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Vegetation of the Savannah River Site: Major Community Types

by

Sarah W. Workman
Kenneth W. McLeod

A Publication of the Savannah River Site
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Savannah River Ecology Laboratory
Drawer E
Aiken, SC 29802
USA

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ABSTRACT

The eight major plant community types of the Savannah River Site (SRS) site are distributed along topographic and moisture gradients and strongly controlled by local management practices. Communities range from sandhill communities in the xeric uplands to bottomland or swamp forests in low-lying areas subject to periodic flooding. The majority of the SRS land area is managed as pine plantation. However, old fields, upland hardwoods, and numerous aquatic communities including ponds, marshes, and Carolina bays cover approximately one-third of the land area on the SRS. Though there is some similarity to old field communities, vegetation of roadsides, powerline cuts and other disturbed herbaceous communities is not specifically covered in this document.

The variety of community types and extensive land area (78,000 ha) of the SRS provides habitat for a diversity of plant species. As a National Environmental Research Park, the SRS provides an area for study of man-altered systems in relation to natural systems. A site-wide Set-Aside Areas program designates specific parcels of land representing different community types on the SRS. These areas conserve habitat for plants and wildlife, including some endangered, threatened and rare species.

This document provides descriptions, including community characteristics and species composition, for the eight major vegetation communities of the SRS (old field, sandhill, upland hardwood, pinelands, bottomland, swamp, Carolina bay and fresh water). Species lists of tree, shrub, vine, herbaceous, and lower plant species of the SRS, by community type, were compiled from existing literature, herbarium information, and solicited additions from researchers familiar with SRS vegetation; these are provided in appendices.

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ACKNOWLEDGMENTS

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INTRODUCTION

Several interacting factors influence the development of vegetation communities. Geologic history and soil types that develop from parent rock of a given region, combined with climatic factors such as rainfall and temperature extremes, determine which plant species will survive and reproduce under prevailing conditions. The resulting combinations of plant species are thus indicative of local conditions; the distribution of any given species varies according to its relative tolerance of the environmental factors. The length of time a community has had to develop, either naturally or following a perturbation, and variations in topographical landscape also play critical roles in determining vegetation patterns. All of these factors--geology, soils, climate, topography and site history--have shaped vegetation patterns on the U.S. Department of Energy's Savannah River Site (SRS).

While much of the environmental and ecological research conducted on the SRS uses an experimental approach, the vegetation of the SRS has been described in a number of older studies but never comprehensively presented. In this document data from previous works have been reviewed and summarized into qualitative descriptions of the eight major vegetation community types of the SRS. Comprehensive information on old field, forest, Carolina bay, and freshwater habitats of the SRS is provided. The present document was prepared in order to:

1. Compile a comprehensive document describing the major vegetation communities on the SRS.
2. Describe environmental parameters affecting species composition and distribution of communities.
3. Include a list of species by community type.

Illustrations and photographs are included to aid understanding of environmental gradients influencing SRS vegetation and to familiarize readers with the qualities of SRS communities and the species comprising them. Appendices containing lists of plant species grouped by growth form and indicating community type have been placed at the end of the text. Botanical nomenclature for vascular plants in this report follows Radford et al. (1968). A glossary is also provided.

The Appendices list vascular and non-vascular plant species (except algae). Overlap of species between communities is common. For example, some species found in upland hardwood communities are also found in stream bluff habitats or, less commonly, in pine forests. This is especially evident in transition areas from one community type and an adjacent community type. Sources of information on species in different communities include not only literature cited in the text but

also several documents produced by researchers studying the flora of the Savannah River Project area in the 1950s.

W.T. Batson and his associates at the University of South Carolina made extensive collections of the SRS dicot plant species (Batson & Kelly, 1953a; Kelley & Batson, 1955a,b, 1956, 1957, 1958a,b). Collections were also made of monocots (Batson & Kelley, 1953b, 1958), mosses (Batson, 1955a,b,c), fungi (Batson, 1955d; Hoy, 1955, 1957, 1958) and other lower plant species (Batson, 1955e). Porter et al. (1958) made additions to the above lists for bottomland communities.

Species listings from other publications were also reviewed for inclusion in the appendices (Kelley & Batson, 1955c; Neismann, 1977; Pechmann et al., 1984, 1985). Further floristic information is contained or referenced in "The Flora of the Savannah River Site" (Batson, Jones and Angerman, 1985), "Studies of Aquatic and Terrestrial Environments of the Savannah River Site, South Carolina: A Bibliography" (Wiener and Smith, 1981), and "Endangered, Threatened, and Rare Vascular Flora of the Savannah River Site" (Knox and Sharitz, in press). Additional collection and documentation for the SREL herbarium are being made by Nancy Coile, curator of the University of Georgia herbarium.

SITE DESCRIPTION

The Savannah River Site (SRS) is a nuclear production facility of the United States Department of Energy and occupies approximately 78,000 ha of land in west central South Carolina, 32 km south of Aiken. Public access to the SRS is controlled because the site is an integrated nuclear complex, including nuclear reactors, nuclear fuel chemical separations plants, a fuel fabrication facility, and a nuclear research laboratory. When land area for the nuclear materials production facility was acquired in 1950, 67% was forested and 33% was crop or pasture land. All forest stands, except those with limited access on the floodplain, had been logged. Corn, cotton, and peanuts were the major crops (Hoy, 1953; Langley and Marter, 1973).

Parts of Aiken and Barnwell counties, and a corridor along Lower Three Runs Creek in Allendale county, are encompassed by the SRS. In 1952 the site was closed to the public and the U.S. Forest Service began planting pine seedlings as part of the timber management plan designed for watershed stabilization (Langley and Marter, 1973). In 1972, the SRS was designated as the country's first National Environmental Research Park. A major purpose in establishing the research park was to provide an area for study of man-altered systems in relation to natural ecosystems.

The SRS lies in the Upper Coastal Plain Physiographic Province (Figure 1). Two physiographic subregions of the province are represented on the SRS. Upland areas above 82 m elevation in the north and central SRS lie on the Aiken Plateau. The 12,000 ha on the Plateau are characterized by sandy soils which have been deeply eroded by stream drainages. The area is underlain by Upper Cretaceous (Appendix A), Tertiary, and Quaternary deposits which have been severely eroded. These unconsolidated sediments unconformably overlie pre-Cambrian to Permian age igneous and metamorphic rocks (U.S. DOE, 1987).

The Pleistocene coastal terraces occupy the southwestern region of the SRS and roughly parallel the Savannah River. This subregion is composed of three adjacent terraces which represent successive recessions in sea level during the glacial epoch approximately 10,000 to 1,000,000 years ago (Figure 2). The Brandywine terrace is the highest and oldest. It lies adjacent to the Aiken Plateau and parallels the river at elevations between 50 m and 82 m. The Sunderland terrace lies between 30 m and 50 m and is second oldest and highest. The Wicomico terrace, the lowest and youngest, occupies the broad floodplain between the river and 30 m elevation. Areas with favorable soils and drainage on the Brandywine and Sunderland terraces were used extensively for agriculture before the SRS was established (Cooke, 1936; Langley and Marter, 1973).

Geologic formations composing the Aiken Plateau and terraces are from 10 to 50 million years old. These relatively young surface sediments overlie Cretaceous sediments (Middendorf/Black Creek (Tuscaloosa)) (Figure 3). This formation is 150 to 180 m thick below the SRS and consists of clay and sand. It

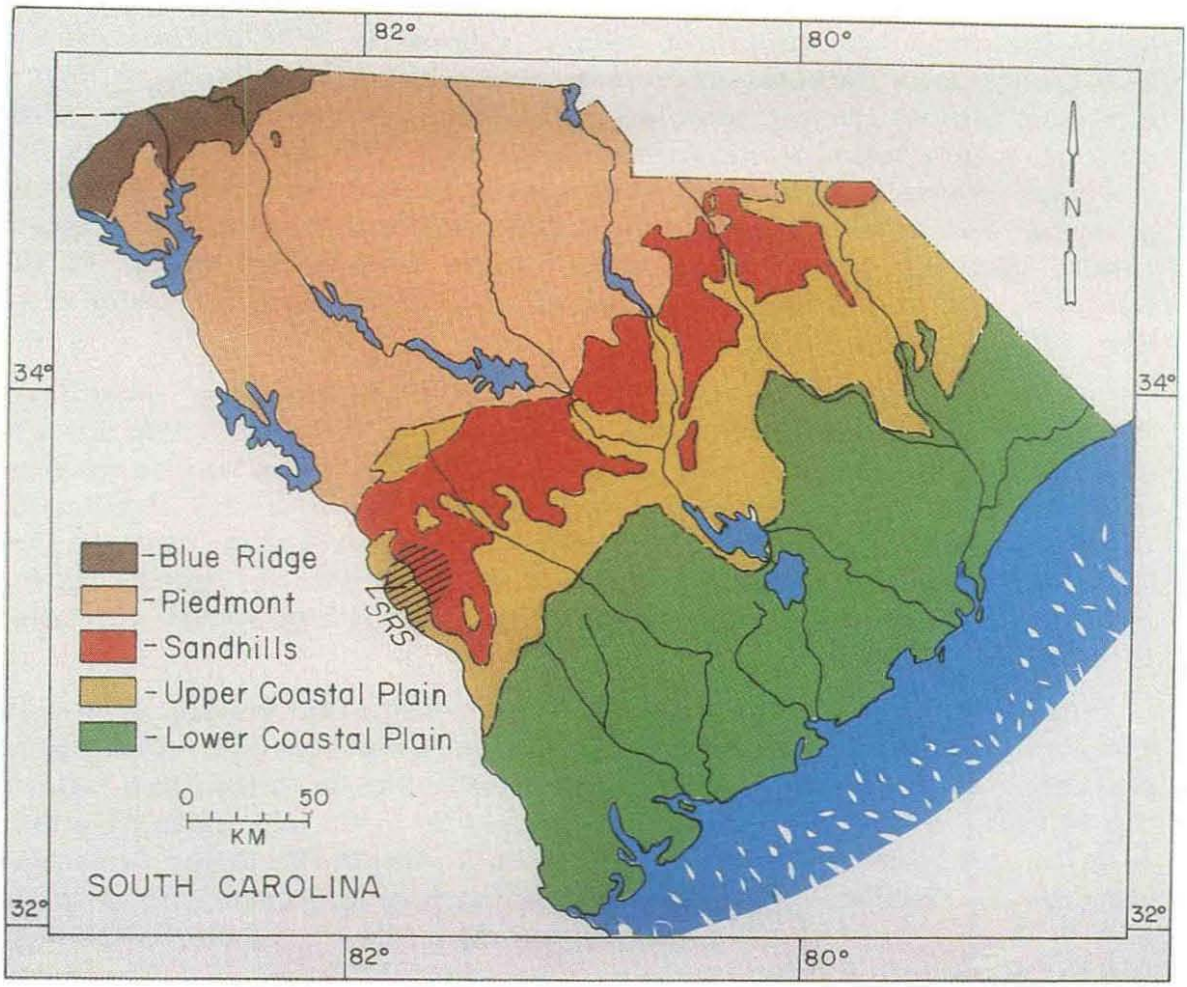


Figure 1. The Savannah River Site in relation to the physiographic provinces of South Carolina.

contains many water-bearing beds, including the primary aquifer of the area. The Middendorf (Tuscaloosa) aquifer supplies water low in iron and dissolved solids with a pH of 4.4 to 6.9 (Langley and Marter, 1973; Dukes, 1983).

Below the Cretaceous sediments lies an eroded basement of igneous and metamorphic rocks dating from the Precambrian and/or Paleozoic Eras. This rock is part of a crystalline formation containing hornblende gneisses and schists. It is found approximately 300 m under the SRS. The Dunbarton Basin, formed by normal faulting of crystalline and metamorphic basement rock during the Triassic-Jurassic Periods, is filled by sandstones, shales, and conglomerates. It underlies the Cretaceous-Quaternary unconsolidated sediments in the southeastern portion of the SRS (U.S. DOE, 1987).

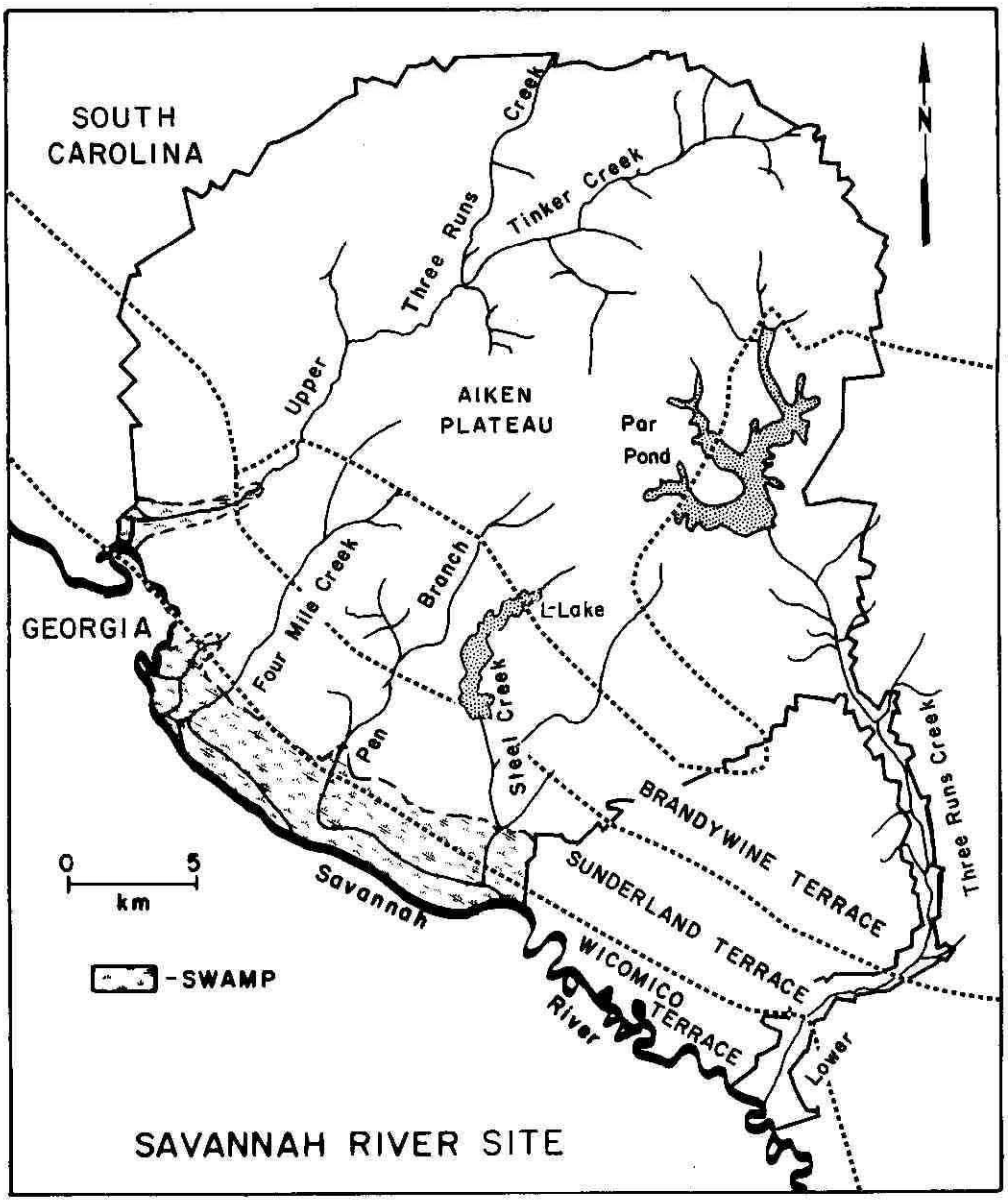


Figure 2. Location of the Pleistocene coastal terraces on the SRS. (Modified from Langley and Marter, 1973.)

The temperate climate of the SRS region, described by Langley and Marter (1973) and Dukes (1983), is characterized by long summers and mild winters. Air temperatures average 27°C in the summer and 9°C in the winter. The frost-free period is approximately 240 days long. Annual rainfall from 1952 to 1981 averaged 120 cm with the most rain in March (13.1 cm) and the least in November (5.9 cm). Prevailing wind direction shifts frequently, but tends to blow from the southwest. Average wind velocity is about 6.4 kph.

The major soils of the SRS are briefly described in Appendix B. Soil qualities vary with the elevational or topographical gradients (Figure 4) of the

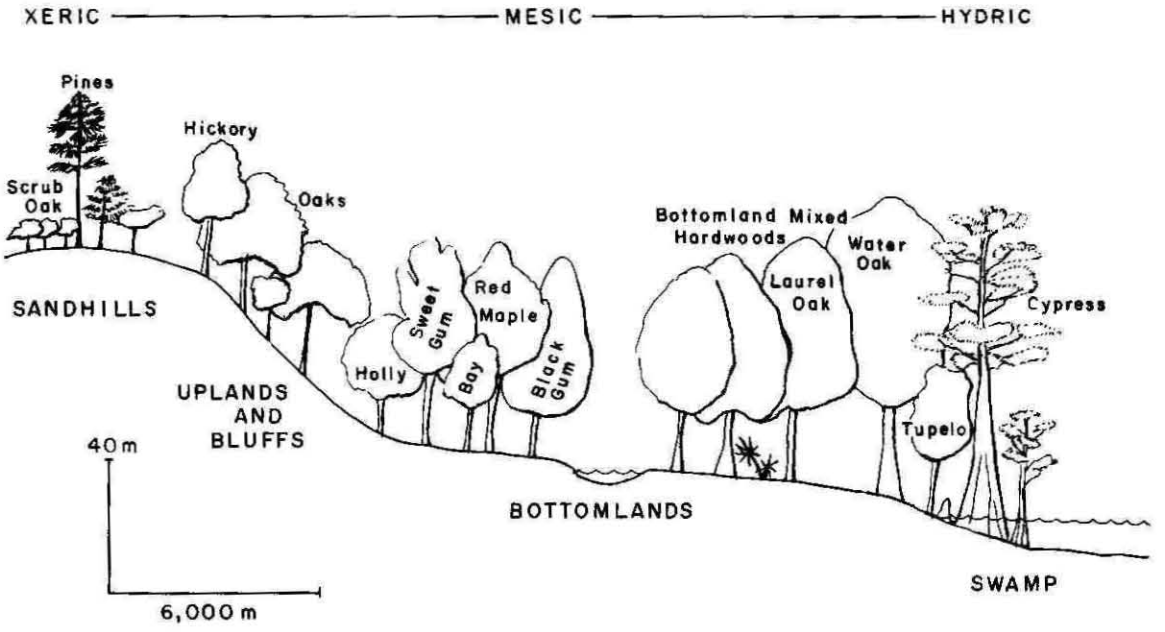


Figure 4. Topographical gradient from the sandhills on the Aiken Plateau to the swamp. The change in elevation is about 80 m.

landscape. Sandy soil types characteristic of the uplands and ridges are generally less fertile than heavier soils containing loam or clay on stream terraces and floodplains. Soil types in the more mesic lowlands differ in relation to depth and duration of flooding (V. Rogers, Soil Conservation Service, pers. comm.). More detailed information about SRS soils will be available when a current survey and mapping report are published.

Soil qualities combined with topography, and moisture gradients, and land management practices determine the vegetation patterns of the SRS landscape (Figure 5). This vegetation map is derived from Forest Service records and thus does not adequately represent small, non-forest or non-commercial forest vegetation types, such as old fields or Carolina bays. Nevertheless, these are distinct vegetation types and are discussed as such. The separation of hardwood forests into upland and sandhill forests is also very difficult from Forest Service and hence are grouped together in Figure 5. Plant communities adapted to dry conditions occur on the upland areas of the SRS on the Aiken Plateau. The most common community types of the northern half of the SRS are longleaf pine plantations and longleaf pine-turkey oak sandhills. More mesic areas along

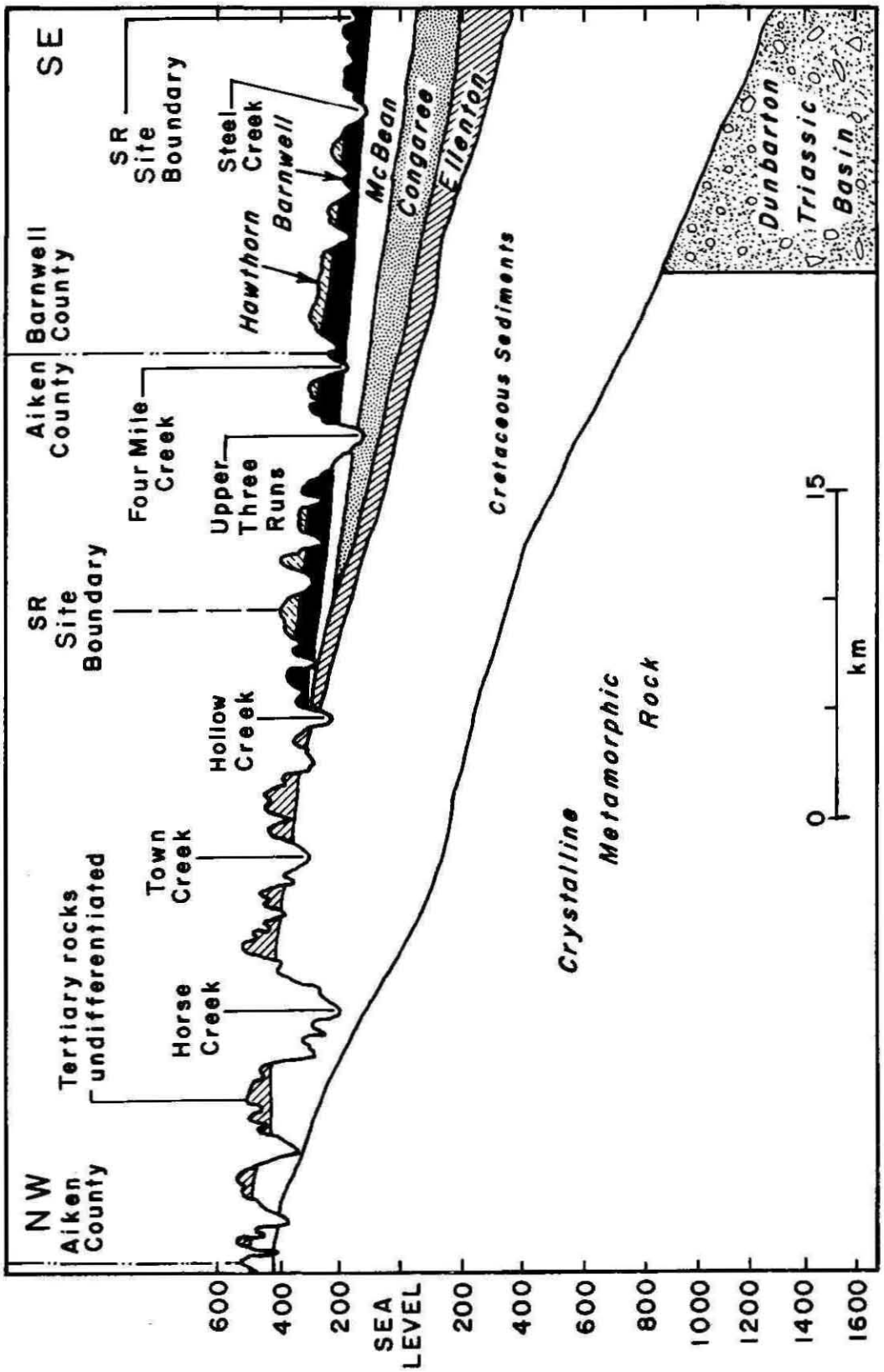


Figure 3. Geological formations underlying the Savannah River Site. (Modified from Langley and Marter, 1973.)

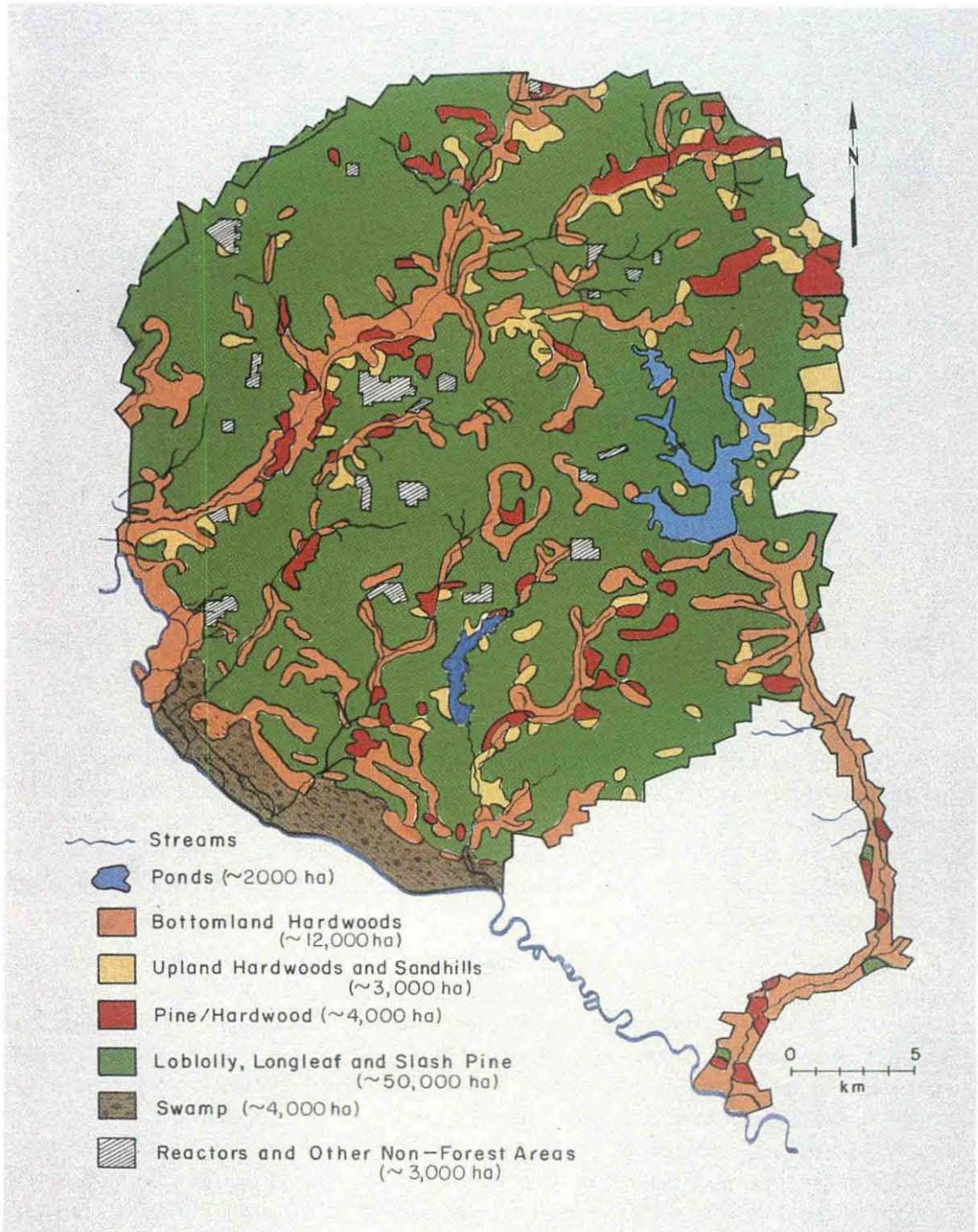


Figure 5. Map of the major vegetation types and their approximate areas (hectares) on the Savannah River Site, South Carolina.

streams and on coastal terraces support different groups of plant species, including loblolly pine and bottomland forest communities.

Aquatic habitats, such as ponds, marshes, and Carolina bays, add diversity to the SRS plant community types. These aquatic habitats and other wetlands of the SRS contain two-thirds of the rare plants reported on the SRS (Knox and Sharitz, in press). Each of the eight SRS communities will now be described in detail.

COMMUNITY TYPES

Old Fields

Pasture and cropland covered approximately 27,000 ha when the SRS was established (Odum, 1960). Many of these old fields, most of which were formerly cotton or corn fields, were planted with pine and have been managed as plantations. Other fields not planted with pine exhibit a characteristic sequence of natural revegetation. Currently, 260 ha of old fields are found on the SRS.

Succession from weedy annual and biennial herbs to perennial grasses occurs within the first eight years after the field is abandoned (Tulloch and Batson, 1954; Kelley and Batson, 1956; Odum, 1960; Pinder, 1975). Shrubs and trees begin colonizing fields during the first three years and become well established by the tenth year (Odum, 1960; Spring et al., 1974). Eventually, as tree species increase in number and size, a southern mixed hardwood forest develops as the climax vegetation (Quarterman and Keever, 1962).

Dominant herb species during the first five to seven years include: horseweed (*Erigeron canadense*), yellow aster (*Haplopappus divaricatus*), purple cudweed (*Gnaphalium purpureum*), camphorweed (*Heterotheca subaxillaris*), crab grass (*Digitaria sanguinalis*), and sheep sorrell (*Rumex acetosella*). Beginning the fourth year, grasses become the most important community dominants and clumps of broomstraw (*Andropogon ternarius*) or broomsedge become established (Odum, 1960; Golley, 1965; Golley and Gentry, 1966). These clumps indicate the relative age of a field (Figure 6). Mature fields have fewer large broomstraw clumps and more smaller, evenly distributed clumps than young fields (Golley, 1965).

As grasses increase in importance, species diversity decreases and growth of forbs, dominant in earlier successional stages, is increasingly limited by competition with grasses (Pinder, 1975; Monk and Gabrielson, 1985). Blackberry and loblolly pine also invade old fields during the first ten years after abandonment (Golley, 1965).

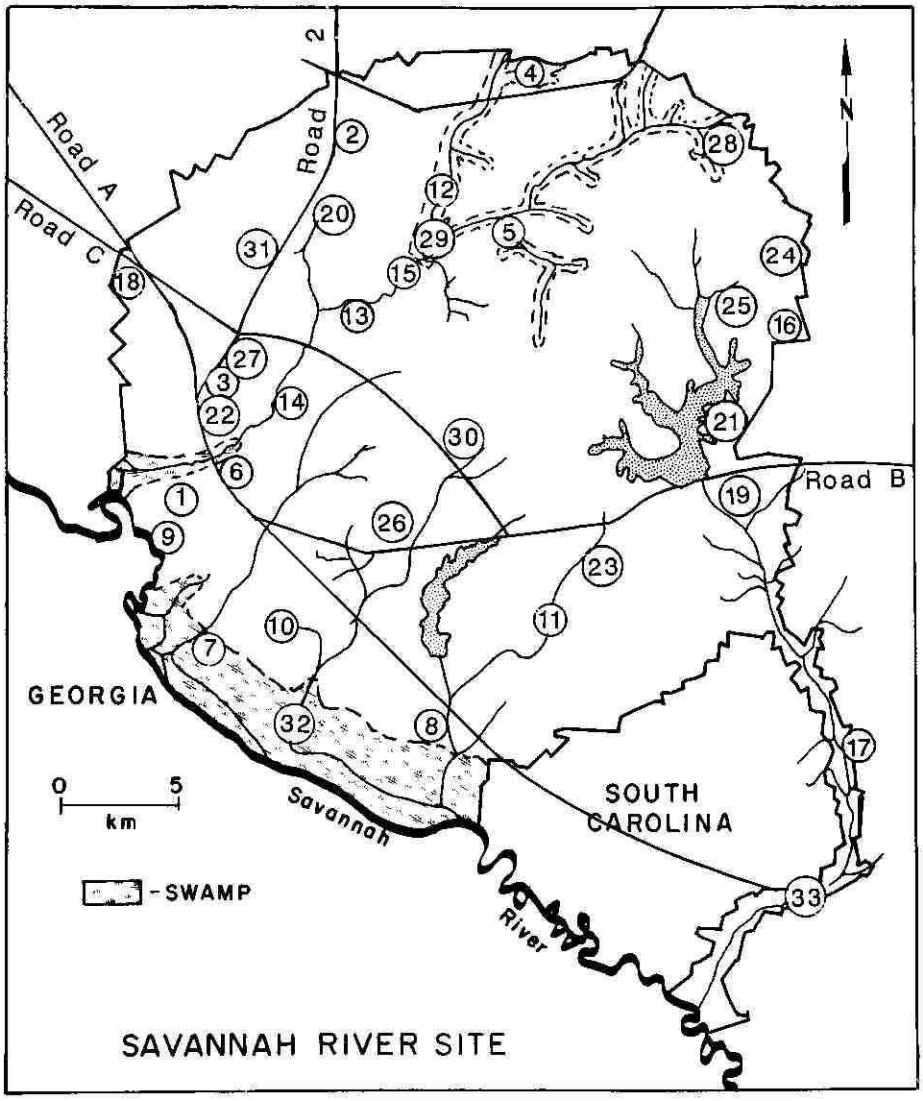
Dominant species vary with different seasons, changing the appearance of the old fields. Blue toadflax (*Linaria canadensis*) is common in the spring. Later in the spring and in early summer, sheep sorrell becomes dominant and gives old fields a characteristic reddish hue. Purple cudweed develops with sheep sorrell and persists as the mid-summer dominant. Daisy fleabane (*Erigeron* spp.) is also common during the summer months. The major producers, horseweed and camphorweed in the early years of succession, and broomsedge and dog fennel in the latter, dominate the fall old fields (Odum, 1960; Golley, 1965).

The rate of succession and the number of dominant species at any stage are influenced by size and cropping of the former agricultural area. In small fields, less than 120 ha, succession and species establishment are often more rapid than in larger fields, greater than 200 ha (Golley and Gentry, 1966). Soil texture, soil

Figure 6. Broomstraw in an old field community.

fertility, and soil moisture also influence succession in old field habitats. The number of dominant species and rate of succession increase with increased silt-clay content of the soil and decreased depth of the water table. This is evident by the second or third year as appearance and species composition begin to differ according to soil type underlying the field (Odum, 1960). On less well-drained or heavier soils the perennial grasses, *Andropogon* and *Cyndodon*, and the woody perennials, dog-fennel, trumpet-creeper (*Campsis radicans*), and blackberry invade rapidly. *Polypremum procumbens* also indicates high soil moisture (Batson and Tulloch, 1955). In lighter soils containing more sand, sandhill grasses tend to replace the annual forbs. Fall witchgrass (*Leptoloma cognatum*), three awn grasses (*Aristida* spp.), panic grasses and buttonweed (*Diodea teres*) are prominent in sandy old fields. Plant species characteristic of SRS old fields are listed in the Appendices.

Differences in relative abundance of dominant species on different soil types are evident when lowland fields of the floodplain terraces (e.g. field 3-412) are compared to upland fields on the Aiken Plateau (e.g. field 9-111) (Figure 7). Lowland fields are more productive, have greater species diversity, and are generally invaded more rapidly than upland fields. Both of these fields, 3-412 and 9-111, are included as Set-Aside Areas, with field 9-111 much more



Set-Aside Areas

1 Field 3-412 (Ellenton Bay, #176†)
2 University of Georgia Old Lab Site
3 Sandhills
4 Loblolly Pine Stand (Field 9-111)
5 Oak-Hickory Forest
6 Beech-Hardwood Forest
7 Mixed Swamp Forest
8 Steel Creek Bay (#143)
9 Cypress Grove
10 Risher Pond
11 Meyers Branch
12 Oak-Hickory Forest
13 Organic Soils
14 Mature Hardwood forest
15 Whipple/OHER Study
16 Sarracenia Bay (#78) & Craig's Pond (#77)
17 Boiling Springs Natural Area
18 Ginger's Bay (#17)
19 Thunder Bay (#83)
20 Flamingo Bay (#3)
21 Little Cypress Bay (#64)
22 Dry Bay (#31)
23 Cypress Bay (#92)
24 Mona Bay (#66) & Woodward Bay (#67)
25 Sandhills Fire Site
26 Barbara's Bay (#172)
27 Field 3-409
28 Scrub Oak Natural Area
29 Upper Three Runs Creek & Tinker Creek Corridors (dashed lines)

Additional Areas of Special Interest

30 Rainbow Bay (#189) & Bullfrog Pond
31 Steed Pond
32 Savannah River Swamp
33 Lower Three Runs Creek Corridor

†Numbers associated with Carolina Bays reference numbering system used by Schalles at al. (1989).

Figure 7. SRS Set-Aside Areas and other habitats of special interest.

successionally advanced than field 3-412. Field 3-409 serves as a comparison to field 3-412 and has recently been included as a new Set-Aside Area (McCort and Wein, 1988).

Sandhills

The sandhills are remnants of ancient beach dunes demarcating the ocean shoreline of the Cretaceous geologic period. Sands washed and sorted by shore currents were laid down as undulating ridges approximately 65 million years ago. These sands can reach 60 m in depth and, in combination with their texture, make sandhills soils characteristically infertile and dry.

On the Aiken Plateau, rolling hills from 80 to 130 m elevation typify sandhill topography. Topography, soil qualities, and periodic fires are the primary factors that exert selective pressure on the plant species and influence their distribution in the sandhills. Environmental factors in the sandhills interact to create the open park-like appearance of scrub oak or oak-pine communities (Figure 8). Approximately 800 ha of the SRS supports sandhills vegetation. As in

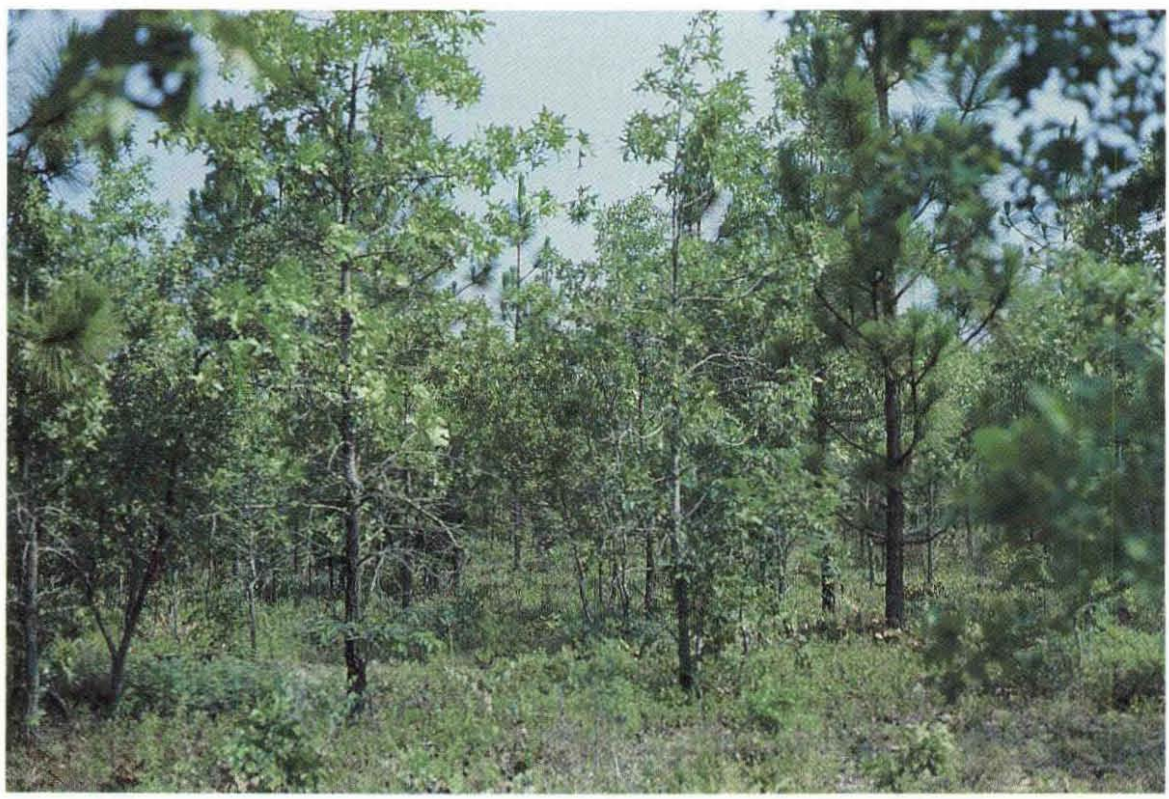


Figure 8. Typical appearance of sandhills scrub oak community.

all SRS plant communities, species composition varies along a soil moisture gradient.

Trees are widely spaced and understory growth is moderate to sparse. Longleaf pine (*Pinus palustris*) and turkey oak (*Quercus laevis*) are the dominant tree species. Pines form the upper canopy when both species are present, and scrub oaks form a low overstory.

On deep sands, or where pine has been removed, there may be pure stands of scrub oaks. Species commonly associated with turkey oak include scrub post oak (*Q. margaretta*), bluejack oak (*Q. incana*), and, on slightly heavier soils of upland flats, blackjack oak (*Q. marilandica*). Blackgum (*Nyssa sylvatica* var. *sylvatica*), sand hickory (*Carya pallida*), mockernut hickory (*C. tomentosa*), black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), and sparkleberry (*Vaccinium arboreum*) also add to the diversity of sandhill communities (Jones et al., 1981; Workman, 1982).

Scattered clumps of gooseberry (*Vaccinium stamineum*) and grasses of the genera *Aristida* and *Andropogon* are prominent in the understory. Winged sumac (*Rhus copallina*), dwarf huckleberry (*Gaylussacia dumosa*), bracken fern (*Pteridium aquilinum*), goat's rue (*Tephrosia virginiana*), and several herbaceous species are common (Batson and Kelley, 1955; Croom, 1978; Workman, in prep.). Species found in the sandhills community type are listed in the Appendices.

Three SRS Set-Aside Areas have been established as representative sandhill sites (Figure 7). The Sandhill Reserve site is located off Road 2 at Road A on the Brandywine Terrace (Hillestad and Bennett, 1982). The Society of American Foresters' (SAF) Research Natural Area is located east of Road 8.11, upland from a tributary of Tinker Creek. The majority of the SAF Research Natural Area is undisturbed. A Sandhills Fire Site southeast of Road 8.8 has also been included as a Set-Aside Area (McCort and Wein, 1988).

Upland Hardwoods

Forests dominated by oak and hickory species are found on upland flats of the Aiken Plateau, stream bluffs, and small areas near borders of wetter forest types on the SRS. Forests of dry upper and mid-slopes are distinct from lower bluff communities which are transitional to bottomland forest.

SRS oak-hickory communities are best represented on the bluffs and upland slopes along Upper Three Runs Creek or as strips of vegetation between stream bottom and ridgetops (Ezra et al., 1986). Slope steepness and aspect, soil moisture, and soil texture determine species composition in an upland hardwood community. Upland hardwood forests are most common on north facing or lower slopes (Jones et al., 1981). Elevation ranges from 30 m at lower slopes to 75 m on

ridgetops. Upland communities dominated by hardwoods occupy approximately 1800 ha of the SRS.

Topography of the remaining upland hardwood areas prevents successful pine management, thus these have recently been relatively undisturbed. Logging in adjacent pinelands, however, may result in introduction of some loblolly pine (*Pinus taeda*) into hardwood stands (Jones et al., 1981).

Upland hardwood areas, not planted with pine and rarely, if ever, subject to fire, contain mixtures of the following species as dominants: white oak (*Quercus alba*), mockernut hickory, black oak (*Q. velutina*), scarlet oak (*Q. coccinea*), and southern red oak (*Q. falcata*) (Jones et al., 1981; Whipple et al., 1981).

The oak-hickory community of the SRS can be divided into subtypes based on the presence or absence of post oak (*Q. stellata*). Post oak tends to inhabit poor soils of dry upper slopes and to decrease in abundance on better soils of mid- to lower slopes (Whipple et al., 1981). Similar subtypes have been described by other authors working in different locations in the southeast (Oosting, 1942; Braun, 1950; Golden, 1976).

On dry upslope soils black cherry is commonly found with post oak. Mid- to lower-slopes support sweetgum (*Liquidambar styraciflua*) and laurel oak (*Q. laurifolia*) (Whipple et al., 1981). Pignut hickory (*Carya glabra*), water oak (*Q. nigra*), blackgum and loblolly pine are occasionally found as minor components in the overstory (Jones et al., 1981; Whipple et al., 1981).

Upland forests have a well-developed subcanopy layer. Flowering dogwood (*Cornus florida*), mockernut hickory and white oak are abundant in the subcanopy. Black cherry, sassafras, and Georgia hackberry (*Celtis occidentalis* var. *georgiana*) may also be represented (Jones et al., 1981; Whipple et al., 1981).

Several vines occur frequently in upland hardwood communities. The most notable vines, poison ivy (*Rhus radicans*), catbriers (*Smilax glauca* and *S. bonanox*) and muscadine (*Vitis rotundifolia*) tend to reflect a moist to dry soil moisture gradient in hardwood communities (B. Collins, unpublished). Shrubs of the genera *Vaccinium*, *Crataegus*, and *Rubus* are present in the understory. Many herbs are widespread but provide little cover. Yellow jessamine (*Gelsemium sempervirens*), pipsissewa (*Chimaphila maculata*), beggar's lice (*Desmodium* spp.), panic grasses (*Panicum* spp.), wild licorice (*Galium circaezans*), partridge berry (*Mitchella repens*), flowering spurge (*Euphorbia corollata*), birthwort (*Aristolochia serpentaria*), and bird-foot violet (*Viola pedata*) are common (Jones et al., 1981; Whipple et al., 1981).

Some stream bluff communities of the SRS contain mesic hardwood forest species more characteristic of southeastern physiographic regions other than the Coastal Plain. These mesic hardwood species are common on less sandy soils of the Piedmont or Mountain physiographic provinces. Tree species of the community are tulip poplar (*Liriodendron tulipifera*), beech (*Fagus grandifolia*), red buckeye (*Aesculus pavia*), sourwood (*Oxydendrum arboreum*), and witch hazel

(*Hamamelis virginiana*). Characteristic shrubs include sweet-shrub (*Calycanthus florida*), mountain laurel (*Kalmia latifolia*), and wild azalea (*Rhododendron canescens*). Seven of the 31 rare species found on the SRS occur in upland hardwood communities (Knox and Sharitz, in press). A shrub, bog asphodel (*Nestronia umbellula*), is fairly widespread on dry bluffs along Upper Three Runs Creek. The green-fringed orchid (*Habenaria lacera*) is found in the Mill Creek Reserve area and also in Carolina bay habitats. Additional species found in upland hardwood communities are listed in the Appendices. Due to the distinctive species composition in the hardwood bluff communities, a separate species list is presented for the bluff community.

Habitats originally containing upland hardwoods rapidly decreased in cover on the SRS due to timber harvest and plantation establishment. Two SRS Set-Aside Areas containing upland hardwood communities (Figure 7) are found on the SRS: the oak-hickory forest off Road E-2 along Mill Creek and the beech-hardwood forest off Road A along Mosquito Creek. Both sites also contain bottomland vegetation (Whipple et al., 1981; Hillestad and Bennett, 1982). Recent additions of hardwood stands (McCort and Wein, 1988; McFarlane, 1988) as Set-Asides will help conserve these valuable community types on the SRS. The Upper Three Runs Management Zone established in 1988 includes some older age oak-hickory forest and other hardwood growth along Tinker Creek representative of natural communities of the SRS.

Pine Forests

Sites on the SRS dominated by pine vegetation can be divided into those natural stands which existed prior to the purchase of the SRS lands (shown in red in Figure 5) and artificially managed even-aged stands (shown in green in Figure 5). Both types are managed primarily for timber products (pulpwood and saw timber).

On the SRS in the mid-50s, the initial reforestation effort was directed at establishing pine plantations on abandoned agricultural land (Hoy and Porter, 1958). A variety of pine species--longleaf, loblolly and slash pine (*Pinus elliottii*)--allowed an appropriate species to be used for different habitat types. Pine forests currently cover the majority of land area on the SRS. Approximate SRS land area (ha) covered by the pine species as of 1983 are as follows: 19,000 loblolly, 15,000 longleaf, 14,000 slash, 4,000 mixed pine and hardwood, and 45 sand, scrub, or other pine species (*P. clausa*, *P. virginiana*).

Common silvicultural practices, such as planting seedlings at specified densities, thinning stands periodically, and using prescibed burns are employed to produce the desired timber products. Seed tree cuts will be used in the future as an alternative method of regeneration.

Soil type, stand age, and management practices (e.g. thinning and prescribed burning) determine basal area, density, and canopy thickness of trees as well as understory composition and litter depth. In general, pine stands that are less densely stocked support greater species diversity in the understory (Hoy and Porter, 1958).

Newly established pine plantations contain a large percentage of non-pine vegetation. As the stand ages and the canopy closes, non-pine vegetation decreases. Events that cause canopy opening, such as commercial thinning or natural mortality, result in increased non-pine vegetation in the understory. Similarly, when fire is used to reduce competition of other woody species with pine, a short-term increase occurs in herbaceous species.

Of the pine species planted, longleaf is best adapted for xeric conditions. Therefore, plantations of this species have been established on the more productive soils of the sandhills (Figure 9). Little attempt has been made to establish plantations on the less productive sites, though some sand pine plantings are being planned for the near future. Stands are planted on undulating to nearly level ridges of the Aiken Plateau. Natural stands may become established following thinning or fire (Jones et al., 1981).

Figure 9. Young longleaf pine plantation.

Common associates in older longleaf communities include small numbers of loblolly pine, an occasional water oak or willow oak (*Q. phellos*), and sand hickory saplings. Gooseberry and broomsedge (*Andropogon virginicus*) are common components of the poorly developed ground cover (Jones et al., 1981).

In younger, often heavily stocked longleaf stands, water oak, persimmon (*Diospyros virginiana*), black cherry and sassafras seedlings are found infrequently. Understory herbs include broomsedge, spider wort (*Stipulicida setacea*), moneywort (*Rhynchosia reniformis*), prickly-pear cactus (*Opuntia compressa*), and panic grasses (*Panicum* spp.) (Jones et al., 1981). Longleaf pine is also associated with scrub oak communities in the sandhills as described previously.

Slash pine is no longer planted on the SRS due to its susceptibility to ice damage. Existing slash pine plantations occupy high flat ridges or slight slopes in upland areas. Sites presently occupied by slash pine will be converted to loblolly or longleaf stands. Hardwood species represented in these stands include occasional saplings or seedlings of black cherry, water oak, sassafras, red maple (*Acer rubrum*), and blackgum (Jones et al., 1981).

Understory vegetation is sparse in densely stocked slash pine stands. In more open plantations, blackberry (*Rubus* spp.), poison ivy, dog-fennel (*Eupatorium compositifolium*), broomsedge, beggar's lice (*Desmodium rotundifolium*), and bedstraw (*Galium hispidulum*) are common. Yellow jessamine, partridge pea (*Cassia fasciculata*), and partridge berry are also found in slash pine communities (Jones et al., 1981).

Loblolly pine is widely planted on the SRS from the uplands to the bottomland terraces. Most commonly, upland loblolly stands contain sweetgum, red maple, water oak, and persimmon seedlings, with southern red oak and sand hickory occasionally present. Of the many species infrequently encountered in the herb layer, broomsedge, dog fennel, and Japanese honeysuckle (*Lonicera japonica*) are the most common. Various grasses, poison ivy, beggar's lice, muscadine (*Vitis rotundifolia*), and catbrier (*Smilax* spp.) also occur in upland loblolly plantations (McCormick, 1969; Jones et al., 1981).

Lowland terrace sites supporting loblolly stands are of two types: those on normally unflooded areas and those on poorly drained, mucky loam soils. On well drained soils, loblolly and sweetgum form a dense canopy. Transgressives of these trees are found in the sub-canopy layer along with red maple, water oak, red bay (*Persea borbonia*), american holly (*Ilex opaca*), and highbush huckleberry (*Vaccinium corymbosum*). Shading by the canopy inhibits herbaceous growth, but catbrier, yellow jessamine, and cane (*Arundinaria gigantea*) are often present (Jones et al., 1981).

Loblolly plantations on poorly-drained soils of upper drainages or floodplains of the streams have canopies dominated by pine, swamp gum (*Nyssa sylvatica* var. *biflora*) and tulip poplar. Pond pine (*Pinus serotina*) is often associated with loblolly pine on soils with poor drainage (Jones et al., 1981).

The sapling layer in lowland loblolly stands consists of red bay, red maple, swamp gum, and sweet bay (*Magnolia virginiana*). Highbush huckleberry and naked wither-rod (*Viburnum nudum*) are common shrubs in these stands. The herb layer contains partridge berry, sensitive fern (*Onoclea sensibilis*), and cinnamon fern (*Osmunda cinnamomea*). Poison ivy and cane are occasional associates (Jones et al., 1981). Species commonly found in SRS pine forests are listed in Appendices B-J.

An 11.3 ha SRS Set-Aside stand of loblolly pine is located in the north central SRS (Figure 7). Loblolly and longleaf pine have reinvaded the once agricultural field, 9-111, at this site (Hillestad and Bennett, 1982). The Boiling Springs Natural Area contains impressive loblolly individuals in the mixed pine-hardwood community.

Bottomland Hardwoods

Bottomland hardwood forests of the SRS represent typical mixed hardwood forests of low wet areas of the southeastern Coastal Plain. These forests are found along stream courses and extend to the stream deltas, where the swamp begins. Several bottomland species are also constituents of the swamp forest, especially on levees or islands within the swamp. Approximately 1200 ha or 40% of the existing Savannah River Swamp, ranging from 25 m elevation at the deltas to 80 m at the headwaters, are covered by bottomland hardwoods (Scott et al., 1986).

Bottomlands occupy more mesic habitats than bluff or upland communities and may be seasonally flooded. Frequency, depth, and duration of flooding cause variation in forest composition and vegetation patterns in the bottomlands. In most variants of this community type, flooding is usually of limited depth and restricted to high water periods in late winter and early spring when plants are dormant. In addition to soil moisture, soil pH, nutrient availability, light level, and elevational gradients help determine species distribution in the stream cuts and delta areas (Figure 10) of the Savannah River watershed (Jones et al., 1981; Whipple et al., 1981; Dunn and Scott, 1987).

Slight changes in elevation along streams, or in the swamp itself, cause distinct changes in species composition. A change of a few feet, and a concomitant change in soil moisture, may determine the presence or absence of individual species (Good, 1981; Good and Whipple, 1982). Stream banks upstream tend to be steeper than in the floodplain near the stream delta. Thus, there is less space for plants to inhabit along the V-shaped stream cut, and environmental characteristics also differ.

Variation in species composition is related not only to the duration of flooding during the growing season (Good and Whipple, 1982; Schneider and Sharitz, 1986), but also to the amount of time since the original substrate was

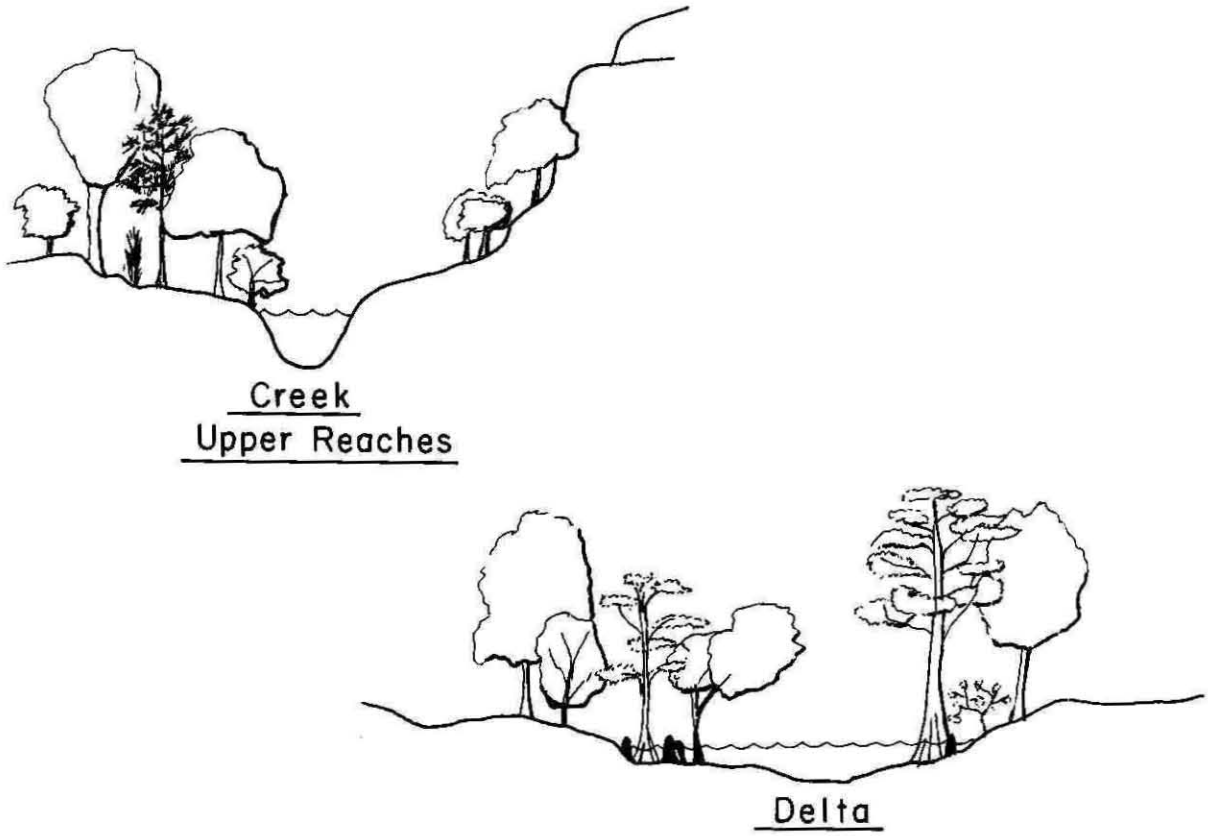


Figure 10. Contrast of stream morphology at the upper reaches and at the delta. Note the V-shaped cut of the upper stream bed and the broad flattened aspect of the delta.

deposited by the river and to the rate of succession following disturbance (Whipple et al., 1981; Dunn and Scott, 1987; Muzika et al., 1987).

Relatively undisturbed bottomlands, like those along Upper Three Runs Creek, are dominated by woody perennials. Trees comprise 40% of the species and 14% are shrubs or vines (Sharitz et al., 1974b). If fire has been a factor in the area, the bottomland forest will be bordered by pine stands. Without fire, mesic hardwoods will intergrade into the bottomlands as moisture conditions permit (Whipple et al., 1981). Dominants along stream banks include tag alder (*Alnus serrulata*), wax myrtle (*Myrica cerifera*), willow (*Salix* spp.), buttonbush (*Cephalanthus occidentalis*), and sweetgum (Gladden et al., 1985a).

Hardwoods were cut out of SRS bottomland areas around the turn of the century, but logging and other disturbances have been minimal in non-thermal areas for the past 60 years (Sharitz et al., 1974a). Gladden et al. (1985a) provide descriptive data for vegetation of thermal and ambient temperature bottomland sites.

Bottomland species are distributed along a moisture gradient related to flooding (Figure 11). The most abundant species in most forests is sweetgum; it is found in all bottomland and swamp associations except the deepest swamp forest type. To varying degrees, swamp gum, red maple, sweetgum, water oak, laurel oak and red ash (*Fraxinus pennsylvanica* var. *subintege*) dominate the bottomland hardwood forests (Sharitz et al., 1974a; Good, 1981; Jones et al., 1981; Whipple et al., 1981; Schneider and Sharitz, 1986; Conner and Day, 1987; Patrick et al., 1988). Laurel oak, water oak, overcup oak (*Quercus lyrata*), red maple, and hackberry (*Celtis laevigata*) dominate old river levees (Scott et al., 1986).

Adjacent to bluffs or streams on the drier bottomland sites that are subject to little or no flooding, blackgum, sweetgum, red maple, and southern magnolia (*Magnolia grandiflora*) dominate the forest canopy. Tulip poplar and beech, though not common, are also found in this forest type (Whipple et al., 1981).

Non-flooded stands tend to have fairly dense understory vegetation and high diversity in the herbaceous strata. Low flat stands, periodically flooded, have sparse or patchy understory vegetation (Figure 12). Common bottomland shrub species include virginia willow (*Itea virginica*) and dog hobble (*Leucothoe axillaris*). Chain fern (*Woodwardia areolata*), cane and lizard's tail (*Saururus cernuus*) are common herbs along with catbrier species in the understory (Batson et al., 1957; Sharitz et al., 1974b; Jones et al., 1981; Whipple et al., 1981). Species of bottomland communities are listed in the Appendices.

The Boiling Springs Natural Area on Lower Three Runs Creek, Mill Creek, and a beech-hardwood stand on Upper Three Runs Creek (Figure 7) are SRS Set-Aside Areas representing examples of SRS bottomland forest. These stands have been described in detail elsewhere (Golley et al., 1965; Hillestad and Bennett, 1982). Boiling Springs, a SAF Natural Area, and mature hardwood sites on Upper Three Runs Creek and Meyers Branch are recent additions to the SRS Set-Aside Areas (McCort and Wein, 1988; McFarlane, 1988).

Swamp Forests

Approximately 30 km of the Savannah River form the southern boundary of the SRS. On the river floodplain, lowlands from 25 to 35 m in elevation that are inundated during a portion of the year support swamp forest. The swamp forest extends from the river margin to the creek deltas, forming a band 3-4 km wide and encompassing 3800 ha. Approximately one-half of the riverine swamp on the SRS is second-growth cypress-tupelo swamp and one-half is comprised of hardwood islands and ridges (Jensen et al., 1984). A natural levee, 6 to 10 m in height, separates the river from swamp forest. Of the five streams that drain the SRS, three breach the levee and flow into the river (Sharitz et al., 1974a).

Most swamp areas have at least a brief seasonal period when the water table is at or below the soil surface. These low water periods, usually in late

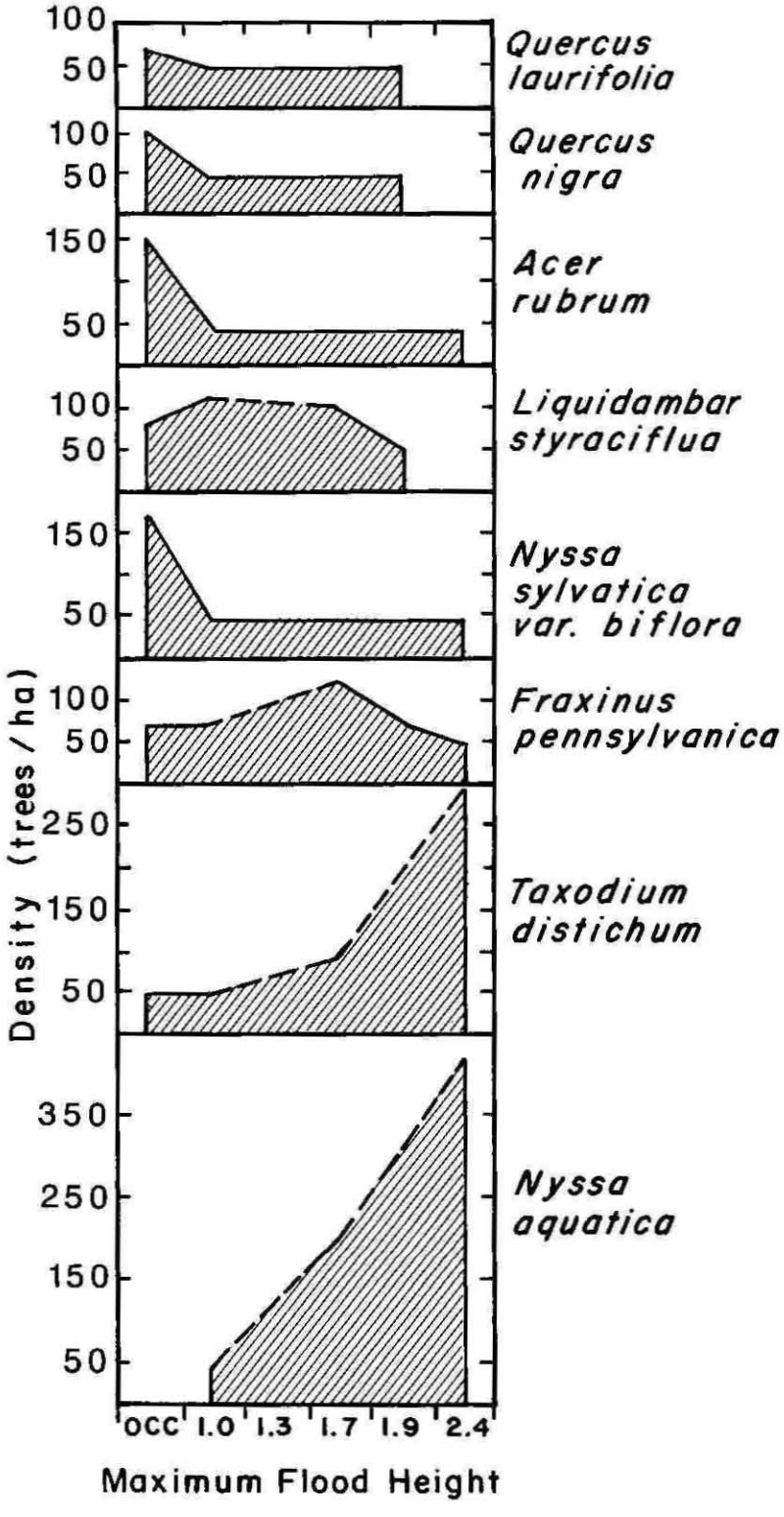


Figure 11. Density (trees/ha) of bottomland and swamp tree species in relation to maximum height of flooding. (Based on data from Whipple et al., 1981 for trees over 10 cm DBH.)

Figure 12. Bottomland hardwood forest community.

spring or summer, are essential for perpetuation of the forest. Seed germination and seedling establishment of the dominant tree species cannot occur in standing water, but require an exposed, moist soil substrate (Fowells, 1965; Whipple et al., 1981; Schneider and Sharitz, 1986; Sharitz et al., 1986).

Although hardwoods were cut in the late 1800s and early 1900s, second growth forest developed, and parts of the SRS swamp have remained relatively undisturbed for the past 60 years (Sharitz et al., 1974a,b).

Climax swamp forest of the SRS containing bald cypress (*Taxodium distichum*) and tupelo gum (*Nyssa aquatica*) as dominants is typical of mature river swamp forests of the Coastal Plain (Figure 13). Many stands have a moderately developed sapling layer which may contain bald cypress, water ash (*Fraxinus caroliniana*), red ash and less frequently tupelo gum, red maple, swamp gum, American elm (*Ulmus americana*), and sycamore (*Platanus occidentalis*) (Repaske, 1981; Whipple et al., 1981).

Variation in the density of the two dominants, bald cypress and tupelo gum, is influenced by depth and duration of flooding, and age of the stand. Based on water marks showing on the trees, the normal high water level in the deeper SRS swamp ranges from 1.3 to 2.4 m (Whipple et al., 1981).

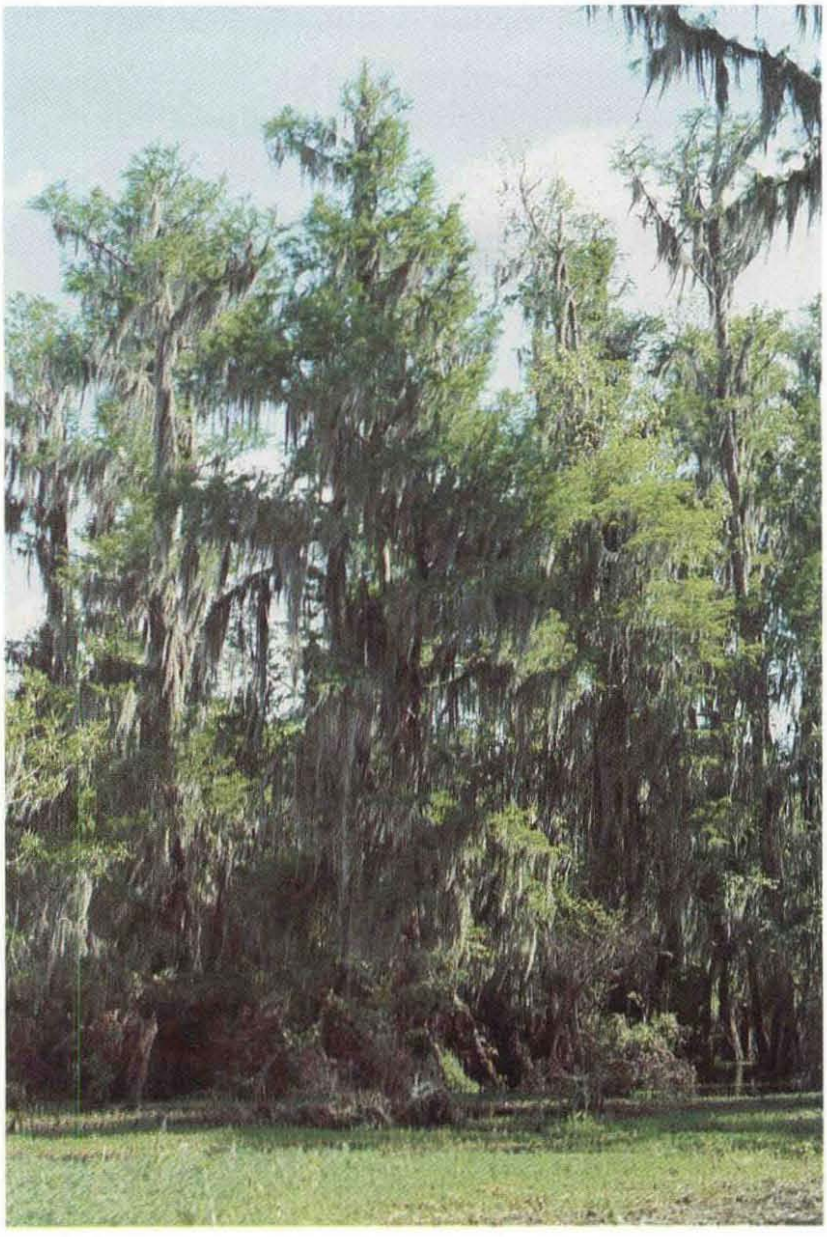


Figure 13. Cypress-tupelo swamp.

Deep swamp areas border the river (Figure 14). As the topography changes from the river to the stream delta, so does species composition. Slight changes in topography, and thus soil moisture, cause distinct changes in vegetation. In general, elevation decreases and depth of flooding increases as the river is approached. Bottomland species become less abundant, while bald cypress and tupelo gum become more abundant (Figure 11). Areas such as levees or islands within the swamp interrupt the elevational gradient by providing higher drier substrate and thus support bottomland species. The remainder of this section will highlight the various swamp communities in relation to topography and flood levels. The mixed swamp and the cypress Set-Aside Area (Figure 7) contain

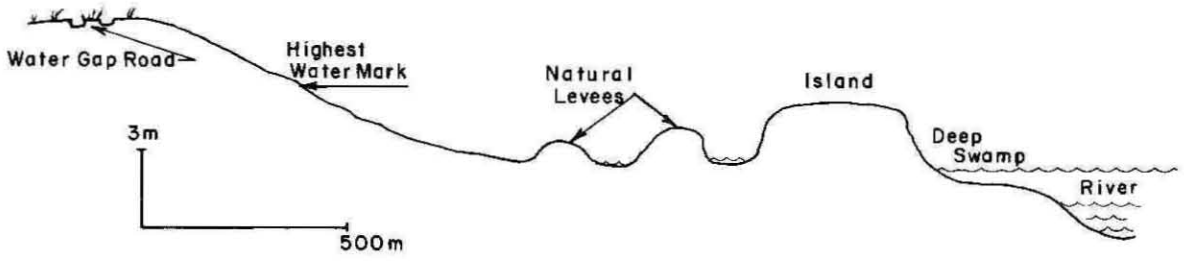


Figure 14. Topographic variation in the Savannah River Swamp. Bottomland vegetation occupies the higher drier sites (left) while cypress-tupelo forests dominate flooded sites.

representative examples of SRS bottomland and swamp communities (Whipple et al., 1981; Hillestad and Bennett, 1982).

Forest stands, subject to longer flooding duration than bottomland forests, but more shallow than the deep swamp, contain a greater abundance of red ash, red maple, and American elm (Figure 11). Sweetgum, which is not found in the deep swamp, is present in areas with restricted drainage. These species indicate a transition from the swamp which is flooded for longer duration, to the bottomland forest, which is flooded for only short periods (Whipple et al., 1981).

One or two of the following species may comprise the poorly developed sapling layer in these stands: tupelo gum, overcup oak (*Quercus lyrata*), box elder (*Acer negundo*), possum haw (*Ilex decidua*) or ash (Whipple et al., 1981).

Vine cover is less dense in the swamp than in bottomland forests and understory vegetation is sparse. Two floating aquatic genera, *Lemna* and *Elodea*, are the dominant herbs of wetter stands, while species of St. John's-wort (*Hypericum* spp.), Virginia willow, false nettle (*Boehmeria cylindrica*), and *Ceratophyllum* spp. are found on higher ground or around trees and stumps.

Woody seedling distribution on these different microsite or substrate types depends more upon the stability and permanence of the microsite than upon the composition of the substrate (Huenneke and Sharitz, 1986). In areas of shallower or less frequent flooding, cut grass (*Leersia* spp.), sedges (*Carex* spp.), and lizard's tail are present (Irwin, 1975; Whipple et al., 1981).

Dominant species on low levees within the swamp, similar to areas with restricted drainage and high water for long periods (Figure 14), include red ash, American elm, sweetgum, and hackberry (*Celtis laevigata*). The subcanopy contains saplings of the dominant tree species as well as laurel oak, possum haw, box elder, tupelo gum and bald cypress (Sharitz et al., 1974b; Whipple et al., 1981).

Although a slow water drainage and a canopy shade limit the ground cover, vines such as catbrier, poison ivy, cross vine (*Anisostichus capreolata*), pepper vine (*Ampelopsis arborea*) and *Berchemia scandens* are significantly abundant. High water marks on tree bases in this forest type range from 1.0 to 1.9 m (Sharitz et al., 1974b; Whipple et al., 1981; Huenneke and Sharitz, 1986).

Levees and islands shallowly flooded for short periods in winter or spring support forests containing sweetgum, laurel oak, water oak, ironwood (*Carpinus caroliniana*), winged elm (*Ulmus alata*), and water elm (*Planera aquatica*). Possum haw and American holly are present in the sapling layer. Palmetto (*Sabal minor*), cane, false nettle, and vines are widespread in the understory (Swails et al., 1957; Sharitz et al., 1974b; Jones et al., 1981; Whipple et al., 1981). See the Appendices for lists of species found in the SRS swamp habitat.

Swamp forests subjected to reactor effluents, which increase siltation, water level and water temperature, differ in species composition from undisturbed swamp forest (Sharitz and Lee, 1985a,b). Thermal stress decreases population size of some species and increases abundance of a few dominant species (Gibbons and Sharitz, 1974; Scott et al., 1985). For example, water temperatures can exceed 45°C in Pen Branch delta; the canopy species have been killed and high densities of plants are crowded onto stumps and fallen logs. Perennial herbs comprise 60% of the Pen Branch vegetation and there are few woody species (Sharitz et al., 1974b; Irwin, 1975). Disturbed swamp sites with no tree canopy are characterized by water primrose (*Ludwigia leptocarpa*) and weedy herbs that invade scattered islands in the thermal stream. Phenology and growth of some herbaceous species exposed to heated effluent apparently shift towards earlier flowering, greater fruit production, and higher growth rates (Christy and Sharitz, 1980; McCaffrey, 1982; Dolan and Sharitz, 1984). Shallow warm water channels in the swamp under open canopy contain smartweed (*Polygonum* spp.), sedges (*Cyperus* spp.), arrowhead (*Sagittaria* spp.), creeping burhead (*Echinodorus cordifolius*) and the duckweeds (*Spirodela oligorrhiza*) and *Lemna* spp. (Gladden et al., 1985b,c).

The Steel Creek swamp received thermal effluents for 15 years until reactor operation ceased in 1968. Large mudflats were exposed in the delta. Early successional recovery has been slow on these mudflats, and herbaceous species, many of which are annuals, characterize the site. Four to five years following cessation of thermal stress, the Steel Creek swamp contained knotweed (*Polygonum punctatum*) as the dominant species and wapato (*Sagittaria latifolia*) and cut grass (*Leersia oryzoides*) as sub-dominants (Sharitz et al., 1974a,b). Approximately seven years after thermal exposure, species composition of the delta had changed only slightly. The post-thermal swamp resembled a freshwater marsh with low dense herbaceous cover, graminoid clumps, and scattered shrubs (Martin et al., 1977; Sharitz et al. 1986).

In areas with extensive tree kill and open canopy, submerged and emergent macrophytes are abundant. *Polygonum* beds line the Steel Creek channel while pennywort (*Hydrocotyl* spp.), tapegrass (*Vallisneria americana*), pond weed (*Potamogeton* sp.), hornwort (*Ceratophyllum* sp.) and parrot-feather (*Myriophyllum* spp.) dominate the braided channels (Gladden et al., 1985a). Composition of the vegetation may also be affected by the recent construction of L-Lake and subsequent increase in water flow into Steel Creek.

Studies indicate that vegetation in the Four Mile Creek stream corridor is similar to Pen Branch and Steel Creek systems (Ezra et al., 1986; Gladden et al., 1985a). Similarities between the stream communities are also evident from observations of the early phases of post-thermal recovery in Four Mile swamp delta (Gladden et al., 1985a). Willows and buttonbush are the dominant woody species on the higher drier areas of the delta. Sedges (*Cyperus* spp. and *Scirpus cyperinus*), rushes (*Juncus* spp.) and water primrose (*Ludwigia* spp.) are some of the more important colonizers of the post-flow environment in the delta (S. Landaal, pers. comm.).

Two SRS Set-Aside Areas have been established in swamp communities of the SRS (Hillestad and Bennett, 1982). The mixed swamp Set-Aside, 36.8 ha, lies adjacent to Road A-13 (Figure 7). The cypress grove Set-Aside (8.9 ha) occupies a narrow strip of land northwest of pump station 3. The mixed swamp Set-Aside is subject to less disturbance and contains variations of bottomland and swamp communities. A tract of approximately 2300 ha has been considered for inclusion as the Savannah River Swamp Set-Aside Area. The area is roughly half mixed deciduous swamp forest and half mixed deciduous bottomland forest (McCort and Wein, 1988).

Carolina Bays

Carolina bays are natural shallow depressions found in greatest abundance in South Carolina and southeastern North Carolina. These bays have a characteristic ovoid or elliptical shape and a northwest to southeast orientation and range up to 1.3 km in length on the SRS (Figure 15). Low sandy ridges, most

conspicuous on the southeastern edge, rim the bays. Water levels are normally low in autumn and high in early spring. The acid water (pH 4.0-4.6) is soft (total dissolved solids 7-20 ppm) and depths range from zero to a few meters (Kelley and Batson, 1955c; Kormondy, 1968; Schalles, 1979).

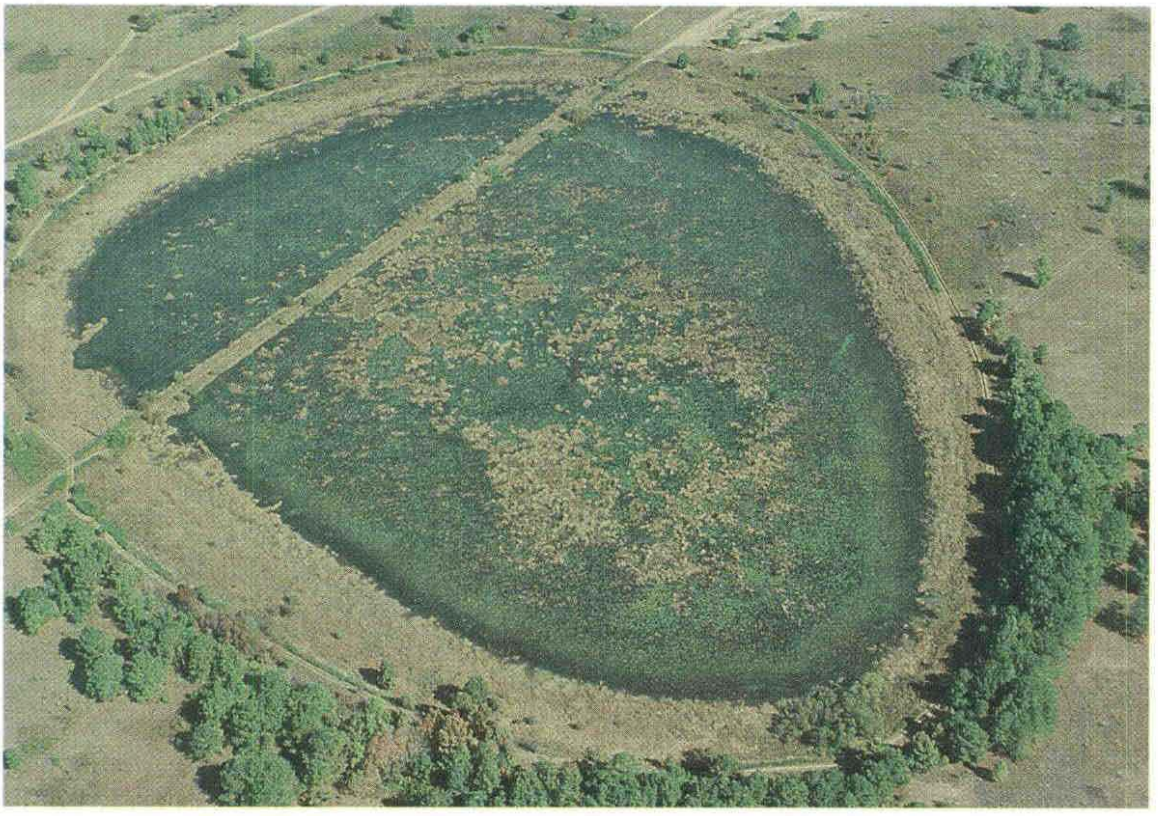


Figure 15. Aerial view of Ellenton Bay, a Carolina Bay.

How the shallow bays originated is not known, though possibilities have been described (Prouty, 1952). Age and total number of the bays are also uncertain. Estimates of age range from 7,000 to 100,000 years before present (Thom, 1970; Frey, 1953). There are approximately 140,000 medium to large bays on the Coastal Plain. If smaller bays are included, the count reaches 500,000 (Schalles, 1979). One hundred ninety-four confirmed or suspected bays totaling about 472 ha have been identified on the SRS (Shields et al., 1982; Schalles et al., 1989).

Composition of bay vegetation on the SRS is primarily determined by topographic relief and hydrology of individual bays. The water depth gradient and soil permeability influence species distribution. Organic soils (e.g. peat) of bays on the Upper Coastal Plain such as those of the SRS are thinner than soils of Lower Coastal Plain sites. Accumulation of peat is often prevented by periodic

fires, indicated by charcoal fragments in bay sediments (Schalles, 1979; Sharitz and Gibbons, 1982; Schalles et al., 1989).

Upland pine, oak, or scrub oak vegetation surrounds most bays. Concentric bands of plant growth, corresponding to fluctuations in water level, surface area, and length of inundation, encircle the bay. Presence of emergent or floating-leaved macrophytes is influenced by surface area and depth. Thus, bay center vegetation ranges from herbaceous savanna, dominated by grasses and sedges in shallow bays, to pond or lake plants, or swamp forests (Kelley and Batson, 1955c; Schalles, 1979; Sharitz and Gibbons, 1982).

Zonation of vegetation in Carolina bays has been explained as a function of succession over time. One theory is that as water levels recede new soil substrates become exposed for colonization. Woody plants have become established in the zone exposed for the greatest length of time while zones closer to the center of a bay contain earlier successional stages of vegetation (Kelley and Batson, 1955c). Alternatively, a cyclic pattern of succession influenced by disturbance and inorganic filling of bays has been proposed. Beyond short-term fluctuations in moisture gradients, relatively long-term reduction in average water level, increasing amplitude in hydroperiod, along with periodic drying and fires or cultivation have determined vegetation patterns in the bays (Hodge, 1985; Schalles at al., 1989).

Arborescent species found along dry margins of bays include combinations of loblolly pine, longleaf and pond pine, with dry site hardwoods such as blackjack oak and turkey oak. Other hardwoods common to low areas, including sweetgum, red maple, water oak, or laurel oak may be found in some bays or along their margins. Pond cypress (*Taxodium ascendens*) is found along the old drainage canal in Rainbow Bay and can be found on other periodically flooded embankments of SRS wetlands (Neufeld, 1984). Bald cypress may occasionally be found in bay habitats (Dry Bay) also. Blackgum, along with the shrubs, winged sumac (*Rhus copallina*), inkberry (*Ilex glabra*), sweet bay, wax myrtle (*Myrica cerifera*), and red chokeberry (*Sorbus arbutifolia*) can be present in the arborescent zone of bays (Kelley and Batson, 1955c; Schalles, 1979; Anonymous, 1979; Schalles et al., 1989).

Craig's Pond (Figure 16) is the largest bay of any on or adjacent to the SRS; it has five zones of plant growth between bay margin and center. The band adjacent to the arborescent zone includes the grasses, broomstraw and plume grass (*Erianthus strictus*), and the herbs, hooded pitcher-plant (*Sarracenia minor*), leopard's-bane (*Arnica acaulis*), and *Centella asiatica*. *Centella asiatica* is found with *Aristida affinis* and *Panicum verrucosum* in the third zone from the bay margin and *Eupatorium album*, *Pluchea foetida*, and *Viola lanceolata* in the fourth zone (Kelley and Batson, 1955c; Hodge, 1985).

The region around the central pool of Craig's Pond contains *Panicum hians*, *Pluchea foetida*, redroot (*Lachnanthes caroliniana*), *Polygala cymosa*, and

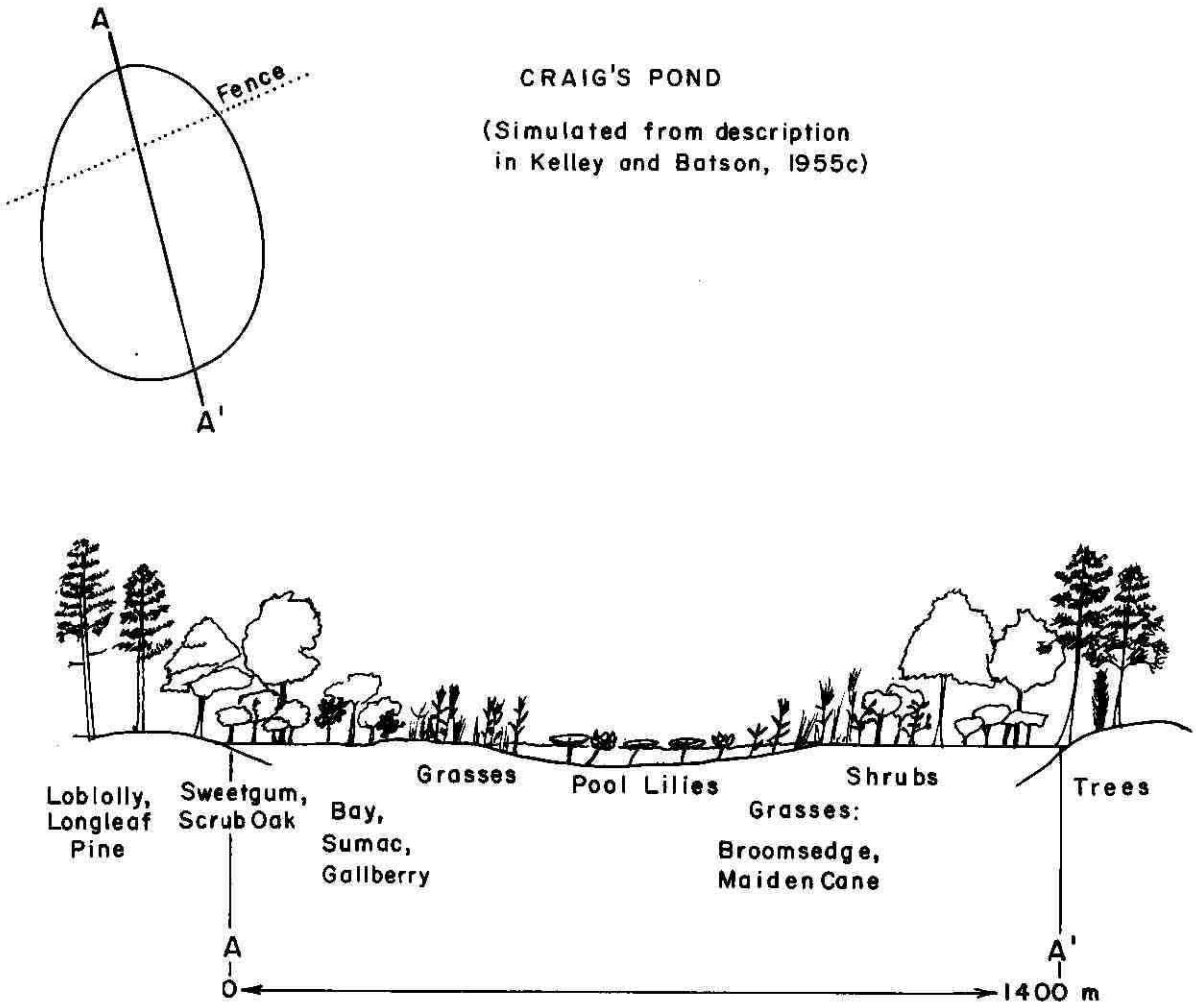


Figure 16. Schematic cross-section of Craig's Pond showing vegetation zones.

pipewort (*Eriocaulon compressum*). White water-lily (*Nymphaea odorata*) and *Nymphoides aquatica* are characteristic plants of bay centers (Kelley and Batson, 1955c; Hodge, 1985).

Thunder Bay (10 ha) and Ellenton Bay (28 ha), though smaller and subjected to greater disturbance than Craig Pond, show similar zonations. Shore margins support blackberries and the emergent plants, maidencane (*Panicum hemitomon*), and cut grass (*Leersia hexandra*). Abundance of water shield (*Brasenia schreberi*) increases toward the deeper central area where white water-lily is common (Kormondy, 1968; Schalles, 1979; Hodge, 1985). Rainbow Bay, an undisturbed bay

containing water intermittently, supports black willow (*Salix nigra*), pond cypress, bulrush (*Scirpus cyperinus*), spikerush (*Eleocharis* spp.) and cat-tail (*Typha latifolia*) (Anonymous, 1979, 1980).

At Thunder Bay (Figure 7), water shield and maidencane comprise approximately 80% of the total macrophyte biomass while water lilies and cut grass contribute 15%. Peak production of emergent plants is found approximately 15-35 m from shore. Emergent vegetation is replaced by floating-leaved water lilies at about 50 cm depth (Schalles, 1979). Species found in Carolina bays are listed in the Appendices.

Carolina bays provide habitat for approximately one-third of the rare plants found on the SRS including awn-petaled meadow beauty (*Rhexia aristosa*), pink tickseed (*Coreopsis rosea*), little bur-head (*Echinodorus parvulus*), and spathulate seedbox (*Ludwigia spathulata*). Ellenton Bay, within the Field 3-412 Set-Aside, and Steel Creek Bay are SRS Set-Aside Areas. In addition, Craig's Pond and ten diverse Carolina bays have recently been designated as new Set-Aside Areas (McCort and Wein, 1988; McFarlane, 1988).

Freshwater Streams, Ponds, and Marshes

Freshwater habitats of the SRS include streams, marshes along streams or pond margins, old farm ponds, and artificial impoundments. Site history, especially age of impoundment, plays a role in what plant species are found in the community. Vegetation patterns in these habitats are determined by water depth, shoreline steepness, soil characteristics, and water temperature. Temperature is especially critical in determining distribution of macrophytes in aquatic systems that receive effluents from reactors, viz. Four Mile Creek, Pen Branch, Par Pond and L-Lake.

From northwest to southeast, the five streams draining the SRS are Upper Three Runs Creek, Four Mile Creek, Pen Branch, Steel Creek, and Lower Three Runs Creek. All originate on the SRS except Upper Three Runs Creek which has its headwaters north of the SRS in Aiken County (Langley and Marter, 1973; Gladden et al., 1985a).

Upper Three Runs Creek has never received thermal effluent from SRS production reactors; thus the creek is representative of undisturbed blackwater streams of the Upper Coastal Plain (Figure 17). It is spring-fed and drains 492 km^2, or approximately one third of the SRS (Langley and Marter, 1973). Trees found adjacent to the stream include the bottomland species: tulip poplar, beech, sweetgum, willow oak, swamp chestnut oak (*Q. michauxii*), water oak, sycamore and loblolly pine. Dogwood, red buckeye and American holly are also abundant (Morse et al., 1980; Gladden et al., 1985c). Tag alder (*Alnus serrulata*) is common along the sandy stream margin (Allred, 1981).

Figure 17. Appearance of lower reaches of Upper Three Runs Creek.

Sites with open canopies are characterized by the presence of macrophytes including eelgrass (*Vallisneria americana*), pondweed (*Potamogeton epihydrous*), and bulrush (*Scirpus subterminalis*). Golden club (*Orontium aquaticum*), wapato, water primrose (*Ludwigia* spp.), and knotweed (*Polygonum* spp.) are found on small floodplains (Morse et al., 1980; Allred, 1981; Gladden et al., 1985c).

Extensive studies have been conducted on vegetation of Pen Branch, which currently receives thermal effluents (Repaske, 1981; Smith et al., 1982; Gladden et al., 1985c; Ezra et al., 1986) and of Four Mile and Steel Creeks, post-thermal streams (Welbourne, 1958; Sharitz et al., 1974a,b; Smith et al., 1981; Gladden et al., 1985c; Tinney et al., 1986). These studies show that few remnants of the orignial flora remain in areas receiving thermal effluent, though many species are common in disturbed delta regions.

Communities range from deltaic fan islands covered primarily by water primrose (*Ludwigia leptocarpa* and *L. decurrens*) to alluvial filled sloughs supporting marsh sedges (*Carex* spp., *Cyperus* spp.), shrub-scrub associations dominated by willow and buttonbush (*Cephalanthus occidentalis*) (Figure 18) and cypress-tupelo forests with variable canopy cover. These stream delta plant

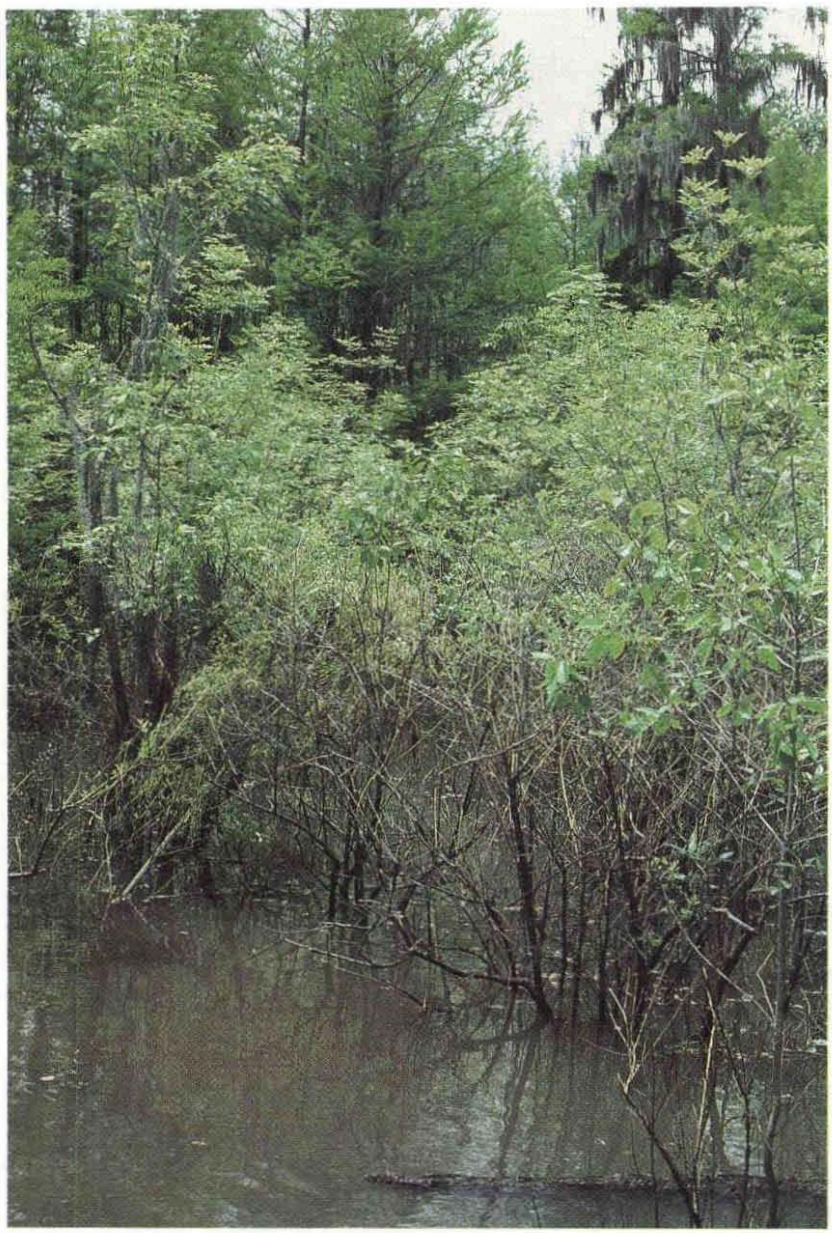


Figure 18. Shrub-scrub community in disturbed delta region of Steel Creek.

communities are distributed along a gradient based on silt deposition and water temperature (Smith et al., 1981, 1982; McCaffrey, 1982).

Succession has been slow at Steel Creek since 1968 when thermal loading ceased. Sandy banks and channel islands support larger woody species such as alder, willow, and wax myrtle. Fine particulate clays of floodplain marshes are characterized by a diversity of species including blackberry, *Hypericum* spp., knotweed and wapato as dominants. Bulrush may also be present (Sharitz et al., 1974a,b; Briese et al., 1975; Smith et al., 1981). Detailed vegetation maps and descriptions of the Steel Creek corridor and delta are presented by Smith et al.

(1981) and Gladden et al. (1985b,c). Stream corridor and delta vegetation of the SRS have also been studied using remote sensing techniques (Jensen et al., 1984; Christensen et al., 1984a,b, 1986; Ezra et al., 1986; Tinney et al., 1986).

Acid softwater ponds of old farm sites still exist from when the SRS was established. Pond sites have some plant species in common with stream communities, Carolina bays, and marsh habitats of floodplains and deltas. Species composition of pond communities is directly related to water depth and shoreline gradient. Risher Pond serves as a SRS Set-Aside Area and has recently been expanded to include a larger marginal buffer zone (McCort and Wein, 1988).

Steed Pond (Figure 7) was originally a 4-5 ha farm pond, but was reduced in size following a dam collapse in 1968. It then occupied 0.5 ha surrounded by marsh. A further dam collapse in 1984 drained all remaining standing water so that only the creek remains. Benke (1969) and Boyd (1971a) described the vegetation before the second dam collapse. This description is included since it is the best description of a pond habitat on the SRS, even though its hydrology has been modified by the introduction of chemical wastes and the pond is currently dry. Water depth fluctuates with precipitation to a maximum depth of 0.7 m (Boyd, 1971a). Willow and button bush were found along the pond margin surrounding a zone of emergent macrophytes. Growth of rushes (*Juncus effusus*) was dense adjacent to the margin with some bulrush (*Scirpus validus*) interspersed (Benke, 1969; Boyd, 1971a). The open water area contained random clumps of needle rush (*Eleocharis acicularis*), manna grass (*Glyceria striata*), and water primrose (*Ludwigia alternifolia*) (Boyd 1971a). Other herbaceous species found in the habitat included pondweed (*Potamogeton diversifolius*) bladderwort (*Utricularia* sp.), ragweed (*Ambrosia* sp.), and bur-reed (*Sparganium americanum*). Sphagnum mosses were also common (Benke, 1969).

Several reservoirs were constructed as part of a network to cool the effluents of two production reactors. Of the more than 50 impoundments on the SRS, Par Pond is the largest with a surface area of 1069 ha and mean depth of 6.1 m. Water from the Savannah River has been diverted into Par Pond since 1957-58, giving the pond higher alkalinity (15.0 ppm $CaCo_3$) and hardness than other ponds on the SRS (Tilly, 1973; Giesy and Tessier, 1979; Gladden et al., 1985d).

Par Pond has many shallow inlets and coves along its shoreline. Marsh or shallow water vegetation inhabit cove areas while deeper areas provide habitat for open water species. Erect stemmed plants rooted in shallow water sediments, but with greatest biomass above the water surface, are characteristic along the shoreline (Figure 19). The abundance of emergent macrophytes lining Par Pond is, in part, attributed to the relatively constant water level resulting from supplemental water pumped from the river to support reactor operations (Gladden et al., 1985d).

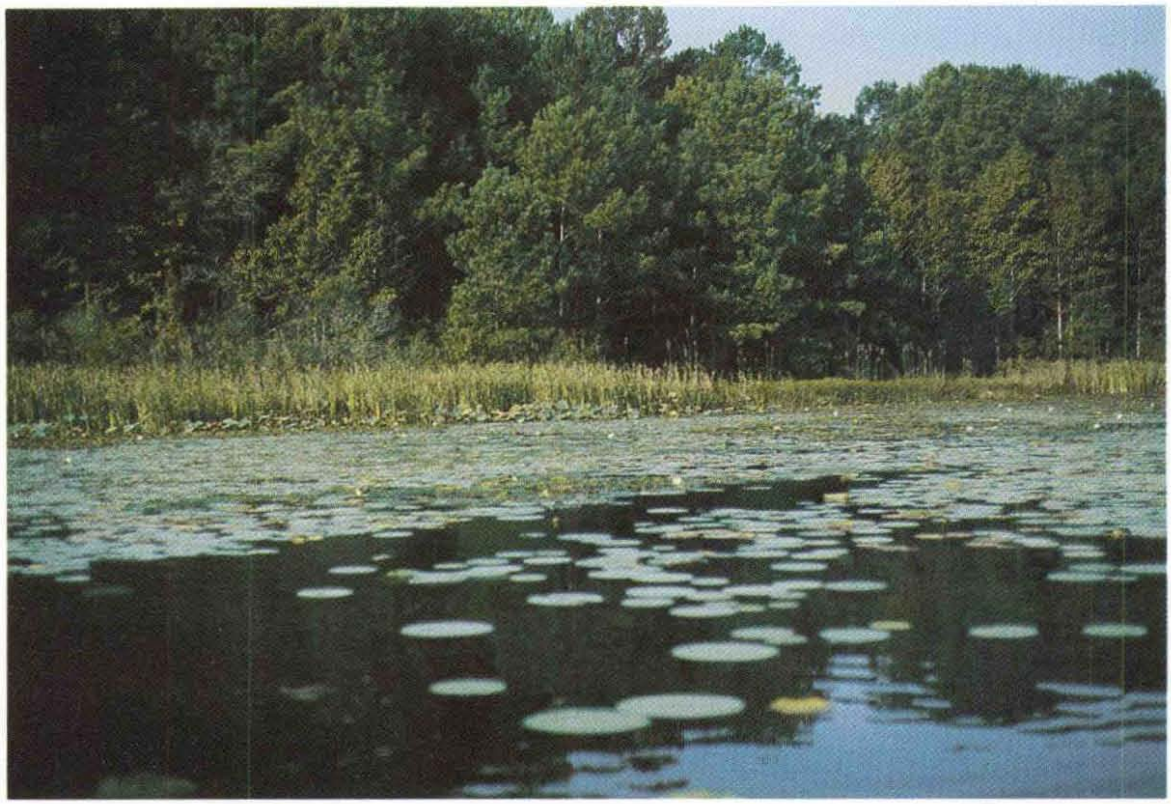


Figure 19. Par Pond shoreline showing emergent vegetation and floating-leaved species.

Of the emergent species, two cattails (*Typha latifolia* and *T. domingensis*) form relatively monospecific stands and produce a large percentage of the habitat's standing crop (Polisini and Boyd, 1972). Under thermal stress conditions the two species increase in importance in the community (Gibbons and Sharitz, 1974) reflecting thermal tolerance (*T. latifolia* > *T. domingensis*) and biochemical adaptation to the environment (Liu et al., 1978). Other dominant emergents are bulrush, maidencane, square-stemmed spike rush (*Eleocharis quadrangulata*), and pickerelweed (*Pontederia cordata*) (Boyd, 1970a; Boyd, 1971b; Boyd and Vickers, 1971; Polisini and Boyd, 1972; Parker et al., 1973; Gladden et al., 1985d).

In water deeper than 25 cm, white water-lily, water-shield and sacred bean (*Nelumbo lutea*) are the dominant floating-leaved plants (Benke, 1969; Boyd, 1970b; Polisini and Boyd, 1972). Common submersed plants include needlerush, bushy pondweed (*Najas quadalupensis*), bladderwort (*Utricularia inflata*), pondweed (*Potamogeton berchtoldii*), water milfoil (*Myriophyllum heterophyllum*), and *Bacopa caroliniana* (Benke, 1969; Boyd, 1970a,b; Grace and Tilly, 1976; Grace, 1977; Gladden et al., 1985d). The cover of macrophytes in the littoral zone of Par Pond has continuously increased since impoundment in 1958.

A shift of species dominance was noted between 1971-73 when *Potomogeton diversifolius* stands were replaced by a more thermal tolerant species of parrot-feather, *Myriophyllum spictatum*. This *Myriophyllum* species not present in Pond B, where calcium and alkalinity levels are lower than Par Pond (Grace, 1977; Giesy and Tessier, 1979; Gladden et al., 1985d).

Vegetation in Pond B appears less dense than in Par Pond though species composition is relatively similar (Parker et al., 1973; Whicker et al., 1989). Differences in species composition between Par Pond, Pond B and Pond C reflect the differences in water quality and thermal loadings received by the reservoirs (Parker et al., 1973). Plants tend to emerge and become senescent earlier in warmer regions of Par Pond (Grace and Tilly, 1976). In Pond C some species have been eliminated from exposure to high temperatures (Parker et al., 1973).

Coves and shallow areas protected from wind in Pond B support abundant rooted macrophytes. Vegetation ranges from 98% cover in water less than five meters deep to no cover at depths greater than six meters. *Nymphoides cordata*, water shield (*Brasenia schreberi*), water lily (*Nymphaea odorata*), *Cabomba caroliniana*, and bladderwort (*Utricularia floridana*) are the most common species (Whicker et al., 1989). *Nymphoides* production peaks in May while water-lily and water shield peak later in the year during August. These plants show high leaf turnover rates with continual leaf production and mortality during the growing season (Kelly, 1988).

L-Lake was created as a flow-through cooling reservoir in 1985 with a surface area of 400 ha. Colonization of the shoreline has been considered accelerated by a planting program described by Wein et al. (1987).

The Appendices contain lists of species found in the freshwater habitats of the SRS. The vegetation of the freshwater margins and marsh communities, which are subject to occasional soil drying, are listed separately from those true freshwater plant species, which cannot survive in this type of fluctuating environment.

SUMMARY & RECOMMENDATIONS

Vegetation patterns of the SRS are primarily determined by topography, edaphic conditions, and land management practices. Plant communities are distributed along elevation and soil moisture gradients.

Depending mostly on soil type, upland sites of the SRS support pine, mixed hardwood, or sandhill communities. More mesic areas along stream cuts or on the floodplain terraces are dominated by pine, bottomland, or swamp communities. Freshwater ponds and Carolina bays have arborescent species on the margins and emergent and/or submergent vegetation in the basins.

Descriptions of some SRS communities are detailed, while other communities have received less research attention. Further studies describing community structure and environmental parameters influencing hardwood and non-swamp communities are needed. The effects of land management practices on vegetational patterns have also received little attention. A better map of the SRS vegetation is currently possible using the available remote sensed imagery.

Jones et al. (1981) suggested successional pathways for the major SRS forest communities. Studies have also been conducted on succession in thermally influenced swamp areas (Sharitz et al., 1974b; Martin et al., 1977; Dunn and Scott, 1987; Muzika et al., 1987) and Carolina bays (Schalles et al., 1989), but additional basic research on community composition and plant succession in all eight community types would be pertinent to the southeastern region as a whole.

Carolina bays have unique plant communities. The many minimally impacted bays on the SRS are excellent sites for vegetational, hydrologic, and geologic investigations.

Examples of all eight community types are included in the land area preserved by the SRS Set-Aside Area Program. Attention toward conserving the variety of habitats and vegetational diversity of the SRS can be maintained through informed management of these Set-Aside Areas and regard for the natural resources of the SRS.

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GLOSSARY*

alluvial--formed or deposited by running water.

annual--a plant that completes its growth in one growing season.

aquifer--a permeable body of rock capable of yielding quantities of groundwater to wells and springs.

arborescent--the state of being treelike in form or appearance.

aspect--seasonal appearance or, for slopes, direction of orientation.

association--major segment of a biome formed by a climax community--e.g. oak-hickory forest of deciduous forest biome.

canopy--the uppermost layer in a forest stand.

climax--a mature, relatively stable community in an area, which community will undergo no further change under the prevailing climate; represents the culmination of ecological succession.

community--aggregation of organisms characterized by a distinctive combination of two or more ecologically related species--e.g. deciduous forest.

competition--the inter- or intraspecific interaction resulting when several individuals share an environmental resource.

cover--surface area occupied or shaded by vegetation.

Cretaceous--the latest system of rocks or period of the Mesozoic Geologic Era, which occurred between 135 and 65 million years ago.

delta--an alluvial deposit, usually triangular in shape, at the mouth of a river, stream, or tidal inlet.

diversity--a measure of the variety of species in a community that takes into account the relative abundance of each species.

dominant--a species having considerable influence or control upon the conditions of existence of associated species either because of number, coverage, or size.

dormancy--a state of quiescence during the development of many plants characterized by their inability to grow, though continuing their morphological and physiological activities.

effluent--material which flows away from a containing space or a main waterway.

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*_Definitions from_ McGraw-Hill Dictionary of Scientific and Technical Terms.

emergent--a plant rooted in water with the majority of its biomass above the water surface.

floodplain--the relatively smooth valley floor adjacent to and formed by an alluviating river which is subject to overflow.

genotype--the genetic constitution of an organism.

gradient--rate of change for a specified feature--e.g. steepness of slope.

habitat--the part of the physical environment in which a plant or animal lives.

hardwood--an angiosperm tree characterized by dense, close-grained wood, such as oak, walnut, cherry, and maple.

headwaters--the source of upstream waters of a stream.

hectare--a unit of area in the metric system equal to 10,000 square meters (2.471 acres)--abbreviated ha.

herbaceous--pertaining to a plant having stems with little or no woody tissue.

hydrology--the science that treats the occurrence, circulation, distribution, and properties of the waters of the earth and their reaction to the environment.

intermittent--not continuously present; with reference to Carolina bays: when bed seepage and evapotranspiration periodically exceed the available water supply.

inundation--flooding, by the rise and spread of water, of a land surface that is not normally submerged.

macrophyte--a macroscopic plant, especially one in an aquatic habitat.

mesic--of or pertaining to a habitat characterized by a moderate amount of water.

monospecific--composed of one type.

overstory--the upper stratum of vegetation (trees) in a forest community.

pH--a term used to describe the hydrogen ion activity of a system--0-7 = acid; 7 = neutral; 7-14 = alkaline (basic).

perennial--a plant that lives for an indefinite period, dying back seasonally and producing new growth annually.

producer--an autotrophic organism of the ecosystem; any of the green plants.

sapling--a young tree with a trunk less than 10 cm (4 in.) in diameter at approximately 1.2 m (4 ft) above the ground.

selection--any natural or artificial process which favors the survival and propagation of individuals of a given genotype in a population.

silviculture--the theory and practice of controlling the establishment, composition, and growth of stands of trees.

slough--a minor marshland or tidal waterway which usually connects other such areas.

soil texture--refers to the size of particles comprising the soil--clay particles are finer than silt particles which are finer than sand particles. Texture directly affects soil moisture.

species--a taxonomic category ranking immediately below genus and including closely related, morphologically similar individuals which actually or potentially interbreed. Abbreviated sp. (singular) or spp. (plural).

substrate--a substance on which an organism is growing.

succession--a gradual process brought about by the change in the number of individuals of each species of a community and by the establishment of new species populations which may gradually replace the original inhabitants.

taxon--a taxonomic group or entity.

taxonomy--a study aimed at producing a hierarchical system of classification of organisms which best reflects the totality of similarities and differences.

topography--the general configuration of a surface, including its relief; the natural surface features of a region.

understory--the lower layer of vegetation in a forest community, either trees or ground cover.

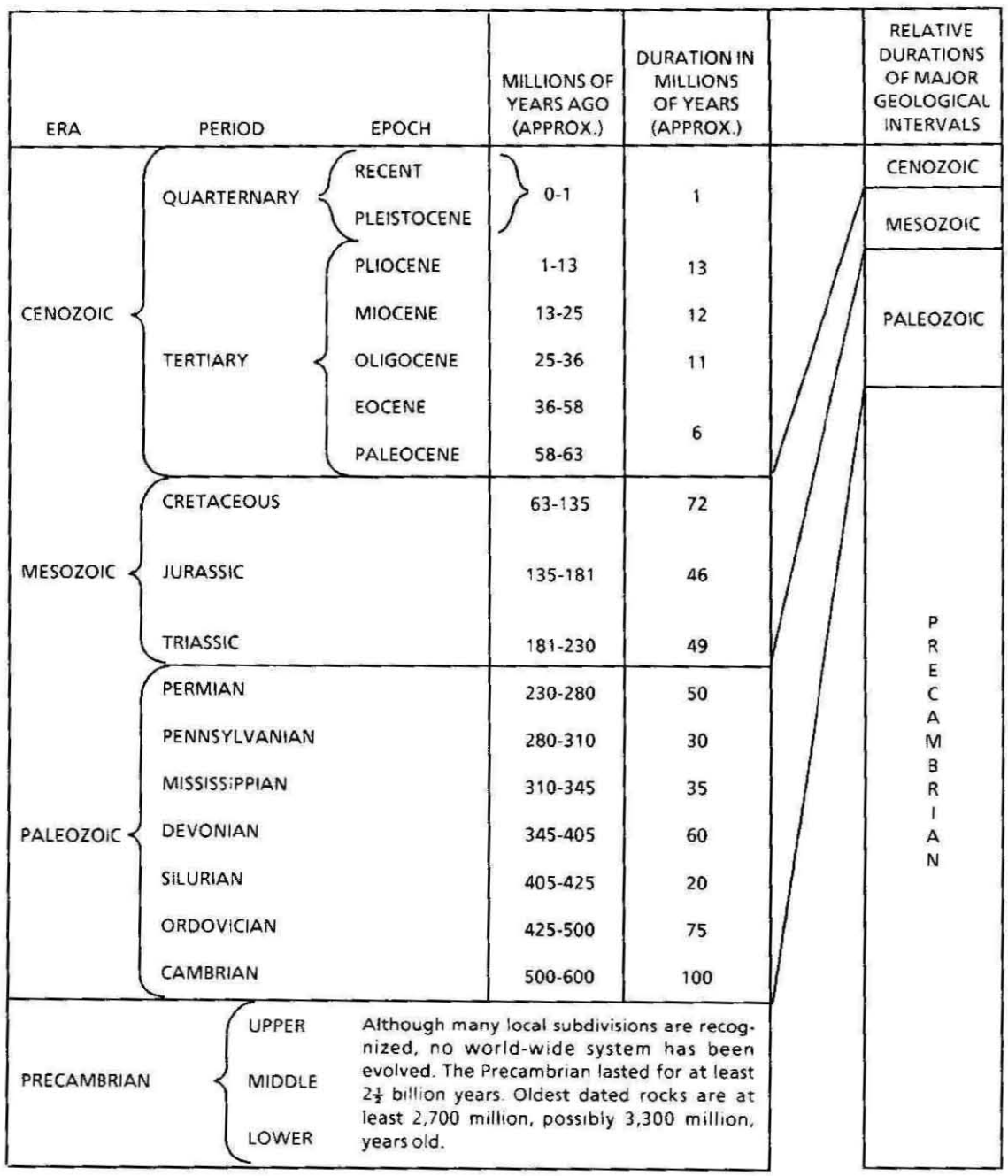
watershed--the drainage area of a stream(s).

water table--groundwater level; the planar surface between the zone of saturation and the zone of aeration.

xeric--of or characterized by, or adapted to an extremely dry habitat (from *American Heritage Dictionary*).

APPENDIX A. GEOLOGIC TIME SCALE

ERA	PERIOD	EPOCH	MILLIONS OF YEARS AGO (APPROX.)	DURATION IN MILLIONS OF YEARS (APPROX.)
CENOZOIC	QUARTERNARY	RECENT	0-1	1
		PLEISTOCENE		
	TERTIARY	PLIOCENE	1-13	13
		MIOCENE	13-25	12
		OLIGOCENE	25-36	11
		EOCENE	36-58	6
		PALEOCENE	58-63	
MESOZOIC	CRETACEOUS		63-135	72
	JURASSIC		135-181	46
	TRIASSIC		181-230	49
PALEOZOIC	PERMIAN		230-280	50
	PENNSYLVANIAN		280-310	30
	MISSISSIPPIAN		310-345	35
	DEVONIAN		345-405	60
	SILURIAN		405-425	20
	ORDOVICIAN		425-500	75
	CAMBRIAN		500-600	100
PRECAMBRIAN	UPPER, MIDDLE, LOWER		Although many local subdivisions are recognized, no world-wide system has been evolved. The Precambrian lasted for at least 2½ billion years. Oldest dated rocks are at least 2,700 million, possibly 3,300 million, years old.	



APPENDIX B. SOILS OF THE SAVANNAH RIVER SITE

Major Soils	Brief Soil Description	Location	Area
Chastain Tawcaw Shellbluff	Poorly drained, somewhat poorly drained, and well drained soils that have fine texture or loamy throughout. The surface horizon often is dark grayish brown to brown loamy soil about 6" thick.	Large floodplain areas generally associated with the Savannah River.	There are about 4,850 hectares in this group with about 250 hectares of minor soils included in this area.
Hornsville Rembert	Moderately well drained and poorly drained soils with clayey subsoils. The surface 4-8" is often brown or gray.	Mostly on the first stream terrace and in some upland depressions.	There are about 5,650 hectares in this group with a large percent of minor soils included. The included soils range from very poorly drained deressions to beds of excessively drained sands.
Blanton Lakeland	Well drained to excessively drained mostly sandy soils. The sandy surface horizons are often in shades of brown or gray.	The uplands with most acreage north of Upper Three Runs Creek and along the east boundary of the site.	There are about 14,500 hectares in this soil group and about 40% of this area is small areas of less sandy soils such as Dothan, Fuquay, and Lucy.

Major Soils	Brief Soil Description	Location	Area
Fuquay Blanton Dothan	Well drained soils that vary in thickness of the sandy surface horizons from about 10" to more than 40". Each soil has a loamy subsoil within 2 meters of the soil surface.	Throughout the upland areas of the site.	About 36,400 hectares with nearly half of this area in small delineations of minor soils such as Lakeland, Rembert, Wagram, etc.
Orange-burg	Well drained loamy soil that often has a reddish brown sandy surface and a red loamy subsoil.	Upland areas of the site with most acreage north of Upper Three Runs Creek and in an area south of 700 area along road D and southwest through TC area to the creek.	About 1,600 hectares with about a third of this area in minor but similar soils.
Vaucluse Ailey	Well drained loamy soil that often has a light brown sandy surface and a brittle subsoil. Some of these soils have quartz gravel on the surface and in the profile.	The uplands throughout the site along sloping to steep areas that are adjacent to drainageways. The delineations are long and narrow and windthrow of trees is likely to occur.	There are about 8,000 hectares in this group and slightly more than half of the area is minor soils that lack the brittle subsoil or other properties typical of this group. Troup, Lucy, Wagram, and Blanton are examples.

Major Soils	Brief Soil Description	Location	Area
Troup Pickney Lucy	Troup and Lucy are well drained soils with sandy surface horizons that are in shades of brown or reddish brown. The loamy subsoil is often reddish brown or red. The Pickney soil has a dark nearly black mucky surface usually with 10 to 15 percent organic matter.	Troup and Lucy soils occur in the uplands along strongly sloping to steep breaks leading into the Pickney soil which is on the floodplain of Upper Three Runs, Tinker, and Steel Creeks, and along the lower part of Meyers Branch.	There are about 8,000 hectares in this group with Troup and Lucy soils slightly more than 4,000 hectares and Pickney soils nearly 3,200 hectares. There are about 400 hectares of minor soils such as Dorovan, Vaucluse, and Ocilla.

This appendix was contributed by V. Rogers, U.S. Soil Conservation Service, and based on his recently completed soil survey of the SRS.

APPENDIX C. TREES OF SRS VEGETATION COMMUNITIES

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Aceraceae									
Acer negundo						X	X	X	
A. rubrum			X	X	X	X	X		X
A. saccharinum						X	X		
Annonaceae									
Asimina triloba						X			
Betulaceae									
Betula nigra						X			
Carpinus caroliniana						X	X	X	
Ostrya virginiana					X				
Cornaceae									
Cornus florida			X	X	X				
Cupressaceae									
Juniperus virginiana	X		X						
Ebenaceae									
Diospyros virginiana	X	X	X						
Ericaceae									
Oxydendrum arboreum					X				
Vaccinium arboreum		X	X						
Fabaceae									
Albizia julibrissin[1]	X		X						
Cercis canadensis				X	X				
Gleditsia aquatica						X	X		
Robinia pseudo-acacia				X					
Fagaceae									
Castanea pumilia				X					
Fagus grandifolia					X			X	
Quercus alba				X	X				
Q. austrina						X			
Q. coccinea				X					

[1] *naturalized exotic*

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Q. durandii[2]				X					
Q. falcata			X	X	X				
Q. incana		X							
Q. laevis		X	X						
Q. laurifolia	X			X		X	X		X
Q. lyrata						X			
Q. margaretta		X							
Q. marilandica		X	X						
Q. michauxii						X			
Q. nigra		X	X			X	X	X	X
Q. pagoda						X			
Q. phellos			X		X	X		X	
Q. stellata				X	X				
Q. velutina				X					
Hamamelidaceae									
Hamamelis virginiana					X				
Liquidambar styraciflua	X		X	X			X	X	X
Juglandaceae									
Carya aquatica						X	X	X	
C. cordiformis						X			
C. glabra		X	X	X	X				
C. myristiciformis						X			
C. ovalis				X					
C. ovata						X			
C. pallida		X	X	X					
C. tomentosa	X	X		X	X				
Juglans nigra					X				
Lauraceae									
Persea borbonia			X						
Sassafras albidum	X	X	X	X					X
Magnoliaceae									
Liriodendron tulipfera					X	X		X	
Magnolia grandiflora				X		X			

[2] *rare*

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
M. virginiana			X			X			X
Meliaceae									
Melia azedarach	X		X			X			
Moraceae									
Morus rubra					X	X			
Nyssaceae									
Nyssa aquatica						X	X		
N. sylvatica var. *sylvatica*		X	X	X	X				
N. sylvatica var. *biflora*						X	X		X
Oleaceae									
Fraxinus caroliniana						X	X		X
F. pennsylvanica						X			
Osmanthus americanus						X			
Platanaceae									
Platanus occidentalis						X	X	X	
Pinaceae									
Pinus clausa			X						
P. glabra[3]						X			
P. taeda	X	X	X			X		X	X
P. echinata			X	X					
P. elliottii			X						
P. serotina						X			X
P. palustris	X	X	X						X
P. virginiana			X						
Rosaceae									
Amelanchier canadensis				X		X			
Prunus americana	X				X	X			
P. caroliniana	X		X						
P. serotina	X	X	X	X		X			
Salicaceae									
Populus deltoides						X		X	X

[3] *rare*

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FWM	CB
P. heterophylla						X	X		
Salix caroliniana							X		
S. nigra							X	X	X
Taxodiaceae									
Taxodium ascendens							X		X
T. distichum						X	X		X
Ulmaceae									
Celtis laevigata						X	X		
C. occidentalis var. *georgiana*	X		X	X					
Planera aquatica						X	X	X	
Ulmus alata						X	X		X
U. americana						X	X		
U. rubra					X	X			

X indicates the presence of a species in a particular community.

OF = Old Field, SH = Sandhills, PP = Pine forest or plantation, UP = Upland Hardwoods, UB = Upland Hardwood Bluff, BL = Bottomland Hardwood, SW = Swamp, FWM = Freshwater Margin, CB = Carolina Bay.

APPENDIX D. SCIENTIFIC AND COMMON NAMES OF TREE SPECIES OF THE SRS [1]

Family	Species	Common Name
Aceraceae	*Acer negundo* L.	Box elder
	A. rubrum L.	Red maple
	A. saccharinum L.	Silver maple
Annonaceae	*Asimina triloba* (L.) Dunal	Pawpaw
Betulaceae	*Betula nigra* L.	River birch
	Carpinus caroliniana Walter	American hornbeam, Ironwood
	Ostrya virginiana (Miller) K. Koch	Hophornbeam
Cornaceae	*Cornus florida* L.	Flowering dogwood
Cupressaceae	*Juniperus virginiana* L.	Red cedar
Ebenaceae	*Diospyros virginiana* L.	Persimmon
Ericaceae	*Oxydendrum arboreum* (L.) DC.	Sourwood
	Vaccinium arboreum Marshall	Sparkleberry
Fabaceae	*Albizia julibrissin* Durazzini	Mimosa
	Cercis canadensis L.	Redbud
	Gleditsia aquatica Marshall	Water locust
	Robinia pseudo-acacia L.	Black locust
Fagaceae	*Castanea pumilia* (L.) Miller	Chinquapin
	Fagus grandifolia Ehrhard	Beech
	Quercus alba L.	White oak
	Q. austrina Small	Bastard white oak, Bluff oak
	Q. coccinea Muenchh.	Scarlet oak
	Q. durandii Buckley	Durand's white oak

[1] *nomenclature according to Radford et al. (1968)*

Family	Species	Common Name
	Q. falcata Michaux	Southern red oak
	Q. incana Bartram	Bluejack oak, Upland willow oak
	Q. laevis Walter	Turkey oak
	Q. laurifolia Michaux	Laurel oak
	Q. lyrata Walter	Overcup oak
	Q. margaretta Ashe	Scrub post oak
	Q. marilandica Muenchh.	Blackjack oak
	Q. michauxii Nuttall	Swamp chestnut oak
	Q. nigra L.	Water oak
	Q. pagoda Raf.	Swamp spanish oak, Cherrybark oak
	Q. phellos L.	Willow oak
	Q. stellata Wang.	Post oak
	Q. velutina Lam.	Black oak
Hamamelidaceae	*Hamamelis virginiana* L.	Witch hazel
	Liquidambar styraciflua L.	Sweetgum
Juglandaceae	*Carya aquatica* (Michaux f.) Nuttall	Water hickory
	C. cordiformis (Wang.) K. Koch	Bitternut hickory
	C. glabra (P. Miller) Sweet	Pignut hickory
	C. myristiciformis (Michaux f.) Nuttall	Nutmeg hickory
	C. ovalis (Wang.) Sargent	Sweet pignut hickory
	C. ovata (P. Miller) K. Koch	Shagbark hickory
	C. pallida (Ashe) Engler & Graebner	Pale hickory, Sand hickory
	C. tomentosa (Poiret) Nuttall	Mockernut, White heart hickory
	Juglans nigra L.	Black walnut
Lauraceae	*Persea borbonia* (L.) Sprengel	Red bay
	Sassafras albidum (Nuttall) Nees	Sassafras
Magnoliaceae	*Liriodendron tulipifera* L.	Tulip poplar, Yellow poplar
	Magnolia grandiflora L.	Magnolia
	M. virginiana L.	Sweet Bay
Meliaceae	*Melia azedarach* L.	China-berry

Family	Species	Common Name
Moraceae	*Morus rubra* L.	Red mulberry
Nyssaceae	*Nyssa aquatica* L.	Tupelo
	N. sylvatica Marshall var. *sylvatica*	Blackgum
	N. sylvatica Marshall var. *biflora* (Walter) Sargent	Swamp tupelo
Oleaceae	*Fraxinus caroliniana* P. Miller	Carolina ash
	F. pennsylvanica Marshall	Red ash
	Osmanthus americanus (L.)	Wild olive
Platanaceae	*Platanus occidentalis* L.	American sycamore
Pinaceae	*Pinus clausa* (Chapm. ex Engelm.) Vasey ex Sarg.[2]	Sand pine
	P. glabra Walter	Walter's pine
	P. taeda L.	Loblolly pine
	P. echinata P. Miller	Shortleaf pine
	P. elliottii Engelm.	Slash pine
	P. serotina Dougl.	Pond pine
	P. palustris P. Miller	Longleaf pine
	P. virginiana P. Miller	Virginia pine
Rosaceae	*Amelanchier canadensis* (L.) Medicus	Shad-bush, Serviceberry
	Prunus americana Marshall	Wild plum
	P. caroliniana (P. Miller) Aiton	Laurel cherry
	P. serotina Ehrhart	Black cherry
Salicaceae	*Populus deltoides* Marshall	Eastern cottonwood
	P. heterophylla L.	Swamp cottonwood
	Salix caroliniana Michaux	Swamp willow
	S. nigra Marshall	Black willow
Taxodiaceae	*Taxodium ascendens* Brongn.	Pond cypress
	T. distichum (L.) L.C. Richard	Bald cypress

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
Ulmaceae	*Celtis laevigata* Willd.	Sugarberry
	C. occidentalis L. var. *georgiana* (Small) Ahles	Georgia or Dwarf hackberry
	Planera aquatica (Walter) J.F. Gmelin	Planer-tree, Water elm
	Ulmus alata Michaux	Winged elm
	U. americana L.	American elm
	U. rubra Muhl.	Slippery elm

APPENDIX E. SHRUBS OF SRS VEGETATION COMMUNITIES

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Anacardiaceae									
Rhus copallina	X	X	X						X
R. glabra	X	X	X						
R. toxicodendron	X	X	X			X			
R. vernix			X			X		X	X
Aquifoliaceae									
Ilex cassine									X
I. coriacea						X			X
I. decidua				X		X			
I. glabra						X			X
I. opaca			X					X	X
I. verticillata						X		X	
I. vomitoria			X						
Arecaceae									
Sabal minor			X			X	X		
Asteraceae									
Baccharis halimifolia	X								
Berberidaceae									
Nandina domestica					X				
Betulaceae									
Alnus serrulata							X	X	
Calycanthaceae									
Calycanthus floridus					X				
Caprifoliaceae									
Sambucus canadensis								X	
Viburnum dentatum				X	X	X		X	
V. prunifolium						X		X	
V. nudum			X	X					
V. rufidulum			X		X				
Celastraceae									
Euonymus americanus					X	X			

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Clethraceae									
Clethra alnifolia									X
Cornaceae									
Cornus amomum								X	
C. stricta						X	X	X	
Cyrillaceae									
Cyrilla racemiflora						X		X	X
Ericaceae									
Gaylussacia dumosa		X							
Kalmia latifolia					X				
Leucothoe axillaris						X		X	
Lyonia ferruginea								X	
L. lucida						X			X
L. mariana						X		X	X
Rhododendron canescens					X				
R. flammeum					X				
Vaccinium spp.							X		
V. corymbosum			X						X
V. vacillans				X					
V. stamineum		X	X						X
Fabaceae									
Amorpha fruiticosa						X		X	
Hippocastanacea									
Aesculus pavia					X			X	
Lauraceae									
Lindera benzoin						X			
L. subcoriacea						X			
Loranthaceae									
Phoradendron serotinum				X		X			
Lythraceae									
Decodon verticillatus									X
Myricaceae									
Myrica cerifera			X		X	X		X	X

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Oleaceae									
Chionanthus virginicus				X		X			
Forestiera acuminata						X	X	X	
Rhamnaceae									
Ceanothus americanus		X							
Rosaceae									
Aronia arbutifolia									X
Crataegus spp.							X		X
C. flava		X	X	X					
C. marshallii						X			
C. viridis						X	X		
Prunus angustifolia	X					X			
Rubus spp.	X		X	X			X	X	X
R. betulifolius								X	
R. trivialis	X								
Cephalanthus occidentalis						X	X		X
Sapotaceae									
Bumelia lanuginosa					X				
B. lycioides					X	X			
Saxifragaceae									
Itea virginica				X		X	X		X
Theaceae									
Gordonia lasianthus						X			X

X indicates the presence of a species in a particular community

OF = Old Field, SH = Sandhills, PP = Pine forest or plantation, UP = Upland Hardwoods, UB = Upland Hardwood Bluff, BL = Bottomland Hardwood, SW = Swamp, FWM = Freshwater Margin, CB = Carolina Bay.

APPENDIX F. SCIENTIFIC AND COMMON NAMES OF SHRUBS OF THE SRS [1]

Family	Species	Common Name
Anacardiaceae	*Rhus copallina* L.	Winged sumac
	R. glabra L.	Smooth sumac
	R. toxicodendron L.	Poison oak
	R. vernix L.	Poison sumac
Aquifoliaceae	*Ilex cassine* L.	Dahoon
	I. coriacea (Pursh) Chapman	Large or Sweet Gallberry
	I. decidua Walter	
	I. glabra (L.) Gray	Inkberry, Gallberry
	I. opaca Aiton	American holly
	I. verticillata (L.) Gray	Black alder
	I. vomitoria Aiton	Yaupon
Arecaceae	*Sabal minor* (Jacquin) Persoon	Palmetto
Asteraceae	*Baccharis halimifolia* L.	Groundsel-tree, Consumption-weed
Berberidaceae	*Nandina domestica* Thunberg	
Betulaceae	*Alnus serrulata* (Aiton). Willd.	Tag alder
Calycanthaceae	*Calycanthus floridus* L.	Sweet shrub, Spicebush
Caprifoliaceae	*Sambucus canadensis* L.	Elderberry
	Viburnum dentatum L.	Possum haw, Arrow-wood
	V. prunifolium L.	Black haw, Nanny-berry
	V. nudum L.	Naked witherod

[1] *nomenclature according to Radford et al. (1968)*

Family	Species	Common Name
	V. rufidulum Raf.	Blue haw
Celastraceae	*Euonymus americanus* L.	Strawberry bush
Clethraceae	*Clethra alnifolia* L.	Sweet pepperbush
Cornaceae	*Cornus amomum* P. Miller	Swamp dogwood
	C. stricta Lam.	Swamp dogwood
Cyrillaceae	*Cyrilla racemiflora* L.	Leatherwood, Titi
Ericaceae	*Gaylussacia dumosa* (Andrz.) T. & G.	Dwarf huckleberry
	Kalmia latifolia L.	Mountain laurel
	Leucothoe axillaris (Lam.) D. Don	Dog hobble
	Lyonia ferruginea (Walter) Nuttall	Stagger-bush
	L. lucida (Lam.) K. Koch	Fetter-bush
	L. mariana (L.) D. Don	Stagger-bush
	Rhododendron canescens (Michaux) Sweet	Wild azalea
	R. flammeum (Michaux) Sargent[2]	Oconee azalea
	Vaccinium spp.	
	V. corymbosum L.	Highbush blueberry
	V. vacillans Torrey	
	V. stamineum L.	Squaw-huckleberry, Gooseberry
Fabaceae	*Amorphoa fruiticosa* L.	
Hippocastanacea	*Aesculus pavia* L.	Red buckeye
Lauraceae	*Lindera benzoin* (L.) Blume	Spicebush
	L. subcoriacea BE Wofford[2]	Spicebush
Loranthaceae	*Phoradendron serotinum* (Raf.) M.C. Johnston	Mistletoe
Lythraceae	*Decodon verticillatus* (L.) Ell.	Water loosestrife

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
Myricaceae	*Myrica cerifera* L.	Waxmyrtle
Oleaceae	*Chionanthus virginicus* L.	Fringe tree
	Forestiera acuminata (Michx.) Poiret	Swamp privet
Rhamnaceae	*Ceanothus americanus* L.	New Jersey tea
Rosaceae	*Aronia arbutifolia* (L.) Persoon	Chokecherry
	Cephalanthus occidentalis L.	Button bush
	Crataegus spp.	Hawthorn
	C. flava Aiton	Hawthorn
	C. marshallii Egglest.	Hawthorn
	C. viridis L.	Hawthorn
	Prunus angustifolia Marshall	Chickasaw plum
	Rubus spp.	Blackberry, Dewberry
	R. betulifolius Small	Blackberry
	R. trivialis L.	Southern dewberry
Sapotaceae	*Bumelia lanuginosa* (Michx.) Pers.[2]	Wooly bumelia
	B. lycioides (L.) Persoon	Buckthorn
Saxifragaceae	*Itea virginica* L.	Virginia willow
Theaceae	*Gordonia lasianthus* (L.) Ellis	Loblolly bay

[2] *not in Radford et al. (1968)*

APPENDIX G. VINES OF SRS VEGETATION COMMUNITIES

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Anacardiaceae									
Rhus radicans			X	X	X	X	X		X
Apocynaceae									
Trachelospermum difforme						X			
Aristolochiacea									
Aristilochia tomentosa						X			
Bignonicaeae									
Campsis radicans			X	X			X		X
Caprifoliaceae									
Lonicera japonica			X	X				X	X
Convolvulaceae									
Cuscuta campestris			X			X			
C. compacta				X					
C. gronovii							X		
Ipomoea hederacea	X								
I. pandurata									
Cucurbitaceae									
Lagenaria siceraria	X		X						
Fabaceae									
Amphicarpa bracteata						X			X
Clitoria mariana		X		X	X	X			
Loganiaceae									
Gelsemium sempervirens					X			X	
Menispermaceae									
Cocculus carolinus	X				X				
Ranunculaceae									
Clematis crispa						X		X	
Rhamnaceae									
Berchemia scandans							X		X
Saxifragaceae									
Decumaria barbara					X	X			

Family Species	Communities								
	OF	SH	PP	UP	UB	BL	SW	FWM	CB
Smilacaceae									
Smilax bona-nox				X	X				
S. glauca	X	X	X	X	X				
S. herbacea					X				
S. hugeri					X				
S. laurifolia						X			
S. pumila			X	X					
S. rotundifolia						X			
S. smallii								X	
S. tamnoides					X				
S. walteri						X	X		
Vitaceae									
Ampelopsis arborea	X						X		X
Parthenocissus quinquefolia				X		X			
Vitis aestivalis			X		X	X	X		X
V. rotundifolia		X	X	X	X	X	X		X

X indicates the presence of a species in a particular community.

OF = Old Field, SH = Sandhills, PP = Pine forest or plantation, UP = Upland Hardwoods, UB = Upland Hardwood Bluff, BL = Bottomland Hardwood, SW = Swamp, FWM = Freshwater Margin, CB = Carolina Bay.

APPENDIX H. SCIENTIFIC AND COMMON NAMES OF VINES OF THE SRS [1]

Family	Species	Common Name
Anacardiaceae	*Rhus radicans* L.	Poison ivy
Apocynaceae	*Trachelospermum difforme* (Walt.) Gray	Climbing dogbane
Aristolochiacea	*Aristolochia tomentosa* Sims[2]	
Bignonicaeae	*Campsis radicans* (L.) Seemann	Trumpet vine
Caprifoliaceae	*Lonicera japonica* Thumb.	Japanese honeysuckle
Convolvulacea	*Cuscuta campestris*. Yuncker *C. compacta* Jussieu *C. gronovii* Willd. *Ipomoea hederacea* (L.) Jacq. *I. pandurata* (L.) G.F.W. Mey.	Dodder Compact dodder Dodder Morning glory Wild potato vine, Man root
Cucurbitaceae	*Lagenaria siceraria* (Molina) Standl.[2]	Bottle gourd
Fabaceae	*Amphicarpa bracteata* (L.) Fernald *Clitoria mariana* L.	Hog peanut Butterfly pea
Loganiaceae	*Gelsemium sempervirens* (L.) St. Hil.	Yellow jessamine
Menispermaceae	*Cocculus carolinus* (L.) DC	Carolina mooseed, Coral beads
Ranunculaceae	*Clematis crispa* L.	Leather flower
Rhamnaceae	*Berchemia scandans* (Hill) K. Koch.	Rattan vine

[1] *nomenclature according to Radford et al. (1968)*
[2] *not in Radford*

Family	Species	Common Name
Saxifragaceae	*Decumaria barbara* L.	Climbing hydrangea
Smilacaceae	*Smilax bona-nox* L.	Catbrier
	S. glauca Walter	White catbrier
	S. herbacea L.	Carrion flower
	S. hugeri (Small) J.B.S. Norton ex Pennell	
	S. laurifolia L.	Bamboo vine
	S. pumila Walter	Sarsaparilla-vine
	S. rotundifolia L.	
	S. smallii Morong	
	S. tamnoides L.	Carrion flower
	S. walteri Pursh	Coral green brier
Vitaceae	*Ampelopsis arborea* (L.) Koehne	Pepper-vine
	Parthenocissus quinquefolia (L.) Planchon	Virginia creeper
	Vitis aestivalis Michaux	Silver-leaf grape
	V. rotundifolia Michaux	Muscadine

APPENDIX I. HERBS OF SRS VEGETATION COMMUNITIES

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Acanthaceae										
Dyschoriste oblongifolia	X	X	X							
Acanthaceae										
Justicia ovata						X				
Ruellia carolinensis	X								/X	
Agavaceae										
Nolina georgiana		X								
Aizoaceae										
Mollugo verticillata	X									
Alismataceae										
Echinodorus cordifolius							X			
E. tenellus									/X	X
Sagittaria graminea									X/	
S. latifolia									X/	
S. isoetiforms										X
Amaranthaceae										
Alternanthera philoxeroides						X	X		X/	
Amaranthus palmeri	X	X								
Froelichia floridata	X									
Amaryllidaceae										
Agave virginica			X							
Hypoxis hirsuta							X			
H. micrantha									/X	
Zephyranthes atamasco						X	/X			
Apiaceae										
Apium leptophyllum									X/	
Centella asiatica									/X	X
Chaerophyllum tainturieri						X				
Cicuta maculata							X	X	X/	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Daucus carota	X									
Eryngium integrifolium									X/	
E. yuccifolium		X								
Hydrocotyle umbellata									/X	X
H. verticillata							X			
Sanicula canadensis				X	X					
S. smallii				X	X					
Spermolepis echinata	X									
Thaspium barbinode				X	X	X			X/X	
Ptilimnium capillaceum						X				
Trepocarpus aethusae					X	X				
Apocynaceae										
Amsonia ciliata		X	X							
A. tabernaemontana	X		X		X					
Apocynum cannabinum	X									
Trachelospermum difforme						X				
Araceae										
Arisaema dracontium						X			/X	
A. triphyllum						X				
Orontium aquaticum									X/X	X
Peltandra virginica									X/X	
Aristolochiaceae										
Aristolochia serpentaria				X	X	X				
Hexastylis arifolia				X	X	X				
Asclepiadaceae										
Asclepias verticillata		X	X							
A. humistrata		X	X							

Family / Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
A. amplexicaulis		X	X							
A. obovata	X		X							
A. perennis						X				
A. tuberosa	X	X								
A. variegata						X				
Matelea gonocarpa						X				
Aspidiaceae										
Athyrium asplenioides						X				
Onoclea sensibilis						X	X		X/	
Asteraceae										
Marshallia obovata						X				
Acanthospermum australe	X									
Achillea millefolium	X									
Ambrosia artemisiifolia	X								/X	
Antennaria plantaginifolia				X						
Arnica acaulis			X							X
Aster bifoliatus	X	X								
A. concolor		X								
A. dumosus	X			X		X				
A. linariifolius		X								
A. paternus		X	X							
A. pilosus	X									
A. undulatus										
Baccharis halimifolia	X								/X	
Berlandiera pumila		X								
Bidens aristosa									X/	
B. bipinnata									X/	
B. discoidea									X/	
B. frondosa										X
Boltonia asteroides									X/	

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Cacalia atriplicifolia				X						
Carphephorus bellidifolius		X	X							
Centaurea cyanus	X									
Chaptalia tomentosa			X							
Chrysogonum virginianum var. *australe*				X	X					
Cirsium nuttallii	X									
C. repandum	X	X								
C. virginianum		X								
Coreopsis basalis										
C. lanceolata	X									
C. major		X		X						
C. rosea										X
Echinacea laevigata			X							
Eclipta alba								X		
Elephantopus carolinianus						X				
E. tomentosus				X						
Erechtites hieracifolia							X			
Erigeron annuus	X									
E. canadensis	X									
E. strigosus	X	X								
Eupatorium album			X							
E. aromaticum					X					
E. capillifolium	X									
E. coelestinum						X			X/	
E. compositifolium	X									
E. cuneifolium		X								
E. fistulosum						X			/X	
E. perfoliatum		X								
E. rotundifolium	X		X							
E. pilosum									/X	
E. leucolepis									X/	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Gaillardia aestivalis	X									
Gnaphalium chilense	X									
G. helleri			X							
G. obtusifolium	X									
G. purpureum	X									
Haplopappus divaricatus	X									
Helianthus angustifolius			X							
H. debilis										
H. strumosus			X							
Heliopsis helianthoides						X				
Heterotheca gossypina		X								
H. graminifolia		X								
H. mariana			X	X						
H. subaxillaris	X	X								
Hieracium gronovii		X								
Hymenopappus scabiosaeus										
Hypochoeris glabra	X									
Iva microcephala										
Kirigia oppositifolia	X									
K. virginica		X								
Kuhnia eupatorioides			X	X						
Lactuca canadensis	X									
L. graminifolia	X									
Liatris earlei										
L. elegans										
L. graminifolia		X								
L. secunda	X	X								
L. tenuifolia		X								
Melanthera hastata						X				
Mikania scandens						X	X			
Pluchea camphorata							X		/X	
P. foetida										X

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
P. rosea									/X	
Polymnia uvedalia						X				
Prenanthes serpentaria			X							
Pterocaulon pycnostachyum						X				
Rudbeckia fulgida	X									
R. hirta				X						
Sclerolepis uniflora									/X	
Senecio glabellus						X				
S. obovatus					X					
S. smallii	X									
Silphium compositum		X	X							
Solidago altissima	X									
S. caesia					X					
S. gigantea						X				
S. leavenworthii									/X	
S. microcephala	X									
S. odora			X							
S. petiolaris			X							
S. rugosa									/X	
S. stricta						X				
Sonchus asper	X									
Spilanthes americana						X			/X	
Trilisa paniculata	X									
Verbesina virginica						X	X			
Vernonia altissima						X	X			
V. angustifolia		X								
Azollaceae										
Azolla caroliniana								X		
Balsaminaceae										
Impatiens capensis						X	X		/X	
Berberidaceae										
Nandina domestica					X					

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Blechnaceae										
Woodwardia areolata						X	X			
Boraginaceae										
Lithospermum caroliniense		X								
Myosotis verna	X									
Heliotropium amplexicaule						X				
Brassicaceae										
Camelina microcarpa	X									
Cardamine parviflora						X				
Lepidium virginicum	X									
Rorippa islandica									/X	
R. sessiliflora						X			/X	
Warea cuneifolia		X								
Bromeliaceae										
Tillandsia usneoides				X	X	X	X			
Cabombaceae										
Brasenia schreberi								X		
Cabomba caroliniana								X		
Cactaceae										
Opuntia compressa	X	X	X							
Callitrichaceae										
Callitriche heterophylla								X		
Campanulaceae										
Lobelia boykinii									/X	X
L. elongata									/X	
L. nuttallii	X					X			X/	
L. puberula									X/	
Specularia perfoliata	X									
Sphenoclea zeylandica							X			

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Wahlenbergia marginata	X									
Caryophyllaceae										
Arenaria caroliniana		X								
Cerastium glomeratum	X									
Paronychia riparia			X							
Saponaria officinalis	X									
Scleranthus annuus	X									
Silene angustifolia					X					
S. caroliniana			X	X						
Stellaria media						X				
Stipulicida setacea		X								
Ceratophyllaceae										
Ceratophyllum demersum							X	X		
Chenopodiaceae										
Chenopodium album	X									
C. ambrosioides	X									
Cycloloma artriplicifolium										
Cistaceae										
Helianthemum canadense		X	X							
H. rosmarinifolium		X								
Lechea minor	X			X						
L. patula		X								
L. tenuifolia	X									
L. villosa	X									
Commelinaceae										
Aneliema keisak							X			
Commelina communis						X			/X	
C. diffusa		X								
C. erecta	X									
C. virginica									/X	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Tradescantia ohiensis	X									
T. rosea	X	X								
T. virginiana			X							
Convolvulaceae										
Bonamia aquatica									X/	
B. patens		X								
B. pickeringii		X								
Calystegia sepium						X				
Dichondra carolinensis			X							
Ipomoea hederacea	X									
I. pandurata	X									
I. trichocarpa		X								
Jacquemontia tamnifolia										
Crassulaceae										
Penthorum sedoides									X/	
Cucurbitaceae										
Melothria pendula	X								X/	
Cyperaceae										
Bulbostylis barbata										
B. capillaris	X								/X	
B. ciliatifolia	X									
B. stenophylla	X									
Carex albolutescens										X
C. atlantica									X/	
C. comosa									X/	
C. complanta	X		X			X				
C. debilis									X/	
C. decomposita							X	X		
C. digitalis					X					
C. festucacea									X/	
C. folliculata									/X	
C. howei							X			
C. intumescens						X				
C. joorii							X			

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
C. laevivaginata									/X	
C. laxiflora									/X	
C. louisianica						X				
C. lurida										
C. muhlenbergii	X									
C. nigromarginata										
C. oligocarpa				X						
C. retroflexa							X			
C. seorsa						X				
C. tenax										
C. tribuloides										
C. typhina						X				
Cyperus ferruginescens										X
C. filiculmis	X		X							
C. haspan									X/X	
C. iria						X	X			
C. ovularis	X									
C. polystachyos										
C. pseudovegetus							X		X/X	
C. retrofractus		X								
C. retrorsus	X									
C. rotundus	X									
C. strigosus							X			
C. virens						X	X			
Dulichium arundinaceum										
Eleocharis acicularis								X	X/	
E. equisetoides									X/	X
E. quadrangulata								X		X
E. melanocarpa			X							
E. microcarpa									X/X	
E. obtusa									X/	X
E. robbinsii										X
E. tortilis								X		
E. tricostata									X/	
E. tuberculosa									X/X	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Fimbristylis autumnalis									X/X	
F. dichotoma									X/X	
F. spadicea									X/X	
Fuirena pumila									X/	
F. squarrosa									X/	
Rhynchospora caduca						X				
R. chapmanii									X/	
R. corniculata							X		X/	
R. globularis						X				
R. glomerata						X			X/	
R. grayi		X								
R. inundata									X/	X
R. macrostachya									X/	
R. rariflora									X/	
R. tracyi							X			
Scirpus cyperinus									X/	
S. validus							X		X/	
Scleria reticularis			X							
S. triglomerata	X		X							
Dioscoreaceae										
Dioscorea villosa					X	X				
Droseraceae										
Drosera leucantha						X				
D. capillaris									X/	X
D. intermedia							X		X/X	
Ericaceae										
Chimaphila maculata			X	X	X					
Epigaea repens				X	X					
Monotropa hypopithys				X						
Eriocaulaceae										
Eriocaulon compressum									X/	
E. decangulare						X			X/	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Lachnocaulon anceps						X			X/	
Euphorbiaceae										
Cnidoscolus stimulosus		X	X							
Croton capitatus	X									
C. elliotti										X
Euphorbia chamaesyce	X									
E. corollata		X		X	X					
E. gracilior		X								
E. heterophylla	X									
E. ipecacuanhae		X								
E. supina	X									
Phyllanthus caroliniensis						X				
Sebastiania ligustrina						X			X/	
Stillingia sylvatica		X								
Tragia urens	X	X								
Fabaceae										
Aeschynomene indica							X	X		
Astragalus villosus		X		X						
Baptisia alba			X							
B. cinerea	X									
B. lanceolata		X	X							
B. microphylla		X								
B. perfoliata		X								
B. tinctoria				X		X				
Cassia fasciculata	X	X	X						/X	
C. nictitans	X									
C. obtusifolia	X									
Centrosema virginianum	X									
Crotalaria angulata			X							
C. mucronata	X									

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
C. purshii			X							
C. spectabilis	X									
C. sagittalis	X									
Desmodium fernaldii			X							
D. nudiflorum					X	X				
D. paniculatum			X							
D. rotundifolium			X	X						
D. strictum	X	X	X							
D. tortuosum	X									
Galactia mollis		X								
Gleditsia aquatica							X			
Indigofera caroliniana						X				
Lespedeza angustifolia										
L. cuneata	X									
L. hirta	X		X							
L. intermedia	X									
L. procumbens			X	X						
L. repens							X			
L. striata	X									
L. stuevei	X									
L. virginica	X									
L. capitata			X							
Lupinus diffusus		X								
L. villosus	X	X								
Petalostemum pinnatum		X								
Phaseolus polystachios					X					
Rhynchosia difformis						X				
R. reniformis	X									
R. tomentosa	X									
Robinia hispida				X	X					
R. nana		X								

Family / Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Strophostyles umbellata		X								
Stylosanthes biflora		X	X							
Tephrosia florida	X									
T. spicata	X			X						
T. virginiana		X								
Trifolium arvense	X									
T. campestre	X									
T. dubium									X/	
T. incarnatum	X									
T. repens									X/	
Vicia hirsuta	X									
Zornia bracteata		X					X			
Fumariaceae										
Corydalis flavula				X	X	X				
Gentianaceae										
Bartonia paniculata						X	X			
B. verna										X
Gentiana catesbaei			X			X				
Nymphoides aquatica								X		
N. cordata								X		
Sabatia angularis						X			X/	
S. calycina							X			
S. campanulata									X/	
S. quadrangula		X								
Haemodoraceae										
Lachnanthes caroliniana							X		X/	
Haloragaceae										
Myriophyllum brasiliense							X	X		
M. heterophyllum								X		
M. laxum								X		
M. pinnatum								X		
M. spicatum								X		
Proserpinaca palustris									X/X	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
P. pectinata									X/X	
Hydrocharitaceae										
Vallisneria americana							X	X		
Hydrophyllaceae										
Hydrolea quadrivalvis									X/X	
Phacelia dubia									X/	
Hypericaceae										
Hypericum canadense									X/	
H. cistifolium									X/	
H. denticulatum				X						
H. drummondii				X						
H. gentianoides	X	X								
H. gymnathum						X				
H. hypericoides		X	X							
H. mutilum									X/	
H. nudiflorum						X				
H. punctatum	X		X							
H. setosum									X/	
H. stans									X/	
H. suffruticosum									X/	
H. tubulosum									X/	
H. virginicum									/X	
H. walteri									X/	
Iridaceae										
Iris virginica									X/	
Sisyrinchium albidium									X/	
S. angustifolium						X			X/	
S. arenicola									X/	
S. mucronatum									X/	
Juncaceae										
Juncus acuminatus							X		X/X	
J. biflorus							X			
J. canadensis									X/	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
J. coriaceus									X/	
J. debilis							X			
J. dichotomus	X								/X	
J. effusus								X	X/	X
J. elliottii									X/	
J. polycephalus									X/	
J. repens							X		X/X	
J. scirpoides									X/	
J. tenuis	X									
Psilocarya nitens										X
Lamiaceae										
Hedeoma pulegioides				X						
Lamium amplexicaule	X									
Leonotus nepetaefolia	X									
Lycopus amplectans									X/	
L. rubellus							X			
L. virginicus						X				
Macbridea caroliniana									/X	
Mentha piperita									X/X	
Prunella vulgaris						X			/X	
Pycnanthemum flexuosum			X						X/X	
P. incanum										
Salvia azurea		X								
S. lyrata			X							
S. utricifolia						X				
Scutellaria elliptica				X						
S. integrifolia						X			X/	
S. laterifolia									/X	
Trichostema dichotomum			X	X						
T. setaceum		X		X						
Lauraceae										
Lindera subcoriacea						X				

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Lemnaceae										
Lemna perpusilla								X		
Spirodela oligorrhiza							X	X		
Wolffia papulifera							X	X		
Wolffiella floridana								X		
Lentibulariaceae										
Pinguicula lutea								X		
Utricularia biflora								X		
U. fibrosa								X		
U. floridana								X		X
U. inflata								X		
U. olivacea								X		X
U. purpurea								X		
U. subulata								X		
Liliaceae										
Aletris farinosa	X			X					X/	
Allium ampeloprasum	X			X						
A. canadense				X		X				
A. cuthbertii		X							X/	
A. vineale	X									
Amianthium muscaetoxicum		X		X						
Medeola virginiana						X				
Nolina georgiana		X								
Nothoscordum bivalve										
Polygonatum biflorum					X					
Smilacina racemosa					X					
Uvularia perfoliata					X	X				
U. sessilifolia					X					
Yucca filamentosa										
Zigadensus densus		X		X						
Linaceae										
Linum striatum									X/	
L. virginianum				X		X			X/	
Loganiaceae										
Buddleja lindleyana										

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Cynoctonum mitreola						X			/X	
Polypremum procumbens										
Spigelia marilandica						X				
Lycopodiaceae										
Lycopodium appressum										X
L. alopecuroides										X
L. flabelliforme										X
Lythraceae										
Ammannia coccinea							X	X	X/	
Decodon verticillatus									X/X	
Rotala ramosior									X/	
Malvaceae										
Hibiscus moscheutos						X	X		X/	
H. syriacus									/X	
Sida rhombifolia									X/	
Mayacaceae										
Mayaca aubletii									X/	
Melastomataceae										
Rhexia alifanus									X/	
R. aristosa						X			X/	X
R. mariana										X
R. petiolata									X/	X
R. virginica									X/	
Najadaceae										
Najas gracillima								X		
N. guadalupensis								X		
Nelumbonaceae										
Nelumbo lutea								X		
Nymphaeaceae										
Nymphaea odorata								X		
Nuphar luteum							X	X		
Oleaceae										
Jasminum mesnyi			X							

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Osmanthus americana						X				
Onagraceae										
Gaura biennis	X									
G. filipes		X		X						
Ludwigia alternifolia									X/	
L. arcuata									X/	
L. decurrens									X/	
L. glandulosa									/X	
L. hirtella						X				
L. leptocarpa									X/	
L. linearis									/X	
L. palustris									X/	
L. pilosa										X
L. spathulata										X
L. sphaerocarpa									X/	
L. suffruticosa									X/	
Oenothera biennis	X									
O. fruitcosa			X							
O. laciniata	X									
O. tetragona			X							
Orchidaceae										
Habenaria clavellata						X				
H. cristata			X			X				
H. flava						X				
H. lacera				X	X					X
H. repens							X	X		
Hexalectris spicata				X						
Malaxis unifolia					X				X/	
Spiranthes cernua									X/	
S. grayi			X							
S. praecox									X/	
S. vernalis									X/	
Tipularia discolor					X	X				

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Orobanchaceae										
Conopholis americana						X				
Epifagus virginiana				X	X					
Osmundaceae										
Osmunda cinnamomea			X	X		X			X/X	
O. regalis						X			X/	
Oxalidaceae										
Oxalis corniculata	X									
O. dillenii	X			X						
O. violacea				X	X		X			
Papaveraceae										
Sanguinaria canadensis				X						
Passifloraceae										
Passiflora incarnata	X									
Phrymaceae										
Phryma leptostachya					X	X				
Phytolaccaceae										
Phytolacca americana	X									
Plantaginaceae										
Plantago aristata	X									
P. hookeriana	X									
P. lanceolata	X									
P. virginica	X									
Poaceae										
Agrostis hyemalis	X									X
A. perennans	X									
Aira elegans	X									
Andropogon elliottii	X	X								
A. scoparius		X								
A. ternarius	X	X	X							
A. virginicus	X	X	X							

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Anthaenantia villosa		X	X							
Aristida lanosa		X		X						
A. longespica	X	X								
A. oligantha	X									
A. purpurascens	X	X								
A. tuberculosa	X	X								
A. stricta		X								
Arundinaria gigantea			X			X	X		/X	X
Arundo donax						X			X/X	
Bromus catharticus	X									
B. japonicus	X									
Cenchrus echinatus	X									
C. longispinus	X									
Cynodon dactylon	X									
Dactylis glomerata	X									
Danthonia sericea	X		X							
Digitaria filiformis	X									
D. ischaemum									/X	
D. sanguinalis	X									
Echinochloa crusgalli							X			
E. walteri									/X	
Eleusine indica	X									
Elymus virginicus						X			X/X	
Eragrostis capillaris	X			X						
E. curvula	X	X								
E. refracta			X							
E. spectabilis	X									
Erianthus giganteus			X						X/	X
Festuca elatior	X									
F. sciurea	X									
Glyceria striata									X/	
Gymnopogon ambiguus	X									
G. brevifolius			X							
Holcus lanatus									X/	
Hydrochloa caroliniensis								X		

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Leersia hexandra						X	X			
L. lenticularis							X		X/	
L. oryzoides									/X	
Leptoloma cognatum	X									
Lolium multiflorm									X/	
Manisuris rugosa									X/	
Melica mutica				X						
Muhlenbergia capillaris				X						
M. schreberi						X				
Oplismenus setarius						X	X			
Panicum aciculare	X									
P. agrostoides									X/	
P. anceps	X		X			X				
P. angustifolium			X		X	X				
P. boscii						X				
P. ciliatum									X/	
P. columbianum	X									
P. commonsianum		X								
P. commutatum									X/	
P. consanguineum		X								
P. dichotomiflorum			X							
P. dichotomum									X/	
P. ensifolium						X				
P. gymnocarpon							X			
P. hemitomom								X	X/	
P. hians						X				
P. lanuginosum		X		X						
P. laxiflorum			X							
P. leucothrix									X/	
P. longifolium									X/	
P. nitidum									X/	
P. oligosanthes		X								
P. polyanthes						X				
P. ravenelii			X							
P. scoparium									X/	
P. sphaerocarpon				X						

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
P. verrucosum									X/	
P. virgatum									X/	
P. wrightianum									X/	
P. xalapense									X/	
Paspalum dilatatum	X									
P. floridanum						X				
P. laeve	X									
P. notatum	X									
P. praecox			X			X				
P. setaceum	X									
P. urvillei	X									
Poa annua	X									
P. autumnalis									X/	
P. chapmaniana									X/	
P. pratensis									X/	
Sacciolepis striata									X/	
Setaria corrugata	X									
S. geniculata	X									
S. glauca									/X	
Sorghastrum elliottii				X						
S. nutans	X									
S. secundum		X								
Sorghum halepense	X									
S. vulgare									X/	
Sphenopholis nitida					X					
S. obtusata						X				
Sporobolus clandestinus				X						
S. junceus	X									
S. poiretii				X						
Stipa avenacea				X						
Tridens flavus				X						
Triplasis americana	X			X						
T. purpurea	X			X						
Tripsacum dactyloides						X				

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Triticum aestiym	X									
Uniola latifolia									/X	
U. laxa						X				
U. sessilifora						X				
Zizianopsis miliacea									X/	
Polemoniaceae										
Phlox amoena				X						
P. carolina							X			
P. nivalis		X		X						
Polygalaceae										
Polygala cruciata									X/	
P. curtissii									X/	
P. cymosa									X/	
P. incarnata									X/	
P. lutea									X/	
P. polugama				X						
Polygonaceae										
Eriogonum tomentosum		X								
Polygonella americana	X	X								
P. hirsutum									X/	
P. hydropiperoides									X/	X
P. lapathifolium							X	X		
P. pensylvanicum									X/	
P. persicaria									X/	
P. punctatum						X			/X	
P. sagittatum									/X	
P. scandens									X/	
Rumex acetosella	X									
R. crispus									X/	
R. hastatulus	X									
Tovara virginiana						X			/X	
Pontederiaceae										
Pontederia cordata									X/	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Portulacaceae										
Portulaca pilosa	X									
Potamogetonaceae										
Potamogeton berchtoldii								X		
P. diversifolium								X		
P. epihydrus								X		
P. pulcher								X		
Primulaceae										
Lysimachia lanceolata						X				
L. quadrifolia							X			
Pteridaceae										
Pteridium aquilinum		X								X
Ranunculaceae										
Delphinium ajacis			X							
Ranunculus pusillus									X/	
Xanthorhiza simplicissima						X			/X	
Rhamnaceae										
Hepatica americana					X					
Rosaceae										
Agrimonia pubescens				X	X					
Potentilla canadensis	X									
P. recta	X									
Rubiaceae										
Diodia teres	X		X							
D. virginiana										X
Galium aparine						X				
G. circaezans					X					
G. hispidulum			X	X						
G. obtusum									X/	
G. pilosum	X									
G. tinctorium							X		X/X	

Family Species	Communities OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
G. triflorum									/X	
Houstonia longifolia					X					
H. purpurea				X						
H. pusilla									/X	
Mitchella repens				X	X	X				
Oldenlandia uniflora										X
Richardia brasiliensis	X									
R. scabra	X									
Santalaceae										
Nestronia umbellula				X	X					
Sarraceniaceae										
Sarracenia minor									X/	X
Saururaceae										
Saururus cernuus							X		/X	
Saxifragaceae										
Heuchera americana					X					
Philadelphus inodorus				X	X					
Scrophulariaceae										
Agalinis fasciculata	X	X								X
A. linifolia			X						/X	X
A. setacea		X								
Aureolaria pectinata		X	X							
A. virginica					X					
Bacopa caroliniana									/X	X
B. monnieri										X
Buchnera floridana										X
Chelone glabra									/X	
Gratiola pilosa									/X	
G. ramosa									X/	
G. virginiana						X			X/X	
Linaria canadensis	X	X								

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Lindernia anagallidea									X/	
L. monticola									/X	
Mecardonia acuminataea						X			X/	
Micranthemum umbrosum									/X	
Solanaceae										
Physalis heterophylla		X								
Sparganiaceae										
Sparganium americanum								X		
Typhaceae										
Typha domingensis								X	X/	
T. latofolia								X	X/	X
Urticaceae										
Pilea pumila						X	X			
Violaceae										
Viola spp.						X	X			
V. lanceolata										X
V. pedata		X		X						
V. primulifolia										X
V. villosa										X
Xyridaceae										
Xyris spp.								X		X

X indicates the presence of a species in a particular community

OF = Old Field, SH = Sandhills, PP = Pine forest or plantation, UP = Upland Hardwoods, UB = Upland Hardwood Bluff, BL = Bottomland Hardwood, SW = Swamp, FW = Freshwater, MAR = Marsh, FWM = Freshwater Margin, CB = Carolina Bay.

APPENDIX J. SCIENTIFIC AND COMMON NAMES OF HERBS OF THE SRS [1]

Family	Species	Common Name
Acanthaceae	*Dyschoriste oblongifolia* (Michaux) Kuntze	
Acanthaceae	*Justicia ovata* (Walter) Lindau	Water-willow
	Ruellia carolinensis (Walter) Steudel	
Agavaceae	*Nolina georgiana* Michaux	
Aizoaceae	*Mollugo verticillata* L.	Carpet-weed
Alismataceae	*Echinodorus cordifolius* (L.) Grisebach	Creeping water plantain, Bur-head
	E. tenellus[2]	
	Sagittaria spp. L.	Arrowhead, Duck potato
	S. graminea Michaux	
	S. latifolia Willd.	Wapato, Duck potato
	S. isoetiforms[2]	
Amaranthaceae	*Alternanthera philoxeroides* (Martiux) Grisebach	Alligator weed
	Amaranthus palmeri Watson	
	Froelichia floridata (Nuttall) Mog.	
Amaryllidaceae	*Agave virginica* L.	
	Hypoxis hirsuta (L.) Covell	
	H. micrantha Pollard	
	Zephyranthes atamasco (L.) Herbert	Atamasco lily, Easter lily
Apiaceae	*Apium leptophyllum* (Persoon) F. Mueller	Marsh parsley

[1] *nomenclature according to Radford et al. (1968)*
[2] *not in Radford et al. (1968)*

Family	Species	Common Name
	Centella asiatica (L.) Urban	Marsh pennywort
	Chaerophyllum tainturieri Hooker	
	Cicuta maculata L.	
	Daucus carota L.	Wild carrot, Queen Anne's lace
	Eryngium integrifolium Walter	
	E. yuccifolium Michaux	Button snakeroot, Rattlesnake master
	Hydrocotyle spp. L.	Pennywort
	H. umbellata L.	Marsh pennywort
	H. verticillata Thunberg	
	Sanicula canadensis L.	Snakeroot
	S. smallii Bicknell	Snakeroot
	Spermolepis echinata (Nuttall ex D.C.) Heller	
	Thaspium barbinode (Michaux) Nuttall	
	Ptilimnium capillaceum (Michaux) Raf.	
	Trepocarpus aethusae Nuttall	
Apocynaceae	*Amsonia ciliata* Walter	
	A. tabernaemontana Walt.	Blue stars
	Apocynum cannabinum L.	
	Trachelospermum difforme (Walter) Gray	
Araceae	*Arisaema dracontium* (L.) Schott	Green dragon
	A. triphyllum (L.) Schott	Indian turnip, Jack in the pulpit
	Orontium aquaticum L.	
	Peltandra virginica (L.) Kunth	Arrow aarum
Aristolochiaceae	*Aristolochia serpentaria* L.	Birthwort
	Hexastylis arifolia (Michaux) Small	Heart leaf
Asclepiadaceae	*Asclepias verticillata* L.	
	A. humistrata Walter	
	A. amplexicaulis Smith	

Family	Species	Common Name
	A. obovata Elliott	
	A. perennis Walter	
	A. tuberosa L.	Butterfly-weed, Pleurisy-root
	A. variegata L.	
	Matelea gonocarpa (Walter) Shinners	
Aspidiaceae	*Athyrium asplenioides* (Michaux) A.A. Eaton	Southern lady fern
	Onoclea sensibilis L.	Sensitive fern
Asteraceae	*Marshallia obovata* (Walter) Beadle & Boynton	
	Acanthospermum australe (Loefling) Kuntze	
	Achillea millefolium L.	Milfoil, Yarrow
	Ambrosia artemisiifolia L.	
	Antennaria plantaginifolia (L.) Richardson	Pussy-toes
	Arnica acaulis (Walter) BSP	Leopard's Bane
	Aster bifoliatus (Walter) Ahles	
	A. concolor L.	
	A. dumosus L.	
	A. linariifolius L.	Stiff-leaved aster
	A. paternus Cronquist	White-topped aster
	A. pilosus Willd.	Frost aster
	A. undulatus L.	
	Baccharis halimifolia L.	Groundsel tree, Silverling, Sea-myrtle, Consumption weed
	Berlandiera pumila (Michaux) Nuttall	
	Bidens aristosa (Michaux) Britton	
	B. bipinnata L.	Spanish needles
	B. discoidea (T. & G.) Britton	
	B. frondosa L.	
	Boltonia asteroides (L.) L'Her	
	Cacalia atriplicifolia L.	Pale Indian-plantain
	Carphephorus bellidifolius (Michaux) T. & G.	

Family	Species	Common Name
	Centaurea cyanus L.	Bachelor's button, Raggedy sailors, Cornflower
	Chaptalia tomentosa Vent.	Sun-bonnet
	Chrysogonum virginianum L. var. *australe* (Alexander) Ahles	
	Cirsium nuttallii (D.C.) Pollard	
	C. repandum Michaux	
	C. virginianum (L.) Michaux	
	Coreopsis basalis (Dietrich) Blake	
	C. lanceolata L.	
	C. major Walter	
	C. rosea[2]	
	Echinacea laevigata (Boynton & Beadle) Blake	
	Eclipta alba (L.) Hasskarl.	
	Elephantopus carolinianus Willd.	
	E. tomentosus L.	
	Erechtites hieracifolia (L.) Raf.	Fireweed
	Erigeron annuus (L.) Persoon	Daisy fleabane
	E. canadensis L.	Horseweed, Hogweed, Butterweed
	E. strigosus Muhl. ex Willd.	Daisy fleabane
	Eupatorium album L.	Throughwort
	E. aromaticum L.	
	E. capillifolium (Lam.) Small	Dog-fennel
	E. coelestinum L.	Mistflower, Ageratum
	E. compositifolium Walter	Dog-fennel
	E. cuneifolium Willd.	
	E. fistulosum Barratt	Queen-of-the-meadow, Joe-Pye weed
	E. perfoliatum L.	Boneset
	E. rotundifolium L.	Throughwort
	E. pilosum Walter	

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
	E. leucolepis (DC) T. & G.	
	Gaillardia aestivalis (Walter) H. Rock	
	Gnaphalium chilense Sprengel	
	G. helleri Britton	Cudweed
	G. obtusifolium L.	Rabbit tobacco
	G. purpureum L.	
	Haplopappus divaricatus (Nuttall) Gray	
	Helianthus angustifolius L.	
	H. debilis (T. & G.) Gray	
	H. strumosus L.	
	Heliopsis helianthoides (L.) BSP	
	Heterotheca gossypina (Michaux) Shinners	
	H. graminifolia (Michaux) Shinners	
	H. mariana (L.) Shinners	
	H. subaxillaris (Lam.) Britton & Rusby	
	Hieracium gronovii L.	
	Hymenopappus scabiosaeus L'Her.	
	Hypochoeris glabra L.	
	Iva microcephala Nuttall	
	Krigia oppositifolia Raf.	
	K. virginica (L.) Willd.	
	Kuhnia eupatorioides L.	
	Lactuca canadensis L.	Wild lettuce
	L. graminifolia Michaux	
	Liatris earlei (Greene) K. Schumann	
	L. elegans (Walter) Michaux	
	L. graminifolia Willd.	
	L. secunda Ell.	
	L. tenuifolia Nuttall	
	Melanthera hastata Michaux	
	Mikania scandens (L.) Willd.	Climbing hempweed
	Pluchea camphorata (L.) DC	
	P. foetida (L.) DC	
	P. rosea Godfrey	
	Polymnia uvedalia L.	Bearsfoot

Family	Species	Common Name
	Prenanthes serpentaria Pursh	Gall-of-the-earth, Lion's foot
	Pterocaulon pycnostachyum (Michaux) Ell.	Black-root
	Rudbeckia fulgida Aiton	
	R. hirta L.	Black-eyed Susan
	Sclerolepis uniflora (Walter) BSP.	
	Senecio glabellus Poiret	Butterweed
	S. obovatus Muhl. ex Willd.	
	S. smallii Britton	
	Silphium compositum Michaux	
	Solidago altissima L.	Tall goldenrod
	S. caesia L.	Blue-stem goldenrod, Wreath goldenrod
	S. gigantea Aiton	
	S. leavenworthii T. & G.	
	S. microcephala (Greene) Bush	
	S. odora Aiton	Goldenrod
	S. petiolaris Aiton	
	S. rugosa Miller	
	S. stricta Aiton	
	Sonchus asper (L.) Hill	Spiny-leafed sonchus
	Spilanthes americana (Nuttall) Hieron	
	Trilisa paniculata (Walter ex J.F. Gmelin) Cassini	
	Verbesina virginica L.	
	Vernonia altissima Nuttall	
	V. angustifolia Michaux	Ironweed
Azollaceae	*Azolla caroliniana* Willde	Mosquito fern
Balsaminaceae	*Impatiens capensis* Meerb.	Jewel weed, Spotted touch me not
Berberidaceae	*Nandina domestica* Thunberg.	
Blechnaceae	*Woodwardia areolata* (L.) Moore	Netted chain-fern
Boraginaceae	*Lithospermum caroliniense* (J.F. Gmelin) MacM.	Puccoon

Family	Species	Common Name
	Myosotis verna Nuttall	
	Heliotropium amplexicaule Vahl.	
Brassicaceae	*Camelina microcarpa* Anvrz.	
	Cardamine parviflora L.	
	Lepidium virginicum L.	Poor-man's pepper
	Rorippa islandica (Oeder) Barbes	
	R. sessiliflora (Nuttall) Hitchcock	
	Warea cuneifolia (Muhl.) Nuttall	
Bromeliaceae	*Tillandsia usneoides* L.	Spanish moss
Cabombaceae	*Brasenia schreberi* Gmelin	
	Cabomba caroliniana Gray.	
Cactaceae	*Opuntia compressa* Miller	Prickly-pear cactus
Callitrichaceae	*Callitriche heterophylla* Pursh.	
Campanulaceae	*Lobelia boykinii* T. & G.	
	L. elongata Small	
	L. nuttallii R. & S.	
	L. puberula Michaux	
	Specularia perfoliata (L.) A. DC.	Venus' looking-glass
	Sphenoclea zeylandica Gaertner.	
	Wahlenbergia marginata (Thunberg) DC.	
Caryophyllaceae	*Arenaria caroliniana* Walter	
	Cerastium glomeratum Thuillier	
	Paronychia riparia Chapman	
	Saponaria officinalis L.	
	Scleranthus annuus L.	
	Silene angustifolia Reich.[2]	Wild pink
	S. caroliniana Walter	Wild pink
	Stellaria media (L.) Cyrillo	
	Stipulicida setacea Michaux	Spider plant

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
Ceratophyllaceae	*Ceratophyllum demersum* L.	
Chenopodiaceae	*Chenopodium album* L.	Lambs-quarters, Pigweed
	C. ambrosioides L.	Mexican tea
	Cycloloma artriplicifolium (Sprengel) Coulter	
Cistaceae	*Helianthemum canadense* (L.) Michaux	
	H. rosmarinifolium Pursh	
	Lechea minor L.	
	L. patula Leggett	
	L. tenuifolia Michaux	
	L. villosa Ell.	
Commelinaceae	*Aneliema keisak* Hasskarl	Dayflower
	Commelina communis L.	
	C. diffusa Burman F	
	C. erecta L.	
	C. virginica L.	
	Tradescantia ohiensis Raf.	
	T. rosea Vent.	
	T. virginiana L.	Spiderwort
Convolvulaceae	*Bonamia aquatica* (Walter) Gray	
	B. patens (Desr.) Shinners	
	B. pickeringii (Torrey) Gray.	
	Calystegia sepium (L.) R. Brown	Hedge bindweed
	Dichondra carolinensis Michaux	
	Ipomoea hederacea (L.) Jacquin.	
	I. pandurata (L.) G.F.W. Mayer	Manroot
	I. trichocarpa Ell.	
	Jacquemontia tamnifolia (L.) Griseback	
Crassulaceae	*Penthorum sedoides* L.	
Cucurbitaceae	*Melothria pendula* L.	Creeping cucumber

Family	Species	Common Name
Cyperaceae	*Bulbostylis barbata* (Rottboell) Clarke	
	B. capillaris (L.) Clarke	
	B. ciliatifolia (Ell.) Fernald.	
	B. stenophylla (Ell.) Clarke	
	Carex albolutescens Schweinitz	Sedge
	C. atlantica Bailey	Sedge
	C. comosa Boott.	Sedge
	C. complanta Torrey & Hooker	Sedge
	C. debilis Michaux	Sedge
	C. decomposita Muhl.	Sedge
	C. digitalis Willde	Sedge
	C. festucacea Schkuhr	Sedge
	C. folliculata L.	Sedge
	C. howei MacKenzie	Sedge
	C. intumescens Rudge	Sedge
	C. joorii Bailey	Sedge
	C. laevivaginata (Kukenthal) MacKenzie	Sedge
	C. laxiflora Lam.	Sedge
	C. louisianica Bailey	Sedge
	C. lurida Wahlenberg	Sedge
	C. muhlenbergii Schkuhr	Sedge
	C. nigromarginata Schweinitz	Sedge
	C. oligocarpa Schkuhr	Sedge
	C. retroflexa Muhl. ex Schkuhr	Sedge
	C. seorsa Howe	Sedge
	C. tenax Chapman	Sedge
	C. tribuloides Wahlenberg	Sedge
	C. typhina Michaux	Sedge
	Cyperus ferruginescens Boeckler	Sedge
	C. filiculmis Vahl.	Sedge
	C. haspan L. *pseudovegetus* Steudel	Sedge
	C. iria L.	Sedge
	C. ovularis (Michaux) Torrey	Sedge
	C. polystachyos var. *Texensis* (Torrey) Fernald	Sedge
	C. pseudovegetus Steudel.	Sedge
	C. retrofractus (L.) Torrey	Sedge

Family	Species	Common Name
	C. retrorsus Chapman	Sedge
	C. rotundus L.	Sedge
	C. strigosus L.	Sedge
	C. virens Michaux	Sedge
	Dulichium arundinaceum	
	Eleocharis acicularis (L.) R. & S.	Needle rush
	E. equisetoides (Ell.) Torrey	Spike rush
	E. quadrangulata (Michaux) R. & S.	
	E. melanocarpa Torrey	
	E. microcarpa Torrey	
	E. obtusa (Willd.) Schultes	Spike rush
	E. robbinsii Oakes	
	E. tortilis (Link) Schultes	
	E. tricostata Torrey	
	E. tuberculosa (Michaux) R. & S.	
	Fimbristylis autumnalis (L.) R. & S.	
	F. dichotoma (L.) Vahl.	
	F. spadicea (L.) Vahl.	
	Fuirena pumila Torrey	
	F. squarrosa Michaux	
	Rhynchospora caduca Ell.	
	R. chapmanii M.A. Curtis	
	R. corniculata (Lam.) Gray.	
	R. globularis (Chapman) Small.	
	R. glomerata (L.) Vahl.	
	R. grayi Kunth.	
	R. inundata (Oakes) Fernald.	Nodding beakrush
	R. macrostachya Torrey	
	R. rariflora (Michaux) Ell.	
	R. tracyi Britton	
	Scirpus cyperinus (L.) Kunth	Knot grass, Bulrush
	S. validus Vahl.	
	Scleria reticularis Michaux	
	S. triglomerata Michaux	
Dioscoreaceae	*Dioscorea villosa* L.	Wild yam

Family	Species	Common Name
Droseraceae	*Drosera capillaris* Poiret	
	D. intermedia Hayne	
	D. leucantha Shinners	
Ericaceae	*Chimaphila maculata* L. (Pursh)	Spotted wintergreen, Pipsissewa
	Epigaea repens L.	Trailing arbutus
	Monotropa hypopithys L.	Pine-sap
Eriocaulaceae	*Eriocaulon compressum* Lam.	
	E. decangulare L.	
	Lachnocaulon anceps (Walter) Morong.	
Euphorbiaceae	*Cnidoscolus stimulosus* (Michaux) Engelm & Gray	
	Croton capitatus Michaux	
	C. elliotti[2]	
	Euphorbia chamaesyce L.	
	E. corollata L.	Flowering spurge, Tramps spurge
	E. gracilior Cronquist	
	E. heterophylla L.	Painted-leaf
	E. ipecacuanhae L.	Carolina ipecac
	E. maculata L.	
	E. supina Raf.	
	Phyllanthus caroliniensis Walter	
	Sebastiania ligustrina (Michaux) Muell-Arg.	
	Stillingia sylvatica Garden	
	Tragia urens L.	
Fabaceae	*Aeschynomene indica* L.	
	Astragalus villosus Michaux	
	Baptisia alba (L.) R. Brown	
	B. cinera (Raf.) Fernald & Schubert	
	B. lanceolata (Walter) Ell.	
	B. microphylla Nuttall	

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
	B. perfoliata (L.) R. Brown	
	B. tinctoria (L.) R. Brown	
	Cassia fasciculata Michaux	Partridge pea
	C. nictitans L.	Wild sensitive plant
	C. obtusifolia L.	Sickle pod
	Centrosema virginianum (L.) Bentham	Butterfly pea
	Crotalaria angulata Miller	Rattle box
	C. purshii DC.	Rattle box
	C. spectabilis Roth	Rattle box
	C. mucronata Desvaux	Rattle box
	C. sagittalis L.	Rattlebox
	Desmodium fernaldii Schubert	Beggar lice
	D. nudiflorum (L.) DC.	Beggar lice
	D. paniculatum (L.) DC.	Beggar lice
	D. rotundifolium DC.	Dollarleaf
	D. strictum (Pursh) DC.	
	D. tortuosum (Swartz) DC.	
	Galactia mollis (Michaux)	
	Gleditsia aquatica Marshall	Water locust
	Indigofera caroliniana Miller	
	Lespedeza angustifolia (Purch) Ell.	
	L. capitata Michaux	Lespedeza
	L. cuneata (Dumont) G. Don	Sericea
	L. hirta (L.) Hornemann	
	L. intermedia (Watson) Britton	
	L. procumbens Michaux	
	L. repens (L.) Barton	
	L. striata (Thunberg) H. & A.	Japanese clover
	L. stuevei Nuttall	
	L. virginica (L.) Britton	
	Lupinus diffusus Nuttall	
	L. villosus Willd.	Lady lupine
	Petalostemum pinnatum (Walter ex. J. F. Gmelin) Blake	Summer-farewell
	Phaseolus polystachios (L.) BSP	
	Rhynchosia difformis (Ell.) DC.	
	R. reniformis DC.	Moneywort
	R. tomentosa (L.) H. & A.	
	Robinia hispida L.	Bristly locust

Family	Species	Common Name
	R. nana Ell.	
	Strophostyles umbellata (Muhl. ex Willd.) Britton	
	Stylosanthes biflora (L.) BSP	Pencil flower
	Tephrosia florida (Dietrich) C.E. Wood	
	T. spicata (Walter) T. & G.	
	T. virginiana (L.) Persoon	Goat's rue
	Trifolium arvense L.	Rabbit foot clover
	T. campestre Schreber	Low hop clover
	T. dubium Sibthorp	Low hop clover
	T. incarnatum L.	Crimson clover
	T. repens L.	White clover
	Vicia hirsuta (L.) S.F. Gray	
	Zornia bracteata Walter ex J. F. Gmelin	
Fumariaceae	*Corydalis flavula* (Raf.) DC.	
Gentianaceae	*Bartonia paniculata* (Michaux) Muhl.	Screw-stem
	B. verna (Michaux) Muhl.	
	Gentiana catesbaei Walter	
	Nymphoides aquatica (Walter ex J.F. Gmelin) Kuntze	
	N. cordata (Ell.) Fernald	
	Sabatia angularis (L.) Pursh	Rose pink, Bitter-bloom
	S. calycina (Lam.) Heller	
	S. campanulata (L.) Torrey	
	S. quadrangula Wilbur	Sabatia
Haemodoraceae	*Lachnanthes caroliniana* (Lam.) Dandy	
Haloragaceae	*Myriophyllum brasiliense* Camb.	Parrot feather
	M. heterophyllum Michaux	
	M. laxum Shuttlew. ex Chapman	
	M. pinnatum (Walter) BSP	

Family	Species	Common Name
	M. spicatum[2]	
	Proserpinaca palustris L.	
	P. pectinata Lam.	
Hydrocharitaceae	*Vallisneria americana* Michaux	Tapegrass, Eelgrass
Hydrophyllaceae	*Hydrolea quadrivalvis* Walter	
	Phacelia dubia (L.) Trelease	
Hypericaceae	*Hypericum* spp.	St. John's wort
	H. canadense L.	
	H. cistifolium Lam.	
	H. denticulatum HBK	
	H. drummondii (Grev. & Hooker) T. & G.	
	H. gentianoides (L.) BSP	Pineweed
	H. gymnanthum Engelm. & Gray	
	H. hypericoides (L.) Crantz	St. Andrew's cross
	H. mutilum L.	Dwarf St. John's wort
	H. nudiflorum Michaux ex Willde	
	H. punctatum Lam.	
	H. setosum L.	
	H. stans (Michaux) P. Adams & Robson	St. Peter's-wort
	H. suffruticosum P. Adams & Robson	
	H. tubulosum Walter	
	H. virginicum L.	
	H. walteri Gmelin	Marsh St. John's-wort
Iridaceae	*Iris virginica* L.	Blue flag
	Sisyrinchium albidium Raf.	Blue-eyed grass
	S. angustifolium Miller	
	S. arenicola Picknel	
	S. mucronatum Michaux	

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
Juncaceae	*Juncus acuminatus* Michaux	
	J. biflorus Ell.	Large grass-leaved rush
	J. canadensis J. Gay ex LaHarpe	
	J. coriaceus Mackenzie	
	J. debilis Gray	
	J. dichotomus Ell.	Rush
	J. effusus L.	Rush
	J. elliottii Chapman	
	J. polycephalus Michaux	
	J. repens Michaux	
	J. scirpoides Lam.	
	J. tenuis Willd.	Path rush
	Psilocarya nitens (Vahl.) Woods	
Lamiaceae	*Hedeoma pulegioides* (L.) Persoon	Pennyroyal
	Lamium amplexicaule L.	Henbit
	Leonotis nepetaefolia R. Brown	
	Lycopus amplectens Raf.	
	L. rubellus Moench.	
	L. virginicus L.	
	Macbridea caroliniana (Walter) Blake	
	Mentha piperita L.	Peppermint
	Prunella vulgaris L.	
	Pycnanthemum flexuosum (Walter) BSP	
	P. incanum (L.) Michaux	
	Salvia azurea Lam.	Sage
	S. lyrata L.	
	S. utricifolia L.	
	Scutellaria elliptica Muhl.	Skullcap
	S. integrifolia L.	
	S. laterifolia L.	
	Trichostema dichotomum L.	Blue curls
	T. setaceum Houttuyn	Blue curls

Family	Species	Common Name
Lauraceae	*Lindera subcoriacea*[2]	
Lemnaceae	*Lemna* spp.	Duckweed
	L. perpusilla Torrey	
	Spirodela oligorrhiza (Krz) Hegelm.	
	Wolffia papulifera Thompson	Water meal
	Wolffiella floridana (J. D. Smith) Thompson	
Lentibulariaceae	*Pinguicula lutea* Walter	
	Utricularia biflora Lam.	Bladderwort
	U. fibrosa Walter	Bladderwort
	U. floridana[2]	Bladderwort
	U. inflata Walter	Bladderwort
	U. olivacea Wright ex Grisebach	Bladderwort
	U. purpurea Walter	Bladderwort
	U. subulata L.	Bladderwort
Liliaceae	*Aletris farinosa* L.	Star grass, Colicroot
	Allium ampeloprasum L.	Wild leek
	A. canadense L.	Wild onion
	A. cuthbertii Small	
	A. vineale L.	Field garlic
	Amianthium muscaetoxicum (Walter) Gray	
	Medeola virginiana L.	
	Nolina georgiana Michaux	
	Nothoscordum bivalve L. Britton	
	Polygonatum biflorum (Walker) Ell.	Solomon's seal
	Smilacina racemosa (L.) Desf.	False Solomon's seal
	Uvularia perfoliata L.	
	U. sessilifolia L.	
	Yucca filamentosa L.	Bear-grass
	Zigadensus densus (Desr.) Fernald	Black snake-root, Crow-poison

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
Linaceae	*Linum striatum* Walter	
	L. virginianum var. *medium* Planchon	
Loganiaceae	*Buddleja lindleyana* Fortune	
	Cynoctonum mitreola L. Britton	
	Polypremum procumbens L.	
	Spigelia marilandica L.	
Lycopodiaceae	*Lycopodium appressum* (Chapman) Lloyd & Underwood	Southern bog clubmoss
	L. alopecuroides L.	Foxtail clubmoss
	L. flabelliforme (Fernald) Blanchard	Running pine
Lythraceae	*Ammannia coccinea* Rottboell	
	Decodon verticillatus (L.) Ell.	Water loosestrife
	Rotala ramosior (L.) Keohne	
Malvaceae	*Hibiscus moscheutos* L.	Rose mallow, Wild cotton
	H. syriacus L.	Althea, Rose-of-Sharon
	Sida rhombifolia L.	
Mayacaceae	*Mayaca aubletii* Michaux	
Melastomataceae	*Rhexia alifanus* Walter	Awn-petaled meadow beauty
	R. aristosa Britton	
	R. mariana L.	Meadow beauty
	R. petiolata Walter	
	R. purpurea Michaux	
	R. virginica L.	Meadow beauty
Najadaceae	*Najas gracillima* Magnus	
	N. guadalupensis (Sprengel) Magnus	
Nelumbonaceae	*Nelumbo lutea* (Willd) Persoon	Yellow nelumbo, Pond nuts

Family	Species	Common Name
Nymphaeaceae	*Nymphaea odorata* Aiton	
	Nuphar luteum (L.) Sibthorpe & Smith	Yellow pond-lilly
Oleaceae	*Jasminum mesnyi*[2]	
	Osmanthus americana (L.) Gray	Wild olive
Onagraceae	*Gaura biennis* L.	
	G. filipes Spach	
	Ludwigia alternifolia L.	Water primrose
	L. arcuata Walter	
	L. decurrens Walter	Water primrose, Primrose willow
	L. glandulosa Walter	
	L. hirtella Raf.	
	L. leptocarpa (Nuttall) Hara	Water primrose
	L. linearis Walter	
	L. palustris (L.) Ell.	Water purslane
	L. pilosa Walter	
	L. spathulata T. & G.	
	L. sphaerocarpa Ell.	
	L. suffruticosa Walker	
	Oenothera biennis L.	Evening primrose
	O. fruitcosa L.	Sundrops
	O. laciniata Hill.	
	O. tetragona Roth	Sundrops
Orchidaceae	*Habenaria clavellata* (Michaux) Sprangel	Small green wood-orchid
	H. cristata (Michaux) R. Brown	Crested fringed-orchid
	H. flava (L.) R. Brown	Southern rein-orchid
	H. lacera (Michaux) Lodd.	Green-fringed orchid
	H. repens Nuttall	Water spider-orchid
	Hexalectris spicata (Walter) Barnhart	Crested coral-root

[2] *not in Radford et al. (1968)*

Family	Species	Common Name
	Malaxis unifolia Michaux	Green adder's mouth
	Spiranthes cernua (L.) Richard	Nodding ladies' tresses, Fragrant ladies' tresses
	S. grayi Ames	Little ladies' tresses
	S. praecox (Walter) Watson	Grassed-leaved ladies' tresses
	S. vernalis Engelm. & Gray	Spring ladies' tresses
	Tipularia discolor (Pursh) Nuttall	Crane-fly orchid
Orobanchaceae	*Conopholis americana* (L.) Wallroth	Squaw-root, Cancer root
	Epifagus virginiana (L.) Barton	Beech-drops
Osmundaceae	*Osmunda cinnamomea* L.	Cinnamon fern
	O. regalis (Willd.) Gray	Royal fern
Oxalidaceae	*Oxalis corniculata* L.	Creeping lady's sorrel
	O. dillenii Jacquin	
	O. violacea L.	Violet wood sorrel
Papaveraceae	*Sanguinaria canadensis* L.	Bloodroot
Passifloraceae	*Passiflora incarnata* L.	Maypop
Phrymaceae	*Phryma leptostachya* L.	Lop-seed
Phytolaccaceae	*Phytolacca americana* L.	Pokeweed, Pidgeonberry
Plantaginaceae	*Plantago aristata* Michaux	Plantain
	P. hookeriana (Gray) Poe	
	P. lanceolata L.	English plantain
	P. virginica L.	
Poaceae	*Agrostis hyemalis* (Walter) BSP.	
	A. perennans (Walter) Tuckermann	
	Aira elegans Willd. ex Gaudin	
	Andropogon elliottii Chapman	

Family	Species	Common Name
	A. scoparius Michaux	Little bluestem
	A. ternarius Michaux	
	A. virginicus L.	Broom sedge
	Anthaenantia villosa (Michaux) Beauvois	
	Aristida lanosa Muhl. ex Ell.	
	A. longespica Poiret	
	A. oligantha Michaux	
	A. purpurascens Poiret	
	A. stricta Michaux	Wiregrass
	A. tuberculosa Nuttall.	
	Arundinaria gigantea (Walter) Muhl.	Cane
	Arundo donax L.	Giant reed
	Avena sativa L.	
	Bromus catharticus Vahl.	Brome grass
	B. japonicus Thunberg.	
	Cenchrus echinatus L.	Sandspurs
	C. longispinus (Hackel) Fernald.	
	Cynodon dactylon (L.) Persoon	
	Dactylis glomerata L.	Orchard grass
	Danthonia sericea Nuttall	Oat grass
	Digitaria filiformis (L.) Koeler	Crab grass
	D. ischaemum (Schreber) Schreber ex Muhl.	
	D. sanguinalis L. Scopoli	
	Echinochloa crusgalli (L.) Beaubois	Barnyard grass
	E. walteri (Pursh) Heller	
	Eleusine indica (L.) Gaertner	Goose grass
	Elymus virginicus L.	Wild Rye
	Eragrostis capillaris (L.) Nees	Love grass
	E. curvula (Schrader) Nees	
	E. refracta (Muhl.) Scribner	
	E. spectabilis (Pursh) Steudel	
	Eremochloa ophiuroides (Munro) Hackel	
	Erianthus giganteus (Walter) Muhl.	Beard grass, Plume grass
	Festuca elatior L.	
	F. octoflora Walter	
	F. sciurea Nuttall.	

Family	Species	Common Name
	Glyceria striata (Lam.) Hitchcock	Manna grass
	Gymnopogon ambiguus (Michaux) BSP	
	G. brevifolius Trinius	
	Holcus lanatus L.	
	Hydrochloa caroliniensis Beauvois	
	Leersia spp.	Cut-grass
	L. hexandra Swartz	
	L. lenticularis Michaux	
	L. oryzoides (L.) Swartz	
	Leptoloma cognatum (Schultes) Chase	Fall witchgrass
	Lolium multiflorm Lam.	Rye grass
	Manisuris rugosa (Nuttall) Kuntz	
	Melica mutica Walter	
	Muhlenbergia capillaris (Lam.) Trinius	Muhly grass
	M. schreberi J.F. Gmelin	
	Oplismenus setarius (Lam.) R. & S.	
	Panicum aciculare Desbaux ex Poiret	
	P. agrostoides Sprengel	
	P. anceps Michaux	
	P. angustifolium Ell.	Narrow-leaved Panic grass
	P. boscii Poiret	
	P. ciliatum Ell.	Dwarf panic grass
	P. columbianum Scribner	
	P. commonsianum Ashe	Common's panic grass
	P. commutatum Schultes	Variable panic grass
	P. consanguineum Kunth	Kunth's panic grass
	P. dichotomiflorum Michaux	
	P. dichotomum L.	
	P. ensifolium Baldwin ex Ell.	
	P. gymnocarpon Ell.	
	P. hemitomon Schultes	
	P. hians Ell.	
	P. lanuginosum Ell.	
	P. laxiflorum Lam.	
	P. leucothrix Nash	

Family	Species	Common Name
	P. longifolium Torrey	
	P. nitidum Lam.	
	P. oligosanthes Schultes	Panic grass
	P. polyanthes Schultes	
	P. ravenelii Scribner & Merrill	
	P. scoparium Lam.	
	P. sphaerocarpon Ell.	
	P. verrucosum Muhl.	
	P. virgatum L.	Switch grass
	P. wrightianum Scribner	
	P. xalapense HBK.	
	Paspalum dilatatum Poiret	Dallis grass
	P. floridanum Michaux	
	P. laeve Michaux	
	P. notatum Parodi	Bahia grass
	P. praecox Walter	
	P. setaceum Michaux	
	P. urvillei Steudel	Vasey grass
	Poa annua L.	
	P. autumnalis Muhl. ex Ell.	
	P. chapmaniana Scribner	
	P. pratensis L.	
	Sacciolepis striata (L.) Nash	
	Setaria corrugata (Ell.) Schultes	Foxtail grass
	S. geniculata (Lam.) Beauvois	
	S. glauca (L.) Beauvois	
	Sorghastrum elliottii (Mohr) Nash	Indian grass
	S. nutans (L.) Nash	
	S. secundum (Ell.) Nash	Indian grass
	Sorghum halepense (L.) Persoon	Johnson grass
	S. vulgare Persoon	Broom corn, Milo
	Sphenopholis nitida (Biehler) Scribner	
	S. obtusata (Michaux) Scribner	
	Sporobolus clandestinus (Biehler) Hitchcock	Drop seed
	S. junceus (Michaux) Kunth	
	S. poiretii (R. & S.) Hitchcock	Smut grass
	Stipa avenacea L.	Needle grass
	Tridens flavus (L.) Hitchcock	Purple top

Family	Species	Common Name
	Triplasis americana Beauvois	
	T. purpurea (Walter) Chapman	Sand grass
	Tripsacum dactyloides L.	
	Triticum aestivum L.	
	Uniola latifolia Michaux	
	U. laxa (L.) BSP	
	U. sessilifora Poiret	
	Zizaniopsis miliacea (Michaux) Doell & Ascherson	
Polemoniaceae	*Phlox amoena* Sims	
	P. carolina L.	
	P. nivalis Lodd var. nivalis	
Polygalaceae	*Polygala cruciata* L.	
	P. curtissii Gray	
	P. cymosa Walter	
	P. incarnata L.	
	P. lutea L.	
	P. polygama Walter	
Polygonaceae	*Eriogonum tomentosum* Michaux	Dog-tongue, Wild-buckwheat
	Polygonella americana (Fisch & Mey) Small	Southern jointweed
	Polygonum hirsutum Walter	
	P. hydropiperoides Michaux	
	P. lapathifolium L.	
	P. pennsylvanicum L.	
	P. persicaria L.	
	P. punctatum Ell.	
	P. sagittatum L.	
	P. scandens L.	
	Rumex acetosella L.	Sheep sorrel, Sour grass
	R. crispus L.	
	R. hastatulus Baldwin ex Ell.	
	Tovara virginiana (L.) Raf.	
Pontederiaceae	*Pontederia cordata* L.	

Family	Species	Common Name
Portulacaceae	*Portulaca pilosa* L.	
Potamogetonaceae	*Potamogeton berchtoldii* Fieber	
	P. diversifolium Raf.	
	P. epihydrus Raf.	
	P. pulcher Tuckerman	
Primulaceae	*Lysimachia lanceolata* Walter	
	L. quadrifolia L.	Whorled loosestrife
Pteridaceae	*Pteridium aquilinum* (L.) Kuhn	Bracken fern
Ranunculaceae	*Delphinium ajacis* L.	
	Ranunculus pusillus Poiret	
	Xanthorhiza simplicissima Marshall	
Rhamnaceae	*Hepatica americana* (DC.) Ker.	Liverleaf
Rosaceae	*Agrimonia pubescens* Wallroth	
	Potentilla canadensis L.	Five fingers
	P. recta L.	
Rubiaceae	*Diodia teres* Walter	
	D. virginiana L.	
	Galium aparine L.	
	G. circaezans Michaux	
	G. hispidulum Michaux	Bedstraw
	G. obtusum Bigelow	
	G. pilosum Aiton	
	G. tinctorium L.	
	G. triflorum Michaux	
	Houstonia longifolia Gaertner	
	H. purpurea L.	
	H. pusilla Schoepf	
	Mitchella repens L.	Partridge berry
	Oldenlandia uniflora L.	
	Richardia brasiliensis (Mog.) Gomez	
	R. scabra L.	
Santalaceae	*Nestronia umbellula* Raf.	Bog asphodel

Family	Species	Common Name
Sarraceniaceae	*Sarracenia minor* Walter	Hooded pitcher-plant
Saururaceae	*Saururus cernuus* L.	Lizard's tail
Saxifragaceae	*Heuchera americana* L.	
	Philadelphus inodorus L.	
Scrophulariaceae	*Agalinis fasciculata* (Ell.) Raf.	
	A. linifolia (Nuttall) Britton	
	A. setacea (J. F. Gmelin) Raf.	
	Aureolaria pectinata (Nuttall) Pennell	
	A. virginica (L.) Pennell	
	Bacopa caroliniana (Walter) Robinson	
	B. monnieri (L.) Pennell	
	Buchnera floridana Gandoger	
	Chelone glabra L.	
	Gratiola pilosa Michaux	Hedge hyssop
	G. ramosa Walter	
	G. virginiana L.	Hedge hyssop
	Linaria canadensis (L.) Dumont	Toad-flax
	Lindernia anagallidea (Michaux) Pennell	
	L. monticola Muhl. ex Nuttall	
	Mecardonia acuminata (Walter) Small	
	Micranthemum umbrosum (J. F. Gmelin) Blake	
Solanaceae	*Physalis heterophylla* Nees	Ground cherry
Sparganiaceae	*Sparganium americanum* Nuttall	
Typhaceae	*Typha domingensis* Persoon	Cat-tail
	T. latifolia L.	Cat-tail
Urticaceae	*Pilea pumila* (L.) Gray	Clearweed

Family	Species	Common Name
Violaceae	*Viola* spp. L.	Violet
	V. lanceolata L.	Violet
	V. pedata L.	Bird-foot violet
	V. primulifolia L.	Violet
	V. villosa Walter	Violet
Xyridaceae	*Xyris* spp. L.	Yellow-eyed grass

APPENDIX K. LOWER PLANTS OF SRS VEGETATION COMMUNITIES

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Bryophytes										
Atrichum spp.						X				
Bruchia sullivanti	X									
Byrum argenteum	X									
B. pseudotriquetrus							X			
Clasmatodon				X						
Climacium americanum							X			
Cololejeunea biddlecomiae parvulus				X						
Dicranum condensatum		X								
D. scoparium				X						
Ditrichum pallidum	X									
Drepanocladus aduncus								X		
Dumortiera spp.						X				
Fissidens adianthoides				X			X			
Helodium paludosum							X			
Hypnum pratense							X			
Isopterygium spp.						X				
Leucobryum spp.		X								
Micromitrium sp.							X			
Mnium affine						X				
Odontoschisma prostratum						X				
Pallavicinia spp.						X				
Pellia spp.						X				
Pleuridium ravenelii	X									
Polytrichum commune	X									

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Porella pinnata				X			X			
Riccia fluitans								X		
Sphaerocarpus texanus	X									
Sphagnum spp.						X		X		
S. cyclophyllum										X
S. imbricatum							X			
S. macrophyllum							X			
S. molle										X
S. palustre							X			
Weisia controversa	X									
Fungi										
Amanita abrupta				X						
A. atkinsoniana				X						
A. caesaria				X						
A. chlorinosoma				X						
A. cokeri		X								
A. excelsa				X						
A. gemnata				X						
A. mappa				X						
A. muscaria				X						
A. phalloides				X						
A. rubescens				X						
A. spreta				X						
A. strobiliformis				X						
A. vaginata			X							
A. verna				X						
A. virosa		X		X						
Amanitopsis agglutinata				X						
A. pubescens				X						
A. strangulata				X						
A. vaginata				X						
Armillaria mellea		X								
Clathrus columnatus										X
Ganoderma spp.		X								

Family / Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Geastrum spp.		X								
Hericium erinaceus			X							
Hydnellum diabolus			X							
Lactarius piperatus	X									
Lenzites saepiara			X							
Lepiota procera		X								
Marasmius spp.						X				
Mutinus ravenelii				X						
Panellus sp.										X
Pisolithus tinctorius		X								
Ramaria spp.		X								
Schizophyllum commune		X								
Suillus spp.		X								X
Lichens										
Bulbothrix confoederata			X							
Candelaria spp.			X							
Cetraria celiaris			X			X				
Cladina subtenuis		X								
Cladonia spp.		X								
C. arbuscula			X							
C. chlorophaea			X							
C. clavulifera				X						
C. cristatella			X	X						
C. leporina			X							
C. robbinsii				X						
C. squamosa			X							
Heterodermia speciosa						X				
Hypotrachyna livida						X				
Lobaria sp.						X				
Parmelina galbina						X				
Parmeliopsis aleurites						X				

Family Species	Communities									
	OF	SH	PP	UP	UB	BL	SW	FW	MAR/ FWM	CB
Parmotrema hypotropum	X									
P. michauxianum						X				
P. perforatum		X				X				
Phaeophysica imbricata						X				
Physica aipolia						X				
Ramalina stenospora						X				
R. tenuis				X		X				
Usnea dasypoga						X				
U. mutabilis						X				
U. strigosa						X				

X indicates the presence of a species in a particular community

OF = Old Field, SH = Sandhills, PP = Pine forest or plantation, UP = Upland Hardwoods, UB = Upland Hardwood Bluff, BL = Bottomland Hardwood, SW = Swamp, FW = Freshwater, MAR = Marsh, FWM = Freshwater Margin, CB = Carolina Bay.

APPENDIX L. SCIENTIFIC AND COMMON NAMES OF LOWER PLANTS OF THE SRS

Family	Species	Common Name
Bryophytes	*Atrichum* spp.	
	Bruchia sullivanti Aust.	
	Byrum argenteum Hedw.	
	B. pseudotriquetrus (Hedw.) Gaertn., Meyer & Schreb	
	Clasmatodon parvulus (Hampe) Hook & Wils. ex Sull.	
	Climacium americanum Brid.	Tree Moss
	Cololejeunea biddlecomiae (Aust.) Evans	
	Dicranum condensatum Hedw.	
	D. scoparium Hedw.	
	Ditrichum pallidum (Hedw.) Hampe	
	Drepanocladus aduncus	
	Dumortiera spp.	
	Fissidens adianthoides Hedw.	
	Helodium paludosum (Sull.) Aust.	
	Hypnum pratense Koch ex Spruce	
	Isopterygium spp.	
	Leucobryum spp.	
	Micromitrium sp.	
	Mnium affine Bland. ex Punck.	
	Odontoschisma prostratum (Sw.) Trev.	
	Pallavicinia spp.	
	Pellia spp.	
	Pleuridium ravenelii Aust.	
	Polytrichum commune Hedw.	
	Porella pinnata L.	
	Riccia fluitans	
	Sphaerocarpus texanus Aust.	
	Sphagnum spp.	
	S. cyclophyllum Sull. & Lesq. ex Sull	
	S. imbricatum Hornsch ex Russ	Peat, bog moss
	S. macrophyllum Bernh. ex Brid	Peat, bog moss
	S. molle Sull.	

Family	Species	Common Name
	S. palustre L.	
	Weisia controversa Hedw.	
Fungi	*Amanita abrupta* Pk.	
	A. atkinsoniana Coker	
	A. caesaria Fr.	
	A. chlorinosoma Pk.	
	A. cokeri (Gilb. and Kuehn.) Gilb.	
	A. excelsa Fr.	
	A. gemnata (Fr.) Gill	
	A. mappa (Fr.) Quel.	
	A. muscaria (Fr.) Kummer	
	A. phalloides Fr.	
	A. rubescens Fr.	
	A. spreta Pk.	
	A. strobiliformis (V.H.) Quel.	
	A. vaginata Fr.	
	A. verna (Fr.) Kummer	
	A. virosa (Fr.) Quel., Fam. ex Secr.	
	Amanitopsis agglutinata (B. & C.) Sacc.	
	A. pubescens Sacc.	
	A. strangulata Fr.	
	A. vaginata Fr.	
	Armillaria mellea (Fr.) Karst.	
	Clathrus columnatus Bosc.	
	Ganoderma spp.	
	Geastrum spp.	
	Hericium erinaceus (Bull.) Pers.	
	Hydnellum diabolus Banker	
	Lactarius piperatus (L. ex Fr.) Gray	
	Lenzites saepiara (Wulf. ex Fr.) Fr.	
	Lepiota procera (Fr.) Kummer	
	Marasmius spp.	
	Mutinus ravenelii (B. & C.) E. Fischer	
	Panellus sp.	
	Pisolithus tinctorius Pers.	
	Ramaria spp.	
	Schizophyllum commune Fr.	
	Suillus spp.	

Family	Species	Common Name
Lichens	*Bulbothrix confoederata* (Culb.) Hale	
	Candelaria spp.	
	Cetraria celiaris Ach.	
	Cladina subtenuis (Abb.) Hale & Culb	
	Cladonia spp.	
	C. arbuscula (Wallr.) Hale & Culb.	
	C. chlorophaea (Flk.) Spreng.	
	C. clavulifera Vain.	
	C. cristatella Tuck.	
	C. leporina Fr.	
	C. robbinsii Evans	
	C. squamosa (Scop.) Hoffm.	
	Heterodermia speciosa (Wulf.) Trev.	
	Hypotrachyna livida (Tayl.) Hale	
	Lobaria sp.	
	Parmelina galbina (Ach.) Hale	
	Parmeliopsis aleurites (Ach.) Nyl.	
	Parmotrema hypotropum (Nyl.) Hale	
	P. michauxianum (Zahlbr.) Hale	
	P. perforatum (Jacq.) Mass.	
	Phaeophysica imbricata (Vain.) Essl.	
	Physica aipolia (Ehrh.) Hampe	
	Ramalina stenospora Mull. Arg.	
	R. tenuis (Tuck.) Merr.	
	Usnea dasypoga (Ach.) Nyl.	
	U. mutabilis Stirt.	
	U. strigosa (Ach.) Eaton	