

**A SURVEY OF THE WOODY FLORA OF
NATHAN BEDFORD FORREST STATE PARK, TENNESSEE**

BY

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A SURVEY OF THE WOODY FLORA OF NATHAN BEDFORD FORREST
STATE PARK, TENNESSEE

A Research Paper
Presented To
the Graduate Council of
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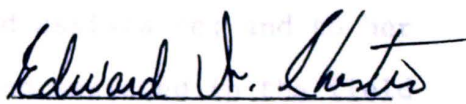
In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Lela Mai Donahoo

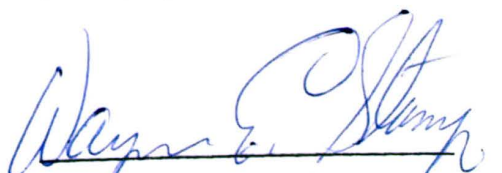
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To the Graduate Council:

I am submitting herewith a research paper written by Lela Clawson Donahoo entitled "A Survey of the Woody Flora of Nathan Bedford Forrest State Park, Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Biology.


Major Professor

Accepted for the Council


Dean of the Graduate School

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I. INTRODUCTION

This investigation attempts a floristic study of a relatively unknown area, Nathan Bedford Forrest State Park, Tennessee. Shanks (1952) summarized the woody flora of the entire state but no specific studies have been made in this area of Tennessee. The state has recently started an expansion program for the park and upon completion will provide a recreational area with camping facilities and hiking trails. It was the purpose of this investigation to determine the woody flora of the park before the major expansion program was begun.

In pursuing the investigation, the following questions were tentatively proposed:

1. What species of woody plants occur within the boundaries of the Nathan Bedford Forrest State Park?
2. How many of the species presently in the area are indigenous and how many have been introduced?
3. Are there any species present that have not been previously attributed to this area of Tennessee?

The result will be an annotated checklist of the woody species present. Such a checklist will be valuable as a permanent record of the woody flora in the park and will be available as a reference list for park visitors. In addition, the author will gain knowledge of the plants of the area and mastery of the classification and identification of plants that cannot be gained in any other way.

In addition, the results will include a description of the area with data on climate, geology, and soils, all taken from published reports. A historical account will also be given and is considered to be only as complete as published accounts and interviews with older local residents and the Tennessee State Park Personnel are available.

II. THE STUDY AREA

LOCATION OF THE PARK

Nathan Bedford Forrest State Park is located on both the eastern and western side of the Kentucky Reservoir (Tennessee River) in Benton County and Humphreys County. The largest and the oldest portion of the park is located on the western side of the reservoir eight miles northeast of Camden, Tennessee. This portion consists of approximately 483 acres and contains Pilot Knob, the highest point in West Tennessee, with an elevation of 680 feet above sea level (United States Department of Agriculture, 1953). The eastern portion includes the old Johnsonville area in Humphreys County and contains 363 acres plus 40 acres leased from individuals. This portion is located approximately four miles northeast of New Johnsonville and was acquired in 1969. The park is 90 miles west of Nashville and 140 miles northeast of Memphis (Figure 1).

DESCRIPTION OF THE AREA

Physiographically, the park area is within the Western Highland Rim (Fenneman, 1938) which at this point is a heavily dissected plateau. Rocks exposed at the surface are of sedimentary origin, principally unconsolidated limestone or chert. A highly fossilized limestone formation, which has been quarried for rip-rap construction, outcrops along the shoreline at a point near the park entrance. There has been

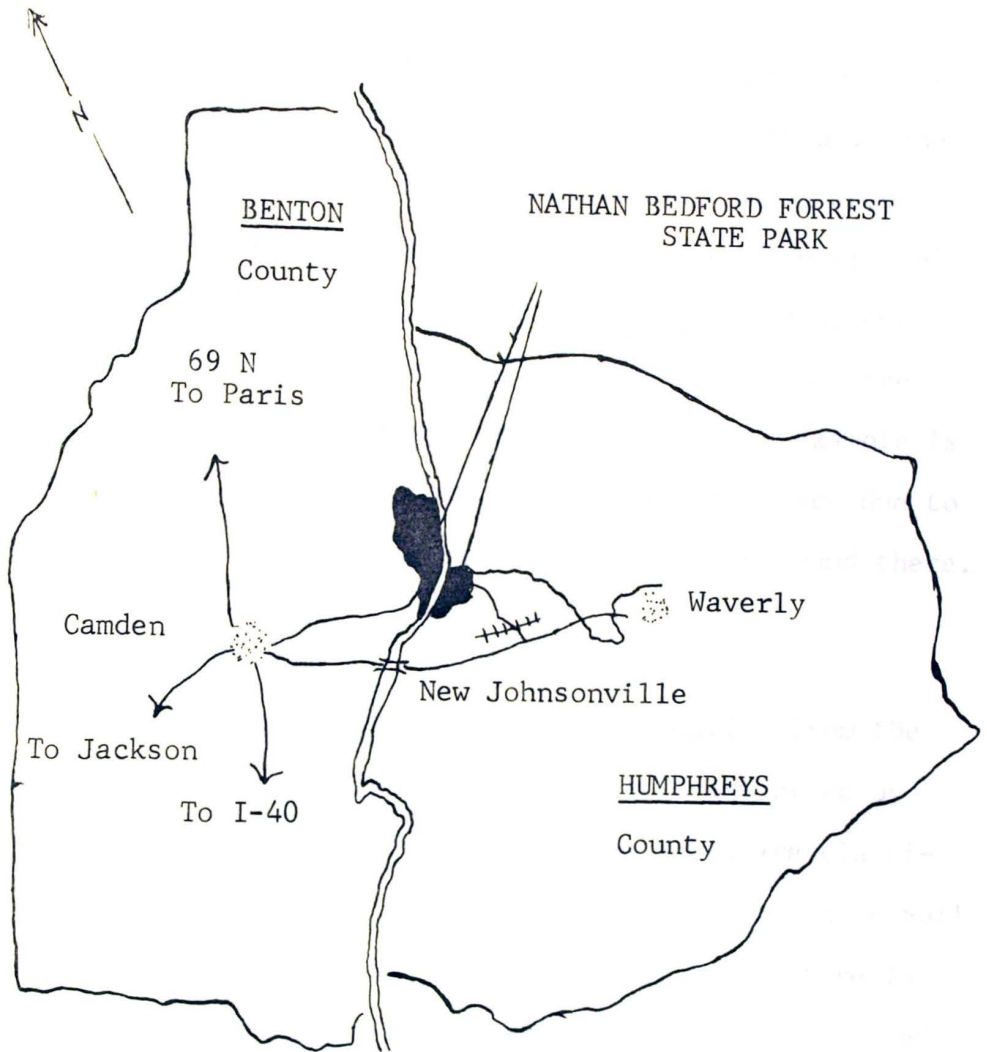


Figure 1. The location of Nathan Bedford Forrest State Park

practically no folding and faulting in the area and the strata deviates little from a horizontal plane (United States Department of Agriculture, 1953).

The site is made up of steep ridges and narrow hollows with limited areas of level or sloping to level areas. The ridge crests are fairly uniform in elevation, being about 600 feet above sea level or 240 feet above the elevation of the reservoir. Typical hogback ridges persist throughout the park. Nestled between some of the hogback ridges are small streams that run through wooded vales. One example is Chester Hollow, an area of major natural significance due to the excellent example of bog or swamp vegetation found there.

SOILS AND CLIMATE

The soils in the park were derived primarily from the weathering of rocks in place and materials transported by water or gravity. Seventy percent of the soils are classified in the Bodine series according to the Benton County Soil Survey published by the U. S. Department of Agriculture in August, 1953. These are brownish-grey, excessively drained and friable soils on steep hillsides. Considerable amounts of chert are found on the surface. Soils are low in organic matter and plant nutrients, particularly phosphate and lime. The subsoil, normally about 16 inches deep, is a very cherty, silty-clay loam. These soils belong to the group of soils known as Lithosols.

The relatively narrow creek-bottom areas are mostly covered with the Greendale silt loam, which is a well-drained cherty, collubial soil. This soil was washed from the upper areas and has some of the same characteristics as the Bodine series, being low in organic content, plant nutrients, and water holding capacity. About 20 percent of the area is covered by this type of soil.

Other soils found in the area include about two percent of the Mountview silt loam, a loessial soil on the higher and flatter ridges, and the Humphreys chert silt loam on the tops of the lower ridges. These soils are part of the yellow-podzolic group.

Mild winters and hot summers are typical of the humid-continental type climate found in the Benton-Humphreys County area. Temperatures above 100° F or below 0° F. are rare. The average precipitation is 51.49 inches with the wettest months being from December to April (U. S. Weather Bureau, 1940). Winds, normally from the southwest, are seldom of sufficient velocity to do damage. Occasionally, during severe thunderstorms, strong winds and tornadoes do occur and have done considerable damage to trees.

HISTORY AND LAND USE

A history of Nathan Bedford Forrest State Park has been compiled by Robert M. McBride and published by the Tennessee Historical Society. In 1907 the citizens of Eva, Tennessee sponsored a reunion of Veterans of the Confederacy. This

created an interest in the establishment of a memorial park to preserve the area where General Nathan Bedford Forrest, in 1864, fought a memorable battle during the War between the States. In the 1920's a group of citizens from all parts of the county organized a movement to establish a park of the area, including Pilot Knob. H. B. Pafford of Eva, Marshall Holland and William Caraway of Big Sandy, and Lindsey Melton of Camden were among the leaders in this effort. The Pafford family offered to donate the land upon which Pilot Knob stood.

In 1929, Governor Henry Horton signed legislation authorizing the establishment of the Nathan Bedford Forrest Memorial Park. The present park is an enlargement and expansion of the original memorial park. It was established as a state park in 1961, at which time adjacent land was acquired adding to the western section of the park. The old Johnsonville area was acquired in 1969 and future plans call for the acquisition of more land.

Before the establishment of the park most of the land suitable was used for farming and for pasturing livestock until the early 1940's. The alluvial river bottomlands were flooded when the reservoir was filled in 1943. The narrow creek bottoms and hillsides discouraged major farming and many farms were abandoned.

The plant growth in the park is predominately second growth hardwoods, with some scattered pine and red cedar.

According to Mr. J. D. Melton, a life-long resident of the county and a local historian, the original park has had no timber cut from it since it became a park. The surrounding land, which was purchased later, has had none cut since the late 1930's. The more recently annexed land consists of old fields in various stages of succession and wooded areas with small trees.

III. METHODS AND PROCEDURES

The survey was begun in August 1971 and collections were made until July 1972. A map of the park was used to designate the areas from which the specimens were collected.

Specimens were collected and prepared according to standard field herbarium procedures. Voucher specimens have been deposited in the herbarium at Austin Peay State University. Scientific names and arrangement of taxa follows Fernald (1950). Abundance is given as: abundant, approximately one-third of the population; common, found throughout the park in any area; uncommon, found only in specific locations; rare, no more than five plants found in the entire park.

IV. ANNOTATED LIST

Pinaceae, pine family

Juniperus virginiana L., red cedar. Common in old fields. Scattered along forest edges and roadsides.

Pinus echinata Mill., shortleaf pine. Planted in areas throughout the park. Restricted to these areas.

Pinus strobus L., white pine. Abundant in small area south of Pilot Knob. Believed to be native to the area.

Gramineae, grass family

Arundinaria tecta (Walt.) Muhl., switch cane, small cane. Common along drainage in the Chester Hollow area but apparently limited to this area.

Liliaceae, lily family

Smilax Bona-nox L., bullbriar, tramp's trouble. Uncommon, in Chester Hollow only.

Smilax rotundifolia L., common greenbriar. Common throughout the park.

Salicaceae, willow family

Populus alba L., white poplar. Introduced. Planted beside the road near the park entrance. Rare.

Populus deltoides Marsh., cottonwood. Uncommon except along Hibiscus Trail near edge of the water.

Salix babylonica L., weeping willow. Introduced. One tree found just past the park headquarters beside the road.

Salix nigra Marsh., black willow. Scattered along the edge of the water in an area that is flooded part of the year. Uncommon.

Juglandaceae, walnut family

Carya glabra (Mill.) sweet (smooth) pignut. Common on low hillsides and in lowlands.

Carya lacinosa (Michx.) Loud., big shellbark, kingnut. Uncommon on lower slope south of the park headquarters.

Carya ovalis (Wang.) false shagbark. Mainly on low slopes, uncommon. Found in one area near Boy Scout Camp.

Carya tomentosa Nutt., mockernut. Common on upper slopes and ridges throughout the park.

Juglans nigra L., black walnut. Older trees rare but young trees were located along edges of floodplain and wooded areas near old fields.

Corylaceae, hazel family

Betula nigra L., river or red birch. Uncommon. Located along the water's edge at the Boy Scout Camp.

Carpinus caroliniana Walt., American hornbeam, ironwood, bluebeech or water beech. Common throughout the park in bottomlands.

Ostrya virginiana (Mill.) K. Koch, hop-hornbeam, ironwood. An uncommon tree found at the western edge of the park at the edge of the woods. Another specimen was found near the park entrance in a moist area.

Fagaceae, beech family

Fagus grandifolia Ehrh., beech. Common, especially on the lower slopes. A large population is found north of the road to Fossil Point.

Quercus alba L., white oak. Common on the upper slopes and ridges.

Quercus bicolor Willd., swamp-white oak. A rare species found in one location near the campground on the lake.

Quercus coccinea Muenchh., scarlet oak. Uncommon.

Quercus falcata Michx., spanish oak. Uncommon. Collected along the Knob Hill Trail.

Quercus imbricaria Michx., shingle oak, laurel oak. Two specimens found, one just past the Superintendent's residence and one in the Chester Hollow area.

Quercus laurifolia Michx., laurel-leaved oak. Rare. The only specimens were in the Chester Hollow area.

Quercus marilandica Muenchh., black jack oak. Abundant near the top of Pilot Knob and along roadsides at the western boundary of the park. Found on dry ridges throughout the park.

Quercus palustris Muenchh., pin-oak, spanish oak. Uncommon. Several specimens were found in the bottomlands.

Quercus Phellos L., willow oak. Found only in the Chester Hollow area. Uncommon.

Quercus Prinus L., chestnut-oak, rock-chestnut-oak. Abundant on the ridges and slopes throughout the park. There is a dense stand north of Pilot Knob along the Azalea Trail.

Magnoliaceae, magnolia family

Liriodendron Tulipifera L., tulip-poplar. Common in the low areas between the road and the lake near the recreation area. Can be found throughout the park.

Annocaceae, custard-apple family

Asima triloba (L.), paw-paw. Abundant at the beginning of the Knob Lake Trail. Several patches were observed scattered throughout the park.

Lauraceae, laurel family

Sassafras albidum (Nutt.) Nees, white sassafras. Common on slopes and in the bottoms. One very large tree is located at the Old Johnsonville site.

Saxifragaceae, saxifrage family

Hydrangea arborescens L., wild hydrangea, seven-bark. Abundant along the road to Fossil Point.

Hamamelidaceae, witch-hazel family

Liquidambar Styraciflua L., sweet gum. Abundant along the streambanks and floodplains.

Platanaceae, plain-tree family

Platanus occidentalis L., sycamore. Uncommon in the bottoms along streams.

Rosaceae, rose family

Amelanchier arborea (Michx. f.) Fern., shadbush. Uncommon along roadsides and the Hibiscus Trail.

Prunus serotina Ehrh., black cherry. Common throughout the park. Several good specimens are found growing beside the road at the recreation area.

Rosa setigera Michx., climbing rose, prairie rose. Common along an old field near the end of the Hibiscus Trail.

Rubus spp., blackberry. Common along roadsides and old fields.

Leguminosae, pulse family

Amorpha Fruticosa L., false or bastard indigo, indigo-bush. Uncommon along the edges of streams.

Cercis canadensis L., redbud. Common as part of the understory throughout the park.

Gleditsia aquatica Marsh., water-locust. Found on the floodplain near the Boy Scout Camp.

Pueraria Lobata (Willd.) Ohwi, kudzu-vine. Abundant in one location where it was apparently set. Grows on a bank beside the road near the top of the hill at Pilot Knob.

Robinia Pseudo-Acacia L., black locust. Abundant at the campground beside the lake.

Wisteria macrostachya Nutt., wisteria. Several plants were found along the edge of the water. Rare along Hibiscus Trail.

Anacardiaceae, cashew family

Rhus copallina L., dwarf or wing-rib sumac. Common along the roadsides and edges of old fields.

Rhus glabra L., smooth sumac. Common along the roadsides on the upper slopes.

Rhus radicans L., poison ivy. Abundant along the hiking trails near the floodplains and along streambanks.

Aquifoliaceae, holly family

Ilex opaca Ait., American holly. Found only in the Chester Hollow area. Uncommon.

Celastraceae, staff-tree family

Euonymus atropurpureus Jacq., burning bush, wahoo. Found in two locations, in Chester Hollow and along a stream near the lake.

Aceraceae, maple family

Acer Negundo L., box elder, ash-leaved maple. Specimens were collected from the floodplains at the Boy Scout Camp and from the Chester Hollow area. Uncommon.

Acer rubrum L., red, scarlet, soft or swamp-maple. Abundant along the floodplains south of Pilot Knob. Makes up most of the population in all regions where the water floods the area part of the year.

Acer saccharinum L., silver, white, soft or river-maple. A few trees were found growing along the water's edge on the Hibiscus Trail.

Acer saccharum Marsh., sugar or rock maple. Uncommon along the lower slopes. Some were found along with red maple.

Vitaceae, vine family

Vitis spp. No fruit or lowers were present. Vines uncommon throughout the park.

Vitis palmata Vahl, red or cat grape. Located along Knob Lake Trail growing near the water. Uncommon.

Vitis rotundifolia Michx., muscadine. Common throughout the park.

Thymelaeaceae, mezereum family

Dirca palustris L., leatherwood. Patches of this shrub were found scattered throughout the forest. Uncommon.

Nyssaceae, sour gum family

Nyssa sylvatica Marsh., black gum. Common along the floodplains and streambanks.

Araliaceae, ginseng family

Aralia spinosa L., Hercules'-club, devil's-walking stick or prickly ash. Shrubs found scattered along the lower hill-sides and streambanks. Uncommon.

Cornaceae, dogwood family

Cornus florida L., flowering dogwood. Common throughout the park.

Cornus foemina Mill., stiff dogwood. Collected from one area on the Hibiscus Trail that is flooded every year.

Cornus Priceae Small, Miss Price's D. Few plants grow on edge of the lake between the campground and Fossil Point. Uncommon.

Ericaceae, heath family

Kalmia latifolia L., mountain-laurel. Common throughout the park.

Oxydendrum arboreum (L.) DC., sourwood. Common throughout the park.

Rhododendron nudiflorum (L.) Torr., pinxterbloom azalea or purple honeysuckle. Abundant along the Azalea Trail from Pilot Knob.

Vaccinium arboreum Marsh., farkleberry or sparkleberry. Common on hillsides throughout the park.

Vaccinium vacillans Torr., blueberry. Common along the trail to Chester Hollow.

Ebenaceae, ebony family

Diospyros virginiana L., common persimmon. Common throughout the park.

Oleaceae, olive family

Fraxinus americana L., white ash. Around the recreation area. Uncommon.

Fraxinus pennsylvanica Marsh., red ash. Common along floodplains and stream banks.

Ligustrum vulgare L., privet, privet. Common on the Azalea Trail and around old homesites. Introduced.

Bignoniaceae, bignonia family

Campis radicans (L.) seem., trumpet-creeper, cow itch. Rare, found only along Hibiscus Trail.

Catalpa speciosa Warden, cigar-tree, Indian-bean. Only one tree was found at an old homesite. Probably introduced.

Rubiaceae, madder family

Cephalanthus occidentalis L., button bush. Abundant along the edge of the water and growing out in the water.

Caprifoliaceae, honeysuckle family

Sambucus canadensis L., common elderberry. Common along the roadsides and edges of the woods.

Lonicera japonica, Japanese honeysuckle. Uncommon along the Hibiscus Trail.

Viburnum nudum L., possumhaw. A few specimens found south of the campground along the lake shore.

Viburnum rufidulum Raf., southern blackhaw. Common around the Boy Scout Camp.

V. DISCUSSION

Based on existing literature and upon the collection of the author, a total of 88 species of woody plants have been identified from the Nathan Bedford Forrest State Park. These represent 58 genera belonging to 32 families. Eight introduced species representing eight genera and seven families are included in this collection. These include Catalpa speciosa Warden, Ligustrum vulgare L., Lonicera japonica, Maclura pomifera (Raf.) Schneid., Pinus echinata Mill., Populus alba L., Pueraria Lobata (Willd.), and Salix babylonica L.

From comparisons of these data with those of Shanks (1952), 19 species of woody plants representing 12 families are reported from Benton County for the first time. These include Cornus Priceae Small, Dirca palustris L., Euonymus atropurpureus Jacq., Gleditsia aquatica Marsh., Kalmia latifolia L., Ligustrum vulgare L., Planera aquatica (Walt.) J. F. Gmel., Pinus strobus L., Pueraria Lobata (Willd.), Quercus bicolor Willd., Quercus laurifolia Michx., Quercus Prinus L., Rhododendron nudiflorum (L.) Torr., Rosa setigera Michx., Salix babylonica L., Smilax Bona-nox L., Vaccinium vacillans Torr., Viburnum nudum L., and Viburnum rufidulum Raf. None of the species collected from Humphreys County represent a new county record.

Three species, Dirca palustris L., Pinus strobus L., and Kalmia latifolia L., are widespread Appalachian

distribution. Most of their ranges terminate abruptly at or near the western escarpment of the Cumberland Plateau. However, a few disjunct stations are found scattered along the Highland Rim and extending into West Tennessee (Shanks, 1958). This extension is explained as a spilling over of species from another floristic region (the Appalachians) into this area (Shanks, 1958). These species are not abundant and are restricted to the high ridges and upper hillsides. The other county records noted are within the range of the species but had not been collected in the county.

The topography of the park is widely varied and ranges from river bottomlands to highly dissected upland areas. Favorable habitats are provided by the varied topography.

Although all of the park is within the Highland Rim Providence, the Coastal Plain Upland extends into Western Benton County (Fenneman, 1938). Some species collected which are characteristic of the Coastal Plain include Carya lacinosa (Michx. f.) Loud., Cornus foemina Mill., Gleditsia aquatica (Walt.) J. F. Gmel., Platanus occidentalis L., and Vitis palmata Vahl. The remaining species that were collected are representative of the Western Mesophytic Forest Region flora of which this area is a part (Braun, 1950).

VI. SUMMARY

A survey was conducted of the woody flora of the Nathan Bedford Forrest State Park, Tennessee from the fall of 1971 to the summer of 1972. Data for this study were obtained from published records and from the collections obtained by the author during numerous field trips. Information was also gathered on the history, climate, geology, and soils of the area.

The results of this study were:

1. The collection and identification of 87 species of woody plants representing 54 genera and 32 families from the study area. Of these plants, seven species representing six genera and six families were found to be remnants of cultivation or introduced species.

2. Nineteen species of woody plants were reported from Benton County for the first time. They represent 12 families and 16 genera. There were no new species recorded from Humphreys County.

3. Six species representative of the bottomland flora of the Coastal Plain were recorded and three species more characteristic of the Appalachian Region were found. The remaining species are representative of the Western Mesophytic Forest type.

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