

A STUDY OF THE VASCULAR FLORA
AND CERTAIN VEGETATIONAL ASPECTS
OF THE LOWER BEAR CREEK
WATERSHED, STEWART COUNTY,
TENNESSEE

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A STUDY OF THE VASCULAR FLORA AND CERTAIN
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STEWART COUNTY. TENNESSEE

An Abstract
Presented to
the Graduate Council of
Austin Peay State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Jacqueline Cay Stack
December 1982

ABSTRACT

A field and herbarium survey of vascular plants of lower Bear Creek, Stewart County, Tennessee resulted in a list of 715 species from 377 genera and 108 families. Species frequency, abundance, diversity and rare elements are discussed.

Quadrats were used to sample three forest community types. Based on importance values the forests are dominated by Acer saccharum. Other associated species in order of importance are Fagus grandifolia, Carya glabra, Quercus alba, Liriodendron tulipifera and Quercus rubra. The area sampled (3.88 ha) supported 1,065 stems/hectare with an average basal area of 25.95 m²/hectare. Results indicate that the forests are in various stages of succession and display affinities with the Mixed Mesophytic Forest Region to the east.

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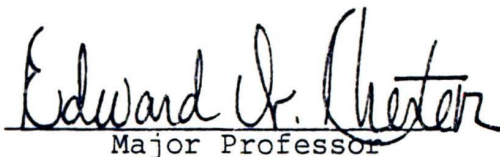
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To the Graduate Council:

I am submitting herewith a Thesis written by Jacqueline Cay Stack entitled "A Study of the Vascular Flora and Certain Vegetational Aspects of the Lower Bear Creek Watershed, Stewart County, Tennessee." I recommend that it be accepted in partial fulfillment of the requirement for the degree of Master of Science, with a major in Biology.

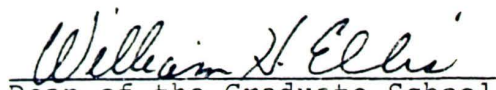

Major Professor

We have read this thesis and
recommend its acceptance:


Second Committee Member


Third Committee Member

Accepted for the
Graduate Council


Dean of the Graduate School

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CHAPTER I

INTRODUCTION

The Bear Creek area of Stewart County, Tennessee is a region of diverse habitat types varying from open bottomlands and lowland swamps to mesic slope and xeric ridge forests. The ecological significance, as well as the abundant and diverse flora and fauna, was recognized by Quarterman and Powell (1978) who proposed National Natural Landmark status for a portion of the watershed. Scott, Chester, and Snyder (1980) also recognized several unique features and recommended that the area be maintained without disturbance. However, the full significance of the area can only be realized after considerable biological information has been obtained.

Objectives of the Study

The primary objective of this research was to collect data on the flora of the lower Bear Creek watershed. Specifically the objectives were to: (1) develop a checklist of the vascular plants, (2) qualitatively describe the major plant communities, (3) quantitatively describe three forest community types, and (4) establish a floristic data base for use in future studies.

Review of the Literature

Increased attention toward the preservation of natural diversity has resulted in publications discussing areas of ecological significance. Bear Creek was subjected to evaluation by the National Park Service as a potential natural landmark (Quarterman and Powell, 1978) and by Scott, Chester, and Snyder (1980) in their survey of potential natural areas in the lower Cumberland River basin of Tennessee.

Regional floristic publications involving Bear Creek included the initial survey of flowering plants of Land Between the Lakes (LBL) (Ellis, Wofford, Chester, 1971) and the checklist of woody plants of LBL (Chester, Schibig, Jensen, 1976). The Tennessee Valley Authority (TVA) (1960) published forest inventory statistics for Stewart County and several studies concerning the flora of the Northwestern Highland Rim included the area (Jensen, 1972; Schibig, 1972; Lyle, 1980).

Other LBL studies have resulted in local guides to selected plant groups (Ellis and Chester, 1971, 1973, 1980; Phillips, 1968). New plant distributional records from the Bear Creek area have been published by Ramsey and Chester (1981) and Chester (1982).

The Study Area

The study area encompasses approximately 324 hectares (800 acres) and is bisected by Bear Creek which

flows eastward into the Cumberland River. The creek is bordered on the south by wooded slopes and bluffs and on the north by mostly cultivated bottomlands.

Floodplains and swampy areas occur near the river (Figures 1 and 2). The elevation varies from 110 to 185 meters (361 to 606 feet) above sea level (U.S. Dept. of Interior, 1957).

Location. The study area is located in Stewart County, northwest Middle Tennessee, approximately 56 kilometers (35 miles) northwest of Clarksville. It is situated along the southern boundary of LBL at $87^{\circ}54'$ west longitude and $36^{\circ}31'$ north latitude in the Tharpe Quadrangle, U.S. Geological Survey Topographic Quadrangle Series. The area is accessible from Tennessee Highway 49 and Blue Springs Road. Location with respect to the neighboring counties and position within the surrounding area is shown in Figure 3.

Physiographically, the study area lies within the Northwestern Highland Rim of the Interior Low Plateau (Fenneman, 1938). Braun (1950) includes the area in the Mississippian Plateau Section of the Western Mesophytic Forest Region. This region is characterized by a mosaic of unlike communities in which the vegetation may be considered an ecotone between the Mixed Mesophytic Forest Region to the east and the more westward Oak-Hickory Region.

Geology. Data on geology have been primarily

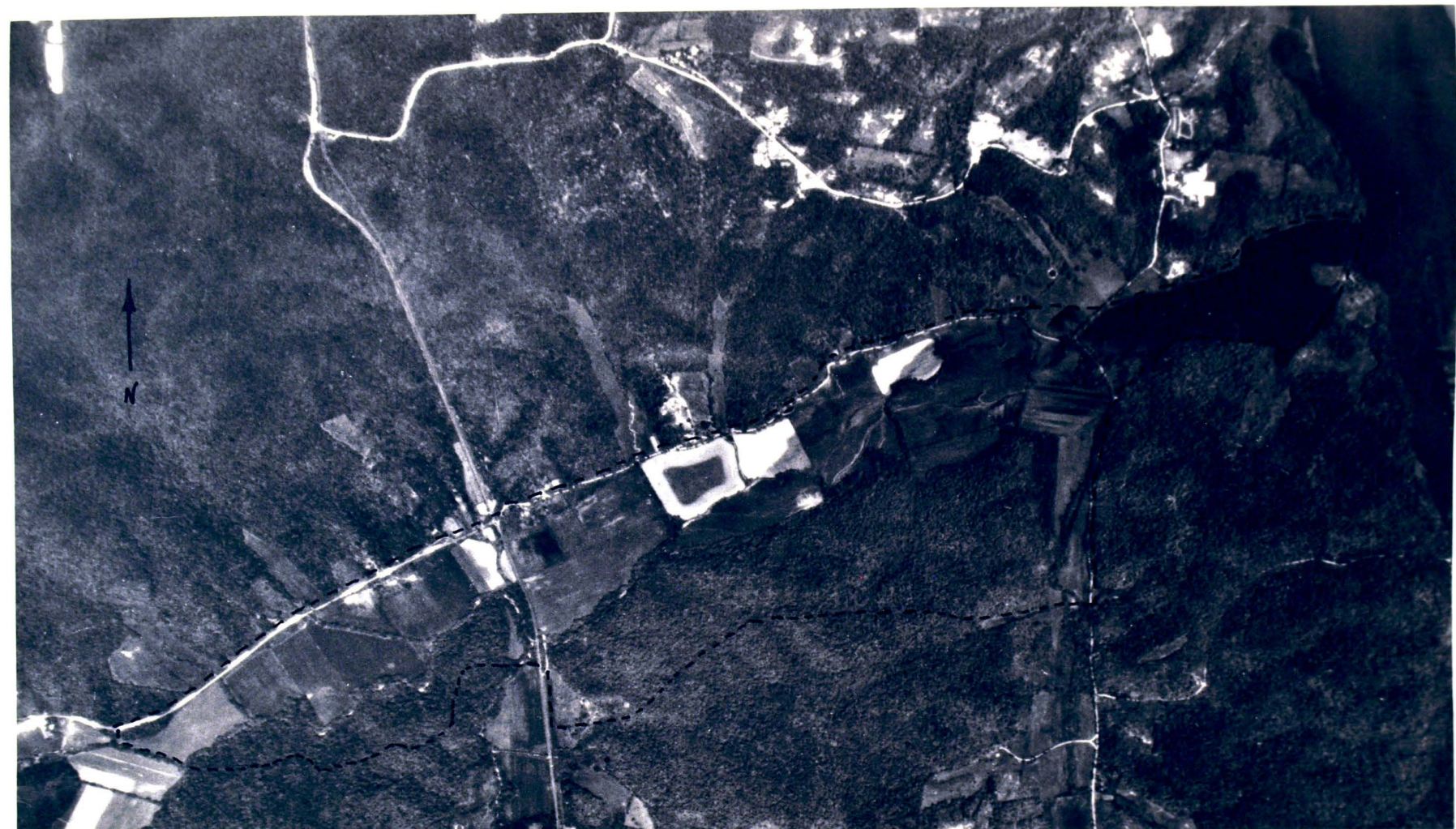


Figure 1. Aerial Photograph Showing the Bear Creek Study Area.

0 0.5 1 Kilometer

0 $\frac{1}{2}$ 1 Mile

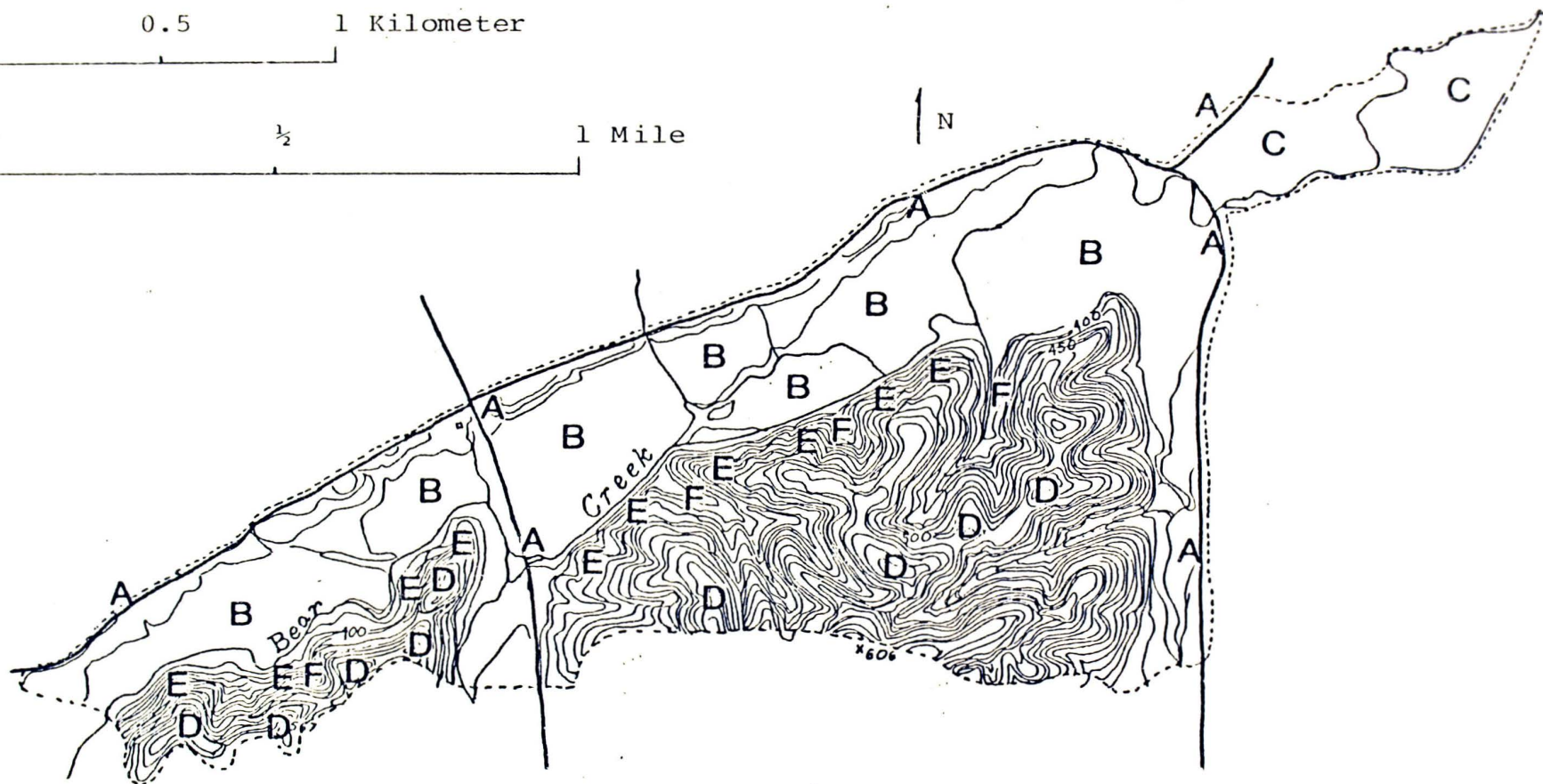


Figure 2. The Bear Creek Study Area.

A=Roadsides and Waste Places; B=Bottomland fields; C=Wetlands; D=Dry ridges;
E=North-facing slopes; F=Streambank-Ravines

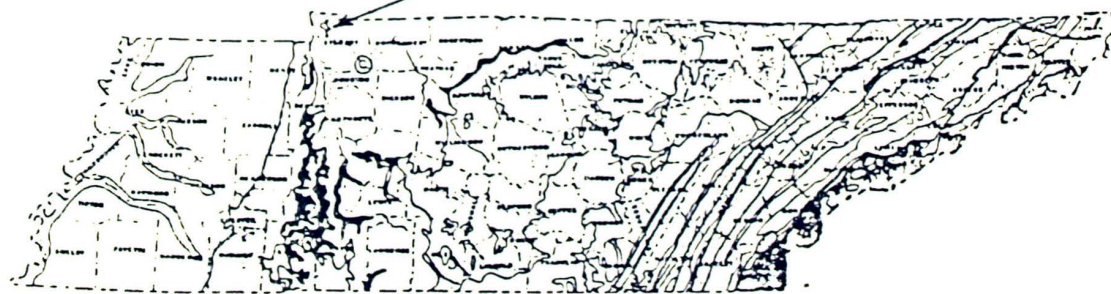
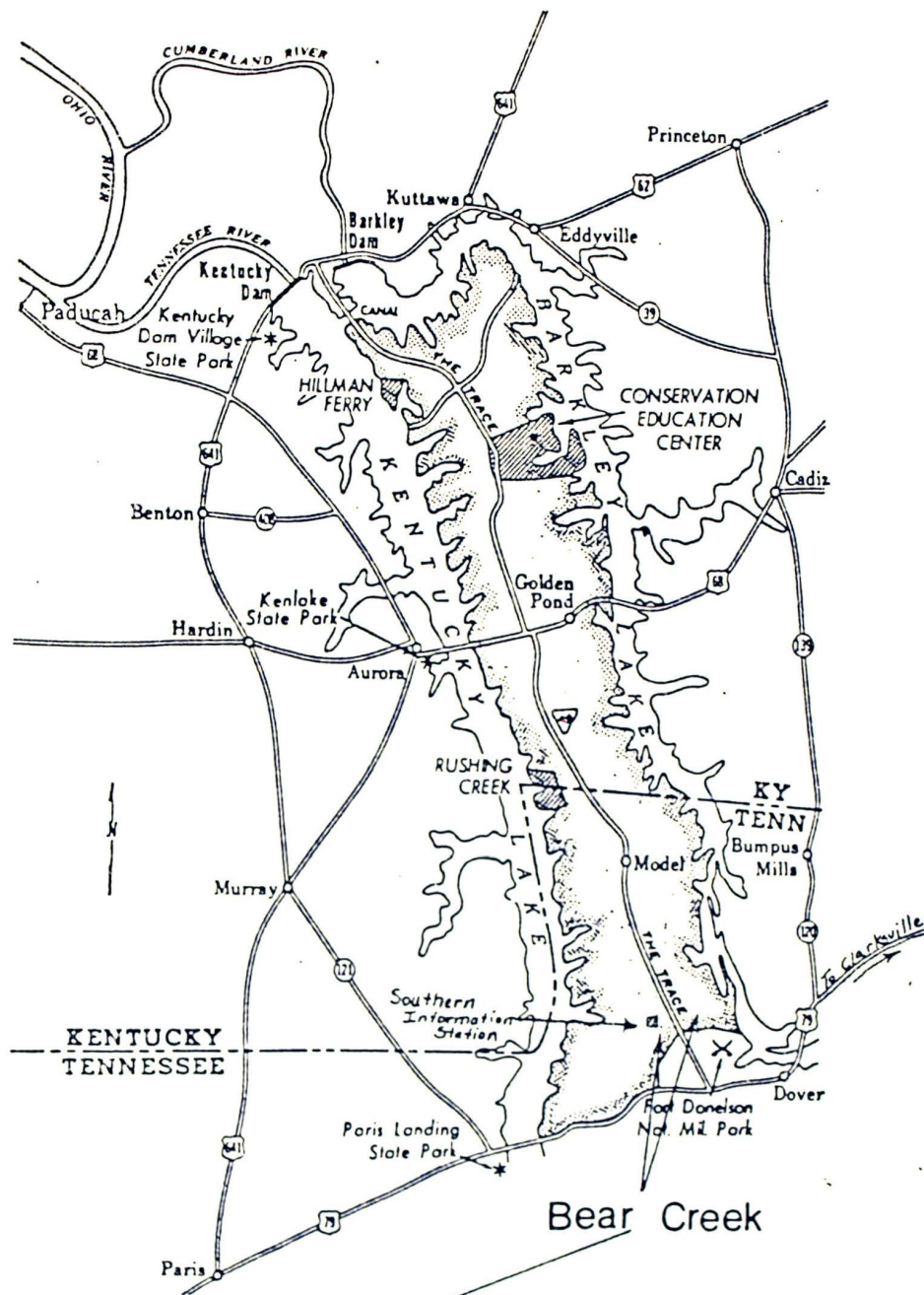


Figure 3. Location of Bear Creek in Relation to Surrounding Areas and Neighboring Counties.

from Marcher (1962). The Bear Creek area is underlain by chert and limestone of Mississippian age. Three major formations are represented: Warsaw and St. Louis Limestones and Fort Payne Chert.

Fort Payne Chert is exposed along the creek and in ravines and is mostly represented by scraggy chert, a mixture of cryptocrystalline quartz and calcite which erodes to very irregular and rough plates. The average thickness over much of the area is between 200 and 500 feet.

The rock outcrops and bluffs which are prevalent throughout the forested slopes are of Warsaw Limestone. This is a light-colored, medium to coarse-grained calcarenite made up of fossil fragments, sand and organic granules. Massive beds ranging from four to eight feet thick and cliffs are characteristic.

The St. Louis Limestone is characteristically found on the ridge tops and is least represented. It is the most heterogeneous formation present and ranges from fine to coarse-grained calcarenite.

Soils. Most of the soils are derived from material weathered from cherty limestone and/or local alluvium washed from the uplands. The soils belong to the Bodine-Baxter-Nixa-Ennis Soil Association (U.S.D.A., 1953). They exhibit bright colors, contain little organic matter, are high in clay and strongly leached.

Due to varied topography, several soil types are found. The bottomlands primarily consist of the Humphreys Silt Loam (low terraces, creek valleys), Ennis Silt Loam (level stream bottoms) and a small amount of Greendale Silt Loam on the footslopes. All of these areas have a maximum of five percent slope and drain readily. The nearly level soils of the creek valleys are fertile and favorable for row crops. The more eastward bottomlands become Cumberland River floodplain and are composed of Lindsides Silty Clay Loam with zero to three percent slope.

Soils of the dissected uplands are cherty with a low nutrient content, subjected to rapid runoff, and poorly suited for agriculture. Mostly of the Bodine type, these soils are mainly of the steep phase, cherty silt loam (25 to 30 percent slope), while rolling and steep eroded phases ranging from five to 25 percent slope are scattered throughout. The wooded ridge tops are capped with the rolling phase of the Bodine Cherty Silt Loam type.

Climate. According to Atwood (1940), the Bear Creek area lies within the humid, subtropical climate area of North America. This is a mesothermal, continental climate with warm, humid summers and mild winters.

The nearest weather stations are maintained at nearby Dover, Tennessee and Fort Campbell, Kentucky; their data and other pertinent reports were used to obtain the following information.

The growing season averages 191 days (U.S.D.A. 1953). In 1980, dates of the first and last frosts were May 9 and October 5 (U.S.N.O.A.A., 1980). The average daily temperature for the past 37 years was 14.4°C (58°F ; 55.8°F for 1980), but extremes have been recorded which range from a maximum of 41.1°C (106°F ; 104°F in 1980) to a minimum of -28.9°C (-20°F ; 0°F in 1980). January is the coldest month with an average of 2.2°C (36°F); daytime highs average 6.7°C (44°F) and nighttime lows average -3.3°C (26°F). The warmest month is July with an average temperature of 25.6°C (78°F). July days average a maximum of 31.1°C (88°F) and a minimum of 20.0°C (68°F). The temperature as a whole is mild with few extremes in winter or summer. Occasional periods of very mild temperatures occur every winter and periods of cool dry weather break up stretches of hot, humid summer days. Table I gives temperature data for 1945-1981 collected at the Fort Campbell, Kentucky weather station.

The annual average total precipitation is 120.65 centimeters (47.5 inches; 42.2 inches in 1980). The highest monthly precipitation usually occurs in March with about 13.72 centimeters (5.4 inches). The average snowfall per year is 30.98 centimeters (12.2 inches; 13.6 inches in 1980). Precipitation is well distributed throughout the year, occurring on an average of 140 days per year. Prevailing southerly winds, with an average speed of six knots, supply moist air from the Gulf of

Table I. Temperature Data for Fort Campbell, Kentucky (1945-1981)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
	Temperature (°F)												
Extreme Maximum	75	86	86	88	97	106	106	103	104	94	83	78	106
Mean Daily Maximum	44	48	57	69	78	85	88	88	82	71	57	47	68
Average Daily	36	39	47	59	67	75	78	77	71	59	47	38	58
Mean Daily Minimum	26	29	37	47	56	64	68	66	59	47	36	29	47
Extreme Minimum	-20	-12	1	25	33	43	49	48	36	23	-4	-10	-20

Mexico. Relative humidity averages about 70 percent and thunderstorms occur on an average of 54 days per year.

History. The area of Land Between the Lakes may have been inhabited as long as 10,000 years ago; evidence indicates certain habitation since 5200 B.C. (Henry, 1976). Apparently various Indian groups, including the Chickasaws, Shawnees, and Cherokees utilized the area until the "long hunters" arrived in the middle 1700's. The Indians had some effects on the vegetation when they burned sections of the forests in order to provide grazing areas for buffalo and other wildlife.

The movement of Europeans into the region in the late 1700's resulted in greater destruction of the vegetation. These early settlers found practically all of Stewart County timbered with hardwood forests and well endowed with wildlife (U.S.D.A., 1953). They were primarily interested in acquiring land for farming and permanent settlement and tended to settle along the major streams. Forests were cleared for planting crops and timber supplied wood for fuel, shelter and farm implements. As settlements expanded, a number of sawmills were built in Stewart County; they supplied railroad crossties and provided the necessary timber for inhabitants of the area. The lumber industry has greatly influenced the vegetation of the area, possibly more than any other factor.

Due to the abundance of timber and mineral resources, Stewart County was a center for iron furnaces and rolling

mills by 1820 (U.S.D.A., 1953). The county abounded in iron ore, leading to the establishment of a number of cold-blast furnaces. These furnaces used charcoal, made from harvesting the timbers of the surrounding forest, to smelt the ore. In 1847, the Peytona Furnace was constructed near the headwaters of Bear Creek (Stewart County Historical Society, 1980). By the end of the Civil War, most of the furnaces had ceased operations because the higher grade deposits were depleted and the supply of timber was not adequate for the production of enough charcoal. From that time until 1964 most of the Bear Creek area has been used for farming. Forested areas or pastures have been selectively harvested for timber or fuel wood.

Present Conditions. The area now known as Land Between the Lakes was purchased from area residents in 1964 by TVA for the purpose of developing a recreational and conservation education center (Ellis, Wofford, Chester, 1971). At present, Bear Creek lies within the boundaries of LBL and is thus protected. The bottomlands are leased to farmers for cultivation of corn and soybeans and a few small areas are planted in grains for wildlife. There is periodic clearing of a hiking trail and recent selective cutting of timber has taken place in parts of the Bear Creek watershed. However, most of the slopes and ridges are in an old growth stage of development and show little disturbance.

CHAPTER II

METHODS AND MATERIALS

Flora

Fifty-seven collecting trips were made from March 1980 through November 1980 and intermittent trips were made in 1981 and 1982. During each trip, an attempt was made to examine as many of the habitat types as possible. Standard field notes were taken and specimens collected and processed according to standard herbarium techniques. Voucher specimens were deposited in the herbarium of Austin Peay State University (APSU). All previous Bear Creek collections in the APSU herbarium were assessed for accuracy.

Identifications were made from standard manuals including Fernald (1950), Gleason and Cronquist (1963), Gleason (1968), and Radford, Ahles and Bell (1968). References on specific groups were used where possible. These and the plant groups they concern included Hitchcock (1950) and Pohl (1968), grasses; Conquist (1980), Asteraceae; Cranfill (1980) and Sharp (1955), ferns; Mahler (1970), legumes; Duncan (1975), woody vines; Underwood (1932, 1945), Cyperaceae and Carex; Sargent (1933) and Shanks and Sharp (1963), trees; Pennell (1935), Scrophulariaceae; McGilliard (1955), Liliaceae; Beal

(1977) and Godfrey and Wooten (1979), wetland plants; and Kenner (1976), Ranunculus.

Some taxonomically difficult groups were annotated or identified by specialists. These include Vitis by Dr. Wilbur Duncan, Spiranthes by Dr. Donovan Correll, Luzula by Dr. Janice Coffey, Ranunculus by Dr. Carl Kenner, Ophioglossum by Dr. Dale Thomas, and certain Cyperus and Carex species by Dr. Robert Kral.

Vegetation

Vegetational studies involved both qualitative and quantitative methods. Qualitative estimations of frequency and abundance are expressed in the checklist by usage of the following terminology:

Frequency: Frequent: found throughout or wherever specific habitat requirements are met.

Occasional: scattered but found in most suitable habitats.

Infrequent: found in only a few sites and often absent where requirements appear to have been met.

Rare: found in only one or two sites.

Abundance: Dominant: occurs in dense stands or in populations of numerous individuals.

Abundant: obvious numbers present, but not necessarily dominant.

Seldom: only a few individuals observed.

In addition, the term "locally abundant" is used for species

with a limited distribution but which are abundant where found.

Quantitative studies were based on the circular plot method suggested by Oosting (1956). Plots, 0.04 hectare (1/10 acre) in size, were established along predetermined cruise lines. Sampling was limited to forested dry ridges, north-facing slopes, and streambank-ravines. On ridges, the sampling line followed the center of the ridge. In slope forests the plots were established equidistant from the top to the base of the slope. The ravine sampling line followed the middle of the ravine bottom, and the streambank plots ran approximately 10 meters from the stream edge and parallel to the stream. The first sample point was selected randomly and subsequent plots taken 30 meters from the adjacent plot center. Only woody plants with a diameter at breast height (dbh) of 2.5 centimeters (1 inch) or greater were measured. Woody species with a dbh of 10 centimeters or greater were considered overstory and those less than 10 centimeters were considered understory. All herbaceous plants within each plot were identified and noted but no quantitative data were taken.

Data collected were used to determine descriptive parameters of species and communities (Cox, 1972) and to develop size class charts.

CHAPTER III

RESULTS

Flora

The known vascular flora of the lower Bear Creek area was found to consist of at least 715 species representing 377 genera and 108 families. Twenty-one species were ferns or fern allies, three were gymnosperms, and 691 were flowering plants. Of the flowering plants, six woody and 167 herbaceous species were monocots and 401 herbaceous species and 118 woody species were dicots. The largest family represented was the Asteraceae with 37 genera and 85 species, followed by the Poaceae with 40 genera and 77 species, the Cyperaceae with six genera and 44 species, and the Fabaceae with 18 genera and 37 species. Other families abundantly represented were the Lamiaceae and Rosaceae, each with 26 species; Brassicaceae and Liliaceae, each with 21 species; Ranunculaceae with 19 species; Scrophulariaceae with 17 species; and Apiaceae with 13 species. Forty-six of the 108 families were represented by a single genus and 29 were represented by a single species. Outstandingly large genera included Carex, with 25 species, and Quercus, with 14 species. A total of 140 taxa not previously known from LBL were found.

Eight species were especially significant since they

are currently on one or more lists of rare, threatened, endangered, or special concern species. A summary of these listed elements is presented in Table II and each is discussed in the annotated list. The status categories, as defined by the Committee for Tennessee Rare Plants (1978), are as follows:

Endangered: species in danger of becoming extinct in Tennessee because of their rarity throughout their range and/or because of their specific habitat requirements or restricted area of distribution.

Threatened: species likely to become endangered in the immediate foreseeable future as a result of rapid habitat destruction or commercial exploitation.

Special Concern: species requiring particular attention, because Tennessee is the limit or near-limit of their geographic range or their status is undetermined due to insufficient information.

Rare (as defined by Sharp, 1974): species which presently occur only in a few localities, and relatively few in numbers, possibly due to their habitat destruction or commercial exploitation.

The following annotated checklist contains the presently known flora of the lower Bear Creek area. The arrangement of families and nomenclature follows that of

Table II. Plants of Bear Creek Listed as Rare (R), Threatened (T) or of Special Concern (SC).

Scientific Name	Family	List ¹	Listed Status	Habitat
<u>Cimicifuga rubifolia</u> Kearney	Ranunculaceae	AD CTRP FR SCS	T T SC T	Rich woods
<u>Hydrastis canadensis</u> L.	Ranunculaceae	AD CTRP SH	T T R	Rich woods
<u>Lesquerella lescurii</u> (Gray) S. Wats.	Brassicaceae	AD CTRP	T T	Bottomlands
<u>Lilium canadense</u> L.	Liliaceae	CTRP	T	Slope woods
<u>Panax quinquefolium</u> L.	Araliaceae	AD CTRP SCS SH	T T R R	Rich woods
<u>Spiranthes ovalis</u> Lindley	Orchidaceae	CTRP SCS	SC R	Low woods
<u>Synandra hispidula</u> (Michx.) Baillon	Lamiaceae	AD FR SCS SH	T SC T R	Low woods
<u>Valeriana pauciflora</u> Michx.	Valerianaceae	SH	R	Low woods

¹ Ayensu, DeFillipps (1978), Committee for Tennessee Rare Plants (1978), Sharp (1974), Federal Register (1980), Soil Conservation Service (1975)

Radford, et al. (1968) except where Fernald (1950) or Hitchcock (1950) was used. Genera and species are presented in alphabetical order. The information listed for each species includes: scientific name and synonymy, if applicable; relative abundance; habitat conditions; date of collection; name of collector; collection number and any annotations. An asterisk indicates a new addition to the known flora of LBL.

Annotated Checklist

EQUISETACEAE

Equisetum arvense L. Rare; sandy streambanks. 18 April 1980, Carpenter, Chester, Stack, 106.

OPHIOGLOSSACEAE

Botrychium biternatum (Sav.) Underwood. Infrequent; bottomland forests. 4 Oct. 1980, Carpenter, Chester, Stack, 1020.

Botrychium dissectum Sprengel. Infrequent; bottomland forests, often in association with B. biternatum. 4 Aug. 1980, Stack, 711.

Botrychium virginianum (L.) Sw. Frequent; rich, moist woods. 11 May 1967, Phillips, 127; 14 May 1980, Carpenter, Stack, 273.

Ophioglossum vulgatum L. var. pycnostichum Fernald. Very rare; low woods. 28 April 1980, Carpenter, Stack, 141 (! R. D. Thomas).

PTERIDACEAE

Adiantum pedatum L. Infrequent; mesic ravines, stream-banks, and slope forests. 6 May 1980, Carpenter, Stack, 206.

Pteridium aquilinum (L.) Kuhn. Rare; dry ridges. 25 Sept. 1980, Carpenter, Stack, 968.

ASPIDIACEAE

Athyrium asplenioides (Michx.) A. A. Eaton. Occasional; deep, moist woods and ravines. 26 June 1980, Gray, Stack, 544.

Athyrium pycnocarpon (Spreng.) Tidestrom. Infrequent; alluvial woods along creek. 6 May 1979, Chester, 3361 (! L. Lyle); 19 July 1980, Chester, P. Harper, Stack, 632.

Cystopteris fragilis (L.) Bernh. Rare; rock crevices along streambank. 24 June 1967, Phillips, 179 (! R. Cranfill).

Cystopteris protrusa (Weatherby) Blasdell. Locally abundant in alluvial woods along creek. 11 May 1967, Phillips, 105 (! R. Cranfill); 20 May 1980, Carpenter, Stack, 301.

Onoclea sensibilis L. Frequent; swampy or wet ground, abundant populations where found. 27 Aug. 1980, Stack, 811; 4 Oct. 1980, Carpenter, Chester, Stack, 1047.

Polystichum acrostichoides (Michx.) Schott. Frequent on moist wooded slopes. 24 June 1967, Phillips, 178;

3 Sept. 1980, Stack, 881.

Thelypteris hexagonaptera (Michx.) Weatherby. Frequent; rich, moist woods. 19 July 1980, Chester, P. Harper, Stack, 633.

Woodsia obtusa (Spreng.) Torr. Abundant; rocky roadside banks and woods. 22 June 1965, Clebsch, Phillips, 119; 20 May 1980, Carpenter, Stack, 307; 28 May 1980, Stack, 349; 4 Aug. 1980, Carpenter, Stack, 691.

ASPLENIACEAE

Asplenium platyneuron (L.) Oakes. Abundant in thickets and open areas, also frequent along roadsides and in rocky open woods. 22 June 1965, Clebsch, Phillips, 118; 11 June 1980, Carpenter, Stack, 452.

Asplenium resiliens Kunze. Infrequent; north-facing limestone outcrops. 9 April 1967, Wofford, 109.

Asplenium rhizophyllum L. Infrequent; limestone outcrops. 29 Mar. 1980, Carpenter, Chester, Stack, 30.

POLYPODIACEAE

Polypodium polypodioides (L.) Watt. Very rare; one collection from limestone outcrops. 15 April 1980, Carpenter, Stack, 92.

PINACEAE

Pinus strobus L. Locally abundant as plantings along roadsides. 1 Oct. 1980, Carpenter, Stack, 1003.

Pinus taeda L. Rare; one planted tree seen along roadside. 4 Oct. 1980, Carpenter, Chester, Stack, 1025.

CUPRESSACEAE

Juniperus virginiana L. Frequent; dry rocky roadsides and old fields. 4 Oct. 1980, Carpenter, Chester, Stack, 1061.

TYPHACEAE

Typha latifolia L. Locally abundant in wet areas. 21 June 1980, Chester, Stack, 530.

ALISMATACEAE

Alisma subcordatum Raf. Occasional; shallow water and muddy shores, open wet fields. 6 July 1980, Carpenter, Stack, 555.

*Sagittaria latifolia Willd. Infrequent; shallow water, mudflats, pond and creek edges. 12 Aug. 1980, Chester, Stack, 701.

POACEAE

*Agrostis hyemalis (Walt.) BSP. Occasional along edge of wet fields. 4 June 1980, Carpenter, Stack, 367.

*Agrostis perennans (Walt.) Tuck. Frequent; shaded places, especially woodland borders. 3 Sept. 1980, Stack, 890; 22 Aug. 1981, Chester, 81-734.

Agrostis stolonifera L. (= A. alba L.) Frequent along moist roadsides and woodland borders near streambanks. 21 June 1980, Chester, Stack, 505; 3 Sept. 1980, Stack, 836.

*Alopecurus carolinianus Walt. Locally abundant in bottom-land fields. 22 April 1980, Carpenter, Stack, 117.

Andropogon elliotii Chapman. Occasional; dry field edges.

1 Apr. 1981, Carpenter, Stack, 1135.

*Andropogon scoparius Michx. Infrequent; dry roadsides.

11 Sept. 1980, L. Harper, Stack, 920; 1 Oct. 1980, Carpenter, Stack, 998.

*Andropogon tenarius Michaux. Occasional; dry roadside embankments. 12 Nov. 1980, Carpenter, Stack, 1132.

Andropogon virginicus L. Abundant along dry roadsides and in old fields. 11 Sept. 1980, L. Harper, Stack, 921.

*Aristida dichotoma Michx. Infrequent; dry roadside embankments. 1 Oct. 1980, Carpenter, Stack, 999; 4 Oct. 1980, Carpenter, Chester, Stack, 1015.

*Aristida longespica Poiret. Infrequent; dry roadside embankments. 17 Oct. 1980, Carpenter, Chester, Stack, 1096.

Aristida oligantha Michx. Abundant along dry roadside embankments. 3 Sept. 1980, Stack, 874.

*Arthraxon hispidus var. cryptatherus (Hack.) Honda.

Locally abundant along moist edge of bottomland fields near streambank border. 25 Sept. 1980, Carpenter, Stack, 965.

Arundinaria gigantea (Walter) Muhl. Locally abundant in drainage ditch along bottomland field edge; occasional throughout study area. 12 Aug. 1980, Chester, Stack, 735.

Brachyelytrum erectum (Schreb.) Beauv. Frequent; rocky woods. 27 July 1965, Ellis, 588 (! K. Rogers and J. K. Underwood); 4 July 1980, Carpenter, Chester, Stack, 556.

*Bromus commutatus Schrader. Frequent throughout along roadsides and in waste ground. 28 May 1980, Carpenter, Stack, 410; 21 June 1980, Chester, Stack, 503.

Bromus purgans L. Frequent; lowland woods along stream-banks and moist wooded roadsides. 23 May 1980, Carpenter, Chester, Stack, 502; 28 May 1980, Carpenter, Stack, 406; 21 June 1980, Chester, Stack, 402.

Bromus tectorum L. Occasional throughout; locally abundant as a roadside weed and in waste areas. 21 May 1966, Ellis, 1101 (! K. Rogers and J. K. Underwood); 9 May 1980, Carpenter, Chester, Stack, 222.

Cinna arundinacea L. Frequent; shaded places, especially along streams and swampy areas. 27 Aug. 1980, Stack, 806; 11 Sept. 1980, L. Harper, Stack, 903.

*Cynodon dactylon (L.) Pers. Locally abundant; growing in full sun in waste places such as old homesites and the lawn of the southern information station. 16 July 1980, S. Stack, J. Stack, 595.

Dactylis glomerata L. Frequent; roadsides and waste places. 21 May 1966, Clebsch, Ellis, 1103 (! K. Rogers and J. K. Underwood); 28 Apr. 1980, Carpenter, Stack, 162.

Danthonia spicata (L). Beauvois ex R. & S. Frequent

throughout; locally abundant on open roadsides and around field edges. 14 May 1980, Carpenter, Stack, 272.

*Digitaria ischaemum (Schreb.) Schreb. ex Muhl. Frequent; cultivated ground, roadsides and waste places. 24 Sept. 1980, Carpenter, Stack, 938; 4 Oct. 1980, Carpenter, Chester, Stack, 1016; 14 Sept. 1981, Chester, 81-807.

Digitaria sanguinalis (L.) Scopoli. Frequent; cultivated ground. 12 Aug. 1980, Chester, Stack, 723.

Echinochloa crusgalli (L.) Beauv. Infrequent; roadsides and open cultivated fields. 7 July 1965, Ellis, 506 (! J. K. Underwood); 16 July 1980, S. Stack, J. Stack, 594; 27 Aug. 1980, Stack, 804; 31 Oct. 1980, Carpenter, Chester, Stack, 1143 (! R. Kral).

Eleusine indica (L.) Gaertn. Infrequent; alluvial woods and waste areas. 7 July 1965, Ellis, 296 (! K. Rogers and J. K. Underwood); 19 July 1980, Chester, P. Harper, Stack, 631; 27 Aug. 1980, Stack, 795.

Elymus villosus Muhl. Frequent; moist, wooded roadsides and stream margins. 7 July 1965, Ellis, 306 (! K. Rogers and J. K. Underwood); 21 July 1965, Ellis, 451 (! K. Rogers and J. K. Underwood); 18 June 1980, B. Stack, J. Stack, 483; 21 June 1980, Chester, Stack, 491.

Elymus virginicus L. Frequent; streambanks and borders of open wet fields. 18 June 1980, B. Stack, J. Stack, 488; 6 Nov. 1980, Carpenter, Stack, 1152.

Eragrostis capillaris (L.) Nees. Infrequent; dry, open cherty roadsides and field edges. 27 Aug. 1980, Stack, 1152.

*Eragrostis cilianensis (All.) Lutati. Locally abundant along edge of mudflats of lower Bear Creek. 4 Aug. 1980, Stack, 685.

Eragrostis hypnoides (Lam.) BSP. Locally abundant in the mudflats of lower Bear Creek. 11 Sept. 1980, L. Harper, Stack, 908; 4 Oct. 1980, Carpenter, Chester, Stack, 1045; 8 Oct. 1980, Carpenter, Stack, 1077; 14 Sept. 1981, Chester, 81-812.

*Eragrostis pilosa (L.) Beauv. Frequent along roadsides. 3 Sept. 1980, Stack, 893.

Eragrostis spectabilis (Pursh.) Steudel. Infrequent; open roadsides and cultivated field edges. 27 Aug. 1980, Stack, 814; 3 Sept. 1980, Stack, 892.

Erianthus alopecuroides (L.) Ell. Very rare; roadsides near abandoned field edges. 11 Sept. 1980, L. Harper, Stack, 913.

Festuca elatior L. Frequent; roadsides and waste ground. 21 May 1966, Ellis, 1102 (! K. Rogers and J. K. Underwood); 28 April 1980, Carpenter, Stack, 161; 9 May 1980, Carpenter, Chester, Stack, 250; 20 May 1980, Carpenter, Stack, 314.

Festuca obtusa Biehler. Frequent; alluvial woods and wooded roadsides. 21 May 1966, Ellis, 1105 (! K. Rogers

and J. K. Underwood); 20 May 1980, Carpenter, Stack, 312 A; 20 May 1980, Carpenter, Stack, 312 B; 23 May 1980, Carpenter, Chester, Stack, 403; 21 June 1980, Chester, Stack, 504 A.

Glyceria striata (Lam.) Hitchc. Frequent; shaded, moist roadsides and field edges. 21 May 1966, Clebsch, Ellis, 1112 (! K. Rogers and J. K. Underwood); 14 May 1980, Carpenter, Stack, 279; 23 May 1980, Carpenter, Chester, Stack, 400; 28 May 1980, Carpenter, Stack, 404.

*Holcus lanatus L. Locally abundant; fields, roadsides, ditches and other moist places. 11 June 1980, Carpenter, Stack, 448.

Hordeum pusillum Nutt. Locally abundant; open bottomland fields and roadsides. 21 May 1966, Clebsch, Ellis, 1127 (! K. Rogers and J. K. Underwood); 9 May 1980, Carpenter, Chester, Stack, 243.

Hystrix patula Moench. Frequent; alluvial woods along stream. 7 July 1965, Ellis, 210 (! K. Rogers and J. K. Underwood); 21 June 1980, Chester, Stack, 512.

*Leersia oryzoides (L.) Swartz. Locally abundant; swampy spots, forming a definite zone. Found at only one collection site. 11 Sept. 1980, L. Harper, Stack, 907.

*Leptochloa filiformis (Lam.) Beauvois. Rare along the sandy edge of cultivated fields. 25 Sept. 1980, Carpenter, Stack, 962.

*Leptochloa panicoides (Presl.) Hitchcock. Locally abundant

along edge of swampy area near mudflats of lower Bear Creek. 11 Sept. 1980, L. Harper, Stack, 906.

Lolium multiflorum Lam. Infrequent but locally abundant in cultivated fields. 28 May 1980, Carpenter, Stack, 356; 4 June 1980, Carpenter, Stack, 362.

Melica mutica Walt. Scattered in rocky woods and along moist, wooded roadsides. 21 May 1966, Clebsch, Ellis, 1115 (! K. Rogers and J. K. Underwood); 30 April 1980, Carpenter, Chester, Stack. 164.

*Microstegium vimineum (Trinius) A. Camus (= Eulalia viminea (Trinius) (Kuntze). Locally abundant; open wet fields, pond edges and swampy areas. 4 Oct. 1980, Carpenter, Chester, Stack, 1017 A, 1017 B; 17 Oct. 1980, Carpenter, Chester, Stack, 1088.

*Muhlenbergia frondosa (Poirot) Fernald. Occasional; moist field edges. 25 Sept. 1980, Carpenter, Stack, 964.

*Muhlenbergia schreberi J. F. Gmelin. Locally abundant along roadsides; occasional throughout the study area. 3 Sept. 1980, Stack, 875; 11 Sept. 1980, Stack, 905.

*Muhlenbergia sobolifera (Muhl.) Trin. Frequent; dry, rocky woods and ridgetops. 21 Aug. 1980, L. Harper, Stack, 763; 22 Aug. 1981, Chester, 81-736.

*Muhlenbergia tenuiflora (Willd.) BSP. Frequent; moist, wooded field edges. 4 Oct. 1980, Carpenter, Chester, Stack, 1034; 17 Oct. 1980, Carpenter, Chester, Stack, 1085.

Panicum agrostoides Sprengel. Locally abundant in low, open bottomland fields and swampy areas. 27 Aug. 1980, Stack, 805; 11 Sept. 1980, L. Harper, Stack, 901.

Panicum anceps Michx. Occasional; low moist ground and fields. Scattered clumps in open meadows near the Cumberland River bottoms. 7 July 1965, Ellis, 319 (! K. Rogers and J. K. Underwood); 19 July 1980, Chester, P. Harper, Stack, 641; 15 July 1981, Chester, 81-562.

Panicum boscii Poiret. Frequent; dry wooded slopes and roadsides. 7 July 1965, Ellis, 220 (! K. Rogers and J. K. Underwood); 20 May 1980, Stack, 300; 28 May 1980, Carpenter, Stack, 411.

Panicum clandestinum L. Occasional; moist alluvial woods along stream and roadsides. 28 May 1980, Carpenter, Stack, 412.

Panicum depauperatum Muhl. Frequent; dry sandy roadsides. 28 May 1980, Carpenter, Stack, 414.

*Panicum dichotomiflorum Michx. Frequent; low woods bordering cultivated fields and moist roadsides. 27 Aug. 1980, Stack, 807; 3 Sept. 1980, Stack, 876; 25 Sept. 1980, Carpenter, Stack, 977.

*Panicum flexile (Gattinger) Scrib. Infrequent; roadsides and waste ground. 3 Sept. 1980, Stack, 889; 11 Sept. 1980, L. Harper, Stack, 902.

Panicum lanuginosum Ell. Frequent; cultivated field edges in full sun. 12 Aug. 1980, Chester, Stack, 693.

Panicum laxiflorum Lam. Frequent; roadsides. 20 May 1980, Carpenter, Stack, 299.

*Paspalum distichum L. Locally abundant in the wet bottoms of the Cumberland River near the mouth of Bear Creek. 31 Oct. 1980, Carpenter, Chester, Stack, 1121; 15 July 1981, Chester, 81-564.

*Paspalum fluitans (Ell.) Kunth. Occasional; open, wet fields and pond edges; locally abundant. 17 Oct. 1980, Carpenter, Chester, Stack, 1086; 31 Oct. 1980, Carpenter, Chester, Stack, 1116.

Paspalum laeve Michx. Frequent; open field edges, scattered along roadsides and lower Bear Creek bottoms. 27 Aug. 1980, Stack, 796; 1 Oct. 1980, Carpenter, Stack, 1159 (! R. Kral); 15 July 1981, Chester, 81-567.

Paspalum pubiflorum Rupr. Infrequent; bottomland cultivated field edges. 7 July 1965, Ellis, 300 (! K. Rogers and J. K. Underwood); 1 Oct. 1980, Carpenter, Stack, 991 (I.D. by R. Kral).

*Phalaris arundinacea L. Rare. Large clumps frequent along dikes and roadsides near water in the Cumberland River bottoms near the mouth of Bear Creek. 15 July 1981, Chester, 81-568.

*Phleum pratense L. Occasional; field edges, roadsides and waste ground. 11 June 1980, Carpenter, Stack, 447.

*Poa chapmaniana Scribn. Frequent throughout and abundant; open disturbed ground. 18 Apr. 1980, Carpenter, Chester, Stack, 123.

*Poa pratensis L. Frequent and abundant in many habitats; open woods, roadsides and lawns. 7 July 1965, Ellis, 509 (! R. Kral); 22 April 1980, Carpenter, Stack, 112; 28 April 1980, Carpenter, Stack, 196; 14 May 1980, Carpenter, Stack, 794.

*Poa sylvestris Gray. Frequent; shaded moist ground, streambanks and roadsides. 9 May 1980, Carpenter, Stack, 225; 20 May 1980, Carpenter, Stack, 310 A, 310 B (! R. Kral).

Setaria faberi Herrm. Frequent in waste ground, roadsides and fields. 9 July 1980, B. Stack, J. Stack, 566.

Setaria glauca (L.) Beauvois (= S. lutescens (Weigel) Hubb.). Frequent; cultivated land, roadsides and waste places. 12 Aug. 1980, Chester, Stack, 694; 11 Sept. 1980, L. Harper, Stack, 904; 18 July 1981, Chester, 81-565.

*Setaria italica (L.) Beauvois. Locally abundant as an escape in cultivated fields. 4 Aug. 1980, Stack, 687.

Setaria viridis (L.) Beauvois. Infrequent; cultivated fields, roadsides and waste places. 7 July 1965, Ellis, 301 (! K. Rogers and J. K. Underwood); 12 Aug. 1980, Chester, Stack, 695.

Sorghum halepense (L.) Persoon. Very abundant in fields and waste ground, especially corn fields. 7 July 1965, Ellis, 302 (! K. Rogers and J. K. Underwood); 9 July 1980, B. Stack, J. Stack, 581.

*Sphenopholis nitida (Biehler) Scribner. Frequent; dry

woods. 28 April 1980, Carpenter, Stack, 195.

Sphenopholis obtusata Michx. Frequent; moist, shaded roadsides. 14 May 1980, Carpenter, Stack, 282.

Tridens flavus (L.) Hitchcock (= Triodia flava (L.) Smyth.). Growing frequently in open disturbed areas such as roadsides. 12 Aug. 1980, Chester, Stack, 724; 11 Sept. 1980, L. Harper, Stack, 930; 22 Aug. 1981, Chester 81-735.

*Triticum aestivum L. Infrequently found as a remnant of cultivation and along roadsides. 20 May 1980, Carpenter, Stack, 304.

Uniola latifolia Michx. Frequent along streambanks and in low, moist wooded areas. 4 Aug. 1980, Stack, 672.

CYPERACEAE

*Carex albursina Sheldon. Frequent; slope forest. 30 Apr. 1980, Carpenter, Chester, Stack, 165.

Carex amphibola Steudel. Occasional; moist woodlands. 21 May 1966, Ellis, 1116; 1 May 1981, Carpenter, Stack, 692.

*Carex blanda Dewey. Occasional; rich woods. 20 Apr. 1980, Carpenter, Chester, Stack, 216; 23 May 1980, Carpenter, Chester, Stack, 398 (! R. Kral).

Carex cephalophora Muhl. ex Schkuh. Frequent; open woodlands. 21 May 1966, Ellis, 1109; 30 Apr. 1980, Carpenter, Chester, Stack, 163; 9 May 1980, Carpenter, Chester, Stack, 1148.

- Carex complanata Torr. & Hook. Infrequent; alluvial woods.
21 May 1966, Clebsch, Ellis, 1157; 14 May 1980,
Carpenter, Stack, 286.
- *Carex digitalis Willd. Frequent; wooded slopes. 22 Apr.
1980, Carpenter, Stack, 111.
- Carex festucacea Schk. Infrequent; mesophytic woodlands
along creek. 21 May 1966, Ellis, 1108 (! R. Kral).
- Carex frankii Kunth. Frequent; wet fields and swamps
throughout the study area. 19 July 1980, Chester,
P. Harper, Stack, 628; 4 Oct. 1980, Carpenter, Chester,
Stack, 1014.
- Carex grayi Carey. Infrequent; floodplain woods. 21 June
1980, Chester, Stack, 525.
- *Carex jamesii Schw. Infrequent, but locally abundant on
mesic slopes. 29 May 1982, Chester, 82-331.
- Carex lupulina Muhl. ex Schkuhr. Occasional; swamps, wet
woods and ditches. 23 May 1980, Carpenter, Chester,
Stack, 395; 21 June 1980, Chester, Stack, 508; 19 July
1980, Chester, P. Harper, Stack, 627.
- Carex lurida Wahlenburg. Frequent; wet woodlands and
swamps. 21 May 1966, Clebsch, Ellis, 1191; 23 May
1980, Carpenter, Chester, Stack, 396.
- Carex muhlenbergii Schkuhr. Frequent; slope forests.
9 May 1980, Carpenter, Chester, Stack, 251 (! R. Kral).
- *Carex nigromarginata Schweinitz. Occasional; dry wooded
slopes. 29 Mar. 1980, Carpenter, Chester, Stack, 194
(! R. Kral).

- *Carex pensylvanica Lam. Infrequent; dry roadside embankments. 1 Apr. 1981, Carpenter, Stack, 1133.
- *Carex retroflexa Muhl. ex Schkuhr. Frequent; dry, wooded ridges and slopes. 9 May 1980, Carpenter, Chester, Stack, 255.
- Carex rosea Schkuhr. (C. convoluta Mackenz.). Infrequent; dry open woods. 21 May 1966, Clebsch, Ellis, 1163.
- *Carex shortiana Dewey. Infrequent to rare; low, moist woods bordering abandoned roadbed. 8 May 1966, Riggins, 1066 (! R. Kral); 9 May 1980, Carpenter, Chester, Stack, 257 (! R. Kral); 23 May 1980, Carpenter, Chester, Stack, 397 (! R. Kral).
- *Carex stipata Muhl. ex Schk. Infrequent; moist alluvial woods along stream. 6 May 1980, Carpenter, Stack, 209.
- *Carex striatula Michx. Frequent; rich hardwood forests. 30 April 1980, Carpenter, Chester, Stack, 179.
- Carex squarrosa L. Frequent; wet woods and swamps. 23 May 1980, Carpenter, Chester, Stack, 394; 25 July 1980, Roberts, Stack, 652; 22 May 1981, Chester, 81-240.
- *Carex swanii (Fern.) Macken. Low wooded slopes, lower Bear Creek bottoms near Cumberland River. Only one fruiting clump seen, but foliage abundant. 22 Aug. 1981, Chester, 81-733.
- Carex tribuloides Wahl. Occasional; wet habitats, swamps and wet fields. 21 May 1966, Ellis, 1144 (! R. Kral); 21 June 1980, Chester, Stack, 509.

Carex vulpinoidea Michx. Frequent; wet places throughout, moist wooded roadsides and wet fields. 23 May 1980, Carpenter, Chester, Stack, 399; 11 June 1980, Carpenter, Stack, 430.

*Cyperus albomarginatus Martius & Schrader ex Nees. Locally abundant; mudflats. 4 Oct. 1980, Carpenter, Chester, Stack, 1062.

*Cyperus aristatus Rottb. Locally abundant; mudflats, 8 Oct. 1980, Carpenter, Stack, 1075 (! R. Kral); 31 Oct. 1980, Carpenter, Chester, Stack, 1123 (! R. Kral); 14 Sept. 1981, Chester, 81-810.

*Cyperus erythrorhizos Muhl. Frequent; mudflats and wet areas. 11 Sept. 1980, L. Harper, Stack, 898; 4 Oct. 1980, Carpenter, Chester, Stack, 1068 (! R. Kral).

*Cyperus esculentus L. Frequent; moist sandy fields, swampy areas and locally abundant in mudflats. 12 Aug. 1980, Chester, Stack, 755; 11 Sept. 1980, L. Harper, Stack, 929 (! R. Kral); 4 Oct. 1980, Carpenter, Chester, Stack, 1066.

*Cyperus ferruginescens Boeckler. Frequent; mudflats. 4 Oct. 1980, Carpenter, Chester, Stack, 1067 (! R. Kral).

Cyperus odoratus L. Very abundant locally along edges of swampy areas. 19 July 1980, Chester, P. Harper, Stack, 648.

Cyperus ovularis (Michx.) Torr. Occasional; cultivated field edges, roadsides, moist to dry habitats. 18 June

1980, B. Stack, J. Stack, 461; 19 July 1980, Chester, P. Harper, Stack, 640.

*Cyperus pseudovegetus Steudel. Frequent; open, wet fields in local populations. 19 July 1980, Chester, P. Harper, Stack, 629.

Cyperus strigosus L. Very abundant in mudflats and as a troublesome weed in moist cultivated ground. 16 July 1980, S. Stack, J. Stack, 588; 4 Aug. 1980, Stack, 671; 12 Aug. 1980, Chester, Stack, 705; 1 Oct. 1980, Carpenter, Stack, 992; 31 Oct. 1980, Carpenter, Chester, Stack, 1103 B.

*Cyperus tenuifolius (Steud.) Dandy. Rare; wet soybean field edge, lower Bear Creek bottoms. 14 Sept. 1981, Chester, 81-811.

Eleocharis engelmannii Steudel. Frequent; open wet fields and mudflats. 4 June 1980, Carpenter, Stack, 390.

Eleocharis obtusa (Willd.) Schult. Very abundant; mudflats, and open wet fields. 30 Apr. 1980, Carpenter, Chester, Stack, 197.

*Fimbristylis autumnalis (L.) R. & S. Abundant but limited to wet bottomland fields and mudflats. 12 Aug. 1980, Chester, Stack, 704; 4 Oct. 1980, Carpenter, Chester, Stack, 1046; 8 Oct. 1980, Carpenter, Chester, Stack, 1070; 31 Oct. 1980, Carpenter, Chester, Stack, 1122; 14 Sept. 1981, Chester, 81-809.

*Fimbristylis vahlii (Lam.) Link. Locally abundant;

mudflats. 8 Oct. 1980, Carpenter, Stack, 1071.

*Hemicarpha micrantha (Vahl.) Pax. Very abundant; mudflats.

8 Oct. 1980, Carpenter, Stack, 1076; 31 Oct. 1980,
Carpenter, Chester, Stack, 1124 (! R. Kral).

Scirpus atrovirens Willd. Frequent; wet ground, swamps
and ditches. 28 May 1980, Carpenter, Stack, 358;
11 June 1980, Carpenter, Stack, 429 A.

*Scirpus cyperinus (L.) Kunth. Rare, growing in huge
tufts along edges of swamps. 11 Sept. 1980, L. Harper,
Stack, 917.

*Scirpus koilolepis (Steud.) Gl. Very rare; open wet fields.
30 Apr. 1980, Carpenter, Chester, Stack, 182; 23 May
1980, Carpenter, Chester, Stack, 389.

Scirpus lineatus Michx. Frequent; locally in wet places,
wet roadside ditches and moist fields. 8 May 1966,
Riggins, 1067; 28 May 1980, Carpenter, Stack, 393.

*Scirpus polyphyllus Vahl. Infrequent to rare along edge
of small tributary of Bear Creek. 4 Aug. 1980, Stack,
676.

ARACEAE

Arisaema dracontium (L.) Schott. Frequent; lowland woods.
21 May 1966, Clebsch, Ellis, 1141; 30 Apr. 1980,
Carpenter, Chester, Stack, 168.

Arisaema triphyllum (L.) Schott. Occasional; moist,
alluvial woods. 21 May 1966, Clebsch, Ellis, 1129,
1170; 11 Apr. 1980, Carpenter, Chester, Stack, 103.

LEMNACEAE

Lemna perpusilla Torrey (= L. minor L.). Very rare in pooled area of stream due to beaver dam in channalized portion of Bear Creek. 12 Aug. 1980, Chester, Stack, 706.

COMMELINACEAE

Commelina communis L. Frequent; moist ground along edges of woods, streams and in disturbed ground. 7 July 1965, Ellis, 213, 295; 18 June 1980, B. Stack, J. Stack, 462.

Commelina diffusa Burm. Locally abundant along woodland borders near streambank and cultivated fields; occasional throughout the study area. 3 Sept. 1980, Stack, 865.

Commelina virginica L. Infrequent; mesic lowland woods. 19 July 1980, Chester, P. Harper, Stack, 622.

Tradescantia subaspera Ker. Frequent; mesic lowland woods. 7 July 1965, Ellis 207, 314; 22 July 1966, Ellis, 2228; 20 May 1967, Wallen, Phillips, 2799; 28 May 1980, Carpenter, Stack, 353.

Tradescantia virginiana L. Infrequent; shaded limestone outcrop of alluvial woods. 14 May 1980, Carpenter, Stack, 259.

JUNCACEAE

Juncus acuminatus Michaux. Very abundant; open wet fields. 23 May 1980, Carpenter, Chester, Stack, 415;

18 June 1980, B. Stack, J. Stack, 460.

*Juncus biflorus Ell. Frequent; open wet fields. 11 June 1980, Carpenter, Stack, 427.

Juncus effusus L. Locally abundant; open wet fields, edges of swamps and wet depressions. 9 May 1980, Carpenter, Chester, Stack, 258; 18 June 1980, B. Stack, J. Stack, 459.

Juncus marginatus Rostk. Frequent; open wet fields, pond and swamp margins. 9 May 1980, Carpenter, Chester, Stack, 1150 (! R. Kral); 11 June 1980, Carpenter, Stack, 426; 18 June 1980, B. Stack, J. Stack, 485.

Juncus tenuis Willd. Frequent in moist or dry open areas especially in paths through grassy areas. 7 July 1965, Ellis 323; 18 June 1980, B. Stack, J. Stack, 458.

*Luzula bulbosa (Wood) Rydb. Infrequent; slope forests. 28 Apr. 1980, Carpenter, Stack, 158 (I.D. by J. Coffey).

Luzula echinata (Sm.) Hermann (= L. campestris L.).

Frequent; slope forests. 1 Apr. 1966, Wofford, 1014; 29 Mar. 1980, Carpenter, Chester, Stack, 126 (! J. Coffey); 18 Apr. 1980, Carpenter, Chester, Stack, 127 (! J. Coffey); 22 Apr. 1980, Carpenter, Stack, 227 (! J. Coffey); 30 Apr. 1980, Carpenter, Chester, Stack, 228 (! J. Coffey); 14 May 1980, Carpenter, Stack, 229 (! J. Coffey).

LILIACEAE

Allium canadense L. Abundant; roadsides, open fields and

woodland borders. Infrequently found flowering.

21 May 1966, Clebsch, Ellis, 1106 (! R. Johnson);

28 May 1980, Carpenter, Stack, 357.

Allium vineale L. Frequent; roadsides, open fields and disturbed areas. 7 July 1965, Ellis, 324 (! R. Johnson); 4 June 1980, Carpenter, Stack, 392; 21 June 1980, Chester, Stack, 492.

*Camassia scilloides (Raf.) Cory. Very rare, one location in a deep ravine. 1 May 1981, Carpenter, Stack, 1145.

Chamaelirium luteum (L.) Gray. Infrequent; rich wooded slopes. Flowers not seen, only rosettes. 23 May 1980, Carpenter, Chester, Stack, 316.

*Disporum lanuginosum (Michx.) Nichol. Rare; rich, moist wooded slopes. 30 Apr. 1980, Carpenter, Chester, Stack, 192.

Erythronium americanum Ker. Abundant; rich floodplain woods and slopes. 1 Apr. 1966, Wofford, 1007 (! R. Johnson); 29 Mar. 1980, Carpenter, Chester, Stack, 28; 4 Apr. 1980, Carpenter, Stack, 57.

Hemerocallis fulva L. Rare; old homesites. 11 June 1980, Carpenter, Stack, 432.

Lilium canadense L. Very rare; growing at the base of north slope near streambank woods. 19 July 1980, Chester, P. Harper, Stack, 625.

Ornithogalum umbellatum L. Occasional; woodland borders. 8 May 1966, Riggins, 1061 (! R. Johnson); 30 Apr.

1967, Phillips, 2690 (! R. Johnson); 6 May 1980,
Carpenter, Stack, 205.

Polygonatum biflorum (Walt.) Ell. Infrequent; rich woods.

7 July 1965, Ellis, 216; 21 May 1966, Clebsch, Ellis,
1118; 1 May 1975, Chester, 2946; 9 May 1980, Carpenter,
Chester, Stack, 242.

Smilacina racemosa (L.) Desf. Frequent; rich woods.

21 May 1966, Clebsch, 1169 (! R. Johnson); 9 May 1980,
Carpenter, Chester, Stack, 232.

Smilax bona-nox L. Frequent; roadsides and woodland

thickets. 23 May 1980, Carpenter, Chester, Stack, 338;
8 Oct. 1980, Carpenter, Stack, 1080; 17 Oct. 1980,
Carpenter, Chester, Stack, 1081; 21 Oct. 1980,
Carpenter, Chester, Stack, 1104.

Smilax glauca Walt. Frequent; roadside thickets. 20 Aug.

1974, Chester, 2867; 21 Aug. 1980, L. Harper, Stack,
852.

Smilax herbacea L. var. pulverulenta (Michx.) Gray.

Infrequent; rich wooded slopes. 27 July 1965, Ellis,
591 (! R. Johnson); 8 May 1966, Riggins, 1063; 6 May
1980, Carpenter, Stack, 219.

Smilax hispida Muhl. Frequent; roadside thickets and

field edges. 21 May 1966, Clebsch, Ellis, 1171,
25 Sept. 1980, Carpenter, Stack, 972; 4 Oct. 1980,
Carpenter, Chester, Stack, 1033.

Smilax rotundifolia L. Frequent; moist thickets. 11 Sept.

1975, Chester, 3111; 6 May 1980, Carpenter, Stack, 218;

1 Oct. 1980, Carpenter, Stack, 1006.

Smilax walteri Pursh. Rare; lowland thickets along Bear Creek near the Cumberland River. 11 Sept. 1975, Chester, 3112.

Trillium cuneatum Raf. Infrequent; mesic woodlands along Bear Creek. 1 May 1975, Chester, 2949.

Trillium flexipes Raf. Rare, moist woods. 1 May 1975, Chester, 2968; 18 April 1980, Carpenter, Chester, Stack, 101.

Trillium recurvatum Beck. Frequent; moist woods. 8 May 1966, Riggins, 1054 (! R. Johnson); 1 May 1975, Chester, 2948; 21 May 1975, Clebsch, Ellis, 1143 (! R. Johnson); 8 April 1980, Carpenter, Stack, 63.

Uvularia grandiflora Sm. Infrequent; north-slope forests. 11 May 1967, Phillips, 2737; 8 April 1980, Carpenter, Stack, 66.

DIOSCOREACEAE

Dioscorea batatas Dcne. Abundant; moderately open alluvial woods and cultivated field edges. 7 July 1965, Ellis, 217; 22 July 1966, Ellis, 2227; 9 July 1980, B. Stack, J. Stack, 572.

Dioscorea villosa L. Frequent; low, moist woods and thickets. 27 July 1965, Ellis, 589; 23 May 1980, Carpenter, Chester, Stack, 326.

AMARYLLIDACEAE

Hymenocallis occidentalis (LeConte) Kunth. Very rare;

lowland woods along abandoned roadbed. 27 Aug. 1980, Stack, 827.

Hypoxis hirsuta (L.) Corville. Very rare; dry, sandy soil of ridge top woods. 20 April 1980, Carpenter, Chester, Stack, 174.

*Narcissus poeticus L. Infrequent as a remnant of cultivation, locally abundant where found. 24 Apr. 1981, Carpenter, Stack, 1142.

*Narcissus pseudo-narcissus L. Infrequent as a remnant of cultivation at abandoned homesites. 29 Mar. 1980, Carpenter, Chester, Stack, 27.

IRIDACEAE

Belamcanda chinensis (L.) DC. A rare escape along roadsides. 9 July 1980, B. Stack, J. Stack, 584.

Iris cristata Ait. Infrequent throughout; locally abundant along the lower aspects of the slope forest. 21 May 1966, Clebsch, Ellis, 1146; 22 April 1979, Chester, 3351; 28 April 1980, Carpenter, Stack, 143.

Sisyrinchium angustifolium Mill. Frequent; open woods, partly shaded cultivated field edges. 8 May 1966, Riggins, 1070; 21 May 1966, Clebsch, Ellis, 1142; 6 May 1980, Carpenter, Stack, 208; 28 May 1980, Carpenter, Stack, 351.

ORCHIDACEAE

Aplectrum hyemale (Muhl. ex Willd.) Torrey. Rare; rich woods. 14 May 1980, Carpenter, Stack, 267; 19 July 1980, Chester, P. Harper, Stack, 618.

Spiranthes grayi Ames. Very rare; dry roadside embankments.
 twelve to fifteen plants observed at the one location.
 27 Aug. 1980, Stack, 832.

*Spiranthes ovalis Lindley. Rare; shaded but open, moist
 woods. 24 Sept. 1980, Carpenter, Stack, 946 (I.D. by
 D. S. Correll); 25 Sept. 1980, Stack, 1144 (I.D. by
 D. S. Correll); 29 Oct. 1980, Carpenter, Stack, 1102
 (I.D. by D. S. Correll).

Tipularia discolor (Pursh.) Nuttall. Rare; northwest
 slope forest. 4 Aug. 1980, Stack, 674.

SAURURACEAE

Saururus cernuus L. Rare, known only from one large patch
 along moist bottomland roadside, lower Bear Creek
 bottoms. 17 Oct. 1980, Carpenter, Chester, Stack, 1089.

SALICACEAE

Populus alba Michx. Infrequent; single stand observed
 persisting around an abandoned homesite. 9 July 1980,
 B. Stack, J. Stack, 567.

Populus deltoides Marshall. Occasional; low woods along
 stream. 4 Oct. 1980, Carpenter, Chester, Stack, 1055.

Salix caroliniana Michx. Infrequent; open banks of stream
 and edge of pond. 25 Sept. 1980, Carpenter, Stack, 955;
 21 June 1980, Chester, Stack, 524.

Salix humilis Marshall. Infrequent; field edges near
 stream. 8 May 1966, Riggins, 1069; 23 May 1980,
 Carpenter, Chester, Stack, 854; 18 April 1980, Carpenter,
 Chester, Stack, 125.

Salix nigra Marshall. Abundant along streambanks, roadsides and pond edges. 25 Sept. 1980, Carpenter, Stack, 983; 1 Oct. 1980, Carpenter, Stack, 1005.

JUGLANDACEAE

Carya cordiformis (Wang.) K. Koch. Frequent; low woods along streams and in ravines. 1 Oct. 1980, Carpenter, Stack, 987, 1001.

Carya glabra (Mill.) Sweet. Frequent; dry ridges and upland north-facing slopes. 15 Oct. 1980, Carpenter, Stack, 1160.

Carya illinoensis (Wang.) K. Koch. Rare; Cumberland River bottoms near mouth of Bear Creek. Two trees ca. 20 feet in height at edge of bottomland forest near river. 15 July 1981, Chester, 81-563.

Carya laciniosa (Michx. f.) Loud. Occasional; streambank and ravine forests. 7 Aug. 1974, Chester, Schibig, 2855; 6 May 1979, Chester, 3362; 4 Oct. 1980, Carpenter, Chester, Stack, 1030.

Carya ovalis (Wang.) Sarg. Rare; dry to mesic slope forests. 27 June 1966, Wofford, 1706; 14 Sept. 1971, Schibig, 46.

Carya ovata (Mill.) K. Koch. Occasional; rich woods, moist slopes and ravines. 27 June 1966, Wofford, 1707; 4 Oct. 1980, Carpenter, Chester, Stack, 1029; 8 Oct. 1980, Carpenter, Stack, 1073 B.

Carya tomentosa Nutt. Occasional; rich slopes and

streambanks. 14 Sept. 1971, Schibig, 45; 25 Sept. 1980, Carpenter, Stack, 982; 4 Oct. 1980, Carpenter, Chester, Stack, 1028.

Juglans cinerea L. Rare in ravine and streambank forests. 4 Oct. 1980, Carpenter, Chester, Stack, 1058.

Juglans nigra L. Occasional; bottomland fencerows and ravines. 28 June 1966, Wofford, 1671; 25 Sept. 1980, Carpenter, Stack, 979.

BETULACEAE

Betula nigra L. Occasional along streambanks. 23 May 1980, Carpenter, Chester, Stack, 318; 4 Oct. 1980, Carpenter, Chester, Stack, 1056.

Carpinus caroliniana Walt. Frequent; mesic upland and lowland woods. 28 June 1966, Wofford, 1661; 4 Oct. 1980, Carpenter, Chester, Stack, 1049.

Corylus americana Walter. Rare; fencerows along roadsides. 12 Aug. 1980, Chester, Stack, 744.

Ostrya virginiana (Miller) K. Koch. Frequent; streambanks. 25 Sept. 1980, Carpenter, Stack, 971.

FAGACEAE

Castanea dentata (Marxh.) Borkh. Very rare as sprouts on north-facing slopes and ridges. 28 April 1980, Carpenter, Stack, 160.

Fagus grandifolia Ehrh. Very abundant. A dominant tree of north-facing slopes and streambanks. 7 July 1965, Ellis, 221; 28 June 1966, Wofford, 1660; 14 Sept.

1971, Jensen, 8; 21 June 1980, Chester, Stack, 528.

Quercus alba L. Frequent; roadsides and slope forests.

27 June 1966, Wofford, 1697; 4 Oct. 1980, Carpenter, Chester, Stack, 1039.

Quercus coccinea Muenchh. Occasional, dry upland slopes.

27 June 1966, Wofford, 1694; 22 Oct. 1980, Carpenter, Stack, 1155.

Quercus falcata var. falcata Michx. Frequent; roadsides

and dry upland woods. 14 Sept. 1971, Jensen, 14;

15 Oct. 1980, Carpenter, Stack, 1161; 25 Sept. 1980, Carpenter, Stack, 978.

Quercus falcata var. pagodaefolia Ell. Very rare;

bottomlands near Cumberland River. 4 Oct. 1980, Carpenter, Chester, Stack, 1009.

Quercus imbricaria Michx. Infrequent; lowland woods and

roadsides. 27 July 1965, Ellis, s.n.; 20 Sept. 1970, Schibig, 8; 21 June 1980, Chester, Stack, 526; 1 Oct. 1980, Carpenter, Stack, 1002.

Quercus marilandica Muenchh. Occasional; along dry ridges.

27 July 1966, Wofford, 1698; 1 Nov. 1980, Carpenter, Stack, 1130.

Quercus michauxii Nutt. Rare; moist woods and stream-

banks. 28 June 1966, Wofford, 1663; 11 Oct. 1970, Schibig, 22; 4 Oct. 1980, Carpenter, Chester, Stack, 1059.

Quercus muehlenbergii Engelm. Infrequent; roadsides and

mesic slopes. 25 Sept. 1980, Carpenter, Stack, 980;
4 Oct. 1980, Carpenter, Chester, Stack, 1044.

Quercus palustris Muenchh. Very rare; Cumberland River
banks of lower Bear Creek. 31 Oct. 1980, Carpenter,
Chester, Stack, 1128.

Quercus prinus L. Frequent; dry ridges. 24 Sept. 1980,
Carpenter, Stack, 939.

Quercus rubra L. Infrequent; mesic upland woods. 13 July
1966, Ellis, 1944; 1 Oct. 1980, Carpenter, Stack, 993.

Quercus shumardii Buckl. Occasional; mesic slope forests
and bottomland woods. 1 Oct. 1980, Carpenter, Stack,
1000; 22 Oct. 1980, Carpenter, Stack, 1098.

Quercus stellata Wang. Frequent; ridge tops and xeric
roadsides. 27 June 1966, Wofford, 1684; 1 Oct. 1980,
Carpenter, Stack, 989; 4 Oct. 1980, Carpenter, Chester,
Stack, 1065.

Quercus velutina Lam. Frequent; north-facing slope forests.
11 Oct. 1970, Schibig, 21; 24 Sept. 1980, Carpenter,
Stack, 936; 25 Sept. 1980, Carpenter, Stack, 957.

ULMACEAE

Celtis laevigata Willd. Frequent; lowland woods, road-
sides, rich moist habitats. 7 July 1965, Ellis, 326;
29 June 1966, Wofford, 1674; 4 June 1980, Carpenter,
Stack, 363; 4 Oct. 1980, Carpenter, Chester, Stack,
1018.

Celtis occidentalis L. Infrequent; lowland woods and

fencerows. 7 Aug. 1974, Chester, Schibig, 2856;
21 June 1980, Chester, Stack, 518.

Ulmus alata Michx. Infrequent; dry disturbed areas and
roadsides. 27 June 1966, Wofford, 1702; 3 Sept. 1980,
Stack, 870.

Ulmus americana L. Frequent; lowland and streambank
woods. 28 June 1966, Wofford, 1672; 9 July 1980, B.
Stack, J. Stack, 582.

Ulmus rubra Muhl. Frequent in mesic woodlands. 28 June
1966, Wofford, 1665; 28 Apr. 1980, Carpenter, Stack,
146; 30 Apr. 1980, Carpenter, Chester, Stack, 167.

MORACEAE

Maclura pomifera (Raf.) Schneider. Very rare; alluvial
woods along riverbank near the mouth of Bear Creek.
31 Oct. 1980, Carpenter, Chester, Stack, 1113.

Morus alba L. Very rare; alluvial woods along riverbank
near the mouth of Bear Creek. 31 Oct. 1980, Carpenter,
Chester, Stack, 1105.

Morus rubra L. Frequent; mesic woodlands along roadsides,
streambanks and north-facing slopes. 27 June 1966,
Wofford, 1700; 28 June 1966, Wofford, 1667; 23 May 1980,
Carpenter, Chester, Stack, 321.

URTICACEAE

Boehmeria cylindrica (L.) Sw. Frequent; lowland moist
woods and streambanks. 7 July 1965, Ellis, 307, 810;
27 July 1965, Ellis, 574; 1 Aug. 1966, Forrester, 2261;
4 July 1980, Carpenter, Stack, 558; 16 July 1980,

S. Stack, J. Stack, 607.

Laportea canadensis L. Frequent; moist, rich streambank woods. Often accounting for most of the herbaceous cover. 7 July 1965, Ellis, 203; 1 Aug. 1966, Forrester, 2264; 21 Aug. 1980, L. Harper, Stack, 785.

Parietaria pensylvanica Muhl. ex Willd. Infrequent; slope forests. 4 June 1980, Carpenter, Stack, 360.

Pilea pumila (L.) Gray. Frequent; mesic lowland woods along streambank. 12 Aug. 1980, Chester, Stack, 713; 24 Sept. 1980, Carpenter, Stack, 937.

LORANTHACEAE

Phoradendron flavescens (Pursh.) Nutt. Infrequently observed on various tree species; not collected.

ARISTOLOCHIACEAE

Asarum canadense L. Occasional; moist wooded slopes and streambanks. 11 May 1967, Phillips, 2733; 8 Apr. 1980, Carpenter, Stack, 69; 15 Apr. 1980, Carpenter, Stack, 86.

Aristolochia tomentosa Sims. Rare along the Cumberland River banks near the mouth of Bear Creek. 31 Oct. 1980, Carpenter, Chester, Stack, 1117.

POLYGONACEAE

Brunnichia cirrhosa Banks ex Gaertner. Rare along pond edge of lower Bear Creek. 17 Oct. 1980, Carpenter, Chester, Stack, 1090.

*Polygonum cespitosum var. longisetum (deBruyn) Stewart.

Abundant along moist field edges, roadsides, waste places and woodland borders. 23 May 1980, Carpenter, Chester, Stack, 329; 21 June 1980, Chester, Stack, 497; 21 Aug. 1980, L. Harper, Stack, 762.

Polygonum erectum L. Occasional; roadsides and waste places. 20 Aug. 1966, Evans, 2502; 27 Aug. 1980, Stack, 816; 3 Sept. 1980, Stack, 862; 22 May 1981, Chester, 81-241.

Polygonum hydropiperoides Michx. Locally abundant in swampy areas and wet field edges. Infrequent throughout area. 19 July 1980, Chester, P. Harper, Stack, 624; 12 Aug. 1980, Chester, Stack, 696; 31 Oct. 1980, Carpenter, Chester, Stack, 1126.

Polygonum pensylvanicum L. Occasional; swampy areas and moist field edges near woodland borders. 4 Oct. 1980, Carpenter, Chester, Stack, 1026; 31 Oct. 1980, Carpenter, Chester, Stack, 1125.

Polygonum punctatum Ell. Frequent; roadsides and field edges near streambank woods. 16 July 1980, S. Stack, J. Stack, 605; 27 Aug. 1980, Stack, 803; 3 Sept. 1980, Stack, 859.

Polygonum scandens L. Abundant; field edge and roadside thickets. 27 July 1965, Ellis, 819; 9 Aug. 1966, Wofford, Evans 2400; 12 Aug. 1980, Chester, Stack, 733; 27 Aug. 1980, Stack, 798.

Rumex acetosella L. Frequent; fields and open disturbed

areas. 8 May 1966, Riggins, 1065; 21 May 1966, Ellis, Clebsch, 1125; 4 May 1967, Phillips, 2725; 10 Apr. 1980, Carpenter, Stack, 80.

Rumex crispus L. Frequent; common weed of disturbed ground. 21 May 1966, Ellis, Clebsch, 1153; 11 June 1980, Carpenter, Stack, 433.

Rumex obtusifolius L. Rare; disturbed area along bank of Bear Creek. 7 July 1965, Ellis, 218.

Tovara virginiana (L.) Raf. Frequent; alluvial woods and moist wooded roadsides. 21 July 1965, Ellis, 452; 12 Aug. 1980, Chester, Stack, 749 A.

CHENOPODIACEAE

Chenopodium album L. Infrequent; cultivated field edges. 23 May 1980, Carpenter, Chester, Stack, 336.

Chenopodium ambrosioides L. Frequent; cultivated field edges. 23 Aug. 1980, Chester, 4436; 27 Aug. 1980, Stack, 818.

AMARANTHACEAE

Amaranthus hybridus L. Abundant; cultivated fields.

4 Oct. 1980, Carpenter, Chester, Stack, 1007; 8 Oct. 1980, Carpenter, Stack, 1083; 31 Oct. 1980, Carpenter, Chester, Stack, 1119.

*Amaranthus palmeri Watson. Occasional; open cultivated fields. 12 Aug. 1980, Chester, Stack, 774.

Amaranthus spinosus L. Infrequent; cultivated fields.

14 Sept. 1981, Chester, 81-806.

PHYTOLACCACEAE

Phytolacca americana L. Frequent; roadsides and disturbed ground. 18 June 1980, B. Stack, J. Stack, 465.

AIZOACEAE

Mollugo verticillata L. Abundant; sandy soil of roadsides and cultivated fields. 7 July 1965, Ellis, 304; 9 July 1980, B. Stack, J. Stack, 569.

PORTULACACEAE

Claytonia virginica L. Abundant; rich, moist woods of streambanks and north-facing slopes. 9 Mar. 1966, Ellis, Clebsch, 894; 1 Apr. 1966, Wofford, 1003; 24 Mar. 1967, Johnson, 2611; 29 Mar. 1980, Carpenter, Chester, Stack, 32, 35; 2 Apr. 1980, Carpenter, Stack, 49.

CARYOPHYLLACEAE

*Arenaria serpyllifolia L. Infrequent; dry sandy soil of roadsides and fields. 23 May 1980, Carpenter, Chester, Stack, 324.

*Cerastium glomeratum Thuiller. Abundant; bottomland cultivated fields. 2 Apr. 1980, Stack, 60.

Cerastium nutans Raf. Frequent; cultivated fields. 18 Apr. 1980, Carpenter, Chester, Stack, 128.

Dianthus armeria L. Frequent; dry roadsides. 27 July 1965, Ellis, 575; 28 May 1980, Carpenter, Stack, 343.

*Paronychia canadensis (L.) Wood. Rare; dry wooded ridges and dry roadside embankments. 4 July 1980, Carpenter, Stack, 560; 27 Aug. 1980, Stack, 813.

Saponaria officinalis L. Infrequent; roadsides. 26 June 1980, Gray, Stack, 542.

Silene antirrhina L. Infrequent; field edges and roadsides. 21 May 1966, Ellis, Clebsch, 1128; 27 June 1979, Chester, 4075; 28 May 1980, Carpenter, Stack, 1157.

Silene stellata (L.) Ait. Infrequent; wooded roadsides of abandoned roadbed. 13 July 1966, Ellis, 1900; 16 July 1980, S. Stack, J. Stack, 601.

Silene virginica L. Infrequent; dry wooded slopes, open streambanks and dry ridges. 8 May 1966, Riggins, 1064; 21 May 1966, Ellis, Clebsch, 1133; 6 Apr. 1967, Phillips, 2552; 22 Apr. 1980, Carpenter, Stack, 121.

Stellaria media (L.) Cyrillo. Very abundant; cultivated fields. 29 Mar. 1980, Carpenter, Chester, Stack, 22.

Stellaria pubera Michx. Frequent; moist, rich woods of streambanks and slopes. 1 Apr. 1966, Wofford, 1015; 21 May 1966, Ellis, Clebsch, 1149; 4 Apr. 1980, Carpenter, Stack, 62.

RANUNCULACEAE

Actaea pachypoda Ell. (= A. alba (L.) Mill.). Occasional; moist, wooded north-facing slopes and ravines. 9 Apr. 1967, Wofford, 2579; 6 May 1980, Carpenter, Stack, 200.

Anemone virginiana L. Occasional; wooded borders along roadsides. 26 June 1980, Gray, Stack, 532.

Cimicifuga rubifolia Kearney. Rare, but locally abundant where found, alluvial woods along stream. 16 Aug. 1966,

Wofford, 2405 (! G. W. Ramsey); 6 May 1979, Scott, Chester, 3365 (! G. W. Ramsey); 21 Aug. 1980, L. Harper, Stack, 782.

Clematis virginiana L. Occasional; lowland thickets of streambanks and roadsides. 1 Aug. 1966, Forrester, 2262; 19 July 1980, Chester, P. Harper, Stack, 630; 12 Aug. 1980, Chester, Stack, 775.

Delphinium tricorne Michx. Occasional; lower portions of north-facing slope woods. 9 Apr. 1967, Wofford, 2582; 22 Apr. 1980, Carpenter, Stack, 498 (white form); 9 May 1980, Carpenter, Chester, Stack, 499 (blue form).

Hepatica acutiloba D. C. Frequent; moist, rich wooded slopes and limestone outcrops. 1 Apr. 1966, Wofford, 1013; 29 Mar. 1980, Carpenter, Chester, Stack, 13.

Hydrastis canadensis L. Rare, but locally abundant; rich, moist woods. 15 May 1966, Evans, 1093; 9 Apr. 1967, Wofford, 2581; 15 Apr. 1980, Carpenter, Stack, 87; 14 May 1980, Carpenter, Stack, 271.

Isopyrum biternatum (Raf.) T. & G. Frequent; streambank woods. 1 Apr. 1966, Wofford, 1002; 2 Apr. 1980, Carpenter, Stack, 44; 4 Apr. 1980, Carpenter, Stack, 58.

*Myosurus minimus L. Frequent; cultivated fields. 22 Apr. 1979, Chester, 3352; 8 Apr. 1980, Carpenter, Stack, 68.

Ranunculus abortivus L. Frequent; cultivated fields and open disturbed areas. 29 Mar. 1980, Carpenter, Chester, Stack, 25.

Ranunculus hispidus Michaux. Occasional; wooded slopes.

8 Apr. 1980, Carpenter, Stack, 65.

Ranunculus micranthus Nuttall. Infrequent; slope forest.

22 Apr. 1980, Carpenter, Stack, 129.

*Ranunculus parviflorus L. Frequent; cultivated fields.

30 Apr. 1980, Carpenter, Stack, 169.

Ranunculus pusillus Poir. Frequent throughout; locally abundant in cultivated fields. 1 May 1975, Chester, 2955; 30 Apr. 1980, Carpenter, Chester, Stack, 185 (! C. S. Keener).

Ranunculus recurvatus Poir. Frequent; rich moist woods.

30 Apr. 1980, Carpenter, Chester, Stack, 186.

*Ranunculus sardous Crantz. Frequent; roadsides. 30 Apr.

1980, Carpenter, Chester, Stack, 178.

Thalictrum revolutum DC. Occasional; lowland woods and open roadsides. 23 May 1980, Carpenter, Chester, Stack, 322; 4 June 1980, Carpenter, Stack, 374.

Thalictrum thalictroides (L.) Boivin. Frequent; stream-bank woods and slope forests. 29 Mar. 1980, Carpenter, Chester, Stack, 37; 8 Apr. 1980, Carpenter, Stack, 76.

BERBERIDACEAE

Caulophyllum thalictroides (L.) Michx. Very rare; stream-bank woods. 5 Apr. 1967, Wofford, 2551; 15 Apr. 1980, Carpenter, Stack, 85.

Popophyllum peltatum L. Throughout and locally abundant in moist woods and on roadsides. 8 May 1968, Riggins, 1057; 28 Apr. 1980, Carpenter, Stack, 153.

MENISPERMACEAE

Calyccarpum lyoni (Pursh.) Gray. Infrequent; bottomland thickets. 22 July 1966, Ellis, 2203; 27 June 1979, Chester, 4073; 18 June 1980, B. Stack, J. Stack, 469.

Cocculus carolinus (L.) DC. Occasional; streambanks and moist roadside or field edge thickets. 3 Oct. 1965, Ellis, 859; 22 July 1966, Ellis, 2226; 9 July 1980, B. Stack, J. Stack, 565; 25 Sept. 1980, Carpenter, Stack, 973.

Menispermum canadense L. Occasional; low woods and roadside thickets along abandoned roadbed. 7 July 1965, Ellis, 231; 28 May 1980, Carpenter, Stack, 341.

MAGNOLIACEAE

Liriodendron tulipifera L. Frequent; moist slopes and ravines. 27 June 1966, Wofford, 1695; 28 May 1980, Carpenter, Stack, 345.

ANNONACEAE

Asimina triloba (L.) Dunal. Frequent; understory species of low, rich woods. 7 July 1965, Ellis, 298; 28 June 1966, Wofford, 1662; 19 July 1980, Chester, P. Harper, Stack, 611.

LAURACEAE

Lindera benzoin (L.) Blume. Frequent as an understory shrub in ravines and along stream. 3 Sept. 1980, Stack, 882.

Sassafras albidum (Nutt.) Nees. Frequent throughout.

Most common along roadsides, borders of fields and in disturbed areas. 3 Sept. 1980, Stack, 839.

PAPAVERACEAE

Sanguinaria canadensis L. Frequent; floodplain woods adjacent to creek. 9 Mar. 1966, Ellis, Clebsch, 897; 1 Apr. 1966, Wofford, 1011; 24 Mar. 1967, Johnson, 2608; 1 May 1975, Chester, 2947; 29 Mar. 1980, Carpenter, Chester, Stack, 20. (Fruit collected 15 Apr. 1980.)

FUMARIACEAE

Corydalis flavula (Raf.) DC. Abundant; floodplain and moist woods. 1 Apr. 1966, Wofford, 1005; 29 Mar. 1980, Carpenter, Chester, Stack, 14.

Dicentra cucullaria (L.) Bernh. Very rare, one location; limestone outcrop. 15 Apr. 1980, Carpenter, Stack, 56.

BRASSICACEAE

Arabis thaliana (L.) Heynhold. Abundant; cultivated fields. 24 Mar. 1967, Johnson, 2615; 29 Mar. 1980, Carpenter, Chester, Stack, 17.

Arabis canadensis L. Infrequent; dry woods. 4 June 1980, Carpenter, Stack, 375.

Arabis laevigata (Muhl. ex Willd.) Poir. Occasional; rocky woods and limestone outcrops. 6 May 1979, Chester, 3366; 4 Apr. 1980, Carpenter, Stack, 52.

Barbarea vulgaris R. Brown var. arcuata (Opiz) Fries. Frequent; bottomland cultivated fields. 15 Apr. 1980, Carpenter, Stack, 97.

*Brassica napus L. Frequent; bottomland cultivated fields.

29 Mar. 1980, Carpenter, Chester, Stack, 31.

Capsella bursa-pastoris (L.) Bedic. Frequent; cultivated ground and waste places. 1 May 1975, Chester, 2953; 4 Apr. 1980, Carpenter, Stack, 59.

Cardamine angustata O. E. Schulz. (= Dentaria heterophylla Nutt.) Frequent; floodplain woods near stream and lower wooded slopes adjacent to stream floodplain. 9 Mar. 1966, Ellis, Clebsch, 896; 1 Apr. 1966, Wofford, 1006, 1010; 24 Mar. 1967, Johnson, 2609; 29 Mar. 1980, Carpenter, Chester, Stack, 40.

Cardamine bulbosa (Schreber) BSP. Infrequent; lowland woods. 18 Apr. 1980, Carpenter, Stack, 100.

Cardamine concatenata (Michx.) Ahles. (= Dentaria laciniata Muhl.) Frequent; streambanks and moist slopes. 2 Apr. 1980, Carpenter, Stack, 51.

Cardamine hirsuta L. Very abundant; cultivated fields and lawns. 16 Mar. 1966, Clebsch, Ellis, 904; 29 Mar. 1980, Carpenter, Chester, Stack, 39; 2 Apr. 1980, Stack, 61.

Cardamine parviflora var. arenicola (Britton) O. E. Schulz. Infrequent; field edges. 29 Mar. 1980, Carpenter, Chester, Stack, 38.

Cardamine pensylvanica Muhl. Infrequent; field edges. 3 Sept. 1980, Stack, 886.

Draba brachycarpa Nutt. Frequent; cultivated fields.

24 Mar. 1967, Johnson, 2614; 29 Mar. 1980, Carpenter, Chester, Stack, 23.

Draba verna L. Abundant; cultivated fields, lawns and waste places. 29 Mar. 1980, Carpenter, Chester, Stack, 18.

Iodanthus pinnatifidus (Michx.) Steud. Frequent; moist alluvial woods and shaded roadsides. 21 May 1966, Ellis, Clebsch, 1138; 11 May 1967, Phillips, 2735; 9 May 1980, Carpenter, Chester, Stack, 233.

*Lepidium campestre (L.) R. Brown. Frequent. Common weed of cultivated fields and roadsides. 20 Apr. 1980, Carpenter, Chester, Stack, 188.

Lepidium virginicum L. Abundant; cultivated fields, roadsides and other disturbed ground. 21 May 1966, Ellis, Clebsch, 1131; 4 May 1967, Phillips, 2715; 30 Apr. 1980, Carpenter, Chester, Stack, 187.

Lesquerella lescurii (Gray) Watson. Rare; scattered populations found only in the cultivated bottomland fields near the Cumberland River. 18 Apr. 1980, Chester, Carpenter, Stack, 4354.

Rorippa sessiliflora (Nutt.) Hitchcock. Locally abundant in open wet fields and around pond shores. 18 Apr. 1980, Carpenter, Chester, Stack, 124; 30 Apr. 1980, Carpenter, Chester, Stack, 183; 17 Oct. 1980, Carpenter, Chester, Stack, 1094.

Sibara virginica (L.) Rollins. Occasional; cultivated

fields. 24 Mar. 1967, Johnson, 2618; 29 Mar. 1980, Carpenter, Chester, Stack, 24.

*Sisymbrium officinale (L.) Scop. Rare; one collection along a shaded roadside. 4 June 1980, Carpenter, Stack, 379.

CRASSULACEAE

Penthorum sedoides L. Frequent; moist cultivated field edges and moist ditches. 16 July 1980, S. Stack, J. Stack, 592.

Sedum ternatum Michx. Frequent; moist rocky woods of streambank and north-facing slopes. 11 May 1967, Phillips, 2738; 6 May 1980, Carpenter, Stack, 198.

SAXIFRAGACEAE

Heuchera americana L. Infrequent; rich wooded slopes. 14 May 1980, Carpenter, Stack, 265.

Heuchera villosa Michx. Frequent; moist limestone outcrops. 4 July 1980, Carpenter, Stack, 557.

Hydrangea arborescens ssp. discolor (Seringe) McClintock. Frequent; shady ledges and limestone outcrops along stream. 18 June 1980, B. Stack, J. Stack, 468.

HAMAMELIDACEAE

Liquidambar styraciflua L. Frequent; moist slope forests and lowland areas along roadsides. 27 June 1966, Wofford, 1701; 8 Apr. 1967, Phillips, Wallen, 2576; 1 Oct. 1980, Carpenter, Stack, 988.

PLATANACEAE

Platanus occidentalis L. Frequent; mesic lowland woods.

28 June 1966, Wofford, 1666; 3 Sept. 1980, Stack, 840.

ROSACEAE

Agrimonia rostellata Wallroth. Occasional; alluvial forest of open ravines. 25 July 1980, Roberts, Stack, 665.

Agrimonia parviflora Aiton. Infrequent; wet drainage ditch along field edge. 12 Aug. 1980, Chester, Stack, 736.

Agrimonia pubescens Wallr. Occasional; lower floodplains and moist shaded roadsides. 7 July 1965, Ellis, 225; 27 July 1965, Ellis, 572; 4 Aug. 1980, Stack, 669.

Amelanchier arborea (Michx. f.) Fern. Occasional; dry ridges and upper slopes. 22 Apr. 1980, Carpenter, Stack, 114.

Crataegus calpodendron (Ehrhart) Medicus. Infrequent; lowland woods. 1 Oct. 1980, Carpenter, Stack, 994.

Crataegus crus-galli L. Infrequent; dry ground and along dry roadsides. 22 Apr. 1980, Carpenter, Stack, 756; 25 Sept. 1980, Carpenter, Stack, 1162.

*Crataegus mollis (T. & G.) Scheele. Infrequent; dry exposed areas along edge of backwaters of Bear Creek. 4 Oct. 1980, Carpenter, Chester, Stack, 748.

Crataegus phaenopyrum (L. f.) Medicus. Infrequent; woodland border of dirt road. 28 May 1980, Carpenter, Stack, 757.

Geum canadense Jacq. Occasional; rich soil of alluvial

forests, thickets and woodland borders. 7 July 1965, Ellis, 620; 11 June 1980, Carpenter, Stack, 435.

Geum vernum (Raf.) T. & G. Infrequent; moist lowland woods and roadsides. 21 May 1966, Ellis, Clebsch, 1110; 30 Apr. 1980, Carpenter, Chester, Stack, 166.

Gillenia stipulata (Muhl.) Baillon. Occasional; rich alluvial woods. 4 June 1980, Carpenter, Stack, 364.

Malus angustifolia (Aiton) (Michx.) (= Pyrus angustifolia Ait.) Infrequent; along roadsides. One grove observed. 1 May 1975, Chester, 2957.

Malus pumila Miller. Infrequently persisting around old homesites. 22 Apr. 1980, Carpenter, Stack, 133.

Potentilla norvegica L. Infrequent; dry cherty field edge, an area of floodwaters in early spring. 4 June 1980, Carpenter, Stack, 384.

Potentilla recta L. Occasional; roadsides, fencerows and disturbed ground. 7 July 1965, Ellis, 318; 21 May 1966, Ellis, Clebsch, 1126, 1161; 21 June 1980, Chester, Stack, 517.

Potentilla simplex Michx. Frequent; open sandy woods, rocky slopes, roadsides and dry ridges. 21 May 1966, Ellis, Clebsch, 1119, 1164; 20 May 1967, Phillips, 2683; 14 May 1980, Carpenter, Stack, 277.

Prunus americana Marshall. Infrequent; field edge thickets. 22 Apr. 1980, Carpenter, Stack, 132.

Prunus persica (L.) Batsch. Infrequent; persisting along roadsides. 8 Apr. 1980, Carpenter, Stack, 73; 9 July

1980, B. Stack, J. Stack, 583.

Prunus serotina Ehrl. Frequent; fencerows, roadsides and woodlands. 28 June 1966, Wofford, 1669; 28 Apr. 1980, Carpenter, Stack, 139.

Pyrus communis L. Rare; persisting around old homesites. 1 Apr. 1981, Carpenter, Stack, 1134.

Rosa carolina L. Infrequent; woodland border along roadside. 11 June 1980, Carpenter, Stack, 444.

Rosa multiflora Thunb. Very abundant along roadsides and field edges. Spreading from plantings. 21 May 1966, Ellis, Clebsch, 1134; 20 May 1980, Carpenter, Stack, 295.

*Rosa palustris Marshall. Infrequent; low, wet ground. 21 June 1980, Chester, Stack, 495.

Rubus argutus Link. Very abundant; roadsides and field edge thickets. 28 May 1980, Carpenter, Stack, 347.

Rubus flagellaris Willd. Infrequent; roadsides. 1 May 1975, Chester, 2956; 30 Apr. 1980, Carpenter, Chester, Stack, 191.

Rubus occidentalis L. Rare along streambanks and thickets bordering swamp woodlands. 20 Aug. 1974, Chester, 2873; 19 July 1980, Chester, P. Harper, Stack, 621.

FABACEAE

Albizia julibrissen Durazzini. Infrequent; persisting around old homesites. 25 Sept. 1980, Carpenter, Stack, 986.

Amorpha fruticosa L. Rare; one location along the banks

of the Cumberland River. 31 Oct. 1980, Carpenter,
Chester, Stack, 1115.

Amphicarpa bracteata (L.) Fern. Rare; alluvial woods.

29 Aug. 1966, Evans, 2501 (! W. Mahler).

Apios americana Medicus. Rare; banks of the backwaters
of Bear Creek. 12 Aug. 1980, Chester, Stack, 740.

Cassia fasciculata Michx. Frequent; roadsides and
cultivated field edges. 4 Aug. 1980, Stack, 673.

Cassia marilandica L. Rare; lowland woods along streams.
12 Aug. 1980, Chester, Stack, 741; 23 Aug. 1980,
Chester, 4441; 27 Aug. 1980, Stack, 817.

Cassia nictitans L. Frequent along roadsides. 4 Aug.
1980, Stack, 683 A, 683 B.

Cassia obtusifolia L. Rare; sandy washout between field
and streambank woods. 25 Sept. 1980, Carpenter, Stack,
976.

Cercis canadensis L. Frequent along roadsides and as an
understory tree in alluvial and slope forests. 28 June
1966, Wofford, 1664; 23 May 1980, Carpenter, Chester,
Stack, 328 (flowers collected 15 Apr. 1980).

Desmodium canescens (L.) DC. Frequent; dry roadsides.
21 Aug. 1980, L. Harper, Stack, 792; 11 Sept. 1980,
L. Harper, Stack, 915.

*Desmodium ciliare (Muhl. ex Willd.) DC. Infrequent; dry
woods near old homesite. 3 Sept. 1980, Stack, 857.

Desmodium glutinosum (Muhl.) Wood. Occasional; rich

woods throughout. 7 July 1965, Ellis, 321 (! E. Wofford).

Desmodium nudiflorum (L.) DC. Occasional; dry ridges.

21 Aug. 1980, L. Harper, Stack, 787.

Desmodium paniculatum (L.) DC. Frequent; roadsides, field edge thickets and other waste places. 27 Aug. 1980, Stack, 834; 11 Sept. 1980, L. Harper, Stack, 919; 4 Oct. 1980, Carpenter, Chester, Stack, 1038.

Desmodium pauciflorum (Nutt.) DC. Occasional; rich woods, ravines. 7 July 1965, Ellis, 311 (! W. Mahler); 25 July 1980, Roberts, Stack, 655.

Desmodium rotundifolium DC. Infrequent; dry woods.

11 Sept. 1980, L. Harper, Stack, 912; 4 Oct. 1980, Carpenter, Chester, Stack, 1021.

Galactia volubilis (L.) Britt. Infrequent; field edge and roadside thickets. 4 Aug. 1980, Stack, 679; 27 Aug. 1980, Stack, 799.

Gleditsia tricanthos L. Occasional; fencerows, woodland borders and disturbed areas. 27 June 1966, Wofford, 1704; 1 Oct. 1980, Carpenter, Stack, 990 (fruits collected 31 Oct. 1980).

*Glycine max (L.) Merrill. Frequent; remnant of cultivation in bottomland fields. 14 July 1975, Chester, 3065; 9 July 1980, B. Stack, J. Stack, 578.

Lespedeza cuneata (Dumont) G. Don. Frequent; fields, roadsides and disturbed areas. 21 Aug. 1980, L. Harper, Stack, 767; 4 Oct. 1980, Carpenter, Chester, Stack, 1022.

Lespedeza hirta (L.) Hornem. Infrequent; dry roadside embankments. 3 Sept. 1980, Stack, 858; 11 Sept. 1980, L. Harper, Stack, 925.

*Lespedeza intermedia (Watson) Britton. Rare; open area along xeric ridge. 25 Sept. 1980, Carpenter, Stack, 961.

Lespedeza procumbens Michx. Frequent; dry roadside embankments. 3 Sept. 1980, Stack, 856; 4 Oct. 1980, Carpenter, Chester, Stack, 1023.

*Lespedeza repens (L.) Bart. Frequent; dry sandy roadsides. 4 Oct. 1980, Carpenter, Chester, Stack, 1024.

*Lespedeza stipulacea Maxim. Frequent; roadsides. 7 July 1965, Ellis, 229; 2 Sept. 1974, Chester, 2889; 12 Aug. 1980, Chester, Stack, 776.

*Lespedeza striata (Thunb.) H. & A. Frequent; roadsides and open soil. 12 Aug. 1980, Chester, Stack, 712; 21 Aug. 1980, L. Harper, Stack, 770.

*Lespedeza virginica (L.) Britt. Occasional; dry soils of roadsides and field edges. 21 Aug. 1980, L. Harper, Stack, 768; 3 Sept. 1980, Stack, 880.

Melilotus alba Desr. Frequent; old fields and roadsides. 11 June 1980, Carpenter, Stack, 440.

Melilotus officinalis (L.) Lam. Infrequent; roadsides. 11 June 1980, Carpenter, Stack, 441.

Robinia pseudo-acacia L. Frequent; roadsides and disturbed forests. 14 May 1980, Carpenter, Stack, 268.

Stylosanthes biflora (L.) BSP. Locally abundant; dry clay roadsides. 12 Aug. 1980, Chester, Stack, 719.

Tephrosia virginiana (L.) Persoon. Rare; found only in ridgetop woods. 21 Aug. 1980, L. Harper, Stack, 783.

Trifolium campestre Schreber. Frequent; roadsides and alluvial woods. 21 May 1966, Ellis, Clebsch, 1156; 30 Apr. 1980, Carpenter, Chester, Stack, 176.

Trifolium pratense L. Frequent; roadsides, alluvial woods and open meadows. 21 May 1966, Ellis, Clebsch, 1154; 20 May 1980, Carpenter, Stack, 296.

Trifolium repens L. Abundant; roadsides, fields and woodlands. 21 May 1966, Ellis, Clebsch, 1155; 6 May 1980, Carpenter, Stack, 207; 23 Aug. 1980, Chester, 4437.

Vicia dasycarpa Tenore. Locally abundant; field-road edge, full sun, lower Bear Creek bottoms. 24 Apr. 1981, Carpenter, Stack, 1141.

Wisteria frutescens (L.) Poiret. Rare; lowland woods. 20 May 1980, Carpenter, Stack, 293.

LINACEAE

Linum virginianum L. Infrequent; moist woods, fields and roadsides. 16 July 1980, S. Stack, J. Stack, 606.

OXALIDACEAE

Oxalis grandis Ell. Locally abundant; rich streambank woods. 8 May 1966, Riggins, 1052; 6 May 1980, Carpenter, Stack, 199.

Oxalis stricta L. Frequent; variety of habitats, both disturbed and natural; cultivated fields and alluvial woods. 21 May 1966, Ellis, Clebsch, 1120; 10 Apr. 1980, Carpenter, Stack, 78.

Oxalis violacea L. Frequent; dry alluvial woods. 15 Apr. 1980, Carpenter, Stack, 98.

GERANIACEAE

Geranium carolinianum L. Frequent; sandy fields and alluvial woods. 21 May 1966, Ellis, Clebsch, 1117; 6 May 1980, Carpenter, Stack, 212.

Geranium maculatum L. Infrequent; limestone outcrops along stream. 21 May 1966, Ellis, Clebsch, 1158; 8 May 1966, Riggins, 1062; 9 May 1980, Carpenter, Chester, Stack, 240.

SIMAROUBACEAE

Ailanthus altissima (Mill.) Sw. Infrequent as an escape in woodlands and along field edges. 20 Aug. 1974, Chester, 2869; 19 July 1980, Chester, P. Harper, Stack, 620.

EUPHORBIACEAE

*Acalypha gracilens Gray. Frequent; seasonally flooded woods. 25 July 1980, Roberts, Stack, 666.

Acalypha ostryaefolia Riddell. Infrequent; bottomland field edges. 12 Aug. 1980, Chester, Stack, 700.

*Acalypha rhomboidea Lam. Frequent; damp field edges. 19 July 1980, Chester, P. Harper, Stack, 616; 12 Aug.

1980, Chester, Stack, 699.

Croton monanthogyrus Michx. Frequent; bottomland fields.

12 Aug. 1980, Chester, Stack, 731.

Euphorbia commutata Engelm. Infrequent; alluvial woods.

6 Apr. 1967, Phillips, 2556.

Euphorbia corollata L. Frequent; shaded roadsides and woodland borders of fields. 7 July 1965, Ellis, 327, 508; 12 Aug. 1980, Chester, 746.

Euphorbia dentata Michx. Infrequent; dry roadsides.

21 July 1965, Ellis, 562; 12 Aug. 1980, Chester, Stack, 702; 3 Sept. 1980, Stack, 861.

Euphorbia maculata L. Frequent; dry roadsides and field edges. 7 July 1965, Ellis, 226, 297; 27 Aug. 1980, Stack, 802; 4 Oct. 1980, Carpenter, Chester, Stack, 1051.

Euphorbia supina Raf. Frequent; dry roadsides, fields and hot gravels of parking lot. 12 Aug. 1980, Chester, Stack, 751 A.

*Phyllanthus caroliniensis Walter. Infrequent; bottomland fields, lowlands. 12 Aug. 1980, Chester, Stack, 732; 4 Oct. 1980, Carpenter, Stack, 1052 (I.D. by E. W. Chester).

BUXACEAE

Pachysandra procumbens Michx. Frequent; moist, rich woodlands along stream. 9 Mar. 1966, Ellis, Clebsch, 893; 24 Mar. 1967, Johnson, 2607; 1 Apr. 1966, Wofford,

1009; 7 Aug. 1974, Chester, Schibig, 2854; 29 Mar. 1980, Carpenter, Chester, Stack, 16.

ANACARDIACEAE

Rhus copallina L. Frequent; open woods and roadside thickets. 27 June 1966, Wofford, 1703; 16 July 1980, S. Stack, J. Stack, 600.

Rhus glabra L. Frequent; roadsides and other disturbed ground. 4 July 1980, Carpenter, Stack, 553.

Rhus radicans L. Abundant; roadside thickets and woods. 20 May 1980, Carpenter, Stack, 287.

AQUIFOLIACEAE

Ilex decidua Walt. Infrequent; alluvial woods. 13 July 1966, Ellis, 1943; 4 Oct. 1980, Carpenter, Chester, Stack, 1050; 8 Oct. 1980, Carpenter, Stack, 1079.

CELASTRACEAE

Euonymus americanus L. Occasional; rich wooded areas, especially north slopes. 20 May 1980, Carpenter, Stack, 292.

Euonymus atropurpureus Jacq. Infrequent; rich woods and thickets along streams. 7 July 1965, Ellis, 230; 8 May 1966, Riggins, 1058; 22 July 1966, Ellis, 2206; 27 May 1978, Chester, Schibig, 3287; 4 June 1980, Carpenter, Stack, 378; 11 June 1980, Carpenter, Stack, 437; 21 Aug. 1980, L. Harper, Stack, 765.

STAPHYLEACEAE

Staphylea trifolia L. Infrequent; streambank woods and

wooded ravines. 28 June 1966, Wofford, 1670; 11 May 1967, Phillips, 2734; 20 Aug. 1974, Chester, 2870; 28 Apr. 1980, Carpenter, Stack, 140; 4 June 1980, Carpenter, Stack, 371.

ACERACEAE

Acer negundo L. Frequent; moist field edges, streambanks and roadsides. 7 July 1965, Ellis, 215; 28 June 1966, Wofford, 1668; 12 Aug. 1980, Chester, Stack, 753 B.

Acer rubrum L. Frequent; lowland field edges and woods. 24 Sept. 1980, Carpenter, Stack, 932.

Acer saccharum Marsh. Abundant; cosmopolitan in habitat. A dominant tree of mesic woodlands throughout the area. 28 June 1966, Wofford, 1658; 19 July 1980, Chester, P. Harper, Stack, 650 (! R. Kral); 1 Oct. 1980, Carpenter, Stack, 651 (! R. Kral).

Acer saccharum Marsh. var. Schneckii Rehd. Infrequent; rocky clay soil on Blue Springs roadside. 7 July 1965, Ellis, 328.

Acer saccharinum L. Frequent; lowland woods of lower Bear Creek. 8 Oct. 1980, Carpenter, Stack, 1072.

HIPPOCASTANACEAE

Aesculus glabra Willd. Frequent; streambanks, ravines and lower north slopes. 9 Mar. 1966, Ellis, Clebsch, 895; 8 May 1966, Riggins, 1055; 28 June 1966, Wofford, 1673; 6 Apr. 1967, Phillips, 2555; 15 Apr. 1980, Carpenter, Stack, 91.

Aesculus pavia L. Rare; alluvial woods along stream.

9 Apr. 1967, Wofford, 2580; 1 May 1975, Chester, 2954;
30 Apr. 1980, Carpenter, Chester, Stack, 190.

SAPINDACEAE

Cardiospermum halicacabum L. Rare; moist field edges and
moist pond edge, lower Bear Creek bottoms. 17 Oct.
1980, Carpenter, Chester, Stack, 1095; 31 Oct. 1980,
Carpenter, Chester, Stack, 1114.

BALSAMINACEAE

Impatiens capensis Meerb. Frequent; streambank woods.

11 June 1980, Carpenter, Stack, 438.

Impatiens pallida Nutt. Infrequent; alluvial woods.

15 June 1966, Ellis, 1228; 22 July 1966, Ellis, 2224;

11 June 1980, Carpenter, Stack, 439.

RHAMNACEAE

Rhamnus caroliniana Walter. Occasional; moist woods and
in fencerows of bottomlands. 11 June 1980, Carpenter,
Stack, 445.

VITACEAE

Ampelopsis cordata Michx. Locally abundant in lowland
woods and thickets. 7 July 1965, Ellis, 310 (! E. W.
Chester); 21 June 1980, Chester, Stack, 527.

Parthenocissus quinquefolia L. Frequent; lowland woods
and roadsides. 9 July 1980, B. Stack, J. Stack, 564;
3 Sept. 1980, Stack, 872.

Vitis aestivalis Michx. Infrequent; streambank woods.

1 Oct. 1980, Carpenter, Stack, 843 (! W. Duncan).

*Vitis cinerea Engelm. Frequent; thickets along roadsides and fields. 21 June 1980, Chester, Stack, 844 B, 845 (I. D. by W. Duncan).

*Vitis riparia Michx. Frequent; woodland borders along roadsides. 4 June 1980, Carpenter, Stack, 842 (I.D. by W. Duncan); 3 Sept. 1980, Stack, 837 B (I.D. by W. Duncan).

Vitis rotundifolia Michx. Infrequent; north-facing slope woods. 4 Oct. 1980, Carpenter, Chester, Stack, 1036.

Vitis vulpina L. Abundant; roadsides and fencerow thickets. 28 May 1980, Carpenter, Stack, 847; 21 June 1980, Chester, Stack, 844 A, 846; 21 Aug. 1980, P. Harper, Stack, 793; 3 Sept. 1980, Stack, 837 A.

TILIACEAE

Tilia heterophylla Vent. Rare; deep gorge cut in a north-facing slope. One tree observed, 22.6" d.b.h. 22 Oct. 1980, Carpenter, Stack, 1099.

MALVACEAE

Abutilon theophrastii Medicus. Rare; open meadow, one plant observed. 4 Oct. 1980, Carpenter, Chester, Stack, 1060.

Hibiscus militaris Cav. Frequent; swampy areas of lower Bear Creek. 9 July 1980, Chester, P. Harper, Stack, 643.

Hibiscus moscheutos L. Rare; moist sandy soil along edge of bottomland fields. 12 Aug. 1980, Chester, Stack, 742.

Hibiscus syriacus L. Rare; escaping to woodland borders and roadsides. 21 July 1965, Ellis, 450; 9 July 1980, B. Stack, J. Stack, 577.

Sida spinosa L. Frequent, bottomland fields, roadsides and disturbed areas. 21 July 1965, Ellis, 627; 27 July 1965, Ellis, 582; 19 July 1980, Chester, P. Harper, Stack, 647; 12 Aug. 1980, Chester, Stack, 703; 3 Sept. 1980, Stack, 867.

HYPERICACEAE

Hypericum hypericoides (L.) Crantz. Frequent; dry ridges. 25 July 1980, Roberts, Stack, 654.

Hypericum mutilum L. Abundant; open wet fields. 26 June 1980, Gray, Stack, 538; 19 July 1980, Chester, P. Harper, Stack, 642.

Hypericum prolificum L. (= H. spathulatum (Spach.) Steud.). Rare; limestone outcrop in streambank woods. 28 June 1966, Wofford, 1675; 19 July 1980, Chester, P. Harper, Stack, 626.

Hypericum punctatum Law. Occasional; moist soil of fields, woods, ditches and roadsides. 7 July 1965, Ellis, 309; 4 July 1980, Carpenter, Stack, 561.

CISTACEAE

Lechea tenuifolia Michx. Rare; dry roadside embankments. 26 June 1980, Gray, Stack, 541.

VIOLACEAE

Hybanthus concolor (Forst.) Spreng. Locally abundant;

streambank woods, occasional throughout the study area.
 21 May 1966, Ellis, Clebsch, 1140; 22 Apr. 1980,
 Carpenter, Stack, 116; 4 June 1980, Carpenter, Stack,
 373.

Viola eriocarpa Schwein (= V. pensylvanica Michx.).

Occasional; streambank woods. 8 Apr. 1980, Carpenter,
 Stack, 75.

*Viola palmata L. var. sororia (Willd.) Poll. Occasional;
 streambank woods. 8 Apr. 1967, Phillips, Wallen,
 2578; 4 Apr. 1980, Carpenter, Stack, 851.

Viola palmata L. var. triloba (Sch.) Ging. ex DC.

Frequent; upper slope forest. 9 Apr. 1967, Wofford,
 2584; 15 Apr. 1980, Carpenter, Stack, 108, 22 Apr.
 1980, Carpenter, Stack, 850; 9 May 1980, Carpenter,
 Chester, Stack, 848.

Viola papilionacea Pursh. Frequent; moist woods. 1 Apr.
 1966, Wofford, 1004; 8 Apr. 1967, Phillips, Wallen,
 2578; 29 Mar. 1980, Carpenter, Chester, Stack, 849;
 4 Apr. 1980, Carpenter, Stack, 72.

Viola rafinesquii Greene. Frequent; bottomland
 cultivated fields. 24 Mar. 1967, Johnson, 2616; 2 Apr.
 1980, Carpenter, Stack, 43.

Viola striata Ait. Frequent; moist woods near stream.
 21 May 1966, Ellis, Clebsch, 1111; 8 Apr. 1967,
 Phillips, Wallen, 2577; 18 Apr. 1980, Carpenter,
 Chester, Stack, 109.

PASSIFLORACEAE

Passiflora incarnata L. Frequent; thickets of field edges and roadsides. 7 Nov. 1974, Chester, 2933; 9 July 1980, B. Stack, J. Stack, 570.

Passiflora lutea L. Infrequent; thickets on streambanks. 16 July 1980, S. Stack, J. Stack, 610.

LYTHRACEAE

Ammannia coccinea Rottboell. Abundant; open wet fields. 19 July 1980, Chester, P. Harper, Stack, 623.

Cuphea viscosissima Jacquin. Infrequent; old road bed in low lying area, cultivated field edge of lower Bear Creek. 17 Oct. 1980, Carpenter, Chester, Stack, 1092.

Rotala ramosior (L.) Koehne. Frequent, damp areas, cultivated fields. 4 Aug. 1980, Stack, 667; 12 Aug. 1980, Chester, Stack, 772.

ONAGRACEAE

Circaea lutetiana ssp. canadensis (L.) Ascherson & Magnus. Infrequent; rich woods of slope forests, but locally abundant where found. 11 June 1980, Carpenter, Stack, 436.

Ludwigia alternifolia L. Abundant; swampy ground. 9 July 1980, B. Stack, J. Stack, 585.

Ludwigia decurrens Walt. (= Jussiaea decurrens (Walt.) DC.). Locally abundant, wet ground, swamps, wet ditches. 21 July 1965, Ellis, 453; 12 Aug. 1980, Chester, Stack, 754.

*Ludwigia peploides var. glabrescens (Kuntze) Shinnars
 (= Jussiaea repens L. var. glabrescens Ktze.). Locally
 abundant; swampy areas. 1 Sept. 1969, Chester, 2277;
 19 July 1980, Chester, P. Harper, Stack, 644.

*Ludwigia uruguayensis (Camb.) Hara. Locally abundant;
 open swamps and marshes, lower Bear Creek. 15 July
 1981, Chester, 81-561.

Oenothera biennis L. Frequent; cultivated fields and
 roadsides. 4 Aug. 1980, Stack, 688.

Oenothera laciniata Hill. Frequent; cultivated fields.
 21 May 1966, Ellis, Clebsch, 1124; 9 May 1980,
 Carpenter, Chester, Stack, 245.

ARALIACEAE

Aralia spinosa L. Occasional; woodland borders along
 roadsides and fields. 12 Aug. 1980, Chester, Stack,
 716.

Panax quinquefolium L. Rare; rich forests of upland woods
 and ravines. 27 July 1965, Ellis, 571; 9 May 1980,
 Carpenter, Chester, Stack, 237.

APIACEAE

*Chaerophyllum procumbens (L.) Crantz. Infrequent;
 alluvial woods. 30 Apr. 1980, Carpenter, Chester, Stack,
 177.

Chaerophyllum tainturieri Hook. Abundant; cultivated
 fields, mesic lowland woods. 21 May 1966, Ellis, 1104;
 6 Apr. 1967, Phillips, 2558; 10 Apr. 1980, Carpenter,
 Stack, 79.

Cryptotaenia canadensis (L.) DC. Frequent; alluvial woods. 7 July 1965, Ellis, 313; 4 June 1980, Carpenter, Stack, 369; 23 Aug. 1980, Chester, 4443.

Daucus carota L. Frequent; roadsides, fields and waste ground. 4 June 1980, Carpenter, Stack, 368.

Erigenia bulbosa (Michx.) Nutt. Locally abundant; rich streambank woods and slopes. 1 Apr. 1966, Wofford, 1008; 21 Apr. 1978, Carpenter, Stack, Chester, 3276; 29 Mar. 1980, Carpenter, Chester, Stack, 21 (fruiting specimen collected 22 Apr. 1980).

Osmorhiza longistylis (Torr.) DC. Frequent; rich, low woods. 21 May 1966, Ellis, Clebsch, 1134; 20 Apr. 1967, Phillips, 2691; 30 Apr. 1980, Carpenter, Chester, Stack, 173.

Sanicula canadensis L. Apparently not restricted to any specific habitat. Frequent in moist rich woods of slopes, streambanks and ravines and dry open woods of ridges. 7 July 1965, Ellis, 212, 505 (! E. W. Chester); 14 June 1966, Ellis, 1524 (! E. W. Chester); 9 May 1980, Carpenter, Chester, Stack, 99; 23 May 1980, Carpenter, Chester, Stack, 480; 4 June 1980, Carpenter, Stack, 476, 481.

Sanicula gregaria Bicknell. Frequent; slope forest. 9 May 1980, Carpenter, Chester, Stack, 479; 14 May 1980, Carpenter, Stack, 473; 20 May 1980, Carpenter, Stack, 474.

*Sanicula smallii Bicknell. Infrequent; alluvial forest.

4 June 1980, Carpenter, Stack, 423.

Thaspium trifoliatum (L.) Gray var. flavum Blake.

Frequent; streambank woods. 22 April 1980, Carpenter, Stack, 230.

Torilis japonica (Houth) DC. Rare; roadsides. 7 July 1965, Ellis, 205; 26 June 1980, Gray, Stack, 533.

*Zizia aptera (Gray) Fern. Infrequent; alluvial woods of streambank. 6 Apr. 1967, Phillips, 2553 (! A. H. Lindsey); 20 May 1980, Carpenter, Stack, 298; 23 May 1980, Carpenter, Stack, 340.

Zizia aurea (L.) Koch. Infrequent; alluvial woods.

7 July 1965, Ellis, 211 (! A. H. Lindsey); 8 May 1966, Riggins, 1060 (! A. H. Lindsey); 18 June 1980, B. Stack, J. Stack, 1153.

NYSSACEAE

Nyssa sylvatica Marsh. Frequent; slope forest and mesic woodlands. 27 June 1966, Wofford, 1699; 4 Oct. 1980, Carpenter, Chester, Stack, 1063.

CORNACEAE

Cornus amomum Miller. Frequent; thickets of moist soil along streams and fields. 21 June 1980, Chester, Stack, 514; 4 Oct. 1980, Carpenter, Stack, 1027.

Cornus florida L. Frequent as an understory tree in slope forests, alluvial woods and along fence rows. 28 June 1966, Wofford, 1659; 22 Apr. 1980, Carpenter, Stack, 119.

ERICACEAE

*Chimaphila maculata (L.) Pursh. Very rare; dry ridges.
25 July 1980, Roberts, Stack, 658.

Monotropa uniflora L. Very rare; humus-laden soils of streambanks. 25 July 1980, Roberts, Stack, 661.

Oxydendrum arboreum (L.) DC. Frequent; dry ridges and upland slope forests. 4 Oct. 1980, Carpenter, Chester, Stack, 1064.

Vaccinium stamineum L. Frequent; dry roadsides and ridge tops. 14 May 1980, Carpenter, Stack, 263.

Vaccinium vacillans Torrey. Frequent, dry ridges. 30 Apr. 1980, Carpenter, Chester, Stack, 171.

PRIMULACEAE

Dodocatheon meadia L. Infrequent; moist wooded slopes.
9 Apr. 1967, Wofford, 2583; 22 Apr. 1980, Carpenter, Stack, 115.

Lysimachia ciliata L. Frequent; wet ground, swamps.
21 June 1980, Chester, Stack, 494; 9 July 1980, B. Stack, J. Stack, 573.

*Lysimachia nummularia L. Infrequent but locally abundant in roadside ditches of the lower Bear Creek bottoms.
22 May 1981, Chester, 81-239.

Samolus parviflorus Raf. Occasional; sandy margins of Bear Creek backwaters. 23 May 1980, Carpenter, Chester, Stack, 327.

EBENACEAE

Diospyros virginiana L. Frequent; woods, field edges and roadsides. 27 June 1966, Wofford, 1696; 4 June 1980, Carpenter, Stack, 385.

OLEACEAE

Fraxinus americana L. Occasional; slope forests and woodland borders along fields. 27 June 1966, Wofford, 1705; 4 Oct. 1980, Carpenter, Chester, Stack, 1031.

Fraxinus pennsylvanica var. subintegerrima (Vahl.) Fern. Frequent; low, wet bottomlands of lower Bear Creek, near river. Often forming extensive stands. 7 July 1965, Ellis, 315; 4 June 1980, Carpenter, Stack, 386; 18 June 1980, B. Stack, J. Stack, 487.

*Ligustrum obtusifolium Sieb. & Zucc. Rare escape on roadsides. 28 May 1980, Carpenter, Stack, 355.

*Ligustrum sinense Lour. Frequent escape on roadsides and field edges. 4 June 1980, Carpenter, Stack, 381 A, 381 C.

LOGANIACEAE

Spigelia marilandica L. Infrequent; mesic lowland woods. 11 May 1967, Phillips, 2736; 4 June 1980, Carpenter, Stack, 377.

GENTIANACEAE

Obolaria virginica L. Occasional; mesic upland woods. 15 Apr. 1980, Carpenter, Stack, 88.

Sabatia angularis (L.) Pursh. Infrequent; dry roadside embankments. 16 July 1980, S. Stack, J. Stack, 602.

Swertia caroliniensis (Walt.) Ktze. Infrequent; slope forests. 21 May 1966, Ellis, Clebsch, 1151; 4 June 1980, Carpenter, Stack, 366.

APOCYNACEAE

Amsonia tabernaemontana Walt. Infrequent; bottomland woods. 8 May 1966, Riggins, 1053; 28 Apr. 1980, Carpenter, Stack, 154.

Apocynum cannabinum L. Occasional; moist, shaded roadsides. 18 June 1980, Carpenter, Stack, 456.

ASCLEPIADACEAE

Asclepias incarnata L. Infrequent; moist edge of cultivated fields. 16 July 1980, S. Stack, J. Stack, 590; 4 Aug. 1980, Stack, 681.

Asclepias syriaca L. Infrequent; roadsides. 21 June 1980, Chester, Stack, 529.

Asclepias tuberosa L. Occasional on roadsides and field margins. 18 June 1980, B. Stack, J. Stack, 466.

Asclepias variegata L. Infrequent; low, woodland borders. 18 June 1980, B. Stack, J. Stack, 472.

Cynanchum laeve (Michx.) Persoon (= Ampelamus albidus (Nutt.) Britt.). Infrequent; field edge thickets. 7 July 1965, Ellis, 504; 12 Aug. 1980, Chester, Stack, 725.

Matelea gonocarpa (Walt.) Shinn. (= Gonolobus gonocarpus (Walt.) Perry). Rare; moist woodland border of roadsides. 22 July 1966, Ellis, 2229; 26 June 1980, Gray, Stack, 537.

CONVOLVULACEAE

*Calystegia sepium (L.) R. Brown. Frequent; cultivated field edge thickets. 19 July 1980, Chester, P. Harper, Stack, 617.

Cuscuta campestris Yuncker. Frequent; roadsides, field edges and open areas. Often parasitic on legumes. 18 June 1980, B. Stack, J. Stack, 463.

*Cuscuta compacta Jussieu. Infrequent; edge of swamp woods. 24 Sept. 1980, Carpenter, Stack, 1154.

Cuscuta cuspidata Engelm. Occasional; swamp forests. 27 Aug. 1980, Stack, 853; 11 Sept. 1980, L. Harper, Stack, 926.

Ipomoea hederacea (L.) Jaeg. Frequent; thickets of fields, roadsides and waste places. 7 July 1965, Ellis, 204; 21 July 1965, Ellis, 563; 19 July 1980, Chester, P. Harper, Stack, 619; 23 Aug. 1980, Chester, 4438.

Ipomoea lacunosa L. Frequent and often abundant in cultivated fields. 23 Aug. 1980, Chester, 4439; 27 Aug. 1980, Stack, 828.

Ipomoea pandurata (L.) G.F.W. Meyer. Frequent; cultivated field edge thickets and roadside thickets. 9 July 1980, B. Stack, J. Stack, 576; 24 Sept. 1980, Carpenter, Stack, 935; 15 July 1981, Chester, 81-566.

POLEMONIACEAE

*Phlox carolina L. Infrequent; open area of slope forest. 28 May 1980, Carpenter, Stack, 354.

Phlox divaricata L. Frequent; mesic upland and lowland

woods. 1 Apr. 1966, Wofford, 1016; 8 Apr. 1980, Carpenter, Stack, 64.

Phlox paniculata L. Frequent; low, moist woods. 7 July 1966, Ellis, 208; 22 July 1966, Ellis, 2230; 9 July 1980, B. Stack, J. Stack, 586.

Phlox pilosa L. Rare; roadsides. 20 Apr. 1967, Phillips, 2681.

Polemonium reptans L. Frequent; streambank woods and lowland slope woods. 24 Mar. 1967, Johnson, 2606; 15 Apr. 1980, Carpenter, Stack, 93.

HYDROPHYLLACEAE

*Hydrophyllum appendiculatum Michx. Abundant; rich, moist streambank woods. 6 May 1980, Carpenter, Stack, 210.

Hydrophyllum canadense L. Abundant; moist, rich woods of streambanks and north slopes. 29 Aug. 1966, Evans, 2504; 27 June 1979, Chester, 4074; 18 June 1980, B. Stack, J. Stack, 467.

Hydrophyllum macrophyllum Nutt. Frequent; rich, moist woods. 21 May 1966, Ellis, Clebsch, 1139; 11 May 1967, Phillips, 2732; 6 May 1979, Chester, 3367; 4 June 1980, Carpenter, Stack, 372.

Nemophila microcalyx (Nutt.) Fisch. & Mey. Rare; moist alluvial woods (locally abundant where found). 6 Apr. 1967, Phillips, 2557; 21 Apr. 1978, Carpenter, Chester, Stack, 3275; 22 Apr. 1980, Carpenter, Stack, 122.

Phacelia bipinnatifida Michx. Infrequent; limestone

outcrops on streambanks. 22 Apr. 1979, 3350; 28 Apr. 1980, Carpenter, Stack, 142.

BORAGINACEAE

Cynoglossum virginianum L. Infrequent; dry ridges.

28 Apr. 1980, Carpenter, Stack, 155.

Heliotropium indicum L. Infrequent; moist field edges.

23 Aug. 1980, Chester, 4440; 27 Aug. 1980, Stack, 815.

Mertensia virginica (L.) Pers. Abundant; streambank

woods. 1 Apr. 1966, Wofford, 1001; 24 Mar. 1967,

Johnson, 2610; 8 Apr. 1980, Carpenter, Stack, 70;

18 Apr. 1980, Carpenter, Stack, 110 (white form).

Myosotis macrosperma Engelm. Infrequent; moist roadsides

and ravines. 6 May 1980, Carpenter, Stack, 1156;

1 May 1981, Carpenter, Stack, 1146.

Myosotis verna Nuttall. Frequent; open scrubby woods

and fields. 28 Apr. 1980, Carpenter, Stack, 149;

23 May 1980, Carpenter, Chester, Stack, 315.

VERBENACEAE

Lippia lanceolata Michx. Frequent; low woods and wet

habitats. 21 June 1980, Chester, Stack, 521.

Verbena simplex Lehmann. Occasional; roadsides. 20 May

1980, Carpenter, Stack, 289.

Verbena urticifolia L. Occasional; moist habitats, mesic

woodlands. 7 July 1965, Ellis, 209; 19 July 1980,

Chester, P. Harper, 636.

PHRYMACEAE

Phryma leptostachya L. Frequent; mesic woodland slopes.

7 July 1965, Ellis, 308; 25 July 1980, Roberts, Stack, 664.

LAMIACEAE

Agastache nepetoides (L.) Kuntze. Infrequent; bottomland field-edge thickets. 27 July 1965, Ellis, 590; 12 Aug. 1980, Chester, Stack, 722; 4 Oct. 1980, Carpenter, Chester, Stack, 1041.

Blephilia ciliata (L.) Benth. Occasional; alluvial woods. 4 June 1980, Carpenter, Stack, 380; 11 June 1980, Carpenter, Stack, 431.

Blephilia hirsuta (Pursh.) Benth. Infrequent; north-facing slope forests. 4 July 1980, Carpenter, Stack, 549.

*Collinsonia canadensis L. Infrequent; moderately to heavily shaded north slopes and ravine slopes. 3 Sept. 1980, Stack, 879.

Cunila organoides (L.) Britt. Frequent; dry areas of ridges and roadsides. 20 Aug. 1974, Chester, 2866; 11 Sept. 1980, L. Harper, Stack, 914; 4 Oct. 1980, Carpenter, Chester, Stack, 1040.

Glechoma hederacea L. Infrequent; roadsides, fencerows and disturbed woods. 26 May 1966, Ellis, Clebsch, 1151; 24 Mar. 1967, Johnson, 2613; 20 May 1967, Phillips, 2727; 28 Apr. 1980, Carpenter, Stack, 145.

Lamium amplexicaule L. Abundant; cultivated fields. A common weed of waste areas. 29 Mar. 1980, Carpenter,

Chester, Stack, 19.

Lamium purpureum L. Frequent; cultivated fields. 29 Mar. 1980, Carpenter, Chester, Stack, 26.

Lycopus americanus Muhl. ex Barton. Locally abundant; swampy areas. 12 Aug. 1980, Chester, Stack, 739.

Lycopus virginicus L. Frequent; swampy areas. 11 Sept. 1980, L. Harper, Stack, 928.

Monarda fistulosa L. Infrequent; mesic woods of abandoned field of approximately 25 years. 20 Aug. 1974, Chester, 2864; 12 Aug. 1980, Chester, Stack, 708.

Perilla frutescens (L.) Britt. Abundant; cultivated fields. 29 Aug. 1966, Wofford, 2505; 3 Sept. 1980, Stack, 873.

Prunella vulgaris L. Frequent; roadsides. 7 July 1965, Ellis, 299; 16 July 1980, S. Stack, J. Stack, 596.

Pycnanthemum incanum (L.) Michx. Occasional; dry open roadsides and open ravines. 12 Aug. 1980, Chester, Stack, 707 A, 707 B; 4 Oct. 1980, Carpenter, Chester, Stack, 1057.

Pycnanthemum tenuifolium Schrader. Infrequent; dry fields and roadsides. 4 July 1980, Carpenter, Stack, 550.

Salvia lyrata L. Frequent; woodland borders and roadsides. 8 May 1966, Riggins, 1068; 21 May 1966, Ellis, Clebsch, 1114, 1165; 6 May 1980, Carpenter, Stack, 201.

Scutellaria elliptica Muhl. Frequent, alluvial woods. 7 July 1965, Ellis, 808; 4 June 1980, Carpenter, Stack, 383.

Scutellaria incana Biechler. Occasional; alluvial woods.

7 July 1965, Ellis, 322.

Scutellaria lateriflora L. Locally abundant; moist woodland borders, swampy areas; infrequent throughout the study area. 12 Aug. 1980, Chester, Stack, 734; 21 Oct. 1980, Carpenter, Chester, Stack, 1107.

Scutellaria nervosa Pursh. Frequent; alluvial and slope woods. 9 May 1980, Carpenter, Chester, Stack, 234.

Scutellaria ovata Biechler. Occasional; streambank woods. 4 June 1980, Carpenter, Stack, 382.

Scutellaria parvula Michx. Infrequent; dry wooded ridges. 30 Apr. 1980, Carpenter, Chester, Stack, 175.

Stachys tenuifolia Willd. Infrequent; moist field edges, lower Bear Creek bottoms. 31 Oct. 1980, Carpenter, Chester, Stack, 1112.

Synandra hispidula (Michx.) Bail. Rare; alluvial woods of ravines and creek banks. 21 May 1966, Ellis, 1136; 6 May 1979, Chester, 3363; 14 May 1980, Carpenter, Stack, 270.

Teucrium canadense L. Frequent; low moist woodland borders or roadsides, fields and swampy areas. 21 June 1980, Chester, Stack, 510; 26 June 1980, Gray, Stack, 539.

Trichostema dichotomum L. Infrequent; dry roadsides. 3 Sept. 1980, Stack, 864.

SOLANACEAE

Datura stramonium L. Infrequent, dry rocky stream beds

and field edges. 19 July 1980, Chester, P. Harper, Stack, 638.

*Lycopersicon esculentum Miller. Rare escape; Cumberland River bank near mouth of Bear Creek. 31 Oct. 1980, Carpenter, Chester, Stack, 1111.

Nicandra physalodes (L.) Persoon. Rare; cultivated field edges. 4 Oct. 1980, Carpenter, Chester, Stack, 1010.

*Physalis angulata L. Frequent; cultivated field edges. 12 Aug. 1980, Chester, Stack, 760 A, 760 B.

Physalis heterophylla Nees. Frequent; edges of cultivated ground. 12 Aug. 1980, Chester, Stack, 761.

Physalis pubescens L. Infrequent; open pond edge, lower Bear Creek. 8 Oct. 1980, Carpenter, Stack, 1082.

Physalis virginiana Miller. Frequent; cultivated fields. 19 July 1980, Chester, P. Harper, Stack, 649.

Solanum carolinense L. Frequent; roadsides, fields and waste places. 23 May 1980, Carpenter, Chester, Stack, 317.

Solanum americanum Mill. Frequent; cultivated field edges. 12 Aug. 1980, Chester, Stack, 717.

SCROPHULARIACEAE

*Agalinis tenuifolia (Vahl.) Raf. Frequent; dry field edges and dry roadside embankments. 27 Aug. 1980, Stack, 823; 3 Sept. 1980, Stack, 878; 4 Oct. 1980, Carpenter, Chester, Stack, 1054.

Aureolaria flava (L.) Farwell. Infrequent; dry ridges.

3 Sept. 1980, Stack, 838.

Conobea multifida (Michx.) Benth. Occasional; sandy soil of field edges and along bank of Bear Creek back waters. 19 July 1980, S. Stack, J. Stack, 608; 3 Sept. 1980, Stack, 883.

*Dasistoma macrophylla (Nutt.) Raf. (= Seymeria macrophylla Nutt.). Infrequent; open, upland woods, dominant in oaks. 7 July 1965, Ellis, 305; 16 Aug. 1966, Evans, 2406; 12 Aug. 1980, Chester, Stack, 737.

Gratiola neglecta Torrey. Frequent; open wet fields and moist field edges. 23 May 1980, Carpenter, Chester, Stack, 325.

Lindernia anagallidea (Michx.) Fern. Occasional; open wet fields. 21 June 1980, Chester, Stack, 520.

Lindernia dubia (L.) Pennell. Infrequent; moist ditch along edge of cultivated fields. 19 July 1980, Carpenter, Chester, Stack, 612.

Mimulus alatus Aiton. Frequent; moist wooded road edges, low wet areas. 19 July 1980, Chester, P. Harper, Stack, 634.

Paulownia tomentosa (Thunberg) Steud. Infrequent escape; shaded woods of roadsides, lower Bear Creek. 31 Oct. 1980, Carpenter, Chester, Stack, 1108.

*Penstemon australis Small. Infrequent; mesophytic woodlands. 21 May 1966, Ellis, Clebsch, 1130, 1162.

*Penstemon calycosus Small. Occasional; moist wooded

embankment bordering abandoned road bed. 28 May 1980, Carpenter, Stack, 348; 18 June 1980, B. Stack, J. Stack, 489.

Penstemon tenuiflorus Pennell. Infrequent; dry open areas and roadsides. 14 May 1980, Carpenter, Stack, 280.

Scrophularia marilandica L. Infrequent; mesic lowland woods, shaded road banks. 27 July 1965, Ellis, 584; 20 Aug. 1974, Chester, 2872; 25 July 1980, Roberts, Stack, 660.

Verbascum blattaria L. Frequent; cultivated fields, roadsides and waste ground. 7 July 1965, Ellis, 809; 23 May 1980, Carpenter, Chester, Stack, 319.

Verbascum thapsus L. Infrequent; roadsides. 27 June 1980, Gray, Stack, 540.

Veronica arvensis L. Frequent; cultivated fields and lawns. 2 Apr. 1980, Carpenter, Stack, 42.

*Veronica peregrina L. Frequent; cultivated ground. 1 May 1975, Chester, 2951; 2 Apr. 1980, Carpenter, Stack, 46.

BIGNONIACEAE

Anisostichus capreolata (L.) Bureau. (= Bignonia carpeolata L.). Infrequent; moist, shaded roadsides and fence-rows. 21 May 1966, Ellis, Clebsch, 1159; 9 May 1980, Carpenter, Chester, Stack, 248.

Campsis radicans (L.) Seem. Frequent; moist, shaded thickets, fencerows and roadsides. 7 July 1965, Ellis, Clebsch, 223; 18 June 1980, B. Stack, J. Stack, 464.

Catalpa speciosa Warder. Infrequent, escape; field edge woods near creek. 16 July 1980, S. Stack, J. Stack, 603.

OROBANCHACEAE

*Conopholis americana (L.) Wallr. Occasional as parasite on roots of various trees in moist woods. 1 May 1975, Chester, 2950; 6 May 1979, Chester, 3360; 9 May 1980, Carpenter, Chester, Stack, 238.

Epifagus virginiana (L.) Bart. Abundant as parasite on roots of beech trees on rich, moist wooded slopes. 27 July 1965, Ellis, 820; 29 Mar. 1980, Carpenter, Chester, Stack, 33.

ACANTHACEAE

Dicliptera brachiata (Pursh.) Spreng. Rare throughout; locally abundant along roadside of lowlands. 17 Sept. 1967, Snyder, 3160; 17 Oct. 1980, Carpenter, Chester, Stack, 1091.

Ruellia caroliniensis (Walt.) Steud. Infrequent; mesophytic woods. 27 July 1965, Ellis, 583.

Ruellia strepens L. Occasional; rich, moist alluvial woods. 4 June 1980, Carpenter, Stack, 387.

PLANTAGINACEAE

Plantago aristida Michx. Occasional; dry roadsides. 18 June 1980, B. Stack, J. Stack, 455.

Plantago lanceolata L. Frequent; lawns, roadsides, open woods and waste ground. 7 July 1965, Ellis, 507, 511; 21 May 1966, Ellis, Clebsch, 1121; 6 May 1980,

Carpenter, Stack, 211.

Plantago rugelii Dcne. Frequent; fields, lawns, roadsides and waste ground. 16 July 1980, S. Stack, J. Stack, 598; 3 Sept. 1980, Stack, 884.

Plantago virginica L. Frequent; dry sandy soil of cultivated fields. 22 Apr. 1980, Carpenter, Stack, 136.

RUBIACEAE

Cephalanthus occidentalis L. Frequent; lowland swamps and along streams. 22 July 1966, Ellis, 2223; 4 July 1980, Carpenter, Stack, 559.

Diodia teres Walt. Frequent; low ground, cultivated fields, roadsides and open areas. 7 July 1965, Ellis, 219, 228; 16 July 1980, S. Stack, J. Stack, 593.

Diodia virginiana L. Frequent; open wet fields and stream margins. 7 July 1965, Ellis, 206, 214; 21 June 1980, Chester, Stack, 522.

Galium aparine L. Frequent; mesic lowland woods. 21 May 1966, Ellis, Clebsch, 1107; 22 Apr. 1980, Carpenter, Stack, 130.

Galium circaeazans Michx. Frequent; hardwood slope forest. 4 June 1980, Carpenter, Stack, 361.

*Galium obtusum Bigelow. Frequent; low woods; found along woodland border of abandoned road bed. 4 June 1980, Carpenter, Stack, 388.

Galium pilosum Ait. Frequent; shady road banks. 7 July 1965, Ellis, 320; 21 June 1980, Chester, Stack, 500.

Galium tinctorium L. Locally abundant; open swamps.

19 July 1980, Chester, P. Harper, Stack, 646.

Galium triflorum Michx. Occasional; rich bottomland woods and shady roadside thickets. 9 July 1980, B. Stack, J. Stack, 562; 23 Aug. 1980, Chester, 4442; 24 Sept. 1980, Carpenter, Stack, 933.

*Houstonia longifolia Gaertn. Occasional; dry ridge woods and dry rocky soil of roadsides. 21 May 1966, Ellis, Clebsch, 1166; 20 May 1980, Carpenter, Stack, 302; 23 May 1980, Carpenter, Stack, 337; 28 May 1980, Carpenter, Stack, 352.

*Houstonia pusilla Schoepf. Frequent; dry field edges.
4 Apr. 1980, Carpenter, Stack, 55.

CAPRIFOLIACEAE

Lonicera japonica Thunb. Abundant; thickets of low woods, roadsides and disturbed areas. 7 July 1965, Ellis, 294; 28 May 1980, Carpenter, Stack, 342.

Lonicera sempervirens L. Occasional; disturbed woods.
9 May 1980, Carpenter, Chester, Stack, 241.

Sambucus canadensis L. Frequent; near streams and other moist places. 18 June 1980, B. Stack, J. Stack, 470.

Symphoricarpos orbiculatus Moench. Occasional; open woods and thickets. 7 July 1965, Ellis, 317; 31 Oct. 1980, Carpenter, Chester, Stack, 1118.

Virburnum rufidulum Raf. Occasional; rocky woods, streambanks and dry roadsides. 18 Apr. 1980, Carpenter, Stack, 113; 1 Oct. 1980, Carpenter, Stack, 995.

VALERIANACEAE

*Valeriana pauciflora Michx. Rare, floodplain ravines.

Nice population where found. 26 May 1975, Wofford, Dennis, 51672; 6 May 1979, Chester, 3364; 14 May 1980, Carpenter, Stack, 269.

Valerianella radiata (L.) Dufr. Frequent; moist roadsides.

20 Apr. 1967, Phillips, 2682; 6 May 1980, Carpenter, Stack, 215.

CUCURBITACEAE

Sicyos angulatus L. Rare; sandy field edge thickets.

25 Sept. 1980, Carpenter, Stack, 967.

CAMPANULACEAE

Campanula americana L. Occasional; moist rich woods near creek. 7 July 1965, Ellis, 329; 9 July 1980, B. Stack, J. Stack, 571.

Lobelia cardinalis L. Frequent; moist open streambanks and swampy areas. 12 Aug. 1980, Chester, Stack, 727.

Lobelia inflata L. Occasional; cultivated field edges and moist wooded roadsides. 27 July 1965, Ellis, 573; 9 July 1980, B. Stack, J. Stack, 580; 3 Sept. 1980, Stack, 877.

Lobelia puberula Michx. Infrequent; dry roadsides.

31 Oct. 1980, Carpenter, Chester, Stack, 1110.

Lobelia silphilitica L. Occasional; low wet ground such as the edge of swamp woods and the wet edges of cultivated fields. 3 Sept. 1980, Stack, 863.

Specularia perfoliata (L.) ADC. Occasional; cultivated fields. 4 May 1967, Phillips, 2726; 20 May 1980, Carpenter, Stack, 297.

ASTERACEAE

Achillea millefolium L. Frequent; open ground, edge of fields and roads. 21 May 1966, Ellis, Clebsch, 1122; 14 May 1980, Carpenter, Stack, 264.

Ambrosia artemisiifolia L. Frequent; field edges and waste ground. 27 Aug. 1980, Stack, 824; 17 Oct. 1980, Carpenter, Chester, Stack, 1084.

Ambrosia trifida L. Frequent; cultivated field edges. 23 Aug. 1980, Chester, 4435; 3 Sept. 1980, Stack, 871.

Antennaria plantaginifolia (L.) Richardson. Frequent; xeric ridgetop woods. 8 Apr. 1980, Carpenter, Stack, 67.

*Antennaria solitaria Rydberg. Occasional; dry ridges and roadsides. 22 Apr. 1980, Carpenter, Stack, 118.

Arctium minus (Hill) Bernh. Rare; roadsides and open meadow near old homesite. 7 July 1965, Ellis, 222.

Artemisia annua L. Occasional; cultivated field edges. 19 July 1980, Chester, P. Harper, Stack, 639; 27 Aug. 1980, Stack, 810.

Aster azureus Lindl. Infrequent; roadsides. 27 July 1965, Ellis, 818.

*Aster cordifolius L. Rare; alluvial woods of streambank; a variable species. 25 Sept. 1980, Carpenter, Stack, 1139 (! R. Kral).

- Aster dumosus L. Frequent; dry roadsides, field edges; extremely variable. 11 Sept. 1980, Stack, 918; 25 Sept. 1980, Carpenter, Stack, 985; 4 Oct. 1980, Stack, 1013.
- Aster hemisphericus Alexander. Rare; dry cherty roadsides. One collection. 4 Oct. 1980, Carpenter, Chester, Stack, 1012.
- Aster patens Aiton. Frequent; dry ridge woods. 24 Sept. 1980, Carpenter, Stack, 945; 25 Sept. 1980, Carpenter, Stack, 954.
- Aster pilosus Willd. Frequent; disturbed areas, roadsides and field edges. 25 Sept. 1980, Carpenter, Stack, 952; 1 Oct. 1980, Carpenter, Stack, 996.
- *Aster sagittifolius Wedem. ex Willd. Frequent; dry ridges and dry roadsides. 11 Sept. 1980, L. Harper, Stack, 909; 25 Sept. 1980, Carpenter, Stack, 1140 (! R. Kral); 28 Sept. 1980, Carpenter, Stack, 1138; 4 Oct. 1980, Carpenter, Chester, Stack, 1137 (! R. Kral).
- *Aster shortii Lindl. Infrequent; upland woods of slopes. 4 Sept. 1980, Carpenter, Stack, 944.
- *Aster undulatus L. Frequent; dry ridge woods. 24 Sept. 1980, Carpenter, Stack, 947 (! R. Kral); 25 Sept. 1980, Carpenter, Stack, 1148 (I.D. by R. Kral).
- Bidens bipinnata L. Occasional; moist roadsides and mesic upland slope forests. 11 Sept. 1975, Chester, 3113; 3 Sept. 1980, Stack, 868.
- *Bidens cernua L. Frequent; swampy ground. 25 Sept. 1980,

Carpenter, Stack, 970; 4 Oct. 1980, Carpenter, Chester, Stack, 1043.

Bidens frondosa L. Locally abundant; wet woodland depressions. 24 Sept. 1980, Carpenter, Stack, 942.

Bidens polylepis Blake. Frequent; cultivated field edges and roadsides. 12 Aug. 1980, Chester, Stack, 778; 25 Sept. 1980, Carpenter, Stack, 966.

*Bidens tripartita L. Infrequent; open wet fields and wet depressions. 25 Sept. 1980, Carpenter, Stack, 969; 14 Sept. 1981, Chester, 81-808.

Boltonia asteroides (L.) L'Herit. Rare; shaded roadsides. 27 Aug. 1980, Stack, 831.

Cacalia atriplicifolia L. Infrequent; rich lowland woods and roadsides. 27 July 1965, Ellis, 581; 25 July 1980, Roberts, Stack, 663.

Cacalia muhlenbergii (Sch.-Bip.) Fern. Infrequent; open lowland woods, field edge thickets. 22 July 1966, Ellis, 2204; 1 Aug. 1966, Forrester, 2263; 27 June 1979, Chester, 4076; 18 June 1980, B. Stack, J. Stack, 471.

Carduus altissimus L. (= Cirsium altissimum (L.) Spr.). Occasional; cultivated field edges. 20 Aug. 1974, Chester, 2875; 12 Aug. 1980, Chester, Stack, 721.

Carduus discolor (Muhl. ex Willd). Nuttall. Infrequent; field edges and open roadsides. 21 Aug. 1980, L. Harper, Stack, 766.

Chrysanthemum leucanthemum L. Frequent; dry fields and

roadsides. 21 May 1966, Ellis, Clebsch, 1146; 20 May 1980, Carpenter, Stack, 288.

Chrysopsis camporum Greene. Rare throughout; locally abundant along open roadsides and field edges. 7 July 1965, Ellis, 227; 3 Oct. 1965, Ellis, 860; 28 Oct. 1973, Chester, 2655; 9 July 1980, B. Stack, J. Stack, 579; 27 Aug. 1980, Stack, 800.

Coreopsis major Walter. Frequent; dry ridge woods. 26 June 1980, Gray, Stack, 546.

Coreopsis tripteris L. Frequent; woodland borders along open fields and roadsides. 21 Aug. 1980, Chester, Stack, 748; 25 Sept. 1980, Carpenter, Stack, 960.

Eclipta alba (L.) Hassk. Occasional; moist ditch along edge of cultivated field. 19 July 1980, Carpenter, Chester, Stack, 615.

Elephantopus carolinianus Willd. Frequent along woodland border of cultivated fields. 12 Aug. 1980, Chester, Stack, 745.

Erechtites hieracifolia (L.) Raf. Rare; disturbed woods. 25 Sept. 1980, Carpenter, Stack, 958.

Erigeron annuus (L.) Pers. Abundant; fields, roadsides, woods and waste ground. 21 May 1966, Ellis, Clebsch, 1152; 23 May 1980, Carpenter, Chester, Stack, 330.

Erigeron canadensis L. Occasional; roadsides. 27 Aug. 1980, Stack, 808.

Erigeron philadelphicus L. Frequent; open woods,

roadsides and disturbed ground. 21 May 1966, Ellis, Clebsch, 1137, 1166; 1 May 1980, Carpenter, Stack, 1147; 6 May 1980, Carpenter, Stack, 203.

Erigeron strigosus Muhl. ex Willd. Occasional; fields and roadsides. 7 July 1965, Ellis, 321; 21 June 1980, Chester, Stack, 493; 11 Sept. 1980, L. Harper, Stack, 910.

Eupatorium coelestinum L. Frequent; moist roadsides and field edges. 27 July 1965, Ellis, 585; 27 Aug. 1980, Stack, 826.

Eupatorium fistulosum Barratt. Frequent; moist woodlands bordering fields. 12 Aug. 1980, Chester, Stack, 750.

Eupatorium hyssopifolium L. Infrequent; dry open roadsides. 12 Aug. 1980, Chester, Stack, 718.

*Eupatorium incarnatum Walter. Occasional; wooded roadsides. 27 Aug. 1980, Stack, 821; 4 Oct. 1980, Carpenter, Chester, Stack, 1048.

*Eupatorium perfoliatum L. Infrequent; open, grown up field edges. 12 Aug. 1980, Chester, Stack, 715.

Eupatorium purpureum L. Infrequent; woods. 7 July 1965, Ellis, 316.

Eupatorium rugosum Houttuyn. Occasional; dry ridge trail. 25 July 1980, Roberts, Stack, 662.

Eupatorium serotinum Michx. Infrequent; roadsides and field edges. 12 Aug. 1980, Chester, Stack, 720.

Gnaphalium obtusifolium L. Occasional; dry sandy soil of

roadsides. 12 Aug. 1980, Chester, Stack, 777.

Gnaphalium purpureum L. Frequent; dry open roadsides.

21 May 1966, Ellis, Clebsch, 1160; 14 May 1980, Carpenter, Stack, 266.

Helenium flexosum Raf. Abundant; swampy ground and open wet fields. 9 July 1980, B. Stack, J. Stack, 575; 16 July 1980, S. Stack, J. Stack, 589.

*Helianthus annuus L. Infrequent; cultivated fields.

14 July 1975, Chester, 3064.

Helianthus divaricatus L. Infrequent; dry open roadsides.

27 June 1970, Chester, 2355.

*Helianthus tuberosus L. Occasional; wooded edge of fields,

roads and waste ground. 3 Sept. 1980, Stack, 860;

11 Sept. 1980, L. Harper, Stack, 916.

Heliopsis helianthoides (L.) Sweet. Frequent; woodland

borders of cultivated fields. 22 July 1966, Ellis,

2205; 21 Aug. 1980, L. Harper, Stack, 788; 3 Sept.

1980, Stack, 885.

Hieracium gronovii L. Frequent; dry woods. 25 July 1980,

Roberts, Stack, 659; 21 Aug. 1980, L. Harper, Stack,

780.

*Iva annua L. Locally abundant; soybean fields of lower

Bear Creek. 14 Sept. 1981, Chester, 81-805.

Krigia biflora (Walter) Blake. Occasional; upland wooded

slopes and woodland borders of roads. 21 May 1966,

Ellis, Clebsch, 1172; 20 Apr. 1967, Phillips, 2684;

9 May 1980, Carpenter, Chester, Stack, 220.

Krigia dandelion (L.) Nutt. Occasional; woods. 21 May 1966, Ellis, Clebsch, 1145; 20 May 1980, Carpenter, Stack, 418.

*Krigia oppositifolia Raf. Very abundant; bottomland cultivated fields. 15 Apr. 1980, Carpenter, Stack, 422; 28 Apr. 1980, Carpenter, Stack, 420; 22 May 1981, Chester, 81-242.

Lactuca canadensis L. Frequent; fields, woodlands and waste places. 26 June 1980, Gray, Stack, 534.

Lactuca floridana (L.) Gaertner. Occasional; open weedy ground of cultivated field edges and roadsides. 21 Aug. 1980, Chester, Stack, 752; 21 Aug. 1980, L. Harper, Stack, 784.

Lactuca scariola L. Infrequent; open woods. 7 July 1965, Ellis, 202.

*Pluchea camphorata (L.) DC. Infrequent; collected along pond edge, lower Bear Creek. 17 Oct. 1980, Carpenter, Chester, Stack, 1093.

Prenanthes altissima L. Infrequent; slope forest and rich, moist woods along roadsides. 29 Oct. 1980, Carpenter, Stack, 1100; 31 Oct. 1980, Carpenter, Chester, Stack, 1109.

*Prenanthes barbata (T. & G.) Milstead. Rare; slope forests. 11 Sept. 1980, L. Harper, Stack, 931 (! R. Kral).

Pyrrhopappus carolinianus (Walter) DC. Infrequent; open roadside banks. 7 July 1965, Ellis, 325; 11 June 1980, Carpenter, Stack, 449.

Rudbeckia hirta L. Infrequent; roadsides and cut-over fields. 21 June 1980, Chester, Stack, 515.

*Rudbeckia laciniata L. Infrequent but locally abundant in low woods and along bottomland field edges. 19 July 1980, Chester, P. Harper, Stack, 613.

Rudbeckia triloba L. Locally abundant; low ground along field edge borders and roadsides; occasional throughout the study area. 22 July 1966, Ellis 2231; 19 July 1980, Chester, P. Harper, Stack, 614; 4 Aug. 1980, Stack, 677 (! E. W. Chester).

Senecio aureus L. Abundant; streambank woods. 6 Apr. 1967, Phillips, 2554; 1 May 1975, Chester, 2952; 15 Apr. 1980, Carpenter, Stack, 95.

Senecio glabellus Poiret. Very abundant; bottomland cultivated fields. 4 Apr. 1980, Carpenter, Stack, 54.

Silphium intergrifolium Michx. Rare; dry roadsides. 4 Oct. 1980, Carpenter, Chester, Stack, 1019.

Silphium trifoliatum L. Rare; mixed deciduous woodlands. 27 July 1965, Ellis, 586.

*Solidago altissima L. (= S. canadensis L.). Frequent; field edge thickets, roadsides and open places. 3 Oct. 1965, Ellis, 857; 21 Aug. 1980, L. Harper, Stack, 791; 27 Aug. 1980, Stack, 830; 3 Sept. 1980, Stack, 887;

11 Sept. 1980, L. Harper, Stack, 896.

Solidago caesia L. Frequent; rich woods. 27 July 1965, Ellis, 817; 3 Sept. 1980, Stack, 894; 24 Sept. 1980, Stack, 950.

Solidago erecta Pursh. Occasional; dry oak woods of ridge tops and dry roadsides. 25 Sept. 1980, Carpenter, Stack, 984; 31 Oct. 1980, Carpenter, Chester, Stack, 1106.

*Solidago flexicaulis L. Locally abundant; streambank woods. 24 Sept. 1980, Carpenter, Stack, 951.

*Solidago hispida Muhl. Occasional; xeric ridge tops and dry roadside embankments. 4 Oct. 1980, Carpenter, Chester, Stack, 1011; 1 Nov. 1980, Carpenter, Stack, 1129.

Solidago juncea Aiton. Frequent; dry open roadsides. 4 Aug. 1980, Stack, 689; 21 Aug. 1980, L. Harper, Stack, 789.

Solidago nemoralis Aiton. Frequent; open roadsides and dry open woods. 3 Oct. 1965, Ellis, 861; 11 Sept. 1980, L. Harper, Stack, 897 B; 25 Sept. 1980, Carpenter, Stack, 949.

*Solidago rugosa Miller. Infrequent; cultivated field edges. 1 Oct. 1980, Carpenter, Stack, 997.

*Solidago ulmifolia Muhl. ex Willd. Frequent; upland woods along ridge top. 3 Sept. 1980, Stack, 888; 24 Sept. 1980, Carpenter, Stack, 948.

- Taraxacum officinale Wiggers. Frequent; open disturbed places, roadsides. 15 Apr. 1980, Carpenter, Stack, 94.
- *Verbesina alternifolia (L.) Britton ex Kearney. Frequent; field edge thickets. 4 Aug. 1980, Stack, 680.
- Verbesina virginica L. Frequent; lowland woods along stream, fields and roads. 29 Aug. 1966, Evans, 2503; 4 Aug. 1980, Stack, 678; 27 Aug. 1980, Stack, 809.
- *Vernonia altissima Nuttall. Frequent; moist soil along field edges and roadsides. 4 Aug. 1980, Stack, 675.
- Xanthium strumarium L. Abundant; cultivated field edges. 7 July 1965, Ellis, 244; 11 Sept. 1980, L. Harper, Stack, 927.

Forest Vegetation

Plot data from the forest communities sampled gave the following results. Species area curves developed after Cain (1938) indicated that sampling was adequate.

Ridges. Thirty-one woody species were found in 28, 0.04 ha plots (total of 1.12 ha sampled). In the overstory, 564 stems of 24 species were sampled, yielding a total basal area of 24.55 m^2 ; on a per hectare basis, the stems totaled $503.6/\text{ha}$ and the basal area was $21.9 \text{ m}^2/\text{ha}$ (Table III). A total of 916 stems were sampled in the understory, revealing 26 different woody species (Table IV).

North-facing Slopes. Thirty-three species were found in 44 plots that totaled 1.76 ha. The 739 overstory stems

Table III. Statistical Data of Overstory Tree Species on Dry Ridges, Based on 28, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/Ha	Relative Density	Total, BA cm	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer saccharum</i>	147	149.11	29.61	16,078.87	216.04	14.70	0.89	13.03	57.34
<i>Amelanchier arborea</i>	1	0.05	0.10	993.22	993.22	0.40	0.04	0.59	1.17
<i>Carya glabra</i>	105	93.75	18.62	41,545.33	395.67	16.92	0.86	12.59	48.13
<i>Carya ovata</i>	23	20.54	4.08	7,922.35	344.45	3.23	0.39	5.71	13.02
<i>Carya tomentosa</i>	22	19.64	3.90	9,343.72	424.71	3.81	0.39	5.71	13.42
<i>Corylus canadensis</i>	3	2.68	0.53	404.80	134.93	0.16	0.11	1.61	2.30
<i>Coryna florida</i>	0	7.14	1.42	853.86	106.73	0.35	0.18	2.64	4.41
<i>Fraxus grandifolia</i>	3	2.68	0.53	445.45	215.22	0.26	0.11	1.61	2.40
<i>Fraxinus americana</i>	11	9.82	1.95	4,069.33	551.76	2.47	0.39	5.71	10.13
<i>Juglans nigra</i>	6	5.36	1.06	2,475.90	412.65	1.09	0.21	3.07	5.22
<i>Juniperus virginiana</i>	2	1.79	0.34	571.24	285.62	0.23	0.07	1.02	1.61
<i>Liriodendron tulipifera</i>	1	0.89	0.18	2,452.60	2,452.60	1.00	0.04	0.59	1.77
<i>Nyssa sylvatica</i>	14	14.29	2.84	2,785.32	234.68	1.53	0.18	2.64	7.01
<i>Ostrya virginiana</i>	7	6.35	1.28	1,101.42	157.35	0.45	0.18	2.64	4.33
<i>Ostrya virginiana</i>	17	15.18	3.01	1,745.40	102.67	0.72	0.21	3.07	6.80
<i>Quercus alba</i>	47	55.62	11.04	17,000.44	361.91	23.58	0.89	13.03	48.49
<i>Quercus falcata</i>	4	3.57	0.71	5,201.89	1,300.47	3.12	0.14	2.05	4.88
<i>Quercus marilandica</i>	1	0.89	0.18	147.75	147.75	0.06	0.04	0.59	0.81
<i>Quercus prinus</i>	14	14.29	2.84	11,075.48	791.11	4.51	0.21	3.07	10.42
<i>Quercus rubra</i>	2	1.79	0.34	2,295.21	1,147.60	0.98	0.04	0.59	1.93
<i>Quercus stellata</i>	1	0.89	0.18	1,110.84	555.42	0.45	0.07	1.02	1.83
<i>Quercus velutina</i>	44	50.93	10.18	47,457.57	1,078.58	19.41	0.79	11.57	42.68
<i>Desmodium illinoense</i>	4	3.57	0.71	822.95	205.74	0.34	0.11	1.61	2.66
<i>Ulmus rubra</i>	10	8.93	1.77	2,000.31	200.03	1.23	0.29	4.25	7.25
TOTAL	144	144.59	100.00	247,400.53	1,718.12	99.95	4.83	100.01	100.03

Table IV. Statistical Data for Understory Species on Dry Ridges, Based on 28, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total BA cm ²	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer saccharum</i>	451	402.68	49.24	11,398.68	25.27	46.39	1.00	15.50	111.13
<i>Aesculus glabra</i>	2	1.79	0.22	19.74	9.87	0.08	0.07	1.09	1.39
<i>Amelanchier arborea</i>	7	6.25	0.76	112.14	16.02	0.46	0.25	3.88	5.10
<i>Carpinus caroliniana</i>	1	0.89	0.11	12.97	12.97	0.05	0.04	0.62	0.78
<i>Carya glabra</i>	47	41.96	5.13	1,714.36	36.48	6.98	0.46	7.13	19.24
<i>Carya ovata</i>	1	0.89	0.11	77.17	77.17	0.31	0.04	0.62	1.04
<i>Carya tomentosa</i>	1	2.68	0.33	64.58	21.53	0.26	0.07	1.09	1.68
<i>Celtis occidentalis</i>	1	0.89	0.11	42.65	42.65	0.17	0.04	0.62	0.90
<i>Cercis canadensis</i>	1	0.89	0.11	29.16	29.16	0.12	0.04	0.62	0.85
<i>Cornus florida</i>	61	54.46	6.66	1,376.73	22.57	5.60	0.46	7.13	19.39
<i>Fagus grandifolia</i>	1	2.68	0.33	80.59	26.86	0.33	0.11	1.71	2.37
<i>Fraxinus americana</i>	25	22.33	2.73	441.70	17.67	1.80	0.39	6.05	10.58
<i>Juniperus virginiana</i>	4	3.57	0.44	58.91	14.73	0.24	0.11	1.71	2.39
<i>Myrica oxycarpa</i>	18	16.07	1.96	480.03	26.67	1.95	0.29	4.50	8.41
<i>Ostrya virginiana</i>	114	101.78	12.44	3,050.25	26.76	12.41	0.61	9.46	34.31
<i>Ostrya arborescens</i>	10	24.79	3.08	1,176.07	39.20	4.79	0.21	3.26	11.33
<i>Quercus alba</i>	28	25.00	3.06	1,368.08	48.63	5.57	0.57	8.84	17.47
<i>Quercus muhlenbergii</i>	2	1.79	0.22	24.39	12.20	0.10	0.04	0.62	0.94
<i>Quercus prinus</i>	5	4.46	0.55	219.95	43.99	0.90	0.07	1.09	2.54
<i>Quercus stellata</i>	1	0.89	0.11	14.26	14.26	0.14	0.04	0.62	0.87
<i>Quercus velutina</i>	20	17.86	2.18	709.72	35.49	2.89	0.43	6.67	11.74
<i>Rhamnus caroliniana</i>	2	1.79	0.22	18.52	9.26	0.08	0.04	0.62	0.92
<i>Sassafras albidum</i>	20	17.86	2.18	699.33	34.97	2.85	0.36	5.58	10.61
<i>Ulmus alata</i>	4	3.57	0.44	54.00	13.50	0.22	0.11	1.71	2.37
<i>Ulmus rubra</i>	59	52.68	6.44	1,183.81	20.06	4.82	0.46	7.13	18.39
<i>Vitis</i> sp.	4	3.56	0.44	123.10	20.52	0.50	0.14	2.17	3.33
TOTAL	914	817.95	100.00	24,570.89	713.46	100.01	6.45	100.04	300.07

sampled (29 species) had an average basal area of 48.93 m^2 for the area sampled or a basal area of 27.80 m^2 per hectare and 440.4 trees per hectare (Table V). The understory yielded 801 stems of 23 different species (Table VI).

Streambank-Ravines. Thirty-six woody species were found in 25, 0.04 ha plots (total of 1.0 ha sampled). A total of 462 overstory stems (33 species) was recorded, corresponding to a density of 462 stems per hectare and a basal area of 18.30 m^2 per hectare (Table VII). Among the understory, 652 individuals were sampled, representing 26 different species (Table VIII).

Total Area Sampled. Woody vegetational analysis revealed 48 species from a total sampled area of 3.88 ha. The total of 4,134 stems yielded a basal area of 100.70 m^2 , which averaged 243.59 cm^2 per stem. This corresponded to a density of 1,065 stems per hectare and a total basal area of 25.95 m^2 per hectare. Diameter size class distributions (Table IX) show a larger concentration of stems in the smaller size classes.

Forty-four woody species with individuals of 10 cm or greater in dbh (overstory) were present (Table X). The 1,765 overstory stems corresponded to a density of 454.9 stems per hectare and a total basal area of 23.65 m^2 per hectare.

All woody species with a dbh less than or equal to

Table V. Statistical Data for Overstory Tree Species on North-facing Slopes, Based on 44, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total ₂ BA cm ²	Average BA/Stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer saccharum</i>	131	74.43	16.90	68,118.54	519.99	13.92	0.77	12.26	43.08
<i>Aesculus glabra</i>	2	1.14	0.26	761.40	380.70	0.16	0.05	0.80	1.22
<i>Carpinus caroliniana</i>	1	0.57	0.13	107.23	107.23	0.02	0.02	0.32	0.47
<i>Carya cordiformis</i>	5	2.84	0.64	2,406.08	481.22	0.49	0.09	1.43	2.56
<i>Carya glabra</i>	51	28.98	6.58	42,139.95	826.27	8.61	0.55	8.76	23.95
<i>Carya ovata</i>	11	6.25	1.42	11,680.06	1,061.82	2.39	0.14	2.23	6.04
<i>Carya tomentosa</i>	1	0.57	0.13	705.59	705.59	0.14	0.02	0.32	0.59
<i>Cercis canadensis</i>	3	1.70	0.39	483.25	161.08	0.10	0.07	1.11	1.60
<i>Cornus florida</i>	4	2.27	0.52	589.91	147.48	0.12	0.09	1.43	2.07
<i>Fagus grandifolia</i>	214	121.59	27.61	196,828.91	919.76	40.22	0.98	15.61	83.44
<i>Fraxinus americana</i>	18	10.23	2.32	12,375.07	687.50	2.53	0.29	4.62	9.47
<i>Juglans cinerea</i>	1	0.57	0.13	357.57	357.57	0.07	0.02	0.32	0.52
<i>Juglans nigra</i>	1	0.57	0.13	681.85	681.85	0.14	0.02	0.32	0.59
<i>Liquidambar styraciflua</i>	2	1.14	0.26	1,494.48	747.24	0.31	0.05	0.80	1.37
<i>Liriodendron tulipifera</i>	53	30.11	6.84	31,192.39	588.54	6.37	0.43	6.85	20.06
<i>Nyssa sylvatica</i>	36	20.45	4.64	14,491.91	402.55	2.96	0.48	7.64	15.24
<i>Ostrya virginiana</i>	23	13.07	2.97	3,317.94	144.26	0.68	0.34	5.41	9.06
<i>Oxydendrum arboreum</i>	7	3.98	0.90	941.48	134.50	0.19	0.07	1.11	2.20
<i>Prunus serotina</i>	29	16.48	3.74	10,768.32	371.32	2.20	0.30	4.78	10.72
<i>Quercus alba</i>	21	11.93	2.71	29,070.58	1,384.31	5.94	0.23	3.66	12.31
<i>Quercus coccinea</i>	4	22.73	5.16	4,358.84	1,089.71	0.89	0.07	1.11	7.16
<i>Quercus falcata</i>	1	0.57	0.13	1,065.42	1,065.42	0.22	0.02	0.32	0.67
<i>Quercus muehlenbergii</i>	2	1.14	0.26	900.18	450.09	0.18	0.05	0.80	1.24
<i>Quercus prinus</i>	28	15.91	3.61	11,849.36	423.19	2.42	0.09	1.43	7.46
<i>Quercus shumardii</i>	2	1.14	0.26	3,448.27	1,724.14	0.70	0.05	0.80	1.76
<i>Quercus velutina</i>	10	5.68	1.29	9,283.98	928.40	1.90	0.20	3.18	6.37
<i>Sassafras albidum</i>	29	16.48	3.74	15,430.73	532.09	3.15	0.36	5.73	12.62
<i>Ulmus americana</i>	1	0.57	0.13	248.27	248.27	0.05	0.02	0.32	0.50
<i>Ulmus rubra</i>	48	27.27	6.19	14,228.27	296.42	2.91	0.41	6.53	15.63
TOTAL	739	440.36	99.99	489,325.83	17,568.51	99.98	6.28	100.00	299.97

Table VI. Statistical Data for Understory Species on North-facing Slopes, Based on 44, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total ₂ BA cm ²	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer negundo</i>	1	0.57	0.13	65.68	65.68	0.32	0.02	0.35	0.80
<i>Acer saccharum</i>	199	113.07	24.84	4,215.80	21.18	20.35	0.75	13.00	58.19
<i>Aesculus glabra</i>	12	6.82	1.50	173.82	14.49	0.84	0.14	2.43	4.77
<i>Carpinus caroliniana</i>	35	19.89	4.37	854.63	24.42	4.13	0.34	5.89	14.39
<i>Carya glabra</i>	2	1.14	0.25	106.33	53.17	0.51	0.05	0.87	1.63
<i>Celtis occidentalis</i>	1	0.57	0.13	6.13	6.13	0.03	0.02	0.35	0.51
<i>Cercis canadensis</i>	3	1.70	0.37	155.56	51.85	0.75	0.05	0.87	1.99
<i>Cornus florida</i>	75	42.61	9.36	1,640.81	21.88	7.92	0.68	11.79	29.07
<i>Fagus grandifolia</i>	85	48.30	10.61	1,721.46	20.25	8.31	0.59	10.23	29.15
<i>Fraxinus americana</i>	57	32.39	7.12	1,500.99	26.33	7.25	0.32	5.55	19.92
<i>Liriodendron tulipifera</i>	29	16.48	3.62	965.48	33.29	4.66	0.34	5.89	14.17
<i>Nyssa sylvatica</i>	39	22.16	4.87	1,409.37	36.14	6.80	0.32	5.55	17.22
<i>Ostrya virginiana</i>	147	83.52	18.35	3,747.90	25.50	18.09	0.75	13.00	49.44
<i>Oxydendrum arboreum</i>	14	7.95	1.75	583.52	41.68	2.82	0.09	1.56	6.13
<i>Prunus serotina</i>	19	10.80	2.37	740.24	38.96	3.57	0.27	4.68	10.62
<i>Quercus alba</i>	2	1.14	0.25	110.14	55.07	0.53	0.05	0.87	1.65
<i>Quercus muehlenbergii</i>	2	1.14	0.25	87.10	43.55	0.42	0.05	0.87	1.54
<i>Quercus prinus</i>	1	0.57	0.13	16.39	16.39	0.08	0.02	0.35	0.56
<i>Quercus velutina</i>	3	1.70	0.37	80.65	26.88	0.39	0.05	0.87	1.63
<i>Sassafras albidum</i>	14	7.95	1.75	644.88	46.06	3.11	0.23	3.99	8.85
<i>Ulmus alata</i>	1	0.57	0.13	6.13	6.13	0.03	0.02	0.35	0.51
<i>Ulmus rubra</i>	48	27.27	5.99	1,704.49	35.51	8.23	0.39	6.76	20.98
<i>Vitis</i> sp.	12	6.82	1.50	179.11	14.93	0.86	0.23	3.99	6.35
TOTAL	801	455.13	100.01	20,716.61	725.47	100.00	5.77	100.06	300.07

Table VII. Statistical Data for Overstory Species on Streambank-Ravines, Based on 25, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total BA cm ²	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer negundo</i>	89	89	19.26	28,074.85	315.45	15.31	0.24	3.49	38.06
<i>Acer saccharum</i>	79	79	17.10	35,065.85	443.87	19.17	0.72	10.47	46.74
<i>Aesculus glabra</i>	3	3	0.65	661.33	220.44	0.36	0.12	1.74	2.75
<i>Carpinus caroliniana</i>	9	9	1.95	983.35	109.26	0.54	0.20	2.91	5.40
<i>Carya cordiformis</i>	8	8	1.73	2,874.88	359.36	1.57	0.20	2.91	6.21
<i>Carya glabra</i>	2	2	0.43	1,049.22	524.61	0.57	0.08	1.16	2.16
<i>Carya laciniosa</i>	1	1	0.22	2,067.67	2,067.67	1.13	0.04	0.58	1.93
<i>Carya ovata</i>	5	5	1.08	3,840.68	768.14	2.10	0.16	2.33	5.51
<i>Celtis occidentalis</i>	8	8	1.73	2,846.24	355.78	1.56	0.28	4.07	7.36
<i>Cercis canadensis</i>	11	11	2.38	2,292.33	208.39	1.25	0.28	4.07	7.70
<i>Cornus florida</i>	1	1	0.22	194.21	194.21	0.11	0.04	0.58	0.91
<i>Diospyros virginiana</i>	4	4	0.87	2,730.29	682.57	1.49	0.12	1.74	4.10
<i>Fagus grandifolia</i>	6	6	1.30	4,395.49	732.58	2.40	0.16	2.33	6.03
<i>Fraxinus americana</i>	1	1	0.22	147.75	147.75	0.08	0.04	0.58	0.88
<i>Fraxinus pennsylvanica</i>	11	11	2.38	4,890.68	444.61	2.67	0.20	2.91	7.96
<i>Gleditsia tricanthos</i>	1	1	0.22	324.34	324.34	0.18	0.04	0.58	0.98
<i>Juglans nigra</i>	8	8	1.73	6,355.09	794.39	3.47	0.28	4.07	9.27
<i>Liquidambar styraciflua</i>	39	39	8.44	20,032.11	513.64	10.95	0.56	8.14	27.53
<i>Liriodendron tulipifera</i>	49	49	10.61	20,605.04	420.51	11.26	0.52	7.56	29.43
<i>Morus rubra</i>	2	2	0.43	948.64	474.32	0.52	0.06	1.16	2.11
<i>Nyssa sylvatica</i>	2	2	0.43	981.54	490.77	0.54	0.08	1.16	2.13
<i>Ostrya virginiana</i>	4	4	0.87	567.78	141.95	0.31	0.16	2.33	3.51
<i>Platanus occidentalis</i>	23	23	4.98	16,725.46	727.19	9.14	0.48	6.98	21.10
<i>Populus deltoides</i>	3	3	0.65	2,341.24	780.41	1.28	0.04	0.58	2.51
<i>Prunus serotina</i>	6	6	1.30	2,706.81	451.14	1.48	0.16	2.33	5.11
<i>Quercus alba</i>	3	3	0.65	560.36	186.79	0.31	0.08	1.16	2.12
<i>Quercus muehlenbergii</i>	7	7	1.52	3,144.77	449.25	1.72	0.16	2.33	5.57
<i>Quercus rubra</i>	1	1	0.22	85.17	85.17	0.05	0.04	0.58	0.85
<i>Quercus velutina</i>	2	2	0.43	1,137.17	568.59	0.62	0.08	1.16	2.21
<i>Sassafras albidum</i>	5	5	1.08	954.32	190.86	0.52	0.08	1.16	2.76
<i>Ulmus americana</i>	24	24	5.19	11,782.19	490.92	6.44	0.52	7.56	19.19
<i>Ulmus rubra</i>	43	43	9.31	1,500.41	34.89	0.82	0.56	8.14	18.27
<i>Vitis</i> sp.	2	2	0.43	89.36	44.68	0.05	0.08	1.16	1.64
TOTAL	462	462	100.01	182,956.62	14,744.50	99.97	6.88	100.01	299.99

Table VIII. Statistical Data for Understory Species on Streambank-Ravines, Based on 25, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total BA cm ²	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
<i>Acer negundo</i>	53	53	8.13	2,080.90	39.26	4.74	0.36	4.15	17.02
<i>Acer saccharum</i>	78	78	11.96	7,502.77	96.19	17.08	0.72	8.29	37.33
<i>Aesculus glabra</i>	42	42	6.44	1,008.06	24.00	2.29	0.36	4.15	12.88
<i>Asimina triloba</i>	12	12	1.84	147.11	12.26	0.33	0.32	3.69	5.86
<i>Carpinus caroliniana</i>	93	93	14.26	2,241.04	24.10	5.10	0.76	8.76	28.12
<i>Carya cordiformis</i>	2	2	0.31	38.20	19.10	0.09	0.08	0.92	1.32
<i>Carya glabra</i>	1	1	0.15	14.65	14.65	0.03	0.04	0.46	0.64
<i>Carya ovata</i>	1	1	0.15	18.32	18.32	0.04	0.04	0.46	0.65
<i>Celtis occidentalis</i>	15	15	2.30	429.83	28.66	0.98	0.40	4.61	7.89
<i>Cercis canadensis</i>	18	18	2.76	744.24	41.35	1.69	0.40	4.61	9.06
<i>Cornus florida</i>	31	31	4.75	676.94	21.84	1.54	0.48	5.53	11.82
<i>Fagus grandifolia</i>	16	16	2.45	541.90	33.87	1.23	0.44	5.07	8.75
<i>Fraxinus americana</i>	19	19	2.91	311.18	16.38	0.70	0.48	5.53	9.14
<i>Lindera benzoin</i>	33	33	5.06	321.57	9.74	0.73	0.12	1.38	7.17
<i>Liquidambar styraciflua</i>	6	6	0.92	162.46	27.08	0.37	0.24	2.76	4.05
<i>Liriodendron tulipifera</i>	44	44	6.75	1,095.87	24.91	2.49	0.44	5.07	14.31
<i>Ostrya virginiana</i>	11	11	1.69	308.47	28.04	0.70	0.36	4.15	6.54
<i>Platanus occidentalis</i>	3	3	0.46	162.46	54.15	0.37	0.08	0.92	1.75
<i>Prunus serotina</i>	7	7	1.07	229.43	32.78	0.52	0.24	2.77	4.36
<i>Quercus alba</i>	3	3	0.46	112.46	37.49	0.26	0.12	1.38	2.10
<i>Quercus muehlenbergii</i>	4	4	0.61	129.69	32.42	0.30	0.16	1.84	2.75
<i>Sassafras albidum</i>	3	3	0.46	144.33	48.11	0.33	0.08	0.92	1.71
<i>Ulmus alata</i>	2	2	0.31	20.00	10.00	0.05	0.08	0.92	1.28
<i>Ulmus americana</i>	46	46	7.06	1,104.00	24.00	2.51	0.64	7.37	16.94
<i>Ulmus rubra</i>	74	74	11.35	23,738.00	320.78	54.03	0.68	7.83	73.21
<i>Vitis sp.</i>	35	35	5.37	647.00	18.49	1.47	0.56	6.45	13.29
TOTAL	652	652	99.98	43,930.88	1,057.97	99.97	8.68	99.99	299.94

Table IX. Diameter Size Class Distribution, Showing the Number of Trees in Each Size Class.

Species	Size Classes (in centimeters)							% Size Class
	2.54 to 7.61	7.62 to 15.23	15.24 to 27.93	27.94 to 40.63	40.64 to 53.33	53.34 to 78.73	78.74 to 101.60	
Acer negundo	35	55	45	7	1	0	0	71
Acer saccharum	605	272	147	65	15	1	0	86
Aesculus glabra	49	8	3	1	0	0	0	57
Amelanchier arborea	7	0	0	1	0	0	0	29
Asimina triloba	12	0	0	0	0	0	0	14
Carpinus caroliniana	111	27	1	0	0	0	0	43
Carya cordiformis	2	4	5	4	0	0	0	57
Carya glabra	33	65	64	32	9	5	0	86
Carya laciniata	0	0	0	0	1	0	0	29
Carya ovata	1	9	19	7	5	0	0	71
Carya tomentosa	3	4	12	7	0	0	0	57
Celtis occidentalis	14	10	1	0	0	0	0	43
Cercis canadensis	12	22	5	0	0	0	0	43
Cornus florida	149	29	2	0	0	0	0	43
Diospyros virginiana	0	0	1	3	0	0	0	29
Fagus grandifolia	92	39	78	68	45	4	1	100
Fraxinus americana	88	25	8	3	6	1	0	86
Fraxinus pensylvanica	0	2	7	2	0	0	0	43
Gleditsia tricanthos	0	0	1	0	0	0	0	14
Juglans cinerea	0	0	1	0	0	0	0	14
Juglans nigra	0	0	8	6	1	0	0	43
Juniperus virginiana	4	1	1	0	0	0	0	43
Lindera benzoin	33	0	0	0	0	0	0	14
Liquidambar styraciflua	5	9	19	12	2	0	0	71
Liriodendron tulipifera	58	47	43	15	11	2	0	86

Table IX. (continued)

Species	Size Classes (in centimeters)							Size Class
	2.54 to 7.61	7.62 to 15.23	15.24 to 27.93	27.94 to 40.63	40.64 to 53.33	53.34 to 78.73	78.74 to 101.60	
<i>Morus rubra</i>	0	0	0	0	0	0	0	14
<i>Nyssa sylvatica</i>	38	43	19	10	1	0	0	71
<i>Ostrya virginiana</i>	224	74	8	0	0	0	0	43
<i>Oxydendrum arboreum</i>	35	29	4	0	0	0	0	43
<i>Platanus occidentalis</i>	0	6	10	5	4	1	0	71
<i>Populus deltoides</i>	0	0	2	0	1	0	0	29
<i>Prunus serotina</i>	17	16	24	4	0	0	0	57
<i>Quercus alba</i>	18	30	27	26	18	4	1	100
<i>Quercus coccinea</i>	0	0	0	3	1	0	0	29
<i>Quercus falcata</i>	0	0	0	2	3	0	0	29
<i>Quercus marilandica</i>	0	1	0	0	0	0	0	14
<i>Quercus muehlenbergii</i>	6	6	3	1	1	0	0	71
<i>Quercus prinus</i>	3	9	19	13	5	1	0	86
<i>Quercus rubra</i>	0	1	0	1	1	0	0	43
<i>Quercus shumardii</i>	0	0	0	1	0	1	0	29
<i>Quercus stellata</i>	1	0	1	1	0	0	0	29
<i>Quercus velutina</i>	16	20	27	19	16	3	0	86
<i>Rhamnus caroliniana</i>	2	0	0	0	0	0	0	14
<i>Sassafras albidum</i>	23	31	9	9	3	0	0	71
<i>Ulmus alata</i>	7	0	0	0	0	0	0	14
<i>Ulmus americana</i>	40	18	11	0	0	2	0	57
<i>Ulmus rubra</i>	116	91	57	17	1	0	0	71

Table X. Overall Statistical Data for Overstory Species at Bear Creek, Stewart County, Tennessee Based on 97, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total ² BA cm	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
Acer negundo	89	22.94	5.04	28,074.85	315.45	3.06	0.06	0.92	9.02
Acer saccharum	377	97.16	21.36	139,263.26	369.40	15.17	0.79	12.06	48.59
Aesculus glabra	5	1.29	0.28	1,422.73	284.55	0.16	0.05	0.76	1.20
Amelanchier arborea	1	0.26	0.06	993.22	993.22	0.11	0.01	0.15	0.32
Carpinus caroliniana	10	2.58	0.57	1,090.58	109.06	0.12	0.06	0.92	1.61
Carya cordiformis	13	3.35	0.74	5,280.96	406.23	0.58	0.09	1.37	2.69
Carya glabra	158	40.72	8.95	84,734.50	536.29	9.23	0.52	7.94	26.12
Carya laciniosa	1	0.26	0.06	2,067.67	2,067.67	0.23	0.01	0.15	0.44
Carya ovata	39	10.05	2.21	23,443.09	601.10	2.55	0.22	3.36	8.12
Carya tomentosa	23	5.93	1.30	10,049.31	436.93	1.09	0.12	1.83	4.22
Celtis occidentalis	8	2.06	0.45	2,846.24	355.78	0.31	0.07	1.07	1.83
Cercis canadensis	17	4.38	0.96	3,180.38	187.08	0.35	0.13	1.98	3.29
Cornus florida	13	3.35	0.74	1,637.98	126.00	0.19	0.10	1.53	2.46
Diospyros virginiana	4	1.03	0.23	2,730.29	682.57	0.30	0.03	0.46	0.99
Fagus grandifolia	223	57.47	12.63	201,870.05	905.25	22.00	0.52	7.94	42.57
Fraxinus americana	30	7.73	1.70	18,592.15	619.74	2.03	0.26	3.97	7.70
Fraxinus pennsylvanica	11	2.84	0.62	4,890.68	444.61	0.53	0.05	0.76	1.91
Gleditsia tricanthos	1	0.26	0.06	324.34	324.34	0.04	0.01	0.15	0.25
Juglans cinerea	1	0.26	0.06	357.57	357.57	0.04	0.01	0.15	0.25
Juglans nigra	15	3.87	0.85	9,712.84	647.52	1.06	0.14	2.14	4.05
Juniperus virginiana	2	0.52	0.11	571.26	285.63	0.06	0.02	0.31	0.43
Liquidambar styraciflua	41	10.57	2.32	21,526.59	525.04	2.35	0.16	2.44	7.11
Liriodendron tulipifera	103	26.55	5.84	54,250.03	526.70	5.91	0.34	5.19	16.94
Morus rubra	2	0.52	0.11	948.64	474.32	0.10	0.02	0.31	0.52
Nyssa sylvatica	54	13.92	3.06	19,218.77	355.90	2.09	0.29	4.43	9.58
Ostrya virginiana	34	8.76	1.93	4,987.14	146.68	0.54	0.25	3.82	6.29
Oxydendrum arboreum	24	6.19	1.36	2,706.88	112.79	0.29	0.09	1.37	3.02
Platanus occidentalis	23	5.93	1.30	16,725.46	727.19	1.82	0.12	1.83	4.95
Populus deltoides	3	0.77	0.17	2,341.24	780.41	0.26	0.01	0.15	0.58
Prunus serotina	35	9.02	1.98	13,475.13	385.00	1.47	0.18	2.75	6.20

Table X. (continued)

Species	Total Stems	Density Stems/ha	Relative Density	Total ² BA cm ²	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
Quercus alba	91	23.45	5.15	87,519.38	961.75	9.54	0.38	5.80	20.49
Quercus coccinea	4	1.03	0.23	4,358.84	1,089.71	0.47	0.03	0.46	1.16
Quercus falcata	5	1.29	0.28	6,268.31	1,253.66	0.68	0.05	0.76	1.72
Quercus marilandica	1	0.26	0.06	147.75	147.75	0.02	0.01	0.15	0.23
Quercus muehlenbergii	9	2.32	0.51	4,044.95	449.44	0.44	0.06	0.92	1.87
Quercus prinus	44	11.34	2.49	22,924.80	521.02	2.50	0.10	1.53	6.52
Quercus rubra	3	0.77	0.17	2,480.48	826.83	0.27	0.02	0.31	0.75
Quercus shumardii	2	0.52	0.11	3,448.27	1,724.14	0.38	0.02	0.31	0.80
Quercus stellata	2	0.52	0.11	1,110.84	555.42	0.12	0.02	0.31	0.54
Quercus velutina	78	20.10	4.42	58,078.72	744.60	6.33	0.34	5.19	15.94
Sassafras albidum	38	9.79	2.15	17,218.00	453.11	1.88	0.22	3.36	7.39
Ulmus americana	25	6.44	1.42	12,030.46	481.22	1.31	0.14	2.14	4.87
Ulmus rubra	101	26.03	5.72	18,736.99	185.51	2.04	0.41	6.26	14.02
Vitis sp.	2	0.52	0.11	89.36	44.68	0.01	0.02	0.31	0.43
TOTAL	1,765	454.92	99.98	917,770.98	24,528.86	100.03	6.55	100.02	300.03

9.9 cm were sampled as understory species and yielded a total of 2,369 stems (Table XI). Thirty-five understory species were sampled, yielding 610.6 stems/ha, with a basal area of $2.30 \text{ m}^2/\text{ha}$. Vitis spp. was the only woody vine sampled.

Table XI. Overall Statistical Data for Understory Species at Bear Creek, Stewart County, Tennessee Based on 97, 0.04 Ha Quadrats.

Species	Total Stems	Density Stems/ha	Relative Density	Total ₂ BA cm	Average BA/stem	Relative Dominance	Frequency	Relative Frequency	IVI
Acer negundo	54	13.91	2.28	2,146.58	39.75	2.41	0.10	1.50	6.19
Acer saccharum	728	187.63	30.73	23,117.25	31.75	25.91	0.81	12.14	68.78
Aesculus glabra	56	14.43	2.36	1,201.62	21.46	1.35	0.18	2.70	6.41
Amelanchier arborea	7	1.80	0.29	112.14	16.02	0.13	0.07	1.05	1.47
Asimina triloba	12	3.09	0.51	147.11	12.26	0.16	0.08	1.20	1.87
Carpinus caroliniana	129	33.25	5.45	3,108.64	24.10	3.48	0.36	5.40	14.33
Carya cordiformis	2	0.52	0.09	38.20	19.10	0.04	0.02	0.30	0.43
Carya glabra	50	12.89	2.11	1,835.34	36.71	2.06	0.16	2.40	6.57
Carya ovata	2	0.52	0.09	95.49	47.75	0.11	0.02	0.30	0.50
Carya tomentosa	3	0.77	0.13	64.58	21.53	0.07	0.02	0.30	0.50
Celtis occidentalis	17	4.38	0.72	478.61	28.15	0.54	0.12	1.80	3.06
Cercis canadensis	22	5.67	0.93	928.96	42.23	1.04	0.13	1.95	3.92
Cornus florida	167	43.04	7.05	3,694.48	22.12	4.14	0.57	8.55	19.74
Fagus grandifolia	104	26.80	4.39	2,343.95	22.54	2.63	0.41	6.15	13.17
Fraxinus americana	101	26.03	4.26	2,253.87	22.32	2.53	0.38	5.70	12.59
Juniperus virginiana	4	1.03	0.17	58.91	14.73	0.07	0.03	0.45	0.69
Lindera benzoin	33	8.51	1.39	321.57	9.74	0.36	0.03	0.45	2.20
Liquidambar styraciflua	6	1.55	0.25	162.46	27.08	0.18	0.06	0.90	1.33
Liriodendron tulipifera	73	18.81	3.08	2,061.35	28.24	2.31	0.27	4.05	9.44
Nyssa sylvatica	57	14.69	2.41	1,889.40	33.15	2.12	0.23	3.45	7.98
Ostrya virginiana	272	70.10	11.48	7,106.62	26.13	7.97	0.61	9.15	28.60
Oxydendrum arboreum	44	11.34	1.86	1,759.59	39.99	1.97	0.10	1.50	5.33
Platanus occidentalis	3	0.77	0.13	162.46	54.15	0.18	0.02	0.30	0.61
Prunus serotina	26	6.70	1.10	969.67	37.30	1.09	0.19	2.85	5.04
Quercus alba	33	8.51	1.39	1,590.68	48.20	1.78	0.22	3.30	6.46
Quercus muehlenbergii	8	2.06	0.34	241.18	30.15	0.27	0.07	1.05	1.66
Quercus prinus	6	1.55	0.25	236.34	39.39	0.26	0.03	0.45	0.96
Quercus stellata	1	0.26	0.04	34.26	34.26	0.04	0.01	0.15	0.23
Quercus vellutina	23	5.93	0.97	790.37	34.36	0.89	0.14	2.10	3.96
Rhamnus caroliniana	2	0.52	0.09	18.52	9.26	0.02	0.01	0.15	0.26
Sassafras albidum	37	9.54	1.56	1,488.54	40.23	1.67	0.23	3.45	6.68
Ulmus alata	7	1.80	0.29	80.13	11.45	0.09	0.06	0.90	1.28
Ulmus americana	46	11.86	1.94	1,104.00	24.00	1.24	0.16	2.40	5.58
Ulmus rubra	181	46.65	7.64	26,626.30	147.11	29.84	0.48	7.20	44.68
Vitis sp.	53	13.66	2.24	949.21	17.91	1.06	0.29	4.35	7.65
TOTAL	2,369	610.57	100.01	89,218.38	1,114.62	100.01	6.67	100.04	300.15

CHAPTER IV

DISCUSSION

Flora

The flora of the 323 ha lower Bear Creek area is diverse and large. This is demonstrated when the list of 715 taxa is compared with similar studies. For example, Van Horn (1981), in his study of ca. 3,403 ha of Chickamauga and Chattanooga National Military Park, found 585 species; Thomas (1976) in a survey of ca. 4,047 ha of Chilhowee Mountain identified 953 species; Wofford, et. al. (1979) reported 680 taxa from ca. 6,400 ha at Savage Gulf; the vascular flora of Johnson State Park in Mississippi, an area of ca. 326 ha, consisted of 351 species (Carter and Jones, 1968).

The largest families represented included species that occurred in several community types. Representatives of Asteraceae and Poaceae, the largest families, occurred primarily in disturbed areas such as cultivated fields, roadsides and waste areas, but were found throughout the entire study area. The Cyperaceae, the third largest family, was also found in a broad range of habitat types, but not as much so as the Asteraceae or Poaceae. Other families with numerous species exhibited

similar characteristics for habitat selection. Those with fewer species were generally found in fewer habitat types.

Several species are of special interest because of their comparative rarity or for phytogeographic reasons. The rich mesophytic streambank woods afforded a suitable habitat for the rare occurrence of Caulophyllum thalictroides, Monotropa uniflora, Juglans cinerea and Aesculus pavia. The only observation of Tilia heterophylla was in a deep wooded gorge. This species is noteworthy because it is a representative of the Mixed Mesophytic Forest Region. Collections of Uvularia grandiflora, Chamaelirium luteum, Prenanthes altissima, P. barbata, Collinsonia canadensis, Aplectrum hyemale and Tipularia discolor were restricted to the rich woods of north-facing slopes and are considered somewhat rare for the area. A single population of Dicentra cucullaria was discovered atop a small limestone outcrop in the lower slope forest. A single collection of Disporum lanuginosum was significant due to its usual affinities with the Appalachian region. The rare adders' tongue fern, Ophioglossum vulgatum var. pycnostichum, was found in a secluded section of lowland woods.

One of the most interesting aspects of the flora of any region is the presence of plants at or near the limit of their geographical range. Extraneous southeastern

species occurring at Bear Creek include Coreopsis major, Hibiscus moscheutos, Hydrophyllum macrophyllum, Oxalis grandis, Pachysandra procumbens and Passiflora lutea. Plants with coastal plain affinities include Spiranthes grayi, Smilax walteri and Quercus falcata var. pagodaefolia. Northeastern species near their limit of distribution include Phlox divaricata, Pycnanthemum incanum, Cornus amomum, Panicum agrostoides and Scutellaria nervosa. According to Heilman (1972) there were 19 species of plants at LBL with disjunct ranges; 15 of those occurred at Bear Creek.

All eight species of plants considered rare by authorities (Table II) occurred in rich mesic communities. A large population of Synandra hispidula and Valeriana pauciflora occurred in ravines which opened into the streambank. Noteworthy populations of Hydrastis canadensis were scattered throughout the slope forest; Panax quinquefolium occurred less frequently. Only one small population of Lilium canadense was observed and few specimens of Spiranthes ovalis occur. Cimicifuga rubifolia was limited to the streambanks and widely scattered; Lesquerella lescurii occurred in abundance only in the lower bottomlands near the Cumberland River.

Plant Communities

According to Oosting (1956), a plant community is "an aggregation of living organisms having mutual

relationships among themselves and to their environment". Plant communities are best described in terms of the quantitative representations of each species, their dominance and indicator species. The following major Bear Creek communities will be discussed: ridge top forests, north-facing slope forests, streambank-ravine forests, bottomland fields, roadsides and waste areas and wetlands.

Roadsides and Waste Areas. Sites such as road shoulders, lawns, fencerows and old homesites support a wide variety of species, including many introductions. The existence and species composition of these habitats are often dependent upon the amount of disturbance.

Important species found in this community were members of the Poaceae, Apiaceae and Asteraceae families. Common examples are: Taraxacum officinale, Rudbeckia spp., Chrysanthemum leucanthemum, Ambrosia trifida, Plantago major, Asclepias spp., Desmodium spp., Achillea millefolium, Lespedeza spp., Daucus carota, Cassia fasciculata, Solidago spp., and Phytolacca americana. Annual grasses included such species as Bromus spp., Poa spp., Festuca elatior, Phleum pratense, Setaria spp., Panicum spp., Andropogon spp., Aristida spp., and Tridens flava. Herbaceous species dominated and woody vegetation was limited primarily to such forest remnants as Prunus serotina, Liriodendron tulipifera, Platanus occidentalis, Ulmus spp., or as young growth, Sassafras albidum,

Diospyros virginiana or Celtis occidentalis.

Roadside or fencerow thickets consisted of Vitis spp., Rubus spp., Clematis virginiana and Rosa multiflora. Prunus persica, Malus pumila, M. angustifolia, Populus alba, Narcissus pseudo-narcissus, N. poeticus and Heimerocallis fulva persisted from plantings around abandoned homesites. Such species as Juniperus virginiana, Gleditsia tricanthos, Rhus glabra, R. copallina and Sassafras albidum occupied abandoned homesites, lawns, and fields and indicate early successional stages.

Bottomland Fields. Most of the bottomland fields were cultivated and planted in crops such as soybeans and corn; natural vegetation was most abundant in the early spring before tilling. Characteristic species included: Hordeum pusillum, Lolium multiflorum, Ranunculus spp., Myosurus minimum, Draba verna, D. brachycarpa, Viola rafinesquii, Lamium amplexicaule, L. purpureum, Stellaria media, Cerastium spp., Brassica napus, Rorippa sessiliflora, Krigia spp., and Cardamine hirsuta. After planting, such weedy species as Ipomoea pandurata, Aster spp., Sorghum halapense, Solanum spp., Mollugo verticillata, Panicum anceps, Setaria spp., Perilla frutescens and Physalis spp. appeared.

Progressively wetter fields toward the eastern side included such hydric-mesophytic herbaceous species as Typha latifolia, Rotala ramosior, Ammannia coccinea,

Hypericum mutilus, Cyperus spp., Juncus spp., and Eleocharis spp.; such woody mesophytes as Salix nigra, Populus deltoides, Acer negundo and Betula nigra were found along wet field margins.

Wetlands. Wetland areas were quite extensive near the Cumberland River. These riparian communities were dominated by herbaceous plants in the summer and fall and showed definite zonation patterns imposed by the hydroperiod. The periphery supported such species as Acer saccharinum, Acer negundo, Eragrostis cilianensis, Fraxinus pennsylvanica, Scirpus cyperinus, Lysimachia spp., Populus deltoides, Cephalanthus occidentalis, Hibiscus spp., Bidens spp., Lycopus spp., Leersia oryzoides, Eupatorium serotinum, and Lobelia cardinalis, all indicative of wet habitats. Areas nearest the river, and flooded for longer periods, lacked woody species but provided a unique assemblage of very small rooted vascular plants in the late summer and fall. Characteristic species included Cyperus aristatus, C. nigromarginata, Fimbristylis vahlii, F. autumnalis, Eragrostis hypnoides and Hemicarpha micrantha. This community warrants additional study, both taxonomically and ecologically.

Other wetland habitats, much different from the areas previously described, are low lying wooded bottomlands that contain some water throughout the growing season. These areas are characterized by an established woody

flora; Salix nigra and Platanus occidentalis dominate. Additional species include Lobelia silphilitica, Spiranthes ovalis, Cyperus lupulina, Cardamine bulbosa, Botrychium biternatum and a rare collection of Ophioglossum vulgatum var. pycnostichum.

Dry Ridges. The small ridge community is restricted to the summit of the slope forests and supports a generally xerophytic flora. Areas of exposed rock are often observed and the herbaceous layer is scant. In the spring, species such as Antennaria solitaria, Cynoglossum virginianum, Scutellaria parvula, and various grasses dominate. The summer and fall herbaceous flora is more noticeable and includes Desmodium spp., Lespedeza spp., Hieracium gronovii, Sanicula spp., Cunila origanoides, Coreopsis major, Pteridium aquilinum, Muhlenbergia sobolifera, Solidago spp., and Aster spp.

The woody vegetation is indicative of past disturbance and some sections of the ridge have hiking trails maintained by TVA. The five most dominant tree species are Acer saccharum, Quercus alba, Carya glabra, Quercus velutina and Carya tomentosa (Table III). The secondary layer is controlled largely by Acer saccharum, Ostrya virginiana, Cornus florida and Carya glabra (Table IV). Other woody species commonly associated with these xeric sites and which appear as components of the canopy include Carya ovata, Quercus prinus, Fraxinus americana,

Oxydendrum arboreum and Nyssa sylvatica. The lower shrub layer is mainly comprised of Vaccinium stamineum, V. vacillans and Hypericum hypericoides. Three species, Amelanchier arborea, Quercus stellata, and Quercus marilandica are limited to this area.

The dominance of Acer saccharum on the ridges is unusual and probably indicates a successional stage. The number of sapling oaks and hickories indicate future development into a more typical oak-hickory forest characteristic of dry ridges.

North-facing Slopes. The rich, moist, north-facing slopes include a thick and diverse herbaceous flora, especially on the footslopes. The most representative species include: Podophyllum peltatum, Epifagus virginiana, Uvularia grandiflora, Delphinium tricornis, Panicum spp., Solidago spp., Conopholis americana, Hydrastis canadensis, Pachysandra procumbens, Phlox divaricata, Polystichum acrostichoides, Carex albursina, Luzula spp., and Viola spp.

Fagus grandifolia dominates the canopy, followed by Acer saccharum, Carya glabra, Liriodendron tulipifera and Ulmus rubra. The understory is dominated by Acer saccharum, Ostrya virginiana, Fagus grandifolia, Cornus florida and Ulmus rubra (Tables V and VI).

Streambank-Ravines. The streambank and ravine habitats were combined because of the limited streambank area. This community was the richest in herbaceous

vegetation and the vernal aspect of the flora was the most striking feature. Noticeable species include: Mertensia virginica, Hydrophyllum spp., Caulophyllum thalictroides, Sanguinaria canadensis, Trillium flexipes, Impatiens spp., Erythronium americanum, Erigenia bulbosa, Hystrix patula, Claytonia virginica, Elymus spp., Dentaria spp., Anemonella thalictroides, Pachysandra procumbens, Valeriana pauciflora, Arisaema triphyllum, Viola spp., Oxalis grandis, Senecio aureus, Solidago caesia, Zizia spp., and Athyrium pycnocarpon. Scattered along the streambank were several populations of cane, Arundinaria tecta. Several large limestone outcrops support such species as Heuchera villosa, Camptosorus rhizophyllus, Arabis laevigata, Dicentra cucullaria and Sedum ternatum.

The overstory is dominated by Acer saccharum, Acer negundo, Liriodendron tulipifera, Liquidambar styraciflua, Platanus occidentalis, Ulmus americana and Ulmus rubra (Table VII). Carya laciniata, Fraxinus pennsylvanica, Platanus occidentalis and Populus deltoides appear to be restricted to this habitat. The most important understory species are Ulmus rubra, Acer saccharum, Carpinus caroliniana, Acer negundo, Ulmus americana, Liriodendron tulipifera, Aesculus glabra and Cornus florida (Table VIII). The shrub layer was composed of Asimina triloba, Hydrangea arborescens, Lindera benzoin and Staphylea trifoliata. Vitis spp. was the only woody vine sampled.

Combined Sampling Data. When all sampling data are compared, the six most predominant species (and their importance values) are Acer saccharum (48.59), Fagus grandifolia (42.57), Carya glabra (26.12), Quercus alba (20.49), Liriodendron tulipifera (16.94) and Quercus velutina (15.94). These six species make up 68 percent of total basal area measured. Acer saccharum was the most abundant understory tree with a relative density of 30.73. Sugar maple was present in significant numbers in all areas, reaching its maximum development in the ridge community. Fagus grandifolia had the largest total basal area, 20.19 m². Of the 48 total species sampled, 20 occurred in all three community types.

Size class distributions revealed the presence of Fagus grandifolia and Quercus alba in all seven size classes. These two individuals had the greatest dbh's sampled, 93.47 cm and 92.97 cm, respectively. These size classes indicate the forest is reproducing itself, since canopy species are also present in the smaller size classes.

Comparisons between the three forest communities sampled were made by calculating the coefficient of similarity as described by Phillips (1959). These coefficients indicated that the three communities were very similar in woody species composition. The streambank-ravine and dry ridge communities were the most dissimilar.

According to Braun (1950), the Western Mesophytic Forest Region is a transition zone between the more mesic Mixed Mesophytic Forest Region to the east and the more xeric Oak-Hickory Region to the west. As such, it is a mixture of community types and contains elements of both Regions. The occurrence of mixed forest types and such indicator herbaceous species as Pachysandra procumbens and Trillium recurvatum indicate a typical Western Mesophytic Forest condition for most of the Bear Creek area. However, the dominance of Acer saccharum and Fagus grandifolia, as well as the rare presence of Tilia heterophylla, indicates that the mesic Bear Creek slopes show affinities with and development toward the Mixed Mesophytic Forest Region. This characteristic was pointed out by Quarterman and Powell (1978) and is a significant feature of the area. Fortunately, the area will be afforded protection and the possible further development into a disjunct Mixed Mesophytic community can be monitored. It is hoped that the preliminary data contained herein will facilitate future studies and monitoring.

CHAPTER V

SUMMARY

A qualitative survey of the vascular flora and a quantitative analysis of three forest community types within the topographically and vegetationally diverse lower Bear Creek area, Stewart County, Tennessee, was made. The area is owned by the Tennessee Valley Authority and is part of Land Between the Lakes, a 170,000 acre public recreation and conservation-education facility.

Within the 324 ha (800 acres) lower Bear Creek area, six broad community types, including wetlands, bottomland fields, roadsides and waste places, streambank-ravines, north-facing slopes, and dry ridges were recognized. From these communities, 715 vascular species representing 377 genera and 108 families were collected, indicating a large and diverse flora for a relatively small area. Several rare, threatened, endangered, and/or special concern elements were found or their suspected presence verified.

Quadrats were used to sample three secondary but late growth forest community types. Standard descriptive parameters were calculated for sampled species of both overstory and understory. Based on calculated importance values the dominant taxa of the ridges were Acer saccharum,

Quercus alba, Carva glabra and Quercus velutina. North-facing slopes were dominated by Fagus grandifolia, Acer saccharum, Carva glabra and Liriodendron tulipifera. Streambank-ravine forests were occupied chiefly by Acer saccharum, A. negundo, Liriodendron tulipifera, Liquidambar styraciflua and Platanus occidentalis.

For the most part the area is considered typical of the Western Mesophytic Forest Region of Braun (1950) but the more mesic slopes are sugar maple-beech dominated and show affinities with the Mixed Mesophytic Forest Region to the east. This feature was observed in 1978 by Quarterman and Powell and the area is being considered as a National Natural Landmark by the National Park Service. The major criteria for this consideration were verified in this research and include (1) the presence of a large and diverse flora, (2) the presence of several rare elements, (3) the diversity of habitats ranging from wetlands to high ridge tops, (4) the old-growth and relatively undisturbed forest stands, and (5) the affinities with and possible development into a disjunct, Mixed Mesophytic community.

It is hoped that this research will provide a preliminary data base for needed future studies and monitoring of this unique area.

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