



Vegetation Monitoring at Natchez Trace Parkway: Results for 2021

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ON THE COVER

Forest near plot RS04 in the Rocky Springs site, Mississippi, August 2021. Photo by NPS /Jane E. Carlson

Summary and Key Findings

The Gulf Coast Inventory and Monitoring (I&M) Network completed its first round of vegetation monitoring on the Natchez Trace Parkway between June and September 2021. Thirty-two long-term plots were randomly distributed across all vegetated habitats of five key Parkway sites: Rocky Springs, MS (8 plots); Jeff Busby, MS (5 plots); Chickasaw Village, MS (4 plots); Colbert Ferry, AL (7 plots); and Meriwether Lewis, TN (8 plots). Four of the five focal sites were forested; Chickasaw Village was the only prairie-dominated site. The 32 plots were first visited during the winter months of 2018 and 2019 to install plot markers, tag trees, and assign broad vegetation classes. Crews returned to sample plots during the growing season of 2021, following the methods published in the protocol “Monitoring Terrestrial Vegetation in Gulf Coast Network Parks” and its 11 standard operating procedure documents (Carlson et al. 2018a, b). In short, all plant species were identified in each 400-meter² (20 x 20 meter) plot, and their coverages and relative frequencies were recorded in nested sampling frames. Data were also collected on forest health, including tree growth, recruitment, and mortality. The first round of sampling was completed on 25 of the 28 forested plots and all 4 of the prairie plots. The remaining three forested plots were not sampled in 2021 due to logistical constraints, but they still had some data from the initial visit in 2019.

The project’s key findings for 2021 were as follows:

- The Natchez Trace Parkway’s 28 forested plots and 4 prairie plots fell into five broad vegetation classes. The forested classes were Mesic Upland Hardwood Forest (17 plots), Mesic Upland Pine-Hardwood Forest (6 plots), and Lowland Hardwood Forest (5 plots). The prairie classes were Mixed Ruderal Prairie (3 plots) and Black Belt Prairie (1 plot), the latter having the Global Conservation Status Rank of critically imperiled (G1). While these broad vegetation classes were a means of unifying plots with similar plant communities and landscape positions, the most informative way to summarize plots was by their study site (Rocky Springs, Jeff Busby, Colbert Ferry, Meriwether Lewis, or Chickasaw Village), due to the large distances between sites.
- A total of 391 taxa were recorded during monitoring, and 307 of these were in the forested plots. The four prairie plots had 131 species in total, 36% of which were also recorded in the forested plots. Both forested and prairie plots had a low percentage of non-natives, at only 4% for forest and 6.5% for prairie. These percentages were based only on the 91-93% of taxa for which identifications were sufficiently complete to determine nativity.
- In the forested sites, two native species were extremely widespread –i.e., found in all 25 plots with complete data for 2021. These were poison ivy (*Toxicodendron radicans*) and roundleaf greenbrier (*Smilax rotundifolia*). Of the tree species recorded, the three most widespread were black cherry (*Prunus serotina*), winged elm (*Ulmus alata*), and sweetgum (*Liquidambar styraciflua*). Each occurred in 22-24 plots and were native species for the park. Most of the non-native species recorded across all forest plots were not particularly widespread or dense, with the exception of Japanese stiltgrass (*Microstegium vimineum*), which was in 19 of 25 plots and had extensive understory coverage in one plot in Rocky Springs and two plots in Colbert Ferry (>45% mean coverage). The other widespread non-natives were Chinese privet (*Ligustrum sinense*, 15 plots) and Japanese honeysuckle (*Lonicera japonica*, 15 plots), but their estimated mean coverage in plots was never greater than 2%. Most native species also had low coverage in the understory and midstory of forested plots. The only two natives with ≥5% average coverage within plots in a given site were longleaf woodoats (*Chasmanthium sessiflorum*) at 10% cover in Rocky Springs, and slender woodoats (*Chasmanthium laxum*) at 5% cover in Meriwether Lewis.
- For the prairie site, 10% of its recorded species were widespread in the site, i.e., found in all four plots. The species with the greatest coverage was tall goldenrod (*Solidago altissima*) at 23%, and this was followed by partridge pea (*Chamaecrista fasciculata*) at 18% and little bluestem (*Schizachyrium scoparium*) at 15%. The only non-native in the top 20 for cover was Silky bushclover (*Lespedeza cuneata*), at 2.9%.

- Across both forested and prairie plots, the Parkway had 64 species per plot on average, which was 20-35 species higher than per-plot averages for all but one other park monitored by the Gulf Coast I&M Network. Plots were not all uniformly rich, however. Plot-level richness ranged from 106 species in a Meriwether Lewis plot to 31 species in a Colbert Ferry plot. Meriwether Lewis –the northernmost and richest site– had 190 species combined across plots, with more forbs and graminoids than the other forested sites. The next most species-rich site was Rocky Springs, at 153 species, followed by Jeff Busby at 134 species, Chickasaw Village at 131 species, and finally Colbert Ferry, at 99 species. Low richness at Colbert Ferry was associated with having fewer forb and grass species than other sites. The species list for Chickasaw Village plots represented a distinct, graminoid-rich flora. As mentioned previously, only 36% of Chickasaw Village species were also found in forested plots. The three Ruderal Mixed Prairie plots were species rich and relatively similar to each other, with 62-67 species per plot and 24-26% of each plot's species list unique to that plot. The Black Belt Prairie plot, in contrast, was relatively species poor and had less in common with other plots at the site. It had only 46 species, of which 50% were unique to that plot.
- Forest health metrics were recorded in 25 forested plots in 2021; the 3 remaining forested plots had partial data available from 2019. Each plot had between 8 and 32 trees -also called stems- and between 15 and 304 seedlings and saplings. Tree size, density and composition varied widely among plots, with only a few patterns apparent within and across sites. Meriwether Lewis was the most oak-dominated site, in terms of both basal area and stem density. The site's most common oak species were white oak (*Quercus alba*) and black oak (*Quercus velutina*). Sourwood (*Oxydendrum arboreum*) was also uniquely abundant there, in terms of stem density. Oaks were also the top contributors to basal area in Rocky Springs, with the top species of water oak (*Quercus nigra*) and cherry-bark oak (*Quercus pagoda*). In all three southern sites, pine was among the top three contributors for basal area (mainly loblolly pine, *Pinus taeda*), and sweetgum was the dominant or co-dominant tree species for stem density. Overall, Parkway trees were not particularly large (maximum diameter at breast height = 108 centimeters), nor basal area very high, which reflects a history of timber harvest and/or farming in each site prior to NPS acquisition in the 1950s and 1960s. All sites nevertheless had rich assemblages of juvenile trees, generally reflecting a positive regeneration status. The highest seedling densities were at Rocky Springs, and the highest sapling densities were at Meriwether Lewis. Colbert Ferry had the fewest seedlings and saplings, and this site also had more standing dead trees and fewer live adult trees than the other sites.
- Overall, the five monitored sites on the Natchez Trace Parkway were species rich, heterogeneous, and presented a compelling picture of naturally vegetated landscapes of the Southeastern United States. As this is the first round of data collection in a long-term study, in-depth interpretation of patterns will benefit from additional rounds of sampling. The next vegetation monitoring event on the Parkway is scheduled for summer 2025, and subsequent events will continue once every four years.

Project Background

The Gulf Coast Inventory and Monitoring (I&M) Network tracks the condition of plant communities in eight National Park Service (NPS) units in the southeastern U.S. and Texas. The plant communities and vegetated landscapes in these parks are a foundation for park visitor experiences and provide vital ecosystem and wildlife services. Yet even on NPS protected lands, plant communities are threatened by human activities and environmental change. Monitoring plant communities is therefore essential to understanding park health and making informed management decisions, so that resources may be enjoyed, unimpaired, by future generations.

Throughout the NPS, plant communities and other key natural resources are tracked and assessed scientifically by 32 I&M networks, as part of their vital signs monitoring programs. For parks in the Gulf Coast I&M Network, the goals of vegetation monitoring include documenting status and change in (1) richness of native and non-native species; (2) percent cover and frequency of key species or growth forms (e.g., graminoids or shrubs); and (3) the health and regeneration of forests. The network follows a published protocol (Carlson et al. 2018a) that is largely consistent with other I&M networks in the eastern U.S. (e.g., Tierney et al. 2016; Boyle et al. 2019).

The Gulf Coast I&M Network conducts vegetation monitoring fieldwork once every four years in each park. In the years after sampling, the network presents its findings in a range of ways. The current summary, which is the first for the park, describes the study area, methods, and major findings thus far, including species lists, richness summaries, understory and mid-story percent cover, relative frequency, tree metrics, and regeneration metrics. All current and past reports, as well as raw data exports, are available online (irma.nps.gov/DataStore/Reference/Profile/2247864).

Study Area

Parkway Description

The Natchez Trace Parkway is a 716-kilometer (445-mile) roadway that travels through rural and forested landscapes in three southeastern states: Mississippi, Alabama, and

Tennessee. The Parkway follows and commemorates a historic wilderness route used first by Native Americans and later by travelers and settlers within the United States, primarily up through the 1830s. Federal Parkway construction began in 1938, with most larger tracts acquired between 1950 and 1980. Today, the Parkway leads visitors through scenic, largely undeveloped landscapes that approximate those of early America. In doing so, the NPS protects 18,745 hectares [ha] (46,320 acres) of forests, waters, wetlands, and fields. Much of this protected land is restricted to narrow corridors along the roadway, but the Parkway boundaries occasionally expand to encompass larger natural features, culturally significant sites, and campgrounds. The four largest of these corridor expansions, referred to here as sites, were selected for inclusion in the Gulf Coast Network's vegetation monitoring project: Rocky Springs, MS; Jeff Busby, MS; Colbert Ferry, AL; and Meriwether Lewis, TN. Chickasaw Village, MS, was also added to the project due to park management interest. This site contains a small area of Black Belt Prairie, which is a critically imperiled (G1) plant association, based on NatureServe's Global Conservation Status Rank. These prairies are restricted to specific soil types in Mississippi and Alabama, and they are severely threatened by development into agricultural land and other human uses. Even when protected, regular prescribed fire is required to prevent encroachment of eastern red cedar (*Juniperus virginiana*).

Latitudinal Gradients

The Natchez Trace Parkway spans 4.5° latitude over its entire length, and for just the five I&M vegetation monitoring sites, the extent is 3.5° latitude. Over this large north-south spread, the suite of dominant plant species changes composition, and in a few instances, a plant species meets its northern or southern geographic limit between Parkway endpoints. The spectrum of plant communities extending north to south along the Parkway can be attributed to gradients in climate, elevation, and geologic history. Although these are not the only regional drivers of spatial patterns in plants, they are likely central to differences among the five I&M monitoring sites, which are widely spaced along the Parkway's extent.

Changes in latitude along the Parkway are primarily experienced as differences in climate and weather. The

northern end has a shorter frost-free period and colder temperatures in winter, which shifts plant phenology and limits occurrence of the Parkway's most cold-sensitive species (e.g., Florida Keys hempvine, *Mikania cordifolia*). The southern end, in contrast, experiences more frequent tornados, which can damage vegetation and create treefall gaps, but typically impact a relatively small area each time. Although temperatures and storm frequencies create differing conditions from north to south, rainfall is relatively consistent across the Parkway. The mean annual rainfall ranges from 1403-1452 millimeters (55-57 inches) among the five focal sites, providing abundant moisture throughout. Hatch and Kruse (2008) provide additional, in-depth discussion of climate patterns along the Parkway.

Elevation, geologic history, and soils vary from north to south along the Parkway, and these factors have additional impacts on plant community composition. Parkway elevations range from 20-330 meters [m] above sea level (66-1,083 feet), which is striking within the context of the relatively flat Gulf Coast Plain. Parkway elevations generally, though not constantly, decline with latitude. The Parkway's highest (natural) point is north of Collinwood, TN, at mile marker 358 (Tuscaloosa geologic formation), and its lowest is at Bayou Pierre in Port Gibson, MS, mile marker 40 (Catahoula geologic formation). Henderson et al. (2022) provide additional information on the Parkway's geologic history, but there is no companion, single treatment of soils data. Natural Resource Conservation Service (NRCS) Ecological Site Descriptions are a helpful resource for interpreting local soils data, and these descriptions are currently available online for much of the Parkway, including Rocky Springs, Colbert Ferry, and Meriwether Lewis (<https://edit.jornada.nmsu.edu/>). Relevant maps of some of these features for each site are included in Appendix A.

Parkway Land Use History and Management

Knowledge of historic land use along the Parkway provides essential context to spatial patterns of plant occurrence and richness. Since pre-colonial times, humans have occupied and cleared the forests and grasslands of the Parkway to varying degrees, often for crops or grazing. The numerous archaeological sites along the Parkway reflect the long-standing use of these areas by American Indians. Planting pine for timber also has a long, although more

recent history. Most of the Parkway's native forests were selectively and repeatedly logged, clear-cut, or planted in pine, with regrowth typically beginning in the decades before NPS acquisition. Recent-past land uses are still detectable as sunken roadways, homestead landscaping, sentinel trees, trash, barbed wire fences, and in some cases, increased occurrence of invasive exotics. Historic disturbances are heterogeneous across the landscape, such that impacts may vary widely among plots within a site (e.g., Table B1 in Appendix B). Even though most Parkway properties are now protected from additional clearing and development, these communities are still shaped, albeit in more beneficial ways, by modern management activities.

Current-day vegetation management activities along the Natchez Trace Parkway consist primarily of mowing, prescribed fire, and invasive plant control. Mowing occurs along roadways and to a limited degree within sites, but the areas of natural vegetation targeted by I&M monitoring are not mowed. Prescribed fire, in contrast, occurs in all targeted sites and likely impacts nearly all I&M monitoring plots. Chickasaw Village is burned most frequently, at a near-annual basis, as part of the ongoing prairie restoration effort. In the remaining sites, prescribed burns may occur once or twice a decade (see Table B1 in Appendix B for prescribed fire history for each plot). Finally, invasive plants are treated along the Parkway most years, either through park-led efforts or in partnership with the regional Invasive Plant Management Team. Currently, invasive control efforts focus on kudzu (*Pueraria montana*) and privet species (*Ligustrum* spp.).

Previous Vegetation-Related Studies

Several previous studies of the Parkway's plant communities and associated landscapes have served as a foundation for the current work. The two largest-scale studies were the Vascular Plant Inventory (Hatch and Kruse 2008) and the U.S. National Vegetation Classification (USNVC) map (Hop et al. 2016). The Parkway's Vascular Plant Inventory was conducted in 2004-2006, and this effort produced a species list of 2,197 plant taxa. Of these, 1,374 were new voucher specimens, and 823 were existing vouchers that the authors examined and verified. Building on the Inventory, the Parkway's 2016 USNVC project analyzed data from 589 vegetation plots to describe 122 natural vegetation types on the Parkway, 54 of

which could be mapped with reasonable accuracy using aerial imagery from fall 2011. In-depth plant species inventories have also taken place at smaller spatial scales, such as one at Chickasaw Village. This site was acquired by NPS in 1964, but it continued to be leased for crops and tall fescue (*Schedonorus arundinaceus*) as forage until 1985. In 1991, NPS began preparations to restore the site to native prairie, and as part of that process, Wieland (1994) conducted a survey of plant species and soil characteristics. Wieland's study provided an initial species list of 176 taxa and descriptions of the soil types most suitable for Black Belt Prairie within the site, which provided a baseline for comparison with the current study.

Methods

Plot Selection

The I&M approach to vegetation monitoring on the Natchez Trace Parkway focused on 5 discrete sites, as decided in 2014 through a joint effort of I&M and park staff. This approach was preferred over a random selection of points that would allow for park-wide inference, because of specific management interests in these five sites. Within each site, between 4 and 8 plots were randomly assigned to all naturally vegetated areas, excluding roads, infrastructure, the park boundary, and 50 m buffers around each. In 2018, the initial selection of 32 plots was formalized as part of a network-wide Vegetation Monitoring Protocol Implementation Plan (Carlson et al. 2018a). Table B1 in Appendix B provides a complete list of plots, including their vegetation class, soil characteristics, and fire and disturbance history.

Field Methods

A complete description of field methods can be found in the protocol narrative and 11 Standard Operating Procedure documents (Carlson et al. 2018a, b and references therein). In short, fieldwork was completed through two types of trips: establishment and sampling. Establishment trips were conducted between October 2018 and April 2019, and they consisted of finding, evaluating, and permanently marking plot midpoints and corners (Figure 1). Crews then then tagged and surveyed the location of all trees with a diameter at breast height [DBH] greater than 10 centimeters [cm], and they measured the

DBH of those trees. This prepared the plot in advance of the growing season and provided preliminary data on tree sizes.

Sampling trips at the Natchez Trace Parkway were conducted in June-September 2021, and they involved the following elements: creating species lists at the 1-m², 10-m², 100-m² and 400-m² scales (including species rooted in, overhanging or prostrate across plots); estimating percent cover of all plant material <1.5 m tall at the 1-m² quadrat scale (targeting ground layer); estimating percent cover of all plants below 5 m at the 10-m² microplot scale (targeting shrub layer and below); counting seedlings and saplings within four size classes each at the 10-m² microplot scale; and measuring DBH and assessing the condition of all trees at the 400-m² full plot scale (see Figure 1 for nested sampling frame locations).

The 3-month field season on the Natchez Trace Parkway began at Meriwether Lewis and progressed south over the summer. The one exception was that Chickasaw Village was completed last, in late September, which was out of geographic sequence but increased the chances that prairie grasses were reproductively mature (see Table 1 for dates

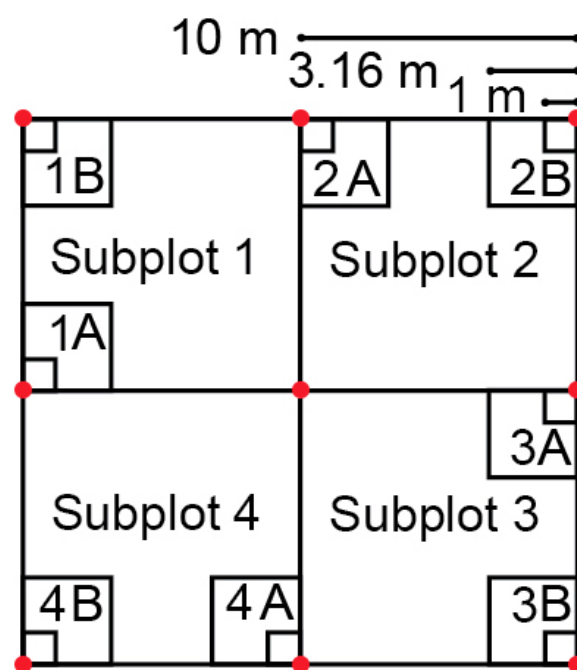


Figure 1. Plot design for long-term vegetation monitoring in the Gulf Coast Network. There are eight 1-m² quadrats (1 x 1 m), eight 10-m² microplots (3.16 x 3.16 m), four 100-m² subplots (10 x 10 m), and one 400-m² plot (20 x 20 m). Red dots show locations of plot markers (fiberglass or rebar stakes).

Table 1. Names and characteristics of the units on the Natchez Trace Parkway that were included in the long-term vegetation monitoring program by the Gulf Coast I&M Network. All plots are in the USDA Ecoregion of Eastern Temperate Forest, Southeastern USA Plains. Broad vegetation classes were scaled within rather than across units, due to major cross-site differences in climate and soils.

Park Site	Mile Marker, County, State	Year(s) NPS Acquired	US Ecoregion, Level III; Level IV	Sample frame area	Mean Plot Elev. (Min-Max)	Total Plots in Site	Broad Vegetation Classes Sampled	Sample Dates
Rocky Springs (RS)	55, Claiborne County, MS	1954	Mississippi Valley Loess Plains; Bluff Hills	178 ha	61 m (50-75)	8	Lowland Hardwood, Mesic Upland Hardwood, Mesic Upland Pine-Hardwood	8/10/2021-8/26/2021
Jeff Busby (JB)	193, Choctaw County, MS	1950	Southeastern Plains; Southern Hilly Gulf Coast Plain	44 ha	124 m (115-133)	5	Lowland Hardwood, Mesic Upland Hardwood, Mesic Upland Pine-Hardwood	7/20/2021-7/22/2021
Colbert Ferry (CF)	327, Colbert County, AL	1964	Interior Plateau; Eastern Highland Rim	159 ha	148 m (136-158)	7	Mesic Upland Hardwood, Mesic Upland Pine-Hardwood	6/23/2021-6/25/2021
Meriwether Lewis (ML)	387, Lewis County, TN	1956 (1927 for monument)	Interior Plateau; Western Highland Rim	267 ha	253 m (213-280)	8	Lowland Hardwood, Mesic Upland Hardwood	6/7/2021-6/22/2021
Chickasaw Village (CV)	262, Lee County, MS	1964	Southeastern Plains; Blackland Prairie	16 ha	93 m (90-98)	4	Mixed Ruderal Prairie; Black Belt Prairie	9/14/2021-9/17/2021

as well as other site-level characteristics). All plots were sampled once except JB 01, which was sampled twice for quality control, and CF 05, ML 01 and ML 02, which went unsampled due to unplanned complications. Sampling lasted an average of 5.8 hours per plot (range 2-13 hours).

Results

Vegetation Communities Sampled

Of 32 plots total on the Natchez Trace Parkway, 28 plots were in forest (including 3 that were incompletely sampled) and 4 plots were in prairie (Figure 2). The four prairie plots were all in Chickasaw Village (CV), and they belonged to either Black Belt Prairie (one plot) and Mixed Ruderal Prairie (3 plots; Figure 3; vegetation classes derived from Hop et al. 2016). The Black Belt Prairie plot represented a unique and relatively rare grassland community occurring on alkaline soils (see also Wieland 1994; Barone 2005; Barone and Hill 2007; Campbell and Seymour 2011a, b; Campbell and Seymour 2012). Although this community was less common within Chickasaw Village than the mixed ruderal prairie community, the park owns other small parcels of Black Belt Prairie nearby (Barone and Hill 2008; Barone et al. 2018). A map of Chickasaw Village soil types

in relation to Black Belt Prairie suitability is included in Appendix A.

In contrast to the limited sampling of prairie plots, the Parkway's forested plots were numerous, varied and distributed widely across the four sites of the Parkway (Table 1, Figure 2). Plots were primarily grouped by site – Rocky Springs (RS), Jeff Busby (JB), Colbert Ferry (CF) Meriwether Lewis (ML) –, as dictated by the original sampling design. Even so, each site encompassed a variety of plant communities, which at the broadest scale, belonged to either mesic uplands (slope or summit) or lowlands (bottomland, floodplain or stream side). Additionally, uplands either did or did not include pine as a major component of the overstory. These broad vegetation classes were, in effect, generalized groupings of the ground-truthed map classes from the 2016 USNVC products by Hop and others (2016). On-site classifications were also confirmed using soils data or, where available, soils-defined NRCS Ecological Site Descriptions. For simplicity, the three broad classes were called Mesic Upland Hardwood Forest, Mesic Upland Pine-Hardwood Forest, and Lowland Hardwood Forest (Figure 4, plot-level vegetation and soil-related classes listed in Table B1 in Appendix B).

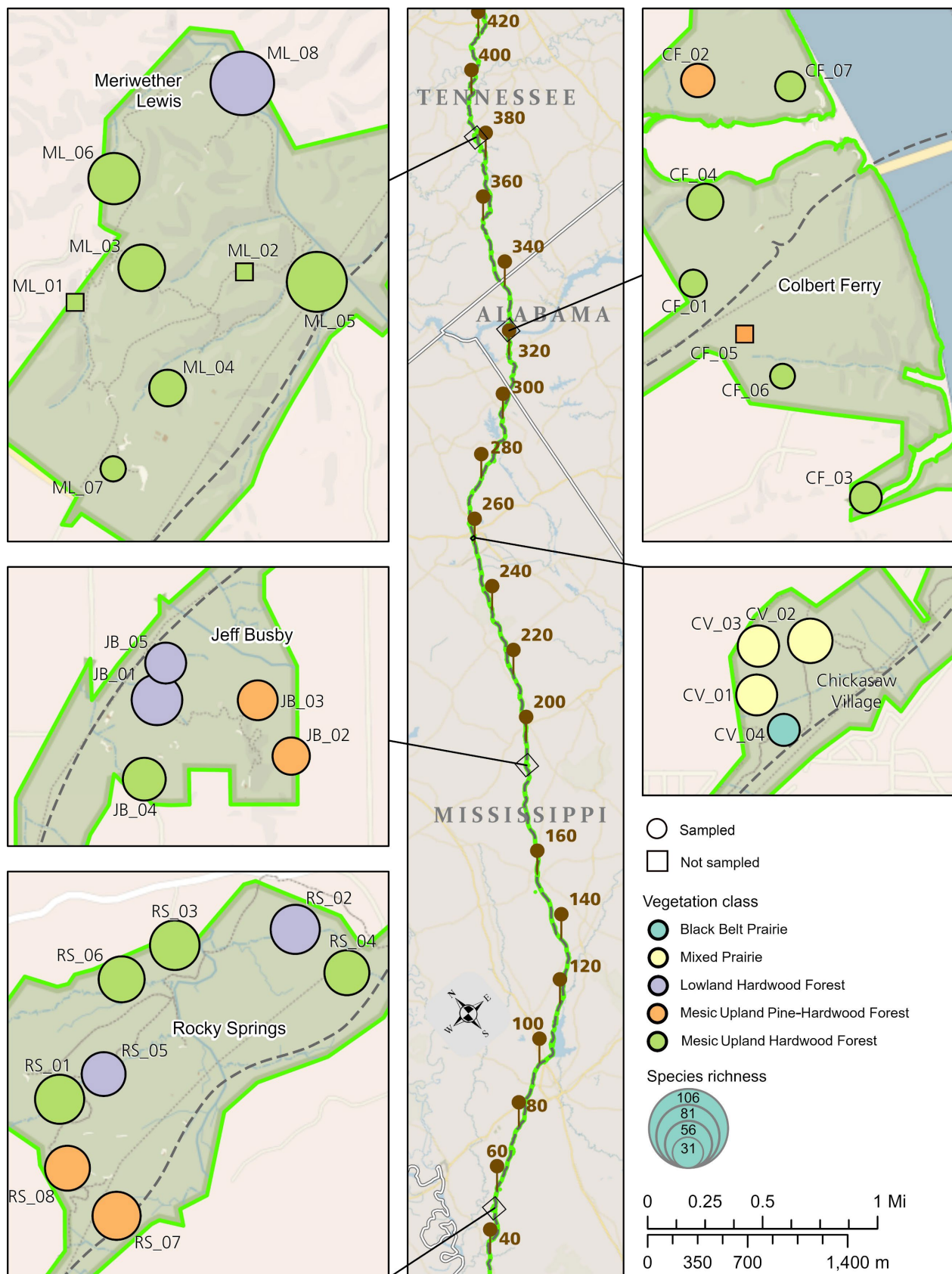


Figure 2. Monitoring plots on the Natchez Trace Parkway (site ID number in black), with points scaled by species richness and colored to indicate their broad vegetation class. Twenty-nine plots were sampled in 2021 (circles), and three plots were not (squares).

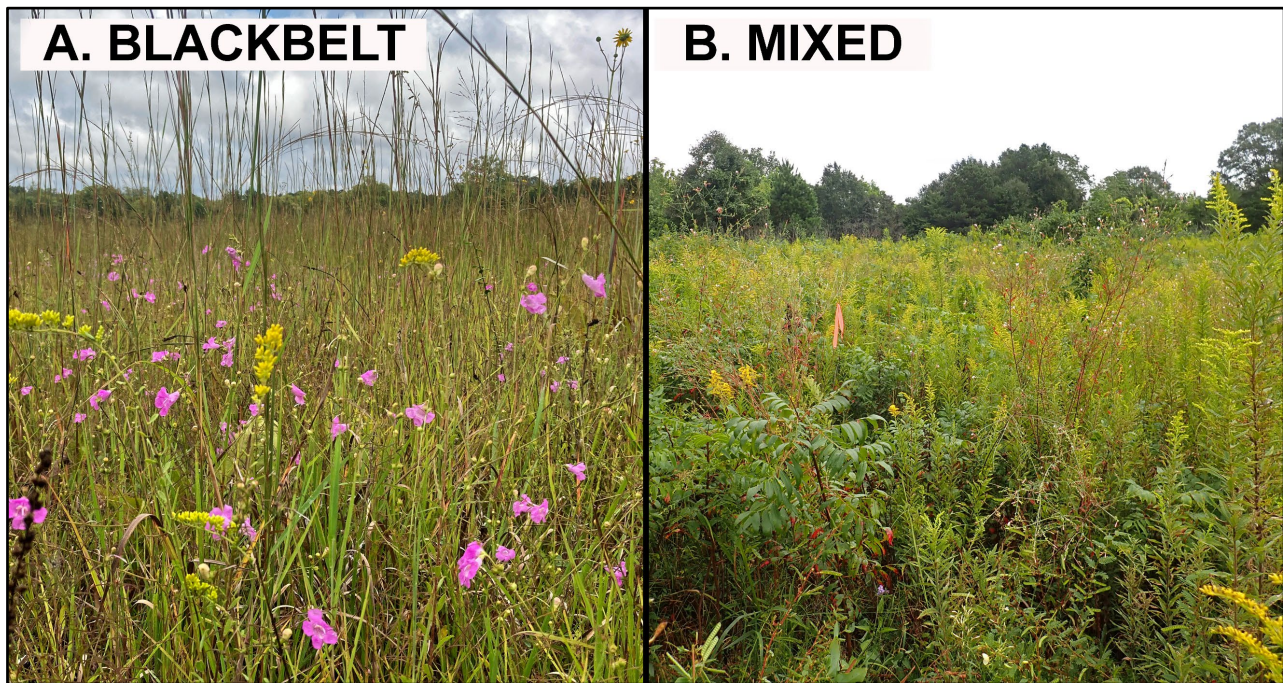


Figure 3. Representative photos of the two vegetation classes at Chickasaw Village. (A) Black Belt Prairie and (B) Mixed Ruderal Prairie.

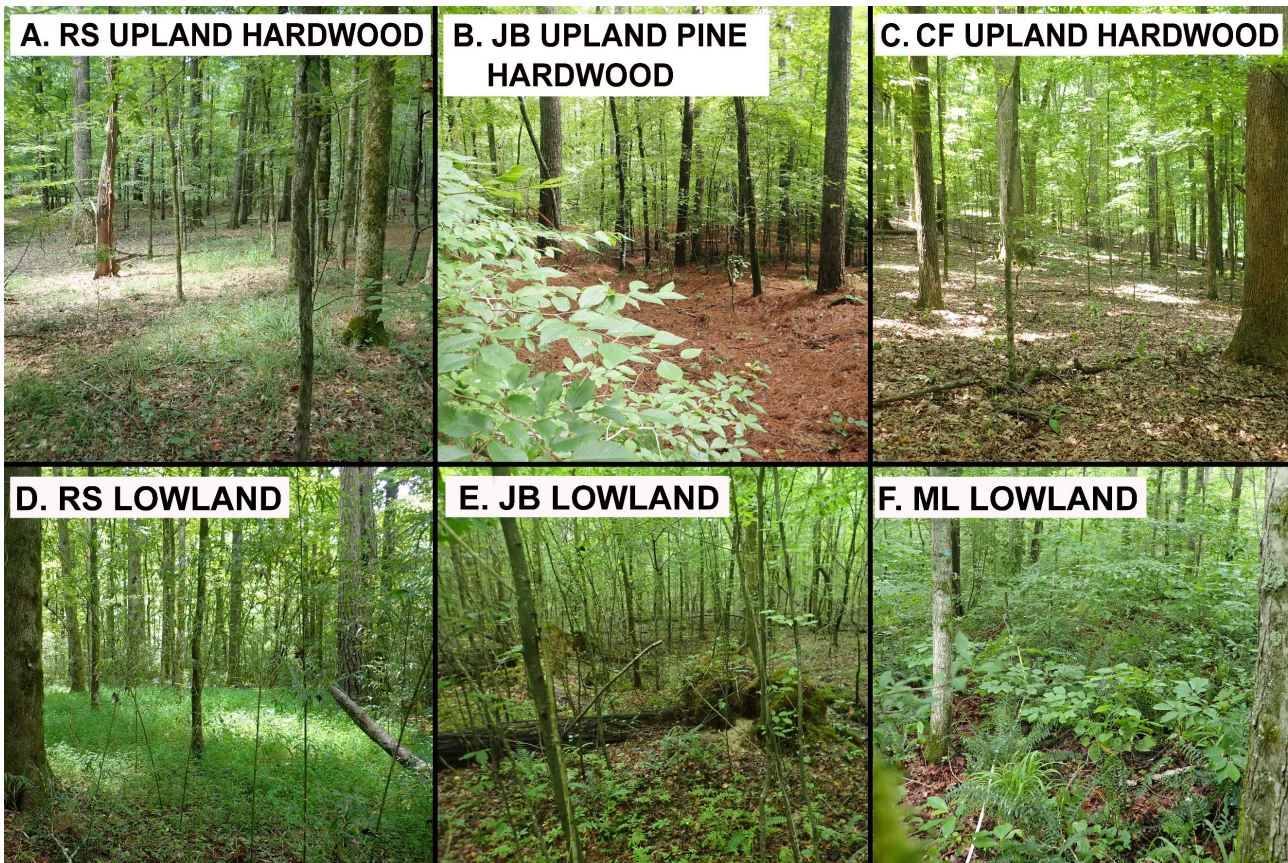


Figure 4. Representative photos of each of the three broad forest vegetation classes sampled along the Natchez Trace Parkway. (A) Mesic Upland Hardwood Forest at Rocky Springs; (B) Mesic Upland Pine-Hardwood Forest at Jeff Busby; (C) Mesic Upland Hardwood Forest at Colbert Ferry; (D) Lowland Hardwood Forest at Rocky Springs; (E) Lowland Hardwood Forest at Jeff Busby and (F) Lowland Hardwood Forest at Meriwether Lewis.

The most sampled class on the Parkway was Mesic Upland Hardwood Forest, represented by 17 plots on well-drained soil types (Figure 2). Nearly all of these plots were oak-dominated; only CF 01 lacked oaks entirely, most likely related to its intensive land use history.

The Mesic Upland Pine-Hardwood Forest was the second most sampled vegetation class. Among the six plots in that class, there were two on deep loess summits at Rocky Springs, two on steep, well-drained slopes at Jeff Busby, and two in a forest that was previously a pine plantation at Colbert Ferry. Finally, there were five plots in the Lowland Hardwood Forest class, including two stream-adjacent plots on loess soils at Rocky Springs, two bottomland and floodplain plots at Jeff Busby, and one stream-adjacent plot on well-drained gravelly alluvium at Meriwether Lewis.

Species List and Species Richness

Across all 29 plots sampled in 2021, I&M staff recorded a total of 391 plant taxa (Table 2). Ninety-one percent of these could be identified to genus or species level, leaving as unknown 26 taxa from forest plots and 9 from prairie plots, most often because all individuals were immature. Of the complete species list, 307 taxa were found in forest plots, 131 were found in prairie plots, and 47 (12% of the total) were shared between the two major groups. The most species-rich growth form in both forest and prairie plots was forbs (Table 2). After forbs, however, ranking differed between forest and prairie: graminoids were second most rich in prairie plots, and trees were second most rich in forest plots. Appendix C includes the forest and prairie species lists for 2021 vegetation monitoring, grouped by growth form. These lists also provide each species' relative frequency within sites and across the Parkway as whole.

Poison ivy (*Toxicodendron radicans*) was the most frequently recorded species from the full Parkway list, being present in all 25 of the forest plots and 3 of the 4 prairie plots. Only one other species was present in all 25 forest plots, roundleaf greenbrier (*Smilax rotundifolia*). Three additional species were found in 24 of 25 forest plots: Virginia creeper (*Parthenocissus quinquefolia*), black cherry (*Prunus serotina*) and muscadine (*Vitis rotundifolia*). Other than black cherry, the most frequently recorded trees were winged elm (*Ulmus alata*; 22 plots), sweetgum

(*Liquidambar styraciflua*; 22 plots), red maple (*Acer rubrum*; 21 plots) and pignut hickory (*Carya glabra*, 21 plots). For the prairie site, 13 different species occurred in all four plots, or 10% of the prairie species list. All of these most-frequent species in the forested and prairie sites were natives.

Among the identifiable plants, only 4% of the forest species and 6.5% of the prairie species were non-native to the region. These values reflect a minimal contribution of exotics to the sampled flora overall, and especially in the forests. Three of these non-natives were nevertheless quite common, occurring in over half of all sampled forest plots. Japanese stiltgrass (*Microstegium vimineum*) was the most widespread of these, being present in 19 of 25 plots. Three of the forested plots had extensive coverage of this species in the 10-m² microplots: RS 02 (45% coverage), CF 02 (47%) and CF 01 (78%; see next subsection for more on percent cover). The other two common non-natives were Chinese privet (*Ligustrum sinense*) and Japanese honeysuckle (*Lonicera japonica*). Each of these were present in 15 forest plots total, though none at >2% cover. For the prairie, the most widespread non-native was silky bush clover (*Lespedeza cuneata*), being present in all four plots. Other important non-natives in the prairie included Japanese honeysuckle (3 plots), Chinese privet (2 plots) and multiflora rose (*Rosa multiflora*; 2 plots).

A small number of rare plant species were detected during monitoring, with rarity based on species tracking lists for their states (Mississippi Natural Heritage Program 2018; Crabtree 2021; Alabama Natural Heritage Program 2022). Earleaf false foxglove (*Agalinis auriculata*) and White heath aster (*Symphyotrichum ericoides*) were recorded in Chickasaw Village, and Lance-leaf loosestrife (*Lysimachia hybrida*) was recorded in Meriwether Lewis. Meriwether Lewis also had four orchid species in plots, but none were on the Tennessee state list. No federally-listed species were documented during monitoring.

Patterns in plant species richness differed among the four forested sites (Table 2, Table 3). The richest site was Meriwether Lewis, the northernmost sampled, with 190 species recorded across 6 plots. There were 74.1 species per plot on average and a maximum of 106 (ML 08). The distribution of richness among growth forms in the site's plots showed slightly more shrubs, grasses and forbs than in other forested sites, and slightly fewer vines and trees.

Table 2. Species richness (*R*) of 400-m² plots from 2021 sampling on the Natchez Trace Parkway. The site-level and total summaries are cumulative across plots. Richness counts included unidentified species as well as those identified only to genus or fully identified, which may slightly inflate counts. The forb growth form includes all herbaceous non-graminoid angiosperms plus ferns. Three plots had no richness data for 2021: CF 05, ML 01 and ML 02. Totals in the 'All Species *R*' column are greater than the sum of natives plus non-natives due to unidentified species with unknown nativity status. Vegetation classes are UPLAND HARDWOOD= Mesic Upland Hardwood Forest; UPLAND PINE HARDWOOD= Mesic Upland Pine-Hardwood Forest; LOWLAND=Lowland Hardwood Forest; MIXED PRAIRIE=Mixed Ruderal Prairie; BLACKBELT PRAIRIE=Black Belt Prairie.

Plot ID, Vegetation Class	All Species <i>R</i>	Non- Native <i>R</i>	Native <i>R</i>	Forb <i>R</i>	Graminoid <i>R</i>	Shrub <i>R</i>	Vine <i>R</i>	Tree <i>R</i>
RS 01, UPLAND HARDWOOD	77	2	75	19	10	9	13	26
RS 02, LOWLAND	76	2	74	22	13	4	13	24
RS 03, UPLAND HARDWOOD	78	3	75	26	10	3	20	19
RS 04, UPLAND HARDWOOD	70	4	64	19	12	6	16	17
RS 05, LOWLAND	68	2	65	17	13	4	14	20
RS 06, UPLAND HARDWOOD	72	3	68	20	8	1	17	26
RS 07, UPLAND PINE HARDWOOD	76	3	71	19	8	7	15	27
RS 08, UPLAND PINE HARDWOOD	70	4	65	20	7	7	16	20
Rocky Springs	153	7	140	53	18	18	25	39
JB 01, LOWLAND	81	5	73	24	11	7	15	24
JB 02, UPLAND PINE HARDWOOD	55	2	51	13	3	5	10	24
JB 03, UPLAND PINE HARDWOOD	59	3	55	16	3	4	11	25
JB 04, UPLAND HARDWOOD	66	0	66	17	5	5	12	27
JB 05, LOWLAND	61	2	59	17	7	5	14	18
Jeff Busby	134	5	124	46	16	13	22	37
CF 01, UPLAND HARDWOOD	36	4	32	13	3	4	8	8
CF 02, UPLAND PINE HARDWOOD	47	4	44	6	8	5	7	21
CF 03, UPLAND HARDWOOD	43	3	40	10	2	4	9	18
CF 04, UPLAND HARDWOOD	53	3	48	17	2	5	8	21
CF 06, UPLAND HARDWOOD	31	2	29	4	1	2	5	19
CF 07, UPLAND HARDWOOD	40	3	38	5	6	3	7	19
Colbert Ferry	99	5	92	27	12	10	14	36
ML 03, UPLAND HARDWOOD	73	2	66	33	7	7	9	17
ML 04, UPLAND HARDWOOD	53	0	53	12	3	7	10	21
ML 05, UPLAND HARDWOOD	99	4	89	42	14	10	10	22
ML 06, UPLAND HARDWOOD	82	2	76	34	7	11	11	19
ML 07, UPLAND HARDWOOD	32	0	31	6	3	5	5	13
ML 08, LOWLAND	106	4	98	38	13	16	14	25
Meriwether Lewis	190	6	169	87	26	20	20	37
CV 01, MIXED PRAIRIE	62	3	58	26	19	2	10	5
CV_02, MIXED PRAIRIE	67	6	58	25	16	6	11	8
CV_03, MIXED PRAIRIE	63	4	58	26	14	6	13	4
CV_04, BLACKBELT PRAIRIE	46	2	39	29	12	1	2	2
Chickasaw Village	131	8	114	63	30	8	18	12
Totals	391	16	338	194	73	32	40	64

Indeed, this northernmost site possessed several forb species near their southern range limits, e.g., American columbo (*Frasera caroliniensis*), Greek valerian (*Polemonium reptans*), whorled loosestrife (*Lysimachia quadrifolia*) and pale-flowered leaf cup (*Polymnia canadensis*). Forty-five percent of the species recorded at Meriwether Lewis were not recorded in any other forested site on the Parkway. This was 18 percentage points higher than uniqueness values at any of the other forested sites.

The site with the second highest richness was Rocky Springs, the southernmost of the monitored sites, at 153

species (Table 2, Table 3). This site had 8 plots sampled, rather than the 5 or 6 of the other forested sites, which likely inflated its total species count. Even so, the average richness per plot was close to that of Meriwether Lewis, at 73.5, suggesting that Rocky Springs plots were rich but more similar to each other than plots at Meriwether Lewis. Like Meriwether Lewis but to a lesser extent, Rocky Springs had a few plant species near the edge of their geographic range limits. For example, dwarf palmetto (*Sabal minor*) and lance-leaf greenbriar (*Smilax smallii*) are not found much further north than northern Mississippi.

Table 3. Mean plot-level species richness (*R*) for each site from 2021 sampling on the Natchez Trace Parkway. 'All Species' richness includes unidentified species with unknown nativity status. Plot-level averages are for all species recorded in each 400-m² plot, including overhanging species. Percentage of total richness attributed to each growth form are also averaged across all plots in a site.

Site	All Species Mean <i>R</i>	Non-Native Species Mean <i>R</i>	Native Species Mean <i>R</i>	Forbs Mean <i>R</i> (% of Total)	Graminoids Mean <i>R</i> (% of Total)	Mean <i>R</i> per Plot, Shrubs (% of Total)	Mean <i>R</i> per Plot, Vines (% of Total)	Mean <i>R</i> per Plot, Trees (% of Total)
RS	73.5	2.9	69.4	20.3 (28%)	10.1 (14%)	5.1 (7%)	15.5 (21%)	22.5 (31%)
JB	64.6	2.4	60.6	17.6 (27%)	5.8 (9%)	5.2 (8%)	12.4 (19%)	23.6 (37%)
CF	41.7	3.2	38.0	9.2 (22%)	3.7 (9%)	3.8 (9%)	7.3 (17%)	17.7 (42%)
ML	74.1	2.0	68.7	27.5 (37%)	7.8 (11%)	9.3 (13%)	9.8 (13%)	19.5 (26%)
CV	59.5	3.8	53.3	26.5 (45%)	15.3 (26%)	3.8 (6%)	9.0 (16%)	4.8 (8%)

Twenty-seven percent the species at Rocky Springs were unique to that site. The site most similar to Rocky Springs was Jeff Busby, which shared 58% of the species at Rocky Springs. Jeff Busby had 134 species total across 5 sampled plots, 64.6 species on average, and 19% of species unique to that site.

Colbert Ferry was by far the most species-poor site, in terms of both its total count at 99 (Table 2) and its plot-level average of 41.7 (Table 3). The park-wide minimum richness was also in this site, at 31 species in CF 06. This site's relative paucity of species was largely driven by low richness in understory graminoids and forbs. For example, Colbert Ferry had 9 forbs per plot on average, whereas the other three sites had 18-28 (Table 3). Only 13% of the species on the Colbert Ferry list were unique to that site.

The four prairie plots at Chickasaw Village had a total richness of 131 species overall, with 62-67 species per plot in Ruderal Mixed Prairie and 46 species in the Black Belt Prairie plot (Table 2, Table 3). In contrast to most graminoid-poor forested plots, grasses and sedges contributed 26% of richness at Chickasaw Village. The forested site with the next highest contribution of graminoids was Rocky Springs at 14% (Table 3). Sixty-five percent of the species at Chickasaw Village were not found in any of the forested plots, and of this unique group, 91% were graminoids or forbs. The single plot in Black Belt Prairie, CV 04, had the site's lowest richness, but half of those species were not represented in any of the Ruderal Mixed Prairie plots (Appendix C). In each Ruderal Mixed Plot, in contrast, 24-26% of species were unique to that plot, and each shared 55-63% of species with the other Ruderal Mixed plots.

Relative Frequency and Cover in Forest Understory and Midstory

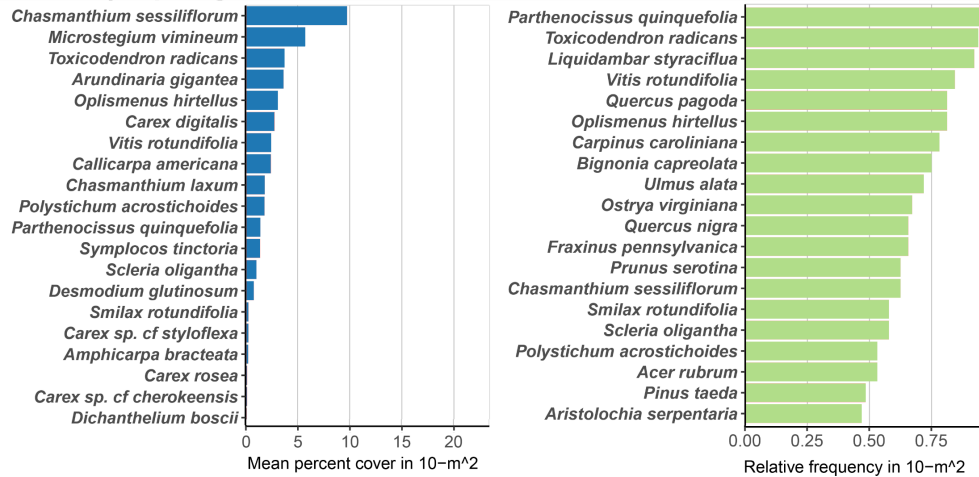
To determine which species dominated the understory and midstory of each forested site, coverage and frequency values were estimated within 10-m² nested subplots. Percent cover was averaged across the four 10-m² microplots per full 400-m² plot, based on all foliage up to 5 m above ground level. Relative frequency was calculated as the percent occupancy out of eight 10-m² microplots per full plot for all species rooted in or overhanging the microplot, from ground level through tree canopies.

Frequency and cover estimates revealed that few species had extensive coverage in the understory and midstory of forested plots (Figure 5 A-D, left panels), but several species had high relative frequency (Figure 5 A-D, right panels). The highest mean percent cover was 21% for Japanese stiltgrass at Colbert Ferry, followed by 10% for longleaf woodoats (*Chasmanthium sessiflorum*) at Rocky Springs, 6% for Japanese stiltgrass at Rocky Springs, and 5% for slender woodoats (*Chasmanthium laxum*) at Meriwether Lewis. The remaining mean percent cover values were all <5% at the 10-m² scale. For relative frequency, each site had 10 -18 species that occurred in ≥50% of microplots. The two most-frequent species per site (≥65% of microplots) were Virginia creeper and poison ivy at Rocky Springs and Jeff Busby, Virginia creeper and winged elm at Colbert Ferry, and roundleaf greenbriar and white oak [*Quercus alba*] at Meriwether Lewis.

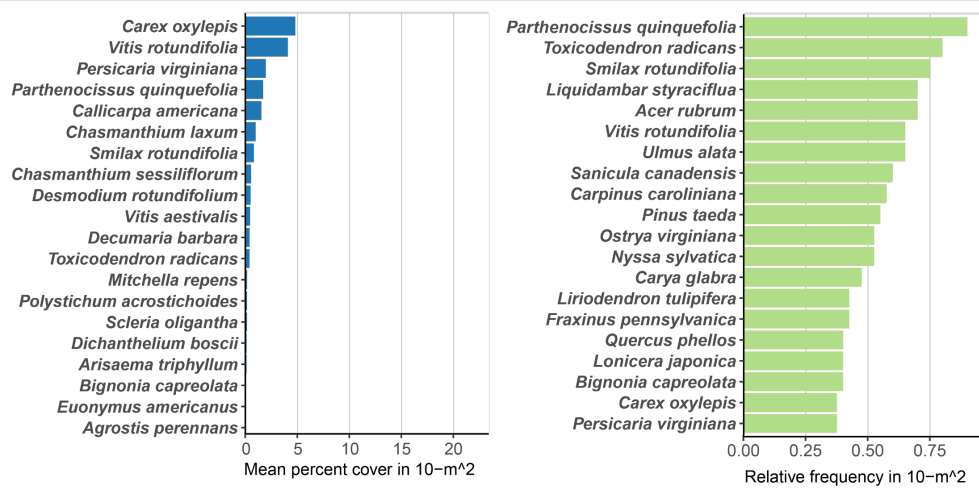
Relative Frequency and Cover in Prairie

Relative frequency and percent cover were also estimated for the four plots in Chickasaw Village, which tended to have many more plants at ground level than forested sites.

A. Rocky Springs



B. Jeff Busby



C. Colbert Ferry

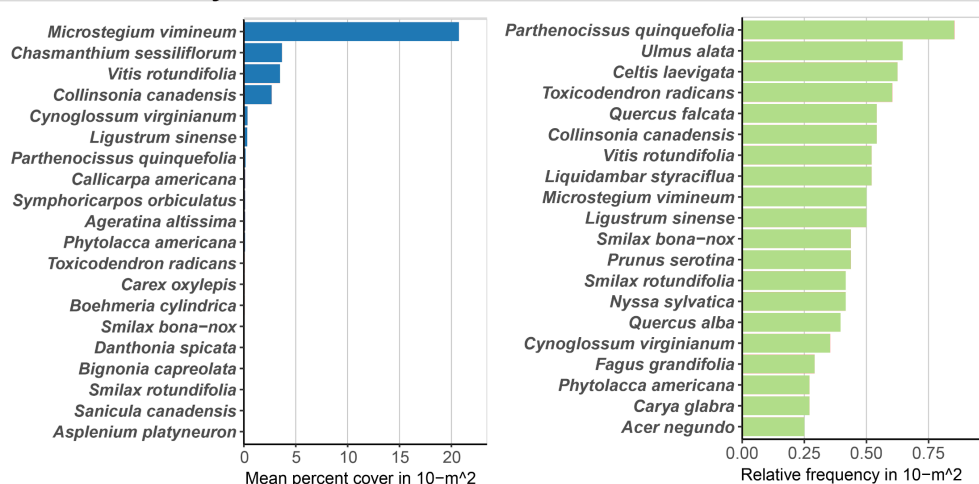
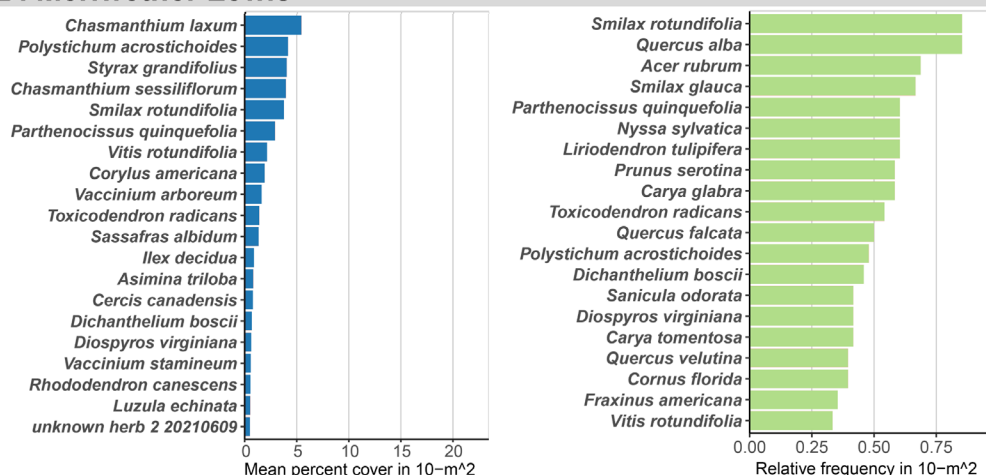


Figure 5. Plant species cover and relative frequency in forested plots from 2021 sampling at Natchez Trace Parkway. *Left panels* (blue bars): Top 20 high-coverage species per site, based on mean percent cover per plot. Percent cover was estimated in four 10-m² microplots per plot then averaged. *Right panels* (green bars): Top 20 most-frequent species per site, based on percent occupancy of eight 10-m² microplots per plot.

D. Meriwether Lewis



E. Chickasaw Village

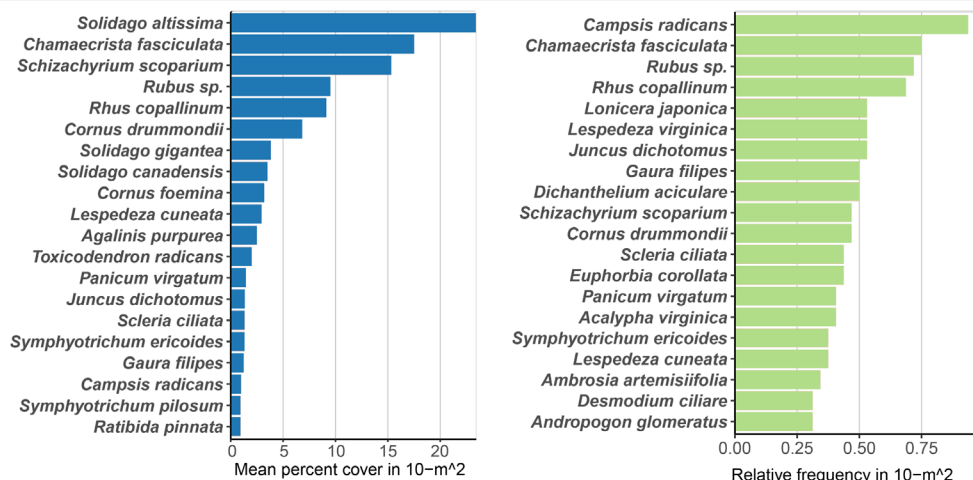


Figure 5, continued. Plant species cover and relative frequency in forested plots from 2021 sampling at Natchez Trace Parkway. *Left panels (blue bars):* Top 20 high-coverage species per site, based on mean percent cover per plot. Percent cover was estimated in four 10-m² microplots per plot then averaged. *Right panels (green bars):* Top 20 most-frequent species per site, based on percent occupancy of eight 10-m² microplots per plot.

There were 6 species with $\geq 5\%$ mean cover at the prairie site, led by tall goldenrod (*Solidago altissima*) with 23%, followed by partridge pea (*Chamaecrista fasciculata*) with 18%, and little bluestem (*Schizachyrium scoparium*) with 15% (Figure 5E left panel). For relative frequency, only two species were present in $\geq 75\%$ of microplots: trumpet creeper (*Campsis radicans*) and partridge pea (Figure 5E right panel). The Black Belt Prairie plot (CV 04) had a distinct species assemblage from the other Chickasaw Village plots. There were 12 species that occurred in more than 75% of microplots within CV 04. Those with 100% occupancy within the plot were white heath aster (*Symphyotrichum ericoides*), little bluestem, pinnate prairie

coneflower (*Ratibida pinnata*), purple false foxglove (*Agalinis purpurea*) and rosepink (*Sabatia angularis*). Little bluestem had the greatest mean percent cover at 59% in CV 04; all other species were $<10\%$ cover.

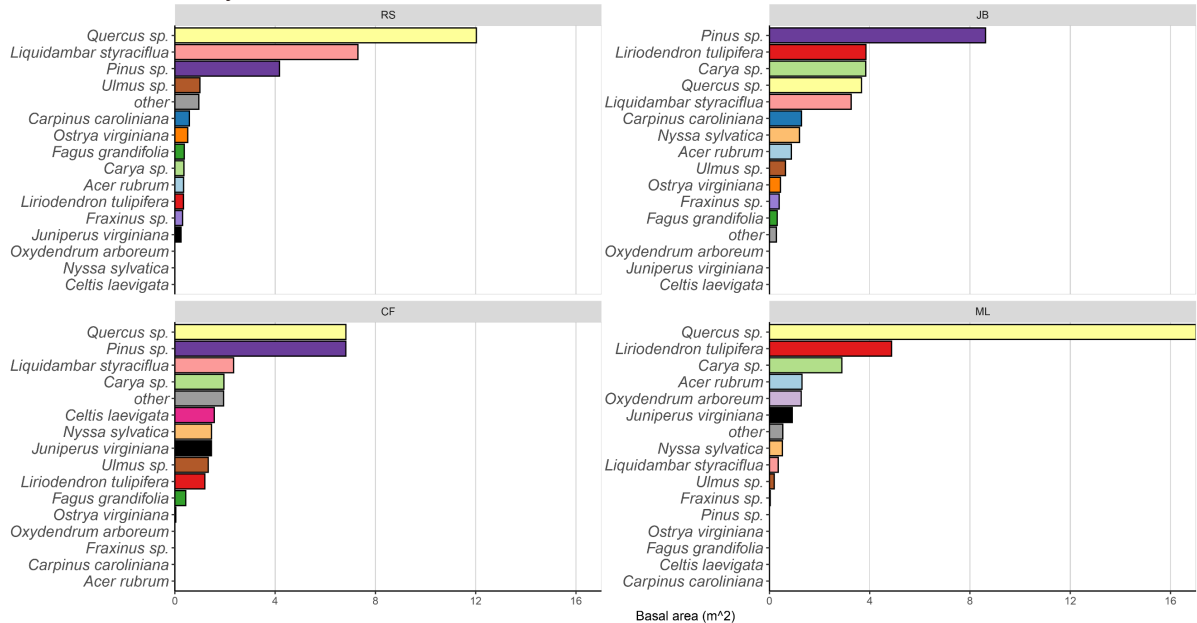
Tree and Regeneration Metrics

Forest health metrics were recorded in all 25 forested plots in 2021; the 3 remaining forested plots had partial data available from 2019. Including the 3 plots with partial data, each plot had 8-32 trees with a diameter at breast height [DBH] ≥ 10 cm (481 total). Focal metrics included tree location, status (alive, dead, leaning), DBH and structural damage (i.e., large dead branches or broken top; advanced

decay). Seedlings and saplings were also counted into different sizes classes in four 10-m² microplots per full plot (3,244 counted total, 15-304 per plot). These classes were combined into juvenile tree density, from which recent germinants were excluded due to high year-to-year fluctuations.

The compositions, basal areas, and densities of sampled tree communities differed greatly among the four forested sites (Figure 6, Table 4). Meriwether Lewis was the most oak-dominated site, in terms of both basal area (Figure 6A) and stem density (Figure 6B). The site's most common oak species were white oak (*Quercus alba*) and black oak

A. Basal Area by Site



B. Stems per Hectare by Site

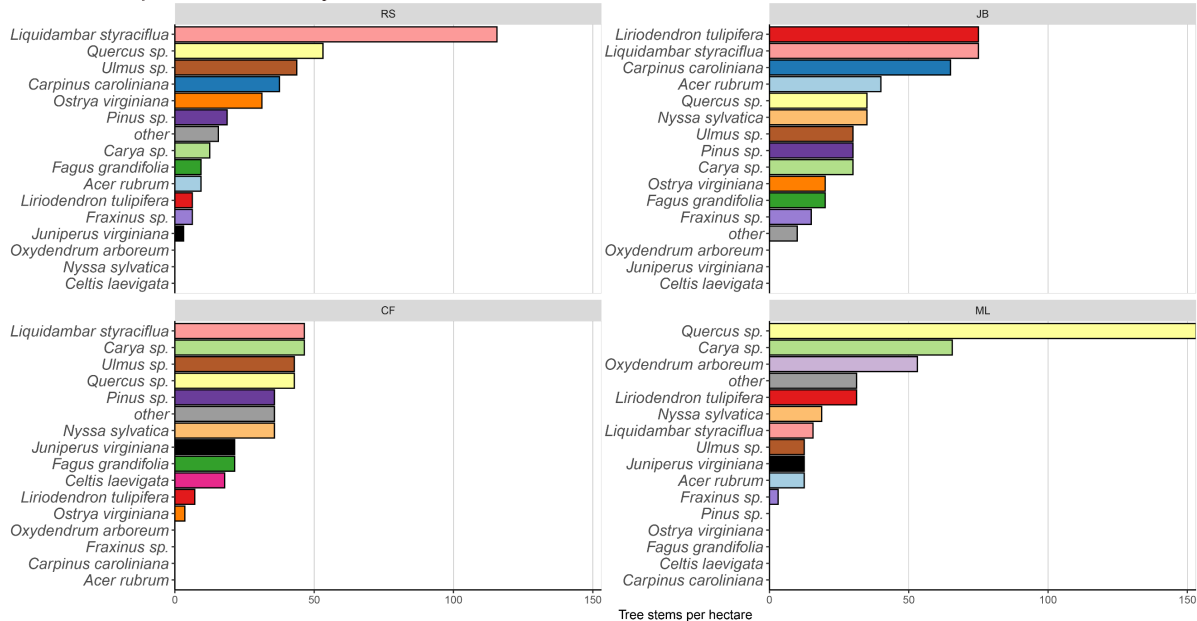


Figure 6. (A) Basal area by tree taxa and (B) stem density by tree taxa for the four forested sampling units on the Natchez Trace Parkway. Tree data from the establishment trip in April 2019 were used for the three plots (ML 01, ML 02 and CF 05) that went unsampled in 2021. Based on the remaining plots in those units, the mean increase between 2019 and 2021 in basal area and stems per hectare would be non-detectable at this scale (1 live stem per plot and 1.3 m²/ha basal area). The 'other' category consisted of the following five species: *Sassafras albidum*, *Cornus florida*, *Prunus serotina*, *Morus rubra* and *Acer saccharum*.

Table 4. Mean plot-level tree and regeneration metrics from 2021 sampling on the Natchez Trace Parkway. Adult tree data were collected for all trees ≥ 10 cm DBH in the 400-m² plot, and regeneration data (seedling and sapling densities) were collected in a 40-m² area of the plot (four 10-m² microplots). Recent germinants were those 5 to 15 cm tall; small seedlings were 16 to 50 cm; large seedlings were 51 to 137 cm tall, and saplings were 1-10 cm DBH. Total juvenile densities were based on the sum of small seedling, large seedling, and sapling classes. Two plots in ML and one plot in CF were not sampled in 2021, but their adult trees were tagged and measured in 2019 during plot establishment. This table used the 2019 data for the 34 live and 11 dead adult trees in those plots. Overall means were likely only minimally impacted using older DBH data. For example, two-year growth was estimated to be 0.5 cm DBH, based on the remaining 433 live trees that were measured in both 2019 and 2021.

Unit	Live Tree Stems /ha	Standing Dead Trees /ha	Basal Area (m ² /ha)	Canopy Height (m)	Canopy Closure	Mean DBH (cm)	Percent with Structural Damage	Recent Germinant Density /m ²	Small Seedling Density /m ²	Large Seedling Density /m ²	Sapling Density /m ²	Total juvenile tree density /m ²
RS	362.5	34.4	28.5	30.1	91%	27.1	12%	2.14	2.11	0.23	0.11	2.4
JB	480.0	20.0	28.7	28.8	86%	24.6	2%	1.14	1.19	0.38	0.15	1.7
CF	357.1	50.0	27.4	26.2	92%	27.9	5%	0.98	0.16	0.00	0.06	0.2
ML	409.4	15.6	29.9	26.6	91%	26.7	17%	0.94	1.60	0.64	0.18	2.4

(*Quercus velutina*). Sourwood (*Oxydendrum arboreum*) was also uniquely abundant there (Figure 6A). Oaks were also the top contributors to basal area in Rocky Springs (Figure 6A), with the top species of water oak (*Quercus nigra*, 7 tagged stems) and cherry-bark oak (*Quercus pagoda*, 7 tagged stems). In all three southern sites, pine species were among the top three contributors for basal area (mainly loblolly pine, *Pinus taeda*; Figure 6A), and sweetgum was the dominant or co-dominant tree species for stem density (13-37 tagged stems per site; Figure 6B).

The mean tree density for all species combined also differed slightly among sites. Plots in Jeff Busby and Meriwether Lewis had relatively high average stem counts, which was linked to a relatively low DBH in Jeff Busby (i.e., densely packed small trees), but not in Meriwether Lewis (i.e., densely packed larger trees; Table 4). For this reason, Meriwether Lewis had the highest mean basal area at 29.9. Site-level averages were nevertheless of limited use for comparison, because tree species composition and forest health metrics were so variable among plots within sites (Figure 7, Table B2 in Appendix B), often in association with their vegetation class.

The two trees with the largest girths in this study were both cherrybark oaks (*Quercus pagoda*) at Rocky Springs. One had a DBH of 108 cm and the other a DBH of 97 cm, although the smaller of the two died between the establishment and sampling trips. The next two largest trees documented were a loblolly pine at Jeff Busby (90 cm DBH) and a white oak at Meriwether Lewis (83 cm DBH). Overall, trees were not particularly large, nor basal area very high in any of the plots, reflecting the regrowth status of all the monitored forest stands.

Comparison of regeneration metrics across plots revealed rich assemblages of juvenile trees in all sites (Figure 8), but wide variation in their density among sites (Table 4). The relative proportion of taxa in the juvenile tree cohorts was often quite different from that in the canopy, but the top five tree taxa in each site all had juvenile representatives, with the exception of tulip poplar (*Liriodendron tulipifera*) at Jeff Busby (Figure 8). Seedling densities were highest at Rocky Springs, driven by large numbers of recent germinants and small seedlings. Larger seedlings and saplings were most dense at Meriwether Lewis. The lowest seedling and sapling densities were at Colbert Ferry, especially for the larger size classes (Table 4, Figure 9). Of all the forested sites sampled, this site also had the lowest adult tree basal area (Table 4, Figure 7) and highest densities of standing dead trees (Table 4).

A small number of seedlings and saplings were recorded at Chickasaw Village, although none were likely to reach adulthood due to the site's frequent prescribed fires. The mean number of juvenile stems per m² was 0.12 (19 juvenile trees and 4 recent germinants recorded in total), and the species detected included eastern persimmon (*Diospyros virginiana*), sassafras (*Sassafras albidum*), winged elm, loblolly pine, and box elder (*Acer negundo*).

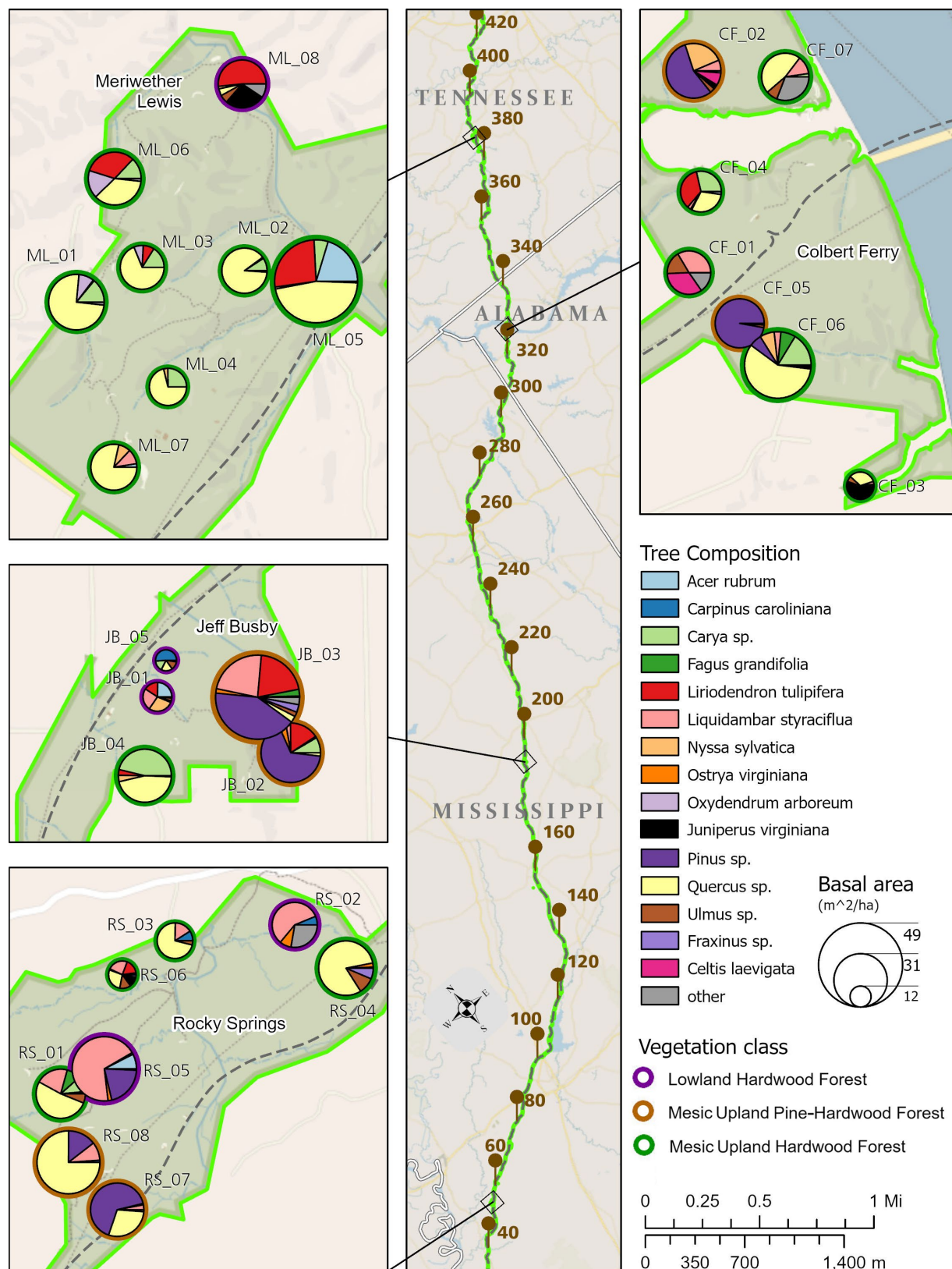


Figure 7. Total basal area and percent composition among species for I&M monitoring plots on the Natchez Trace Parkway. Point size is scaled to the mean basal area per plot, and pie charts depict the proportion of basal area belonging to each taxonomic group. The rings around the pie charts indicate the vegetation class of the plot. Tree data from the establishment trip in April 2019 were used for the three plots that went unsampled in 2021 (ML 01, ML 02 and CF 05). Based on the remaining plots in those units, the mean increase in basal area between 2019 and 2021 would be non-detectable in the figure (1.3 m²/ha over 2 years).

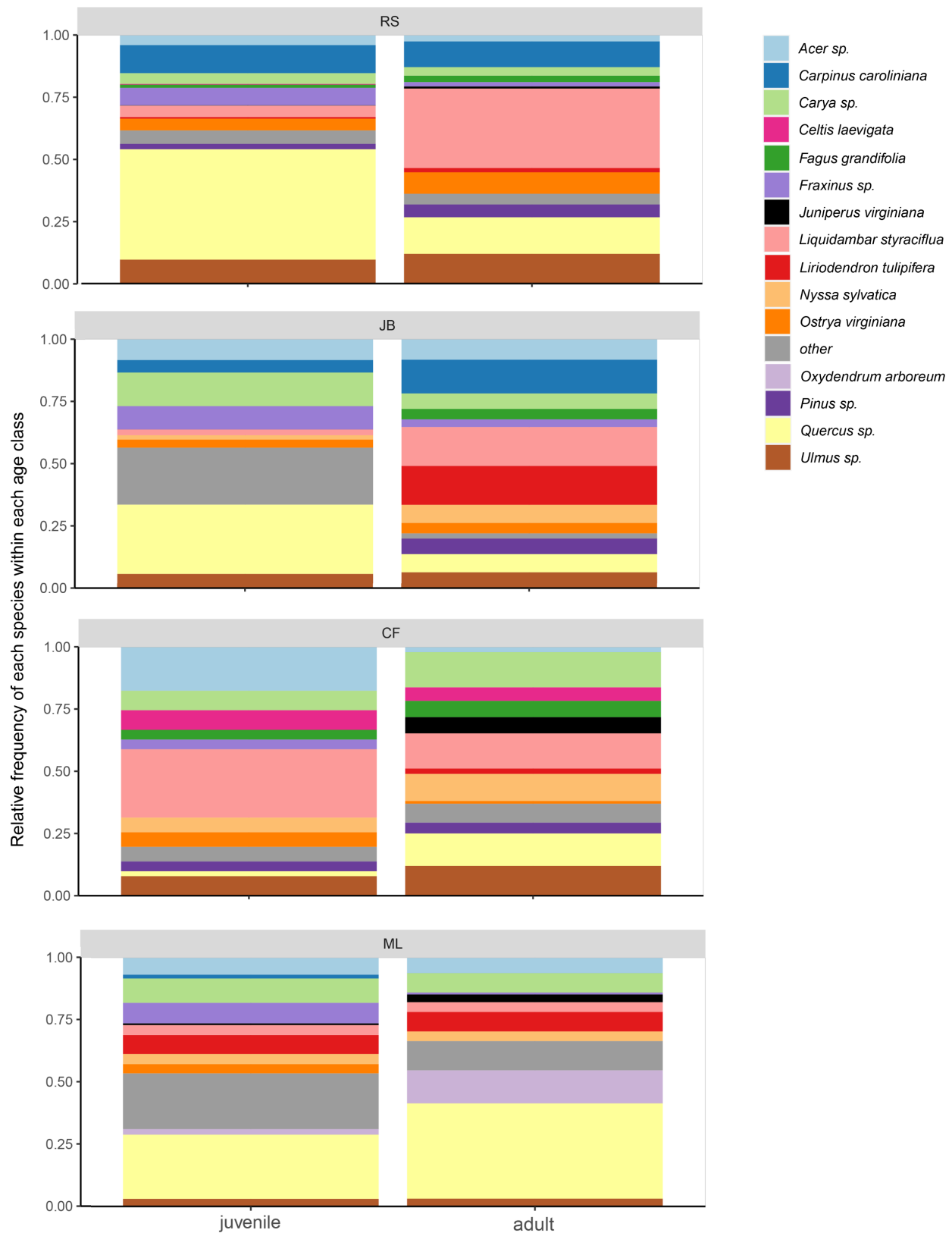


Figure 8. Relative frequency of juvenile and adult trees for the four forested monitoring sites on the Natchez Trace Parkway. Juveniles were all seedlings greater than 15 cm tall plus all saplings. Recent germinants were excluded. These figures exclude ML 01, ML 02 and CF 05 because juvenile trees were not counted there in 2021.

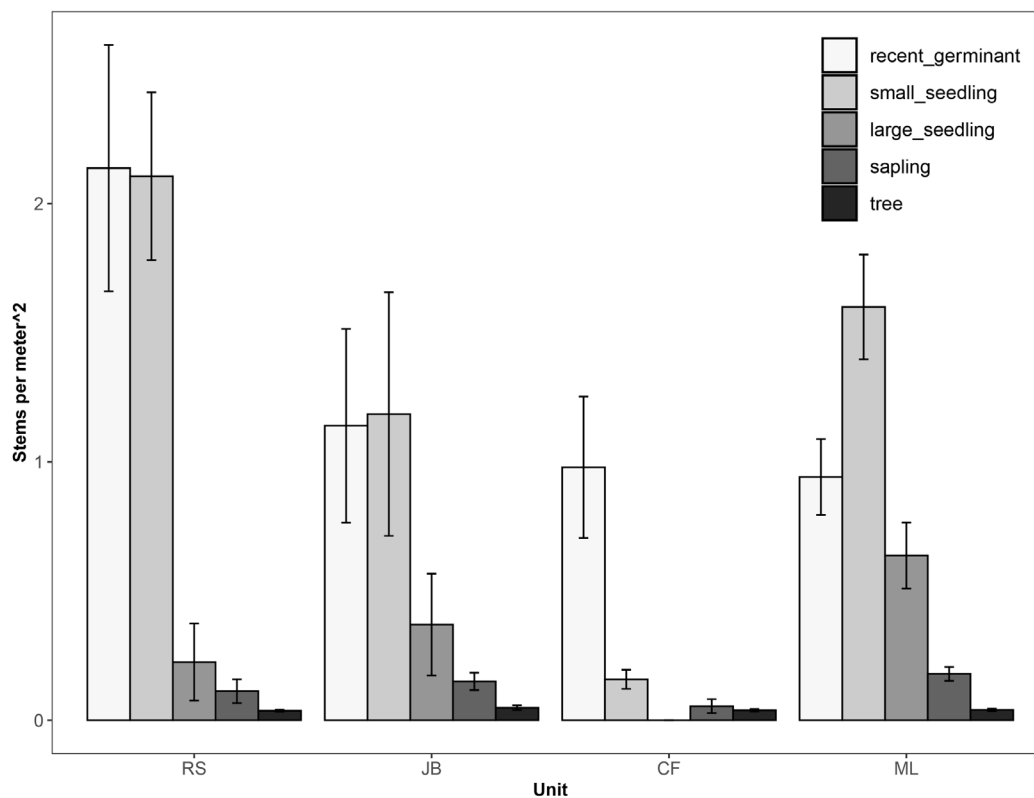


Figure 9. Stem density by tree age class for the four forested monitoring sites on the Natchez Trace Parkway. Plot-level data were collected at the full 400-m² for trees and in four 10-m² microplots for seedlings and saplings. Tree data from the establishment trip in April 2019 were used for the three plots that were not sampled in June 2021 (ML 01, ML 02 and CF 05) .

Conclusions

This is first I&M vegetation monitoring summary for the Natchez Trace Parkway, and its intent is to provide a wide breadth of findings and data summaries from the 2021 sampling season. Major results and highlights from 2021 are listed in the Summary and Key Findings section, and they are not repeated here. An overarching theme was the notable heterogeneity among sites –in species richness, understory species cover, tree metrics and regeneration metrics. To interpret these differences, they must be viewed in context of the environmental gradients and land use histories described in the introduction. After at least three rounds of data collection, the first I&M vegetation monitoring trend report will explore these in greater depth.

The next vegetation monitoring event on the Parkway is scheduled for summer 2025, and subsequent events will continue once every four years. As data accumulate for each of the 32 monitoring plots, it will be possible to determine the ways in which plot community composition

and structure are changing over time and potentially identify key drivers in these processes.

Acknowledgements

This report was prepared with assistance from Jeff Bracewell, network GIS specialist, who also central to project logistics and field data collection. Network staff members Fabi Speyrer, Whitney Granger, and Billy Finney assisted with fieldwork, data entry or data management. Participating interns were Amber Monlezun, Mackenzie Toussel, and Kimberly Bowman. Natchez Trace Parkway staff member Deanna Boench and intern Tyria Zanders participated in fieldwork at Colbert Ferry. Editorial support came from Martha Segura, network program manager, and Carolyn and Doug Carlson.

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Appendix A: Maps of Soils and Elevation

Rocky Springs

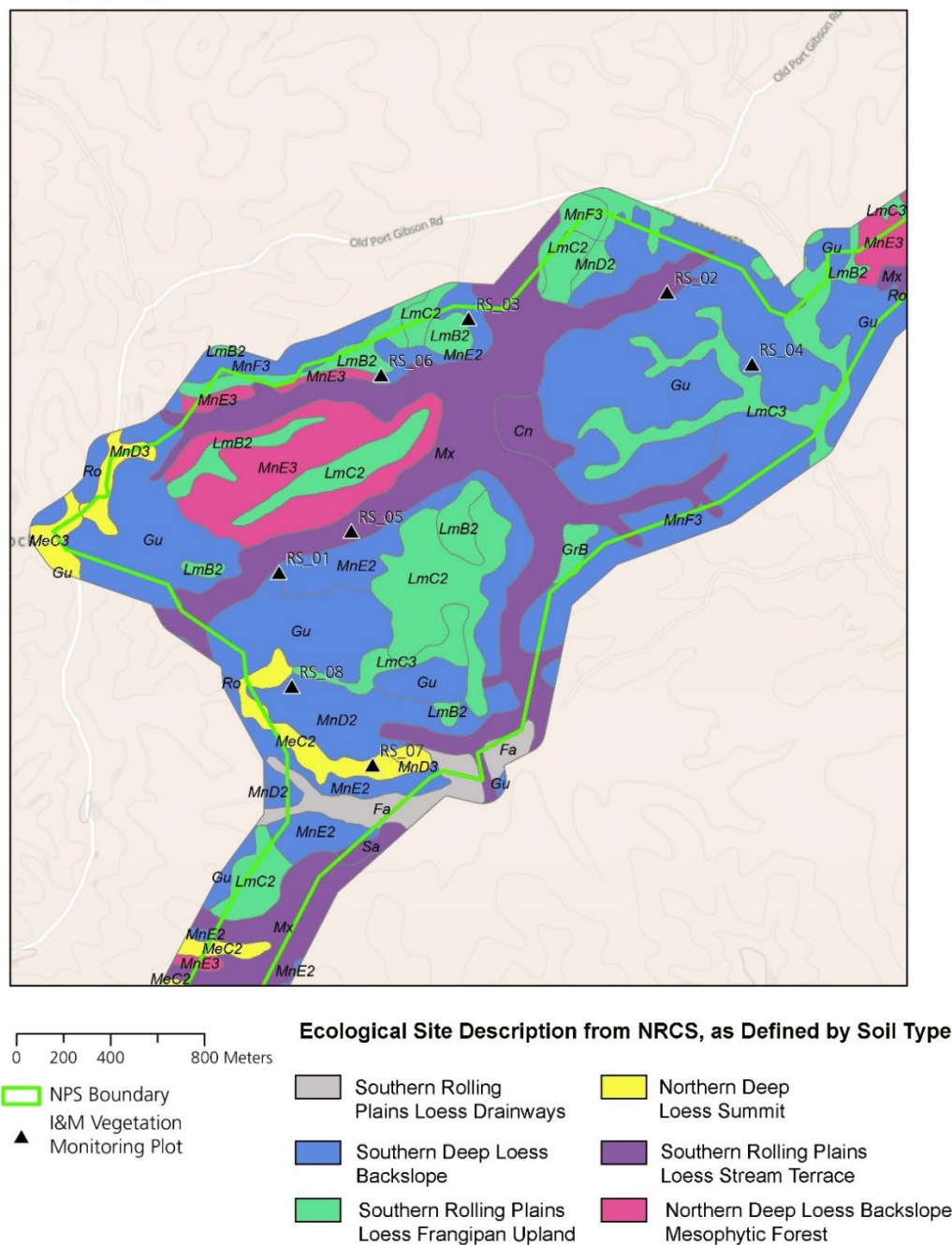


Figure A1. Rocky Springs soil map units (labeled in *italics*) and Ecological Site Descriptions (color classes). The names of the map unit codes can be found online at <https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx> with AOI centered on 32.089098, -90.803898 (data source: Claiborne county MS soils map). The USDA Ecological Site Descriptions are from <https://edit.jornada.nmsu.edu/>.

Jeff Busby

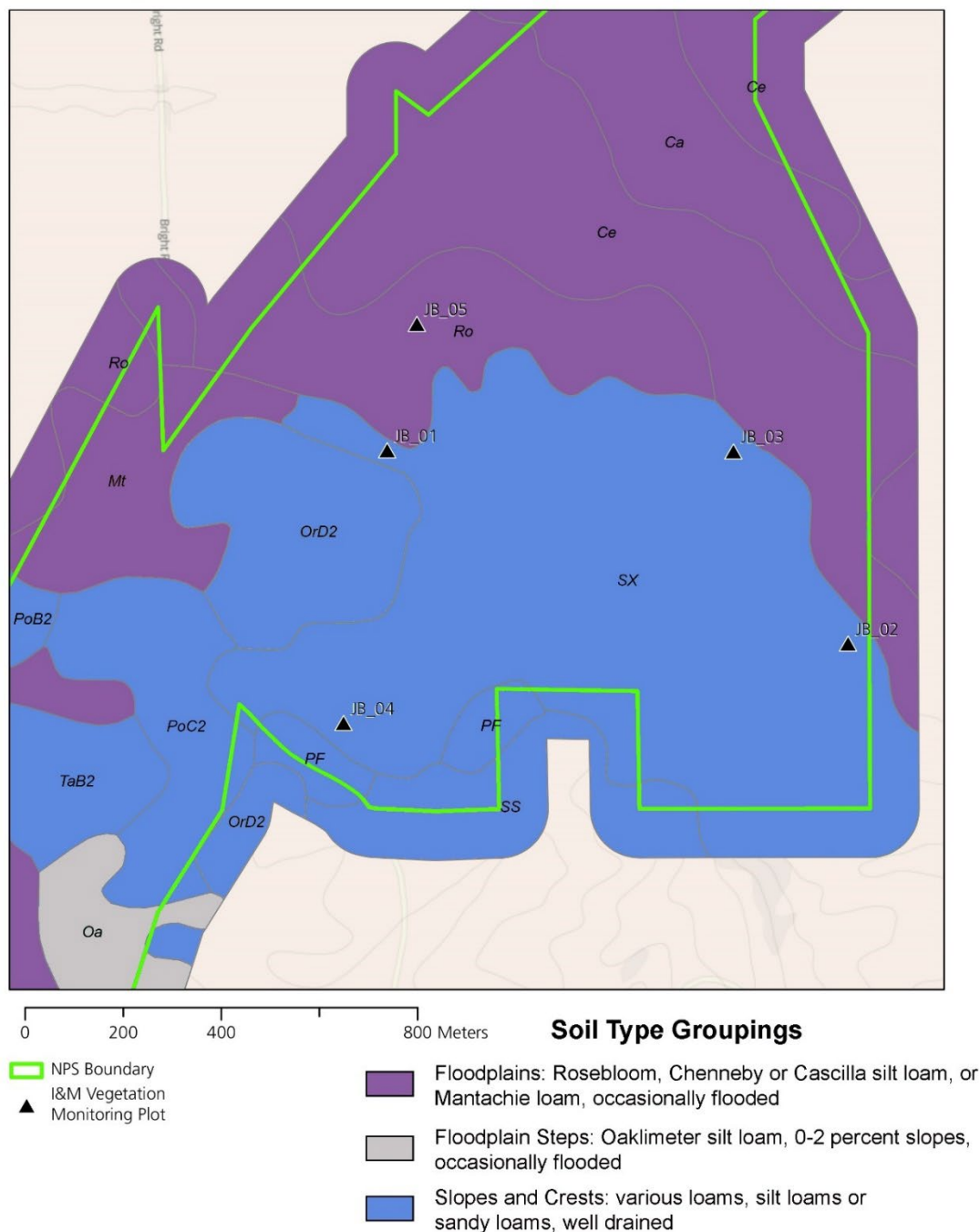


Figure A2. Jeff Busby soil map units (labeled in italics) and hydrological groupings (color classes). The names of the map unit codes can be found online at <https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx> with AOI centered on 33.418065, -89.26669 (data source: Choctaw county MS soils map). No USDA Ecological Site Descriptions are available for this site at the time of reporting.

Colbert Ferry

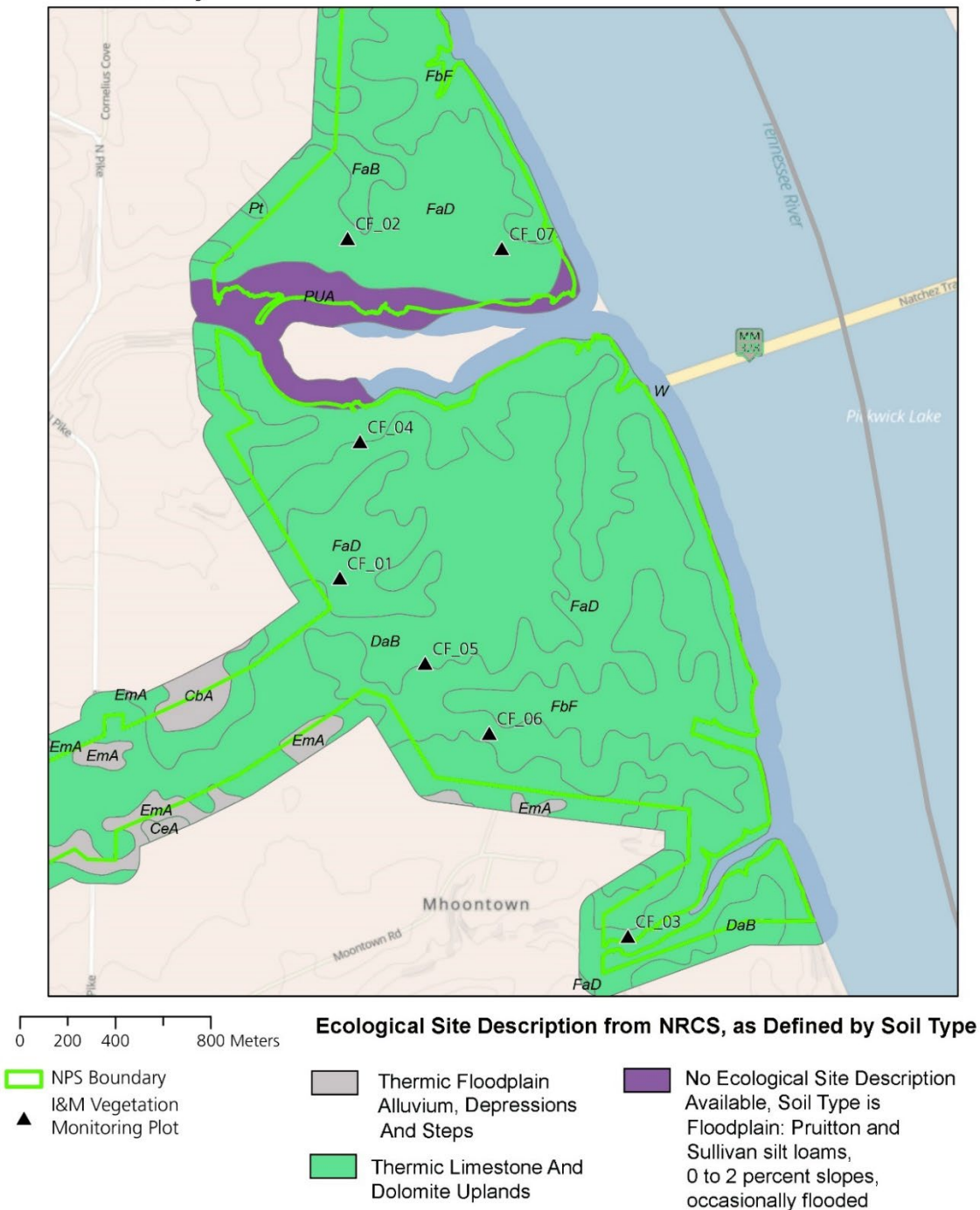
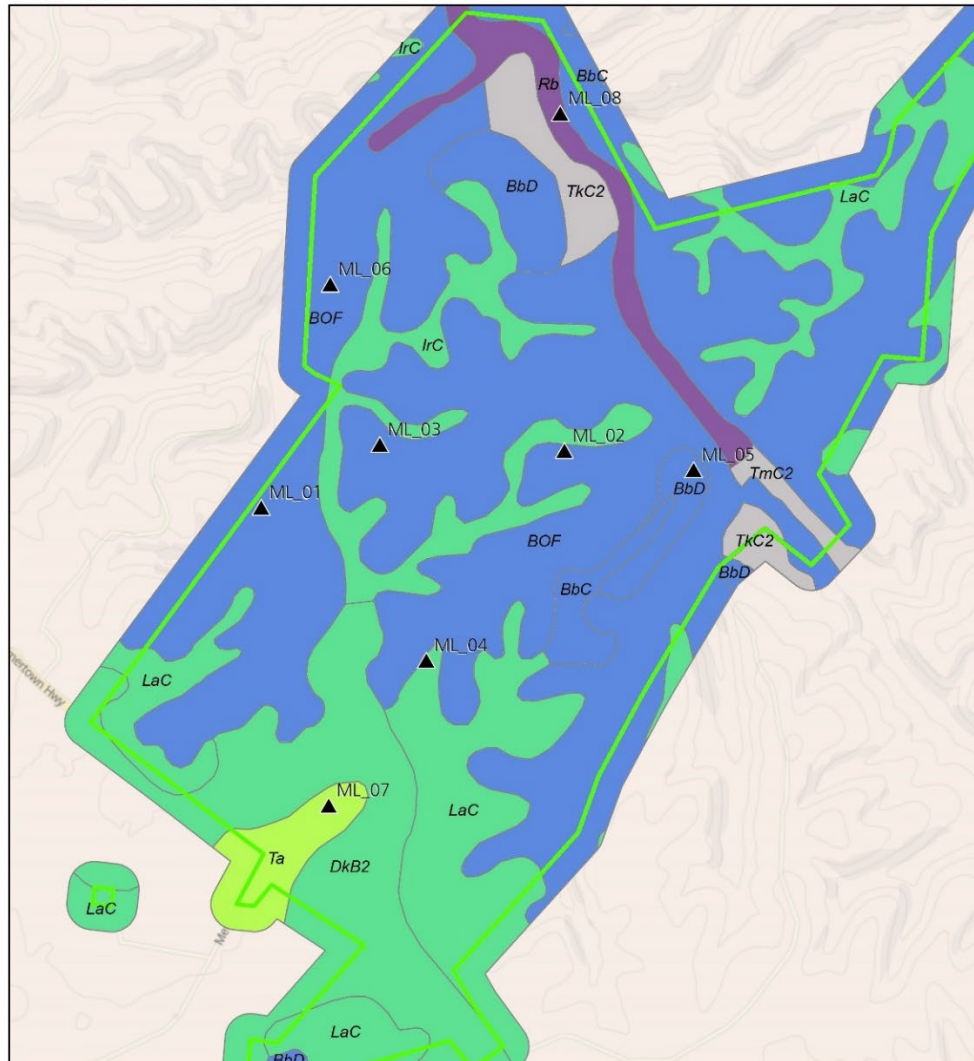


Figure A3. Colbert Ferry soil map units (labeled in italics) and Ecological Site Descriptions (color classes). The names of the map unit codes can be found online at <https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx> with AOI centered on 34.835237, -87.951611 (data source: Colbert County AL soils map). The USDA Ecological Site Descriptions are from <https://edit.jornada.nmsu.edu/>.

Meriwether Lewis



Ecological Site Description from NRCS, as Defined by Soil Type

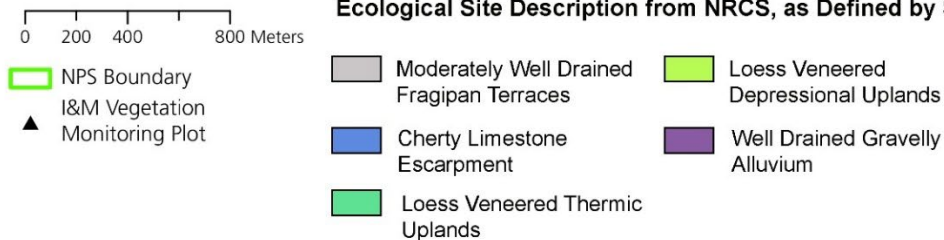


Figure A4. Meriwether Lewis soil map units (labeled in italics) and Ecological Site Descriptions (color classes). The names of the map unit codes can be found online at <https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx> with AOI centered 35.527495, -87.452316 (data source: Lewis County TN soils map). The USDA Ecological Site Descriptions are from <https://edit.jornada.nmsu.edu/>.

Chickasaw Village

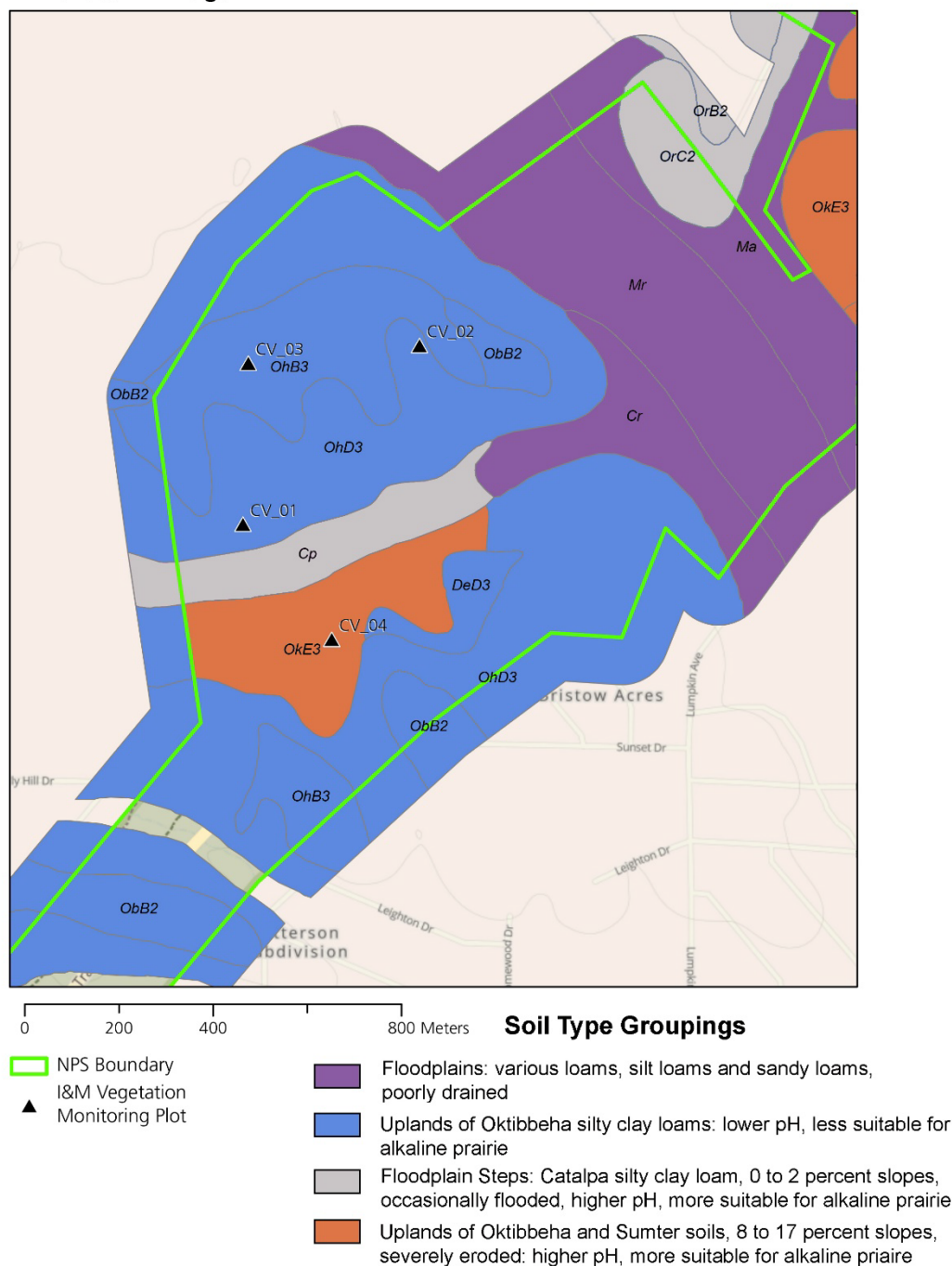


Figure A5. Chickasaw Village soil map units (labeled polygons) and soil type groupings (color classes). The soil type groupings are combinations of soils map classes based on hydrological characteristics and Black Belt Prairie Suitability (as reported by Weiland 1994). The names of the map unit codes can be found online at <https://websoilsurvey.sc.egov.usda.gov/app/WebSoilSurvey.aspx> with AOI centered on 34.278126, -88.746217 (data source: Lee county MS soils map). No USDA Ecological Site Descriptions are available for this site at the time of reporting. The Chickasaw Village site is just within, but at the eastern edge of, the Demopolis chalk formation, which is the formation where other Black Belt Prairies in MS and AL are found (Campbell and Seymour 2011a).

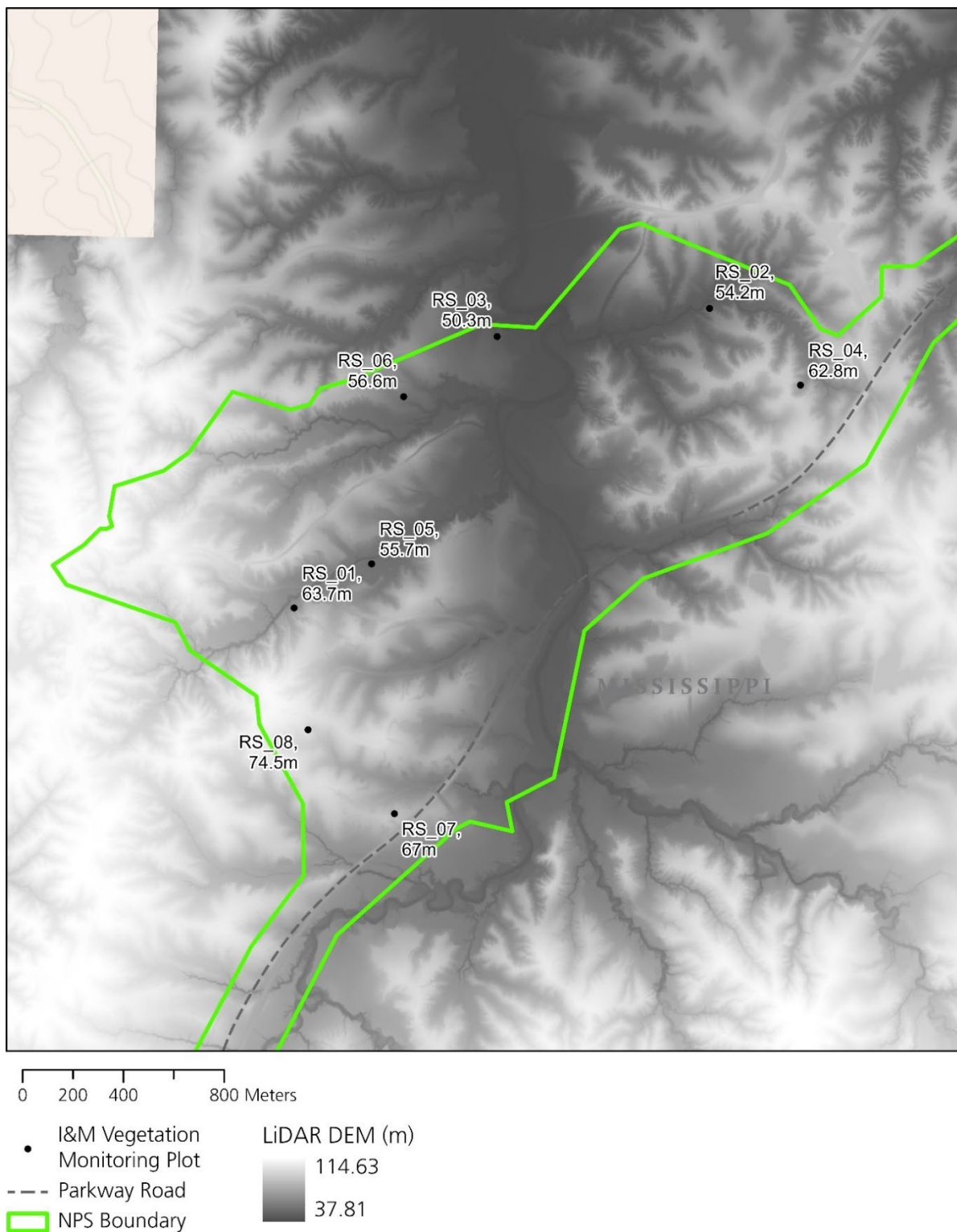


Figure A6. Rocky Springs digital elevation model from the 2016 lidar. Plot elevations are included with the plot ID label.

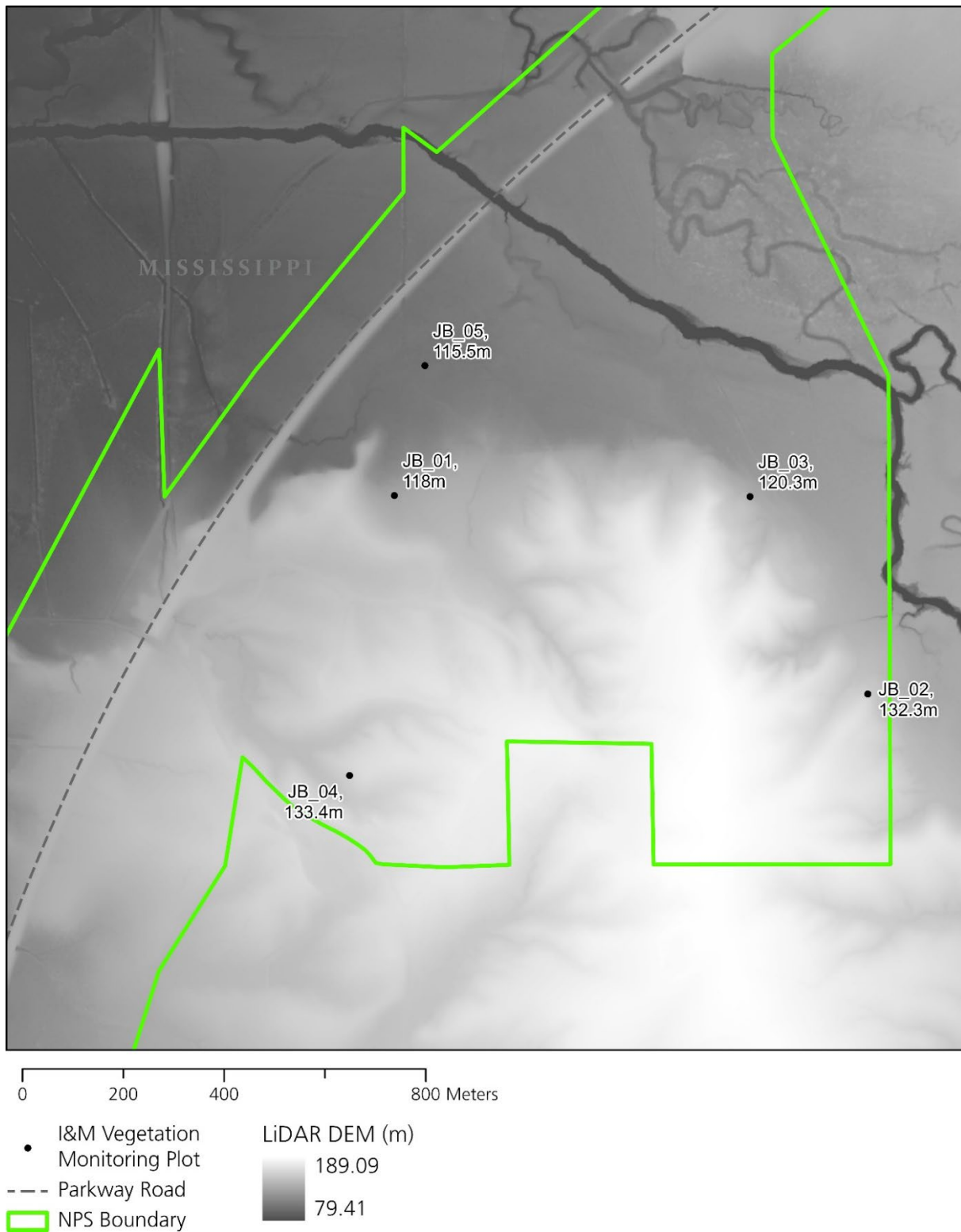


Figure A7. Jeff Busby digital elevation model from the 2014 lidar. Plot elevations are included with the plot ID label.

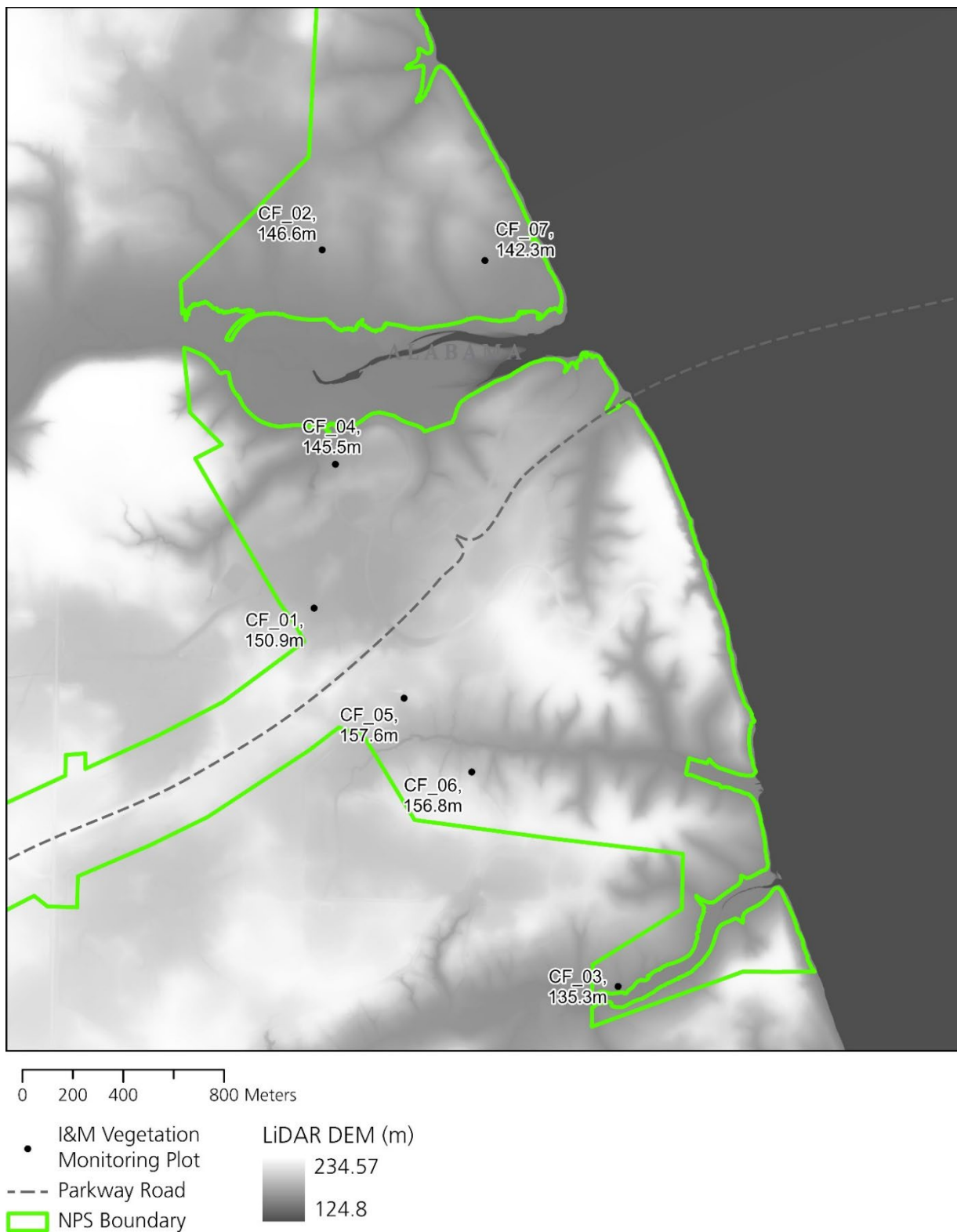


Figure A8. Colbert Ferry digital elevation model from the 2017 lidar. Plot elevations are included with the plot ID label.

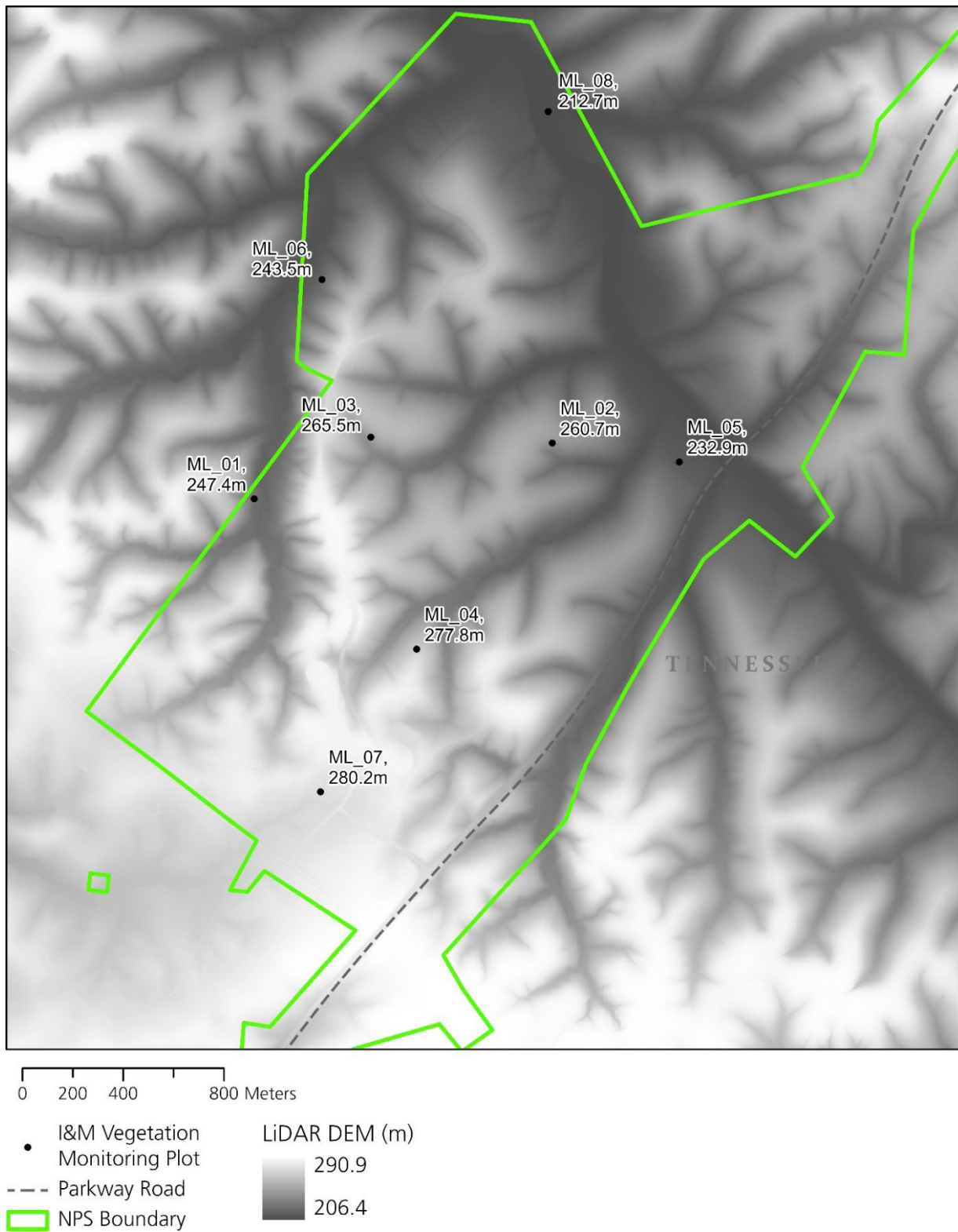


Figure A9. Meriwether Lewis digital elevation model from the 2018 lidar. Plot elevations are included with the plot ID label.



Figure A10. Chickasaw Village digital elevation model from the 2017 lidar. Plot elevations are included with the plot ID label.

Appendix B: Land Use History and Supplemental Tables of Plot Characteristics



Figure B1. Side-by-side comparison of historical imagery from 1953 and fall 2011 at Colbert Ferry, showing the extent of land clearing for farming prior to NPS ownership. Some of the areas that were cleared in 1953 were planted in pine by 1973. There were no aerial images available prior to 1953, but the area was significantly impacted in the preceding decades by the creation of Pickwick Lake in the 1930s, which submerged low-lying areas that were adjacent to the recently dammed river, including the historic Colbert Ferry landing. The John Coffee Memorial Bridge that crosses the Tennessee river at Colbert Ferry was constructed in 1964, the same year that the site came under NPS ownership. The NPS initially developed a visitor station, several roads, a boat ramp, a picnic area and two interpretive sites. In 1983, further developments were planned, including 200-site campground, 15 slip marina, 150 room lodge, 50+ cabins, and 18-hole golf course. Although that project was never fully implemented, some abandoned infrastructure from earlier years is visible on the approach to vegetation monitoring plot CF05. Plots CF01 and CF02 also still contain evidence of past human use, such as artificially flat ground surfaces and scattered trash. Additional plot-specific details are in Table B1.

Table B1. Broad vegetation classes, ecological site descriptions (<https://edit.jornada.nmsu.edu>) and disturbance history of the Gulf Coast I&M Network's 32 long-term vegetation monitoring plots along the Natchez Trace Parkway. Fire History includes all prescribed fires and wildfires between January 2011-May 2021, based on ArcGIS online feature services published by the NPS fire program. Evidence of disturbance was recorded on-site as well as remotely using Lidar DEM and aerial imagery (1949, 1960, 1969 and 1996 in RS; 1952, 1964 and 1996 in JB; 1953 and 1972 in CF; 1988 in ML; 1947, 1953 and 1972 in CV). Even for plots that did not show signs of past disturbance, all areas were likely clear-cut or selectively logged prior to NPS acquisition.

Plot ID	Broad Vegetation Class	Ecological Site Description from NRCS, as Defined by Soil Type	Fire History	Disturbance History
RS 01	Mesic Upland Hardwood Forest	Southern Deep Loess Backslope	No treatment history or evidence of past fires.	No evidence of past disturbance in available imagery or Lidar.
RS 02	Lowland Hardwood Forest	Southern Rolling Plains Loess Stream Terrace	Within a burn unit that was treated in 1/2015, but no evidence of past fires in plot.	No evidence of past disturbance in available imagery or Lidar.
RS 03	Mesic Upland Hardwood Forest	Southern Deep Loess Backslope	No treatment history or evidence of past fires.	In a clearing in 1949, 1960 and 1969 imagery but closed by 1996.
RS 04	Mesic Upland Hardwood Forest	Southern Deep Loess Backslope	Within a burn unit that was treated in 1/2015, but no evidence of past fires in plot.	No evidence of past disturbance in available imagery or Lidar.
RS 05	Lowland Hardwood Forest	Southern Rolling Plains Loess Stream Terrace	Within a burn unit that was treated in 1/2015, but no evidence of past fires in plot.	In a clearing in 1949, 1960 and 1969 imagery but closed by 1996.
RS 06	Mesic Upland Hardwood Forest	Southern Deep Loess Backslope	No treatment history or evidence of past fires.	No evidence of past disturbance in available imagery or Lidar.
RS 07	Mesic Upland Pine - Hardwood Forest	Southern Deep Loess Summit	200 m from the burn unit that was treated in 1/2015, but several fire-scarred trees in plot.	Site is dominated by pine, suggesting plantation history. Plot is within 50m of road.
RS 08	Mesic Upland Pine - Hardwood Forest	Southern Deep Loess Summit	Within a burn unit that was treated in 1/2015 and several fire-scarred trees in plot	Large, non-native yucca and a large pine are present, suggesting human use history. Site is within 80 m of park road and trail. Large treefall gap in 2021.
JB 01	Lowland Hardwood Forest	Poorly drained silty alluvium on Rosebloom silt loam and steep, well-drained Sweatman-Providence association	Within a burn unit that was treated in 2/2011, but no evidence of past fires in plot.	In a clearing in 1952 imagery but closed by 1964. Large treefall gap in 2021.
JB 02	Mesic Upland Pine - Hardwood Forest	Steep, well-drained Sweatman-Providence association	No treatment history or evidence of past fires.	Lidar DEM shows an old roadbed through plot; 4 large pines. The plot is the closest in JB to the neighboring lignite mine (opened in 2000), but the mine is still a kilometer away.
JB 03	Mesic Upland Pine - Hardwood Forest	Steep, well-drained Sweatman-Providence association	No treatment history or evidence of past fires.	Straddling the edge of large, flat cleared area in 1952, which had intermittent trees by 1964 and was closed by 1996
JB 04	Mesic Upland Hardwood Forest	Steep, well-drained Sweatman-Providence association	Within a burn unit that was treated in 1/2016, and a few fire scars evident in plot.	No evidence of past disturbance in available imagery or Lidar.
JB 05	Lowland Hardwood Forest	Poorly drained silty alluvium on Rosebloom silt loam	No treatment history or evidence of past fires.	No evidence of past disturbance in available imagery or Lidar, except within 25 m from clearing edge in 1952.
CF 01	Mesic Upland Hardwood Forest	Thermic limestone and dolomite uplands	No treatment history or evidence of past fires.	In a clearing in 1953 imagery, but not subsequently planted in pine. The topography appears artificially uniform and the tree community remains ruderal with 73% stilt grass.
CF 02	Mesic Upland Pine - Hardwood Forest	Thermic limestone and dolomite uplands	No treatment history or evidence of past fires.	In a clearing in 1953 imagery but by 1972 was planted in pine. Three

Table B1. Continued.

Plot ID	Broad Vegetation Class	Ecological Site Description from NRCS, as Defined by Soil Type	Fire History	Disturbance History
				matures pines remain in plot, with 34% stilt grass understory. Old trash present.
CF 03	Mesic Upland Hardwood Forest	Thermic limestone and dolomite uplands	No treatment history or evidence of past fires.	No evidence of disturbance in available imagery or Lidar, but plot has 7 dead and 4 live eastern dead cedars on a steep slope.
CF 04	Mesic Upland Hardwood Forest	Thermic limestone and dolomite uplands	No treatment history or evidence of past fires.	No evidence of past disturbance in available imagery or Lidar.
CF 05	Mesic Upland Pine - Hardwood Forest	Thermic limestone and dolomite uplands	Within a burn unit that was treated in 2/2016, and a few fire scars evident in plot.	In a clearing in 1953 but by 1972 was planted in pine and understory was probably cleared for campground; remains pine dominated.
CF 06	Mesic Upland Hardwood Forest	Thermic limestone and dolomite uplands	Within a burn unit that was treated in 2/2016, and a few fire scars evident in plot.	Lidar DEM shows an old roadbed or deep cut tracks through plot.
CF 07	Mesic Upland Hardwood Forest	Thermic limestone and dolomite uplands	No treatment history or evidence of past fires.	Lidar DEM shows possibility of a few cut tracks through plot.
ML 01	Mesic Upland Hardwood Forest	Cherty limestone escarpment	No treatment history or evidence of past fires.	No evidence of past disturbance in available imagery or Lidar.
ML 02	Mesic Upland Hardwood Forest	Cherty limestone escarpment	Within a burn unit that was treated in 3/2014, but no evidence of past fires in plot	No evidence of past disturbance in available imagery or Lidar.
ML 03	Mesic Upland Hardwood Forest	Cherty limestone escarpment	Within a burn unit that was treated in 3/2014, and a few fire scars evident in plot	No evidence of past disturbance in available imagery or Lidar.
ML 04	Mesic Upland Hardwood Forest	Loess veneered thermic uplands	Within a burn unit that was treated in 2/2012, and a few fire scars evident in plot	No evidence of past disturbance in available imagery or Lidar.
ML 05	Mesic Upland Hardwood Forest	Cherty limestone escarpment	Within a burn unit that was treated in 2/2012, but no evidence of past fires in plot.	Lidar DEM shows deep cut tracks through the plot and to the creek.
ML 06	Mesic Upland Hardwood Forest	Cherty limestone escarpment	Within a burn unit that was treated in 1/2015, but no evidence of past fires in plot.	No evidence of past disturbance in available imagery or Lidar.
ML 07	Mesic Upland Hardwood Forest	loess veneered depressional uplands	Within a burn unit that was treated in 1/2015, but no evidence of past fires in plot.	No evidence of past disturbance in available imagery or Lidar.
ML 08	Lowland Hardwood Forest	well drained gravelly alluvium	No treatment history or evidence of past fires.	No evidence of disturbance in available imagery or Lidar, but likely impacted by creek and tributary on two sides. Powerline clearing is within 20 m but appears to have no impact.
CV 01	Mixed Ruderal Prairie	Oktibbeha silty clay, 5 to 12 percent slopes, acidic soils	Burn unit treated annually in winter since 2016, but herbaceous vegetation in plot is dense	Plot without trees from first imagery (1947) to present, although apparent agricultural use in 1947 and mowing in 1972. Park entry road added by 1953. NPS removed the site from ag. lease in 1985.
CV 02	Mixed Ruderal Prairie	Oktibbeha silty clay, 5 to 12 percent slopes, acidic soils	Same as CV 01	Same as CV 01
CV 03	Mixed Ruderal Prairie	Oktibbeha silty clay, 2 to 5 percent slopes, acidic soils	Same as CV 01	Same as CV 01
CV 04	Black Belt Prairie	Oktibbeha and Sumter soils, with Sumter soils being calcareous and associated with black belt prairie	Same as CV 01, except that herbaceous vegetation is relatively sparse rather than dense suggesting prescribed fire was more effective here	Same as CV 01

Table B2. Tree and regeneration metrics from each Gulf Coast Network vegetation monitoring plot on the Natchez Trace Parkway. Adult tree data were collected for all trees ≥ 10 cm DBH in the 400-m² plot, and regeneration data (seedling and sapling densities) were collected in a 40-m² area of the plot (four 10-m² microplots). Two plots in ML and one plot in CF were not sampled in 2021, but their adult trees were tagged and measured in 2019 during plot establishment. This table used the 2019 data for adult tree metrics in those three plots and 2021 data for the remaining plots. Two-year growth was estimated to be 0.5 cm DBH, based on the remaining 757 trees that were measured in both 2019 and 2021.

Plot ID, Vegetation Class	Live Stem Count	Live Stems /ha	Standing Dead Stems /ha	Basal Area (m ² /ha)	Canopy Height (m)	Canopy Closure	Mean DBH (cm)	Percent with Structural Damage	Recent Germinant Density in 40-m ²	Small Seedling Density in 40-m ²	Large Seedling Density in 40-m ²	Sapling Density in 40- m ²
RS 01	16	400	50	28.62	29.37	90%	32.6	19%	137	137	2	1
RS 02	13	325	0	26.25	27.30	94%	27.1	23%	93	68	1	4
RS 03	14	350	0	20.83	31.53	90%	25.6	14%	190	109	1	4
RS 04	12	300	0	31.68	25.40	94%	23.7	0%	50	32	3	0
RS 05	22	550	100	37.22	32.23	95%	37.9	5%	63	51	0	1
RS 06	20	500	75	16.18	28.50	90%	24.5	15%	79	104	1	1
RS 07	9	225	50	31.02	33.50	86%	24.2	0%	32	60	15	14
RS 08	10	250	0	36.46	33.33	87%	19.2	20%	40	114	49	11
JB 01	20	500	25	16.91	21.67	93%	30.2	0%	29	56	22	6
JB 02	15	375	0	34.48	37.17	78%	23.2	0%	19	15	6	5
JB 03	32	800	25	48.56	31.67	77%	33.4	3%	38	8	0	11
JB 04	10	250	0	30.84	29.67	88%	17.2	0%	104	114	43	3
JB 05	19	475	50	12.49	24.00	93%	24.9	5%	38	44	4	5
CF 01	10	250	0	25.34	24.43	92%	25.4	0%	9	6	0	0
CF 02	17	425	25	31.75	27.10	90%	29.4	0%	41	6	0	1
CF 03	11	275	200	16.14	20.37	86%	27.5	18%	37	5	0	1
CF 04	14	350	100	23.79	31.37	93%	33.6	0%	38	8	0	5
CF 05	8	200	0	28.52	28.10	-	22	-	-	-	-	-
CF 06	24	600	25	38.52	31.03	92%	25.9	4%	22	1	0	0
CF 07	16	400	0	27.50	20.97	97%	24.5	6%	88	12	0	6
ML 01	19	475	0	32.24	33.30	-	24.7	-	-	-	-	-
ML 02	17	425	0	26.33	27.77	-	27.7	-	-	-	-	-
ML 03	12	300	75	25.53	27.47	91%	22.5	58%	41	52	11	7
ML 04	12	300	50	21.73	26.43	86%	24.9	0%	51	79	31	6
ML 05	15	375	0	47.91	25.73	92%	26.5	7%	18	62	41	5
ML 06	24	600	0	30.70	27.83	92%	18.8	17%	32	79	11	8
ML 07	14	350	0	26.75	19.90	91%	36.3	0%	28	31	24	5
ML 08	18	450	0	27.87	24.40	93%	35.8	22%	56	81	35	12

Appendix C: Plant Species Lists for Forested Sites and Chickasaw Village Site

Table C1. List of plant species in forested sites from 2021 vegetation monitoring at Natchez Trace Parkway. Frequency values (%) are provided for each recorded plant species at the 400-m² plot level, calculated as the number of plots where a species is recorded divided by the total plots sampled in that group. For Nativity, N=Native, E=Non-Native and U=Nativity Status Unknown. The Vascular Plant Inventory for the Parkway by Hatch and Kruse (2008) documented 2,197 taxa. The current effort detected two species in forests that were not already present on the park's species list, which are marked with an asterisk (*). These records have already been added to NPSpecies. Two asterisks (**) indicate a plant species that was also recorded in the monitored prairie site CV, which has its species listed in Table C2. Project botanist for the Natchez Trace Parkway was Jane Carlson, using the taxonomic references of "Guide to the Vascular Plants of Tennessee" by Chester et al. 2015, "Flora of the Southeastern United States" by Weakly et al. 2022, and "Ferns of Alabama" by Short and Spaulding 2012, among others. Accepted scientific names were based on the United States Department of Agriculture Natural Resource Conservation Service's PLANTS database (<https://plants.usda.gov/>).

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in RS plots (8)	Freq. in JB plots (5)	Freq. in ML plots (6)	Freq. in CF plots (6)	Freq. overall (25)
Forb	Acanthaceae	<i>Ruellia caroliniensis</i>	Carolina wild petunia	N	25%	0%	0%	0%	8%
Forb	Apiaceae	<i>Sanicula canadensis</i>	Canadian blacksnakeroot	N	100%	100%	0%	43%	64%
Forb	Apiaceae	<i>Sanicula odorata</i>	Clustered blacksnakeroot	N	0%	0%	67%	0%	16%
Forb	Apiaceae	<i>Zizia aurea</i>	Golden Alexanders	N	0%	0%	17%	0%	4%
Forb	Araceae	<i>Arisaema dracontium</i>	Green dragon	N	38%	0%	0%	0%	12%
Forb	Araceae	<i>Arisaema triphyllum</i>	Jack in the pulpit	N	88%	100%	33%	14%	60%
Forb	Araliaceae	<i>Panax quinquefolius</i>	American ginseng	N	0%	0%	0%	14%	4%
Forb	Aristolochiaceae	<i>Aristolochia serpentaria</i>	Virginia snakeroot	N	100%	80%	83%	14%	72%
Forb	Asclepiadaceae	<i>Asclepias variegata</i>	Redring milkweed	N	13%	20%	0%	0%	8%
Forb	Asparagaceae	<i>Maianthemum racemosum</i>	False Solomon's-seal	N	13%	40%	67%	0%	28%
Forb	Asparagaceae	<i>Polygonatum biflorum</i>	King Solomon's seal	N	0%	0%	67%	0%	16%
Forb	Aspleniaceae	<i>Asplenium platyneuron</i>	Ebony spleenwort	N	50%	20%	17%	57%	40%
Forb	Asteraceae	<i>Ageratina altissima</i>	White snakeroot	N	0%	0%	0%	14%	4%
Forb	Asteraceae	<i>Antennaria plantaginifolia</i>	Plantainleaf pussytoes	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Cirsium altissimum</i>	Roadside thistle	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Cirsium</i> sp.	Thistle	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Coreopsis major</i>	Greater tickseed	N	0%	0%	67%	0%	16%
Forb	Asteraceae	<i>Coreopsis tripteris</i>	Tall tickseed	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Elephantopus</i> sp.	Elephantsfoot	N	38%	0%	0%	0%	12%
Forb	Asteraceae	<i>Elephantopus tomentosus</i>	Devil's grandmother	N	13%	20%	17%	0%	12%
Forb	Asteraceae	<i>Erechtites hieraciifolius</i> **	American burnweed	N	75%	20%	0%	0%	28%
Forb	Asteraceae	<i>Erigeron annuus</i>	Annual fleabane	N	0%	0%	33%	0%	8%
Forb	Asteraceae	<i>Krigia</i> sp.	Dwarf dandelion	E	0%	0%	50%	0%	12%
Forb	Asteraceae	<i>Lactuca</i> sp.	Lettuce	U	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Pluchea</i> sp.	Camphorweed	N	13%	20%	0%	0%	8%
Forb	Asteraceae	<i>Polymnia canadensis</i>	Pale-flower leafcup	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Prenanthes altissima</i>	Rattlesnake root	N	0%	0%	50%	0%	12%
Forb	Asteraceae	<i>Smilax uvedalius</i>	Hairy leafcup	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Solidago caesia</i>	Wreath goldenrod	N	0%	0%	17%	0%	4%
Forb	Asteraceae	<i>Solidago</i> sp.	Goldenrod	N	13%	0%	17%	0%	8%
Forb	Asteraceae	<i>Sonchus</i> sp.	Sowthistle	E	13%	0%	17%	0%	8%
Forb	Asteraceae	<i>Verbesina alternifolia</i>	Wingstem	N	0%	0%	17%	0%	4%
Forb	Balsaminaceae	<i>Impatiens capensis</i>	Jewelweed	N	0%	20%	0%	0%	4%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in RS plots (8)	Freq. in JB plots (5)	Freq. in ML plots (6)	Freq. in CF plots (6)	Freq. overall (25)
Forb	Berberidaceae	<i>Podophyllum peltatum</i>	May apple	N	0%	0%	33%	14%	12%
Forb	Boraginaceae	<i>Cynoglossum virginianum</i>	Blue houndstongue	N	13%	0%	50%	57%	32%
Forb	Boraginaceae	<i>Lithospermum tuberosum</i>	Tuberous gromwell	N	38%	0%	0%	0%	12%
Forb	Boraginaceae	<i>Myosotis verna</i>	Spring forget-me-not	N	0%	0%	17%	0%	4%
Forb	Buxaceae	<i>Pachysandra procumbens</i>	Allegheny spurge	N	0%	0%	17%	0%	4%
Forb	Commelinaceae	<i>Tradescantia</i> sp.	spiderwort	N	0%	0%	0%	14%	4%
Forb	Dennstaedtiaceae	<i>Pteridium aquilinum</i>	Brackenfern	N	0%	0%	17%	0%	4%
Forb	Dryopteridaceae	<i>Polystichum acrostichoides</i>	Christmas fern	N	100%	60%	67%	14%	64%
Forb	Ericaceae	<i>Chimaphila maculata</i>	Striped prince's pine	N	0%	0%	50%	0%	12%
Forb	Euphorbiaceae	<i>Acalypha gracilens</i>	Slender threeseed mercury	N	0%	20%	0%	0%	4%
Forb	Euphorbiaceae	<i>Acalypha</i> sp.	Copperleaf	N	13%	0%	0%	0%	4%
Forb	Euphorbiaceae	<i>Acalypha virginica</i> **	Virginia copperleaf	N	13%	0%	0%	0%	4%
Forb	Euphorbiaceae	<i>Euphorbia corollata</i> **	Flowering spurge	N	0%	0%	33%	0%	8%
Forb	Fabaceae	<i>Desmodium glabellum</i> (including <i>Desmodium</i> sp. cf <i>glabellum</i>)	Tall ticktrefoil	N	50%	20%	0%	0%	20%
Forb	Fabaceae	<i>Desmodium glutinosum</i>	Largeflower ticktrefoil	N	100%	20%	0%	0%	36%
Forb	Fabaceae	<i>Desmodium nudiflorum</i>	Barestem ticktrefoil	N	13%	60%	33%	0%	24%
Forb	Fabaceae	<i>Desmodium paniculatum</i>	Panicleleaf ticktrefoil	N	0%	20%	0%	0%	4%
Forb	Fabaceae	<i>Desmodium pauciflorum</i>	Fewflower ticktrefoil	N	13%	0%	0%	0%	4%
Forb	Fabaceae	<i>Desmodium rotundifolium</i>	Prostrate ticktrefoil	N	25%	40%	33%	0%	24%
Forb	Fabaceae	<i>Desmodium</i> sp.	Ticktrefoil	N	38%	0%	0%	14%	16%
Forb	Fabaceae	<i>Erythrina herbacea</i>	Ticktrefoil	N	13%	0%	0%	0%	4%
Forb	Fabaceae	<i>Lespedeza cuneata</i> **	Silky bush clover	E	13%	0%	0%	0%	4%
Forb	Fabaceae	<i>Lespedeza frutescens</i>	Shrubby lespedeza	N	0%	0%	33%	0%	8%
Forb	Fabaceae	<i>Lespedeza procumbens</i> **	Trailing lespedeza	N	0%	0%	67%	14%	20%
Forb	Fabaceae	<i>Vicia</i> sp.	Vetch	U	0%	0%	17%	0%	4%
Forb	Gentianaceae	<i>Frasera caroliniensis</i>	American columbo	N	0%	0%	33%	0%	8%
Forb	Hypericaceae	<i>Hypericum hypericoides</i> **	St. Andrew's cross	N	38%	40%	50%	0%	32%
Forb	Lamiaceae	<i>Blephilia ciliata</i> **	Downy Blephilia	N	0%	20%	33%	0%	12%
Forb	Lamiaceae	<i>Collinsonia canadensis</i>	Richweed	N	0%	0%	17%	86%	28%
Forb	Lamiaceae	<i>Monarda bradburiana</i>	Eastern beebalm	N	0%	0%	33%	0%	8%
Forb	Lamiaceae	<i>Pycnanthemum tenuifolium</i> **	Narrowleaf mountainmint	N	0%	0%	17%	0%	4%
Forb	Lamiaceae	<i>Salvia lyrata</i>	Lyreleaf sage	N	0%	20%	33%	0%	12%
Forb	Lamiaceae	<i>Scutellaria elliptica</i>	Hairy skullcap	N	0%	0%	33%	0%	8%
Forb	Lamiaceae	<i>Scutellaria integrifolia</i>	Helmet flower	N	0%	20%	0%	0%	4%
Forb	Lamiaceae	<i>Teucrium canadense</i>	Hairy germander	N	0%	0%	33%	0%	8%
Forb	Loganiaceae	<i>Spigelia marilandica</i>	Woodland pinkroot	N	0%	0%	17%	0%	4%
Forb	Melanthiaceae	<i>Chamaelirium luteum</i>	Fairywand	N	0%	0%	17%	0%	4%
Forb	Melanthiaceae	<i>Trillium</i> sp.	Wakerobin	N	0%	0%	33%	0%	8%
Forb	Onocleaceae	<i>Onoclea sensibilis</i>	Sensitive fern	N	0%	20%	0%	0%	4%
Forb	Ophioglossaceae	<i>Botrychium bitematum</i> or <i>dissectum</i> **	Grape fern	N	100%	20%	0%	0%	36%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in RS plots (8)	Freq. in JB plots (5)	Freq. in ML plots (6)	Freq. in CF plots (6)	Freq. overall (25)
Forb	Ophioglossaceae	<i>Botrychium virginianum</i>	Common grapefern	N	75%	80%	50%	43%	64%
Forb	Ophioglossaceae	<i>Ophioglossum</i> sp.	adderstongue	N	13%	0%	0%	0%	4%
Forb	Orchidaceae	<i>Goodyera pubescens</i>	Downy rattlesnake plantain	N	0%	0%	17%	0%	4%
Forb	Orchidaceae	<i>Malaxis unifolia</i>	Green addersmouth orchid	N	0%	0%	50%	0%	12%
Forb	Orchidaceae	<i>Platanthera lacera</i>	Green fringed orchid	N	0%	0%	17%	0%	4%
Forb	Orchidaceae	<i>Spiranthes</i> sp.	Ladies' tresses	N	0%	0%	17%	0%	4%
Forb	Oxalidaceae	<i>Oxalis</i> sp.	Woodsorrel	N	38%	0%	0%	0%	12%
Forb	Oxalidaceae	<i>Oxalis stricta</i>	Common yellow woodsorrel	N	0%	0%	50%	0%	12%
Forb	Phrymaceae	<i>Mimulus alatus</i>	Sharpwing monkeyflower	N	0%	20%	0%	0%	4%
Forb	Phrymaceae	<i>Phryma leptostachya</i>	American lopseed	N	25%	40%	17%	57%	36%
Forb	Phytolaccaceae	<i>Phytolacca americana</i>	inkberry	N	25%	0%	0%	57%	24%
Forb	Polemoniaceae	<i>Polemonium reptans</i>	Greek valerian	N	0%	0%	17%	0%	4%
Forb	Polygonaceae	<i>Persicaria longiseta</i>	Oriental lady's thumb	N	0%	0%	0%	57%	16%
Forb	Polygonaceae	<i>Persicaria punctata</i>	Dotted smartweed	N	25%	0%	0%	0%	8%
Forb	Polygonaceae	<i>Persicaria virginiana</i>	Jumpseed	N	25%	60%	17%	29%	32%
Forb	Polypodiaceae	<i>Pleopeltis polypodioides</i>	Resurrection fern	N	50%	80%	0%	14%	36%
Forb	Primulaceae	<i>Lysimachia hybrida</i>	Lance-leaf loosestrife	N	0%	0%	17%	0%	4%
Forb	Primulaceae	<i>Lysimachia quadrifolia</i>	Whorled loosestrife	N	0%	0%	50%	0%	12%
Forb	Ranunculaceae	<i>Actaea pachypoda</i>	Baneberry	N	0%	0%	17%	0%	4%
Forb	Ranunculaceae	<i>Ranunculus recurvatus</i>	Littleleaf buttercup	N	13%	20%	17%	0%	12%
Forb	Rosaceae	<i>Agrimonia pubescens</i>	Groovebur	N	0%	0%	33%	0%	8%
Forb	Rosaceae	<i>Agrimonia rostellata</i>	Beaked agrimony	N	13%	0%	0%	0%	4%
Forb	Rosaceae	<i>Agrimonia</i> sp.	Agrimony	N	25%	40%	0%	0%	16%
Forb	Rosaceae	<i>Geum canadense</i> **	White avens	N	13%	0%	0%	14%	8%
Forb	Rosaceae	<i>Geum virginianum</i>	Cream avens	N	0%	0%	17%	0%	4%
Forb	Rosaceae	<i>Potentilla simplex</i>	Common cinquefoil	N	0%	0%	67%	0%	16%
Forb	Rubiaceae	<i>Galium circaezans</i>	Wild licorice	N	13%	20%	50%	29%	28%
Forb	Rubiaceae	<i>Galium pilosum</i>	Hairy bedstraw	N	38%	0%	0%	0%	12%
Forb	Rubiaceae	<i>Galium triflorum</i>	Sweetscented bedstraw	N	25%	20%	17%	0%	16%
Forb	Rubiaceae	<i>Galium uniflorum</i> *	Oneflower bedstraw	N	88%	100%	0%	0%	48%
Forb	Rubiaceae	<i>Houstonia caerulea</i>	Azure bluet	N	0%	0%	50%	0%	12%
Forb	Rubiaceae	<i>Houstonia purpurea</i> **	Venus' pride	N	0%	0%	50%	0%	12%
Forb	Rubiaceae	<i>Mitchella repens</i>	Partridgeberry	N	63%	80%	17%	0%	40%
Forb	Saxifragaceae	<i>Heuchera</i> sp.	Alumroot	N	0%	0%	50%	0%	12%
Forb	Solanaceae	<i>Physalis heterophylla</i>	Clammy groundcherry	N	0%	20%	0%	0%	4%
Forb	Thelypteridaceae	<i>Macrothelypteris torresiana</i>	swordfern	E	0%	20%	0%	0%	4%
Forb	Thelypteridaceae	<i>Phegopteris hexagonoptera</i>	Broad beech fern	N	0%	20%	0%	0%	4%
Forb	Thelypteridaceae	<i>Thelypteris kunthii</i>	Kunth's maiden fern	N	0%	20%	0%	0%	4%
Forb	Unknown	unknown_herb_01_20 210607	Herb	U	0%	0%	50%	0%	12%
Forb	Unknown	unknown_herb_01_20 210622	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknown_herb_02_20 210607	Herb	U	0%	0%	17%	0%	4%

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Forb	Unknown	unknown_herb_03_20 210607	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknownherb_01_202 10609	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknownherb_01_202 10610	Herb	U	0%	0%	33%	0%	8%
Forb	Unknown	unknownherb_01_202 10621	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknownherb_01_202 10624	Herb	U	0%	0%	0%	14%	4%
Forb	Unknown	unknownherb_01_202 10720	Herb	U	0%	20%	0%	0%	4%
Forb	Unknown	unknownherb_01_202 10722	Herb	U	0%	20%	0%	0%	4%
Forb	Unknown	unknownherb_01_202 10810	Herb	U	38%	0%	0%	0%	12%
Forb	Unknown	unknownherb_01_202 10825	Herb	U	38%	0%	0%	0%	12%
Forb	Unknown	unknownherb_01_202 10826	Herb	U	13%	0%	0%	0%	4%
Forb	Unknown	unknownherb_02_202 10609	Herb	U	0%	0%	33%	0%	8%
Forb	Unknown	unknownherb_02_202 10610	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknownherb_02_202 10621	Herb	U	0%	0%	17%	0%	4%
Forb	Unknown	unknownherb_02_202 10624	Herb	U	0%	0%	0%	29%	8%
Forb	Unknown	unknownherb_02_202 10720	Herb	U	0%	60%	0%	0%	12%
Forb	Unknown	unknownherb_03_202 10609	Herb	U	0%	0%	33%	0%	8%
Forb	Unknown	unknownherb_03_202 10720	Herb	U	0%	20%	0%	0%	4%
Forb	Urticaceae	<i>Boehmeria cylindrica</i>	False nettle	N	75%	40%	17%	14%	40%
Forb	Urticaceae	<i>Pilea pumila</i>	Canadian clearweed	N	0%	0%	33%	0%	8%
Forb	Urticaceae	<i>Urtica chamaedryoides</i>	Slim stinging nettle	N	0%	0%	0%	14%	4%
Forb	Violaceae	<i>Viola hirsutula</i>	Southern woodland violet	N	0%	0%	33%	0%	8%
Forb	Violaceae	<i>Viola lanceolata*</i>	Bog white violet	N	0%	0%	17%	0%	4%
Forb	Violaceae	<i>Viola palmata</i>	Three-lobed violet	N	0%	20%	50%	14%	20%
Forb	Violaceae	<i>Viola</i> sp. cf <i>sororia</i>	Common blue violet	N	75%	60%	67%	29%	60%
Forb	Violaceae	<i>Viola</i> sp. cf <i>walteri</i>	Prostrate blue violet	N	50%	0%	0%	0%	16%
Forb	Woodsiaceae	<i>Athyrium filix-femina</i>	Asplenium ladyfern	N	13%	40%	0%	0%	12%
Graminoid	Cyperaceae	<i>Carex abscondita</i>	Hidden-fruit caric-sedge	N	0%	0%	0%	29%	8%
Graminoid	Cyperaceae	<i>Carex amphibola</i>	Amphibious sedge	N	0%	0%	17%	0%	4%
Graminoid	Cyperaceae	<i>Carex basiantha</i>	Willdenow's sedge	N	63%	0%	0%	0%	20%
Graminoid	Cyperaceae	<i>Carex blanda</i>	Bland sedge	N	0%	0%	50%	0%	12%
Graminoid	Cyperaceae	<i>Carex cephalophora</i>	Oval-leaf sedge	N	0%	0%	17%	0%	4%
Graminoid	Cyperaceae	<i>Carex complanata</i>	Blue sedge	N	0%	0%	33%	0%	8%
Graminoid	Cyperaceae	<i>Carex debilis</i>	White edge sedge	N	0%	20%	0%	0%	4%
Graminoid	Cyperaceae	<i>Carex digitalis</i>	Slender wood sedge	N	63%	0%	50%	0%	32%
Graminoid	Cyperaceae	<i>Carex gracillima</i>	Graceful sedge	N	0%	0%	17%	0%	4%
Graminoid	Cyperaceae	<i>Carex intumescens</i>	Greater bladder sedge	N	0%	20%	0%	0%	4%
Graminoid	Cyperaceae	<i>Carex jamesii</i>	James' sedge	N	0%	0%	17%	0%	4%
Graminoid	Cyperaceae	<i>Carex laxiflora</i>	Broad looseflower sedge	N	0%	20%	0%	0%	4%

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Graminoid	Cyperaceae	<i>Carex oxylepis</i>	Sharp-scale sedge	N	0%	40%	0%	14%	12%
Graminoid	Cyperaceae	<i>Carex rosea</i>	Rosy sedge	N	75%	0%	17%	0%	28%
Graminoid	Cyperaceae	<i>Carex</i> sp.	Carex sedge	N	0%	0%	33%	29%	16%
Graminoid	Cyperaceae	<i>Carex</i> sp. cf <i>cherokeensis</i>		N	38%	0%	0%	0%	12%
Graminoid	Cyperaceae	<i>Carex styloflexa</i> (including <i>Carex</i> sp. cf <i>styloflexa</i>)	Bent sedge	N	38%	0%	17%	0%	16%
Graminoid	Cyperaceae	<i>Carex tribuloides</i>	Blunt broom sedge	N	0%	20%	0%	0%	4%
Graminoid	Cyperaceae	<i>Scleria oligantha</i> **	Littlehead nutrush	N	100%	80%	17%	14%	56%
Graminoid	Cyperaceae	unknownsedge_01_20 210722	Sedge	U	0%	40%	0%	0%	8%
Graminoid	Juncaceae	<i>Juncus antheratus</i>	Greater poverty rush	N	0%	0%	0%	14%	4%
Graminoid	Juncaceae	<i>Juncus coriaceous</i> **	Leathery rush	N	0%	20%	0%	0%	4%
Graminoid	Juncaceae	<i>Luzula echinata</i>	Hedgehog woodrush	N	0%	0%	33%	0%	8%
Graminoid	Poaceae	<i>Agrostis hyemalis</i>	Winter bentgrass	N	0%	0%	17%	14%	8%
Graminoid	Poaceae	<i>Agrostis perennans</i>	Autumn bentgrass,	N	0%	40%	0%	29%	16%
Graminoid	Poaceae	<i>Arundinaria gigantea</i>	Giant cane	N	75%	0%	0%	0%	24%
Graminoid	Poaceae	<i>Bromus catharticus</i>	Rescuegrass	E	0%	0%	0%	29%	8%
Graminoid	Poaceae	<i>Bromus pubescens</i>	Hairy woodbrome grass	N	0%	0%	17%	0%	4%
Graminoid	Poaceae	<i>Chasmanthium laxum</i>	Slender woodoats	N	88%	20%	33%	0%	40%
Graminoid	Poaceae	<i>Chasmanthium sessiliflorum</i>	Longleaf woodoats	N	100%	80%	50%	29%	68%
Graminoid	Poaceae	<i>Danthonia spicata</i>	Poverty oatgrass	N	0%	0%	50%	14%	16%
Graminoid	Poaceae	<i>Dichanthelium aciculare</i> **	Needleleaf rosette grass	N	13%	0%	0%	0%	4%
Graminoid	Poaceae	<i>Dichanthelium acuminatum</i>	Hotspots rosette grass	N	0%	20%	17%	0%	8%
Graminoid	Poaceae	<i>Dichanthelium boscii</i>	Bosc's panicgrass	N	63%	40%	83%	0%	48%
Graminoid	Poaceae	<i>Dichanthelium commutatum</i> ** (including <i>D. boscii</i> or <i>commutatum</i>)	Variable panicgrass	N	50%	40%	0%	0%	24%
Graminoid	Poaceae	<i>Dichanthelium dichotomum</i>	Cypress panicgrass	N	0%	20%	50%	14%	20%
Graminoid	Poaceae	<i>Elymus hystrix</i>	Eastern bottlebrush grass	N	0%	0%	17%	0%	4%
Graminoid	Poaceae	<i>Melica mutica</i>	Onion grass	N	0%	0%	33%	0%	8%
Graminoid	Poaceae	<i>Microstegium vimineum</i>	Japanese stiltgrass	E	100%	60%	33%	86%	76%
Graminoid	Poaceae	<i>Oplismenus hirtellus</i>	Bristle basketgrass	N	100%	0%	0%	0%	32%
Graminoid	Poaceae	<i>Panicum anceps</i> **	Beaked panicgrass	N	13%	0%	0%	0%	4%
Graminoid	Poaceae	<i>Schizachyrium scoparium</i> **	Little bluestem	N	0%	0%	17%	0%	4%
Graminoid	Poaceae	unknowngrass_01_20 210608	Grass	U	0%	0%	33%	0%	8%
Graminoid	Poaceae	unknowngrass_01_20 210609	Grass	U	0%	0%	17%	0%	4%
Graminoid	Poaceae	unknowngrass_01_20 210810	Grass	U	13%	0%	0%	0%	4%
Graminoid	Poaceae	unknowngrass_01_20 210824	Grass	U	13%	0%	0%	0%	4%
Graminoid	Poaceae	unknowngrass_01_20 210826	Grass	U	13%	0%	0%	0%	4%
Shrub	Adoxaceae	<i>Sambucus nigra</i> **	elderberry	N	13%	0%	0%	29%	12%
Shrub	Adoxaceae	<i>Viburnum rufidulum</i>	Rusty blackhaw	N	13%	0%	50%	0%	16%

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Shrub	Anacardiaceae	<i>Rhus copallinum</i> **	Winged sumac	N	0%	0%	17%	0%	4%
Shrub	Annonaceae	<i>Asimina triloba</i>	Pawpaw	N	0%	0%	17%	29%	12%
Shrub	Aquifoliaceae	<i>Ilex decidua</i> **	Possumhaw	N	25%	60%	50%	14%	36%
Shrub	Arecaceae	<i>Sabal minor</i>	Dwarf palmetto	N	13%	0%	0%	0%	4%
Shrub	Asparagaceae	<i>Yucca</i> sp. cf <i>aloifolia</i>	Aloe yucca	E	13%	0%	0%	0%	4%
Shrub	Asteraceae	<i>Baccharis halimifolia</i>	Poverty weed	N	13%	0%	0%	0%	4%
Shrub	Betulaceae	<i>Corylus americana</i>	American hazelnut	N	0%	0%	50%	0%	12%
Shrub	Caprifoliaceae	<i>Symphoricarpos orbiculatus</i>	Buck brush coralberry	N	0%	0%	33%	29%	16%
Shrub	Celastraceae	<i>Euonymus americanus</i>	Strawberry bush	N	63%	80%	83%	29%	64%
Shrub	Cornaceae	<i>Cornus foemina</i> **	Swamp dogwood	N	0%	40%	0%	0%	8%
Shrub	Ericaceae	<i>Rhododendron canescens</i>	Mountain azalea	N	0%	20%	67%	0%	20%
Shrub	Ericaceae	<i>Vaccinium arboreum</i>	Sparkleberry	N	38%	20%	33%	14%	28%
Shrub	Ericaceae	<i>Vaccinium corymbosum</i>	Highbush blueberry	N	25%	20%	17%	0%	16%
Shrub	Ericaceae	<i>Vaccinium elliotii</i>	Elliott's blueberry	N	25%	0%	0%	0%	8%
Shrub	Ericaceae	<i>Vaccinium pallidum</i>	Blue Ridge blueberry	N	0%	0%	50%	0%	12%
Shrub	Ericaceae	<i>Vaccinium stamineum</i>	Deerberry	N	38%	20%	100%	0%	40%
Shrub	Fabaceae	<i>Albizia julibrissin</i>	Mimosa	E	0%	0%	0%	29%	8%
Shrub	Fabaceae	<i>Cercis canadensis</i>	Eastern redbud	N	13%	80%	50%	29%	40%
Shrub	Hamamelidaceae	<i>Hamamelis virginiana</i>	American witchhazel	N	50%	0%	17%	0%	20%
Shrub	Hippocastanaceae	<i>Aesculus pavia</i>	Red buckeye	N	0%	20%	0%	0%	4%
Shrub	Lauraceae	<i>Lindera benzoin</i>	Northern spicebush	N	0%	0%	33%	0%	8%
Shrub	Oleaceae	<i>Ligustrum sinense</i> **	Chinese privet	E	38%	60%	50%	86%	60%
Shrub	Rosaceae	<i>Amelanchier arborea</i>	Serviceberry	N	25%	20%	100%	0%	36%
Shrub	Rosaceae	<i>Prunus mexicana</i>	Mexican plum	N	0%	0%	33%	0%	8%
Shrub	Rosaceae	<i>Prunus umbellata</i> **	Hog plum	N	13%	0%	0%	0%	4%
Shrub	Rosaceae	<i>Rosa multiflora</i> **	Multiflora rose	E	0%	0%	17%	0%	4%
Shrub	Sapotaceae	<i>Sideroxylon lycioides</i>	Buckthorn bully	N	13%	0%	0%	0%	4%
Shrub	Styracaceae	<i>Styrax grandifolius</i>	Bigleaf snowbell	N	0%	20%	67%	0%	20%
Shrub	Verbenaceae	<i>Callicarpa americana</i>	American beautyberry	N	88%	60%	0%	43%	52%
Tree	Altingiaceae	<i>Liquidambar styraciflua</i>	Sweetgum	N	100%	100%	33%	86%	84%
Tree	Aquifoliaceae	<i>Ilex opaca</i>	American holly	N	75%	80%	0%	0%	40%
Tree	Betulaceae	<i>Carpinus caroliniana</i>	American hornbeam	N	100%	100%	50%	29%	72%
Tree	Betulaceae	<i>Ostrya virginiana</i>	Eastern hophornbeam	N	88%	80%	50%	29%	64%
Tree	Cannabaceae	<i>Celtis laevigata</i> **	Southern hackberry	N	75%	0%	33%	86%	56%
Tree	Cornaceae	<i>Cornus florida</i>	Flowering dogwood	N	100%	80%	83%	29%	76%
Tree	Cupressaceae	<i>Juniperus virginiana</i> **	Eastern red cedar	N	50%	20%	33%	57%	44%
Tree	Ebenaceae	<i>Diospyros virginiana</i> **	Eastern persimmon	N	88%	80%	83%	14%	68%
Tree	Ericaceae	<i>Oxydendrum arboreum</i>	Sourwood	N	0%	20%	33%	0%	12%
Tree	Fabaceae	<i>Gleditsia triacanthos</i>	Common honeylocust	N	50%	0%	0%	43%	28%
Tree	Fabaceae	<i>Robinia pseudoacacia</i>	Black locust	N	0%	0%	17%	0%	4%
Tree	Fagaceae	<i>Fagus grandifolia</i>	American beech	N	50%	80%	17%	43%	48%
Tree	Fagaceae	<i>Quercus alba</i>	White oak	N	25%	80%	100%	71%	68%
Tree	Fagaceae	<i>Quercus coccinea</i>	Scarlet oak	N	0%	0%	33%	0%	8%
Tree	Fagaceae	<i>Quercus falcata</i> **	Southern red oak	N	38%	40%	100%	71%	64%
Tree	Fagaceae	<i>Quercus marilandica</i>	Blackjack oak	N	0%	0%	17%	0%	4%
Tree	Fagaceae	<i>Quercus michauxii</i>	Swamp chestnut oak	N	25%	60%	0%	0%	20%

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Tree	Fagaceae	<i>Quercus muehlenbergii</i>	Chinkapin oak	N	13%	0%	17%	29%	16%
Tree	Fagaceae	<i>Quercus nigra</i> **	Water oak	N	75%	80%	0%	0%	40%
Tree	Fagaceae	<i>Quercus pagoda</i>	Cherrybark oak	N	100%	100%	17%	29%	64%
Tree	Fagaceae	<i>Quercus phellos</i> **	Willow oak	N	0%	80%	50%	0%	28%
Tree	Fagaceae	<i>Quercus rubra</i>	Northern red oak	N	0%	40%	33%	0%	16%
Tree	Fagaceae	<i>Quercus shumardii</i>	Shumard's oak	N	13%	0%	0%	0%	4%
Tree	Fagaceae	<i>Quercus</i> sp. (seedlings of various species)	Oak	N	25%	40%	33%	57%	40%
Tree	Fagaceae	<i>Quercus stellata</i> **	Post oak	N	0%	20%	67%	14%	24%
Tree	Fagaceae	<i>Quercus velutina</i>	Black oak	N	0%	40%	67%	14%	28%
Tree	Juglandaceae	<i>Carya cordiformis</i>	Bitternut hickory	N	88%	0%	33%	29%	44%
Tree	Juglandaceae	<i>Carya glabra</i>	Pignut hickory	N	88%	100%	83%	57%	84%
Tree	Juglandaceae	<i>Carya ovata</i>	Shagbark hickory	N	25%	40%	0%	14%	20%
Tree	Juglandaceae	<i>Carya</i> sp. (seedlings of various species)	Hickory	N	0%	20%	0%	29%	12%
Tree	Juglandaceae	<i>Carya tomentosa</i>	Mockernut hickory	N	25%	60%	100%	43%	56%
Tree	Lauraceae	<i>Sassafras albidum</i> **	Sassafras	N	38%	40%	83%	43%	52%
Tree	Magnoliaceae	<i>Liriodendron tulipifera</i>	Tulip poplar	N	100%	80%	83%	43%	80%
Tree	Magnoliaceae	<i>Magnolia acuminata</i>	Cucumbertree	N	13%	0%	0%	0%	4%
Tree	Magnoliaceae	<i>Magnolia grandiflora</i>	Southern magnolia	N	38%	0%	0%	0%	12%
Tree	Moraceae	<i>Morus rubra</i>	Red mulberry	N	88%	60%	0%	14%	44%
Tree	Nyssaceae	<i>Nyssa sylvatica</i>	Black gum	N	13%	100%	100%	71%	68%
Tree	Oleaceae	<i>Fraxinus americana</i>	White ash	N	0%	0%	50%	29%	20%
Tree	Oleaceae	<i>Fraxinus pennsylvanica</i>	Green ash	N	88%	100%	0%	0%	48%
Tree	Oleaceae	<i>Fraxinus</i> sp.	Ash	N	0%	20%	0%	43%	16%
Tree	Pinaceae	<i>Pinus echinata</i>	Shortleaf pine	N	13%	20%	0%	57%	24%
Tree	Pinaceae	<i>Pinus taeda</i> **	Loblolly pine	N	88%	100%	0%	29%	56%
Tree	Rhamnaceae	<i>Frangula caroliniana</i>	Carolina buckthorn	N	13%	0%	67%	14%	24%
Tree	Rosaceae	<i>Crataegus crus-galli</i>	Bush hawthorn	N	0%	0%	17%	0%	4%
Tree	Rosaceae	<i>Crataegus marshallii</i>	Parsley hawthorn	N	0%	40%	0%	0%	8%
Tree	Rosaceae	<i>Crataegus</i> sp.	Hawthorne	N	0%	20%	17%	0%	8%
Tree	Rosaceae	<i>Prunus serotina</i>	Black cherry	N	100%	80%	100%	86%	96%
Tree	Sapindaceae	<i>Acer floridanum</i>	Florida maple	N	25%	0%	0%	0%	8%
Tree	Sapindaceae	<i>Acer negundo</i> **	Box elder	N	38%	0%	0%	29%	20%
Tree	Sapindaceae	<i>Acer rubrum</i>	Red maple	N	88%	100%	100%	43%	84%
Tree	Sapindaceae	<i>Acer saccharum</i>	Sugar maple	N	0%	0%	50%	14%	16%
Tree	Symplocaceae	<i>Symplocos tinctoria</i>	Sweetleaf shrub	N	13%	0%	0%	0%	4%
Tree	Ulmaceae	<i>Ulmus alata</i> **	Winged elm	N	100%	100%	50%	86%	88%
Tree	Ulmaceae	<i>Ulmus americana</i>	American elm	N	0%	60%	33%	43%	32%
Tree	Ulmaceae	<i>Ulmus rubra</i>	Slippery elm	N	75%	0%	17%	0%	28%
Vine	Anacardiaceae	<i>Toxicodendron radicans</i> **	Poison ivy	N	100%	100%	100%	86%	100%
Vine	Apocynaceae	<i>Matelea gonocarpus</i>	Angularfruit milkvine	N	75%	0%	0%	14%	28%
Vine	Apocynaceae	<i>Trachelospermum difforme</i> **	Climbing dogbane	N	25%	0%	0%	0%	8%
Vine	Asteraceae	<i>Mikania scandens</i>	Climbing hempvine	N	50%	40%	0%	0%	24%
Vine	Bignoniaceae	<i>Bignonia capreolata</i>	Cross vine	N	100%	80%	17%	14%	56%
Vine	Bignoniaceae	<i>Campsis radicans</i> **	Trumpet creeper	N	0%	0%	0%	29%	8%
Vine	Caprifoliaceae	<i>Lonicera japonica</i> **	Japanese honeysuckle	E	75%	80%	33%	43%	60%
Vine	Convolvulaceae	<i>Ipomoea</i> sp.	Morningglory	N	0%	0%	17%	0%	4%
Vine	Cucurbitaceae	<i>Melothria pendula</i>	Guadeloupe cucumber	N	25%	0%	17%	0%	12%
Vine	Dioscoreaceae	<i>Dioscorea quaternata</i>	Fourleaf yarn	N	0%	20%	50%	0%	16%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in RS plots (8)	Freq. in JB plots (5)	Freq. in ML plots (6)	Freq. in CF plots (6)	Freq. overall (25)
Vine	Fabaceae	<i>Amphicarpaea bracteata</i> **	American hogpeanut	N	75%	20%	67%	0%	44%
Vine	Fabaceae	<i>Centrosema virginianum</i>	Butterfly pea	N	0%	40%	0%	0%	8%
Vine	Fabaceae	<i>Clitoria mariana</i> **	Pigeonwings	N	0%	0%	17%	0%	4%
Vine	Gelsemiaceae	<i>Gelsemium sempervirens</i>	Carolina jessamine	N	75%	60%	0%	0%	36%
Vine	Hydrangeaceae	<i>Decumaria barbara</i>	Climbing hydrangea	N	0%	20%	0%	0%	4%
Vine	Lygodiaceae	<i>Lygodium japonicum</i>	Japanese climbing fern	E	38%	20%	0%	0%	16%
Vine	Menispermaceae	<i>Cocculus carolinus</i> **	Carolina coralbead	N	13%	0%	17%	0%	8%
Vine	Passifloraceae	<i>Passiflora lutea</i>	Yellow passionflower	N	38%	20%	50%	0%	28%
Vine	Polygonaceae	<i>Brunnichia ovata</i>	American buckwheat vine	N	0%	20%	0%	0%	4%
Vine	Ranunculaceae	<i>Clematis virginiana</i>	Devil's darning needles	N	25%	20%	17%	0%	16%
Vine	Rhamnaceae	<i>Berchemia scandens</i>	Alabama supplejack	N	38%	60%	0%	29%	32%
Vine	Rosaceae	<i>Rubus flagellaris</i>	Whiplash dewberry	N	0%	0%	17%	0%	4%
Vine	Rosaceae	<i>Rubus</i> sp. **	Brambles	N	75%	40%	83%	14%	56%
Vine	Smilacaceae	<i>Smilax bona-nox</i> **	Saw greenbrier	N	88%	80%	33%	86%	76%
Vine	Smilacaceae	<i>Smilax glauca</i> **	Cat greenbrier	N	100%	100%	100%	43%	88%
Vine	Smilacaceae	<i>Smilax rotundifolia</i>	Roundleaf greenbrier	N	100%	100%	100%	86%	100%
Vine	Smilacaceae	<i>Smilax smallii</i>	Lance-leaf greenbrier	N	38%	0%	0%	0%	12%
Vine	Smilacaceae	<i>Smilax tamnoides</i>	Bristly greenbrier	N	38%	0%	0%	0%	12%
Vine	Vitaceae	<i>Ampelopsis cordata</i>	Peppervine	N	38%	0%	0%	0%	12%
Vine	Vitaceae	<i>Parthenocissus quinquefolia</i>	Virginia creeper	N	100%	100%	83%	86%	96%
Vine	Vitaceae	<i>Vitis aestivalis</i> **	Summer grape	N	50%	40%	67%	0%	40%
Vine	Vitaceae	<i>Vitis cinerea</i> **	Graybark grape	N	75%	80%	17%	14%	48%
Vine	Vitaceae	<i>Vitis rotundifolia</i>	Muscadine	N	100%	100%	100%	71%	96%
Vine	Vitaceae	<i>Vitis vulpina</i>	Fox grape	N	0%	0%	0%	14%	4%

Table C2. List of plant species in the Chickasaw (CV) site from 2021 vegetation monitoring at Natchez Trace Parkway. Frequency values (%) were calculated as the number of Ruderal Mixed Prairie plots where that species occurred, divided by three. Presence in the Black Belt prairie plot (CV04) was listed separately. The current effort detected one species in prairie that was not already present on the park's species list: *Agalinis auriculata*. Because of park management interest in this site, the following additional comparisons were made. The initial inventory by Weiland (1994) recorded 176 species; 79 of those were recorded during the current study. Species observed in 2021 that were not recorded by Weiland were indicated by a single asterisk[*]. The Vascular Plant Inventory (Hatch and Kruse 2008) in 2004-2005 included all records from Weiland; but that project added few additional collections of Black Belt prairie species or of Chickasaw Village in particular. Only 11 species were collected in Chickasaw Village and an additional 32 were collected in nearby grasslands on Black Belt Prairie type soils. Seven of the 11 species collected for Hatch and Kruse (2008) in Chickasaw Village were also recorded in 2021, including *Symphyotrichum ericoides* and *Oenothera filiformis*. In 2008, a survey of Black Belt prairie sites along the Parkway by Hill and Barone (2008) recorded 34 species across five locations within the Chickasaw Village site, 27 of which were also recorded in 2021. The Vegetation Community Mapping project (Hop et al. 2016) had relatively good coverage of the site. They recorded 68 species across 17 sampling plots, of which 74% were also recorded in 2021. However, the 2016 project focused only on the common species, so those data were not used for additional comparison here. Two asterisks [**] = plant species that were also recorded in the 2021 monitored forest sites (Table C1). For Nativity, N=Native, E=Non-Native and U=Nativity Status Unknown. Project botanist for the Natchez Trace Parkway was Jane Carlson, using the taxonomic references of "Guide to the Vascular Plants of Tennessee" by Chester et al. 2015, "Flora of the southeastern United States" by Weakly et al. 2022, and "Ferns of Alabama" by Short and Spaulding 2012, among others. Accepted scientific names were based on the United States Department of Agriculture Natural Resource Conservation Service's PLANTS database (<https://plants.usda.gov/>).

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in Ruderal Mixed Prairie plots (3)	Present in Black Belt Plot	Freq. overall
Forb	Apocynaceae	<i>Apocynum cannabinum</i> *	Common dogbane	N	67%		50%
Forb	Asteraceae	<i>Ambrosia artemisiifolia</i>	Annual ragweed	N	67%	X	75%
Forb	Asteraceae	<i>Boltonia diffusa</i>	Smallhead doll's daisy	N	0%	X	25%
Forb	Asteraceae	<i>Cirsium discolor</i> *	Field thistle	N	33%		25%
Forb	Asteraceae	<i>Cnoclinium coelestinum</i>	Blue mistflower	N	67%		50%
Forb	Asteraceae	<i>Erechtites hieracifolius</i> (*)**	American burnweed	N	33%		25%
Forb	Asteraceae	<i>Helenium autumnale</i>	Smallflower sneezeweed	N	0%	X	25%
Forb	Asteraceae	<i>Helianthus giganteus</i> *	Giant sunflower	N	33%		25%
Forb	Asteraceae	<i>Helianthus hirsutus</i>	Hairy sunflower	N	33%		25%
Forb	Asteraceae	<i>Liatris squarrosa</i>	Scaly blazing star	N	0%	X	25%
Forb	Asteraceae	<i>Ratibida pinnata</i>	Pinnate prairie coneflower	N	0%	X	25%
Forb	Asteraceae	<i>Rudbeckia fulgida</i>	Orange coneflower	N	0%	X	25%
Forb	Asteraceae	<i>Silphium terebinthinaceum</i>	Prairie rosinweed	N	33%	X	50%
Forb	Asteraceae	<i>Solidago altissima</i>	Tall goldenrod	N	67%		50%
Forb	Asteraceae	<i>Solidago canadensis</i>	Canada goldenrod	N	33%		25%
Forb	Asteraceae	<i>Solidago gigantea</i> *	Giant goldenrod	N	100%	X	100%
Forb	Asteraceae	<i>Solidago nemoralis</i>	Gray goldenrod	N	33%	X	50%
Forb	Asteraceae	<i>Symphyotrichum ericoides</i>	White heath aster	N	67%	X	75%
Forb	Asteraceae	<i>Symphyotrichum pilosum</i>	Hairy white oldfield aster	N	33%		25%
Forb	Asteraceae	<i>Vernonia missurica</i> *	Missouri ironweed	N	67%		50%
Forb	Campanulaceae	<i>Lobelia siphilitica</i> *	Great blue lobelia	N	33%		25%
Forb	Campanulaceae	<i>Lobelia spicata</i> *	Palespike lobelia	N	0%	X	25%
Forb	Celastraceae	<i>Eupatorium album</i> *	White thoroughwort	N	33%		25%
Forb	Celastraceae	<i>Eupatorium altissimum</i> *	Tall Thoroughwort	N	100%	X	100%
Forb	Celastraceae	<i>Eupatorium serotinum</i> *	Lateflowering thoroughwort	N	33%		25%
Forb	Euphorbiaceae	<i>Acalypha virginica</i> **	Virginia copperleaf	N	100%		75%
Forb	Euphorbiaceae	<i>Euphorbia corollata</i> (*)**	Flowering spurge	N	100%		75%
Forb	Fabaceae	<i>Chamaecrista fasciculata</i>	Partridge pea	N	100%		75%
Forb	Fabaceae	<i>Dalea candida</i>	White prairie clover	N	0%	X	25%
Forb	Fabaceae	<i>Desmanthus illinoensis</i> *	Illinois bundleflower	N	0%	X	25%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in Ruderal Mixed Prairie plots (3)	Present in Black Belt Plot	Freq. overall
Forb	Fabaceae	<i>Desmodium ciliare</i> *	Hairy small-leaf ticktrefoil	N	67%		50%
Forb	Fabaceae	<i>Desmodium perplexum</i> *	Perplexed ticktrefoil	N	33%		25%
Forb	Fabaceae	<i>Lespedeza cuneata</i> **	Silky bush clover	E	100%	X	100%
Forb	Fabaceae	<i>Lespedeza procumbens</i> **	Trailing lespedeza	N	100%	X	100%
Forb	Fabaceae	<i>Lespedeza virginica</i> *	Slender lespedeza	N	100%		75%
Forb	Gentianaceae	<i>Sabatia angularis</i> *	Rosepink	N	0%	X	25%
Forb	Hypericaceae	<i>Hypericum hypericoides</i> **	St. Andrew's cross	N	33%		25%
Forb	Iridaceae	<i>Sisyrinchium albidum</i> *	White blue-eyed grass	N	0%	X	25%
Forb	Lamiaceae	<i>Blephilia ciliata</i> **	Downy Blephilia	N	0%	X	25%
Forb	Lamiaceae	<i>Pycnanthemum tenuifolium</i> **	Narrowleaf mountainmint	N	33%		25%
Forb	Lythraceae	<i>Lythrum alatum</i>	Winged loosestrife	N	33%		25%
Forb	Onagraceae	<i>Ludwigia alternifolia</i> *	Bushy seedbox	N	33%		25%
Forb	Onagraceae	<i>Oenothera filiformis</i> *	Longflower beeblossum	N	100%	X	100%
Forb	Onagraceae	<i>Oenothera pilosella</i> *	Meadow evening primrose	N	33%		25%
Forb	Ophioglossaceae	<i>Botrychium bitermum or dissectum</i> (*)**	Grape fern	N	67%		50%
Forb	Orobanchaceae	<i>Agalinis auriculata</i> *	Earleaf false foxglove	N	33%		25%
Forb	Orobanchaceae	<i>Agalinis purpurea</i>	Purple false foxglove	N	100%	X	100%
Forb	Orobanchaceae	<i>Buchnera americana</i> *	American bluehearts	N	0%	X	25%
Forb	Oxalidaceae	<i>Oxalis dillenii</i>	Slender yellow woodsorrel	N	33%		25%
Forb	Plantaginaceae	<i>Penstemon</i> sp. *	Penstemon	N	0%	X	25%
Forb	Polygonaceae	<i>Rumex crispus</i> *	Curly dock	N	33%		25%
Forb	Rosaceae	<i>Geum canadense</i> (*)**	White avens	N	67%		50%
Forb	Rosaceae	<i>Potentilla canadensis</i> *	Dwarf cinquefoil	N	100%		75%
Forb	Rubiaceae	<i>Diodia teres</i>	Poorjoe	N	33%		25%
Forb	Rubiaceae	<i>Houstonia purpurea</i> (*)**	Venus' pride	N	0%	X	25%
Forb	Solanaceae	<i>Solanum carolinense</i>	Carolina horsenettle	N	100%		75%
Forb	Unknown	Unknownforb_01_20210915	Unknown	U	33%		25%
Forb	Unknown	unknownherb_01_20210916	Unknown	U	0%	X	25%
Forb	Unknown	unknownherb_02_20210916	Unknown	U	0%	X	25%
Forb	Unknown	unknownherb_03_20210916	Unknown	U	0%	X	25%
Forb	Unknown	unknownherb_04_20210916	Unknown	U	0%	X	25%
Forb	Verbenaceae	<i>Verbena brasiliensis</i> *	Brazilian vervain	E	33%		25%
Forb	Verbenaceae	<i>Verbena simplex</i> *	Narrowleaf vervain	N	0%	x	25%
Graminoid	Cyperaceae	<i>Carex cherokeensis</i>	Cherokee sedge	N	0%	X	25%
Graminoid	Cyperaceae	<i>Carex granularis</i>	Limestone meadow sedge	N	33%	X	50%
Graminoid	Cyperaceae	<i>Scleria ciliata</i> *	Fringed nutrush	N	100%	X	100%
Graminoid	Cyperaceae	<i>Scleria oligantha</i> (*)**	Littlehead nutrush	N	33%		25%
Graminoid	Cyperaceae	Unknownsedge_01_20210916	Unknown	U	33%		25%
Graminoid	Cyperaceae	unknownsedge_01_20210917	Unknown	U	67%		50%
Graminoid	Juncaceae	<i>Juncus coriaceous</i> (*)**	Leathery rush	N	100%		75%
Graminoid	Juncaceae	<i>Juncus dichotomus</i> (*)	Forked rush	N	100%		75%
Graminoid	Poaceae	<i>Andropogon glomeratus</i> *	Bushy bluestem	N	67%	X	75%
Graminoid	Poaceae	<i>Andropogon virginicus</i> *	Broomsedge bluestem	N	100%		75%
Graminoid	Poaceae	<i>Arthraxon hispidus</i> *	Small carpetgrass	E	0%	X	25%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in Ruderal Mixed Prairie plots (3)	Present in Black Belt Plot	Freq. overall
Graminoid	Poaceae	<i>Dichanthelium aciculare</i> **	Needleleaf rosette grass	N	67%		50%
Graminoid	Poaceae	<i>Dichanthelium commutatum</i> (*)**	Variable panicgrass	N	33%		25%
Graminoid	Poaceae	<i>Dichanthelium laxiflorum</i> *	Openflower rosette grass	N	33%		25%
Graminoid	Poaceae	<i>Eragrostis hirsuta</i> *	Bigtop lovegrass	N	33%		25%
Graminoid	Poaceae	<i>Eragrostis spectabilis</i>	Purple lovegrass	N	100%		75%
Graminoid	Poaceae	<i>Hordeum pusillum</i>	Little wild barley	N	33%		25%
Graminoid	Poaceae	<i>Panicum anceps</i> **	Beaked panicgrass	N	100%	X	100%
Graminoid	Poaceae	<i>Panicum flexile</i>	Wiry panicgrass	N	0%	X	25%
Graminoid	Poaceae	<i>Panicum virgatum</i>	Old switch panicgrass	N	100%	X	100%
Graminoid	Poaceae	<i>Paspalum laeve</i> *	Field paspalum	N	100%		75%
Graminoid	Poaceae	<i>Saccharum giganteum</i>	Sugarcane plumegrass	N	67%		50%
Graminoid	Poaceae	<i>Schizachyrium scoparium</i> **	Little bluestem	N	100%	X	100%
Graminoid	Poaceae	<i>Setaria parviflora</i>	Marsh bristlegrass	N	67%	X	75%
Graminoid	Poaceae	<i>Sorghastrum nutans</i>	Indiangrass	N	33%	X	50%
Graminoid	Poaceae	<i>Sorghum halepense</i>	Johnsongrass	E	33%		25%
Graminoid	Poaceae	<i>Tridens strictus</i> *	Longspike tridens	N	33%		25%
Graminoid	Poaceae	<i>Tripsacum dactyloides</i>	Eastern gamagrass	N	33%		25%
Graminoid	Poaceae	unknowngrass_01_20210915	Unknown	U	33%		25%
Graminoid	Poaceae	unknowngrass_02_20210915	Unknown	U	0%	X	25%
Shrub	Adoxaceae	<i>Sambucus nigra</i> (*)**	Elderberry	N	33%		25%
Shrub	Anacardiaceae	<i>Rhus copallinum</i> **	Winged sumac	N	100%		75%
Shrub	Aquifoliaceae	<i>Ilex decidua</i> (*)**	Possumhaw	N	33%		25%
Shrub	Cornaceae	<i>Cornus drummondii</i> (*)	Roughleaf dogweed	N	100%	X	100%
Shrub	Cornaceae	<i>Cornus foemina</i> (*)**	Swamp dogwood	N	33%		25%
Shrub	Oleaceae	<i>Ligustrum sinense</i> **	Chinese privet	E	67%		50%
Shrub	Rosaceae	<i>Prunus umbellata</i> (*)**	Hog plum	N	33%		25%
Shrub	Rosaceae	<i>Rosa multiflora</i> **	Multiflora rose	E	67%		50%
Tree	Cannabaceae	<i>Celtis laevigata</i> **	Southern hackberry	N	33%		25%
Tree	Cupressaceae	<i>Juniperus virginiana</i> **	Eastern red cedar	N	33%		25%
Tree	Ebenaceae	<i>Diospyros virginiana</i> **	Eastern persimmon	N	100%	X	100%
Tree	Fagaceae	<i>Quercus falcata</i> (*)**	Southern red oak	N	33%		25%
Tree	Fagaceae	<i>Quercus nigra</i> **	Water oak	N	67%		50%
Tree	Fagaceae	<i>Quercus phellos</i> **	Willow oak	N	33%		25%
Tree	Fagaceae	<i>Quercus stellata</i> **	Post oak	N	33%		25%
Tree	Lauraceae	<i>Sassafras albidum</i> **	Sassafras	N	33%		25%
Tree	Pinaceae	<i>Pinus taeda</i> **	Loblolly pine	N	33%	X	50%
Tree	Rosaceae	<i>Pyrus calleryana</i>	Callery pear	E	33%		25%
Tree	Sapindaceae	<i>Acer negundo</i> (*)**	Box elder	N	33%		25%
Tree	Ulmaceae	<i>Ulmus alata</i> **	Winged elm	N	100%		75%
Vine	Anacardiaceae	<i>Toxicodendron radicans</i> **	Poison ivy	N	100%		75%
Vine	Apocynaceae	<i>Trachelospermum difforme</i> (*)**	Climbing dogbane	N	33%		25%
Vine	Bignoniaceae	<i>Campsis radicans</i> (*)**	Trumpet creeper	N	100%	X	100%
Vine	Caprifoliaceae	<i>Lonicera japonica</i> **	Japanese honeysuckle	E	100%		75%
Vine	Convolvulaceae	<i>Cuscuta</i> sp.*	Dodder	N	67%		50%
Vine	Convolvulaceae	<i>Ipomoea</i> sp. (<i>pandurata</i> or <i>lacunosa</i>)*	Morningglory	N	67%	X	75%
Vine	Fabaceae	<i>Amphicarpaea bracteata</i> (*)**	American hogpeanut	N	33%		25%

Growth Form	Family	Scientific Name	Common Name	Nativity	Freq. in Ruderal Mixed Prairie plots (3)	Present in Black Belt Plot	Freq. overall
Vine	Fabaceae	<i>Clitoria mariana</i> (*)**	Pigeonwings	N	33%		25%
Vine	Fabaceae	<i>Galactia volubilis</i> *	Downy milkpea	N	100%		75%
Vine	Fabaceae	<i>Strophostyles leiosperma</i>	Slickseed fuzzybean	N	33%		25%
Vine	Menispermaceae	<i>Cocculus carolinus</i> (*)**	Carolina coralbead	N	67%		50%
Vine	Passifloraceae	<i>Passiflora incarnata</i> *	Purple passionflower	N	67%		50%
Vine	Rosaceae	<i>Rubus</i> sp. **	Brambles	N	100%		75%
Vine	Smilacaceae	<i>Smilax bona-nox</i> (*)**	Saw greenbrier	N	33%		25%
Vine	Smilacaceae	<i>Smilax glauca</i> (*)**	Cat greenbrier	N	100%		75%
Vine	Vitaceae	<i>Nekemias arborea</i> *	Peppervine	N	67%		50%
Vine	Vitaceae	<i>Vitis aestivalis</i> (*)**	Summer grape	N	33%		25%
Vine	Vitaceae	<i>Vitis cinerea</i> (*)**	Graybark grape	N	33%		25%