A CONTRIBUTION TO THE VASCULAR FLORA OF THE SEQUATCHIE VALLEY WITHIN SEQUATCHIE COUNTY, TENNESSEE

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ABSTRACT

The vascular flora of the Sequatchie Valley within Sequatchie County, Tennessee was studied for three growing seasons from 2008 through 2010. The Sequatchie Valley is located within the southeastern portion of the Cumberland Plateau and is generally considered to be part of the Cumberland Plateau Physiographic Province. Nevertheless, a number of geological and ecological factors distinguish the Sequatchie Valley from the elevated Cumberland Plateau, suggesting that the floristic composition of the valley may be different from the surrounding region. Although several previous floristic studies have been conducted on the plateau surface, very little attention has been given to the Sequatchie Valley prior to the present study. This contribution documents a total of 767 species representing 379 genera in 116 families. This documentation results in the addition of 513 county records, more than doubling the number of previously documented vascular plant species in Sequatchie County from 468 to 981. Among the noteworthy rare species found were *Oenothera parviflora* (quite disjunct from its known distributions), *Ribes curvatum* and *Scutellaria montana*. Of special interest is the rediscovery of *Rudbeckia triloba* var. *pinnatiloba*, designated by the Tennessee Department of Environment and Conservation as a Tennessee endangered species, and previously thought to be extirpated from the state. In addition, eight state records were documented: *Carex digitalis* var. *assymetrica*, *Spiranthes lacera* var. *lacera*, *Bromus latiglumis*, *Elymus glaucus*, *Gamochaeta coarctata*, *Vaccinium angustifolium*, *Crataegus succulenta*, and *Verbena scabra*.

DEDICATION

This work is lovingly dedicated to my wife, Karla, and my two sons, John Edward Evans and Matthew "Caleb" Evans. Thank you for the emotional and substantive support you've given me from start to finish. Thank you for patiently enduring my absence and my preoccupation with the research and writing that produced this work.

ACKNOWLEDGEMENTS

This work exists in large part due to the consistent and professional mentorship provided to me by my advising professor, J. Hill Craddock. Encouraging me to be single-minded of purpose, he remained so as well, meeting with me every week to discuss both what I *have* accomplished and what I *intend* to accomplish. In the act of providing both structure and level-headed sensibility, Dr. Craddock rekindled in me a talent I once owned, but thought I had lost, the ability to calmly find a solution to what seems to be an insurmountable problem.

Dr. Craddock has also provided a critical element that I had hoped to find when I left a career of sixteen years to return to school, an element that was as important to me as the educational material itself, the spirit of University. The privilege to be in the company of learned minds, and to engage in animated discussion of a variety of subjects was a reward that had eluded me for much of my university experience, to the extent that I had become disillusioned with academia. J. Hill Craddock is an academic in all the positive aspects of the term. He has fun learning.

To Joey Shaw I give great thanks for the skill and expertise that I acquired in the fields of plant taxonomy and field botany. It is by his instruction that I now feel comfortable referring to myself as a plant expert. One can only learn what I have learned either by being a genius, or by standing on the shoulders of giants. Dr. Shaw provided for me the latter option.

I would be remiss if I did not acknowledge, in the most professional sense, the contribution of Caleb Evans. In rain, sweltering heat, through briars and even leaping along slippery rocks amidst rushing waters, Caleb enthusiastically accompanied me on many field-collecting trips. He did not merely “tag along.” He worked. He carried backpacks, plastic bags full of plant specimens, and lunch. He spotted plants that I missed, and if it weren’t for him, I would have lost dozens of plant trowels in the field instead of the five or six that I actually did lose.

To adequately describe the substantive support willingly offered by my wife, Karla would require a manuscript unto itself. It would include an itemized list of thousands of individual events wherein she the job at hand possible. To her I owe a debt of gratitude that can only be repaid in kind, and I look forward to supporting her in the pursuit of her own academic goals and remaining by her side in her continuing path of self fulfillment and happiness.

To Emily Blyveis I offer gratitude for mutual edification, learning, and friendship. This work would have been a lonely and more difficult experience without her.

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INTRODUCTION

A floristic study, more commonly referred to as a flora, is a thorough inventory of the plant species that occur in a specified geographic area (Palmer et al. 1995). Although not designed to measure *species diversity* in the full, ecological sense of the term, such inventories provide very accurate estimates of plant *species richness* within the study area. Moreover, as a natural consequence of conducting such a broad and thorough inventory, floristic studies document the occurrence of rare, threatened, and endangered plant species, providing critical information to conservation biologists and agencies. Of equal conservation concern is the spread of invasive exotic plant species (McKinney & Lockwood 1999, McKinney 2004). Floristic studies document the occurrence, as well as changes in the range and distribution, of invasive exotic species. Thus, at a time when biological diversity is under greater threat than at any other period in recorded history (Myers 1989), data from floristic studies offer greater utility than ever before. Efforts such as biological inventories, impact assessments, land management decisions, ecological research, and public policy formulation can all benefit directly from the information provided by floristic studies (Palmer et al. 1995).

Since 1966, ten major floristic studies of vascular plants have been conducted on the Cumberland Plateau in Tennessee, adding greatly to our knowledge of the region (Clark 1966, Wofford et al. 1979, Schmalzer et al. 1985, Clements & Wofford 1991, Allawos 1994, Goodson 2000, Bailey & Coe 2001, Fleming & Wofford 2004, Beck & Van Horn 2007, and Huskins & Shaw 2010). Two additional studies in Kentucky extend coverage to the northern portions of the Cumberland Plateau (Weckman et al. 2003, McEwan et al. 2005) (Table 1). In addition to these studies, Caplenor (1955, 1965, 1978, and 1979) completed a cumulative series of floristic studies of the gorges of Fall Creek Falls State Park (FCFSP), located on the Cumberland Plateau in Van Buren and Bledsoe Counties in Tennessee. More recently, Shaw and Wofford (2003) completed a checklist of the woody plants of the Big South Fork National River and Recreation Area, which straddles the border between Tennessee and Kentucky (Figure 1).

Table 1. Summary of vascular floras of the Cumberland Plateau.

Study Area	Area (ha)	Families	Genera	Species	Non-Native Taxa
Prentice Cooper (Beck & Van Horn 2007)	10,300	137	536	1,072	171
Fall Creek Falls (Flemming & Wofford 2004)	8,900	131	445	879	101
White Oak Creek Gorge (Allawos 1994)	5,407	109	323	521	41
Savage Gulf (Wofford et al. 1979)	4,047	111	360	675	40
Obed (Schmalzer et al. 1979)	4,000	122	392	724	59
Fiery Gizzard (Clark 1966)	3,626	111	345	597	37
NCCGSNA (Huskins & Shaw 2010)	2,862	110	329	604	73
Clear Fork (Goodson 2000) + New River (Bailey & Coe 2001)	1,896	115	346	584	43
Wolf Cove (Clements & Wofford 1991)	1,000	109	329	573	27
Pilot Knob (Weckman et al. 2003)	262	100	289	501	51
Big Everidge Hollow (McEwan et al. 2005)	52	82	176	263	1
Contribution to Flora of SVSCT (Evans 2011)	14,763	116	379	766	130

Values from Goodson (2000) and Bailey & Coe (2001) have been combined herein after Huskins (2008) and Huskins & Shaw (2010). The study areas for Goodson (2000) and Bailey & Coe (2001) overlap, and the species checklists for both were combined by Goodson (2000). Values reported here may differ from those reported by the authors in the original publications due the fact that the nomenclature for each of these studies was standardized by Huskins (2008) and Huskins & Shaw (2010) to that of the USDA NRCS PLANTS Database (2011). Some values here may also differ from Huskins (2008) and Huskins & Shaw (2010).

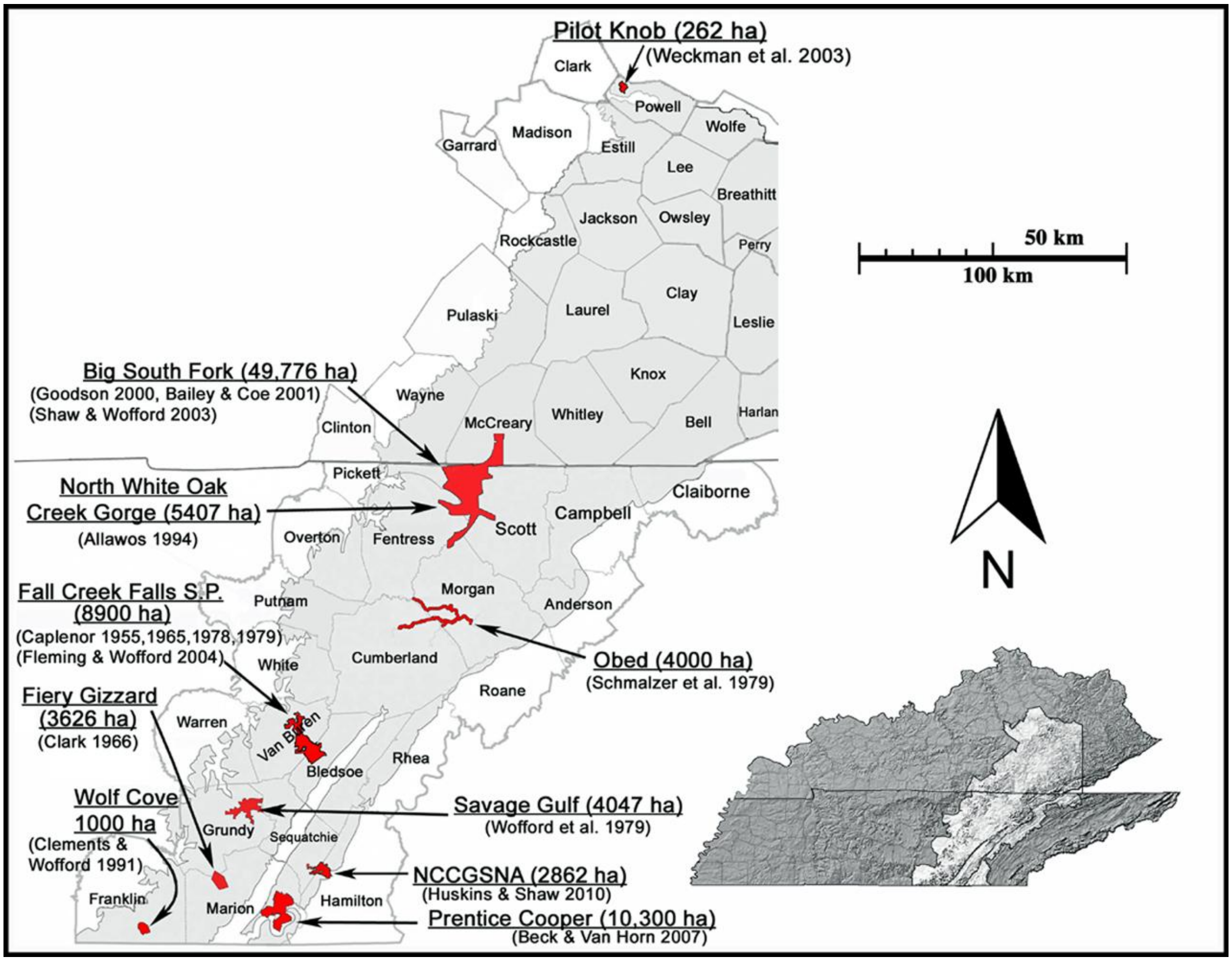

Figure 1. Floras of the Cumberland Plateau in Tennessee and Kentucky. Tennessee portion of county outlines and Cumberland Plateau obtained from p.19 of The Cumberland Plateau National Heritage Corridor Feasibility Study (Alliance for the Cumberlands 2006).Map expanded and enhanced to include Kentucky and Cumberland Plateau floristic study areas. Study area for McEwen et al. 2005 not shown.

Nevertheless, a large and distinctive geophysical feature of the Cumberland Plateau region remains understudied. The Sequatchie Valley stretches for over 240 km from northeast to southwest, bisecting the southern portion of the Cumberland Plateau as a 7 km wide, 400 m deep gorge (Figure 2). Visible from satellite orbit, the valley is a striking geologic feature that has been described as “almost ruler-straight” (Luther 1977, p. 57). Yet, despite its geophysical prominence, no formal floristic study has ever been conducted in the Sequatchie Valley. This is not entirely without reasonable explanation, as the Sequatchie Valley includes no state or federally protected natural areas, which are the typical subjects of modern floristic research.

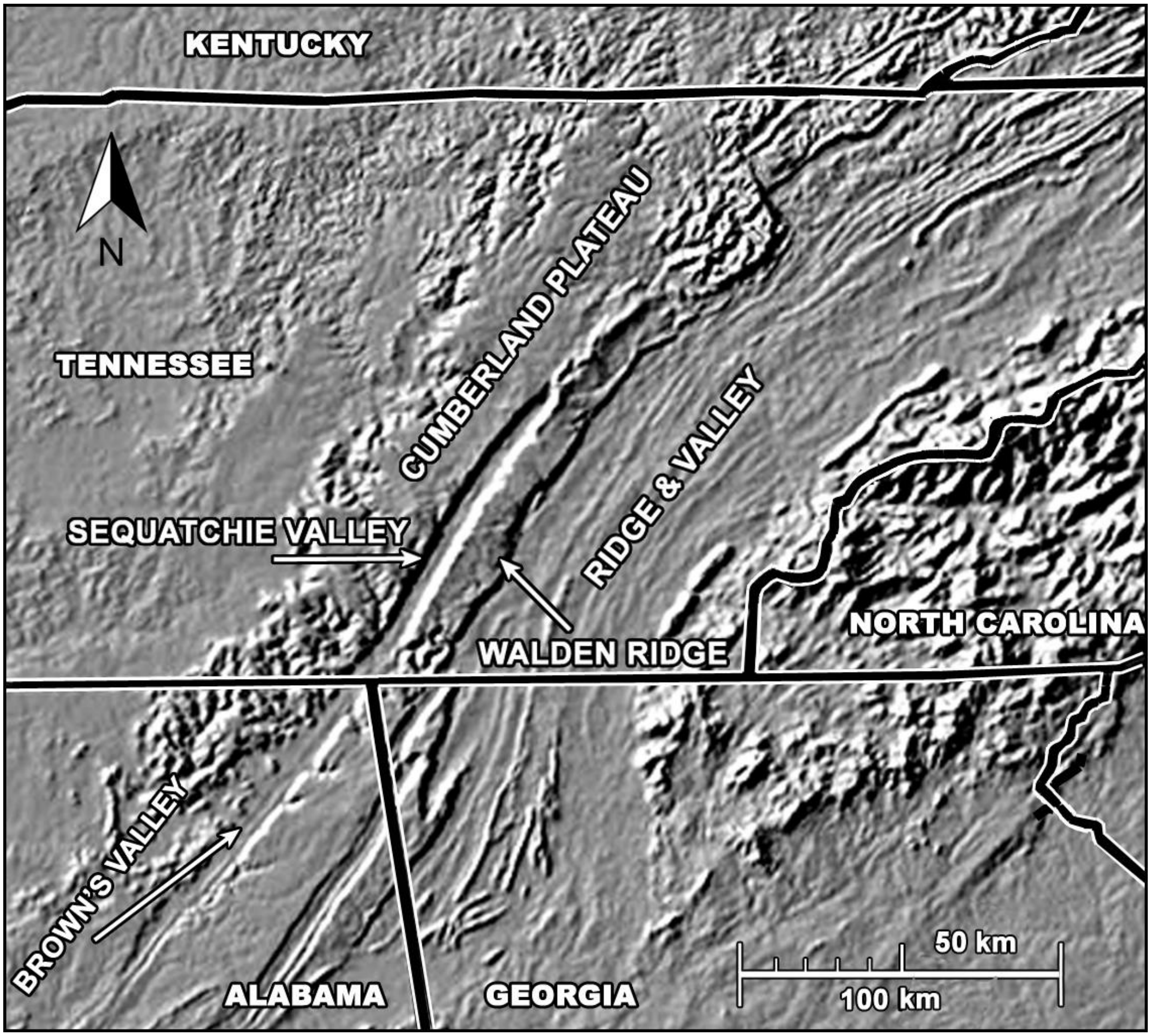

Figure 2. The physiographic setting of the Sequatchie Valley.
Digital Elevation Model (DEM) obtained from the United States Geological Service. Borders labels and annotation added by author.

The valley is properly referred to as the Sequatchie Valley only within Tennessee, where it is drained by the Sequatchie River. Southward, from the point where the valley extends into Alabama, it is drained by the Tennessee River and is locally known Brown's Valley (Camp 1997). Traditionally, the Sequatchie Valley is included within the Cumberland Plateau section of the Appalachian Plateau Physiographic Province (Fenneman 1938, Luther 1977, Wofford & Chester 2002). Geophysically, however, the Sequatchie Valley is quite distinct from both the plateau surface and the many smaller gorges that dissect the plateau. The portion of the Sequatchie Valley that extends from Cumberland County, Tennessee to the border with Alabama has an average elevation that is ca. 400 m (1300 ft.) below the plateau surface. The level-to-rolling valley floor is ca. 5.25 km (3.26 mi) wide and is deeply covered in fertile soils that are much more productive than the thin, sandy soils of the plateau surface (Camp 1997, Prater 2003). Furthermore, the scale and dimensions of the valley result in a microclimate that is both warmer and drier than the elevated plateau. These factors combine to suggest the potential for a floristic assemblage that may be rather unlike that of other portions of the Cumberland Plateau. In fact, Griffith et al. (1997) classify the Sequatchie Valley as a distinct and separate ecoregion from the Cumberland Plateau, and the Tennessee Department of Environment and Conservation (TDEC) treats the valley as an entirely separate physiographic province in the Natural Heritage Program Rare Plant List (2008).

At least four species of plants are thought to be endemic to the Cumberland Plateau. Three of these, *Ageratina luciae-brauniae* (Fernald) King & H. Rob., *Eurybia saxicastellii* (J.J.N. Campbell & M. Medley) G.L. Nesom, and *Minuartia cumberlandensis* (B.E. Wofford & Kral) McNeill, are all constrained to the portion of the Cumberland Plateau that spans the border between Tennessee and Kentucky, with the latter two restricted to just a few counties on either side of the border (USDA, NRCS 2011). According to the PLANTS Database (USDA NRCS 2011), *Clematis morefieldii* Kral is restricted to a single county in Alabama (Madison) on the Tennessee-Alabama border; however, TENN (2011) indicates at least one occurrence in Franklin County, Tennessee. Given that the Sequatchie Valley is isolated from other low-elevation areas to the east and west by this elevated and edaphically dissimilar region of endemism, it is not inconceivable that the Sequatchie Valley may harbor its own set of locally distributed plant species. In fact, Estes (in press) has recently described a new species of *Polymnia* (Asteraceae) discovered by John Beck on Little Cedar Mountain, Tennessee, located at the intersection of the Sequatchie Valley and the Tennessee River Gorge in Marion County, Tennessee. This new species, *Polymnia johnbeckii* Estes, is known from nowhere else in the world (Estes 2010).

Unfortunately, a factor that has most certainly disrupted the natural floristic composition of the Sequatchie Valley is the history of persistent (and increasing) human disturbance. This factor alone wholly distinguishes the Sequatchie Valley from the many other floristic study sites on the Cumberland Plateau, all of which are constrained by the boundaries of protected natural areas. Human disturbance and development are associated with colonization by non-native plant species (Shigesada & Kawasaki 1997, McKinney & Lockwood 1999, McKinney 2002), and the long history of agricultural activity in the Sequatchie Valley suggests that the proportion of non-native plant species in this study area should be higher than that of protected natural areas (Shigesada & Kawasaki 1997).

In summary, factors such as physiography, climate, soils, isolation, and land use history combine to make the Sequatchie Valley an appealing subject of floristic research. The data acquired from such a study will add greatly to the body of knowledge concerning the regional biota of the Southern Appalachians. It will serve to provide a baseline for future ecological investigations, and given the rate of human development in the Sequatchie Valley, it may further serve to inform planning and policy decisions by state and local governments.

The goals of this study are to (1) inventory the vascular flora of the Sequatchie Valley in Sequatchie County, Tennessee (SVSCT), (2) document the occurrence of species of conservation concern, (3) determine the number of introduced species, (4) record any new county records for Sequatchie County, and (5) compare the floristic composition of the SVSCT to the floras of the surrounding Cumberland Plateau.

CHAPTER II

THE STUDY AREA

The study area is confined to the portion of the Sequatchie Valley located within Sequatchie County, Tennessee (Fig. 3). It includes the valley floor as well as the eastern escarpment, which is also the western slope of Walden Ridge. The western escarpment is not included in this study. The objective of defining the boundaries in this manner was to capture as much of the character of the valley as possible, while managing the scale of the study area to an extent that is appropriate for a three-year study. The eastern escarpment (ascending Walden Ridge) was selected over the western escarpment (ascending the main section of the Cumberland Plateau) by reason of the fact that Walden Ridge is not as well studied as the main section of the plateau. Thus, the study area is circumscribed by a combination of natural and artificial boundaries.

This section of the valley is located between 35.2325 and 35.4449 latitudes and -85.2832 and -85.4792 longitudes, and the study site covers a total area of approximately 14,763 ha (36,480 acres). The highest elevation within the site is 721 m (2365 ft.), occurring on the plateau rim just north of Highway 111 at 35.370 latitude and -85.320 longitude. The lowest elevation is 200 m (656 ft.), occurring along the Sequatchie River at 35.627 latitude and -85.458 longitude, at the point where the river enters Marion County in its southward flow. This yields a total elevation range of 521 m (1709 ft.).

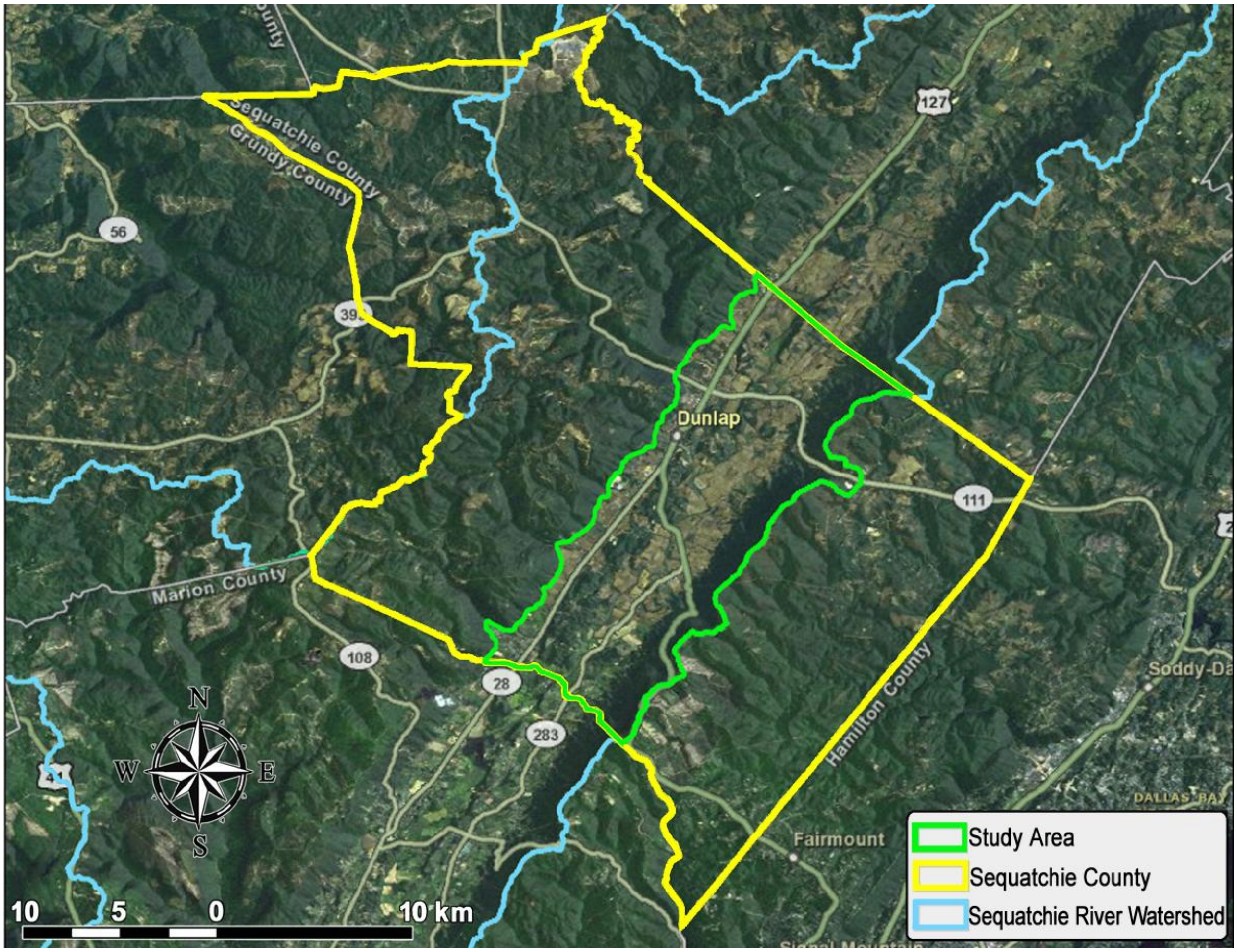

Figure 3. The study area for the Flora of the Sequatchie Valley within Sequatchie County, Tennessee.

The study area is outlined in green, and includes the valley floor as well as the eastern escarpment. It is constrained to the northeast and the southwest by the borders of Sequatchie County. Original map created by Andy Carroll, GIS Manager, University of Tennessee at Chattanooga. Original map further modified by the author.

The study area may be topographically divided into five general sub-sections. Obviously, there is the level-to-rolling *Valley Floor*, averaging 5.25 km wide and constituting the largest sub-section of the study area. The valley floor is a patchwork of various land uses interspersed with isolated wooded areas and riparian zones. The primary land use is agricultural, the majority of which is in pasture, leaving much smaller portions devoted to row crops. The fence rows that delimit land parcels are often densely lined with brush, thickets, and large trees, effectively serving as microhabitats for plants and wildlife. Residential properties constitute the second largest land use on the valley floor, with most concentrated within and around the city of Dunlap. Within the past decade, however, residential development has experienced a surge in the Sequatchie Valley, following the manner of urban sprawl typically associated with community growth throughout most of the United States. Unfortunately, this trend is expected to continue in the valley for the foreseeable future, despite recent economic adjustments that have slowed housing starts (J. Condra, Sequatchie County Property Assessor, personal communication, July 23, 2010). Historically, commercial and industrial properties have occupied only a small portion of the Sequatchie Valley floor, but these too have recently undergone a surge of expansion in association with population growth.

Coursing its way along the length of the valley within Tennessee, the Sequatchie River is flanked by its associated *Flood Plain*, which constitutes a distinct subsection of the valley. Within the study area, the flood plain varies in width in association with the surrounding terrain, but along certain lengthy sections it may span several hundred meters wide on at least one side of the river. A flood plain may be defined as "the part of a river valley that is made of unconsolidated, river-borne sediment and is periodically flooded" (Allaby 2004, p. 162). As such, flood plains have unique edaphic features and disturbance regimes. Within the study area the flood plain is easily distinguished in most places, as it is often delimited by a sudden rise in terrain. Of course, very little development occurs within the bounds of the flood pain; however, large portions of it are utilized as pasture land for livestock.

Running intermittently along the center of the valley floor (and parallel with it) is a series of *Central Ridges*, with crests averaging 60-70 m above the surrounding landscape. These remain mostly wooded. Historically they have been little disturbed due to steepness of terrain and the poor quality of the soils found on the slopes (Prater 2003). Unfortunately, a recent trend toward high-end residential development on the crests of these ridges has resulted in the clearing of large patches of forest. Much of what remains as forest, however, has not been disturbed for generations.

The *Eastern Escarpment* of the valley ascends to the Walden Ridge section of the Cumberland Plateau. Slopes on the eastern escarpment can be as steep as 75 % in the study area, rising in elevation from 365 to 457 m above the gently sloped edges of the valley floor (Prater 2003). The eastern escarpment is heavily forested, with large portions in seral stages approaching climax. Within the study area, these rich forests are interrupted by only a few widely spaced roads and power line cuts. The worst disruption (in ecological terms) is the brutally coarse cut into the slope near Henson Gap to accommodate Highway 111 as it enters the valley from Walden Ridge.

Finally, the study area incorporates the *Plateau Rim* of Walden Ridge. The plateau rim includes the sandstone bluffs that are the exposed edges of the cap rock that underlies the plateau surface, as well as a short interval just above these outcrops that is essentially the narrowly sloped edge of the plateau surface. The study area is thus delimited at the crest of this short interval, whereupon the plateau surface begins to slope in the opposite direction toward the east.

Geology

Geologically, the Sequatchie Valley may be interpreted as an outlier of the Ridge and Valley Province to the east of the Cumberland Plateau (Fenneman 1938, Griffith et al. 1997, Prater 2003). Although separated from the Ridge and Valley Province by the eastern section of the Cumberland Plateau (Walden Ridge), the Sequatchie Valley was actually formed by the same forces and processes as those that formed the Ridge and Valley Province (Fenneman 1938).

Approximately 250 million years ago tectonic forces from the southeast compressed the entire region now known as the southern Appalachian Highland (Fenneman 1938, Luther 1977). In what is now the Ridge and Valley Province, these forces resulted not only in the displacement of surface formations several km to the northwest, but also in the folding and uplift of rocks along numerous faults. Ridges that were thus formed are referred to as anticlines, and the alternating valleys are referred to as synclines. During the next 250 million years, it was the anticlinal ridges that eroded most rapidly, becoming the valleys of today's landscape, while the synclinal valleys resisted erosion, remaining as today's ridges.

In contrast, most of what is now the Cumberland Plateau merely rose and shifted to the northwest without the corresponding folding. Nevertheless, exceptions to this pattern occurred along a few isolated faults. The largest of these isolated faults is now referred to as the Sequatchie Anticline, where rock from the southeast was pushed up and over rock to the northwest (Luther 1977). Here, a long, straight ridge was formed, running approximately 290 km from northeast to southwest. Today, most of this ridge is no longer there; however, remnants of it may be seen at the northern extreme of the fault, known today as the Crab Orchard Mountains (examine closely the northern extreme of the valley in Figure 2). The rest of this once enormous ridge has been swept away over geological time due to the effects of the very same forces that formed it.

Although the thick sandstone layer that caps most of the Cumberland Plateau is very resistant to erosion, along the Sequatchie Anticline this cap rock was folded and broken, allowing rainwater to penetrate through gaps in the sandstone to the chemically vulnerable limestone below. As water dissolved and sapped away the underlying limestone, a straight 240 km long valley was eventually carved where there once stood a ridge (Fenneman 1938, Luther 1977).

Soils

Soils within the study site are strongly associated with terrain and vary across a wide range of textures, natural drainages, slopes, and depths to bedrock (Prater 2003). The valley floor is underlain with limestone of Ordovician age (Fenneman1938, Camp 1997), and the soils over this bedrock are generally very deep, from 150 cm to over 300 cm in places (Camp 1997, Prater 2003). Three main soil associations make up most of the valley floor. These are the Waynesboro-Holston-Sequatchie association that occurs on the eastern side of the valley and portions of the western side, the Sullivan-Whitwell-Hamblen association that occurs along the center of the valley, and the Sequatchie-Cobstone association, which dominates the western side of the valley. All three of these soil groups are very loamy, well-drained, and generally more productive than soils found atop the plateau (Camp 1997, Prater 2003).

The central ridges that run along the center of the valley floor are remnants of that once great anticlinal ridge that has since been reduced by erosion to form the Sequatchie Valley. The soils that overlay these rolling to steep ridges are in the Bodine-Pailo-Minvale association. These soils consist of the residuum and colluvium debris left by the erosion processes that formed the valley, and they are often very deep, very gravelly (chert), and well drained to excessively drained (Prater 2003).

Although the soils of the eastern escarpment of the valley are also composed of residuum and colluvium, the parent material from which they are derived is of more recent geological age than that of the central ridges. Thus, the composition and character of these soils are quite different from those of the central ridges. These soils are dominated by the Bouldin stony loam, which is derived from the Pennsylvanian age sandstone and conglomerate that constitutes the cap rock of the plateau (Griffith et al. 1997, Prater 2003). They overlay steep to very steep terrain and are typically very deep, loamy, and well drained, and often contain a large amount of sandstone rock fragments (Prater 2003).

The Bouldin soils end abruptly at the sandstone bluffs that run nearly continuously just below the summit of the escarpment. These exposed outcrops of the Pennsylvanian age sandstone and conglomerate that cap the Cumberland Plateau are mostly devoid of vegetation, except where soil and organic matter accumulate along fissures in the stone and in thin layers on horizontal surfaces. Many of the plants growing here specialize in this type of habitat and are not encountered elsewhere.

Finally, there is the short interval just above the sandstone bluffs where the slope of the escarpment continues to rise before cresting to the plateau surface. Soils here are contiguous with those of the plateau surface and are mostly in the Ramsey-Lily and Lily-Gilpin-Jefferson groups. These are derived primarily from the residuum of more recent sandstone layers and, as a whole, run from shallow to very deep and are well drained to excessively drained (Prater 2003).

Climate

Recent long-term climate data that have been collected within the study area are not available. However, a Southern Regional Climate Center (SRCC) station is located in Pikeville, TN, approximately 34 km (21 mi) north of the geographic center of the study area, at an elevation of 263 m (valley floor). Data from the Pikeville station for the period from 1971 to 2000 suggest mild winters and warm, humid summers for the Sequatchie Valley (Table 2). The coolest temperatures occur in January, wherein the average low temperature for the period is –2.6°C (27.3°F) and the average high is 9.1°C (48.4°F). July is the warmest month with an average low temperature of 18.2°C (64.8°F) and an average high of 31.3°C (88.4°F). The average annual precipitation for the 30-year period is 138.53 cm (54.54 in) (SRCC 2010).

It is informative to compare the climate of the Sequatchie Valley with that of the more elevated plateau surface. Long-term climate data provides the most stabilized picture of climate norms. Unfortunately, the closest source for long-term climate data on the plateau surface is the SRCC climate station at Monteagle, Tennessee (elevation: 564 m). The Monteagle climate station is 73.1 km SW of the Pikeville climate station, and so it is difficult to determine whether this geographic (and latitudinal) distance between the two stations adds a confounding effect to any climate comparison between the valley floor and the plateau surface. Nevertheless, for long-term perspective, the data from the two stations are compared (Table 2).

Table 2. Comparison of climate data from Pikeville, TN and Monteagle, TN (1971 – 2000).

1971 – 2000 Monthly Climate Summary						
Month	**Pikeville, Tennessee** (SRCC Station 407184, elevation: 263 m)			**Monteagle, Tennessee** (SRCC Station 406162, elevation: 564 m)		
	Average Max. Temperature (°C)	Average Min. Temperature (°C)	Average Total Precipitation (cm)	Average Max. Temperature (°C)	Average Min. Temperature (°C)	Average Total Precipitation (cm)
January	9.1	-2.6	13.11	6.2	-3.2	15.19
February	12.1	-1.3	11.48	9.0	-1.1	12.80
March	17.1	2.8	14.86	13.8	3.1	17.65
April	22.2	6.4	11.02	18.9	7.7	12.78
May	25.8	11.3	13.00	22.9	12.3	14.02
June	29.5	15.7	10.95	26.8	16.4	12.14
July	31.3	18.2	10.77	28.6	18.8	13.82
August	30.9	17.3	9.30	28.3	18.1	10.26
September	27.9	13.9	10.36	25.3	15.0	12.55
October	22.6	6.9	8.31	19.8	8.7	10.80
November	16.1	2.4	12.17	13.7	3.7	14.94
December	10.9	-1.3	13.21	8.4	-1.2	15.06
Annual	21.3	7.5	138.53	18.5	8.2	161.98

Monthly climate summaries from the Pikeville, TN Southern Regional Climate Station 407184, and the Monteagle, TN Southern Regional Climate Station 406162, recorded from 1971 to 2000. Data obtained from the Southern Regional Climate Center (SRCC 2010). Original values reported in English customary units by SRCC have been converted here to International System units (SI).

We can reduce the confounding effects of geographic distance by comparing data from the SRCC station at Pikeville, TN to that of the SRCC station at Fall Creek Falls State Park (FCFSP), TN. These two stations are only 16 km (ca. 10 mi) apart and at nearly the same latitude, yet the Pikeville station is on the valley floor (elevation: 263 m), whereas the FCFSP station is atop the plateau (elevation: 545 m). The limiting factor here is that the FCFSP climate station only reports daily averages for the previous year, providing only a snapshot of the climate experienced there. Nevertheless, since a corresponding dataset for the same period is available from the Pikeville station as well, a direct comparison of monthly averages is calculated for data from 01 January 2010 to 31 December 2010 (Table 3).

The general trend suggested by data from the Pikeville and FCFSP stations is for the valley floor to be both warmer and drier than the surrounding plateau. For the annual period covering January 1, 2010 to December 31, 2010 the average high temperature was 20.9°C (69.6°F) for Pikeville in the valley and 19.3°C (66.7°F) for FCFSP on the plateau. The average low temperature for this same period was 8.1°C (46.6°F) for Pikeville and 7.5°C (45.5°F) for FCFSP. Total precipitation for this period was 103.99 cm (40.9 in) in the valley at Pikeville and 133.10 cm (52.4 in) on the plateau at FCFSP (SRCC 2010). A more detailed summary of temperature and precipitation for these two stations is presented in Table 3.

Table 3. Comparison of temperature and precipitation at Pikeville, TN and Fall Creek Falls State Park (FCFSP), TN.

	Pikeville, TN (SRCC Station 407184, elevation: 263 m)					**FCFSP, TN** (SRCC Station 403040, elevation: 545 m)				
Month	Average High (°C)	T-max (°C)	Average Low (°C)	T-min (°C)	Total Precipitation (cm)	Average High (°C)	T-max (°C)	Average Low (°C)	T-min (°C)	Total Precipitation (cm)
January 2010	5.7	16.1	-3.6	-13.3	15.34	3.8	15.6	-6.0	-16.1	18.36
February 2010	5.7	17.2	-2.9	-8.9	7.90	3.2	15.6	-5.0	-10.0	9.70
March 2010	14.7	24.4	2.6	-7.2	7.80	10.8	22.2	0.6	-7.2	8.69
April 2010	24.7	31.7	7.3	0.6	9.55	23.3	29.4	6.5	-1.7	7.34
May 2010	26.9	31.1	13.9	5.0	11.25	24.8	30.6	12.5	2.8	23.83
June 2010	31.0	34.4	19.3	13.3	10.57	29.3	32.2	17.7	12.8	9.98
July 2010	32.8	37.2	19.5	12.8	7.98	31.3	35.0	18.3	10.6	3.66
August 2010	32.6	36.1	20.0	14.4	3.91	31.1	34.4	18.5	13.3	12.85
September 2010	30.2	35.0	15.1	6.7	3.25	28.3	32.8	12.8	5.6	6.86
October 2010	23.6	30.0	5.8	-1.1	10.08	22.4	28.9	4.6	-3.3	9.68
November 2010	16.9	23.9	3.2	-5.6	13.87	15.7	23.9	1.8	-6.7	15.29
December 2010	5.1	15.6	-3.9	-12.2	2.49	3.5	14.4	-2.4	-3.3	6.86
Annual	20.9	37.2	8.1	-13.3	103.99	19.3	35.0	7.5	-16.1	133.10

Monthly averages were calculated from daily values reported from January 1, 2010 to December 31, 2010.
T-max is the highest recorded temperature for the period; T-min is the lowest recorded temperature for the period. Data obtained from the Southern Regional Climate Center (SRCC 2010). Original values reported in English customary units by SRCC have been converted here to International System units (SI).

The comparative trend suggested above is generally consistent with a comparison of the previously mentioned long-term (1971-2000) data from the Pikeville, TN station to data for the same period from the more distant (and southerly) Monteagle, TN station (Table 2). These data also indicate that the overall trend is for warmer and dryer conditions in the Sequatchie Valley as compared to the Cumberland Plateau surface (SRCC 2007). However, in the comparison between Pikeville and Monteagle, a curious inconsistency appears within the data for the annual and monthly average *low* temperatures. With the exception of the month of January, average monthly low temperatures for the 30-year period are lower at the Pikeville station (valley floor) than they are at the Monteagle station (plateau surface). This effect may be an artifact of the longitudinal difference between the respective locations of the two climate stations. On the other hand, if this pattern truly is the long-term norm between the plateau surface and the valley floor, it may explain the frequent thermal inversions that occur over the Sequatchie Valley, leaving it shrouded in fog on mornings when cool air in the valley is blanketed by a layer of warmer air above.

Access

Access to collection sites in the Sequatchie Valley is much more complicated than it is for most other floristic studies, particularly those previously conducted on the Cumberland Plateau. Whereas each of the previous floras conducted on the Cumberland Plateau were circumscribed by the boundaries of protected state or federal natural areas, the study area for the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee (SVSCT) is composed almost entirely of several hundred individual land parcels under separate private or corporate ownership.

This fact imposes additional preparations and procedures on the collection process, the complexities of which were unforeseen upon conception of the study. Whereas conducting a floristic study of state or federally protected natural areas requires the collector to obtain permission from a single administrative agency to conduct field research, conducting a floristic study in the Sequatchie Valley requires the collector to obtain permission on an individual basis, parcel by parcel, to access and collect specimens from any property beyond roadsides.

In addition to mere legality and professionalism, the permission process was a matter of best practice for community relations, ensuring an attitude of good faith between the University of Tennessee at Chattanooga and the local community in the Sequatchie Valley. Local attitudes are highly protective of private property rights, and even remotely owned parcels are closely guarded by neighbors against trespassers. Personal communication with more than a few local sources suggests that in this region of Tennessee there is a prevailing attitude of mistrust of "strangers" wandering about on private property. In some cases, this is the result of a misinformed but strongly held belief that government agencies actively seek excuses to take possession of private property by means of regulations included in such laws as the Endangered Species Act of 1973 and § 404(a) of the Clean Water Act (1972). In other cases, it very well may be the natural response of a property owner who is conducting a somewhat less than legal enterprise on the premises and would prefer that his or her activities remain under the radar, so to speak. It is said that fifty years ago, such individuals were kind enough to fire one or two shots from a .30-30 into the air as fair warning; however, local law enforcement authorities have advised this author that such mannerly behavior has suffered some decline in recent years.

CHAPTER III

MATERIALS AND METHODS

The four major components of this study were: 1) field work – excursions into the study area to physically collect vascular plant specimens and record associated data; 2) specimen identification – determination of the species or subspecific taxon of each specimen collected; 3) data analysis – statistical summaries of data generated by the current study, as well as summaries of data from selected floras of the Cumberland Plateau for comparison of such elements as species richness and floristic composition; and 4) specimen processing – preparing and archiving specimens according to standard herbarium protocols.

Field Work

All species determinations are based on voucher specimens collected from the study area, and only specimens collected by the author are included in the species checklist for this study. These do include 164 specimens collected by the author during an exploratory study from 2006 to 2007 before the formal study was launched in the spring of 2008; however, no specimens previously collected by other investigators are included in the checklist for this flora.

The acquisition of large collection sites was a cumulative process during the course of the study. In many cases obtaining permission to collect plants required a lengthy process of identifying desirable collection sites, searching public records for the identity of land owners, additional searching to acquire contact information, and making cold calls to request permission to access the property and collect plant material on a routine basis. Fortunately, when permission was properly requested in advance, most property owners responded in a remarkably positive manner. In rare cases a notarized statement of release from liability was required by the property owner in exchange for the right to access the property and collect plant specimens.

Beginning in March 2008, field-collecting trips were made on a regular basis so as to cover the phenology of most vascular plants throughout the growing season. Annually, routine visitation to collection sites began in early March and ended in late October; however, occasional site inspections were made from November to February to locate vascular plants with atypical phenology. Sites of interest were surveyed by repeatedly traversing the site in a regular pattern to achieve maximum coverage with an economy of effort.

Specimens of vascular plants were collected from the study site and returned to the laboratory for identification. Specimens of woody trees and shrubs were obtained by selecting and clipping branches or twigs that possessed a variety of physical structures so as to provide as many diagnostic characters as possible to identify the plant. In the case of most herbaceous plants, specimens were collected by taking the entire plant, including the root structures, as these are frequently used as diagnostic characters for herbaceous plants. Exceptions to this protocol were made in cases of rare or isolated perennial species, from which only above-ground material was taken, leaving the roots *in situ* to preserve the living plant for future seasons.

With so much of the Sequatchie Valley under human occupation and use, care was taken to distinguish between naturally occurring (and naturalized) populations and those that were deliberately propagated and under current human cultivation (e.g. garden or landscape plants). Specimens, both native and non-native, were collected from individuals or populations that clearly appeared to be naturally occurring, naturalized, or at least persistent without cultivation. No samples were collected from individuals or populations that appeared in any way to be actively cultivated.

For each specimen collected, information was recorded in the field for subsequent analysis. Such information includes Global Positioning System (GPS) coordinates, habitat type, associated species, and any special notes that may be relevant to the circumstances under which the specimen was collected. GPS coordinates were recorded as latitude and longitude in decimal degrees with a Garmin eTrex Vista Cx GPS unit, which is accurate to three meters. Typically, all specimens collected within a three-meter radius of a GPS data point were assigned to that data point. Exceptions were made for plants that were easily identified in the field to be rare, threatened, and endangered species, in which case coordinates were taken at the exact point of occurrence of the specimen. Of course, in such cases, physical collection was either omitted, or conducted in a manner that did not imperil the survival of the plant. Field data associated with each specimen were later entered into a database along with a location string, which further describes the location of the collection site in phrase form.

Specimens in this study were usually pressed immediately upon collection in order to preserve the integrity of diagnostic characters (this is alternative to some traditional methods in which identification is conducted before pressing). After the pressed specimens had dried completely, they were queued to undergo the identification process. This alternative protocol was adopted to facilitate frequent collections of large numbers of specimens while reducing the risk of spoilage before identification could be carried out.

Specimen Identification

Specimens were identified using a combination of diagnostic keys, taxonomic manuals, illustrative manuals, and comparisons with verified herbarium specimens. Taxonomic resources included Small (1933), Gleason and Cronquist (1963), Radford (1968), Smith (1977), Cronquist (1980), Wofford (1989), Swanson (1994), Wofford and Chester (2002), Jones (2005), Weakley (in prep.), and selected volumes from the Flora of North America series (Flora of North America Editorial Committee, eds. 1993+). Upon determination of each species, visual confirmation was made using illustrations from Holmgren et al. (1998) as well as images from the online Database of Tennessee Vascular Plants at the Herbarium of the University of Tennessee, Knoxville (TENN 2011) and the United States Department of Agriculture, National Resources Conservation Service PLANTS Database (USDA, NRCS 2011). For more difficult determinations, the herbaria of the University of Tennessee at Chattanooga (UCHT) and Knoxville (TENN) were utilized for physical comparisons of specimens.

For purposes of standardization, taxonomic nomenclature within this study follows that of the USDA, NRCS PLANTS Database (2011). Likewise, determinations of general native/non-native status for each species also follow that of the USDA, NRCS (2011). For each species thus designated as non-native to the region, the Tennessee Exotic Plant Pest Council (TN-EPPC) list of Invasive Plants of Tennessee (2009) was consulted to determine whether the TN-EPPC considers the species to possess invasive characteristics. In such cases, the TN-EPPC assigns an invasive threat rank to the species, which is a qualitative determination of the degree of threat the species poses to native plant communities. If such a rank is assigned by the TN-

EPPC, it is included in the annotated species checklist for this study. In cases of rare, threatened, or endangered species, designations of state and federal status for rare plants are also included, as well as Tennessee state ranks, all of which follow the Tennessee Natural Heritage Program Rare Plant List published by the Tennessee Department of Environment and Conservation (TDEC 2008). In addition, the global ranking system developed and maintained by NatureServe (2011) is included for plants of conservation concern on a global scale.

Data Analysis

Summary statistics for this study were calculated using Microsoft Office Excel 2007 (MS Excel) worksheets. An early MS Excel version of Huskins' (2008) "Normalized Comparative Plant List" was made available as a resource for this study. The list compares the species records for eleven Cumberland Plateau vascular floras (Table 1). The term "normalized" refers to the fact that the taxonomic nomenclature used in each of the various studies was standardized by Huskins to the nomenclature used by the USDA, NRCS PLANTS Database (2008). This standardization of nomenclature enabled Huskins to make reliable comparisons of presence/absence data among the various studies included, as well as to re-calculate totals for each study based on the converted nomenclature.

The MS Excel version of Huskins' Normalized Comparative Plant List was used in this study as a template on which to build a dynamic, interactive worksheet capable of instantly calculating, updating, and comparing a variety of summary statistics for this study as well as the eleven other studies listed in Table 1. This was achieved by adding data fields to store information for two additional datasets: 1) existing species occurrence data for Sequatchie

County, TN, obtained from TENN (2011), and 2) species occurrence records generated by the present study.

Simple mathematic and statistical functions were then inserted into cells to create fields that automatically calculate a variety of summaries for each flora, including totals, subtotals, percentages, and minimum and maximum values for a variety of data subsets. The worksheet was then given computational power for increasingly extensive data analysis by building a hierarchy calculated fields, wherein the input for certain calculated fields was linked to the output of other calculated fields. The extent of these calculation sequences can be appropriately modulated or variously directed by nesting calculation functions within logical or conditional command functions. For instance, a statistical function can be nested within the MS Excel "IF" function so that the output value of the statistical function is treated as input only if that value meets certain specified conditions. An example of such a nested function from the worksheet for this study is:

=IF(MAX(B1913:L1913)<1,IF(N1913=1,1,0),0)

This particular command happens to be found in cell W1913 of the worksheet, and in this case it determines whether or not the occurrence of *Penstemon calycosus* within the Sequatchie Valley study area is unique among the set of floras included in the analysis. If this condition is determined to be true, then that information becomes part of a dataset that is analyzed to assess the overall degree of similarity (or difference) between the floristic composition of the Sequatchie Valley study area and those of the other floristic studies conducted in the Cumberland Plateau region.

The worksheet contains hundreds of such functions, each dependent upon the output of other functions. The advantage of the system is evident each time a new raw value is added to the dataset, or an existing value is changed, as calculated fields and graphic charts throughout the entire worksheet are instantly updated. The caveat for such an interdependent system of calculations is that a simple error can be propagated throughout the system and have extensive adverse effects on the integrity of the data. In this system, the probability of accepting an error is reduced by validating intermediate and final outputs via alternate calculations pathways.

Upon the completion of a floristic study, it is often informative to compare the floristic assemblage of the study area to those of other study areas within the same physiographic province, or at least within a certain geographic range. Indeed, such a comparison is a primary goal of this study, necessary to test the prediction that the Sequatchie Valley is floristically distinct from the Cumberland Plateau. Quantitative methods are available to make such comparisons between study sites, and Sørensen's Similarity Index (based on presence/absence data) is frequently the method of choice for floristic studies (Bailey and Coe 2001, Huskins 2008). Furthermore, in at least one study that compared the reliability of various similarity indices, Sørensen's index proved to most accurately predict actual known values (Magurran 2004, p. 175). However, the reliability of Sørensen's Index (or any other such similarity measure) relies heavily on the degree of "completeness" of each study included in the analysis (Magurran 2004). Since most of the habitats within the study area for this flora remain yet to be explored, this study cannot reasonably be considered to be a complete investigation of the 14,673 ha study area. Therefore, the application of such quantitative measures at this time would yield meaningless (and misleading) results. Therefore the employment of any similarity (or distance) indices will be deferred until further investigation of the study area is completed.

This is not to say, however, that comparisons of certain summarized values are not informative, provided one bears in mind the intermediate status of the current study. In this sense, such comparisons provide heuristic value, identifying both the direction and potential for continued study. Therefore, informative summaries of data from previous Cumberland Plateau floras are herein compared to the present study and will be presented among other results.

One such comparison bears noting here. Ecologists have long recognized a relationship between the spatial scale of a particular habitat or region, and the number of species that may be expected to occur within that habitat or region. In fact, this relationship was recognized well before Ecology existed as a distinct and recognized science. According to Brown and Lomolino (1998 p. 373), the well-known Swiss botanist Augustin P. deCandolle (1778 – 1841) was one of the first to publish the observation that the number of species tends to increase with increasing area (citing deCandolle 1855). Arrhenius (1921) is cited as the first to publish an equation to describe this relationship (Brown & Lomolino 1998, p. 373), and the famous American botanist, Henry Gleason followed a year later with his own mathematical model (Gleason 1922). (Incidentally, Gleason's publication was a refutation of Arrhenius' model, and a proposal of a more accurate alternative for larger spatial scales.) Although the *power model*, as it is called today, is credited to Arrhenius (1921), it was Preston (1962) who further developed it into the clearly stated regression model commonly used by ecologists today, $S = cA^z$, where S is the predicted number of species, A is the size of the area, and c and z are fitted constants. The equation is useful for producing a regression line, based on known values, that describes the increase in species richness with increasing area. Through interpolation, estimates of species richness can be generated for areas yet to be studied. As a comparative measure, it may be used in two different ways: 1) comparing the species richness of separate areas of varying size (e.g. islands or alpine habitats) or 2) modeling the increase in species richness as increasing portions of a single study area are sampled or inventoried. It is of use to this study in the former sense, comparing the species richness of the Vascular Flora of the SVSCT with the species richness of the previous floras conducted in the Cumberland Plateau Physiographic Province. The power model also serves heuristically to guide the floristic investigator toward a broad estimate of the completeness of the study. However, if too much emphasis is placed upon the model to serve the latter role, it becomes useless in the former, as the model then becomes a sort of self-fulfilling prophecy, rather like throwing a dart at a wall and then drawing a bull's-eye around it. We shall apply three versions of the model to the vascular floras of the Cumberland Plateau to examine the strengths and weaknesses associated with the procedure.

Specimen Processing

Following identification, all specimens were further processed according to standard herbarium protocols. These include the production of standard herbarium labels and the physical mounting of specimens and their associated labels on archival quality herbarium mounting paper. All voucher specimens for this study were deposited in the herbarium at the University of Tennessee, Chattanooga (UCHT). Any duplicate specimens were sent to the herbaria at the University of Tennessee, Knoxville (TENN) and Austin Peay State University (APSC).

Key information included on the herbarium label and entered into the electronic database includes collection site (including GPS coordinates); collection date; family, genus and species epithet of the specimen; species authority, habitat type, associated species, collector name, and any special notes that may be considered useful to future investigators.

CHAPTER IV

RESULTS AND DISCUSSION

Floristic Summary

During the course of this study approximately 110 collecting trips were made resulting in the acquisition of approximately 2000 specimens. Of these, 1652 specimens have been positively identified yielding 767 species and sub-specific taxa. These represent 379 genera in 116 families (Table 4). Asteraceae is the most highly represented family within the study area, with 125 species and sub-specific taxa, representing 16.3% of the total number of taxa for this study. Asteraceae is followed by Poaceae with 69 taxa (9.0%), Fabaceae with 45 taxa (5.9%), Cyperaceae with 41 taxa (5.4%), Rosaceae with 29 taxa (3.8%), Lamiaceae with 21 taxa (2.7%), and Brassicaceae with 18 taxa (2.3%) (Figure 4). Based on a thorough review of the information included in the TENN database (TENN 2011), this study produced 513 county records for Sequatchie County, increasing the number of documented vascular plant species for the county from 468 to 981.

Table 4. Floristic Summary of the Sequatchie Valley within Sequatchie County, Tennessee.

Division	Families	Genera	Total Species	Native Species	Non-Native Species	Percent of Total Species Composition
Equisetophyta	1	1	1	1	0	0.13%
Lycopodiophyta	1	1	1	1	0	0.13%
Pteridophyta	8	18	24	24	0	3.13%
Coniferophyta	2	3	5	5	0	0.65%
Magnoliophyta	104	355	735	605	130	95.95%
(Liliopsida)	(13)	(61)	(160)	(128)	(32)	(20.89%)
(Magnoliopsida)	(91)	(295)	(575)	(477)	(98)	(75.07%)
Total	116	378	766	636	130	100%

Values in parentheses represent the contributions of Liliopsida and Magnoliopsida to the division Magnoliophyta, and are not individually included in overall totals.

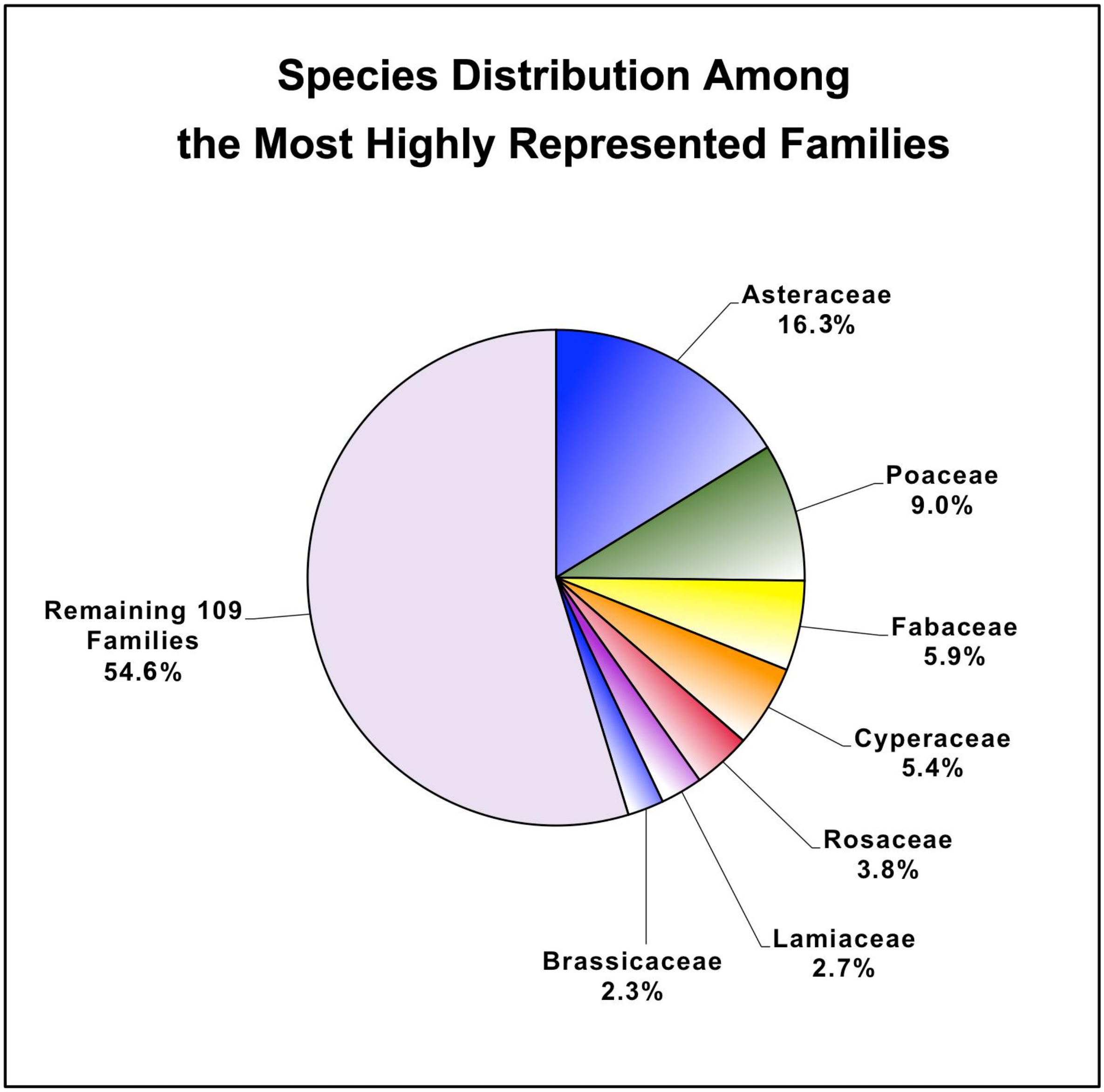

Figure 4. The distribution of species among the seven most highly represented families within the study area.

Conversely, a review of the TENN database (2011) indicates that 214 vascular plant species occur within Sequatchie County that have not yet been documented by the present study to occur within the Sequatchie Valley portion of the county. However, few conclusions can be drawn from this information for two reasons: 1) data for Sequatchie County from TENN include collections made throughout the entire county, whereas data for the present study is limited to collections taken only from the Sequatchie Valley portion of Sequatchie County; 2) the floristic survey of the Sequatchie Valley portion of the county is not thoroughly complete. Thus it may be that many of the 214 exceptions to the present study are either limited to plateau habitats and as such do not occur in the valley at all, or indeed do occur in the study area, but remain yet to be discovered.

Species of Conservation Concern

According to the Tennessee Natural Heritage Program Rare Plant List (TDEC 2008), seven species documented by this study are considered to be of conservation concern within the state of Tennessee and have been assigned conservation status. These are *Rudbeckia triloba* var. *pinnatiloba*, *Scutellaria montana*, *Castanea dentata*, *Oenothera parviflora*, *Festuca paradoxa*, *Panax quinquefolius,* and *Ribes curvatum* (Table 5).

Table 5. Plant species of conservation concern documented in the study area.

Scientific Name	Common Name	State Status	Federal Status	State Rank	Global Rank
Castanea dentata (Marsh.) Borkh.	American Chestnut	S		S2S3	G4
Festuca paradoxa Desv.	Clustered Fescue	S		S1	G5
Oenothera parviflora L.	Northern Evening-primrose	S		S1	G4
Panax quinquefolius L.	American Ginseng	S-CE		S3S4	G3G4
Ribes curvatum Small	Granite Gooseberry	T		S1	G4
Rudbeckia triloba L. var. *pinnatiloba* Torr. & A. Gray	Pinnate-lobed Black-eyed-Susan	E-P		SX	GNR
Scutellaria montana Chapm.	Large-flowered Skullcap	T	LT	S2	G3

State Status abbreviations: E = Endangered Species; T = Threatened Species; S = Special Concern Species; CE = Commercially Exploited; P = Possibly Extirpated from state.
Federal Status abbreviation: LT = Listed Threatened.
State Ranks: S1 = Extremely rare and critically imperiled; S2 = Very rare and imperiled; S3 = Rare and uncommon; S4 = Widespread, abundant and secure within the state; SX = Believed to be extirpated from Tennessee. Combinations of ranks denote some degree of uncertainty about the exact rarity of the species.
Global Ranks: G1 = Extremely rare and critically imperiled throughout the world; G2 = Very rare and imperiled globally; G3 = Very rare and local throughout its range or found locally in a restricted range; G4 = Apparently secure globally, though it may be quite rare in parts of its range; G5 = Demonstrably secure globally, though it might be quite rare in parts of its range. Combinations of ranks denote some degree of uncertainty about the exact rarity of the species. Source: TDEC 2008

The most notable of these is *Rudbeckia triloba* L. var. *pinnatiloba* Torr. & A. Gray, a taxon listed as Endangered within the State of Tennessee and assigned a state rank of SX, indicating that it is "Believed to be extirpated from Tennessee, with virtually no likelihood that it will be rediscovered" (TDEC 2008 p. iv). In spite of this gloomy prognosis, it has, in fact, been rediscovered in the Sequatchie Valley by the present study.

All three varieties of *Rudbeckia triloba* L. are distinguished from their congeners by the combination of lobed leaves and distinctly cuspidate paleae (receptacle bracts with awn-like tips that are ≥ 1.5 mm) (Urbatsch and Cox. 2006). *Rudbeckia triloba* var. *pinnatiloba* is distinguished from the two other varieties of *R. triloba* (var. *triloba* and var. *rupestris*) by the cauline leaf blades, which are smaller than those of the other varieties (ca. 5 cm in length) and may have from five to seven lobes, rather than three (as the species epithet would suggest) (Cronquist 1980, Urbatsch and Cox. 2006). Two other species of *Rudbeckia* that have the potential for 3-5 lobes on the stem leaves are found in Tennessee, but both lack the distinctive cuspidate paleae, and their leaves tend to be closer to fully compound (at least at the base of the leaf blades) rather than merely lobed. The last documented occurrence for *R. triloba* var. *pinnatiloba* in Tennessee is from a specimen deposited at the Herbarium of the University of Tennessee, Knoxville (TENN), which was collected from Campbell County in 1934 (Figure 5).

Explaining the occurrence of *Oenothera parviflora* L. in the Sequatchie Valley would require an entirely separate biogeographic study. Not only is *O. parviflora* considered a species of conservation concern within Tennessee (TDEC 2008), but more interestingly, the known distribution of this species within the state is limited to just three counties in the Blue Ridge Province, Washington, Unicoi, and Johnson Counties (TENN 2011). All three of these counties are located in the extreme northeastern portion of the state (Figure 6), suggesting that the occurrence of *O. parviflora* in the Sequatchie Valley is highly disjunct. In fact, as its common name (northern evening primrose) would suggest, this species occurs most densely in the northeastern extreme of the United States, as well as much of Canada (USDA NRCS 2011).

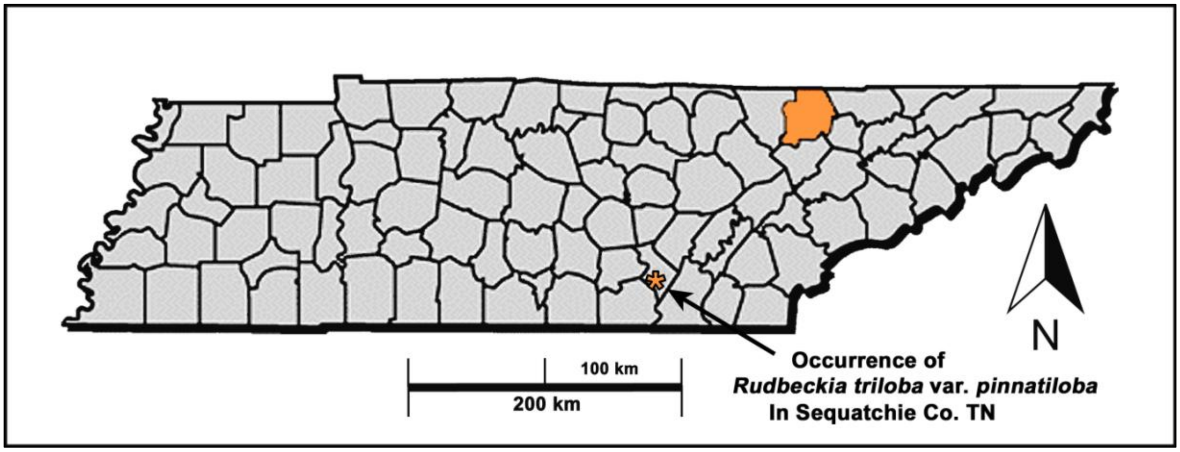

Figure 5. The historic occurrence of *Rudbeckia triloba* L. var. *pinnatiloba* Torr. & A. Gray in Campbell Co, TN. Included above is the general location of the rediscovery of this taxon within Sequatchie County, Tennessee. Annotation added by author to county-level distribution map provided by the Herbarium at the University of Tennessee, Knoxville (TENN)

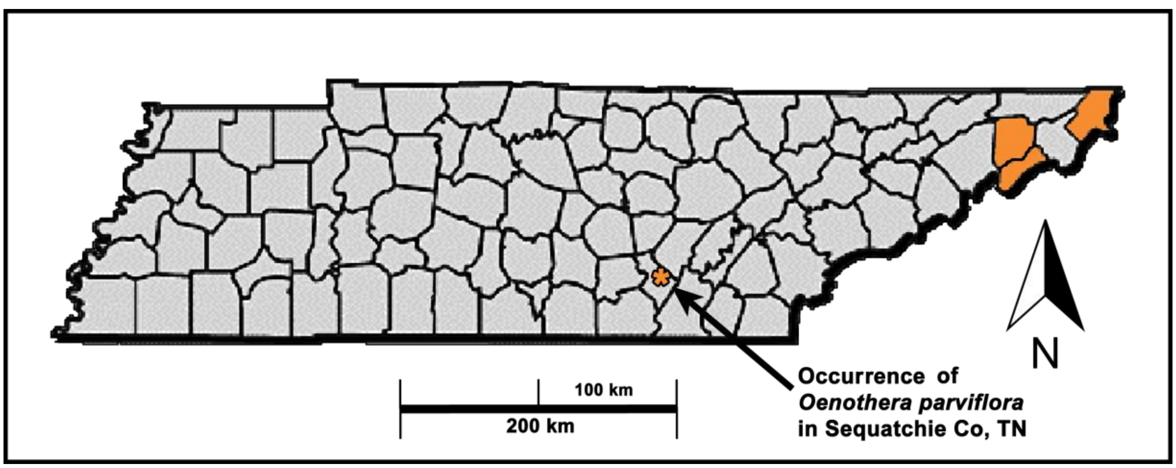

Figure 5. The known distribution of *Oenothera parviflora* within Tennessee. Annotation added by author to county-level distribution map provided by TENN.

Scutellaria montana Chapm. is the only species thus far documented by this study to have both state and federal status as an imperiled plant species. Listed by both TDEC and the United States Fish and Wildlife Service as *Threatened*, it is afforded protection under the U.S. Endangered Species Act of 1973, and known populations are protected and monitored either directly by government agencies, or by the assistance of trained botanists and plant ecologists (Boyd et al. 2011, Mackowske et al. 2011). *S. montana* is locally endemic to just a few counties in southeast Tennessee and northwest Georgia that intersect with either the Ridge and Valley or Cumberland Plateau Physiographic Provinces. Fortunately, although the distribution of *S. montana* is restricted to such a limited range, it appears to be locally abundant within widely scattered locations throughout this range.

Additionally, numerous saplings of *Castanea dentata* (Marsh.) Borkh. (American chestnut) were also encountered along the eastern escarpment of the Sequatchie Valley, and special attention was directed toward identifying any flowering or fruiting individuals, as these are now quite rare as a result of the chestnut blight that devastated the American Chestnut population in North America during the early decades of the twentieth century (Roane et al. 1986). Unfortunately, however, no reproductively mature individuals were located during the course of this study. *Castanea dentata* is listed as a species of Special Concern by the state of Tennessee (TDEC 2008), and considerable effort is devoted to restoring this once dominant member of the Eastern Deciduous Forests of North America (Craddock 1998).

Festuca paradoxa Desv. (clustered fescue) is documented to occur throughout an expansive range that includes most of the eastern half of North America; however, existing documentation suggests a very thinly scattered distribution within this range (USDA NRCS 2011). In Tennessee it has only been documented in three other counties, Franklin, Coffee, and

Fayette, and it is therefore considered a species of Special Concern within the state (TDEC 2008).

Ribes curvatum Small was found growing precisely where it is "supposed" to be, on sandstone outcrops along the plateau rim. Commonly called the granite gooseberry, it thrives on thin, acidic soils over granite or sandstone. It is listed by TDEC (2008) as a Threatened species within the state, but observations during the course of this study suggest that it is locally abundant on the rim of the eastern escarpment of the Sequatchie Valley.

Panax quinquefolius L. (American ginseng) occurs on the eastern escarpment and plateau rim within the study area. TDEC (2008) has listed *P. quinquefolius* as a species of Special Concern within Tennessee by reason of its rapid decline due to Commercial Exploitation (TDEC code: "S-CE"). American ginseng is closely related to several East Asian species of the same genus, especially *Panax ginseng* C.A. Mey. Roots from Asian species of Panax have been used in traditional medicine in Korea and China for centuries (Xiang et al. 2008), and in recent decades ginseng has been popularized as an herbal remedy in Western societies as well. American ginseng (*P. quinquefolius*) possesses the same medicinal qualities as the Asian species, and populations have been under pressure from commercial harvesting since the arrival of Europeans to its native range (NatureServe 2010). Currently, worldwide demand (especially from China) far exceeds production from cultivated sources. Furthermore, the threat to wild populations is amplified by the strong preference within China (expressed in terms of premium prices offered) for wild-grown plants (White 2000, cited by NatureServe 2010).

State Records

Based on data obtained from TENN, eight species documented by this study are state records for Tennessee. These are *Carex digitalis* Willd. var. *assymetrica* Fernald; *Spiranthes lacera* (Raf.) Raf. var. *lacera*; *Bromus latiglumis* (Shear) Hitchc.; *Elymus glaucus* Buckley; *Gamochaeta coarctata* (Willd.) Kerguélen; *Vaccinium angustifolium* Aiton; *Crataegus succulenta* Schrad. ex Link; and *Verbena scabra* Vahl.

The TENN Website (2011) indicates that two varieties of *Carex digitalis* (var. *digitalis* and var. *macropoda*) occur within the state of Tennessee, but *Carex digitalis* var. *assymetrica* is not listed for the state. However, citing personal communication with Robert Naczi, a well-known expert on the genus *Carex*, the USDA NRCS PLANTS Database (2011) does indicate that this variety occurs within Tennessee. No county-level information is offered by USDA NRCS, so it is impossible to determine from that source the known distribution within the state. County-level information is displayed for Florida and Mississippi, and it appears as though *C. digitalis* var. *assymetrica* has a southerly center of distribution in the Eastern United States.

The determination of *Spiranthes lacera* (Raf.) Raf. var. *lacera* was a difficult call, so to speak. This variety is considered to have a northern center of distribution, and its range has not been documented to intersect with Tennessee. In contrast, *S. lacera* (Raf.) Raf. var. *gracilis* (Bigelow) Luer has a much more extensive distribution that fully includes Tennessee (USDA NRCS 2011). Furthermore, descriptions and diagnostic characters offered within the literature are somewhat ambiguous. In fact, on page 854 of the second edition of the Manual of Vascular Plants of Northeastern United States and Adjacent Canada (Gleason and Cronquist 1991), *S. lacera* var. *lacera* and *S. lacera* var. *gracilis* are described as “Two ill-defined vars. with broadly overlapping range”. Indeed, the diagnostic characters used to distinguish the two varieties in most texts (e.g., number and density of flowers, leaf persistence, and degree of pubescence within the inflorescence) have the potential to be highly variable, as evidenced by a physical examination of a large number of *S. lacera* specimens held at TENN (7 March 2011). Nevertheless, after consulting multiple sources, electronic and bound, I am reasonably confident in the determination of *S. lacera* var. *lacera*. A critical diagnostic character that facilitated a confident determination came from a treatment of the genus *Spiranthes* by Sheviak & Brown (2003) in the online version of the Flora of North America (FNA). Therein, they describe the stem vestiture within the inflorescence as capitate pubescent, with evident glands on the tips of the trichomes. This character, as well as the others mentioned, was evident in the specimen in question (Evans accession 1063). Interestingly, close examination of specimens of *Spiranthes lacera* deposited at TENN suggests that many specimens collected within Tennessee that are labeled *S. lacera* var. *gracilis* may in fact be *S. lacera* var. *lacera*.

County-level occurrence data from the PLANTS Database (USDA NRCS 2011), indicates that *Verbena scabra* Vahl has a distribution that is almost entirely restricted to coastal regions of the United States, with additional scattered populations throughout the arid southwest. (see Figure 7 for the southeastern distribution of *V. scabra*). Once again, this presents a taxonomic dilemma. The occurrence of *V. scabra* in Sequatchie County, Tennessee is entirely disjunct from its known distribution. Nevertheless, the specimen "keys out" to *V. scabra*, matches the published descriptions of *V. scabra*, and is clearly dissimilar to other species of *Verbena* known to occur within the southern Appalachian Plateau.

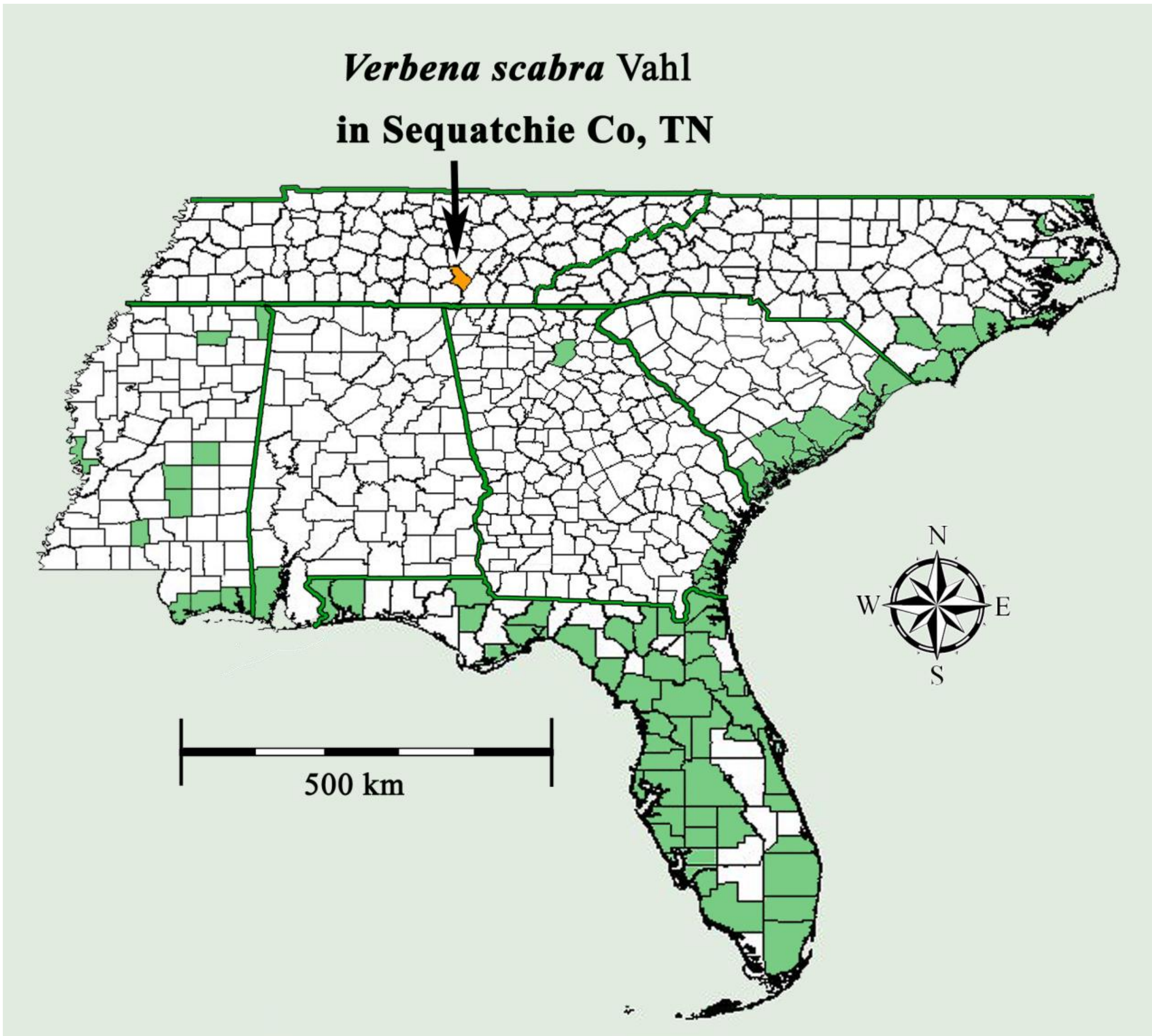

Figure 6. The distribution of *Verbena scabra* in the southeastern United States. County occurrence maps for individual states were retrieved from the PLANTS Database (USDA NRCS 2011) and combined here with added annotation to provide a regional perspective.

Non-Native Species

Based on the USDA's Plants Database (2010), 130 species documented in this study are non-native to the Sequatchie Valley. This value represents 17.0% of the total of 767 species identified during the course of this study. This is higher than the statewide proportion of non-native vascular plants, which is 15.1% (Chester et al. 2009).

Among the 130 non-native plant species documented for the valley, 44 species are classified by the Tennessee Exotic Plant Pest Council (TN-EPPC) as invasive exotics (TN-EPPC 2009). An invasive exotic species is any non-native species that has the capability of colonizing and persisting in an area where it has not previously occurred (Shigesada and Kawasaki 1997). TN-EPPC assigns rankings to invasive exotic plant species in the following manner: *Severe Threat* – non-native plants that "possess invasive characteristics; spread easily in native plant communities and displace native vegetation;" *Significant Threat* – non-native plants that "possess invasive characteristics; not presently considered to spread as easily into native plant communities as Severe Threat;" *Lesser Threat* – non-native plants that "spread in or near disturbed areas; not presently considered a threat to native plant communities;" *Alert* – non-native plants that "possess invasive characteristics; known to be invasive in similar habitats as those found in Tennessee" (TN-EPPC 2009, p. 1).

Fourteen exotic species ranked as Severe Threat have been documented by the present study. These include some of the most notorious of the "usual suspects" such as *Ailanthus altissima* (Tree of Heaven), *Albizia julibrissin* (Mimosa), *Ligustrum sinense* (Chinese Privet), *Pueraria montana* var. *lobata* (Kudzu), and *Rosa multiflora* (Multiflora Rose) among others (Table 6). Conspicuously absent from this section of the Sequatchie Valley is the *Significant Threat*–ranked *Lonicera maackii* (Amur Bush Honeysuckle), which appears to be nearly ubiquitous to the east of Walden Ridge in Hamilton County, Tennessee (author's observation).

Table 6. Tennessee state-ranked invasive plant species documented in the SVSCT study area.

Tennessee State Ranked Invasive Plant Species Documented in the Study Area		
Scientific Name	Common Name	State Rank
Agrostis stolonifera L.	Creeping bentgrass	Alert
Ailanthus altissima (Mill) Swingle	Tree of heaven	Severe Threat
Albizia julibrissin Durazz.	Mimosa	Severe Threat
Allium vineale L.	Field garlic	Significant Threat
Arundo donax L.	Giant reed	Significant Threat
Bromus sterilis L.	Poverty brome	Lesser Threat
Bromus tectorum L.	Cheat grass	Severe Threat
Buglossoides arvensis (L.) I.M. Johnston	Corn Gromwell	Lesser Threat
Cardiospermum halicacabum L.	Balloon vine	Lesser Threat
Carduus nutans L.	Nodding thistle	Significant Threat
Cichorium intybus L.	Chicory	Lesser Threat
Conium maculatum L.	Poison hemlock	Lesser Threat
Coronilla varia L.	Crown vetch	Alert
Daucus carota L.	Queen Anne's lace	Alert
Dioscorea oppositifolia L.	Chinese yam	Severe Threat
Elaeagnus pungens Thunb.	Thorny olive	Significant Threat
Elaeagnus umbellata Thunb.	Autumn olive	Severe Threat
Eragrostis curvula (Schrad) Nees	Weeping love grass	Significant Threat
Euonymus alatus (Thunb.) Siebold	Burning bush	Lesser Threat
Glechoma hederacea L.	Ground ivy	Significant Threat
Hedera helix L.	English ivy	Lesser Threat
Kummerowia striata (Thunb.) Schindl.	Japanese clover	Alert
Lespedeza bicolor Turcz.	Bicolor lespedeza	Severe Threat
*Lespedeza cuneata (*Dum.-Cours) G. Don	Chinese lespedeza	Severe Threat
Leucanthemum vulgare Lam.	Ox-eye daisy	Alert
Ligustrum sinense Lour.	Chinese privet	Severe Threat
Lonicera japonica Thunb.	Japanese honeysuckle	Severe Threat
Microstegium vimineum (Trin.) A. Camus	Japanese stiltgrass	Severe Threat
Miscanthus sinensis Anderson	Chinese silver grass	Significant Threat
Nandina domestica Thunb.	Sacred bamboo	Alert
Paulownia tomentosa (Thunb.) Siebold & Zucc. ex Steud.	Princess tree	Severe Threat
Polygonum cespitosum Blume var. *longisetum* (Bruijn) A.N. Steward	Bristly lady's thumb	Significant Threat

Table 6 continued

Tennessee State Ranked Invasive Plant Species Documented in the Study Area		
Scientific Name	Common Name	State Rank
Polygonum persicaria L.	Spotted lady's thumb	Significant Threat
Populus alba L.	White poplar	Significant Threat
Pueraria montana (Lour.) Merr. var. *lobata* (Willd.) Maesen & S. Almeida	Kudzu	Severe Threat
Ranunculus bulbosus L.	St. Anthony's turnip	Lesser Threat
Rosa multiflora Thunb.	Multiflora rose	Severe Threat
Rubus bifrons Vest ex Tratt.	Himalayan berry	Alert
Rubus phoenicolasius Maxim.	Wineberry	Lesser Threat
Setaria pumila (Poir.) Roem. & Schult. ssp. *pumila*	Yellow foxtail	Alert
Setaria viridis (L.) P. Beauv. var. *viridis*	Green foxtail	Significant Threat
Sorghum halepense (L.) Pers.	Johnson grass	Severe Threat
Spiraea japonica L.f.	Japanese spiraea	Significant Threat
Tragopogon dubius Scop.	Yellow goat's beard	Lesser Threat
Verbascum thaspus L.	Common mullein	Significant Threat

State rankings obtained from TEPPC (2009). Severe Threat = possess invasive characteristics; spread easily in native plant communities and displace native vegetation; Significant Threat = posses invasive characteristics; not presently considered to spread as easily into native plant communities as Severe Threat; Lesser Threat = spread in or near disturbed areas; not presently considered a threat to native plant communities; Alert = possess invasive characteristics; known to be invasive in similar habitats as those found in Tennessee.

Comparisons to Previous Studies on the Cumberland Plateau

With the afore-mentioned caveat in mind, Figures 8, 9, and 10 are presented to offer a comparison of species richness (expressed as species density) among the previously conducted Cumberland Plateau floras. The regression lines are based on the model promoted by Preston, $S = cA^z$ (1962). The values from the previous floras were used in three different combinations to generate the regression lines; however, the current value for the SVSCT study is deliberately *not* factored in, lest, as mentioned above, the model becomes a *product* of the study, rather than a *measure* of the study (i.e., drawing the bull's-eye around the dart).

The first regression (Figure 8) includes all eleven of the previous Cumberland Plateau vascular floras listed in Table 1. The regression equation generated by the data from these studies predicts that the 14,763 ha study area for the Vascular Flora of the Sequatchie Valley in Sequatchie County, Tennessee should contain something in the region of 894 species. However, Huskins (2008) noted that the inclusion of Allawos' (1994) data from the Vascular Flora of North White Oak Creek Gorge had a deleterious effect on the r-squared value (0.7809) for the regression model. Huskins therefore treated the data from that study as an outlier, a reasonable approach to such a low value from a region that has since proven to be much more species rich than Allawos' reported value would suggest. Huskins (2008) noted that removing Allawos' data from the equation substantially improved the r-squared value for the regression model, increasing it from 0.7809 to 0.8845 (Figure 9). Incidentally, the resulting equation predicts a higher species number for a completed Vascular Flora of the Sequatchie Valley within Sequatchie County study (955).

Consider that if the low value from Allawos' study catches our attention and prompts us to treat it as an outlier, consistency requires us to take note of the unusually high value generated by Beck’s (2000) study of the vascular flora of Prentice Cooper State Forest and Wildlife Management Area, located on the Cumberland Plateau in Southeastern Tennessee. If, for the sake of consistency, we were to also delete the data from Beck’s study from the input values used to generate the regression, we would find that the r-squared value receives an additional nudge upward, while the predicted value for a completed vascular flora of the Sequatchie Valley in Sequatchie County moves downward to a value very nearly equal to the original value generated by including all of the Cumberland Plateau studies Figure 10).

For Figures 8 – 10, the data point label abbreviations are as follows: BEH=Big Everidge Hollow (McEwen et al. 2005); CF/NR=Clear Fork/New River (Goodson 2000/Bailey & Coe 2001, respectively); FCF=Fall Creek Falls (Flemming & Wofford 2004); FG=Fiery Gizzard (Clark 1966); NCCG=North Chickamauga Creek Gorge (Huskins 2008); Obed=Obed Wild and Scenic River (Schmalzer et al. 1985); PC=Prentice Cooper (Beck and Van Horn 2007); PK=Pilot Knob (Weckman et al. 2003); SG=Savage Gulf (Wofford et al. 1979); and WC=Wolf Cove (Clements and Wofford 1991) and WOCG = North White Oak Creek Gorge (Allawos 1994, shown only in Figure 8).

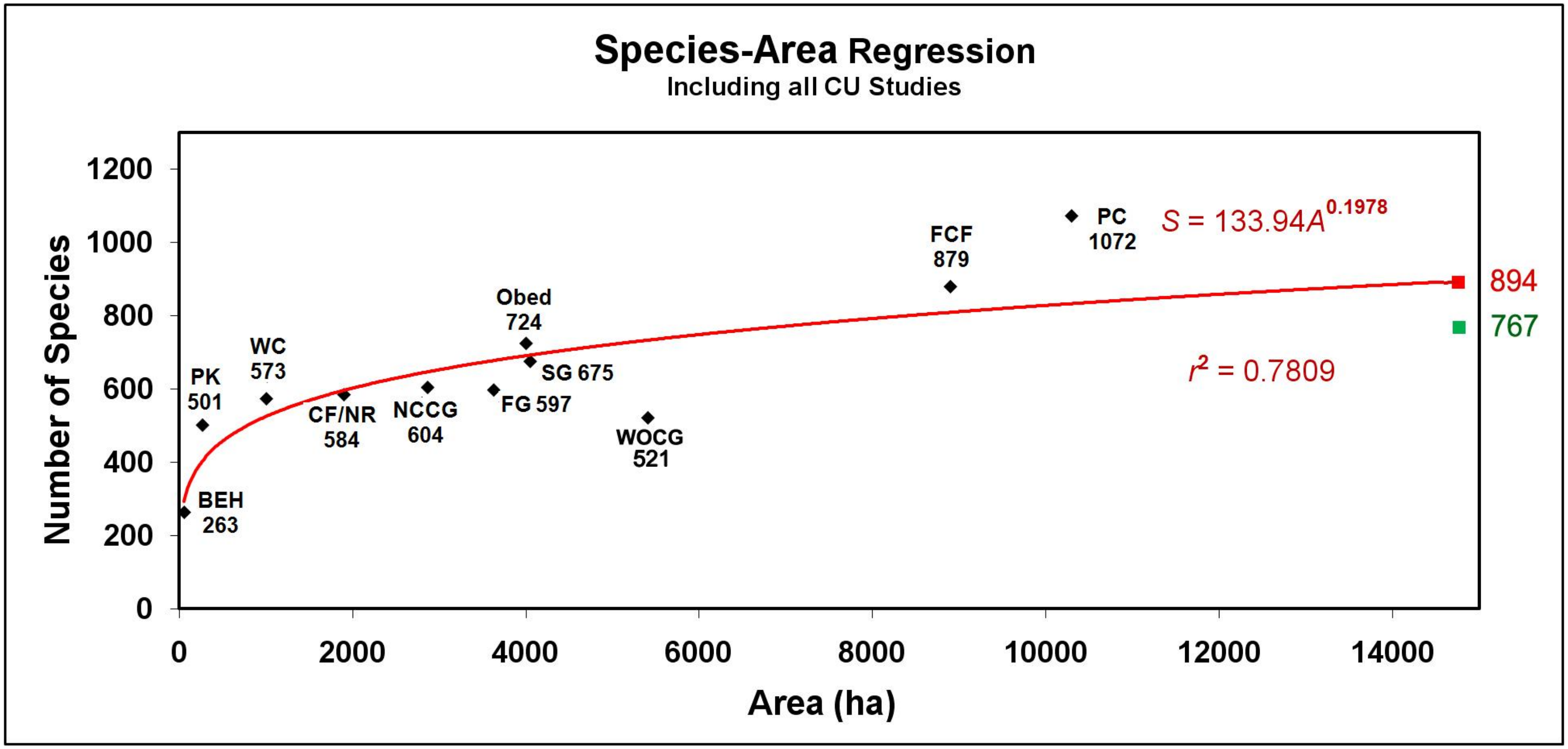

Figure 8. Species-area regression line for eleven vascular floras conducted on the Cumberland Plateau. The regression line is based on the total number of taxa reported by each of the eleven previous floras on the Cumberland Plateau; however, the values reflect nomenclature that has been standardized to that of the PLANTS Database (USDA NRCS 2011) by Huskins (2008) and Huskins and Shaw (2010). Actual and projected species numbers for the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee (SVSCT) are presented, but were not introduced into the dataset that produced the regression equation. The green square indicates the current species number for the SVSCT study (767). The red trend line reflects the values predicted by the Power Model promoted by Preston (1962) See below for a key to the abbreviations used in the graphs.

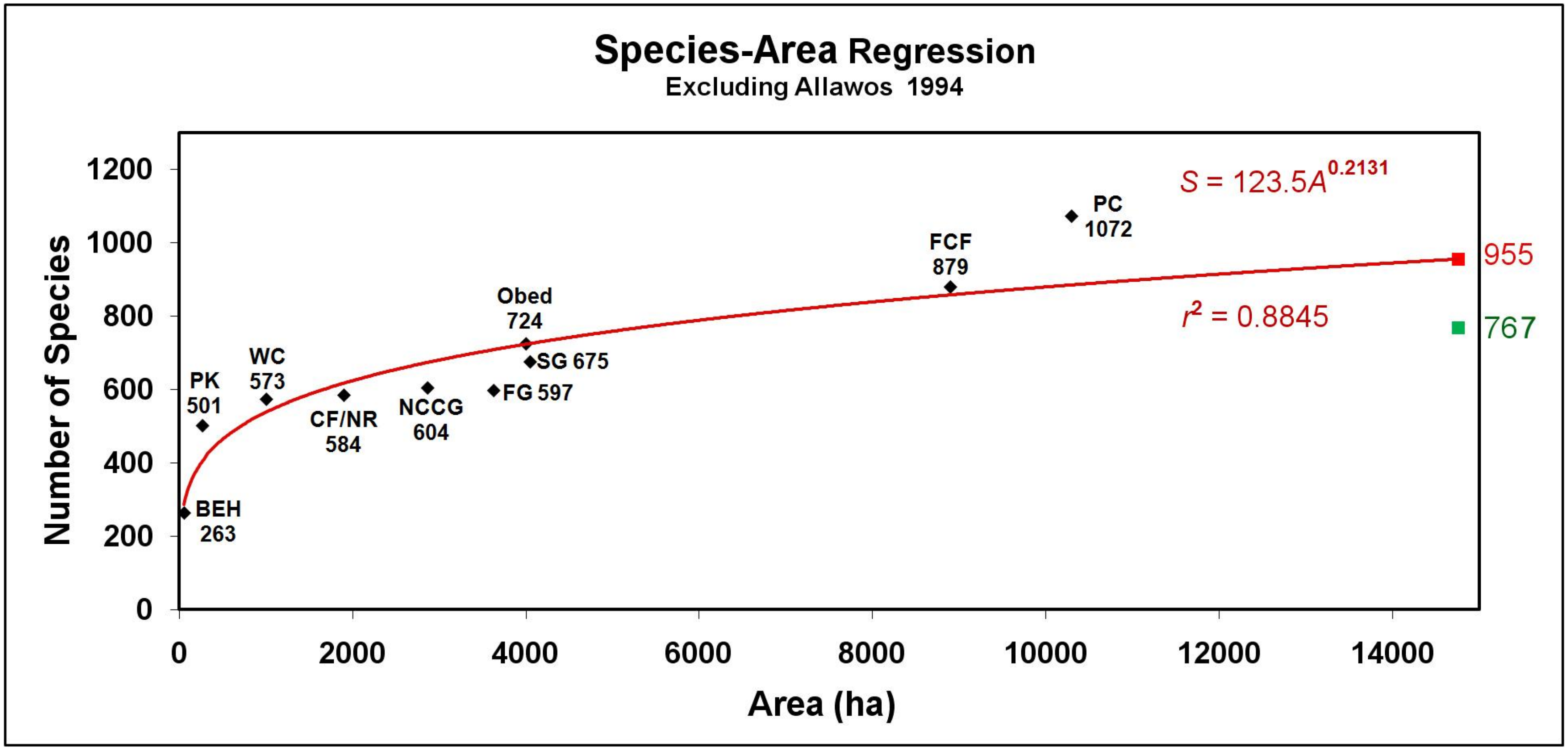

Figure 9. The changes in the species-area regression upon the removal of a low-value outlier. Note the resulting improvement in the r^2 value.

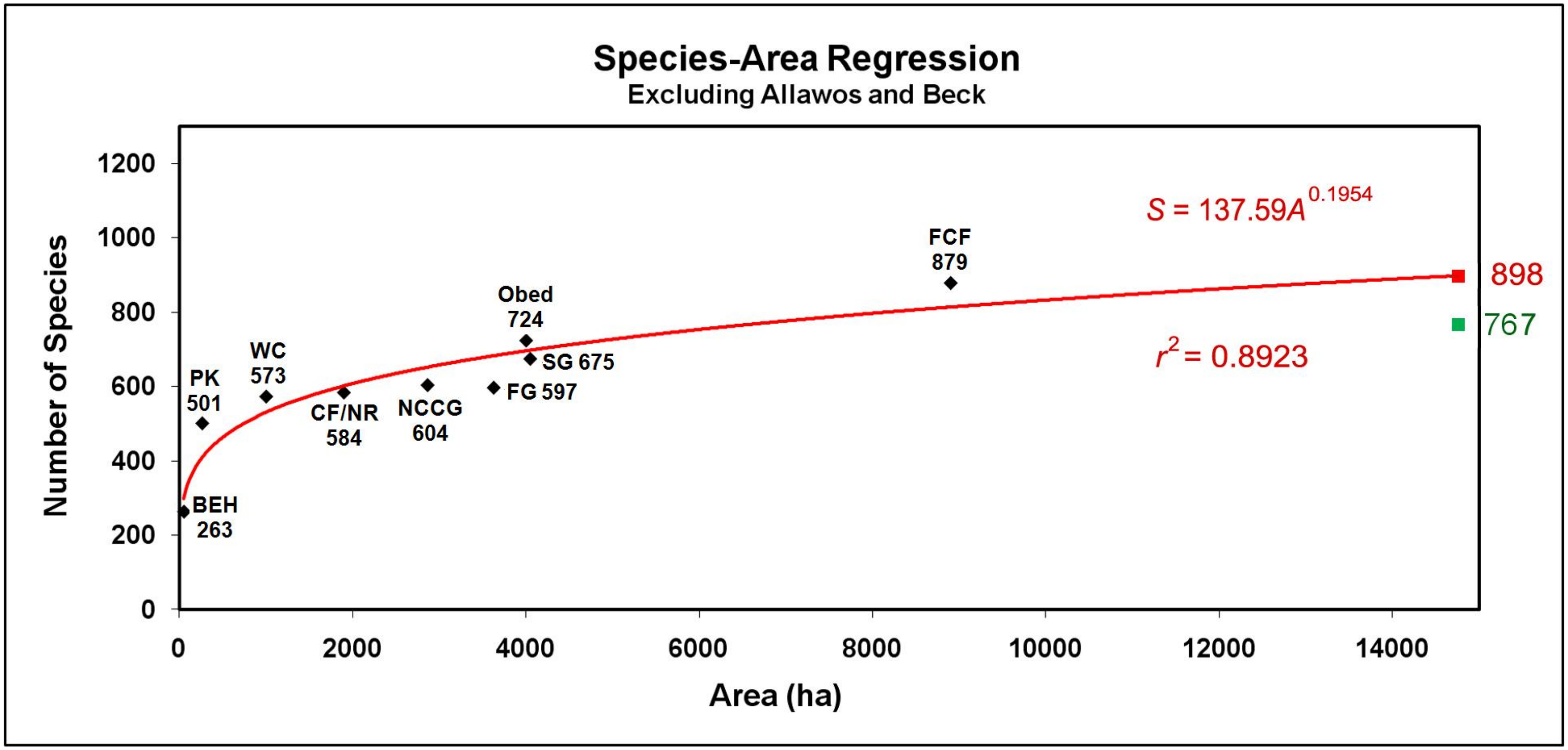

Figure 10. The changes in the species area regression upon the removal of both low and high value outliers.

However, the take-home message here is not which set of values will generate the most accurate prediction of the species richness to be found in the Sequatchie Valley. That value remains to be generated empirically. The utility of this comparative exercise is instructive. It says more about the impact of sampling effort on measures of species richness than it can possibly say about how many species I may expect to find in an exhaustive inventory of the Sequatchie Valley study area. As Magurran (2004, p. 132) noted, the number of species within a given assemblage tends to increase with increasing sampling effort. She correctly cites Connor and Simberloff (1978) for their observation that "the number of botanical trips to the Galapagos Islands was a better predictor of species richness than area or isolation" (Magurran 2004, p. 132).

Given that only a very small portion of the study area for the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee has thus far been examined, it is noteworthy that 89 taxa documented by this study have not been documented in any of the previous Cumberland Plateau vascular floras listed in Table 7. Moreover, 65 of these 89 taxa are considered native to the region by the USDA, NRCS (2011). A review of the data from the previous Cumberland Plateau floras suggests that this degree of "uniqueness" of floristic composition is unusual among the group of studies included. Only the Vascular Flora of Prentice Cooper State Forest and Wildlife Management Area (PCSFWMA) (Beck 2000, Beck & Van Horn 2007) documents more taxa that are uniquely present with respect to the other Cumberland Plateau vascular floras (127 total, 85 native; Table 7). If we compare the total number of taxa thus far documented by the Contribution to the Vascular Flora of the SVSCT

(767) to the number of taxa documented by the Vascular Flora of PCSFWMA (1072), the potential held within a complete survey of the Sequatchie Valley begins to emerge.

Even at this current stage of completion, in terms of proportion, the Flora of the SVSCT thus far has a greater percentage (10.08%) of the native taxa that uniquely occur within SVSCT study area than any of the previous Cumberland Plateau vascular floras, including PCSFWMA. This is also noteworthy, given that the most understudied areas in the SVSCT study are the most remote and undisturbed habitats.

Table 7. Comparisons of the number of taxa unique to each CU flora.

Study Area	Total Taxa Recorded from Study Area	Total Taxa Unique to Study Area	Percent of Total Taxa Unique to Study Area	Native Taxa Recorded from Study Area	Native Taxa Unique to Study Area	Percent of Native Taxa Unique to Study Area
Prentice Cooper (Beck & Van Horn 2007)	1,072	127	11.85	901	85	9.43
Fall Creek Falls (Flemming & Wofford 2004)	879	49	5.57	778	36	4.63
White Oak Creek Gorge (Allawos 1994)	521	6	1.15	480	6	1.25
Savage Gulf (Wofford et al. 1979)	675	24	3.56	635	21	3.31
Obed (Schmalzer et al. 1979)	724	29	4.01	665	25	3.76
Fiery Gizzard (Clark 1966)	597	29	4.86	560	29	5.18
NCCGSNA (Huskins & Shaw 2010)	604	19	3.15	531	14	2.64
Clear Fork (Goodson 2000) + New River (Bailey and Coe 2001)	584	27	4.62	541	27	4.99
Wolf Cove (Clements & Wofford 1991)	573	23	4.01	546	22	4.03
Pilot Knob (Weckman et al. 2003)	501	29	5.79	450	26	5.78
Big Everidge Hollow (McEwan et al. 2005)	263	4	1.14	262	4	1.53
Contribution to Vascular Flora of SVSCT (Evans 2011)	764	88	11.52	635	64	10.08

"Taxa" is here defined to include species and subspecific taxa.

CHAPTER V

CONCLUSIONS

It may reasonably be stated that the Vascular Flora of Prentice Cooper State Forest and Wildlife Management Area (Beck 2000, Beck and Van Horn 2007) is one of the most exhaustive floristic investigations on record for the Cumberland Plateau Physiographic Province. This is evidenced by removing the data for Beck's (2000) flora from the species-area equation, which increases the r^2 value of the regression from 0.8845 to 0.8923, suggesting that it is an outlier among the other Cumberland Plateau floras. Whether this is the result of a more species rich study area or the result of extraordinary sampling effort is a moot point, for this number of species could not be collected without extraordinary effort. Hampered by the underestimation of the difficulties of investigating hundreds of separately owned land parcels, the Contribution to the Vascular Flora of the Sequatchie Valley is far from exhaustive. A fair estimation of the tempero-spatial coverage thus far would range somewhere between 10 and 20%. Yet, the number of unique occurrences of taxa documented by the Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee is second only to Beck's (2000) study. This fact alone is suggestive of the unique character of the floristic assemblage of the Sequatchie Valley.

The number of disjunct occurrences of taxa from both northern and southern centers of distribution provokes a closer review of the floristic literature covering the Southern Appalachian Highland Division to determine whether these occurrences are to be expected as a result of random probability, or if they are a result of historical biogeographic mechanisms. Such a review, of course, should be accompanied by a more complete investigation of the Sequatchie Valley to provide the data necessary to conduct a robust analysis.

REFERENCES CITED

Allaby, M. (Ed.). 2004. Oxford Dictionary of Ecology. Oxford University Press, New York, NY.

Alliance for the Cumberlands (AC). 2006. The Cumberland Plateau Heritage Corridor, Feasibility study and assessment of impacts for national heritage corridor designation. (http://www.tdec.net/recreation/cumberlandplateau.pdf). Knoxville, Tennessee.

Allawos, J. G. 1994. The vascular flora of North White Oak Creek Gorge, Scott and Fentress Counties, Tennessee. M.S. thesis, The University of Tennessee, Knoxville, Tennessee.

Arrhenius, O. 1921. Species and area. Journal of Ecology 9(1): 95-99.

Bailey, C. J. and F. G. Coe. 2001. The vascular flora of the riparian zones of the Clear Fork River and the New River in the Big South Fork National River and Recreation Area (BSFNRRA). Castanea 66(3): 252-274.

Beck, J. T. 2000. The vascular flora of Prentice Cooper State Forest and Wildlife Management Area, Tennessee. M.S. Thesis. University of Tennessee, Chattanooga, Chattanooga, TN.

Beck, J. T. and S. Van Horn. 2007. The vascular flora of Prentice Cooper State Forest and Wildlife Management Area, Tennessee. Castanea 72(1): 15-44.

Boyd, J. and J. Shaw. 2011. Successful relocation of federally threatened *Scutellaria montana* (Lamiaceae, large-flowered skullcap) [Abstract]. Oral presentation at the 72nd Annual Meeting of the Association of Southeastern Biologists, University of Alabama, Huntsville. Retrieved from http://alabamaacademyofscience.org/asb/view.php?id=458.

Brown, J. H. and M. V. Lomolino. 1998. Biogeography; Second Edition. Sinauer Associates, Sunderland, MA.

Camp, H. R. 1997. Sequatchie County: a story of a place and its people. Hillsboro Press, Franklin, Tennessee.

Candolle, A. P. de. 1855. *Géographie Botanique Raisonnée.* 2 vols. Masson, Paris. (cited by Brown and Lomolino 1998 p. 373.

Caplenor, D. 1955. An annotated list of the vascular plants of the gorges of the Fall Creek Falls State Park. Journal of the Tennessee Academy of Science 30:93-10.

Caplenor, D. 1965. The vegetation of the gorges of the Fall Creek Falls State Park. Journal of the Tennessee Academy of Science 40:27-39.

Caplenor, D. 1978. Additions to the list of plants of the gorges of the Fall Creek Falls State Park. Journal of the Tennessee Academy of Science 53:135

Caplenor, D. 1979. Woody plants of the gorges of the Fall Creek Falls State Park. Journal of the Tennessee Academy of Science 54:139-145.

Chester, E. W., B. E. Wofford, D. Estes, and C. Bailey. 2009. A Fifth Checklist of Tennessee Vascular Plants. BRIT Press, Fort Worth, Texas.

Clark, R. C. 1966. The vascular flora of the Fiery Gizzard Gorges in south-central Tennessee. M.A. Thesis, the University of North Carolina, Chapel Hill, North Carolina.

Clean Water Act. 1972. 33 U.S.C.S. § 1344(a). Retrieved from LexisNexis. 2011 through PL 111-383: http://www.lexisnexis.com/hottopics/lnacademic/?verb=sf&sfi=AC00NBGenSrch

Clements, R. K. and B. E. Wofford. 1991. The vascular flora of Wolf Cove, Franklin County, Tennessee. Castanea 56(4): 268-286.

Connor, E. F. and D. S. Simberloff. 1978. Species number and compositional similarity of the Galapagos fauna and flora. Ecological Monographs 48(2): 219-248.

Craddock, J. H. 1998. Chestnut Resources in North America. Annual Report of the Northern Nut Growers Association 89: 19-30.

Cronquist, A. 1980. Vascular flora of the Southeastern United States. Volume 1. Asteraceae. University of North Carolina Press, Chapel Hill, North Carolina.

Endangered Species Act. 1973. 16 U.S.C.S. § 1531 et seq. Retrieved from LexisNexis. 2011 through PL 111-383: http://www.lexisnexis.com/hottopics/lnacademic/?verb=sf&sfi=AC00NBGenSrch

Estes, L. D. 2010. John Beck's leafcup, a rare plant named for a rare individual. The Tennessee Conservationist 76(5): 8-11.

Fenneman, N. M. 1938. Physiography of eastern United States. McGraw-Hill Book Company, Inc., New York and London.

Fleming, C. A. and B. E. Wofford. 2004. The vascular flora of Fall Creek Falls State Park, Van Buren and Bledsoe Counties, Tennessee. Castanea 69(3): 164-184.

Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford.

Gleason, H. A. 1922. On the relation between species and area. Ecology 3: 158-162.

Gleason, H.A. and A. Cronquist. 1963. Manual of the vascular plants of northeastern United States and adjacent Canada. Litton Educational Publishing, Inc., New York, New York.

Goodson, B. E. 2000. The vascular flora of the Clear Fork and New River Gorges of the Big South Fork National River and Recreation Area. M.S. thesis, Tennessee Technological University, Cookeville, Tennessee.

Griffith, G. E., J. M. Omernik, and S.H. Azevedo. 1997. Ecoregions of Tennessee. EPA/600/R-97/022. U.S. Environmental Protection Agency. National Health and Environmental Effects Research Laboratory, Corvallis, OR.

Holmgren, N. H., P. K. Holmgren, R.A. Jess, K.M. McCauley and L. Vogel. 1998. Illustrated companion to Gleason and Cronquist's manual, illustrations of the vascular plants of northeastern United States and adjacent Canada. The New York Botanical Garden, Bronx, New York.

Huskins, S. D. 2008. The Vascular Flora of North Chickamauga Creek Gorge State Natural Area, Hamilton and Sequatchie Counties, Tennessee. M.S. Thesis. University of Tennessee, Chattanooga, Chattanooga, TN.

Huskins, S. D., and J. Shaw. 2010. The Vascular Flora of North Chickamauga Creek Gorge State Natural Area, Tennessee. Castanea 75: 101-125.

Jones, L. J. 2005. Plant life of Kentucky. The University Press of Kentucky, Lexington, Kentucky.

Luther, E. T. 1977. Our Restless Earth, The geologic regions of Tennessee. The University of Tennessee Press, Knoxville, Tennessee.

Magurran, A. E. 2004. Measuring Biological Diversity. Blackwell, Malden, MA.

Makowske, J. E., J. Shaw, and J. Boyd. 2011. Investigating large animal herbivory on Scutellaria montana in the Tennessee Army National Guard Volunteer Training Site, Catoosa County, GA [Abstract]. Poster presentation at the presentation at the 72nd Annual Meeting of the Association of Southeastern Biologists, University of Alabama, Huntsville. Retrieved from http://alabamaacademyofscience.org/asb/view.php?id=623.

McEwan, R. W., R. D. Paratley, R.N. Muller and C.L. Riccardi. 2005. The vascular flora of an old-growth mixed mesophytic forest in southeastern Kentucky. Journal of the Torrey Botanical Society 132(4): 618-627.

McKinney, M. L. 2002. Urbanization, biodiversity, and conservation. BioScience 52(10): 883-890.

McKinney, M. L. 2004. Measuring floristic homogenization by non-native plants in North America. Global Ecology and Biogeography 13: 47–53.

McKinney, M. L., and J. L. Lockwood. 1999. Biotic homogenization: a few winners replacing many losers in the next mass extinction. Trends in Ecology & Evolution 14: 450–453.

Myers, N. 1989. Extinction rates, past and present. BioScience 39(1): 39-41.

NatureServe. 2010. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Accessed 27 April 2011 from http://www.natureserve.org/explorer.

Palmer, M. W., G. L. Wade, and P. Neal. 1995. Standards for the writing of floras. BioScience 45: 339-345.

Prater, J. L., United States, & University of Tennessee, Knoxville. (2003). Soil survey of Sequatchie County, Tennessee. Washington, D.C.: The Service.

Preston, F. W. 1962. The Canonical Distribution of Commonness and Rarity: Part I. Ecology 43(2): 185-215.

Radford, A. R., H.E. Ahles, and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. University of North Carolina Press, Chapel Hill, North Carolina.

Roane, M. K., G.J. Griffin, and J.R. Elkins. 1986. Chestnut blight, other Endothia diseases, and the genus *Endothia*. APS Monograph. APS Press, American Phytopathological Society, St. Paul, Minn.

Schmalzer, P.A., T.S. Patrick and H.R. DeSelm. 1985. Vascular flora of the Obed Wild and Scenic River, Tennessee. Castanea 50(2): 71-88.

Shaw, J. and B.E. Wofford. 2003. Woody plants of Big South Fork National River and Recreation Area, Tennessee and Kentucky and floristic comparison of selected Southern Appalachian woody floras. Castanea 68: 119-134.

Sheviak, C. J. and P. M. Brown. 2003. Spiranthes. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford. Vol. 21, pp. 44-60. Retrieved from http://www.fna.org/. March 2011.

Shigesada, N. and K. Kawasaki. 1997. Biological invasions: Theory and practice. Oxford University Press, New York.

Small, J.K. 1933. Manual of the southeastern flora. Hafner Publishing Company, New York, New York.

Smith, J.P. 1977. Vascular Plant Families. Mad River Press, Eureka, California.

Southern Regional Climate Center (SRCC). 2010. Observation Stations. Louisiana State University, Baton Rouge, LA. http://www.srcc.lsu.edu/stations/.

Swanson, R.E. 1994. A field guide to the trees and shrubs of the southern Appalachians. Johns Hopkins University Press, Baltimore, Maryland.

Tennessee Department of Environment and Conservation (TDEC). 2008. Tennessee Natural Heritage Program rare plant list. Nashville, TN.

Tennessee Exotic Plant Pest Council (TN-EPPC). 2009. Invasive plants of Tennessee. Fairview, TN. http://www.tneppc.org/invasive_plants.

United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2008. The PLANTS Database (http://plants.usda.gov). National Plant Data Center, Baton Rouge, Louisiana 70874- 4490 USA.

United States Department of Agriculture, Natural Resources Conservation Service (USDA NRCS). 2011. The PLANTS Database (http://plants.usda.gov). National Plant Data Center, Baton Rouge, Louisiana 70874- 4490 USA.

University of Tennessee Herbarium (TENN). 2011. Database of Tennessee vascular plants (http://tenn.bio.utk.edu/vascular/vascular.html). The University of Tennessee, Knoxville, Tennessee.

Urbatsch. L.E., and P.B. Cox. 2006. Rudbeckia. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 16+ vols. New York and Oxford. Vol. 21, pp. 44-60. Retrieved from http://www.fna.org/. March 2011.

Weakley, A.S. (in preparation). Flora of the Carolinas, Virginia, and Georgia, and surrounding areas. University of North Carolina, Chapel Hill, North Carolina.

Weckman, T.J., J.E. Weckman and N.R. George. 2003. Checklist of the vascular flora of Pilot Knob State Nature Preserve, Powell County, Kentucky. J, Ky. Acad. Sci. 64(1): 36-54.

White, D. 2000. Raiding Mother Earth's treasure chest. The Lady-Slipper [Kentucky Native Plant Society] 15(2/3): 4 (cited by NatureServe 2010).

Wofford, B.E. 1989. Guide to the vascular flora of the Blue Ridge. University of Georgia Press, Athens, Georgia.

Wofford, B.E. and E.W. Chester. 2002. Trees, shrubs, and woody vines of Tennessee. University of Tennessee Press, Knoxville, Tennessee.

Wofford, B.E., T.S. Patrick, L.R. Phillippe and D.H. Webb. 1979. The vascular flora of Savage Gulf, Tennessee. Sida 8(2): 135-151.

APENDIX A

INTERPRETING THE SPECIES CHECKLIST

Interpreting the Species Checklist

General Information

The species checklist is organized taxonomically by division, class, family, genus, and species. The nomenclature for each of these taxonomic levels follows that of the USDA NRCS PLANTS Database (2011).

Sequatchie County records are indicated by a check mark (✓) in the corresponding column. In the case of a Tennessee state record, the abbreviation SR! accompanies the check mark in the county record column.

An asterisk (*) preceding a taxonomic name indicates non-native status according to the USDA NRCS PLANTS Database (2011).

For species of conservation concern, state status, federal status, state rank, and global rank abbreviations are presented in the preceding order in bold type within **{brackets}**, immediately following the taxonomic name and authority. Only one taxon in this list is assigned a federal conservation status, *Scutellaria montana* Chapm. Therefore, no separate key is provided to federal status abbreviations. *S. montana* is Listed Threatened (LT) by the U.S. Fish and Wildlife Service.

Due to the large proportion of non-native plant species documented by this study, a separate column in the species checklist is devoted to TN-EPPC (2009) invasive threat ranks for invasive non-native species.

Accession numbers are included within the checklist; however, in some cases the abbreviation s.n. is used to indicate that an accession number has not yet been assigned. This is usually indicative of a recent collection and is particularly evident among the *Solidago* & *Symphyotrichum* spp. Collected during the most recent autumn season. Accession numbers will be assigned to these specimens as they are further processed and will be reported in a future publication.

It is standard practice in floristic literature to include some estimate of relative abundance for each taxon documented within the study area. However, the study area as described herein has not yet been explored to the extent that any estimate of relative abundance would be reliable or meaningful. Such estimates would, in fact, be misleading at this stage. Therefore, estimates of relative abundance will be withheld for future publication.

<u>Key to Tennessee Rare Plant Status Abbreviations (TDEC 2008, p. iii)</u>

E **Endangered species** – "any species or subspecies of plant whose continued existence as a viable component of the state's flora is determined by the commissioner [of the Department of Environment and Conservation or his/her authorized representatives] to be in jeopardy, including but not limited to all species of plants determined to be "endangered species" pursuant to the Endangered Species Act."

T **Threatened species** – "any species or subspecies of plant which appears likely, within the foreseeable future, to become endangered throughout all or a significant portion of its range in Tennessee, including but not limited to all species of plants determined to be a "threatened species" pursuant to the Endangered Species Act."

S **Special concern species** – "any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status."

<u>Modifiers to the above</u>

CE **Commercially exploited** – "plants that are being taken from the wild in large numbers and propagation or cultivation is insufficient to meet market demand. These plants are of long-term conservation concern but the division does not recommend they be included in the normal environmental review process."

P **Possibly extirpated** – "a species or subspecies that has not been seen in Tennessee for the past 20 years. It is possible that it may no longer occur in Tennessee.

<u>Key to Tennessee Rare Plant State Rank Abbreviations (TDEC 2008, p. iv)</u>

S1 **"**Extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extirpation from Tennessee."

S2 **"**Very rare and imperiled within the state, six to twenty occurrences and less than 3000 individuals, or few remaining individuals, or because of some factor(s) making it vulnerable to extirpation from Tennessee."

S3 "Rare and uncommon in the state, from 21 to 100 occurrences."

S4 "Widespread, abundant, and apparently secure within the state, though it may be quite rare in parts of its range, especially at the periphery, and is of long-term concern."

SX "Believed to be extirpated from Tennessee, with virtually no likelihood that it will be rediscovered."

S#S# **"**Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)"

Key to Relevant Global Conservation Rank Abbreviations (NatureServe 2011)

G1 "**Critically Imperiled** – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors."

G2 "**Imperiled** – At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors."

G3 "**Vulnerable** – At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors."

G4 "**Apparently Secure** – Uncommon but not rare; some cause for long-term concern due to declines or other factors."

G5 "**Secure** – Common; widespread and abundant."

G#G# "**A Numeric Range Rank** (e.g., G2G3) is used to indicate the rank of uncertainty in the status of a species or community. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4)."

G#? "**Inexact Numeric Rank** – Denotes inexact numeric rank; this should not be used with any of the Variant Global Conservation Status Ranks or GX or GH."

GH "**Possibly Extinct** – Known from only historical occurrences but still some hope of rediscovery. There is evidence that the species may be extinct or the ecosystem may be eliminated throughout its range, but not enough to state this with certainty."

GNR **"Unranked** – Global rank not yet assessed."

GX "**Presumed Extinct –** Not located despite intensive searches and virtually no likelihood of rediscovery."

Q "Questionable taxonomy that may reduce conservation priority— Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or inclusion of this taxon or type in another taxon or type, with the resulting taxon having a lower-priority (numerically higher) conservation status rank. The "Q" modifier is only used at a global level and not at a national or subnational level."

<u>Key to Threat Rank Abbreviations for Invasive Exotic Plant Species (TN-EPPC 2009, p. 1)</u>

Severe	**Severe Threat** – "possess invasive characteristics; spread easily in native plant communities and displace native vegetation"
Significant	**Significant Threat** – "posses invasive characteristics; not presently considered to spread as easily into native plant communities as Severe Threat"
Lesser	**Lesser Threat** – "spread in or near disturbed areas; not presently considered a threat to native plant communities"
Alert	**Alert** – "possess invasive characteristics; known to be invasive in similar habitats as those found in Tennessee"

APPENDIX B

SPECIES CHECKLIST FOR A CONTRIBUTION TO THE VASCULAR FLORA OF THE SEQUATCHIE VALLEY WITHIN SEQUATCHIE COUNTY, TENNESSEE

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
EQUISETOPHYTA			
EQUISETACEAE			
Equisetum arvense L.	516		
LYCOPODIOPHYTA			
LYCOPODIACEAE			
Lycopodium digitatum Dill. ex A. Braun	s.n.		
PTERIDOPHYTA			
ASPLENIACEAE			
Asplenium platyneuron (L.) Britton, Stearns & Poggenb. var. *platyneuron*	53; 454; 589; 921; 1011; 1516; 1531		
A. resiliens Kunze	s.n.		
A. rhizophyllum L.	52; 919		
DENNSTAEDTIACEAE			
Dennstaedtia punctilobula (Michx.) T. Moore	745		
Pteridium aquilinum (L.) Kuhn	1576		
DRYOPTERIDACEAE			
Athyrium filix-femina (L.) Roth. ssp. *asplenioides* (Michx.) Hultén	846; 856; 1789; 1793		
Cystopteris tennesseensis Shaver	991; 1572	✓	
Dryopteris marginalis (L.) A. Gray	155; 242; 749; 852;		

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
	1604; 1622; 1745; 1755		
Onoclea sensibilis L.	133; s.n.	✓	
Polystichum acrostichoides (Michx.) Schott	44; 297; 753		
Woodsia obtusa (Spreng.) Torr.	923; 1620		
OPHIOGLOSSACEAE			
Botrychium biternatum (Sav.) Underw.	49		
B. dissectum Spreng.	596		
B. virginianum (L.) Sw.	756; 769		
Ophioglossum vulgatum L.	841	✓	
OSMUNDACEAE			
Osmunda cinnamomea L.	1791; 1806		
O. regalis L. var. *spectabilis* (Willd.) A. Gray	1812		
POLYPODIACEAE			
Pleopeltis polypodioides (L.) Andrews & Windham ssp. *michauxiana* (Weath.) Andrews & Windham	40; 256; 1022; 3x(s.n.)		
Polypodium virginianum L.	1754	✓	
PTERIDACEAE			
Adiantum pedatum L.	996; 1573		
Pellaea atropurpurea (L.) Link	931; 956; s.n.		
P. glabella Mett. ex Kuhn ssp. *glabella*	1021	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
THELYPTERIDACEAE			
Phegopteris hexagonoptera (Michx.) Fée	521		
Thelypteris noveboracensis (L.) Nieuwl.	1811		
CONIFEROPHYTA			
CUPRESSACEAE			
Juniperus virginiana L.	232; 949		
PINACEAE			
Pinus echinata Mill.	45		
P. taeda L.	891	✓	
P. virginiana Mill.	46; 305; 1186; 1629		
Tsuga canadensis (L.) Carriére	47; 48; 243		
MAGNOLIOPHYTA - LILIOPSIDA			
AGAVACEAE			
Yucca flaccida Haw.	1337; 1522	✓	
ALISMATACEAE			
Alisma subcordatum Raf.	1822	✓	
ARACEAE			
Arisaema triphyllum (L.) Schott	153; 154; 286; 770		
A. triphyllum (L.) Schott ssp. *quinatum* (Buckley) Huttleston	1430		

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
COMMELINACEAE			
**Commelina communis* L.	408; 1226; 1652	✓	
Tradescantia subaspera Ker Gawl.	152; 758; 844; 1535		
CYPERACEAE			
Carex abscondita Mack.	818	✓	
C. albicans Willd. ex Spreng. var. *albicans*	591	✓	
C. amphibola Steud.	1506		
C. annectens (E.P. Bicknell) E.P. Bicknell	144; 315; 318; 324; 697; 889; 1479;		
C. austrina (Small) Mack.	643	✓	
C. baileyi Britton	397	✓	
C. blanda Dewey	693; 998; 1376; 1378; 1392; 1426;		
C. caroliniana Schwein.	1421; 1428	✓	
C. complanata Torr. & Hook.	145; 325; 334; 731; 1420; 1524		
C. conjuncta Boott	1397	✓	
C. cumberlandensis Naczi, Kral & Bryson	821	✓	
C. digitalis Willd. var. *asymmetrica* Fernald	767	✓**SR!**	
C. festucacea Schkuhr ex Willd.	326; 1424; 1483; 1514	✓	
**C. fissa* Mack. var. *fissa*	1485	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
C. flaccosperma Dewey	1505	✓	
C. frankii Kunth	493; 496; 905; 1136; 1489; 1722;	✓	
C. grayi Carey	876; 1713		
C. grisea Wahlenb.	691	✓	
C. hirsutella Mack.	665; 1467	✓	
C. laxiflora Lam.	636; 721	✓	
C. leavenworthii Dewey	119; 664; 694; 1478; 1523		
C. lupulina Muhl. ex Willd.	1719; 1721	✓	
C. lurida Wahlenb.	1513		
C. muehlenbergii Schkuhr ex Willd. var. *enervis* Boott.	123		
C. picta Steud.	258; 563; 566; 635	✓	
C. projecta Mack.	151		
C. retroflexa Muhl. ex Willd.	1391; 1471	✓	
C. stipata Muhl. ex Willd.	1458	✓	
C. swanii (Fernald) Mack.	1600		
C. texensis (Torr.) L.H. Bailey	1408	✓	
C. tribuloides Wahlenb. var. *sangamonensis* Clokey	1499; 1718	✓	
C. vulpinoidea Michx.	692; 1425; 1484; 1488; 1501	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Cyperus echinatus (L.) Alph. Wood	1117; 1148	✓	
C. lancastriensis Porter ex A. Gray	1000; 1114; 1729; 1730	✓	
C. pseudovegetus Steud.	494		
C. strigosus L.	21; 1145; 1153; 1725		
Eleocharis obtusa (Willd.) Schult.	492	✓	
Scirpus atrovirens Willd.	439; 890; 1502	✓	
S. georgianus Harper	1558	✓	
S. pendulus Muhl.	1508	✓	
DIOSCOREACEAE			
**Dioscorea oppositifolia* L.	911	✓	Severe
D. villosa L.	162; 773		
IRIDACEAE			
Iris cristata Aiton	285	✓	
Sisyrinchium angustifolium Mill.	121; 125; 678; 1429; 1461		
S. mucronatum Michx.	1503	✓	
S. nashii E.P. Bicknell	728	✓	
JUNCACEAE			
Juncus brachycarpus Engelm.	317; 1465; 1493	✓	
J. coriaceus Mack.	329; 463; 1559; 1639; 1717		

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
J. debilis A. Gray	1464		
J. effusus L.	146; 396		
J. elliottii Chapm.	1427	✓	
J. marginatus Rostk.	1491		
J. scirpoides Lam.	149	✓	
J. tenuis Willd.	330; 333; 344; 122; 314; 1469; 1487; 1492; 1544		
Luzula bulbosa (Alph. Wood) Smyth & Smyth	392	✓	
L. echinata (Small) F. J. Herm.	255	✓	
L. multiflora (Ehrh.) Lej.	592; 593	✓	
LILIACEAE			
Allium canadense L.	1504	✓	
**A. vineale* L.	1550	✓	Significant
**Asparagus officinalis* L.	427	✓	
**Hemerocallis fulva* (L.) L.	423	✓	
Hymenocallis caroliniana (L.) Herbert	1551; 1706	✓	
Maianthemum racemosum (L.) Link ssp. *racemosum*	751; 1631		
Medeola virginiana L.	1819		
Polygonatum biflorum (Walter) Elliot	747; 1628		
P. biflorum (Walter) Elliot var. *commutatum* (Schult. & Schult. f.) Morong	1615	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Trillium catesbaei Elliot	s.n.	✓	
Trillium cuneatum Raf.	s.n.	✓	
T. grandiflorum (Michx.) Salisb.	292		
T. luteum (Muhl.) Harbison	282		
Uvularia perfoliata L.	759	✓	
ORCHIDACEAE			
Goodyera pubescens (Willd.) R. Br.	1788	✓	
Spiranthes cernua (L.) Rich.	s.n.	✓	
S. lacera (Raf.) Raf. var. *gracilis* (Bigelow) Luer	1062		
S. lacera (Raf.) Raf. var. *lacera*	1063	✓**SR!**	
S. vernalis Engelm. & A. Gray	181; 182; 1703		
Tipularia discolor (Pursh) Nutt.	568; 1691	✓	
POACEAE			
Agrostis hyemalis (Walter) Britton, Sterns & Poggenb.	737; 1515		
**A. stolonifera L.*	501	✓	Alert
Andropogon glomeratus (Walter) Britton, Sterns & Poggenb.	s.n.	✓	
A. virginicus L.	1064; 1212; 1310	✓	
**Arundo donax* L.	475; 551	✓	Significant
Brachyelytrum erectum (Schreb. ex Spreng.) P. Beauv.	1565; 1582	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**Bromus arvensis* L.	338	✓	
**B. hordeaceus* L. ssp. *hordeaceus*	380; 1437	✓	
B. latiglumis (Shear) Hitchc.	1581	✓**SR!**	
B. pubescens Muhl. ex Willd.	415; 843	✓	
**B. racemosus* L.	670; 680; 830; 862	✓	
**B. sterilis* L.	677	✓	Lesser
**B. tectorum* L.	871; 1382	✓	Severe
Chasmanthium latifolium (Michx.) Yates	487; 992; 1715	✓	
C. laxum (L.) Yates	s.n.	✓	
C. sessiflorum (Poir.) Yates	1655; 1668; 1685	✓	
**Cynodon dactylon* (L.) Pers.	1112	✓	
**Dactylis glomerata* L.	687; 1394; 1396		
Danthonia compressa Austin	854	✓	
D. spicata (L.) P. Beauv. ex Roem. & Schult.	730; 802; 822	✓	
Dichanthelium acuminatum (Sw.) Gould & C.A. Clark var. *fasciculatum* (Torr.) Freckmann	337; 340	✓	
D. acuminatum (Sw.) Gould & C.A. Clark var. *lindheimeri* (Nash) Gould & C.A. Clark	505	✓	
D. boreale (Nash) Freckmann	803; 828; 1080	✓	
D. boscii (Poir.) Gould & C.A. Clark	385; 391; 420; 457; 735; 805; 817; 855; 1413;		

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
	1575		
D. clandestinum (L.) Gould	434	✓	
D. commutatum (Schult.) Gould	332; 366; 386; 390; 738; 788; 1541	✓	
D. dichotomum (L.) Gould var. *dichotomum*	944; 1542; 1574	✓	
D. laxiflorum (lam.) Gould	323; 647; 729;1753	✓	
D. meridionale (Ashe) Freckmann	705; 726	✓	
D. sphaerocarpon (Elliot) Gould var. *isophyllum* (Scribn.) Gould & C.A. Clark	1595; 1654	✓	
D. villosissimum (Nash) Freckman var. *villosissimum*	780		
Digitaria ciliaris (Retz.) Koeler	206		
D. sanguinalis (L.) Scop.	1047	✓	
Echinochloa muricata (P. Beauv.) Fernald var. *microstachya* Wiegand	1130	✓	
**Eleusine indica* (L.) Gaertn.	1048; 1316	✓	
Elymus glaucus Buckley	433	✓**SR!**	
E. villosus Muhl. ex Willd.	888	✓	
E. virginicus L.	491; 875; 987; 1596; 1634	✓	
**Eragrostis curvula* (Schrad.) Nees	958	✓	Significant
E. spectabilis (Pursh) Steud.	1056	✓	
Festuca paradoxa Desv. {**S, S1, G5}**	1474	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
F. rubra L.	654; 1109; 1438; 1446' 1476; 1548	✓	
**Holcus lanatus* L.	345; 393; 660; 727; 1482	✓	
Hordeum pusillum Nutt.	673; 1401; 1436; 1439; 1477	✓	
Leersia oryzoides (L.) Sw.	1132	✓	
L. virginica Willd.	1239	✓	
**Lolium perenne* L. ssp. *multiflorum* (Lam.) Husnot	795; 1510	✓	
**Microstegium vimineum* (Trin.) A. Camus	1287	✓	Severe
**Miscanthus sinensis* Anderson	1250	✓	Significant
Muhlenbergia schreberi J. F. Gmel.	207	✓	
Panicum anceps Michx.	1061; 1709	✓	
P. virgatum L.	960		
**Paspalum dilatatum* Poir.	208; 422; 532; 1049; 1077; 1111; 1707	✓	
P. pubiflorum Rupr. ex Fourn.	1078; 1144	✓	
P. setaceum Michx.	1059; 1079		
**Phleum pratense* L.	381; 959; 1500	✓	
Poa alsodes A. Gray	1472	✓	
**P. annua* L.	594; 607	✓	
P. chapmaniana Scribn.	656; 659; 1362	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**P. pratensis* L.	1384	✓	
**Schedonorus phoenix* (Scop.) Holub	435	✓	
**S. pratensis* (Huds.) P. Beauv.	655; 663; 799; 1383; 1470	✓	
Setaria parviflora (Poir.) Kerguélen	209; 210; 910; 1067; 1110; 1557	✓	
**S. pumila* (Poir.) Roem. & Schult. ssp. *pumila*	1037; 1771	✓	Alert
**S. viridis* (L.) P. Beauv. var. *viridis*	1113	✓	Significant
**Sorghum halepense* (L.) Pers.	205; 467		Severe
Tridens flavus (L.) Hitchc. var. *flavus*	1038; 1070; 1708		
**Triticum aestivum* L.	794	✓	
SMILACACEAE			
Smilax bona-nox L.	33; 37; 569; 902		
S. glauca Walter	34; 740; 1020		
S. hugeri (Small) J.B.S. Norton ex Pennell	922	✓	
S. rotundifolia L.	716	✓	
S. tamnoides L.	1235	✓	
TYPHACEAE			
Typha latifolia L.	1799	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
MAGNOLIOPHYTA-MAGNOLIOPSIDA			
ACANTHACEAE		✓	
Justicia americana (L.) Vahl	993	✓	
Ruellia caroliniensis (J.F. Gmel.) Steud.	14; 424; 1009; 1553		
ACERACEAE			
Acer negundo L.	432; 612		
A. pensylvanicum L.	744		
A. rubrum L.	304; 574; 816; 826		
A. rubrum L. var. *trilobum* Torr. & A. Gray ex K. Koch	815; 897	✓	
A. saccharinum L.	302; 583		
A. saccharum Marsh. var. *saccharum*	288; 762; 806; 928; 965; 1019	✓	
AMARANTHACEAE			
Amaranthus spinosus L.	1122; 1231; 1329	✓	
ANACARDIACEAE			
Rhus copallinum L.	710; 1107	✓	
R. glabra L.	488; 711; 1244		
Toxicodendron radicans (L.) Kuntze	132	✓	
ANNONACEAE			
Asimina triloba (L.) Dunal	972	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
APIACEAE			
Chaerophyllum tainturieri Hook.	105	✓	
**Conium maculatum* L.	405	✓	Lesser
Cryptotaenia canadensis (L.) DC.	431; 864; 887; 1216; 1546; 1705	✓	
**Daucus carota* L.	342	✓	Alert
Eryngium prostratum Nutt. Ex DC.	1552	✓	
Osmorhiza claytonii (Michx.) C.B. Clarke	1570	✓	
Sanicula canadensis L.	448; 837; 1584; 1653	✓	
S. smallii E.P. Bicknell	787		
Thaspium barbinode (Michx.) Nutt.	291; 743; 1445		
**Torilis arvensis* (Huds.) Link	478		
APOCYNACEAE			
Amsonia tabernaemontana Walter var. *tabernaemontana*	287	✓	
Apocynum cannabinum L.	350; 1088; 1637	✓	
AQUIFOLIACEAE			
Ilex ambigua (Michx.) Torr.	369; 1015; 1024; 1540	✓	
I. decidua Walter	229; 1432; 1659	✓	
I. montana Torr. & A. Gray ex A. Gray	1539		
I. opaca Aiton	50; 241; 461		

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ARALIACEAE			
**Hedera helix* L.	s.n.	✓	Lesser
Panax quinquefolius L. **{S-CE, S3S4,G3G4}**	1606	✓	
ARISTOLOCHIACEAE			
Aristolochia tomentosa Sims	872		
Hexastylis arifolia (Michx.) Small var. *arifolia*	1449	✓	
H. arifolia (Michx.) Small var. *ruthii* (Ashe) Blomquist	257; 1450	✓	
ASCLEPIADACEAE			
Asclepias quadrifolia Jacq.	364; 748		
A. syriaca L.	470	✓	
A. tuberosa L.	177		
A. variegata L.	352		
Cynanchum laeve (Michx.) Pers.	480	✓	
Matelea gonocarpos (Walter) Shinners	833; s.n.	✓	
ASTERACEAE			
Achillea millefolium L.	349; 465		
Ageratina altissima (L.) King & H. Rob. var. *altissima*	1338; 1340; 2x(s.n.)		
A. aromatica (L.) Spach. var. *aromatica*	546; 1262; 1292; s.n.		
Ambrosia artemisiifolia L.	407; 562; 1058; 1135	✓	

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A. trifida L.	1165; 1180; 1301	✓	
Antennaria plantaginifolia (L.) Richardson	259; 354	✓	
Anthemis arvensis L.	278; 797		
**Arctium minus* Bernh.	1710	✓	
Arnoglossum atriplicifolium (L.) H. Rob.	514; 1447; 1641		
Bidens aristosa (Michx.) Britt.	220; 1168	✓	
B. bipinnata L.	549; 1008; 1181; 1744	✓	
B. frondosa L.	1142		
B. vulgata Greene	1173	✓	
**Carduus nutans* L.	117		Significant
Chrysopsis mariana (L.) Elliot	540; 1303		
**Cichorium intybus* L.	1164; s.n.	✓	Lesser
Cirsium altissimum (L.) Hill	s.n.	✓	
C. discolor (Muhl. ex Willd.) Spreng.	1042	✓	
Conoclinium coelestinum (L.) DC.	1150		
Conyza canadensis (L.) Cronquist var. *canadensis*	1066; 1133		
C. canadensis (L.) Cronquist var. *pusilla* (Nutt.) Cronquist	204; 1072	✓	
C. ramosissima Cronquist	1129	✓	
Coreopsis grandiflora Hogg ex Sweet	1171	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
C. lanceolata L.	1518		
C. major Walter	178; 1269		
C. tripteris L.	1172		
**Crepis pulchra* L.	668; 1462	✓	
Eclipta prostrata (L.) L.	1119; 1291; s.n.	✓	
Elephantopus carolinianus Raeusch.	216; 1035		
E. tomentosus L.	s.n.	✓	
Erechtites hieraciifolia (L.) Raf. ex DC.	1134; 1208; 1228; 1776	✓	
Erigeron annuus (L.) Pers.	706	✓	
E. philadelphicus L.	661; 667; 701; 1390; 1395; 1422		
E. strigosus Muhl. ex Willd. var. *septentrionalis* (Fernald & Wiegand) Fernald	410; 798; 1152; 1238; 1243; 1319	✓	
E. strigosus Muhl. ex Willd. var. *strigosus*	336; 399; 531; 708; 1002; 1204; 1521; 1545	✓	
Eupatoriadelphus fistulosus (Barratt) King & H. Rob.	1174		
Eupatorium capillifolium (Lam.) Small	217; 1311; 1076	✓	
E. hyssopifolium L. var. *hyssopifolium*	222; 1265; 1192; 1210		
E. hyssopifolium L. var. *laciniatum* A. Gray	1151; 1192	✓	
E. perfoliatum L.	1802		
E. purpureum L.	517; 518; 519; 523; 544	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
E. rotundifolium L. var. *rotundifolium*	1263	✓	
E. serotinum Michx.	219; 1041; 1069; 1106; 1127; 1209; 1222; 1247; 1271; 1280; 1296; 1339		
E. sessilifolium L.	1610; 1738; 1749		
Eurybia divaricata (L.) G.L. Nesom	997; 1586; 1665; 1740; 1741; 1766; 1786; 2x(s.n.)	✓	
Fleischmannia incarnata (Walter) King & H. Rob.	1289; s.n.		
Galinsoga quadriradiata Cav.	1774	✓	
Gamochaeta argyrinea Nesom	1372	✓	
G. coarctata (Willd.) Kerguélen	648; 1368	✓**SR!**	
G. purpurea (L.) Cabrera	1414		
G. pensylvanica (Willd.) Cabrera	1014	✓	
Helenium amarum (Raf.) H. Rock	1162; 1526		
H. autumnale L.	s.n.	✓	
H. flexuosum Raf.	1307; 1315; 1732		
Helianthus microcephalus Torr. & A. Gray	1169; 1251; 1692; 1734; 1750; 1762; 1768		
H. tuberosus L.	550	✓	
Heterotheca camporum (Greene) Shinners var. *glandulissimum* Semple	1090; 1166; 1170; 1207; 1333; 1334	✓	
Hieracium gronovii L.	1286; 1308		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
H. paniculatum L.	801	✓	
H. venosum L.	1419; 355; 943		
**Hypochaeris radicata* L.	1562; 1589		
Krigia caespitosa (Raf.) K.L. Chambers	645; 1403	✓	
Lactuca canadensis L.	502; 503; 1001; 1189; 1537	✓	
L. floridana (L.) Gaertn.	1282	✓	
**L. saligna* L.	1200; 1211	✓	
**Leucanthemum vulgare* Lam.	662		Alert
Liatris spicata (L.) Willd.	s.n.		
Packera anonyma (Alph. Wood) W.A. Weber & A. Löve	335; 658; 1411; 1486		
P. obovata (Muhl. ex Willd.) W.A. Weber & A. Löve	251; 598		
Pityopsis graminifolia (Michx.) Nutt. var. *latifolia* (Fernald) Semple & F.D. Bowers	1305	✓	
Prenanthes altissima L.	1283; s.n.		
P. trifoliolata (Cass.) Fernald	1297	✓	
Pseudognaphalium obtusifolium (L.) Hillard & B.L. Burtt ssp. *obtusifolium*	543; 1128; 1193; 1293		
Pyrrhopappus carolinianus (Walter) DC.	1065; 1071; 1157; 1562		
Rudbeckia fulgida Aiton var. *umbrosa* (C.L. Boynt. & Beadle) Cronquist	522; 1670; 1769; 1787	✓	
R. hirta L. var. *hirta*	464		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
R. hirta L. var. *pulcherrima* Farw.	1298	✓	
R. triloba L.	1309	✓	
R. triloba L. var. *pinnatiloba* Torr. & A. Gray **{E-P, SX, GNR}**	1716	✓	
Silphium astericus L. var. *astericus*	1671	✓	
S. astericus L. var. *laevicaule* DC.	1657	✓	
S. astericus L. var. *trifoliatum* (Barratt) E.E. Lamont	201		
S. trifoliatum L. var *trifoliatum*	485; 489; 490; 1648	✓	
Smallanthus uvedalius (L.) Mack. ex Small	200; 1141		
Solidago altissima L.	218; 1156; 1260; 1320; 1331	✓	
S. arguta Aiton var. *caroliniana* A. Gray	1266	✓	
S. bicolor L.	545	✓	
S. caesia L.	1279; 1281; 1738; 1747; 4x(s.n.)		
S. canadensis L.	1105		
S. curtisii Torr. & A. Gray	1256; 1285; 1747, 5x(s.n.)	✓	
S. erecta Pursh	2x(s.n.)		
S. flaccidifolia Small	2x(s.n.)	✓	
S. flexicaulis L.	s.n.		
S. gigantea Aiton	29; 189; 530; 1039		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
S. nemoralis Aiton	541; 2x(s.n.)		
S. odora Aiton var. *odora*	1295; 1304; 3x(s.n.)	✓	
S. roanensis Porter	s.n.	✓	
S. rugosa Ait. var. *aspera* (Aiton) Cronquist	s.n.	✓	
S. speciosa Nutt. var. *rigidiuscula* Torr. & A. Gray	2x(s.n.)		
S. speciosa Nutt. var. *speciosa*	1335	✓	
S. sphacelata Raf.	1756; s.n.	✓	
S. ulmifolia Muhl. Ex Willd.	1261; 1272; 1803	✓	
**Sonchus asper* (L.) Hill	702; 1213; 1404; 1509		
Symphyotrichum cordifolium (L.) G.L. Nesom	2x(s.n.)	✓	
S. laeve (L.) A. Löve & D. Löve var. *laeve*	1332	✓	
S. lateriflorum (L.) A. Löve & D. Löve var. *lateriflorum*	s.n.		
S. lowrieanum (Porter) G. L. Nesom	227; 1342; 1344	✓	
S. oblongifolium (Nutt.) G.L. Nesom	2x(s.n.)	✓	
S. ontarionis (Wiegand) G.L. Nesom	27		
S. patens (Aiton) G.L. Nesom var. *patens*	39; 538; 1225; 1764; s.n.		
S. patens (Aiton) G.L. Nesom var. *gracile* (Hook.) G.L. Nesom	s.n.	✓	
S. pilosum (Willd.) G.L. Nesom var. *pilosum*	1317; 1343; 1345;554; 555		
S. shortii (Lindl.) G.L. Nesom	1294	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
S. undulatum (L.) G.L. Nesom	1267		
S. urophyllum (Lindl.) G.L. Nesom	s.n.	✓	
**Taraxacum laevigatum* (Willd.) DC.	577	✓	
**T. officinale* F.H. Wigg	1609	✓	
**Tragopogon dubius* Scop.	796	✓	Lesser
Verbesina alternifolia (L.) Britton ex Kearney	215; 1220; 1278; 1324; 1325	✓	
V. occidentalis (L.) Walter	1240		
V. virginica L.	214; 536; 1223	✓	
Vernonia flaccidifolia Small	527; 1767		
V. gigantea (Walter) Trel. ssp. *gigantea*	35; 1089; s.n.		
Xanthium strumarium L.	1139	✓	
X. strumarium L. var. *glabratum* (DC.) Cronquist	1321		
BALSAMINACEAE			
Impatiens capensis Meerb.	16		
I. pallida Nutt.	1571; s.n.	✓	
BERBERIDACEAE			
**Nandina domestica* Thunb.	590	✓	Alert
Podophyllum peltatum L.	102; 103; 104; 265		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
BETULACEAE			
Alnus serrulata (Aiton) Willd.	192	✓	
Betula lenta L.	850		
B. nigra L.	865		
Carpinus caroliniana Walter	85; 438; 979; 990; 1434; 1532		
Corylus americana Walter	1033	✓	
Ostrya virginiana (Mill.) K. Koch	412; 486; 712; 989;	✓	
BIGNONIACEAE			
Bignonia capreolata L.	127; 874; 929;	✓	
Campsis radicans (L.) Seem. ex Bureau	414		
Catalpa bignonioides Walter	880	✓	
BORAGINACEAE			
**Buglossoides arvensis* (L.) I.M. Johnston	246; 584; 620		Lesser
Cynoglossum virginianum L.	1695	✓	
Mertensia virginica (L.) Pers. ex Link	611	✓	
BRASSICACEAE			
**Arabidopsis thaliana* (L.) Heynh.	602		
Arabis laevigata (Muhl. ex Willd.) Poir. var. *laevigata*	870	✓	
**Barbarea vulgaris* W.T. Aiton	112; 245; 276		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**Capsella bursa-pastoris* (L.) Medik.	41		
Cardamine angustata O.E. Schulz	75; 268; 280; 586; 610		
C. bulbosa (Schreb. ex Muhl.) Britton, Sterns & Poggenb.	92	✓	
C. concatenata (Michx.) Sw.	86; 1364		
C. diphylla (Michx.) Alph. Wood	s.n.	✓	
C. dissecta (Leavenworth) Al-Shehbaz	76; 77		
**C. hirsuta* L.	238; 1354		
Draba brachycarpa Nutt. ex Torr. & A. Gray	1356	✓	
**D. verna* L.	604	✓	
Lepidium densiflorum Schrad.	1199	✓	
**Raphanus sativus* L.	275	✓	
Rorippa palustris (L.) Besser ssp. *fernaldiana* (Butters & Abbe) Jonsell	1723; s.n.		
**Sisymbrium officinale* (L.) Scop.	116; 689	✓	
**Thlaspi arvense* L.	608; 619	✓	
T. perfoliatum L.	247; 609	✓	
CALYCANTHACEAE			
Calycanthus floridus L. var. *floridus*	274; 365; 374; 771		
CAMPANULACEAE			
Campanula divaricata Michx.	1614; 1736	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Campanulastrum americanum (L.) Small	194; 509; 1013		
Lobelia cardinalis L.	13; 1796		
L. inflata L.	187; 510; 1638; 1669; 1779		
L. puberula Michx.	15; 1253; 1346; 2x(s.n.)		
L. siphilitica L.	202; 1299		
Triodanis biflora (Ruiz & Pav.) Greene	1454; 1468	✓	
T. perfoliata (L.) Nieuwl.	690; 1455; 1498		
CANNABACEAE			
Cannabis sativa L.	221	✓	
CAPPARACEAE			
Cleome hassleriana Chod.	1177	✓	
CAPRIFOLIACEAE			
Lonicera japonica Thunb.	588; 685	✓	Severe
L. sempervirens L.	363	✓	
Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli	466; 752	✓	
Symphoricarpos orbiculatus Moench	s.n.		
Viburnum acerifolium L.	367; 718; 1417; 1623		
V. prunifolium L.	954; 1023	✓	
V. rufidulum Raf.	630; 760; 827; 1433; 1568	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
CARYOPHYLACEAE			
**Arenaria serpyllifolia* L.	631; 1371		
**Cerastium glomeratum* Thuill.	634; 1360	✓	
**Dianthus armeria* L.	964		
Paronychia canadensis (L.) Alph. Wood	1627	✓	
Silene latifolia Poir. ssp. *alba* (Mill.) Greuter & Burdet	379; 384	✓	
S. stellata (L.) W.T. Aiton	1612; 1759; 1760		
S. virginica L.	1415		
Stellaria corei Shinners	81; 82	✓	
**S. media* (L.) Vill. ssp. *media*	572; 573; 605; 1361	✓	
**S. media* (L.) Vill. ssp. *pallida* (Dumort.) Asch. & Graebn.	1358	✓	
**S. graminea* L.	683	✓	
S. pubera Michx.	252; 632; 1363	✓	
CELASTRACEAE			
**Euonymus alatus* (Thunb.) Siebold	298	✓	Lesser
E. americanus L.	382; 542; 764		
E. obovatus Nutt.	686	✓	
CHENOPODIACEAE			
**Chenopodium album* L. var. *album*	1185	✓	

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**C. ambrosioides* L.	1237; 1328; s.n.	✓	
CISTACEAE			
Lechea racemulosa Michx.	1644	✓	
CLUSIACEAE			
Hypericum densiflorum Pursh	999	✓	
H. drummondii (Grev. & Hook.) Torr. & A. Gray	1050; 1060	✓	
H. gentianoides (L.) Britton, Sterns & Poggenb.	1190; 1302	✓	
H. hypericoides (L.) Crantz ssp. *hypericoides*	1727	✓	
H. hypericoides (L.) Crantz ssp. *multicaule* (Michx. ex Willd.) Robson	559; 1057; 1084; 1577; 1682; s.n.		
H. mutilum L.	183; 1724	✓	
H. punctatum Lam.	507; 511; 734; 1124; 1591; 1642; 1673; 1680; 1688; 1704		
CONVOLVULACEAE			
Calystegia sepium (L.) R. Br.	1236	✓	
**Ipomoea coccinea* L.	1217	✓	
**I. hederacea* Jacq.	1003; 1178; 1224	✓	
I. lacunosa L.	1176; 1179; 1784	✓	
I. pandurata (L.) G. Mey.	513; 1034	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
CORNACEAE			
Cornus amomum Mill.	18; 303; 347; 445		
C. florida L.	271; 714; 733	✓	
C. foemina Mill.	19		
Nyssa sylvatica Marsh.	723; 761; 783; 857; 896; 906	✓	
CRASSULACEAE			
Sedum ternatum Michx.	295; 917		
CUCURBITACEAE			
Melothria pendula L.	534	✓	
Sicyos angulatus L.	1218	✓	
EBENACEAE			
Diospyros virginiana L.	441	✓	
ELAEAGNACEAE			
**Elaeagnus pungens* Thunb.	1731	✓	Significant
**E. umbellata* Thunb.	88; 1379	✓	Severe
ERICACEAE			
Kalmia latifolia L.	51; 383; 1807		
Oxydendrum arboreum (L.) DC.	725; 858	✓	
Rhododendron canescens (Michx.) Sweet	306		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Vaccinium angustifolium Aiton	741	✓**SR!**	
V. arboreum Marsh.	429; 719; 782; 903; 938; 941	✓	
V. corymbosum L.	368; 781; 1026		
V. pallidum Aiton	939; 1027	✓	
V. stamineum L.	1025	✓	
EUPHORBIACEAE			
Acalypha gracilens A. Gray	1074; 1191	✓	
A. ostryifolia Riddell	1214; 1219	✓	
A. rhomboidea Raf.	1233; 1776		
A. virginica L.	1103; 1234	✓	
Chamaesyce humistrata (Engelm. ex A. Gray) Small	1154	✓	
C. nutans (Lag.) Small	1053; 1104; 1146; 1206	✓	
C. prostrata (Aiton) Small	1147	✓	
Croton glandulosus L.	1313	✓	
C. monanthogynus Michx.	1221; 1781		
C. willdenowii G.L. Webster	1086	✓	
Euphorbia corollata L.	197; 361; 1737		
E. dentata Michx.	196; 1100; 1159; 1184; 1783; s.n.	✓	
E. mercurialina Michx.	266		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
FABACEAE			
**Albizia julibrissin* Durazz.	483	✓	Severe
Amorpha fruticosa L.	346	✓	
Amphicarpaea bracteata (L.) Fernald	203; 1763	✓	
Apios americana Medik.	188; 1800		
Centrosema virginianum (L.) Benth.	22		
Cercis canadensis L.	272; 707	✓	
Chamaecrista fasciculata (Michx.) Greene var. *fasciculata*	1091	✓	
C. nictitans (L.) Moench ssp. *nictitans* var. *nictitans*	1757	✓	
**Coronilla varia* L.	398		Alert
**Cytisus scoparius* (L.) Link	195		
Desmodium glutinosum (Muhl. ex Willd.) Alph. Wood	418	✓	
D. nudiflorum (L.) DC.	482		
D. nuttallii (Schindl.) B.G. Schub.	s.n.		
D. paniculatum (L.) DC. var. *paniculatum*	1277; 1797	✓	
D. pauciflorum (Nutt.) DC.	1694	✓	
D. rotundifolium DC.	975	✓	
Galactia volubilis (L.) Britton	1687; 1798	✓	
**Kummerowia striata* (Thunb.) Schindl.	1044; 1075	✓	Alert

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**Lathyrus hirsutus* L.	143, 861	✓	
**Lespedeza bicolor* Turcz.	1270		Severe
**L. cuneata* (Dum. Cours.) G. Don	1097	✓	Severe
L. frutescens (L.) Hornem.	1255; 1765		
L. hirta (L.) Hornem.	1306	✓	
L. procumbens Michx.	1083; 1094; 1202; 1739; 1761		
L. violacea (L.) Pers.	1683	✓	
L. virginica (L.) Britton	1198	✓	
**Medicago sativa* L.	860; 962; 1004	✓	
Melilotus officinalis (L.) Lam.	471; 1205	✓	
Mimosa microphylla Dryand.	1188		
Pueraria montana (Lour.) Merr. var. *lobata* (Willd.) Maesen & S. Almeida	s.n.		Severe
Robinia pseudoacacia L.	1388; 1566	✓	
Senna marilandica (L.) Link	533	✓	
S. obtusifolia (L.) Irwin & Barneby	1068; 1248	✓	
Strophostyles helvola (L.) Elliot	1096	✓	
Tephrosia spicata (Walter) Torr. & A. Gray	1554	✓	
**Trifolium campestre* Schreb.	322; 652; 831; 1055; 1512		
**T. dubium* Sibth.	1373	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**T. incarnatum* L.	101	✓	
**T. pratense* L.	343; 679; 1163; 1386		
**T. repens* L.	421		
Vicia caroliniana Walter	633		
**V. grandiflora* Scop.	698	✓	
**V. sativa* L. ssp. *nigra* (L.) Ehrh.	671		
**V. tetrasperma* (L.) Schreber	124	✓	
**V. villosa* Roth ssp. *varia* (Host) Corb.	699	✓	
FAGACEAE			
Castanea dentata (Marsh.) Borkh. **{S, S2S3, G4}**	373; 853; 957; s.n.	✓	
Fagus grandifolia Ehrh.	228; 294		
Quercus alba L.	375; 807; 969; 977; 2x(s.n.)	✓	
Q. coccinea Münchh.	4x(s.n.)		
Q. falcata Michx.	789; 892; 908; 1230	✓	
Q. michauxii Nutt.	453; 878		
Q. muehlenbergii Engelm.	s.n.		
Q. nigra L.	223; 224; s.n.		
Q. pagoda Raf.	s.n.		
Q. phellos L.	28		

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Q. prinus L.	814; 945; 1580; s.n.	✓	
Q. rubra L.	927; 978; 1010; 1672; s.n.	✓	
Q. shumardii Buckley	3x(s.n.)		
Q. stellata Wangenh.	895; 1314; 4x(s.n.)	✓	
Q. velutina Lam.	3x(s.n.)	✓	
FUMARIACEAE			
Corydalis flavula (Raf.) DC.	614	✓	
GERANIACEAE			
Geranium bicknellii Britton	1375	✓	
G. carolinianum L.	651; 674	✓	
G. dissectum L.	277	✓	
G. maculatum L.	290; 768		
GROSSULARIACEAE			
Itea virginica L.	s.n.	✓	
Ribes curvatum Small **{T, S1, G4}**	1635	✓	
HAMAMELIDACEAE			
Hamamelis virginiana L.	372; 638; 1448; s.n.	✓	
Liquidamber styraciflua L.	230; 231	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
HIPPOCASTANACEAE			
Aesculus flava Soland.	1569; 1661		
A. pavia L.	263; 1365		
A. sylvatica Bartram	264		
HYDRANGEACEAE			
Hydrangea cinerea Small	193; 357; 484; 525; 836; 907; 912	✓	
Philadelphus hirsutus Nutt.	952; 1603	✓	
P. pubescens Loisel. var. *pubescens*	1032	✓	
HYDROPHYLLACEAE			
Phacelia bipinnatifida Michx.	83; 84; 260		
JUGLANDACEAE			
Carya alba (L.) Nutt.	548; 715; 1678; s.n.	✓	
C. aquatica (Michx. f.) Nutt.	559	✓	
C. carolinae-septentrionalis (Ashe) Engl. & Graebn.	1677	✓	
C. cordiformis (Wang.) K. Koch	765; 877; 2x(s.n.)		
C. glabra (Mill.) Sweet	1529; 1578; 1579; 1593	✓	
C. ovalis (Wagenh.) Sarg.	966	✓	
Juglans nigra L.	235; 437; 899	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
LAMIACEAE			
Collinsonia canadensis L.	1341; 1794		
C. tuberosa Michx.	s.n.		
Cunila origanoides (L.) Britton	948; 1018	✓	
**Glechoma hederacea* L.	576	✓	Significant
Hedeoma pulegioides (L.) Pers.	1752; 1782; s.n.	✓	
**Lamium amplexicaule* L.	42		
**L. purpureum* L.	56	✓	
Lycopus virginicus L.	1123; 1138; s.n.		
Monarda fistulosa L.	884		
**Mosla dianthera* (Buch.-Ham. ex Roxb.) Maxim.	1073; 1254		
**Perilla frutescens* (L.) Britton	1227; 1326		
Prunella vulgaris L.	186; 526; 1770	✓	
Pycnanthemum pycnanthemoides (Leavenworth) Fernald var. *pycnanthemoides*	199; 1647; 2x(s.n.)	✓	
Salvia lyrata L.	657; 1389		
Scutellaria elliptica Muhl. var. *hirsuta* (Short & Peter) Fernald	458; 819; 842; 1519	✓	
S. integrifolia L.	150; 402	✓	
S. montana Chapm. **{T, LT, S2, G3}**	377		
S. ovata Hill	980		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Teucrium canadense L.	474; 1093; 1102; 1322		
Trichostema brachiatum L.	1183		
T. dichotomum L.	1187	✓	
LAURACEAE			
Lindera benzoin (L.) Blume	450; 986; 1353	✓	
Sassafras albidum (Nutt.) Nees	370; 417; 628	✓	
LOGANIACEAE			
Polypremum procumbens L.	1588	✓	
Spigelia marilandica (L.) L.	460; 823		
MAGNOLIACEAE			
Liriodendron tulipifera L.	436; 774	✓	
Magnolia acuminata (L.) L.	451; 755; 824; s.n.	✓	
M. grandiflora L.	270	✓	
MALVACEAE			
Anoda cristata (L.) Schltdl	213	✓	
Sida rhombifolia L.	30; 1318		
S. spinosa L.	1045; 1161	✓	
MELASTOMATACEAE			
Rhexia mariana L. var. *mariana*	185; 1801		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
MENISPERMACEAE			
Calycocarpum lyonii (Pursh) A. Gray	2x(s.n.)	✓	
Cocculus carolinus (L.) DC.	38; 535		
MORACEAE			
**Fatoua villosa* (Thunb.) Nakai	s.n.	✓	
**Morus alba* L.	1530	✓	
M. rubra L.	31; 681; 808; 898; 1416		
OLEACEAE			
Chionanthus virginicus L.	1599		
Fraxinus americana L.	894; 935	✓	
F. pennsylvanica Marsh.	444; 497; 847	✓	
**Ligustrum sinense* Lour.	236; 700; s.n.		Severe
ONAGRACEAE			
Ludwigia alternifolia L.	1120; 1645; 1650; 1773		
L. palustris (L.) Elliot	1720	✓	
Oenothera biennis L.	226; 1087; 1197	✓	
O. laciniata Hill	310	✓	
O. parviflora L. **{S, S1, G4}**	1201; s.n.	✓	
O. speciosa Nutt.	1555	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
OROBANCHACEAE			
Orobanche uniflora L.	296	✓	
OXALIDACEAE			
Oxalis dillenii Jacq.	1778	✓	
O. stricta L.	1125		
O. violacea L.	269	✓	
PAPAVERACEAE			
Sanguinaria canadensis L.	74; 1666		
PASSIFLORACEAE			
Passiflora incarnata L.	11; 468; 469;	✓	
P. lutea L.	988		
PHYTOLACCACEAE			
Phytolacca americana L.	476		
PLANTAGINACEAE			
Plantago aristata Michx.	401; 1440	✓	
**P. lanceolata* L.	313; 649	✓	
**P. major* L.	1795	✓	
P. rugelii Decne.	413; 1099; 4x(s.n.)	✓	
P. virginica L.	646; 650; 778; 1369		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
PLATANACEAE			
Platanus occidentalis L.	348	✓	
POLEMONIACEAE			
Phlox amplifolia Britton	1605	✓	
P. carolina L.	1662	✓	
P. divaricata L.	80; 250		
P. glaberrima L.	360		
P. maculata L.	1444	✓	
P. paniculata L.	984	✓	
POLYGONACEAE			
**Polygonum cespitosum* Blume var. *longisetum* (Bruijn) A.N. Steward	24; 25; 500; 1046; 1203; 1290; 1300; 1785		Significant
P. erectum L.	1556	✓	
**P. hydropiper* L.	1143	✓	
P. hydropiperiodes Michx.	1137		
P. pensylvanicum L.	12; 1155; 1167		
**P. persicaria* L.	961	✓	Significant
P. punctatum Elliot var. *punctatum*	26; 1232; 1288		
P. scandens L. var. *cristatum* (Engelm. & A. Gray) Gleason	1743; s.n.	✓	
P. scandens L. var. *scandens*	1249	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
P. setaceum Baldw.	s.n.	✓	
P. virginianum L.	1698	✓	
**Rumex acetosella* L.	339; 653; 1617		
R. altissimus Alph. Wood	498; 1473	✓	
**R. conglomeratus* Murray	499	✓	
R. verticillatus L.	409; 675; 1495	✓	
PORTULACACEAE			
Claytonia virginica L.	58; 59		
PRIMULACEAE			
Lysimachia tonsa (Alph. Wood) Alph. Wood ex Pax & R. Knuth	970; 1538; 1543		
PYROLACEAE			
Chimaphila maculata (L.) Pursh	240; 804; s.n.		
RANUNCULACEAE			
Actaea racemosa L. var. *racemosa*	813; 1607	✓	
Anemone quinquefolia L.	1451	✓	
A. virginiana L.	515; 529; 1751		
Clematis virginiana L.	1658	✓	
Hepatica nobilis Schreb. var. *acuta* (Pursh) Steyerm.	78; 934		
**Ranunculus acris* L.	495	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**R. bulbosus* L.	43	✓	Lesser
R. recurvatus Poir.	867	✓	
**R. sardous* Crantz	695; 1399; 1406; 1456; 1459; 1481; 1496		
Thalictrum thalictroides (L.) Eames & B. Boivin	79; 253; 281; 587; 639		
Xanthorhiza simplicissima Marsh.	845; 1792		
RHAMNACEAE			
Ceanothus americanus L.	885		
Frangula caroliniana (Walter) A. Gray	552; 713; 812; 1625		
ROSACEAE			
Agrimonia rostellata Wallr.	1623	✓	
Aruncus dioicus (Walter) Fernald	776		
Crataegus intricata Lange	308; 1690	✓	
C. pruinosa (Wendl. f.) K. Koch	1621	✓	
C. succulenta Schrad. ex Link	1757	✓**SR!**	
**Duchesnea indica* (Andrews) Focke	688; 1409	✓	
Geum canadense Jacq.	886; 1619; 1696; 1714	✓	
G. virginianum L.	455; 512; 1746	✓	
Gillenia stipulata (Muhl. ex Willd.) Baill.	353		
G. trifoliata (L.) Moench	362		

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
**Malus pumila* Mill.	309	✓	
Physocarpus opulifolius (L.) Maxim., orth. cons.	640	✓	
Potentilla canadensis L.	262		
P. norvegica L.	1649	✓	
**P. recta* L.	341	✓	
P. simplex Michx.	s.n.	✓	
Prunus angustifolia Marsh.	579; 600	✓	
P. munsoniana W. Wight & Hedrick	580; 1520	✓	
P. serotina Ehrh.	301	✓	
**Pyrus communis* L.	254; 578; 2x(s.n.)	✓	
Rosa carolina L.	772; 1547; 1742	✓	
**R. multiflora* Thunb.	120; 311; 462		Severe
R. palustris Marsh.	32; 169; 882		
R. setigera Michx.	404	✓	
Rubus argutus Link	128; 394; 722; 739; 1418; 1646		
R. flagellaris Willd.	1594	✓	
R. occidentalis L.	746; 1347; 1608	✓	
**R. phoenicolasius* Maxim.	163; 426	✓	Lesser
**Spiraea japonica* L.f.	452; 1527		Significant

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
RUBIACEAE			
Cephalanthus occidentalis L.	1564		
Diodia teres Walter	1040; 1051	✓	
D. virginiana L.	184	✓	
Galium aparine L.	676; 1367; 1385	✓	
G. circaezans Michx.	720	✓	
G. lanceolatum Torr.	757	✓	
G. mollugo L.	395	✓	
**G. pedemontana* (Bellardi) Ehrend.	1402	✓	
G. pilosum Aiton	1592		
Houstonia caerulea L.	90; 1453		
H. canadensis Willd. ex Roem. & Schult.	703; 736	✓	
H. purpurea L. var. *purpurea*	359; 766; 1616	✓	
H. pusilla Schoepf	69; 70; 704; 1355; 1357	✓	
Mitchella repens L.	378; 567	✓	
**Sherardia arvensis* L.	644; 1370; 1400		
SALICACEAE			
**Populus alba* L.	400	✓	Significant
P. deltoides Bartram ex Marsh.	1660	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Salix caroliniana Michx.	1175	✓	
S. eriocephala Michx.	1276	✓	
S. nigra Marsh.	190; 191; 1275	✓	
SAPINDACEAE			
**Cardiospermum halicacabum* L.	1131	✓	Lesser
SAPOTACEAE			
Sideroxylon lycioides L.	879; 1667; 1675; 1679		
SAURURACEAE			
Saururus cernuus L.	995	✓	
SAXIFRAGACEAE			
Astilbe biternata (Vent.) Britton	775	✓	
Heuchera americana L.	307; 356; 918		
H. villosa Michx. var. *villosa*	1613	✓	
Saxifraga virginiensis Michx.	249	✓	
Tiarella cordifolia L.	293; 754; 982	✓	
SCROPHULARIACEAE			
Agalinis obtusifolia L.	1252; 1264	✓	
A. purpurea (L.) Pennell	561	✓	
Aureolaria virginica (L.) Pennell	1630; 1684	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Chelone glabra L.	s.n.	✓	
Mecardonia acuminata (Walter) Small	1115; 2x(s.n.)		
Mimulus alatus Aiton	20; 1772		
Nuttallanthus canadensis (L.) D.L. Sutton	110		
**Paulownia tomentosa* (Thunb.) Siebold & Zucc. ex Steud.	976; 1407	✓	Severe
Penstemon calycosus Small	147; 403	✓	
Penstemon canescens (Britton) Britton	312; 732		
P. pallidus Small	358; 779	✓	
**Verbascum blattaria* L.	430	✓	
**V. thapsus* L.	508	✓	Significant
**Veronica arvensis* L.	606; 629	✓	
**V. hederifolia* L.	618		
**V. persica* Poir.	575; 1352; 1374		
SIMAROUBACEAE			
**Ailanthus altissima* (Mill) Swingle	477; 1007	✓	Severe
SOLANACEAE			
**Nicandra physalodes* (L.) Scop.	23		
Physalis longifolia Nutt. var. *sublabrata* (Mack. & Bush) Cronquist	17; 1101; 1323		
P. pubescens L. var. *integrifolia* (Dunal) Waterf.	1775	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
Solanum carolinense L.	406; 1149	✓	
S. ptychanthum Dunal	1126	✓	
STAPHYLEACEAE			
Staphylea trifolia L.	985	✓	
THEACEAE			
Stewartia ovata (Cav.) Weath.	791		
THYMELAEACEAE			
Dirca palustris L.	641	✓	
TILIACEAE			
Tilia americana L. var. *americana*	926	✓	
T. americana L var. *heterophylla* (Vent.) Loudon	411	✓	
ULMACEAE			
Celtis laevigata Willd.	442; 443; 446		
C. occidentalis L.	900	✓	
C. tenuifolia Nutt.	873; 1674	✓	
Ulmus alata Michx.	300; 428; 1693; 585; 1017; 1029; 1443; 1567; 1693	✓	
U. americana L.	581; 615	✓	

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Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
U. rubra Muhl.	750; 859; 901; 963; 1636; 1006	✓	
U. thomasii Sarg.	1534	✓	
URTICACEAE			
Boehmeria cylindrica (L.) Sw.	472; 1116; 1140		
Laportea canadensis (L.) Weddell	909; 1663	✓	
Pilea pumila (L.) A. Gray	1215	✓	
VALERIANACEAE			
Valerianella locusta (L.) Lat.	642	✓	
V. radiata (L.) Dufr.	1387; 669		
VERBENACEAE			
Callicarpa americana L.	481; 971; s.n.		
Phryma leptostachya L.	920; 981; 1699		
Verbena scabra Vahl	893	✓**SR!**	
V. simplex Lehm.	506; 1242		
V. urticifolia L.	1108; 1241; 1327; 1651	✓	
VIOLACEAE			
Viola bicolor Pursh	68; 248		
V. cucullata Aiton	595	✓	
V. hirsutula Brainerd	261	✓	

Species Checklist for A Contribution to the Vascular Flora of the Sequatchie Valley within Sequatchie County, Tennessee			
Taxa	**Accession No.**	**County Record**	**TN-EPPC Invasive Threat Rank**
V. x *palmata* L. (pro. sp.) [*brittoniana* or *pedatifida* x *affinis* or *sororia*]	1016	✓	
V. rostrata Pursh	279	✓	
V. sororia Willd.	91; 93	✓	
V. triloba Schwein. var. *triloba*	273	✓	
VISCACEAE			
Phoradendron leucarpum (Raf.) Reveal & M. C. Johnst.	582	✓	
VITACEAE			
Ampelopsis cordata Michx.	447; 914; 1640	✓	
Parthenocissus quinquefolia (L.) Planch.	416	✓	
Vitis aestivalis Michx. var. *aestivalis*	786; 825; 1602; 1626	✓	
V. aestivalis Michx. var. *bicolor* Deam	351	✓	
V. cinerea (Engelm.) Engelm. ex Millard	1676	✓	
V. palmata Vahl	967	✓	
V. rotundifolia Michx.	371; 459; 790; 868; 915	✓	
V. vulpina L.	916		

VITA

For John R. Evans

John R. Evans was born in Camden, New Jersey and spent most of his childhood living with his mother and grandparents in nearby Pennsauken. His fascination with plants and wildlife began at the age of four, exploring in his grandmother's opulent garden and sneaking off on adventures into the nearby woods. Both cultivated and indigenous plants aroused his curiosity about the natural world and instilled a love of science that has endured to this day. His fascination with evolutionary concepts began before the age of ten, and he spent many hours that would otherwise have been devoted to television imagining the world of both the ancestors and the descendants of the life forms he encountered.

At the age of 16, John and his family to moved to Hawaii. Although reluctant to leave his cherished grandparents, Hawaii deepened his love of both the plant and marine worlds. However, John turned down the opportunity to study marine biology at the University of Hawaii to move to Chattanooga and attend a well-known Baptist University. Unfortunately, his experience there only created a rift between his passion for knowledge of the physical world and his search for spirituality. Disillusioned, John dropped out from university studies and took a delivery job with a local optical company.

Throughout the course of rising to the position of senior optician and vice president of laboratory operations in the multi-state company, John's love of science and nature never wavered. Frustrated, he left his career of sixteen years and returned to school. His experiences at Chattanooga State Technical Community College (CSTCC) were much more positive than his first encounter with college studies. He excelled in the A.S. Honor's program, not only conducting a biological inventory of the wetlands surrounding the Chattanooga State campus, but also designing, writing, and teaching a physics lab session on magnetism in which he employed the use of state-of-the-art data-sensing and recording technology.

In 2002, John graduated from CSTCC with a 4.0 GPA. Not only did he win the Awards for Excellence in Biology, Physics, and Math and Science but also taking the President's Award for Academic Excellence. John also became the first student in the state of Tennessee to win the prestigious Morris K. Udall Scholarship, placing him with cohorts from such institutions as Yale, Harvard, Princeton, Cornell, and Berkeley.

Because of the Udall Scholarship, John was personally recruited by Thomas Broadhead, Director of the University of Tennessee, Knoxville Honors Program. He was offered the Frederick T. Bonham, Col. S. H. Lockett, and Fred M. Roddy scholarships as additional support to continue his studies. The combination of all four of these scholarships provided John with $10, 000 of support for his first year at The University of Tennessee. He went on to receive all four scholarships the following year.

In April of 2004 John was the First Place Winner at the University of Tennessee, Knoxville's Exhibition of Undergraduate Research and Creative Achievement for his 2003 research, Identification and Comparison of the Pollinators for the Purple-fringed Orchids *Plantanthera psycodes* and *P. grandiflora.* At the same event, this research also won the Award of Excellence from the College of Arts and Sciences, the Award of Excellence for the Natural Sciences Division, and the Phi Kappa Phi Honor Society Award of Excellence.

John currently lives with his wife and youngest son in Dunlap, Tennessee, and is looking forward to further investigating the vascular flora of the Sequatchie Valley and future investigations in biogeography and pollination ecology.