABLI.22 ABLI.23	GNA
CEGL007220	Successional Tuliptree Forest (Circumneutral Type)	<i>Liriodendron tulipifera</i> / (<i>Cercis canadensis</i>) / (<i>Lindera benzoin</i>) Forest	Tuliptree / (Eastern Redbud) / (Northern Spicebush) Forest	South-Central Interior Mesophytic Forest (CES202.887)	ABLI.1 ABLI.9	GNA

Global rank

G1 = Critically imperiled globally

G2 = Imperiled globally

G3 = Rare or uncommon

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

G5 = Demonstrably widespread, abundant and secure

G? = Unranked

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

Qualifiers:

? = Inexact numeric rank

Q = Questionable taxonomy

Table 7. Index of Plot photo names and photo descriptions for Abraham Lincoln Birthplace National Historic Site

Photo file name	Date Taken	Description of photo
Plot photos		
5-ABLI_1~100.JPG	4/30/2002	Plot 1, transect from conduit @135 degrees (SE)
6-ABLI_1~101.JPG	4/30/2002	Plot 1, SW from conduit
7-ABLI_1~102.JPG	4/30/2002	Plot 1, NW from conduit
8-ABLI_1~103.JPG	4/30/2002	Plot 1, NE from conduit
9-ABLI_1~104.JPG	4/30/2002	Plot 1, ground cover
33-ABLI_2.JPG	7/16/2002	Plot 2, south from conduit (40 m from intensive plot)
34-ABLI_2.JPG	7/16/2002	Plot 2, west from conduit (40 m from intensive plot)
35-ABLI_2.JPG	7/16/2002	Plot 2, north from conduit (40 m from intensive plot)
36-ABLI_2.JPG	7/16/2002	Plot 2, east from conduit (looking toward intensive plot)
37-ABLI_2.JPG	7/16/2002	Plot 2, at intensive plot
29-ABLI_3.JPG	7/16/2002	Plot 3, transect from conduit @ 90 degrees (E)
30-ABLI_3.JPG	7/16/2002	Plot 3, south from conduit
31-ABLI_3.JPG	7/16/2002	Plot 3, west from conduit
32-ABLI_3.JPG	7/16/2002	Plot 3, north from conduit
20-ABLI_4.JPG	7/15/2002	Plot 4, south from conduit
21-ABLI_4.JPG	7/15/2002	Plot 4, west from conduit
22-ABLI_4.JPG	7/15/2002	Plot 4, north from conduit
23-ABLI_4.JPG	7/15/2002	Plot 4, east from conduit
24-ABLI_4.JPG	7/15/2002	Plot 4, in 10x50 intensive plot
25-ABLI_4.JPG	7/15/2002	Plot 4, in 10x50 intensive plot
1-ABLI_5.JPG	7/14/2002	Plot 5, SW from conduit
2-ABLI_5.JPG	7/14/2002	Plot 5, NW (upslope) from conduit
3-ABLI_5.JPG	7/14/2002	Plot 5, NE from conduit
4-ABLI_5.JPG	7/14/2002	Plot 5, SE (downslope) from conduit
5-ABLI_5.JPG	7/14/2002	Plot 5, surveyors working
6-ABLI_5-HEXA_SPI.JPG	7/14/2002	Plot 5, Hexalectris spicata
7-ABLI_5-HEXA_SPI.JPG	7/14/2002	Plot 5, Hexalectris spicata
8-ABLI_5-HEXA_SPI.JPG	7/14/2002	Plot 5, Hexalectris spicata
10-ABLI_6.JPG	7/14/2002	Plot 6, east from plot center/conduit
11-ABLI_6.JPG	7/14/2002	Plot 6, south from plot center/conduit
12-ABLI_6.JPG	7/14/2002	Plot 6, west from plot center/conduit
13-ABLI_6.JPG	7/14/2002	Plot 6, north from plot center/conduit
13-ABLI_7.JPG	10/8/2002	Plot 7, transect from conduit @180 degrees (south)
14-ABLI_7.JPG	10/8/2002	Plot 7, west from conduit
15-ABLI_7.JPG	10/8/2002	Plot 7, north from conduit
16-ABLI_7.JPG	10/8/2002	Plot 7, east from conduit
43-ABLI~8.JPG	10/12/2002	Plot 8, transect from conduit @ 90 degrees (east)
44-ABLI~8.JPG	10/12/2002	Plot 8, south from conduit
45-ABLI~8.JPG	10/12/2002	Plot 8, west from conduit
46-ABLI~8.JPG	10/12/2002	Plot 8, north from conduit
13-ABLI_9~107.JPG	4/30/2002	Plot 9, transect from plot center @ 290 degrees (W-NW)
14-ABLI_9~108.JPG	4/30/2002	Plot 9, N-NE from plot center

Index of photographs taken at ABLI

Photo file name	Date Taken	Description of photo
15-ABLI_9~109.JPG	4/30/2002	Plot 9, transect from plot center @ 110 degrees (E-SE)
16-ABLI_9~110.JPG	4/30/2002	Plot 9, S-SE from plot center
7-ABLI_10.JPG	10/8/2002	Plot 10, transect from conduit @ 68 degrees (E-NE)
8-ABLI_10.JPG	10/8/2002	Plot 10, N-NE from conduit (surveyor at work)
9-ABLI_10.JPG	10/8/2002	Plot 10, E-SE from conduit
10-ABLI_10.JPG	10/8/2002	Plot 10, S-SE from conduit
11-ABLI_10.JPG	10/8/2002	Plot 10, W-SW from conduit
12-ABLI_10.JPG	10/8/2002	Plot 10, N-NW from conduit
2-ABLI_11~96.JPG	4/29/2002	Plot 11, sideslope, W-NW from conduit
3-ABLI_11~97.JPG	4/29/2002	Plot 11, downslope, N-NE from conduit
4-ABLI_11~98.JPG	4/29/2002	Plot 11, sideslope, transect from conduit @ 120 degrees
5-ABLI_11~99.JPG	4/29/2002	Plot 11, upslope, S-SW from conduit
17-ABLI_12~111.JPG	4/30/2002	Plot 12, E-NE from conduit
18-ABLI_12~112.JPG	4/30/2002	Plot 12, S-SE from conduit
19-ABLI_12~113.JPG	4/30/2002	Plot 12, W-SW from conduit
20-ABLI_12~114.JPG	4/30/2002	Plot 12, N-NW from conduit
14-ABLI_13.JPG	7/15/2002	Plot 13, sideslope, east from conduit
15-ABLI_13.JPG	7/15/2002	Plot 13, downslope, south from conduit
16-ABLI_13.JPG	7/15/2002	Plot 13, sideslope, west from conduit
17-ABLI_13.JPG	7/15/2002	Plot 13, upslope, north from conduit
18-glade-ABLI_13.JPG	7/15/2002	Plot 13, glade area upslope
19-glade-ABLI_13.JPG	7/15/2002	Plot 13, glade area upslope
10-A-BP-22Viburnum.JPG	4/13/2005	Plot 22, exotic viburnum
11-A-BP-22.JPG	4/13/2005	Plot 22
87-ABLI_24-E-witness tree.JPG	6/30/2005	Plot 24, 3-trunked Sycamore witness tree (east of trail)
88-ABLI_24-S.JPG	6/30/2005	Plot 24, south from jct of trail and transect
89-ABLI_24-W.JPG	6/30/2005	Plot 24, west from jct of trail and transect
90-ABLI_24-N~REPORT.JPG	6/30/2005	Plot 24, north from jct of trail and transect
13-A-BP-24.JPG	4/13/2005	Plot 24 in spring
14-A-BP-24.JPG	4/13/2005	Plot 24 in spring
15-A-BP-24.JPG	4/13/2005	Plot 24 in spring
16-A-BP-24.JPG	4/13/2005	Plot 24 in spring
17-A-BP-24Ulmus-blight.JPG	4/13/2005	Plot 24, a blight on many of the elm saplings
1-ABLI_25-N.JPG	6/30/2005	Plot 25, north from conduit
2-ABLI_25-E.JPG	6/30/2005	Plot 25, east from conduit
3-ABLI_25-S.JPG	6/30/2005	Plot 25, south from conduit
4-ABLI_25-W.JPG	6/30/2005	Plot 25, west from conduit
10-ABLI_26Upslope.JPG	6/26/2005	Plot 26, upslope - south from GPS point
11-ABLI_26Westward.JPG	6/26/2005	Plot 26, west from GPS point
12-ABLI_26Eastward.JPG	6/26/2005	Plot 26, east from GPS point
13-ABLI_26Eastward.JPG	6/26/2005	Plot 26, looking east from west of the GPS point
14-ABLI_26Hydrangea.JPG	6/26/2005	Plot 26, up close of Hydrangea arborea
15-ABLI_26Hydrangea.JPG	6/26/2005	Plot 26, up close of Hydrangea arborea

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11-ABLI_9-panax105.JPG	4/30/2002	Panax quinquefolius, Plot 9
12-ABLI_9-panax106.JPG	4/30/2002	Panax quinquefolius, Plot 9
16-ABLI_11Pana-qui-VOUCHER.JPG	6/26/2005	Panax quinquefolius, Plot 11
19-ABLI-RUDB-A-Pedi-can-VOUCHER.JPG	6/26/2005	Pedicularis canadensis, from collection pt RUDB-A
62-ABLI_27Caly-sep-VOUCHER.JPG	6/29/2005	Calystegia sepium, Plot 27
63-ABLI_27Caly-sep-VOUCHER.JPG	6/29/2005	Calystegia sepium, Plot 27
71-ABLI-Afield-Dipsacus-full-VOUCHER.JPG	6/29/2005	Dipsacus fullonum, from collection pt Afield
72-ABLI-Afield-Dipsacus-full-VOUCHER.JPG	6/29/2005	Dipsacus fullonum, from collection pt Afield
73-ABLI-Afield-Dipsacus-full-VOUCHER.JPG	6/29/2005	Dipsacus fullonum, from collection pt Afield
79-ABLI-near-afield-Euon-atr-VOUCHER.JPG	6/29/2005	Euonymus atropurpurea, near collection pt Afield
83-ABLI_ afield-Small-uveVOUCHER.JPG	6/29/2005	Smallanthus uvedalius, near collection pt Afield
86-ABLI_ afield-Polym-canVOUCHER.JPG	6/29/2005	Polymnia canadensis, near collection pt Afield
5-ABLI_10-Aris-dra-VOUCHER.JPG	6/30/2005	Arisaema dracontium, Plot 10
Wildflowers/plants and scenery at ABLI		
Mertensiavirginica1.JPG	4/16/2004	Virginia bluebells
Mertensiavirginica2.JPG	4/16/2004	Virginia bluebells
Mertensiavirginica3.JPG	4/16/2004	Virginia bluebells
Mitelladiphylla1.JPG	4/16/2004	Two Leaf Bishops' Cap
Mitelladiphylla2.JPG	4/16/2004	Two Leaf Bishops' Cap
Mitelladiphylla3.JPG	4/16/2004	Two Leaf Bishops' Cap
19Arabis-laev-aboveABLI-20.JPG	4/14/2005	Smooth rockcress near Plot 20
20Arabis-laev-aboveABLI-20.JPG	4/14/2005	Smooth rockcress near Plot 20
21CelandinePoppy&Delphin-KnobCrk.JPG	4/14/2005	Celandine poppy and Delphinium
22CelandinePoppy-KnobCrk-ABLI.JPG	4/14/2005	Celandine poppy
23Delphinium-KnobCrk-ABLI.JPG	4/14/2005	Dwarf larkspur
24Trillium-flexipes-KnobCrk-ABLI.JPG	4/14/2005	Nodding wakerobin (trillium)
25Trillium-flexipes-KnobCrk-ABLI.JPG	4/14/2005	Nodding wakerobin (trillium)
26Dutchman's-Britches-KnobCrk-ABLI.JPG	4/14/2005	Dutchman's breeches
1-ABLI_22Phryma.JPG	6/25/2005	American lopseed
2-ABLI_22Geum-can.JPG	6/25/2005	White avens
3-ABLI_22Quer-imb.JPG	6/25/2005	Shingle oak
4-ABLI_22Circ-lut-can.JPG	6/25/2005	Broad-leaf enchanter's nightshade
5-ABLI_1Ipom~pan.JPG	6/26/2005	Morning glory
6-ABLI_1Ambr-tri.JPG	6/26/2005	Great ragweed
7-ABLI_26Hydr-can.JPG	6/26/2005	Bluntleaf waterleaf
8-ABLI_26Hydr-can.JPG	6/26/2005	Bluntleaf waterleaf
9-ABLI_26Hydr-can.JPG	6/26/2005	Bluntleaf waterleaf
17-ABLI_11Adia-ped.JPG	6/26/2005	Northern maidenhair
18-ABLI_11Adia-ped-REPORT.JPG	6/26/2005	Northern maidenhair
53-ABLI_ birthplace spring.JPG	6/29/2005	Fern at natural spring at Birthplace
54-ABLI_ birthplace spring.JPG	6/29/2005	Fern at natural spring at Birthplace
55-ABLI_ birthplace spring.JPG	6/29/2005	Fern at natural spring at Birthplace
57-ABLI_27Mona-fis.JPG	6/29/2005	Oswego tea

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59-ABLI_27Saponaria.JPG	6/29/2005	Bouncing Bet
69-ABLI-Sapo-off.JPG	6/29/2005	Bouncing Bet
70-ABLI-Sapo-off.JPG	6/29/2005	Bouncing Bet
60-ABLI_27Cyna-lae.JPG	6/29/2005	Honeyvine
61-ABLI_27Cyna-lae.JPG	6/29/2005	Honeyvine
66-ABLI-KC-Castanea-dent.JPG	6/29/2005	American Chestnut
67-ABLI-KC-Castanea-dent.JPG	6/29/2005	American Chestnut
68-ABLI-KC-Castanea-dent.JPG	6/29/2005	American Chestnut
74-ABLI-rich-slope-plant.JPG	6/29/2005	
75-ABLI-rich-slope-plant.JPG	6/29/2005	
80-ABLI_ afield-Penst-dig.JPG	6/29/2005	Foxglove beardtongue
81-ABLI_ afield-Penst-dig.JPG	6/29/2005	Foxglove beardtongue
91-ABLI_ fields~REPORT.JPG	6/30/2005	Fields at Boyhood home
6-ABLI-Asclepias-tuberosa.JPG	6/30/2005	Butterfly milkweed
7-ABLI-Lobe-spic.JPG	6/30/2005	Palespike lobelia
8-ABLI-Lobe-spic.JPG	6/30/2005	Palespike lobelia

Appendix I. Plot sheet used for permanent plots at ABLI

SEVENTEEN PARKS PROJECT: Permanent Plot Sampling Form

Page 1

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

Provisional community name _____

Classified community name _____

Classifier _____ Date _____ NVC ELCODE _____

Survey date: _____ Surveyor initials: _____

Directions to plot: _____

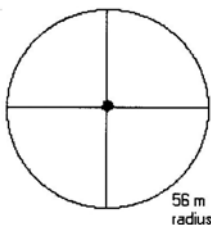
Tagged tree is a _____ of _____ cm dbh with tag # _____. Conduit is at a bearing of _____ degrees and _____ m from tree.

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

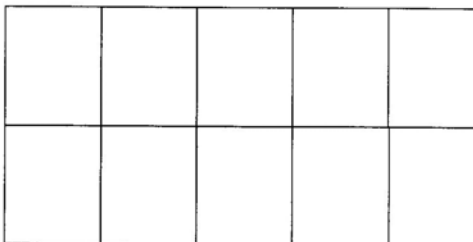
Time taken to walk to plot: _____

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

Plot representativeness -Is the 1 hectare all the same? ____YES ____NO - If not, depict in circle below)



1 ha circle



20 x 50 Meter plot

Est. Extent of occurrence of community: _____

_____ degrees = bearing of centerline

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

PIC # _____ Description of pic(s): _____

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

GPS Techniques/Equipment _Garmin GPS III Plus_ Datum(pick one) _NAD 83_OR_NAD27_ Zone: _16_OR_17_

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

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

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

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ENVIRONMENTAL / SITE INFORMATION

Community Survey
Page 2

Page 3

QUANTITATIVE VEGETATION SAMPLE

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

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

[illegible]

Page 4

SPECIES COMPOSITION AND COVER/ABUNDANCE CLASS BY STRATUM

[illegible]

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

Community Survey
Page 4

**Appendix II. Photos of selected plots of Abraham Lincoln Birthplace
National Historic Site.**



Plot 11 Northern maidenhair fern
(*Adiantum pedatum*)



Plot 11 Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit:
Beech – Maple Unglaciated Forest



Plot 26 Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit:
Limestone Cliff/Talus Seep



Plot 26 Smooth hydrangea
(*Hydrangea arborescens*)



Plot 5 Abraham Lincoln Birthplace National Historic Site/Boyhood Home Unit: Interior Low Plateau Mesic Sugar Maple - Hickory Forest



**Looking downhill from Plot 5
Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit**



**Plot 24 Abraham Lincoln Birthplace
National Historic Site/ Birthplace Unit:
Rich Levee Mixed Hardwood Bottomland Forest**



**Plot 13 Abraham Lincoln Birthplace
National Historic Site/ Boyhood Home Unit:
Central Limestone Glade**



**Fields at Abraham Lincoln Birthplace
National Historic Site/ Boyhood Home Unit.
(Plot 9 is on low slope of knob to the right.)**



**Plot 9 Abraham Lincoln Birthplace
National Historic Site/ Boyhood Home Unit:
Successional Tuliptree Forest
(Circumneutral Type).**



**Plot 6 Abraham Lincoln Birthplace
National Historic Site/ Boyhood Home Unit:
White Oak - Mixed Oak Dry-Mesic Alkaline
Forest.**



**Teresa Leibfreid, Gary Talley and Keith Langdon
at Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit**



**Dwarf larkspur (*Delphinium tricorne*) at
Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit:
Rich Levee Mixed Hardwood Bottomland Forest**



**Spiked crested coralroot (*Hexalectris spicata*) at
Abraham Lincoln Birthplace
National Historic Site/ Boyhood Home Unit**



**Abraham Lincoln Birthplace
National Historic Site/Birthplace Unit:
ferns growing at sinking spring**



**Abraham Lincoln Birthplace
National Historic Site/Boyhood Home Unit:
Wild bergamot (*Monarda fistulosa*)**

**Appendix III. US NVC Classification of Plant Associations at Abraham Lincoln
Birthplace National Historic Site**

INDEX TO US NVC PLANT ASSOCIATIONS BY CODE

Plant Association Code* and Name	Appendix Page #
2070 - White Oak - Mixed Oak Dry-Mesic Alkaline Forest	118
2411 - Beech - Maple Unglaciaded Forest	103
2591 - Virginia Pine Successional Forest	94
3836 - Floodplain Canebrake	138
4044 - Successional Broom-sedge Vegetation	145
4048 - Cultivated Meadow	149
4133 - Southeastern Successional Black Cherry Forest	113
4708 - Highland Rim Limestone Cliff/Talus Seep	142
4741 - Interior Low Plateau Mesic Sugar Maple - Hickory Forest	130
5018 - Southern Red Oak - Mixed Oak Forest	124
5131 - Central Limestone Glade	153
7124 - Red-cedar Successional Forest	98
7220 - Successional Tuliptree Forest (Circumneutral Type)	108
8429 - Rich Levee Mixed Hardwood Bottomland	134

* Code – A unique identification number used by NatureServe to identify plant associations; it typically is written with a prefix (CEGL00) followed by 4 unique numbers – truncated here for convenience.

U.S. NATIONAL VEGETATION CLASSIFICATION

ASSOCIATIONS AND ALLIANCES OF

Abraham Lincoln Birthplace National Historic Site

16 March 2007

by

NatureServe

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

6114 Fayetteville St, Suite 109
Durham, NC 27713

This subset of the International Ecological Classification Standard covers associations and alliances attributed to Abraham Lincoln Birthplace National Historic Site. This classification has been developed in consultation with many individuals and agencies and incorporates information from a variety of publications and other classifications. Comments and suggestions regarding the contents of this subset should be directed to Mary J. Russo, Central Ecology Data Manager, Durham, NC <mary_russo@natureserve.org> and Erin Lunsford Jones, Ecologist/Data Manager, Durham, NC <erin_jones@natureserve.org>.



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

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

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I. Forest

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

A.131–*Pinus virginiana* Forest Alliance

ALLIANCE CONCEPT

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

Classification Comments: Appalachian pine-dominated associations need to be revisited in relation to the ecology of shortleaf pine, *Pinus echinata*. Are some stands of this type ones that historically were dominated by shortleaf pine? (MP 2002-03).

Similar Alliances:

Pinus (rigida, pungens, virginiana) - Quercus prinus Woodland Alliance (A.677)

Pinus virginiana Planted Forest Alliance (A.100)

Similar Alliance Comments:

Related Concepts:

Appalachian pine-oak forest (Evans 1991) I

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

Pine--Oak/Heath (Nelson 1986) I

Pine--Oak/Heath (Schafale and Weakley 1990) I

Virginia Pine - Mixed Oaks HR (Pyne 1994) ?

Virginia Pine CUPL, BR, RV (Pyne 1994) ?

Virginia Pine: 79 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: This alliance includes both early-successional forests resulting from natural or anthropogenic disturbances and natural forests in edaphically extreme situations.

Vegetation: This alliance includes evergreen forests dominated by *Pinus virginiana* (Virginia Pine). These forests are usually dense and can contain admixtures of *Pinus taeda* (Loblolly Pine), *Pinus echinata* (Shortleaf Pine), *Pinus pungens* (Table Mountain Pine), and/or *Pinus rigida* (Pitch Pine), and, particularly in fire-suppressed examples, small stems of deciduous species. Associated species vary with the geographic distribution of the alliance. In many associations, a dense ericaceous shrub stratum is typical. Types resulting from anthropogenic disturbance may have a greater admixture of deciduous species. In the Piedmont common associates include *Liquidambar styraciflua* (Sweetgum), *Pinus taeda* (Loblolly Pine), *Pinus echinata* (Shortleaf Pine), and *Quercus* (Oak) spp., while on extreme sites in the southern Appalachians, *Pinus pungens* (Table Mountain Pine) and *Pinus rigida* (Pitch Pine) are more typical. In areas with calcareous geology, *Juniperus virginiana* (Eastern Red-cedar) is a typical associate. In many associations, a dense ericaceous shrub stratum is typical and can include species such as *Vaccinium pallidum* (Hillside Blueberry), *Vaccinium stamineum* (Deerberry), *Vaccinium arboreum* (Farkleberry), *Vaccinium angustifolium* (Northern Lowbush Blueberry), *Vaccinium myrtilloides* (Velvetleaf Blueberry), *Gaylussacia baccata* (Black Huckleberry), *Gaylussacia ursina* (Bear Huckleberry), *Kalmia latifolia* (Mountain Laurel), *Rhododendron catawbiense* (Catawba Rhododendron), and *Rhododendron maximum* (Great Laurel). Dry-mesic successional examples may contain other *Pinus* (Pine) species (e.g., *Pinus taeda* (Loblolly Pine), *Pinus echinata* (Shortleaf Pine)) or other early successional deciduous trees (e.g., *Acer rubrum* (Red Maple), *Liquidambar styraciflua* (Sweetgum), *Liriodendron tulipifera* (Tuliptree)). The subcanopy may contain *Acer saccharum* (Sugar Maple) and *Cornus florida* (Flowering Dogwood); other associated species may include *Cercis canadensis* (Eastern Redbud), *Parthenocissus quinquefolia* (Virginia Creeper), *Lycopodium digitatum* (Fan Clubmoss), as well as the exotics *Lonicera japonica* (Japanese Honeysuckle) and *Microstegium vimineum* (Japanese Stiltgrass) (Andreu and Tukman 1995).

Dynamics: This alliance includes both early successional forests resulting from natural or anthropogenic disturbance and natural forests in edaphically extreme situations. Typically, *Pinus virginiana* communities are short-lived as a forest and are more common as woodland communities [see *Pinus (rigida, pungens, virginiana)* - *Quercus prinus* Woodland Alliance (A.677)].

ALLIANCE DISTRIBUTION

Range: Forests in this alliance are possible in the Piedmont from Pennsylvania south to Alabama, and ranging west into the Appalachians, Ridge and Valley, the Cumberland Plateau, and at scattered locales in the Interior Low Plateau.

Nations: US

Subnations: AL, DE, GA, IN, KY, MD, NC, NJ, OH, PA, SC, TN, VA, WV

TNC Ecoregions: 43:C, 44:C, 49:C, 50:C, 51:C, 52:C, 58:C, 59:C, 61:C, 62:C

USFS Ecoregions: 221Da:CCC, 221Db:CCC, 221Ea:CC?, 221Eb:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCC, 221Eg:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 221Ja:CCC, 221Jb:CCC, 221Jc:CCC, 222Cg:CCC, 222Da:CCC, 222Dc:CCC, 222Dd:CCC, 222Dg:CCC, 222Dj:CCC, 222Eb:CCC, 222Eg:CCC, 222Eh:CCC, 222Ej:CCC, 222El:CCC, 222En:CCC, 222Eo:CCC, 222Fc:CCC, 222Fd:CCC, 222Ff:CCC, 231Aa:CCC, 231Ab:CCC, 231Ac:CCP, 231Ad:CCC, 231Ae:CCC, 231Af:CCP, 231Ag:CCP, 231Ah:CCP, 231Ai:CCP, 231Aj:CCP, 231Ak:CCP, 231Al:CCP, 231Am:CCP, 231An:CCP, 231Ao:CCP, 231Ap:CCP, 231Bc:CCC, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCC, 231Ce:CCP, 231Cf:CCP, 231Cg:CCP, 231Da:CCC, 231Dc:CCC, 232Ab:CCC, 232Br:CCC, 232Bt:CCC, 232Bx:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CCP, M221Be:CCP, M221Ca:CCP, M221Cb:CCC, M221Cc:CCC, M221Cd:CCC, M221Ce:CCC, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga, Cumberland Gap, Fredericksburg-Spotsylvania, Gettysburg, Great Smoky Mountains, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Natchez Trace, New River Gorge, Obed, Shenandoah, Shiloh, Thomas Stone); TVA (Land Between the Lakes?, Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Jefferson, Nantahala, Pisgah, Sumter, Talladega, Uwharrie?); USFWS (Chesapeake Marshlands)

(CEGL002591) Virginia Pine Successional Forest

Pinus virginiana Successional Forest

Virginia Pine Successional Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Evergreen forest (I.A.)
Physiognomic Group	Temperate or subpolar needle-leaved evergreen forest (I.A.8.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)
Formation	Rounded-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.b.)
Alliance	<i>Pinus virginiana</i> Forest Alliance (A.131)
Alliance (English name)	Virginia Pine Forest Alliance
Association	<i>Pinus virginiana</i> Successional Forest
Association (English name)	Virginia Pine Successional Forest
Association (Common name)	Virginia Pine Successional Forest
Ecological System(s):	Central Appalachian Dry Oak-Pine Forest (CES202.591) Northeastern Interior Dry-Mesic Oak Forest (CES202.592) Southern Appalachian Low-Elevation Pine Forest (CES202.332)

ELEMENT CONCEPT

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

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: A common community of formerly farmed uplands at Knob Creek, this successional forest was sampled once in the park. The site is a gentle, north-facing midslope at 260 m (848 feet) elevation with mesic soils. The unvegetated surface is comprised of leaf litter (89% cover), wood (5%), bare soil (5%), and lichens (<1%). The site was logged in the past.

Global Environment: This community occurs in areas where canopy removal has created open conditions and bare mineral soil, allowing for the establishment of *Pinus virginiana*. These conditions can include old fields, old pastures, clearcuts, and burned or eroded areas. In the Ridge and Valley of Tennessee, northeastern Monroe County, early successional forests with *Pinus virginiana* dominance were found on low slopes in areas that were cleared for agriculture prior to the 1970s, when Tellico Lake was created (Andreu and Tukman 1995). In the Central Appalachians, this vegetation occurs where soft shales have been farmed (primarily in valleys), resulting in stands with nothing but successional species in the understory. Soils underlying these communities are of two general types, i.e., those derived in residuum from calcareous shale and calcareous sandstone of the Middle Ordovician and those of some other origin. Series of the former type include Dandridge (Lithic Ruptic-Alfic Eutrochrepts), Tellico (Typic Rhododults), and Steekee (Ruptic-Ultic Dystrochrepts). Other soil series that this forest type may occur on include Litz, Dewey, Alcoa, Bland, Etowah, Lobdell and Neubert. All of these soils are well-drained and range in pH from moderate acid to very strongly acidic.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: More recently abandoned fields are clearly dominated by *Pinus virginiana* (Virginia Pine) of varying heights. In the more mature sample taken, the moderately sparse (40% cover) tree canopy, 20-35 m tall, is dominated by *Pinus virginiana* (Virginia Pine) and *Liriodendron tulipifera* (Tuliptree), along with *Carya alba* (Mockernut Hickory) and *Quercus velutina* (Black Oak). The moderately dense (70%) subcanopy (10-15 m) is dominated by *Carya alba* (Mockernut Hickory) and *Fagus grandifolia* (American Beech), along with lesser amounts of *Acer rubrum* (Red Maple), *Cornus florida* (Flowering Dogwood), *Pinus virginiana* (Virginia Pine), *Quercus muehlenbergii* (Chinquapin Oak), and *Quercus velutina* (Black Oak). The moderately sparse (30%) shrub layer (2-5 m) is dominated by *Ostrya virginiana* (Eastern Hop-hornbeam) and *Fagus grandifolia* (American Beech), along with lesser amounts of *Acer saccharum* (Sugar Maple) and *Acer rubrum* (Red Maple). *Lycopodium digitatum* (Fan Clubmoss) dominates the sparse (10%) herbaceous layer; a total of 52 taxa were recorded.

Global Vegetation: This forest typically has a very dense canopy of *Pinus virginiana* (Virginia Pine) and little understory vegetation. *Pinus taeda* (Loblolly Pine) or *Pinus echinata* (Shortleaf Pine) may co-occur with *Pinus virginiana* (Virginia Pine) in the canopy. The canopy can also have significant admixtures of early-successional deciduous trees (e.g., *Acer rubrum* (Red Maple), *Liquidambar styraciflua* (Sweetgum), *Prunus serotina* (Black Cherry), *Liriodendron tulipifera* (Tuliptree)). Associated woody and herbaceous species vary with geography but are typically ruderal or exotic species; *Lonicera japonica* (Japanese Honeysuckle) and *Rosa multiflora* (Multiflora Rose) are common. Shrub and herb strata are absent to sparse in coverage. In eastern Tennessee, the subcanopy may contain *Acer saccharum* (Sugar Maple) and *Cornus florida* (Flowering Dogwood); other associated species may include *Cercis canadensis* (Eastern Redbud), *Parthenocissus quinquefolia* (Virginia Creeper), *Lonicera japonica* (Japanese Honeysuckle), and *Microstegium vimineum* (Japanese Stiltgrass) (Andreu and Tukman 1995). In the Central Appalachians, associates include *Pinus taeda* (Loblolly Pine), *Pinus echinata* (Shortleaf Pine), and *Pinus rigida* (Pitch Pine). Some stands may have a dense ericaceous shrub stratum containing *Vaccinium* (Blueberry) spp., *Gaylussacia* spp., *Kalmia latifolia* (Mountain Laurel), and *Rhododendron* (Azalea, Rhododendron) spp.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Needle-leaved tree	<i>Pinus virginiana</i> (Virginia Pine)
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Carya alba</i> (Mockernut Hickory), <i>Quercus velutina</i> (Black Oak)
Tree canopy	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i> (Tuliptree)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (Red Maple), <i>Fagus grandifolia</i> (American Beech)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Acer saccharum</i> (Sugar Maple), <i>Fagus grandifolia</i> (American Beech), <i>Ostrya virginiana</i> (Eastern Hop-hornbeam)
Herb (field)	Fern or fern ally	<i>Lycopodium digitatum</i> (Fan Clubmoss)

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Needle-leaved tree	<i>Pinus virginiana</i> (Virginia Pine)
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i> (Eastern Red-cedar)

Tree subcanopy	Broad-leaved deciduous tree	<i>Acer rubrum</i> (Red Maple), <i>Cornus florida</i> (Flowering Dogwood), <i>Nyssa sylvatica</i> (Blackgum), <i>Oxydendrum arboreum</i> (Sourwood)
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Cornus florida</i> (Flowering Dogwood), <i>Nyssa sylvatica</i> (Blackgum), <i>Oxydendrum arboreum</i> (Sourwood)
Tall shrub/sapling	Broad-leaved evergreen tree	<i>Vaccinium arboreum</i> (Farkleberry)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Vaccinium stamineum</i> (Deerberry)
Short shrub/sapling	Broad-leaved deciduous tree	<i>Cercis canadensis</i> (Eastern Redbud), <i>Cornus florida</i> (Flowering Dogwood), <i>Oxydendrum arboreum</i> (Sourwood), <i>Quercus alba</i> (White Oak), <i>Sassafras albidum</i> (Sassafras)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle), <i>Smilax glauca</i> (Whiteleaf Greenbrier), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Acer rubrum* (Red Maple), *Cornus florida* (Flowering Dogwood), *Quercus muehlenbergii* (Chinquapin Oak)

Global: *Pinus virginiana* (Virginia Pine)

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Lonicera japonica* (Japanese Honeysuckle), *Microstegium vimineum* (Japanese Stiltgrass), *Rosa multiflora* (Multiflora Rose)

Global:

CONSERVATION STATUS RANK

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

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Abraham Lincoln Birthplace National Historic Site Comments:

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

Global Similar Associations:

Pinus echinata Early-Successional Forest (CEGL006327)--occurs in similar environments but is dominated (>50% of canopy) by *Pinus echinata* instead of *Pinus virginiana*.

Pinus taeda - *Liquidambar styraciflua* Semi-natural Forest (CEGL008462)--is commonly found in the same area as CEGL002591 in the Piedmont. CEGL008462 contains at least 50% *Pinus taeda* in the canopy, whereas CEGL002591 is mostly *Pinus virginiana*.

Pinus taeda / *Liquidambar styraciflua* - *Acer rubrum* var. *rubrum* / *Vaccinium stamineum* Forest (CEGL006011)--occurs in similar environments with similar disturbance histories but is dominated by (>50% of canopy) *Pinus taeda* instead of *Pinus virginiana*.

Pinus virginiana - *Juniperus virginiana* var. *virginiana* - *Ulmus alata* Forest (CEGL007121)--on more calcareous or circumneutral substrates.

Pinus virginiana - *Pinus (rigida, echinata)* - (*Quercus prinus*) / *Vaccinium pallidum* Forest (CEGL007119)--can have a very similar canopy in the Piedmont and Blue Ridge ecoregions, but CEGL007119 is generally created and maintained by fire and/or logging but not heavy plowing and/or erosion. CEGL002591 generally has signs of heavy agricultural use such as sparse herbaceous or shrub layers, large percentage of invasive exotics such as *Lonicera japonica* in the herbaceous layer, old plowlines, human debris, and extremely even-aged canopy, whereas CEGL007119 generally has a more intact herbaceous/shrub layer (especially *Vaccinium pallidum*) and less signs of severe human disturbance.

Global Related Concepts:

Pinus virginiana forest (Vanderhorst 2001b) =

IA7c. Xeric Virginia Pine Ridge Forest (Allard 1990) B

Pine-Oak Association of the Western Shore District (Shreve et al. 1910) B

Unclassified Old-Field Successional Forest (Fleming and Moorhead 2000) ?

Virginia Pine - Oak: 78 (Eyre 1980) B

Virginia Pine Type (Schmalzer and DeSelm 1982) B

Virginia Pine, RV (Pyne 1994) B
 Virginia Pine: 79 (Eyre 1980) B
 Virginia pine successional forest (Collins and Anderson 1994) =
 Xeric Pine Forest (Ambrose 1990a) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This successional community is common on the more recently cleared or farmed uplands of the Boyhood Home Unit atop the knobs, sometimes adjacent to land kept as open fields.

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

Nations: US

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

USFS Ecoregions: 221Da:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 221J:CC, 222Cg:CCC, 222Ej:CCC, 222En:CCC, 222Eo:CCC, 231Ae:CCC, 231Cd:CCC, 232Br:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ca:CCP, M221Cb:CCC, M221Cc:CCP, M221Cd:CCC, M221Ce:CCP, M221Da:CCC, M221Db:CCC, M221Dc:CCC, M221Dd:CCC

Federal Lands: NPS (Big South Fork, Blue Ridge Parkway?, Cumberland Gap, Fredericksburg-Spotsylvania, Gettysburg, Great Smoky Mountains, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Natchez Trace, New River Gorge, Obed, Shenandoah, Shiloh, Thomas Stone); TVA (Tellico); USFS (Bankhead, Chattahoochee, Chattahoochee (Piedmont), Chattahoochee (Southern Blue Ridge), Cherokee, Daniel Boone, George Washington, Jefferson, Sumter, Sumter (Mountains), Sumter (Piedmont), Uwharrie?)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.8 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

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

References: Allard 1990, Ambrose 1990a, Andreu and Tukman 1995, Collins and Anderson 1994, Eyre 1980, Fike 1999, Fleming and Coulling 2001, Fleming and Moorhead 2000, Hall and Mathews 1974, Nelson 1986, Patterson et al. 1999, Pyne 1994, Schmalzer and DeSelm 1982, Schotz pers. comm., Shreve et al. 1910, Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1998, Vanderhorst 2001b, Vanderhorst 2007

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

A.137–*Juniperus virginiana* Semi-natural Forest Alliance

ALLIANCE CONCEPT

Summary: Examples of this semi-natural eastern red-cedar forest alliance are expected to be found in locally disturbed areas. Forests in this alliance are strongly dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) on usually high pH, fire-suppressed sites or old fields. 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* (Eastern Red-cedar) 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* (Mockernut Hickory), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), and *Pinus virginiana* (Virginia Pine). Various oaks (including *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), and *Quercus phellos* (Willow Oak)) also may be present. The midstory is typically sparse, with canopy species as well as *Cornus florida* (Flowering Dogwood), *Ilex opaca* (American Holly), *Liquidambar styraciflua* (Sweetgum), and *Prunus serotina* var. *serotina* (Black Cherry). *Frangula caroliniana* (Carolina Buckthorn) may occur in several strata. Herb distribution is patchy, and typical species include *Asplenium platyneuron* (Ebony Spleenwort), *Chasmanthium laxum* (Slender Spikegrass), *Eupatorium* (Boneset, Joe-pyeweed, Thoroughwort) spp., *Polystichum acrostichoides* (Christmas Fern), and *Carex* (Sedge) spp. In the central and upper midwestern United States, stands of semi-natural vegetation dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) 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* (Staghorn Sumac) may be an associate.

Classification Comments: This alliance formerly included elements that represented mature (100+ year) stands, on limestone or chalk, mostly in blacklands (as in the Blackbelt of Alabama, on the margins of Chalk Prairies), and also on sandstone (e.g., in Oklahoma).

Similar Alliances:

Juniperus virginiana Woodland Alliance (A.545)

Similar Alliance Comments:

Related Concepts:

Eastern Redcedar: 46 (Eyre 1980) I

T1A9cI1a. *Juniperus virginiana* (Foti et al. 1994) ?

ALLIANCE DESCRIPTION

Environment: Forests in this alliance occur on usually high pH, fire-suppressed sites or old fields. The habitat for this alliance is most commonly old fields and pastures, successional cleared land, and other various locally disturbed areas, especially on calcareous rocks.

Vegetation: Stands are strongly dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar). Other species that may occur in the canopy of Tennessee stands include *Carya alba* (Mockernut Hickory), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), and *Pinus virginiana* (Virginia Pine). Various oaks (including *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), and *Quercus phellos* (Willow Oak)) also may be present. The midstory is typically sparse, with canopy species as well as *Cornus florida* (Flowering Dogwood), *Ilex opaca* (American Holly), *Liquidambar styraciflua* (Sweetgum), and *Prunus serotina* var. *serotina* (Black Cherry). *Frangula caroliniana* (Carolina Buckthorn) may occur in several strata. Herb distribution is patchy, and typical species include *Asplenium platyneuron* (Ebony Spleenwort), *Chasmanthium laxum* (Slender Spikegrass), *Eupatorium* (Boneset, Joe-pyeweed, Thoroughwort) spp., *Polystichum acrostichoides* (Christmas Fern), and *Carex* (Sedge) spp. In the central and upper midwestern United States, stands are dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) with *Rhus typhina* (Staghorn Sumac) as an associate.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the northeastern U.S. from Massachusetts and New York, adjacent Ontario, Canada, to the southeastern U.S. from Virginia to Oklahoma and Texas, to the midwestern U.S. from Iowa to Missouri, and possibly elsewhere.

Nations: CA, US

Subnations: AL, AR, GA, IA, KY, LA, MA, MO, MS, NC, NJ, NY, OK, ON, PA, 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:C, 51:?, 52:?, 53:P, 58:C, 59:C, 60:C, 61:C, 62:C

USFS Ecoregions: 212Fc:CCC, 221Aa:CCP, 221Ab:CCC, 221Ac:CCP, 221Ad:CCP, 221Ae:CC?, 221Ak:CCP, 221Bd:CCC, 221Hc:CCC, 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, 222Ed:CCC, 222Eg: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, 232Br: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 (Big South Fork, Cape Cod, Chickamauga-Chattanooga, Chickasaw NRA, Cumberland Gap, Delaware Water Gap, Fire Island, Fort Donelson, Fredericksburg-Spotsylvania, Kings Mountain, Lincoln Birthplace, Mammoth Cave, Natchez Trace, Russell Cave, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Cherokee?, Daniel Boone, Ouachita, Ozark)

(CEGL007124) Eastern Red-cedar - (Oak species) Forest

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

Eastern Red-cedar Successional Forest

NVC Classification

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

Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar needle-leaved evergreen forest (I.A.8.N.)
Formation	Conical-crowned temperate or subpolar needle-leaved evergreen forest (I.A.8.N.c.)
Alliance	<i>Juniperus virginiana</i> Semi-natural Forest Alliance (A.137)
Alliance (English name)	Eastern Red-cedar Forest Alliance
Association	<i>Juniperus virginiana</i> var. <i>virginiana</i> - (<i>Quercus</i> spp.) Forest
Association (English name)	Eastern Red-cedar - (Oak species) Forest
Association (Common name)	Eastern Red-cedar Successional Forest
Ecological System(s):	East Gulf Coastal Plain Northern Loess Plain Oak-Hickory Upland (CES203.482) East Gulf Coastal Plain Interior Shortleaf Pine-Oak Forest (CES203.506) Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898) Southern Ridge and Valley / Cumberland Dry Calcareous Forest (CES202.457) East Gulf Coastal Plain Limestone Forest (CES203.502)

ELEMENT CONCEPT

Global Summary: This is a successional community dominated by a nearly monospecific *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) canopy. Species composition and cover are variable depending upon geographic location and disturbance history. Some examples are densely forested (75-100% total cover) with *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) and sparse subcanopy, shrub and herb strata. Other examples, especially those that are somewhat more open-canopied, are more species-rich, and other tree species may enter the canopy in low levels of abundance. Species that may occur in the canopy include *Carya alba* (Mockernut Hickory), *Carya caroliniae-septentrionalis* (Carolina Shagbark Hickory), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), and *Pinus virginiana* (Virginia Pine). Various oaks (including *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), *Quercus stellata* (Post Oak), and *Quercus phellos* (Willow Oak)) may also be present, seeding in from adjacent oak-hardwood forests. The midstory is typically sparse, with canopy species as well as *Cornus florida* (Flowering Dogwood), *Ilex opaca* (American Holly), *Liquidambar styraciflua* (Sweetgum), and *Prunus serotina* var. *serotina* (Black Cherry). In addition, *Frangula caroliniana* (Carolina Buckthorn) occurs in various strata. Herbs are patchy and typically include *Asplenium platyneuron* (Ebony Spleenwort), *Chasmanthium laxum* (Slender Spikegrass), *Eupatorium* (Boneset, Joe-pyeweed, Thoroughwort) spp., *Polystichum acrostichoides* (Christmas Fern), and *Carex* (Sedge) spp.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This successional community was sampled only once in the park, in a disturbed area beside the highway, adjacent to a mowed field at 232 m elevation. However, it is frequent in both units of the park, including on the previously farmed tops of knobs. Wherever the soils are deep enough, other tree species may eventually predominate; on drier sites with rocky, shallow calcareous soils, stands dominated by *Juniperus virginiana* var. *virginiana* may persist.

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

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: In the sampled plot, the stunted vegetation is dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) and *Rhus copallinum* (Winged Sumac) in the sparse (10% cover) tall-shrub layer (2-5 m tall). The dense (80%) short-shrub layer (0.5-1 m) dominates the site with *Celastrus orbiculata* (Asian Bittersweet) and the exotic *Lonicera japonica* (Japanese Honeysuckle). The moderately sparse (30%) herbaceous layer is dominated by *Festuca rubra* (Red Fescue). In occurrences atop knobs at the Boyhood Home, quite a bit of *Pinus virginiana* (Virginia Pine) is often mixed in with the *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar).

Global Vegetation: Stands are dominated by *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar). A host of other woody species may also be present, some of which may occur in the canopy at low levels of abundance. These species include *Carya alba* (Mockernut Hickory), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), *Pinus virginiana* (Virginia Pine), *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), and *Quercus phellos* (Willow Oak). The midstory is typically sparse, with canopy species as well as *Cornus florida* (Flowering Dogwood), *Ilex opaca* (American Holly), *Liquidambar styraciflua* (Sweetgum), and *Prunus serotina* var. *serotina* (Black Cherry) (NatureServe Ecology unpubl. data). In addition, *Frangula caroliniana* (Carolina Buckthorn) occurs in various strata. Herbs are patchy and typically include *Asplenium platyneuron* (Ebony Spleenwort), *Chasmanthium laxum* (Slender Spikegrass), *Eupatorium* (Boneset, Joe-pyeweed, Thoroughwort) spp.,

Polystichum acrostichoides (Christmas Fern), and *Carex* (Sedge) spp. The ground layers of some stands may exhibit dominance by native warm-season grasses and other graminoids, including *Schizachyrium scoparium* (Little Bluestem), *Andropogon* (Bluestem) spp., and *Danthonia* (Oatgrass) spp. The exotics *Lonicera japonica* (Japanese Honeysuckle) and *Microstegium vimineum* (Japanese Stiltgrass) may also be present.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Rhus copallinum</i> (Winged Sumac)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Cercis canadensis</i> (Eastern Redbud)
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Juniperus virginiana</i> (Eastern Red-cedar)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Celastrus orbiculata</i> (Asian Bittersweet)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle)
Herb (field)	Graminoid	<i>Festuca rubra</i> (Red Fescue)

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i> var. <i>virginiana</i> (Eastern Red-cedar)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Fraxinus americana* (White Ash), *Lespedeza procumbens* (Trailing Bushclover), *Sassafras albidum* (Sassafras)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Cardamine hirsuta* (Hairy Bittercress), *Cirsium vulgare* (Bull Thistle), *Kummerowia striata* (Japanese-clover), *Leucanthemum vulgare* (Oxeye Daisy), *Lolium arundinaceum* (Tall Fescue), *Lonicera japonica* (Japanese Honeysuckle), *Plantago lanceolata* (Narrowleaf Plantain), *Poa annua* (Annual Bluegrass), *Prunus avium* (Sweet Cherry), *Rosa multiflora* (Multiflora Rose), *Sorghum halepense* (Johnson Grass), *Trifolium campestre* (Low Hop Clover), *Trifolium repens* (White Clover)

Global:

CONSERVATION STATUS RANK

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

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Abraham Lincoln Birthplace National Historic Site Comments:

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

Global Similar Associations:

Juniperus virginiana Midwest Forest (CEGL002593)

Juniperus virginiana var. *virginiana* / *Rhus copallinum* / *Schizachyrium scoparium* Woodland (CEGL007704)

Global Related Concepts:

Eastern Redcedar: 46 (Eyre 1980) B

IB5a. Eastern Red Cedar Woodland (Allard 1990) ?

Red cedar, RV (Pyne 1994) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This community is found at both units of the park. At the Birthplace Unit, it was sampled east of Highway 31E, directly across from the park entrance, adjacent to a mowed field. It is also frequent in large patches on the western half of the Birthplace Unit, west of the residences,

and along the road leading to them. At the Boyhood Home Unit, this association is common atop knobs where old fields are being left alone to revert to forest.

Global Range: This community is widely distributed in both coastal plain and interior regions of the southeastern United States, ranging in the interior to Oklahoma, Kentucky, and West Virginia.

Nations: US

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

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

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

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.2 [Birthplace Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: K.D. Patterson, mod. M. Pyne

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

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

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

ALLIANCE CONCEPT

Summary: This alliance is composed of rich, mesic forests of the east-central United States and southern Canada. The southern range of this alliance is limited by the distribution of *Acer saccharum* (Sugar Maple) which is largely absent from the Coastal Plain. Stands of this alliance are found on flat, rolling, or, in the south, dissected topography. South of the limit of glaciation there is an increasing tendency for this alliance to be found on north- or east-facing slopes. The soils are fertile well-drained, silt, silt loam, sandy loam, or loam. Those in the north have formed over glacial till almost exclusively, while stands south of the limit of Wisconsin glaciation may form from till, alluvium, sandstone, or shale. The forest canopy and subcanopy are typically dominated by *Acer saccharum* (Sugar Maple) and *Fagus grandifolia* (American Beech), although *Liriodendron tulipifera* (Tuliptree) may be an important canopy component in some parts of the range. Other common trees include *Carpinus caroliniana* (American Hornbeam), *Carya* (Hickory) spp., *Fraxinus americana* (White Ash), *Ostrya virginiana* (Eastern Hop-hornbeam), *Quercus rubra* (Northern Red Oak), *Tilia americana* (American Basswood), and *Ulmus americana* (American Elm). In the southern part of this alliance's range, additional species may include *Quercus alba* (White Oak), *Tilia americana* (American Basswood), *Liquidambar styraciflua* (Sweetgum), *Aesculus glabra* (Ohio Buckeye), *Nyssa sylvatica* (Blackgum), and *Carya cordiformis* (Bitternut Hickory). Shrubs are usually rare in northern stands but become more abundant in southern stands. *Asimina triloba* (Common Pawpaw) and *Lindera benzoin* (Northern Spicebush) (in the southern parts of this alliance's range), *Diervilla lonicera* (Bush-honeysuckle), *Euonymus obovatus* (Running Strawberry-bush), and *Sambucus* (Elder) spp. (in the northern parts), *Morus rubra* (Red Mulberry), and *Corylus americana* (American Hazelnut) are typical shrubs. The herbaceous layer is well-developed. The most abundant species include *Adiantum pedatum* (Northern Maidenhair), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Claytonia virginica* (Virginia Springbeauty), *Dicentra canadensis* (Squirrel-corn), *Dryopteris intermedia* (Intermediate Woodfern), *Galium aparine* (Sticky Willy), *Maianthemum canadense* (Canada Mayflower) (in the north), *Maianthemum racemosum* (Feathery False Lily-of-the-valley), *Menispermum canadense* (Common Moonseed), *Osmorhiza claytonii* (Blank Sweet-cicely), *Phegopteris hexagonoptera* (Broad Beech Fern) (in the south), *Podophyllum peltatum* (Mayapple), *Polygonatum biflorum* (Smooth Solomon's-seal), *Sanguinaria canadensis* (Bloodroot), *Trillium grandiflorum* (White Trillium), and *Viola* (Violet) spp.

Classification Comments: At the southern limit of this alliance's distribution (e.g., in the Cumberland Plateau of Alabama), the sugar maple in the stands, if present, may be *Acer barbatum* and/or *Acer leucoderme*, not *Acer saccharum*.

Similar Alliances:

Acer saccharum - *Betula alleghaniensis* - (*Fagus grandifolia*) Forest Alliance (A.216)

Acer saccharum - *Fraxinus americana* - *Tilia americana* Forest Alliance (A.217)

Acer saccharum - *Tilia americana* - (*Quercus rubra*) Forest Alliance (A.220)

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

Fagus grandifolia - *Quercus alba* Forest Alliance (A.228)

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

Fagus grandifolia - *Quercus* spp. - *Acer* spp. Forest Alliance (A.230)

Liriodendron tulipifera - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance (A.235)--some conceptual and floristic overlap.

Quercus rubra - (*Acer saccharum*) Forest Alliance (A.251)

Similar Alliance Comments: Stands of this alliance may be similar to stands in the *Acer saccharum* - *Betula alleghaniensis* - (*Fagus grandifolia*) Forest Alliance (A.216) (northward), *Fagus grandifolia* - *Quercus alba* Forest Alliance (A.228), and *Fagus grandifolia* - *Quercus* spp. - *Acer* spp. Forest Alliance (A.230). In the northeast this alliance is not clearly differentiated from the *Acer saccharum* - *Fraxinus americana* - *Tilia americana* Forest Alliance (A.217), especially on the lakeplain in New York [see Kuchler 1964]. Rogers (1981) also compared stands of this beech-maple alliance with those of the maple-basswood alliance, *Acer saccharum* - *Tilia americana* - (*Quercus rubra*) Forest Alliance (A.220), in Minnesota and Wisconsin. *Tilia americana* was far more dominant in that alliance. Further review of Rogers' discussion of the herbaceous layer of these two alliances is needed. Forests in this alliance are distinguished from forests in the *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance (A.235) by lacking the suite of Appalachian species characteristic to that alliance.

Related Concepts:

Acer/Fagus/Liriodendron/Quercus (Pyne 1994) ?

Fagus grandifolia - *Acer saccharum* - *Podophyllum peltatum* association (Pell and Mack 1977) ?

Acidic mesophytic forest (Evans 1991) I

Beech - Maple association (Braun 1950) ?

Beech - Sugar Maple: 60 (Eyre 1980) I

Coastal Plain mesophytic cane forest (Evans 1991) ?

Deep soil mesophytic forest (Evans 1991) I

Dry-Mesic Acidic Central Forest (Smith 1991) ?

Eastern Broadleaf Forests: 102: Beech-Maple Forest (*Fagus-Acer*) (Kuchler 1964) ?

IA5d. Typic Mesophytic Forest (Allard 1990) ?

Mesic Central Forest (Smith 1991) ?

Mixed Mesophytic Forest (Foti 1994b) I

Sugar Maple-Beech-Tulip Poplar HR (Pyne 1994) ?

T1B4a11c. *Fagus grandifolia* - *Acer* spp. (*rubrum*, *saccharum*) - *Liriodendron tulipifera* (Foti et al. 1994) ?

Tuliptree - beech - maple forest (Fike 1999) ?

Western Mesophytic Forest Region (Braun 1950) I

ALLIANCE DESCRIPTION

Environment: Stands of this alliance are found on flat, rolling, or, in the south, dissected topography (Braun 1950, Pell and Mack 1977). South of the limit of glaciation there is an increasing tendency for this alliance to be found on north- or east-facing slopes (Eyre 1980). The soils are fertile, well-drained silt, silt loam, sandy loam, or loam. Those in the north have formed over glacial till almost exclusively, while stands south of the limit of Wisconsin glaciation may form from till, alluvium, sandstone, or shale (Dodge and Harman 1977, Eyre 1980).

Vegetation: This alliance is composed of rich, mesic forests of the east-central United States and southern Canada. The forest canopy and subcanopy are dominated by *Acer saccharum* (Sugar Maple) and *Fagus grandifolia* (American Beech). Other common trees include *Carpinus caroliniana* (American Hornbeam), *Carya* (Hickory) spp., *Fraxinus americana* (White Ash), *Ostrya virginiana* (Eastern Hop-hornbeam), *Quercus rubra* (Northern Red Oak), *Quercus macrocarpa* (Bur Oak) (in wetter stands), *Tilia americana* (American Basswood), and *Ulmus americana* (American Elm). In the southern part of this alliance's range, species more typical of mixed mesophytic forests occur. These include *Aesculus glabra* (Ohio Buckeye), *Liquidambar styraciflua* (Sweetgum), *Nyssa sylvatica* (Blackgum), and *Quercus alba* (White Oak) (Braun 1950). Shrubs are less abundant in northern stands than in southern stands. Typical shrubs include *Asimina triloba* (Common Pawpaw) (in the southern parts of this alliance's range), *Corylus americana* (American Hazelnut), *Diervilla lonicera* (Bush-honeysuckle) (in the north), *Euonymus obovatus* (Running Strawberry-bush), *Lindera benzoin* (Northern Spicebush) (in the south), *Morus rubra* (Red Mulberry), and *Sambucus* (Elder) spp. (in the north). The herbaceous layer is well-developed. The most abundant species include *Adiantum pedatum* (Northern Maidenhair), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Claytonia virginica* (Virginia Springbeauty), *Dicentra canadensis* (Squirrel-corn), *Dryopteris intermedia* (Intermediate Woodfern), *Galium aparine* (Sticky Willy), *Maianthemum canadense* (Canada Mayflower) (in the north), *Maianthemum racemosum* (Feathery False Lily-of-the-valley), *Menispermum canadense* (Common Moonseed), *Osmorhiza claytonii* (Blank Sweet-cicely), *Phegopteris hexagonoptera* (Broad Beech Fern) (in the south), *Podophyllum peltatum* (Mayapple), *Polygonatum biflorum* (Smooth Solomon's-seal), *Sanguinaria canadensis*

(Bloodroot), *Trillium grandiflorum* (White Trillium), and *Viola* (Violet) spp. At the southern limit of this alliance's distribution (e.g., in the Cumberland Plateau of Alabama), the "sugar maple" in the stands, if present, may be *Acer barbatum* (Southern Sugar Maple) and/or *Acer leucoderme* (Chalk Maple), not *Acer saccharum* (Sugar Maple).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in southern Michigan, Ohio, Indiana, Illinois, eastern Missouri, Kentucky, Tennessee, Alabama, Pennsylvania, New York, New Jersey, West Virginia, and possibly Arkansas, Maryland, and Virginia. It is also found in Canada in southern Ontario.

Nations: CA, US

Subnations: AL, AR?, CT, DE, GA, IL, IN, KY, MD, MI, MO, MS, NJ, NY, OH, ON, PA, SC, TN, VA, WV

TNC Ecoregions: 36:C, 38:C, 42:C, 43:C, 44:C, 45:C, 48:C, 49:C, 50:C, 52:C, 57:C, 58:C, 59:C, 60:C, 61:C

USFS Ecoregions: 212Fa:CC?, 212Fb:CCP, 212Fc:CCC, 212Ga:CPP, 221Bd:CCC, 221D:CC, 221Ea:CCC, 221Eb:CCC, 221Ec:CCC, 221Ed:CCC, 221Ef:CCC, 221Eg:CCC, 221Fa:CCC, 221Fb:CCC, 221Fc:CCC, 221Ha:CCP, 221Hc:CCC, 221He:CCC, 221J:CC, 222Ak:CP?, 222Ao:CPP, 222Aq:CPP, 222Ca:CCP, 222Cb:CCC, 222Cc:CCC, 222Cg:CCC, 222Ch:CCP, 222Da:CCC, 222Db:CCC, 222Dc:CCC, 222De:CCC, 222Df:CCC, 222Dg:CCC, 222Dh:CCP, 222Di:CCC, 222Eb:CCC, 222Eg:CCC, 222Eh:CCC, 222Ei:CCC, 222Ek:CCC, 222El:CCC, 222Em:CCC, 222En:CCP, 222Eo:CCC, 222Fa:CCP, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Fe:CCC, 222Ff:CCC, 222Ga:CCC, 222Gc:CCC, 222Gd:CCC, 222Ha:CCC, 222Hb:CCC, 222Hc:CCC, 222Hd:CCC, 222Hf:CCC, 222Ia:CC?, 222Ib:CC?, 222Ic:CC?, 222Id:CCP, 222If:CCC, 222Ja:CCC, 222Jb:CCC, 222Jc:CCC, 222Jd:CCC, 222Jg:CCC, 222Jh:CCC, 222Ji:CCC, 222Jj:CCC, 222Kj:CCC, 231Ac:CCP, 231Ae:CCC, 231Af:CCC, 231Ah:CCP, 231Ai:CCP, 231Ba:CC?, 231Bb:CC?, 231Bc:CCP, 231Bd:CCP, 231Be:CCP, 231Bf:CC?, 231Bh:CCP, 231Bk:CCP, 231Cd:CCC, 232Ac:CCC, 232Br:CCC, 232Bx:CCC, 234Ab:CCC, 234Ac:CCC, 234An:CCC, 251De:CCC, M221Aa:CC?, M221Ab:CCP, M221Ac:CCC, M221Ad:CCP, M221Ba:CCC, M221Bb:CCC, M221C:CP, M221Da:CPP

Federal Lands: NPS (Allegheny Portage Railroad, Big South Fork, Colonial, Delaware Water Gap, Friendship Hill, Indiana Dunes, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Morristown, Natchez Trace, Obed, Shiloh, Thomas Stone); TVA (Land Between the Lakes, Tellico); USFS (Bankhead, Chattahoochee?, Cherokee?, Daniel Boone, Jefferson?, Talladega, Tuskegee); USFWS (Chesapeake Marshlands, Eastern Neck, Erie, Prime Hook)

(CEGL002411) American Beech - Sugar Maple - Tuliptree Unglaciaded Forest

Fagus grandifolia - *Acer saccharum* - *Liriodendron tulipifera* Unglaciaded Forest

Beech - Maple Unglaciaded Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Fagus grandifolia</i> - <i>Acer saccharum</i> - (<i>Liriodendron tulipifera</i>) Forest Alliance (A.227)
Alliance (English name)	American Beech - Sugar Maple - (Tuliptree) Forest Alliance
Association	<i>Fagus grandifolia</i> - <i>Acer saccharum</i> - <i>Liriodendron tulipifera</i> Unglaciaded Forest
Association (English name)	American Beech - Sugar Maple - Tuliptree Unglaciaded Forest
Association (Common name)	Beech - Maple Unglaciaded Forest
Ecological System(s):	East Gulf Coastal Plain Northern Mesic Hardwood Slope Forest (CES203.477) Ozark-Ouachita Mesic Hardwood Forest (CES202.043) South-Central Interior Mesophytic Forest (CES202.887)

ELEMENT CONCEPT

Global Summary: This beech - maple forest is found in unglaciaded areas of the east-central United States. Stands occur on unglaciaded terraces and mesic slopes of maturely dissected plateaus and submontane regions. The aspect is neutral on sandy alluvial terraces and is northern to eastern on slopes. Soils are moderately well-drained, moist, rich and deep (100+ cm). The vegetation is dominated by a closed-canopy forest with a well-developed tall-shrub layer. The forest canopy is dominated by *Fagus grandifolia* (American Beech) and *Acer saccharum* (Sugar Maple). Other canopy species include *Liriodendron tulipifera* (Tuliptree), *Liquidambar styraciflua* (Sweetgum), *Fraxinus americana* (White Ash), *Quercus rubra* (Northern Red Oak), *Carya glabra* (Pignut Hickory), and *Carya cordiformis* (Bitternut Hickory). Shrubs commonly found in this community are *Asimina triloba* (Common Pawpaw) and

Lindera benzoin (Northern Spicebush). Herbaceous species are diverse, forming a dense cover. They include *Adiantum pedatum* (Northern Maidenhair), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Asarum canadense* (Canadian Wild Ginger), *Carex blanda* (Eastern Sedge), *Dicentra canadensis* (Squirrel-corn), *Dioscorea quaternata* (Fourleaf Yam), *Galium circaeans* (Licorice Bedstraw), *Menispermum canadense* (Common Moonseed), *Phegopteris hexagonoptera* (Broad Beech Fern), *Polystichum acrostichoides* (Christmas Fern), and *Sanguinaria canadensis* (Bloodroot). The large size of dominant canopy species (over 30 m tall), herbaceous diversity, and accumulated litter emphasize the high degree of mesophytism. Community occurrences have been extensively logged, and the canopy openings favor regeneration of *Acer saccharum* (Sugar Maple). In the Appalachians of eastern Kentucky, other typical trees include *Aesculus flava* (Yellow Buckeye) (locally abundant), *Juglans cinerea* (Butternut), *Juglans nigra* (Black Walnut), *Magnolia acuminata* (Cucumber-tree), *Quercus muehlenbergii* (Chinquapin Oak), and *Ulmus rubra* (Slippery Elm).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: The one site at the Boyhood Home Unit where this forest association was sampled is a steep, north-facing lower midslope of a knob with mesic loam soil. The unvegetated surface is dominated by leaf litter (97% cover) with a little wood (2%) and bedrock (1%). Lichens cover about 5% of the surface. Very little soil disturbance is evident, but the site was likely logged long ago.

Global Environment: Stands occur on unglaciated terraces and mesic slopes of maturely dissected plateaus and submontane regions. The aspect is neutral on sandy alluvial terraces and is northern to eastern on slopes. Soils are moderately well-drained, moist, rich, and deep (100+ cm). In Crowley's Ridge of Missouri, stands occur on moderate slopes of hills and valleys and on knolls or ridges of large alluvial terraces.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The dense (80% cover) tree canopy, 20-35 m tall, and sparse (20%) subcanopy (15-20 m) are dominated by *Acer saccharum* (Sugar Maple) and *Fagus grandifolia* (American Beech). The canopy also includes lesser amounts of *Fraxinus* (Ash) sp. and *Liriodendron tulipifera* (Tuliptree). The subcanopy includes *Liriodendron tulipifera* (Tuliptree), *Aesculus glabra* (Ohio Buckeye), and *Cornus florida* (Flowering Dogwood). Both the tall-shrub layer (2-5 m) and short-shrub layer (0.5-1 m) are sparse (20%) and dominated by *Asimina triloba* (Common Pawpaw) and *Lindera benzoin* (Northern Spicebush). The moderately sparse (40%) but rich herbaceous layer is dominated by the ferns *Adiantum pedatum* (Northern Maidenhair), *Osmunda cinnamomea* (Cinnamon Fern), and *Polystichum acrostichoides* (Christmas Fern). In spring, these slopes are a breath-taking display of delicate flowers. *Jeffersonia diphylla* (Twinleaf), *Dicentra canadensis* (Squirrel-corn), *Caulophyllum thalictroides* (Blue Cohosh), *Delphinium tricorne* (Dwarf Larkspur), and *Arisaema triphyllum* (Jack-in-the-Pulpit) are just some of the over 70 herbaceous species encountered at the plot sampled.

Global Vegetation: The vegetation is dominated by a closed-canopy forest with a well-developed tall-shrub layer. The forest canopy is dominated by *Fagus grandifolia* (American Beech) and *Acer saccharum* (Sugar Maple). Other canopy species include *Liriodendron tulipifera* (Tuliptree), *Liquidambar styraciflua* (Sweetgum), *Fraxinus americana* (White Ash), *Quercus rubra* (Northern Red Oak), *Carya glabra* (Pignut Hickory), and *Carya cordiformis* (Bitternut Hickory). Shrubs commonly found in this community are *Asimina triloba* (Common Pawpaw) and *Lindera benzoin* (Northern Spicebush). Herbaceous species are diverse, forming a dense cover. They include *Adiantum pedatum* (Northern Maidenhair), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Asarum canadense* (Canadian Wild Ginger), *Carex blanda* (Eastern Sedge), *Dicentra canadensis* (Squirrel-corn), *Dioscorea quaternata* (Fourleaf Yam), *Galium circaeans* (Licorice Bedstraw), *Menispermum canadense* (Common Moonseed), *Phegopteris hexagonoptera* (Broad Beech Fern), *Polystichum acrostichoides* (Christmas Fern), and *Sanguinaria canadensis* (Bloodroot). The large size of dominant canopy species (over 30 m tall), herbaceous diversity, and accumulated litter emphasize the high degree of mesophytism (TNC 1995a). In the Appalachians of eastern Kentucky, other typical trees include *Aesculus flava* (Yellow Buckeye) (locally abundant), *Juglans cinerea* (Butternut), *Juglans nigra* (Black Walnut), *Magnolia acuminata* (Cucumber-tree), *Quercus muehlenbergii* (Chinquapin Oak), and *Ulmus rubra* (Slippery Elm). Shrub cover may be low to moderate, and includes *Cornus alternifolia* (Alternate-leaf Dogwood) and *Cornus florida* (Flowering Dogwood). Ground cover is moderate with frequent (or locally abundant) *Asarum canadense* (Canadian Wild Ginger), *Eurybia divaricata* (White Wood-aster), *Diplazium pycnocarpon* (Glade Fern), *Hepatica nobilis* var. *acuta* (Sharp-lobe Liverleaf), *Osmorhiza claytonii* (Blank Sweet-cicely), *Poa sylvestris* (Woodland Bluegrass), *Ranunculus recurvatus* (Blisterwort), *Sedum ternatum* (Woodland Stonecrop), and *Uvularia grandiflora* (Large-flower Bellwort), among others (Campbell 2001).

MOST ABUNDANT SPECIES**Abraham Lincoln Birthplace National Historic Site****Stratum****Lifeform****Species**

Tree (canopy & subcanopy) Broad-leaved deciduous tree

Acer saccharum (Sugar Maple), *Fagus grandifolia* (American Beech), *Liriodendron tulipifera* (Tuliptree)

Tree subcanopy Broad-leaved deciduous tree

Aesculus glabra (Ohio Buckeye)

Shrub/sapling (tall & short) Broad-leaved deciduous shrub

Asimina triloba (Common Pawpaw), *Fagus grandifolia* (American Beech), *Lindera benzoin* (Northern Spicebush)**Global****Stratum****Lifeform****Species**

Tree canopy Broad-leaved deciduous tree

Acer saccharum (Sugar Maple), *Carya cordiformis* (Bitternut Hickory), *Carya glabra* (Pignut Hickory), *Fagus grandifolia* (American Beech), *Fraxinus americana* (White Ash), *Liquidambar styraciflua* (Sweetgum), *Liriodendron tulipifera* (Tuliptree), *Quercus rubra* (Northern Red Oak)

Tree subcanopy Broad-leaved deciduous tree

Asimina triloba (Common Pawpaw), *Lindera benzoin* (Northern Spicebush), *Morus rubra* (Red Mulberry), *Ulmus americana* (American Elm)

Shrub/sapling (tall & short) Vine/Liana

Parthenocissus quinquefolia (Virginia Creeper),*Toxicodendron radicans* (Eastern Poison-ivy)

Herb (field) Semi-shrub

Galium circaeazans (Licorice Bedstraw)

Herb (field) Vine/Liana

Menispermum canadense (Common Moonseed)

Herb (field) Forb

Actaea pachypoda (White Baneberry), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Asarum canadense* (Canadian Wild Ginger), *Claytonia virginica* (Virginia Springbeauty), *Dicentra canadensis* (Squirrel-corn), *Dioscorea quaternata* (Fourleaf Yam), *Maianthemum racemosum* (Feathery False Lily-of-the-valley), *Sanguinaria canadensis* (Bloodroot), *Sanicula canadensis* (Canadian Black Snakeroot)

Herb (field) Graminoid

Carex blanda (Eastern Sedge)

Herb (field) Fern or fern ally

Adiantum pedatum (Northern Maidenhair), *Phegopteris hexagonoptera* (Broad Beech Fern), *Polystichum acrostichoides* (Christmas Fern)**CHARACTERISTIC SPECIES****Abraham Lincoln Birthplace National Historic Site:** *Acer saccharum* (Sugar Maple), *Adiantum pedatum* (Northern Maidenhair), *Liriodendron tulipifera* (Tuliptree), *Polystichum acrostichoides* (Christmas Fern)**Global:****OTHER NOTEWORTHY SPECIES****Abraham Lincoln Birthplace National Historic Site: (Exotics)** *Rosa multiflora* (Multiflora Rose)**Global:** *Ambystoma tigrinum* (Tiger Salamander), *Baeolophus bicolor* (Tufted Titmouse), *Carphophis amoenus* (Eastern Wormsnake), *Dryocopus pileatus* (Pileated Woodpecker), *Empidonax vireescens* (Acadian Flycatcher), *Eurytides marcellus* (Zebra Swallowtail), *Hylocichla mustelina* (Wood Thrush), *Meleagris gallopavo* (Wild Turkey), *Microtus pinetorum* (Woodland Vole), *Odocoileus virginianus* (White-tailed Deer), *Oporornis formosus* (Kentucky Warbler), *Plethodon glutinosus* (Slimy Salamander), *Rana sylvatica* (Wood Frog), *Sciurus carolinensis* (Eastern Gray Squirrel), *Wilsonia citrina* (Hooded Warbler)**CONSERVATION STATUS RANK****Global Rank & Reasons:** G4? (15-Mar-2007). This is a fairly wide-ranging and broadly defined community type. Many community occurrences have been extensively logged, and the canopy openings favor regeneration of *Acer saccharum*. In Crowley's Ridge Section of Missouri, this community is rare and confined to protected valleys (Vancil Hollow Natural Area), but it has been so extensively eliminated that its classification is problematic. It is

probably eliminated in the Lowlands Section of the state. Possible occurrences in Arkansas need to be examined further.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: Braun (1950, p. 141-150) describes these beech - maple forests in the Hill Section of her Western Mesophytic Forest Region. Dry-mesic forests, in which *Quercus alba*, *Quercus rubra*, and *Carya ovata* dominate, often have American beech and sugar maple regeneration due to an increased availability of moisture when mature oaks are removed. Where logging is heavy in these oak - hickory stands, second-growth regeneration is often dominated by sugar maple and, to a lesser extent, American beech. Classification under these circumstances can be difficult. Conversely, where sugar maple is selectively removed by logging, American beech can occur in pure stands. Forests from the southern part of Crowley's Ridge (Arkansas) are placed in *Fagus grandifolia* - *Quercus alba* - *Liriodendron tulipifera* / *Hydrangea arborescens* / *Schisandra glabra* Forest (CEGL004663), where *Acer saccharum* is not a big component and *Quercus alba* is more common. This type may apply to other parts of Crowley's Ridge, but more information is needed.

Global Similar Associations:

Acer saccharum - *Carya cordiformis* / *Asimina triloba* Floodplain Forest (CEGL005035)

Acer saccharum - *Liriodendron tulipifera* - *Fraxinus americana* / *Staphylea trifolia* Forest (CEGL006201)--may overlap with CEGL002411.

Fagus grandifolia - *Acer saccharum* Glaciated Midwest Forest (CEGL005013)--may be similar to this community.

Fagus grandifolia - *Betula lenta* - *Liriodendron tulipifera* - *Acer saccharum* Forest (CEGL006296)

Fagus grandifolia - *Quercus alba* / *Cornus florida* Forest (CEGL007881)--a beech - white oak type.

Fagus grandifolia - *Quercus rubra* - *Tilia americana* var. *caroliniana* / *Magnolia tripetala* / *Podophyllum peltatum* Forest (CEGL007823)

Fagus grandifolia - *Quercus* spp. - *Acer rubrum* - *Juglans nigra* Forest (CEGL005014)

Liriodendron tulipifera - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* / (*Magnolia tripetala*) Forest (CEGL005222)--has coniferous evergreen species, such as eastern hemlock (*Tsuga canadensis*), as well as species such as white basswood (*Tilia americana* var. *heterophylla*) and sweet buckeye (*Aesculus flava*), which are not present in CEGL002411 (Braun 1950).

Quercus alba - *Fagus grandifolia* Western Allegheny Plateau Forest (CEGL006144)

Quercus alba - *Quercus rubra* - *Quercus prinus* - *Acer saccharum* / *Lindera benzoin* Forest (CEGL002059)

Global Related Concepts:

Fagus - *Acer saccharum* - *Liriodendron* / *Rhus radicans* community (Voigt and Mohlenbrock 1964) =

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

Beech - Maple Forest (Braun 1950) I

Beech - Sugar Maple: 60 (Eyre 1980) B

Beech - Tulip Poplar Type (Schmalzer and DeSelm 1982) =

Beech-maple-tuliptree forest (matrix, large patch) (CAP pers. comm. 1998) ?

Eastern Broadleaf Forests: 102: Beech-Maple Forest (*Fagus-Acer*) (Kuchler 1964) B

Terrestrial: Forest: Hardwood (TNC 1985) B

UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B

Western Mesophytic Forest (Braun 1950) I

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This rich community occupies mesic slopes of the "knobs" at the Boyhood Home Unit.

Global Range: This beech - maple forest is found in unglaciated areas of the east-central United States, ranging from Ohio, West Virginia (and possibly western Maryland and Virginia) southwest to southeastern Missouri, Kentucky and Tennessee, and possibly Arkansas. This community occupies mesic slopes of maturely dissected plateaus and submontane regions of the east-central United States. These sites were not covered by Wisconsin era glaciers.

Nations: US

States/Provinces: AR?, IL, IN, KY, MD?, MO, OH, TN, VA?, WV

USFS Ecoregions: 221D:CC, 221Ea:CCC, 221Eb:CCC, 221Ec:CCC, 221Ed:CCC, 221Ef:CCC, 221Eg:CCC, 221Ha:CCP, 221Hc:CCC, 221He:CCC, 221J:CP, 222Ak:CP?, 222Ao:CPP, 222Aq:CPP, 222Ca:CPP, 222Ch:CPP, 222Db:CCC, 222Dc:CCC, 222De:CCC, 222Df:CCC, 222Dh:CCP, 222Di:CCC, 222Ei:CCC, 222Ek:CCC,

222El:CCC, 222Em:CCC, 222En:CCP, 222Eo:CCP, 222Fa:CCP, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Fe:CCC, 222Ff:CCC, 222Gc:CCC, 222Gd:CCP, 222Hc:CCC, 234Ab:CCC, 234Ac:CCC, 234An:CCP, M221Ab:CCP, M221Ac:CCC, M221Ad:CCP, M221Ba:CCC, M221Bb:CCC, M221C:CP, M221Da:CPP
Federal Lands: NPS (Big South Fork, Lincoln Birthplace, Mammoth Cave, Natchez Trace, Obed); USFS (Daniel Boone?, Jefferson?, Land Between the Lakes)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.11 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Guetersloh, mod. D. Faber-Langendoen 04-00

References: Behler 1988, Braun 1950, Bull and Farrand 1977, CAP pers. comm. 1998, Campbell 2001, Clark and Hutchinson 1994, Craighead 1949, Duncan and Duncan 1988, Evans 1991, Eyre 1980, Faircloth 1971, Fralish 1987, Fralish 1988b, Franklin et al. 1993, Harrison 2004, Illinois Nature Preserve Commission 1973, Jenkins and Pallardy 1993, Kuchler 1964, Little 1980a, Midwestern Ecology Working Group n.d., Mohlenbrock 1986, Niering 1979, SAF 1967, Schafale and Weakley 1985, Schmalzer and DeSelm 1982, Schwartz and Schwartz 1959, TDNH unpubl. data, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

A.236–*Liriodendron tulipifera* Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes deciduous forests dominated by *Liriodendron tulipifera* (Tuliptree), primarily in areas which were once clearcut, old fields, or cleared by fire or other natural disturbances. These non-wetland forests are also found along mesic stream terraces and on upland mountain benches. Forests in this alliance are abundant in the central and southern Appalachians, below 915 m (3000 feet) elevation, usually associated with disturbance and on the most productive sites, but also occur in the Coastal Plain, Piedmont, Ridge and Valley, and Cumberland Plateau. This alliance includes pure, often even-aged stands of *Liriodendron tulipifera* (Tuliptree) as well as forests with *Liriodendron tulipifera* (Tuliptree) associated with other species favored by canopy openings. Associated species vary with geographic location. Throughout most of the range of this alliance, *Acer rubrum* (Red Maple), *Robinia pseudoacacia* (Black Locust), *Betula lenta* (Sweet Birch), *Acer saccharum* (Sugar Maple), and *Acer negundo* (Box-elder) are common components. In the Piedmont and Coastal Plain, *Liquidambar styraciflua* (Sweetgum) is a common associate. In the Appalachians, *Halesia tetraptera* (Mountain Silverbell), *Tsuga canadensis* (Eastern Hemlock), *Tilia americana* var. *heterophylla* (Appalachian Basswood), *Prunus serotina* var. *serotina* (Black Cherry), and *Magnolia fraseri* (Fraser Magnolia) can be additional components. In the Ridge and Valley and Cumberland Plateau, additional species include *Quercus rubra* (Northern Red Oak), *Magnolia acuminata* (Cucumber-tree), *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory), *Pinus virginiana* (Virginia Pine), *Sassafras albidum* (Sassafras), *Pinus strobus* (Eastern White Pine), *Carpinus caroliniana* (American Hornbeam), *Asimina triloba* (Common Pawpaw), and *Staphylea trifolia* (American Bladdernut). Herbaceous strata are not diverse and, in the southern Appalachians, this feature distinguishes these forests from rich cove forests in *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance (A.235). Vines can be abundant including *Vitis* (Grape) spp., *Smilax* (Greenbrier) spp., *Aristolochia macrophylla* (Pipevine), and *Parthenocissus quinquefolia* (Virginia Creeper). Forests in this alliance occur on middle to lower slopes, sheltered coves and gentle concave slopes, and river terraces over various soils and geologies. Vegetation of this alliance is uncommon in Louisiana.

Classification Comments:

Similar Alliances:

Liquidambar styraciflua - (*Liriodendron tulipifera*, *Acer rubrum*) Temporarily Flooded Forest Alliance (A.287)--temporarily flooded forests dominated or codominated by *Liriodendron tulipifera*.

Liriodendron tulipifera - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance (A.235)

Pinus taeda - *Liriodendron tulipifera* Temporarily Flooded Forest Alliance (A.434)--temporarily flooded forests dominated or codominated by *Liriodendron tulipifera*.

Similar Alliance Comments:

Related Concepts:

Yellow-Poplar: 57 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: Forests in this alliance are primarily found in areas which were once clearcut, old fields, or cleared by fire or other natural disturbances. These forests are also found along streams in flat bottoms and on upland mountain benches. Forests in this alliance are abundant in the central and southern Appalachians, below 915 m

(3000 feet) elevation, usually associated with disturbance and on the most productive sites. They also occur in the Coastal Plain, Piedmont, Ridge and Valley, and Cumberland Plateau.

Vegetation: This alliance includes pure, often even-aged stands of *Liriodendron tulipifera* (Tuliptree) as well as forests with *Liriodendron tulipifera* (Tuliptree) associated with other species favored by canopy openings. Associated species vary with geographic location. Throughout most of the range of this alliance, *Acer rubrum* (Red Maple), *Robinia pseudoacacia* (Black Locust), *Betula lenta* (Sweet Birch), *Acer saccharum* (Sugar Maple), and *Acer negundo* (Box-elder) are common components. In the Piedmont and Coastal Plain, *Liquidambar styraciflua* (Sweetgum) is a common associate. In the Appalachians, *Halesia tetraptera* (Mountain Silverbell), *Tsuga canadensis* (Eastern Hemlock), *Tilia americana* var. *heterophylla* (Appalachian Basswood), *Prunus serotina* var. *serotina* (Black Cherry), and *Magnolia fraseri* (Fraser Magnolia) can be additional components. In the Ridge and Valley and Cumberland Plateau, additional species include *Quercus rubra* (Northern Red Oak), *Magnolia acuminata* (Cucumber-tree), *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory), *Pinus virginiana* (Virginia Pine), *Sassafras albidum* (Sassafras), *Pinus strobus* (Eastern White Pine), *Carpinus caroliniana* (American Hornbeam), *Asimina triloba* (Common Pawpaw), and *Staphylea trifolia* (American Bladdernut). Herbaceous strata are not diverse and, in the southern Appalachians, this feature distinguishes these forests from rich cove forests in *Liriodendron tulipifera* - *Tilia americana* var. *heterophylla* - *Aesculus flava* - *Acer saccharum* Forest Alliance (A.235). Vines can be abundant including *Vitis* (Grape) spp., *Smilax* (Greenbrier) spp., *Aristolochia macrophylla* (Pipevine), and *Parthenocissus quinquefolia* (Virginia Creeper).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in Alabama, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Maryland, Pennsylvania, Virginia, and West Virginia. Forests in this alliance are abundant in the central and southern Appalachians, below 915 m (3000 feet) elevation, but also occur in the Coastal Plain, Piedmont, Ridge and Valley, and Cumberland Plateau.

Nations: US

Subnations: AL, DC, DE?, FL?, GA, KY, LA, MD, MS, NC, NJ, PA, SC, TN, VA, WV

TNC Ecoregions: 43:C, 44:C, 50:C, 51:C, 52:C, 53:P, 58:C, 59:C, 61:C

USFS Ecoregions: 221Da:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 221Jb:CCC, 222Cg:CCC, 222D:CC, 222Eb:CCC, 222Ed:CCP, 222Eg:CCC, 222En:CCC, 222Eo:CCC, 231Aa:CCC, 231Ab:CCC, 231Ae:CCC, 231Ai:CCC, 231Ak:CCC, 231Al:CCC, 231Ap:CCC, 231Bc:CCC, 231Bh:CCC, 231Cd:CCC, 231Dc:CCC, 232Ad:CCC, 232Br:CCC, 232D:CP, 234Ab:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Bb:CCC, M221Cb:CCC, M221Da:CCC, M221Db:CCP, M221Dc:CCC, M221Dd:CCC

Federal Lands: DOD (Arnold, Camp Dawson, Fort Benning); NPS (Antietam, Appomattox Court House, Big South Fork, Blue Ridge Parkway, Booker T. Washington, C&O Canal, Catocin Mountain, Chickamauga-Chattanooga, Cowpens, Cumberland Gap, Fort Donelson, Fort Necessity, Fredericksburg-Spotsylvania, George Washington Parkway, Gettysburg, Great Smoky Mountains, Guilford Courthouse, Harpers Ferry, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Mammoth Cave, Manassas, Morristown, Natchez Trace, National Capital-East, New River Gorge, Ninety Six, Obed, Prince William, Rock Creek, Shenandoah, Shiloh, Thomas Stone, Valley Forge, Vicksburg); TVA (Tellico); USFS (Apalachicola?, Bankhead, Bienville?, Chattahoochee, Cherokee, Conecuh?, Daniel Boone, De Soto?, George Washington, Jefferson, Nantahala, Oconee?, Pisgah, Sumter, Talladega, Tombigbee?, Tuskegee?)

(CEGL007220) Tuliptree / (Eastern Redbud) / (Northern Spicebush) Forest

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

Successional Tuliptree Forest (Circumneutral Type)

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Liriodendron tulipifera</i> Forest Alliance (A.236)
Alliance (English name)	Tuliptree Forest Alliance
Association	<i>Liriodendron tulipifera</i> / (<i>Cercis canadensis</i>) / (<i>Lindera benzoin</i>) Forest
Association (English name)	Tuliptree / (Eastern Redbud) / (Northern Spicebush) Forest
Association (Common name)	Successional Tuliptree Forest (Circumneutral Type)
Ecological System(s):	Appalachian (Hemlock)-Northern Hardwood Forest (CES202.593) Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)

ELEMENT CONCEPT

Global Summary: This semi-natural or successional community dominated by *Liriodendron tulipifera* (Tuliptree) occurs in the Ridge and Valley of Tennessee and Virginia, the Interior Low Plateau of Kentucky, and the Central Appalachians, Piedmont and inner Coastal Plain regions of Virginia, West Virginia, and Maryland. It may also occur in similar regions of Pennsylvania and Delaware. It is distinguished from other upland communities dominated by *Liriodendron tulipifera* (Tuliptree) by the presence of species associated with soils with moderately high base saturation levels (rich soils). Species found in stands attributable to this type may be fairly diverse and result in a varied composition. In addition to *Liriodendron tulipifera* (Tuliptree), other canopy species may include *Liquidambar styraciflua* (Sweetgum), *Acer saccharum* (Sugar Maple), *Robinia pseudoacacia* (Black Locust), *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), *Aesculus flava* (Yellow Buckeye), *Magnolia acuminata* (Cucumber-tree), *Ulmus rubra* (Slippery Elm), *Quercus imbricaria* (Shingle Oak), *Quercus muehlenbergii* (Chinquapin Oak), *Prunus serotina* (Black Cherry), and *Carya ovata* (Shagbark Hickory). Species often found in the subcanopy include *Acer saccharum* (Sugar Maple), *Cercis canadensis* (Eastern Redbud), *Ulmus alata* (Winged Elm), *Fraxinus americana* (White Ash), *Morus rubra* (Red Mulberry), and *Cornus florida* (Flowering Dogwood). Shrubs include saplings of the subcanopy and canopy species, as well as *Lindera benzoin* (Northern Spicebush), *Symphoricarpos orbiculatus* (Coralberry), *Asimina triloba* (Common Pawpaw), *Staphylea trifolia* (American Bladdernut), *Acer negundo* (Box-elder), and *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar). Exotic shrubs, including *Rosa multiflora* (Multiflora Rose), *Rubus phoenicolasius* (Wine Raspberry), and *Lonicera japonica* (Japanese Honeysuckle), are present at some sites. Herbaceous species include the exotics *Microstegium vimineum* (Japanese Stiltgrass), *Alliaria petiolata* (Garlic Mustard), and *Veronica hederifolia* (Ivyleaf Speedwell), as well as *Toxicodendron radicans* (Eastern Poison-ivy), *Parthenocissus quinquefolia* (Virginia Creeper), *Actaea racemosa* (Black Cohosh), *Caulophyllum thalictroides* (Blue Cohosh), *Laportea canadensis* (Canadian Wood-nettle), *Impatiens pallida* (Yellow Jewelweed), *Hydrophyllum canadense* (Mapleleaf Waterleaf), *Adiantum pedatum* (Northern Maidenhair), *Polygonatum pubescens* (Hairy Solomon's-seal), *Verbesina alternifolia* (Wingstem), *Amphicarpa bracteata* (American Hog-peanut), and *Polystichum acrostichoides* (Christmas Fern).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This semi-natural or successional community was sampled at two locations. One site is a fairly mesic, somewhat disturbed, southwest-facing midslope that faces the Birthplace Visitor Center and is adjacent to a mesic ravine. This site has an unusually high component of *Quercus imbricaria* (Shingle Oak). The other site is a somewhat steep, northeast-facing, mesic lowslope of a knob adjacent to a mowed field. No elevations were recorded. The unvegetated surface is dominated by leaf litter (90-97% cover) with some wood (2%), bare soil (0-10%), and lichens (1-5%). Evidence of disturbance includes past logging, trails and roads, clearing for agriculture, and many exotic plants. Part of the site near the Visitor Center was sprayed with herbicide in 2005 to combat invasion by *Hedera helix*.

Global Environment: These forests are found on disturbed mesic areas underlain by rich soils with moderately high base saturation levels. It occurs on abandoned farmland and townsites, old strip mines, old clearcuts, burned areas, and other areas where the canopy was removed or heavily disturbed in the past. Small patches may occur in areas where canopy disturbance has resulted from natural causes such as windfall or landslides. Soils may be underlain by a variety of geologic strata that weather to base-rich soils including limestone, dolomite, calcareous shale, shell deposits, metabasalts and granitic complexes. In Kentucky this association may occur on calcareous substrates in the Dripping Springs Escarpment. At Shenandoah National Park in Virginia, this community is underlain by Catocin metabasalt or a pyroxene-bearing granitic complex. In West Virginia, parent materials include sandstone, shale, and alluvium. Soils in plots were described as moderately well-drained to well-drained clay, silt loam, and sandy loam with pH ranging from 5.0 to 7.5.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The moderate (50-70% cover) tree canopy, 20-35 m tall, is clearly dominated by *Liriodendron tulipifera* (Tuliptree); other taxa can include *Fraxinus americana* (White Ash), *Juglans nigra* (Black Walnut), *Platanus occidentalis* (Sycamore), and, at the Birthplace Unit, *Quercus imbricaria* (Shingle Oak). The moderate to dense (50-80%) subcanopy (10-20 m) is dominated by *Juniperus virginiana* (Eastern Red-cedar), along with lesser amounts of *Celtis occidentalis* (Common Hackberry), *Cornus florida* (Flowering Dogwood), *Fraxinus americana* (White Ash), and *Liriodendron tulipifera* (Tuliptree), among others. The sparse to moderate (30-40%) tall-shrub layer (2-10 m) can be dominated by *Aesculus glabra* (Ohio Buckeye), *Celtis occidentalis* (Common Hackberry), *Juniperus virginiana* (Eastern Red-cedar), and/or *Lindera benzoin* (Northern Spicebush). The sparse (20-30%) short-shrub layer (0.5-1 m) contains taxa found in the upper layers along with *Symphoricarpos orbiculatus* (Coralberry) and *Toxicodendron radicans* (Eastern Poison-ivy). The moderately dense (70-80%) herbaceous layer includes *Toxicodendron radicans* (Eastern Poison-ivy), *Jeffersonia diphylla* (Twingleaf), *Podophyllum peltatum* (Mayapple), and the fern *Polystichum acrostichoides* (Christmas Fern); 131 taxa were recorded in this layer in one plot.

Global Vegetation: Stands are dominated by *Liriodendron tulipifera* (Tuliptree) but also include various other species, including ones indicative of rich or circumneutral environments. Other species include *Liquidambar styraciflua* (Sweetgum), *Acer saccharum* (Sugar Maple), *Aesculus flava* (Yellow Buckeye), *Robinia pseudoacacia* (Black Locust), *Juglans nigra* (Black Walnut), *Halesia tetraptera* (Mountain Silverbell), *Fraxinus americana* (White Ash), *Magnolia acuminata* (Cucumber-tree), *Ulmus rubra* (Slippery Elm), *Quercus imbricaria* (Shingle Oak), *Quercus muehlenbergii* (Chinquapin Oak), and *Carya ovata* (Shagbark Hickory) (NatureServe Ecology unpubl. data, VDNH unpubl. data). Species often found in the subcanopy include *Acer saccharum* (Sugar Maple), *Cercis canadensis* (Eastern Redbud), *Ulmus alata* (Winged Elm), *Morus rubra* (Red Mulberry), *Sassafras albidum* (Sassafras), and *Cornus florida* (Flowering Dogwood). *Cercis canadensis* (Eastern Redbud) is often abundant on soils underlain by carbonate strata. Shrubs include saplings of the subcanopy and canopy species, as well as *Symphoricarpos orbiculatus* (Coralberry), *Lindera benzoin* (Northern Spicebush), *Asimina triloba* (Common Pawpaw), and *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar). *Lindera benzoin* (Northern Spicebush) is often abundant in occurrences of this community in the Central Appalachians, Piedmont and inner Coastal Plain regions of Virginia, West Virginia, and Maryland. Exotic shrubs, including *Rosa multiflora* (Multiflora Rose), *Rubus phoenicolasius* (Wine Raspberry), and *Lonicera japonica* (Japanese Honeysuckle), are present at some sites. Vines, which may be abundant, include *Aristolochia macrophylla* (Pipevine), *Toxicodendron radicans* (Eastern Poison-ivy), and *Vitis aestivalis* var. *bicolor*. Herbaceous species include the exotics *Microstegium vimineum* (Japanese Stiltgrass), *Alliaria petiolata* (Garlic Mustard), and *Veronica hederifolia* (Ivyleaf Speedwell), as well as *Actaea racemosa* (Black Cohosh), *Ageratina altissima* (White Snakeroot), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Asarum canadense* (Canadian Wild Ginger), *Caulophyllum thalictroides* (Blue Cohosh), *Cryptotaenia canadensis* (Canada Honewort), *Galium triflorum* (Sweet-scent Bedstraw), *Laportea canadensis* (Canadian Wood-nettle), *Impatiens pallida* (Yellow Jewelweed), *Hydrophyllum canadense* (Mapleleaf Waterleaf), *Osmorhiza longistylis* (Aniserooot), *Adiantum pedatum* (Northern Maidenhair), *Polygonatum pubescens* (Hairy Solomon's-seal), *Polystichum acrostichoides* (Christmas Fern), *Verbesina alternifolia* (Wingstem), *Amphicarpaea bracteata* (American Hog-peanut), and *Polystichum acrostichoides* (Christmas Fern). (Andreu and Tukman 1995, NatureServe Ecology unpubl. data, WVNHP unpubl. data, VDNH unpubl. data). Examples at Fort Donelson that have been very heavily disturbed may have local dominance by *Celtis laevigata* (Sugarberry) and *Juglans nigra* (Black Walnut).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Fraxinus americana</i> (White Ash), <i>Liriodendron tulipifera</i> (Tuliptree)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus imbricaria</i> (Shingle Oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple), <i>Celtis occidentalis</i> (Common Hackberry), <i>Cornus florida</i> (Flowering Dogwood)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Acer saccharum</i> (Sugar Maple), <i>Aesculus glabra</i> (Ohio Buckeye), <i>Lindera benzoin</i> (Northern Spicebush)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Celtis occidentalis</i> (Common Hackberry)
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Juniperus virginiana</i> (Eastern Red-cedar)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)
Herb (field)	Forb	<i>Jeffersonia diphylla</i> (Twinleaf), <i>Podophyllum peltatum</i> (Mayapple)

Global

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Liriodendron tulipifera</i> (Tuliptree)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Juniperus virginiana* (Eastern Red-cedar), *Parthenocissus quinquefolia* (Virginia Creeper)

Global: *Acer saccharum* (Sugar Maple), *Aesculus flava* (Yellow Buckeye), *Ageratina altissima* (White Snakeroot), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Aristolochia macrophylla* (Pipevine), *Asarum canadense* (Canadian Wild Ginger), *Asimina triloba* (Common Pawpaw), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), *Cryptotaenia canadensis* (Canada Honewort), *Galium triflorum* (Sweet-scent Bedstraw), *Lindera benzoin* (Northern Spicebush), *Osmorhiza longistylis* (Aniserooot), *Parthenocissus quinquefolia* (Virginia Creeper), *Polystichum acrostichoides* (Christmas Fern), *Toxicodendron radicans* (Eastern Poison-ivy), *Ulmus rubra* (Slippery Elm)

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Bromus commutatus* (Meadow Brome), *Buglossoides arvensis* (Corn-gromwell), *Daucus carota* (Queen Anne's-lace), *Duchesnea indica* (Indian-strawberry), *Galinsoga quadriradiata* (Fringed Quickweed), *Glechoma hederacea* (Ground-ivy), *Hedera helix* (English Ivy), *Lamium amplexicaule* (Common Deadnettle), *Leucanthemum vulgare* (Oxeye Daisy), *Ligustrum sinense* (Chinese Privet), *Lolium arundinaceum* (Tall Fescue), *Lonicera japonica* (Japanese Honeysuckle), *Lonicera maackii* (Amur Honeysuckle), *Microstegium vimineum* (Japanese Stiltgrass), *Plantago lanceolata* (Narrowleaf Plantain), *Rosa multiflora* (Multiflora Rose), *Setaria faberi* (Giant Foxtail), *Sorghum halepense* (Johnson Grass), *Trifolium pratense* (Red Clover), *Trifolium repens* (White Clover), *Valerianella locusta* (European Cornsalad), *Veronica arvensis* (Corn Speedwell), *Vinca minor* (Lesser Periwinkle)

Global:

CONSERVATION STATUS RANK

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

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Abraham Lincoln Birthplace National Historic Site Comments:

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

Global Similar Associations:

Liriodendron tulipifera - *Pinus taeda* Forest (CEGL007521)--supports a significant pine component.

Liriodendron tulipifera - *Quercus* spp. Forest (CEGL007221)--lacks species affiliated with circumneutral conditions.

Liriodendron tulipifera Forest (CEGL007218)--is less diverse and earlier successional.

Global Related Concepts:

Liriodendron tulipifera / *Lindera benzoin* Forest (Lea 2000) F

Oak-Hickory Association of the Western Shore District (Shreve et al. 1910) B

Successional forest of low-elevation plateaus (Vanderhorst 2001a) B

Tulip Poplar Type (Schmalzer and DeSelm 1982) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: At both the Birthplace Unit and the Boyhood Home Unit, this association is often found in mesic areas between the floodplain community *Platanus occidentalis* - *Celtis laevigata* - *Liriodendron tulipifera* / *Lindera benzoin* - *Arundinaria gigantea* / *Amphicarpaea bracteata* Forest (CEGL008429) and other upland associations. It is occasionally found on mesic slopes of the knobs of the Boyhood Home Unit, and sometimes in sinkholes and depressions scattered throughout the Birthplace Unit.

Global Range: This type occurs in the Ridge and Valley and Cumberland Plateau of Tennessee, the Interior Low Plateau of Kentucky, the Upper East Gulf Coastal Plain of Mississippi, and the Central Appalachian, Piedmont and Inner Coastal Plain regions of Virginia, West Virginia, Maryland and possibly Pennsylvania and Delaware. Its full range is unknown.

Nations: US

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

USFS Ecoregions: 221Hc:CCC, 221He:CCC, 221Jb:CCC, 222Eg:CCC, 231Ae:CCC, 231Al:CCC, 231Ap:CCC, 232Ad:CCC, M221Ab:CCC, M221Bb:CCC, M221Cb:CCC, M221Da:CCC

Federal Lands: DOD (Camp Dawson); NPS (Antietam, Big South Fork, Blue Ridge Parkway, C&O Canal, Catoctin Mountain, Chickamauga-Chattanooga, Cumberland Gap, Fort Donelson, George Washington Parkway, Harpers Ferry, Lincoln Birthplace, Mammoth Cave, Natchez Trace, National Capital-East, New River Gorge, Obed, Rock Creek, Shenandoah, Thomas Stone, Vicksburg); TVA (Tellico); USFS (Cherokee?)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (2 plots: ABLI.1 [Birthplace Unit], ABLI.9 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: R.E. Evans, mod. M. Pyne, J. Teague, C.W. Nordman, R. White, S.C. Gawler

References: Andreu and Tukman 1995, Hall and Mathews 1974, Lea 2000, Lea 2003, Martin 1989, NatureServe Ecology - Southeastern U.S. unpubl. data, Schmalzer and DeSelm 1982, Shreve et al. 1910, Southeastern Ecology Working Group n.d., TDNH unpubl. data, VDNH unpubl. data, Vanderhorst 2001a, Vanderhorst and Streets 2006, WVNHP unpubl. data b

A.237–*Prunus serotina* - *Acer rubrum* - *Amelanchier canadensis* - *Quercus* spp. Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes temperate deciduous forests and scrub forests comprised of early-successional species. The physiognomy of this vegetation is highly variable and may range from open woodland to stunted forest to dense nearly impenetrable thicket. In maritime settings, individual trees tend to be wind-pruned and multi-stemmed. In inland settings, this vegetation is generally the result of natural or human-caused disturbance such as hurricanes or logging. The canopy may contain *Prunus serotina* var. *serotina* (Black Cherry), *Amelanchier canadensis* (Canada Serviceberry), *Acer rubrum* (Red Maple), *Liriodendron tulipifera* (Tuliptree), *Fraxinus americana* (White Ash), *Nyssa sylvatica* (Blackgum), *Photinia pyrifolia* (Red Chokeberry), and *Sassafras albidum* (Sassafras) in varying proportions. *Pinus taeda* (Loblolly Pine), *Diospyros virginiana* (Eastern Persimmon), and *Ilex opaca* var. *opaca* (American Holly) may occur locally on the Coastal Plain. Some examples support vines in great abundance, such as *Smilax rotundifolia* (Roundleaf Greenbrier), *Smilax glauca* (Whiteleaf Greenbrier), *Parthenocissus quinquefolia* (Virginia Creeper), and *Toxicodendron radicans* (Eastern Poison-ivy). Herbs are of variable cover, depending on the degree of sunlight penetrating the canopy. Herbaceous composition is widely variable and may include both native and exotic species. The substrate varies from pure sand and loamy sands in coastal regions, or loam in the interior.

Classification Comments: The physiognomy may also be manifested as tall shrubland, with height ranging from <5 m, comprised of multiple stems, to taller forests.

Similar Alliances:

Ilex opaca Forest Alliance (A.3002)

Similar Alliance Comments:

Related Concepts:

Black Oak: 110 (Eyre 1980) I

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

Maritime Shrubland Community (Swain and Kearsley 2001) ?

White Oak: 53 (Eyre 1980) I

ALLIANCE DESCRIPTION

Environment: The substrate varies from pure sand and loamy sands in coastal regions, or loam in the interior.

Vegetation: The physiognomy of this vegetation is highly variable and may range from forest to open woodland to stunted forest to dense nearly impenetrable thicket. In maritime settings, individual trees tend to be wind-pruned and multi-stemmed. The canopy may contain *Prunus serotina* var. *serotina* (Black Cherry), *Amelanchier canadensis* (Canada Serviceberry), *Acer rubrum* (Red Maple), *Liriodendron tulipifera* (Tuliptree), *Fraxinus americana* (White Ash), *Nyssa sylvatica* (Blackgum), *Photinia pyrifolia* (Red Chokeberry), and *Sassafras albidum* (Sassafras) in varying proportions. *Pinus taeda* (Loblolly Pine), *Diospyros virginiana* (Eastern Persimmon), and *Ilex opaca* var. *opaca* (American Holly) may occur locally on the Coastal Plain. Some examples support vines in great abundance, such as *Smilax rotundifolia* (Roundleaf Greenbrier), *Smilax glauca* (Whiteleaf Greenbrier), *Parthenocissus quinquefolia* (Virginia Creeper), and *Toxicodendron radicans* (Eastern Poison-ivy). Herbs are of variable cover, depending on the degree of sunlight penetrating the canopy.

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the eastern U.S. from southern Maine south to Virginia, Kentucky, and Tennessee. The extent of its distribution in central and northern Maine needs clarification.

Nations: US

Subnations: CT, DE, IN?, KY, MA, MD, ME, NH, NJ, NY, PA, RI, TN, VA, WV

TNC Ecoregions: 44:C, 49:C, 52:?, 58:C, 59:C, 60:C, 61:C, 62:C, 63:C

USFS Ecoregions: 212Cb:CCP, 212Db:CCC, 212Dc:CCP, 212Fc:CCC, 212G:C?, 221Aa:CCC, 221Ab:CCC, 221Ac:CCC, 221Ad:CCC, 221Ae:CCC, 221Af:CCC, 221Ag:CCC, 221Ah:CCC, 221Ai:CCC, 221Ak:CCC, 221Al:CCC, 221Am:CCC, 221Ba:CCC, 221Bb:CCC, 221Bc:CCC, 221Bd:CCC, 221Da:CCC, 221Db:CCC, 221Dc:CCC, 221Fa:CCC, 222Dc:CPP, 222Dj:CPP, 222Ea:CCP, 222Eh:CCP, 222Ei:CCP, 222Ek:CCC, 231A:??,

232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CC?, 232Bb:CC?, 232Bc:CCP, 232Bd:CCP, 232Bz:CCC, 232Ch:CCC, M212Bc:CCC, M212Bd:CCC, M212Cb:CCC, M212E:C?, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Ad:CCC, M221Ba:CCC, M221Bb:CCC, M221Bc:CCC, M221Bd:CCC, M221Da:CCC
Federal Lands: NPS (Allegheny Portage Railroad, Assateague Island, Cape Cod, Delaware Water Gap, Fire Island, Fort Necessity, Friendship Hill, Gateway, Gettysburg, Johnstown Flood, Lincoln Birthplace, Mammoth Cave, Morristown, Upper Delaware, Valley Forge, Weir Farm); USFS (George Washington, Monongahela); USFWS (Erie, Great Meadows?, Nomans Land Island?, Parker River, Prime Hook, Rachel Carson)

(CEGL004133) Black Cherry - Sassafras - (White Ash) / Eastern Red-cedar Forest

Prunus serotina - *Sassafras albidum* - (*Fraxinus americana*) / *Juniperus virginiana* Forest

Southeastern Successional Black Cherry Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Prunus serotina</i> - <i>Acer rubrum</i> - <i>Amelanchier canadensis</i> - <i>Quercus</i> spp. Forest Alliance (A.237)
Alliance (English name)	Black Cherry - Red Maple - Canada Serviceberry - Oak species Forest Alliance
Association	<i>Prunus serotina</i> - <i>Sassafras albidum</i> - (<i>Fraxinus americana</i>) / <i>Juniperus virginiana</i> Forest
Association (English name)	Black Cherry - Sassafras - (White Ash) / Eastern Red-cedar Forest
Association (Common name)	Southeastern Successional Black Cherry Forest
Ecological System(s):	Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)

ELEMENT CONCEPT

Global Summary: This early-successional woody vegetation of the interior southeastern United States (unglaciated Interior Low Plateau) occurs on sites that have generally been formerly cleared for agriculture or heavily impacted by logging or grazing. Environmental setting varies, but generally sites are dry-mesic to mesic. Early-successional woody species dominate the canopy in a widely variable mixture, depending on geographic location. Tree species typically include *Prunus serotina* (Black Cherry), *Sassafras albidum* (Sassafras), *Robinia pseudoacacia* (Black Locust), *Liriodendron tulipifera* (Tuliptree), *Fraxinus americana* (White Ash), and/or *Acer rubrum* (Red Maple). Other associates can include *Juglans nigra* (Black Walnut), *Ulmus americana* (American Elm), *Quercus* (Oak) spp., *Juniperus virginiana* (Eastern Red-cedar), *Acer negundo* (Box-elder), and the exotic *Ailanthus altissima* (Tree-of-Heaven). Other woody species may contribute to the canopy or form a tall-shrub layer, including *Lindera benzoin* (Northern Spicebush), *Carpinus caroliniana* (American Hornbeam), and *Crataegus* (Hawthorn) spp. The low-shrub layer, if present, is usually characterized by the presence of *Rubus* (Blackberry) spp. such as *Rubus argutus* (Southern Blackberry), *Rubus allegheniensis* (Allegheny Blackberry), *Rubus flagellaris* (Northern Dewberry), *Rubus hispidus* (Bristly Dewberry), and/or the exotic *Rubus phoenicolasius* (Wine Raspberry). This layer may also be dominated by exotic species such as *Lonicera maackii* (Amur Honeysuckle), *Lonicera japonica* (Japanese Honeysuckle), *Rosa multiflora* (Multiflora Rose), and *Berberis thunbergii* (Japanese Barberry). Vines may be present, including *Smilax* (Greenbrier) spp., *Vitis* (Grape) spp., *Toxicodendron radicans* (Eastern Poison-ivy), and *Parthenocissus quinquefolia* (Virginia Creeper). The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This newly described association was sampled at three locations in the park. Sites are generally flat interfluvies or gently sloping bottomlands, one with a northeastern aspect. The unvegetated surface is predominantly leaf litter (90-100% cover) with some wood (0-10%). A well-trafficked gravel footpath passes through one area not far from a boundary fence beyond which is a cleared area and big pond. Another site contains an exotic viburnum that suggests some human disturbance.

Global Environment: This vegetation occurs on sites that have been cleared for agriculture or otherwise heavily modified in the past. Generally sites are dry-mesic.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The moderately dense (70% cover) tree canopy, 20-35 m tall, is usually dominated by *Prunus serotina* var. *serotina* (Black Cherry), with lesser amounts of *Acer saccharum* (Sugar Maple), *Sassafras albidum* (Sassafras), *Liriodendron tulipifera* (Tuliptree), *Juglans nigra* (Black

Walnut), and *Fraxinus americana* (White Ash). (A variant of this community type, found in plot ABLI.23, has a canopy comprised of nearly all *Fraxinus americana* (White Ash). This anomalous small patch is surrounded by the more typical mix of canopy trees in this community type.) The sparse to moderate (10-40%) subcanopy (10-20 m) is dominated by *Juniperus virginiana* (Eastern Red-cedar). The very sparse to moderate (5-60%) tall-shrub layer (2-10 m) can be dominated by *Acer saccharum* (Sugar Maple), *Prunus serotina* var. *serotina* (Black Cherry), *Lindera benzoin* (Northern Spicebush), and/or *Sassafras albidum* (Sassafras). The very sparse to dense (5-80%) short-shrub layer (0.1-2 m) is dominated by *Toxicodendron radicans* (Eastern Poison-ivy) and the exotic *Rosa multiflora* (Multiflora Rose). The herbaceous layer (30-80%) is dominated by *Podophyllum peltatum* (Mayapple) and the exotic *Lonicera japonica* (Japanese Honeysuckle). Other vines include *Parthenocissus quinquefolia* (Virginia Creeper).

Global Vegetation: Early-successional woody species dominate the canopy in a widely variable mixture, depending on geographic location. Tree species typically include *Prunus serotina* (Black Cherry), *Sassafras albidum* (Sassafras), *Robinia pseudoacacia* (Black Locust), *Liriodendron tulipifera* (Tuliptree), *Fraxinus americana* (White Ash), and/or *Acer rubrum* (Red Maple). Other associates can include *Juglans nigra* (Black Walnut), *Ulmus americana* (American Elm), *Quercus* (Oak) spp., *Juniperus virginiana* (Eastern Red-cedar), *Acer negundo* (Box-elder), and the exotic *Ailanthus altissima* (Tree-of-Heaven). Other woody species may contribute to the canopy or form a tall-shrub layer, including *Lindera benzoin* (Northern Spicebush), *Carpinus caroliniana* (American Hornbeam), and *Crataegus* (Hawthorn) spp. The low-shrub layer, if present, is usually characterized by the presence of *Rubus* (Blackberry) spp. such as *Rubus argutus* (Southern Blackberry), *Rubus allegheniensis* (Allegheny Blackberry), *Rubus flagellaris* (Northern Dewberry), *Rubus hispidus* (Bristly Dewberry), and/or the exotic *Rubus phoenicolasius* (Wine Raspberry). This layer may also be dominated by exotic species such as *Lonicera maackii* (Amur Honeysuckle), *Lonicera japonica* (Japanese Honeysuckle), *Rosa multiflora* (Multiflora Rose), and *Berberis thunbergii* (Japanese Barberry). Vines may be present, including *Smilax* (Greenbrier) spp., *Vitis* (Grape) spp., *Toxicodendron radicans* (Eastern Poison-ivy), and *Parthenocissus quinquefolia* (Virginia Creeper). The herbaceous layer is variable, often containing grasses and forbs of both native and exotic origin.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Sassafras albidum</i> (Sassafras)
Tree canopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple), <i>Fraxinus americana</i> (White Ash), <i>Juglans nigra</i> (Black Walnut), <i>Liriodendron tulipifera</i> (Tuliptree), <i>Prunus serotina</i> var. <i>serotina</i> (Black Cherry)
Tree subcanopy	Needle-leaved tree	<i>Juniperus virginiana</i> (Eastern Red-cedar)
Tree subcanopy	Broad-leaved deciduous tree	<i>Cornus florida</i> (Flowering Dogwood)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Acer saccharum</i> (Sugar Maple), <i>Cornus florida</i> (Flowering Dogwood), <i>Prunus serotina</i> var. <i>serotina</i> (Black Cherry)
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Juniperus virginiana</i> (Eastern Red-cedar)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Rosa multiflora</i> (Multiflora Rose)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle), <i>Parthenocissus quinquefolia</i> (Virginia Creeper), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)
Herb (field)	Forb	<i>Circaea lutetiana</i> ssp. <i>canadensis</i> (Broadleaf Enchanter's-nightshade), <i>Podophyllum peltatum</i> (Mayapple)

Global Stratum

Lifeform

Species

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Prunus serotina* var. *serotina* (Black Cherry), *Quercus imbricaria* (Shingle Oak), *Sanicula canadensis* (Canadian Black Snakeroot)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Duchesnea indica* (Indian-strawberry), *Lonicera japonica* (Japanese Honeysuckle), *Rosa multiflora* (Multiflora Rose)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (3-Aug-2006). This vegetation is modified, originates from human activity and is not of conservation concern.

CLASSIFICATION

Status: Nonstandard

Classification Confidence: 3 - Weak

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: This vegetation is broadly defined and varies widely in composition across its range.

Global Similar Associations:

Liriodendron tulipifera - *Quercus* spp. Forest (CEGL007221)--is more strongly dominated by *Liriodendron* and is generally in a later successional state as evidenced by taller trees and more closed canopy.

Prunus serotina - *Liriodendron tulipifera* - *Acer rubrum* - *Fraxinus americana* Forest (CEGL006599)--of northeastern states.

Robinia pseudoacacia Forest (CEGL007279)--stands of this type are generally over 75% *Robinia*.

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This community occurs at the Birthplace Unit of the park, in the western area behind the monument, and other formerly disturbed sites, including a flat area near Keith Road in the eastern portion of the unit.

Global Range: This vegetation is currently described from Kentucky and Tennessee but is likely of broader distribution in the upper southeastern U.S. and adjacent lower Midwest (unglaciated Interior Low Plateau).

Nations: US

States/Provinces: IN?, KY, TN

USFS Ecoregions: 222:C

Federal Lands: NPS (Lincoln Birthplace, Mammoth Cave)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (3 quickplots: ABLI.15, ABLI.22, ABLI.23 [Birthplace Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Pyne, after L.A. Sneddon

References: Southeastern Ecology Working Group n.d.

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

ALLIANCE CONCEPT

Summary: This alliance is widely distributed in the eastern United States and portions of adjacent Canada and includes dry mesic to mesic upland oak forests dominated by *Quercus alba* (White Oak) and/or *Quercus rubra* (Northern Red Oak), with or without *Carya* (Hickory) species. Stands are found on gentle to moderately steep lower to upper slopes on uplands and on steep valley sides. The soils are moderately deep to deep and vary from silts to clays and loams. The parent material ranges from glaciated till to limestone, shale, sandstone and other bedrock types. In the midwestern United States, many stands are succeeding to types dominated by *Acer saccharum* (Sugar Maple), *Tilia americana* (American Basswood), *Acer rubrum* (Red Maple), and other mesic tree associates. This succession may be delayed by fire and grazing. In the eastern and southeastern United States, *Liriodendron tulipifera* (Tuliptree), *Liquidambar styraciflua* (Sweetgum), *Fraxinus americana* (White Ash), *Acer rubrum* (Red Maple), and other mesic associates often increase after disturbances, such as clearcutting or windstorms, especially in the absence of fire and in areas adjacent to creeks and rivers. Stands are 15-25 m tall, with a closed, deciduous canopy. The shrub and herbaceous strata are typically well-developed. *Quercus alba* (White Oak) usually dominates, either alone or in combination with *Quercus rubra* (Northern Red Oak) (especially on moister sites) and sometimes *Quercus velutina* (Black Oak) and *Quercus falcata* (Southern Red Oak) (especially on drier sites). Some associations in this alliance are dominated by *Quercus rubra* (Northern Red Oak), although *Quercus alba* (White Oak) is usually also a canopy component. *Carya* (Hickory) species (particularly *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory) or *Carya ovata* (Shagbark Hickory)) are typically common either in the canopy or subcanopy. In the southeastern United States, this alliance covers dry-mesic forests of the Piedmont, low Appalachian Mountains, and the Cumberland and Interior Low Plateau, and mesic oak-hickory forests of the Blue

Ridge and the interior highlands of the Ozarks and Ouachita Mountains. Associated species include *Carya glabra* (Pignut Hickory), *Carya ovata* (Shagbark Hickory), *Carya alba* (Mockernut Hickory), *Fraxinus americana* (White Ash), *Acer rubrum* (Red Maple), *Acer leucoderme* (Chalk Maple), *Cornus florida* (Flowering Dogwood), *Nyssa sylvatica* (Blackgum), *Ostrya virginiana* (Eastern Hop-hornbeam), *Calycanthus floridus* (Sweet-shrub), *Pyrularia pubera* (Buffalo-nut), *Tilia americana* var. *caroliniana* (Southern Basswood), *Oxydendrum arboreum* (Sourwood), *Kalmia latifolia* (Mountain Laurel), and others. This alliance is found throughout the midwestern United States on moderately rich, upland sites. Typical associates include *Fraxinus americana* (White Ash), *Ulmus americana* (American Elm), *Tilia americana* (American Basswood), *Acer saccharum* (Sugar Maple), *Acer rubrum* (Red Maple), and more locally, *Quercus macrocarpa* (Bur Oak) and *Quercus ellipsoidalis* (Northern Pin Oak).

Classification Comments:

Similar Alliances:

Carya (glabra, ovata) - Fraxinus americana - Quercus (alba, rubra) Forest Alliance (A.258)

Quercus alba - (Quercus nigra) Forest Alliance (A.238)

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

Quercus alba Montane Forest Alliance (A.271)--forests dominated by *Quercus alba* in extreme montane landscapes.

Quercus rubra - (Acer saccharum) Forest Alliance (A.251)--mesic forests dominated by *Quercus rubra*.

Quercus rubra Montane Forest Alliance (A.272)--forests dominated by *Quercus rubra* in extreme montane landscapes.

Quercus velutina - Quercus alba - (Quercus coccinea) Forest Alliance (A.1911)--includes floristically and structurally similar stands, typically drier than A.239.

Similar Alliance Comments:

Related Concepts:

Acidic mesophytic forest (Evans 1991) I

Basic Oak - Hickory Forest (Nelson 1986) ?

Basic Oak--Hickory Forest, Mafic Substrate Variant (Schafale and Weakley 1990) I

Calcareous mesophytic forest (Evans 1991) I

Dry-Mesic Oak--Hickory Forest (Schafale and Weakley 1990) ?

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

Mesic Oak - Hickory Forest (Foti 1994b) I

Montane Oak--Hickory Forest (Schafale and Weakley 1990) I

Oak - Chestnut - Hickory Forest (Ambrose 1990a) I

Oak - Hickory Forest (Swain and Kearsley 2001) ?

Oak--Hickory Forest (Nelson 1986) I

Permesotrophic Forest (Rawinski 1992) I

Submesic broadleaf deciduous forest (Ambrose 1990a) I

T1B4aIII. *Quercus rubra - Quercus* spp. (Foti et al. 1994) ?

White Oak - Black Oak - Northern Red Oak: 52 (Eyre 1980) I

White Oak: 53 (Eyre 1980) I

ALLIANCE DESCRIPTION

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

Vegetation: This alliance is widely distributed in the eastern United States and portions of adjacent Canada and includes dry mesic to mesic upland oak forests dominated by *Quercus alba* (White Oak) and *Quercus rubra* (Northern Red Oak), with or without *Carya* (Hickory) species. Stands are 15-25 m tall, with a closed deciduous canopy. The shrub and herbaceous strata are typically well-developed. *Quercus alba* (White Oak) usually dominates stands, either alone or in combination with *Quercus rubra* (Northern Red Oak) (especially on moister sites) and sometimes *Quercus velutina* (Black Oak) (especially on drier sites). Some associations in this alliance are dominated by *Quercus rubra* (Northern Red Oak), although *Quercus alba* (White Oak) is usually also a canopy component. *Carya* (Hickory) species (particularly *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory) or *Carya ovata* (Shagbark Hickory)) are typically common either in the canopy or subcanopy. In the southeastern United States, this alliance covers dry-mesic forests of the Piedmont, low Appalachian Mountains, and Interior Low Plateau, and mesic oak-hickory forests of Blue Ridge and interior highlands of the Ozarks and Ouachita Mountains. Associated species in the southeastern United States include *Carya glabra* (Pignut Hickory), *Carya ovata* (Shagbark Hickory), *Carya alba* (Mockernut Hickory), *Fraxinus americana* (White Ash), *Acer rubrum* (Red Maple), *Acer*

leucoderme (Chalk Maple), *Cornus florida* (Flowering Dogwood), *Nyssa sylvatica* (Blackgum), *Ostrya virginiana* (Eastern Hop-hornbeam), *Calycanthus floridus* (Sweet-shrub), *Pyrularia pubera* (Buffalo-nut), *Kalmia latifolia* (Mountain Laurel), *Tilia americana* var. *caroliniana* (Southern Basswood), *Oxydendrum arboreum* (Sourwood), and others. In the midwestern United States, this alliance is found throughout the region on moderately rich, upland sites. Typical associates include *Fraxinus americana* (White Ash), *Ulmus americana* (American Elm), *Tilia americana* (American Basswood), *Acer saccharum* (Sugar Maple), *Acer rubrum* (Red Maple), and more locally, *Quercus macrocarpa* (Bur Oak) and *Quercus ellipsoidalis* (Northern Pin Oak).

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

ALLIANCE DISTRIBUTION

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

Nations: CA, US

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

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

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

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

(CEGL002070) White Oak - Northern Red Oak - Chinquapin Oak / Eastern Redbud Forest
***Quercus alba* - *Quercus rubra* - *Quercus muehlenbergii* / *Cercis canadensis* Forest**
White Oak - Mixed Oak Dry-Mesic Alkaline Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus alba</i> - (<i>Quercus rubra</i> , <i>Carya</i> spp.) Forest Alliance (A.239)
Alliance (English name)	White Oak - (Northern Red Oak, Hickory species) Forest Alliance
Association	<i>Quercus alba</i> - <i>Quercus rubra</i> - <i>Quercus muehlenbergii</i> / <i>Cercis canadensis</i> Forest
Association (English name)	White Oak - Northern Red Oak - Chinquapin Oak / Eastern Redbud Forest
Association (Common name)	White Oak - Mixed Oak Dry-Mesic Alkaline Forest
Ecological System(s):	Ozark-Ouachita Dry-Mesic Oak Forest (CES202.708) Southern Ridge and Valley / Cumberland Dry Calcareous Forest (CES202.457) Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898) North-Central Interior Dry-Mesic Oak Forest and Woodland (CES202.046)

ELEMENT CONCEPT

Global Summary: This dry-mesic white oak - mixed oak alkaline forest community is found in unglaciated areas of the Interior Highlands of the east-central United States. Stands occur on gentle to steep slopes with moderately to well-drained moist loamy/sandy, relatively neutral to basic soils, which are underlain by bedrock of limestone and less commonly sandstone, siltstone, or shale. Soils may be shallow to somewhat deep (20-100 cm), with rock fragments present. The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer, especially in the spring. Typical tree dominants include *Quercus alba* (White Oak), *Quercus rubra* (Northern Red Oak), *Quercus velutina* (Black Oak), and *Quercus muehlenbergii* (Chinquapin Oak). Typical associates include *Carya ovata* (Shagbark Hickory), *Carya alba* (Mockernut Hickory), and *Liriodendron tulipifera* (Tuliptree). Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (Sugar Maple) (or possibly *Acer barbatum* (Southern Sugar Maple) to the south), *Ulmus rubra* (Slippery Elm), *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), *Ostrya virginiana* (Eastern Hop-hornbeam), *Carpinus caroliniana* (American Hornbeam), and *Amelanchier arborea* (Common Serviceberry). *Quercus muehlenbergii* (Chinquapin Oak) is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. Typical shrubs include *Aesculus glabra* (Ohio Buckeye), *Asimina triloba* (Common Pawpaw), *Cercis canadensis* (Eastern Redbud), *Cornus florida* (Flowering Dogwood), *Euonymus americanus* (American Strawberry-bush), *Frangula caroliniana* (Carolina Buckthorn), and *Viburnum rufidulum* (Rusty Blackhaw). Woody vines include *Parthenocissus quinquefolia* (Virginia Creeper) and *Toxicodendron radicans* (Eastern Poison-ivy). Herbaceous species include *Anemone virginiana* (Tall Thimbleweed), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Botrychium virginianum* (Rattlesnake Fern), *Carex jamesii* (James' Sedge), *Actaea racemosa* (Black Cohosh), *Desmodium glutinosum* (Large Tick-trefoil), *Desmodium rotundifolium* (Prostrate Tick-trefoil), *Dioscorea quaternata* (Fourleaf Yam), *Goodyera pubescens* (Downy Rattlesnake-plantain), *Hybanthus concolor* (Green Violet), *Iris cristata* (Crested Dwarf Iris), *Maianthemum racemosum* (Feathery False Lily-of-the-valley), *Passiflora lutea* (Yellow Passionflower), and *Sanicula canadensis* (Canadian Black Snakeroot). These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This forest community was sampled at four locations in the Boyhood Home Unit of the park, and once at the Birthplace Unit. The site sampled at the Birthplace Unit is a dry-mesic low upland flat located near a residential neighborhood. Signs of disturbance include the presence of exotic plants. At the Boyhood Home Unit, it is the matrix forest found on moderate to somewhat steep mid- to upper slopes and ridges of the knob formations, with eastern, southern, southeastern and southwestern aspects at recorded elevations of 220 - 235 m (723-770 feet). Soils are dry-mesic to mesic loams and clay loams underlain mostly by limestone. Soils may vary in depth and moisture, with resulting slight variations in the forest. Where this type grades into a limestone cedar glade, for instance, soils may be thinner, and dry species such as *Juniperus virginiana* (Eastern Red-cedar) occur. The unvegetated surface is a nearly continuous layer of leaf litter (96-100% cover) with some large rocks (0-3%) and wood (0-10%). (Several subcanopy blow-downs in 2005 had increased the unvegetated surface cover of wood at one site significantly.) These sites were likely logged and sometimes cleared for agriculture in the past. Some sites may have been logged and burned within the past 60 years

(which may explain the lower than expected oak cover in certain occurrences). There are signs of animal grazing and the presence of exotic plants. Old roads and a utility right-of-way occur nearby.

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

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The moderate to dense (60-80% cover) tree canopy, 20-35 m tall, is typically dominated by *Quercus alba* (White Oak) and *Quercus rubra* (Northern Red Oak), and sometimes *Carya* (Hickory) spp. (where oaks have been logged out). Occasionally *Sassafras albidum* (Sassafras) co-dominates with Hickory. Typical associates include *Carya* (Hickory) spp. and *Fraxinus quadrangulata* (Blue Ash). The sparse to dense (20-80%) subcanopy (10-20 m) is dominated by *Acer saccharum* (Sugar Maple) (constant) and may include canopy species along with *Cercis canadensis* (Eastern Redbud), *Juniperus virginiana* (Eastern Red-cedar), and *Liriodendron tulipifera* (Tuliptree). The sparse to dense (20-80%) tall-shrub layer (2-5 m) is dominated by species found in the upper layers, especially *Acer saccharum* (Sugar Maple), and additionally *Fagus grandifolia* (American Beech) and *Ostrya virginiana* (Eastern Hop-hornbeam); a total of 23 taxa were recorded in this layer in five plots. Although absent to sparse (0-20%) in most sites, the short-shrub layer (0.5-1 m) is rather diverse and made up of species of the upper layers, as well as *Fraxinus americana* (White Ash), *Frangula caroliniana* (Carolina buckthorn), and *Symphoricarpos orbiculatus* (Coralberry). Occasionally *Quercus muehlenbergii* (Chinquapin Oak) can be found. At the Birthplace Unit site, *Parthenocissus virginiana* (Virginia Creeper) provided abundant cover (75%) in this layer. A total of 40 taxa were recorded in this layer. The sparse to moderate (5-60%) and diverse herbaceous layer includes *Polystichum acrostichoides* (Christmas Fern) (constant), *Adiantum pedatum* (Northern Maidenhair), *Jeffersonia diphylla* (Twinleaf), *Podophyllum peltatum* (Mayapple) and *Dichanthelium boscii* (Bosc's Witchgrass); nearly 180 species were recorded in this rich layer in five plots. Vines include *Smilax* (Greenbrier) spp.

Global Vegetation: The canopy is dense, yet enough scattered light penetrates to encourage a rich and diverse herbaceous layer. Typical tree dominants include *Quercus alba* (White Oak), *Quercus rubra* (Northern Red Oak), *Quercus velutina* (Black Oak), and *Quercus muehlenbergii* (Chinquapin Oak). Typical associates include *Carya ovata* (Shagbark Hickory) and *Carya alba* (Mockernut Hickory). Other shade-tolerant tree associates that may dominate the subcanopy include *Acer saccharum* (Sugar Maple) (and/or *Acer barbatum* (Southern Sugar Maple) or *Acer leucoderme* (Chalk Maple) to the south), *Ulmus rubra* (Slippery Elm), *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), *Ostrya virginiana* (Eastern Hop-hornbeam), *Carpinus caroliniana* (American Hornbeam), and *Amelanchier arborea* (Common Serviceberry). *Quercus muehlenbergii* (Chinquapin Oak) is a key, but perhaps uncommon, indicator of the more neutral to alkaline soil characteristics of this type. *Juniperus virginiana* (Eastern Red-cedar) may be present. Typical shrubs include *Aesculus glabra* (Ohio Buckeye), *Asimina triloba* (Common Pawpaw), *Cercis canadensis* (Eastern Redbud), *Cornus florida* (Flowering Dogwood), *Euonymus americanus* (American Strawberry-bush), *Frangula caroliniana* (Carolina Buckthorn), and *Viburnum rufidulum* (Rusty Blackhaw). Woody vines include *Parthenocissus quinquefolia* (Virginia Creeper) and *Toxicodendron radicans* (Eastern Poison-ivy). Herbaceous species include *Anemone virginiana* (Tall Thimbleweed), *Arisaema triphyllum* (Jack-in-the-Pulpit), *Botrychium virginianum* (Rattlesnake Fern), *Carex jamesii* (James' Sedge), *Actaea racemosa* (Black Cohosh), *Desmodium glutinosum* (Large Tick-trefoil), *Desmodium rotundifolium* (Prostrate Tick-trefoil), *Dioscorea quaternata* (Fourleaf Yam), *Goodyera pubescens* (Downy Rattlesnake-plantain), *Hybanthus concolor* (Green Violet), *Iris cristata* (Crested Dwarf Iris), *Maianthemum racemosum* (Feathery False Lily-of-the-valley), *Passiflora lutea* (Yellow Passionflower), and *Sanicula canadensis* (Canadian Black Snakeroot). These forests occur in habitats transitional between mesic to wet riparian and floodplain communities and the drier ridgetop ecosystems (Nelson 1985, TNC 1995a).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple), <i>Fraxinus quadrangulata</i> (Blue Ash), <i>Liriodendron tulipifera</i> (Tuliptree), <i>Quercus rubra</i> (Northern Red Oak)
Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> (Mockernut Hickory), <i>Prunus serotina</i> var. <i>serotina</i> (Black Cherry), <i>Quercus</i>

Tree subcanopy	Broad-leaved deciduous tree	<i>alba</i> (White Oak), <i>Quercus coccinea</i> (Scarlet Oak)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Cercis canadensis</i> (Eastern Redbud) <i>Acer saccharum</i> (Sugar Maple), <i>Cornus florida</i> (Flowering Dogwood), <i>Ostrya virginiana</i> (Eastern Hop-hornbeam)
Herb (field)	Fern or fern ally	<i>Polystichum acrostichoides</i> (Christmas Fern)
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Quercus alba</i> (White Oak), <i>Quercus muehlenbergii</i> (Chinquapin Oak), <i>Quercus rubra</i> (Northern Red Oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple)
Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> (Virginia Creeper), <i>Smilax bona-nox</i> (Fringed Greenbrier), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)
Herb (field)	Forb	<i>Arisaema dracontium</i> (Green Dragon), <i>Hybanthus concolor</i> (Green Violet)
Herb (field)	Graminoid	<i>Carex jamesii</i> (James' Sedge)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Acer saccharum* (Sugar Maple), *Carya glabra* (Pignut Hickory), *Carya ovata* (Shagbark Hickory), *Cercis canadensis* (Eastern Redbud), *Cornus florida* (Flowering Dogwood), *Fagus grandifolia* (American Beech), *Frangula caroliniana* (Carolina buckthorn), *Fraxinus americana* (White Ash), *Juniperus virginiana* (Eastern Red-Cedar), *Nyssa sylvatica* (Blackgum), *Parthenocissus virginiana* (Virginia Creeper), *Podophyllum peltatum* (Mayapple), *Sassafras albidum* (Sassafras)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Daucus carota* (Queen Anne's-lace), *Leucanthemum vulgare* (Oxeye Daisy), *Lolium arundinaceum* (Tall Fescue), *Lonicera japonica* (Japanese Honeysuckle), *Lonicera maackii* (Amur Honeysuckle), *Microstegium vimineum* (Japanese Stiltgrass), *Rosa multiflora* (Multiflora Rose)

Global: *Agkistrodon contortrix* (Copperhead), *Callirhytis quercuspunctata* (Gouty Oak Gall Wasp), *Caprimulgus vociferus* (Whip-poor-will), *Chionaspis corni* (Dogwood Scale), *Cyanocitta cristata* (Blue Jay), *Dendroica cerulea* (Cerulean Warbler), *Dryocopus pileatus* (Pileated Woodpecker), *Eumeces laticeps* (Broad-headed Skink), *Eurytides marcellus* (Zebra Swallowtail), *Glaucomys volans* (Southern Flying Squirrel), *Hylocichla mustelina* (Wood Thrush), *Isotria medeoloides* (Small Whorled Pogonia), *Juglans cinerea* (Butternut), *Lynx rufus* (Bobcat), *Melanerpes carolinus* (Red-bellied Woodpecker), *Melanerpes erythrocephalus* (Red-headed Woodpecker), *Meleagris gallopavo* (Wild Turkey), *Myotis sodalis* (Indiana Myotis), *Nymphalis antiopa* (Mourning Cloak), *Odocoileus virginianus* (White-tailed Deer), *Piranga olivacea* (Scarlet Tanager), *Sayornis phoebe* (Eastern Phoebe), *Schizura badia* (Chestnut Schizura), *Sciurus carolinensis* (Eastern Gray Squirrel), *Sciurus niger* (Eastern Fox Squirrel), *Tamias striatus* (Eastern Chipmunk), *Thryothorus ludovicianus* (Carolina Wren)

CONSERVATION STATUS RANK

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

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

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

Global Similar Associations:

Fagus grandifolia - *Quercus alba* / *Cornus florida* Forest (CEGL007881)--contains a high concentration of *Fagus grandifolia* in the canopy.

Quercus alba - *Carya alba* - (*Quercus velutina*) / *Desmodium nudiflorum* - (*Carex picta*) Forest (CEGL007795)--is not as strongly calcareous in character but with a similar distribution.

Quercus alba - *Quercus rubra* - *Carya (alba, ovata)* / *Cornus florida* Acid Forest (CEGL002067)--is very similar, but has a more acidic character.

Quercus alba - *Quercus rubra* - *Carya ovata* / *Cercis canadensis* - *Juniperus virginiana* var. *virginiana* Forest (CEGL007240)

Quercus alba - *Quercus rubra* - *Carya ovata* Glaciated Forest (CEGL002068)

Quercus alba - *Quercus stellata* / *Ostrya virginiana* - *Acer barbatum* / *Chasmanthium sessiliflorum* Forest (CEGL008443)

Quercus alba / *Cornus florida* Unglaciated Forest (CEGL002066)

Quercus falcata - *Quercus alba* - *Quercus stellata* - *Quercus velutina* Forest (CEGL005018)--occurs on drier sites and contains *Quercus falcata*, which this community does not have in large amounts.

Quercus muehlenbergii - *Quercus shumardii* - *Carya (carolinae-septentrionalis, ovata)* Forest (CEGL007808)

Quercus prinus - *Quercus rubra* - *Carya* spp. - *Fraxinus americana* / *Cercis canadensis* / *Solidago sphacelata* Forest (CEGL008549)

Quercus rubra / *Ostrya virginiana* / *Ptelea trifoliata* - *Ribes curvatum* / *Helianthus divaricatus* Woodland (CEGL007828)

Quercus velutina - *Quercus alba* - *Carya (glabra, ovata)* Forest (CEGL002076)--occurs where soils are drier and thick to very thin over bedrock which is often exposed, and on hillsides with clay soils where sand is absent.

Global Related Concepts:

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

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This forest is found in the northeastern corner of the Birthplace Unit of the park (northeast of Keith Road). At the Boyhood Home Unit of the park, it is the matrix forest found on the mid- to upper slopes and ridges of the knobs. More acidic variants of this community, identified by their less rich/diverse herbaceous layer, are found over small patches of slightly more acidic soils within this matrix.

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

Nations: US

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

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

Federal Lands: NPS (Buffalo River, Fort Donelson, Lincoln Birthplace, Mammoth Cave, Natchez Trace, Ozark, Russell Cave, Shiloh); USFS (Bankhead, Daniel Boone, Mark Twain, Ouachita (Mountains)?, Ouachita?, Ozark, Shawnee)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (5 plots: ABLI.6, ABLI.7, ABLI.20, ABLI.21 [Boyhood Home Unit]; ABLI.12 [Birthplace Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

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

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

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

ALLIANCE CONCEPT

Summary: This alliance contains vegetation that can be described as dry oak and oak-hickory forests. These often are successional forests following logging and/or agricultural cropping (and possibly also chestnut blight in the southern Appalachians). Some examples occur in upland flats and have been called xerohydric because they occasionally will have standing water in the winter due to a perched water table, but are droughty by the end of the growing season. Other occurrences are found on well-drained sandy loam or clay loam soils that are often, although not always, shallow. Karst topography can be found in areas where this alliance occurs. Soils are most often a well-drained sandy loam, although clay loams are not uncommon. Forests of this alliance may occupy narrow bands of dry-mesic habitat transitional between lower and midslope mesic communities and xeric ridgetops. This alliance is found in the Upper East Gulf Coastal Plain, Piedmont, low mountains (including Cumberlands, Ridge and Valley, and low parts of the Southern Blue Ridge), and Interior Low Plateau. Distribution in the Atlantic Coastal Plain, East Gulf Coastal Plain, and Upper West Gulf Coastal Plain needs assessment. In the Shawnee Hills, Knobs, Coastal Plain, and Appalachian Plateau regions of Kentucky, these forests form a common matrix vegetation over acid sandstone and shales. These Kentucky forests are dominated by *Quercus alba* (White Oak) with little or no *Quercus falcata* (Southern Red Oak) and occupy middle to upper slope positions. In the southern Illinois portion of the range, examples occur on south- to west-facing slopes where increased temperatures favor *Quercus falcata* (Southern Red Oak) over *Quercus rubra* (Northern Red Oak). These forests are usually dominated by a mixture of *Quercus alba* (White Oak) and *Quercus falcata* (Southern Red Oak); *Quercus stellata* (Post Oak) may be dominant or codominant. In addition, *Quercus coccinea* (Scarlet Oak), *Quercus velutina* (Black Oak), *Quercus marilandica* (Blackjack Oak), *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory), *Carya pallida* (Sand Hickory), *Carya carolinae-septentrionalis* (Carolina Shagbark Hickory), *Carya ovata* (Shagbark Hickory), and *Fraxinus americana* (White Ash) often are present. Common subcanopy and shrub species include *Oxydendrum arboreum* (Sourwood), *Acer rubrum* (Red Maple), *Ulmus alata* (Winged Elm), *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar), *Vaccinium arboreum* (Farkleberry), *Cornus florida* (Flowering Dogwood), *Sassafras albidum* (Sassafras), *Gaylussacia frondosa* (Dangleberry), *Gaylussacia baccata* (Black Huckleberry), *Vaccinium pallidum* (Hillside Blueberry), and *Vaccinium stamineum* (Deerberry). Herbaceous species that may be present include *Chimaphila maculata* (Striped Pipsissewa), *Polystichum acrostichoides* (Christmas Fern), *Asplenium platyneuron* (Ebony Spleenwort), *Hexastylis arifolia* (Arrowleaf Heartleaf), *Coreopsis major* (Greater Tickseed), *Tephrosia virginiana* (Goat's-rue), *Sanicula canadensis* (Canadian Black Snakeroot), *Desmodium nudiflorum* (Naked-flower Tick-trefoil), *Desmodium nuttallii* (Nuttall's Tick-trefoil), *Symphyotrichum urophyllum* (White-arrow American-aster)?, *Symphyotrichum patens* (Late Purple American-aster), *Solidago ulmifolia* (Elmleaf Goldenrod), and *Hieracium venosum* (Rattlesnake-weed).

Classification Comments:

Similar Alliances:

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

Quercus alba - (*Quercus nigra*) Forest Alliance (A.238)

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

Quercus alba - *Quercus stellata* - *Quercus velutina* - (*Quercus falcata*) Woodland Alliance (A.613)

Quercus falcata Forest Alliance (A.243)

Quercus velutina - *Quercus alba* - (*Quercus coccinea*) Forest Alliance (A.1911)

Similar Alliance Comments: These forests are drier than those of the *Quercus alba* - (*Quercus rubra*, *Carya* spp.) Forest Alliance (A.239) and the *Quercus velutina* - *Quercus alba* - (*Quercus coccinea*) Forest Alliance (A.1911) and often occur on poorer soils or on south- and west-facing slopes. Related forests, drier than those of this alliance, are placed in the more southerly ranging *Quercus falcata* Forest Alliance (A.243). This alliance could occur in the Ozarks and Ouachita Mountains, but associations are yet to be defined. Distribution of vegetation in this alliance is patchy, occurring on south- to west-facing slopes where *Quercus falcata* is favored over *Quercus rubra*. Stands of this alliance are similar to, and can grade into, stands of other dry-mesic *Quercus* spp.-dominated alliances such as the *Quercus alba* - (*Quercus rubra*, *Carya* spp.) Forest Alliance (A.239), the *Quercus velutina* - *Quercus alba* - (*Quercus coccinea*) Forest Alliance (A.1911), and the *Quercus alba* - *Quercus stellata* - *Quercus velutina* - (*Quercus falcata*) Woodland Alliance (A.613). Dominance by *Quercus falcata* typically serves to separate this alliance from others in the Midwest.

Related Concepts:

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

ALLIANCE DESCRIPTION

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

Vegetation: This alliance contains vegetation that can be described as dry oak and oak-hickory forests. These are usually dominated by a mixture of *Quercus alba* (White Oak) and *Quercus falcata* (Southern Red Oak); *Quercus stellata* (Post Oak) may be dominant or codominant. In addition, *Quercus coccinea* (Scarlet Oak), *Quercus velutina* (Black Oak), *Quercus marilandica* (Blackjack Oak), *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory), *Carya pallida* (Sand Hickory), *Carya caroliniae-septentrionalis* (Carolina Shagbark Hickory), *Carya ovata* (Shagbark Hickory), and *Fraxinus americana* (White Ash) often are present. Common subcanopy and shrub species include *Oxydendrum arboreum* (Sourwood), *Acer rubrum* (Red Maple), *Ulmus alata* (Winged Elm), *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar), *Vaccinium arboreum* (Farkleberry), *Cornus florida* (Flowering Dogwood), *Sassafras albidum* (Sassafras), *Gaylussacia frondosa* (Dangleberry), *Gaylussacia baccata* (Black Huckleberry), *Vaccinium pallidum* (Hillside Blueberry), and *Vaccinium stamineum* (Deerberry). Herbaceous species that may be present include *Chimaphila maculata* (Striped Pipsissewa), *Polystichum acrostichoides* (Christmas Fern), *Asplenium platyneuron* (Ebony Spleenwort), *Hexastylis arifolia* (Arrowleaf Heartleaf), *Coreopsis major* (Greater Tickseed), *Tephrosia virginiana* (Goat's-rue), *Sanicula canadensis* (Canadian Black Snakeroot), *Desmodium nudiflorum* (Naked-flower Tick-trefoil), *Desmodium nuttallii* (Nuttall's Tick-trefoil), *Symphyotrichum urophyllum* (White-arrow American-aster)?, *Symphyotrichum patens* (Late Purple American-aster), *Solidago ulmifolia* (Elmleaf Goldenrod), and *Hieracium venosum* (Rattlesnake-weed).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance is found in the Upper East Gulf Coastal Plain, Piedmont, low mountains, and Interior Low Plateau. Distribution in the Atlantic Coastal Plain, East Gulf Coastal Plain, and Upper West Gulf Coastal Plain needs assessment. In the Shawnee Hills, Knobs, Coastal Plain, and Appalachian Plateau regions of Kentucky, these forests form a common matrix vegetation over acid sandstone and shales.

Nations: US

Subnations: AL, AR, CT, DE, GA, IL, IN?, KY, LA?, MA, MD, MO?, MS, NC, NJ, NY, OK?, PA, SC, TN, TX?, VA

TNC Ecoregions: 32:P, 40:C, 41:P, 42:C, 43:C, 44:C, 50:C, 51:C, 52:C, 53:P, 56:C, 57:P, 58:C, 59:P, 61:C, 62:C

USFS Ecoregions: 221Ad:CPP, 221Dc:CC?, 221Ha:CCP, 221Hc:CCC, 221Hd:CCP, 221He:CCP, 221Jb:CCC, 222Ca:CCP, 222Cb:CCC, 222Cc:CCP, 222Cd:CCP, 222Ce:CCP, 222Cf:CC?, 222Cg:CCC, 222Ch:CC?, 222Da:CCC, 222Dc:CCP, 222Dd:CCP, 222De:CCC, 222Df:CCP, 222Dg:CCC, 222Dh:CCC, 222Di:CCP, 222Dj:CCC, 222Ea:CCC, 222Eb:CCC, 222Ec:CCP, 222Ee:CCC, 222Ef:CCC, 222Eg:CCC, 222Eh:CCC, 222Ei:CCC, 222Ej:CCC, 222El:CCC, 222En:CCC, 231Aa:CCC, 231Ab:CCP, 231Ac:CCP, 231Ad:CCP, 231Ae:CCC, 231Af:CCC, 231Ag:CCC, 231Ah:CCP, 231Ai:CCC, 231Aj:CCP, 231Ak:CCC, 231Al:CCC, 231Am:CCC, 231An:CCC, 231Ao:CCC, 231Ap:CCC, 231Ba:CPP, 231Bc:CPP, 231Bd:CPP, 231Be:CP?, 231Ca:CCP, 231Cb:CCP, 231Cc:CCP, 231Cd:CCC, 231Ce:CCP, 231Cg:CCP, 231Da:CCC, 231Dc:CCC,

231De:CCC, 231Ea:CC?, 231Eb:CCC, 232Aa:CCC, 232Ab:CCC, 232Ac:CCC, 232Ad:CCC, 232Bl:CCP, 232Bm:CCP, 232Bn:CCP, 232Bq:CCC, 232Br:CCC, 232Bt:CCC, 232Bv:CCP, 232Bx:CCC, 232Bz:CCC, 232Ca:CC?, 232Ch:CCC, 232Fa:CP?, 234Aa:CC?, 234Ab:CCC, 234Ac:CCP, 234Ae:CCC, 234Ag:CC?, 234Ah:CCP, M221Aa:CC?, M221Ab:CCC, M221Da:CCC, M221Dd:CCC

Federal Lands: DOD (Arnold, Fort A.P. Hill, Fort Benning, Fort Gordon, Yorktown); DOE (Oak Ridge); NPS (Big South Fork, Blue Ridge Parkway, Chickamauga-Chattanooga, Cowpens, Fire Island, Fredericksburg-Spotsylvania, George Washington Parkway, Great Smoky Mountains, Guilford Courthouse, Kennesaw Mountain, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Natchez Trace, National Capital-East, Ninety Six, Petersburg, Richmond, Shiloh); TVA (Land Between the Lakes?, Tellico); USFS (Bankhead, Chattahoochee?, Cherokee, Daniel Boone, Holly Springs?, Oconee, Shawnee, St. Francis, Sumter, Talladega, Tombigbee?, Tuskegee?, Uwharrie); USFWS (Blackwater, Chesapeake Marshlands, Eufaula, Prime Hook)

(CEGL005018) Southern Red Oak - White Oak - Post Oak - Black Oak Forest

Quercus falcata - *Quercus alba* - *Quercus stellata* - *Quercus velutina* Forest

Southern Red Oak - Mixed Oak Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus alba</i> - <i>Quercus falcata</i> , <i>stellata</i> Forest Alliance (A.241)
Alliance (English name)	White Oak - (Southern Red Oak, Post Oak) Forest Alliance
Association	<i>Quercus falcata</i> - <i>Quercus alba</i> - <i>Quercus stellata</i> - <i>Quercus velutina</i> Forest
Association (English name)	Southern Red Oak - White Oak - Post Oak - Black Oak Forest
Association (Common name)	Southern Red Oak - Mixed Oak Forest
Ecological System(s):	Ozark-Ouachita Dry Oak Woodland (CES202.707) Southern Interior Low Plateau Dry-Mesic Oak Forest (CES202.898)

ELEMENT CONCEPT

Global Summary: This dry-mesic southern red oak - mixed oak forest type is found in the central United States in the unglaciated Interior Low Plateau. Stands occur on the upper slopes and ridgetops of moderately to maturely dissected hills, where they occupy narrow bands of dry-mesic habitat transitional between lower and midslope mesic communities and xeric ridgetops. Soils are most often a well-drained sandy loam, although clay loams are not uncommon. Bedrock is predominantly Paleozoic sandstone of Pennsylvanian age and is often exposed; the association may also occur on siltstone, shale, or coal, or over Mississippian limestones, especially in the southern part of its range. Karst topography can be found in areas where this community occurs. The vegetation is dominated by a closed-tree canopy. *Quercus alba* (White Oak), *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), *Quercus stellata* (Post Oak), and *Quercus velutina* (Black Oak) are among the oaks which dominate this dry-mesic forest. *Quercus falcata* (Southern Red Oak) reaches the northern extent of its range within this community. Other tree species include *Carya ovata* (Shagbark Hickory), *Carya glabra* (Pignut Hickory), and *Carya alba* (Mockernut Hickory). The density and diversity of subcanopy, shrub, and herbaceous species are substantially less than are found in mesic forests due to limited moisture availability during most of the growing season. Typical shrubs and small trees include *Cornus florida* (Flowering Dogwood) and *Sassafras albidum* (Sassafras). Common herbaceous species include *Sanicula canadensis* (Canadian Black Snakeroot), *Desmodium nudiflorum* (Naked-flower Tick-trefoil), *Desmodium nuttallii* (Nuttall's Tick-trefoil), *Symphyotrichum urophyllum* (White-arrow American-aster), *Symphyotrichum patens* (Late Purple American-aster), *Solidago ulmifolia* (Elmleaf Goldenrod), and *Podophyllum peltatum* (Mayapple).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This oak-hickory forest was sampled twice at the Birthplace Unit of the park. One site is on a gentle, southeast-facing high slope not far from the picnic area; the other is on a summit. Leaf litter forms a continuous layer (75-100% cover) on the unvegetated ground surface along with some wood (0-5%) and bare soil (0-20%). At the Boyhood Home Unit, this forest association was sampled once on a moderate, southwest-facing upper slope with very dry loam soils. The unvegetated surface is dominated by leaf litter (90% cover) with some large rocks (5%) and wood (5%). Hybrid American chestnuts were planted here around 2003, but most had died by 2005.

Global Environment: Stands occur on the upper slopes and ridgetops of moderately to maturely dissected hills, where they occupy narrow bands of dry-mesic habitat transitional between lower and midslope mesic communities and xeric ridgetops. Soils are most often a well-drained sandy loam, although clay loams are not uncommon. Bedrock is predominantly Paleozoic sandstone of Pennsylvanian age and is often exposed; the association may also occur on siltstone, shale, or coal, or over Mississippian limestones, especially in the southern part of its range (Kentucky). Karst topography can be found in areas where this community occurs.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: At the Birthplace Unit, the dense (90% cover) tree canopy, 20-35 m tall, is typically dominated by *Quercus falcata* (Southern Red Oak), *Carya alba* (Mockernut Hickory), *Carya glabra* (Pignut Hickory), *Quercus coccinea* (Scarlet Oak), and *Acer saccharum* (Sugar Maple), the sparse to moderate (20-60%) subcanopy (10-15 m) by *Acer saccharum* (Sugar Maple) and sometimes *Liriodendron tulipifera* (Tuliptree) and *Fraxinus* (Ash) sp. The sparse (10-20%) tall-shrub layer (2-5 m) is dominated by *Acer saccharum* (Sugar Maple) and sometimes *Juniperus virginiana* (Eastern Red-cedar), the sparse to moderate (10-50%) short-shrub layer (0.5-1 m) by *Acer saccharum* (Sugar Maple), *Carya alba* (Mockernut Hickory), *Fagus grandifolia* (American Beech), and *Toxicodendron radicans* (Eastern Poison-ivy). The only herbaceous species recorded is the exotic vine *Lonicera japonica* (Japanese Honeysuckle). At the Boyhood Home Unit, the site is drier and apparently more acidic. The dense (80% cover) tree canopy, 20-35 m tall, is dominated by oak species (*Quercus alba* (White Oak), *Quercus coccinea* (Scarlet Oak), *Quercus stellata* (Post Oak), *Quercus velutina* (Black Oak)) and *Nyssa sylvatica* (Blackgum). The sparse (20%) subcanopy (10-15 m) includes *Juniperus virginiana* (Eastern Red-cedar), *Acer rubrum* (Red Maple), *Acer saccharum* (Sugar Maple), *Quercus alba* (White Oak), and *Quercus coccinea* (Scarlet Oak). The moderate (60%) tall-shrub layer (2-5 m) is dominated by *Cercis canadensis* (Eastern Redbud), and *Vaccinium arboreum* (Farkleberry), the sparse (20%) short-shrub layer (0.5-1 m) by *Sassafras albidum* (Sassafras) and *Vaccinium pallidum* (Hillside Blueberry). The sparse (10%) herbaceous layer includes *Aureolaria virginica* (Downy Yellow False Foxglove), *Hypericum hypericoides* ssp. *multicaule* (St. Andrew's-cross), and *Danthonia spicata* (Poverty Oatgrass).

Global Vegetation: The vegetation is dominated by a closed-tree canopy. *Quercus alba* (White Oak), *Quercus coccinea* (Scarlet Oak), *Quercus falcata* (Southern Red Oak), *Quercus stellata* (Post Oak), and *Quercus velutina* (Black Oak) are among the oaks which dominate this dry-mesic forest. *Quercus falcata* (Southern Red Oak) reaches the northern extent of its range within this community. Other tree species include *Carya ovata* (Shagbark Hickory), *Carya glabra* (Pignut Hickory), and *Carya alba* (Mockernut Hickory). The density and diversity of subcanopy, shrub, and herbaceous species are substantially less than are found in mesic forests due to limited moisture availability during most of the growing season. Typical shrubs and small trees include *Cornus florida* (Flowering Dogwood) and *Sassafras albidum* (Sassafras). Common herbaceous species include *Sanicula canadensis* (Canadian Black Snakeroot), *Desmodium nudiflorum* (Naked-flower Tick-trefoil), *Desmodium nuttallii* (Nuttall's Tick-trefoil), *Symphotrichum urophyllum* (White-arrow American-aster), *Symphotrichum patens* (Late Purple American-aster), *Solidago ulmifolia* (Elmleaf Goldenrod), and *Podophyllum peltatum* (Mayapple).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple)
Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> (Mockernut Hickory), <i>Carya glabra</i> (Pignut Hickory), <i>Juniperus virginiana</i> (Eastern Red-cedar), <i>Quercus coccinea</i> (Scarlet Oak), <i>Quercus falcata</i> (Southern Red Oak), <i>Quercus velutina</i> (Black Oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Fraxinus americana</i> (White Ash), <i>Liriodendron tulipifera</i> (Tuliptree)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Acer saccharum</i> (Sugar Maple), <i>Sassafras albidum</i> (Sassafras)
Tall shrub/sapling	Broad-leaved evergreen shrub	<i>Juniperus virginiana</i> (Eastern Red-cedar), <i>Vaccinium arboreum</i> (Farkleberry)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Carya alba</i> (Mockernut Hickory), <i>Fagus grandifolia</i> (American Beech), <i>Fraxinus americana</i> (White Ash), <i>Vaccinium pallidum</i> (Hillside Blueberry)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)

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

Tree canopy	Broad-leaved deciduous tree	<i>Carya alba</i> (Mockernut Hickory), <i>Carya glabra</i> (Pignut Hickory), <i>Carya ovata</i> (Shagbark Hickory), <i>Quercus alba</i> (White Oak), <i>Quercus falcata</i> (Southern Red Oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Carpinus caroliniana</i> (American Hornbeam), <i>Fraxinus americana</i> (White Ash)
Shrub/sapling (tall & short)	Vine/Liana	<i>Parthenocissus quinquefolia</i> (Virginia Creeper), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)
Tall shrub/sapling	Broad-leaved deciduous tree	<i>Cornus florida</i> (Flowering Dogwood), <i>Sassafras albidum</i> (Sassafras)
Herb (field)	Semi-shrub	<i>Desmodium nuttallii</i> (Nuttall's Tick-trefoil)
Herb (field)	Forb	<i>Desmodium canescens</i> (Hoary Tick-trefoil), <i>Desmodium nudiflorum</i> (Naked-flower Tick-trefoil), <i>Podophyllum peltatum</i> (Mayapple), <i>Sanicula canadensis</i> (Canadian Black Snakeroot), <i>Solidago ulmifolia</i> (Elmleaf Goldenrod), <i>Symphyotrichum cordifolium</i> (Common Blue American-aster), <i>Symphyotrichum patens</i> (Late Purple American-aster)

CHARACTERISTIC SPECIES**Abraham Lincoln Birthplace National Historic Site:****Global:****OTHER NOTEWORTHY SPECIES**

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Lonicera japonica* (Japanese Honeysuckle)

Global: *Agkistrodon contortrix* (Copperhead), *Callirhytis quercuspunctata* (Gouty Oak Gall Wasp), *Caprimulgus vociferus* (Whip-poor-will), *Chionaspis corni* (Dogwood Scale), *Cyanocitta cristata* (Blue Jay), *Dendroica cerulea* (Cerulean Warbler), *Dryocopus pileatus* (Pileated Woodpecker), *Eurytides marcellus* (Zebra Swallowtail), *Glaucmys volans* (Southern Flying Squirrel), *Hylocichla mustelina* (Wood Thrush), *Lynx rufus* (Bobcat), *Melanerpes carolinus* (Red-bellied Woodpecker), *Melanerpes erythrocephalus* (Red-headed Woodpecker), *Meleagris gallopavo* (Wild Turkey), *Myotis sodalis* (Indiana Myotis), *Nymphalis antiopa* (Mourning Cloak), *Odocoileus virginianus* (White-tailed Deer), *Piranga olivacea* (Scarlet Tanager), *Sayornis phoebe* (Eastern Phoebe), *Sciurus carolinensis* (Eastern Gray Squirrel), *Synanthedon scitula* (Dogwood Borer Moth), *Tamias striatus* (Eastern Chipmunk), *Thryothorus ludovicianus* (Carolina Wren)

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G5 (22-Jun-1998).

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: More information is needed to distinguish this association from those recognized in the Southeast, such as *Quercus falcata* - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest (CEGL007244) and *Quercus falcata* - *Quercus (coccinea, stellata)* / *Vaccinium (pallidum, stamineum)* Forest (CEGL007247). The type does not appear to occur in the Ozark region, and in Arkansas, *Quercus falcata* is more common in the coastal plain. Selective removal of oaks for sawtimber can cause shifts in tree species dominance, thereby creating classification difficulties. *Quercus falcata* is a key dominant distinguishing this oak type from others. Braun (1950, p. 154-158) noted the prominence of *Quercus falcata* and *Quercus alba* on the low hills of the Mississippi Embayment Section of her Western Mesophytic Forest Region as well as in the Mississippian Plateau (TNC 1995a).

Global Similar Associations:

Quercus alba - *Quercus rubra* - *Carya (alba, ovata)* / *Cornus florida* Acid Forest (CEGL002067)--lacks southern red oak as a dominant canopy species and occupies a broader range of habitats.

Quercus alba - *Quercus rubra* - *Quercus muehlenbergii* / *Cercis canadensis* Forest (CEGL002070)

Quercus falcata - *Quercus (coccinea, stellata)* / *Vaccinium (pallidum, stamineum)* Forest (CEGL007247)

Quercus falcata - *Quercus alba* - *Carya alba* / *Oxydendrum arboreum* / *Vaccinium stamineum* Forest (CEGL007244)

Quercus velutina - *Quercus alba* - *Carya (glabra, ovata)* Forest (CEGL002076)--lacks southern red oak as a dominant canopy species and occupies a broader range of habitats.

Global Related Concepts:

Dry-mesic Upland Forest (White and Madany 1978) B
 Eastern Broadleaf Forests: 100: Oak-Hickory Forest (*Quercus-Carya*) (Kuchler 1964) B
 Terrestrial: Forest: Hardwood (TNC 1985) B
 UNESCO FORMATION CODE: I.B.3a (UNESCO 1973) B
 Western Mesophytic Forest (Braun 1950) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This forest type with *Quercus falcata* was found scattered all about the Birthplace Unit, and especially concentrated along the eastern border. A drier variant lacking *Quercus falcata* (Southern Red Oak) was observed in one relatively small patch in the southeastern corner of the Boyhood Home Unit, on a dry upper slope of a knob, above limestone glades. It is probably quite uncommon in this mostly limestone park unit and occurs in patches too small to be mapped.

Global Range: This dry-mesic southern red oak - mixed oak forest type is found in the central United States in the unglaciated parts of the Interior Low Plateau region of Illinois, Indiana, and Kentucky. This community occupies narrow dry-mesic habitats within the Interior Low Plateau and Appalachian Plateau of Fenneman (1928).

Nations: US

States/Provinces: IL, IN?, KY, TN

USFS Ecoregions: 222Ca:CP?, 222Ch:CP?, 222De:CCC, 222Di:CCP, 222E:CP

Federal Lands: NPS (Lincoln Birthplace, Mammoth Cave); USFS (Land Between the Lakes?, Shawnee)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (3 plots: ABLI.16, ABLI.18 [Birthplace Unit]; ABLI.25 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Guetersloh, mod. M. Pyne

References: Behler 1988, Braun 1950, Bull and Farrand 1977, Clark and Hutchinson 1994, Craighead 1949, Duncan and Duncan 1988, Evans 1991, Eyre 1980, Fenneman 1928, Fralish et al. 1991, Illinois Nature Preserve Commission 1973, Kuchler 1964, Little 1980a, Midwestern Ecology Working Group n.d., Mohlenbrock 1986, Nelson 1985, Niering 1979, Robertson and Heikens 1994, Schwartz and Schwartz 1959, TDNH unpubl. data, TNC 1985, TNC 1995a, Thornbury 1965, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

A.1912-*Quercus muehlenbergii* - (*Acer saccharum*) Forest Alliance

ALLIANCE CONCEPT

Summary: This alliance includes a variety of dry, dry-mesic, and mesic forests, dominated by *Quercus muehlenbergii* (Chinquapin Oak) and possibly *Acer saccharum* (Sugar Maple), 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* (White Oak), *Quercus shumardii* (Shumard Oak), *Fraxinus americana* (White Ash), *Fraxinus quadrangulata* (Blue Ash), *Acer barbatum* (Southern Sugar Maple), *Tilia americana* (American Basswood), *Carya* (Hickory) spp., *Juglans nigra* (Black Walnut), and *Liriodendron tulipifera* (Tuliptree) (in the more interior portions of the alliance's distribution), and *Quercus sinuata* var. *sinuata* (Durand Oak) and *Carya myristiciformis* (Nutmeg Hickory) (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* (Shumard Oak) and *Frangula caroliniana* (Carolina Buckthorn) 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* (Chinquapin Oak) with *Acer barbatum* (Southern Sugar Maple). On rare occurrences of limestone in the Southern Blue Ridge of North Carolina, *Quercus muehlenbergii* (Chinquapin Oak) occurs with *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), and *Acer saccharum* (Sugar Maple). Understory species may include *Cornus florida* (Flowering Dogwood), *Cercis canadensis* (Eastern Redbud), *Calycanthus floridus* (Sweet-shrub), *Cornus*

alternifolia (Alternate-leaf Dogwood), *Ostrya virginiana* (Eastern Hop-hornbeam), and *Hydrangea arborescens* (Smooth Hydrangea). In the Northeast, the shrub layer is sparse and may contain *Hamamelis virginiana* (American Witch-hazel), *Zanthoxylum americanum* (Common Prickly-ash), and *Cornus alternifolia* (Alternate-leaf Dogwood). In some more southerly examples, shrubs may include *Forestiera ligustrina* (Glade Privet), *Frangula caroliniana* (Carolina Buckthorn), and *Symphoricarpos orbiculatus* (Coralberry). The herbaceous layer may contain *Asclepias quadrifolia* (Fourleaf Milkweed), *Clematis occidentalis* (Mountain Clematis) (in northeastern examples), *Packera obovata* (Roundleaf Groundsel), *Phryma leptostachya* (American Lopseed), *Saxifraga virginensis* (Early Saxifrage), *Arabis laevigata* (Smooth Rockcress), and *Triosteum aurantiacum* (Orange-fruit Horse-gentian). 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* (Southern Sugar Maple) instead of *Acer saccharum* (Sugar Maple).

Classification Comments: This alliance was created by the merger of the former *Acer saccharum* - *Quercus muehlenbergii* Forest Alliance and the former *Quercus muehlenbergii* Forest Alliance. MP 6-01: On the southern flank of the alliance's distribution, the sugar maple which is present is *Acer barbatum* (= *Acer saccharum* var. *floridanum*), not *Acer saccharum* var. *saccharum*. Is this a problem?

Similar Alliances:

Fraxinus quadrangulata - (*Juniperus virginiana*) Woodland Alliance (A.1913)

Quercus muehlenbergii Woodland Alliance (A.621)

Similar Alliance Comments:

Related Concepts:

Quercus muehlenbergii forest alliance (Hoagland 1997) ?

Basic Mesic Forest, Montane Calcareous Subtype (Schafale and Weakley 1990) ?

Bigtooth Maple-Oak Series (Diamond 1993) I

Calcareous Talus Forest / Woodland (Swain and Kearsley 2001) ?

Calcareous mesophytic forest (Evans 1991) I

Calcareous sub-xeric forest (Evans 1991) I

Calcareous xeric forest (Evans 1991) I

Dry-Mesic Calcareous Central Forest (Smith 1991) ?

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

IA6k. Sugar Maple - Oak - Hickory Forest (Allard 1990) I

Sugar Maple - Oak - Hickory Forest (Pyne 1994) I

Sugar Maple: 27 (Eyre 1980) I

Yellow Oak Dry Calcareous Forest (Swain and Kearsley 2001) ?

Yellow oak - redbud woodland (Fike 1999) ?

ALLIANCE DESCRIPTION

Environment: This alliance includes a variety of dry, dry-mesic, and mesic forests, associated with high base substrates (e.g., limestone or dolomite) under a variety of moisture conditions. 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. 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.

Vegetation: This alliance includes a variety of dry, dry-mesic, and mesic forests, dominated by *Quercus muehlenbergii* (Chinquapin Oak) and possibly *Acer saccharum* (Sugar Maple), 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* (White Oak), *Quercus shumardii* (Shumard Oak), *Fraxinus americana* (White Ash), *Fraxinus quadrangulata* (Blue Ash), *Acer barbatum* (Southern Sugar Maple), *Tilia americana* (American Basswood), *Carya* (Hickory) spp., *Juglans nigra* (Black Walnut), and *Liriodendron tulipifera* (Tuliptree) (in the more interior portions of the alliance's distribution), and *Quercus sinuata* var. *sinuata* (Durand Oak) and *Carya myristiciformis* (Nutmeg Hickory) (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* (Shumard Oak) and *Frangula caroliniana* (Carolina Buckthorn) 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* (Chinquapin Oak) with *Acer barbatum* (Southern Sugar Maple). On rare occurrences of limestone in the Southern Blue Ridge of North Carolina, *Quercus muehlenbergii* (Chinquapin Oak) occurs with *Juglans nigra* (Black Walnut), *Fraxinus americana* (White Ash), and *Acer saccharum* (Sugar Maple). Understory species may include *Cornus florida* (Flowering Dogwood), *Cercis canadensis* (Eastern Redbud), *Calycanthus floridus* (Sweet-shrub), *Cornus alternifolia* (Alternate-leaf Dogwood), *Ostrya virginiana* (Eastern Hop-hornbeam), and *Hydrangea arborescens* (Smooth Hydrangea). In the Northeast, the shrub layer is sparse and may contain *Hamamelis virginiana* (American Witch-hazel), *Zanthoxylum americanum* (Common Prickly-ash), and *Cornus alternifolia* (Alternate-leaf Dogwood). In some more southerly examples, shrubs may include *Forestiera ligustrina* (Glade Privet), *Frangula caroliniana* (Carolina Buckthorn), and *Symphoricarpos orbiculatus* (Coralberry). The herbaceous layer may contain *Asclepias quadrifolia* (Fourleaf Milkweed), *Clematis occidentalis* (Mountain Clematis) (in northeastern examples), *Packera obovata* (Roundleaf Groundsel), *Phryma leptostachya* (American Lopseed), *Saxifraga virginiana* (Early Saxifrage), *Arabis laevigata* (Smooth Rockcress), and *Triosteum aurantiacum* (Orange-fruit Horse-gentian).

Dynamics:

ALLIANCE DISTRIBUTION

Range: This alliance may be found nearly throughout the eastern U.S. from Vermont to North Carolina and possibly South Carolina and west to from Illinois to Texas as well as Ontario in southern Canada. 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

Subnations: 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, 52: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??, 221Ae:CCC, 221B:CC, 221Dc:CC?, 221Ea: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:CCC, 232Cj:CCC, 232Fa:CCC, 251Ea:P??, 251Eb:P??, 251Ec:P??, 251Ed:P??, 255Af:CCC, 311A:CC, 315D:CC, M212B:CC, M212Cb:CCC, M212Cc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ac:CCC, M221Bd:CC?, M221Be:CCP, M221Ca:CC?, M221Cb:CCC, M221Cc:CC?, M221Ce:CCC, M221Da:CCC, M221Db:CC?, M221Dc:CCC, M221Dd:CCC

Federal Lands: COE (J. Percy Priest?, Lake Millwood); DOD (Yorktown); NPS (Antietam, Big South Fork, Blue Ridge Parkway?, Buffalo River?, C&O Canal, Chickamauga-Chattanooga, Colonial, Cumberland Gap, George Washington Birthplace, Great Smoky Mountains?, Harpers Ferry, Lincoln Birthplace, Mammoth Cave, Manassas, Natchez Trace, New River Gorge, Russell Cave, Shiloh, Stones River); TVA (Columbia, Tellico); USFS (Bankhead, Chattahoochee, Cherokee, Daniel Boone, George Washington, Jefferson, Ozark, Pisgah); USFWS (Wichita Mountains)

(CEGL004741) Sugar Maple - Shagbark Hickory - Black Walnut / Coralberry / Licorice Bedstraw Forest*Acer saccharum* - *Carya ovata* - *Juglans nigra* / *Symphoricarpos orbiculatus* / *Galium circaezans* Forest**Interior Low Plateau Mesic Sugar Maple - Hickory Forest****NVC Classification**

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Lowland or submontane cold-deciduous forest (I.B.2.N.a.)
Alliance	<i>Quercus muehlenbergii</i> - (<i>Acer saccharum</i>) Forest Alliance (A.1912)
Alliance (English name)	Chinquapin Oak - (Sugar Maple) Forest Alliance
Association	<i>Acer saccharum</i> - <i>Carya ovata</i> - <i>Juglans nigra</i> / <i>Symphoricarpos orbiculatus</i> / <i>Galium circaezans</i> Forest
Association (English name)	Sugar Maple - Shagbark Hickory - Black Walnut / Coralberry / Licorice Bedstraw Forest
Association (Common name)	Interior Low Plateau Mesic Sugar Maple - Hickory Forest
Ecological System(s):	South-Central Interior Mesophytic Forest (CES202.887)

ELEMENT CONCEPT

Global Summary: This association represents mesic forests over limestone in portions of the unglaciated Interior Low Plateau, including the Mitchell Plain and the dissected Knobs region of Kentucky, and the Nashville Basin of Tennessee, dominated by *Acer saccharum* (Sugar Maple) with *Carya ovata* (Shagbark Hickory) and *Juglans nigra* (Black Walnut). Scattered individuals of *Quercus muehlenbergii* (Chinquapin Oak), *Quercus shumardii* (Shumard Oak), and *Tilia americana* var. *heterophylla* (Appalachian Basswood) are also present in the more-or-less closed canopy (about 70% closure). *Carya ovata* (Shagbark Hickory) may occur as patches or as scattered individuals. Stands of this association may be smaller-scale patches embedded in a less mesic matrix of oak-dominated forests. The high predominance of *Acer saccharum* (Sugar Maple) in preference to oaks is presumably due to these more mesic and/or fire-sheltered conditions, but in some cases it may be the result of the removal of oaks by logging. The subcanopy contains *Acer saccharum* (Sugar Maple), *Ostrya virginiana* (Eastern Hop-hornbeam), *Cercis canadensis* (Eastern Redbud), and *Celtis occidentalis* (Common Hackberry), with one or more *Carya* (Hickory) spp. In the shrub stratum, *Symphoricarpos orbiculatus* (Coralberry) is a common component.

ENVIRONMENTAL DESCRIPTION**USFWS Wetland System:**

Abraham Lincoln Birthplace National Historic Site Environment: This forest association was sampled twice in the Boyhood Home Unit of the park. One site is located beside an old road high atop a knob on a gentle ridge with an eastern aspect. The second site is on a steep, south-facing lower slope at 227 m elevation that is fairly protected by its low position opposite an adjacent knob, and therefore somewhat mesic for a south-facing slope. Soils are moderately well- to well-drained, dry-mesic clay loams. The unvegetated surface is made up of leaf litter (80-92% cover), wood (0-10%), and bare soil (8-10%). Disturbance includes animal browsing and probable past clearing for agriculture (on flatter surfaces) and logging (on steep slopes). Evidence of disturbance in the ridgetop sample includes an old fenceline, with larger trees in the fenceline. This community was also observed but not sampled at the Birthplace Unit.

Global Environment: This association represents mesic forests over limestone in portions of the unglaciated Interior Low Plateau, including the Mitchell Plain and the dissected Knobs region of Kentucky, and the Nashville Basin of Tennessee. In one example near the Duck River in Maury County, Tennessee, this vegetation has developed on soils derived from Ordovician limestone, in an area of alternating karst collapse features and residual rectangular-linear arrays of limestone boulders and slabs. Deeper soils have accumulated in the collapse features and the interstices between the boulders; this configuration contributes to the herbaceous diversity of the community. This situation would tend to be generally fire-sheltered. In Kentucky (Abraham Lincoln Birthplace National Historic Site units), one site is located beside an old road high atop a knob on a gentle ridge with an eastern aspect. The second site is on a steep, south-facing lower slope at 227 m elevation that is fairly protected by its low position opposite an adjacent knob, and somewhat mesic for a south-facing slope. Soils are moderately well- to well-drained, dry-mesic clay loams.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The moderate (40-60% cover) tree canopy, 15-35 m tall, is dominated by *Acer saccharum* (Sugar Maple) and *Carya alba* (Mockernut Hickory), as are the dense (80%) subcanopy (10-20 m) and moderately sparse to moderate (30-50%) tall-shrub layer (2-5 m). The canopy also

includes lesser amounts of *Quercus prinus* (Chestnut Oak) and *Quercus rubra* (Northern Red Oak), and the subcanopy includes *Carya cordiformis* (Bitternut Hickory) and *Quercus velutina* (Black Oak). The tall-shrub layer also contains *Cornus florida* (Flowering Dogwood) and *Viburnum rufidulum* (Rusty Blackhaw). The sparse to moderately sparse (10-30%) but relatively diverse (37 species recorded) short-shrub layer (0.5-1 m) is made up of species of the upper layers, as well as *Nyssa sylvatica* (Blackgum), *Fraxinus americana* (White Ash), *Staphylea trifolia* (American Bladdernut), *Asimina triloba* (Common Pawpaw), and *Lindera benzoin* (Northern Spicebush). The herbaceous layer (0-60%) is quite diverse with over 200 taxa recorded for two plots; dominants include the graminoids *Dichanthelium boscii* (Bosc's Witchgrass) and *Elymus hystrix* (Bottlebrush Grass).

Global Vegetation: Stands of this association are dominated by *Acer saccharum* (Sugar Maple) with *Carya* (Hickory) spp. (e.g., *Carya alba* (Mockernut Hickory), *Carya ovata* (Shagbark Hickory)) and *Juglans nigra* (Black Walnut). Scattered individuals of *Quercus muehlenbergii* (Chinquapin Oak), *Quercus shumardii* (Shumard Oak), other *Quercus* (Oak) spp., and *Tilia americana* var. *heterophylla* (Appalachian Basswood) may also be present. The subcanopy contains *Acer saccharum* (Sugar Maple), *Ostrya virginiana* (Eastern Hop-hornbeam), *Cercis canadensis* (Eastern Redbud), and *Celtis occidentalis* (Common Hackberry), with occasional *Carya cordiformis* (Bitternut Hickory). In the shrub stratum, *Symphoricarpos orbiculatus* (Coralberry) is most prevalent; also present are *Rhus aromatica* (Fragrant Sumac), *Forestiera ligustrina* (Glade Privet), *Frangula caroliniana* (Carolina Buckthorn), *Parthenocissus quinquefolia* (Virginia Creeper), and *Toxicodendron radicans* (Eastern Poison-ivy). Some examples contain *Cornus florida* (Flowering Dogwood), *Viburnum rufidulum* (Rusty Blackhaw), *Nyssa sylvatica* (Blackgum), *Fraxinus americana* (White Ash), *Staphylea trifolia* (American Bladdernut), *Asimina triloba* (Common Pawpaw), and *Lindera benzoin* (Northern Spicebush). In one Tennessee example, dense stands of vigorous (over 1 m tall) *Polymnia canadensis* (Canada Leafcup) are present on the exposed limestone slabs and boulders. *Asplenium rhizophyllum* (Walking Fern) occurs on the sheltered vertical surfaces of the boulders, along with several mosses. *Sedum pulchellum* (Widow's-cross) and *Parietaria pensylvanica* (Pennsylvania Pellitory) are also characteristic of these limestone exposures. Some herbs which occur in deeper soils include *Dichanthelium boscii* (Bosc's Witchgrass), *Bromus pubescens* (Common Eastern Brome), *Chasmanthium sessiliflorum* (Longleaf Spikegrass), *Elymus villosus* (Hairy Wild Rye), *Elymus hystrix* (Bottlebrush Grass), *Carex* (Sedge) spp., *Saxifraga virginicensis* (Early Saxifrage), *Sanicula canadensis* var. *canadensis* (Canadian Black Snakeroot), *Phryma leptostachya* (American Lopseed), *Geum canadense* (White Avens), *Galium circaeazans* (Licorice Bedstraw), *Arabis laevigata* var. *laevigata* (Smooth Rockcress), *Trillium cuneatum* (Little Sweet Trillium), *Viola X palmata* (Early Blue Violet), *Agrimonia* (Groovebur) sp., and *Dioscorea quaternata* (Fourleaf Yam).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple), <i>Carya alba</i> (Mockernut Hickory)
Tree canopy	Broad-leaved deciduous tree	<i>Quercus prinus</i> (Chestnut Oak), <i>Quercus rubra</i> (Northern Red Oak)
Tree subcanopy	Broad-leaved deciduous tree	<i>Aesculus glabra</i> (Ohio Buckeye)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Acer saccharum</i> (Sugar Maple)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Aesculus glabra</i> (Ohio Buckeye), <i>Carya alba</i> (Mockernut Hickory), <i>Cornus florida</i> (Flowering Dogwood), <i>Viburnum rufidulum</i> (Rusty Blackhaw)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Lindera benzoin</i> (Northern Spicebush), <i>Staphylea trifolia</i> (American Bladdernut)
Herb (field)	Graminoid	<i>Dichanthelium boscii</i> (Bosc's Witchgrass), <i>Elymus hystrix</i> (Bottlebrush Grass)

Global

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

Abraham Lincoln Birthplace National Historic Site: *Acer rubrum* (Red Maple), *Carya cordiformis* (Bitternut Hickory), *Cercis canadensis* (Eastern Redbud), *Erigeron pulchellus* (Robin's-plantain), *Fraxinus americana* (White Ash), *Hybanthus concolor* (Green Violet), *Muhlenbergia schreberi* (Nimblewill), *Quercus velutina* (Black Oak)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Cardamine hirsuta* (Hairy Bittercress), *Cerastium fontanum* ssp. *vulgare* (Common Mouse-ear Chickweed), *Daucus carota* (Queen Anne's-lace), *Glechoma hederacea* (Ground-ivy), *Kummerowia striata* (Japanese-clover), *Leucanthemum vulgare* (Oxeye Daisy), *Lonicera japonica*

(Japanese Honeysuckle), *Microstegium vimineum* (Japanese Stiltgrass), *Morus alba* (White Mulberry), *Plantago lanceolata* (Narrowleaf Plantain), *Poa compressa* (Canada Bluegrass), *Rosa multiflora* (Multiflora Rose)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3G4 (15-Mar-2007). This type was originally described from the Central Basin of Tennessee. Additional data from Kentucky has led to its becoming better defined with an expanded range. It is somewhat restricted in its habitat and range, and some doubt remains about its global rarity.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: In one example near the Duck River in Maury County, Tennessee, this vegetation has developed on soils derived from Ordovician limestone, in an area of alternating karst collapse features and residual rectangular-linear arrays of limestone boulders and slabs. Deeper soils have accumulated in the collapse features and the interstices between the boulders; this configuration contributes to the herbaceous diversity of the community. This situation would tend to be generally fire-sheltered.

Global Similar Associations:

Acer saccharum - *Quercus muehlenbergii* / *Cercis canadensis* Forest (CEGL006017)--from areas to the east and north.

Global Related Concepts:

IA6k. Sugar Maple - Oak - Hickory Forest (Allard 1990) B

Sugar Maple - Oak - Hickory Forest (Pyne 1994) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This mesic sugar maple - hickory limestone forest occurs in small patches across the knobs at the Boyhood Home Unit, in a matrix of either White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070) or the more mesic Beech - Maple Unglaciaded Forest (CEGL002411). At the Birthplace Unit, a disturbed variant of this community occurs scattered throughout the park.

Global Range: This association represents mesic forests over limestone in portions of the unglaciaded Interior Low Plateau.

Nations: US

States/Provinces: AL?, KY, TN

USFS Ecoregions: 222Ed:CCC

Federal Lands: NPS (Lincoln Birthplace, Mammoth Cave, Stones River?); TVA (Columbia)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (2 plots: ABLI.5, ABLI.10 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Pyne

References: Allard 1990, NatureServe Ecology - Southeastern U.S. unpubl. data, Pyne 1994, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. Data

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

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

ALLIANCE CONCEPT

Summary: Forests in this alliance occur on the fronts, terraces, and levees of small, medium and large rivers of the Atlantic Coastal Plain, Southern Ridge and Valley, Interior Low Plateau, Ozark Highlands, Ouachita Mountains, Arkansas Valley, East and West Gulf coastal plains, Mississippi River Alluvial Plain, Cumberland Plateau, Southern Blue Ridge, and lower Piedmont. These forests are dominated by *Platanus occidentalis* (Sycamore) or a mixture of it with *Fraxinus pennsylvanica* (Green Ash), *Celtis laevigata* (Sugarberry), and *Acer saccharinum* (Silver Maple), as well as *Acer negundo* (Box-elder), *Ulmus americana* (American Elm), *Liquidambar styraciflua* (Sweetgum), *Ulmus alata* (Winged Elm), *Planera aquatica* (Planertree), *Juglans nigra* (Black Walnut), *Celtis occidentalis* (Common

Hackberry), *Carya illinoensis* (Pecan), *Quercus nigra* (Water Oak), *Salix nigra* (Black Willow), *Carya cordiformis* (Bitternut Hickory), *Quercus pagoda* (Cherrybark Oak), and *Carya aquatica* (Water Hickory). The understory may be dense and typically contains *Asimina triloba* (Common Pawpaw), *Crataegus viridis* (Green Hawthorn), *Crataegus spathulata* (Littlehip Haw), and *Lindera benzoin* (Northern Spicebush). Herbaceous species that may be present include *Elymus virginicus* (Virginia Wild Rye), *Carex grayi* (Gray's Sedge), *Carex lupulina* (Hop Sedge), *Carex abscondita* (Concealed Sedge), *Chasmanthium latifolium* (River-oats), *Boehmeria cylindrica* (Small-spike False Nettle), *Polygonum virginianum* (Jumpseed), *Elymus virginicus* (Virginia Wild Rye), *Pilea pumila* (Canadian Clearweed), *Leersia lenticularis* (Catchfly Cutgrass), and others. Vines may be abundant and species include *Bignonia capreolata* (Crossvine), *Toxicodendron radicans* (Eastern Poison-ivy), and *Smilax tamnoides* (Chinaroot). This alliance does not include typical alluvial forests of the upper Piedmont and Blue Ridge, but forests in this alliance may occur in these areas in restricted calcareous situations. In Arkansas, these forests occur during point bar succession as intermediates between forests dominated by *Salix* (Willow) and *Populus* (Cottonwood), and those dominated by *Carya illinoensis* (Pecan). In Kentucky and Arkansas, *Fraxinus americana* (White Ash), *Fraxinus pennsylvanica* (Green Ash), *Ulmus rubra* (Slippery Elm), and *Ulmus americana* (American Elm) are common in these forests. According to K. Ribbeck (pers. comm.) "Sycamore - River Birch - Silver Maple" forests of the Pearl River in Louisiana are included here.

Classification Comments: The relationship between this alliance and the *Fraxinus pennsylvanica* - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286) needs to be defined more clearly. It appears that this alliance (A.288) may be more northern in distribution and more often located closer to the river and in areas of more active deposition, but further research is needed. In Texas, where *Acer saccharinum* is absent, these forests occur on the Sabine and Neches rivers. In Arkansas, forests in this alliance that are dominated by *Celtis laevigata*, *Platanus occidentalis*, and *Carya illinoensis* occur in areas with flowing water, active deposition, and lots of meandering; still water and lesser deposition are needed for succession to oaks (T. Foti pers. comm.).

Similar Alliances:

Acer saccharinum Temporarily Flooded Forest Alliance (A.279)--with stronger dominance by *Acer saccharinum*.
Fraxinus pennsylvanica - *Ulmus americana* - *Celtis (occidentalis, laevigata)* Temporarily Flooded Forest Alliance (A.286)

Platanus occidentalis - (*Liquidambar styraciflua*, *Liriodendron tulipifera*) Temporarily Flooded Forest Alliance (A.289)

Similar Alliance Comments: Is this alliance (A.288) in a more base-rich and/or lower gradient environment than A.289?

Related Concepts:

Alluvial forest (Evans 1991) I

IIA7g. Sycamore - Sweetgum - American Elm Riverfront Forest (Allard 1990) I

Riparian forest (Evans 1991) I

Sycamore - Sweetgum - American Elm: 94 (Eyre 1980) I

Sycamore-Willow Series (Diamond 1993) I

ALLIANCE DESCRIPTION

Environment: Forests in this alliance occur on fronts, terraces, and levees of small, medium and large rivers, particularly where there are base-rich inputs to the sediments. In Arkansas, these forests occur during point bar succession as intermediates between forests dominated by *Salix* and *Populus*, and those dominated by *Carya illinoensis* (T. Foti pers. comm.).

Vegetation: These forests are dominated by *Platanus occidentalis* (Sycamore) or a mixture of it with *Fraxinus pennsylvanica* (Green Ash), *Celtis laevigata* (Sugarberry), and *Acer saccharinum* (Silver Maple), as well as *Acer negundo* (Box-elder), *Ulmus americana* (American Elm), *Liquidambar styraciflua* (Sweetgum), *Ulmus alata* (Winged Elm), *Planera aquatica* (Planertree), *Juglans nigra* (Black Walnut), *Celtis occidentalis* (Common Hackberry), *Carya illinoensis* (Pecan), *Quercus nigra* (Water Oak), *Salix nigra* (Black Willow), *Carya cordiformis* (Bitternut Hickory), *Quercus pagoda* (Cherrybark Oak), and *Carya aquatica* (Water Hickory). *Asimina triloba* (Common Pawpaw), *Crataegus viridis* (Green Hawthorn), *Crataegus spathulata* (Littlehip Haw), and *Lindera benzoin* (Northern Spicebush) may be fairly dense in the understory. Herbaceous species that may be present include *Elymus virginicus* (Virginia Wild Rye), *Carex grayi* (Gray's Sedge), *Carex lupulina* (Hop Sedge), *Carex abscondita* (Concealed Sedge), *Chasmanthium latifolium* (River-oats), *Boehmeria cylindrica* (Small-spike False Nettle), *Polygonum virginianum* (Jumpseed), *Elymus virginicus* (Virginia Wild Rye), *Pilea pumila* (Canadian Clearweed), *Leersia lenticularis* (Catchfly Cutgrass), and others. Vines may be abundant and species include *Bignonia capreolata* (Crossvine), *Toxicodendron radicans* (Eastern Poison-ivy), and *Smilax tamnoides* (Chinaroot). In Kentucky and Arkansas, *Fraxinus americana* (White Ash), *Fraxinus pennsylvanica* (Green Ash), *Ulmus rubra* (Slippery Elm), and *Ulmus americana* (American Elm) are common in these forests. In the Cumberland Plateau of

Alabama, *Platanus occidentalis* (Sycamore) is codominant with *Celtis laevigata* (Sugarberry) and *Liriodendron tulipifera* (Tuliptree).

Dynamics:

ALLIANCE DISTRIBUTION

Range: Forests in this alliance occur on the fronts, terraces, and levees of small, medium and large rivers of the Atlantic Coastal Plain, Southern Ridge and Valley, Cumberland Plateau, Interior Low Plateau, Ozark Highlands, Ouachita Mountains, Arkansas Valley, East and West Gulf coastal plains, Mississippi River Alluvial Plain, and lower Piedmont. It also ranges into the southern midwestern United States. This alliance does not include typical alluvial forests of the upper Piedmont and Blue Ridge, but forests in this alliance may occur in these areas in restricted calcareous situations.

Nations: US

Subnations: AL, AR, CT, DC, DE, GA, IN, KY, LA, MA, MD, MO, MS, NC, NH, NJ, NY, OH, PA, RI, SC, TN, TX, VA, VT, WV

TNC Ecoregions: 24:C, 29:C, 31:C, 32:?, 37:C, 38:C, 39:P, 40:C, 41:C, 42:C, 43:C, 44:C, 45:C, 49:C, 50:C, 51:C, 52:C, 53:P, 56:P, 57:C, 58:C, 59:C, 60:C, 61:C, 63:C

USFS Ecoregions: 212E:C?, 212Fb:CCP, 212Fc:CCC, 221Af:CCC, 221Bd:CCC, 221Da:CCC, 221Ea:CCC, 221Ec:CCC, 221Ed:CCP, 221Ef:CCP, 221Eg:CCC, 221Fa:CCC, 221Ha:CCC, 221Hc:CCC, 221He:CCC, 222Ab:CCC, 222Ac:CCC, 222Ad:CCC, 222Ae:CCC, 222Af:CCC, 222Ag:CCC, 222Ah:CCC, 222Aj:CCC, 222Ak:CCC, 222Am:CCC, 222An:CCC, 222Cb:CCP, 222Cd:CCP, 222Ce:CCP, 222Cg:CCC, 222De:CCP, 222Eb:CCC, 222Ec:CCC, 222Ed:CCP, 222Eg:CCC, 222Eh:CCP, 222Em:CCP, 222En:CCC, 222Eo:CCC, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Hb:CCC, 222Hf:CCC, 222I:C?, 222O:C?, 231Aa:CCC, 231Ae:CCC, 231Af:CCC, 231Ak:CCP, 231Al:CCC, 231Ap:CCC, 231Ba:CCP, 231Bc:CCP, 231Bd:CCP, 231Be:CCC, 231Bg:CCP, 231Bh:CCC, 231Bj:CCP, 231Bk:CCP, 231Bl:CCP, 231Cd:CCC, 231Da:CCC, 231Dc:CCC, 231Ef:CCC, 231Eg:CCP, 231Eh:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Ad:CCC, 232Bj:CCC, 232Bk:CCP, 232Bl:CCP, 232Bq:CCP, 232Br:CCP, 232Bs:CCC, 232Bu:CCP, 232Bv:CCP, 232Ca:CCP, 232Fa:CCP, 232Fb:CCP, 232Fc:CCP, 232Fd:CCP, 234Aa:CCP, 234Ab:CC?, 234Ac:CCC, 234Ae:CCP, 234Ag:CCC, 234Ah:CC?, 234Ai:CCP, 234Am:CCC, 234An:CCC, 251Cd:CCP, 251Eb:CCC, 255Da:CCP, 255Db:CCC, 315:C, M212Bd:CCC, M221Aa:CCC, M221Ab:CCC, M221Cd:CCC, M221Da:CCC, M221Db:CCP, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231:P

Federal Lands: DOD (Arnold, Fort Benning); NPS (Antietam, Blue Ridge Parkway, Buffalo River?, C&O Canal, Chickamauga-Chattanooga, Congaree Swamp, Delaware Water Gap, Eisenhower, Fort Donelson, Friendship Hill, George Washington Parkway, Gettysburg, Great Smoky Mountains, Harpers Ferry, Kennesaw Mountain, Lincoln Birthplace, Mammoth Cave, Manassas, Monocacy, Natchez Trace, National Capital-East, Ninety Six, Ozark, Rock Creek, Russell Cave, Shiloh, Upper Delaware, Valley Forge, Vicksburg); USFS (Angelina, Bankhead, Bienville, Chattahoochee, Daniel Boone, Davy Crockett, De Soto, Delta?, George Washington, Holly Springs, Homochitto, Jefferson, Kisatchie, Oconee, Ozark, Pisgah?, Sabine NF, Sam Houston, St. Francis?, Tombigbee?, Tuskegee); USFWS (Erie, San Bernard?)

(CEGL008429) Sycamore - Sugarberry - Tuliptree / Northern Spicebush - Giant Cane / American Hog-peanut Forest

Platanus occidentalis - *Celtis laevigata* - *Liriodendron tulipifera* / *Lindera benzoin* - *Arundinaria gigantea* / *Amphicarpaea bracteata* Forest

Rich Levee Mixed Hardwood Bottomland Forest

NVC Classification

Physiognomic Class	Forest (I)
Physiognomic Subclass	Deciduous forest (I.B.)
Physiognomic Group	Cold-deciduous forest (I.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous forest (I.B.2.N.)
Formation	Temporarily flooded cold-deciduous forest (I.B.2.N.d.)
Alliance	<i>Platanus occidentalis</i> - (<i>Fraxinus pennsylvanica</i> , <i>Celtis laevigata</i> , <i>Acer saccharinum</i>) Temporarily Flooded Forest Alliance (A.288)
Alliance (English name)	Sycamore - (Green Ash, Sugarberry, Silver Maple) Temporarily Flooded Forest Alliance
Association	<i>Platanus occidentalis</i> - <i>Celtis laevigata</i> - <i>Liriodendron tulipifera</i> / <i>Lindera benzoin</i> - <i>Arundinaria gigantea</i> / <i>Amphicarpaea bracteata</i> Forest
Association (English name)	Sycamore - Sugarberry - Tuliptree / Northern Spicebush - Giant Cane / American Hog-peanut Forest
Association (Common name)	Rich Levee Mixed Hardwood Bottomland Forest

Ecological System(s): South-Central Interior Small Stream and Riparian (CES202.706)

ELEMENT CONCEPT

Global Summary: This forest occurs on infrequently flooded, base-rich alluvial terraces along small streams in the upper southeastern United States. In addition to *Platanus occidentalis* (Sycamore), *Celtis laevigata* (Sugarberry), and *Liriodendron tulipifera* (Tuliptree), other dominants of the closed canopy can include *Acer negundo* (Box-elder), *Juglans nigra* (Black Walnut), *Acer saccharum* (Sugar Maple), and *Fraxinus pennsylvanica* (Green Ash). Several other canopy components are possible. Midstory components include *Carpinus caroliniana* (American Hornbeam), *Acer barbatum* (Southern Sugar Maple), *Ulmus rubra* (Slippery Elm), and *Tilia americana* (American Basswood). The understory is often dominated by *Lindera benzoin* (Northern Spicebush). The ground cover flora is variable in composition and cover. Ground cover components include *Polystichum acrostichoides* (Christmas Fern), *Elymus virginicus* (Virginia Wild Rye), *Verbesina occidentalis* (Yellow Crownbeard), *Verbesina virginica* (Common Frostweed), *Verbesina alternifolia* (Wingstem), *Viola* (Violet) sp., *Chasmanthium latifolium* (River-oats), *Polygonum virginianum* (Jumpseed), *Amphicarpaea bracteata* (American Hog-peanut), *Boehmeria cylindrica* (Small-spike False Nettle), and *Laportea canadensis* (Canadian Wood-nettle). This community is reported to have a rich herbaceous flora in the spring. The invasive exotics *Glechoma hederacea* (Ground-ivy), *Ligustrum sinense* (Chinese Privet), and *Microstegium vimineum* (Japanese Stiltgrass) may invade examples of this community.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Abraham Lincoln Birthplace National Historic Site Environment: This association was sampled a total of five times – along streams at both park units, and in sinkhole depressions at the Birthplace Unit. Streamside sites range from flat to gently sloping east- and southeast-facing channel streambeds. The elevation at one site is 165 m (539 feet). Soils are somewhat poorly to poorly drained silty clay and sandy loam. The unvegetated surface is made up of leaf litter (3-90% cover), large rocks (0-50%), small rocks (0-50%), sand (0-10%), wood (0-15%), and bare soil (0-10%). Evidence of disturbance includes the presence of exotic plants. A walking trail passes through the large sinkhole depression where this association was sampled along the eastern boundary of the Birthplace Unit. This sinkhole seems to have standing water for a period of days after rainstorms, which makes its vegetation character similar to that along streams at ABLI. Soils are somewhat poorly to poorly drained silty clay. The unvegetated surface is made up of leaf litter (85-95% cover), and wood (5-15%). Evidence of disturbance includes the presence of exotic plants, in addition to the walking trail.

Global Environment: This association occurs on terraces of small, base-rich streams in the Cumberland Plateau, Ridge and Valley, and Interior Low Plateau. These alluvial deposits are apparently somewhat calcareous, resulting from erosion of limestone strata within the surrounding watersheds.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The sparse to moderately dense (20-70% cover) tree canopy, 15-35 m tall, may be dominated by *Platanus occidentalis* (Sycamore) and sometimes *Liriodendron tulipifera*, and may include *Acer negundo* (Box-elder), *Juglans nigra* (Black Walnut), *Celtis* (Hackberry), *Quercus imbricaria* (Shingle Oak), *Fagus grandifolia* (American Beech) and *Prunus serotina* var. *serotina* (Black Cherry). The very sparse to moderate (5-50%) subcanopy (5-20 m) includes canopy species as well as *Acer saccharum* (Sugar Maple), *Fraxinus pennsylvanica* (Green Ash), and *Ulmus* (Elm). The very sparse to moderate (5-40%) tall-shrub layer (2-5 m) may contain *Acer negundo* (Box-elder), *Liriodendron tulipifera* (Tuliptree), *Prunus serotina* var. *serotina* (Black Cherry), *Sambucus canadensis* (American Elder), *Ulmus rubra* (Slippery Elm), and the exotic *Rosa multiflora* (Multiflora Rose). The very sparse to very dense (5-90%) short-shrub layer (0.5-2 m) is dominated by *Sambucus canadensis* (American Elder), *Symphoricarpos orbiculatus* (Coralberry), and *Toxicodendron radicans* (Eastern Poison-ivy), with *Lindera benzoin* (Northern Spicebush). The sparse to dense (10-80%) herbaceous layer includes *Hydrophyllum macrophyllum* (largeleaf waterleaf), *Geum virginianum* (Cream Avens), *Laportea canadensis* (Canadian Wood-nettle), and exotics *Lonicera japonica* (Japanese Honeysuckle), *Duchesnea indica* (Indian strawberry), and *Microstegium vimineum* (Japanese Stiltgrass).

Global Vegetation: In addition to *Platanus occidentalis* (Sycamore), *Celtis laevigata* (Sugarberry), and *Liriodendron tulipifera* (Tuliptree), other dominants of the closed canopy can include *Acer negundo* (Box-elder), *Juglans nigra* (Black Walnut), *Acer saccharum* (Sugar Maple), and *Fraxinus pennsylvanica* (Green Ash). Other canopy components include *Quercus shumardii* (Shumard Oak), *Quercus muehlenbergii* (Chinquapin Oak), *Quercus michauxii* (Swamp Chestnut Oak), *Quercus lyrata* (Overcup Oak), *Carya glabra* (Pignut Hickory), *Carya ovata* (Shagbark Hickory), *Fraxinus americana* (White Ash), and *Aesculus glabra* (Ohio Buckeye) or *Aesculus flava* (Yellow Buckeye). Midstory components include *Carpinus caroliniana* (American Hornbeam), *Acer barbatum* (Southern Sugar Maple), *Ulmus rubra* (Slippery Elm), *Ostrya virginiana* (Eastern Hop-hornbeam), and *Tilia americana* (American Basswood), in addition to the species represented in the canopy. The understory is often dominated by *Lindera benzoin* (Northern Spicebush). Other understory components include *Arundinaria gigantea* (Giant Cane), which may be dominant in patches, *Asimina triloba* (Common Pawpaw), *Sambucus canadensis*

(American Elder), and *Ulmus americana* (American Elm). The ground cover flora is variable in composition and cover. Ground cover components include *Polystichum acrostichoides* (Christmas Fern), *Elymus virginicus* (Virginia Wild Rye), *Verbesina occidentalis* (Yellow Crownbeard), *Verbesina virginica* (Common Frostweed), *Verbesina alternifolia* (Wingstem), *Viola* (Violet) sp., *Chasmanthium latifolium* (River-oats), *Polygonum virginianum* (Jumpseed), *Amphicarpaea bracteata* (American Hog-peanut), *Boehmeria cylindrica* (Small-spike False Nettle), *Laportea canadensis* (Canadian Wood-nettle), *Smallanthus uvedalius* (Bear's-foot), *Ageratina altissima* (White Snakeroot), *Geum canadense* (White Avens), *Sanicula canadensis* (Canadian Black Snakeroot), *Elephantopus carolinianus* (Carolina Elephant's-foot), *Polymnia canadensis* (Canada Leafcup), *Amphicarpaea bracteata* (American Hog-peanut), *Campanulastrum americanum* (American Bellflower), *Circaea lutetiana* ssp. *canadensis* (Broadleaf Enchanter's-nightshade), and *Teucrium canadense* (American Germander). This community is reported to have a rich herbaceous flora in the spring. The invasive exotics *Glechoma hederacea* (Ground-ivy), *Ligustrum sinense* (Chinese Privet), and *Microstegium vimineum* (Japanese Stiltgrass) may invade examples of this community.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree (canopy & subcanopy)	Broad-leaved deciduous tree	<i>Acer negundo</i> (Box-elder), <i>Juglans nigra</i> (Black Walnut), <i>Liriodendron tulipifera</i> (Tuliptree)
Tree canopy	Broad-leaved deciduous tree	<i>Platanus occidentalis</i> (Sycamore)
Tree subcanopy	Broad-leaved deciduous tree	<i>Acer saccharum</i> (Sugar Maple), <i>Celtis laevigata</i> (Sugarberry), <i>Prunus serotina</i> var. <i>serotina</i> (Black Cherry), <i>Quercus imbricaria</i> (Shingle Oak)
Shrub/sapling (tall & short)	Broad-leaved deciduous shrub	<i>Acer negundo</i> (Box-elder), <i>Lindera benzoin</i> (Northern Spicebush), <i>Rosa multiflora</i> (Multiflora Rose), <i>Ulmus rubra</i> (Slippery Elm)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Liriodendron tulipifera</i> (Tuliptree)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Platanus occidentalis</i> (Sycamore), <i>Symphoricarpos orbiculatus</i> (Coralberry)
Herb (field)	Vine/Liana	<i>Lonicera japonica</i> (Japanese Honeysuckle), <i>Toxicodendron radicans</i> (Eastern Poison-ivy)
Herb (field)	Forb	<i>Laportea canadensis</i> (Canadian Wood-nettle), <i>Pilea pumila</i> (Canadian Clearweed), <i>Polymnia canadensis</i> (Canada Leafcup)
Herb (field)	Graminoid	<i>Microstegium vimineum</i> (Japanese Stiltgrass)

Global

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

Abraham Lincoln Birthplace National Historic Site: *Corylus americana* (American Hazelnut), *Geum virginianum* (Cream Avens), *Prunus serotina* var. *serotina* (Black Cherry), *Sambucus canadensis* (American Elder), *Ulmus rubra* (Slippery Elm)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Ambrosia artemisiifolia* (Annual Ragweed), *Ambrosia trifida* (Great Ragweed), *Calystegia sepium* (Hedge False Bindweed), *Euonymus fortunei* (Winter Creeper), *Glechoma hederacea* (Ground-ivy), *Ipomoea purpurea* (Common Morning-glory), *Lonicera japonica* (Japanese Honeysuckle), *Melilotus albus* (White Sweet-clover), *Microstegium vimineum* (Japanese Stiltgrass), *Rosa multiflora* (Multiflora Rose), *Rubus phoenicolasius* (Wine Raspberry), *Saponaria officinalis* (Bouncing-bet)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G4? (23-Feb-2007). This association is probably found at scattered localities in the southern Cumberland Plateau, the southern Ridge and Valley, and the Interior Low Plateau, where it is confined to base-rich terraces along small streams.

CLASSIFICATION

Status: Standard

Classification Confidence: 3 - Weak

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: This association was originally described from the Bankhead National Forest in the Cumberland Plateau of northern Alabama. It also includes occurrences in the Ridge and Valley portion of the Chattahoochee National Forest of Georgia, and the Interior Low Plateau of Tennessee and Kentucky.

Global Similar Associations:

Platanus occidentalis - *Acer saccharinum* - *Juglans nigra* - *Ulmus rubra* Forest (CEGL007334)--on the riverfronts of medium to large streams/rivers.

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This mixed hardwood bottomland forest is found alongside seasonal streams at both the Birthplace Unit and the Boyhood Home Unit, and in the bottoms of certain sinkholes scattered throughout the Birthplace Unit.

Global Range: This association is found in the southern Cumberland Plateau, the southern Ridge and Valley, and the Interior Low Plateau from Alabama and Georgia to Kentucky.

Nations: US

States/Provinces: AL, GA, KY, TN

USFS Ecoregions: 222:C, 231Cd:CCC, 231Da:CCC, 231Dc:CCC

Federal Lands: NPS (Chickamauga-Chattanooga, Lincoln Birthplace, Mammoth Cave?, Russell Cave); USFS (Bankhead, Chattahoochee, Chattahoochee (Southern Blue Ridge))

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (5 plots: ABLI.14, ABLI.17, ABLI.24 [Birthplace Unit], ABLI.19, ABLI.27 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: J. Teague, mod. E.L. Jones and M. Pyne

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

III. Shrubland

III.A.2.N.g. Temporarily flooded temperate broad-leaved evergreen shrubland

A.795–*Arundinaria gigantea* Temporarily Flooded Shrubland Alliance

ALLIANCE CONCEPT

Summary: This alliance encompasses various temporarily flooded wetlands, including alluvial or loess substrates (streamside flats, bottomlands), dominated by *Arundinaria* (Giant Cane), without an overstory, or with widely scattered trees. Evidence suggests that this alliance was widespread historically, covering large areas of many floodplains and streamside in the Coastal Plain from North Carolina to Texas, the Mississippi River Alluvial Plain north to Illinois and Missouri, Interior Highlands, Interior Low Plateau, Southern Blue Ridge and possibly the Central Appalachians of the southeastern United States. It now occupies very little of its former acreage. Canebrakes are successional communities and may have originated following abandonment of aboriginal agricultural fields or catastrophic disturbances such as windstorms. They are thought to have been maintained in part by fires set by Native Americans. This alliance may be found along larger rivers (Buffalo, White, Norfork) in the Ozarks, as well as in the Wabash and Ohio drainage systems, at least historically. It was also reported historically along the Red and Mississippi rivers in Louisiana, Coastal Prairie rivers in Texas, and the Black, Washita, Arkansas, Pearl, Tombigbee, Yazoo, Savannah, and St. Mary's rivers. Large, extant canebrakes still exist and have been documented from the Ocmulgee Basin, south of Macon, Georgia. In the Central Appalachians various wetlands, including those on alluvial or loess substrates (streamside flats, bottomlands), were dominated by *Arundinaria* (Giant Cane), without an overstory, or with widely scattered trees.

Classification Comments: *Arundinaria gigantea* is a common component in many bottomland and streamside communities today. Vegetation characterized by a predominance of *Arundinaria* in the understory of a woodland or forest community would not be classified in this alliance. Today, high-quality examples of this alliance are extremely rare. In pre-colonial times, herds of bison would swim across the Mississippi River in winter, when food was scarce on the prairies, to feed in the huge, lush canebrakes of Kentucky and Tennessee. U.S. President Theodore

Roosevelt (1908) offered these comments on Louisiana canebrakes: "The canebrakes stretch along the slight rises of ground, often extending for miles, forming one of the most striking and interesting features of the country. They choke out other growths, the feathery, graceful canes standing in ranks, tall, slender, serried, each but a few inches from his brother, and springing to a height of fifteen or twenty feet. They look like bamboos; they are well-nigh impenetrable to a man on horseback; even on foot they make difficult walking unless free use is made of the heavy bush-knife. It is impossible to see through them for more than fifteen or twenty paces, and often for not half that distance. Bears make their lairs in them, and they are the refuge for hunted things." <<http://www.theodore-roosevelt.com/trcanebrakes.html>>.

Similar Alliances:

Arundinaria gigantea Saturated Shrubland Alliance (A.801)

Arundinaria gigantea Saturated Wooded Shrubland Alliance (A.804)

Arundinaria gigantea Wooded Shrubland Alliance (A.794)

Similar Alliance Comments:

Related Concepts:

Arundinaria gigantea shrubland alliance (Hoagland 1998a) ?

P5A4bIII4a. *Arundinaria gigantea* (Foti et al. 1994)

ALLIANCE DESCRIPTION

Environment: This alliance is found in wetlands on alluvial or loess substrates. Dense monospecific stands of *Arundinaria gigantea* ssp. *gigantea* were historically found in bottomlands and streamsides in the southeastern United States. In presettlement times, a single river valley grove could be 2 or 3 miles wide and 100 miles long.

Vegetation: Vegetation of this alliance is dominated by *Arundinaria gigantea* ssp. *gigantea* (Giant Cane). Widely scattered trees may be present and the cane thicket may also include various briars (*Smilax* (Greenbrier) spp.) and other vines.

Dynamics: Vegetation classed within this alliance is successional and is thought to be maintained by periodic fires and may have originated following abandonment of aboriginal agricultural fields or catastrophic disturbances such as windstorms.

ALLIANCE DISTRIBUTION

Range: This alliance was widespread historically but now occupies very little acreage. It may be found along rivers and streamsides in Alabama, Arkansas, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Florida and Virginia.

Nations: US

Subnations: AL, AR, FL?, GA, IL, KY, LA, MO, MS, NC, OK, SC, TN, TX, VA?

TNC Ecoregions: 31:P, 32:P, 38:C, 39:C, 40:C, 41:P, 42:C, 43:P, 44:C, 50:C, 51:C, 52:P, 53:P, 56:C, 57:P, 59:C

USFS Ecoregions: 221Ha:CC?, 221Hc:CCP, 221Hd:CCP, 221He:CC?, 221Ja:CCC, 221Jb:CCP, 221Jc:CCP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 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:CCC, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ef:CCP, 222Eg:CCP, 222Eh:CCC, 222Ei:CCP, 222Ej:CC?, 222Ek:CCP, 222El:CCP, 222Em:CCP, 222En:CC?, 222Eo:CC?, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Ff:CC?, 231Aa:CCP, 231Ab:CC?, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CC?, 231Ah:CC?, 231Ai:CCP, 231Am:CC?, 231An:CC?, 231Ao:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 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:CCC, 231Ed:CCC, 231Ee:CCP, 231Ej:CCP, 231Ek:CCP, 231Em:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 234Aa:CCC, 234Ab:CC?, 234Ac:CCP, 234Ad:CCP, 234Ae:CCC, 234Af:CCP, 234Ag:CCC, 234Ah:CC?, 234Ai:CCC, 234Aj:CC?, 234Ak:CC?, 234Al:CCP, 234Am:CCC, 234An:CCC, 255Da:PPP, 255Db:PPP, M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Fort Benning); NPS (Blue Ridge Parkway?, Buffalo River, Chickamauga-Chattanooga?, Cowpens, Great Smoky Mountains, Lincoln Birthplace, Ninety Six, Ozark); USFS (Cherokee?, Mark Twain, Ouachita?, Ozark, St. Francis); USFWS (Little River, San Bernard?)

(CEGL003836) Giant Cane Shrubland

Arundinaria gigantea ssp. *gigantea* Shrubland

Floodplain Canebrake

NVC Classification

Physiognomic Class

Shrubland (III)

Physiognomic Subclass	Evergreen shrubland (III.A.)
Physiognomic Group	Temperate broad-leaved evergreen shrubland (III.A.2.)
Physiognomic Subgroup	Natural/Semi-natural temperate broad-leaved evergreen shrubland (III.A.2.N.)
Formation	Temporarily flooded temperate broad-leaved evergreen shrubland (III.A.2.N.g.)
Alliance	<i>Arundinaria gigantea</i> Temporarily Flooded Shrubland Alliance (A.795)
Alliance (English name)	Giant Cane Temporarily Flooded Shrubland Alliance
Association	<i>Arundinaria gigantea</i> ssp. <i>gigantea</i> Shrubland
Association (English name)	Giant Cane Shrubland
Association (Common name)	Floodplain Canebrake
Ecological System(s):	Central Appalachian River Floodplain (CES202.608)
	Central Atlantic Coastal Plain Nonriverine Swamp and Wet Hardwood Forest (CES203.304)
	Mississippi River Riparian Forest (CES203.190)
	South-Central Interior Large Floodplain (CES202.705)
	South-Central Interior Small Stream and Riparian (CES202.706)
	Atlantic Coastal Plain Large River Floodplain Forest (CES203.066)
	Mississippi River High Floodplain (Bottomland) Forest (CES203.196)

ELEMENT CONCEPT

Global Summary: This association is characterized by dense, often monospecific thickets of the bamboo shrub *Arundinaria gigantea* (Giant Cane) occupying large areas referred to as canebrakes. The canebrake shrubland type was historically widespread, but is now rare and occupies very little of its former acreage. It was best developed in streamside flats and alluvial floodplains on ridges and terraces where it was protected from prolonged inundation. Historically, this community covered large areas of many floodplains and streamside in the Coastal Plain from North Carolina to Texas, Mississippi River Alluvial Plain, Interior Highlands, Interior Low Plateau, Southern Blue Ridge and possibly the Central Appalachians of the southeastern United States. Stands occur on alluvial and loess soils and are often associated with bottomland hardwood forest vegetation. This association is successional and is thought to be maintained by periodic fires. It may have originated following abandonment of aboriginal agricultural fields or other natural and anthropogenic disturbances such as blow-downs and catastrophic floods. Historical accounts report cane as abundant along the Wabash and Ohio drainage systems, as well as common along larger rivers (Buffalo, White, Norfork) in the Ozarks and Ouachitas. It was also reported as common along the Red and Mississippi rivers in Louisiana, Coastal Prairie rivers in Texas, and the Black, Washita, Arkansas, Sabine, Pearl, Tombigbee, Yazoo, Savannah, and St. Mary's rivers. Large, extant canebrakes still exist and have been documented from the Ocmulgee Basin, south of Macon, Georgia. In the Central Appalachians various wetlands, including those on alluvial or loess substrates (streamside flats, bottomlands), were dominated by *Arundinaria* (Giant Cane), without an overstory, or with widely scattered trees.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System: Palustrine

Abraham Lincoln Birthplace National Historic Site Environment: At the Boyhood Home Unit, small patches of *Arundinaria gigantea*, sometimes infested by *Rosa multiflora*, exist along the edges of fields and floodplains. The present size and quality of these patches disqualify them as representative occurrences of this somewhat globally rare community. However, if some of these bottomland floodplains at the Boyhood Home Unit were managed for presettlement conditions, the opportunity exists for restoration of examples of Giant Cane Shrubland.

Global Environment: Stands of this association occur on alluvial and loess soils often affiliated with bottomland hardwood forest vegetation. Historically, it was best developed in streamside flats and alluvial floodplains on ridges and terraces where it was protected from prolonged inundation.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: The vegetation is dominated by *Arundinaria gigantea* (Giant Cane), and sometimes infested by *Rosa multiflora* (Multiflora Rose).

Global Vegetation: The vegetation is dominated by *Arundinaria gigantea* (Giant Cane). Little else is known about its vegetational characteristics. However, information on its historic patterns of distribution provides some clues as to its ecology. General Land Office surveys and other historical accounts indicate that canebrakes were present in southern Illinois, southern Indiana, Kentucky, Missouri, Arkansas, eastern Texas, Louisiana, Tennessee, Mississippi, Alabama, Georgia, and South Carolina. Historical accounts refer to both "pure" stands of cane without an overstory of trees (cane shrublands) and areas with variable overstory closure (woodlands or forests) but with a dense understory dominated by cane as "canebrakes." As currently described, this association refers only to the former, cane shrublands. Cane was abundant along the Wabash and Ohio drainage systems (B. McClain pers. comm. 2000). In Missouri, these canebrakes were also thought to be common in the Ozark Highlands, particularly in southward-draining rivers and streams with finer-textured, more developed soils on upper floodplain terraces (T. Nigh pers.

comm. 2000). Stands may be found along larger rivers (Buffalo, White, Norfork) in the Arkansas Ozarks in addition to the Ouachitas. In the Central Appalachians various wetlands, including those on alluvial or loess substrates (streamside flats, bottomlands), were dominated by *Arundinaria* (Giant Cane), without an overstory, or with widely scattered trees (Central Appalachian Forest Ecoregional Team pers. comm. 1998). Historic accounts describe large expanses (one area was described as 75 miles long by 1-3 miles wide) of an "ocean of cane" in bottomlands of the Coastal Prairie of Texas (Smeins et al. 1992). No extant occurrences of this vegetation are known from this area today.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tall shrub/sapling	Graminoid	<i>Arundinaria gigantea</i> (Giant Cane)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site:

Global: *Arundinaria gigantea* (Giant Cane)

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site:

Global: *Limnolophus swainsonii* (Swainson's Warbler), *Vermivora bachmanii* (Bachman's Warbler)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2? (15-Feb-1999). Stands of this vegetation type were historically widespread, but now are rare or occupy very little acreage. It is thought to be maintained by frequent fire and may have historically resulted from aboriginal agriculture and burning. Dense, monospecific stands of *Arundinaria gigantea ssp. gigantea* were historically found in bottomland sites throughout the southeastern United States. Today, this vegetation exists as small remnants, and high-quality examples are extremely rare.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: This is a general placeholder, covering a broad geographic range, and several associations may ultimately be recognized. Dense, monospecific stands of *Arundinaria gigantea ssp. gigantea* were historically found in bottomland sites in the southeastern United States. Today, high-quality examples are extremely rare, if not absent. Historical accounts refer to both "pure" stands of cane without an overstory of trees (cane shrublands) and areas with variable overstory closure (woodlands or forests) but with a dense understory dominated by cane as "canebrakes." As currently described, this association refers only to the former, cane shrublands.

Global Similar Associations:

Global Related Concepts:

P5A4bIII4a. *Arundinaria gigantea* (Foti et al. 1994) ?

Piedmont/Mountain Canebrake (Schafale 1998b) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range:

Global Range: This association was widespread historically but now occupies very little acreage. It may be found along rivers and streambanks in Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and possibly Virginia (?).

Nations: US

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

USFS Ecoregions: 221Ha:CC?, 221Hc:CCP, 221Hd:CCP, 221He:CC?, 221Ja:CCC, 221Jb:CCP, 221Jc:CCP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 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:CCC, 222Eb:CCC, 222Ec:CCC, 222Ed:CCC, 222Ef:CCP, 222Eg:CCP, 222Eh:CCC, 222Ei:CCP, 222Ej:CC?, 222Ek:CCP, 222El:CCP, 222Em:CCP, 222En:CC?, 222Eo:CC?, 222Fa:CCC, 222Fb:CCC, 222Fc:CCC, 222Fd:CCC, 222Ff:CC?, 231Aa:CCP, 231Ab:CC?, 231Ac:CCP, 231Ad:CCP, 231Ae:CCP, 231Af:CCP, 231Ag:CC?, 231Ah:CC?, 231Ai:CCP, 231Am:CC?,

231An:CC?, 231Ao:CCP, 231Ba:CCP, 231Bb:CCP, 231Bc:CCP, 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:CCC, 231Ed:CCC, 231Ee:CCP, 231Ej:CCP, 231Ek:CCP, 231Em:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 234Aa:CCC, 234Ab:CC?, 234Ac:CCP, 234Ad:CCP, 234Ae:CCC, 234Af:CCP, 234Ag:CCC, 234Ah:CC?, 234Ai:CCC, 234Aj:CC?, 234Ak:CC?, 234Al:CCP, 234Am:CCC, 234An:CCC, 255Da:PPP, 255Db:PPP, M221Dc:CCC, M221Dd:CCC, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: NPS (Blue Ridge Parkway?, Buffalo River, Chickamauga-Chattanooga?, Cowpens, Great Smoky Mountains, Lincoln Birthplace?, Ninety Six, Ozark); USFS (Cherokee?, Mark Twain, Ouachita (Coastal Plain)?, Ouachita (Mountains)?, Ouachita?, Ozark, St. Francis); USFWS (Little River, San Bernard?)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: None.

Local Description Authors: E.L. Jones

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

References: Barden 1997, Blair 1938, CAP pers. comm. 1998, Campbell 1980, Campbell 1989b, Davidson 1950, Flores 1984, Foti et al. 1994, Heineke 1987, Hoagland 1997, Hoagland 1998c, Hoagland 2000, Hughes 1966, McClain pers. comm., McInteer 1952, Meanley 1972, Mohr 1901, Nigh pers. comm., Nuttall 1821, Peet et al. unpubl. data 2002, Platt and Brantley 1992, Platt and Brantley 1997, Schafale 1998b, Schafale 2002, Schotz pers. comm., Smeins et al. 1992, Southeastern Ecology Working Group n.d., TDNH unpubl. data, West 1934

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

A.1905—(*Hydrangea* spp., *Philadelphus* spp.) / *Heuchera* spp. Shrubland Alliance

ALLIANCE CONCEPT

Summary: Stands of this alliance are physiognomically variable, edaphically controlled areas without a tree canopy. They are open zones in a primarily forested environment. Some examples are dry and others are moist with evident, at least seasonal, seepage. Stands occur in rocky places, typically either on solid vertical and near-vertical exposures, or cobble/channery debris fields of varying sizes. At a given location, the substrate may be composed of limestone, siltstone, mudstone, calcareous sandstones, as well as mafic metamorphic and igneous rocks. This alliance is potentially widespread in the Southern Blue Ridge, Cumberlands and Southern Ridge and Valley, Interior Low Plateau, and Interior Highlands. The vegetation composition is variable and often has a mixed and variable physiognomy. Individual occurrences may be herb-dominated, shrub-dominated, or sparsely vegetated with vascular plants (though sometimes with dense patchy cover of mosses, hepatics, or lichens). Characteristic shrubs are *Hydrangea* (*Hydrangea*) spp. (*Hydrangea arborescens* (Smooth Hydrangea), *Hydrangea cinerea* (Ashy Hydrangea), *Hydrangea radiata* (Silverleaf Hydrangea)), *Philadelphus* (Mock Orange) spp. (*Philadelphus hirsutus* (Hairy Mock Orange), *Philadelphus inodorus* (Scentless Mock Orange), *Philadelphus pubescens* (Hoary Mock Orange)), *Toxicodendron radicans* (Eastern Poison-ivy), *Physocarpus opulifolius* (Eastern Ninebark), and *Ribes* (Gooseberry) spp. (*Ribes cynosbati* (Eastern Prickly Gooseberry)). Characteristic herbs are *Heuchera* (Alumroot) spp. (*Heuchera americana* var. *americana*, *Heuchera americana* var. *hirsuticaulis* (Midwestern Alumroot), *Heuchera americana* var. *hispida* (American Alumroot), *Heuchera caroliniana*, *Heuchera villosa* var. *arkansana* (Ozark Crag-jangle), *Heuchera villosa* var. *villosa* (Rock Alumroot)). Other species which are typical include various ferns (e.g., *Woodsia obtusa* (Common Cliff Fern), *Dryopteris* (Woodfern) spp., *Cystopteris* (Bladderfern) spp.) and/or grasses (e.g., *Dichanthelium* (Witchgrass, Rosette Grass) spp., *Danthonia spicata* (Poverty Oatgrass), *Deschampsia flexuosa* (Wavy Hairgrass), and others). Some characteristic mosses include *Anomodon attenuatus* (Anomodon Moss) and *Anomodon rostratus* (Anomodon Moss).

Classification Comments: The range of this alliance is extended to include Virginia and Maryland with the addition of the provisional association *Hydrangea arborescens* / *Sedum ternatum* - *Polypodium virginianum* Herbaceous Vegetation (CEGL006479) that occupies cliff-faces weathered from siltstone, shale, calcareous sandstone, and metabasalt located above rivers and large streams.

Similar Alliances:

Impatiens pallida - *Cystopteris bulbifera* - *Adoxa moschatellina* Herbaceous Alliance (A.1598)—appears to be related midwestern alliance in terms of its environment to some members of this alliance (A.1905).

Similar Alliance Comments:

Related Concepts:

ALLIANCE DESCRIPTION

Environment: This alliance is known from vertical and near-vertical exposures of limestone, siltstone, mudstone, calcareous sandstones, and may also occur on mafic metamorphic and igneous rocks.

Vegetation: Characteristic shrubs are *Hydrangea* (Hydrangea) spp. (*Hydrangea arborescens* (Smooth Hydrangea), *Hydrangea cinerea* (Ashy Hydrangea), *Hydrangea radiata* (Silverleaf Hydrangea)), *Philadelphus* (Mock Orange) spp. (*Philadelphus hirsutus* (Hairy Mock Orange), *Philadelphus inodorus* (Scentless Mock Orange), *Philadelphus pubescens* (Hoary Mock Orange)), *Toxicodendron radicans* (Eastern Poison-ivy), *Physocarpus opulifolius* (Eastern Ninebark), and *Ribes* (Gooseberry) spp. (*Ribes cynosbati* (Eastern Prickly Gooseberry)). Characteristic herbs are *Heuchera* (Alumroot) spp. (*Heuchera americana* var. *americana*, *Heuchera americana* var. *hirsuticaulis* (Midwestern Alumroot), *Heuchera americana* var. *hispida* (American Alumroot), *Heuchera caroliniana*, *Heuchera villosa* var. *arkansana* (Ozark Crag-jangle), *Heuchera villosa* var. *villosa* (Rock Alumroot)). Other species which are typical include *Dichanthelium* (Witchgrass, Rosette Grass) spp., *Woodsia obtusa* (Common Cliff Fern), *Dryopteris* (Woodfern) spp., *Cystopteris* (Bladderfern) spp., *Danthonia spicata* (Poverty Oatgrass), *Deschampsia flexuosa* (Wavy Hairgrass), and others. Characteristic mosses include *Anomodon attenuatus* (Anomodon Moss) and *Anomodon rostratus* (Anomodon Moss).

Dynamics:

ALLIANCE DISTRIBUTION

Range: The alliance is potentially widespread in the Southern Blue Ridge, Cumberlands and Southern Ridge and Valley, Interior Low Plateau, and Interior Highlands. It is found in Alabama, Arkansas, Kentucky, North Carolina, Tennessee, Virginia and Maryland, and possibly Georgia, Mississippi, and Oklahoma.

Nations: US

Subnations: AL, AR, GA?, KY, MD, MS?, NC, OK?, TN, VA

TNC Ecoregions: 38:C, 39:C, 43:P, 44:C, 50:C, 51:C, 52:C, 59:P

USFS Ecoregions: 221Hc:CCC, 222Ea:CCC, 222Eb:CCC, 222Ee:CC?, 222Ef:CC?, 222Eg:CCC, 222Eh:CCC, 222Eo:CCC, 231Be:CPP, 231Gb:CCC, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC

Federal Lands: NPS (Blue Ridge Parkway?, C&O Canal, Harpers Ferry, Lincoln Birthplace, Mammoth Cave, Manassas, Natchez Trace, Russell Cave); USFS (Chattahoochee?, Cherokee, Jefferson, Ouachita?, Ozark, Pisgah)

(CEGL004708) Smooth Hydrangea / (Orange Jewelweed, Yellow Jewelweed) - Rock Alumroot Shrubland

Hydrangea arborescens / *Impatiens (capensis, pallida)* - *Heuchera villosa* Shrubland

Highland Rim Limestone Cliff/Talus Seep

NVC Classification

Physiognomic Class	Shrubland (III)
Physiognomic Subclass	Deciduous shrubland (III.B.)
Physiognomic Group	Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup	Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation	Temperate cold-deciduous shrubland (III.B.2.N.a.)
Alliance	(<i>Hydrangea</i> spp., <i>Philadelphus</i> spp.) / <i>Heuchera</i> spp. Shrubland Alliance (A.1905)
Alliance (English name)	(Hydrangea species, Mock Orange species) / Alumroot species Shrubland Alliance
Association	<i>Hydrangea arborescens</i> / <i>Impatiens (capensis, pallida)</i> - <i>Heuchera villosa</i> Shrubland
Association (English name)	Smooth Hydrangea / (Orange Jewelweed, Yellow Jewelweed) - Rock Alumroot Shrubland
Association (Common name)	Highland Rim Limestone Cliff/Talus Seep
Ecological System(s):	Central Interior Calcareous Cliff and Talus (CES202.690)

ELEMENT CONCEPT

Global Summary: This association includes forb-dominated seepage vegetation from low to moderate elevations (about 305-400 m [1000-1300 feet]) in the Interior Low Plateau, Highland Rim Section. Examples are found on saturated, sloping to concave to near-vertical exposures of gray calcareous mudstones and/or siltstones of the Fort Payne Formation. These exposures vary greatly in size, from about 10 to perhaps 50 square meters. The seeps occur where blocky limestones with vertical fissures and joints overlie more flatly bedded strata. Herbs observed include *Impatiens capensis* (Orange Jewelweed), *Impatiens pallida* (Yellow Jewelweed), *Heuchera villosa* (Rock Alumroot), *Saxifraga virginensis* (Early Saxifrage), *Dodecatheon meadia* (Pride-of-Ohio), *Cardamine diphylla* (Crinkleroot), *Polymnia canadensis* (Canada Leafcup), and *Thaspium pinnatifidum* (Cutleaf Meadow-parsnip) (*sensu lato*). They are primarily herbaceous systems but may be ringed by shrubs. *Hydrangea arborescens* (Smooth Hydrangea) is invariably present and often dominant in this marginal shrub zone; other shrubs present include *Staphylea trifolia* (American Bladdernut) and *Hypericum prolificum* (Shrubby St. John's-wort). Sheltered areas

under rock overhangs or boulders may harbor thallose liverworts and various mosses, including *Mnium* (*Mnium* Calcareous Moss) sp. This distinctive vegetation is maintained by seepage from the siltstones; this seepage and the steep irregular topography do not allow trees to take hold and dominate the community. In a sparsely vegetated variant on near-vertical, gently concave exposures of gray siltstone talus of the Fort Payne, *Polymnia canadensis* (Canada Leafcup) and *Heuchera villosa* (Rock Alumroot) dominate; also present in this variant are *Pellaea atropurpurea* (Purple Cliffbrake), *Monarda fistulosa* (Wild Bergamot), and *Packera obovata* (Roundleaf Groundsel).

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This rare Hydrangea shrubland is believed to occur only once in the park. The site is a nearly vertical face of limestone draining off the north side of a knob formation into a creek running west to east at the extreme northern edge of the Boyhood Home Unit. This is an unusually large stand of hydrangea shrubland, extending approximately 10 m upslope by 50 m wide. Seepage coming down over the surface of the limestone was observed in April 2005. There is a shale-like quality to the limestone which has resulted in much fragmentation into the creekbed. Sandy Brue noted rough holes in fragmented and eroded limestone shale where embedded geodes had broken loose. Jennie Jones noted numerous crinoid fossils in the creekbed. The unvegetated surface is made up of bedrock (70% cover) with some limestone bedrock and some fragmented shale, large rocks (10%), leaf litter (18%), and water (2%) from seepage.

Global Environment: This association includes forb-dominated seepage vegetation from low to moderate elevations (about 300-400 m [1000-1300 feet]) in the Interior Low Plateau, Highland Rim Section. Examples are found on saturated, sloping to concave to near-vertical exposures of gray calcareous mudstones and/or siltstones of the Fort Payne Formation. These exposures vary greatly in size, from about 10 to perhaps 50 square meters.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: There is a very sparse (5% cover) emergent (20-35 m) tree canopy of *Aesculus glabra* (Ohio Buckeye) and *Fraxinus americana* (White Ash) and a very sparse (5%) tall-shrub layer (2-5 m) of *Carpinus caroliniana* (American Hornbeam) with *Tilia americana* var. *americana* (American Basswood). The dominant layer (60%) is the short-shrub layer (1-2 m) of *Hydrangea arborescens* (Smooth Hydrangea). The sparse (10%) herbaceous layer includes *Hepatica nobilis* var. *acuta* (Sharp-lobe Liverleaf), *Hydrophyllum canadense* (Mapleleaf Waterleaf), *Maianthemum racemosum* ssp. *racemosum* (Feathery False Lily-of-the-valley), *Impatiens pallida* (Yellow Jewelweed), and *Mitella diphylla* (Twoleaf Miterwort); a total of 22 herbaceous species were recorded in the plot. Calcareous seeps are known habitat for the Kentucky state-threatened species *Adiantum capillus-veneris* (Southern Maidenhair). An *Adiantum* (Maidenhair) was seen on the limestone seep above eye level but was out of reach for positive identification as *Adiantum capillus-veneris* (Southern Maidenhair).

Global Vegetation: Herbs observed include *Impatiens capensis* (Orange Jewelweed), *Impatiens pallida* (Yellow Jewelweed), *Heuchera villosa* (Rock Alumroot), *Saxifraga virginiana* (Early Saxifrage), *Dodecatheon meadia* (Pride-of-Ohio), *Cardamine diphylla* (Crinkleroot), *Polymnia canadensis* (Canada Leafcup), and *Thaspium pinnatifidum* (Cutleaf Meadow-parsnip) (*sensu lato*). They are primarily herbaceous systems but may be ringed by shrubs. *Hydrangea arborescens* (Smooth Hydrangea) is invariably present and often dominant in this marginal shrub zone; other shrubs present include *Staphylea trifolia* (American Bladdernut) and *Hypericum prolificum* (Shrubby St. John's-wort). Sheltered areas under rock overhangs or boulders may harbor thallose liverworts and various mosses, including *Mnium* (*Mnium* Calcareous Moss) sp. In a sparsely vegetated variant on near-vertical, gently concave exposures of gray siltstone talus of the Fort Payne, *Polymnia canadensis* (Canada Leafcup) and *Heuchera villosa* (Rock Alumroot) dominate; also present in this variant are *Pellaea atropurpurea* (Purple Cliffbrake), *Monarda fistulosa* (Wild Bergamot), and *Packera obovata* (Roundleaf Groundsel).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Tree canopy	Broad-leaved deciduous tree	<i>Aesculus glabra</i> (Ohio Buckeye), <i>Fraxinus americana</i> (White Ash)
Tall shrub/sapling	Broad-leaved deciduous shrub	<i>Carpinus caroliniana</i> (American Hornbeam)
Short shrub/sapling	Broad-leaved deciduous shrub	<i>Hydrangea arborescens</i> (Smooth Hydrangea)
Herb (field)	Forb	<i>Maianthemum racemosum</i> ssp. <i>racemosum</i> (Feathery False Lily-of-the-valley)

Global

Stratum**Lifeform****Species****CHARACTERISTIC SPECIES**

Abraham Lincoln Birthplace National Historic Site: *Hepatica nobilis* var. *acuta* (Sharp-lobe Liverleaf),
Hydrophyllum canadense (Mapleleaf Waterleaf)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Rubus phoenicolasius* (Wine Raspberry)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: G3 (31-Jan-2007). This community is restricted to the southern Interior Low Plateau. It is well-distributed in the Eastern and Western Highland Rim of Tennessee and may range as far south and west as northeastern Mississippi. There are probably at least 50 EOs of this community, although not many are documented. Most sites would be expected to be small ones, less than an acre in extent. An outstanding example would need to be well-situated in a matrix of hardwood forest, and well-buffered from disturbances or hydrologic alterations. This association is threatened by the effects of upslope timber removal and from alterations to the groundwater hydrology. This type would generally not have decreased in extent, although some examples may be less well-buffered or protected from disturbance than in the past.

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: These habitats are commonly utilized by a variety of salamanders. The *Heuchera villosa* present in this community has often been treated as *Heuchera villosa* var. *macrorrhiza*, now recognized by Kartesz (1999) as *Heuchera villosa* var. *villosa*. Vegetation related to this ("Calcareous Seep") is reported from Mississippi; its precise composition needs to be verified.

Global Similar Associations:

Global Related Concepts:

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: Only one occurrence of this smooth hydrangea shrubland was found. The site is a nearly vertical face of limestone draining off the north side of a knob into a creek running west to east at the extreme northern edge of the Boyhood Home Unit. This example is an unusually large stand, extending approximately 10 m upslope by 50 m wide.

Global Range: This type is well-distributed in the Eastern and Western Highland Rim of Tennessee and may range as far south and west as northeastern Mississippi.

Nations: US

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

USFS Ecoregions: 221Hc:CCC, 222Ea:CCC, 222Eb:CCC, 222Ee:CC?, 222Ef:CC?, 222Eg:CCC, 222Eh:CCC, 222Eo:CCC, 231Be:PPP

Federal Lands: NPS (Lincoln Birthplace, Mammoth Cave, Natchez Trace)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.26 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Pyne

References: Pyne 1997, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, Wieland 1994b, Wieland 2000b

V. Herbaceous Vegetation**V.A.5.N.c. Medium-tall sod temperate or subpolar grassland****A.1208–*Andropogon virginicus* Herbaceous Alliance**

ALLIANCE CONCEPT

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

Classification Comments:

Similar Alliances:

Similar Alliance Comments:

Related Concepts:

Andropogon virginicus herbaceous alliance (Hoagland 1998a) ?

ALLIANCE DESCRIPTION

Environment: Stands of this alliance occur on old fields, pastures, and rocky sites.

Vegetation: Stands of this alliance are dominated by *Andropogon virginicus* var. *virginicus* (Broomsedge Bluestem). Associated species vary with geography and habitat and include typical pioneer species.

Dynamics:

ALLIANCE DISTRIBUTION

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

Nations: US

Subnations: AL, AR, CT, GA, IL, IN, KY, LA, MA, ME, MO?, MS, NC, NH, NJ, NY, OK, PA, RI, SC, TN, TX, VA, VT, WV

TNC Ecoregions: 31:C, 32:C, 38:C, 39:C, 40:C, 41:C, 42:C, 43:C, 44:C, 50:C, 51:P, 52:P, 53:C, 56:C, 57:C, 59:C, 60:C, 61:C, 62:C

USFS Ecoregions: 212Fc:CCC, 221Ab:CCC, 221Bd:CCC, 221C:CP, 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 222Eg:CCC, 231Aa:CCC, 231Ae:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232Aa:CCC, 232Ac:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CC?, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Arnold, Camp Dawson, Fort Benning, Fort Gordon); NPS (Big South Fork, Cape Cod, Chickamauga-Chattanooga?, Cowpens, Delaware Water Gap, Fire Island, Fort Donelson, Gateway, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Ninety Six, Saratoga, Shiloh, Stones River, Upper Delaware, Weir Farm); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita?, Ozark?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria, Great Swamp)

(CEGL004044) Broomsedge Bluestem Herbaceous Vegetation

Andropogon virginicus var. *virginicus* Herbaceous Vegetation

Successional Broom-sedge Vegetation

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)
Alliance	<i>Andropogon virginicus</i> Herbaceous Alliance (A.1208)
Alliance (English name)	Broomsedge Bluestem Herbaceous Alliance
Association	<i>Andropogon virginicus</i> var. <i>virginicus</i> Herbaceous Vegetation
Association (English name)	Broomsedge Bluestem Herbaceous Vegetation
Association (Common name)	Successional Broom-sedge Vegetation
Ecological System(s):	East Gulf Coastal Plain Jackson Prairie and Woodland (CES203.555) Texas-Louisiana Coastal Prairie (CES203.550)

ELEMENT CONCEPT

Global Summary: This association includes herbaceous-dominated vegetation that has been anthropogenically altered and/or maintained, especially on old fields and pastures. Examples support predominately native species or a mixture of native and exotic species, one of the most dominant or characteristic species being *Andropogon virginicus* var. *virginicus* (Broomsedge Bluestem). *Lolium pratense* (Meadow Ryegrass) can dominate fields early in the season. This is a very common and wide-ranging association that can be quite variable in terms of species

composition. Additional components are other perennial grasses and herbaceous species, most with pioneer or weedy tendencies, the exact composition of which will vary with geography, management history, and habitat.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: This herbaceous vegetation was sampled at one location at the Boyhood Home Unit. The site is a gently sloping ridge on a knob at 216 m elevation with an eastern aspect. The soil is a dry-mesic sandy loam. The unvegetated surface is made up entirely of leaf litter (100% cover). This site and other patches like it were cleared or farmed in the recent past and have the appearance of abandoned or infrequently mowed fields. Evidence of disturbance includes the presence of exotic plants.

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

Abraham Lincoln Birthplace National Historic Site Vegetation: There is a very sparse (5% cover) emergent shrub layer, 1-2 m tall, that includes *Sassafras albidum* (Sassafras), *Quercus velutina* (Black Oak), and others; a total of 16 species were recorded. However, the dominant layer is the herbaceous layer with 90% cover. Dominant species include *Andropogon virginicus* (Broomsedge Bluestem), *Panicum anceps* (Beaked Panicgrass), and *Solidago juncea* (Early Goldenrod); a total of 121 herbaceous species were recorded in the plot. The substantial cover of *Andropogon virginicus* (Broomsedge Bluestem) identifies this community.

Global Vegetation: Stands of this community are dominated by *Andropogon virginicus* var. *virginicus* (Broomsedge Bluestem), sometimes codominant with *Lolium pratense* (Meadow Ryegrass). Associated species vary with geography and habitat and include typical pioneer species. Species with high cover values in plot samples attributed to this type include *Tridens flavus* (Tall Redtop), *Setaria parviflora* (Yellow Foxtail Grass), *Eragrostis spectabilis* (Purple Lovegrass), and *Panicum anceps* (Beaked Panicgrass) (NatureServe Ecology unpubl. data). On the eastern Highland Rim of Tennessee (Arnold Air Force Base), associated species include *Diodia teres* (Rough Buttonweed), *Aristida dichotoma* (Forktip Three-awn), *Aristida oligantha* (Prairie Three-awn), *Packera anonyma* (Small's Groundsel), *Paspalum laeve* (Field Crowngrass), *Lespedeza virginica* (Wand Lespedeza), and *Plantago virginica* (Pale-seed Plantain). *Rubus argutus* (Southern Blackberry) and *Smilax* (Greenbrier) spp. may be locally abundant but are not dominant. In clearcuts, *Schizachyrium scoparium* (Little Bluestem), *Danthonia spicata* (Poverty Oatgrass), and *Dichanthelium* (Witchgrass, Rosette Grass) spp. are also common, as are occasional *Quercus* (Oak) spp. and *Rubus argutus* (Southern Blackberry). The plot at Shiloh National Military Park (western Tennessee) was a mowed field of mostly native species, dominated by *Andropogon virginicus* var. *virginicus* (Broomsedge Bluestem). *Paspalum setaceum* (Slender Crowngrass) and *Tridens flavus* (Tall Redtop) were codominant (with less cover). Other herbaceous plants with high cover values were *Setaria parviflora* (Yellow Foxtail Grass), *Diodia teres* (Rough Buttonweed), *Schizachyrium scoparium* (Little Bluestem), and less common were *Packera anonyma* (Small's Groundsel), *Sorghum halepense* (Johnson Grass), and *Cyperus retrorsus* (Pine Barren Flat Sedge). At less than 1% cover were *Polypremum procumbens* (Juniper-leaf), *Oxalis stricta* (Common Yellow Wood Sorrel), *Eragrostis spectabilis* (Purple Lovegrass), *Salvia lyrata* (Lyreleaf Sage), *Solanum carolinense* (Carolina Horse-nettle), *Digitaria sanguinalis* (Hairy Crabgrass), *Panicum anceps* (Beaked Panicgrass), *Croton willdenowii* (Broadleaf Rushfoil), *Trifolium pratense* (Red Clover), *Kummerowia striata* (Japanese-clover), *Coreopsis pubescens* (Star Tickseed), *Plantago lanceolata* (Narrowleaf Plantain), and *Mecardonia acuminata* (Axil-flower). At only a trace amount of cover were *Conyza canadensis* (Canada Horseweed), *Acalypha virginica* (Virginia Copperleaf), *Solidago* (Goldenrod) sp., *Erigeron annuus* (Eastern Daisy Fleabane), *Sida spinosa* (Prickly Fanpetals), *Hypericum drummondii* (Nits-and-lice), *Polygala verticillata* (Whorled Milkwort), *Eupatorium capillifolium* (Dog-fennel), *Passiflora incarnata* (Purple Passionflower), and *Asclepias amplexicaulis* (Clasping Milkweed). In West Virginia, common associates include *Sorghastrum nutans* (Yellow Indiangrass), *Dichanthelium clandestinum* (Deer-tongue Witchgrass), *Anthoxanthum odoratum* (Sweet Vernal Grass), *Phleum pratense* (Timothy), *Dactylis glomerata* (Orchard Grass), *Daucus carota* (Queen Anne's-lace), *Lotus corniculatus* (Garden Bird's-foot-trefoil), *Trifolium pratense* (Red Clover), *Leucanthemum vulgare* (Oxeye Daisy), *Solidago canadensis* (Canada Goldenrod), *Solidago rugosa* (Wrinkleleaf Goldenrod), and *Solidago nemoralis* (Gray Goldenrod).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>
Herb (field)	Forb
Herb (field)	Graminoid

Species

Solidago juncea (Early Goldenrod)
Andropogon virginicus (Broomsedge Bluestem),
Panicum anceps (Beaked Panicgrass)

Global

Stratum

Herb (field)

Lifeform

Graminoid

Species

Andropogon virginicus var. *virginicus*
(Broomsedge Bluestem)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Andropogon virginicus* (Broomsedge Bluestem), *Solidago juncea* (Early Goldenrod)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Daucus carota* (Queen Anne's-lace), *Dianthus armeria* (Deptford-pink), *Leucanthemum vulgare* (Oxeye Daisy), *Ligustrum sinense* (Chinese Privet), *Lonicera japonica* (Japanese Honeysuckle), *Microstegium vimineum* (Japanese Stiltgrass), *Phleum pratense* (Timothy), *Plantago lanceolata* (Narrowleaf Plantain), *Rosa multiflora* (Multiflora Rose)

Global:

CONSERVATION STATUS RANK

Global Rank & Reasons: GNA (ruderal) (8-Aug-2000). This is a ruderal community and represents vegetation resulting from succession following anthropogenic disturbance of an area. It is not a conservation priority for its own sake and does not receive a conservation rank.

CLASSIFICATION

Status: Standard

Classification Confidence: 1 - Strong

Abraham Lincoln Birthplace National Historic Site Comments:

Global Comments: Phenology can affect apparent composition: in West Virginia, fields visited early in the season had high cover of *Lolium pratense*, while those sampled later in the season were dominated by *Andropogon virginicus*.

Global Similar Associations:

Global Related Concepts:

Old fields (Vanderhorst 2001a) ?

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: This community is found in old fields or clearings atop knobs at the Boyhood Home Unit, fringing formerly cleared land that is now giving way to successional woodlands and forests. It is also found under powerline corridors. It may also be found in areas formerly maintained as lawns or cleared areas at the Birthplace Unit where the vegetation is being left to revert to forest.

Global Range: This community ranges throughout most or all of the southeastern United States, extending north to Virginia and West Virginia.

Nations: US

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

USFS Ecoregions: 222Ab:CCC, 222Ag:CCC, 222Ah:CCC, 222An:CCC, 222Cg:CCC, 222Eg:CCC, 231Aa:CCC, 231Fa:CCP, 231Fb:CCC, 231Ga:CCC, 231Gb:CCC, 231Gc:CCC, 232B:CC, 232F:CC, 255Da:CCC, 255Dc:CCC, M221Aa:CCC, M221Ab:CCC, M221Ba:CC?, M221Bb:CCC, M221Bd:CC?, M221Ca:CPP, M221Cb:CPP, M221Cc:CPP, M221Ce:CPP, M221Da:CCC, M221Db:CCC, M221Dc:CCP, M221Dd:CCP, M222Aa:CCC, M222Ab:CCC, M231Aa:CCC, M231Ab:CCC, M231Ac:CCC, M231Ad:CCC

Federal Lands: DOD (Arnold, Camp Dawson, Fort Benning, Fort Gordon); NPS (Big South Fork, Chickamauga-Chattanooga?, Cowpens, Fort Donelson, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Ninety Six, Shiloh, Stones River); USFS (Cherokee, George Washington, Jefferson, Oconee?, Ouachita (Coastal Plain)?, Ouachita (Mountains)?, Ouachita?, Ozark?, Talladega (Oakmulgee)?, Talladega (Talladega)?, Talladega?, Tuskegee?); USFWS (Anahuac, Big Boggy?, Brazoria)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.4 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

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

References: Fleming and Coulling 2001, Hoagland 2000, NatureServe Ecology - Southeastern U.S. unpubl. data, Penfound 1953, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, TNC 1998a, Tarr et al. 1980, Vanderhorst 2001a, White and Madany 1978

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

ALLIANCE CONCEPT

Summary: This alliance includes sites dominated by European tall or meadow fescues, including the taxa *Lolium pratense* (Meadow Ryegrass) and *Lolium arundinaceum* (Tall Fescue) (formerly treated as *Festuca elatior* and *Festuca arundinacea*, respectively). This non-native vegetation occurs in a variety of different ecological and anthropogenic settings such as pastures, and hayfields, with more-or-less cultural origins, though sometimes no longer actively maintained. These communities are sometimes nearly monospecific, but can also be very diverse and contain many native species of grasses, sedges, and forbs. The dominant species in this alliance are of uncertain and controversial generic placement.

Classification Comments: The dominant species were formerly treated as *Festuca elatior* and *Festuca arundinacea*, these two closely related species are now treated by Kartesz (1999) as *Lolium pratense* and *Lolium arundinaceum*, respectively.

Similar Alliances:

Dactylis glomerata - *Rumex acetosella* Herbaceous Alliance (A.1190)

Phleum pratense Herbaceous Alliance (A.1195)

Similar Alliance Comments:

Related Concepts:

ALLIANCE DESCRIPTION

Environment: This alliance occurs in a variety of ecological and anthropogenic settings, such as pastures, hayfields, and old pastures, more-or-less cultural, though sometimes no longer actively maintained. Because of its wide range of site adaptation and its vigorous seedling growth, tall fescue is often used to seed roadsides and disturbed areas (Rayburn 1993), and it has been estimated that *Lolium arundinaceum* has been seeded on more than 14 million hectares in the eastern United States (Bransby n.d.). Although the individual species (*Lolium arundinaceum*) may be found from the Pacific Northwest to the southern states, the core distribution of this alliance occurs in the fescue belt which extends across northern Missouri to Washington, DC, south to the middle of Mississippi, Alabama and Georgia (Bransby n.d.). *Lolium arundinaceum* is adapted to a wide range of soils, but it grows best on clay soils high in organic matter in moist environments (Duble n.d.). It also tolerates wet soils and short periods of flooding and is tolerant of low soil pH (Rayburn 1993). However, due to its temperate nature and preference for heavy clay soils, *Lolium arundinaceum* does not survive well in the immediate vicinity of the Gulf Coast, where summers are long and very hot, and soils are typically sandy and prone to drought (Bransby n.d.). In the southern United States, tall fescue is best adapted in Oklahoma, Arkansas, Missouri, Tennessee, Kentucky, Virginia, and northern parts of North Carolina, Georgia and Texas (Duble n.d.). It grows well in the Black Belt region of Alabama and Mississippi where it is commonly found in mixture with *Paspalum dilatatum* (dallisgrass) (Bransby n.d.).

Vegetation: These communities range from nearly monospecific, being dominated by exotic *Lolium* (Ryegrass) species, to diverse mixtures containing many native species of grasses, sedges, and forbs (NatureServe Ecology unpubl. data). In the Black Belt region of Alabama and Mississippi, it is commonly found in mixture with *Paspalum dilatatum* (Golden Crown Grass) (dallisgrass) (Bransby n.d.). The exotics *Lespedeza cuneata* (Chinese Bushclover) and *Bromus tectorum* (Cheatgrass) may be present in stands.

Dynamics: Tall fescue is drought-tolerant and will survive during dry periods in a dormant state (Duble n.d.). It is especially well adapted to the "transition zone" of the United States where summers are too hot and humid for cool-season grasses and winters too cold for warm-season grasses. It is deep-rooted and forms a dense sod. The presence of a symbiotic fungal endophyte (*Neotyphodium coenophialum*) helps provide *Lolium arundinaceum* a competitive advantage over native species (Bacon and Siegel 1988). Prescribed burning (unless combined with other treatments, such as herbicides) is not effective at decreasing *Lolium arundinaceum* cover (Washburn et al. 2002).

ALLIANCE DISTRIBUTION

Range: This alliance 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. It is currently described from West Virginia south to Georgia and west to Missouri and Oklahoma. It may also occur in Canada in Nova Scotia, New Brunswick and Quebec.

Nations: CA, US

Subnations: AL, AR, GA, KY, MD, MO, MS, NC, OK, SC, TN, VA, WV

TNC Ecoregions: 38:C, 39:C, 40:P, 43:C, 44:C, 50:C, 51:C, 52:C, 57:C, 58:C, 59:C

USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eg:CCC, 231Ae:CCC, 231Bh:CCC, M221Cb:CCC, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC, M231Aa:CCP, M231Ab:CCP, M231Ac:CCP, M231Ad:CCP

Federal Lands: NPS (Big South Fork, Blue Ridge Parkway, Buffalo River, Carl Sandburg Home, Chickamauga-Chattanooga, Cowpens, Cumberland Gap, Fort Donelson, Great Smoky Mountains, Guilford Courthouse, Kings Mountain, Lincoln Birthplace, Little River Canyon?, Mammoth Cave, Natchez Trace, New River Gorge, Ninety Six, Obed, Russell Cave, Shenandoah, Shiloh, Stones River, Thomas Stone, Vicksburg); USFS (Cherokee, Ouachita, Ozark)

(CEGL004048) (Tall Fescue, Meadow Fescue) Herbaceous Vegetation

Lolium (arundinaceum, pratense) Herbaceous Vegetation

Cultivated Meadow

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland (V.A.5.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland (V.A.5.N.)
Formation	Medium-tall sod temperate or subpolar grassland (V.A.5.N.c.)
Alliance	<i>Lolium (arundinaceum, pratense)</i> Herbaceous Alliance (A.1213)
Alliance (English name)	(Tall Fescue, Meadow Ryegrass) Herbaceous Alliance
Association	<i>Lolium (arundinaceum, pratense)</i> Herbaceous Vegetation
Association (English name)	(Tall Fescue, Meadow Fescue) Herbaceous Vegetation
Association (Common name)	Cultivated Meadow

Ecological System(s):

ELEMENT CONCEPT

Global Summary: This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained. The dominant species in this type are the European "tall or meadow fescues" of uncertain and controversial generic placement. Several other exotic grasses (*Agrostis gigantea* (Giant Bentgrass), *Dactylis glomerata* (Orchard Grass), *Holcus lanatus* (Common Velvetgrass), *Phleum pratense* (Timothy), and *Poa pratensis* (Kentucky Bluegrass), for example) are common associates. These communities are sometimes nearly monospecific but can also be very diverse and contain many native as well as exotic species of grasses, sedges, and forbs. Exotic forbs include the legumes *Lespedeza cuneata* (Chinese Bushclover), *Trifolium campestre* (Low Hop Clover), *Trifolium hybridum* (Alsike Clover), *Trifolium pratense* (Red Clover), and *Trifolium repens* (White Clover), as well as *Achillea millefolium* (Common Yarrow), *Calystegia sepium* (Hedge False Bindweed), *Daucus carota* (Queen Anne's-lace), *Leucanthemum vulgare* (Oxeye Daisy), *Oxalis stricta* (Common Yellow Wood Sorrel), and *Plantago lanceolata* (Narrowleaf Plantain). Common native herbs include *Apocynum cannabinum* (Indian-hemp), *Desmodium canescens* (Hoary Tick-trefoil), *Dichanthelium clandestinum* (Deer-tongue Witchgrass), *Erigeron annuus* (Eastern Daisy Fleabane), *Fragaria virginiana* (Virginia Strawberry), *Potentilla simplex* (Common Cinquefoil), *Solanum carolinense* (Carolina Horse-nettle), *Solidago canadensis* (Canada Goldenrod), and *Verbesina occidentalis* (Yellow Crownbeard). This vegetation is currently defined for the central and southern Appalachians, Ozarks, Ouachita Mountains, and parts of the Piedmont and Interior Low Plateau, but it is possible throughout much of the eastern United States and southern Canada.

ENVIRONMENTAL DESCRIPTION

USFWS Wetland System:

Abraham Lincoln Birthplace National Historic Site Environment: Though not sampled in the park for this study, Cultivated Meadow was featured at the Boyhood Home Unit during the period of this study, in the first few years after NPS acquired the property. In the long, narrow bottomlands between the knob formations, the flat areas just above the floodplains of Knob Creek were being maintained as hayfields by systematic mowing/haying, symbolic of the farming Abraham Lincoln's father engaged in on his rented 30 acres of Knob Creek Farm. Further interpretation of the historic landscape may lead to diversification of the farmed land. The bottomland here is base-rich.

Global Environment: This association includes grassland pastures and hayfields, more-or-less cultural, though sometimes no longer actively maintained. It occurs in areas which have been cleared in the past, including abandoned farmlands, strip mines, and other areas disturbed by human activities.

VEGETATION DESCRIPTION

Abraham Lincoln Birthplace National Historic Site Vegetation: These hayfields are characterized by fescues, with orchard grass, alfalfa, clovers, sweetclover, and various other exotic and native herbaceous species.

Global Vegetation: This association represents early-successional herbaceous and herb-shrub vegetation dominated by or having a large component of exotic grasses and legumes. The dominant species in this association are the European "tall or meadow fescues" (*Lolium* (Ryegrass) spp.). These communities are sometimes nearly

monospecific but can also be very diverse and contain many native species of grasses, sedges, and forbs. Woody encroachment is restricted to low cover by *Toxicodendron radicans* (Eastern Poison-ivy) and species of *Rubus* (Blackberry), both of which become more abundant in older stands. Scattered individuals of various shrubs may be present, including *Crataegus crus-galli* (Cockspur Haw), *Fraxinus pennsylvanica* (Green Ash), *Fraxinus americana* (White Ash), *Rosa multiflora* (Multiflora Rose), *Robinia pseudoacacia* (Black Locust), *Cornus florida* (Flowering Dogwood), *Elaeagnus umbellata* (Autumn-olive), *Sambucus nigra ssp. canadensis*, and *Sassafras albidum* (Sassafras). In the Central Appalachians and northern Cumberlands, the dominant exotic grasses include *Agrostis gigantea* (Giant Bentgrass), *Dactylis glomerata* (Orchard Grass), *Holcus lanatus* (Common Velvetgrass), *Lolium pratense* (Meadow Ryegrass), *Phleum pratense* (Timothy), and *Poa pratensis* (Kentucky Bluegrass). Exotic forbs include the legumes *Lespedeza cuneata* (Chinese Bushclover), *Trifolium campestre* (Low Hop Clover), *Trifolium hybridum* (Alsike Clover), *Trifolium pratense* (Red Clover), and *Trifolium repens* (White Clover), as well as *Achillea millefolium* (Common Yarrow), *Calystegia sepium* (Hedge False Bindweed), *Daucus carota* (Queen Anne's-lace), *Leucanthemum vulgare* (Oxeye Daisy), *Oxalis stricta* (Common Yellow Wood Sorrel), and *Plantago lanceolata* (Narrowleaf Plantain). Common native herbs include *Apocynum cannabinum* (Indian-hemp), *Desmodium canescens* (Hoary Tick-trefoil), *Dichanthelium clandestinum* (Deer-tongue Witchgrass), *Erigeron annuus* (Eastern Daisy Fleabane), *Fragaria virginiana* (Virginia Strawberry), *Potentilla simplex* (Common Cinquefoil), *Solanum carolinense* (Carolina Horse-nettle), *Solidago canadensis* (Canada Goldenrod), and *Verbesina occidentalis* (Yellow Crownbeard). In the Black Belt region of Alabama and Mississippi, it is commonly found in mixture with *Paspalum dilatatum* (Golden Crown Grass) (Bransby n.d.), and the exotic *Bromus tectorum* (Cheatgrass) may be present in stands.

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Global		
<u>Stratum</u>	<u>Lifeform</u>	<u>Species</u>
Herb (field)	Graminoid	<i>Agrostis gigantea</i> (Giant Bentgrass), <i>Phleum pratense</i> (Timothy)

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site:

Global: *Achillea millefolium* (Common Yarrow), *Apocynum cannabinum* (Indian-hemp), *Calystegia sepium* (Hedge False Bindweed), *Dactylis glomerata* (Orchard Grass), *Daucus carota* (Queen Anne's-lace), *Desmodium canescens* (Hoary Tick-trefoil), *Dichanthelium clandestinum* (Deer-tongue Witchgrass), *Erigeron annuus* (Eastern Daisy Fleabane), *Fragaria virginiana* (Virginia Strawberry), *Holcus lanatus* (Common Velvetgrass), *Lespedeza cuneata* (Chinese Bushclover), *Leucanthemum vulgare* (Oxeye Daisy), *Oxalis stricta* (Common Yellow Wood Sorrel), *Plantago lanceolata* (Narrowleaf Plantain), *Poa pratensis* (Kentucky Bluegrass), *Potentilla simplex* (Common Cinquefoil), *Solanum carolinense* (Carolina Horse-nettle), *Solidago canadensis* (Canada Goldenrod), *Trifolium hybridum* (Alsike Clover), *Trifolium pratense* (Red Clover), *Trifolium repens* (White Clover)

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site:

Global:

CONSERVATION STATUS RANK

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

CLASSIFICATION

Status: Standard

Classification Confidence: 2 - Moderate

Abraham Lincoln Birthplace National Historic Site Comments:

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

Global Similar Associations:

Dactylis glomerata - *Phleum pratense* - *Festuca* spp. - *Solidago* spp. Herbaceous Vegetation (CEGL006107)
Schizachyrium scoparium - *Solidago* spp. Herbaceous Vegetation (CEGL006333)

Global Related Concepts:

Festuca pratensis - (*Holcus lanatus*) - *Solidago canadensis* herbaceous vegetation (Vanderhorst 2001b) =
 Cleared Areas (Schmalzer and DeSelm 1982) B

OTHER COMMENTS

Other Comments:

ELEMENT DISTRIBUTION

Abraham Lincoln Birthplace National Historic Site Range: Long, narrow hayfields or pasturelands are maintained at the Boyhood Home Unit in the low areas between the steep knobs, above the floodplain of Knob Creek.

Global Range: This association is currently documented from the southern half of the Central Appalachians through the Gulf Coastal Plain and west to the Ozarks and Ouachitas. It is possible throughout much of the eastern United States.

Nations: US

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

USFS Ecoregions: 221Hc:CCC, 221He:CCC, 222Eg:CCC, 231Ae:CCC, 231Bh:CCC, M221Cb:CCC, M221Dc:CCC, M221Dd:CCC, M222Ab:CCC, M231A:CC

Federal Lands: NPS (Big South Fork, Blue Ridge Parkway, Buffalo River, Carl Sandburg Home, Chickamauga-Chattanooga, Cowpens, Cumberland Gap, Fort Donelson, Great Smoky Mountains, Guilford Courthouse, Kings Mountain, Lincoln Birthplace, Mammoth Cave, Natchez Trace, New River Gorge, Ninety Six, Obed, Russell Cave, Shiloh, Stones River, Thomas Stone, Vicksburg); USFS (Cherokee, Ouachita, Ouachita (Coastal Plain)?, Ouachita (Mountains), Ozark)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: None.

Local Description Authors: E.L. Jones

Global Description Authors: A.S. Weakley, mod. S.C. Gawler

References: Bransby n.d., Heath et al. 1973, Hoagland 2000, Kartesz 1999, NatureServe Ecology - Southeastern U.S. unpubl. data, Schmalzer and DeSelm 1982, Schotz pers. comm., Southeastern Ecology Working Group n.d., TDNH unpubl. data, Vanderhorst 2001b, Vanderhorst 2007

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

**A.1919–(*Juniperus virginiana*) / *Schizachyrium scoparium* - (*Bouteloua curtipendula*)
Wooded Herbaceous Alliance**

ALLIANCE CONCEPT

Summary: Perennial grasslands (variously locally called barrens, glades, and/or prairies) dominated by *Schizachyrium scoparium* (Little Bluestem), possibly also *Bouteloua curtipendula* (Sideoats Grama), 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* (Eastern Red-cedar), *Quercus muehlenbergii* (Chinquapin Oak), and/or *Quercus stellata* (Post Oak). Specimens of *Juniperus virginiana* (Eastern Red-cedar) 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* (Ashe's Juniper) may replace *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) in the southwestern-most portion of the alliance's range. The subcanopy is absent or very sparse. Commonly encountered shrubs include *Cornus florida* (Flowering Dogwood), *Ulmus alata* (Winged Elm), *Rhus copallinum* (Winged Sumac), and *Symphoricarpos orbiculatus* (Coralberry). *Toxicodendron radicans* (Eastern Poison-ivy) 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* (Big Bluestem), *Bouteloua curtipendula* (Sideoats Grama), *Schizachyrium scoparium* (Little Bluestem), *Sorghastrum nutans* (Yellow Indiangrass), *Helianthus divaricatus* (Spreading Sunflower), *Manfreda virginica* (Eastern Agave), *Silphium* (Rosinweed) spp., *Liatris* (Blazingstar) spp., *Rudbeckia* (Coneflower) spp., *Sabatia angularis* (Squarestem Sabatia), and *Verbesina alternifolia* (Wingstem). In the western portion of the alliance's range, some characteristic species may include *Rudbeckia missouriensis* (Missouri Coneflower), *Draba reptans* (Carolina Whitlow-grass), *Mentzelia oligosperma* (Plains Mentzelia), *Physalis pumila* (Dwarf Ground-cherry), *Astragalus distortus* (Ozark Milk-vetch), *Erysimum capitatum* (Sand-dune Wallflower), *Castilleja purpurea* (Prairie Indian-paintbrush), *Lesquerella filiformis* (Limestone Glade Bladderpod), *Nothocalais cuspidata* (Wavyleaf Prairie-dandelion), *Penstemon cobaea* (Cobaea Beardtongue), and *Clematis fremontii* (Fremont's Virgin's-bower). *Smilax bona-nox* (Fringed Greenbrier) and *Smilax glauca* (Whiteleaf Greenbrier) 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.

Classification Comments: An additional association may be required for the Southern Ridge and Valley of eastern Tennessee.

Similar Alliances:

(*Quercus stellata*, *Quercus marilandica*) / *Schizachyrium scoparium* Wooded Herbaceous Alliance (A.1920)

Bouteloua curtipendula Herbaceous Alliance (A.1244)

Juniperus virginiana Woodland Alliance (A.545)

Sporobolus (neglectus, vaginiflorus) Herbaceous Alliance (A.1815)

Similar Alliance Comments: This alliance is similar to the (*Quercus stellata*, *Quercus marilandica*) / *Schizachyrium scoparium* Wooded Herbaceous Alliance (A.1920) but occurs on more base-rich substrates. It is also related to the *Juniperus virginiana* Woodland Alliance (A.545) and some elements of xeric oak woodland alliances. In general, this formation/alliance should be compared with related woodlands (for instance some alliances in II.A.4.N.a, II.A.4.N.b, or II.C.3.N.a). See also the *Sporobolus (neglectus, vaginiflorus)* Herbaceous Alliance (A.1815) for the annual grass-dominated portion of glades, where this has been recognized as distinct.

Related Concepts:

Schizachyrium scoparium / *Juniperus virginiana* herbaceous alliance (Hoagland 1998a) I

Calcareous Glade/Outcrop (Foti 1994b) ?

Coastal Plain Limestone Glade (Foti 1994b) ?

ID4f. Limestone Prairie (Allard 1990) I

IE10a. Interior Upland Limestone Barren (Allard 1990) ?

Northern Appalachian Calcareous Rocky Summit (Smith 1991) ?

Red-cedar - redbud shrubland (Fike 1999) ?

ALLIANCE DESCRIPTION

Environment: 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.

Vegetation: Perennial grasslands (variously locally called barrens, glades, and/or prairies) dominated by *Schizachyrium scoparium* (Little Bluestem), possibly also *Bouteloua curtipendula* (Sideoats Grama), 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* (Eastern Red-cedar), *Quercus muehlenbergii* (Chinquapin Oak), and/or *Quercus stellata* (Post Oak). Specimens of *Juniperus virginiana* (Eastern Red-cedar) 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* (Ashe's Juniper) may replace *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) in the southwestern-most portion of the alliance's range. The subcanopy is absent or very sparse. Commonly encountered shrubs include *Cornus florida* (Flowering Dogwood), *Ulmus alata* (Winged Elm), *Rhus copallinum* (Winged Sumac), and *Symphoricarpos orbiculatus* (Coralberry). *Toxicodendron radicans* (Eastern Poison-ivy) 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* (Big Bluestem), *Bouteloua curtipendula* (Sideoats Grama), *Schizachyrium scoparium* (Little Bluestem), *Sorghastrum nutans* (Yellow Indiangrass), *Helianthus divaricatus* (Spreading Sunflower), *Manfreda virginica* (Eastern Agave), *Silphium* (Rosinweed) spp., *Liatris* (Blazingstar) spp., *Rudbeckia* (Coneflower) spp., *Sabatia angularis* (Squarestem Sabatia), and *Verbesina alternifolia* (Wingstem). In the western portion of the alliance's range, some characteristic species may include *Rudbeckia missouriensis* (Missouri Coneflower), *Draba reptans* (Carolina Whitlow-grass), *Mentzelia oligosperma* (Plains Mentzelia), *Physalis pumila* (Dwarf Ground-cherry), *Astragalus distortus* (Ozark Milk-vetch), *Erysimum capitatum* (Sand-dune Wallflower), *Castilleja purpurea* (Prairie Indian-paintbrush), *Lesquerella filiformis* (Limestone Glade Bladderpod), *Nothocalais cuspidata* (Wavyleaf Prairie-dandelion), *Penstemon cobaea* (Cobaea Beardtongue), and *Clematis*

fremontii (Fremont's Virgin's-bower). *Smilax bona-nox* (Fringed Greenbrier) and *Smilax glauca* (Whiteleaf Greenbrier) are the most frequently encountered vines and may form dense mats when present.

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

Subnations: 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:C, 61:C

USFS Ecoregions: 221A:CC, 221Ea:CCP, 221Ec:CCC, 221H:CC, 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, 231Da: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 (Buffalo River?, Chickamauga-Chattanooga, Harpers Ferry, Lincoln Birthplace, Mammoth Cave, Ozark, Stones River); TVA (Columbia); USFS (Bankhead?, Daniel Boone, Mark Twain, Ouachita, Ozark)

(CEGL005131) Chinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation

Quercus muehlenbergii - *Juniperus virginiana* / *Schizachyrium scoparium* - *Manfreda virginica* Wooded Herbaceous Vegetation

Central Limestone Glade

NVC Classification

Physiognomic Class	Herbaceous Vegetation (V)
Physiognomic Subclass	Perennial graminoid vegetation (V.A.)
Physiognomic Group	Temperate or subpolar grassland with a sparse tree layer (V.A.6.)
Physiognomic Subgroup	Natural/Semi-natural temperate or subpolar grassland with a sparse tree layer (V.A.6.N.)
Formation	Bedrock temperate or subpolar grassland with a sparse tree layer (V.A.6.N.q.)
Alliance	(<i>Juniperus virginiana</i>) / <i>Schizachyrium scoparium</i> - (<i>Bouteloua curtipendula</i>) Wooded Herbaceous Alliance (A.1919)
Alliance (English name)	(Eastern Red-cedar) / Little Bluestem - (Sideoats Grama) Wooded Herbaceous Alliance
Association	<i>Quercus muehlenbergii</i> - <i>Juniperus virginiana</i> / <i>Schizachyrium scoparium</i> - <i>Manfreda virginica</i> Wooded Herbaceous Vegetation
Association (English name)	Chinquapin Oak - Eastern Red-cedar / Little Bluestem - Eastern Agave Wooded Herbaceous Vegetation
Association (Common name)	Central Limestone Glade
Ecological System(s):	Central Interior Highlands Calcareous Glade and Barrens (CES202.691) Nashville Basin Limestone Glade and Woodland (CES202.334) Central Appalachian Alkaline Glade and Woodland (CES202.602) Ridge and Valley Calcareous Glade and Woodland (CES202.024)

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* (Little Bluestem), *Sorghastrum nutans* (Yellow Indiangrass), *Aristida* (Three-awn) spp., and *Sporobolus compositus* (Tall Dropseed). In deeper soil areas *Andropogon gerardii* (Big Bluestem) may be present. At some sites *Bouteloua curtipendula* (Sideoats Grama) is present, but it may be rare or absent at others. Forbs vary in dominance by site. *Quercus*

muehlenbergii (Chinquapin Oak) and *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) can form a sparse canopy. *Quercus stellata* (Post Oak) may be common in parts of the range. Other scattered trees which may be present include *Cercis canadensis* (Eastern Redbud), *Fraxinus quadrangulata* (Blue Ash), *Quercus velutina* (Black Oak), *Quercus alba* (White Oak), *Quercus marilandica* (Blackjack Oak), and *Liriodendron tulipifera* (Tuliptree). The subcanopy is absent or very sparse. Commonly encountered shrubs include *Celtis tenuifolia* (Georgia Hackberry), *Cornus florida* (Flowering Dogwood), *Ulmus alata* (Winged Elm), *Rhus aromatica* (Fragrant Sumac), *Rhus copallinum* (Winged Sumac), and *Symphoricarpos orbiculatus* (Coralberry). 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:

Abraham Lincoln Birthplace National Historic Site Environment: This wooded herbaceous vegetation was sampled on a steep, south-facing upper limestone slope at 228 m elevation. Soils are shallow sandy loams over rock and very dry due to the southern exposure of the site. The unvegetated surface is made up of leaf litter (55% cover), bedrock (5%), and bare soil (40%). Little disturbance was noted; however, fire suppression may be impacting the site.

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

Abraham Lincoln Birthplace National Historic Site Vegetation: The sparse (10% cover) and stunted tree canopy (5-10 m) is dominated by *Juniperus virginiana* (Eastern Red-cedar) and *Ostrya virginiana* (Eastern Hop-hornbeam), as are the sparse (10% each) tall-shrub (2-5 m) and short-shrub (0.5-1 m) layers. Other dominants include *Cercis canadensis* (Eastern Redbud) in the tall-shrub layer and *Rhus aromatica* (Fragrant Sumac) in the short-shrub layer. The dominant (70%) and diverse herbaceous layer is made up of *Andropogon gerardii* (Big Bluestem), with lesser amounts of *Allium cernuum* (Nodding Onion), *Croton capitatus* var. *capitatus*, and *Hedyotis nigricans* (Narrowleaf Summer Bluets), among others. Other typical limestone glade associates found here include *Hypericum dolabriforme* (Straggling St. John's-wort), *Echinacea pallida* (Pale Purple Coneflower), and *Opuntia humifusa* (Eastern Prickly-pear). A total of 150 herbaceous taxa were recorded in one plot.

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* (Little Bluestem), *Sorghastrum nutans* (Yellow Indiangrass), *Aristida* (Three-awn) spp., and *Sporobolus compositus* (Tall Dropseed). In deeper soil areas *Andropogon gerardii* (Big Bluestem) may be present. At some sites *Bouteloua curtipendula* (Sideoats Grama) is present, but it may be rare or absent at others. Forbs vary in dominance by site and include *Asclepias verticillata* (Whorled Milkweed), *Comandra umbellata* (Bastard Toadflax), *Coreopsis tripteris* (Tall Tickseed), *Croton monanthogynus* (Prairie-tea), *Echinacea simulata* (Prairie Purple Coneflower), *Galactia regularis* (Eastern Milkpea), *Hexalectris spicata* (Spiked Crested Coralroot), *Helianthus divaricatus* (Spreading Sunflower), *Helianthus hirsutus* (Whiskered Sunflower), *Hypericum dolabriforme* (Straggling St. John's-wort), *Hypericum sphaerocarpum* (Roundfruit St. John's-wort), *Euphorbia corollata* (Flowering Spurge), *Gaura* (Beeblossom) spp., *Lespedeza hirta* (Hairy Bushclover), *Lespedeza virginica* (Wand Lespedeza), *Liatris aspera* (Rough Blazingstar), *Liatris cylindracea* (Ontario Gayfeather), *Liatris squarrosa* (Scaly Blazingstar), *Leavenworthia exigua* var. *exigua* (Tennessee Gladecress), *Lithospermum canescens* (Hoary Puccoon), *Lobelia spicata* var. *leptostachys* (Pale-spike Lobelia), *Manfreda virginica* (Eastern Agave), *Matelea obliqua* (Climbing Milkvine), *Ophioglossum engelmannii* (Limestone Adder's-tongue), *Physostegia virginiana* (Obedient Plant), *Ratibida pinnata* (Gray-head Prairie Coneflower), *Rudbeckia hirta* (Black-eyed-Susan), *Ruellia humilis* (Low Wild Petunia), *Sabatia angularis* (Squarestem Sabatia), *Scutellaria parvula* (Small Skullcap), *Silphium trifoliatum* (Threeleaf Rosinweed), *Solidago nemoralis* (Gray Goldenrod), *Verbesina helianthoides* (Gravelweed), *Verbesina virginica* (Common Frostweed), and *Zizia aptera* (Heartleaf Alexanders). *Quercus muehlenbergii* (Chinquapin Oak) and *Juniperus virginiana* var. *virginiana* (Eastern Red-cedar) can form a sparse canopy. *Quercus stellata* (Post Oak) may be common in parts of the range. Other scattered trees which may be present include *Cercis canadensis* (Eastern Redbud), *Fraxinus quadrangulata* (Blue Ash), *Quercus velutina* (Black Oak), *Quercus alba* (White Oak), *Quercus marilandica* (Blackjack Oak), and *Liriodendron tulipifera* (Tuliptree). The subcanopy is absent or very sparse. Commonly encountered shrubs include *Celtis tenuifolia* (Georgia Hackberry), *Cornus florida* (Flowering Dogwood), *Ulmus alata* (Winged Elm), *Rhus aromatica* (Fragrant Sumac), *Rhus copallinum* (Winged Sumac), and *Symphoricarpos orbiculatus* (Coralberry). 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, D. Minney pers. comm. 2000).

MOST ABUNDANT SPECIES

Abraham Lincoln Birthplace National Historic Site

Stratum

Tree (canopy & subcanopy)
Shrub/sapling (tall & short)
Tall shrub/sapling
Tall shrub/sapling
Short shrub/sapling
Herb (field)

Lifeform

Needle-leaved tree
Broad-leaved deciduous shrub
Broad-leaved deciduous shrub
Broad-leaved evergreen shrub
Broad-leaved deciduous shrub
Forb

Species

Juniperus virginiana (Eastern Red-cedar)
Ostrya virginiana (Eastern Hop-hornbeam)
Cercis canadensis (Eastern Redbud)
Juniperus virginiana (Eastern Red-cedar)
Rhus aromatica (Fragrant Sumac)
Echinacea pallida (Pale Purple Coneflower),
Hypericum dolabriforme (Straggling St. John's-wort)
Andropogon gerardii (Big Bluestem)
Opuntia humifusa (Eastern Prickly-pear)

Herb (field)

Graminoid

Herb (field)

Succulent forb

Global

Stratum

Tree canopy
Tree canopy

Lifeform

Needle-leaved tree
Broad-leaved deciduous tree

Species

Juniperus virginiana (Eastern Red-cedar)
Quercus muehlenbergii (Chinquapin Oak),
Quercus stellata (Post Oak)
Cercis canadensis (Eastern Redbud)
Smilax bona-nox (Fringed Greenbrier)
Manfreda virginica (Eastern Agave)
Helianthus divaricatus (Spreading Sunflower)
Andropogon gerardii (Big Bluestem),
Schizachyrium scoparium (Little Bluestem),
Sorghastrum nutans (Yellow Indiangrass)

Tree subcanopy

Broad-leaved deciduous tree

Shrub/sapling (tall & short)

Vine/Liana

Short shrub/sapling

Succulent shrub

Herb (field)

Forb

Herb (field)

Graminoid

CHARACTERISTIC SPECIES

Abraham Lincoln Birthplace National Historic Site: *Allium cernuum* (Nodding Onion), *Croton capitatus* var. *capitatus* (Hogwort), *Hedyotis nigricans* (Narrowleaf Summer Bluets), *Liatris squarrosa* (Scaly Blazingstar), *Lithospermum canescens* (Hoary Puccoon), *Lobelia spicata* var. *spicata* (Pale-spike Lobelia), *Ostrya virginiana* (Eastern Hop-hornbeam), *Trichostema brachiatum* (Fluxweed)

Global:

OTHER NOTEWORTHY SPECIES

Abraham Lincoln Birthplace National Historic Site: (Exotics) *Bromus japonicus* (Japanese Brome), *Lolium arundinaceum* (Tall Fescue), *Lonicera japonica* (Japanese Honeysuckle), *Rosa multiflora* (Multiflora Rose)

Global: *Agkistrodon contortrix* (Copperhead), *Aimophila aestivalis* (Bachman's Sparrow), *Archilochus colubris* (Ruby-throated Hummingbird), *Aspidoscelis sexlineata* (Six-lined Racerunner), *Astragalus crassicaulis* var. *trichocalyx* (Ground-plum), *Astragalus distortus* (Ozark Milk-vetch), *Berchemia scandens* (Supplejack), *Berlandiera betonicifolia* (Texas Greeneyes), *Bombycilla cedrorum* (Cedar Waxwing), *Chondestes grammacus* (Lark Sparrow), *Colaptes auratus* (Northern Flicker), *Cotinus obovatus* (American Smoketree), *Cyanocitta cristata* (Blue Jay), *Delphinium alabamicum* (Alabama Larkspur), *Dendroica discolor* (Prairie Warbler), *Echinacea simulata* (Prairie Purple Coneflower), *Erysimum capitatum* (Sand-dune Wallflower), *Galium arkansanum* (Arkansas Bedstraw), *Hypericum dolabriforme* (Straggling St. John's-wort), *Lampropeltis calligaster* (Yellow-bellied Kingsnake), *Lanius ludovicianus* (Loggerhead Shrike), *Leavenworthia crassa* (Fleshy-fruit Gladecress), *Leavenworthia uniflora* (Michaux's Gladecress), *Meleagris gallopavo* (Wild Turkey), *Odocoileus virginianus* (White-tailed Deer), *Passerina cyanea* (Indigo Bunting), *Polygala senega* (Seneca Snakeroot), *Sayornis phoebe* (Eastern Phoebe), *Sceloporus undulatus* (Fence/prairie/plateau Lizard), *Sciurus carolinensis* (Eastern Gray Squirrel), *Sialia sialis* (Eastern Bluebird), *Thryomanes bewickii* (Bewick's Wren), *Thryothorus ludovicianus* (Carolina Wren), *Toxostoma rufum* (Brown Thrasher), *Trimerotropis saxatilis* (A Grasshopper), *Zizia aptera* (Heartleaf Alexanders)

CONSERVATION STATUS RANK

Global Rank & Reasons: G2G3 (2-Nov-1999). 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). [The present study documents its occurrence in Kentucky.] 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**Status:** Standard**Classification Confidence:** 2 - Moderate**Abraham Lincoln Birthplace National Historic Site Comments:**

Global 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)* - (*Juniperus virginiana* var. *virginiana*) 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.

Global Similar Associations:

Juniperus virginiana / *Schizachyrium scoparium* - *Silphium terebinthinaceum* var. *luciae-brauniae* - *Carex juniperorum* - *Castilleja coccinea* Wooded Herbaceous Vegetation (CEGL004464)--is a zonal component within this type.

Quercus muehlenbergii - *Quercus (alba, velutina)* - (*Juniperus virginiana* var. *virginiana*) Bluff Woodland (CEGL002144)--is the more northern equivalent of this type.

Quercus muehlenbergii Woodland [Placeholder] (CEGL003704)

Quercus stellata - *Quercus marilandica* - *Quercus velutina* - *Carya texana* / *Schizachyrium scoparium* Woodland (CEGL002149)

Quercus stellata - *Quercus marilandica* / *Schizachyrium scoparium* Wooded Herbaceous Vegetation (CEGL002391)

Global Related Concepts:

Juniperus virginiana / *Schizachyrium scoparium* - *Bouteloua curtipendula* - *Sisyrinchium albidum* - *Packera millefolia* Wooded Herbaceous Vegetation (Fleming pers. comm.) ?

Barrens type (Hutchison 1994) ?

Barrens type (Hutchison et al. 1986) ?

Central and Eastern Grassland and Forest Combinations: 83: Cedar Glades (*Quercus-Juniperus-Sporobolus*) (Kuchler 1964) B

Eastern Redcedar: 46 (Eyre 1980) B

Post Oak - Blackjack Oak: 40 (Eyre 1980) B

Terrestrial: Savanna (TNC 1985) B

UNESCO FORMATION CODE: V.B.1c (UNESCO 1973) B

Xeric Limestone Prairie (Baskin et al. 1994) ?

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

Abraham Lincoln Birthplace National Historic Site Range: This limestone glade or barrens community occurs at the Boyhood Home Unit on south- to southwest-facing slopes of the knobs. It is typically surrounded by dry oak-hickory communities higher upslope more species-rich communities below.

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, GA, IL:S2, IN:S2S3, KY, OH, TN, VA, WV

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, 231Da:CCC, 251Cf:CCC, 251Ci:CCC

Federal Lands: DOD (J. Percy Priest?); NPS (Chickamauga-Chattanooga, Lincoln Birthplace, Mammoth Cave, Stones River); TVA (Columbia); USFS (Bankhead?)

ELEMENT SOURCES

Abraham Lincoln Birthplace National Historic Site Inventory Notes:

Abraham Lincoln Birthplace National Historic Site Plots: (1 plot: ABLI.13 [Boyhood Home Unit]).

Local Description Authors: M.J. Russo and E.L. Jones

Global Description Authors: M. Guetersloh

References: 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, Homoya et al. 1988, Hutchison 1994, Hutchison et al. 1986, Kuchler 1964, Midwestern Ecology Working Group n.d., Minney pers. comm., Nelson 1985, Quarterman and Powell 1978, Schotz pers. comm., TDNH unpubl. data, TNC 1985, TNC 1995a, UNESCO 1973, Voigt and Mohlenbrock 1964, White and Madany 1978

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**Appendix IV. Key to Plant Associations at Abraham Lincoln Birthplace
National Historic Site.**

Key to the U.S. National Vegetation Classification (US NVC) Associations which occur at Abraham Lincoln Birthplace National Historic Site

Associations (or ecological communities) which are documented from Abraham Lincoln Birthplace are in **bold type**. The common name is followed by the Association Code in parentheses (CEGL00####) and the Alliance Code in brackets [A.###]. Alliances are broader units (groups of associations) based on dominant species.

KEY TO FIELD KEYS

- 1a.** Vegetation dominated by grasses, herbs or shrubs; trees absent or very sparse
..... **KEY D – HERBACEOUS AND GRAMINOID VEGETATION & SHRUBLANDS**
- 1b.** Vegetation dominated by trees, either closed forests or open woodlands **2**
- 2a.** [Birthplace Unit only] Forest in a sinkhole (concave landform). Sinkhole forests may have characteristics of various rich upland and bottomland communities, and are often characterized by Tuliptree (*Liriodendron tulipifera*). Sinkholes may be mapped as simply **Sinkhole**
*Note: In some sinkholes, Shingle oak (*Quercus imbricaria*), hickory (*Carya* spp.), or other oaks (*Quercus* spp.) may be present. These highly variable, rich sinkholes are not classified to the US NVC. Where possible, sinkholes may be classified. A community type often seen in sinkholes at ABLI is **Successional Tuliptree Forest (Circumneutral Type) (CEGL007220)** (see **KEY B, 6a**). In sinkholes where Sycamore (*Platanus occidentalis*) codominates, the vegetation may be classified as **Rich Levee Mixed Hardwood Bottomland Forest (CEGL008429)** (see **KEY C**).*
- 2b.** Forest not in a sinkhole **3**
- 3a.** Evergreen or mixed (evergreen and deciduous) forest or woodland
..... **KEY A – EVERGREEN FORESTS AND WOODLANDS**
- 3b.** Deciduous forest or woodland; if evergreen trees are present, they are in the subcanopy, or are a minor canopy component **4**
- 4a.** Upland forest, rarely if ever flooded **KEY B – UPLAND DECIDUOUS FORESTS**
- 4b.** Forest in a floodplain or bottomland; typically inundated during part of the year, at least temporarily; often with a significant component of Sycamore (*Platanus occidentalis*), Box-elder (*Acer negundo*), or Tuliptree (*Liriodendron tulipifera*) **KEY C – TEMPORARILY FLOODED DECIDUOUS FORESTS**

KEY A – EVERGREEN FORESTS AND WOODLANDS

- 1a.** Evergreen or mixed (evergreen and deciduous) forest or open woodland with significant component of Eastern red-cedar (*Juniperus virginiana*) 2
- 1b.** [Boyhood Home Unit] Evergreen or mixed (evergreen and deciduous) forest dominated by Virginia pine (*Pinus virginiana*); or old cultivated field succeeding to forest with significant component of Virginia pine. This successional community occurs atop formerly cultivated knobs at the Boyhood Home Unit **Virginia Pine Successional Forest (CEGL002591) [A.131]**
- 2a.** Eastern red-cedar in subcanopy, overtopped by a thick deciduous forest canopy
..... **See KEY B – UPLAND DECIDUOUS FORESTS**
- 2b.** Eastern red-cedar (*Juniperus virginiana*) not overtopped by a thick deciduous canopy 3
- 3a.** [Birthplace and Boyhood Home Units] Old cultivated fields succeeding to evergreen or mixed forest with a significant component of Eastern red-cedar (*Juniperus virginiana*); thick weedy shrub layer (Japanese honeysuckle, bittersweet, sumac, etc.).
..... **Red-cedar Successional Forest (CEGL007124) [A.137]**
- 3b.** [Boyhood Home Unit] Dry limestone glade community, rare in the general landscape, occurring at the Boyhood Home Unit on upper slopes of knobs with southern exposure. Mosaic of natural open woodlands of scattered Eastern red-cedar or dry site oaks, with large patches of native perennial grasses such as Big bluestem (*Andropogon gerardii*) or Little bluestem (*Schizachyrium scoparium*). Other limestone glade/barrens associates such as straggling St. John's-wort (*Hypericum dolabriforme*), Pale purple coneflower (*Echinacea pallida*), or Prickly pear cactus (*Opuntia humifusa*) present. Thin, rocky soil conditions and fire keep this open community from being overtaken by the surrounding forest
..... **Central Limestone Glade (CEGL005131) [A.1919]**

KEY B – UPLAND DECIDUOUS FORESTS

- 1a.** Upland forest of predominantly early-successional and shade-intolerant hardwood trees¹, weedy to rich in appearance; site formerly cleared or heavily disturbed. Forest may be maturing to include mid- to late successional species (such as oaks). 2
- 1b.** Upland forest not dominated by early-successional and shade-intolerant trees¹; site generally less (or less recently) disturbed. 4
- 2a.** [Birthplace and Boyhood Home Units] Rich, mesic forest dominated by Tuliptree (*Liriodendron tulipifera*). Variable composition – possible associates include White ash (*Fraxinus americana*), Black walnut (*Juglans nigra*), Shingle oak (*Quercus imbricaria*), or Sugar maple (*Acer saccharum*). Other oaks may be present. **Successional Tuliptree Forest (Circumneutral Type) (CEGL007220) [A.236]**
- 2b.** Forest not dominated by Tuliptree (*Liriodendron tulipifera*). 3
- 3a.** [Birthplace Unit] Forest dominated by Black cherry (*Prunus serotina* var. *serotina*) and/or Ash (*Fraxinus* spp.) with Sassafras (*Sassafras albidum*). (Oaks may or may not be present.)
..... **Southeastern Successional Black Cherry Forest (CEGL004133) [A.237]**

Key B, cont.

3b. [Highly disturbed areas in the southeastern side of the Birthplace Unit, and near the highway at the Boyhood Home Unit] Young forests consisting of highly variable combinations of weedy early-successional hardwood trees¹; Black cherry, Ash, Sassafras or Tuliptree may be present, but do not predominate. Overstory often one or more of the species Hackberry (*Celtis* spp.), Elm (*Ulmus* spp.), or Black walnut (*Juglans nigra*). Redbud (*Cercis canadensis*), Sugar maple (*Acer saccharum*), Winged sumac (*Rhus copallina*), or Eastern red cedar (*Juniperus virginiana*) may be present in the understory.....

..... **Successional (not classified to the US NVC)**

4a. (from 1b) [Boyhood Home Unit] Forest codominated by both Sugar maple (*Acer saccharum*) and Beech (*Fagus grandifolia*). Common on rich, mesic mid- to lower slopes/ravines of knobs at the Boyhood Home Unit. Sometimes also found high on knobs, intermixed with Virginia pine (old field, now succeeding to hardwoods)..... **Beech - Maple Unglaciaded Forest (CEGL002411) [A.227]**

4b. (from 1b) Forest not codominated by both Sugar maple (*Acer saccharum*) and Beech (*Fagus grandifolia*) **5**

5a. Forests dominated or codominated by tuliptree (*Liriodendron tulipifera*) or sugar maple (*Acer saccharum*) in the canopy, with or without significant components of hickory or oak. Rich, mesic to dry-mesic forests, often on mid to lower slopes **6**

5b. Forests dominated or codominated by oaks (*Quercus* spp.) or hickory (*Carya* spp.); canopy not dominated by tuliptree or sugar maple (though they may be present or dominant in understory); Dry-mesic to dry forests **7**

6a. [Birthplace and Boyhood Home Units] Rich, mesic forest dominated or codominated by Tuliptree (*Liriodendron tulipifera*) with oaks. Variable composition – possible associates include Shingle oak (*Quercus imbricaria*), White oak (*Quercus alba*), Black oak (*Quercus velutina*), White ash (*Fraxinus americana*), or Sugar maple (*Acer saccharum*). Other oaks may be present.....
..... **Successional Tuliptree Forest (Circumneutral Type) (CEGL007220) [A.236]**

6b. [Birthplace and Boyhood Home Units] Rich dry-mesic forest, dominated or codominated by Sugar maple (*Acer saccharum*). Neither Beech (*Fagus grandifolia*) nor Tuliptree (*Liriodendron tulipifera*) present, or only at low cover. The herbaceous layer may be notably rich.....
..... **Interior Low Plateau Mesic Sugar Maple - Hickory Forest (CEGL004741) [A.1912]**

- At the Birthplace Unit, Black cherry (*Prunus serotina*) may be present.
- At the Boyhood Home Unit, this community sometimes occurs in patches too small to map, generally within a matrix of either **Beech - Maple Unglaciaded Forest (CEGL002411) (4a.** above) or **White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070) (9b.** below). Significant amounts of Hickory (*Carya* spp.) or Ohio buckeye (*Aesculus glabra*) may be present.

7a. (from 5b) [Birthplace Unit] Forest dominated or codominated by Southern red oak (*Quercus falcata*), often with Pignut hickory (*Carya glabra*), and Mockernut hickory (*Carya alba*). Found on dry-mesic, flat to sloping areas at the Birthplace Unit
..... **Southern Red Oak - Mixed Oak Forest (CEGL005018) [A.241]**

7b. (from 5b) Forest not dominated by Southern red oak (*Quercus falcata*)..... **8**

Key B, cont.

8a. [Boyhood Home Unit] Extremely dry forest dominated or codominated by Scarlet oak (*Quercus coccinea*), Post oak (*Quercus stellata*), Black oak (*Quercus velutina*) and White oak (*Quercus alba*), and, with Blueberries (*Vaccinium* spp.) in the shrub layers. Southern red oak may not be present. An extremely dry community on shallow acidic soil of south-facing upper slopes of knobs, found at the Boyhood Home Unit in a patch too small to map, in a matrix of *White Oak - Mixed Oak Dry-Mesic Alkaline Forest* (CEGL002070) (9b. below) **Southern Red Oak - Mixed Oak Forest (CEGL005018) [A.241]**

8b. [Birthplace Unit – Northeastern section, and Boyhood Home Unit – upper slopes of knobs] Dry-mesic forest dominated or codominated by Hickories (*Carya* spp.) and/or White oak (*Quercus alba*), Red oak (*Quercus rubra*) or Chinquapin oak (*Quercus muehlenbergii*). Possible associates include Sugar maple (*Acer saccharum*), Ash (*Fraxinus* spp.), Black gum (*Nyssa sylvatica*), Sassafras (*Sassafras albidum*), Black cherry (*Prunus serotina*) and Eastern red-cedar (*Juniperus virginiana*). **9**

9a. [Birthplace Unit] White oak (*Quercus alba*) or mixed oak forest found at the Birthplace unit, in the northeastern corner of the property **White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070) [A.239]**

9b. [Boyhood Home Unit]. Dry-mesic community with a canopy that is sometimes oak-dominated, but from which the oaks may be logged out, leaving hickories and sassafras to dominate, found mostly on upper slopes of knobs. The herb layer varies from somewhat rich to rather sparse. **White Oak - Mixed Oak Dry-Mesic Alkaline Forest (CEGL002070) [A.239]**

KEY C – TEMPORARILY FLOODED DECIDUOUS FORESTS

1a. [Birthplace and Boyhood Home Units] Forest along streambed or bottomland drainage area. Canopy some combination of Tuliptree (*Liriodendron tulipifera*), Sycamore (*Platanus occidentalis*), Box-elder (*Acer negundo*), and Hackberry (*Celtis*), often with Spicebush (*Lindera benzoin*) in the shrub layer **Rich Levee Mixed Hardwood Bottomland Forest (CEGL008429) [A.288]**

1b. [Birthplace Unit] Forest in a large concave landform with gentle to moderate slopes on all sides (a sinkhole), and with slow drainage or standing water in winter. Vegetation same as above (1a.), and may have significant component of slippery elm (*Ulmus rubra*) **Rich Levee Mixed Hardwood Bottomland Forest (CEGL008429) [A.288]**

KEY D – HERBACEOUS AND GRAMINOID VEGETATION & SHRUBLANDS

1a. Shrublands – Hydrangea (*Hydrangea arborescens*) or Giant cane (*Arundinaria gigantea*) **2**

1b. Herbaceous and graminoid (grass or grass-like) communities – cultivated and natural. (Includes Limestone glade – sparse woody vegetation over dry native grasses and herbs.) **3**

2a. [Boyhood Home Unit] Smooth hydrangea (*Hydrangea arborescens*) shrubs dominating the vegetation on a steep limestone seep. This community, very rare in the general landscape, occurs in the extreme northwest of the Boyhood Home Unit. It is perched over a streambed on a nearly-vertical, moist shale-like limestone slope at the north-facing base of a knob. Soil is shallow or absent in places; the herb layer is rich and diverse, though sparse **Highland Rim Limestone cliff/Talus Seep (CEGL004708) [A.1905]**

Key D, cont.

2b. [Boyhood Home Unit] Small patches of Giant cane (*Arundinaria gigantea*) in the bottomland, without an overstory of trees. Sometimes infested with Multiflora rose (*Rosa multiflora*). These patches occur at edges of floodplains and fields. (Not high enough quality occurrences to classify as the US NVC's **Floodplain Canebrake (CEGL003836)**)..... **Cane**

3a. (from 1b) [Boyhood Home Unit] Limestone barren/glade: Natural dry grassland or sparse open woodland on limestone slope, dominated by native perennial grasses such as Big bluestem (*Andropogon gerardii*) or Little bluestem (*Schizachyrium scoparium*), with other limestone barrens associates such as straggling St. John's-wort (*Hypericum dolabrifolium*), Pale purple coneflower (*Echinacea pallida*), Prickly pear cactus (*Opuntia humifusa*) and scattered Eastern red-cedar (*Juniperus virginiana*) and/or dry site oaks such as Post oak (*Quercus stellata*). A natural community, rare in the general landscape, that occurs on upper slopes of knobs with southern exposure. Thin, rocky soil conditions and fire keep this open community from being overtaken by the surrounding forest..... **Central Limestone Glade (CEGL005131) [A.1919]**

3b. (from 1b) Graminoid (grass-like) or herbaceous vegetation of cultivated (or formerly cultivated) areas; very common non-native or weedy native species (lawns, rights-of-way, fields)..... **4**

4a. Grass lawns or frequently mowed areas with perennial grasses and herbs (weedy lawns), sometimes interspersed with ornamental plantings **Lawns**

4b. Pastures and agricultural fields, actively maintained or abandoned, or utility rights-of-way..... **5**

5a. Utility right-of-way. Linear feature, maintained in an early successional condition by infrequent mowing or herbicide treatment. **ROW**

5b. Pastures and agricultural fields, actively maintained or somewhat recently abandoned **Fields**

Note: for mapping purposes, no distinction was made between the following types of fields:

- A field actively maintained for agriculture; grassland pastures and hayfields dominated by European tall fescue or Meadow fescue (*Lolium arundinaceum*, *Lolium pratense*), Bermuda grass (*Cynodon dactylon*), White clover (*Trifolium repens*), and other exotic or weedy herbs. **Cultivated Meadow (CEGL004048) [A.1213]**
- An old field or clearing giving way to Broomsedge bluestem (*Andropogon virginicus*) and other native grasses and eventually woody species. **Successional Broom-sedge Vegetation (CEGL004044) [A.1208]**
(Note: With long neglect, succession to woods is evident in emerging shrubs and saplings [often Eastern red-cedar (*Juniperus Virginiana*) or Virginia pine (*Pinus virginiana*) – See **KEY A – EVERGREEN FORESTS AND WOODLANDS**]).
- An old field giving way to other weedy exotic and native herbs such as Queen Anne's lace (*Daucus carota*), Wingstem (*Verbesina alternifolia*), thistles (*Cirsium* spp.), and Teasel (*Dipsacus fullonum*), [and weedy shrubs and vines such as briars (*Rubus* spp.) and Japanese honeysuckle (*Lonicera japonica*)], with various non-native or native grasses. **Old field**

¹**Early-successional and shade-intolerant hardwoods** (From Key B, 1a. and 1b.)

Black cherry (*Prunus serotina*), White ash (*Fraxinus americana*), Sassafras (*Sassafras albidum*), Black walnut (*Juglans nigra*), Common hackberry (*Celtis occidentalis*), Tuliptree (*Liriodendron tulipifera*), Black locust (*Robinia pseudoacacia*)