

THE PLANT COMMUNITIES AND VASCULAR PLANTS OF CROFT STATE PARK

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Abstract

This report is submitted in compliance with the terms of a contract dated 2 February 1989, between the South Carolina Department of Parks Recreation and Tourism and Robert W. Powell, Jr., to investigate aspects of the natural history of Croft State Park, Spartanburg County, South Carolina.

Specifically, the following are reported:

- I. Introduction
- II. A delineation of the climax and successional communities on a topographical map and a brief description of each.
- III. A listing of the vascular flora with map locations of county records, endangered and threatened species, and unusually large trees of championship caliber.
- IV. Map locations of old home-sites, archaeological sites, and cemeteries.
- V. A comparison of the relative abundance of selected, significant natural communities of the Park to the relative abundance of the same communities elsewhere in the State with comments on future preservation needs.
- VI. A list of recommendations and map locations for existing Park areas to be preserved and adjacent outside areas that should be acquired.
- VII. Comments on the geology, fauna, and non-vascular flora, with recommendations for future investigations.
- VIII. References Cited.
- IX. Acknowledgements
- X. Appendices

I. Introduction

This investigation was conducted during the late winter, spring, and early summer of 1989, while the author was on sabbatical leave from Converse College. Further support was furnished by PRT to allow the participation of a team of investigators and field assistants coordinated by the author. Participants are listed below under Acknowledgements.

The Park was surveyed and photographed from the air from small fixed-wing aircraft and helicopter which was followed by ground survey and collecting. Voucher specimens are on file in the Converse College Herbarium. Although most of the Park was surveyed, time did not allow



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for a thorough coverage. Therefore, this study should be regarded as a beginning effort in the inventory of the biota of the Park.

Croft State Park, consisting of 7,088 acres and located southeast and almost adjacent to the city of Spartanburg, S. C., came into being soon after the end of World War II. It was formed from lands acquired by the United States Government in 1941 to establish Camp Croft, an infantry training base of about 18,000 acres. Camp Croft was closed about four years after it was built.

Most of the Park was formed from the "back country" of Camp Croft which was used for the gunnery range, bivouac, and other field exercises. Prior to the establishment of Camp Croft, Park lands mainly were small farms, pastures, and woodlots.

The Park, therefore, must be described and interpreted with these recent uses in mind. It is a mosaic of mature upland, cove, and bottomland hardwoods, old fields with almost fifty years of succession, a mixture of pines and hardwoods, and small miscellaneous communities. Old homesites and relics of the military abound.

However, since nature has had about fifty years to heal the scars of war and farming, most of the Park is well on the way back to climax hardwoods that typify the Piedmont of the Carolinas.

Geologically, the Park is underlain by schists and gneisses which over geologic time have produced the typical, rolling and hilly Piedmont topography with occasional outcroppings and varied soil types. Two major streams traverse the Park, Fairforest Creek and Kelsey Creek, with numerous small spring-fed tributaries. Unfortunately, the watersheds of all these major streams do not lie entirely within the bounds of the Park, and a considerable portion of the watershed is urban with the resulting pollution. Kelsey Creek, the smaller of the two major water-courses, feeds Lake Craig, and a tributary of Kelsey, Thompson Creek, feeds Lake Johnson.

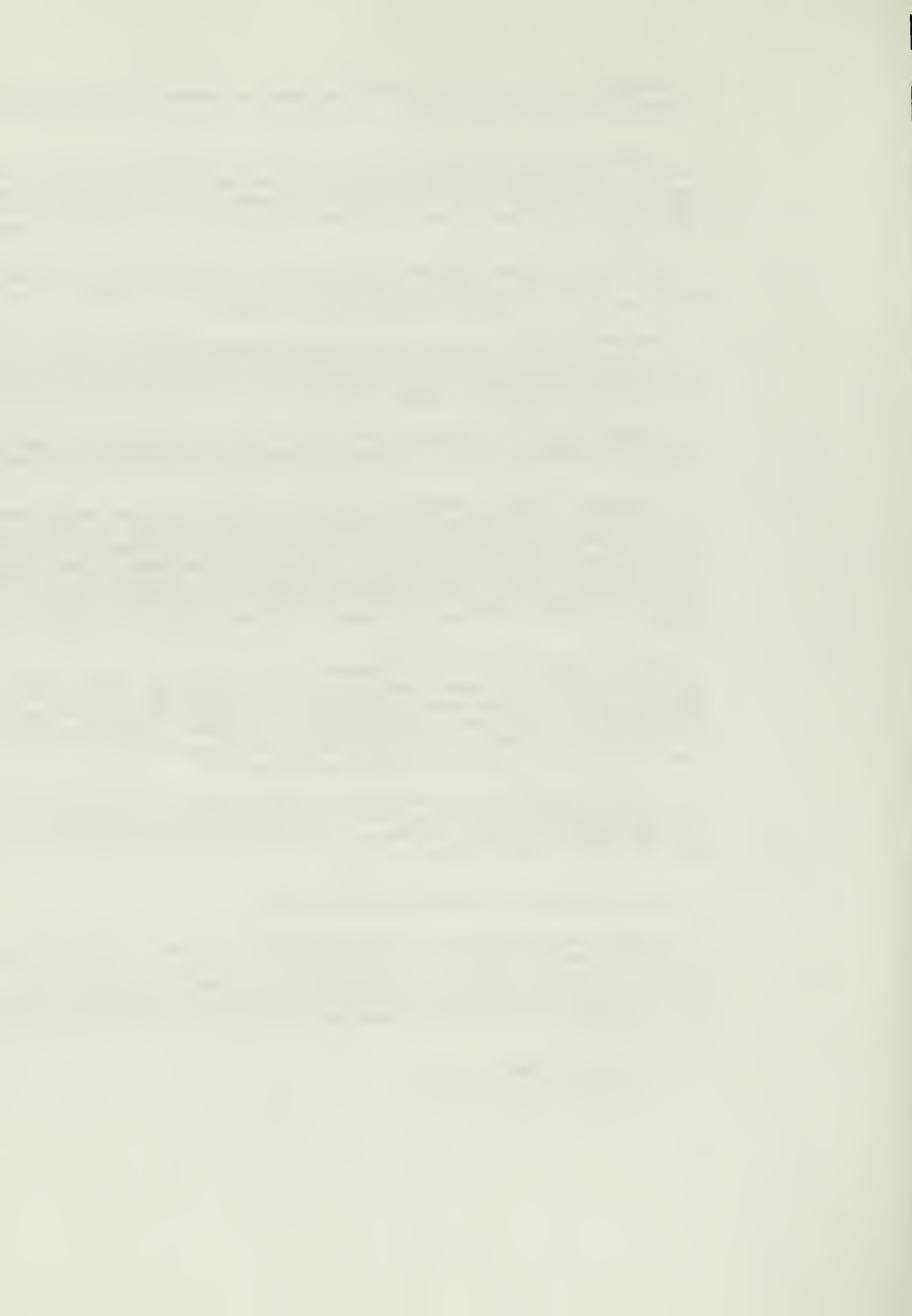
Local non-park government facilities located on Park lands are the main Spartanburg County landfill, the SC ETV transmission tower for Channel 49, a training area for a U. S. Marine Reserve ammunition transport unit, and a regional S. C. Forestry Commission headquarters and service shop. The S. C. Wildlife and Marine Resources Department manages Lake Johnson and the immediate surroundings as a fishing and wildlife area and also manages a state-of-the-arts rifle range in the southern part of the Park.

Of historical interest on Park lands are several old mill sites with some remnants still in place, Whitestone Springs with the adjacent hotel and bottling house sites, the Colonel Thompson Monument, numerous cemeteries, an old surface gold mine, and several archaeological sites including one recently registered.

II. Plant Communities and Characteristic Vascular Species

Proposed classifications of the natural communities of the Piedmont of the Carolinas are numerous (Radford, et al., 1981; Barry, 1980; Nelson, 1986; Batson, 1989). Much thought was given to the best way to describe Croft State Park, and a conservative, workable scheme was selected. Plant species are named herein according to the taxonomic nomenclature of Radford, Ahles, and Bell, 1968, unless otherwise specified. The communities of the Park in approximate order of abundance are:

- A. Old-field Pines
- B. Mixed Pine and Hardwoods
- C. Upland Hardwoods



- D. Cove Hardwoods
- E. Bottomland Hardwoods
- F. Mountain Laurel Bluffs

Though not natural, pine plantations are included on the map and rank closely after Bottomland Hardwoods in extent.

A. Old-field Pines

This community was expected to be the most extensive since much, if not most, of present Park lands were under cultivation when Camp Croft was established. The classic description of old-field succession in the Piedmont (Oosting 1942) is much in evidence. Old-field pines occupy the drier as well as the tillable hilltops and hillsides. Dominant species are the native *Pinus virginiana* and *P. echinata*. After about fifty years of successional growth, however, just about any of the hardwood species of the Upland Hardwoods community can be found somewhere in the understory; and frequently, many from the Cove Hardwoods. Other common woody species are *Buonymous americana*, the plums (*Prunus* spp.), *Vaccinium* spp., especially *V. arboreum* on hilltops; vines (*Lonicera japonica*, *L. sempervirens*, *Vitis rotundifolia*, *Clitoria mariana*, *Campsis radicans*, and *Rhus radicans*); *Pteridium aquilinum*; grasses; a multitude of forbs including *Chimaphila maculata*; and in at least one place, a large population of *Cypripedium acaule*.

B. Mixed Pine and Hardwoods

This community is difficult to distinguish from Old-field Pines, but an attempt is made on the basis of age. This group theoretically was old fields already well into succession at the time Camp Croft was established. Species composition is about the same as Old-field Pines, although the hardwoods and other woody plants are considerably larger, and the ground cover more abundant and diverse.

C. Upland Hardwoods

This community is dominated by oaks and hickories with a long list of subordinate canopy species. Upland Hardwoods, with the Cove Hardwood community, represent the least-disturbed natural communities in the Park. No virgin areas were found, but the closest to climax, mature forest are these two communities. Trees 2-3' d.b.h. are common, and some of the best diversity of the understory, shrubs, and ground cover is found here.

Among the oaks in the Upland Hardwoods community, *Quercus alba*, *Q. falcata*, *Q. velutina*, *Q. stellata*, *Q. rubra*, and *Q. nigra* are the most common. Among the hickories, *Carya tomentosa* and *C. glabra* are the most abundant. Other canopy species found throughout are *Liriodendron tulipifera*, *Ulmus alata*, *Liquidambar styraciflua*, *Prunus serotina*, *Fraxinus americana*, and *Diospyros virginiana*.

Understory species found in abundance are *Acer rubrum*, *Ilex opaca*, *Cercis canadensis* (a good indicator species of circumneutral soils), *Morus rubra*, *Sassafras albidum*, *Cornus florida*, and *Oxydendrum arboreum*.

Common shrub species are *Vaccinium arboreum*, *V. vacillans*, *Buonymous americanus*, *Asimina parviflora*, *Crataegus* spp., *Rhus copallina*, *Calycanthus floridus*, and *Rhamnus caroliniana*.

Characteristic vines found are *Vitis rotundifolia*, *Smilax glauca*, *Gelsemium sempervirens*, and *Lonicera sempervirens*.

Examples of common ground cover are *Pteridium aquilinum*, *Aristolochia serpentaria*, *Panicum boscii*, *Luzula multiflora*, *Desmodium rotundifolium*, *Euphorbia corollata*, *Hieracium venosum*, *Obolaria virginica*, *Asplenium platyneuron*, and *Cynoglossum virginianum*.

D. Cove Hardwoods

This community is characterized by deep, moist rich soils; (C.Camp, 1968) and like the Upland Hardwoods, is among the least disturbed natural communities in the Park. Two indicator species are used to separate this community from Upland Hardwoods: *Fagus grandifolia* and *Magnolia acuminata*. If either was found, the community was designated Cove Hardwoods. Floristically, this community also is among the richest. Just about all of the woody species listed above as common for Upland Hardwoods can be found here and frequently as mature plants. This community, with the Upland Hardwoods, is perhaps the most deserving of future preservation and protection due to its richness and maturity.

The typical spring flowers of the deciduous forest on the plant list are found here although not in the expected abundance, probably due to overbrowsing by deer. Herbaceous species which are typical are *Botrychium virginianum*, *Polystichum acrostichoides*, *Thelypteris hexagonaptera*, *T. noveboracensis*, *Panicum* spp., *Arisaema triphyllum*, *Trillium catesbaei*, *Iris cristata*, *Uvularia* spp., *Anemone lancifolia*, *Hepatica americana*, *Thalictrum thalictroides*, *Podophyllum peltatum*, *Tiarella cordifolia*, *Potentilla canadensis*, *Geranium maculatum*, *Viola* spp., *Polygonatum biflorum*, *Pedicularis canadensis*, *Galium* spp., *Houstonia* spp., *Smilacina racemosa*, *Erigeron pulchellus*, and *Chrysogonum virginianum*.

E. Bottomland Hardwoods

This community is found well-developed on the floodplains of Fairforest and Kelsey Creeks with some located on smaller tributaries. During the winter, most of it projected a park-like appearance and was a genuine pleasure to walk through. However, during the summer, it is considerably grown up on the forest floor. Typical canopy species are *Platanus occidentalis*, *Populus deltoides*, *Quercus phellos*, *Q. nigra*, *Q. lyrata*, *Q. alba*, *Betula nigra*, *Ulmus alata*, *U. rubra*, *U. americana*, *Liquidambar styraciflua*, *Liriodendron tulipifera*, *Fraxinus* spp., *Juglans nigra*, and *Diospyros virginiana*. Typical understory species are *Acer rubrum*, *A. negundo*, *Morus rubra*, *Cercis canadensis*, *Ilex opaca*, *I. decidua*, *Alnus serrulata*, and *Asimina triloba*. Common shrubs include *Ligustrum sinense*, *Lindera benzoin*, and *Leucothoe axillaris* var. *editorum*. Vines in great abundance are *Rhus radicans*, *Vitis aestivalis*, *V. rotundifolia*, *Decumaria barbara*, *Anisostichus capreolata*, *Campsis radicans*, and *Parthenocissus quinquefolia*.

Ground cover is mostly grasses and sedges dominated by *Microstegium vimineum* and *Carex* spp. *Arundinaria gigantea* is abundant as are numerous forbs.

Some areas of the floodplain are old fields rapidly returning to the typical flora. These areas are not separated on the map from the mature hardwoods.

F. Mountain Laurel Bluffs

This is a small and localized community dominated by *Kalmia latifolia*. It is found in a few isolated locations, mostly on steep bluffs adjacent to the major streams. Other species as listed for Upland Hardwoods also occur, although not in large numbers.

III. List of Vascular Flora



Three lists of the vascular flora of the Park are submitted as appendices:

- APPENDIX A. A natural order of species by family as found in Radford, Ahles, and Bell (1968).
- APPENDIX B. An alphabetical list of species by genus.
- APPENDIX C. A three-part list consisting of county records, plants on the state Endangered and Threatened Species List, and very large trees that might qualify for championship designation. Locations of these special plants are designated on the map by correspondingly numbered white dots.

IV. Historical Sites

Old house-sites that could be identified are designated by red triangles on the map, but data on the former occupants or owners are incomplete. Therefore, this information is not reported. Two old mill sites are located with red dots on the map, but again, historical data are incomplete and not yet reported. A third mill, shown on Mill's Atlas (1820) as Martin's Mill is known, but the exact location in the Park has not been pin-pointed.

Two archaeological sites are located with yellow dots, but with substantial data lacking, a discussion is not included here. Known cemeteries are located with purple dots but not discussed.

It is expected that a more complete investigation of the historical aspects of the Park will follow.

V. Abundance of Similar Communities in South Carolina

Three communities are worthy of mention here: Upland Hardwoods, Cove Hardwoods, and Bottomland Hardwoods.

When compared to similar communities elsewhere in the State, all three of these are common throughout the Piedmont. However, preservation is recommended not because they are unique or presently rare, but because they are representatives of communities which have natural and cultural importance not likely to be found undisturbed anywhere in the State by the year 2,000 except in the state park system.

These mature large-area examples of hardwood forests are the only such under public ownership in Spartanburg County at the present time.

VI. Recommendations

One of the most striking features of this Piedmont park is the abundance of existing mature hardwood forest, and the successional process rapidly returning old fields fifty years old and older to climax. If this park is left alone, most of the seven-thousand plus acres could achieve climax status in a relatively short period of time. Excellent mature hardwoods, both upland and cove, occur rather evenly distributed throughout the Park, and in time Croft State Park could become a unique, large-area refugium and preserve in the Up-state. Heritage Trust is pushing this concept of large-area preservation for animal wildlife requiring a minimum range.

Even so, the early old-fields, being relatively level, would be good locations for development as needs for mass or team sport recreation become greater. Stream recreation could be expanded if and when the two major creeks are cleaned up by the County. The surface

of the county landfill when it is closed could be used for team sport recreation, campsites, and even an arboretum. Further, these could be established with a minimum of effort and cost.

One of the many pleasant surprises that surfaced during the course of this study is the park-like atmosphere and appearance of the mature bottomland hardwoods. Most are open in aspect with large canopy species. These are most pleasant to experience, especially during the winter. There is great potential for nature trails here, especially along the creek banks if the pollution can be removed.

The richest yield of species and the areas found least disturbed are the branch banks and north- and west- facing bluffs in the Cove Hardwoods communities. These should be preserved at all costs. The largest contiguous areas of upland and cove hardwoods were found north of Kelsey Creek throughout the Park, and generally should not be disturbed.

One area recommended for addition to the Park is shown on the map at the southeastern corner in magenta vertical stripes. This is recommended in order to preserve a beautiful rocky stream, an old water wheel site, an old, dry-wall stone road bridge foundation in nearly perfect condition exemplifying fine workmanship, and some very nice cove hardwood communities.

A similar rocky stream (Pauline Creek) south of Foster Mill Road with a mountain laurel bluff with the only known location of *Epigaea repens* in the Park also should be included in the Park if not actually there now. The problem is that the location of the boundary is obscure in this area.

Concerning boundaries, many other portions of the Park are not clearly delimited. An immediate survey with permanent marking strongly is recommended. Law enforcement and sound management are difficult when boundaries are not clearly defined. The exact locations of these needs were clearly marked on a plat of the Park and given to PRT earlier this year by the author.

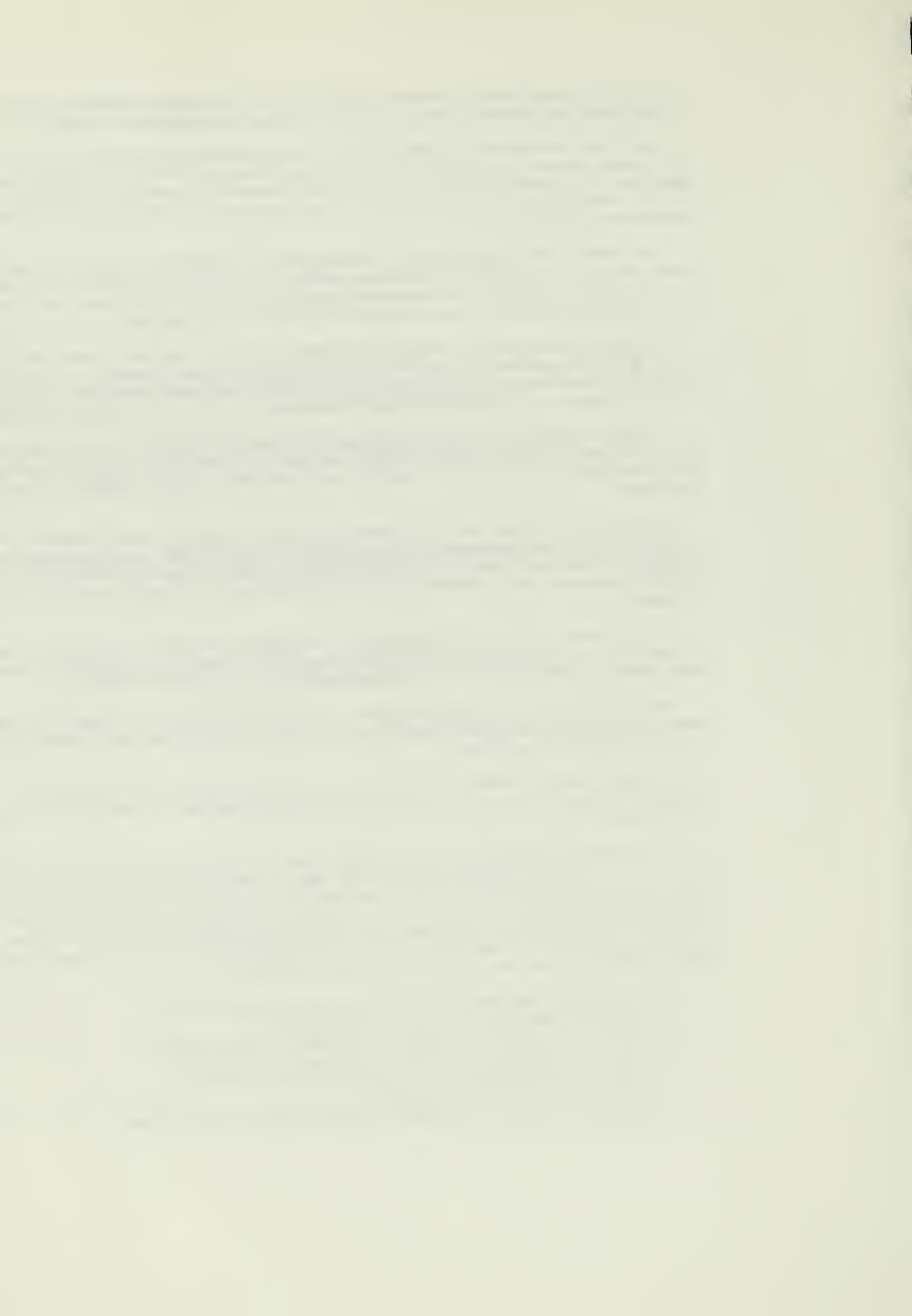
Another matter of concern is an apparent overpopulation of deer in the Park. It is quite evident that the spring flowers were overbrowsed this past season, and considerable damage is being done to neighboring farms. Some means should be found to thin the herds.

Sedimentation from the county landfill is a problem in the Park. For example, silt three feet deep was observed in the adjacent flood plain of Fairforest Creek where considerable damage to the plants was noted.

Concerning uses of preserved natural communities in Croft State Park that might be considered by policy-makers in the future, the following comments are presented as inspired by Dr. E. Gibbs Patton.

If the assumptions are made that (1) preservation of natural and historic lands is accepted park policy as one of management's responsibilities; (2) that undisturbed natural areas are already rare in the state and destined to become rarer; (3) pressures on park managers for development of park lands in old and new ways will increase; and (4) educators in natural history and researchers in ecology will come to depend increasingly on preserved natural areas in S.C. state parks; then a considerable effort will have to be made on PRT's part to meet these responsibilities. Some specific land-uses to consider:

1. Nature education and history teaching by park personnel along with self-guided facilities for the general public.
2. Field trip activity by local schools, colleges, and youth groups.
3. All-day events and conservation camps conducted for local and state-wide clientele with the cooperation of other state agencies and citizen education groups.
4. Base-line scientific studies and reference data from undisturbed



park lands for understanding effects of land management practices outside the parks such as forest burning, herbicide application, and wetlands drainage.

5. Long-term monitoring of environmental change in the region such as air quality, and effects of acid rain on soils and vegetation.
6. Habitat for native animals.
7. Control of soil erosion, sedimentation, and flooding downstream from park lands.

VII. Geology, Fauna, and Non-vascular Plants

A. Geology

A report on the geology of Croft State Park by Dr. Terry A. Ferguson, Department of Geology, Wofford College, is attached as Appendix D.

B. Fauna

Animal investigations associated with this study include some work on rodents and amphibians by Dr. Clarence L. Abercrombie, III, Department of Sociology, Wofford College, and his students. Dr. Abercrombie's brief report is attached as Appendix E.

Mr. Rudy Mancke, SC ETV, collected some significant dragonfly species in the Park during 1989. His data are unpublished, but his work simply is cited here for information (Mancke, 1989).

A study of the nesting species of birds in the Park was conducted during the 1989 season by the Piedmont Chapter of the National Audubon Society and coordinated by the Rev. Marion Clark of Spartanburg. This study was part of the South Carolina Breeding Bird Atlas project of the S.C. Wildlife and Marine Resources Department. Clark reports thirty-eight confirmed nesting species, and a copy of his report is attached as Appendix F.

Animals (by common name) observed by the author are as follows:

1. Mammals - white-tailed deer, gray squirrel, cottontail rabbit, opossum, racoon, field rat, gray fox, and feral dogs.
2. Birds - (See Appenxix F. The author was a participant.)
3. Snakes - black rat (most observations), garter, Eastern king, DeKay's, copperhead, red-bellied water (most common in lakes), Northern water, blue racer, and hog-nosed.

C. Non-vascular Plants

A list of the non-vascular plants was not compiled since this was beyond the scope of the investigation, but thallophytes and bryophytes were observed in abundance throughout the Park. All are worthy of study. Due to an unusually moist spring and summer this year, the fungi, particularly, were much in evidence. Algae abound in the lakes, and mosses and liverworts may be found throughout the Park. They are especially abundant on the moist banks and rocks in the shady spring branches and on the creek banks. These species need to be recorded.

VIII. References Cited

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IX. Acknowledgements

Subcontract consultants who participated were:

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- Dr. Wade T. Batson (retired) Department of Biology, USC, Columbia, botanist
- Dr. Clarence L. Abercrombie, III, Department of Sociology, Wofford College, wildlife biologist, pilot
- Dr. Terry A. Ferguson, Department of Geology, Wofford College, geologist
- Dr. Douglas A. Rayner, Department of Biology, Wofford College, botanist

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- Ms. Sandra W. Powell
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- Ms. Gail Herbert
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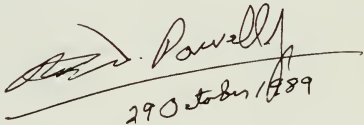
Grateful appreciation is expressed to the following personnel of PRT who cooperated fully and enthusiastically:

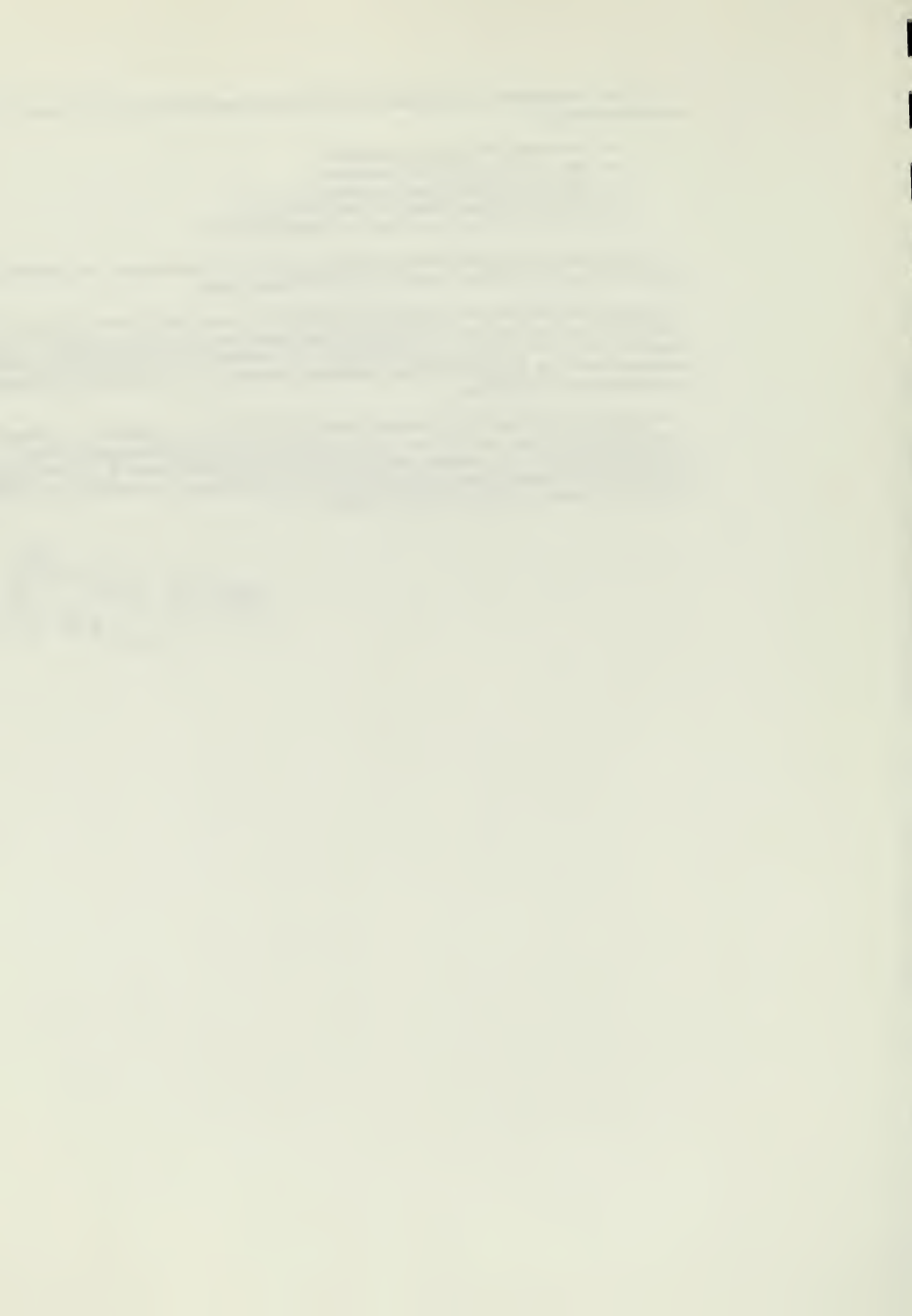
Mr. Mike Foley, Resource Management
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Mr. Joe Frank Watson, Chief Naturalist
Mr. Ray Hayes, Superintendent, Croft State Park
Mr. Irvin Pitts, Naturalist, Caesar's Head State Park.

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29 October 1989



3	LYCOPODIACEAE	<i>Lycopodium flabelliforme</i>	(Fern.) Blanchard
3		<i>Lycopodium lucidulum</i>	Michaux
4	SELAGINELLACEAE	<i>Selaginella apoda</i>	(L.) Spring
6	OPHIOGLOSSACEAE	<i>Botrychium dissectum</i>	Sprengel
6		<i>Botrychium virginianum</i>	(L.) Swartz
6		<i>Ophioglossum vulgatum</i> var. <i>pycnostichum</i>	Fernald
7	OSMUNDACEAE	<i>Osmunda cinnamomea</i>	L.
7		<i>Osmunda regalis</i> var. <i>spectabilis</i>	(Willd.) Gray
10	PTERIDACEAE	<i>Adiantum pedatum</i>	L.
10		<i>Pteridium aquilinum</i>	(L.) Kuhn
11	ASPIDIACEAE	<i>Athyrium asplenoides</i>	(Mich.) A.A.Eaton
11		<i>Onoclea sensibilis</i>	L.
11		<i>Polystichum acrostichoides</i>	(Mich.) Schott
11		<i>Polystichum acrostichoides</i> forma <i>incisum</i>	B. & B.
11		<i>Thelypteris hexagonoptera</i>	(Mich.) Weatherby
11		<i>Thelypteris noveboracensis</i>	(L.) Nieuwland
12	BLECHNACEAE	<i>Woodwardia areolata</i>	(L.) Moore
13	ASPLENIACEAE	<i>Asplenium platyneuron</i>	(L.) Oakes
14	POLYPODIACEAE	<i>Polypodium polypodioides</i>	(L.) Watt
16	PINACEAE	<i>Pinus echinata</i>	Miller
16		<i>Pinus strobus</i>	L.
16		<i>Pinus taeda</i>	L.
16		<i>Pinus virginiana</i>	Miller
18	CUPRESSACEAE	<i>Juniperus virginiana</i>	L.
19	TYPHACEAE	<i>Typha latifolia</i>	L.
27	ALISMATACEAE	<i>Sagittaria latifolia</i> var. <i>pubescens</i>	(Muhl.) J.G.Smith
29	POACEAE	<i>Aira elegans</i>	Willd. ex Gaudin
29		<i>Andropogon scoparius</i>	Michaux
29		<i>Andropogon virginicus</i>	L.
29		<i>Anthoxanthum odoratum</i>	L.
29		<i>Arundinaria gigantea</i>	(Walter) Muhl.
29		<i>Brachelytrum erectum</i>	(Schreber) Beauvois
29		<i>Bromus purgans</i>	L.
29		<i>Bromus secalinus</i>	L.
29		<i>Cenchrus incertus</i>	M. A. Curtis
29		<i>Dactylis glomerata</i>	L.
29		<i>Danthonia sericea</i>	Nuttall
29		<i>Danthonia spicata</i>	(L.) Beauvois ex R. & S.
29		<i>Digitaria sanguinalis</i>	(L.) Scopoli
29		<i>Elymus canadensis</i>	L.
29		<i>Elymus virginicus</i>	L.
29		<i>Erianthus alopecuroides</i>	(L.) Ell.
29		<i>Erianthus contortus</i>	Baldwin ex Ell.
29		<i>Festuca myuros</i>	L.
29		<i>Festuca octoflora</i>	Walter
29		<i>Festuca paradoxa</i>	Desvaux.
29		<i>Glyceria striata</i>	(Lam.) Hitchcock
29		<i>Hystrix patula</i>	Moench
29		<i>Melica mutica</i>	Walter
29		<i>Microstegium vimineum</i>	(Trinius) Camus
29		<i>Panicum aciculare</i>	Desvaux ex Poiret
29		<i>Panicum boscii</i>	Poiret
29		<i>Panicum clandestinum</i>	L.
29		<i>Panicum commutatum</i>	Schultes
29		<i>Panicum depauperatum</i>	Muhl.
29		<i>Panicum dichotomum</i>	L.

29		<i>Panicum lanuginosum</i>	Ell.
29		<i>Panicum laxiflorum</i>	Lam.
29		<i>Panicum polyanthes</i>	Schultes
29		<i>Paspalum dilatatum</i>	Poir.
29		<i>Paspalum laeve</i>	Michaux
29		<i>Paspalum notatum</i> var. <i>saurae</i>	Parodi
29		<i>Poa autumnalis</i>	Muhl. ex Ell.
29		<i>Poa chapmaniana</i>	Scribner
29		<i>Poa cuspidata</i>	Nuttall
29		<i>Poa sylvestris</i>	Gray
29		<i>Setaria geniculata</i>	(Lam.) Beauvois
29		<i>Sorghum halepense</i>	(L.) Persoon
29		<i>Sphenopholis intermedia</i>	(Rydberg) Rydberg
29		<i>Stipa avenacea</i>	L.
29		<i>Tridens flavus</i> var. <i>flavus</i>	(L.) Hitchcock
29		<i>Uniola latifolia</i>	Michaux
29		<i>Uniola sessiliflora</i>	Poir.
30	CYPERACEAE	<i>Carex annectens</i>	Bicknell
30		<i>Carex caroliniana</i>	Schweinitz
30		<i>Carex cephalophora</i>	Muhl. ex Schkuhr.
30		<i>Carex crinita</i>	Lam.
30		<i>Carex gracilescens</i>	Steudel
30		<i>Carex howei</i>	Mackenzie
30		<i>Carex laevivaginata</i>	(Kukenthal) Mackenzie
30		<i>Carex laxiculmis</i>	Schweinitz
30		<i>Carex leptalea</i>	Wahlenberg
30		<i>Carex lurida</i>	Wahlenberg
30		<i>Carex oligocarpa</i>	Schkuhr.
30		<i>Carex pennsylvanica</i>	Lam.
30		<i>Carex rosea</i>	Schkuhr.
30		<i>Carex scoparia</i>	Schkuhr.
30		<i>Carex stipata</i>	Muhl. ex Schkuhr.
30		<i>Eleocharis baldwinii</i>	(Torrey) Chapman
30		<i>Eleocharis obtusa</i>	(Willd.) Schultes
30		<i>Rhynchospora glomerata</i>	(L.) Vahl.
30		<i>Scirpus cyperinus</i>	(L.) Kunth
30		<i>Scirpus polyphyllus</i>	Vahl
30		<i>Scleria oligantha</i>	Michaux
32	ARACEAE	<i>Arisaema dracontium</i>	(L.) Schott
32		<i>Arisaema triphyllum</i>	(L.) Schott
32		<i>Peltandra virginica</i>	(L.) Kunth
33	LEMNACEAE	<i>Lemna perpusilla</i>	Torrey
38	COMMELINACEAE	<i>Aneilema keisak</i>	Hasskarl
38		<i>Commelina communis</i>	L.
38		<i>Tradescantia rosea</i> var. <i>rosea</i>	Vent
40	JUNCACEAE	<i>Juncus acuminatus</i>	Michaux
40		<i>Juncus coriaceus</i>	Mackenzie
40		<i>Juncus diffusissimus</i>	Buckley
40		<i>Juncus effusus</i>	L.
40		<i>Juncus tenuis</i>	Willd.
40		<i>Luzula acuminata</i>	Raf.
41	LILIACEAE	<i>Allium vineale</i>	L.
41		<i>Amianthium muscaetoxicum</i>	(Walter) Gray
41		<i>Chamaelirium luteum</i>	(L.) Gray
41		<i>Medeola virginiana</i>	L.
41		<i>Polygonatum biflorum</i>	(Walter) Ell.

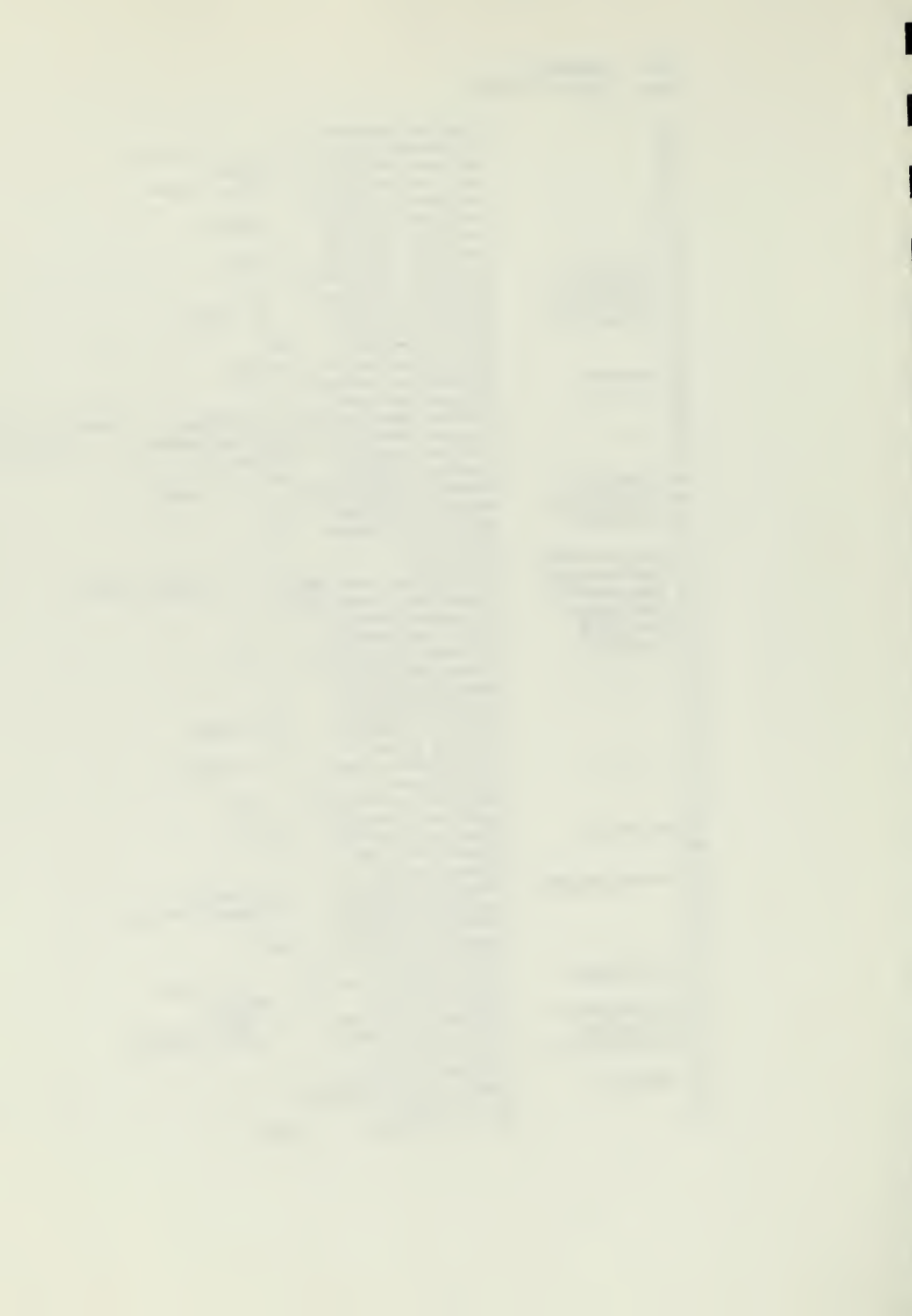
41		<i>Smilacina racemosa</i>	(L.) Desf.
41		<i>Smilax bona-nox</i>	L.
41		<i>Smilax glauca</i>	Walter
41		<i>Smilax rotundifolia</i>	L.
41		<i>Trillium catesbaei</i>	Ell.
41		<i>Trillium lanceolatum</i>	Boykin
41		<i>Uvularia perfoliata</i>	L.
41		<i>Uvularia sessilifolia</i>	L.
43	DIOSCOREACEAE	<i>Dioscorea batatas</i>	Decne.
43		<i>Dioscorea villosa</i>	L.
44	AMARYLLIDACEAE	<i>Hypoxis hirsuta</i>	(L.) Coville
44		<i>Narcissus</i> sp	
46	IRIDACEAE	<i>Iris cristata</i>	Aiton
46		<i>Sisyrinchium angustifolium</i>	Miller
46		<i>Sisyrinchium mucronatum</i>	Michaux
49	ORCHIDACEAE	<i>Cypripedium acaule</i>	Aiton
49		<i>Cypripedium calceolus</i> var. <i>pubescens</i>	(Willd.) Correll
49		<i>Goodyera pubescens</i>	(Willd.) R. Brown
49		<i>Habenaria clavellata</i>	(Michaux) Sprengel
49		<i>Liparis lilifolia</i>	(L.) Richard
49		<i>Malaxis unifolia</i>	Michaux
49		<i>Orchis spectabilis</i>	L.
49		<i>Spiranthes ovalis</i>	Lindley
51	SALICACEAE	<i>Populus alba</i>	L.
51		<i>Populus deltoides</i>	Marshall
51		<i>Salix nigra</i>	Marshall
53	JUGLANDACEAE	<i>Carya cordiformis</i>	(Wang.) K. Koch
53		<i>Carya glabra</i>	(Miller) Sweet
53		<i>Carya illinoensis</i>	(Wang.) K. Koch
53		<i>Carya tomentosa</i>	(Poiret) Nuttall
53		<i>Juglans nigra</i>	L.
54	BETULACEAE	<i>Alnus serrulata</i>	(Aiton) Willd.
54		<i>Betula nigra</i>	L.
54		<i>Carpinus caroliniana</i>	Walter
54		<i>Corylus americana</i>	Walter
55	FAGACEAE	<i>Castanea alnifolia</i>	Nuttall
55		<i>Castanea dentata</i>	(Marshall) Borkh.
55		<i>Castanea pumila</i>	(L.) Miller
55		<i>Fagus grandifolia</i>	Ehrhart
55		<i>Quercus alba</i>	L.
55		<i>Quercus coccinea</i>	Muenchh.
55		<i>Quercus falcata</i>	Michaux
55		<i>Quercus lyrata</i>	Walter
55		<i>Quercus marilandica</i>	Muenchh.
55		<i>Quercus michauxii</i>	Nuttall
55		<i>Quercus nigra</i>	L.
55		<i>Quercus phellos</i>	L.
55		<i>Quercus rubra</i>	L.
55		<i>Quercus stellata</i>	Wang.
55		<i>Quercus velutina</i>	Lam.
56	ULMACEAE	<i>Celtis laevigata</i> var. <i>georgiana</i>	(Small) Ahles
56		<i>Ulmus alata</i>	Michaux
56		<i>Ulmus americana</i>	L.
56		<i>Ulmus rubra</i>	Muhl.
57	MORACEAE	<i>Broussonetia papyrifera</i>	(L.) Vent.
57		<i>Cannabis sativa</i>	L.

57		<i>Morus rubra</i>	L.	
59	URTICACEAE	<i>Boehmeria cylindrica</i>	(L.) Swartz	
59		<i>Pilea pumila</i>	(L.) Gray	
61	LORANTHACEAE	<i>Phoradendron serotinum</i>	(Raf.) M.C. Johnston	
62	ARISTOLOCHIACEAE	<i>Aristolochia serpentaria</i>	L.	
63	POLYGONACEAE	<i>Polygonum convolvulus</i>	L.	
63		<i>Polygonum pensylvanicum</i>	L.	
63		<i>Rumex acetosella</i>	L.	
63		<i>Rumex crispus</i>	L.	
68	PHYTOLACCACEAE	<i>Phytolacca americana</i>	L.	
71	CARYOPHYLLACEAE	<i>Arenaria serpyllifolia</i>	L.	
71		<i>Cerastium glomeratum</i>	Thuillier	
71		<i>Silene virginica</i>	L.	
71		<i>Stellaria graminea</i>	L.	
71		<i>Stellaria media</i>	(L.) Cyrillo	
71		<i>Stellaria pubera</i>	Michaux	
76	RANUNCULACEAE	<i>Anemone lancifolia</i>	Pursh	
76		<i>Cimicifuga racemosa</i>	Nuttall	
76		<i>Clematis virginiana</i>	L.	
76		<i>Hepatica americana</i>	(D.C.) Ker	
76		<i>Ranunculus abortivus</i>	L.	
76		<i>Ranunculus parviflorus</i>	L.	
76		<i>Ranunculus recurvatus</i>	Poir.	
76		<i>Thalictrum thalictroides</i>	(L.) Boivin	
76		<i>Xanthorhiza simplicissima</i>	Marshall	
77	BERBERIDACEAE	<i>Caulophyllum thalictroides</i>	(L.) Michaux	
77		<i>Podophyllum peltatum</i>	L.	
80	MAGNOLIACEAE	<i>Liriodendron tulipifera</i>	L.	
80		<i>Magnolia acuminata</i>	L.	
80		<i>Magnolia grandiflora</i>	L.	
80		<i>Magnolia tripetala</i>	L.	
81	ANNONACEAE	<i>Asimina parviflora</i>	(Mich.) Danul.	
81		<i>Asimina triloba</i>	(L.) Dunal.	
83	CALYCANTHACEAE	<i>Calycanthus floridus</i>	L.	
84	LAURACEAE	<i>Lindera benzoin</i>	(L.) Blume	
84		<i>Sassafras albidum</i>	(Nuttall) Nees	
85	PAPAVERACEAE	<i>Sanguinaria canadensis</i>	L.	
88	BRASSICACEAE	<i>Arabidopsis thaliana</i>	(L.) Heynhold	
88		<i>Barbarea verna</i>	(Miller) Ascherson	
88		<i>Cardamine hirsuta</i>	L.	
94	SAXIFRAGACEAE	<i>Decumaria barbara</i>	L.	
94		<i>Hydrangea arborescens</i>	L.	
94		<i>Itea virginica</i>	L.	
94		<i>Saxifraga virginiana</i>	Michaux	
94		<i>Tiarella cordifolia</i>	L.	
95	HAMAMELIDACEAE	<i>Hamamelis virginiana</i>	L.	
95		<i>Liquidambar styraciflua</i>	L.	
96	PLATANACEAE	<i>Platanus occidentalis</i>	L.	
97	ROSACEAE	<i>Agrimonia pubescens</i> var. <i>microcarpa</i>	(Wallroth) Ahles	
97		<i>Agrimonia rostellata</i>	Wallroth	
97		<i>Alchemilla microcarpa</i>	Bossier & Reutter	
97		<i>Amelanchier arborea</i>	(Mich. f.) Fern.	
97		<i>Amelanchier canadensis</i>	(L.) Medicus	
97		<i>Crataegus crus-galli</i>	L.	
97		<i>Crataegus flabellata</i>	(Bosc) K. Koch	
97		<i>Crataegus uniflora</i>	Muenchh.	

97		<i>Duchesnea indica</i>	(Andrz.) Focke
97		<i>Fragaria virginiana</i>	Duchesne
97		<i>Geum</i> sp.	
97		<i>Malus pumila</i>	Miller
97		<i>Physocarpus opulifolius</i>	(L.) Maxim.
97		<i>Potentilla canadensis</i>	L.
97		<i>Potentilla simplex</i>	Michaux
97		<i>Prunus americana</i>	Marshall
97		<i>Prunus angustifolia</i>	Marshall
97		<i>Prunus caroliniana</i>	Aiton
97		<i>Prunus persica</i>	(L.) Batsch
97		<i>Prunus serotina</i>	Ehrhart
97		<i>Pyrus communis</i>	L.
97		<i>Rosa multiflora</i>	Thunberg
97		<i>Rubus argutus</i>	Link
97		<i>Rubus canadensis</i>	L.
97		<i>Rubus flagellaris</i>	Willd.
98	FABACEAE	<i>Albizia julibrissin</i>	Durazzini
98		<i>Amphicarpa bracteata</i>	(L.) Fern.
98		<i>Apios americana</i>	Medicus
98		<i>Cassia fasciculata</i>	Michaux
98		<i>Cassia nictitans</i>	L.
98		<i>Cercis canadensis</i>	L.
98		<i>Clitoria mariana</i>	L.
98		<i>Desmodium canescens</i>	(L.) D.C.
98		<i>Desmodium nudiflorum</i>	(L.) D.C.
98		<i>Desmodium rotundifolium</i>	D. C.
98		<i>Galactia volubilis</i>	(L.) Britton
98		<i>Gleditsia triacanthos</i>	L.
98		<i>Lespedeza capitata</i>	Michaux
98		<i>Lespedeza cuneata</i>	(Dumont) G Don
98		<i>Lespedeza hirta</i>	(L.) Hornemann
98		<i>Lespedeza intermedia</i>	(Watson) Britton
98		<i>Lespedeza repens</i>	(L.) Barton
98		<i>Lespedeza virginica</i>	(L.) Britton
98		<i>Melilotus alba</i>	Desc.
98		<i>Pueraria lobata</i>	(Willd.) Ohwi
98		<i>Rhynchosia tomentosa</i>	(L.) H. & A.
98		<i>Schrankia microphylla</i>	(Solander ex Smith) Macbride
98		<i>Stylosanthes biflora</i>	(L.) BSP
98		<i>Tephrosia virginiana</i>	(L.) Persoon
98		<i>Trifolium pratense</i>	L.
98		<i>Trifolium repens</i>	L.
98		<i>Vicia angustifolia</i>	Reichard
98		<i>Vicia caroliniana</i>	Walter
98		<i>Wisteria sinensis</i>	(Sims) Sweet
100	OXALIDACEAE	<i>Oxalis dillenii</i>	Jacquin
100		<i>Oxalis florida</i>	Salisbury
100		<i>Oxalis stricta</i>	L.
100		<i>Oxalis violacea</i>	L.
101	GERANIACEAE	<i>Geranium carolinianum</i>	L.
101		<i>Geranium dissectum</i>	L.
101		<i>Geranium maculatum</i>	L.
104	SIMARUBACEAE	<i>Ailanthus altissima</i>	(Miller) Swingle
105	MELIACEAE	<i>Melia azedarach</i>	L.
107	EUPHORBIACEAE	<i>Euphorbia corollata</i> var. <i>corollata</i>	L.

108	BUXACEAE	Pachysandra terminalis	Siebold & Zucc.
110	ANACARDIACEAE	Rhus copallina	L.
110		Rhus glabra	L.
110		Rhus radicans	L.
112	AQUIFOLIACEAE	Ilex decidua	Walter
112		Ilex opaca	Aiton
113	CELASTRACEAE	Euonymus americanus	L.
115	ACERACEAE	Acer negundo	L.
115		Acer rubrum	L.
115		Acer saccharum var. floridanum	(Chap.) Desmarais
118	BALSAMINACEAE	Impatiens capensis	Meerb.
119	RHAMNACEAE	Rhamnus caroliniana	Walter
120	VITACEAE	Ampelopsis arborea	(L.) Koehne
120		Parthenocissus quinquefolia	(L.) Planchon
120		Vitis aestivalis	Michaux
120		Vitis rotundifolia	Michaux
121	TILIACEAE	Tilia americana	L.
121		Tilia heterophylla	Vent.
126	HYPERICACEAE	Hypericum gentianoides	(L.) B.S.P.
126		Hypericum hypericoides	(L.) Crantz
126		Hypericum mutilum	L.
126		Hypericum punctatum	Lam.
130	VIOLACEAE	Viola hastata	Michaux
130		Viola hirsutula	Brainerd
130		Viola papilionacea	Pursh
130		Viola rafinesquii	Greene
130		Viola walteri	House
131	PASSIFLORACEAE	Passiflora incarnata	L.
131		Passiflora lutea	L.
132	CACTACEAE	Opuntia sp	
134	ELAEAGNACEAE	Elaeagnus pungens	Thunberg.
134		Elaeagnus umbellata	Thunberg.
137	ONAGRACEAE	Ludwigia palustris	(L.) Ell.
137		Oenothera biennis	L.
137		Oenothera fruticosa	L.
137		Oenothera laciniosa	Hill
139	ARALIACEAE	Aralia spinosa	L.
140	APIACEAE	Chaerophyllum tainturieri	Hooker
140		Daucus carota	L.
140		Ligusticum canadense	(L.) Britton
140		Sanicula canadensis	L.
140		Sanicula marilandica	L.
140		Taenidia integerrima	(L.) Drude
140		Thaspium barbinode	(Mich.) Nuttall
140		Zizia aptera	(Gray) Fernald
140		Zizia aurea	(L.) W.D.Koch
141	NYSSACEAE	Nyssa sylvatica	Marshall
142	CORNACEAE	Cornus alternifolia	L.
142		Cornus amomum	Miller
142		Cornus florida	L.
142		Cornus stricta	Lam.
145	ERICACEAE	Chimaphila maculata	(L.) Pursh
145		Epigaea repens	L.
145		Kalmia latifolia	L.
145		Leucothoe axillaris var. editorum	(Fern. & Schub.) Ahles
145		Monotropa hypopithys	L.

145	Monotropa uniflora	L.	
145	Rhododendron nudiflorum	(L.) Torrey	
145	Vaccinium arboreum	Marshall	
145	Vaccinium atrococcum	(Gray) Porter	
145	Vaccinium corymbosum	L.	
145	Vaccinium elliotii	Chapman	
145	Vaccinium stamineum	L.	
145	Vaccinium vacillans	Torrey	
147	PRIMULACEAE		
	Lysimachia nummularia	L.	
150	EBENACEAE		
	Diospyros virginiana	L.	
151	SYMPLOCACEAE		
	Symplocos tinctoria	(L.) L'Her.	
152	STYRACACEAE		
	Halesia carolina	L.	
152	Styrax americana	Lam.	
152	Styrax grandifolia	Aiton	
153	OLEACEAE		
	Chionanthus virginicus	L.	
153	Fraxinus americana	L.	
153	Fraxinus americana var. biltmoreana	(Beadle) J. Wright ex F	
153	Fraxinus pennsylvanica var. subintegerrima	(Vahl.) Fernald	
153	Fraxinus tomentosa	Michaux f.	
153	Ligustrum sinense	Lour.	
154	LOGANIACEAE		
	Gelsemium sempervirens	(L.) Aiton f.	
155	GENTIANACEAE		
	Obolaria virginica	L.	
156	APOCYNACEAE		
	Apocynum cannabinum	L.	
156	Vinca major	L.	
157	ASCLEPIADACEAE		
	Matelea sp		
159	POLEMONIACEAE		
	Phlox nivalis var. hentzii	(Nuttall) Wherry	
161	BORAGINACEAE		
	Cynoglossum virginianum	L.	
162	VERBENACEAE		
	Callicarpa americana	L.	
163	PHYRMACEAE		
	Phryma leptostachya	L.	
164	LAMIACEAE		
	Collinsonia canadensis	L.	
164	Glechoma hederacea	L.	
164	Lamium amplexicaule	L.	
164	Lycopus virginicus	L.	
164	Perilla frutescens	(L.) Britton	
164	Prunella vulgaris	L.	
164	Pycnanthemum incanum	(L.) Michaux	
164	Salvia lyrata	L.	
164	Scutellaria elliptica	Muhl.	
164	Scutellaria integrifolia	L.	
165	SOLANACEAE		
	Physalis virginiana	Miller	
165	Solanum carolinense	L.	
165	Solanum nigrum	L.	
166	SCROPHULARIACEAE		
	Linaria canadensis	(L.) Dumont	
166	Paulownia tomentosa	(Thunberg) Steudel	
166	Pedicularis canadensis	L.	
166	Penstemon australis	Small	
166	Veronica arvensis	L.	
167	BIGNONIACEAE		
	Anisostichus capreolata	(L.) Bureau	
167	Campsis radicans	(L.) Seemann	
169	OROBANCHACEAE		
	Epifagus virginiana	(L.) Barton	
171	ACANTHACEAE		
	Ruellia caroliniensis	(Walter) Steudel	
172	PLANTAGINACEAE		
	Plantago major	L.	
172	Plantago virginica	L.	
173	RUBIACEAE		
	Cephalanthus occidentalis	L.	
173	Galium aparine	L.	
173	Galium circaezans	Michaux	



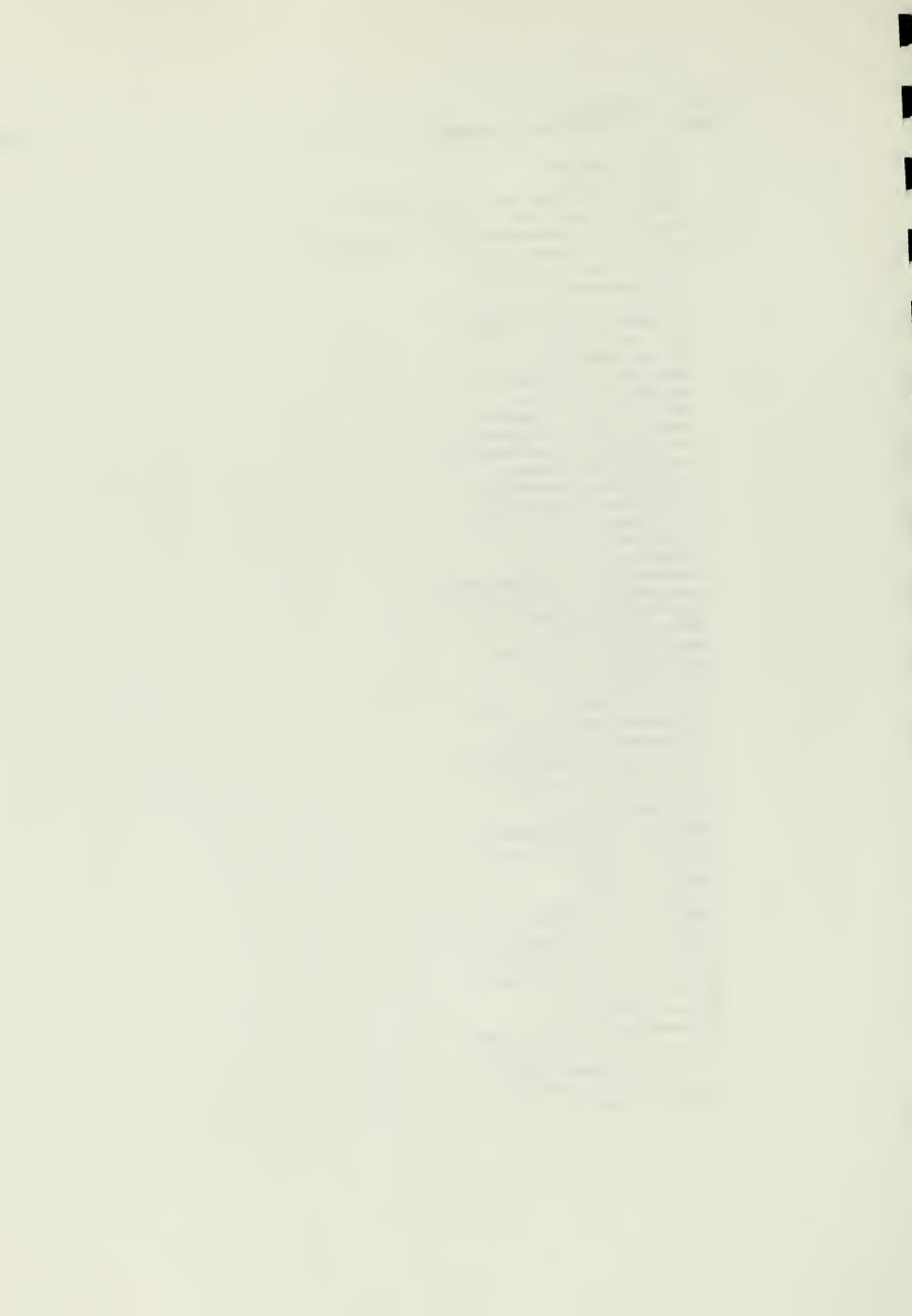
173		<i>Galium obtusum</i> var. <i>filifolium</i>	(Wiegand) Fernald
173		<i>Galium pilosum</i>	Aiton
173		<i>Galium tinctorium</i>	L.
173		<i>Galium triflorum</i>	Michaux
173		<i>Galium uniflorum</i>	Michaux
173		<i>Houstonia caerulea</i>	L.
173		<i>Houstonia longifolia</i>	Gaertner
173		<i>Houstonia purpurea</i>	L.
173		<i>Houstonia serpyllifolia</i>	Michaux
173		<i>Houstonia tenuifolia</i>	Nuttall
173		<i>Mitchella repens</i>	L.
174	CAPRIFOLIACEAE	<i>Lonicera japonica</i>	Thunberg
174		<i>Lonicera sempervirens</i>	L.
174		<i>Sambucus canadensis</i>	L.
174		<i>Viburnum acerfolium</i>	L.
174		<i>Viburnum dentatum</i>	L.
174		<i>Viburnum nudum</i>	L.
174		<i>Viburnum prunifolium</i>	L.
174		<i>Viburnum rufidulum</i>	Raf.
175	VALERIANACEAE	<i>Valerianella radiata</i>	(L.) Dufr.
178	CAMPANULACEAE	<i>Lobelia inflata</i>	L.
178		<i>Lobelia puberula</i>	Michaux
178		<i>Specularia biflora</i>	(R. & P.) F. & M.
179	ASTERACEAE	<i>Ambrosia artemisiifolia</i>	L.
179		<i>Ambrosia trifida</i>	L.
179		<i>Antennaria plantaginifolia</i>	(L.) Richardson
179		<i>Bidens bipinnata</i>	L.
179		<i>Cacalia atriplicifolia</i>	L.
179		<i>Carduus altissimus</i>	L.
179		<i>Carduus spinosissimus</i>	Walter
179		<i>Chrysanthemum leucanthemum</i>	L.
179		<i>Chrysogonum virginianum</i>	L.
179		<i>Coreopsis lanceolata</i>	L.
179		<i>Elephantopus carolinianus</i>	Willd.
179		<i>Elephantopus tomentosus</i>	L.
179		<i>Erigeron canadensis</i>	L.
179		<i>Erigeron pulchellus</i>	Michaux
179		<i>Erigeron strigosus</i>	Muhl. ex Willd.
179		<i>Eupatorium capillifolium</i>	(Lam.) Small
179		<i>Eupatorium hyssopifolium</i>	L.
179		<i>Eupatorium perfoliatum</i>	L.
179		<i>Gnaphalium obtusifolium</i>	L.
179		<i>Gnaphalium purpureum</i>	L.
179		<i>Helenium amarum</i>	(Raf.) H. Rock
179		<i>Helianthus annuus</i>	L.
179		<i>Helianthus hirsutus</i>	Raf.
179		<i>Helianthus laevigatus</i>	T. & G.
179		<i>Heterotheca subaxillaris</i>	(Lam.) Britton & Rusby
179		<i>Hieracium gronovii</i>	L.
179		<i>Hieracium venosum</i>	L.
179		<i>Krigia virginica</i>	(L.) Willd.
179		<i>Lactuca</i> sp.	
179		<i>Polymnia uvedalia</i>	L.
179		<i>Prenanthes serpentaria</i>	Pursh
179		<i>Senecio smallii</i>	Britton
179		<i>Silphium dentatum</i> var. <i>dentatum</i>	Ell.

179	Solidago altissima	L.
179	Taraxacum officinale	Wiggers
179	Verbesina occidentalis	(L.) Walter

total
families: 99

total species: 451

Acer negundo
Acer rubrum
Acer saccharum var. floridanum
Adiantum pedatum
Agrimonia pubescens var. microcarpa
Agrimonia rostellata
Ailanthus altissima
Aira elegans
Albizia julibrissin
Alchemilla microcarpa
Allium vineale
Alnus serrulata
Ambrosia artemisiifolia
Ambrosia trifida
Amelanchier arborea
Amelanchier canadensis
Amianthium muscaetoxicum
Ampelopsis arborea
Amphicarpa bracteata
Andropogon scoparius
Andropogon virginicus
Aneilema keisak
Anemone lancifolia
Anisostichus capreolata
Antennaria plantaginifolia
Anthoxanthum odoratum
Apios americana
Apocynum cannabinum
Arabidopsis thaliana
Aralia spinosa
Arenaria serpyllifolia
Arisaema dracontium
Arisaema triphyllum
Aristolochia serpentaria
Arundinaria gigantea
Asimina parviflora
Asimina triloba
Asplenium platyneuron
Athyrium asplenoides
Barbarea verna
Betula nigra
Bidens bipinnata
Boehmeria cylindrica
Botrychium dissectum
Botrychium virginianum
Brachyelytrum erectum
Bromus purgans
Bromus secalinus
Broussonetia papyrifera
Cacalia atriplicifolia
Callicarpa americana
Calycanthus floridus
Campsis radicans



Cannabis sativa
Cardamine hirsuta
Carduus altissimus
Carduus spinosissimus
Carex annectens
Carex caroliniana
Carex cephalophora
Carex crinita
Carex gracilescens
Carex howei
Carex laevivaginata
Carex laxiculmis
Carex leptalea
Carex lurida
Carex oligocarpa
Carex pensylvanica
Carex rosea
Carex scoparia
Carex stipata
Carpinus caroliniana
Carya cordiformis
Carya glabra
Carya illinoensis
Carya tomentosa
Cassia fasciculata
Cassia nictitans
Castanea alnifolia
Castanea dentata
Castanea pumila
Caulophyllum thalictroides
Celtis laevigata var. georgiana
Cenchrus incertus
Cephalanthus occidentalis
Cerastium glomeratum
Cercis canadensis
Chaerophyllum tainturieri
Chamaelirium luteum
Chimaphila maculata
Chionanthus virginicus
Chrysanthemum leucanthemum
Chrysogonum virginianum
Cimicifuga racemosa
Clematis virginiana
Clitoria mariana
Collinsonia canadensis
Commelina communis
Coreopsis lanceolata
Cornus alternifolia
Cornus amomum
Cornus florida
Cornus stricta
Corylus americana
Crataegus crus-galli

Crataegus flabellata
Crataegus uniflora
Cynoglossum virginianum
Cypripedium acaule
Cypripedium calceolus var. pubescens
Dactylis glomerata
Danthonia sericea
Danthonia spicata
Daucus carota
Decumaria barbara
Desmodium canescens
Desmodium nudiflorum
Desmodium rotundifolium
Digitaria sanguinalis
Dioscorea batatas
Dioscorea villosa
Diospyros virginiana
Duchesnea indica
Elaeagnus pungens
Elaeagnus umbellata
Eleocharis baldwinii
Eleocharis obtusa
Elephantopus carolinianus
Elephantopus tomentosus
Elymus canadensis
Elymus virginicus
Epifagus virginiana
Epigaea repens
Erianthus alopecuroides
Erianthus contortus
Erigeron canadensis
Erigeron pulchellus
Erigeron strigosus
Euonymus americanus
Eupatorium capillifolium
Eupatorium hyssopifolium
Eupatorium perfoliatum
Euphorbia corollata var. corollata
Fagus grandifolia
Festuca myuros
Festuca octoflora
Festuca paradoxa
Fragaria virginiana
Fraxinus americana
Fraxinus americana var. biltmoreana
Fraxinus pennsylvanica var. subintegerrima
Fraxinus tomentosa
Galactia volubilis
Galium aparine
Galium circaeans
Galium obtusum var. filifolium
Galium pilosum
Galium tinctorium

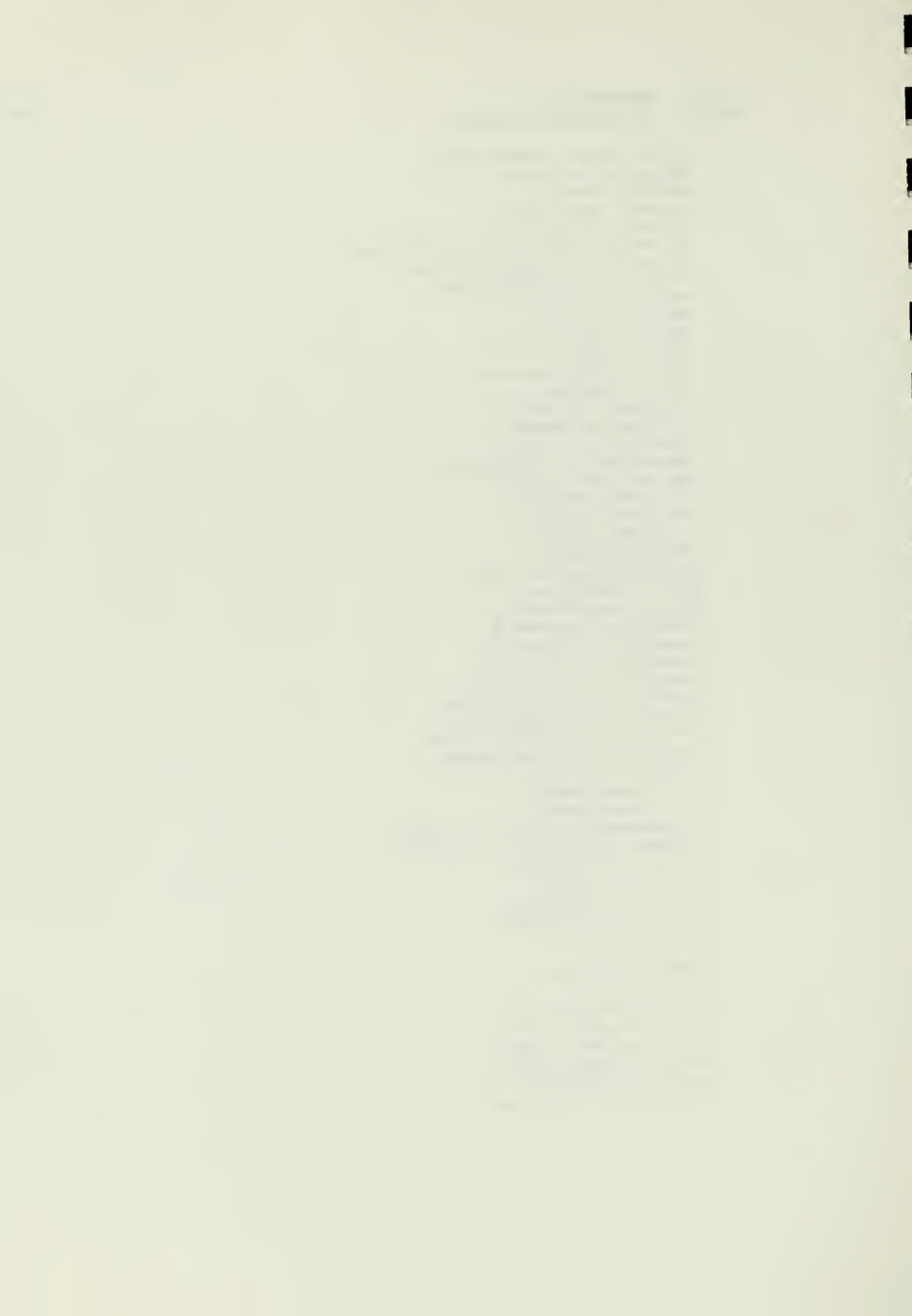
Galium triflorum
Galium uniflorum
Gelsemium sempervirens
Geranium carolinianum
Geranium dissectum
Geranium maculatum
Geum sp.
Glecoma hederacea
Gleditsia triacanthos
Glyceria striata
Gnaphalium obtusifolium
Gnaphalium purpureum
Goodyera pubescens
Habenaria clavellata
Halesia carolina
Hamamelis virginiana
Helenium amarum
Helianthus annuus
Helianthus hirsutus
Helianthus laevigatus
Hepatica americana
Heterotheca subaxillaris
Hieracium gronovii
Hieracium venosum
Houstonia caerulea
Houstonia longifolia
Houstonia purpurea
Houstonia serpyllifolia
Houstonia tenuifolia
Hydrangea arborescens
Hypericum gentianoides
Hypericum hypericoides
Hypericum mutilum
Hypericum punctatum
Hypoxis hirsuta
Hystrix patula
Ilex decidua
Ilex opaca
Impatiens capensis
Iris cristata
Itea virginica
Juglans nigra
Juncus acuminatus
Juncus coriaceus
Juncus diffusissimus
Juncus effusus
Juncus tenuis
Juniperus virginiana
Kalmia latifolia
Krigia virginica
Lactuca sp.
Lamium amplexicaule
Lemma perpusilla

Lespedeza capitata
Lespedeza cuneata
Lespedeza hirta
Lespedeza intermedia
Lespedeza repens
Lespedeza virginica
Leucothoe axillaris var. *editorum*
Ligusticum canadense
Ligustrum sinense
Linaria canadensis
Lindera benzoin
Liparis lilifolia
Liquidambar styraciflua
Liriodendron tulipifera
Lobelia inflata
Lobelia puberula
Lonicera japonica
Lonicera sempervirens
Ludwigia palustris
Luzula acuminata
Lycopodium flabelliforme
Lycopodium lucidulum
Lycopus virginicus
Lysimachia nummularia
Magnolia acuminata
Magnolia grandiflora
Magnolia tripetala
Malaxis unifolia
Malus pumila
Matelea sp
Medeola virginiana
Melia azedarach
Melica mutica
Melilotus alba
Microstegium vimineum
Mitchella repens
Monotropa hypopithys
Monotropa uniflora
Morus rubra
Narcissus sp
Nyssa sylvatica
Obolaria virginica
Oenothera biennis
Oenothera fruticosa
Oenothera laciniata
Onoclea sensibilis
Ophioglossum vulgatum var. *pycnostichum*
Opuntia sp
Orchis spectabilis
Osmunda cinnamomea
Osmunda regalis var. *spectabilis*
Oxalis dillenii
Oxalis florida

Oxalis stricta
Oxalis violacea
Pachysandra terminalis
Panicum aciculare
Panicum boscii
Panicum clandestinum
Panicum commutatum
Panicum depauperatum
Panicum dichotomum
Panicum lanuginosum
Panicum laxiflorum
Panicum polyanthes
Parthenocissus quinquefolia
Paspalum dilatatum
Paspalum laeve
Paspalum notatum var. *saurae*
Passiflora incarnata
Passiflora lutea
Paulownia tomentosa
Pedicularis canadensis
Peltandra virginica
Penstemon australis
Perilla frutescens
Phlox nivalis var. *hantzii*
Phoradendron serotinum
Phryma leptostachya
Physalis virginiana
Physocarpus opulifolius
Phytolacca americana
Pilea pumila
Pinus echinata
Pinus strobus
Pinus taeda
Pinus virginiana
Plantago major
Plantago virginica
Platanus occidentalis
Poa autumnalis
Poa chapmaniana
Poa cuspidata
Poa sylvestris
Podophyllum peltatum
Polygonatum biflorum
Polygonum convolvulus
Polygonum pensylvanicum
Polymnia uvedalia
Polypodium polypodioides
Polystichum acrostichoides
Polystichum acrostichoides forma *incisum*
Populus alba
Populus deltoides
Potentilla canadensis
Potentilla simplex

Frenanthes serpentaria
Frunella vulgaris
Prunus americana
Prunus angustifolia
Prunus caroliniana
Prunus persica
Prunus serotina
Pteridium aquilinum
Pueraria lobata
Pycnanthemum incanum
Pyrus communis
Quercus alba
Quercus coccinea
Quercus falcata
Quercus lyrata
Quercus marilandica
Quercus michauxii
Quercus nigra
Quercus phellos
Quercus rubra
Quercus stellata
Quercus velutina
Ranunculus abortivus
Ranunculus parviflorus
Ranunculus recurvatus
Rhamnus caroliniana
Rhododendron nudiflorum
Rhus copallina
Rhus glabra
Rhus radicans
Rhynchosia tomentosa
Rhynchospora glomerata
Rosa multiflora
Rubus argutus
Rubus canadensis
Rubus flagellaris
Ruellia caroliniensis
Rumex acetosella
Rumex crispus
Sagittaria latifolia var. *pubescens*
Salix nigra
Salvia lyrata
Sambucus canadensis
Sanguinaria canadensis
Sanicula canadensis
Sanicula marilandica
Sassafras albidum
Saxifraga virginiana
Schrankia microphylla
Scirpus cyperinus
Scirpus polyphyllus
Scleria oligantha
Scutellaria elliptica

Scutellaria integrifolia
Selaginella apoda
Senecio smallii
Setaria geniculata
Silene virginica
Silphium dentatum var. dentatum
Sisyrinchium angustifolium
Sisyrinchium mucronatum
Smilacina racemosa
Smilax bona-nox
Smilax glauca
Smilax rotundifolia
Solanum carolinense
Solanum nigrum
Solidago altissima
Sorghum halepense
Specularia biflora
Sphenopholis intermedia
Spiranthes ovalis
Stellaria graminea
Stellaria media
Stellaria pubera
Stipa avenacea
Stylosanthes biflora
Styrax americana
Styrax grandifolia
Symplocos tinctoria
Taenidia integerrima
Taraxacum officinale
Tephrosia virginiana
Thalictrum thalictroides
Thaspium barbinode
Thelypteris hexagonoptera
Thelypteris noveboracensis
Tiarella cordifolia
Tilia americana
Tilia heterophylla
Tradescantia rosea var. rosea
Tridens flavus var. flavus
Trifolium pratense
Trifolium repens
Trillium catesbaei
Trillium lanceolatum
Typha latifolia
Ulmus alata
Ulmus americana
Ulmus rubra
Uniola latifolia
Uniola sessiliflora
Uvularia perfoliata
Uvularia sessilifolia
Vaccinium arboreum
Vaccinium atrococcum



Vaccinium corymbosum
Vaccinium elliottii
Vaccinium stamineum
Vaccinium vacillans
Valerianella radiata
Verbesina occidentalis
Veronica arvensis
Viburnum acerfolium
Viburnum dentatum
Viburnum nudum
Viburnum prunifolium
Viburnum rufidulum
Vicia angustifolia
Vicia caroliniana
Vinca major
Viola hastata
Viola hirsutula
Viola papilionacea
Viola rafinesquii
Viola walteri
Vitis aestivalis
Vitis rotundifolia
Wisteria sinensis
Woodwardia areolata
Xanthorhiza simplicissima
Zizia aptera
Zizia aurea

APPENDIX C: 1. SPECIES LIST OF COUNTY RECORDS

(a.) Verified Spartanburg County Records with vouchers
(located on map by correspondingly numbered white dots)

GENUS SPECIES

-
1. *Arisaema dracontium*
 2. *Carex cephalophora*
 3. *Carex gracilescens*
 4. *Carex howei*
 5. *Carex pennsylvanica*
 6. *Cenchrus incertus*
 7. *Crataegus flabellata*
 8. *Elymus canadensis*
 9. *Erianthus alopecuroides*
 10. *Fraxinus tomentosa*
 11. *Galium obtusum* var. *filifolium*
 12. *Geranium dissectum*
 13. *Habenaria clavellata*
 14. *Houstonia serpyllifolia*
 15. *Houstonia tenuifolia*
 16. *Hystrix patula*
 17. *Lespedeza capitata*
 18. *Liparis liliifolia*
 19. *Luzula acuminata*
 20. *Malaxis unifolia*
 21. *Oxalis florida*
 22. *Panicum aciculare*
 23. *Panicum lanuginosum*
 24. *Poa chapmaniana*
 25. *Poa cuspidata*
 26. *Poa sylvestris*
 27. *Polystichum acrostichoides* forma *incisum*
 28. *Rubus canadensis*
 29. *Sanicula marilandica*
 30. *Spiranthes ovalis*
 31. *Stellaria graminea*
 32. *Vaccinium corymbosum*
 33. *Viola hirsutula*
 34. *Zizia aptera*

APPENDIX C: 1. SPECIES LIST OF COUNTY RECORDS

(b.) Unverified Spartanburg County Records without vouchers
(not located on map)

GENUS SPECIES

1. Amelanchier canadensis	*
2. Cannabis sativa	***
3. Carex leptalea	*
4. Carex oligocarpa	*
5. Eleocharis baldwinii	****
6. Lemna perpusilla	**
7. Lespedeza hirta	*
8. Plantago major	**
9. Prunus caroliniana	**
10. Quercus lyrata	*
11. Solanum nigrum	**
12. Taenidia integerrima	**
13. Trillium lanceolatum	*
14. Uvularia sessilifolia	*
15. Viola walteri	

* identified in field by Dr. Wade Batson or
Dr. Douglas A. Rayner

** specimen lost

*** illegally planted and destroyed

**** collected by Dr. Cynthia Aulbach-Smith, July, 1987.
Location unknown



APPENDIX C: 2. THREATENED AND ENDANGERED PLANTS

(Located on map by correspondingly numbered white dots)

GENUS SPECIES

3. *Carex gracilescens*35. *Helianthus laevigatus*

APPENDIX C: 3. LARGE TREES

(Located on map by correspondingly numbered white dots)

GENUS SPECIES	D.B.H.in inches
36. <i>Liriodendron tulipifera</i>	60.4
37. <i>Liriodendron tulipifera</i>	48.7
38. <i>Populus deltoides</i>	58.1
39. <i>Quercus michauxii</i>	53.3

The Geology of Croft State Park
Spartanburg County, South Carolina¹

By Terry A. Ferguson
Department of Geology
Wofford College

Croft state park is generally underlain by Paleozoic age, (approx. 360-250 Ma) crystalline rocks (ie. metamorphic and igneous rocks). The rocks of the park are located in two distinct regions or belts which contain similar rock types and geologic histories: The Inner Piedmont Belt and the Kings Mountain Belt (Figure 1). These belts trend NE-SW and bisect the park so that the western portion of the park is located in the Inner Piedmont Belt and the eastern portion in the Kings Mountain Belt (Figure 1).

The major portion of the rocks falling in the Inner Piedmont portion of the park can be classified generally as Paleozoic age paragneiss and orthogneiss. Simply stated, this refers to medium- to high-grade metamorphic rocks (gneisses) which prior to regional metamorphism were either preexisting sedimentary rocks (paragneiss) or igneous rocks (orthogneiss). More specifically, the paragneiss and orthogneiss of the Inner Piedmont Belt are mainly biotite and granitic gneisses; with sparse amphibole gneiss and minor amounts of amphibolite (Mittwede 1989). These rocks underlie the majority of the western half of the park.

Within the Inner Piedmont Belt portion of the park are several other types of rocks which are either thrust-emplaced inclusions (thrust slices or klippen) or intrusions of igneous rocks into the gneisses. The igneous rocks which can be

characterized as thrust slices or klippen are associated with the Hammett Grove Meta-igneous Suite and include: a) altered (steatitized and serpentinized) ultra-mafites (metaperidotite); mostly soapstone, impure talc schist and antigorite serpentinite; b) metapyroxenite; and c) metagabbro (Mittewede 1989).² Outcroppings of these rocks occur as lenses of boulders and float, and have only been located in the northwestern most corner of the park (Figure 1). The use of these rocks by prehistoric inhabitants of the area approximately 3,000 yrs ago give the rocks a cultural as well as geologic significance.³ The outcroppings of the altered ultra-mafites that are located in the park show definite signs of having been used for the production of stone bowls.

Igneous intrusions located in the Inner Piedmont Belt portion of the park include: a) pods and sills (syn-or post-kinematic) of undeformed granite, most probably Devonian in age; and b) Mesozoic age, diabase dikes (Mittewede 1989). The pod and sills of undeformed granite primarily outcrop along a NE-SW trending line in the in the northwest portion of the park (Figure 1). A diabase dike also outcrops in the vicinity of one of the granite outcrops in the northwest portion of the park (Figure 1).

The Kings Mountain Shear Zone is a zone of Late Paleozoic deformation separating the Inner Piedmont Belt to the west from the Kings Mountain Belt to the east (Figure 1). This zone is a pronounced discontinuity which exhibits a NE-strike with a steep to moderate SE-dip (Horton 1981a, 1981b). The major portion of the rocks falling within and immediately to the east of the Kings

Mountain Shear Zone, in the Kings Mountain Belt portion of the park have been assigned by Mittwede (1989) to the Battleground Formation and include: a) metamorphosed, schistose to gneissic, volcanic and sedimentary rocks; and b) manganiferous mica schist with concordant layers of gondite, assigned by Mittwede (1989) to the Jumping Branch Manganiferous Member of the Battleground Formation. These rocks are generally low- to medium-grade metamorphic rocks, which existed as volcanic and sedimentary rock before they were regionally metamorphosed. The rocks of the Battleground Formation trend NE-SW across the east-central portion of the park (Figure 1).

Igneous intrusions located within the Kings Mountain Belt portion of the of the park include: a) pegmatite dikes, probably associated with the intrusion of the nearby Pacolet Mills pluton and b) Mesozoic age, diabase dikes (Mittwede 1989). The pegmatite dikes are located in the northeast portion of the park and the diabase dike in the southeast-central portion of the park (Figure 1).

Located to the east of the rocks of the Battleground Formation, underlying the eastern most portion of the park (Figure 1) is megacrystic, biotite-rich granite; probably granodioritic in composition (Mittwede 1989). This granite is of Devonian age, and associated with the Pacolet Mills pluton, which was intruded into existing rocks during or after the regional metamorphism of the region.

As with the other portions of the park diabase dikes of Mesozoic age are also located within the portion of the park

underlain by the Pacolet Granite. Such a dike is located along the eastern edge of the park (Figure 1).

In conclusion, this report has presented only a brief summary of the geology of Croft State Park. But, even this brief report indicates that there is a wealth of valuable geologic information available within the park boundaries. Due to the geologic complexity of the area though, a more comprehensive and systematic study and mapping will be required to obtain a more detailed picture, particularly in the southern portion of the park.

Future study of the geology of Croft State Park should be conducted in conjunction with intensive systematic studies of all the park's bio-physical and cultural resources. Integrated study of this type is a vital first step in the development of comprehensive, long range management planning. Studies of this type are also well suited to the development of comprehensive databases of spatially referenced environmental information, which are the basis of Geographical Information Systems. Due to their effectiveness as a management tool the development of a Geographical Information System for the park is highly recommended. The use of Geographical Information Systems for education and research, as well as management is becoming increasingly popular. Future systematic study would be an excellent opportunity to develop such a system and to assess its potential.

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Notes

1 This overview of the geology of Croft State Park is based on a synthesis and extrapolation of recent geologic mapping by Mittwede (1989) and unsystematic, spot field observations by the author. The mapping by Mittwede (1989) and field coverage by the author focused on the northern portion of the park. Therefore, coverage in the southern portion lacks the detail of the northern portion and interpretations are more tenuous. Any errors or inconsistencies in this report are the sole responsibility of the author.

2 Though these rocks occur within the Inner Piedmont Belt they have been associated by Mittwede (1988) with the Kings Mountain Belt.

3 For further information on the prehistoric use of soapstone in this area see Ferguson (1980)

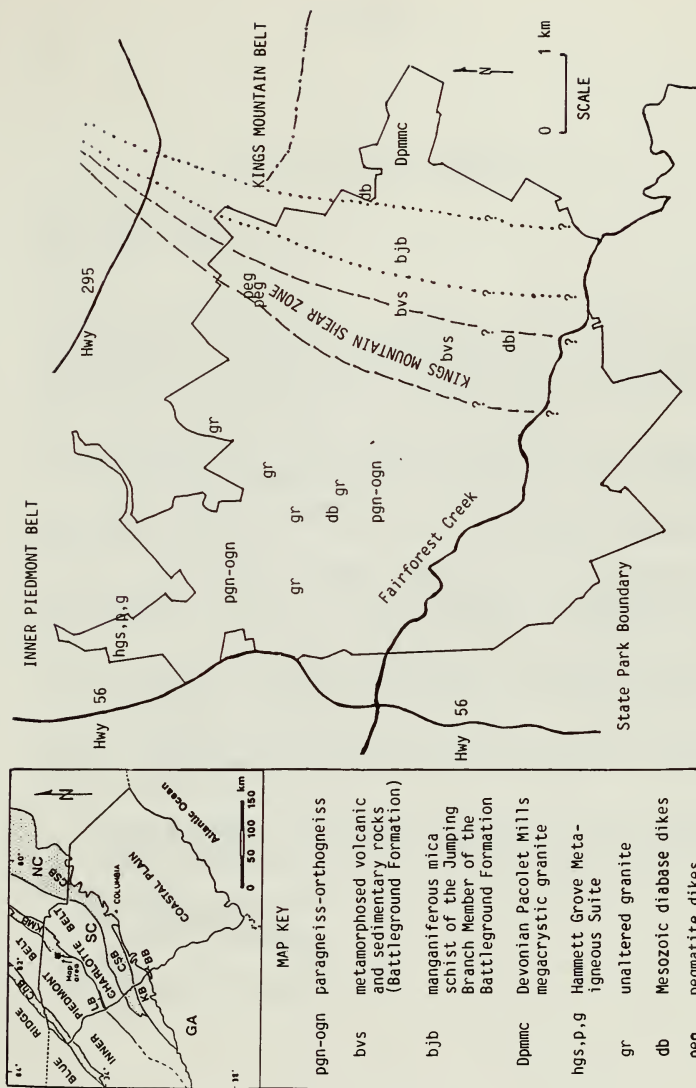


Figure 1. Generalized Geologic Map of Croft State Park (adapted from Mittwee 1988, 1989).

APPENDIX E

Wofford College
Spartanburg, South Carolina 29301
June 18, 1989

Dr. Robert Powell
Department of Biology
Converse College
Spartanburg, South Carolina

Dear Bob:

The most embarrassing thing about this brief letter is that I don't know whether your last name has one "l" or two! But nevertheless, I do need to get a report into your hands as soon as possible. To begin with, let me say that I thoroughly enjoyed working on the Croft Project-- since it gave me some free flying hours and also provided a place for me to send a bunch of highly motivated students. Anyhow, here's how we did:

I. Sherman Traps. All trapping was done with standard, "large folding aluminum," 7.6X8.9X22.9cm, traps from H.B. Sherman Trap Company, (904) 562-5566, baited with oatmeal & peanut butter.

A. 3 nights (6-8MAR) X 40 traps running about 2km upstram from Foster Mill. Total captures: 5 Peromyscus leucopus and 2 Ochrotomys nuttalli.

B. 3 nights (13-15MAR) X 40 traps vic. Pump Station, north Croft. Total captures: 9 Peromyscus; most are almost certainly P. leucopus, but two closely resemble P. maniculatus, and I believe one to be so (skull saved; Wofford College).

C. 3 nights (3-5APR) X 40 traps on line running from "old swimming pool area" to creek feeding NW corner of Lake Craig. Total captures: 10 Peromyscus leucopus; 1 Peromyscus maniculatus (?), 1 Sigmodon hispidus.

II. Drift Fence (1 50-foot fence with 6 buckets and 4 funnel traps). Emplaced 11APR; closed (in place) 19MAY. Captures by dates (note: these are dates fence was checked, not necessarily dates animals were caught):

16APR:

Nerodia sipedon. Although a bit out of range, this animal has very clearly the pattern of the subspecies N. s. sipedon.
Sorex longirostris. Saved for eventual skull prep.

18APR:

Chelydra serpentina.
Rana catesbeiana.
1 unidentified Rana.

20APR:

Kinosternon subrubrum.

28APR:

Didelphis virginiana.
1 unidentified Eumeces, either E. fasciatus or E. inexpectatus; released in error.

29APR:

3 unidentified shrews (discarded in error)
Ambystoma maculatum.

2MAY:

Bufo americanus (note: like other D. Croft Bufo, it shows B. woodhousei influence).
Rana catesbeiana.
Rana utricularia (or whatever they are calling southern leopard frogs these days).
Ambystoma opacum.

6MAY:

3 Cryptotis parva.
2 Rana catesbeiana.
Rana utricularia.
Kinosternon subrubrum.
Ambystoma opacum.
Nerodia erythrogaster.

9MAY:

Cryptotis parva.

11MAY:

Cryptotis parva.
Rana utricularia.

14MAY:

Sorex longirostris (saved for eventual skull preparation).

19MAY:

2 Cryptotis parva (one very large and very rotten one possibly Blarina; saved for eventual skull preparation).
Sorex longirostris (saved for eventual skull preparation).
Bufo americanus (see note on Bufo above).
Rana catesbeiana.
Rana utricularia.

All collections were made under SWMR Scientific Research Permit Number 0006-89, issued to me.

Again, thanks for letting us be a part of your project. I'll be out of town for a while, but when I get back, I'll give you a call.



Clarence L. Abercrombie, III
Associate Professor

**South Carolina Breeding Bird Atlas
FIELD DATA CARD**

QUICKSEARCH NAME	N/A	COUNTY	50786	READ INSTRUCTION MANUAL BEFORE COMPLETING THIS CARD
BLOCK	N/A	SPECIAL AREA	50786	
NAME	MARCUS CLARK NATION CLUB			
ADDRESS	507 NORD - 117 S			
PHONE	262-3555			

Year	1	0	8	9
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507 1400-1.12 5-
PHONE 1.12 TSC 3760

10 553-8167

[illegible][illegible]

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38 Confirmed nesting species. 97- 67

TOTAL PARTY HOURS _____ TOTAL SPECIES _____

[illegible]

(over)

