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To the Graduate Council:

I am submitting herewith a thesis written by Daniel Lee Wyrick entitled "Vascular flora of Gee Creek Wilderness Cherokee National Forest, Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Botany.

B. Eugene Wofford, Major Professor

We have read this thesis and recommend its acceptance:

Ed Clebsch, David Smith

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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and recommend its acceptance:

Edward E.C. Clebsch

David K. Smith

Accepted for the Council:

Associate Vice Chancellor and
Dean of The Graduate School

VASCULAR FLORA OF GEE CREEK WILDERNESS

CHEROKEE NATIONAL FOREST, TENNESSEE

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Daniel Lee Wyrick

August 1996

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ABSTRACT

The vascular flora of Gee Creek Wilderness, a watershed in the Blue Ridge physiographic province of southeast Tennessee, was studied for three growing seasons (1991-1993). A total of 592 plant collections, excluding duplicates, were collected in the wilderness. These collections represent 98 families, 243 genera, and 387 species and lesser taxa. Ten species are listed in Tennessee as either endangered, threatened, special concern, or special rare plants. Two species, *Juglans cinerea* and *Vaccinium hirsutum*, have been assigned a category 2 status by the U.S. Fish and Wildlife Service.

The phytogeography of each taxon was analyzed both in Tennessee and in North America to understand the component nature of the flora. Eleven taxa were identified as uncommon floristic elements or have some type of phytogeographic significance. The flora of Gee Creek Wilderness is typical for the Southern Appalachians, except for the presence of a minor contingent of Cumberland Plateau species. These include *Asplenium bradleyi*, *Carex joorii*, *Parnassia asarifolia*, and *Scutellaria pseudoserrata*.

Evidence of prospecting, mining, and logging activities is prevalent in the wilderness. Despite the disturbance history, less than 2% of the flora is introduced, or non-native to eastern North America.

The complex and rugged terrain, abundant surface water features, and a unique flora make Gee Creek Wilderness an excellent member of the National Wilderness Preservation System.

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INTRODUCTION

The rugged mountain terrain and numerous cascades and waterfalls along Gee Creek embody the wilderness character of the watershed. These physical attributes were emphasized in the environmental statement for the wilderness proposal (USDA Forest Service 1974). There was little discussion about its biological attributes, other than from a wildlife or timber perspective. In spite of lacking a detailed biological description, the Gee Creek watershed was recognized for its primitive character and designated by Public Law 93-622 of 1975 as Gee Creek Wilderness.

The primary objective of this study was to inventory the vascular flora of Gee Creek Wilderness (GCW) with the anticipation that significant botanical discoveries would be made to lend support to its wilderness designation. Qualitative data were collected to develop an annotated checklist and provide insight into the ecological requirements for each species. Rare plant populations were mapped and status reports were written. Finally, a phytogeographic analysis was conducted to identify uncommon or significant floristic elements in GCW.

Knowledge gained from this investigation may help to ensure that both the abiotic and biotic components of the wilderness resource are considered in management decisions. This study also represents a continued effort to document the flora of Tennessee and the Cherokee National Forest.

CHAPTER 1

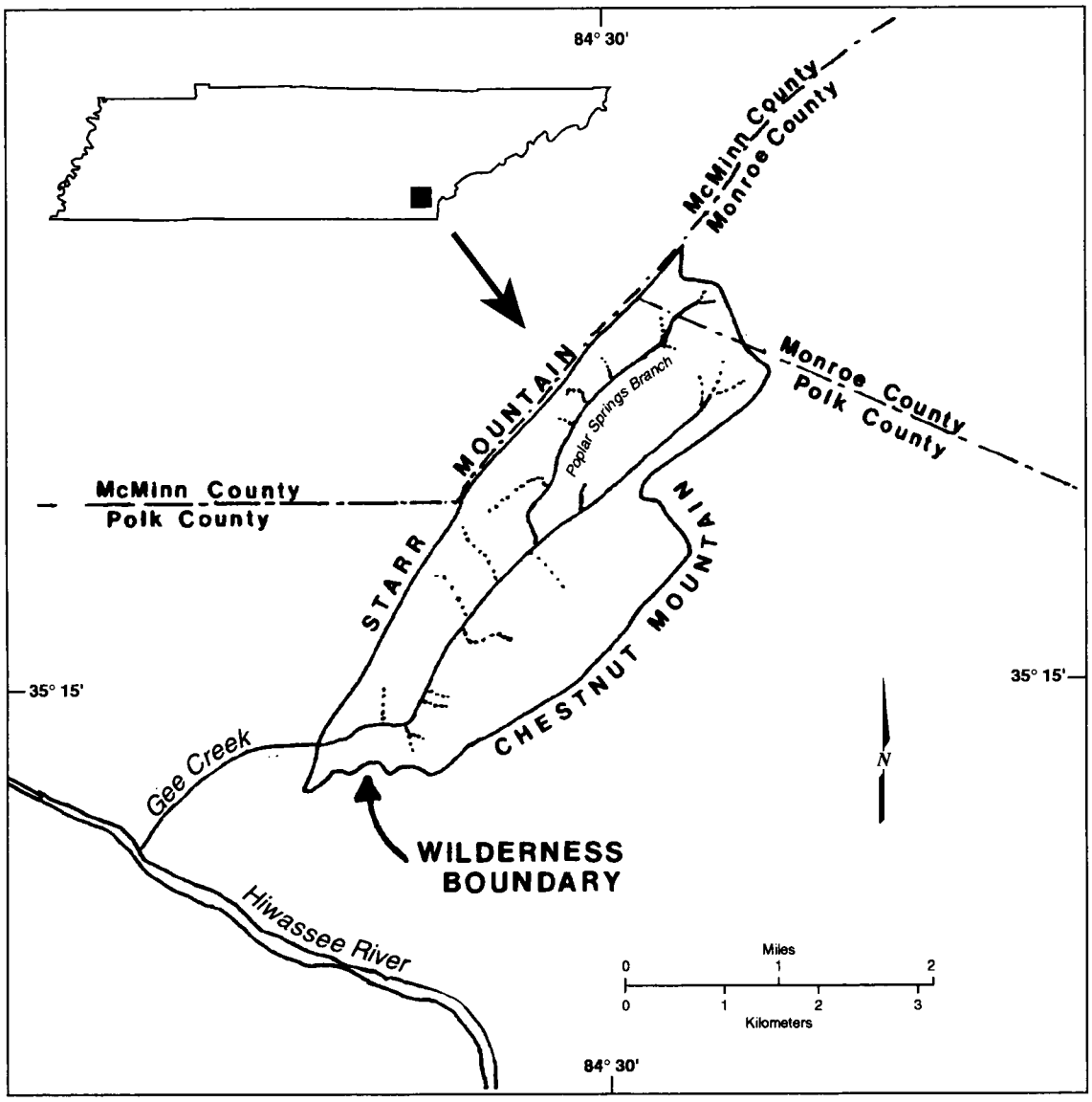
LOCATION

General

GCW is located in southeast Tennessee approximately 75 mi (121 km) south of Knoxville and 45 mi (72 km) northeast of Chattanooga (Figure 1). The wilderness is found in the Hiwassee Ranger District of Cherokee National Forest, and GCW is part of the greater Hiwassee River watershed. It is the smallest wilderness in Cherokee National Forest lying entirely in Tennessee (USDA Forest Service 1986, The Wilderness Society 1989, Harvey Broome Group of the Tennessee Chapter of the Sierra Club 1992). Its total area is 2,493 ac (1010 ha) or roughly four square miles (10 km^2). Most of the acreage is in Polk County; however, a small portion of the total, circa 93 ac (38 ha), is included in Monroe County. The site is described on three USGS 7.5 minute series topographic maps that have been modified for U.S. Forest Service use (Etowah, Mecca, and Oswald Dome quadrangles).

Legal boundaries of GCW include the entire Gee Creek watershed which is distributed between 35° 14' 25" and 35° 17' 26" north latitude and 84° 28' 50" and 84° 32' 03" west longitude. The eastern and western boundaries are defined by Chestnut Mountain and Starr Mountain, respectively. They form a gorge through which Gee Creek flows. The northern boundary parallels Forest Road 297 and the southern boundary extends to the crest of Gee Knob.

Figure 1. Location of Gee Creek Wilderness in Tennessee. Adapted from Gazdik and Behum (1983).


84° 30'
McMinn County
Monroe County
Monroe County
Polk County
McMinn County
Polk County
STARR MOUNTAIN
Poplar Springs Branch
CHESTNUT MOUNTAIN
35° 15'
35° 15'
Gee Creek
Hiwassee River
WILDERNESS BOUNDARY
N
Miles
0
1
2
0
1
2
3
Kilometers
84° 30'

More detailed descriptions of landscape features are discussed in Chapter 2.

Physiographic

Tennessee has a complex physiography intimately related to differences in geology and geomorphic history from east to west Tennessee. Safford (1856) identified seven "natural divisions" in the state based on landforms, geology, and topography. He defined the east, middle, and west political regions of Tennessee, in part, on his natural divisions. In-state distribution analyses of the GCW flora in Chapter 5 follow Safford's political divisions (1856). East Tennessee, the focus area of this study, includes three of Safford's natural divisions of the Appalachian system. Table 1 lists these divisions as well as more recent nomenclature and corresponding physiographic units delineated in east Tennessee.

GCW is located along the western boundary of the Blue Ridge physiographic province in Tennessee (Figure 2). Several sources, primarily botanical, were used in the compilation of the map, but the final product approximates that of Hack (1982). The Blue Ridge physiographic province extends from Pine Log Mountain north of Cartersville, Georgia, to southern Pennsylvania where it contacts Paleozoic rocks of the Valley and Ridge physiographic province and Triassic and Jurassic rocks in the Gettysburg basin of the Northeastern Highlands, a subregion of the Piedmont physiographic province (Hack 1982). The Blue Ridge geologic belt (or province) terminates at

Table 1. Terminology of physiographic provinces and lesser divisions applicable to regions in east Tennessee.

Safford (1856)	Fenneman (1928)	Thornbury (1965)	Hack (1982)
Unaka Bed of Mountains	Blue Ridge province: Southern section	Blue Ridge province: Southern section	Southern Blue Ridge province: Chilhowee-Walden Creek belt and Mountain Highlands subdivisions
Valley of East Tennessee	Valley and Ridge province: Tennessee section	Ridge and Valley province: Southern section	N/A
Cumberland Table-land	Appalachian Plateaus province: Cumberland Plateau and Cumberland Mountain sections	Appalachian Plateaus province: Cumberland Plateau and Cumberland Mountains sections	N/A

Figure 2. Map of the Blue Ridge physiographic province (shaded area) and relative position of Gee Creek Wilderness (denoted by star). Province boundaries determined from Army Map Service (1956), Duncan (1967), Radford et al. (1968), Mahler (1970), Wharton (1978), Harvill et al. (1992), and Rhoads and Klein (1993).

40°
35°
30°
85°
80°
Miles
0
100
200
300
0
200
400
Kilometers

the end of South Mountain (40° 05' N lat., 77° 10' W long.) in southern Pennsylvania (Reed 1970). Goldberg et al. (1989) note that the physiographic and geologic provinces generally coincide in the northwestern portion of the Blue Ridge where the boundary is defined by the emplacement of Grenville-age crystalline basement rocks over sedimentary rocks of the Valley and Ridge province. The physiographic boundary separating the Valley and Ridge and the Blue Ridge is a topographic break traceable from Georgia to Pennsylvania. This break occurs along the geologic contact of stronger Precambrian and lower Cambrian rocks in the mountains with weaker lower Cambrian and Ordovician limestones and shales of the Valley and Ridge (Fenneman 1928, Thornbury 1965). In the Southern Appalachians through Georgia and Tennessee, the geologic contact occurs along a system of thrust faults responsible for emplacing older Paleozoic and Precambrian rocks of the Blue Ridge over unmetamorphosed sedimentary rocks of Paleozoic age in the Valley and Ridge province. These thrust faults are the Cartersville in Georgia (Georgia Geological Survey 1976) and the Great Smoky and the Holston-Iron Mountain-Stone Mountain in Tennessee (Goldberg et al. 1989, Hatcher and Goldberg 1991).

The central and southwestern portions of the Blue Ridge physiographic and geologic provinces do not generally coincide. The Brevard zone, which is a fault zone 1 to 2 km wide and 600 km long extending from Alabama to the North Carolina-Virginia border (Goldberg et al. 1989, Horton and McConnell 1991) , and its northeastern continuation, the Bowens Creek fault, separate the Blue

Ridge and Piedmont geologic provinces (Hatcher and Goldberg 1991, Horton and McConnell 1991). The southeastern physiographic boundary of the Blue Ridge, the escarpment, and the Brevard zone do not coincide in all places. In northern North Carolina and Virginia the Brevard zone and the Bowens Creek fault occur in the Piedmont physiographic province (Goldberg et al. 1989). Near Winston-Salem, North Carolina, the Brevard zone is 35 km from the escarpment, but to the southeast it approaches the foot and crosses the moutain highlands (Hack 1982). To the southwest through Georgia and Alabama, it occurs in the Piedmont physiographic province (Hack 1982). Consequently, the Blue Ridge geologic province encompasses a much larger area than the one recognized by physiographers. Overall length of the physiographic province is approximately 580 mi (940 km), and it ranges in width from 120 mi (190 km) between Tennessee and North Carolina to less than 14 mi (22 km) through Maryland and Pennsylvania.

Some confusion exists in botanical literature as to where the Blue Ridge physiographic province terminates in the southeastern United States. Mountainous regions southwest of Pine Log Mountain in Georgia and Alabama have been included as part of the Blue Ridge by Harper (1913, 1943), Duncan (1967), Wharton (1978), Wofford (1989a), and Brown and Kirkman (1990). Perhaps from a vegetation standpoint, these mountains and ridges (e.g., Talladega and Cheaha Mountains) should not be excluded from the mountain highlands in north Georgia, Tennessee, and North Carolina. However, a

physiographic province is defined as a region with similar physical features such as geologic structure, relief and landform features, and climate (Bates and Jackson 1987). Vegetation is not a criterion in physiographic divisions. Even though landforms and relief features are similar in this region to portions of the Blue Ridge physiographic province, it has traditionally been treated as part of the Piedmont (Fenneman 1928, Thornbury 1965). More recent delineations connote distinction from the Piedmont proper. Hack (1982) aptly defines this mountainous area as the Southwestern Highlands subregion of the Piedmont, and in Alabama, Osborne et al. (1988) recognize it as the Northern Piedmont physiographic province.

CHAPTER 2

PHYSICAL ENVIRONMENT

Geology

Areal. The complexity of the geology and historic exploitation of rock and mineral resources in the Gee Creek watershed are responsible, at least in part, for its wilderness designation. Interest in the Chilhowee Group and the presence of large bedrock exposures of its constituent formations have led several individuals to describe structural and stratigraphic features in the Gee Creek area (Hayes 1895, Phillips 1952, and Rodgers 1953). The most recent and comprehensive survey was conducted by Epstein (1983a) as required by the Wilderness Act (Public Law 88-577, Sept. 3, 1964). His survey descriptions serve as the basis for geologic descriptions discussed below.

The Chilhowee Group is a thick sequence of clastic sedimentary rock exposed along discontinuous strike belts from Alabama to Pennsylvannia in the Blue Ridge geologic belt (Walker 1988). Since the Chilhowee Group is a widespread geologic unit, stratigraphic nomenclature is somewhat confusing but only stratigraphic units described in east Tennessee are relevant in this study.

Six formations are described for this area. They are the Helenmode, Hesse Sandstone, Murray Shale, Nebo Sandstone, Nichols Shale, and Cochran Conglomerate (Whisonant 1974) of which four are mapped in GCW (Epstein 1983a). These include the Nichols Shale and Nebo Sandstone of Lower

Cambrian (?) age and Hesse Sandstone and Murray Shale, undifferentiated, of Lower Cambrian age. Epstein (1983a) could not resolve the formation boundaries for the latter two, since both consist of alternating sandstones and shales. Consequently, he recognized a single "undifferentiated" unit.

The stratigraphic sequence of formations in GCW from a basal position to the uppermost one are Nichols Shale--Nebo Sandstone--Hesse Sandstone and Murray Shale, undifferentiated. The lithologic titles used in these formations indicate at least one type of rock present, but it may contain others. The Nichols Shale formation consists of silty shales and shaly siltstones. Bedrock outcrops are exposed on midslopes to footslopes north and west of the summit of Chestnut Mountain. It is also mapped along Poplar Springs Branch below the ridgeline of Poplar Springs Ridge.

Overlying the Nichols sequence is the Nebo Sandstone composed primarily of quartzites and rarer lithic types such as graywacke, silty shale, and sandy siltstone. "Quartzite" is a general term applied to an indurated, well cemented quartz rich rock (Pettijohn et al. 1972). This term has been applied to both metamorphic and sedimentary rock. Adding more confusion is the proliferation of essentially synonymous terms for sedimentary quartzites. Three commonly encountered terms are quartz arenite, quartzose sandstone, and orthoquartzite. They are sometimes used interchangeably in the literature, as is the case in Epstein (1983b), where the latter two are applied to lithologic descriptions and thin-section analyses of the same bedrock samples (see descriptions for rock

samples 12 and 17 and their corresponding thin-section analyses samples 13s and 14s). Bedrock outcrops of Nebo quartzite are visible from Tennessee Highway 411 on Starr Mountain in the mouth of the gorge. These quartzites, in addition to those of the Hesse Sandstone and Murray Shale, undifferentiated, are extremely erosion resistant and form ridges (Rodgers 1953). The crests and upper slopes of Chestnut and Starr Mountains and Poplar Springs Ridge are supported by the Nebo formation.

Overlying the Nebo is an interval of sandstone, siltstone, and shale units of the Hesse Sandstone and Murray Shale, undifferentiated. Its sandstones are typically quartzites which petrographically resemble those of the Nebo (Whisonant 1974). Futhermore, some of these quartzites, like those of the Nebo, weather to a friable sand. However, I recall only one sandstone outcrop on Starr Mountain that had this characteristic (bedrock chip sample: Wyrick #92-9, Hesse Sandstone and Murray Shale, undifferentiated). Generally, the sandstones in GCW are well cemented and weather resistant. Epstein (1983a) maps sandstone, siltstone, shale, and mixed lithic units of the Hesse and Murray as alternating outcrop belts within the contact boundaries of the formation. These units are confined to Starr Mountain and portions of Gee Knob in the wilderness. The Gee Creek fault is its eastern contact boundary and the Nebo formation is its western.

Structural. GCW is a syncline broken by two faults, the Gee Creek and Iron Gap (Epstein 1983a). The Gee Creek fault is a thrust, and its fault plane

parallels the strike of Starr Mountain. The Iron Gap fault is a high angle fault which is traced below the confluence of Poplar Springs Branch and Gee Creek northeastward through Iron Gap. Within this faulted syncline, other folds are superimposed and difficult to trace due to limited exposures. In describing the geology of Starr Mountain which included GCW, Phillips (1952) stated that the structure of this area is ". . . neither typical of the Blue Ridge or the Valley and Ridge, but a combination of the two."

Since the Starr Mountain area has been of interest to geologists for some time, differing opinions involving structural and stratigraphic details exist. These differences are relatively minor except for two. Firstly, Rodgers (1953) mapped a small region of Shady Dolomite along Gee Creek which is not recognized by Hayes (1895), Phillips (1952), or Epstein (1983a). Carbonate formations such as Shady Dolomite and Knox Dolomite are mapped, however, near the GCW boundary (Epstein 1983a). There is a possibility that calcareous sandstones, siltstones, or shales may occur along the footslopes of Chestnut Mountain. A transitional unit such as the Helenmode Formation, which is known from Chilhowee Mountain (Neuman and Nelson 1965) northeast of GCW, could have been overlooked or mistaken for Hesse Sandstone and Murray Shale, undifferentiated, by Epstein (1983a). Since the Helenmode ranges from 50-200 ft (15-60 m) in thickness (Walker 1988), colluvium from upper slopes may help to cover and conceal exposures. Botanical evidence suggests that some type of calcareous substrate may occur on the footslopes of Chestnut Mountain. Three

calciphiles, *Hybanthus concolor*; *Polymnia laevigata*; and *Staphylea trifolia*, are found on these slopes. Secondly, the Gee Creek fault was interpreted by Phillips (1952) as a normal fault. Epstein (1983a), however, contends that this fault is a thrust since the fault plane dips at a low angle (circa 10° SE) toward the upthrown block.

Surficial. Bedrock outcrops are prominent features throughout the wilderness. They protrude through a surface mantle of unconsolidated geologic material. This mantle or regolith includes unconsolidated rock debris, or scree, diamicta, alluvium, and soils.

Slopes are typically blanketed by a layer of rock debris varying in size from large boulders to small stones and chips. This blanket is chiefly composed of quartzite cobbles and boulders, but other lithologic types such as shales and siltstones contribute smaller fragments and chips. Quartzite scree is common in the lower one-half of GCW where sandstone outcrops of the Nebo and Hesse and Murray, undifferentiated, are abundant. Its clasts are strewn below source outcrops from mountain crests to footslopes along Gee Creek. Shale and siltstone scree is more localized and confined to slopes in close proximity to source outcrops. An interstitial matrix of soil and/or litter usually fills voids between clasts, and thus provides a substrate hospitable for plant growth and colonization. However, vegetal cover can be sparse, especially where large boulders cover the surface and contact each other directly.

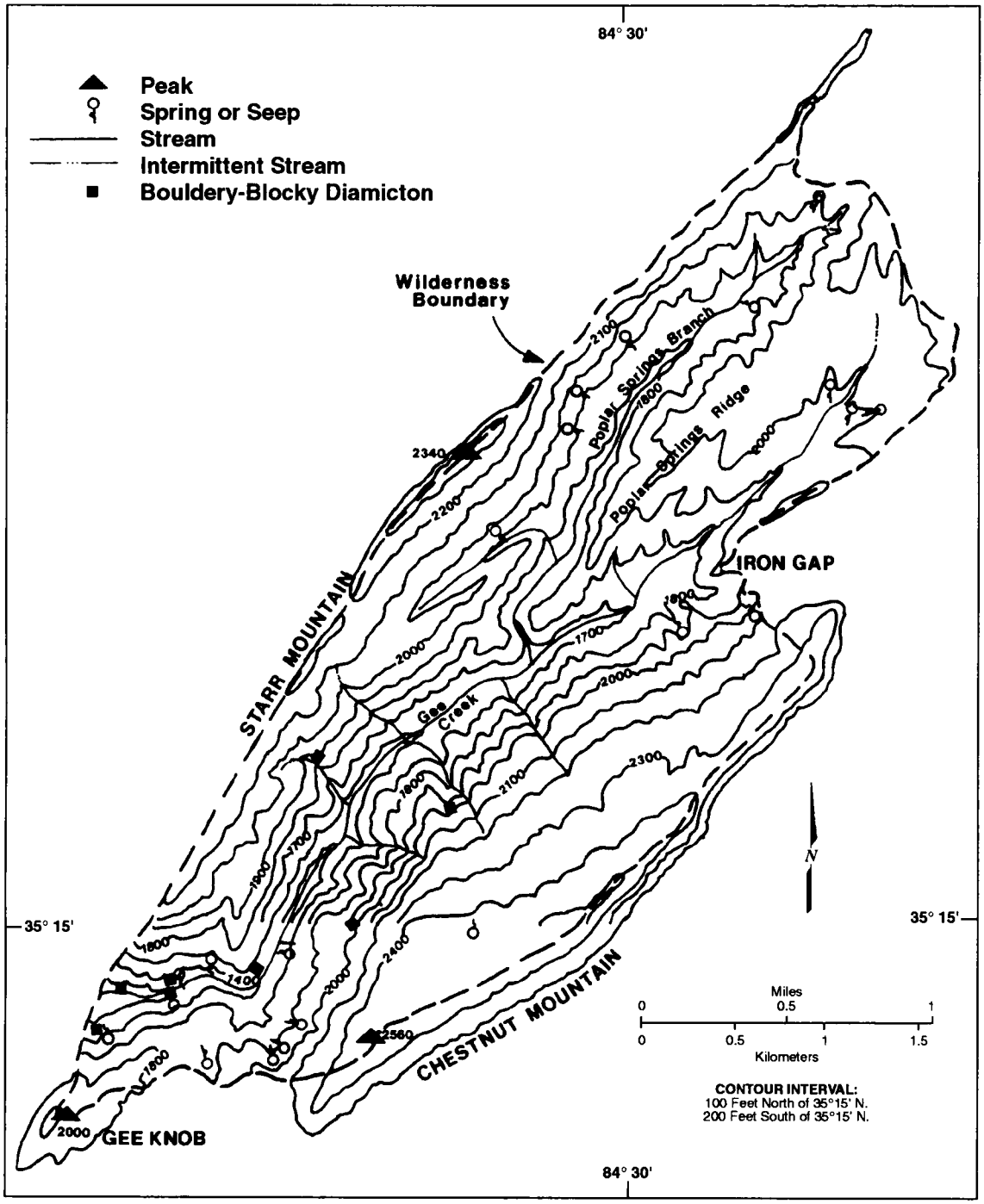
Several locations of quartzite boulder deposits are found in GCW. Since the

mode of origin and age of these deposits are unknown, a non-genetic term for unconsolidated material (e.g., fine earth, stones, boulders, etc.) or "diamicton" is used herein to describe them (see Flint et al. 1960a, 1960b). Eight diamicta are mapped in GCW and these commonly occur on mountain footslopes and at higher elevations in ravines (Figure 3). Landscape elements such as diamicta and scree are not uncommon surface features found in the Appalachians. Rodgers (1953) notes that Chilhowee Group sandstones and conglomerates that are weather resistant produce rock debris and even talus. Hack (1960) finds similar formations of scree and talus in northern Virginia derived from quartzite outcrops of the Antietam Formation of the Chilhowee Group.

Scree and diamicton deposits are the most intriguing surface features, in my opinion, in GCW, and they pose many questions. For example, are these deposits relict landscape elements formed in a periglacial environment or are they products of weathering and normal slope processes in a contemporary climate, or both? If they are being formed today, then which slope process (e.g., rockfall, creep, slope wash, etc.) is predominant? Does human activity cause their formation? These questions are difficult to answer and beyond the scope of this project, but they are suitable research topics in Appalachian geomorpholgy.

Another surface deposit in GCW is Quaternary-aged alluvium located along Gee Creek (Epstein 1983a). It occurs as a narrow band circa 78-390 ft (24-120 m) in width and 1.2 mi (1.9 km) in length. Its northeast boundary is near Iron

Figure 3. Topographic map of Gee Creek Wilderness. Compiled from field reconnaissance data and U.S. Geological Survey 7.5 minute series topographic maps modified for USDA Forest Service use (1957, 1967a, b).


84° 30'
Peak
Spring or Seep
Stream
Intermittent Stream
Bouldery-Blocky Diamicton
Wilderness Boundary
Poplar Springs Branch
Poplar Springs Ridge
IRON GAP
STARR MOUNTAIN
Gee Creek
CHESTNUT MOUNTAIN
GEE KNOB
2340
2560
2000
35° 15'
N
Miles
0
0.5
1
0
0.5
1
1.5
Kilometers
CONTOUR INTERVAL:
100 Feet North of 35°15' N.
200 Feet South of 35°15' N.

Gap, and it extends below the confluence of Poplar Springs Branch and Gee Creek. The flood plain and bedload deposits are composed of ". . . medium- to coarse-grained sand, organic matter, chips of shale and siltstone, and pebbles, cobbles, and boulders" (Epstein 1983a). These deposits rarely exceed 3 ft (1 m) in thickness.

The final integral and dynamic component of the regolith is soil. Soil types found in the wilderness are typical of those in the Blue Ridge. Predominant soil orders in mountainous regions are Inceptisols, Ultisols, and Spodosols (Springer and Elder 1980). The first two are represented in GCW, but the third, a soil commonly formed at higher elevations and under ericaceous and coniferous vegetation (e.g., heath balds and spruce-fir forests), is not. The western front of the Unakas consisting of Starr, Chilhowee, and English Mountains is pedologically similar and three soil series--the Wallen, Jefferson, and Ramsey--combine to form 75% of the soils mapped (Springer and Elder 1980). These three series plus the Lily and Petros are found in GCW (W. D. Dickson, Jr., unpublished data, Hall et al. 1981). As taxonomically classified, the Ramsey, Wallen, and Petros series are Inceptisols, and the Lily and Jefferson series are Ultisols (W. D. Dickson, Jr., unpublished data, Hall et al. 1981).

In general, these soils are shallow to deep depending on depth to bedrock, parent material, and topographic position. For example, soils developing in colluvial deposits on mountain footslopes are deeper than those developing on steep mountain sideslopes and crests in quartzite residuum. Surface and

subsoil textures are predominately loams, fine sandy loams, and silt loams with varying amounts of rock fragments (W. D. Dickson, Jr., unpublished data, Springer and Elder 1980, Hall et al. 1981). Soil reactions are strongly acid to very strongly acid (pH $\leq$ 5.5), and they are well-drained to excessively well-drained (W. D. Dickson, Jr., unpublished data, Hall et al. 1981).

Landscape Features

Mountain slopes. A topographic map with added landscape elements is depicted in Figure 3 (p. 18). The wilderness is oriented in a northeast-southwest direction which conforms to the regional strike of the Chilhowee range of mountains. Terrain is rugged, especially in the gorge. Slopes range from 5% to greater than 60%. Massive quartzite outcrops form precipices on Starr Mountain and Gee Knob that are unscalable without climbing gear. Footing can be precarious on steep slopes and on unstabilized scree. Elevations range from 1040 ft (317 m) at the southern boundary where Gee Creek exits the wilderness to 2560 ft (781 m) at the summit of Chestnut Mountain. Mountain flanks are corrugated by a ravine-ridge topography. Two hollows which separate Gee Knob and Chestnut Mountain are interpreted as debris slide scars by G. M. Clark (pers. comm.). These debris slides represent new records in the Southern Appalachians (G.M. Clark, pers. comm.). Mass movements such as debris slides and flows are not uncommon in the southern Blue Ridge because steep slopes, lithology, structure, and high rainfall create the potential for their

occurrence (Miller and Sitterly 1977, Clark 1987).

Surface waters. Two major streams drain the wilderness, and the basic drainage pattern is parallel (as defined by Howard 1967) with a transition to a trellis type below the confluence of Gee Creek and Poplar Springs Branch. Gee Creek is a third-order trunk stream, and Poplar Springs Branch is a second-order tributary of Gee Creek. Several smaller unbranched tributaries or first-order streams originate on mid-upper slopes of Starr and Chestnut Mountains. Perennial streamflow is exhibited by all streams drawn in Figure 3 (p. 18) except at streamhead positions where they may be intermittent. Streamflow discharge is noticeably greater during the spring months than in the summer and fall. Stream crossings on Gee Creek become increasingly difficult where rising water levels cover stepping stones. This flowage trend also occurs in other surface water features such as springs and seeps. Only locations of perennial springs and seeps were mapped (Figure 3, p. 18) although several intermittent and ephemeral ones were noted in the wilderness.

As Gee Creek flows southwest to the Hiwassee River from its headwaters, cascades and waterfalls are found along the streamcourse. Some waterfalls exceed 20 ft (6.1 m) in height. Gee Creek drops 960 ft (290 m) in elevation from its headwaters to its exit from the wilderness boundary. This is accomplished over a distance of 3.8 mi (6.1 km). Total length from its headwaters to the Hiwassee River is 5.3 mi (8.5 km).

Climate

Tennessee falls within the humid, mesothermal climatic province in the eastern United States where there is no season of water deficiency (i.e., potential evapotranspiration exceeds precipitation) and percentage of summer thermal efficiency (i.e., concentration of thermal conditions favorable for plant growth in summer when compared to the annual total) is between 35-49% (Thornthwaite 1931). Symbolic classification of this climate description is BB'rb, where the first and third letters designate the humidity province and subprovince, respectively, and the second and fourth letters designate the temperature province and subprovince, respectively (Thornthwaite 1931). In order to classify the GCW climate, monthly precipitation and temperature normals calculated over a 30-year period from 1961-1990 (Owenby and Ezell 1992) were analyzed for the nearest weather station (Athens, TN) using the methods and formulae derived by Thornthwaite (1931) and tabulated below (Table 2). Weather data from the Athens station is herein used to describe conditions in GCW.

The only difference between Tennessee's climatic regime and that of GCW is the humidity province. Since the precipitation effectiveness (P-E) index exceeds 128, the humidity province would be classified as wet according to Thornthwaite (1931). For additional comparison, P-E indices were determined from the Athens station's monthly temperature and precipitation averages in 1991 and 1992 (NOAA 1991, 1992). Each were below 128 which would yield a humid classification. Wet provinces, later re-classified as perhumid by Thornthwaite

Table 2. Climate description and indices for the Athens weather station.

Station	P-E Index	T-E Index	% summer thermal efficiency	Climatic Province
Athens (35° 26' N, 84° 35' W; elev. 940 ft (287 m) ; McMinn Co., TN	129	75.5	42.8	AB'rb

(1948), are characteristically found at high elevations in the Appalachians where precipitation greatly exceeds potential evapotranspiration which creates a large water surplus. Altitudinal related precipitation increases in the mountains defining GCW are not significant enough to create such a condition. Consequently, a humid climate type is more accurate for the GCW area. A possible explanation for the high P-E index for the Athens station calculated over the 30-year period is that the adjustment of observed mean monthly temperature and precipitation values to form the normals has raised the values. Computed index values using these raised normal values would consequently be higher.

Normal annual temperature and precipitation values calculated for the Athens station over a 30-year period (1961-1990) are 57.2° F (14.0° C) and 57.7 in (147 cm), respectively (Owenby and Ezell 1992). The coldest temperatures prevail through the winter months with the January normal maximum reaching 46.3° F (7.9° C) and the normal minimum dipping to 24.4° F (-4.2° C) (Owenby and Ezell 1992). The summer months are the warmest with July being the hottest. Its normal maximum is 88.1° F (31.2° C) and its normal minimum is 64.7° F (18.2° C) (Owenby and Ezell 1992). The greatest amount of rainfall occurs through the winter and early spring months with the wettest month being March, which averages 6.3 in (16.1 cm) of precipitation (Owenby and Ezell 1992). October is the driest month averaging 3.6 in (9.3 cm) of precipitation (Owenby and Ezell 1992).

Length of the growing season varies from year to year. For example, in 1991

for the Athens station, the number of days at or below 32° F (0° C) was 189 (NOAA 1991). In 1992 the number of days for the station at or below 32° F (0° C) was 174 (NOAA 1992). On average the last freezing date in spring is April 10 and the first freezing date in fall is October 25 in the Valley and Ridge in southeast Tennessee (N. Rhodes, pers. comm.), which makes the growing season length 198 days.

Growing season lengths and other climatic values determined for the Athens station are acknowledged to be only an estimation for climatic conditions in GCW. Topography, exposure, and elevation interact to form a myriad of microclimates in the mountains but, in general, lower mean temperatures and a shorter growing season are expected due to elevation effects. This is corroborated by Dickson (1959), who found that in the Southern Appalachians, there is a negative correlation between elevation and climatic variables such as mean temperatures and growing season lengths. As elevation increases temperature decreases and growing seasons become shorter.

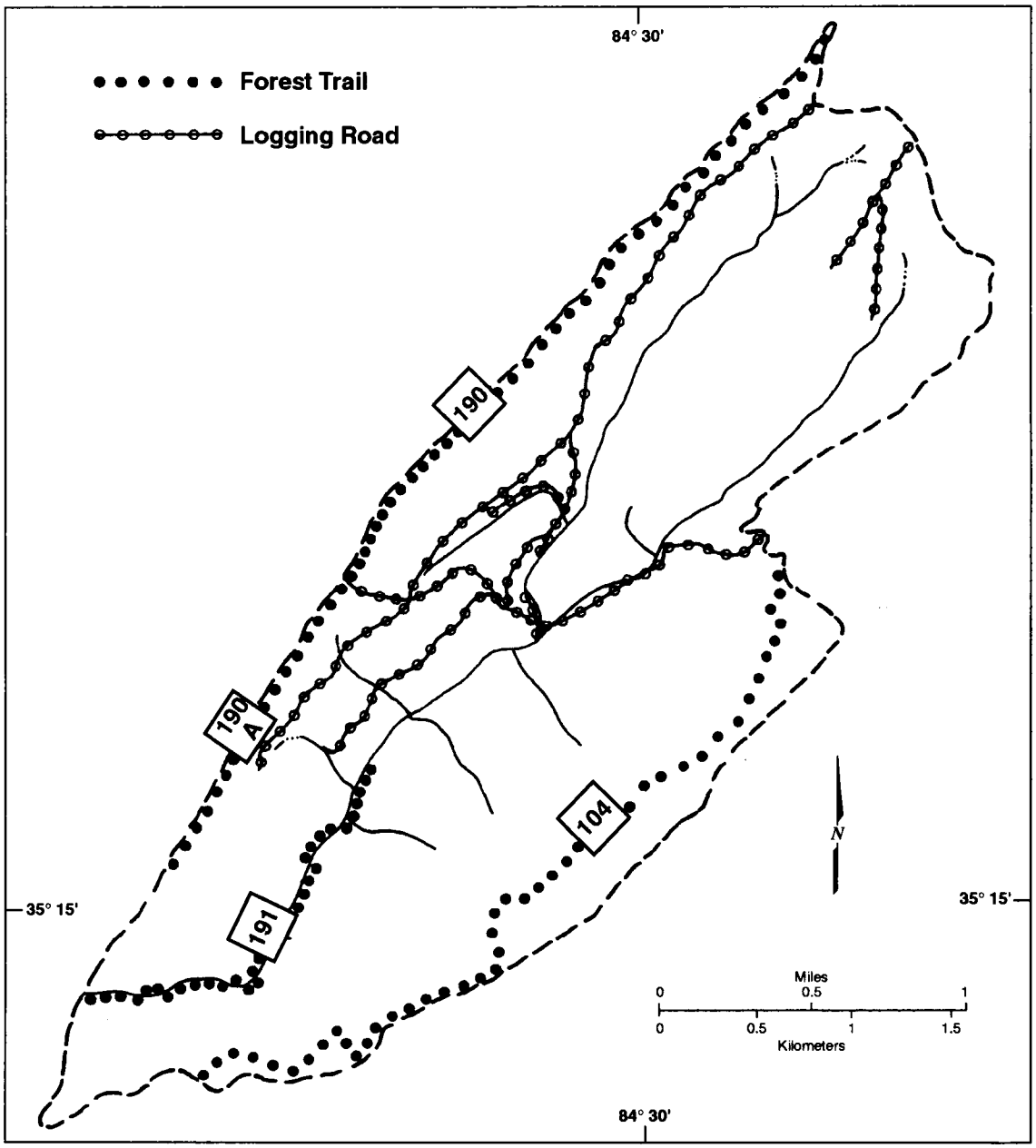
CHAPTER 3

FOREST TRAILS AND LOGGING ROADS

Four trails access the wilderness with three being foot trails (nos. 190, 190A, 191) and the fourth, a horse trail (no. 104). Figure 4 depicts their locations and path plus logging roads which were utilized during this project. All trail lengths given in the following passage include only sections located within the GCW boundary. For a detailed description of these trails see Harvey Broome Group of the Tennessee Chapter of the Sierra Club (1992).

The Chestnut Mountain trail no. 104 ascends the mountain from Iron Gap and exits below Gee Knob. Trail length is 2.8 mi (4.5 km). On the opposite side of the gorge on Starr Mountain are two trails, nos. 190 and 190A, which follow the ridgeline boundary of the wilderness. A logging road that runs westward from Gee Creek to the Starr Mountain ridgecrest forms the dividing point of the two trails. Trail no. 190A follows the ridgeline to the southwest for 1.0 mi (1.6 km) where it dead-ends at the southwest escarpment of Starr Mountain. Trail no. 190 follows the ridgeline to the northeast for a distance of 2.3 mi (3.7 km) where it leaves the wilderness boundary and intersects a four-wheel drive road. The only trail which accesses the interior of GCW is no. 191, which follows Gee Creek for a distance of 1.3 mi (2.1 km). Eight switchbacks occur along its path and it dead-ends near a primitive campsite. Northeast of the campsite *Rhododendron maximum* chokes the drainage and steep sideslopes make off-

Figure 4. Forest trails and logging roads in Gee Creek Wilderness. Compiled from field reconnaissance data and U.S. Geological Survey topographic maps modified for USDA Forest Service use (1957, 1967a, b).


84° 30'
Forest Trail
Logging Road
190
190 A
191
104
35° 15'
35° 15'
N
Miles
0
0.5
1
0
0.5
1
1.5
Kilometers
84° 30'

trail hiking difficult.

To access more interior locations in the wilderness, an extensive network of former logging roads was traveled, but only those in Figure 4 were utilized on a regular basis. Approximately 7 mi (11 km) of roads were mapped but probably 10 mi (16 km) actual exist. These roads are in fair to good condition. Their reclamation into surrounding forest communities is slow but progressive. Examples of woody taxa becoming established on these roads are *Liriodendron tulipifera*, *Pinus strobus*, and *P. virginiana*.

CHAPTER 4

METHODS

Preliminary reconnaissance of GCW was conducted in the summer of 1990 to determine its suitability for a floristic survey. Once chosen, an intensive investigation of the site was initiated. A tentative survey plan was developed in 1991 from earlier field work and information gathered from the USDA Forest Service. This plan targeted species rich areas for regular site visitation and learning the established trail system. Vascular plant collections were made to document the flora and specimen data such as scientific name, locality, habitat, collection number, etc., were recorded in permanently bound field books. Specimens were pressed at the end of each field day and dried at the University of Tennessee Herbarium (TENN). Once dried, specimens were reexamined to confirm or complete determinations using floras, monographs, taxonomic treatments, and plant collections stored at TENN. At least one specimen will be deposited at TENN and duplicates will be used for exchange with other herbaria.

A secondary activity performed during reconnaissance and plant collecting was recording general information about habitats, forest types, plant distributions, and topographic features. A mini-cassette recorder and photocopies of topographic maps were carried into the field to expedite data collection. Later, these tape recorded notes were transcribed and field maps were edited and recopied. This valuable information was compiled to form

species annotations and figures in this document.

Field investigation of GCW lasted for three growing seasons. Fifty-four day trips were made between May 12, 1991, and October 8, 1993. The primary objective of these trips was plant collecting but, during the later stages of the research, more emphasis was placed on mapping projects (e.g., plant distributions, forest types, topographic features, etc.) and writing field reports for rare plants.

In order to reach target areas in the wilderness, three access points were used: (1) Gee Creek trailhead (no. 191) served as an access to the interior sections of the gorge and sideslopes of Starr Mountain, Gee Knob, and Chestnut Mountain; (2) Iron Gap trailhead (no. 104) served to access the mid-upper slopes and crest of Chestnut Mountain; (3) Forest Road 297 served to access the northern one-half of the wilderness, which includes Poplar Springs Ridge, Poplar Springs Branch, Starr Mountain, and the headwaters of Gee Creek.

CHAPTER 5

RESULTS

Floristic Summary

During the three growing seasons in which the study was conducted, 592 vascular plant collections were made excluding duplicates. These collections represent 98 families, 243 genera, and 387 species and lesser taxa. An annotated checklist was created and several tables were made to summarize significant information (see Appendix A). Table A-1 (p. 168) provides a complete listing of plant families by category (i.e., Pteridophytes, Gymnosperms, etc.) and the number of genera and species and lesser taxa found in each. Table A-2 (p. 172) summarizes this information. Ten families were found to collectively represent 50.3% or 195 species located in GCW. Percentages by family are the following: Asteraceae (14%), Cyperaceae (4.6%), Ericaceae (4.4%), Fabaceae (4.1%), Lamiaceae (3.1%), Liliaceae (3.6%), Poaceae (6.5%), Rosaceae (4.6%), Saxifragaceae (2.8%), and Violaceae (2.6%). The Asteraceae and Poaceae have the greatest generic and subgeneric diversity in GCW.

The most frequently occurring number of genera and lower taxa per family is one. Over one-half of the plant families in the GCW are represented by a single genus and nearly 80% of those have only one species. A few genera in GCW are widespread and consist of several taxa. For example, *Aster*; *Carex*;

Panicum; *Solidago*; and *Viola* all have seven or more species or varieties with *Carex* topping the list at 16. Disturbance related taxa (Table A-3, p. 173) comprise 15% of the flora and most of these are rare or very rare in the wilderness. There are only seven introduced species in GCW (Table A-4, p. 176) and all but two, *Lonicera japonica* and *Elaeagnus umbellata*, are restricted to disturbed sites. All introduced species represented in the flora are infrequent except for *Microstegium vimineum*, which has scattered localities on Starr and Chestnut Mountains.

Rare Plants

Ten species found in GCW are designated in Tennessee as either endangered, threatened, special concern, or special rare plants (Table 3) (Tennessee Department of Environment and Conservation 1993). Twenty-five rare plant populations were identified in the wilderness and most of these are in its lower one-half (Figure B-1, p. 180). All ten species are represented here and many are concentrated on lower slopes below 1600 ft (490 m) in the gorge. Only three species, *Cypripedium acaule*; *Juncus gymnocarpus*; and *Trichomanes petersii*, are found in the upper one-half of GCW.

No federally listed threatened or endangered species were found but two species in GCW, *Juglans cinerea* and *Vaccinium hirsutum*, are being reviewed as potential candidates for listing by the U.S. Fish and Wildlife Service. Both have been assigned a category 2 status (U.S. Fish and Wildlife Service 1993b).

Table 3. Tennessee rare plants and number of populations in Gee Creek Wilderness. Listings based on Tennessee Department of Environment and Conservation (1993) and U.S. Fish and Wildlife Service (1993b). Status codes defined in Appendix B.

TAXA	STATUS		POPULATIONS
	Federal	State	
Amelanchier sanguinea		T	2
Calamagrostis porteri subsp. *porteri*	3C	E	2
Cardamine flagellifera		T	1
Coreopsis X delphinifolia		E	1
Cypripedium acaule		E*	4
Juglans cinerea	C2	T	1
Juncus gymnocarpus	3C	T	7
Panax quinquefolius	3C	T	1
Polymnia laevigata	3C	S	4
Trichomanes petersii		E	2

Status reports were written for all state-listed species and their population localities were mapped. These reports, map figure, and a discussion about *V. hirsutum* can be found in Appendix B.

Phytogeography

The geographic distributions of native plants in GCW were analyzed from a regional and range-wide perspective to identify their floristic affinities. For the regional analysis, their generalized physiographic distributions in Tennessee were determined from county range maps at TENN and other published sources (Chester et al. 1993, DeSelm et al. 1994). These physiographic distributions were then classified into the three geographic regions of Tennessee (i.e., east, middle, and west) based on Safford's delineation (1856). As an example, *Thermopsis mollis* is recorded from counties on the Cumberland Plateau, Valley and Ridge, and Blue Ridge. Since these provinces comprise the eastern geographic region of Tennessee, its distribution pattern would be classified as such. Besides an east pattern, three other types are represented in the flora and defined as the following: (1) east-peripheral, species with geographic ranges essentially confined to the Appalachians but they have outlying stations (three counties records or fewer) on the Highland Rim, Central Basin, or Coastal Plain, or combinations thereof; (2) east-middle, species with geographic ranges which include at least one of the physiographic provinces in both east and middle Tennessee; and (3) general, species with geographic ranges extending

from east to west Tennessee. The only pattern not represented in the flora was an east-west distribution.

Approximately 64% of the plants found in GCW have a general distribution and the remaining 36% consist of east, east-peripheral, and east-middle distributions. Exact percentages and examples for each type are given in Table 4. When the physiographic distributions of east-peripheral taxa were examined, 30 were found to occur only on the Highland Rim, especially its eastern and northern sections. Examples are *Astilbe biternata*, *Disporum maculatum*, *Monarda clinopodia*, and *Viola canadensis*. Of the remaining four east-peripheral taxa, three were documented on the Coastal Plain and one in the Central Basin. Their ranges also included the Highland Rim.

For the range-wide analysis, North American geographic distributions were determined for each taxon primarily from Gleason and Cronquist (1991) and additional sources (Cain 1930, Radford et al. 1968, Little 1970, Smith 1976, Farrar 1985, Lellinger 1985, Jones and Coile 1988, Brown and Kirkman 1990, Haufler and Windham 1991, Harvill et al. 1992, Luebke 1992). To analyze their geographic affinities, a classification system devised by Cain (1930) was used. Taxa were first grouped into two broad geographic categories, intraneous and extraneous, then placed into narrower sub-categories based on their chief distribution pattern. These sub-categories, though not entirely identical to Cain's, are loosely based on his descriptions.

Table 4. Regional analysis of the geographic distribution of the flora of Gee Creek Wilderness in Tennessee. Distribution categories based on regions defined by Safford (1856); taxa scattered throughout Tennessee were classified as "General". Introduced taxa and *Crataegus macrosperma* were omitted from the analysis.

DISTRIBUTION	SPECIES AND LESSER TAXA	PERCENT	EXAMPLE
I. East	58	15.3	*Galium latifolium*
II. East-Peripheral	34	9.0	*Cornus alternifolia*
III. East-Middle	44	11.6	*Caulophyllum thalictroides*
IV. General	243	64.1	*Smilacina racemosa*

Taxa identified as intraneous (i.e., those which are not at their distributional limits in Tennessee) were classified into one of the five following sub-categories: general, northern, southern, Appalachian, or endemic. Intraneous general taxa are those found throughout eastern North America. Their distribution is not confined to any one region. The last four sub-categories, however, are more restrictive. Taxa found primarily in the northeastern United States and/or adjacent Canada were classified as intraneous northern. These species often range southward down the Appalachian chain and form a funnel shaped distribution pattern. Taxa found chiefly in the southeastern United States, mainly the Coastal Plain and Piedmont, were classified as intraneous southern. Some of these may range northward along the Atlantic Coastal Plain to New Jersey or Massachusetts but are absent further inland. Species which are principally distributed along the Appalachian physiographic provinces (Appalachian Plateaus and Mountains, Valley and Ridge, and Blue Ridge) were classified as intraneous Appalachian. Included in this category were taxa with peripheral locations or disjuncts on the Ozark Plateau and Ouachita Mountains, Piedmont, Highland Rim, or Coastal Plain. Finally, those taxa restricted to the southern Blue Ridge were classified as intraneous endemic.

Taxa identified as extraneous (i.e., those which reach their distributional limits in Tennessee) were classified into one of following three sub-categories: northern, southern, or Appalachian. Extraneous northern taxa are those which have their main distributions in the northeastern United States and Canada and

reach their southern limits in the Appalachians. Extraneous southern taxa are those which have their main distributions on the Coastal Plain and/or Piedmont and extend northward to Tennessee. Lastly, extraneous Appalachian taxa are those which have their main distribution in the Appalachians but reach their northward or southward range limit in Tennessee.

Table 5 summarizes the geographic affinities of the flora in GCW. Intraneous taxa constitute 96% of the 380 native taxa, while extraneous taxa comprise only 4%. If the intraneous and extraneous geographic elements are combined and ranked by percent to reflect their importance, they would have the following order: general--northern--southern--Appalachian--endemic. Since GCW is in the southern Blue Ridge physiographic province, intraneous and extraneous Appalachian taxa were analyzed to determine if GCW has species typical of the Southern Appalachian region. This analysis revealed 21 species, four of which are strict endemics (Table 6).

Forest Communities and Habitats

The landscape in GCW is almost completely forested except where gaps have been created by treethrow, stream courses, bedrock exposures, and man-made clearings (e.g., trails, wildlife plots, etc.). Using a hierarchical approach, these forests have been classified into three community types: mixed cove forest, mixed oak forest, and pine dominated forest. Below each community are forest types. These forest types were identified in the field and differentiated by

Table 5. Range-wide analysis of the geographic distribution of the flora of Gee Creek Wilderness. Distributional classification adapted from Cain (1930). Introduced taxa were omitted from the analysis.

DISTRIBUTION	SPECIES AND LESSER TAXA	PERCENT	EXAMPLE
I. Intraneous			
A. General	189	49.7	*Acer rubrum*
B. Northern	81	21.3	*Solidago flexicaulis*
C. Southern	49	12.9	*Chasmanthium laxum*
D. Appalachian	45	11.8	*Trillium vaseyi*
E. Endemic	1	0.3	*Stachys* sp.
II. Extraneous			
A. Northern	4	1.1	*Amelanchier sanguinea*
B. Southern	7	1.8	*Hydrangea quercifolia*
C. Appalachian	4	1.1	*Scutellaria pseudoserrata*

Table 6. Southern Appalachian near and strict endemics in Gee Creek Wilderness (from Radford et al. 1968, Jones and Coile 1988, Gleason and Cronquist 1991, Harvill et al. 1992, and TENN dot maps). Near Southern Appalachian endemics are principally distributed on the Appalachian Plateaus and Mountains, Valley and Ridge, and Blue Ridge physiographic provinces from Virginia southward and may also include locales peripheral to the Appalachians such as the Piedmont, Interior Low Plateau, and disjuncts to the Ozark Plateau and Ouachita Mountains. Strict endemics (denoted by an asterisk) are confined to the three principal Appalachian provinces listed above.

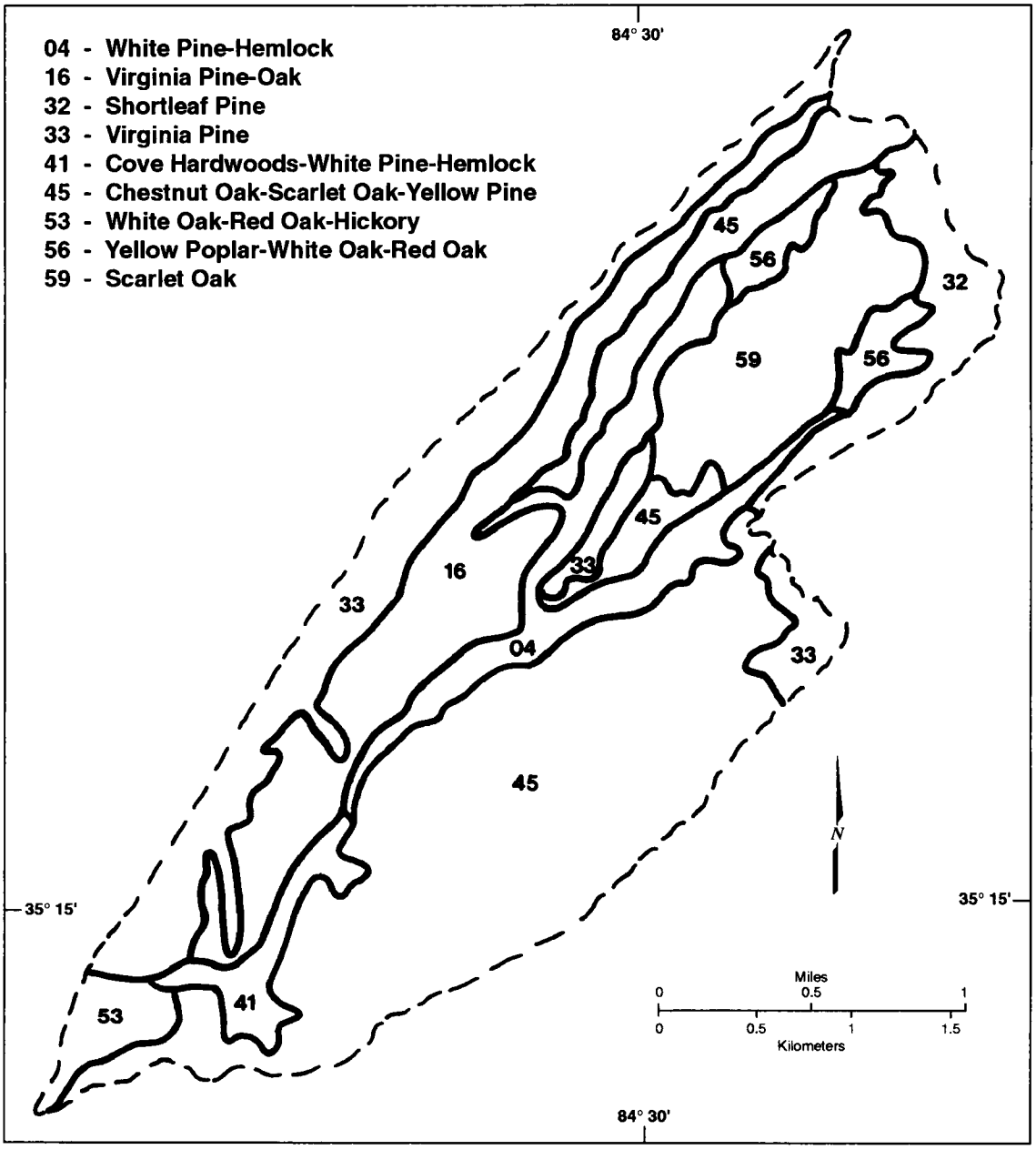
Aster surculosus	* *Rhododendron cumberlandense*
Astilbe biternata	*Scutellaria pseudoserrata*
Cardamine flagellifera	*Solidago curtisii*
Carex austrocaroliniana	* *Stachys* sp.
Carex purpurifera	*Thermopsis mollis*
Euphorbia mercurialina	*Tradescantia subaspera*
Gentiana decora	*Trillium luteum*
* *Hexastylis arifolia var. ruthii*	*Trillium vaseyi*
Hexastylis shuttleworthii	* *Vaccinium hirsutum*
Parnassia asarifolia	*Zizia trifoliata*
Philadelphus hirsutus	

their canopy composition. Their type name is taken from the dominant and co-dominant canopy species. Those forest types most similar in species composition, structure, and ecological requirements were grouped together under the same community type.

Nine forest types were mapped in GCW and these were determined from silvicultural examinations by the Forest Service and from my field observations. Compartment stand maps (C-123 and C-125) made by the Forest Service circa 1970 formed the template for Figure 5. However, these maps are not identical. Forest types and their boundaries were changed in certain instances where field observations conflicted with the stand maps. Most changes were minor except for three. First, mesic hardwood forests along Gee Creek in the gorge mapped as type 56 (Yellow Poplar-White Oak-Red Oak) in C-125 were re-mapped as type 41 (Cove Hardwoods-White Pine-Hemlock). Second, mixed pine-oak forests on Starr Mountain mapped as type 33 (Virginia Pine) in C-123 and C-125 were re-mapped as type 16 (Virginia Pine-Oak). Third, mixed oak-pine forests on slopes above headwaters of Poplar Springs Branch mapped as type 44 (Southern Red Oak-Yellow Pine) in C-123 were re-mapped as type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). With boundaries re-drawn and new forest type designations made, their acreages were determined from Figure 5 using an English Area dot grid.

Three basic habitat types were defined in GCW: mountain slopes, drainages, and ruderal. Mountain slopes include all portions of the landscape

Figure 5. Forest types in Gee Creek Wilderness. Adapted from USDA Forest Service stand maps, C-123 and C-125.


04 - White Pine-Hemlock
16 - Virginia Pine-Oak
32 - Shortleaf Pine
33 - Virginia Pine
41 - Cove Hardwoods-White Pine-Hemlock
45 - Chestnut Oak-Scarlet Oak-Yellow Pine
53 - White Oak-Red Oak-Hickory
56 - Yellow Poplar-White Oak-Red Oak
59 - Scarlet Oak
84° 30'
35° 15'
45
56
32
59
56
45
33
16
33
04
33
45
53
41
N
Miles
0
0.5
1
0
0.5
1
1.5
Kilometers

exclusive of ruderal sites and areas along stream courses and spring runs. Footslopes and lowland areas along surface water features encompass the drainage habitat type. Lastly, ruderal habitat includes sites of current and historic anthropogenic disturbance such as trails, logging roads, and wildlife plots. Today, only trails are receiving human impact in the wilderness through recreation usage and trail maintenance by the Forest Service. To better characterize habitat preferences for taxa in GCW, additional descriptors incorporating topographic features and other landscape elements were enlisted for mountain slopes and drainages. These additions were utilized in the annotated checklist and have been described in Appendix A (p. 105).

A summary of the vegetation classification of GCW is provided in Table 7. Listed here are forest types comprising each community, their habitats, and areal extent. A more complete description of each community is given below.

Mixed cove forest. Three forest types comprise this community and their best development is along Poplar Springs Branch and Gee Creek. Although White Pine-Hemlock, Cove Hardwoods-White Pine-Hemlock, Yellow Poplar-White Oak-Red Oak forests are separable by their overstory dominants, they share a similar habitat type and possess mesophytic taxa. These features tie them together and support their alignment under a single forest community.

Cove Hardwoods-White Pine-Hemlock forests (41) are confined to mesic slopes and ravines in the gorge. Stand size is 71.6 ac (29.0 ha). As indicated by the type description, cove hardwoods, white pine, and hemlock are all

Table 7. Forest communities, forest type constituents, habitats, and acreages in Gee Creek Wilderness.

COMMUNITY/FOREST TYPE	HABITAT	ACREAGE
I. Mixed cove forest		
A. Cove Hardwoods-White Pine-Hemlock	Mesic lower slopes and ravines in gorge; primarily N and NW aspects; 1200-1880 ft (366-573 m) elev.	71.6
B. White Pine-Hemlock	Submesic-mesic sheltered footslopes and flats along major drainages; 1600-1900 ft (488-580 m) elev.	202.3
C. Yellow Poplar-White Oak-Red Oak	Submesic-mesic footslopes and flats at streamheads; 1820-2020 ft (555-616 m) elev.	68.9
II. Mixed oak forest		
A. Chestnut Oak-Scarlet Oak-Yellow Pine	Xeric-submesic rocky slopes, ridges, summits, and ravines; aspect variable; 1320-2560 ft (403-781 m) elev.	1011.9
B. White Oak-Red Oak-Hickory	Subxeric-mesic rocky slopes and ravines; NW aspect; 1040-1800 ft (317-549 m) elev.	57.4
C. Scarlet Oak	Xeric uplands and subxeric ravine and ridges on upper slopes above drainages; 1840-2120 ft (561-647 m) elev.	258.0

Table 7. (continued)

COMMUNITY/FOREST TYPE	HABITAT	ACREAGE
III. Pine dominated forest		
A. Virginia Pine	Xeric rocky slopes, ridges, and summits; S and SE aspects; 1080-2340 ft (329-714 m) elev.	390.8
B. Virginia Pine-Oak	Xeric rocky slopes and ridges; S and SE aspects 1320-2100 ft (403-640 m) elev.	378.0
C. Shortleaf Pine	Xeric uplands; 2020-2120 ft (616-647 m) elev.	131.0

components of this forest. The most common cove hardwood taxa are *Acer saccharum*, *Aesculus flava*, *Carya ovata*, and *Liriodendron tulipifera*. Less common, accessory hardwoods are *Fraxinus americana*, *Quercus rubra*, and *Tilia americana* var. *heterophylla*. *Pinus strobus* and *Tsuga canadensis* are scattered throughout. A rich understory layer is found under the cove hardwoods. This layer can be interrupted and sparse on lower footslopes along Gee Creek and sheltered ravines where *Rhododendron maximum* is prevalent. Characteristic understory species are *Aster divaricatus*, *Brachyelytrum erectum*, *Carex austrocaroliniana*, *Cimicifuga racemosa*, *Disporum lanuginosum*, *Dryopteris marginalis*, *Hepatica acutiloba*, *Heuchera villosa*, *Laportea canadensis*, *Sanguinaria canadensis*, *Sedum ternatum*, *Thalictrum thalictroides*, *Trillium luteum*, and *Viola rostrata*. One hundred twenty-three species were recorded in this forest type; 36 taxa are found nowhere else in the wilderness.

Interposed between the Cove Hardwoods-White Pine-Hemlock and Yellow Poplar-White Oak-Red Oak forests along Gee Creek and Poplar Springs Branch are White Pine-Hemlock forests (04). Roughly 202 ac (81.8 ha) of the forest type were mapped and it constitutes nearly 60% of the mixed cove forest community acreage. These forests primarily occur on a mid-drainage position along the larger streams in the gorge. However, stringers of White Pine-Hemlock forests were observed along first-order perennial streams on Starr and Chestnut Mountains. These stringers, though, were too narrow to map at a 1:24000 scale, and were consequently excluded from Figure 5.

The most distinguishing character of White Pine-Hemlock forests is their low species richness. Only 52 species were recorded in this forest type. The overstory is dominanted by *Pinus strobus* and *Tsuga canadensis*, and the understory is typically a dense undergrowth of *Rhododendron maximum*. Hardwoods are scarce and most are found along the linear gaps created by stream courses. The most common ones are *Acer rubrum*, *Betula lenta*, and *Liriodendron tulipifera*. Like the overstory, the understory is species poor. Very few species were found growing beneath *Rhododendron maximum*. None are common or abundant. Some of the more regularly occurring species are *Galax urceolata*, *Hexastylis* spp., *Leucothoe fontanesiana*, *Mitchella repens*, *Polystichum acrostichoides*, *Viola hastata*, and *Trillium catesbaei*. Species richness increases where White Pine-Hemlock forests are transitional and more open such as at Iron Gap.

The White Pine-Hemlock forests grade into the third forest type constituent of the mixed cove forest community, the Yellow Poplar-White Oak-Red Oak forests (56). These forests occur at the streamheads of Poplar Springs Branch and Gee Creek. The Poplar Springs Branch stand is 31.6 ac (12.8 ha), and the Gee Creek stand is 37.3 ac (15.1 ha). Moisture conditions are slightly drier at both sites than in the rest of the mixed cove forest community and have been designated as submesic for slopes bordering these creeks. Only flats directly adjacent to the stream courses with moist to wet soils have been characterized as mesic.

One feature that distinguishes this forest from the Cove Hardwoods-White Pine-Hemlock and White Pine-Hemlock forests is the presence of *Quercus alba* in the canopy. Oaks are more common in the mixed oak forest and pine dominated forest communities. The type name for code 56 also identifies red oak as a dominant. Its listing as a dominant is misleading and inaccurate in describing the forests in GCW. During numerous surveys at both streamheads, only one *Q. falcata* occurrence was recorded along Poplar Springs Branch and no *Q. rubra* was seen at either streamhead. The only other oak species present there were *Q. coccinea* and *Q. velutina*. Both are rare on lower, submesic footslopes near the stream courses. They are more common where forest type 56 grades into xeric forests (e.g., types 32, 45, and 59). Forest type 56 was selected from USDA Forest Service (1992) because no other hardwood type listed best described the forests present in GCW. A more accurate type name for the forests observed at Poplar Springs Branch and Gee Creek would be "Yellow Poplar-White Oak-Red Maple" since *Acer rubrum* is a canopy dominant at both streamheads.

Even though the forest types at Gee Creek and Poplar Springs Branch are the same, they have different understory species compositions. Open flat areas along the spring runs at the head of Gee Creek are dominanted by ferns and shrubs, and a few herbs. Common species are *Arundinaria gigantea*, *Galax urceolata*, *Juncus gymnocarpus*, *Kalmia latifolia*, *Osmunda cinnamomea*, *Rhododendron periclymenoides*, and *Thelypteris noveboracensis*. Less common

herbaceous plants are *Carex debilis* var. *debilis*, *Chasmanthium laxum*, and *Viola primulifolia*. Where the spring runs converge to form Gee Creek, the understory is dominanted by *Rhododendron maximum* and the herbaceous layer essentially disappears.

More herbs and fewer shrubs are found on flats and lower footslopes along Poplar Springs Branch. Common species are *Aster macrophyllus*, *Hexastylis arifolia* var. *ruthii*, *Smilacina racemosa*, *Thalictrum thalictroides*, *Thelypteris noveboracensis*, *Trillium catesbaei*, and *Viola hastata*. Ericaceous shrubs such as *Vaccinium* spp. and *Kalmia latifolia* are more prevalent on upper footslopes. Down along Poplar Springs Branch *R. maximum* is the dominant shrub with *Alnus serrulata* scattered along the stream margin in openings. One hundred four taxa were recorded in forest type 56.

Mixed oak forest. Three forest types comprise this community and together they cover over 50% of the landscape. Unifying characteristics of Chestnut Oak-Scarlet Oak-Yellow Pine, White Oak-Red Oak-Hickory, and Scarlet Oak forests are the predominance of oaks and habitat similarity. Although they occur on specific areas of the landscape with different topographic features, they are confined primarily to xeric mountain slopes and uplands.

Among all the forest types in GCW, the Chestnut Oak-Scarlet Oak-Yellow Pine type (45) is the most widespread and extensive. A total of 1012 ac (410 ha) was mapped in GCW with the largest contiguous stand on Chestnut Mountain. Smaller stands occur on Starr Mountain, Gee Knob, and Poplar

Springs Ridge. *Quercus montana* and *Q. coccinea* are the dominant oak species followed in importance by *Q. velutina*, *Q. alba*, and *Q. rubra*, in that order. *Carya glabra* and *C. pallida* are occasional canopy species. The pine component consists of *Pinus virginiana* and *P. strobus*, rather than "Yellow Pine" as the type name denotes. Like forest type 56, no hardwood-pine type listed in USDA Forest Service (1992) exactly fits the forests observed in GCW, but type 45 is the closest. A more accurate type name for it would be "Chestnut Oak-Scarlet Oak-Virginia Pine." Virginia pine is common on xeric, rocky ridges and exposed slopes whereas white pine is more common on subxeric-submesic slopes and uplands.

Underneath the mixed hardwood or hardwood-pine canopy, the subcanopy layer is composed of deciduous hardwoods such as *Acer rubrum*, *Cornus florida*, *Oxydendrum arboreum*, and *Nyssa sylvatica*. The understory layer is predominately ericaceous shrubs and tree saplings and seedlings. Frequently encountered shrubs are *Kalmia latifolia*, *Vaccinium* spp., and *Viburnum acerifolium*. The herbaceous layer is sparse, especially in closed canopy situations.

Four areas in forest type 45 support the greatest numbers of species: spring heads, forest edges, exposed ridge slopes and outcrops, and sheltered ravines. Submesic-mesic elements are found around the spring heads (e.g., *Carex atlantica*, *Chasmanthium laxum*, *Chelone glabra*, *Medeola virginiana*, *and Osmunda* spp.) and in ravines (e.g., *Dryopteris marginalis*, *Hexastylis arifolia* var.

ruthii, and *Rhododendron maximum*). Xeric-subxeric elements are found along forest edges (e.g., *Lysimachia quadrifolia*, *Microstegium vimineum*, *Potentilla simplex*, and *Viola sororia*) and exposed ridge slopes and outcrops (e.g., *Coreopsis major*, *Hedyotis purpurea*, *Panicum commutatum* var. *ashei*, and *Solidago arguta* var. *caroliniana*).

Two hundred thirty taxa were recorded in forest type 45. Field surveys were primarily conducted on Chestnut Mountain, and efforts were concentrated in the species rich areas described above. In particular, forest edges and open woods found between 2400-2560 ft (732-781 m) on Chestnut Mountain were targeted. Common understory species encountered here were *Carex pensylvanica*, *Hedyotis purpurea*, *Iris verna*, *Lysimachia quadrifolia*, *Scutellaria pseudoserrata*, and *Vaccinium hirsutum*.

The second, more restricted forest type constituent of the mixed oak forest community is the White Oak-Red Oak-Hickory (53). This forest is located in the mouth of the gorge and is distributed from Gee Creek to the upper NW facing slopes of Gee Knob. This single forest stand is 57.4 ac (23.2 ha). Moisture conditions vary from mesic along Gee Creek to subxeric on mid-upper slopes. Bedrock outcrops of Nebo sandstone are common and canopy cover is less dense on lower-midslopes. Stand density increases toward the summit of Gee Knob and the canopy becomes closed. Species richness is greatest below 1600 ft (488 m) and is best illustrated in two regions: (1) open to partially open rocky slopes and (2) mesic footslopes along Gee Creek. Above this altitudinal

boundary herbaceous species abundance and richness are less in comparison. The forest, here, begins to transition to forest type 45 and xeric elements typical of mixed oak-pine woods, especially ericaceous shrubs, become dominant.

The canopy dominants in forest type 53 are *Quercus montana*, *Q. rubra*, and *Carya glabra*. *Quercus alba* was not observed on Gee Knob. Like forest types 45 and 56, the type name associated with code 53 does not accurately depict the canopy dominants present in this forest. However, no hardwood type listed in USDA Forest Service (1992) was a closer match. A more accurate type name for it would be "Chestnut Oak-Red Oak-Hickory."

Below 1120 ft (342 m) on Gee Knob, the overstory is a complex mixture of mesic cove species (e.g., *Liriodendron tulipifera*, *Ostrya virginiana*, *Tilia americana* var. *heterophylla*, and *Tsuga canadensis*), *Carya glabra*, *Quercus* spp., and *Pinus virginiana*. Since this transitional stand has closer affinity to forest type 53 than forest types 33 and 41, it was mapped as such. Species compositions and habitat conditions more characteristic for forest type 53 occur above 1120 ft (342 m). Although hardwoods trees are the dominant elements on these slopes, pine trees are still a component. *Pinus virginiana* is localized to ridge points, rock outcrops, and upper slopes of Gee Knob. The mesic cove hardwoods observed along Gee Creek disappear above 1120 ft (342 m).

Common subcanopy species on lower-midslopes on Gee Knob are *Chionanthus virginicus* and *Ptelea trifoliata*. Common understory species are *Aster divaricatus*, *Dryopteris marginalis*, *Hedyotis purpurea*, *Heuchera*

americana, *Panicum boscii*, *Parthenocissus quinquefolia*, *Philadelphus inodorus*, *Vaccinium corymbosum*, and *Viburnum acerifolium*. One hundred forty-three taxa were recorded in forest type 53.

The third and last forest type constituent of the mixed oak forest community is the Scarlet Oak type (59). This forest occurs on Poplar Springs Ridge and covers 258 ac (104 ha). Its boundaries include most of the ridge except where it narrows to the southwest and where it approaches Forest Road 297. General habitat conditions are xeric uplands on the main ridge and subxeric footslopes above Poplar Springs Branch and Gee Creek. Herbaceous vegetation is sparse except on the upper footslopes along Poplar Springs Branch and logging roads on the main ridge. Several taxa recorded in forest type 59 were only observed at these localities. Throughout the rest of the forest, herbaceous taxa are scattered amongst an understory strata composed predominantly of shrubs, tree seedlings, and saplings.

Dominant canopy species are *Quercus coccinea*, *Q. velutina*, and *Pinus virginiana*. Accessory canopy species are *Acer rubrum*, *Carya glabra*, *C. pallida*, *Nyssa sylvatica*, and *P. echinata*. Common subcanopy species are *Acer rubrum*, *Cornus florida*, *Nyssa sylvatica*, and *Oxydendrum arboreum*. Common understory species of the xeric uplands are *Desmodium nudiflorum*, *Iris verna*, *Ligusticum canadense*, *Pyrularia pubera*, *Vaccinium* spp., and *Vitis rotundifolia*. Examples of herbaceous taxa restricted to either logging roads or footslopes above Poplar Springs Branch are *Agrimonia parviflora*, *Aureolaria virginica*,

Desmodium laevigatum, *Eupatorium purpureum*, *Lespedeza intermedia*, *Luzula multiflora*, and *Solidago erecta*. Seventy-five taxa were recorded in forest type 59.

Pine dominated forest. Three forest types comprise this community and cover approximately 35% of the landscape. This community is dominant on Starr Mountain where it is represented by Virginia Pine and Virginia Pine-Oak forest types. Shortleaf Pine forests, the third forest type constituent, are found on Poplar Springs Ridge. Unifying characteristics of the Virginia Pine, Virginia Pine-Oak, and Shortleaf Pine forests are threefold. One, *Pinus virginiana* and/or *P. echinata* are canopy dominants. Two, ericaceous shrubs are dominant elements in the understory. Three, they share a common habitat type--xeric mountain slopes and uplands.

Virginia Pine forests (33) are extensive and comprise the largest segment of the community. The largest stand occurs on Starr Mountain and totals 319 ac (129 ha). Additional stands occur on Poplar Springs Ridge and Chestnut Mountain. They total 27.3 ac (11.1 ha) and 44.5 ac (18.0 ha), respectively. These forests are found on some of the driest, most exposed slopes in GCW. Occasionally, they occur in pure stands on exposed ridges and slopes. Species diversity (i.e., richness and abundance) is highest on the open, south and southeast facing slopes of Starr Mountain from 1080-1800 ft (329-549 m). This region contains massive quartzite outcrops and scree.

The dominant canopy species of Virginia Pine forests is *Pinus virginiana*. Pure stands of *P. virginiana* are uncommon and typically an oak element (i.e., *Quercus montana* or *Q. coccinea*) is present. Sometimes *P. virginiana* is mixed with *P. echinata*. Good examples of this pine mixture are on mid-upper south facing slopes of Starr Mountain and Poplar Springs Ridge. Common subcanopy species are *Acer rubrum*, *Nyssa sylvatica*, *Oxydendrum arboreum*, and *Sassafras albidum*. The understory is dominated by two elements, ericaceous shrubs and hardwood saplings and seedlings. Common shrubs are *Kalmia latifolia*, *Vaccinium pallidum*, and *V. stamineum*. Dense, almost impenetrable heath layers of *K. latifolia* and *Vaccinium* spp. are found on ridges and steep slopes with shallow soils. Generally, the only species found growing underneath this heath layer are *Galax urceolata* and *Smilax rotundifolia*. The hardwood saplings and seedlings consist primarily of the common subcanopy taxa listed above, but oaks, hickories, and chestnut also occur in this understory layer. In comparison to the woody elements, herbaceous or evergreen understory taxa are considerably less abundant and diverse. This is especially true in closed canopy woods. Regularly occurring taxa in this setting are *Chimaphila maculata*, *Iris verna*, *Pteridium aquilinum*, *Panicum dichotomum* var. *dichotomum*, and *Smilax* spp. Trail-sides, woodland edges, and open slopes support the greatest variety of species in the Virginia Pine forests. The best example is on the lower, south facing slopes of Starr Mountain near the wilderness boundary. Common understory species here are *Carex pensylvanica*, *Coreopsis major*, *Euphorbia*

corollata, *Hypericum prolificum*, *Panicum commutatum* var. *ashei*, and *Solidago arguta* var. *caroliniana*. One hundred seventy-six taxa were recorded in forest type 33.

Virginia Pine forests on Starr Mountain grade into the Virginia Pine-Oak forests (16). Its stand size is 378 ac (153 ha) and habitat conditions are xeric rocky slopes and ridges. It is distributed on the sideslopes of Starr Mountain and positioned between mesic forests along drainages and the xeric pine forests on upper slopes and summit. Above the confluence of Poplar Springs Branch and Gee Creek, it grades into forest type 45 as it nears the stream course.

The relative dominance of pine and oak in the overstory varies throughout the forest and slope configuration appears to be a primary control. *Pinus virginiana* is dominant on convex slopes and *Quercus* spp. on concave slopes. The best mixture is found on even slopes with moderate relief. The decision to segregate this mixed pine-hardwood stand from the Virginia Pine type was difficult since *P. virginiana* is a common crown species. However, I felt that the designation of a mixed type best reflected the observed forest heterogeneity. Calculation of importance values by quantitative sampling may not support this decision.

Forest characteristics are very similar to the Virginia Pine forest type. It is primarily a closed canopy forest except where canopy breaks have been created by logging roads or bedrock outcrops. Both forest types share the same dominant elements in the understory and species compositions are similar. Their only major differences are in their canopy cover and species numbers.

Eighty-five taxa were recorded in the Virginia Pine-Oak forests while 176 were recorded in the Virginia Pine forests. This difference may be attributable to canopy closure. Species richness was observed to be considerably lower in closed canopy situations than where canopy cover is broken and slopes are exposed. Open canopy situations and exposed slopes are uncommon in the Virginia Pine-Oak forest. In contrast, they are more prevalent in the Virginia Pine forests, although, they are confined to the Starr Mountain stand.

Shortleaf Pine forests (32), the third forest type constituent of the pine dominated community, is similar in species composition, understory characteristics, and habitat conditions to the other pine forest types. It is distributed on the headslopes of Gee Creek along the wilderness boundary. Topography consists of low ridges and shallow ravines that slope gradually in a south and southwesterly direction. Moisture conditions are xeric. The stand is 131 ac (53 ha), and the forest canopy is closed except on logging roads and the location of a wildlife plot.

The dominant overstory species throughout the stand is *Pinus echinata*. Accessory canopy species are *Acer rubrum*, *P. virginiana*, *Quercus coccinea*, and *Q. velutina*. Hardwoods become more prevalent toward the streamhead of Gee Creek and southwesterly to the main ridgeline of Poplar Springs Ridge. Common subcanopy species are *A. rubrum*, *Nyssa sylvatica*, and *Oxydendrum arboreum*. Understory characteristics are identical to closed canopy situations in forest types 16 and 33. The dominant elements are ericaceous shrubs and

tree saplings and seedlings. The herbaceous layer is sparse. Characteristic herbaceous elements are *Iris verna*, *Pteridium aquilinum*, and *Stenanthium gramineum*. Other, occasionally encountered taxa in the understory are *Chimaphila maculata*, *Cypripedium acaule*, *Epigaea repens*, *Hexastylis arifolia* var. *ruthii*, *Monotropa uniflora*, *Polystichum acrostichoides*, and *Smilax* spp. Fifty-five taxa were recorded in forest type 32.

Significant Botanical Records

Approximately 68% of the taxa recorded in GCW represent new records for the wilderness and surrounding mountains. Forty-five taxa represent county records according to TENN dot maps. These records are listed in Table A-5 (p. 177). Eleven taxa found in GCW represent physiographic records, range extensions, or uncommon floristic elements on the Tennessee Blue Ridge. Table 8 lists these taxa and reason(s) for their significance.

Table 8. Taxa in Gee Creek Wilderness which are uncommon floristic elements or have phytogeographic significance.

TAXA	SIGNIFICANCE
Amelanchier sanguinea	State-listed threatened; GCW locale is a Polk Co. record and represents the southernmost station in its geographic distribution. Species is more common in northeastern United States and southern Canada.
Asplenium bradleyi	Starr Mountain population in GCW and Chestnut Mountain population outside the wilderness boundary represent the only Blue Ridge records in Tennessee. Species is typically found on the Cumberland Plateau in the state.
Aster laevis var. *concinnus*	GCW locale is a Polk Co. record and it represents the third documented county for it in Tennessee. Species is irregularly distributed through the Southern Appalachian region.
Calamagrostis porteri subsp. *porteri*	State-listed endangered; GCW locale is only the second documented occurrence in Tennessee and represents a Blue Ridge record and a Polk Co. record. GCW locale is a range extension and represents the southernmost station in its geographic distribution.
Carex joorii	GCW locale is a Polk Co. record and represents one of only two documented sites on the Blue Ridge in Tennessee. Species is more common westward on Cumberland Plateau and Highland Rim.
Coreopsis X *delphinifolia*	State-listed endangered; second record in Tennessee and represents a slight range extension northward in Polk Co. Species is chiefly distributed on the Coastal Plain and Piedmont; the Blue Ridge populations in Tennessee are disjuncts.

Table 8. (continued)

TAXA	SIGNIFICANCE
Hydrangea quercifolia	GCW locale is a Blue Ridge record and Polk Co. record; species is chiefly distributed south of Tennessee in Alabama, Georgia, and Mississippi..
Polymnia laevigata	State-listed special concern; GCW locale is a Blue Ridge record, Polk Co. record, and the easternmost station in its geographic distribution. Habitat conditions are atypical--quartzite talus rather than limestone talus or basic soils.
Scutellaria pseudoserrata	Southern Appalachian endemic; GCW locale is only the fifth record on the Blue Ridge in Tennessee. Known from only seven counties in the state; most are on the Cumberland Plateau.
Stachys sp.	GCW plants may represent a new species, distinct from *S. eplingii*, or possibly variety thereof. If taxonomically distinct, the GCW populations would represent a state record, a Polk Co. record, and a Blue Ridge record. (see annotation for discussion)
Trichostema setaceum	GCW locale is a Blue Ridge record and Polk Co. record; only known from four counties in Tennessee. Species is chiefly distributed on the Coastal Plain, irregularly further inland on Appalachian physiographic provinces.

CHAPTER 6

DISCUSSION

The Southern Appalachians has one of the richest floras in temperate North America and is a region of complex geology, landforms, and landscape features. One physiographic province, the Blue Ridge, embodies the botanical richness and environmental diversity of the Southern Appalachians. Gee Creek Wilderness is part of this region and shares floristic elements, vegetation types, and habitats found on the Blue Ridge and characteristic for its geology, landforms, and topographic attributes. The derivation of the flora, floristic elements, and forests present in GCW may be explained through historical phytogeography, paleoclimatic shifts and biotic responses, current habitat conditions, and recent anthropogenic and exotic pest impacts. The author will address each of these factors in discussing the floristics of GCW.

Paleovegetation

The Southern Appalachian landscape has been suitable for plant occupancy since the last orogenic episode (Alleghenian) in the late Carboniferous-Permian, well before the advent of angiosperms or deciduous forests (Wofford 1989). The Appalachian land mass was constructed through a sequence of compressional events dating back to Ordovician and ended climactically in the late Paleozoic with the collision of North America and Africa (Hatcher 1987). This collision

produced a Blue Ridge-Piedmont composite crystalline thrust sheet that moved westward, deforming and uplifting Precambrian and Cambrian strata deposited on the continental margins (Redington 1978, Hatcher and Goldberg 1991). These folded and faulted highlands have been eroded and subdued through geologic time to form the present day Blue Ridge province. Lateral compression in the Alleghanian orogeny deformed Paleozoic sedimentary strata in the miogeosyncline to form the Appalachian Ridges and slowly uplifted the innermost belt of the miogeosyncline to form the Appalachian Plateaus (Redington 1978). These original landforms have evolved into the Valley and Ridge and Appalachians Plateaus provinces, respectively.

A logical step in exploring the floristic elements in the modern flora is to reconstruct North American paleovegetation that is part of its foundation, notably the Arcto-Tertiary Geoflora. Although angiosperms are indisputably of Cretaceous origin and distributed world-wide by the late Upper Cretaceous (Graham 1993), a major extinction event caused by a low temperature excursion (0° C for 1-2 months) at the Cretaceous-Tertiary boundary eliminated many megathermal evergreen angiosperms and most mesothermal evergreen angiosperms in the Northern Hemisphere (Wolfe and Upchurch 1987). Prior to this event, deciduous vegetation was rare, except at high paleolatitudes (> 66° N). In the Paleocene, though, deciduous vegetation was much more common and deciduous angiosperms were recognizable elements in both megathermal and mesothermal vegetation (Wolfe and Upchurch 1987). It was not until the

Tertiary that deciduous angiosperms diversified, especially in mesothermal climates. It is conceivable that the Appalachian highlands, although within the megathermal climatic province in the Cretaceous and early Tertiary, supported mesothermal vegetation at higher elevations. The crest of the Blue Ridge was close to 14000 ft (4000 m) in the Cretaceous. Since that time, the Blue Ridge has eroded 7900 ft (2400 m) based on an average erosion rate of 1.6×10^{-3} in/yr (0.04 mm/yr) (Hack 1989). Environmental diversity on upland landforms would probably have supported a mosaic of vegetation types like we see today. Unfortunately, montane landscapes generally lack the proper depositional environments to preserve plant deposits (Axelrod 1952). Without fossil evidence to help reconstruct paleoclimates and plant assemblages, we can only speculate what may have existed in the Appalachian mountains.

The concept of a transcontinental temperate flora or "geoflora" in the middle-upper latitudes in the Northern Hemisphere during the Tertiary was developed in the first half of the twentieth century and became widely accepted. However, this concept has been recently challenged by Wolfe (1978, 1980) and Tiffney (1985). The contention rests on three points: (1) uniformity and composition of the Arcto-Tertiary Geoflora, (2) time of development, and (3) latitudinal distribution. Proponents of the geofloral concept, like Chaney (1947) and Axelrod (1952), note that temperate broad-leaved forests of the Arcto-Tertiary Geoflora were widespread over the northern high latitudes by the Eocene.. However, Paleocene and Eocene fossil assemblages from Alaska do not support

their interpretation according to Wolfe (1975, 1978, 1980). These assemblages indicate broad-leaved evergreen vegetation to paleolatitude 60° north. Poleward during the Paleocene, vegetation was broad-leaved deciduous but it had megathermal-mesothermal affinities with no resemblance to any modern temperate forest (Wolfe 1980). Wolfe (1975) referred to this mixture of megathermal and mesothermal elements as the boreotropical flora. The Eocene floras, though less well represented in the fossil record at high paleolatitudes, indicate megathermal conditions and a tropical vegetation type (Wolfe 1978). Not until the terminal Eocene event (i.e., climatic deterioration), did temperate broad-leaved deciduous vegetation replace megathermal-mesothermal broad-leaved evergreen vegetation at middle to high paleolatitudes (Wolfe 1978, 1980). The altitudinal factor of the Appalachian highlands introduces the possibility that temperate forests developed here before the terminal Eocene event. This factor led Braun (1947) to conclude that hardwood forests occurred on Appalachian uplands by Eocene time and consisted of a large proportion of genera of contemporary deciduous forests. Regardless of opposing views on the uniformity and physiognomy of these middle-high latitude forests in the Tertiary, some modern seed plants of the Southern Appalachians are undeniably derived from this flora.

Residual elements of the Arcto-Tertiary Geoflora are illustrated by numerous disjunct taxa shared between eastern Asia (e.g., China) and eastern North America (e.g., Southern Appalachians). Asa Gray is credited with recognizing

the floristic similarities between eastern Asia and eastern North America (Boufford and Spongberg 1983). Shared taxa, both on a generic and subgeneric level, between Japan and North America led Gray (1859) to suggest that a temperate flora was once distributed across the Northern Hemisphere. He reasoned that the anomalous or disjunct distribution pattern between eastern North American and Japanese taxa was developed by a process of migration and floristic interchange followed by a disruption of ranges caused by climatic decline (i.e. glaciation). He listed 65 genera with closely related or identical species found in eastern North America and Japan, excluding western North America and Europe. Genera in GCW which share this anomalous or "disjunct" distribution pattern are provided in Table 9. Between 62 (Wood 1972) and 74 (Thorne 1972) genera exhibit an eastern Asia-eastern North America distribution pattern. These genera are predominantly woody and are from primitive families (Li 1972). This bicentric pattern and other floristic similarities of eastern Asia and eastern North America have resulted from three variables--geography, climate, and evolution (Tiffney 1985). The Bering land bridge and the North Atlantic connections in the Northern Hemisphere formed direct and indirect geographic links, respectively, between the Asian and North American continents and permitted floristic interchange and species migration. These connections were eventually disrupted in the middle Tertiary (for the North Atlantic land bridge) and late Tertiary-Quaternary (for the Bering land bridge) by climatic decline and oceanic transgression (McKenna 1983). Elimination of

Table 9. Eastern Asia and eastern North America disjunct genera represented in the flora of Gee Creek Wilderness. Compiled from Li (1952), Wood (1972), and Wofford (1989b).

Apios	*Liriodendron*
Astilbe	*Magnolia*
Brachyelytrum	*Mitchella*
Carya	*Nyssa*
Caulophyllum	*Panax*
Chionanthus	*Parthenocissus*
Decumaria	*Podophyllum*
Epigaea	*Pyrularia*
Halesia	*Sassafras*
Hamamelis	*Tipularia*
Lindera	

these migration routes separated the Asian and North American floras and limited floristic interchange to long distance dispersal which is not considered to be a significant contributor to existing floristic similarities (Tiffney 1985). Regional climates selected for adapted vegetation types and climatic oscillations in the Cenozoic have forced species migrations, disrupted distributions, and caused extinctions. Both geography and climate are causal factors in the diversification and evolution of plant groups in the Tertiary. Extant genera and closely allied species from eastern Asia and eastern North America have descended from common ancestors of Tertiary floras. These remnants of the geoflora exist, in particular, in eastern China and the Southern Appalachians because they are relict temperature centers, not subjected to Pleistocene glaciations and have favorable climates (Hsu 1983). Their easterly localities of their temperate deciduous forests place them near a warm moisture bearing ocean, and they have similar latitudinal ranges (Li 1972). Other physical factors such as soil type, temperature, and rainfall are but a few characteristics which bear resemblance (Li 1972).

To summarize, the floristic similarities of eastern Asia and eastern North America have resulted from many factors. Both have high plant species diversities and many genera in common. The disjunct distribution of these genera has been caused by the combined effects of plate tectonics, Cenozoic climatic changes and correspondent vegetational changes (i.e., evolution, extinction, and geographic shifting), and geographic and climatic similarities of

both regions in the Holocene. The observed patterns of distribution have only been established in recent geologic history. The modern forest communities of eastern China and the Southern Appalachians have a mixture of endemic and introduced taxa and a third component of disjunct genera. These disjuncts were derived from a common source, the Arcto-Tertiary Geoflora. The vegetational features of both are a product of past and present environmental conditions.

The location and species compositions of modern deciduous forests in the Northern Hemisphere were thought by Chaney (1947) and Axelrod (1952) to be the same as the temperate deciduous forests of the Tertiary. Braun (1947, 1950) and Cain (1943) support their position by acknowledging that modern cove hardwood or mixed mesophytic forests of the Southern Appalachians are Tertiary relics, unchanged for millions of years. Apparently when the progressive cooling trend began in the Oligocene (38 million years ago (m.y.a.)) followed by decreasing rainfall and increasing seasonality of temperatures in the Pliocene (5 m.y.a), the Arcto-Tertiary Geoflora was fragmented (Chaney 1947, Axelrod 1952). These fragments shifted intact into regions of suitable climate. The eastern United States became a refugium for the temperate deciduous forests which characterized the Arcto-Tertiary Geoflora.

The comparison between ancient and modern forests has been challenged and shown to be inaccurate by the Quaternary pollen record (Davis 1983). The composition and location of modern temperate forests in eastern North America have been modified by past glacial and interglacial intervals (Davis 1983).

Quaternary climate change has had a profound effect on vegetation, in terms of composition, physiognomy, and geographic location (Watts 1980, Delcourt and Delcourt 1987). Seventeen glacial cycles have been recorded in the Quaternary in the past 1.6 million years (Bowen 1978, Morrison 1991). The most recent glaciation was the Wisconsinan, dating from 75 k.y.a. to 10 k.y.a. (k.y.a. = thousand years ago) (Morrison 1991). Glacial maximum occurred 20-18 k.y.a (Morrison 1991). Deglaciation commenced 15-14 k.y.a. and was nearly complete by 9 k.y.a. (Morrison 1991).

Pleistocene floras of the southeastern United States pre-dating the Wisconsinan glaciation are relatively unknown (Watts 1980). The main reason for lacking a paleovegetation record in the early-middle Quaternary is inadequate fossil-pollen and macrofossil data (Smiley et al. 1991). This stems from the following: (1) lack of appropriate fossil-pollen sites, (2) fossil-pollen preservation in older sediments is poor and inconsistent, (3) radiocarbon dating is not suitable with older organics (> 50 k.y.), and (4) difficulties listed above dissuade palynologists from conducting studies with older materials (Smiley et al. 1991). In contrast, the late Quaternary palynological data are considerably more extensive and complete (see Delcourt and Delcourt 1987).

Utilizing the fossil pollen record from sites in eastern North America, a series of broad-scale paleovegetation maps have been developed (Delcourt and Delcourt 1981). Generalizations made from these maps will be used to describe the vegetation history of the Southern Appalachians (includes GCW) from 18

k.y.a to 200 yr. B.P. (years before present) on roughly 4000 yr. increments.

At the height of Wisconsin glaciation (ca 18 k.y.a.), boreal forests comprised of jack pine and subdominants of spruce and fir occurred on mid-lower elevations in the Appalachians. Alpine tundra was found along the Appalachian mountain chain at high elevations. An ecotonal assemblage of mixed conifers and northern hardwoods occurred between the boreal forests to the north and warm temperate forests (i.e., oak-hickory-southern pine) to the south. This ecotone occurred between 33° and 34° north latitude and was approximately coincident with the mean winter position of the atmospheric polar frontal zone (Delcourt and Delcourt 1983). Mixed hardwood forests were restricted to valleys along major rivers in the southeast (e.g., Mississippi River).

At 14 k.y.a. the Laurentide Ice Sheet was melting and receding northward in response to climatic warming. Deglaciated terrain was rapidly invaded by spruce forest, and tundra retreated northward. Alpine tundra remained on high mountain crests in the Appalachians. The ecotonal region of mixed conifers-northern hardwood forests expanded northward and eastward replacing jack pine-spruce forests. Warm temperate forests remained in place on the Atlantic and Gulf Coastal Plains.

In transition to interglacial conditions (ca. 10 k.y.a.), significant vegetational changes occurred in the Appalachians. Forests replaced alpine tundra, and boreal forest remnants of spruce and fir were retained at high elevations. Mixed conifers-northern hardwood forests and boreal forests were displaced to the

northern Appalachians. Mixed hardwood forests expanded between 34° and 37° north latitude, a region formerly occupied by cool temperate and boreal forests.

In the mid-Holocene (8-4 k.y.a.), profound vegetational changes occurred in the southeastern United States and the midwest. Peak warming and increased aridity during the mid-Holocene Hypsithermal Interval (Wright 1976) promoted the eastward expansion of prairie and oak savannah in the Great Plains. The oak-hickory and mixed hardwood forests became limited in areal extent. The latter was restricted to the Cumberland and Allegheny Plateaus, and the former to the Interior Low Plateaus. Southern pine forests replaced oak-hickory-southern pine forests as the dominant vegetation type on the sandy uplands of the Atlantic and Gulf Coastal Plain. The oak-hickory-southern pine forests were restricted to the Piedmont and Ozark and Ouachita Mountains. Oak-chestnut forests became the dominant vegetation type in the Central and Southern Appalachians. Spruce-fir forests were retained at high elevations in the Blue Ridge.

Since 5 k.y.a. the geographic locations of present day vegetation types have been relatively stable in eastern North America. However, climatic cooling and increased precipitation after the Hypsithermal Interval have led to the southward expansion of boreal forest and the westward shift of the prairie/forest boundary in the Great Plains. No changes in vegetation types at the formation and sub-formation level were apparent in the Appalachians before major European settlement (200 yr. B.P.).

The biogeographic affinities of present day taxa in the Southern Appalachians and GCW reflect the late Quaternary species migrations and vegetational history of the region. Wofford (1989b) lists several taxa present in east Tennessee which are remnants of late Quaternary boreal forests that invaded the Southern Appalachians during the Wisconsin glacial maximum. Some intraneous northern taxa in GCW (e.g., *Aster macrophyllus* and *Anemone quinquefolia*) and extraneous northern taxa (e.g., *Amelanchier sanguinea*) are recognized components of cold temperate boreal forests. Post-glacial warming eliminated taxa from GCW with strict ecological requirements such as microthermal climates. Elevations on Starr and Chestnut Mountains are not high enough to create this type of environment. This may also help to explain why their are fewer extraneous northern taxa than extraneous southern taxa represented in the flora. The expansion of Coastal Plain taxa into east Tennessee during the mid-Holocene Hypsithermal Interval (Wofford 1989b) is yet more evidence of climate controlled species migrations in the late Quaternary. Examples of Coastal Plain taxa in GCW with their northernmost distribution in Tennessee are *Carex joorii*, *Callicarpa americana*, *Coreopsis* X *delphinifolia*, and *Hydrangea quercifolia*. These southern elements have migrated to the mountains and become established in favorable habitats.

The biogeographic analysis of GCW taxa reveals the component nature of the flora. It has five distinct elements: Appalachian, southern, northern, endemic, and general. These floristic elements are typical for the Tennessee

Blue Ridge (see Wofford 1989b). Reasoning along these lines, the flora of GCW is similar to the rest of Tennessee Blue Ridge, but habitat conditions and geography control the relative importance of each of these elements. Geographic analysis from both a regional and range-wide perspective yielded similar results. They showed that at least 50% of the plant species in GCW range throughout both eastern North America and Tennessee. The remaining 50% have more restricted distributions.

Results of the regional geographic analysis showed that east, east-peripheral, and east-middle taxa comprise about one-third of the flora. The proportion of east taxa exceeds that of east-peripheral and east-middle taxa; this condition was expected. In general, Blue Ridge taxa that are not strict endemics typically range west across the state where favorable habitat exists. This occurs primarily on the Valley and Ridge, Cumberland Plateau, and occasionally the Highland Rim. Shanks (1958) found that species which transgress physiographic boundaries predominantly occur at sites with similar edaphic features. Similarities in elevational gradients, surficial geology, and geographic proximity help explain why four species with distributional centers on the Cumberland Plateau are present in GCW and rare elsewhere on the Blue Ridge. These four plants are *Asplenium bradleyi*, *Carex joorii*, *Parnassia asarifolia*, and *Scutellaria pseudoserrata*. Additional species in GCW which appear more common westward on the Cumberland Plateau, Valley and Ridge, and/or Highland Rim include *Euphorbia mercurialina*, *Hypericum prolificum*, *Isotria*

verticillata, *Kuhnia eupatorioides*, and *Ptelea trifoliata*.

Results from the range-wide geographic analysis showed that the flora consists predominantly of intraneous taxa. The mid-latitudinal position of Tennessee makes this state a crossroads for many species. The physiographic continuance of the Appalachian provinces north and south of the state allow plants to extend across its political boundaries. Only 15 taxa in GCW reach their distributional limits in Tennessee. Consequently, these extraneous taxa are a minor component of the flora. The percentage of northern species (22.4%) exceeds the nearly equivalent percentages of southern (14.7%) and Appalachian/endemic taxa (13.2%). Excluding intraneous general taxa, the flora has a decided northern affinity. Reasons for this condition are two-fold. One, mountain climates and habitats are more suitable for northern taxa than southern taxa. Two, the Blue Ridge was a migratory route for northern taxa during Quaternary climate change (Wofford 1989b), and these plants have persisted through periods of vegetational instability. Cain (1930) considered the Southern Appalachians as a "stronghold" for northern taxa during glacial times, and that these species have migrated northward since deglaciation. He believed that most of these northern species are glacial relics.

Land Use History

Other factors relevant in shaping the vegetation types and species composition of GCW have been its land use history. Paleo-Indians were an

integral part of the natural history of Tennessee dating back at least 11000 yr. B.P. (Satz 1979). The lands comprising GCW were part of the Cherokee Nation in the region called the Overhill Towns (Folsmbee et al. 1969, Satz 1979). There is no evidence of Indian habitation in the wilderness, but they probably hunted these grounds and periodically burned them to improve it for wildlife (Q. Bass, pers. comm.).

After the Cherokee were removed in 1838 from southeast Tennessee (Folsmbee et al. 1969, Satz 1979), their lands were open for exploitation. Three activities in GCW have impacted vegetation on a large scale. They are limonite prospecting, quartzite mining, and logging. Evidence for these activities include cave pits, trenching, quartzite processing structures, absence of old growth forests, sawmill sets, and logging roads. For a review of these activities see USDA Forest Service (1974) and Gazdik and Behum (1983).

The exact effects of these various activities are difficult to ascertain, but certainly plants were impacted indirectly by habitat modification and directly by destruction or targeted removal during prospecting, mining, and logging operations. Local extinctions may have occurred and population sizes may have decreased, but without floristic and ecological data pre-dating these activities, we cannot determine their extent. Timber harvesting of the entire wilderness occurred as recently as the 1940s (USDA Forest Service 1974). The only remnants of primary forest consist of a few large *Liriodendron tulipifera*, *Acer saccharum*, and *Tsuga canadensis* left along Gee Creek in the gorge. Duffy and

Meier (1992) addressed the impacts of clear cutting to understory herbs and concluded that species richness and cover in secondary mixed mesophytic forests in the Southern Appalachians may never recover to their primary forest conditions or, perhaps, take several centuries to do so. In spite of the disturbance history of GCW, the rarity of introduced species (< 2%) in the flora is signficant. Presently, these taxa are essentially restricted to trails, wildlife plots, and logging roads.

Perhaps the single greatest impact or modification to the forests of GCW was the loss of *Castanea dentata* (American chestnut). Once a canopy dominant throughout the Southern Appalachians, American chestnut was eliminated from the canopy layer by a blight fungus, *Endothia parasitica* (Murr.) A. & A. The last vestiges of this once important and valuable tree are its root sprouts. Their widespread occurrence in the mixed oak forest and pine dominanted forest communities suggest its former dominance or codominance. Additional evidence to support its dominance in GCW is from Killebrew (1876). He listed it as one of the four canopy species found on sideslopes of ravines and spur ridges on Starr Mountain. Furthermore, Chestnut Mountain likely got its name for the chestnut forests that once covered its slopes.

Analyses of tree compositions and their importance values in postblight chestnut forests in the Southern Appalachians (Woods and Shanks 1959, McCormick and Platt 1980, and Stephenson 1985) suggest that successional changes are site specific and lack regional consistency. Either an oak-hickory

association (McCormick and Platt 1980) or an oak association-complex (Woods and Shanks 1959, Stephenson 1985) will develop. It is difficult to ascertain which condition has developed in GCW because logging activities postblight confound the successional dynamics. Based on my field observations, the mixed oak forest community more closely aligns with the oak association-complex (sensu Woods and Shanks 1959). Hickory is a part of this complex, but it is generally a minor component. I would not classify hickory as a codominant or dominant replacement species for chestnut in GCW.

In conclusion, GCW has a rich diversity of vascular plants. Its modern flora is derived, in part, from the Arcto-Tertiary Geoflora that once existed in the middle-upper paleolatitudes in the Northern Hemisphere. Cenozoic climatic decline disrupted the geoflora and climatic oscillations from glacial to interglacial intervals in the late Quaternary have forced species migrations and caused biomes to shift their geographic positions. Species have migrated to and from the region during the late Quaternary in response to changing climates.

During Wisconsin glacial maximum, boreal forests covered the mountains of GCW. With climatic amelioration boreal forests were replaced by cool temperate mixed forests of northern hardwoods and conifers. By the mid-Holocene oak-chestnut forests had become established as the dominant vegetation type.

The mixture of floristic elements (Appalachian, southern, northern, endemic, and general) that characterizes the flora of GCW may be accounted from the

vegetational history of the region. The relative importance of each element is controlled largely by the present physical environment and its geographic location. Quantification of these floristic elements on a regional and range-wide scale revealed that most taxa range throughout eastern North America and Tennessee. The rest have more restricted distributions. The proportion of Appalachian and northern elements in the flora is greater than southern elements because the mountain climates and habitats favor these taxa. Apparently when boreal and cool temperate species migrated northward in response to Wisconsin deglaciation and the Hypsithermal Interval, the Blue Ridge served as a migratory route and many plants persisted in microhabitats approximating those found in higher northern latitudes. During the Hypsithermal Interval Coastal Plain species invaded the mountains of Tennessee and some have persisted. This may help to explain the extraneous southern taxa present in GCW. An intriguing result from the regional geographic analysis was the identification of a minor Cumberland Plateau affinity. Similarities in lithologies (primarily sandstones and shales) and elevational gradients may help explain the occurrence of four Cumberland Plateau species on the Blue Ridge.

Lastly, the land use history and the chestnut blight have modified the forests of GCW. Today, the only old growth that remains is a small pocket of cove hardwoods along Gee Creek. In spite of the loss of American chestnut and the various human impacts to the wilderness, GCW still retains some rare and

unusual taxa and the floristic elements which characterize the Southern Appalachians.

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APPENDICES

APPENDIX A

ANNOTATED CHECKLIST

OF THE

VASCULAR FLORA OF GEE CREEK WILDERNESS

FORMAT

The annotated checklist is organized after Wofford and Kral (1993) with respect to the arrangement of taxa, synopsis, and summary. Three general categories of vascular plants are recognized (i.e. Pteridophyta, Gymnospermae, and Angiospermae). The Angiospermae is divided into two subcategories, monocots and dicots. Plant families are arranged alphabetically under their respective category. Taxa restricted to disturbed sites, introduced taxa, and Tennessee county records are tabulated and placed at the end of the checklist in Tables A-2, A-3, and A-4.

The primary sources used for plant identification were Gleason (1952), Cronquist (1980), Wofford (1989a), and Isely (1990). Secondary sources consulted to provide additional information about taxa in specific families and aid in determinations were Fernald (1950) -- **Lamiaceae**, **Poaceae**; Radford et al. (1964) -- **Asteraceae**, **Lamiaceae**; Hitchcock (1971) -- **Poaceae**, Godfrey and Wooten (1979) -- **Cyperaceae**, **Poaceae**; Duncan & Duncan (1988) -- **Fagaceae**, **Juglandaceae**; Godfrey (1988) -- **Fagaceae**, **Juglandaceae**, **Vitaceae**; Gleason and Cronquist (1991) -- **Juncaceae**, **Poaceae**, **Rosaceae**. Various taxonomic monographs and treatments were used as supplements. In cases where these sources were used exclusively for determinations, they are mentioned in the annotation.

Taxonomy and nomenclature generally follow Wofford and Kral (1993).

Authors of plant names are written by the forms set in Brummitt and Powell (1992). Differences in taxonomic and nomenclatural interpretations by the author are discussed in the taxon description. Synonyms are listed in brackets for selected taxa which may need taxonomic and/or nomenclatural clarification. Typical subspecies and varieties are implied and omitted from the scientific name unless taxonomically informative or necessary in order to distinguish from other documented taxa of the same species.

The remainder of the checklist consists of descriptive information for each taxon. This information is composed of five basic points: (1) frequency of occurrence, (2) moisture regimes, (3) forests, (4) elevation, and (5) general habitats and locations. Other information occasionally included are comments on taxonomy, sources used for identification, and population size.

(1) Frequency of occurrence. Qualitative measurement utilized to describe a taxon's abundance in an area. Seven terms were defined by White (1982):

very rare -	a single locale, few individuals
rare -	one or two localities, generally small populations
scarce -	several localities, or scattered small populations
infrequent -	scattered localities throughout
occasional -	well distributed, but not anywhere abundant
frequent -	generally encountered
common -	characteristic and dominant

Usage of these terms follows Murrell and Wofford (1987). The term applied to each taxon was based on the author's impression of its abundance and distribution in GCW.

(2) Moisture regimes. Moisture conditions were characterized for taxa locations in GCW. The terminology used to describe the moisture regimes is after Whittaker (1956). He proposed four moisture classes as a means by which to group taxa together which have similar positions on topographic and moisture gradients. The four moisture classes are xeric, subxeric, submesic, and mesic. Xeric (dry) and mesic (moist or wet) represent the extremes whereas subxeric and submesic represent intermediate moisture conditions. Moisture regimes were based on vegetation characteristics and topographic parameters such as slope position and shape, proximity to drainages, aspect, degree of exposure, relief, and geology. Slope position, aspect, and degree of exposure were key variables in the determination of moisture regimes. No attempt was made to quantify the environmental variables and standardize the moisture classes. Localities which typify each moisture regime are:

xeric -	Starr Mountain on exposed slopes with S-SW and SE aspects; pine and mixed woodlands
subxeric -	Chestnut Mountain on upper slopes with NW aspect; mixed woodland
submesic -	Upper reaches of Poplar Branch and Gee Creek; mixed deciduous woodland
mesic -	Chestnut Mountain on footslopes along Gee Creek; mixed deciduous woodland

Generally, there is a transition from mesic to submesic conditions along Gee Creek and Poplar Springs Branch to subxeric and xeric conditions on the slopes of Chestnut Mountain and Starr Mountain, respectively. Localized changes in physical features of the landscape can modify the moisture regime and lead to

changes in the forest community. Forest types and transitions were essential to recognizing environmental changes.

Sites where modification to moisture regimes is apparent are at springs, seeps, and streams on xeric slopes. Taxa located around these surface water features are usually absent from the surrounding area. Moisture regimes described for taxa around these features are based on their proximity to it. Areas in or along the margin of the spring runs, seeps, and streams which have a saturated substrate are considered mesic sites. A moisture gradient is formed by increasing the distance from the water source. The position of moisture regimes along the gradient is dependent on the distance from the surface water feature, topography, and vegetation.

(3) Forests. Forest descriptions are divided into two parts, a forest type classification following USDA Forest Service (1992) and an overstory characterization. Forest type codes are listed beside the overstory characterization in the annotation. The definitions for the type codes are as follow:

04 - White Pine-Hemlock
16 - Virginia Pine-Oak
32 - Shortleaf Pine
33 - Virginia Pine
41 - Cove Hardwoods-White Pine-Hemlock
45 - Chestnut Oak-Scarlet Oak-Yellow Pine
53 - White Oak-Red Oak-Hickory
56 - Yellow Poplar-White Oak-Red Oak
59 - Scarlet Oak

The overstory characterization consists of four categories:

1. mixed deciduous woodland - dominants in the canopy are deciduous hardwoods; softwoods are accessory species or absent

2. mixed woodland - mixture of deciduous hardwoods and softwoods in the canopy

3. pine woodland - yellow pine (i.e., shortleaf and Virginia pine) dominant in the canopy

4. pine/hemlock woodland - white pine and/or eastern hemlock dominant in canopy

These categories are used to provide more detail about the overstory at a species' location. The forest type classification describes the overstory in a general area whereas the overstory characterization targets the immediate site. In certain cases a forest type classification by itself is inadequate and sometimes misleading for taxa which occupy specific areas in a forest stand with unique canopy characteristics. These areas are often too small to be recognized and mapped as different forest types. Therefore, the overstory characterization is utilized to discriminate these sites from the surrounding forest stand. Prime examples of this situation occur along stream courses on Starr Mountain where the forest stands have been mapped as Virginia pine type. These stream courses harbor plant assemblages uncharacteristic for the surrounding area. This includes understory as well as subcanopy and canopy species. There is usually a concentration of deciduous hardwoods around the drainage, especially at the streamhead. A species located in this area would be described as occurring in a <u>mixed deciduous woodland - 33</u> rather than in a pine woodland - 33. The forest is more accurately depicted by citing the appropriate overstory

characterization rather than the one implied by the forest type. Simply listing the type code by itself and assuming the implied overstory characterization would be inaccurate in describing the habitat preference of this species.

(4) Elevation. Elevation or elevation ranges are approximations which were determined by using USGS 7.5 minute topographic maps for GCW.

(5) General habitats and locations. Three general habitat types are defined in GCW: (1) mountain slopes, (2) ruderal (i.e., trails, logging roads, and wildlife plots), and (3) drainages. Since habitats one and three are general, more detailed topographic features are incorporated in each to yield a more precise habitat characterization. For example, habitat one includes areas described in the checklist as: wooded slopes (w/ and w/o scree and outcrops), rocky slopes, rock outcrops, bouldery-blocky diamicta, and upland woods (applied to upper elevations and crests of mountains and Poplar Springs Ridge). Habitat three includes types of surface water features, location (e.g., headwaters, streamhead, and upper reaches), and woodland modifiers (e.g., rich woods, low woods).

Several topographic modifiers are incorporated in the annotations. A commonly used topographic position term in the checklist is footslope. Here, the term is divided into upper and lower types and defined on the basis of elevation above Poplar Springs Branch or Gee Creek. Lower footslope is the area from the stream margin to an elevation of 75 ft (23 m) above. Upper footslope is the area from the elevational boundary of the lower footslope plus 75 ft (23 m). Other terminology used is slope configuration (concave and convex), slope

aspect, and exposure.

General locations are cited for a majority of the taxa, and more specific locations are noted for rare species. It is recommended that the reader use Figures 3, 4, and 5 when reading the annotations.

ANNOTATED CHECKLIST

PTERIDOPHYTA

ASPLENIACEAE

Asplenium bradleyi D.C.Eaton --Rare. S facing rock outcrops on Starr Mt. Xeric sites. Pine woodland - 33. 1600 ft. Epipetric on quartzite.

A. montanum Willd. --Rare. Footslopes of Gee Knob on N-NW facing rock outcrops. Submesic sites. Mixed deciduous woodlands - 41, 53. 1160-1360 ft. Epipetric on quartzite.

A. platyneuron (L.) Britton, Sterns, & Poggenb. --Occasional. Xeric-subxeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45. 1200-2360 ft. Rock outcrops, rocky slopes, former wildlife plots, and logging rds.

A. rhizophyllum L. --Rare. Two small populations located near FT 191 on lower footslope of Chestnut Mt. with NW aspect. Mesic sites. Mixed deciduous woodland - 41. 1520 ft. On rock outcrop and quartzite blocks.

A. trichomanes L. --Scarce. Mesic sites. Mixed woodland- 04; mixed deciduous woodland - 41. 1400-1860 ft. Shaded rock outcrops with mixed lithologies (quartzite and siltstone) along drainages. Occurs primarily on Chestnut Mt. in forest type 41 on steep slopes in lower portion of Gee Creek drainage.

BLECHNACEAE

Woodwardia areolata (L.) T.Moore --Rare. Two localities in GCW - (1) Gee Creek headwaters in low woods, esp. along springs and intermittent areas of Gee Creek; (2) intermittent streamhead on Starr Mt. Mesic sites. Mixed deciduous woodlands - 33, 56. 1940-2100 ft.

DENNSTAEDTIACEAE

Dennstaedtia punctilobula (Michx.) T.Moore --Infrequent. Xeric-submesic sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 53, 56. 1200-2560 ft. Upland woods and wooded slopes along drainages (w/ and w/o scree and outcrops). Sites on lower footslopes along Poplar Springs Branch and Gee Creek and upland woods on Chestnut Mt.

Pteridium aquilinum (L.) Kuhn
[*P. aquilinum* (L.) Kuhn var. *latiusculum* (Desv.) Underw. ex A.Heller; *P. aquilinum* (L.) Kuhn var. *pseudocaudatum* (Clute) A.Heller]
--Occasional. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 32, 45. 1200-2400 ft. Trails, logging rds., upland woods, and rocky slopes. Primarily distributed on rocky slopes of Starr Mt. Sites also noted on Gee Knob, Chestnut Mt., and xeric woods peripheral to the head of Gee Creek.

DRYOPTERIDACEAE

Dryopteris marginalis (L.) A.Gray --Occasional. Subxeric-mesic sites. Mixed woodlands - 04, 33; mixed deciduous woodlands - 41, 45, 53. 1080-2500 ft. Lower slopes and rich woods along drainages, bouldery-blocky diamicta, rocky slopes, and springs. Common on lower footslopes of Chestnut Mt. (forest type 41) and Gee Knob (forest type 53). In drier woods, found around shaded springs and concave slopes.

Polystichum acrostichoides (Michx.) Schott --Frequent. All moisture regimes, overstory characterizations, and forest types. Xeric-mesic sites. 1080-2560 ft. Low woods along drainages, wooded slopes (w/ and w/o scree and outcrops), and upland woods. Common in low woods at Iron Gap (forest type 04).

HYMENOPHYLLACEAE

Trichomanes petersii A.Gray --Rare. Two localities in GCW - (1) lower footslope of Chestnut Mt. on rock outcrop with NW aspect; (2) rock outcrop with NW aspect along drainage with SW x NE orientation on Starr Mt. Mesic sites. Mixed deciduous woodland - 41; mixed woodland - 04. 1440, 1860 ft. Both populations found on basal portions of sheltered outcrops on siltstone.

ISOETACEAE

Isoetes caroliniana (A.A.Eaton) Luebke --Rare. Two localities in GCW - (1) W side of Poplar Springs Branch along edge; (2) depression at spring locality below Chestnut Mt. summit. Mesic sites. Mixed deciduous woodlands - 45, 56. 1800, 2440 ft.

LYCOPODIACEAE

Diphasiastrum digitatum (A.Braun) Holub
[*Lycopodium digitatum* A.Braun]
--Scarce. Subxeric-submesic sites. Mixed woodlands - 04, 45, 56. 1600-1980 ft. Logging rds. Scattered sites on Poplar Springs Ridge and Starr Mt. generally under *Pinus strobus* saplings.

Huperzia lucidula (Michx.) Trevis.
[*Lycopodium lucidulum* Michx.]
--Rare. Concave slope on Poplar Springs Ridge with NW aspect. Submesic site. Mixed deciduous woodland - 56. 1900 ft. Small population.

OPHIOGLOSSACEAE

Botrychium biternatum (Sav.) Underw. --Very rare. FT 191 near boundary. Mesic site. Mixed deciduous woodland - 53. 1040 ft. Scattered individuals on trail and trail margin.

B. virginianum (L.) Sw. --Infrequent. Xeric-submesic sites. Mixed woodlands - 45, 59; mixed deciduous woodlands - 45, 53. 1080-2520 ft. Upland woods, rocky slopes, FT 191, and logging rds.

OSMUNDACEAE

Osmunda cinnamomea L. --Infrequent. Mesic sites. Mixed deciduous woodlands - 16, 45, 56. 1900-2440 ft. Streamheads and springs. Large population in NE concavity at the head of Gee Creek. Less abundant at streamheads on upper slopes of Starr Mt.

O. regalis L. var. *spectabilis* (Willd.) A.Gray --Scarce. Mesic sites. Mixed deciduous woodlands - 16, 33, 45, 56. 1900-2440 ft. Streamheads and springs. Occurring in same habitats as *Osmunda cinnamomea* but less abundant and not as widespread.

POLYPODIACEAE

Polypodium appalachianum Haufler & Windham --Occasional. Xeric-mesic sites. Mixed woodland - 33; mixed deciduous woodlands - 41, 45, 53. 1080-2500 ft. Rock outcrops, rocky slopes, and fallen trees. Frequently encountered on footslopes of Gee Knob and Chestnut Mt. Haufler and Windham (1991) propose that this species is distinct from *P. virginianum* L. on the basis of ploidy level and morphology. Both have similar distributions

and occur in Tennessee. The variability in gross morphological characters used to distinguish them such as blade shape and shape of pinnae apices makes field recognition more difficult. It is possible that *P. virginianum* occurs in GCW and was overlooked by the author.

P. polypodioides (L.) Watt var. *michauxianum* Weath. --Scarce. Subxeric-mesic sites. Mixed woodland - 45; mixed deciduous woodlands - 33, 41, 53. 1240-1640 ft. Rocky slopes and rock outcrops; full to partially shaded sites. Small populations scattered on Gee Knob, Starr Mt., and Chestnut Mt.

SINOPTERIDACEAE

Adiantum pedatum L. --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 56. 1440-2200 ft. FT 104 margin and rich woods along drainages and ravines. Occurs primarily on shaded lower footslopes and ravines on Chestnut Mt. in shale (forest type 41). Other sites on gentle footslopes along Poplar Springs Branch in upper reaches.

Cheilanthes tomentosa Link --Very rare. Epipetric on exposed outcrop with mixed lithology on Starr Mt. Xeric site. Pine woodland - 33. 1120 ft. Outcrop located on lower footslope with S-SW aspect.

THELYPTERIDACEAE

Thelypteris noveboracensis (L.) Nieuwl. --Frequent. Xeric-mesic sites. Mixed deciduous woodlands - 16, 33, 45, 56. 1900-2440 ft. Streamheads, shaded slopes along drainages, rocky slopes, and FT 104. Common in submesic-mesic woods on gentle footslopes along Poplar Springs Branch and headwaters of Gee Creek.

VITTARIACEAE

Vittaria appalachiana Farrar & Mickel --Scarce. Mesic sites. Mixed deciduous woodlands - 41, 53. 1160-1400 ft. Epipetric on quartzite outcrops. Populations were noted on footslopes of Gee Knob. Rock outcrops on footslopes of Chestnut Mt. were not checked in detail, but it is highly probably that it occurs there as well.

WOODSIACEAE

Athyrium filix-femina (L.) Roth subsp. *asplenioides* (Michx.) Hultén --Scarce. Mesic sites. Mixed deciduous woodlands - 16, 33, 45, 56. 1960-2100 ft. Streamheads, springs, and shaded slopes. Occasional on gentle

footslopes along Poplar Springs Branch in upper reaches and concave slopes at headwaters of Gee Creek.

Cystopteris protrusa (Weath.) Blasdell --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1480-1560 ft. Rich woods in gorge. Distributed on footslopes of Chestnut Mt., esp. along bases of outcrops.

Deparia acrostichoides (Sw.) M.Kato
[*Athyrium thelypterioides* (Michx.) Desv.]
--Rare. Rich woods in NW x SE oriented ravine S of Gee Creek between Chestnut Mt. and Gee Knob. Mesic sites. Mixed deciduous woodland - 41. 1400-1720 ft. Found along base of ravine in shale.

GYMNOSPERMAE

CUPRESSACEAE

Juniperus virginiana L. --Scarce. Xeric-submesic sites. Pine woodland- 33; mixed deciduous woodlands - 45, 53. 1080-2560 ft. Exposed rocky slopes, FT 191, and upland woods. A few scattered trees on exposed slopes of Starr Mt. with S-SW aspect; seedlings present along FT 191 near GCW boundary; and two small trees on summit of Chestnut Mt.

PINACEAE

Pinus echinata Mill. --Frequent. Xeric-subxeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45, 59; mixed deciduous woodland - 59. 1400-2380 ft. Upland woods and rocky slopes. Occurs primarily on Starr Mt. and Poplar Springs Ridge (forest types 16, 32, and 59). Less frequent on exposed slopes and ridges where *Pinus virginiana* is generally dominant.

P. strobus L. --Common. All moisture regimes, forest types, and overstory characterizations. 1080-2560 ft. Low woods and slopes along drainages, rocky slopes, upland woods, and logging rds. Common along drainages in forest type 04; generally on upper slopes along drainages less mesic than areas occupied by *Tsuga canadensis* (L.) Carriére. Frequent on lower rocky slopes to upland woods on Chestnut Mt. (forest type 45).

P. virginiana Mill. --Common. Xeric-subxeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 53, 59. 1080-2560 ft. Upland woods, rocky slopes, ridges, and disturbed areas. Dominant canopy species on Starr Mt. (forest types 16 and 33), SW region

of Poplar Springs Ridge (forest type 33), and slopes S-SE of Iron Gap on Chestnut Mt. (forest type 33). Frequent recolonizing species at former wildlife plots and logging rds. in xeric woods.

Tsuga canadensis (L.) Carrière --Frequent. Xeric-mesic sites. Pine/hemlock woodland - 04; mixed woodlands - 04, 16, 33, 45; mixed deciduous woodlands - 41, 53, 56. 1080-2520 ft. Stream drainages, rich woods, and rocky slopes. Primarily distributed along footslopes of Poplar Springs Branch and Gee Creek (forest types 04 and 41). Reaches higher elevations on Starr and Chestnut Mts. along stream drainages and shaded concave slopes.

A N G I O S P E R M A E: Monocots

AMARYLLIDACEAE

Hypoxis hirsuta (L.) Coville --Scarce. Xeric sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 45. 1960-2560 ft. Upland woods and FT 104. Restricted to Chestnut Mt. and typically found on FT 104; partially shaded to exposed sites.

ARACEAE

Arisaema triphyllum (L.) Schott --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1240-1600 ft. Rich woods on shaded slopes and ravines in lower portion of gorge.

COMMELINACEAE

Tradescantia subaspera KerGawl. --Scarce. Xeric-submesic sites. Pine woodland - 33; mixed deciduous woodlands - 33, 45. 1120-2200 ft. Shaded to exposed rocky slopes in quartzite and shale. Largest population on exposed lower footslope of Starr Mt. with S-SW aspect along quartzite outcrops.

CYPERACEAE

Carex atlantica L.H.Bailey
[*C. incomperta* E.P.Bicknell]
--Scarce. Mesic sites. Mixed deciduous woodlands - 16, 33, 45, 56. 1940-2440 ft. Streamheads and springs.

C. austrocaroliniana L.H.Bailey --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1220-1800 ft. Rich woods on rocky footslopes and ravines in gorge. Infrequent.

C. debilis Michx. var. *debilis* --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 45, 56. 2000-2440 ft. Streamheads, springs, and concave slopes along drainages.

C. debilis Michx. var. *pubera* A.Gray --Infrequent. Submesic-mesic sites. Mixed deciduous woodlands - 16, 33, 45, 56. 1840-2440 ft. Streamheads, springs, and concave slopes along drainages. This taxon occupies the same habitats as *C. debilis* var. *debilis* which creates the potential for intermixing of populations. Occasionally, both occur together. Perigynia pubescence is the key diagnostic feature separating the two varieties. Variety *pubera* has pubescent perigynia whereas they are glabrous in var. *debilis*. Morphology of pistillate scales is a secondary character used for separation in Gleason and Cronquist (1991), and their description indicates the possibility of variation. At localities where the two varieties occur together, no plants observed had both glabrous and pubescent perigynia. Whether or not perigynia pubescence is a worthy character used for separation is arguable. Wofford and Kral (1993) do not seem to think that the varieties are distinct enough to warrant recognition. In the genus *Carex* it is my impression that species are narrowly defined by characters which are sometimes impossible to discern in the field. Since perigynia pubescence appears to be consistent in the field and is an an acceptable character in species delimitations of *Carex*, I have chosen to recognize the varieties which follow the taxonomy of Gleason and Cronquist (1991).

C. digitalis Willd. --Infrequent. Xeric-mesic sites. Pine woodland - 33; mixed woodland - 45; mixed deciduous woodlands - 41, 53. 1200-2560 ft. Upland woods, rocky slopes, and trails. Primarily distributed on xeric-subxeric sites along FT 190 and FT 104. Other sites on rocky slopes of Gee Knob and Chestnut Mt.; partially shaded.

C. intumescens Rudge --Scarce. Mesic sites. Mixed deciduous woodlands - 45, 56. 1820-2440 ft. Streamheads, low areas along drainages, and springs. Populations at headwaters of Gee Creek, upper reaches of Poplar Springs Branch, and spring near Chestnut Mt. summit.

C. joorii L.H.Bailey --Very rare. Small population located in a shallow depression on Poplar Springs Ridge. Submesic site. Mixed deciduous woodland - 59. 2080 ft. Seasonally wet depression with *Sphagnum* around NW margin. In September, 1992, when the voucher was collected (Wyrick

999), the depression was dry.

C. laxiflora Lam. --Very rare. Sideslope of Gee Knob with NW aspect at base of rock outcrop peripheral to bouldery-blocky diamicton; partially shaded. Submesic site. Mixed deciduous woodland - 53. 1280 ft.

C. lurida Wahlenb. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 45, 56. 2000-2440 ft. Streamheads and springs.

C. nigromarginata Schwein. --Rare. Rocky footslopes of Starr Mt. with S-SE aspect. Xeric sites. Mixed woodland - 33; mixed deciduous woodland - 33. 1280-1400 ft.

C. pensylvanica Lam. --Common. Xeric-submesic sites. Pine woodland - 33; mixed woodlands - 16, 45, 53; mixed deciduous woodland - 45. 1080-2560 ft. Upland woods, trails, and rocky slopes. Common at xeric to subxeric sites on exposed slopes and ridges, esp. on Starr Mt. Primarily in pine and mixed woodlands in forest types 16, 33, and 45. Scarce in closed woods and submesic areas.

C. platyphylla J.Carey --Scarce. Mesic sites. Mixed deciduous woodlands - 41, 53. 1120-1880 ft. Rocky slopes and drainages. Three localities in GCW: Gee Creek drainage, rocky footslopes on Chestnut Mt., and partially shaded ravine w/seep on Chestnut Mt.

C. purpurifera Mack. --Rare. NW x SE oriented ravines on Chestnut Mt. to edge of FT 104. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45. 1560-1960 ft. Sideslopes of ravines in shale and FT 104 margin.

C. swanii (Fernald) Mack. --Very rare. FT 104 approaching summit of Chestnut Mt. Xeric site. Mixed deciduous woodland - 45. 2480 ft. Abundance may be underestimated because of similarity to *C. virescens* Willd.

C. tribuloides Wahlenb. --Very rare. Spring on Chestnut Mt. near summit in shallow drainage. Mesic site. Mixed deciduous woodland - 45. 2440 ft. Population size = 5 plants.

C. virescens Willd. --Scarce. Xeric-submesic sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 53. 1120-2480 ft. Rocky footslopes on Gee Knob and FT 104 and FT 190.

Scirpus polyphyllus Vahl --Very rare. FT 104 in depression intermittently filled with water. Submesic site. Mixed deciduous woodland - 45. 2440 ft. Small

population restricted to the depression.

Scleria oligantha Michx. --Michx. Very rare. Logging rd. on Starr Mt. in a partially open area. Xeric site. Mixed woodland - 16. 1700 ft. Small population.

DIOSCOREACEAE

Dioscorea villosa L. --Occasional. Subxeric-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 33, 45, 53, 56. 1080-2000 ft. Rocky slopes and drainages. Sites on Gee Knob, Chestnut Mt., and footslopes along Poplar Springs Branch and Gee Creek. Reaches highest elevations on Chestnut Mt. in forest type 45.

IRIDACEAE

Iris cristata Sol. --Infrequent. Subxeric-mesic sites. Mixed deciduous woodlands - 33, 41, 45, 53, 56. 1200-2000 ft. Wooded slopes primarily along drainages and shaded trail margins. Sites on footslopes along Poplar Springs Branch and Gee Creek, shaded midslopes on Gee Knob, and FT 104 and FT 191.

I. verna L. var. *smalliana* Fernald ex M.E.Edwards --Common. Xeric-submesic sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45; mixed deciduous woodlands - 56, 59. 1400-2560 ft. Common in xeric upland woods on Starr Mt. and Poplar Springs Ridge.

Sisyrinchium mucronatum Michx. --Very rare. Former wildlife plot growing under *Malus angustifolia* (Aiton) Michx. and *Pinus virginiana* on Poplar Springs Ridge. Xeric site. Mixed woodland - 32. 2120 ft. Small population near clearing.

JUNCACEAE

Juncus debilis A.Gray --Rare. Headwaters of Gee Creek around springs. Mesic sites. Mixed deciduous woodland - 56. 1980-2000 ft.

J. effusus L. --Very rare. Seep on Starr Mt. logging rd. Mesic site. Mixed woodland - 16. 1800 ft. Four caespitose plants at site.

J. gymnocarpus Coville --Occasional. Submesic-mesic sites. Mixed woodland - 33; mixed deciduous woodlands - 16, 33, 45, 56. 1900-2440 ft. Streamheads and springs. Of the seven populations noted in GCW, four

are found along trails (two on FT 104 and two on Starr Mt. logging rds.).

J. tenuis Willd. --Rare. FT 104 approaching Chestnut Mt. summit from Iron Gap. Xeric sites. Mixed deciduous woodland - 45. 2300-2440 ft. Plants scattered along trail.

Luzula multiflora (Retz.) Lej. --Rare. Two localities in GCW - (1) sideslope of Starr Mt. along logging rd.; (2) upper footslope of Poplar Springs Ridge with NW aspect. Xeric-subxeric sites. Mixed woodlands - 45, 59. 1920-2000 ft. This species and *L. echinata* (Small) F.J.Herm. are very similar morphologically and perhaps not distinct. Gleason and Cronquist (1991) separate the two on the basis of inflorescence branch divergence and geographic distribution. The suitability of these characters for delimiting the taxa at the species level is questionable. Branch divergence may be an artifact of plant pressing during specimen preparation or, in living plants, a result of age and environmental effects. Using geographic distributions as a distinguishing character in Tennessee is impractical because their ranges overlap. After examining TENN specimens, branch divergence alone is unsuitable as the key delimiting feature since there is so much variation. A combination of branch divergence and inflorescence shape appear to be more adequate. *L. multiflora* generally has cylindric to subcylindric glomerules; whereas, *L. echinata* has globose glomerules. Some specimens exhibit intermediate glomerule shapes which weakens this as a dependable character for separation. Inconsistency in recognized diagnostic features has led the author to agree with Wofford (1989) in recognizing a single variable species, *L. multiflora*.

LILIACEAE

Chamaelirium luteum (L.) A.Gray --Scarce. Xeric sites. Pine woodland - 32; mixed woodland - 45. 1980-2120 ft. Upland woods. Sites on Poplar Springs Ridge (forest type 32) and S-SW facing slopes above headwaters of Poplar Springs Branch near boundary (forest type 45).

Disporum lanuginosum (Michx.) G.Nicholson --Occasional. Submesic-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 45, 53, 56. 1300-1900 ft. Wooded slopes (w/ and w/o scree and outcrops) and rich woods along drainages. Localities on footslopes along Poplar Springs Branch and Gee Creek; rocky slopes on Gee Knob; and shaded ravines and slopes on Chestnut Mt. Occurs primarily in rich woods (forest type 41).

D. maculatum (Buckley) Britton --Rare. Two localities in GCW in rich woods on lower footslope of Chestnut Mt. near FT 191. Mesic sites. Mixed woodland

- 04; mixed deciduous woodland - 41. 1520-1540 ft. Total population size = 4 plants.

Erythronium americanum KerGawl. --Rare. Rich woods on lower footslope of Chestnut Mt. along FT 191 margin. Mesic site. Mixed deciduous woodland - 41. 1520 ft. Small population; partially shaded.

Lilium michauxii Poir. --Scarce. Xeric-submesic sites. Pine woodland - 33; mixed woodland - 16; mixed deciduous woodland - 53. 1280-2040 ft. Rocky slopes and FT 104 margin. Three localities in GCW: Open, rocky lower footslopes of Starr Mt. and Gee Knob, and FT 104 margin near Iron Gap.

Medeola virginiana L. --Infrequent. Submesic-mesic sites. Mixed woodland - 41; mixed deciduous woodlands - 33, 45, 56. 1240-2440 ft. Streamheads, springs, and wooded slopes along drainages (w/ and w/o scree and outcrops). Occurs primarily on footslopes of Poplar Springs Branch and headwaters of Gee Creek (forest type 56). Other sites on rocky footslopes of Gee Knob under *Tsuga canadensis* and *Rhododendron maximum* L., Starr Mt. at streamhead, and spring near Chestnut Mt. summit.

Polygonatum biflorum (Walter) Elliott
[*P. canaliculatum* (Muhl.) Pursh; *P. commutatum* (Schult.f.) A.Dietr.]
--Infrequent. Xeric-mesic sites. Pine woodland - 33; mixed deciduous woodlands - 33, 41, 45, 53. 1120-2560 ft. Rocky slopes, upland woods, and trails. Primarily on footslopes of Starr Mt. and Chestnut Mt. and along FT 190.

Smilacina racemosa (L.) Desf. --Common. Xeric-mesic sites. Pine woodlands - 32, 33; mixed woodland - 45; mixed deciduous woodlands - 33, 41, 45, 53, 56, 59. 1160-2560 ft. Exposed to shaded rocky slopes, upland woods, drainages, and trails. Frequently encountered along FT 190 (forest type 33), lower slopes on Gee Knob (forest type 53), and upland woods on Chestnut Mt. (forest types 33 and 45).

Stenanthium gramineum (KerGawl.) Morong --Occasional. Xeric-subxeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 32, 45, 59; mixed deciduous woodlands - 56, 59. 1700-2400 ft. Upland woods and rocky slopes. Occurs primarily in upland pine or mixed hardwood-pine forest types (32, 33, 45, and 59). Localities on Poplar Springs Ridge, Starr Mt., and Chestnut Mt.

Trillium catesbaei Elliott --Frequent. Xeric-mesic sites. Pine/hemlock woodland

- 04; pine woodlands - 32, 33; mixed woodlands - 04, 33, 45; mixed deciduous woodlands - 45, 53, 56, 59. 1040-2560 ft. Upland woods and drainages. Frequent on gentle footslopes and low woods along Poplar Springs Branch and Gee Creek at Iron Gap (forest types 04 and 56); frequent in xeric upland woods (forest types 33 and 45) on Chestnut Mt. Occasionally seen only vegetative under *Rhododendron maximum* and *Tsuga canadensis-Pinus strobus* overstory.

T. luteum (Muhl.) Harb.
[*T. cuneatum* Raf. var. *luteum* (Muhl.) H.E.Ahles]
--Scarce. Mesic sites. Mixed woodland - 04; mixed deciduous woodland - 41. 1520-1600 ft. Rich woods. Sites on rocky lower footslopes and ravines of Chestnut Mt.; infrequent.

T. vaseyi Harb.
[*T. erectum* L. var. *vaseyi* (Harb.) H.E.Ahles]
--Rare. Two localities in GCW - (1) sideslopes of NW x SE oriented ravine S of Gee Creek separating Chestnut Mt. and Gee Knob; (2) upper footslope of Chestnut Mt. with W-NW aspect near waterfall. Mesic sites. Mixed deciduous woodland - 41. 1400-1600 ft. Both localities in rich woods in shale.

Uvularia grandiflora Sm. --Very rare. Rich, low woods adjacent to FT 191 SW of primitive campsite. Mesic site. Mixed deciduous woodland - 41. 1520 ft.

U. perfoliata L. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 33, 41, 59. 1240-1960 ft. Rich woods and slopes along drainages. Three localities in GCW: rocky lower footslope of Starr Mt. above Gee Creek, low woods adjacent to FT 191 SW of primitive campsite, and upper footslopes on Poplar Springs Ridge.

ORCHIDACEAE

Corallorhiza odontorhiza (Willd.) Nutt. --Rare. Two localities in GCW - (1) FT 191 under *Rhododendron maximum* near edge of Gee Creek; (2) logging rd. on upper footslope of Starr Mt. under *Pinus strobus* saplings. Xeric, mesic sites. Mixed woodlands - 41, 45. 1400, 1900 ft. Rare at localities.

Cypripedium acaule Aiton --Scarce. Xeric-submesic sites. Pine woodland - 32; pine/hemlock woodland - 56; mixed woodland - 45; mixed deciduous woodlands - 32, 56, 59. 1960-2380 ft. Upland woods and slopes along drainages where pine is usually a dominant or co-dominant canopy species. Large population of grouped and scattered plants in forest type 32 E-NE of

Gee Creek. Other localities include upper slopes of Chestnut Mt., headwaters of Gee Creek, and a few scattered plants on upper footslope of Poplar Springs Ridge.

Goodyera pubescens (Willd.) R.Br. --Infrequent. Xeric-submesic sites. Pine woodlands - 32, 33; mixed woodlands - 45, 53. 1080-2340 ft. Trails and upland woods.

Isotria verticillata (Muhl. ex Willd.) Raf. --Rare. Two localities in GCW - (1) concave lower footslope of Poplar Springs Ridge on E side of Poplar Springs Branch; (2) spring drainage at the headwaters of Gee Creek. Submesic sites. Mixed deciduous woodland - 56. 1860, 2000 ft. Scarce at localities.

Liparis lilifolia (L.) Rich. ex Lindl. --Very rare. Poplar Springs Ridge under young growth *Pinus virginiana*. Xeric site. Pine woodland - 32. 2120 ft. Disturbed area logged prior to wilderness designation. Population size = 2 plants.

Malaxis unifolia Michx. --Rare. Two localities in GCW - (1) FT 191 near entrance to GCW; (2) FT 104. Xeric, submesic sites. Mixed woodland - 45; mixed deciduous woodland - 53. 1120, 2320 ft. Easily overlooked because of small size and inconspicuous inflorescence. Very rare at localities.

Platanthera ciliaris (L.) Lindl.
[*Habenaria ciliaris* (L.) R.Br.]
--Scarce. Xeric sites. Mixed woodland - 33; mixed deciduous woodland - 45. 2000-2400 ft. FT 104 and Starr Mt. logging rd.

P. clavellata (Michx.) Luer
[*Habenaria clavellata* (Michx.) Spreng.]
--Scarce. Mesic sites. Mixed deciduous woodlands - 33, 45, 56. 1940-2440 ft. Streamheads and springs. Localities at Gee Creek headwaters, Starr Mt. streamhead, and spring near Chestnut Mt. summit.

Tipularia discolor (Pursh) Nutt. --Scarce. Submesic-mesic sites. Mixed deciduous woodland - 53. 1120-1200 ft. FT 191 and rocky slopes. Sites on Gee Knob.

POACEAE

Agrostis perennans (Walter) Tuck. --Occasional. Xeric-mesic sites. Mixed woodlands - 04, 32, 33, 45; mixed deciduous woodlands - 41, 45, 53. 1120-2440 ft. Rocky slopes, rock outcrops, trails, and logging rds. Occurs

primarily on FT 191, FT 104, and logging rds. but not restricted to these sites. Scarce on rock outcrops and rocky lower slopes of Gee Knob.

Arundinaria gigantea (Walter) Muhl. --Rare. Concave slope with spring on E side of Gee Creek at headwaters. Submesic site. Mixed deciduous woodland - 56. 2000 ft. Partially shaded site with population concentrated NE of spring. Wofford and Kral (1993) recognize three subspecies of *A. gigantea*. The taxonomy in the checklist, however, follows Godfrey and Wooten (1979) and Gleason and Cronquist (1991), in not recognizing any subspecies.

Brachyelytrum erectum (Schreb.) P.Beauv. --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 53. 1200-1840 ft. Rich woods and rocky slopes. Occasional on shaded footslopes and ravines on Chestnut Mt; scarce on Gee Knob in forest type 53.

Calamagrostis porteri A.Gray subsp. *porteri* --Rare. Two localities in GCW - (1) upper footslope of Gee Knob on exposed quartzite outcrop with seep; (2) sideslope of Gee Knob on a partially shaded quartzite outcrop. Submesic sites. Mixed deciduous woodland - 53. 1280, 1480 ft. Taxonomy of *Calamagrostis* follows Greene (1984) in recognizing two subspecies of *C. porteri*. He lowers *C. insperata* Swallen to a subspecific status of *C. porteri* which differs from the taxonomic interpretations of Hitchcock (1971) and Gleason and Cronquist (1991). They consider *C. insperata* to be a distinct species from *C. porteri*. The typical subspecies was included to clarify the author's taxonomic interpretation. Wofford and Kral (1993) do not include any subspecies of *C. porteri* in their list. Their omission may reflect a different taxonomic interpretation or the redundancy associated with listing the typical subspecies.

Chasmanthium laxum (L.) H.O.Yates
[*Uniola laxa* (L.) Britton, Sterns & Poggenb.;]
--Infrequent. Subxeric-submesic sites. Mixed deciduous woodlands - 33, 45, 56. 1960-2440 ft. Streamheads, springs, and FT 104.

C. sessiliflorum (Poir.) H.O.Yates
[*Uniola sessiliflora* Poir.; *U. laxum* (L.) H.O.Yates ssp. *sessiflorum* (Poir.) L.G.Clark]
--Rare. Rocky lower footslope of Starr Mt. with SE aspect; shaded. Mesic site. Mixed woodland - 41. 1500 ft. Scarce under *Tsuga canadensis* and *Acer saccharum* approx. 30 ft. upslope from Gee Creek.

Dactylis glomerata L. --Very rare. FT 104 near trailhead at Iron Gap. Subxeric

site. Mixed woodland - 33. 1960 ft. The lower portion of FT 104 below the boundary was seeded with this species to prevent slope erosion. Its presence in GCW is probably accidental.

Danthonia compressa Austin --Rare. Summit of Chestnut Mt. along FT 104. Xeric sites. Mixed deciduous woodland - 45. 2440-2560 ft.

D. sericea Nutt. --Scarce. Xeric sites. Pine woodland - 33; mixed woodlands - 33, 45. 1120-2400 ft. Rocky slopes, rock outcrops, and trails. Sites on FT 104, FT 190, and exposed rocky slopes and outcrops of Starr Mt.

D. spicata (L.) P.Beauv. ex Roem. & Schult.
[*D. spicata* (L.) P.Beauv. ex Roem. & Schult. var. *longipila* Scribn. & Merr.]
--Occasional. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 33; mixed deciduous woodland - 45, 53. 1120-2560 ft. Rocky slopes, rock outcrops, and trails. Same localities as *D. sericea* but more widespread and in greater abundance.

Microstegium vimineum (Trin.) A.Camus
[*Eulalia viminea* (Trin.) Kuntze]
--Scarce. Xeric-mesic sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 45. 1960-2420 ft. FT 104, Starr Mt. logging rd., and former wildlife plot in clearing (2220 ft) on Chestnut Mt. Rare on Starr Mt. logging rd. (2000 ft); frequent on FT 104 in forest types 33 and 45 (1960-2420 ft).

Muhlenbergia schreberi J.F.Gmel. --Very rare. Logging rd. on Poplar Springs Ridge in vicinity of former wildlife plot. Xeric site. Mixed woodland - 32. 2120 ft. Small population growing with *Agrostis perennans*.

M. tenuifolia (Humb., Bonpl. & Kunth) Kunth --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1400-1600 ft. Rich woods in gorge. Restricted to rocky footslopes of Chestnut Mt.

Panicum (including *Dicanthelium*)
P. boscii Poir. --Occasional. Xeric-submesic sites. Pine woodland - 33; mixed woodlands - 33, 45; mixed deciduous woodlands - 33, 45, 53. 1160-2560 ft. Exposed to partially shaded rocky slopes, upland woods, and trails. Occurs primarily on xeric rocky slopes and FT 190 on Starr Mt. (forest type 33) and subxeric-submesic rocky lower slopes of Gee Knob (forest type 53).

P. commutatum Schult. var. *ashei* (T.G.Pearson) Fernald --Occasional. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 53, 59. 1080-2560 ft. Trails, upland woods, and

exposed to shaded rocky slopes. Common on exposed, rocky lower slopes (1080-1600 ft) with S-SW aspect on Starr Mt. (forest type 33). *P. commutatum* var. *ashei* and the typical variety are similar morphologically and distinguished by characters which may be affected by environmental conditions rather than genetic control. The inclusion of *P. ashei* as a synonym of *P. commutatum* by Gleason and Cronquist (1991) suggests that *P. commutatum* is too variable to identify consistent characters which allow for infraspecific or specific separation. The author has chosen to recognize both varieties, however, since their habitat preferences and gross morphology of plants in opposite environmental extremes were different. Characters used for separation were leaf width and spikelet length defined in Fernald (1950). Plants with narrow leaves (<11 mm) and smaller spikelets (<2.7 mm) were identified as var. *ashei*. Larger leaved and larger spikelet plants were identified as var. *commutatum*. More weight was placed on leaf width for separation since the ranges of spikelet lengths overlap. On Starr Mt. there are plants with leaves and spikelets which approach the proportions of var. *commutatum*. The author has decided to group these "intermediates" under var. *ashei*.

P. commutatum Schult. var. *commutatum* --Scarce. Xeric-submesic sites. Mixed woodland - 33; mixed deciduous woodland - 56. 2000-2200 ft. FT 104 and concave slopes at the headwaters of Gee Creek.

P. depauperatum Muhl. --Scarce. Xeric sites. Pine woodland - 33; mixed woodland - 45. 1120-2000 ft. Exposed rocky slopes and rock outcrops. Sites on Starr Mt. and Chestnut Mt.

P. dichotomum L. var. *dichotomum* --Infrequent. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 45. 1240-2100 ft. Exposed to partially shaded rocky slopes, trails, and upland woods. Occasional on rocky slopes and upland woods on Starr Mt. (forest types 16 and 33); scarce on Chestnut Mt. (forest type 45).

P. dichotomum L. var. *ramulosum* (Torr.) Lelong
[*P. microcarpon* Muhl. ex Elliott]
--Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 16, 53, 56. 1280-2000 ft. Springs and streamhead. Four localities in GCW: two springs on Gee Knob, an intermittent streamhead on Starr Mt., and spring at headwaters of Gee Creek. The author follows the taxonomy of Lelong (1984) by treating plants recognized as *P. microcarpon* as a variety of *P. dichotomum*. Wofford and Kral (1993) treat *P. microcarpon* as a distinct species.

P. polyanthes Schult. --Very rare. FT 191 margin near boundary. Mesic sites. Mixed deciduous woodland - 53. 1080-1160 ft.

Poa cuspidata Nutt. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 53. 1080-1540 ft. Rocky slopes and FT 191. Sites on lower slopes of Gee Knob and Chestnut Mt., and FT 191 near boundary.

Schizachyrium scoparium (Michx.) Nash
[*Andropogon scoparius* Michx.]
--Infrequent. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 45. 1120-2340 ft. Exposed to shaded rocky slopes and rock outcrops, upland woods, and trails. Frequent on exposed S-SW facing slopes of Starr Mt. (forest type 33); infrequent on shaded, wooded slopes where it was typically observed in vegetative state.

Sphenopholis nitida (Biehler) Scribn. --Rare. FT 190. Xeric site. Mixed woodland - 33. 2160 ft.

S. obtusata (Michx.) Scribn. --Rare. FT 104 near summit of Chestnut Mt. Xeric site. Mixed deciduous woodland - 45. 2520 ft.

Stipa avenacea L.
[*Piptocaetium avenaceum* (L.) Parodi]
--Infrequent. Xeric-subxeric sites. Pine woodland - 32; mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 59. 1840-2340 ft. Upland woods and FT 190. Common on FT 190 (2220-2340 ft); infrequent on Poplar Springs Ridge.

SMILACACEAE

Smilax bona-nox L. --Very rare. Exposed quartzite outcrop dipping SE on lower footslope of Starr Mt. Xeric site. Mixed woodland - 16. 1520 ft.

S. glauca Walter --Occasional. All moisture regimes, overstory characterizations, and forest types. 1120-2400 ft. Upland woods, rocky slopes, drainages, trails, and disturbed areas (former wildlife plots and logging rds.). Scarce in mesic woods along drainages. Encountered primarily in forested habitats rather than on exposed slopes.

S. rotundifolia L. --Common. All moisture regimes, overstory characterizations, and forest types. 1120-2560 ft. Rocky slopes, rock outcrops, drainages, upland woods, trails, and historically disturbed areas (former wildlife plots and logging rds.). Dominant *Smilax* species on exposed rocky slopes and

upland woods. Similar to *S. glauca* in respect to its scarcity in mesic woods along drainages. *S. glauca* and *S. rotundifolia* typically occur in xeric forest communities which have been historically logged.

A N G I O S P E R M A E: Dicots

ACERACEAE

Acer rubrum L. --Common. All moisture regimes, overstory characterizations, and forest types. 1040-2560 ft. Upland woods, rocky slopes, trails, and historically disturbed areas (former wildlife plots and logging rds.). Occurs primarily in xeric woods (forest types 16, 33, 45, and 59) on Poplar Springs Ridge and Starr and Chestnut Mts. Frequently encountered as an understory and subcanopy species; occasionally reaching canopy stature. Rare in cove hardwoods in gorge where *A. saccharum* is more common.

A. saccharum Marshall --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1400-1800 ft. Rich woods along drainages. Localities in ravines and rocky footslopes on Chestnut Mt.

ANACARDIACEAE

Rhus copallina L. --Scarce. Xeric sites. Pine woodland - 33; mixed deciduous woodland - 53. 1280-2160 ft. Exposed rocky slopes, rock outcrops, and upland woods. Localities on Starr Mt. and Gee Knob.

Toxicodendron radicans (L.) Kuntze
[*Rhus radicans* L.]
--Occasional. Xeric-mesic sites. Pine woodland - 45; mixed woodland - 33; mixed deciduous woodlands - 41, 45, 53, 56. 1040-2560 ft. Drainages, rocky slopes, bouldery-blocky diamicta, upland woods, partially shaded to exposed seeps in subxeric woods, trails, and disturbed areas (former wildlife plots and logging rds.). Common on bouldery-blocky diamicta and shaded to partially shaded rocky slopes, esp. on Gee Knob; scattered localities along lower portions of Gee Creek drainage.

ANNONACEAE

Asimina triloba (L.) Dunal --Very rare. Bouldery-blocky diamicton on Gee Knob. Mesic site. Mixed deciduous woodland - 41. 1240 ft. Population size = 5 plants.

APIACEAE

Angelica venenosa (Greenway) Fernald --Rare. Two localities in GCW - (1) logging rd. on Poplar Springs Ridge near boundary; (2) FT 104 near exit of GCW between Gee Knob and Chestnut Mt. Xeric sites. Pine woodland - 32; mixed deciduous woodland - 45. 2120, 1720 ft.

Cryptotaenia canadensis (L.) DC. --Rare. Low woods in boggy area adjacent to FT 191 SW of primitive campsite. Mesic site. Mixed deciduous woodland - 41. 1520 ft.

Ligusticum canadense (L.) Britton --Infrequent. Xeric-mesic sites. Mixed woodlands - 16, 45, 59; mixed deciduous woodlands - 41, 45, 56. 1680-2420 ft. Upland woods, logging rds., and FT 104. Occurs primarily in xeric upland woods on Poplar Springs Ridge (forest type 59) and Chestnut Mt. (forest type 45).

Oxypolis rigidior (L.) Raf. --Rare. Two localities in GCW - (1) spring on Chestnut Mt. near summit; (2) spring near headwaters of Gee Creek. Mesic sites. Mixed deciduous woodlands - 45, 56. 2440, 1980 ft. Very rare at localities.

Sanicula canadensis L. --Occasional. Xeric-mesic sites. Mixed woodland - 16; mixed deciduous woodlands - 45, 53, 56. 1080-2400 ft. Trails, logging rds., and boggy areas along streams and springs. Sites on FT 191 and FT 104, logging rds. on Starr Mt., and boggy areas on Chestnut Mt. and along Poplar Springs Branch.

Taenidia integerrima (L.) Drude --Scarce. Subxeric sites. Mixed deciduous woodland - 45. 1740-2200 ft. Wooded slopes. Restricted to Chestnut Mt.

Thaspium barbinode (Michx.) Nutt. --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-1800 ft. Rocky slopes and rich woods in gorge. Concentrated on lower slopes and footslopes of Gee Knob and Chestnut Mt.

T. trifoliatum (L.) A.Gray var. flavum S.F.Blake --Very rare. Logging rd. on Starr Mt. Xeric site. Mixed woodland - 45. 2000 ft.

Zizia trifoliata (Michx.) Fernald --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 45, 56. 1400-1960 ft. Trail margins and wooded slopes (w/ and w/o scree and outcrops) along drainages. Localities on lower slopes of Chestnut Mt., FT 104 margin, and shaded footslopes

along Poplar Springs Branch.

AQUIFOLIACEAE

Ilex ambigua (Michx.) Torr. var. *monticola* (A.Gray) Wunderlin & Poppleton [*I. montana* Torr. & A.Gray; *I. monticola* A.Gray; *I. ambigua* (Michx.) Torr. var. *montana* (Torr. & A.Gray) H.E.Ahles]
--Scarce. Xeric sites. Pine woodland - 33; mixed woodlands - 16, 33. 1540-2200 ft. Rocky slopes and upland woods. Localities on Starr Mt. (exposed rocky footslopes to shaded upper slopes, 1540-1900 ft) and Chestnut Mt. (pine-oak woods, 2200 ft). Small trees in understory; scattered distribution.

I. opaca Aiton --Scarce. Xeric-submesic sites. Mixed woodland - 04, 33; mixed deciduous woodland - 56. 1800-2320 ft. FT 190 margin and drainages. Occurs primarily in low woods and gentle footslopes along Poplar Springs Branch and Gee Creek (forest types 04 and 56).

ARALIACEAE

Aralia racemosa L. --Rare. Two localities in GCW - (1) margin of Gee Creek below concrete flume; (2) rocky concave slope on Chestnut Mt. Mesic sites. Mixed deciduous woodlands - 41, 53. 1080, 1700 ft.

A. spinosa L. --Rare. Chestnut Mt. summit at former wildlife plot among *Pinus virginiana* saplings. Xeric site. Pine woodland - 45. 2560 ft. Several small trees and seedlings at locality. Seedlings also found outside of GCW boundary near summit.

Panax quinquefolius L. --Rare. Rich woods in shale on lower footslope of Chestnut Mt. Mesic site. Mixed deciduous woodland - 41. 1560 ft. Population size = 11 plants.

ARISTOLOCHIACEAE

Aristolochia macrophylla Lam.
[*A. durior* Hill]
--Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-1900 ft. Rich woods, rocky slopes, and margins of Gee Creek. Occasional in ravines and footslopes of Chestnut Mt. (forest types 41 and 45); rare on shaded, rocky concave slopes on Gee Knob.

A. serpentaria L. --Very rare. Upland woods near edge of FT 104 below

Chestnut Mt. summit. Xeric site. Mixed woodland - 45. 2520 ft. Inconspicuous understory species which was overlooked prior to collection of voucher specimen (Wyrick and Wofford 951). Subsequent field trips yielded no additional localities in GCW.

Hexastylis arifolia (Michx.) Small var. *ruthii* (Ashe) H.L.Blomq. --Frequent. Xeric-submesic sites. Pine woodlands - 32, 33; pine/hemlock woodland - 04; mixed woodlands - 04, 45; mixed deciduous woodlands - 33, 53, 56, 59. 1200-2120 ft. Rocky slopes, footslopes and low woods along drainages, and upland woods. Primarily occurs on rocky slopes of Starr Mt. (forest types 16 and 33) and lower to upper footslopes on E side of Poplar Springs Branch (forest types 56 and 59).

H. shuttleworthii (Britten & Baker) Small --Scarce. Submesic-mesic sites. Pine/hemlock woodlands - 04, 56; mixed deciduous woodlands - 45, 56. 1680-2000 ft. Low woods along drainages and slightly drier slopes at streamheads. Generally found under *Rhododendron maximum* and *Pinus strobus-Tsuga canadensis* overstory along Gee Creek. A large population is concentrated under *Pinus strobus* in concave slope on W side of Gee Creek at headwaters.

ASCLEPIADACEAE

Asclepias exaltata L. --Very rare. FT 104 below Chestnut Mt. summit. Xeric site. Mixed deciduous woodland - 45. 2520 ft.

A. quadrifolia Jacq. --Scarce. Xeric-subxeric sites. Mixed deciduous woodland - 45. 1800-2560 ft. Rocky slopes, FT 104, and upland woods. Restricted to Chestnut Mt. with sites on W-NW facing sideslopes, open woods at summit, and FT 104 from summit to 1960 ft. southwesterly.

A. tuberosa L. --Very rare. Exposed convex slope on Chestnut Mt. in shale. Xeric site. Mixed woodland - 45. 2000 ft. Population size = 6 plants.

ASTERACEAE

Antennaria plantaginifolia (L.) Richardson
[*A. parlinii* Fernald]
--Infrequent. Xeric-subxeric sites. Pine woodland - 33; mixed woodland - 45; mixed deciduous woodland - 53. 1080-2040 ft. Exposed to partially shaded rocky slopes. Primarily distributed in lower one-third of GCW with sites on Starr Mt., Chestnut Mt., and Gee Knob.

A. solitaria Rydb. --Rare. Two localities in GCW - (1) rocky lower footslope of Starr Mt. with S-SE aspect; (2) rocky sideslope of Chestnut Mt. with NW aspect. Subxeric sites. Mixed deciduous woodland - 33; mixed woodland - 45. 1240, 1700 ft. Small populations at localities and partially shaded.

Aster cordifolius L.
[*A. lowrieanus* Porter]
--Infrequent. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1080-1960 ft. Rocky slopes, trail margins, and drainages. Sites on lower slopes of Gee Knob and lower slopes and ravines of Chestnut Mt. Taxonomy follows Radford et al. (1968) with the inclusion of *A. lowrieanus* as a synonym. Some taxonomists have chosen to recognize *A. lowrieanus* as a distinct species from *A. cordifolius* (Cronquist 1980 and Wofford and Kral 1993) or subspecies thereof (Jones 1980).

A. divaricatus L. --Occasional. Subxeric-mesic sites. Mixed deciduous woodland - 33, 41, 45, 53, 56. 1040-2000 ft. Rich woods along drainages, rocky slopes, and trails. Occurs primarily on rocky lower slopes of Gee Knob (forest type 53) and FT 191. Located around seeps, springs, and shaded concavities on drier slopes.

A. infirmus Michx.
[*Doellingeria infirma* (Michx.) Greene]
--Rare. Two localities in GCW - (1) wooded sideslope of Chestnut Mt. with NW aspect; (2) upper convex footslope along Poplar Springs Branch. Subxeric sites. Mixed woodland - 45; mixed deciduous woodland - 59. 1700, 1920 ft. Taxonomy and nomenclature follow Cronquist (1980). This differs from the taxonomic interpretation of Wofford and Kral (1993), who place this species in *Doellingeria*. This genus can be segregated from *Aster* on the basis of pappus characteristics (*Doellingeria* = double pappus; *Aster* = single pappus). The author believes that these differences can be expressed at the infrageneric level.

A. laevis L. var. *concinnus* (Willd.) House --Rare. Two localities in GCW - (1) wooded sideslope of Chestnut Mt. with NW aspect; (2) upland woods on Poplar Springs Ridge. Xeric-subxeric sites. Mixed woodlands - 45, 59. 1740, 2080 ft. Very rare at localities.

A. lateriflorus (L.) Britton --Infrequent. Xeric-submesic sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 56, 59. 1880-2440 ft. FT 104, logging rds., and footslopes along stream drainage. Occurs primarily in forest types 45, 56, and 59 with deciduous hardwoods dominant. Populations are located on Starr Mt., Chestnut Mt., and concave footslopes

along Poplar Springs Branch.

A. macrophyllus L. --Infrequent. Xeric-submesic sites. Mixed deciduous woodlands - 45, 56, 59. 1820-2520 ft. Upland woods and stream drainage. Common on gentle concave and convex footslopes in upper one-third of Poplar Springs Branch drainage (forest type 56); scarce on Chestnut Mt.

A. paternus Cronquist
[*Sericocarpus asterioides* (L.) Britton, Sterns & Poggenb.]
--Occasional. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 45; mixed deciduous woodland - 45. 1320-2360 ft. FT 104, logging rds., and rocky slopes. This taxon has been variously treated. It has been segregated from *Aster* by Small (1933), Fernald (1950), and Wofford and Kral (1993) and placed in *Sericocarpus*. The author has chosen to follow the taxonomy and nomenclature of Cronquist (1980) with the assumption that the differences are not substantial enough to warrant separation from *Aster*, and these differences can be expressed at the infrageneric level.

A. phlogifolius Muhl.
[*A. patens* Aiton var. *phlogifolious* (Muhl.) Nees]
--Very rare. Shaded sideslope of Chestnut Mt. with NW aspect. Subxeric site. Mixed woodland - 45. 1740 ft. Scarce at locality. Jones (1983) was referenced to make final species determination.

A. surculosus Michx. --Very rare. Exposed quartzite outcrop dipping SE on lower footslope of Starr Mt. Xeric site. Mixed woodland - 16. 1520 ft.

A. undulatus L. --Infrequent. Xeric-submesic sites. Pine woodland - 33; mixed woodland - 33; mixed deciduous woodlands - 45, 53. 1120-2520 ft. FT 104 and rocky woods. Localities on Starr Mt., Gee Knob, and Chestnut Mt.

Bidens frondosa L. --Scarce. Xeric-mesic sites. Pine woodland - 33; mixed deciduous woodlands - 33; 45. 2080-2440 ft. FT 104, Starr Mt. logging rd., and spring drainage in wet depression on Chestnut Mt.

Cacalia atriplicifolia L. --Scarce. Xeric-submesic sites. Mixed woodland - 33; mixed deciduous woodlands - 45, 56. 1900-2560 ft. FT 104, upland woods, and lower footslopes along Poplar Springs Branch. Rare on footslopes along Poplar Springs Branch and upland woods on Chestnut Mt.; infrequent on FT 104 (trailhead to 2000 ft elev. SW of Chestnut Mt. summit).

Chrysopsis mariana (L.) Elliott
[*Heterotheca mariana* (L.) Shinners]

--Very rare. Logging rd. on Starr Mt. upslope from Poplar Springs Branch. Xeric site. Mixed woodland - 16. 2040 ft. Scarce on logging rd. Taxonomic treatment of the goldenasters vary considerably, especially at the generic level. Anywhere from one to three genera have been recognized (Gray 1884, Shinners 1951, and Cronquist 1977). Semple et al. (1980) provide a short summary of previous taxonomic interpretations and evidence to support three separate genera, *Chrysopsis*; *Heterotheca*; and *Pityopsis*. Their treatment represents a break from tradition in utilizing multiple characters rather than just pappus characteristics in delimiting genera. The generic concepts of Semple et al. (1980) differ from Wofford and Kral (1993) who recognize only one genus of goldenasters, *Heterotheca*. The taxonomy and nomenclature of *Chrysopsis* strictly follow Semple (1981).

Coreopsis X *delphinifolia* Lam.
[*C. major* Walter var. *linearis* Small]
--Rare. Exposed to shaded rocky slopes of Starr Mt. with S-SW aspect. Xeric sites. Pine woodland - 33. 1080-2080 ft. Steep slopes in quartzite and micaceous siltstone scree. Recognition of this hybrid from *C. major* Walter is complicated by the intergradation of leaflet morphology in the *C. major* complex which is illustrated by Smith (1976). Some plants in GCW exhibit leaflet characters approaching *C.* X *delphinifolia* but not within the typical limits defined by Smith (1976).

C. major Walter --Frequent. Xeric-submesic sites. Pine woodland - 33; mixed woodlands - 16, 45, 56; mixed deciduous woodlands - 53, 59. 1120-2520 ft. Upland woods, shaded to exposed rocky slopes, trails, and logging rds. Common on exposed to partially shaded rocky slopes of Starr Mt. (forest types 33); less abundant on wooded slopes with closed forest canopy.

Elephantopus tomentosus L. --Rare. Logging rd. in low woods along Gee Creek drainage W of Iron Gap. Submesic site. Mixed woodland - 04. 1740 ft.

Erechtites hieracifolia (L.) Raf. ex DC. --Scarce. Xeric-subxeric sites. Upper and lower footslopes of Starr Mt. near GCW boundary. Xeric-subxeric sites. Pine woodland - 33; mixed woodland - 45; mixed deciduous woodlands - 33, 45. 1120-2400 ft. Exposed rocky slopes, trails, and former wildlife plot; generally unshaded sites. Localities on Starr Mt. (rocky footslopes and FT 191 margin) and Chestnut Mt. (FT 104 and clearing at former wildlife plot (2360 ft)).

Erigeron annuus (L.) Pers. --Scarce. Xeric-submesic sites. Mixed woodlands - 04, 16; mixed deciduous woodland - 45. 1680-2560 ft. Logging rds. and FT

104. Three localities in GCW: logging rds. on Starr Mt. and Gee Creek near confluence with Poplar Springs Branch, and FT 104 at Chestnut Mt. summit.

Eupatorium aromaticum L.
[*Ageratina aromatica* (L.) R.M.King & H.Rob.]
--Rare. Two localities in GCW - (1) concave lower footslope along Poplar Springs Branch; (2) logging rd. on Starr Mt. Submesic, xeric sites. Mixed deciduous woodland - 59; mixed woodland - 16. 1900, 2000 ft. Very rare at localities. Cronquist's (1980) concept of *Eupatorium* is followed in the checklist. Wofford and Kral (1993) split *Eupatorium s.l.* into three separate genera, *Ageratina*; *Eupatoriadelphus*; and *Eupatorium*.

E. purpureum L.
[*Eupatoriadelphus purpureus* (L.) R.M.King & H.Rob.]
--Infrequent. Xeric-submesic sites. Mixed deciduous woodlands - 45, 53, 56, 59. 1200-2560 ft. Rocky slopes, drainages, and upland woods. Sites on rocky slopes of Gee Knob near boundary, footslopes along Poplar Springs Branch, and sideslopes and summit of Chestnut Mt.

E. rugosum Houtt.
[*Ageratina altissima* (L.) R.M.King & H.Rob.]
--Scarce. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-2560 ft. Rocky slopes, FT 104 margins, and upland woods. Occurs primarily on lower rocky slopes of Gee Knob (forest type 53) and Chestnut Mt. (forest type 41). Rare in xeric upland woods.

E. serotinum Michx. --Very rare. Periphery of clearing at former wildlife plot on Chestnut Mt. Xeric site. Mixed woodland - 45. 2360 ft. Population size = 9 plants.

E. sessilifolium L. --Scarce. Subxeric-submesic sites. Mixed deciduous woodlands - 45, 53. 1200-2200 ft. Open rocky slopes. Localities on Gee Knob (lower slopes) and Chestnut Mt. (lower-midslopes).

Gnaphalium obtusifolium L. --Rare. Two localities in GCW - (1) exposed upper footslope of Starr Mt. in colluvium; (2) logging rd. on Poplar Springs Ridge near former wildlife plot. Xeric sites. Pine woodland - 33; mixed woodland - 32. 1120, 2120 ft.

Helianthus atrorubens L. --Rare. Logging rd. on Starr Mt. Xeric sites. Mixed woodlands - 16, 45. 1700-2000 ft. Scarce on rd.

H. divaricatus L. --Rare. FT 104 at and below Chestnut Mt. summit. Xeric sites. Mixed deciduous woodland - 45. 2120-2560 ft. Exposed to partially shaded sites; scarce.

H. microcephalus Torr. & A.Gray --Frequent. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 45; mixed deciduous woodlands - 45, 53, 59. 1120-2560 ft. Exposed to partially shaded rocky slopes, upland woods, logging rds., and trails. Frequent on exposed footslopes with S-SW aspect on Starr Mt. (forest type 33). Other localities on Gee Knob, Chestnut Mt., and Poplar Springs Ridge.

Hieracium gronovii L. --Very rare. Logging rd. on Poplar Springs Ridge near boundary. Xeric site. Mixed woodland - 32. 2120 ft.

H. paniculatum L. --Rare. Two localities in GCW - (1) logging rd. on Starr Mt.; (2) FT 104 below Chestnut Mt. summit. Xeric sites. Mixed woodland - 45; mixed deciduous woodland - 45. 1900-2040, 2440 ft. Scarce at locality #1; small population ca. 20-30 plants at locality #2.

H. venosum L. --Scarce. Xeric-subxeric sites. Mixed deciduous woodlands - 33, 45, 53. 1160-2100 ft. FT 104 and rocky slopes. Localities on Gee Knob, Chestnut Mt., and Starr Mt.

Kuhnia eupatorioides L.
[*Brickellia eupatorioides* (L.) Shinners]
--Very rare. Open woods on rocky, convex midslope of Chestnut Mt. Xeric site. Mixed woodland - 45. 1940 ft. Population size = 7 plants.

Lactuca canadensis L. --Scarce. Xeric-subxeric sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 33, 45, 53. 1280-2560 ft. Upland woods, rocky slopes, and FT 104 to summit of Chestnut Mt.

L. floridana (L.) Gaertn. --Very rare. FT 104 on summit of Chestnut Mt. Xeric site. Mixed deciduous woodland - 45. 2560 ft. Population size = 10 plants.

Liatris squarrulosa Michx. --Very rare. Wooded slope on Chestnut Mt. with NW aspect. Subxeric site. Mixed woodland - 45. 1720 ft.

Parthenium integrifolium L. --Rare. Two localities in GCW - (1) logging rd. on Poplar Springs Ridge; (2) FT 104 SW of Chestnut Mt. summit. Xeric sites. Mixed woodland - 32; mixed deciduous woodland - 45. 2120, 2200 ft. Very rare at localities.

Pityopsis graminifolia (Michx.) Nutt. var. *latifolia* Semple & Bowers
[*Chrysopsis graminifolia* (Michx.) Elliott var. *latifolia* Fernald; *Heterotheca graminifolia* (Michx.) Shinners]
--Scarce. Xeric sites. Pine woodland - 33; mixed woodland - 16. 1120-1600 ft. Rocky slopes and rock outcrops. Concentrated on exposed lower slopes of Starr Mt. along quartzite and micaceous siltstone outcrops. The taxonomic revision of *Pityopsis* by Semple and Bowers (1985) was used exclusively for the identification of specimens, and their interpretation of the taxonomy and nomenclature was followed. Wofford and Kral (1993) do not recognize the genus Pityopsis and include this species in *Heterotheca*.

Polymnia laevigata Beadle --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-1900 ft. Rocky slopes and bouldery-blocky diamicta. Localities on Gee Knob, Starr Mt., and Chestnut Mt.

Prenanthes altissima L. --Scarce. Xeric-mesic sites. Pine woodland - 33; mixed deciduous woodlands - 45, 53, 56. 1040-2100 ft. Drainages and trails. Localities on Gee Knob (FT 191 and margins), Poplar Spring Branch (lower footslopes), and FT 104.

Rudbeckia hirta L. --Scarce. Xeric-subxeric sites. Mixed woodlands - 16, 33; mixed deciduous woodlands - 45, 59. 1700-2560 ft. Wooded slopes, FT 104, and Starr Mt. logging rd.; open to partially shaded sites. Occurs primarily on trail and logging rd.

Senecio anonymus A.W.Wood
[*S. smallii* Britton]
--Scarce. Xeric sites. Mixed woodlands - 32, 33, 45; mixed deciduous woodland - 45. 1960-2560 ft. Logging rd. and trails. Localities on FT 190, FT 104, and Poplar Springs Ridge on logging rd. in vicinity of former wildlife plot.

S. obovatus Muhl. ex Willd. --Infrequent. Subxeric-mesic sites. Mixed deciduous woodlands - 33, 41, 53, 56. 1240-1880 ft. Rocky slopes and drainages. Sites along Poplar Springs Branch on lower footslopes, Chestnut Mt. in rich woods along Gee Creek, and Gee Knob and Starr Mt. on open to partially shaded rocky slopes.

Silphium compositum Michx. --Rare. Two localities in GCW - (1) logging rd. on lower slope of Starr Mt.; (2) FT 104 below summit of Chestnut Mt. Xeric sites. Mixed woodlands - 16, 33. 1740, 2160 ft. No plants observed in flower; vegetative specimen collected (Wyrick and Wofford 946).

Solidago arguta Aiton var. *caroliniana* A.Gray --Frequent. Xeric-mesic sites. Pine woodland - 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 53, 56. 1040-2440 ft. Exposed to shaded rocky slopes, disturbed sites, footslopes along drainages, and trails.

S. curtisii Torr. & A.Gray --Occasional. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53, 56. 1040-2560 ft. Rich woods and slopes along drainages, upland woods, and trails. Common on summit of Chestnut Mt. in xeric deciduous woods (forest type 45). Other localities include shaded ravines and footslopes along Gee Creek, footslopes along Poplar Springs Branch, and rocky slopes of Gee Knob.

S. erecta Pursh --Infrequent. Xeric-submesic sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 56, 59. 1840-2440 ft. Logging rds., trails, drainages, and rocky slopes. Common on Starr Mt. logging rd., open to partially shaded sites (forest type 45); occasional on gentle footslopes along Poplar Springs Branch (forest types 56 and 59).

S. flexicaulis L. --Rare. Rich woods on footslopes of Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1480-1580 ft. Occasional at locality.

S. nemoralis Aiton --Rare. Upper footslope of Starr Mt. with S-SW aspect. Xeric site. Pine woodland - 33. 1120 ft. Scarce on exposed slope in colluvium.

S. odora Aiton --Very rare. FT 104 SW of Iron Gap. Xeric site. Mixed woodland - 45. 2360 ft. Population size = 6 plants.

S. puberula Nutt. --Rare. Two localities in GCW - (1) logging rd. on Starr Mt.; (2) FT 104 SW of Iron Gap. Xeric sites. Mixed woodland - 45. 1880, 2380 ft. Rare at localities.

S. roanensis Porter --Rare. Two localities in GCW - (1) rocky lower footslope of Gee Knob near boundary and FT 191; (2) rocky upper footslope of Starr Mt. with S-SW aspect. Mesic, xeric sites. Mixed deciduous woodland - 53; pine woodland - 33. 1040, 1120 ft.

Vernonia gigantea (Walter) Trel. ex Branner & Coville
[*V. altissima* Nutt.]
--Very rare. Poplar Springs Ridge at end of logging rd. under young stand of *Pinus virginiana*; vicinity of former wildlife plot. Xeric site. Pine woodland - 59. 2060 ft. No plants were observed in flower; vegetative specimen collected (Wyrick 1008).

BERBERIDACEAE

Caulophyllum thalictroides (L.) Michx. --Rare. Rich woods on lower footslope of Chestnut Mt. near FT 191. Mesic site. Mixed deciduous woodland - 41. 1520 ft.

Podophyllum peltatum L. --Rare. Low woods on W side of Poplar Springs Branch. Mesic site. Pine/hemlock woodland - 04. 1800 ft. Small colony of plants under *Tsuga canadensis*. No plants were observed in flower; vegetative specimen collected (Wyrick 857).

BETULACEAE

Alnus serrulata (Aiton) Willd. --Occasional. Submesic-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 16, 33, 53, 56. 1200-2100 ft. Stream drainages, streamheads, and springs. Occurs primarily around streamheads and stream margins where deciduous hardwoods are dominant. Sites on Gee Creek, Poplar Springs Branch, and streamheads on Starr Mt.

Betula lenta L. --Occasional. Xeric-mesic sites. Pine/hemlock woodland - 04; mixed woodland - 04; mixed deciduous woodlands - 16, 33, 41, 45, 53, 56. 1080-2420 ft. Rocky slopes, upland woods, bouldery-blocky diamicta, and drainages. Common on bouldery-blocky diamicta in concave slopes on Chestnut Mt. (forest type 45).

Ostrya virginiana (Mill.) K.Koch --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-2200 ft. Rocky slopes and stream drainages. Sites along Gee Creek and shaded slopes on Chestnut Mt. Reaches highest elevation on Chestnut Mt. in concave slopes.

BIGNONIACEAE

Bignonia capreolata L.
[*Anisostichus capreolata* (L.) Bureau]
--Scarce. Xeric-mesic sites. Pine woodland - 33; mixed deciduous woodlands - 41, 53. 1080-1600 ft. Rocky slopes. Sites on lower slopes of Gee Knob, Starr Mt., and Chestnut Mt.; exposed to shaded areas.

BRASSICACEAE

Arabis laevigata (Muhl.) Poir. --Very rare. Upper slope of Chestnut Mt. in shale. Subxeric site. Mixed deciduous woodland - 45. 2200 ft. Unable to relocate

after voucher collection in subsequent field trips.

Cardamine flagellifera O.E.Schulz --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1400-1600 ft. Rich woods in gorge. Distributed on rocky footslopes, outcrops, and FT 191 on Chestnut Mt.

CALYCANTHACEAE

Calycanthus floridus L. --Occasional. Xeric-mesic sites. Pine/hemlock woodland - 56; mixed woodland - 16; mixed deciduous woodlands - 33, 53, 56. 1200-2100 ft. Stream drainages, springs, and rocky slopes. On Starr Mt. found at streamheads and xeric convex slopes in forest type 16.

CAMPANULACEAE

Campanula divaricata Michx. --Infrequent. Xeric-subxeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 53. 1120-2380 ft. FT 104, rocky slopes, and rock outcrops. Occurs primarily on exposed rocky slopes and outcrops on Gee Knob and Starr Mt. (forest types 16, 33, and 45). Infrequent on FT 104; scarce in closed canopy woods.

Lobelia cardinalis L. --Very rare. Upper reaches of Poplar Springs Branch near confluence with a secondary branch (N-S drainage). Mesic site. Mixed deciduous woodland - 56. 1840 ft. Growing on bedrock in stream.

L. inflata L. --Scarce. Xeric sites. Mixed woodlands - 33, 45, 59; mixed deciduous woodland - 45. 1760-2380 ft. FT 104 and logging rds. on Poplar Springs Ridge and at Iron Gap.

L. puberula Michx. --Infrequent. Xeric-submesic sites. Mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 56, 59. 1820-2440 ft. Logging rds, FT 104, and footslopes along Poplar Springs Branch. Common on FT 104 from trailhead to 2380 ft. (forest types 33 and 45 with pine-hardwood overstory).

CAPRIFOLIACEAE

Lonicera japonica Thunb. --Rare. Two localities in GCW - (2) former wildlife plot on Poplar Springs Ridge; (2) spring at headwaters of Gee Creek. Xeric, mesic sites. Mixed woodland - 32; mixed deciduous woodland - 56. 2120, 2000 ft. Small populations at localities.

L. sempervirens L. --Rare. Two localities in GCW - (1) rocky lower slope of Gee Knob with NW aspect; (2) NW x SE oriented concavity with seep on Chestnut Mt. Subxeric-submesic sites. Mixed deciduous woodlands - 45, 53. 1200-1300, 1880 ft. Scarce at locality #1 and very rare at locality #2.

Sambucus canadensis L. --Very rare. Upland woods on FT 104 margin at Chestnut Mt. summit. Xeric site. Mixed deciduous woodland - 45. 2560 ft. Population size = 4 plants; ca. 3 ft in height.

Viburnum acerifolium L. --Occasional. Xeric-mesic sites. Pine woodlands - 33, 45; mixed woodland - 45; mixed deciduous woodlands - 45, 53. 1040-2560 ft. Upland woods and rocky slopes. Concentrated in lower one-half of GCW, esp. on Chestnut Mt. (forest type 45) and Gee Knob (forest type 53). Frequent on rocky slopes with a hardwood-pine or hardwood overstory.

V. cassinoides L. --Rare. Spring at headwaters of Gee Creek. Mesic site. Mixed deciduous woodland - 56. 2000 ft. Small population. No plants were observed in flower; vegetative specimen collected (Wyrick 899). Separating this species from *V. nudum* L. can be difficult because both have overlapping characters. Gleason and Cronquist (1991) have lowered *V. cassinoides* to a variety of *V. nudum* which indicates, by their interpretation, a close relationship. They point out that var. *cassinoides* has a more northern range while var. *nudum* is more southern. Both species or varieties, depending on your taxonomic interpretation, occur in Tennessee. After examination of TENN specimens, it was decided that a combination of characters must be utilized to make accurate determinations. No one character is entirely consistent, but the closest is peduncle length at anthesis (var. *cassinoides* $\leq$ 25 mm and var. *nudum* $\geq$ 20 mm). Traditionally, leaf morphology has been the delimiting character in taxonomic keys; even though, there can be much variation. Using both vegetative and flowering characters to identify specimens is the best approach. Since only vegetative specimens were collected in GCW (Wyrick 897), the determination made by the author is tentative. The likelihood that the GCW collections represent *V. cassinoides* is highly probable since there has been a previous collection on Starr Mt. (Wyrick et al. 331).

CARYOPHYLLACEAE

Silene stellata (L.) W.T.Aiton --Scarce. Xeric, mesic sites. Mixed deciduous woodlands - 41, 45. 1440-2560 ft. Upland woods and rocky slopes. Occurs primarily shaded rocky footslopes on Chestnut Mt. (forest type 41).

S. virginica L. --Scarce. Xeric-subxeric sites. Mixed woodland - 33; mixed deciduous woodland - 53. 1080-1400 ft. Rocky slopes. Occurs primarily on lower slopes of Gee Knob and Starr Mt.

Stellaria pubera Michx. --Infrequent. Xeric-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 33, 41, 45, 53. 1040-2560 ft. Rocky slopes, rich woods along drainages, and upland woods. Primarily distributed on rocky footslopes along Gee Creek (forest types 41 and 53).

CELASTRACEAE

Euonymus americanus L. --Infrequent. Submesic-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 53, 59. 1040-2000 ft. Stream drainages. Primarily on shaded rocky footslopes along Gee Creek, esp. in lower one-third of drainage (forest types 04, 41, and 53). Scarce on slopes along Poplar Springs Branch (forest types 04 and 59).

CLUSIACEAE

Hypericum hypericoides (L.) Crantz
[*Ascyrum hypericoides* L.]
--Rare. Rocky lower footslope of Starr Mt. with SE aspect. Xeric site. Mixed woodland - 16. 1540 ft.

H. prolificum L. --Scarce. Xeric-subxeric sites. Pine woodland - 33; mixed deciduous woodland - 53. 1120-1400 ft. Rocky slopes. Frequent on exposed lower slopes of Starr Mt. near boundary (forest type 33).

H. stragulum W.P.Adams & N.Robson
[*Ascyrum hypericoides* L. var. *multicaule* (Michx. ex Willd.) Fernald; *H. hypericoides* L. var. *multicaule* (Michx. ex Willd.) Fosberg]
--Scarce. Xeric sites. Mixed woodlands - 16, 32; mixed deciduous woodland - 33. 1740-2200 ft. Trails and logging rds. Sites on FT 104, FT 190, and logging rds. on Starr Mt. and Poplar Springs Ridge.

CONVOLVULACEAE

Ipomoea pandurata (L.) G.Mey. --Rare. Two localities in GCW - (1) upland woods on Poplar Springs Ridge; (2) FT 104 margin. Xeric sites. Mixed woodlands - 32, 45. 2040, 2400 ft.

CORNACEAE

Cornus alternifolia L.f. --Rare. Two localities in rich woods along drainages on Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1440, 1520 ft. Only two small trees were found during the survey.

C. florida L. --Occasional. Xeric-mesic sites. Pine woodland - 32; mixed woodlands - 16, 32, 45, 59; mixed deciduous woodlands - 33, 41, 45, 53, 56, 59. 1040-2560 ft. Upland woods, rocky slopes, and drainages. Primarily occurs in xeric-submesic mixed oak forest (types 45, 53, and 59).

CRASSULACEAE

Sedum ternatum Michx. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 33, 41, 53. 1080-1800 ft. Rocky slopes and rich woods along drainages. Lower one-third of GCW with localities on Gee Knob, Starr Mt., and Chestnut Mt. Occasional on lower footslopes of Chestnut Mt. in forest type 41. Scarce on drier slopes where plants are typically located around seeps or near Gee Creek.

DIAPENSIACEAE

Galax urceolata (Poir.) Brummitt
[*G. aphylla* sensu auctt., non L.]
--Common. Xeric-mesic sites. Pine woodland - 33; mixed woodlands - 04, 16, 45; mixed deciduous woodlands - 16, 33, 45, 53, 56, 59. 1200-2560 ft. Upland woods, rocky slopes, and drainages. Generally found under ericaceous shrubs such as *Rhododendron maximum*, *Kalmia latifolia*, and *Vaccinium* spp. Common along springs and stream drainages but also located in xeric woods. Often the only species under heath layer.

EBENACEAE

Diospyros virginiana L. --Scarce. Xeric sites. Pine woodland - 33; mixed woodland - 33. 1480-2200 ft. Upland woods and FT 190A. Occurs primarily on upper slopes on Starr Mt. with S-SW and SE aspects; exposed to shaded sites. Small trees typically in subcanopy.

ELAEAGNACEAE

Elaeagnus umbellata Thunb. --Very rare. Summit of Chestnut Mt. S of FT 104 near former wildlife plot. Xeric site. Mixed deciduous woodland - 45. 2560 ft. Small tree ca. 15 ft in height with leaning branches.

ERICACEAE

Chimaphila maculata (L.) Pursh --Occasional. Xeric-submesic sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45; mixed deciduous woodlands - 45, 53, 59. 1080-2560 ft. Upland woods, trails, and wooded slopes. Generally located in xeric upland woods in pine and hardwood-pine forest types -- Gee Knob (45), Chestnut Mt. (45), and Starr Mt. (33).

Epigaea repens L. --Infrequent. Xeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45. 1700-2400 ft. Upland woods and wooded slopes. Occasional on upper slopes of Starr Mt. primarily under *Pinus virginiana*; infrequent to scarce in upland woods on Chestnut Mt. and Poplar Springs Ridge.

Gaultheria procumbens L. --Rare. Poplar Springs Ridge at SW end where narrowed. Xeric site. Pine woodland - 33. 1960 ft. Only one documented locality in GCW but may exist on other elongate ridges with a *Pinus virginiana* and/or *Pinus echinata* overstory and lacking a dense heath layer.

Gaylussacia baccata (Wangenh.) K.Koch --Frequent. Xeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45, 59. 1700-2460 ft. Upland woods and rocky slopes. Largest populations located in xeric upland woods on Poplar Springs Ridge (forest types 32 and 59). Plants also found on Gee Knob, Chestnut Mt., and Starr Mt.

Kalmia latifolia L. --Common. All moisture regimes, overstory characterizations, and forest types. 1200-2560 ft. Upland woods, rocky slopes, springs, stream drainages, and trail margins. Often dominant on rocky exposed slopes and ridges. Rare in mesic woods (forest types 04 and 41) where *Rhododendron maximum* is more common.

Leucothoe fontanesiana (Steud.) Sleumer
[*L. axillaris* D.Don var. *editorum* Fernald & B.G.Schub.; *L. editorum* Fernald & B.G.Schub.]
--Infrequent. Submesic-mesic sites. Pine/hemlock woodland - 04; mixed woodland - 04; mixed deciduous woodland - 41. 1200-1800 ft. Low woods and rocky footslopes along Gee Creek. Found on both Starr and Chestnut Mts. usually under *Tsuga canadensis* and *Rhododendron maximum*.

Monotropa hypopithys L. --Rare. Footslopes along Poplar Springs Branch in upper portion of drainage. Subxeric sites. Mixed deciduous woodland - 59. 1900-1940 ft. Early summer and autumnal flowering plants present in area.

M. uniflora L. --Scarce. Xeric-subxeric sites. Pine woodland - 32; mixed deciduous woodland - 59. 2000-2100 ft. Upland woods and footslopes

along Poplar Springs Branch. Distributed on Poplar Springs Ridge with localities on upper footslopes along Poplar Springs Branch and NE region of Ridge (2080-2120 ft).

Oxydendrum arboreum (L.) DC. --Common. All moisture regimes, overstory characterizations (except pine/hemlock woodland), and forest types (except 04 and 41). 1040-2560 ft. Upland woods, rocky slopes, drainages, and streamheads. Common subcanopy species and usually dominant in xeric upland woods and rocky slopes on Starr and Chestnut Mts. (forest types 16, 33, and 45). Absent in rich woods along Gee Creek and Poplar Springs Branch and where slopes are dominated by *Rhododendron maximum* and have a *Pinus strobus-Tsuga canadensis* overstory.

Rhododendron cumberlandense E.L.Braun --Rare. Two localities in GCW - (1) W-NW convex slope below summit of Chestnut Mt.; (2) upland woods at summit of Chestnut Mt. Subxeric-xeric sites. Mixed deciduous woodland - 45. 2200, 2560 ft. Less than 10 plants in GCW. E. Lucy Braun (1941) first described *R. cumberlandense* (red azalea) as distinct from *R. calendulaceum* (Michx.) Torr. (flame azalea). In Kentucky, where Braun described the species, the flame and red azaleas may be clearly distinguishable, but in the southern Blue Ridge their recognition can be complicated. Geographic and phenological overlap can cause difficulty in discriminating the two. In Tennessee the flame azalea is restricted to the Blue Ridge whereas the red azalea occurs on the Cumberland Plateau, Valley and Ridge, and Blue Ridge according to Kron (1987). Based on TENN specimens annotated by Kathleen Kron, the flame azalea flowers from April to early June, and the red azalea flowers from early June to July. Problems in discriminating the species arise when late blooming flame azaleas and early blooming red azaleas occur. This can happen in the mountains where elevation modifies the environment and delayed flowering may result. In this case one of the three characters used primarily for separation, flowering time, is less diagnostic. A second character, leaf expansion at anthesis, is sometimes subjective and difficult to distinguish between half to full expansion. Glandularity, a third character utilized, is too variable, in my opinion, to be reliably used.

R. maximum L. --Common. All moisture regimes, overstory characterizations, and forest types. 1040-2560 ft. Springs, stream drainages, shaded slopes, and upland woods. Dominant at springs and stream drainages, esp. common along Poplar Springs Branch and Gee Creek (forest types 04 and 41). Scarce in xeric upland woods.

R. periclymenoides (Michx.) Shinners

[*R. nudiflorum* (L.) Torr.]
--Occasional. Xeric-mesic sites. Pine woodland - 33; mixed deciduous woodlands - 33, 45, 56. 1640-2440 ft. Streamheads, drainages, springs, and rocky slopes. Occasional on stream margins and gentle footslopes in upper reaches of Poplar Springs Branch and concave slopes near and along spring localities at Gee Creek headwaters. Rare on rocky, S-SW facing slopes on Starr Mt. (1600-1800 ft).

Vaccinium arboreum Marshall --Occasional. Xeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45. 1200-2340 ft. Upland woods, rocky slopes, and FT 190 among quartzite outcrops; shaded to exposed sites. Common on steep rocky slopes on Starr Mt. with S-SW aspect (forest type 33; 1200-2200 ft). Scarce in upland woods with closed canopy.

V. corymbosum L.
[*V. constablaei* A.Gray]
--Occasional. Xeric-submesic sites. Mixed woodland - 45; mixed deciduous woodlands - 33, 45, 53, 56, 59. 1120-2560 ft. Upland woods, rocky slopes, stream drainages, and springs. Sites on lower and upper footslopes of Poplar Springs Ridge at NE region of Poplar Springs Branch, concave slopes at Gee Creek headwaters, and upper slopes and summit of Chestnut Mt. Common on rocky slopes of Gee Knob (N-NW aspect, 1120-1780 ft, forest type 53); rare on lower footslopes of Starr Mt. along Gee Creek. Vander Kloet (1980) simplified a rather complex assemblage of highbush blueberry species by recognizing a single polymorphic taxon, *V. corymbosum*. This polymorphism is exhibited by plants found in GCW. Plant height, presence or abscence of leaf margin serrations, and leaf shape and dimensions are variable.

V. hirsutum Buckley --Frequent. Xeric-submesic sites. Pine woodlands - 32, 33; mixed woodlands - 16, 32, 45; mixed deciduous woodlands - 45, 56, 59. 1900-2560 ft. Upland woods, rocky slopes, and drainages. Common on Poplar Springs Ridge (forest type 32); frequent on Chestnut Mt. (forest types 33 and 45). Plants also found on Starr Mt. but in less abundance than *V. pallidum*.

V. pallidum Aiton
[*V. vacillans* Kalm ex Torr.]
--Common. Xeric-subxeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45, 59; mixed deciduous woodlands - 45, 53, 59. 1600-2560 ft. Upland woods, rocky slopes, drainages, and trail margins; exposed to shaded sites. Common throughout GCW except along drainages in

mesic habitats. This species, like *V. hirsutum*, can form a dense ground cover especially on xeric ridges and slopes where the overstory is a pine or pine-hardwood type. Morphological descriptions provided in Vander Kloet (1978) were utilized in the identification of specimens and for field recognition.

V. stamineum L. --Frequent. Xeric-submesic sites. Pine woodland - 33; mixed woodlands - 16, 45, 59; mixed deciduous woodlands - 32, 45, 59. 1120-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), drainage heads, and trail margins; exposed to shaded sites. Distributed throughout GCW; primarily occurring on rocky slopes and upland woods in forest types 16, 33, and 45. Occasional on rocky slopes of Starr Mt. (forest types 16 and 33) and upland woods on Chestnut Mt. (forest type 45).

EUPHORBIACEAE

Acalypha virginica L. --Very rare. Upper footslope of Starr Mt. on exposed outcrop with S-SW aspect. Xeric site. Pine woodland - 33. 1160 ft.

Euphorbia corollata L. --Scarce. Xeric sites. Pine woodland - 33; mixed woodland - 33; mixed deciduous woodland - 45. 1080-2560 ft. Exposed rocky slopes and FT 104. Common on exposed, lower S-SW facing slopes on Starr Mt. near boundary (forest type 33); rare on FT 104 (forest types 33 and 45, 2080-2560 ft).

E. mercurialina Michx. --Rare. Two localities in GCW - (1) rocky convex slope with W-NW aspect on Chestnut Mt. below summit; (2) FT 104 SW of Chestnut Mt. summit. Xeric sites. Mixed deciduous woodland - 45. 1700, 1960 ft. Very rare at localities.

FABACEAE

Amphicarpaea bracteata (L.) Fernald --Scarce. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 56. 1520-2560 ft. Upland woods and footslopes along drainages. Localities on lower footslopes of Poplar Springs Branch in upper part of drainage, upland woods on Chestnut Mt., and low woods near Gee Creek.

Apios americana Medik. --Very rare. Upper slope of Starr Mt. at intermittent streamhead. Submesic site. Mixed deciduous woodland - 33. 2100 ft.

Cercis canadensis L. --Very rare. W-NW facing concave slope in shale on Chestnut Mt. Subxeric site. Mixed deciduous woodland - 45. 2200 ft.

Desmodium glabellum (Michx.) DC. --Rare. Rocky footslopes near FT 191 E of GCW entrance. Subxeric-submesic sites. Mixed deciduous woodlands - 33, 53. 1160-1200 ft.

D. glutinosum (Muhl. ex Willd.) A.W.Wood --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1120-2000 ft. Rich woods in gorge, ravines, and rocky slopes; shaded. Primarily occurs on footslopes of Gee Knob and Chestnut Mt. in lower one-third of GCW. Reaches highest elevations in ravines on Chestnut Mt. (forest type 45).

D. laevigatum (Nutt.) DC. --Scarce. Xeric sites. Mixed woodlands - 16, 59. 1700-2080 ft. Logging rds. on Poplar Springs Ridge and Starr Mt.

D. nudiflorum (L.) DC. --Occasional. Xeric-mesic sites. Mixed woodland - 59; mixed deciduous woodlands - 41, 53, 56, 59. 1080-2560 ft. Upland woods, drainages, and rocky slopes. Localities on lower and upper rocky slopes of Gee Knob, lower rocky slopes and xeric upland woods on Chestnut Mt., and footslopes and xeric upland woods on Poplar Springs Ridge.

D. paniculatum (L.) DC. --Rare. Two localities in GCW - (1) FT 191 at GCW boundary; (2) upland woods on Poplar Springs Ridge logging rd. Mesic, xeric sites. Mixed deciduous woodland - 53; mixed woodland - 59. 1040, 2080 ft. Occasional at locality #2; rare at locality #1.

D. rotundifolium DC. --Rare. Two localities in GCW - (1) logging rd. near former wildlife plot on Poplar Springs Ridge; (2) FT 104 near summit of Chestnut Mt. Xeric sites. Mixed woodland - 59; mixed deciduous woodland - 45. 2080, 2520 ft. Very rare at localites.

Lespedeza hirta (L.) Hornem. --Scarce. Xeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 59; mixed deciduous woodland - 59. 1120-2300 ft. Exposed rocky slopes, logging rds., and FT 104.

L. intermedia (S.Watson) Britton --Infrequent. Xeric sites. Pine woodland - 33; mixed woodlands - 16, 33, 45, 59. 1120-2360 ft. Same localites as *Lespedeza hirta* but in greater abundance and distribution.

L. repens (L.) Barton --Very rare. Logging rd. near former wildlife plot on Poplar Springs Ridge. Xeric site. Mixed woodland - 59. 2080 ft. Rare at locality.

Robinia pseudoacacia L. --Rare. Two localities in GCW - (1) bouldery-blocky diamicton on Gee Knob near GCW boundary; (2) clearing at former wildlife plot on Chestnut Mt. Submesic, xeric sites. Mixed deciduous woodland -

53; mixed woodland - 33. 1080-1360, 2220 ft.

Tephrosia virginiana (L.) Pers. --Very rare. Exposed, rocky lower footslope of Starr Mt. with SE aspect. Xeric site. Mixed woodland - 16. 1540 ft.

Thermopsis mollis (Michx.) M.A.Curtis ex A.Gray --Rare. Logging rd. on W side of Gee Creek at headwaters. Subxeric site. Mixed woodland - 56. 1980 ft. Population size = ca. 80 plants, 3 flowering (observation - May 26, 1993).

Vicia caroliniana Walter --Scarce. Xeric-subxeric sites. Mixed woodland - 45; mixed deciduous woodland - 45. 1700-2560 ft. Wooded slopes, upland woods, FT 104, and logging rd. Primarily occurs on open slopes and upland woods on Chestnut Mt.; rare on Starr Mt. logging rd.

FAGACEAE

Castanea dentata (Marshall) Borkh. --Occasional. Xeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 45, 59. 1700-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), and trail margins. Xeric woods throughout GCW; absent in mesic and submesic woods along Gee Creek and Poplar Springs Branch.

Fagus grandifolia Ehrend. --Rare. Rich woods on lower footslopes of Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1400-1520 ft.

Quercus alba L. --Occasional. Xeric-mesic sites. Mixed woodlands - 04, 16, 45; mixed deciduous woodlands - 33, 45, 56, 59. 1680-2440 ft. Upland woods, trail margins, streamheads, springs, and footslopes along drainages. Frequent at upper reaches of Poplar Springs Branch and Gee Creek (forest type 56); occasional in xeric upland woods on Chestnut Mt. and Starr Mt. (forest types 45 and 16, respectively).

Q. coccinea Münchh. --Frequent. Xeric-subxeric sites. Pine woodlands - 32, 33. Mixed woodlands - 16, 33, 45, 59; mixed deciduous woodlands - 45, 59. 1600-2560 ft. Upland woods, trail margins, and wooded slopes (w/ and w/o scree and outcrops). Generally occurs on xeric slopes and upland woods. Common on Poplar Springs Ridge (forest type 59).

Q. falcata Michx. --Very rare. Low woods along Poplar Springs Branch SW of headwaters. Submesic site. Mixed deciduous woodland - 56. 1860 ft.

Q. marilandica Münchh. --Scarce. Xeric sites. Pine woodland - 33; mixed woodland - 33. 1600-2200 ft. FT 190A margin and rocky slopes.

Distributed on Starr Mt.

Q. montana Willd.
[*Q. prinus* L.]
--Common. Xeric-submesic sites. All overstory characterizations except pine/hemlock woodland. All forest types except 04 and 41. 1040-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), drainages, streamheads, and trail margins. Common on xeric rocky slopes of Starr Mt. and Chestnut Mt. (forest types 16, 33, and 45). Less common along drainages and streamheads where conditions are more mesic.

Q. rubra L. --Occasional. Xeric-mesic sites. Pine woodland - 33; mixed woodland - 33; mixed deciduous woodlands - 41, 45, 53. 1040-2200 ft. Rocky slopes, drainages, bouldery-blocky diamicta, and trail margins. Localities on rocky slopes of Gee Knob, upper footslopes and upper concave slopes of Chestnut Mt., and exposed S-SW facing slopes and FT 190A margins on Starr Mt. Most abundant on lower slopes of Gee Knob (forest type 53).

Q. velutina Lam. --Occasional. Xeric-submesic sites. All overstory characterizations except pine/hemlock woodland. All forest types except 04, 41, 53. 1600-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), and trail margins. Primarily in xeric upland woods. Most abundant on Starr Mt., Chestnut Mt., and Poplar Springs Ridge in forest types 16, 45, 59; respectively.

GENTIANACEAE

Gentiana decora Pollard --Scarce. Xeric-submesic sites. Mixed woodland - 33; mixed deciduous woodlands - 45, 59. 1900-2440 ft. FT 104, Starr Mt. logging rd., and concave lower footslope along Poplar Springs Branch with a W-NW x E-SE orientation. Rare at localities. Pringle (1967) was used for the identification of specimens.

Obolaria virginica L. --Rare. Wooded slope of Chestnut Mt. with NW aspect. Subxeric sites. Mixed deciduous woodland - 45. 1700 ft. Abundance and distribution may be underestimated since this species is small and easily camouflaged in leaf litter and debris.

GERANIACEAE

Geranium maculatum L. --Infrequent. Submesic-mesic sites. Pine/hemlock woodland - 04; mixed woodland - 04; mixed deciduous woodlands - 41, 45,

56. 1520-1960 ft. FT 104 margin and low woods and slopes along drainages. Occasional along Poplar Springs Branch (forest types 04 and 56); scarce on Chestnut Mt. (forest types 41 and 45).

HAMAMELIDACEAE

Hamamelis virginiana L. --Infrequent. Xeric-mesic sites. Mixed woodland - 45; mixed deciduous woodlands - 33, 41, 45, 53, 59. 1080-2000 ft. Rocky slopes, bouldery-blocky diamicta, and drainages. Generally encountered on lower footslopes of Gee Knob (forest type 53). Reaches highest elevations on Chestnut Mt. on shaded convex slopes (forest type 45).

Liquidambar styraciflua L. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 45, 53, 56. 1040-2040 ft. Stream drainages. Middle to upper reaches of Poplar Springs Branch and lower portion of Gee Creek.

HIPPOCASTANACEAE

Aesculus flava Sol.
[*A. octandra* Marshall]
--Scarce. Mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 53. 1040-1700 ft. Stream drainage. Distributed along Gee Creek from its confluence with Poplar Springs Branch to GCW boundary at 1040 ft. Primarily located in rich woods on lower and upper footslopes of Chestnut Mt. (forest type 41).

HYDROPHYLLACEAE

Hydrophyllum canadense L. --Rare. Two localities in rich woods on lower footslope of Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1400 ft, 1520-1560 ft. Infrequent at localities.

JUGLANDACEAE

Carya glabra (Mill.) Sweet --Occasional. Xeric-mesic sites. Pine woodland - 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 33, 41, 45, 53, 56, 59. 1040-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), and logging rd. and trail margins. Distributed throughout GCW; primarily found in xeric-submesic mixed oak forest (types 45, 53, and 59).

C. ovata (Mill.) K.Koch --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1480-1600 ft. Rich woods along drainages. Localities on rocky footslopes of Chestnut Mt. along Gee Creek and in a NW x SE oriented ravine

separating Gee Knob and Chestnut Mt.

C. pallida (Ashe) Engl. & Graebn. --Occasional. Xeric-subxeric sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 53, 59. 1280-2560 ft. Upland woods, rocky slopes, and trail margins. Primarily occurs in xeric upland woods on Chestnut Mt. (forest type 45) and Poplar Springs Ridge (forest type 59). Infrequent on Starr Mt. (FT 190A margins) and Gee Knob (upper slopes and crest).

Juglans cinerea L. --Very rare. Single tree on rocky lower footslope of Starr Mt. just above Gee Creek; partially shaded. Submesic site. Mixed deciduous woodland - 53. 1040 ft.

LAMIACEAE

Collinsonia canadensis L. --Infrequent. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53, 56. 1080-2560 ft. Drainages, rocky slopes, and trail margins. Primarily occurs on footslopes and stream margins along Gee Creek (forest types 41 and 53) and footslopes along Poplar Springs Branch (forest type 56). Reaches higher elevations on Chestnut Mt. in shaded concave slopes and FT 104 margin.

C. verticillata Baldwin ex Elliott --Rare. Upper footslope of Gee Knob SW of GCW entry marker on FT 191. Mesic site. Mixed deciduous woodland - 53. 1120 ft. Scarce on shaded rocky slope.

Lycopus virginicus L. --Infrequent. Subxeric-mesic sites. Pine/hemlock woodland - 04; mixed woodland - 04; mixed deciduous woodlands - 41, 45, 56. 1520-2440 ft. Stream margins, springs, and FT 104 (typically in depressions).

Monarda clinopodia L. --Infrequent. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 56. 1520-2560 ft. Upland woods, rocky slopes, and footslopes along drainages. Largest population in xeric upland woods on Chestnut Mt. (2520-2560 ft, forest type 45). Other localities on rocky slopes and ravines on Chestnut Mt. and gentle footslopes along Poplar Springs Branch.

M. fistulosa L. --Scarce. Xeric sites. Mixed woodland - 45; mixed deciduous woodland - 45. Xeric sites. 1960-2560 ft. Upland woods and FT 104. Restricted to Chestnut Mt.

Prunella vulgaris L. --Rare. Two localities in GCW - (1) logging rd. at Iron Gap

near GCW boundary; (2) FT 104. Xeric-submesic sites. Mixed deciduous woodland - 45; mixed woodlands - 33, 45. 1860, 2000-2440 ft. Scarce on FT 104 and rare on logging rd.

Pycnanthemum incanum (L.) Michx. subsp. *loomisii* (Nutt.) Hamer
[*P. loomisii* Nutt.]
--Scarce. Xeric, submesic sites. Mixed woodlands - 04, 16, 33; mixed deciduous woodland - 45. 1700-2560 ft. Upland woods, FT 104, and logging rds. Generally found on logging rds. (Starr Mt. and Iron Gap) and xeric upland woods on Chestnut Mt. (2480-2560 ft).

Scutellaria elliptica Muhl. var. *hirsuta* (Short & R.Peter) Fernald --Scarce. Xeric-submesic sites. Mixed woodland - 33; mixed deciduous woodlands - 45, 56, 59. 1840-2400 ft. FT 104 and stream drainage. Primarily distributed on footslopes of Poplar Springs Branch and FT 104 below Chestnut Mt. summit. Occasional in xeric woods (forest types 33 and 45) where the overstory is a mixture of hardwoods with pine as co-dominant or accessory species; scarce in forest types 56 and 59.

S. pseudoserrata Epling --Scarce. Xeric-subxeric sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 53. 1600-2560 ft. Upland woods, wooded slopes, and FT 104. Chestnut Mt. in upland woods and upper slopes of Gee Knob. Frequent in xeric upland woods on Chestnut Mt. (forest type 45); scarce on Gee Knob (forest type 53). Interesting to note that the distributions of *S. elliptica* var. *hirsuta* and *S. pseudoserrata* are similar at lower elevations on Chestnut Mt., but *S. elliptica* var. *hirsuta* was not encountered above 2400 ft.

Stachys nuttallii Shuttlew. ex Benth.
[*S. riddellii* House]
--Rare. Two localities in GCW - (1) lower rocky slope of Gee Knob with N aspect; (2) NW x SE oriented ravine on Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1400, 1560 ft. Nelson and Fairey (1979) submerge *S. riddellii* as a taxonomic synonym of *S. nuttallii* since they believe them to be conspecific. *S. nuttallii*, according to Nelson and Fairey (1979), has priority since its publication predates that of *S. riddellii*. However, a nomenclatural problem arises since *S. riddellii* is based on *S. cordata* Riddell; its publication predating *S. nuttallii* by 12 years. It appears that *S. cordata* should be the proper name for the entity called *S. nuttallii* by Nelson and Fairey (1979). They cite, however, that *S. cordata* is an illegitimate name but offer no explanation. In Gleason and Cronquist (1991) *S. nuttallii* and *S. riddellii* are listed as taxonomic synonyms of *S. cordata*. Even though there are two conflicting nomenclatural positions, the author

has decided to follow Nelson and Fairey (1979) based on their familiarity with the genus.

S. sp. --Rare. Two localities in GCW - (1) FT 104 SW of Chestnut Mt. summit; (2) FT 104 at Chestnut Mt. summit. Xeric sites. Mixed deciduous woodland - 45. 1960, 2560 ft. Specimens collected in GCW were sent to John B. Nelson at the University of South Carolina for determination. He was unable to assign a known species to the collections, but he referred to this unknown as a "broad-leaved form" of *S. eplingii* J.B.Nelson. Dr. Nelson added that he had seen plants of similar morphology in Murray Co., Georgia. Whether or not this taxon is a distinct species from *S. eplingii* is speculative based on our conversation; he was unable to provide a definitive answer (J. Nelson, pers. comm.). In my opinion, it may be an ecotype or variety of *S. eplingii*. Three taxonomic sources were utilized by the author in an attempt to make a determination (Nelson 1981, Mulligan and Munro 1989, and Gleason and Cronquist 1991). All specimens were keyed to *S. eplingii* using these sources. Nelson (1981) and Gleason and Cronquist (1991) do not list Tennessee within its geographic range but Mulligan and Munro (1989) do. They report two collection localities from Polk Co., Tennessee. One locality, 1.7 mi E on Hwy 30 from jct. with Hwy 411, was confirmed by the author and B. E. Wofford. A single specimen was collected and used for comparison with GCW specimens (Wyrick and Wofford 945). No major differences were noted except phenology and pubescence on stem and leaf surfaces. These differences may be attributed to environmental effects. Site characteristics such as the degree of exposure and moisture regimes may affect pubescence. Both GCW populations are located at xeric sites and partially shaded. The population along Hwy 30 is partially shaded on a woodland margin and characterized as a mesic site. Increased pubescence on individuals in GCW populations may be an adaptation to drier conditions where available water is limited and potential evapotranspiration is greater. Plants along Hwy 30 exhibit less pubescence, in comparison, but the site is more mesic where available water is not limiting and potential evapotranspiration is diminished. Variability in leaf and stem vestitures is acknowledged by Nelson (1981) where he notes that "age and/or ecology" may affect indumentum characters. The phenological differences in GCW and Hwy 30 populations may be altitude related. The Hwy 30 population had completed flowering at the time of visitation; whereas, the GCW populations were just beginning. Flower initiation may be delayed at higher elevations. The Hwy 30 population is located at 740 ft; whereas, GCW populations are at 1960 ft and 2560 ft.

Trichostema setaceum Houtt. --Very rare. Exposed rock outcrop on upper

footslope of Starr Mt. with S-SW aspect near boundary. Xeric site. Pine woodland - 33. 1160 ft.

LAURACEAE

Lindera benzoin (L.) Blume --Very rare. Rich woods near waterfall on upper footslope of Chestnut Mt. Mesic site. Mixed deciduous woodland - 41. 1600 ft. One plant ca. 6 ft in height.

Sassafras albidum (Nutt.) Nees --Occasional. Xeric sites. Pine woodlands - 32, 33; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 33, 45. 1200-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops), and trails. Found on Starr Mt. (lower and upper slopes, FT 190 and FT 190A), Poplar Springs Ridge, Chestnut Mt. (upper slopes to summit, FT 104); and Gee Knob (upper slopes). Most abundant in forest types 33 and 45. In most forest communities this species exists in the understory. Occasionally it it reaches subcanopy stature.

LINACEAE

Linum virginianum L. --Rare. FT 104 on Chestnut Mt. S-SW of Iron Gap. Xeric sites. Mixed woodland - 33. 2100-2200 ft. Scarce on trail.

LOGANIACEAE

Spigelia marilandica L. --Scarce. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1080-2560 ft. Upland woods and rocky slopes. Localities on footslopes of Chestnut Mt. and Gee Knob, and xeric upland woods on Chestnut Mt. summit.

MAGNOLIACEAE

Liriodendron tulipifera L. --Frequent. Xeric-mesic sites. Mixed woodlands - 04, 33, 45, 56; mixed deciduous woodlands - 16, 33, 41, 45, 53, 56, 59. 1040-2560 ft. Streamheads, low woods and slopes along drainages, springs, and upland woods. Frequent along Gee Creek and Poplar Springs Branch in forest types 41, 53, and 56. Primarily located in mesic to submesic woods along drainages. In xeric woods such as those found on Starr Mt. and upper slopes of Chestnut Mt., this species is typically found around springs and streamheads.

Magnolia acuminata (L.) L. --Very rare. Rich woods on upper footslope of Chestnut Mt. at seep/seasonal waterfall. Mesic site. Mixed deciduous

woodland - 41. 1520 ft. A single tree ca. 20 ft in height.

M. tripetala L. --Infrequent. Submesic-mesic sites. Pine/hemlock woodlands - 04, 56; mixed deciduous woodlands - 16, 33, 41, 56. 1080-1980 ft. Low woods along drainages, streamheads, and springs. Sites along Gee Creek, Poplar Springs Branch, and Starr Mt. at streamheads and springs.

NYSSACEAE

Nyssa sylvatica Marshall --Frequent. Xeric-submesic sites. All overstory characterizations except pine/hemlock woodland. All forest types except 04 and 41. 1200-2560 ft. Upland woods, wooded slopes (w/ and w/o scree and outcrops; exposed to shaded), drainages, trails, streamheads, and springs. Generally found in xeric woods and mt. slopes in forest types 16, 33, 45, and 59 with mixed oak-pine or pine dominant overstories. This species is typically encountered in the understory and subcanopy. Larger trees were observed at streamheads, springs, and wooded slopes near drainages.

OLEACEAE

Chionanthus virginicus L. --Scarce. Xeric-submesic sites. Pine woodland - 33; mixed deciduous woodlands - 33, 53. 1120-2220 ft. Rocky slopes and FT 190; exposed to shaded sites. Frequent on lower rocky slopes of Gee Knob with NW aspect (forest type 53); rare on Starr Mt. (exposed S-SW facing midslope and FT 190, forest type 33).

Fraxinus americana L.
[*F. americana* L. var. *biltmoreana* (Beadle) J.W.Wright ex Fernald]
--Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1080-2000 ft. Rocky slopes and stream drainage. Localities on lower footslopes along Gee Creek, lower slopes of Gee Knob, and concave lower-midslopes of Chestnut Mt.

ONAGRACEAE

Ludwigia palustris (L.) Elliott --Rare. Spring on Chestnut Mt. below summit near FT 104. Mesic site. Mixed deciduous woodland - 45. 2440 ft. Emergent in shallow, water-filled depression.

OROBANCHACEAE

Conopholis americana (L.) Wallr. --Infrequent. Xeric-mesic sites. Pine

woodland - 33; mixed woodlands - 04, 45; mixed deciduous woodlands - 45, 53. 1200-2560 ft. Upland woods, stream drainage, rocky slopes, and trail margins. Most abundant in xeric to subxeric woods (forest types 45 and 53) with oaks as dominant canopy species. Localities on Starr Mt., Chestnut Mt., and Gee Knob with greater abundance on the latter two.

PAPAVERACEAE

Sanguinaria canadensis L. --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1400-1800 ft. Rich woods along drainages. Localities on lower footslopes and ravines of Chestnut Mt.

PASSIFLORACEAE

Passiflora lutea L. --Very rare. Rich woods on lower footslope of Chestnut Mt. with NW aspect. Mesic site. Mixed deciduous woodland - 41. 1520 ft.

PHYTOLACCACEAE

Phytolacca americana L. --Scarce. Xeric sites. Pine woodland - 33; mixed woodlands - 33, 45. 1600-2360 ft. Exposed slopes around quartzite outcrops, clearings in former wildlife plots, and FT 190A margin. Based on the localities, this species occupies openings where overtopping vegetation has been removed or development inhibited by either anthropogenic or natural disturbances (e.g. treethrow, wildlife plot and trail construction).

PLANTAGINACEAE

Plantago rugelii Decne. --Scarce. Xeric-subxeric sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 45. 1900-2520 ft. Starr Mt. logging rd. and FT 104. Rare at localities.

PLATANACEAE

Platanus occidentalis L. --Scarce. Mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 53. 1040-1800 ft. Stream drainage on margins and rocky lower footslopes. Distributed along Gee Creek from boundary at FT 191 to Iron Gap.

POLEMONIACEAE

Phlox glaberrima L.
[*P. carolina* L.]

--Very rare. Upper portion of NW x SE oriented ravine on Chestnut Mt. W-SW of summit. Mesic site. Mixed deciduous woodland - 45. 1960 ft. Three plants around seep in shallow, narrow ravine.

POLYGONACEAE

Polygonum caespitosum Blume var. *longisetum* (Bruijn) A.N.Steward --Rare. FT 104 S-SW of Iron Gap. Xeric site. Mixed woodland - 45. 2320 ft. Population size = 20 plants.

P. scandens L. --Scarce. Xeric sites. Pine woodland - 33; mixed woodlands - 33, 45. 1200-2360 ft. Exposed rocky slopes and former wildlife plots. Three localities in GCW: quartzite outcrop on Starr Mt. and clearings at two former wildlife plots on Chestnut Mt. growing on *Phytolacca americana*.

PORTULACACEAE

Claytonia virginica L. --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1400-1540 ft. Rich woods in gorge. Restricted to rocky lower footslopes of Chestnut Mt.

PRIMULACEAE

Lysimachia quadrifolia L. --Infrequent. Xeric sites. Mixed woodlands - 16, 33, 45; mixed deciduous woodland - 45. 1700-2560 ft. Trails, logging rds., and upland woods (open to closed canopy). Starr Mt. on logging rds., Gee Knob on upper slopes to summit, and Chestnut Mt. along FT 104 and adjacent woods to summit. Largest populations in GCW are found in open, xeric upland woods on Chestnut Mt. (forest type 45).

RANUNCULACEAE

Anemone quinquefolia L.
[*A. lancifolia* Pursh; *A. minima* DC.]
--Rare. Two localities in GCW - (1) lower footslope of Chestnut Mt. in rich woods; (2) lower footslope of Poplar Springs Ridge along W-NW x E-SE oriented concavity located in upper reaches of Poplar Springs Branch drainage. Mesic, submesic sites. Mixed deciduous woodlands - 41, 56. 1520, 1900 ft. Small populations at localities.

Cimicifuga racemosa (L.) Nutt. --Scarce. Mesic sites. Mixed woodland - 04; mixed deciduous woodland - 41. 1460-1800 ft. Rocky slopes and rich woods along drainages. Distributed in lower one-third of GCW with

localities in ravines, lower footslopes, and lower slopes of Chestnut Mt.

Hepatica acutiloba DC.
[*H. nobilis* Mill. var. *acuta* (Pursh) Steyerm.]
--Scarce. Mesic sites. Mixed woodland - 04; mixed deciduous woodland - 41. 1400-1800 ft. Rich woods along drainages. Frequent on footslopes of Chestnut Mt. in gorge (forest type 41).

Ranunculus recurvatus Poir. --Rare. Low woods in boggy area near FT 191 SW of primitive campsite. Mesic site. Mixed deciduous woodland - 41. 1520 ft.

Thalictrum thalictroides (L.) Eames & B.Boivin
[*Anemonella thalictroides* (L.) Spach]
--Infrequent. Mesic-xeric sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 45, 56. 1400-2560 ft. Rich woods and slopes along drainages, rocky slopes, and upland woods. Typically found in submesic-mesic woods along Poplar Springs Branch (forest type 56) and Gee Creek (forest type 41). Rare in xeric upland woods and upper slopes on Chestnut Mt.

Xanthorhiza simplicissima Marshall --Scarce. Mesic-submesic sites. Mixed deciduous woodlands - 41, 53, 56. 1040-2020 ft. Stream margins and springs. Common at headwaters of Gee Creek where *Rhododendron maximum* is absent or scarce. Scarce along Poplar Springs Branch in NE region of drainage. Occurrence below upper reaches of Poplar Springs Branch and Gee Creek declines with increased coverage by *R. maximum* and increased relief.

RHAMNACEAE

Ceanothus americanus L. --Very rare. Lower rocky slope of Gee Knob; partially shaded. Subxeric site. Mixed deciduous woodland - 53. 1280 ft. Two shrubs ca. 5 ft in height.

ROSACEAE

Agrimonia parviflora Aiton --Rare. Logging rd. on Poplar Springs Ridge Xeric site. Mixed woodland - 59. 2080-2120 ft. Scarce on rd.

A. pubescens Wallr. --Rare. Rocky lower footslopes of Gee Knob near FT 191. Mesic sites. Mixed deciduous woodland - 53. 1040-1200 ft. This species can be confused with *A. rostellata* Wallr. without closer inspection. *A. pubescens* is typically densely pubescent throughout stem and abaxial

surface of leaflets and has an eglandular inflorescence axis. Its leaflets are narrow oblanceolate or obovate. *A. rostellata*, in contrast, is sparsely pubescent throughout and has a glandular inflorescence axis. Its leaflets are broadly obovate to oblanceolate.

A. rostellata Wallr. --Rare. Two localities in GCW - (1) rich woods on rocky upper footslope of Chestnut Mt. with W-NW aspect; (2) rich woods in W-NW x E-SE oriented ravine near FT 191 SW of primitive campsite. Mesic sites. Mixed deciduous woodland - 41. 1520, 1580 ft. Scarce at localities.

Amelanchier arborea (F.Michx.) Fernald
[*A. arborea* (F.Michx.) Fernald var. *austromontana* (Ashe) H.E.Ahles]
--Infrequent. Xeric-subxeric sites. Mixed woodlands - 16, 45; mixed deciduous woodlands - 33, 53. 1300-2200 ft. Rocky slopes (exposed to partially shaded), trails, and upland woods. Occurs primarily on rocky slopes of Gee Knob (forest type 53). Other sites on FT 190A, rocky lower slopes of Starr Mt., and Poplar Springs Ridge.

A. sanguinea (Pursh) DC. --Rare. Two localities in GCW - (1) lower rocky slope on Gee Knob; (2) rocky sideslope of NW x SE oriented ravine on Chestnut Mt. Subxeric sites. Mixed deciduous woodlands - 45, 53. 1200-1320, 1920-2000 ft. Shaded to partially shaded slopes. Populations appearing colonial; solitary individuals generally not encountered.

Aronia arbutifolia (L.) Pers.
[*Pyrus arbutifolia* (L.) L.f.; *Sorbus arbutifolia* (L.) Heynh.]
--Rare. Two localities in GCW - (1) concave slope near spring on E side of Gee Creek at headwaters; (2) streamhead on Starr Mt. Submesic sites. Mixed deciduous woodlands - 33, 56. 1980, 2100 ft. Small shrubs to 6 ft in height.

Crataegus macrosperma Ashe
[*C. flabellata* (Bosc.) K.Koch]
--Very rare. FT 191 E of entrance marker at boundary. Submesic site. Mixed deciduous woodland - 53. 1040 ft. Immature shrub ca. 3 ft in height.

Fragaria virginiana Duchesne --Rare. FT 104 near summit of Chestnut Mt. Xeric site. Mixed deciduous woodland - 45. 2560 ft. Small population.

Malus angustifolia (Aiton) Michx.
[*Pyrus angustifolia* Aiton]
--Very rare. Former wildlife plot among *Pinus virginiana* on Poplar Springs Ridge. Xeric site. Mixed woodland - 32. 2120 ft. Population size = 7 ;

trees ca. 15 ft in height.

Porteranthus stipulatus (Muhl. ex Willd.) Britton
[*Gillenia stipulata* (Muhl.) Baill.]
--Scarce. Xeric-submesic sites. Mixed woodland - 45; mixed deciduous woodlands - 45, 53. 1600-1960 ft. Wooded slopes and FT 104. Known from three localities and very rare at each: FT 104 SW of Chestnut Mt. summit, upper footslope of Chestnut Mt. with NW aspect, and upper slope of Gee Knob.

P. trifoliatus (L.) Britton
[*Gillenia trifoliata* (L.) Moench]
--Scarce. Xeric-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 45, 56. 1520-2060 ft. Footslopes along drainages and FT 104. Known from three localities and very rare at each: lower footslope of Chestnut Mt. E of primitive campsite, FT 104 SW of Chestnut Mt. summit, and lower footslope of Poplar Springs Ridge in W-NW x E-SE oriented concavity in upper portion of Poplar Springs Branch drainage.

Potentilla canadensis L. --Occasional. Xeric-submesic sites. Mixed woodlands - 16, 32, 33, 45; mixed deciduous woodlands - 45, 53, 56, 59. 1260-2560 ft. Logging rds., trails, upland woods, rocky slopes, and stream drainage. Primarily occurs in forest types 33, 45,and 56 with hardwood or mixed hardwood-pine overstories. Localities on Gee Knob (upper and lower slopes), Starr Mt. (logging rd. on lower SE facing slope), Poplar Springs Ridge (lower to upper footslopes and logging rd. on ridge), and FT 104.

P. simplex Michx. --Scarce. Xeric-submesic sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 56. 1840-2560 ft. Stream drainage and FT 104. Occasional on FT 104 (forest types 33 and 45); scarce on footslopes along Poplar Springs Branch (forest type 56).

Prunus serotina Ehrend. --Scarce. Xeric-submesic sites. Mixed woodlands - 45, 53; mixed deciduous woodlands - 45, 53. 1120-2560 ft. Upland woods and open to semi-open rocky slopes. Primarily found on Gee Knob (lower-midslopes, forest type 53) and Chestnut Mt. (convex slopes to summit). Trees encountered in GCW are typically of subcanopy stature and generally not found in closed woods.

Rosa carolina L. --Scarce. Xeric-subxeric sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 53. 1280-2220 ft. Rocky slopes and FT 104. Localities on FT 104 S-SW of Iron Gap (2100-2220 ft) and lower to upper slopes of Gee Knob. Rare on Gee Knob in forest types 45 and 53; scarce

on FT 104 in forest type 33.

Rubus allegheniensis Porter ex L.H.Bailey --Rare. Two localities in GCW - (1) edge of bouldery-blocky diamicton on Gee Knob at seep; (2) quartzite outcrop on upper slope of Gee Knob. Submesic, xeric sites. Mixed deciduous woodland - 53. 1280, 1780 ft.

R. argutus Link
[*R. pensilvanicus* Poir.]
--Infrequent. Xeric-submesic sites. Pine woodland - 33; mixed woodlands - 33, 45; mixed deciduous woodlands - 45, 53. 1200-2560 ft. Exposed rocky slopes, upland woods, bouldery-blocky diamicton, FT 104, and former wildlife plots. Sites on lower slopes of Starr Mt. along quartzite outcrops, Gee Knob on bouldery-blocky diamicton, Chestnut Mt. in clearings at former wildlife plots, and FT 104.

R. flagellaris
[*R. enslenii* Tratt.]
--Scarce. Xeric sites. Mixed woodland - 33. 2000-2300 ft. FT 104. Infrequent.

RUBIACEAE

Galium circaezans Michx. --Scarce. Xeric sites. Mixed woodlands - 33, 45; mixed deciduous woodland - 45. 2200-2560 ft. Upland woods. Scattered localities on Chestnut Mt.

G. latifolium Michx. --Rare. Two localities in GCW - (1) upper rocky slope on Gee Knob with N-NE aspect near boundary; (2) upland woods on Chestnut Mt. Subxeric, xeric sites. Mixed deciduous woodlands - 45, 53. 1920, 2480-2560 ft. Occasional on summit of Chestnut Mt.; scarce on Gee Knob.

G. triflorum Michx. --Rare. Two localities in GCW - (1) seep/seasonal waterfall on upper footslope of Chestnut Mt.; (2) rich woods on rocky lower footslope of Chestnut Mt. near FT 191. Mesic sites. Mixed deciduous woodland - 41. 1520 ft.

Hedyotis purpurea (L.) Torr. & A.Gray
[*Houstonia purpurea* L.]
--Occasional. Xeric-mesic sites. Mixed woodlands - 32, 33, 45; mixed deciduous woodlands - 45, 53, 56, 59. 1040-2560 ft. Upland woods, rocky slopes, drainages, trails, and logging rds. Generally encountered in forest types 45, 53, and 56 with hardwood overstories. Localities on Gee Knob

(FT 191 to midslopes), Chestnut Mt. (FT 104 and adjacent woods), and Poplar Springs Ridge (logging rds. and footslopes along Poplar Springs Branch).

Mitchella repens L. --Infrequent. Xeric-mesic sites. Pine/hemlock woodland - 04; mixed woodland - 41; mixed deciduous woodlands - 45, 53, 59. 1040-2560 ft. Upland woods, drainages, and trails. Sites on footslopes along Gee Creek and Poplar Springs Branch (forest type 04), Gee Knob along FT 191 and adjacent woods, and xeric upland woods on Chestnut Mt. and Poplar Springs Ridge.

RUTACEAE

Ptelea trifoliata L. --Scarce. Xeric-subxeric sites. Pine woodland - 33; mixed woodland - 16; mixed deciduous woodlands - 33, 53. 1160-1600 ft. Open rocky slopes. Occasional on Gee Knob (forest type 53); scarce on Starr Mt. (forest types 16 and 33).

SALICACEAE

Salix nigra Marshall --Very rare. Clearing at former wildlife plot on Chestnut Mt. Xeric site. Mixed woodland - 45. 2360 ft. Three trees ca. 15 ft in height; largest tree with 7 in dbh. Very unusual to find this species in upland woods.

SANTALACEAE

Pyrularia pubera Michx. --Occasional. Xeric-mesic sites. Pine/hemlock woodlands - 04, 56; mixed woodlands - 16, 33, 45; mixed deciduous woodlands - 33, 45, 56, 59. 1600-2200 ft. Rocky woods on concave and convex slopes, gentle slopes and low woods along drainages, and streamheads. This species can occupy areas with a variety of overstory characteristics and moisture regimes. However, it is generally encountered in forest types with conifers as accessory or co-dominant species and with xeric-submesic moisture regimes. Regions of abundance include the upper reaches of Poplar Springs Branch on wooded slopes of Poplar Springs Ridge (forest types 45, 56, and 59), Starr Mt. on upper rocky slopes generally in shaded concavities (forest type 16), and Chestnut Mt. on lower slopes near Iron Gap (forest type 45).

SAXIFRAGACEAE

Astilbe biternata (Vent.) Britton --Rare. Rich woods in NW x SE oriented ravine

on Chestnut Mt. Mesic site. Mixed deciduous woodland - 41. 1520-1800 ft. Scattered on slopes in shale.

Decumaria barbara L. --Infrequent. Submesic-mesic sites. Mixed woodland - 04, 33; mixed deciduous woodlands - 41, 45, 53. 1120-2060 ft. Perennial-seasonal springs and Gee Creek drainage (includes low woods and lower footslopes along stream course and stream channel). Primarily found on rocky lower footslopes of Gee Knob and on quartzite boulders and outcrops along stream channel. Other localities at springs on Starr Mt. and Chestnut Mt.

Heuchera americana L. --Occasional. Mesic-xeric sites. Pine woodland - 33; mixed woodland - 45; mixed deciduous woodlands - 45, 53, 59. 1040-2560 ft. Rocky slopes, rock outcrops, upland woods, and trail margins. Occurs primarily on open rocky slopes of Gee Knob (forest type 53) and exposed lower slopes of Starr Mt. (forest type 33). Sites also on Poplar Springs Ridge, FT 104, and FT 191.

H. villosa Michx. --Scarce. Submesic-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1200-1900 ft. Rocky slopes, ravines, and bouldery-blocky diamicta. Restricted primarily to shaded rocky slopes in gorge. Localities on footslopes to lower slopes of Gee Knob (forest types 41 and 53) and Chestnut Mt. on concave slopes and bouldery-blocky diamicta (forest type 45).

Hydrangea arborescens L. --Scarce. Xeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1040-2560 ft. Stream drainages and FT 104. Sites along Gee Creek, NW x SE oriented ravine separating Gee Knob and Chestnut Mt., and FT 104 (2000-2560 ft -- from summit and to the SW along trail).

H. arborescens L. subsp. *discolor* (Ser. ex DC.) E.M.McClint.
[*H. cinerea* Small]
--Very rare. Gee Creek near waterfall in lower portion of drainage. Mesic site. Mixed deciduous woodland - 53. 1200 ft. Taxonomy of *Hydrangea* follows McClintock (1957) with the recognition of three subspecies of *H. arborescens*, subsp. *arborescens*; subsp. *discolor*; and subsp. *radiata*. Wofford and Kral (1993), however, consider them as distinct species. Both interpretations are documented in the literature based on the synonymy listed by McClintock (1957). The correct taxonomic interpretation, specific or subspecific recognition, is an arguable point but fairly insignificant when the taxonomic distance between the rankings is considered. McClintock (1957) delimits these taxa primarily on their abaxial leaf vestiture and to a

lesser extent on the tubercularity of hairs. She makes no mention about habitat selectivity but does describe their geographic distributions. All subspecies occur in the Southern Appalachian Mountains. Subspecies *radiata* occurs primarily in southern Blue Ridge and extends onto the Piedmont in South Carolina. Subspecies *arborescens* is the most widespread with localities from the southeastern United States on the Coastal Plain to the Ozarks westward and northeastward to southern New York; subsp. *discolor* is present throughout much of subsp. *arborescens* range except in its northeastern part. According to McClintock (1957), it is seldom that more than one subspecies occurs together at the same locality. When they do occur together, intermediates can result, but she states that they are uncommon. Given that their geographic ranges overlap, the possibility of interbreeding, and only leaf vestiture is used to separate the three, a subspecies ranking seems more appropriate.

H. quercifolia Bartram --Very rare. Embankment of logging rd. on Starr Mt. Xeric site. Mixed woodland - 45. 1880 ft. Six plants at site ca. 6-8 ft in height.

Parnassia asarifolia Vent. --Scarce. Mesic sites. Mixed deciduous woodlands - 16, 45, 56. 1840-2440 ft. Streamhead, stream margin, and springs. Four localities in GCW: spring at headwaters of Gee Creek, spring near summit of Chestnut Mt., streamhead on Starr Mt., and Poplar Springs Branch in upper reaches near confluence with secondary branch.

Philadelphus hirsutus Nutt.
[*P. sharpianus* S.Y.Hu]
--Scarce. Xeric-submesic sites. Mixed woodland - 45; mixed deciduous woodlands - 33, 45, 53. 1480-2220 ft. Rocky slopes; exposed to partially shaded areas. Four localities in GCW: FT 190 near boundary just SW of Forest Protection Road, Chestnut Mt. at treethrow near AS_2 site and below bouldery-blocky diamicton at PL_3 site, and Gee Knob on mid-upper slopes.

P. inodorus L. --Scarce. Subxeric-mesic sites. Mixed deciduous woodlands - 41, 45, 53. 1080-2000 ft. Rich woods along drainages, rocky slopes, and bouldery-blocky diamicta. Primarily distributed on rocky footslopes of Gee Knob. Other localities on Chestnut Mt. and Starr Mt.

Tiarella cordifolia L. --Infrequent. Submesic-mesic sites. Mixed woodlands - 04; mixed deciduous woodlands - 41, 53, 56. 1200-1900 ft. Slopes along drainages (w and w/o scree and outcrops). Occurs primarily in rich woods on Chestnut Mt. (forest type 41). Also noted on footslopes of Gee Knob and along Poplar Springs Branch. Often only vegetative on shaded rock

outcrops.

SCROPHULARIACEAE

Aureolaria laevigata (Raf.) Raf.
[*Gerardia laevigata* Raf.]
--Scarce. Xeric-submesic sites. Pine woodland - 33; mixed deciduous woodlands - 45, 53, 59. 1080-1960 ft. Rocky slopes and stream drainage. Starr Mt. on S-SW footslopes in micaceous siltstone colluvium, Chestnut Mt. on convex slopes, Poplar Springs Ridge on footslopes along Poplar Springs Branch, and Gee Knob on upper slopes. Some plants in GCW have lower and middle cauline leaves which are conspicuously lobed and upper leaves entire. According to Gleason and Cronquist (1991), this species sometimes exhibits lobed margins on the lowest leaves. However, it typically has entire margins. No in-state collections and only one out-of-state collection (T. S. Patrick and L. Pounds 5732) at TENN exhibited leaf margin characters similar to plants in GCW. It is possible to confuse this unusual form with *A. flava* (L.) Farw., which has lobed lower leaves that become less deeply lobed toward the stem apex. *A. flava*, though, has other diagnostic characteristics such as longer pedicels and glaucous stems that help distinguish it from *A. laevigata*.

A. virginica (L.) Pennell
[*Gerardia virginica* (L.) Britton, Sterns & Poggenb.]
--Rare. Convex lower footslope on Poplar Springs Ridge in upper portion of Poplar Springs Branch. Submesic site. Mixed deciduous woodland - 59. 1920 ft. Shaded open woods in vicinity of *A. laevigata*; scarce.

Chelone glabra L. --Scarce. Mesic sites. Mixed deciduous woodlands - 16, 41, 45. 1520-2440 ft. Streamhead, seep/seasonal waterfall, and spring. Three localities in GCW: Chestnut Mt. at two sites (upper footslope at seep/seasonal waterfall and spring near mt. summit) and Starr Mt. at streamhead in NE x SW oriented concave slope.

Pedicularis canadensis L. --Very rare. Rich woods on shaded upper footslope of Chestnut Mt. Mesic site. Mixed deciduous woodland - 41. 1540 ft. Vegetative specimen collected (Wyrick 1039).

Penstemon canescens (Britton) Britton --Scarce. Xeric-submesic sites. Pine woodland - 33; mixed deciduous woodlands - 45, 53. 1080-2000 ft. Exposed to shaded rocky slopes and FT 104. Localities on lower-midslopes of Gee Knob, footslopes of Starr Mt. with S-SW aspect, and FT 104 SW of summit and convex slopes on Chestnut Mt. Primarily occurs on

Gee Knob (forest type 53).

Veronica arvensis L. --Very rare. FT 104 SW of Chestnut Mt. summit. Xeric site. Mixed woodland - 45. Population size = 4 plants.

STAPHYLEACEAE

Staphylea trifolia L. --Rare. Two localities in GCW - (1) bouldery-blocky diamicton on Gee Knob; (2) rich woods on rocky upper footslope of Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1240, 1540 ft. Scarce at localities.

STYRACACEAE

Halesia tetraptera J.Ellis
[*H. carolina* L.]
--Infrequent. Xeric-mesic sites. Pine woodland - 33; mixed woodland - 45; mixed deciduous woodlands - 41, 45, 53, 56. 1080-2560 ft. Upland woods, rocky slopes, FT 190A, and footslopes along drainages. Occurs primarily on lower footslopes along Poplar Springs Branch and concave slopes at headwaters of Gee Creek (forest type 56). Additional scattered localities on Starr Mt., Gee Knob, and Chestnut Mt.

TILIACEAE

Tilia americana L. var. *heterophylla* (Vent.) Loudon
[*T. heterophylla* Vent.]
--Scarce. Mesic sites. Mixed deciduous woodlands - 41, 53. 1040-1800 ft. Rich woods along stream drainages. Occurs primarily on rocky lower footslopes along Gee Creek (forest type 41) and reaches highest elevation along ravine separating Gee Knob and Chestnut Mt. Taxonomy follows Hardin (1990) who recognizes four varieties of *Tilia americana* in North America. He effectively submerges taxa which have been treated as species by Jones (1968) to the varietal level. Hardin (1990) reviews characters which have been used to distinguish North American taxa and concludes that trichome morphology is taxonomically useful. It is under genetic control and two type of trichomes, stellate and fasciculate, are taxonomically informative. Leaf vestiture, which has been used a primary character in distinguishing taxa, is too inconsistent, in his opinion, to be employed exclusively because of seasonal and environmental control of variation Hardin (1990). Hardin's classification combines leaf, twig, and peduncle vestitures; trichome morphology; and geographic range to delimit the varieties (1990). Wofford and Kral (1993) make their taxonomic

separation at the species level which follows Jones (1968). A broad concept of *Tilia americana* with taxonomic separation at the varietal level seems appropriate given that (1) geographic ranges of morphological differences are identifiable but there is added confusion with potential introgression and (2) variation exists within and among individuals in populations.

ULMACEAE

Ulmus alata Michx. --Scarce. Xeric-subxeric sites. Pine woodland - 33; mixed deciduous woodlands - 33, 53. 1120-1400 ft. Rocky slopes; exposed to partially shaded. Primarily distributed on S and S-SW facing slopes on Starr Mt.; rarer on Gee Knob. Small trees ca. 10-15 ft in height.

U. americana L. --Very rare. Logging rd. on Poplar Springs Ridge in vicinity of former wildlife plot. Xeric site. Mixed woodland - 32. 2120 ft. Single tree ca. 20 ft in height and 12 in dbh.

U. rubra Muhl. --Rare. Two localities in GCW - (1) rich woods on rocky upper footslope on Chestnut Mt. with NW aspect; (2) rich woods in NW x SE oriented ravine on Chestnut Mt. Mesic sites. Mixed deciduous woodland - 41. 1540, 1600 ft. Extensive population of seedlings at locality #1. According to Barnes and Wagner (1981), seedlings spread rhizomatously which helps to explain the colonial habit observed.

URTICACEAE

Laportea canadensis (L.) Wedd. --Scarce. Mesic sites. Mixed deciduous woodland - 41. 1240-1800 ft. Shaded slopes and outcrops along drainages in gorge. Primarily located on rocky footslopes of Gee Knob and Chestnut Mt.

Pilea pumila (L.) A.Gray --Rare. Bouldery-blocky diamicton on Gee Knob. Mesic site. Mixed deciduous woodland - 41. 1240 ft.

VERBENACEAE

Callicarpa americana L. --Rare. Rocky upper footslopes to lower slopes of Starr Mt. with S-SW aspect near boundary. Xeric site. Pine woodland - 33. 1120-1400 ft. Scarce on exposed slopes around quartzite outcrops.

VIOLACEAE

Hybanthus concolor (T.F.Forst.) Spreng. --Rare. Rich woods on rocky lower footslope of Chestnut Mt. with NW aspect. Mesic site. Mixed deciduous woodland - 41. 1500-1520 ft.

Viola blanda Willd. --Occasional. Xeric-mesic sites. Pine/hemlock woodland - 04; mixed woodlands - 04, 33, 45; mixed deciduous woodlands - 41, 45, 53, 56. 1040-2560 ft. Rocky slopes, gentle footslopes and low woods along drainages, logging rds., and trails. Frequent at upper reaches of Poplar Springs Branch on lower footslopes (forest type 56); occasional on trails and logging rds.

V. canadensis L. --Rare. Two localities in GCW - (1) rich woods on upper and lower footslopes of Chestnut Mt. with NW aspect; (2) rich, low woods adjacent to FT 191 SW of primitive campsite. Mesic sites. Mixed deciduous woodland - 41. 1520-1540 ft. Frequent at localities.

V. hastata Michx. --Scarce. Xeric-mesic sites. Pine/hemlock woodland - 04; mixed woodlands - 04, 33; mixed deciduous woodlands - 56, 59. 1680-2300 ft. Low woods and footslopes along drainages and FT 104. Occurs primarily in low woods at Iron Gap (forest type 04) and footslopes along Poplar Springs Branch (forest types 56 and 59).

V. palmata L.
[*V. triloba* Schwein.]
--Occasional. Xeric-mesic sites. Mixed woodlands - 33, 45; mixed deciduous woodlands - 41, 45, 53, 56. 1320-2560 ft. Wooded slopes (w/ and w/o scree and outcrops), drainages, FT 104, and upland woods. Most abundant on Chestnut Mt. along FT 104 and xeric upland woods from 2000-2560 ft (forest types 33 and 45).

V. pedata L. --Rare. Open rocky slopes of Starr Mt. with S aspect. Xeric sites. Pine woodland - 33. 1400-1600 ft. Scarce.

V. primulifolia L. --Rare. Headwaters of Gee Creek at springs and stream margin. Mesic sites. Mixed woodland - 56; mixed deciduous woodland - 56. 1940-1980 ft. Three populations.

V. pubescens Aiton
[*V. eriocarpa* Schwein.; *V. pensylvanica* Michx.; *V. pubescens* Aiton var. *leiocarpa* (Fernald & Wiegand) B.Boivin]
--Scarce. Submesic-mesic sites. Mixed woodland - 04; mixed deciduous woodland - 56. 1520-1880 ft. Low woods along drainages. Small populations along Gee Creek and Poplar Springs Branch.

V. rostrata Pursh --Scarce. Submesic-mesic sites. Mixed woodland - 04; mixed deciduous woodlands - 41, 45, 53. 1040-2000 ft. Rich woods and rocky slopes along drainages. Infrequent in lower one-third of GCW along Gee Creek on footslopes and ravines of Chestnut Mt. Reaches 2000 ft in a partially shaded seep on Chestnut Mt.

V. sororia Willd.
[*V. papilionacea* Pursh]
--Occasional. Xeric-mesic sites. Mixed woodlands - 04, 33, 45; mixed deciduous woodlands - 41, 45, 53, 56. 1040-2560 ft. Logging rds., trails, wooded slopes along drainages (w/ and w/o scree and outcrops), and upland woods. Primarily occurs on wooded slopes along Poplar Springs Branch (forest type 56) and upland woods on Chestnut Mt. (forest type 45).

VISCACEAE

Phoradendron leucarpum (Raf.) Reveal & M.C.Johnston
[*P. serotinum* (Raf.) M.C.Johnston]
--Very rare. Rich, low woods near FT 191 SW of primitive campsite. Mesic site. Mixed deciduous woodland - 41. 1520 ft. This species may be more widespread and abundant than documented since visual observation of tree canopies was not stressed. Attention, rather, was focused on recognition and documentation of woody species forming the canopy and subcanopy strata.

VITACEAE

Parthenocissus quinquefolia (L.) Planch. --Infrequent. Xeric-mesic sites. Pine woodland - 45; mixed woodlands - 33, 45; mixed deciduous woodlands - 33, 41, 45, 53. 1040-2560 ft. Rocky slopes, bouldery-blocky diamicta, former wildlife plots, logging rds., and upland woods. Common on lower footslopes to midslopes of Gee Knob (forest type 53). Large populations often on bouldery-blocky diamicta with *Toxicodendron radicans*.

Vitis aestivalis Michx. var. *bicolor* Deam --Occasional. Xeric-mesic sites. Pine woodland - 33; mixed woodlands - 32, 45; mixed deciduous woodlands - 41, 45, 53. 1080-2560 ft. Rocky slopes (exposed to shaded), former wildlife plots, logging rds., bouldery-blocky diamicta, and upland woods. Specimens of *Vitis* were identified using Moore (1991).

V. rotundifolia Michx. --Infrequent. Xeric-mesic sites. Pine woodlands - 32, 33; mixed woodlands - 16, 45; mixed deciduous woodlands - 41, 45, 53. 1120-2560 ft. Upland woods, rocky slopes, and logging rds. Occurs primarily on

exposed rocky slopes of Starr Mt. (forest type 33) and upland woods on Poplar Springs Ridge (forest types 32 and 59) and Chestnut Mt. (forest type 45).

Table A-1. Synopsis of the vascular flora of Gee Creek Wilderness.

FAMILY	GENERA		SPECIES AND LESSER TAXA	
	Native	Intro.	Native	Intro.
PTERIDOPHYTES				
1. Aspleniaceae	1		5	
2. Blechnaceae	1		1	
3. Dennstaedtiaceae	2		2	
4. Dryopteridaceae	2		2	
5. Hymenophyllaceae	1		1	
6. Isoetaceae	1		1	
7. Lycopodiaceae	2		2	
8. Ophioglossaceae	1		2	
9. Osmundaceae	1		2	
10. Polypodiaceae	1		2	
11. Sinopteridaceae	2		2	
12. Thelypteridaceae	1		1	
13. Vittariaceae	1		1	
14. Woodsiaceae	3		3	
GYMNOSPERMS				
15. Cupressaceae	1		1	
16. Pinaceae	2		4	
MONOCOTS				
17. Amaryllidaceae	1		1	
18. Araceae	1		1	
19. Commelinaceae	1		1	
20. Cyperaceae	3		18	
21. Dioscoreaceae	1		1	
22. Iridaceae	2		3	
23. Juncaceae	2		5	
24. Liliaceae	10		14	
25. Orchidaceae	8		9	
26. Poaceae	12	2	23	2

Table A-1. (continued)

FAMILY	GENERA		SPECIES AND LESSER TAXA	
	Native	Intro.	Native	Intro.
27. Smilacaceae	1		3	
DICOTS				
28. Aceraceae	1		2	
29. Anacardiaceae	2		2	
30. Annonaceae	1		1	
31. Apiaceae	8		9	
32. Aquifoliaceae	1		2	
33. Araliaceae	2		3	
34. Aristolochiaceae	2		4	
35. Asclepiadaceae	1		3	
36. Asteraceae	25		53	
37. Berberidaceae	2		2	
38. Betulaceae	3		3	
39. Bignoniaceae	1		1	
40. Brassicaceae	2		2	
41. Calycanthaceae	1		1	
42. Campanulaceae	2		4	
43. Caprifoliaceae	2		4	1
44. Caryophyllaceae	2		3	
45. Celastraceae	1		1	
46. Clusiaceae	1		3	
47. Convolvulaceae	1		1	
48. Cornaceae	1		2	
49. Crassulaceae	1		1	
50. Diapensiaceae	1		1	
51. Ebenaceae	1		1	
52. Elaeagnaceae		1		1
53. Ericaceae	10		17	
54. Euphorbiaceae	2		3	
55. Fabaceae	9		16	
56. Fagaceae	3		9	

Table A-1. (continued)

FAMILY	GENERA		SPECIES AND LESSER TAXA	
	Native	Intro.	Native	Intro.
57. Gentianaceae	2		2	
58. Geraniaceae	1		1	
59. Hamamelidaceae	2		2	
60. Hippocastanaceae	1		1	
61. Hydrophyllaceae	1		1	
62. Juglandaceae	2		4	
63. Lamiaceae	7	1	11	1
64. Lauraceae	2		2	
65. Linaceae	1		1	
66. Loganiaceae	1		1	
67. Magnoliaceae	2		3	
68. Nyssaceae	1		1	
69. Oleaceae	2		2	
70. Onagraceae	1		1	
71. Orobanchaceae	1		1	
72. Papaveraceae	1		1	
73. Passifloraceae	1		1	
74. Phytolaccaceae	1		1	
75. Plantaginaceae	1		1	
76. Platanaceae	1		1	
77. Polemoniaceae	1		1	
78. Polygonaceae	1		1	1
79. Portulacaceae	1		1	
80. Primulaceae	1		1	
81. Ranunculaceae	6		6	
82. Rhamnaceae	1		1	
83. Rosaceae	11		18	
84. Rubiaceae	3		5	
85. Rutaceae	1		1	
86. Salicaceae	1		1	
87. Santalaceae	1		1	
88. Saxifragaceae	7		11	

Table A-1. (continued)

FAMILY	GENERA		SPECIES AND LESSER TAXA	
	Native	Intro.	Native	Intro.
89. Scrophulariaceae	4	1	5	1
90. Staphyleaceae	1		1	
91. Styracaceae	1		1	
92. Tiliaceae	1		1	
93. Ulmaceae	1		3	
94. Urticaceae	2		2	
95. Verbenaceae	1		1	
96. Violaceae	2		10	
97. Viscaceae	1		1	
98. Vitaceae	2		3	

Table A-2. Summary of the vascular flora of Gee Creek Wilderness.

	Families	Genera	Species and Lesser Taxa
Pteridophytes	14	20	27
Gymnosperms	2	3	5
Monocots	11	44	81
Dicots	71	176	274
TOTALS	**98**	**243**	**387**
Native	97	238	380
Introduced/Naturalized	1	5	7
TOTALS	**98**	**243**	**387**

Table A-3. Taxa restricted to areas of current and historic anthropogenic disturbance (i.e. logging and wildlife managment activities prior to wilderness designation) in Gee Creek Wilderness. Marked columns indicate localities.

Taxa	Forest trails	Logging roads	Wildlife plots
Agrimonia parviflora		X	
Angelica venenosa	X	X	
Aralia spinosa			X
Asclepias exaltata	X		
Botrychium biternatum	X		
Carex swanii	X		
Chrysopsis mariana		X	
Crataegus macrosperma	X		
Dactylis glomerata	X		
Danthonia compressa	X		
Desmodium laevigatum		X	
Desmodium paniculatum	X	X	
Desmodium rotundifolium	X	X	
Diphasiastrum digitatum		X	
Elephantopus tomentosus		X	
Erigeron annuus	X	X	
Eupatorium serotinum			X
Fragaria virginiana	X		
Helianthus atrorubens		X	
Helianthus divaricatus	X		
Hieracium gronovii		X	
Hieracium paniculatum	X	X	
Hydrangea quercifolia		X	

Table A-3. (continued)

Taxa	Forest trails	Logging roads	Wildlife plots
Hypericum stragulum	X	X	
Juncus effusus		X	
Juncus tenuis	X		
Lactuca floridana	X		
Lespedeza repens		X	
Linum virginianum	X		
Liparis lilifolia			X
Lobelia inflata	X	X	
Malaxis unifolia	X		
Malus angustifolia			X
Microstegium vimineum	X	X	X
Muhlenbergia schreberi		X	
Panicum polyanthes	X		
Parthenium integrifolium	X	X	
Plantago rugelii	X	X	
Platanthera ciliaris	X	X	
Polygonum caespitosum var. *longisetum*	X		
Prunella vulgaris	X	X	
Rubus flagellaris	X		
Salix nigra			X
Scirpus polyphyllus	X		
Scleria oligantha		X	
Senecio anonymus	X	X	

Table A-3. (continued)

Taxa	Forest trails	Logging roads	Wildlife plots
Silphium compositum	X	X	
Sisyrinchium mucronatum			X
Solidago odora	X		
Solidago puberula	X	X	
Spenopholis nitida	X		
Sphenopholis obtusata	X		
Stachys sp.	X		
Thaspium trifoliatum var. *flavum*		X	
Thermopsis mollis		X	
Ulmus americana		X	
Vernonia gigantea		X	
Veronica arvensis	X		

Table A-4. Introduced taxa in Gee Creek Wilderness.

FAMILY	TAXON
Caprifoliaceae	*Lonicera japonica*
Elaeagnaceae	*Elaeagnus umbellata*
Lamiaceae	*Prunella vulgaris*
Poaceae	*Dactylis glomerata* *Microstegium vimineum*
Polygonaceae	*Polygonum caespitosum* var. *longisetum*
Scrophulariaceae	*Veronica arvensis*

Table A-5. List of Gee Creek Wilderness taxa which represent Tennessee county records. Polk Co. and Monroe Co. records are indicated by "P" and "M", respectively.

Agrimonia parviflora (P)	*Desmodium laevigatum* (P)	*Pinus echinata* (P)
Amelanchier sanguinea (P)	*Desmodium rotundifolium* (P)	*Quercus falcata* (P)
Anemone quinqefolia (P)	*Diospyros virginiana* (P)	*Rubus argutus* (P)
Aster laevis var. *concinnus* (P)	*Eupatorium aromaticum* (P)	*Scleria oligantha* (P)
Aster macrophyllus (P)	*Eupatorium serotinum* (P)	*Sisyrinchium mucronatum* (M)
Calamagrostis porteri subsp. *porteri* (P)	*Hydrangea quercifolia* (P)	*Sphenopholis nitida* (P)
Callicarpa americana (P)	*Isotria verticillata* (P)	*Spenopholis obtusata* (P)
Carex joorii (P)	*Juncus gymnocarpus* (P)	*Stachys* sp. (P)
Carex swanii (P)	*Juncus tenuis* (P)	*Thermopsis mollis* (P)
Carex tribuloides (P)	*Juniperus virginiana* (P)	*Trichostema setaceum* (P)
Carya pallida (P)	*Liatris squarrulosa* (P)	*Ulmus alata* (P)
Chamaelirium luteum (M)	*Liparis lilifolia* (M)	*Ulmus americana* (M)
Chionanthus virginicus (P)	*Ludwigia palustris* (P)	*Vernonia gigantea* (P)
Chrysopsis mariana (P)	*Monarda fistulosa* (P)	**Polk Co. records = 41**
Collinsonia verticillata (P)	*Panicum depauperatum* (P)	**Monroe Co. records = 4**
Corallorhiza odontorhiza (P)	*Parnassia asarifolia* (P)	**TOTAL = 45**

APPENDIX B

STATUS REPORTS

OF

TENNESSEE RARE PLANTS AND FEDERAL CANDIDATE SPECIES

IN GEE CREEK WILDERNESS

FORMAT

Information provided in the reports follow an adapted Tennessee Heritage Program "Survey Form for Rare Plant Species" (Tennessee Department of Environment and Conservation 1992). Geographic distributions and comments on population viability and potential threats have been added to the reports. Tennessee geographic distributions were determined from TENN dot maps. North American geographic ranges are taken exclusively from Gleason and Cronquist (1991) when possible; other primary and supplementary sources are noted when used. Cherokee National Forest Threatened, Endangered, and Sensitive (TES) species recognition and state and federal status designations are also given.

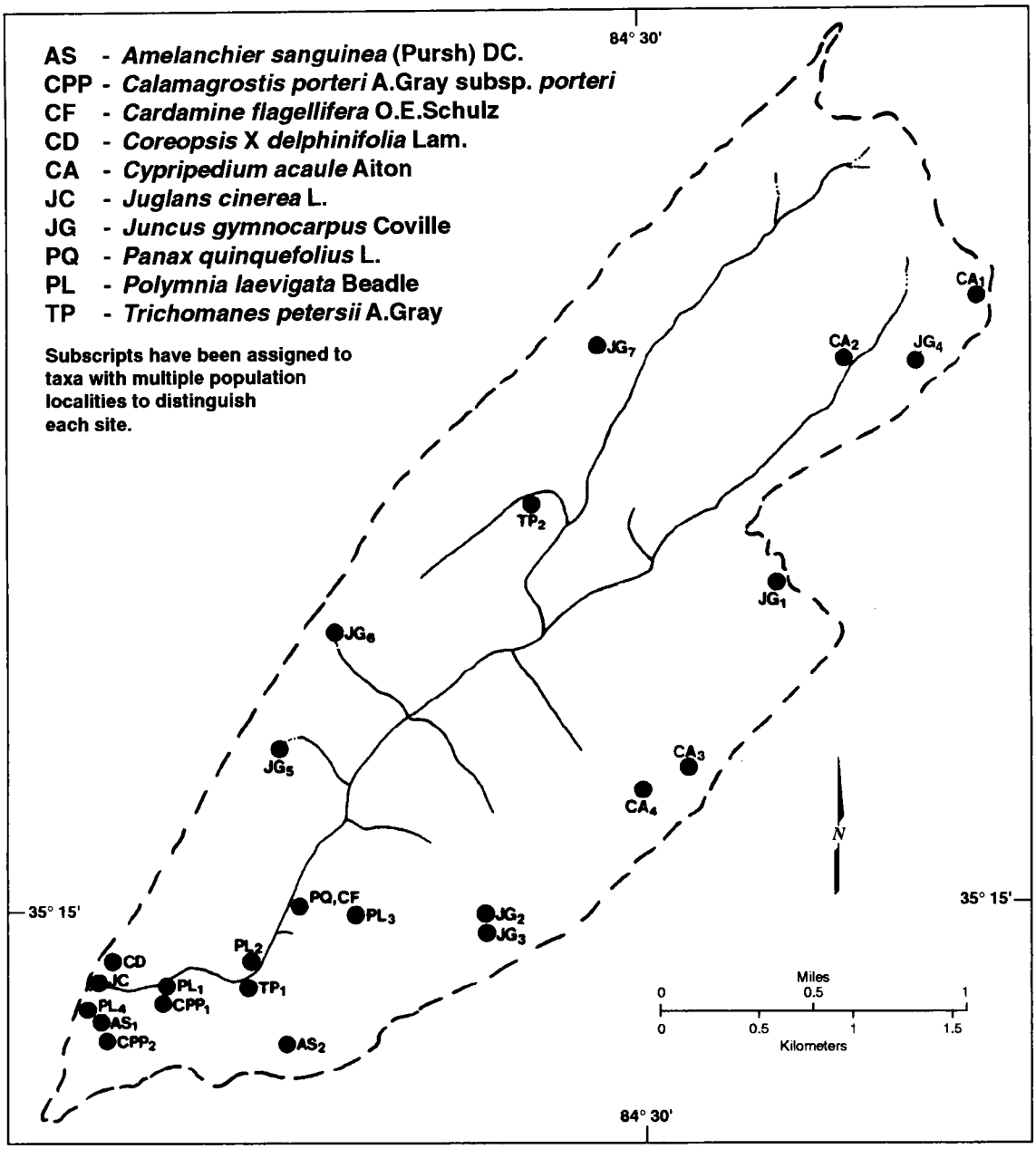
Accompanying the status reports is a map designating population sites (Figure B-1). An alphanumeric system was employed to distinguish individual species and their localities. No subscripts were assigned to taxa with only one known locality or in cases where the population had poorly defined boundaries with scattered individuals. When scattered, a dot was placed in a known location with latitude and longitude determined.

Legal and/or formal status was checked at three levels:

(1) Federal
source(s): U.S. Fish and Wildlife Service (1993a)
U.S. Fish and Wildlife Service (1993b)

(2) State
source(s): Tennessee Department of Environment and Conservation (1993)

Figure B-1. Population localities of endangered, threatened, special concern, or special rare taxa in Gee Creek Wilderness.


AS - Amelanchier sanguinea (Pursh) DC.
CPP - Calamagrostis porteri A.Gray subsp. porteri
CF - Cardamine flagellifera O.E.Schulz
CD - Coreopsis X delphinifolia Lam.
CA - Cypripedium acaule Aiton
JC - Juglans cinerea L.
JG - Juncus gymnocarpus Coville
PQ - Panax quinquefolius L.
PL - Polymnia laevigata Beadle
TP - Trichomanes petersii A.Gray
Subscripts have been assigned to taxa with multiple population localities to distinguish each site.
84° 30'
35° 15'
CA1
CA2
JG4
JG7
TP2
JG1
JG6
JG5
CA3
CA4
N
PQ,CF
PL3
JG2
JG3
PL2
CD
JC
PL1
TP1
CPP1
PL4
AS1
CPP2
AS2
Miles
0
0.5
1
0
0.5
1
1.5
Kilometers

(3) Cherokee National Forest
source(s): USDA Forest Service (1993)

Federal and state status codes and definitions are written in detail below for ones applicable to GCW flora.

Federal. Status codes and definitions are from U.S. Fish and Wildlife Service (1993b). Category 3 listings are taken from Tennessee Department of Environment and Conservation (1993).

Status Code	Status	Definition
C2	Category 2	"Taxa for which information now in the possession of the Service indicates that proposing to list as endangered or threatened is possibly appropriate, but for which sufficient data on biological vulnerability and threat are not currently available to support proposed rules. . . . Further biological research and field study usually will be necessary to ascertain the status of taxa in this category. . . ."
3C	Category 3	"Taxa that have proven to be more abundant or widespread than previously believed and/or those that are not subject to any identifiable threat. If further research or changes in habitat indicate a significant decline in any of these taxa, they may be reevaluated for possible inclusion in categories 1 or 2. . . . Any taxon omitted from a previous notice will still be treated by the Service as belonging to Category 3."

Tennessee. Status codes and definitions are from Tennessee Department of Environment and Conservation (1993).

Status Code	Status	Definition
E	Endangered	"Species now in danger of becoming extinct in Tennessee because of: (a) their rarity throughout their range, or (b) their rarity in Tennessee as a result of sensitive habitat destruction or restricted area of distribution."
T	Threatened	"Species likely to become endangered in the immediately foreseeable future as a result of rapid habitat destruction or commercial exploitation."
S	Special Concern	"Species requiring special concern because of: (a) their rarity in Tennessee because the State represents the limit or near-limit of their geographic range, or (b) their status is undetermined because of insufficient information."
E*		"TAXA considered to be endangered in Tennessee due to evidence of large numbers being taken from the wild and lack of commercial success with propagation or transplantation."

No GCW taxa were listed as federally endangered or threatened (U.S. Fish and Wildlife Service 1993a). Eleven were found to have legal or formal status but only 10 were recognized in this study. *Vaccinium hirsutum*, a C2 candidate (U.S. Fish and Wildlife Service 1993b), was omitted. This species has no current legal status in Tennessee (Tennessee Department of Environment and Conservation 1993), and it is my impression that it occurs in considerable abundance on the Blue Ridge of southeast Tennessee (Blount, Monroe, McMinn, and Polk Cos.). Both the author and B. E. Wofford (pers. comm.) recommend its downlisting to 3C status. Evidence for C2 candidacy is

suggested by its restricted geographic range--southern Blue Ridge (TN, GA, and NC) with one locality on the Cumberland Plateau (Rhea Co., TN). Georgia recognizes the species on the "Special Plant List" (Freshwater Wetlands and Heritage Inventory 1991) with no state status and North Carolina lists it with Candidate status (Weakley 1993). Consideration for federal protection is premature in light of current information.

STATUS REPORT

SPECIES NAME: *Amelanchier sanguinea* (Pursh) DC.

FEDERAL STATUS	STATE STATUS	TES
None	T	Not Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Maine and southern Quebec to Minnesota; south to New York, northern New Jersey, Michigan, and Iowa; and irregularly in the mountains to North Carolina and Tennessee.

Tennessee -- East Tennessee on Cumberland Plateau and Blue Ridge; five counties documented (Blount, Cumberland, Morgan, Polk, and Sevier).

LOCALITY: AS_1

SURVEY DATE(S): 8/16/92, 6/4/93 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 41" ELEVATION: 1320 ft

LONGITUDE (W): 84° 31' 54" POPULATION BOUNDARIES:
S -- 35° 14' 41" N; 1320 ft
N -- 35° 14' 43" N; 1200 ft
E -- 84° 31' 52" W; 1320 ft
W -- 84° 31' 54" W; 1320 ft

DIRECTIONS: 0.11 mi (0.17 km) S-SE of GCW boundary marker at FT 191; lower slope of Gee Knob.

HABITAT: Subxeric site in mixed deciduous woodland -- USFS forest type 53 (White Oak-Red Oak-Hickory). Rocky slope in shaded to partially shaded areas; NW aspect.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Amelanchier arborea*, **Carya glabra*, *Prunus serotina*, **Quercus montana*, **Q. rubra*, *Ulmus alata*

Subcanopy -- *Chionanthus virginicus*, **Ptelea trifoliata*

Understory -- *Antennaria plantaginifolia*, *Aster undulatus*, *Bignonia capreolata*, *Carex pensylvanica*, *Coreopsis major*, *Dryopteris marginalis*, *Hedyotis purpurea*, *Helianthus microcephalus*, **Heuchera americana*, *Hypericum prolificum*, *Lonicera sempervirens*, **Panicum boscii*, **Parthenocissus quinquefolia*, *Penstemon canescens*, *Philadelphus inodorus*, *Polystichum acrostichoides*, *Smilacina racemosa*, *Smilax glauca*, *S. rotundifolia*, **Solidago arguta* var. *caroliniana*, **Vaccinium corymbosum*, *V. stamineum*, *Viburnum acerifolium*

EODATA:
Population size and phenology -- Circa 500 plants (5 fruiting) are recorded at the locality in scattered colonies and typically not encountered as solitary individuals. Flowering occurs from late April through May and fruiting from May to June. Plant heights range from 10 in (25 cm) to 5 ft (1.5 m). The tallest individuals were the only ones observed in fruit; smaller plants less than 5 ft. in height showed no evidence of sexual reproduction. Asexual reproduction appears to account for most of the population growth based on the rarity of fruiting individuals.

Threats and viability -- There are no threats to the population, but canopy closure and competition from other understory shrubs such as *Vaccinium* spp. may suppress sexual reproduction. The population is expected to persist and grow vegetatively.

LOCALITY: AS_2

SURVEY DATE(S): 10/20/92, 4/24/93 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 37" ELEVATION: 1920 ft

LONGITUDE (W): 84° 31' 13" POPULATION BOUNDARIES:
S -- 35° 14' 36" N; 2000 ft
N -- 35° 14' 37" N; 1920 ft
E -- 84° 31' 12" W; 2000 ft
W -- 84° 31' 13" W; 1920 ft

DIRECTIONS: 0.53 mi (0.86 km) E-NE on FT 191 from GCW boundary then 0.25 mi (0.41 km) SE to a NW x SE oriented ravine on sideslope; Chestnut Mt.

HABITAT: Subxeric site in mixed deciduous woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Partially shaded, rocky slope with NW aspect.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer rubrum*, *Carya glabra*, *Pinus virginiana*, **Quercus montana*, *Q. rubra*

Subcanopy -- *Cornus florida*

Understory -- *Aster cordifolius*, *Campanula divaricata*, *Coreopsis major*, *Hamamelis virginiana*, *Helianthus microcephalus*, *Polystichum acrostichoides*, *Schizachyrium scoparium*, *Smilax glauca*, *Solidago erecta*, *Vaccinium stamineum*, **Viburnum acerifolium*, *Vitis aestivalis* var. *bicolor*

EODATA:
Population size and phenology -- Four colonies are distributed between 1920-2000 ft elev. with additional scattered solitary individuals. An estimated 200-300 plants are located at the site with 10 plants observed flowering. See AS_1 for comments on reproduction.

Threats and viability -- There are no threats to the population, and there is less concern for canopy closure than at AS_1. The presence of more flowering individuals at AS_2 may indicate this site is more favorable. Aspect and moisture regimes are similar for AS_1 and AS_2, but AS_2 has a steeper, more open slope. Understory, subcanopy, and canopy strata are less developed. Less competition from woody taxa and dry open slopes are probably more ideal for growth and reproduction of this species.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 868; Polk Co., TN; 5/9/92. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Calamagrostis porteri* A.Gray subsp. *porteri*

FEDERAL STATUS	STATE STATUS	TES
3C	E	Not Listed

GEOGRAPHIC DISTRIBUTION:
North America -- South of glacial boundary in the Appalachian Mts.; south-central New York to Virginia, West Virginia, Kentucky, and Tennessee.

Tennessee -- Two documented localities in the state, Cumberland Mt. (Claiborne Co.) and Gee Creek Wilderness (Polk Co.).

LOCALITY: CPP_1

SURVEY DATE(S): 7/31/92, 8/27/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 46" ELEVATION: 1280 ft

LONGITUDE (W): 84° 31' 39" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.25 mi (0.41 km) E on FT 191 from GCW boundary then 66 yds (60 m) SE of trail on upper footslope of Gee Knob.

HABITAT: Submesic site in mixed deciduous woodland -- USFS forest type 53 (White Oak-Red Oak-Hickory). Exposed quartzite outcrop with NW aspect and seep. Plants are concentrated near edge of outcrop in humus and bryophyte mat. Woody vegetation is better developed upslope from the population and below the outcrop.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- N/A

Subcanopy -- *Chionanthus virginicus*

Understory -- **Aster divaricatus*, *Bignonia capreolata*, *Campanula divaricata*, **Carex pensylvanica*, *Coreopsis major*, *Dryopteris marginalis*, *Heuchera villosa*,

Schizachyrium scoparium, *Toxicodendron radicans*, and miscellaneous bryophytes

EODATA:
Population size and phenology -- Population occupies an area of approx. 528 ft^2 (50 m^2). Vegetative spreading via rhizomes makes individual plant determinations difficult since several culms may arise from a single rootstock. Population size is expressed in numbers of vegetative and reproductive culms rather than individual plants. This format for size estimation was followed at CPP_2. Circa 1,000-2,000 vegetative culms and 120 flowering culms occur at the locality. Flowering period is from late July through August.

Threats and viability -- There are no threats to the population, and vegetative spreading in a lateral and upslope direction is foreseeable.

LOCALITY: CPP_2

SURVEY DATE(S): 8/16/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 39" ELEVATION: 1480 ft

LONGITUDE (W): 84° 31' 51" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.15 mi (0.240 km) SE of GCW boundary marker at FT 191; sideslope of Gee Knob.

HABITAT: Submesic site in mixed deciduous woodland -- USFS forest type 53 (White Oak-Red Oak-Hickory). Rocky slope on partially shaded quartzite outcrop; NW aspect.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer rubrum*, **Carya glabra*, **Quercus montana*, *Q. rubra*

Subcanopy -- *Chionanthus virginicus*, *Cornus florida*, **Nyssa sylvatica*, *Prunus serotina*

Understory -- *Aster divaricatus*, *Coreopsis major*, *Dryopteris marginalis*, *Heuchera americana*, **Parthenocissus quinquefolia*, *Philadelphus hirsutus*, *Smilacina racemosa*, *Smilax glauca*, *Solidago arguta* var. *caroliniana*,

**Toxicodendron radicans*, *Vaccinium corymbosum*, *V. stamineum*

EODATA:
Population size and phenology -- Population occupies an area approx. 858 ft^2 (80 m^2). Vegetative culms are estimated at 2,000 and only one flowering culm. Since CPP_2's population size and areal coverage exceeds CPP_1, CPP_2 habitat conditions may be more favorable for growth and reproduction.

Threats and viability -- There are no threats to the population, and it will probably persist and grow vegetatively. Poor flowering cannot be used as an indicator of population health since flowering occurrences are rare to infrequent (Hitchcock 1971, Greene 1984). Openings, such as at CPP_1, support Greene's (1984) observation that in forested habitats, flowering occurs primarily on "edges and openings produced by disturbance." The chance that additional populations will be established in GCW are slim since this taxon is self-incompatible and has poor fruit set (Greene 1984). Vegetative reproduction via rhizomes is the primary means for population growth (Greene 1984).

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 977; Polk Co., TN; 7/31/92. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Cardamine flagellifera* O.E. Schulz

FEDERAL STATUS	STATE STATUS	TES
None	T	Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Included in *C. clematits* Shuttlew. by Radford et al. (1968) and Gleason and Cronquist (1991); considered distinct by Small (1933), Al-Shehbaz (1988), Wofford (1989), and Rollins (1993). Rollins (1993) separates *C. flagellifera* into two varieties, var. *flagellifera* and var. *hugeri* (Small) Rollins. Distributed from West Virginia south to the Carolinas, Georgia, and Tennessee (from Al-Shehbaz 1988).

Tennessee -- East Tennessee in the Blue Ridge and a single locality in the Valley and Ridge (Knox Co.). Knox Co. collection by F. H. Norris 40631 deposited at TENN is a possible introduction. The specimen was collected in the UT Dean's Woods.

LOCALITY: CF

SURVEY DATE(S): 5/15/92 COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967; Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 01" ELEVATION: 1540 ft

LONGITUDE (W): 84° 31' 11" POPULATION BOUNDARIES:
S -- 35° 14' 46" N; 1440 ft
N -- 35° 15' 16" N; 1520 ft
E -- 84° 31' 00" W; 1520 ft
W -- 84° 31' 21" W; 1400 ft

DIRECTIONS: 0.81 mi (1.3 km) NE on FT 191 from GCW boundary then 30 yds (27 m) upslope from trail; upper footslope of Chestnut Mt.

HABITAT: Mesic sites in mixed deciduous woodland -- USFS forest type 41 (Cove Hardwoods-White Pine-Hemlock). Rocky footslopes, outcrops, and FT 191 on E side of Gee Creek in gorge. Restricted to W-NW and NW facing

slopes of Chestnut Mt.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer rubrum*, **A. saccharum*, **Aesculus flava*, *Carya ovata*, Tilia *americana* var. *heterophylla*, **Tsuga canadensis*

Subcanopy -- *Betula lenta*

Understory -- *Acer saccharum*, *Caulophyllum thalictroides*, *Claytonia virginica*, *Erythronium americanum*, **Hepatica acutiloba*, *Sanguinaria canadensis*, *Sedum ternatum*, *Staphylea trifolia*, *Thalictrum thalictroides*, *Tiarella cordifolia*, *Trillium luteum*, *Ulmus rubra*, *Uvularia grandiflora*, **Viola canadensis*, **V. rostrata*

EODATA:
Population size and phenology -- It is difficult to estimate population size since this taxon is scattered over a distance of approx. 0.6 mi (1 km) and elevations from 1400-1600 ft (427-488 m). A conservative approximation is 500-1,000 individuals; often plants are encountered in small groups of 2's and 3's. Flowering and fruiting numbers were not determined, but some phenological observations were made. For example, plants located in deep shade (e.g. sheltered rock outcrops and under *Tsuga canadensis*) were typically nonflowering. Flowering and fruiting vigor was greatest on slopes with limited to partial shading. Flowering period is March through April with fruit set from April to May.

Threats and viability -- Majority of the population is not subject to any threat but two sites were of concern: (1) FT 191 60 yds (55 m) SW of primitive campsite near trail termination; (2) low, wet woods adjacent to FT 191 79 yds (72 m) SW of primitive campsite near trail termination. Site #1 could be negatively impacted from trail usage, but two factors should limit contact during its flowering and fruiting period. One, the plants are few in number and tightly grouped which limits the contact area. Two, its distance from the GCW boundary on FT 191 (2.2 mi) and increased difficulty in traversing Gee Creek in early spring due to high water should restrict contact to only the most adventurous recreationists. Site #2 showed evidence of rooting by feral hogs. Impact was not assessed and frequency of disturbance is unknown.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 809; Polk Co., TN; 3/28/92. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Coreopsis* X *delphinifolia* Lam.

FEDERAL STATUS	STATE STATUS	TES
None	E	Not Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Georgia, South Carolina, and reputedly to Alabama; disjunct in Blue Ridge of Tennessee. Distribution information from Smith (1976) and Cronquist (1980).

Tennessee -- Southeast Tennessee in the Blue Ridge (Polk Co.). Previous collections by A. J. Sharp 46098 and Wofford and Clebsch 91-19 deposited at TENN confirmed by Edwin Smith as *C.* X *delphinifolia.*

LOCALITY: CD

SURVEY DATE(S): 8/7/92, 8/5/93 COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967; Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 52" ELEVATION: 1480 ft

LONGITUDE (W): 84° 31' 47" POPULATION BOUNDARIES:
S -- 35° 14' 47" N; 1080 ft
N -- 35° 15' 02" N; 2080 ft
E -- 84° 31' 40" W; 2080 ft
W -- 84° 31' 53" W; 1080 ft

DIRECTIONS: 0.15 mi (0.24 km) N-NE from GCW boundary marker at FT 191 on sideslope of Starr Mt.

HABITAT: Xeric sites in pine woodland -- USFS forest type 33 (Virginia Pine). Exposed to partially shaded rocky slopes; S-SW aspect. Found in micaceous siltstone at lower elevations (1080 ft) and quartzite at higher elevations (1200-2080 ft).

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer rubrum, Nyssa sylvatica, Oxydendrum arboreum, *Pinus*

virginiana, *Quercus montana*

Subcanopy -- *Diospyros virginiana*, *Nyssa sylvatica*, *Quercus rubra*

Understory -- *Callicarpa americana*, **Carex pensylvanica*, *Coreopsis major*, **Euphorbia corollata*, **Hypericum prolificum*, **Panicum commutatum* var. *ashei*, **Pityopsis graminifolia* var. *latifolia*, *Schizachyrium scoparium*, *Smilax glauca*, *S. rotundifolia*, *Solidago arguta* var. *caroliniana*, **Vaccinium arboreum*, *V. stamineum*, *Vitis rotundifolia*

EODATA:
Population size and phenology -- A total of 12 plants (8 flowering) was recorded on the S-SW facing escarpment of Starr Mt. Actual population size may be underestimated since only plants with obvious palmately compound leaves and leaflet widths <7 mm were counted. Plants with narrow leaflets (7-15 mm) and leaves appearing simple were not recognized as representative material. Flowering period is from July through August.

Threats and viability -- There are no threats to the population, and there is sufficient habitat for future growth.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 577; Polk Co., TN; 7/1/91. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Cypripedium acaule* Aiton

FEDERAL STATUS	STATE STATUS	TES
None	E*	Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Newfoundland and Quebec to Alberta, south to New Jersey and northern Indiana, and along the mountains and coastal plain to South Carolina and Alabama.

Tennessee -- Middle to east Tennessee on Eastern Highland Rim, Cumberland Plateau, Valley and Ridge, and Blue Ridge.

LOCALITY: CA_1

SURVEY DATE(S): 5/26/93

COUNTY NAME: Polk

QUADNAME(S): Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 16' 40"

ELEVATION: 2100 ft

LONGITUDE (W): 84° 28' 52"

POPULATION BOUNDARIES:
S -- 35° 16' 32" N; 2000 ft
N -- 35° 16' 47" N; 2120 ft
E -- 84° 28' 52" W; 2120 ft
W -- 84° 29' 13" W; 2000 ft

DIRECTIONS: 1.2 mi (1.9 km) NE of Iron Gap on FR 297 then 55 yds (50 m) W-SW of road.

HABITAT: Plants are found in USFS forest types 32 (Shortleaf Pine) and 56 (Yellow Poplar-White Oak-Red Oak) and a transitional overstory from pine to hardwood. Moisture regimes range from xeric-subxeric depending on the proximity to Gee Creek headwaters and topographic position (concave vs. convex slope). Three forest types and plant associates are described below.

ASSOCIATED SPP. (* = common spp. at site):
[Xeric, pine woodland - 32]

Canopy -- *Acer rubrum*, **Pinus echinata*, *P. virginiana*, *Quercus coccinea*

Subcanopy -- *Cornus florida*, *Nyssa sylvatica*, *Oxydendrum arboreum*, *Sassafras albidum*

Understory -- *Chamaelirium luteum*, *Hexastylis arifolia* var. *ruthii*, **Iris verna*, *Kalmia latifolia*, *Nyssa sylvatica*, *Sassafras albidum*, *Smilacina racemosa*, *Stenanthium gramineum*, *Trillium catesbaei*, **Vaccinium hirsutum*

[Xeric, mixed deciduous woodland - 32 (transitional)]
Canopy -- *Acer rubrum*, *Pinus echinata*, *P. virginiana*, **Quercus coccinea*, *Q. velutina*

Subcanopy -- *Castanea dentata*, *Nyssa sylvatica*

Understory -- *Acer rubrum*, *Hexastylis arifolia* var. *ruthii*, *Mitchella repens*, *Nyssa sylvatica*, *Trillium catesbaei*, **Vaccinium hirsutum*, *V. stamineum*

[Subxeric, mixed deciduous woodland - 56]
Canopy -- *Acer rubrum*, *Liriodendron tulipifera*, *Nyssa sylvatica*, **Quercus alba*

Subcanopy -- *Acer rubrum*, *Nyssa sylvatica*, *Oxydendrum arboreum*, Sassafras *albidum*

Understory -- *Galax urceolata*, *Hexastylis arifolia* var. *ruthii*, *Iris verna*, *Medeola virginiana*, *Stenanthium gramineum*, *Thelypteris noveboracencis*

EODATA:
Population size and phenology -- Plants are distributed on convex slopes near Gee Creek and to the E-NE. Circa 500-800 plants (20% flowering) are estimated in the area. Fewer numbers and flowering individuals were encountered in mixed deciduous woodlands as opposed to pine woodlands (Shortleaf and Virginia Pine dominant). This may explain its relative absence on Poplar Springs Ridge which is primarily deciduous woods, USFS forest type 59 (Scarlet Oak). However, a few plants were observed on the upper footslope of Poplar Springs Ridge above Poplar Springs Branch.

Threats and viability -- There are no threats to the population, and there is sufficient habitat for future population growth.

LOCALITY: CA_2

SURVEY DATE(S): 5/26/93 COUNTY NAME: Polk

QUADNAME(S): Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 16' 31" ELEVATION: 1960 ft

LONGITUDE (W): 84° 29' 20" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.0 mi (1.6 km) NE of Iron Gap on FR 297 then 0.36 mi (0.58 km) due W to a N x S oriented concave slope on W side of Gee Creek.

HABITAT: Submesic site in pine/hemlock woodland -- USFS forest type 56 (Yellow Poplar-White Oak-Red Oak). Shaded, low woods in white pine inclusion with scattered yellow poplar.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer rubrum*, *Liriodendron tulipifera*, *Pinus echinata*, **P. strobus*

Subcanopy -- *Magnolia tripetala*, *Oxydendrum arboreum*

Understory -- *Galax urceolata*, **Hexastylis shuttleworthii*, *Kalmia latifolia*, **Pyrularia pubera*, **Thelypteris noveboracencis*

EODATA:
Population size and phenology -- Circa 50 plants (3 flowering) are located in a 2150 ft^2 (200 m^2) area.

Threats and viability -- There are no immediate threats to the population, but individuals are restricted to one area in the stand where associate understory spp. are less dense. Future population expansion is unlikely given the amount of competing vegetation.

LOCALITY: CA_3

SURVEY DATE(S): 6/9/93 COUNTY NAME: Polk

QUADNAME(S): Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 24"

ELEVATION: 2340 ft

LONGITUDE (W): 84° 29' 54"

POPULATION BOUNDARIES:
S -- 35° 15' 21" N; 2360 ft
N -- 35° 15' 24" N; 2340 ft
E -- 84° 29' 54" W; 2340 ft
W -- 84° 30' 01" W; 2360 ft

DIRECTIONS: 0.81 mi (1.3 km) SW of GCW boundary at Iron Gap on FT 104 and margins; Chestnut Mt.

HABITAT: Xeric sites in mixed woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Plants are found on trail edges and wooded margins.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Pinus strobus*, **P. virginiana*, *Quercus alba*

Subcanopy -- *Acer rubrum*, **Oxydendrum arboreum*

Understory -- *Acer rubrum*, *Danthonia spicata*, *Gaylussacia baccata*, *Oxydendrum arboreum*, *Quercus velutina*, *Sassafras albidum*, *Vaccinium hirsutum*, *Viburnum acerifolium*

EODATA:
Population size and phenology -- Plants are scattered from the northeastern to southwestern population boundary over a distance of 219 yds (200 m). Size is estimated at 200 plants (40 flowering). At the northeastern boundary ca. 70 plants (7 flowering) occur on S side of trail.

Threats and viability -- Threats to the population, as a whole, are minor as long as (1) travel is maintained on the established trail and (2) disturbance from any future trail maintenance is avoided. Only three or four plants nearest the center of the trail at the northeastern boundary are in any danger. Shrubs and overhanging branches should discourage travel on the edges and direct traffic to the center of the trail. The population is expected to persist and currently only a few plants are considered to be in any jeopardy.

LOCALITY: CA_4

SURVEY DATE(S): 6/9/93

COUNTY NAME: Polk

QUADNAME: Etowah, 1967; Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 19"

ELEVATION: 2360 ft

LONGITUDE (W): 84° 30' 02"

POPULATION BOUNDARIES:
S -- 35° 15' 17" N; 2380 ft
N -- 35° 15' 24" N; 2340 ft
E -- 84° 29' 54" W; 2380 ft
W -- 84° 30' 01" W; 2360 ft

DIRECTIONS: 0.97 mi (1.6 km) SW of Iron Gap in woods upslope from FT 104; Chestnut Mt.

HABITAT: Xeric sites in mixed woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Shaded woods typically in areas lacking a dense cover of *Vaccinium hirsutum*.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Carya pallida*, *Pinus strobus*, **P. virginiana*, *Quercus alba*, *Q. velutina*

Subcanopy -- *Castanea dentata*, *Cornus florida*, *Nyssa sylvatica*, **Oxydendrum arboreum*, *Sassafras albidum*

Understory -- *Acer rubrum*, *Carex pensylvanica*, *Chimaphila maculata*, *Gaylussacia baccata*, *Iris verna*, *Lysimachia quadrifolia*, *Nyssa sylvatica*, *Oxydendrum arboreum*, *Pteridium aquilinum*, **Sassafras albidum*, *Smilacina racemosa*, *Smilax glauca*, *Stenanthium gramineum*, *Trillium catesbaei*, **Vaccinium hirsutum*, *V. pallidum*, *Viburnum acerifolium*

EODATA:
Population size and phenology -- Small groups and scattered individuals occur over a distance of 328 yds (300 m) from the northeastern to southwestern boundaries and upslope from the woodland margin along FT 104 approx. 109 yds (100 m). Population size is estimated at 300 plants (10-20% flowering). It is possible that some plants exist below 2320 ft in USFS forest type 33 (Virginia Pine), but none were seen during the survey. Another survey is recommended in this area of Chestnut Mt. because it is suitable habitat.

Threats and viability -- There are no apparent threats to the population except from being overgrown by *Vaccinium hirsutum* in some areas. However, places remain which are open enough to allow for future colonization. The population is expected to persist but as the forest stand undergoes successional changes from a hardwood-pine type to a hardwood type, numbers could decline.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 848; Polk Co., TN; 5/5/92. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Juglans cinerea* L.

FEDERAL STATUS	STATE STATUS	TES
C2	T	Listed

GEOGRAPHIC DISTRIBUTION:
North America -- New Brunswick to Minnesota, south to South Carolina, Georgia, and Arkansas.

Tennessee -- Throughout Tennessee but apparently absent from the Central Basin.

LOCALITY: JC

SURVEY DATE(S): 8/5/93 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 46" ELEVATION: 1040 ft

LONGITUDE (W): 84° 31' 53" POPULATION BOUNDARIES: N/A

DIRECTIONS: 55 yds (50 m) NE of GCW boundary marker at FT 191 on lower footslope of Starr Mt. near edge of Gee Creek.

HABITAT: Submesic site in mixed deciduous woodland -- USFS forest type 53 (White Oak-Red Oak-Hickory). Anchored at base of slope in quartzite and micaceous siltstone colluvium; partially shaded and ca. 10 ft (3 m) from creek edge.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Aesculus flava*, *Carya glabra*, *Liriodendron tulipifera*, *Quercus montana*, *Tilia americana* var. *heterophylla*, *Ulmus alata*

Subcanopy -- *Quercus montana*, *Tilia americana* var. *heterophylla*

Understory -- *Aristolochia macrophylla*, *Aster divaricatus*, *Parthenocissus quinquefolia*, *Philadelphus inodorus*

EODATA:
Population size and phenology -- A single tree ca. 15 ft (4.6 m) in height, 2.2 in (5.5 cm) dbh. It was not observed in flower, and there was no evidence of fruiting. Visitation during the species flowering period (April to May) would be necessary to assess its reproductive maturity.

Threats and viability -- Widespread infection of *Juglans cinerea* from a canker disease caused by *Sirococcus clavigignenti-juglandacearum* Nair, Kostichka, & Kuntz has led to a decline in numbers and its elimination in much of its range (Nicholls 1979). The canker disease infects trees of all ages, and canker production on branches and trunks effectively girdles the tree resulting in death (Nicholls 1979, Patterson 1993). Girdling often takes place at the root collar which prevents root sprouting (Tisserat and Kuntz 1984). No cankers were noticed on the trunk or branches of the tree in GCW, but it should be examined yearly, especially in the spring. Symptoms of the disease include: (1) presence of dead branches which have been girdled, (2) dark brown or black vertically oriented and elliptic shaped cankers on stems and branches; young cankers are often dark, sunken areas originating at natural openings (i.e. leaf scars, buds, and lenticels) and at wounds; old cankers are loosely covered by shredded bark, and (3) an inky-black fluid exudes from canker fissures in the spring and leaves a dark stain (Kuntz et al. 1979, Orchard et al. 1982, Anderson 1988). A second, more immediate threat to the tree's survival involves a fallen northern red oak. Damage and possible death may occur if the oak rolls from its current position. Shallow rooting in colluvium predisposes the sapling to be dislodged and the weight of the windthrow could cause its trunk to break. Removal of the windthrow is recommended.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 910; Polk Co., TN; 5/29/92. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Juncus gymnocarpus* Coville

FEDERAL STATUS	STATE STATUS	TES
3C	T	Listed

GEOGRAPHIC DISTRIBUTION:
North America -- East Pennsylvania to the mountains of Tennessee, North Carolina, and South Carolina; west Florida. Godfrey and Wooten (1979) include the Coastal Plain of southeast Alabama in its geographic range.

Tennessee -- East Tennessee in the Blue Ridge. Recorded in four counties (Blount, Monroe, Polk, and Sevier).

LOCALITY: JG_1

SURVEY DATE(S): 7/16/92 COUNTY NAME: Polk

QUADNAME(S): Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 54" ELEVATION: 2060 ft

LONGITUDE (W): 84° 29' 35" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.12 mi (0.20 km) S-SW on FT 104 from GCW boundary at Iron Gap; Chestnut Mt.

HABITAT: Mesic site in mixed woodland -- USFS forest type 33 (Virginia Pine). Plants are found growing at a spring locality on FT 104 in *Sphagnum recurvum* P.-Beauv. and trail substrate.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, *Liriodendron tulipifera*, *Nyssa sylvatica*, **Pinus strobus*

Subcanopy -- *Acer rubrum*, *Oxydendrum arboreum*

Understory -- *Athyrium filix-femina* subsp. *asplenioides*, *Kalmia latifolia*, *Lysimachia quadrifolia*, *Microstegium vimineum*, *Rhododendron maximum*, *Rubus argutus*, **Sphagnum recurvum*, **Thelypteris noveboracencis*, *Viola*

blanda

EODATA:
Population size and phenology -- Population occupies an area approx. 387 ft^2 (36 m^2). Most plants are rooted in *Sphagnum recurvum* rather than on rocky substrate of trail. Rhizomatous nature of the species prevents clear distinction of individuals; consequently, population size is estimated by the number of vegetative and reproductive culms. Subsequent *J. gymnocarpus* reports follow this format for population size estimation. Circa 550 culms are present at the site with 50% of the total representing flowering and fruiting culms. Majority of vegetative and reproductive culms are restricted to the least disturbed sites on E side of the trail. Flowering period is late June through July with capsules evident from July through October.

Threats and viability -- The site is being heavily impacted due to trail use, especially by horseback riders. The viability of the population is in jeopardy. Numbers will decline as more of the trail becomes unsuitable for habitation due to disturbance. The population should persist on the E margin of FT 104 as long as trail use is confined to the middle and W side.

LOCALITY: JG_2

SURVEY DATE(S): 7/16/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 58" ELEVATION: 2440 ft

LONGITUDE (W): 84° 30' 32" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.6 mi (2.5 km) SW on FT 104 from GCW boundary at Iron Gap then W of trail in low woods; Chestnut Mt.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Plants are found in spring drainage and a wet depression near trail; shaded to partially shaded areas.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, **Betula lenta*, *Liriodendron tulipifera*, **Nyssa sylvatica*, *Quercus alba*

Subcanopy -- *Cornus florida*, *Oxydendrum arboreum*

Understory -- **Carex atlantica*, **C. debilis* var. *debilis*, *C. lurida*, *Chasmanthium laxum*, *Chelone glabra*, *Galax urceolata*, **Kalmia latifolia*, *Lycopus virginicus*, *Medeola virginiana*, *Osmunda cinnamomea*, *O. regalis* var. *spectabilis*, *Platanthera clavellata*, *Rhododendron maximum*, *R. periclymenoides*, **Sphagnum recurvum*, *Thelypteris noveboracencis*, *Vaccinium stamineum*

EODATA:
Population size and phenology -- Population consists of scattered clumps totaling approx. 300 culms (40% fruiting). Plants in partial shade, where *Kalmia latifolia* and *Rhododendron maximum* are less dense, showed vigorous growth and possessed more fruiting culms than plants in more densely vegetated areas.

Threats and viability -- There are no apparent threats to the population, but any future trail maintenance or change in trail width could negatively impact plants nearest the trail. Population growth is anticipated, especially in partially shaded areas.

LOCALITY: JG_3

SURVEY DATE(S): 7/16/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 57" ELEVATION: 2440 ft

LONGITUDE (W): 84° 30' 32" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.6 mi (2.6 km) SW on FT 104 from GCW boundary at Iron Gap; Chestnut Mt.

HABITAT: Submesic site in mixed deciduous woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Plants are found at an intermittent spring on E side of trail.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, *Pinus virginiana*, **Quercus alba*

Subcanopy -- *Cornus florida*, *Oxydendrum arboreum*

Understory -- *Chasmanthium laxum*, *Hedyotis purpurea*, **Juncus tenuis*, **Microstegium vimineum*, *Potentilla simplex*, and miscellaneous bryophytes

EODATA:
Population size and phenology -- Circa 50 culms (20% fruiting) occur at locality.

Threats and viability -- Population is threatened by trail use since contact is almost unavoidable, especially by horeseback riders. Vegetative growth may continue if disturbance is infrequent or prohibited. Establishment of new clumps is unlikely given its location and susceptibility to disturbance.

LOCALITY: JG_4

SURVEY DATE(S): 7/16/92 COUNTY NAME: Polk

QUADNAME(S): Mecca, 1957

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 16' 32" ELEVATION: 2000 ft

LONGITUDE (W): 84° 29' 08" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.0 mi (1.5 km) NE of Iron Gap on FR 297 then 315 yds (288 m) due W from road in NE x SW oriented concave slope with spring; spring drainage merges with Gee Creek at headwaters.

HABITAT: Submesic-mesic sites in mixed deciduous woodland -- USFS forest type 56 (Yellow Poplar-White Oak-Red Oak). Low woods along spring in moist to wet sandy loam and *Sphagnum recurvum*; less common in drier areas near drainage.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, *Liriodendron tulipifera*, **Nyssa sylvatica*, *Pinus strobus*, **Quercus alba*

Subcanopy -- *Ilex opaca*, *Magnolia tripetala*

Understory -- *Arundinaria gigantea*, **Carex debilis* var. *debilis*, *C. debilis* var. *pubera*, *C. intumescens*, *Chasmanthium laxum*, *Galax urceolata*, *Halesia tetraptera*, *Kalmia latifolia*, *Medeola virginiana*, **Osmunda cinnamomea*, *O. regalis* var. *spectabilis*, *Rhododendron periclymenoides*, **Sphagnum recurvum*,

Thelypteris noveboracencis, *Vaccinium hirsutum*, *Woodwardia areolata*, **Xanthorhiza simplicissima*

EODATA:
Population size and phenology -- Majority of the population is along drainage, but a few clumps are found in drier soil near spring. Circa 3,000 culms (60% fruiting) are present at locality.

Threats and viability -- There are no threats to the population, and the habitat appears to be extremely suitable for growth and reproduction based on population size and reproductive vigor. Vegetative growth and establishment of new clumps are expected, particularly along spring drainage in *Sphagnum recurvum* and wet sandy loam.

LOCALITY: JG_5

SURVEY DATE(S): 7/23/92 COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 28" ELEVATION: 1940 ft

LONGITUDE (W): 84° 31' 13" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.6 mi (1.0 km) NE on FT 190A from SW end of Starr Mt. then 289 yds (264 m) due E to intermittent streamhead; upper concave slope of Starr Mt.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 16 (Virginia Pine-Oak). Found in quartzite cobble and sandy loam of stream; shaded. No *Sphagnum* is present at locality.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, **Liriodendron tulipifera*, **Nyssa sylvatica*, *Pinus strobus*, *Quercus alba*

Subcanopy -- *Alnus serrulata*, *Cornus florida*, *Magnolia tripetala*, **Oxydendrum arboreum*, *Sassafras albidum*

Understory -- *Athyrium filix-femina* subsp. *asplenioides*, *Carex atlantica*, *C. debilis* var. *pubera*, *Chelone glabra*, *Galax urceolata*, **Osmunda cinnamomea*,

O. regalis var. *spectabilis*, *Parnassia asarifolia*, *Platanthera clavellata*, *Rhododendron maximum*, **Thelypteris noveboracencis*

EODATA:
Population size and phenology -- Three clumps totaling approx. 100 culms (30% fruiting) occur at locality.

Threats and viability -- There are no threats to the population, and it is expected to persist. A significant increase in population size is doubtful since conditions at JG_5 are less ideal for growth. Enlargement of existing clumps will occur vegetatively via rhizome elongation and establishment of new clumps may occur over time.

LOCALITY: JG_6

SURVEY DATE(S): 7/23/92

COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 46"

ELEVATION: 2100 ft

LONGITUDE (W): 84° 31' 03"

POPULATION BOUNDARIES:
S -- 35° 15' 43" N; 2040 ft
N -- 35° 15' 46" N; 2100 ft
E -- 84° 31' 02" W; 2040 ft
W -- 84° 31' 03" W; 2100 ft

DIRECTIONS: 1.0 mi (1.6 km) NE on FT 190A from SW end of Starr Mt. then 315 yds (288 m) due E to intermittent stream head; upper concave slope of Starr Mt.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 33 (Virginia Pine). Plants are located in stream and on margins in moist soil. They are shaded in the upper reaches of the stream course and partially shaded at SE boundary. *Sphagnum recurvum* is rare in the vicinity, and no *J. gymnocarpus* plants were found growing in it.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, **Liriodendron tulipifera*, **Nyssa sylvatica*, *Pinus strobus*, *Quercus montana*, *Tsuga canadensis*

Subcanopy -- *Alnus serrulata*, *Cornus florida*, *Magnolia tripetala*, *Oxydendrum arboreum*, *Sassafras albidum*

Understory -- *Aronia arbutifolia*, *Athyrium filix-femina* subsp. *asplenioides*, *Calycanthus floridus*, **Carex atlantica*, **C. debilis* var. *pubera*, **Galax urceolata*, *Kalmia latifolia*, *Medeola virginiana*, **Osmunda cinnamomea*, *Pyrularia pubera*, **Rhododendron maximum*, *R. periclymenoides*, **Thelypteris noveboracencis*, *Vaccinium stamineum*, *Woodwardia areolata*

EODATA:
Population size and phenology -- Forty-one clumps are distributed along stream course totaling approx. 1,100 culms (60% fruiting). A greater number fruiting culms were present in clumps found in partial shade where the canopy was more open and subcanopy was less dense. This was especially noticeable at the SE boundary (2040 ft.) where the stream course is intersected by a logging rd. which creates a canopy break. Here, plants exhibited vigorous growth with several fruiting culms.

Threats and viability -- There are no threats to the population, and growth should continue within the existing boundaries. Increased coverage and shading by *Rhododendron maximum* and a stony substrate make the stream course downslope from the logging rd. unsuitable for colonization.

LOCALITY: JG_7

SURVEY DATE(S): 10/8/92 COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 16' 34" ELEVATION: 1900 ft

LONGITUDE (W): 84° 30' 11" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.1 mi (1.7 km) SW of Forest Protection Rd. (northern boundary) on logging rd. at spring; Starr Mt.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Wet soil in spring; partially shaded.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Liriodendron tulipifera*, *Tsuga canadensis*

Subcanopy -- **Alnus serrulata*

Understory -- *Carex* sp., *Decumaria barbara*, *Desmodium paniculatum*, and miscellaneous bryophytes

EODATA:
Population size and phenology -- Twelve clumps are present in spring drainage totaling approx. 400 culms (50% fruiting). Percent estimation of fruiting culms was based on presence of old inflorescence branches and capsules. Resurvey of population during fruiting period is recommended for a more accurate count.

Threats and viability -- There are no threats to the population, and future population growth will be restricted to the logging rd. Regions upslope and downslope along the spring drainage are unsuitable for colonization because of increased coverage and shading by *Rhododendron maximum* and stony substrate.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 627; Polk Co., TN; 7/15/91. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Panax quinquefolius* L.

FEDERAL STATUS	STATE STATUS	TES
3C	T	Not Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Quebec to Minnesota and South Dakota, south to Georgia, Louisiana, and Oklahoma.

Tennessee -- Throughout Tennessee but more counties recorded in the Appalachians (Cumberland Plateau, Valley and Ridge, and Blue Ridge).

LOCALITY: PQ

SURVEY DATE(S): 8/7/92 COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 01" ELEVATION: 1560 ft

LONGITUDE (W): 84° 31' 11" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.81 mi (1.3 km) NE on FT 191 from GCW boundary then approx. 30 yds (27 m) upslope from trail; upper footslope on Chestnut Mt.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 41 (Cove Hardwoods-White Pine-Hemlock). Shaded rocky slope in rich woods; NW aspect.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer saccharum*, *Aesculus flava*, *Carya ovata*, *Tilia americana* var. *heterophylla*

Subcanopy -- N/A

Understory -- *Adiantum pedatum*, *Aristolochia macrophylla*, **Aster divaricatus*, **Brachyelytrum erectum*, *Dryopteris marginalis*, **Hepatica acutiloba*, *Polystichum acrostichoides*, *Sedum ternatum*, *Smilacina racemosa*, *Tiarella cordifolia*, *Viola*

canadensis

EODATA:
Population size and phenology -- Eleven plants (8 fruiting) occur at locality. Flowering was never observed during the survey, but anthesis is probably in early summer. Gleason and Cronquist (1991) note flowering period as June and July.

Threats and viability -- There are no threats to the population, and there was no sign of disturbance in the area. Its distance from FT 191 is far enough to obscure it from sight, but this assures no absolute protection from ginseng hunters. The population should persist and increase in size as long as it remains protected.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 762; Polk Co., TN; 9/20/91. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Polymnia laevigata* Beadle

FEDERAL STATUS	STATE STATUS	TES
3C	S	Not Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Scattered localities in six states--southwestern Kentucky, southern Missouri, Tennessee, Alabama, northwest Georgia, and Florida panhandle. Distribution information from Wells (1969), Whetstone (1979), and Browne and Athey (1992).

Tennessee -- Scattered from east to west Tennessee and recorded in eight counties. Physiographic provinces include the Blue Ridge, Cumberland Plateau, Highland Rim, and the Coastal Plain.

LOCALITY: PL_1

SURVEY DATE(S): 4/17/92, 8/27/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 47" ELEVATION: 1240 ft

LONGITUDE (W): 84° 31' 39" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.25 mi (0.41 km) E on FT 191 from GCW boundary then 11 yds (10 m) SW of trail on a bouldery-blocky diamicton; Gee Knob.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 41 (Cove Hardwoods-White Pine-Hemlock). Open slope of weathered quartzite blocks; NW aspect. Canopy and subcanopy species are primarily located on periphery of diamicton and along Gee Creek. Woody understory species are more prevalent on quartzite blocks than the aforementioned species.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Aesculus flava*, *Betula lenta*, *Quercus montana*, *Tilia americana* var. *heterophylla*, *Tsuga canadensis*

Subcanopy -- *Acer rubrum*, *Cornus florida*, *Ostrya americana*

Understory -- *Arisaema triphyllum*, *Asimina triloba*, **Dryopteris marginalis*, **Heuchera villosa*, *Parthenocissus quinquefolia*, **Philadelphus inodorus*, *Pilea pumila*, *Rhododendron maximum*, *Staphylea trifolia*, **Toxicodendron radicans*

EODATA:
Population size and phenology -- Population is divided into east and west sections by an intervening shrub layer (*Asimina triloba*, *Philadelphus inodorus*, and *Staphylea trifolia*).

	width (across slope)	length
east section:	92 ft (28 m)	89 ft (27 m)
west section:	20 ft (6 m)	65 ft (20 m)
diamicton:	171 ft (52 m)	164 ft (50 m)

Population size is estimated at 5,000-8,000 plants (90% flowering). Flowering period is from July to October, and mature achenes are present in late summer and fall.

Threats and viability -- There are no threats to the population. Vigorous growth and reproduction are indicated by the presence of several hundred seedlings and thousands of mature flowering plants. Population growth will likely remain on the diamicton as opposed to adjacent rocky slopes. Site characteristics of *P. laevigata* localities in GCW indicate that the preferred habitat is an open bouldery-blocky diamicton in deciduous woods with limited shading and a mesic-submesic moisture regime.

LOCALITY: PL_2

SURVEY DATE(S): 4/17/92, 8/27/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 50" ELEVATION: 1440 ft

LONGITUDE (W): 84° 31' 19"

POPULATION BOUNDARIES:
S -- 35° 14' 50" N; 1440 ft
N -- 35° 14' 54" N; 1480 ft
E -- 84° 31' 12" W; 1480 ft
W -- 84° 31' 19" W; 1440 ft

DIRECTIONS: 0.58 mi (0.93 km) E-NE on FT 191 from GCW boundary then 22 yds (20 m) N of trail on a bouldery-blocky diamicton; Starr Mt..

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 41 (Cove Hardwoods-White Pine-Hemlock). Open slope of weathered quartzite blocks; SE aspect. Tree and shrub species are scattered on blocks.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer rubrum*, **Betula lenta*, *Ostrya virginiana*, *Pinus strobus*, *Tsuga canadensis*

Subcanopy -- *Cornus florida*

Understory -- *Dioscorea villosa*, *Dryopteris marginalis*, *Hamamelis virginiana*, **Parthenocissus quinquefolia*, *Philadelphus inodorus*, *Polypodium appalachianum*, *Sedum ternatum*, *Smilacina racemosa*, **Toxicodendron radicans*, *Vitis aestivalis* var. *bicolor*, *V. rotundifolia*

EODATA:
Population size and phenology -- Population area is essentially that of the diamicton's dimensions described below.

	width (across slope)	length
diamicton:	361 ft (110 m)	98 ft (30 m)

Population size is estimated at 8,000-11,000 plants (60% flowering). Most of the flowering individuals are located on the lower portion of the slope. Plant density is less than at PL_1, but the number of seedlings and nonflowering individuals is considerably higher.

Threats and viability -- There are no threats to the population, and population growth should continue at the locality.

LOCALITY: PL_3

SURVEY DATE(S): 8/7/92

COUNTY NAME: Polk

QUADNAME(S): Etowah, 1967; Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 15' 00"

ELEVATION: 1900 ft

LONGITUDE (W): 84° 31' 01"

POPULATION BOUNDARIES:
S -- 35° 14' 58" N; 1960 ft
N -- 35° 15' 00" N; 1900 ft
E -- 84° 31' 00" W; 1960 ft
W -- 84° 31' 01" W; 1900 ft

DIRECTIONS: 1.5 mi (2.4 km) SW on FT 104 from GCW boundary at Iron Gap then 0.48 mi (0.77 km) due W from trail on a bouldery-blocky diamicton; Chestnut Mt.

HABITAT: Submesic site in mixed deciduous woodland -- USFS forest type 45 (Chestnut Oak-Scarlet Oak-Yellow Pine). Open slope of weathered quartzite blocks in a narrow concavity; NW aspect. Fallen trees and snags occur in the diamicton, and the few surviving trees are scattered. Most canopy trees are located on the margin, and the population is essentially unshaded.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- **Acer saccharum*, **Betula lenta*, *Quercus montana*, *Q. rubra*

Subcanopy -- *Cornus florida*

Understory -- *Aristolochia macrophylla*, *Dryopteris marginalis*, *Heuchera villosa*, **Parthenocissus quinquefolia*, *Philadelphus hirsutus*, **Toxicodendron radicans*, *Vitis aestivalis* var. *bicolor*

EODATA:
Population size and phenology -- Three thousand plants (75% flowering) are estimated on diamicton with the following dimensions:

	width (across slope)	length
diamicton:	49 ft (15 m)	246 ft (75 m)

The population is principally located on quartzite blocks, but a small population of 40 plants (31 flowering) are located downslope at a tip-up mound (35° 15' 01" N x 84° 31' 01" W; 1840 ft). Competing vegetation and eventual canopy closure at the treethrow should slow growth and prevent it from spreading. Based on inferred habitat preferences in GCW (see PL_1 report), this small group of plants

may persist, but growth and reproductive vigor will never match those plants on the diamicton.

Threats and viability -- There are no threats to the population, and future population growth will be restricted to the diamicton unless natural disturbances create openings in adjacent woods.

LOCALITY: PL_4

SURVEY DATE(S): 8/16/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 45" ELEVATION: 1080 ft

LONGITUDE (W): 84° 31' 55" POPULATION BOUNDARIES:
S -- 35° 14' 43" N; 1160 ft
N -- 35° 14' 45" N; 1080 ft
E -- 84° 31' 52" W; 1080 ft
W -- 84° 31' 57" W; 1160 ft

DIRECTIONS: 33 yds (30 m) due S of GCW boundary marker at FT 191; rocky footslope and bouldery-blocky diamicton on Gee Knob.

HABITAT: Submesic-mesic sites in mixed deciduous woodland -- USFS forest type 53 (White Oak-Red Oak-Hickory). Plants are located on diamicton and shaded, rocky footslope; N-NW aspect. Fallen trees and snags occur on the diamicton similar to PL_3, and woody vegetation is primarily confined to the margins. The diamicton is essentially open with little shading.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Betula lenta*, *Fraxinus americana*, **Liriodendron tulipifera*, **Ostrya virginiana*, *Platanus occidentalis*, *Quercus montana*, *Q. rubra*, **Robinia pseudoacacia*, *Tilia americana* var. *heterophylla*

Subcanopy -- *Acer rubrum*, *Cornus florida*, *Halesia tetraptera*, *Ulmus alata*

Understory -- **Aster divaricatus*, *Dryopteris marginalis*, *Hamamelis virginiana*, *Heuchera americana*, *Hydrangea arborescens* subsp. *arborescens*, *Parthenocissus quinquefolia*, *Philadelphus inodorus*, *Thaspium barbinode*, **Toxicodendron radicans*, *Viburnum acerifolium*, *Vitis aestivalis* var. bicolor

EODATA:
Population size and phenology -- Circa 5,000 plants (20% flowering) are estimated at locality. The population boundary narrows to the SW on the diamicton and spreads laterally ca. 82 yds (75 m) on the rocky lower footslope at the NE boundary. The diamicton's dimensions were not measured, but it extends from 1120-1360 ft. Plants are confined to its lower region (1120-1160 ft). Most of the population occurs on the shaded, rocky footslope below the diamicton (1080-1120 ft), and these plants are typically nonflowering. Their heights range from 4 in (10 cm) to 16 in (40 cm). Larger, more robust flowering individuals are found in unshaded and partially shaded areas on the diamicton.

Threats and viability -- There are no threats to the population. Plants are expected to persist and grow at the site.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 783; Polk Co., TN; 10/4/91. Specimen deposited at the University of Tennessee Herbarium (TENN).

STATUS REPORT

SPECIES NAME: *Trichomanes petersii* A.Gray

FEDERAL STATUS	STATE STATUS	TES
None	E	Listed

GEOGRAPHIC DISTRIBUTION:
North America -- Mountains of North Carolina, South Carolina, and Tennessee, southern Illinois, and Arkansas south to Georgia, Florida, Alabama, Mississippi, and Louisiana. Distribution information from Lellinger (1985).

Tennessee -- East Tennessee on Cumberland Plateau and Blue Ridge. Recorded from six counties (Blount, Franklin, Grundy, Monroe, Polk, and Sevier).

LOCALITY: TP_1

SURVEY DATE(S): 4/17/92 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 14' 47" ELEVATION: 1400 ft

LONGITUDE (W): 84° 31' 21" POPULATION BOUNDARIES: N/A

DIRECTIONS: 0.53 mi (0.86 km) E on FT 191 from GCW boundary then 43 yds (39 m) due S from Gee Creek; lower footslope of Chestnut Mt. on outcrop.

HABITAT: Mesic site in mixed deciduous woodland -- USFS forest type 41 (Cove Hardwoods-White Pine-Hemlock). Epipetric on basal portion of shaded siltstone outcrop; NW aspect.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Acer saccharum*, *Tilia americana* var. *heterophylla*

Subcanopy -- N/A

Understory -- miscellaneous bryophytes

EODATA:
Population size and phenology -- Population is separated into two colonies. The largest colony, C-1, occupies an area approx. 4.2 ft^2 (0.39 m^2). Circa 10,000 plants comprise C-1. The second colony, C-2, is located 39 ft (12 m) E-NE of C-1 in a recess. C-2 occupies an area approx. 1.1 ft^2 (0.10 m^2) and consists of ca. 1,000-2,000 plants. Sporulation was more prevalent in C-1 than C-2. The sporulation period of plants in GCW is not exactly known, but it is probably initiated in early spring.

Threats and viability -- There are no threats to the population, and both colonies should continue to grow in size.

LOCALITY: TP_2

SURVEY DATE(S): 1/27/93 COUNTY NAME: Polk

QUADNAME(S): Oswald Dome, 1967

PHYSIOGRAPHIC PROVINCE: Blue Ridge

LATITUDE (N): 35° 16' 08" ELEVATION: 1860 ft

LONGITUDE (W): 84° 30' 26" POPULATION BOUNDARIES: N/A

DIRECTIONS: 1.6 mi (2.5 km) SW along Poplar Springs Branch from GCW boundary at FR 297 then 0.19 mi (0.30 km) W-SW along tributary stream with SW x NE orientation on Starr Mt.; SE side of stream on outcrop.

HABITAT: Mesic site in mixed woodland -- USFS forest type 04 (White Pine-Hemlock). Plants are found along base of convex ridge where siltstone outcrops are exposed along the stream. The outcrop is partially to fully shaded in areas, recessed in places, and has a NW aspect. Canopy species listed below are ones found on convex slope above the population and along the stream.

ASSOCIATED SPP. (* = common spp. at site):
Canopy -- *Betula lenta*, **Liriodendron tulipifera*, *Pinus strobus*, **Tsuga canadensis*

Subcanopy -- N/A

Understory -- *Asplenium trichomanes*, *Tiarella cordifolia*, and miscellaneous bryophytes

EODATA:
Population size and phenology -- Twelve colonies are distributed over a distance of 33 ft (10 m) and about 3.3 ft (1 m) above the stream. Circa 2,400 plants with less than 10% sporulating occur on the outcrop. Sporulation was determined from bilabiate indusia remaining on fronds from previous season.

Threats and viability -- There are no threats to the population. It should persist and grow as long as the outcrop is partially shaded. Reexamination of the population in spring is recommended to assess its reproductive vigor and to make a more informed judgement about its health.

MANAGED AREA NAME: Gee Creek Wilderness, Cherokee National Forest

SURVEY SITE NAME: Gee Creek Wilderness

OWNER: U.S. Government

CONTACT: Dan Wyrick CONTACT PHONE NO.: (423) 476-9700

BESTSOURCE: Voucher specimen collected by D. Wyrick 91-789; Polk Co., TN; 10/4/91. Specimen deposited at the University of Tennessee Herbarium (TENN).

VITA

Daniel Lee Wyrick and his identical twin brother were born to Jimmie and Janice Wyrick in Athens, Texas on July 23, 1968. Dan attended Athens public schools and graduated from Athens High School in 1986. He entered Centenary College of Louisiana in August, 1986, and graduated summa cum laude with a Bachelor of Science degree in biology in May, 1990.

In June, 1990, he was awarded a Science Alliance Fellowship at the University of Tennessee and began studying the flora of the Southern Appalachian region. He officially entered the Graduate School of the University of Tennessee, Knoxville in the Botany Department in August, 1990. He served as a graduate teaching assistant for the department from fall, 1990, to spring, 1992.

After completion of his field research in 1993, he worked as a contract botanist for the Mississippi Department of Wildlife, Fisheries, and Parks on Camp Shelby, Mississippi. He returned to Tennessee in July, 1995, and is presently employed by the USDA Forest Service as the Cherokee National Forest botanist.