ENDANGERED, THREATENED, AND RARE VASCULAR FLORA OF THE SAVANNAH RIVER SITE

by

John N. Knox
Rebecca R. Sharitz

A Publication of the Savannah River Site
National Environmental Research Park Program
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Division of Wetlands Ecology
Savannah River Ecology Laboratory

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INTRODUCTION

This report summarizes information on the 30 endangered, threatened, or rare plants found on the Savannah River Site, Aiken, South Carolina. Of these 30 species, eight are under review by the U.S. Fish and Wildlife Service as possible candidates for the proposed threatened and endangered list. Twenty-seven of the species are on the State of South Carolina's list prepared by the South Carolina Advisory Committee on Rare, Threatened, and Endangered Vascular Plants. These 27 plants include regionally threatened species, statewide threatened species, and rare species. Approximately two-thirds of these plants are found in wetland habitats.

Also included in this report are summaries of 29 plant species that are likely to occur on the SRS, but have not been found there. Fourteen of these plants are on the Federal list and range in status from endangered to possible candidates for deletion from the list. Twenty-eight are on the State of South Carolina list; approximately two-thirds of these also occur in wetland habitats.

THESAVANNAHRIVERSITEANDPLANTCOMMUNITIES

Overview of the Savannah River Site

The Savannah River Site (SRS), owned by the United States Department of Energy (DOE) and operated for the production of nuclear defense materials, was established in 1950. The SRS is a restricted public access site and occupies about 77,833 ha (300 sq mi) on the upper Atlantic Coastal Plain of South Carolina. The site is bounded on the southwest by the Savannah River and is about 40 km (25 mi) southeast of Augusta, Georgia and 32 km (20 mi) south of Aiken, South Carolina. Portions of the counties of Barnwell (49,172 ha), Aiken (26,979 ha), and Allendale (1,681 ha), South Carolina lie within the SRS boundary. The plant site is underlain by a wedge of unconsolidated to semiconsolidated sediment that thickens seaward. Elevation of the ground surface of the site ranges from 27 to 104 m above mean sea level.

Plant Communities of the Savannah River Site

Workman and McLeod (1990) have described eight different plant communities that occur on the SRS. References and detailed descriptions are given in that report. Summaries (taken from Workman and McLeod) are given below to familiarize the reader with the communities on site.

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 swamp forest occurs. Approximately 12,000 ha on the SRS, ranging from 25 m elevation at the deltas to 80 m at the headwaters, are covered by bottomland hardwoods.

Bottomlands occur on more mesic habitats than bluff or upland communities and may be flooded seasonally. Frequency, depth, and duration of flooding produce variations in the composition and patterns of the forests. In most variants of this community type, flooding is usually of limited depth and is restricted to late winter and early spring when plants are dormant. Soil pH, nutrient availability, elevational gradients, and soil moisture help determine species distribution in the stream cuts and delta areas of the Savannah River watershed.

Relatively undisturbed bottomlands, like those along Upper Three Runs Creek, are dominated by woody perennials. Trees comprise 40% of the species and shrubs and vines another 14%. When fire has been a factor, the bottomland forest is bordered by pine. Without fire, mesic hardwoods intergrade into the bottomlands as moisture conditions permit.

Carolina Bays

Carolina bays are natural, shallow depressions found in great abundance on the Coastal Plain of South Carolina and southeastern North Carolina. These bays have a characteristic oval or elliptical shape, a northwest to southeast orientation, and range from 0.05 to 1.3 km in length. Low sandy ridges, most conspicuous on the southeastern edge, rim the bays. Water levels are normally low in autumn and high in early spring.
Composition of bay vegetation is determined primarily by the topographic relief and hydrology of individual bays. Water depth gradient and soil permeability influence species distribution. Organic soils of bays on the upper Coastal Plain are thinner than soils of lower coastal sites. Periodic fires, indicated by charcoal fragments in bay sediments, often prevent peat buildup.

Upland pine, oak, or scrub oak vegetation surround most bays. Concentric bands of plant growth, corresponding to fluctuations in water level, surface area, and length of inundation, encircle the bays. The presence of emergent or floating-leaved macrophytes is influenced by surface area and water depth; thus, central bay vegetation ranges from herbaceous savanna dominated by grasses and sedges in shallow bays, to pond or lake plants or swamp forests in deeper bays. A detailed description of Carolina bays on the SRS may be found in Schalles et al. (1989).

Streams, Ponds, and Lakes

Freshwater habitats of the SRS include cooling lakes, streams, old farm ponds (abandoned in the early 1950s), and other artificial impoundments. Vegetation patterns in these habitats are determined by water depth, shoreline steepness, soils, and water temperature. Temperature is especially critical in determining macrophyte distribution in aquatic systems that receive reactor effluents.

From northwest to southeast, the five streams draining the SRS are Upper Three Runs Creek, Four Mile Creek, Pen Branch Creek, 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.

Acidic, softwater ponds on old farm sites were numerous 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.

Several reservoirs were constructed as part of a network to cool the effluents of two production reactors. Of the more than fifty 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 CaCO₃) and hardness than other ponds on the SRS. L-Lake, a 430 ha surface area cooling reservoir, was established in 1985. It is the second largest water body on the SRS; portions of it were planted with aquatic macrophytes in 1987.

Old Fields

Pasture and cropland covered approximately 27,000 ha prior to SRS establishment. Many of these fields, most of which were cotton or corn fields, were planted with pine and have been managed as plantations. Other fields not planted exhibit a characteristic sequence of natural revegetation. Currently, 260 ha of old field are found on the SRS.

Generally, succession from weedy annual and biennial herbs to perennial grasses occurs within the first eight years after field abandonment. Shrubs and trees colonize during the first three years and usually become well established by the tenth year. Eventually, as trees increase in number and size, a mixed southern hardwood forest develops.

The rate of succession and number of dominant species at any stage are influenced by size and cropping of the former agricultural area, soil texture, and soil moisture. In small fields, less than 120 ha, succession and species establishment are often more rapid than in fields greater than 200 ha. The number of dominant species and rate of succession increases with increased silt-clay content of the soil and decreased depth of the water table. This is evident by the second or third year when appearance and species composition begin to differ according to soil type underlying the field.

Pine Forests

Sites on the SRS dominated by pine can be divided into those natural stands which existed prior to the purchase of SRS lands and those planted, even-aged stands. Both types are managed primarily for timber products (pulpwood and saw timber).

On the SRS in the mid-1950s, the initial reforestation effort was directed at establishing pine plantations on abandoned agricultural land. A variety of pine species—longleaf (Pinus palustris), loblolly (P. taeda), and slash (P. elliottii) pines—allowed an appropriate species to be selected for
different habitats. Pine forests currently cover the majority of land area on the SRS. Approximate SRS land area (ha) covered by pine species as of 1990 are as follows: 25,677 loblolly, 14,924 longleaf, and 12,011 slash.

Sandhills

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

Rolling hills from 80 to 130 m in elevation typify sandhill topography on the Aiken Plateau. Topography, soil quality, and periodic fires are the primary factors that exert selective pressure on plant species composition and distribution. Environmental factors interact to create the open park or prairie-like appearance of scrub oak or oak-pine communities. Approximately 800 ha of the SRS support sandhills vegetation. As in all SRS plant communities, species composition varies along a soil moisture gradient.

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

Swamp Forests

Approximately 30 km of the Savannah River form the southern boundary of the SRS. Lowlands that occur from 25 to 35 m in elevation on the river floodplain and are inundated during a portion of the year support swamp forest. The swamp forest extends from the river margin to the creek delta and forms a band 3-4 km wide encompassing 3,800 ha. A natural levee, 6 to 10 m in height, separates the river from the swamp forest. Of the five streams that drain the SRS, three breach the levee and flow into the river.

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 spring or summer, are essential for perpetuation of the forest. Seed germination and seedling establishment of trees cannot occur in standing water but require an exposed, moist substrate.

Deep swamp areas border the river. As the topography changes from river to stream delta, so does species composition. Slight changes in topography, and therefore soil moisture, cause distinct changes in vegetation. In general, elevation increases and depth of flooding decreases with increasing distance from the river; bottomland species become more abundant and bald cypress (Taxodium distichum) and tupelo gum (Nyssa aquatica) become less abundant. Areas such as levees or islands within the swamp provide higher, drier substrate and support bottomland species. Hardwoods in the SRS swamp were lumbered in the late 1800s and early 1900s, and second growth forest has developed.

Upland Hardwoods

Forests dominated by oak and hickory 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. 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. Elevation ranges from 30 m at lower slopes to 75 m on ridgetops. Upland communities dominated by hardwoods occupy approximately 1,800 ha of the SRS.

Topography of these areas prevents successful pine management; thus, hardwood stands in the uplands have been relatively undisturbed. Logging in adjacent pinelands, however, may result in introduction of some loblolly pine (Pinus taeda) into hardwood stands.

The oak-hickory community of the SRS may be divided into subtypes based on the presence or absence of post oak (Quercus stellata). Post oak tends to inhabit poor soils of dry upper slopes and to decrease in abundance on better soils of mid-
lower slopes. Similar subtypes have been described by other authors working in different locations in the southeast.

PLANT SPECIES DIVERSITY AND GOVERNMENT ACTIONS

Value of Maintaining Plant Species Diversity

Why be concerned about the loss of some plant species? The reasons presented below are taken directly from Ayensu and DeFilipps (1978).

Each species, subspecies, and variety of plant represents a unique type of life whose genetic resources are specific and unique. When one of these types becomes extinct, its gene pool cannot be duplicated or reestablished and is lost. A large, untapped potential of enormous value to humans exists if the diversity of plant species is preserved. It has been established that thousands of new alkaloids could be discovered in plants, including possible cancer cures. New plant medicinals and drugs presently are being discovered.

Development of new and improved food, fiber, and timber crop species from the existing diversity of under-used plants is very important. Humans will need many types of plant germ plasm to increase future food production in answer to a major and growing world problem. In addition to developing untapped resources, preservation of the ancestors of today’s crop plants could protect against plant diseases and insect pests and ensure vigorous and basic stocks for future breeding. Some ancestral stocks, such as progenitors of corn, are very rare and some apparently are extinct. Many species of endangered and threatened plants may have special value since they are able to grow in unique and difficult places.

Government Actions Related to Plant Populations of Concern

Actions taken by the Federal and South Carolina governments in response to concern over the possible loss of certain plant populations are summarized below. Section 1 presents information directly from the U.S. Fish and Wildlife Service (1985). Section 2 is from Rayner et al. (1986).

The United States Plant List

The Endangered Species Act of 1973, as amended, requires the U.S. Fish and Wildlife Service (USFWS) to identify species of wildlife and plants that are endangered or threatened, based on the best available scientific and commercial data. Recognizing a need to focus on the conservation of endangered and threatened plants, which had not previously been eligible for Federal protection, the 1973 Endangered Species Act directed the Secretary of the Smithsonian Institution to prepare a report on endangered and threatened plant species and to recommend conservation measures. The Smithsonian report, published as House Document No. 94-51, included a list of more than 3,000 native taxa. The USFWS published a notice on July 1, 1975 in which it announced that this report had been accepted as a petition under the terms of the Act and that the taxa named within were being reviewed for possible inclusion on the List of Endangered and Threatened Plants.

The Smithsonian report was revised and published (Ayensu and DeFilipps 1978) and the revision was accepted as a petition for newly included taxa. In September, 1985 the USFWS issued an updated notice of vascular plant taxa native to the U.S. that were being reviewed for possible addition to the formal list. The plant categories are:

Endangered species. Any species which is in danger of extinction throughout all or a significant portion of its range.

Threatened species. Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range (United States Congress 1973).

Proposed endangered. Taxa proposed to be formally listed as endangered.

Proposed threatened. Taxa proposed to be formally listed as threatened.

Category 1 candidate. There is substantial information on biological vulnerability and threats which supports the appropriateness of proposing to list these as endangered or threatened species. Data are being gathered concerning precise habitat needs and, for
some of the taxa, precise boundaries for critical habitat designations.

Category 2 candidate. Current information indicates that proposing to list these plants as endangered or threatened species is possibly appropriate. However, substantial data on biological vulnerability and threats are not currently available to support the immediate preparation of rules. Further biological research and field study will be necessary to ascertain the status of the taxa in Category 2.

Category 3 candidate. These taxa are no longer being considered for listing as threatened or endangered species due to extinction, taxonomic controversy, or populations larger than previously thought.

The authority of the Federal Endangered Species Act applies only to endangered or threatened plants that occur on Federal lands or in a location that would be impacted by a Federally funded project. In either case, the USFWS would be consulted and would issue an opinion on the plant populations. The USFWS would then recommend ways to modify the project or possibly recommend termination of the project.

In cases where there are no Federal funds or no Federal land involved, the USFWS can take no action to modify or prevent a project. If plant populations involved are proposed as endangered or threatened, the USFWS may serve in an advisory capacity, but it has no authority to modify a project or prevent it from impacting the populations.

The South Carolina Plant List

The first list of rare vascular plants in South Carolina was produced as part of an Endangered Species Symposium held in 1976. Since that time, the S.C. Wildlife and Marine Resources Department's Heritage Trust Program has assumed a leading role in collecting data, maintaining occurrence records, and revising the list of rare plants in the state. Plants believed to be endangered or threatened in South Carolina are listed by Rayner et al. (1986).

The 1986 list places each species in one of four State significance categories: national concern, regional concern, statewide concern, and status unresolved. The list includes 44 species of national concern, 35 species of regional concern, 83 species of statewide concern, and one 132 species with status unresolved. Species that are endangered or threatened throughout their entire range (national concern) are of greater significance and priority, both for research and protection, than species that are endangered or threatened in only a portion of their range (regional concern). Species of regional concern, in turn, are of greater significance and priority than are species that are endangered or threatened only in South Carolina (statewide concern). The statuses of species throughout their ranges were determined by examining the most recent lists of endangered and threatened plants for each eastern state and the provinces of Canada.

The South Carolina list is unofficial, has no legal authority, and provides no protection in and of itself. Nonetheless, it is extremely important because it is used by the South Carolina Heritage Trust Program and the South Carolina Nature Conservancy to determine habitat protection priorities. To date, six properties have been acquired by purchase or donation specifically to protect the habitats of endangered or threatened plant species. At least 40 species have been protected by this means, including eight species of national concern. An additional 32 plant species have been provided with a lesser degree of protection.

METHODS

Work began on this document in early 1986 with a review of reports by Workman and McLeod (1990), Hodge (undated), and Hodge (1985). Preliminary lists were developed containing plants with known locations on the SRS and plants that could occur on the SRS but had never been reported. Next, the floral list of the SRS (Batson et al. 1985) was compared to the USFWS and State lists of rare, threatened, and endangered species.

Specimens in the Savannah River Ecology Laboratory (SREL) Herbarium document many of the known locations of plant populations. Many specimens from earlier collections by Batson were checked at the University of South Carolina Herbarium at Columbia and the Clemson University Herbarium was examined to document locations reported by Hodge.
The list of plants that might occur on the SRS was expanded by suggestions from local and regional botanists. From these contacts, specific habitats were selected for survey. Two botanists, Robert McCartney and Jeannine Angerman,* were contracted for portions of the two-year field survey. They focused on several specific plants and habitats.

Field surveys for plants on the two lists (known to occur and potentially occurring on the SRS) began in February, 1986 and were conducted at least four days per month during the 1986 and 1987 growing seasons. To facilitate the survey, computer listings were prepared for species in flower or fruit during each month. These monthly lists were arranged by priority location or habitat with those plants from the USFWS list having first priority and those from the State list second priority.

When a population was newly located or relocated, the number of individuals was counted and, in some cases, the population was marked with flagging. Specimens were collected and deposited in the SREL Herbarium. In cases where only one or two individuals were found, either no specimen was removed or only a piece of the plant was taken.

Metric units are used throughout this report, except for road distances which are reported in miles. These were reported in English units for ease in relocating population sites.

ENDANGERED, THREATENED, AND RARE VASCULAR PLANTS FOUND ON THE SAVANNAH RIVER SITE

This chapter contains summaries, maps, and some illustrations of the endangered, threatened, and rare plants found on the SRS, presented in alphabetical order by species. Unless otherwise noted, all common names and habitat and range information were taken from the South Carolina rare, threatened, or endangered plant list (Rayner et al. 1986) and all South Carolina county information and plant descriptions were taken from Radford et al. (1968). Numbers for the Carolina bays are from Shields et al. (1982) and site numbers for Set-Aside Areas are from Hillestad and Bennett (1981). The listing of Georgia counties of interest was provided by Thomas Patrick of the Georgia Natural Heritage Inventory Program or was taken from Jones and Coile (1988). "Nearby" Georgia counties are those within 85 miles of the SRS and include: Bullock, Burke, Chandler, Columbia, Effingham, Emanuel, Glascock, Hancock, Jefferson, Jenkins, Johnson, Lincoln, McDuffie, Richmond, Screven, Taliaferro, Treutlen, Warren, Washington, and Wilkes.

*deceased
Astragalus villosus Michaux

COMMON NAME: Milk-pea.
FAMILY: Fabaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Sandhills & open sandy woods.
SRS PLANT COMMUNITY: Upland hardwoods.
RANGE: FL to AL & SC.
SOUTH CAROLINA COUNTIES: Aiken.
NEARBY GEORGIA COUNTIES: Bullock, Jenkins, & Screven.
FLOWERING DATES: May-June.
FRUITING DATES: June-Aug.
DESCRIPTION: Perennial herb tufted in clumps. Three dm or less tall. Corolla cream to pale yellow.
LOCATION ON THE SRS: Rd. 8-1, 0.5 mi east of Upper Three Runs Creek; at the margin of open, sandy woods. (Collected by F. Gabrielson, on deposit at the SREL Herbarium.)
Figure 1. SRS location of Astragalus villosus.
**Baptisia lanceolata** (Walter) Elliott

**COMMON NAME:** Yellow wild indigo.

**FAMILY:** Fabaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Sandhills, dry pinelands, & open woods.

**SRS PLANT COMMUNITY:** Pine forest.

**RANGE:** AL to NC.

**SOUTH CAROLINA COUNTIES:** Aiken, Allendale (Radford et al. 1968), & Barnwell (SREL Herbarium).

**NEARBY GEORGIA COUNTIES:** Bullock, Burke, Chandler, Emanuel, Jefferson, Johnson, Screven, & Treutlen.

**FLOWERING DATES:** April-May.

**FRUITING DATES:** June-Nov.

**DESCRIPTION:** Rhizomatous perennial herb, 5 to 9 dm tall. Corolla yellow. Leaflets mostly 4 cm or more long.

**LOCATIONS ON THE SRS:**

1. Rds. 9 & A-18 intersection; in a clearcut, sandy waste area. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)

2. Rd. 9 approximately 0.6 mi north of the intersection with Rd. A-18; opposite side of road from Gate 22 and about 27 m south. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

3. Boggy Gut drainage area south of Rd. A-18; between the east & west forks on high ground cut by gullies and near the west fork on high ground. (Observed by Robert McCartney and John N. Knox.)
Figure 2. SRS locations of *Baptisia lanceolata*. 
**Bumelia lanuginosa** (Michaux) Pers.

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Woolly bumelia (Grimm 1966).</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Sapotaceae (Grimm 1966).</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Moist to dry sandy or rocky woods and thickets (Grimm 1966).</td>
</tr>
<tr>
<td>SRS PLANT COMMUNITY:</td>
<td>Upland hardwoods.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>GA, FL, TX, IL, MO, &amp; KA (Grimm 1966).</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Aiken. (This species has not been reported before in the State. It is included here as a recommendation that it be considered for addition to the state list.)</td>
</tr>
<tr>
<td>NEARLY GEORGIA COUNTIES:</td>
<td>Chandler, Jefferson, &amp; Jenkins.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>June-July (Grimm 1966).</td>
</tr>
<tr>
<td>FRUITING DATES:</td>
<td>October (Grimm 1966).</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>A shrub or small tree 2.5 m or more high with more or less persistent leaves (Grimm 1966).</td>
</tr>
</tbody>
</table>

**LOCATIONS ON THE SRS:**

1. UTR Creek bluffs west of Burma Road (C-3) between Rd. C and the first power line across Burma Road. (Collected by Robert McCartney, will be on deposit at the SREL Herbarium.)

2. UTR Creek bluffs west of Burma Road (C-3), southwest of first power line south of Rd. C; on the point of the bluff very close to the main channel of UTR Creek. (Observed by John N. Knox.)

3. End of Red Hill Road (north fork); on the bluffs of UTR Creek west of Burma Road about 15 m down slope from the end of the road. (Collected by Jeannine Angerman, on deposit at the SREL Herbarium.)
Figure 3. SRS locations of Bumelia lanuginosa.
**Carex decomposita** Muhlenb.

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Cypress knee sedge.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Cyperaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Category 2, candidate possibly appropriate for proposed listing.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Status unresolved, considered rare.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>On floating logs &amp; tree bases in cypress swamps or ponds.</td>
</tr>
<tr>
<td>SRS PLANT COMMUNITY:</td>
<td>Swamp forests.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>FL to LA and north to VA, NY, OH, MI, MO.</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Barnwell (Radford et al. 1968), Calhoun, Charleston, Clarendon, Horry, &amp; Sumter (Aulbach-Smith et al. draft).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>None.</td>
</tr>
<tr>
<td>FLOWERING/FRUITING DATES:</td>
<td>May-June.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>Rhizomatous perennial to 12 dm tall. Pistillate scales not awned. Perigynia blackish.</td>
</tr>
<tr>
<td>LOCATION ON THE SRS:</td>
<td>Steel Creek delta beyond the 2nd island, 1/3 way up island in the main channel. (Collected by Cynthia Aulbach-Smith, on deposit at the USC Herbarium and at the SREL Herbarium.)</td>
</tr>
</tbody>
</table>
Figure 4. SRS location of Carex decomposita.
Figure 5.  *Carex decomposita* (Cypress knee sedge).
1. Entire plant.  3. Perigynium.
2. Fruiting spike.  4. Nutlet.
**Carex oligocarpa** Schkuhr

**COMMON NAME:** Few-fruited sedge.

**FAMILY:** Cyperaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Rich woods over calcareous rock.

**SRS PLANT COMMUNITY:** Upland hardwoods.

**RANGE:** QUE, ONT, VT to KA & MI & south to FL & TX.

**SOUTH CAROLINA COUNTIES:** Allendale, Dorchester (Radford *et al.* 1968), & Fairfield (Aulbach-Smith *et al.* draft).

**NEARBY GEORGIA COUNTY:** Burke & Columbia.

**FLOWERING/FRUITING DATES:** May-June.

**DESCRIPTION:** Rhizomatous perennial, 1 to 4.5 dm tall. Scaberulous culms.

**LOCATION ON THE SRS:** Reported from SRS, location unknown (Batson *et al.* 1985).
**Carya myristiciformis** (Michaux f.) Nutt.

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Nutmeg hickory.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Juglandaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Regional concern, threatened.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Swamp forests, low woods, and bluffs over calcareous soils.</td>
</tr>
<tr>
<td>SRS PLANT COMMUNITY:</td>
<td>Bottomland hardwoods.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>AL, AR, LA, MS, OK, NC, SC, &amp; TX.</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Berkeley (Radford et al. 1968) &amp; Barnwell (B. McCarthey, Rutgers University).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>No information.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>April.</td>
</tr>
<tr>
<td>FRUITING DATES:</td>
<td>October.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>Bud scales valvate, shell smooth, leaflets 5-9.</td>
</tr>
<tr>
<td>LOCATION ON THE SRS:</td>
<td>Boiling Springs Natural Area (Gantt Tract) in the Allendale corridor; near LTR Creek, along the trail near a clearing. (Collected by Dr. J. A. Quinn of Rutgers University, identified by Brian McCarthey, Rutgers University. Fruit also collected by John N. Knox, on deposit at the SREL Herbarium.)</td>
</tr>
</tbody>
</table>

**NOTE:**
There is some doubt about this identification. Some field characters do not completely match the species description. Work will continue with these trees in the Boiling Springs Natural Area.
Figure 6. SRS location of *Carya myristiciformis*.
Coreopsis rosea Nutt.

| COMMON NAME: | Pink tickseed. |
| FAMILY: | Asteraceae. |
| FEDERAL STATUS: | Not listed. |
| SOUTH CAROLINA STATUS: | Regional concern, threatened. |
| HABITAT: | Grass-sedge bays & riverbanks. |
| SRS PLANT COMMUNITY: | Carolina bays. |
| RANGE: | NS, MA, DE, MD, & SC. |
| SOUTH CAROLINA COUNTIES: | Aiken (SREL Herbarium), Edgefield, Horry (Aulbach-Smith et al. draft), & Saluda (D. Rayner, pers. comm.). |
| NEARBY GEORGIA COUNTIES: | No information. |
| FLOWERING/FRUITING DATES: | July-Oct. |
| DESCRIPTION: | Glabrous perennial 0.2 to 0.6 m tall. Ray flowers rose. Disk yellow (Bailey 1949). |
| LOCATIONS ON THE SRS: | 1- Flamingo Bay (Bay #3; collected by John N. Knox, will be on deposit at the SREL Herbarium). |
| | 2- Karen's Pond, also called Peter's Pond (Collected by F. Gabrielson, on deposit at the SREL Herbarium). |
Figure 7. SRS locations of Coreopsis rosea.
Figure 8. *Coreopsis rosea* (Pink tickseed).
Croton elliottii Chapman

COMMON NAME: Elliott's croton.

FAMILY: Euphorbiaceae.

FEDERAL STATUS: Category 2, candidate possibly appropriate for proposed listing.

SOUTH CAROLINA STATUS: Status unresolved, considered rare.

HABITAT: Shallow karst ponds & bays, in moist to dryish sands & peats.

SRS PLANT COMMUNITY: Carolina bays.

RANGE: FL to SC & AL.

SOUTH CAROLINA COUNTIES: Barnwell (Clemson University Herbarium).

NEARBY GEORGIA COUNTIES: None.

FLOWERING/FRUITING DATES: July-Sept.


LOCATIONS ON THE SRS:

1- Sunset Bay (#57); near center of the bay. (Collected by Alston Hodge on deposit at Clemson University Herbarium; also collected by Jeannine Angerman, on deposit at the SREL Herbarium.)

2- Chorus Bay (#60); scattered in the north, central, and south areas of the bay. (Collected by Jeannine Angerman, on deposit at the SREL Herbarium.)

3- Mona Bay (#66; reported and mapped by Alston Hodge; observed by John N. Knox).

4- Bay #79. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

5- Little Cypress Bay (#64; collected by John N. Knox, on deposit at the SREL Herbarium.)
6- Wet roadside ditch east of Rd. 8, 0.4 mi north of the hot
dam at Par Pond. (Collected by John N. Knox, on deposit
at the SREL Herbarium.)

7- Sarracenia Bay (#78); west rim. (Collected by John N.
Knox, on deposit at the SREL Herbarium.)

8- Woodward Bay (#67; Collected by John N. Knox, on
deposit at the SREL Herbarium.)
Figure 9. SRS locations of Croton elliottii.
Figure 10. *Croton elliottii* (Elliott’s croton).
1. Entire plant.
2. Pistillate flower.
4. Seed (2 views).
**Echinacea laevigata** (Boynton & Beadle) Blake

| COMMON NAME: | Smooth purple cone-flower. |
| FAMILY: | Asteraceae. |
| FEDERAL STATUS: | Category 2, candidate possibly appropriate for proposed listing. |
| SOUTH CAROLINA STATUS: | National concern, threatened. |
| HABITAT: | Open woodlands & road banks, usually over calcareous soils. |
| SRS PLANT COMMUNITY: | Upland hardwoods. |
| RANGE: | VA, NC, SC, GA, & AL. |
| SOUTH CAROLINA COUNTIES: | Aiken (Radford et al. 1968), Lancaster, Oconee, & Pickens (Aulbach-Smith et al. draft). |
| NEARBY GEORGIA COUNTIES: | None. |
| FLOWERING/FRUITING DATES: | May-July. |
| DESCRIPTION: | Perennial. Upper surface of leaves and stems glabrous. Ray flowers deep to pale pink (Radford et al. 1968). Taxonomically, this is closest to *E. purpurea*, but is, by comparison, smooth with longer and narrower ray flowers. *E. purpurea* also tends to be a more robust plant with somewhat larger heads and less erect rootstock (Kral 1983b). |
| LOCATION ON THE SRS: | Burma Road (C-3) 3 miles north of the junction with Rd. A (at the roadside area marked by yellow signs; collected by F. Gabrielson, on deposit at the SREL Herbarium.) |
Figure 11. SRS location of *Echinacea laevigata*.
Figure 12. *Echinacea laevigata* (Smooth purple cone-flower).

1. Entire plant.
2. Flower head.
Common Name: Echinodorus tenellus (Martius) Buch var. parvulus (Engelm.) Fassett

Family: Alismataceae

Federal Status: Not listed

South Carolina Status: Statewide concern, threatened

Habitat: Natural ponds & grass-sedge bays or wet depressions, silty draw-down zones along blackwater rivers.

SRS Plant Community: Carolina bays

Range: FL to TX & north locally SC, DE, NJ, MA, MO, IN, ONT, & MN

South Carolina Counties: Aiken (SREL Herbarium), Barnwell (Clemson University Herbarium), Bamberg, Saluda (Aulbach-Smith et al. draft), & Horry (D. Rayner, pers. comm.)

Nearby Georgia Counties: No information

Flowering/Fruiting Dates: July-Oct

Description: Small rhizomatous herb less than 10 cm tall. Often forming dense mats (Godfrey and Wooten 1979)

Locations on the SRS:
1- Sunset Bay (#57); near center of bay. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
2- Chorus Bay (#60); northeast to east side of bay. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
3- Janell's Bay (#62); west rim at edge of clear cut. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
4- Lost Lake (#28); west margins. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)
5- Rd. G-2, 0.3 mi northeast of Gate 18. (Reported and mapped by Alston Hodge.)
6- Rd. 8-5.2 (?); wet roadside ditch through south margin of a small Carolina bay-like depression about 1 mi north of Craig's Pond. (Collected by Alston Hodge, on deposit at the Clemson University Herbarium.)
7- Rds. 2 and F junction; shallow depression near northeast side of road. (Collected by Alston Hodge, on deposit at the Clemson University Herbarium.)

8- Shallow depression in power line right-of-way on south side of Rd. B-5, about 0.3 mi west of Rd. 9 intersection. (Collected by Alston Hodge, on deposit at the Clemson University Herbarium.)
Figure 13. SRS locations of *Echinodorus tenellus* var. *parvulus*.
Figure 14. *Echinodorus tenellus* var. *parvulus* (Little bur-head).
1. Entire plant.
2. Flower.
**Gaura biennis** L.

**COMMON NAME:** Gaura.  
**FAMILY:** Onagraceae.  
**FEDERAL STATUS:** Not listed.  
**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.  
**HABITAT:** Streambanks, meadows, & roadsides.  
**SRS PLANT COMMUNITY:** Old fields.  
**RANGE:** QUE & MN to VA, SC, TN, & MD.  
**SOUTH CAROLINA COUNTIES:** Oconee (Radford et al. 1968), Barnwell (SREL Herbarium), Aiken, & Beaufort (Rayner, pers. comm.).  
**NEARBY GEORGIA COUNTIES:** None.  
**FLOWERING/FRUITING DATES:** June-Oct.  
**DESCRIPTION:** Plant to 2 m tall. Fruit indehiscent, obtusely angled. Corolla white to pink.  
**LOCATIONS ON THE SRS:**

   (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)

2. Banana Case Rd. (A-13) near RR; in an open grassy area.  
   (Collected by F. Gabrielson, on deposit at the SREL Herbarium.)

3. East side of Rd. 2; 0.2 mi northeast of the barricade onto Rd. A.  
   (Collected by Jeannine Angerman, on deposit at the SREL Herbarium.)

4. West side of Rd. A; 0.2 mi south of the junction of Rds. A & 2.  
   (Collected by Jeannine Angerman, on deposit at the SREL Herbarium.)
Figure 15. SRS locations of *Gaura biennis*.
**Lindera subcoriacea** B.E. Wofford

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Bog spice bush.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Lauraceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Category 2, candidate possibly appropriate for proposed listing.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Seepage bogs at base of sandhills (D. Rayner, pers. comm.).</td>
</tr>
<tr>
<td>SRS PLANT COMMUNITY:</td>
<td>Bottomland hardwoods.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>SC, GA, NC, LA, &amp; MS. (Gordon et al. 1986.)</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Aiken &amp; Barnwell (R. McCartney, pers. comm.).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>Richmond.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>March-April.</td>
</tr>
<tr>
<td>FRUITING DATES:</td>
<td>Aug.-Sept.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>Leaves subcoriaceous, elliptic to oblanceolate, obtuse to rounded at the tip and less than 7.5 cm long, faintly aromatic. Most obvious in late March with clusters of bright yellow flowers. After flowering, the shrub superficially resembles other shrubs of its habitat. Vegetative specimens may best be field identified by the characteristic lenticels on the twigs and the characteristic smell of the bruised twig (Gordon et al. 1986).</td>
</tr>
</tbody>
</table>

**LOCATIONS ON THE SRS:**

1- Tinker Creek floodplain 0.1 mi east of bridge on Rd. 8-11 (Kennedy's Pond area; identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)

2- Tinker Creek floodplain about half way between Rds. 8-11 and 8-12. (Observed by Robert McCartney.)

3- Boggy Gut drainage area south of Rd. A-18; in the east fork floodplain, down slope from gullies. (Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)

4- Meyers Branch floodplain, 0.3 mi and 0.5 mi east of Rd. 9 crossing; south of the creek. (Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)
5- Meyers Branch floodplain north of Rd. A; east of the creek, 0.9 mi northeast of gate near Rd. A along unnumbered dirt road. (Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)

6- Tributary to Meyers Branch, north of Rd. A-18; south of RR track, along unnumbered road south of the upper drainage of the second tributary west of Rd. B-63. (Observed by Robert McCartney.)
Figure 16. SRS locations of *Lindera subcoriacea*.
Figure 17. *Lindera subcoriacea* (Bog spice bush).
1. Leaves and flower buds.
2. Flowers and stem.
3. Flower.
Lobelia boykinii Torrey & A. Gray

COMMON NAME: Swamp lobelia.
FAMILY: Campanulaceae.
FEDERAL STATUS: Category 2, candidate possibly appropriate for proposed listing.
SOUTH CAROLINA STATUS: Not listed.
HABITAT: Savannas (Radford et al. 1968).
SRS PLANT COMMUNITY: Carolina bays.
SOUTH CAROLINA COUNTIES: Aiken, Bamberg, Barnwell, Hampton, Sumter, (Radford et al. 1968), Allendale, Berkeley, Florence, Georgetown, Orangeburg, Williamsburg (Aulbach-Smith et al. draft), & Charleston (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTIES: Bullock & Jenkins.
FLOWERING DATES: May-June.
FRUITING DATES: July-Sept.
DESCRIPTION: Rhizomatous perennial 3 to 11 dm tall. Corolla blue to violet. Central stem leaves less than 5 mm wide.
LOCATIONS ON THE SRS:
1- Craig's Pond (#77); margins. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.) Along the southwest rim. (Jeannine Angerman, pers. comm.)
2- Sarracenia Bay (#78); shallow water. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.) Along the west rim, north of the fence, along the southeast rim, south of the fence. (Jeannine Angerman, pers. comm.)
Figure 18. SRS locations of *Lobelia boykinii*. 
Figure 19. *Lobelia boykinii* (Swamp lobelia).

1. Entire plant.
2. Fruiting stem.
3. Side view of flower.
4. Front view of flower.

Scale: 10 cm

15 mm
**Ludwigia spathulata** Torrey & A. Gray

**COMMON NAME:** Florida false loosestrife.

**FAMILY:** Onagraceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Bogs, wet depressions, & pond margins.

**SRS PLANT COMMUNITY:** Carolina bays.

**RANGE:** FL & SC.

**SOUTH CAROLINA COUNTIES:** Aiken (Radford *et al.* 1968), Lexington, Saluda, & Spartanburg (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** None.

**FLOWERING/FRUITING DATES:** June-Oct.

**DESCRIPTION:** Prostrate pubescent perennial. Leaves opposite. Petals absent. Capsule with longitudinal green stripes.

**LOCATIONS ON THE SRS:**

1- Sunset Bay (#57); near center of bay. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

2- Chorus Bay (#60); north to east side of bay. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

3- Rainbow Bay (#189; reported in Vitt 1981.)

4- Rds. 2 and F junction; shallow depression on northeast side of road. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

5- Shallow depression in powerline right-of-way on south side of Rd. B-5, about 0.3 mi west of Rd. 9 intersection. (Collected by Alston Hodge, on deposit at the Clemson University Herbarium.)
Figure 20. SRS locations of Ludwigia spathulata.
Figure 21. Ludwigia spathulata (Florida false loosestrife).
1. Entire plant.
2. Fruit.
**Myriophyllum laxum** Shutleworth ex Chapman

| COMMON NAME: | Loose water-milfoil. |
| FAMILY: | Haloragaceae. |
| FEDERAL STATUS: | Category 2, candidate possibly appropriate for proposed listing. |
| SOUTH CAROLINA STATUS: | Regional concern, threatened. |
| HABITAT: | Ponds & lime sinks. |
| SRS PLANT COMMUNITY: | Freshwater ponds. |
| RANGE: | NC to FL & AL. |
| SOUTH CAROLINA COUNTIES: | Barnwell (Radford *et al.* 1968), Aiken, Berkeley, Darlington, Kershaw, Lexington, Orangeburg (Aulbach-Smith *et al.* draft), & Chesterfield (D. Rayner, pers. comm.). |
| NEARBY GEORGIA COUNTIES: | None. |
| FLOWERING/FRUITING DATES: | June-Oct. |
| DESCRIPTION: | Perennial aquatic. Leaves submersed and emersed. Emersed leaves spatulate, less than 5 mm long, alternate. |
| LOCATION ON THE SRS: | Reported from SRS, location unknown. (Collected by Kelley and Batson, on deposit at the USC Herbarium. Location on herbarium label unclear.) |
**Nestronia umbellula** Raf.

**COMMON NAME:** Nestronia.

**FAMILY:** Santalaceae.

**FEDERAL STATUS:** Category 2, candidate possibly appropriate for proposed listing.

**SOUTH CAROLINA STATUS:** Not listed.

**HABITAT:** Woodlands (Radford et al. 1968).

**SRS PLANT COMMUNITY:** Upland hardwoods.

**RANGE:** VA, SC, GA, & AL (Radford et al. 1968).

**SOUTH CAROLINA COUNTIES:** Barnwell, Calhoun, Chesterfield, Greenville, Oconee, Richland, Spartanburg, Sumter (Radford et al. 1968), Aiken (SREL Herbarium), Anderson, Lexington, Pickens (Aulbach-Smith et al. draft), & Kershaw (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** Burke, Richmond, & Wilkes.

**FLOWERING DATES:** April-May.

**FRUITING DATES:** July.

**DESCRIPTION:** Dioecious colonial shrub 0.6 to 1.3 m tall. Leaves opposite. Believed to be parasitic on the roots of pines.

**LOCATIONS ON THE SRS:**

1- Beach Memorial Road (Rd. 8.1-4); on the east slope about 0.8 mi north of Road 8-1. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)

2- Meyers Branch area, 0.3 mi east of Rd. 9 crossing; south of creek on dry north-facing slopes. (Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)

3- Meyers Branch area north of Rd. A; east of the creek, 0.5 mi northeast of gate near Rd. A along unnumbered dirt road, near a pine plantation. (Identified by Robert McCartney, collected by John N. Knox, will be on deposit at the SREL Herbarium.)

4- Upper Three Runs Creek bluffs west of Burma Road (Rd. C-3; collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.) Between Rd. C and first powerline across Burma Road. (Jeannine Angerman, pers. comm.)
5. Unnamed tributary to Tinker Creek, east of the intersection of Rds. 8-1 and 8-11; dry east and west slopes.
(Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)
Figure 22. SRS locations of *Nestronia umbellula*.
Figure 23. *Nestronia umbellula* (Nestronia).
1. Entire plant.
2. Leaf.
3. Flower.

Scale: 10 cm

Scale: 6 mm

Scale: 6 cm
Nolina georgiana Michaux

COMMON NAME: Sandhill lily.
FAMILY: Agavaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Turkey oak sandhills.
SRS PLANT COMMUNITY: Sandhills.
RANGE: FL to SC.
NEARBY GEORGIA COUNTIES: Bullock, Burke, Chandler, Columbia, Emanuel, Glascock, Hancock, Jefferson, Johnson, McDuffie, Richmond, Treutlen, & Washington.
FLOWERING DATES: May-June.
FRUITING DATES: June-Aug.
DESCRIPTION: Perennial herb. Leaves in basal rosette. Inflorescence a large (0.5-1.5 m tall) panicle. Corolla white.
LOCATIONS ON THE SRS:
1- Boggy Gut drainage area, south of Rd. A-18; between the east & west forks on high ground cut by gullies and near the east fork down slope from the gullies. (Observed by Robert McCartney.)
2- Along Burma Road (Rd. C-3), 2 to 3 mi east of Rd. A. (Collected by F. Gabrielson, on deposit at the SREL Herbarium.) Along the east & west side of Burma Road (as described above; observed by John N. Knox).
3- Upper Three Runs Creek bluff west of Burma Road (Rd. C-3); at the end of Red Hill Road (south fork) about 90 m down slope from the end of the road. (Observed by Jeannine Angerman.)
Figure 24. SRS locations of *Nolina georgiana*. 
**Paronychia americana** (Nutt.) Fenzl ex Walp.

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Nailwort.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Caryophyllaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Status unresolved, considered rare.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Sandhills &amp; dry pinelands.</td>
</tr>
<tr>
<td>SRS PLANT COMMUNITY:</td>
<td>Pine forests.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>FL to SC.</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Edgefield (Radford et al. 1968), Aiken, &amp; Barnwell (SREL Herbarium).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>Bullock, Chandler, Columbia, &amp; Emanuel.</td>
</tr>
<tr>
<td>FLOWERING/FRUITING DATES:</td>
<td>June-Sept.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>Perennial herb. Trailing stem 1 to 4 dm long. Corolla purple.</td>
</tr>
<tr>
<td>LOCATIONS ON THE SRS:</td>
<td></td>
</tr>
<tr>
<td>1-</td>
<td>0.3 mi north of Rd. E-2 south of Mill Ck.; in dry pine woods. (Collected by J. B. Gentry, on deposit at the SREL Herbarium.)</td>
</tr>
<tr>
<td>2-</td>
<td>East of Rd. A-17, south of the RR, before turn in the road. (Collected by Jeannine Angerman, on deposit at the SREL Herbarium.)</td>
</tr>
</tbody>
</table>
Figure 25. SRS locations of Paronychia americana.
Platanthera lacera (Michaux) G. Don

COMMON NAME: Green fringed orchid.
FAMILY: Orchidaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Bogs, wet meadows, swamps, & pine savannas.
SRS PLANT COMMUNITY: Carolina bays & bottomland hardwoods.
RANGE: NFLD to MAN & south to SC, GA, OK, & TN.
SOUTH CAROLINA COUNTIES: Aiken, Barnwell, Saluda (Radford et al. 1968), Anderson, Berkeley, Georgetown, Greenville, & Pickens (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: None.
FLOWERING/FRUITING DATES: June-Aug.
DESCRIPTION: Perennial glabrous herb, 2.5 to 7.5 dm tall. Corolla pale yellowish green or whitish green.
LOCATIONS ON THE SRS:
1- Mill Creek Set-aside Site #5. (Collected by Wellman and Good, on deposit at the SREL Herbarium.)
2- Rainbow Bay (#189; Workman and McLeod 1990).
3- South of the end of Rd. C-5; in floodplain & boggy areas of unnamed creek. (Jeannine Angerman, pers. comm.)
Figure 26. SRS locations of *Platanthera lacera*.
Figure 27. *Platanthera lacera* (Green fringed orchid).
1. Entire plant.
2. Flowers.
**Potamogeton foliosus Raf.**

**COMMON NAME:** Pondweed.

**FAMILY:** Potamogetonaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Lakes, streams, or ponds. (Radford et al. 1968)

**SRS PLANT COMMUNITY:** Freshwater streams, ponds, & marshes.

**RANGE:** AK, Yukon, NWT, BC to NS, LAB, WA to CA, TX, TN, FL, & ME.

**SOUTH CAROLINA COUNTIES:** Greenville (Radford et al. 1968), Aiken, & Berkeley (Aulbach-Smith et al. draft).

**NEARBY GEORGIA COUNTY:** None.

**FLOWERING/FRUITING DATES:** May-Oct.

**DESCRIPTION:** Rhizomatous aquatic perennial. Leaves all submersed, narrowly linear, and without a pair of basal glands. Flowers perfect.

**LOCATION ON THE SRS:** Reported from SRS, location unknown. No herbarium specimen (Batson et al. 1985).
**Rhedia aristosa** Britton

**COMMON NAME:** Awned meadow-beauty.

**FAMILY:** Melastomataceae.

**FEDERAL STATUS:** Category 2, candidate possibly appropriate for proposed listing.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Grass-sedge wet depressions, savannas, & pinelands.

**SRS PLANT COMMUNITY:** Carolina bays.

**RANGE:** NJ to GA & AL.

**SOUTH CAROLINA COUNTIES:** Bamberg, Berkeley, Georgetown (Radford et al. 1968), Barnwell (SREL Herbarium), Aiken, Lee, Marion, Orangeburg, Richland, Sumter (Aulbach-Smith et al. draft), Clarendon, & Marlboro (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** Burke.

**FLOWERING/FRUITING DATES:** June-Sept.

**DESCRIPTION:** Perennial herb to 7 dm tall. Corolla purple. Sepals aristate with coarse yellow bristles.

**LOCATIONS ON THE SRS:**

1- Craig's Pond (#77; collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.) Along the southwest rim, south of the fence; along the northeast rim, north of the fence. (Jeannine Angerman, pers. comm.)

2- Sarracenia Bay (#78; Hodge 1985).
Figure 28. SRS locations of *Rhexia aristosa*.
Figure 29. *Rhexia aristosa* (Awned meadow-beauty).
1. Entire plant.
2. Hypanthium.
3. Leaves (upper & lower views).

Scale: 10 cm
**Rhododendron flammeum** (Michaux) Sarg.

**COMMON NAME:** Oconee azalea.  
**FAMILY:** Ericaceae.  
**FEDERAL STATUS:** Not listed.  
**SOUTH CAROLINA STATUS:** Statewide concern, threatened.  
**HABITAT:** Steep north-facing bluffs.  
**SRS PLANT COMMUNITY:** Upland hardwoods.  
**RANGE:** AL, GA, & SC.  
**SOUTH CAROLINA COUNTIES:** Aiken (R. McCartney, pers. comm.) & Allendale (D. Rayner, pers. comm.).  
**NEARBY GEORGIA COUNTIES:** Bullock, Burke, Effingham, Richmond, & Screven.  
**FLOWERING DATES:** March-May.  
**FRUITING DATES:** Sept.-Oct.  
**DESCRIPTION:** Shrub to 2 m tall. Corolla scarlet or bright red (Dirr 1983).  
**LOCATIONS ON THE SRS:**

1. Boggy Gut Road (Rd. 781-4); north of junction with Hwy 278 at Boggy Gut Creek, on north-facing slope. (Observed by Robert McCartney.)

2. Lower Three Runs Creek; south of Boiling Springs Natural Area and north of Hwy. 125. (Observed by Doug Rayner.)

3. Tinker Creek bluffs, at north end of Rd. 8-12; 0.1 mi west of the road on an east-facing slope. (Identified by Robert McCartney, collected by John N. Knox, on deposit at the SREL Herbarium.)

4. Tinker Creek bluffs; scattered between Rds. 8-11 and 8-12. (Observed by Robert McCartney.)

5. Upper Three Runs Creek west of Burma Road (Rd. C-3) at the end of Red Hill Road (south fork); down slope about 3 m from the creek. (Observed by Jeannine Angerman.)
6- Unnamed tributary to Tinker Creek, east of intersection of Rds. 8-1 and 8-11; dry west slope. (Observed by John N. Knox.)

7- Unnamed tributary to Tinker Creek, west of Rd. 8-12. (Observed by Robert McCartney.)
Figure 30. SRS locations of *Rhododendron flammeum*. 
Figure 31. *Rhododendron flammeum* (Oconee azalea).
1. Leaves and stems.
2. Flower, flower buds, and stems.
**Rhynchospora inundata** (Oakes) Fernald

**COMMON NAME:** Beak-rush.

**FAMILY:** Cyperaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Grass-sedge wet depressions, marshes, & ponds.

**SRS PLANT COMMUNITY:** Carolina bays.

**RANGE:** FL to MA.

**SOUTH CAROLINA COUNTIES:** Berkeley, Dillon, Newberry (Radford *et al.* 1968), Barnwell (Clemson University Herbarium), Allendale, Clarendon, Horry, Lexington (Aulbach-Smith *et al.* draft), & Georgetown (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** No information.

**FLOWERING/FRUITING DATES:** July-Sept.

**DESCRIPTION:** Rhizomatous perennial 0.5 to 1.5 m tall. Tubercle more than 4.5 mm long. Spikelets less than 10 per glomerule.

**LOCATIONS ON THE SRS:**

1- Thunder Bay (#83); southern border. (Collected by A. Hodge, on deposit at the Clemson University Herbarium. Also collected by John N. Knox, on deposit at the SREL Herbarium.)

2- Dunbarton Bay (#97); northwest side near an old RR grade and along the southwest rim. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
Figure 32. SRS locations of *Rhynchospora inundata*. 

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Rhynchospora tracyi Britton

COMMON NAME: Beak-rush.
FAMILY: Cyperaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Cypress swamps, pools, & grass-sedge wet depressions (marshes).
SRS PLANT COMMUNITY: Carolina bays.
RANGE: SC to FL & MS (West Indies).
SOUTH CAROLINA COUNTIES: Allendale, Bamberg, Barnwell, Berkeley (Radford et al. 1968), Lee, Orangeburg (Aulbach-Smith et al. draft), & Georgetown (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTY: Burke.
FLOWERING/FRUITING DATES: June-Sept.
DESCRIPTION: Rhizomatous perennial, 3.5 to 7.5 dm tall. Tubercle more than 4.5 mm long. Spikelets in 1-4 globose heads.
LOCATIONS ON THE SRS:
1- Craig's Pond (#77; collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)
2- Sarracenia Bay (#78; collected by A. Hodge, on deposit at the Clemson University Herbarium. Also collected by John N. Knox, on deposit at the SREL Herbarium.)
3- Thunder Bay (#83; collected by A. Hodge, on deposit at the Clemson University Herbarium.)
4- Woodward Bay (#67; collected by A. Hodge, on deposit at the Clemson University Herbarium.)
Figure 33. SRS locations of *Rhynchospora tracyi*. 
Rorippa sessiliflora (Nutt.) A. Hitch.

COMMON NAME: Yellow cress.
FAMILY: Brassicaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Wet habitats around ponds, lakes, & streams.
SRS PLANT COMMUNITY: Bottomland hardwoods.
RANGE: FL to TX north to IN, WI, MN, NB, DC, & VA.
SOUTH CAROLINA COUNTIES: Richland (Radford et al. 1968), Aiken (SREL Herbarium), & Lexington (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: April-July.
DESCRIPTION: Glabrous biennial herb to 7 dm tall. Corolla yellow. Fruiting pedicels 1 mm or less long.
LOCATION ON THE SRS: SREL Natural Area #2 near Savannah River; in a low, wet, open area. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.) Near Rd. A-5 in an open, wet area. (Jeannine Angerman, pers. comm.)
Figure 34. SRS location of *Rorippa sessiliflora*.
Sagittaria isoetiformis J. G. Smith

COMMON NAME: Quill-leaved swamp-potato.
FAMILY: Alismataceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Grass sedge bogs & wet depressions, often in Carolina bays.
SRS PLANT COMMUNITY: Carolina bays & freshwater ponds.
RANGE: NC to FL & AL.
SOUTH CAROLINA COUNTIES: Aiken (Radford et al. 1968), Barnwell (Clemson University Herbarium), Lexington, & Saluda (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: None.
FLOWERING/FRUITING DATES: April-June.
DESCRIPTION: Rhizomatous aquatic perennial. Flower bracts united. Leaves straplike. (Godfrey and Wooten 1979.) Corolla white.
LOCATIONS ON THE SRS:

1- Mona Bay (#66; collected by John N. Knox, on deposit at the SREL Herbarium.)

2- Craig's Pond (#77); north central portion beyond fence. (Collected by A. Hodge, on deposit at the Clemson University Herbarium.)

3- Pond B; near SREL boatdock and at south end of Boatdock Cove. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

4- Sarracenia Bay (#78; collected by A. Hodge, on deposit at the Clemson University Herbarium.)

5- Thunder Bay (#83; collected by A. Hodge, on deposit at the Clemson University Herbarium; also collected by John N. Knox, on deposit at the SREL Herbarium.)

6- Woodward Bay (#67; reported and mapped by A. Hodge, observed by John N. Knox.)
Figure 35. SRS locations of *Sagittaria isoetiformis*. 
Figure 36. *Sagittaria isoetiformis* (Quill-leaved swamp-potato).
1. Entire plant.
2. Flower.
Trepocarpus aethusae Nutt. ex DC.

COMMON NAME: Trepocarpus.
FAMILY: Apiaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Margins of swamp forest & sandy riverbanks, usually over calcareous soils.
SRS PLANT COMMUNITY: Bottomland hardwoods.
RANGE: AL to TX, OK, AR, & SC.
SOUTH CAROLINA COUNTIES: McCormick (Radford et al. 1968) & Aiken (SREL Herbarium).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: May-June.
DESCRIPTION: Glabrous annual. Leaves pinnately decompound. Corolla white.
LOCATION ON THE SRS: SREL Natural Area #2 near Savannah River; along the margin of moist woods, shaded slope. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)

Near the base of the hillside slope, west of the upper 1/4 of Mosquito Creek. (Jeannine Angerman, pers. comm.)
Figure 37. SRS location of *Trepocarpus aethusae*. 
**Utricularia floridana** Nash

| COMMON NAME: | Florida bladderwort. |
| FAMILY: | Lentibulariaceae. |
| FEDERAL STATUS: | Not listed. |
| SOUTH CAROLINA STATUS: | Statewide concern, threatened. |
| HABITAT: | Old ponds often within Carolina bays. |
| SRS PLANT COMMUNITY: | Freshwater ponds. |
| RANGE: | SC, GA, & FL. |
| SOUTH CAROLINA COUNTIES: | Barnwell (USC Herbarium) & Aiken (Aulbach-Smith *et al.* draft). |
| NEARBY GEORGIA COUNTIES: | No information. |
| FLOWERING/FRUITING DATES: | April-Oct. |
| DESCRIPTION: | Herbaceous carnivorous aquatic. Corolla yellow. Flower scape with one to several bows and bends. Leafy branches cylindrical in outline (Godfrey and Wooten 1979). |

**LOCATIONS ON THE SRS:**

1. Pond B.
   a. East of Bowling's Island.
   b. West side of Heron Island.
   c. In Duck Cove.
   d. Along the shore north of the mouth of Duck Cove.
   e. Along the shore across from Duck Cove and east of Long Bay.
   f. R. Cove (Inlet canal arm).
   g. Outlet canal arm. (Locations a-g, observed by John N. Knox.)
   h. At cove northeast and across the pond from Heron Island (Transect #271; collected by Mary Kelly, on deposit at the SREL Herbarium.)
   i. South and near dam at the SREL boatdock. (Collected by Cynthia Aulbach-Smith, on deposit at the USC Herbarium.)
   j. Boatdock Cove west of SREL boatdock. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
2- Thunder Bay (#83); north & south areas of the bay.
(Collected by John N. Knox, on deposit at the SREL Herbarium.)
Figure 38. SRS locations of *Utricularia floridana*. 
Figure 39. *Utricularia floridana* (Florida bladderwort).
1. Leaves.
2. Flower spike.
4. Growing tip.
5. Flower (side view).
6. Fruit.
7. Flower (front view).
8. Bladder.
Utricularia olivacea Wright ex Griseb.

COMMON NAME: Dwarf bladderwort.
FAMILY: Lentibulariaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Shallow, acidic ponds.
SRS PLANT COMMUNITY: Freshwater ponds.
RANGE: NJ to FL (West Indies, Brazil).
SOUTH CAROLINA COUNTIES: Barnwell, Kershaw (Radford et al. 1968), Chesterfield, & Darlington (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTIES: None.
DESCRIPTION: Herbaceous carnivorous aquatic. Corolla white, scape less than 1 cm long. Plants small, floating.
LOCATIONS ON THE SRS:
1- Craig’s Pond (#77); 1 to 5 m north of the fence and 43 m from the west side of the bay. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
2- Par Pond; northwest arm, east of Rd. 8. (Collected by John N. Knox, on deposit at the SREL Herbarium.)
3- Pond B; northwest arm in 2-3 m of water. (Collected by Cynthia Aulbach-Smith, on deposit at the USC Herbarium.)
Figure 40.  SRS locations of *Utricularia olivacea*. 
Figure 41. *Utricularia olivacea* (Dwarf bladderwort).
1. Flowers and bladders.
2. Fruit.
**Vallisneria americana** Michaux

**COMMON NAME:** Tapegrass.

**FAMILY:** Hydrocharitaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Ponds & streams, mostly in the sandhills.

**SRS PLANT COMMUNITY:** Freshwater ponds.

**RANGE:** FL to TX, AZ, N.M, QUE to NS, ND, & SD.

**SOUTH CAROLINA COUNTIES:** Richland (Radford *et al.* 1968), Barnwell (SREL Herbarium), & Clarendon (Aulbach-Smith *et al.* draft).

**NEARBY GEORGIA COUNTIES:** None.

**FLOWERING/FRUITING DATES:** July-Oct.

**DESCRIPTION:** Aquatic perennial. Leaves basal, ribbonlike, greatly elongated. Staminate flowers free-floating.

**LOCATIONS ON THE SRS:**

1. Par Pond. (Collected by Jones, Angerman, and Batson, on deposit at the SREL Herbarium.)
   a. Upper North Arm area. (Jeannine Angerman, pers. comm.)
   b. West side of cold dam; 15-25 m from shore in 1-1.5 m depth.
   c. Nancy's Nook.
   d. Along north shore of East Lake.
   e. Herde's Inlet.
   f. Near Chris's Cove.
   g. Callahan Slough.
   h. Along shore between Callahan Slough & North Dave's Lake.
   i. North Dave's Lake.
   j. South Dave's Lake.
   k. Gus's Swamp.
   l. Fred's Bay.
   m. Fairman's Landing.
   n. Peggy's Point.
   o. Golley Bay.
p. West shore between SREL boatdock and Loyal Lair arm. (Par Pond locations b.-p. were observed by John N. Knox.)

q. Near SRL boatdock, 9-18 m from shore. (Collected by John N. Knox, on deposit at the SREL Herbarium.)

2- L-Lake. Planted in 1987, it is expanding rapidly in the southern third of the lake on both the east and west shores (Steve Kroeger, pers. comm.).
Figure 42. SRS locations of *Vallisneria americana*.
ADDITIONAL ENDANGERED, THREATENED, AND RARE PLANTS THAT MAY OCCUR ON THE SAVANNAH RIVER SITE

This chapter contains summaries and some illustrations of the endangered, threatened, and rare plants that might occur on the SRS, presented in alphabetical order. Unless otherwise noted all common name, habitat, and range information was taken from Rayner et al. 1986. The listing of Georgia counties of interest was provided by Thomas Patrick of the Georgia Natural Heritage Inventory Program or was taken from Jones and Coile (1988). "Nearby" Georgia counties are those within 85 miles of the SRS and are as listed at the beginning of the preceding chapter.

*Agalinis aphylla* (Nutt.) Raf.

**COMMON NAME:** Scale leaf gerardia.  
**FAMILY:** Scrophulariaceae.  
**FEDERAL STATUS:** Not listed.  
**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.  
**HABITAT:** Wet pine savannas & flatwoods, pineland depressions, & bogs.  
**RANGE:** North FL to LA & NC.  
**SOUTH CAROLINA COUNTIES:** Berkeley, Georgetown (Radford *et al.* 1968), & Horry (Aulbach-Smith *et al.* draft).  
**NEARBY GEORGIA COUNTIES:** Bullock.  
**FLOWERING/FRUITING DATES:** Sept.-Oct.
**Amphicarpum muhlenbergianum** (Schultes) A. Hitchc.

| COMMON NAME: | Blue maiden-cane. |
| FAMILY: | Poaceae. |
| FEDERAL STATUS: | Not listed. |
| SOUTH CAROLINA STATUS: | Status unresolved, considered rare. |
| HABITAT: | Low pineland, sandy margins of lime sinks, & other wet depressions. |
| RANGE: | FL to SC. |
| SOUTH CAROLINA COUNTIES: | Orangeburg (Radford et al. 1968), Aiken, Barnwell, & Berkeley (Aulbach-Smith et al. draft). |
| NEARBY GEORGIA COUNTIES: | None. |
| FLOWERING/FRUITING DATES: | Sept. |

**Aristolochia tomentosa** Sims

| COMMON NAME: | Wooly Dutchman's pipe. |
| FAMILY: | Aristolochiaceae. |
| FEDERAL STATUS: | Not listed. |
| SOUTH CAROLINA STATUS: | Status unresolved, considered rare. |
| HABITAT: | Floodplain forests, river & creek banks. |
| RANGE: | South IN to southeast KA, south FL & TX. |
| SOUTH CAROLINA COUNTIES: | Darlington (Aulbach-Smith et al. draft) & Hampton (D. Rayner, pers. comm.). |
| NEARBY GEORGIA COUNTIES: | None. |
| FLOWERING DATES: | May-June. |
| FRUITING DATES: | Aug.-Sept. |
Bacopa innominata (M. Gomez) Alain

COMMON NAME: Water-hyssop.
FAMILY: Scrophulariaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Lime sinks (D. Rayner, pers. comm.).
RANGE: FL & GA.
SOUTH CAROLINA COUNTIES: Berkeley (Radford et al. 1968), Jasper, Orangeburg (Aulbach-Smith et al. draft), & Horry (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTIES: None.
FLOWERING/FRUITING DATES: June-Sept.

Carex chapmanii Steudel

COMMON NAME: Chapman's sedge.
FAMILY: Cyperaceae.
FEDERAL STATUS: Category 2, candidate possibly appropriate for proposed listing.
SOUTH CAROLINA STATUS: National concern, threatened.
HABITAT: Dry sandy woods & roadsides.
RANGE: VA, NC, SC, & FL.
SOUTH CAROLINA COUNTIES: Bamberg, Berkeley, Dorchester (Radford et al. 1968), & Hampton (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: April-May.
**Delphinium carolinianum** Walter

**COMMON NAME:** Carolina larkspur.

**FAMILY:** Ranunculaceae.

**FEDERAL STATUS:** Not listed.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Dry rocky woods.

**RANGE:** FL to TX & north to VA, KY, MO, & OK.

**SOUTH CAROLINA COUNTIES:** McCormick (Radford et al. 1968), Aiken (R. McCartney, pers. comm.), & Spartanburg (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** Columbia.

**FLOWERING/FRUITING DATES:** March-May.

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**Elliottia racemosa** Muhlenb. ex Elliott

**COMMON NAME:** Georgia plume.

**FAMILY:** Ericaceae.

**FEDERAL STATUS:** Category 3C, candidate no longer being considered for listing.

**SOUTH CAROLINA STATUS:** Extirpated from South Carolina.

**HABITAT:** Sand ridges, oak ridges, & hammocks in sandy to xeric soils.

**RANGE:** SC & GA. (Kral 1983b).

**SOUTH CAROLINA COUNTIES:** Aiken (Kral 1983b).

**NEARBY GEORGIA COUNTIES:** Bullock, Burke, Chandler, Columbia, Emanuel, Richmond, & Screven.

**FLOWERING DATES:** June-Aug.

**FRUITING DATES:** Aug.-Nov.
**Halesia parviflora** Michaux

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Small-flowered silverbell.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Styraceae.</td>
</tr>
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<td>FEDERAL STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Status unresolved, considered rare.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Sandy riverbanks, alluvial woods, &amp; dry north slopes.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>FL to MS, OK, &amp; SC.</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Saluda (Radford <em>et al.</em> 1968), Aiken, Hampton, &amp; Jasper (Aulbach-Smith <em>et al.</em> draft).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>Bullock.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>March-April.</td>
</tr>
</tbody>
</table>

**Helenium brevifolium** (Nutt.) Alph. Wood.

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Sneeze weed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Asteraceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Regional concern, endangered.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Bogs and grass-sedge wet depressions in the coastal plain and seepage bogs in the upper piedmont.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>FL to MS, LA, VA, &amp; TN.</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Anderson, Barnwell, Greenville, &amp; Horry (Aulbach-Smith <em>et al.</em> draft).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>None.</td>
</tr>
<tr>
<td>FLOWERING/FRUITING DATES:</td>
<td>May-June.</td>
</tr>
</tbody>
</table>
**Helenium pinnatifidum** (Nutt.) Rydb.

- **COMMON NAME:** Sneezeweed.
- **FAMILY:** Asteraceae.
- **FEDERAL STATUS:** Not listed.
- **SOUTH CAROLINA STATUS:** Status unresolved, considered rare.
- **HABITAT:** Pocosins, bays, bogs, & savannas.
- **RANGE:** FL to NC.
- **SOUTH CAROLINA COUNTIES:** Berkeley, Darlington, Horry (Radford et al. 1968), Barnwell, Georgetown, & Orangeburg (Aulbach-Smith et al. draft).
- **NEARBY GEORGIA COUNTIES:** None.
- **FLOWERING/FRUITING DATES:** April-May.

**Helianthemum georgianum** Chapman

- **COMMON NAME:** Rockrose.
- **FAMILY:** Cistaceae.
- **FEDERAL STATUS:** Not listed.
- **SOUTH CAROLINA STATUS:** Status unresolved, considered rare.
- **HABITAT:** Sandy pinelands.
- **RANGE:** FL to TX & VA.
- **SOUTH CAROLINA COUNTIES:** Horry (Radford et al. 1968) & Colleton (Aulbach-Smith et al. draft).
- **NEARBY GEORGIA COUNTIES:** None.
- **FLOWERING DATES:** April-May.
- **FRUITING DATES:** May-Oct.
### Hymenocallis coronaria (Le Conte) Kunth

<table>
<thead>
<tr>
<th>COMMON NAME</th>
<th>Rocky shoals spider lily.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Liliaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Category 2, candidate possibly appropriate for proposed listing.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>National concern, threatened.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Rocky or gravelly shoals.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>FL? to SC (AL?).</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Aiken, Lancaster, McCormick, Richland, Union, &amp; York (D. Rayner, pers. comm.).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>Lincoln, Richmond, &amp; Wilkes.</td>
</tr>
<tr>
<td>FLOWERING/FRUITING DATES:</td>
<td>June-July.</td>
</tr>
</tbody>
</table>

### Ilex amelanchier M.Curtis

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>Sarvis holly.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Aquifoliaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Category 2, candidate possibly appropriate for proposed listing.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>Not listed.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Woody streambanks in sandhills, wet depressions, &amp; Carolina bays.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>Southeast VA?, NC to west FL to southeast LA (Godfrey and Wooten 1979).</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Aiken (Radford et al. 1968), Dorchester, Georgetown, Horry, Lexington, Richland, Williamsburg (Aulbach-Smith et al. draft), Darlington, Lee, &amp; Orangeburg (D. Rayner, pers. comm.).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>Bullock.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>April-May.</td>
</tr>
<tr>
<td>FRUITING DATES:</td>
<td>Oct.-Nov.</td>
</tr>
</tbody>
</table>
**Kalmia cuneata** Michaux

<table>
<thead>
<tr>
<th>COMMON NAME:</th>
<th>White wicky.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAMILY:</td>
<td>Ericaceae.</td>
</tr>
<tr>
<td>FEDERAL STATUS:</td>
<td>Category I, candidate for proposed listing.</td>
</tr>
<tr>
<td>SOUTH CAROLINA STATUS:</td>
<td>National concern, endangered.</td>
</tr>
<tr>
<td>HABITAT:</td>
<td>Borders of bays &amp; bogs; between sandhills &amp; pocosins.</td>
</tr>
<tr>
<td>RANGE:</td>
<td>Southeast NC &amp; northeast SC (Godfrey and Wooten 1979).</td>
</tr>
<tr>
<td>SOUTH CAROLINA COUNTIES:</td>
<td>Darlington (Radford et al. 1968), Chesterfield (R. McCartney, pers. comm.), &amp; Kershaw (Aulbach-Smith et al. draft).</td>
</tr>
<tr>
<td>NEARBY GEORGIA COUNTIES:</td>
<td>None.</td>
</tr>
<tr>
<td>FLOWERING DATES:</td>
<td>May-June.</td>
</tr>
<tr>
<td>DESCRIPTION:</td>
<td>Rhizomatous shrub to 1.5 m tall. Most similar to, often in mixed populations with, <em>K. angustifolia</em> var. <em>caroliniana</em>, but differs in being deciduous with consistently alternate, cuneate-based leaves (not whorled, elliptic, or elliptic-lanceolate), and corollas which are white with a red-bordered 'eye' (Kral 1983b).</td>
</tr>
</tbody>
</table>
**Lindera melissifolia** (Walter) Blume

**COMMON NAME:** Pondberry.

**FAMILY:** Lauraceae.

**FEDERAL STATUS:** Endangered.

**SOUTH CAROLINA STATUS:** National concern, endangered.

**HABITAT:** Sink holes & swamps.

**RANGE:** AL, AR, FL, GA, LA, MS, MO, & NC.

**SOUTH CAROLINA COUNTIES:** Berkeley & Colleton (Radford et al. 1968).

**NEARBY GEORGIA COUNTIES:** None.

**FLOWERING DATES:** March-April.

**FRUITING DATES:** Aug.-Sept.

**DESCRIPTION:** Small deciduous shrub 5 to 10 dm tall (Radford et al. 1968). Leaves drooping, membranaceous with a strong sassafras-like odor when crushed; rounded at the base, narrowly ovate (USFWS 1986c).

**Litsea aestivalis** (L.) Fern.

**COMMON NAME:** Pond spice.

**FAMILY:** Lauraceae.

**FEDERAL STATUS:** Category 3C, candidate no longer being considered for listing.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Sink holes, ponds, & wet depressions.

**RANGE:** FL to VA & TN.

**SOUTH CAROLINA COUNTIES:** Berkeley, Charleston, Georgetown, Jasper, Orangeburg (Radford et al. 1968), Beaufort, Colleton, Horry (Aulbach-Smith et al. draft), Jasper, & Kershaw (D. Rayner, pers. comm.).

**NEARBY GEORGIA COUNTIES:** Effingham & Screven.

**FLOWERING DATES:** March-April.

**FRUITING DATES:** May-June.
Figure 43. *Lindera melissifolia* (Pondberry).
1. Leaves and stem.
2. Stem and flowers.
3. Flowers.
Lyonia ferruginea (Walter) Nutt.

COMMON NAME: Stagger-bush.
FAMILY: Ericaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Pine/saw palmetto flatwoods.
RANGE: SC to FL (Godfrey and Wooten 1979).
SOUTH CAROLINA COUNTIES: Beaufort (Aulbach-Smith et al. draft) & Jasper (Radford et al. 1968).
NEARBY GEORGIA COUNTIES: Effingham.
FLOWERING DATES: April-May.
NOTES: This plant was listed in Batson et al. (1985), but the SREL Herbarium specimen was a misidentified L. lucida. Therefore, this species is considered as possibly occurring on the SRS.

Lysimachia asperulaefolia Poiret

COMMON NAME: Rough-leaved loosestrife.
FAMILY: Primulaceae.
FEDERAL STATUS: Endangered (USFWS 1987b).
SOUTH CAROLINA STATUS: National concern, endangered.
HABITAT: Seepage bogs at base of sandhills (D. Rayner, pers. comm.).
RANGE: NC & SC (Godfrey and Wooten 1979).
SOUTH CAROLINA COUNTIES: Darlington (Aulbach-Smith et al. draft) & Richland (Radford et al. 1968).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING DATES: May-June.
DESCRIPTION: Perennial rhizomatous herb to 60 cm. Whorls of three to four leaves encircle the stem below terminal flowers. Corolla yellow (USFWS 1986b).
Menispermum canadense L.

COMMON NAME: Moonseed.
FAMILY: Menispermaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Rich wooded slopes of floodplains.
RANGE: QUE to MAN & NE south to GA, AR, & OK.
SOUTH CAROLINA COUNTIES: Barnwell (Golley et al. 1965), Darlington, Lancaster (Radford et al. 1968), Berkeley, Calhoun, Cherokee, Chester, Marlboro, Pickens, & York (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: Screven.
FLOWERING/FRUITING DATES: June-Aug.
DESCRIPTION: Dioecious twining vine. Fruit bluish-black (Radford et al. 1968).
LOCATION ON THE SRS: Boiling Springs Natural Area (Gantt Tract) in the Allendale corridor (Golley et al. 1965).

Oxypolis canbyi (Coult.& Rose) Fern.

COMMON NAME: Canby's cowbane.
FAMILY: Apiaceae.
FEDERAL STATUS: Endangered.
SOUTH CAROLINA STATUS: National concern, threatened.
HABITAT: Open, boggy, wet depressions.
RANGE: DE, MD, NC, SC, & GA.
SOUTH CAROLINA COUNTIES: Bamberg, Colleton (R. McCartney, pers. comm.), Barnwell, Clarendon, Lee, Marion, Orangeburg, & Richland (Aulbach-Smith et al. draft).
NEARBY GEORGIA COUNTIES: Burke.
Figure 44. *Oxypolis canbyi* (Canby's cowbane).
1. Upper portion of plant with fruit.
2. Lower portion of plant.
**Ptilimnium nodosum** (Rose) Mathias

**COMMON NAME:** Mock bishop's-weed.

**FAMILY:** Apiaceae.

**FEDERAL STATUS:** Proposed as endangered (USFWS 1988a).

**SOUTH CAROLINA STATUS:** National concern, endangered.

**HABITAT:** Grass-sedge wet depressions.

**RANGE:** FL to SC & TX.

**SOUTH CAROLINA COUNTIES:** Aiken (Radford *et al.* 1968) & Saluda (Aulbach-Smith *et al.* draft).

**NEARBY GEORGIA COUNTIES:** None.

**FLOWERING/FRUITING DATES:** June.

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**Quercus oglethorpensis** W. Duncan

**COMMON NAME:** Oglethorpe oak.

**FAMILY:** Fagaceae.

**FEDERAL STATUS:** Category 2, candidate possibly appropriate for proposed listing.

**SOUTH CAROLINA STATUS:** Status unresolved, considered rare.

**HABITAT:** Relatively flat, ancient floodplain terraces.

**RANGE:** SC, GA, & LA.

**SOUTH CAROLINA COUNTIES:** Edgefield, Greenwood, McCormick, & Saluda.

**NEARBY GEORGIA COUNTY:** Wilkes.

**FLOWERING DATES:** April.

**FRUITING DATES:** Sept.-Oct.

**NOTE:** There is taxonomic controversy over the identification of one other oak on the SRS. Specimens previously identified as *Quercus durandii* Buckley have been reinterpreted as *Q. australis* Small. However, there is on deposit at the USC Herbarium a specimen identified as *Q. durandii*. While *Q. durandii* is on the state list (statewide concern, threatened), *Q. australis* may be considered to be as significant (John B. Nelson, pers. comm.). The trees concerned are located near the intersection of Holly Road and Road A-17.
Ruellia caroliniensis ssp. ciliosa (Pursh) R. Long

COMMON NAME: Ruellia.
FAMILY: Acanthaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Status unresolved, considered rare.
HABITAT: Sandy woods.
RANGE: FL to TX, KS, MI, & NJ.
SOUTH CAROLINA COUNTIES: Darlington (Radford et al. 1968) & Sumter (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: May-Sept.

Scleria baldwinii (Torrey) Steudel

COMMON NAME: Baldwin's nut-rush.
FAMILY: Cyperaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Pond cypress savannas.
RANGE: FL to NC & TX (West Indies).
SOUTH CAROLINA COUNTIES: Berkeley, Charleston, Jasper, Sumter (Aulbach-Smith et al. draft), Hampton (D. Rayner, pers. comm.), & Orangeburg (Radford et al. 1968).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: June.
Spiranthes longilabris Lindley

COMMON NAME: Giant spiral-orchid.
FAMILY: Orchidaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, threatened.
HABITAT: Wet pine or pond cypress savannas.
RANGE: FL to TX & NC.
SOUTH CAROLINA COUNTIES: Georgetown (Radford et al. 1968), Jasper (Aulbach-Smith et al. draft), Orangeburg, Horry, & Williamsburg (D. Rayner, pers. comm.).
NEARBY GEORGIA COUNTIES: No information.
FLOWERING/FRUITING DATES: Oct.-Nov.

Stillingia aquatica Chapman

COMMON NAME: Queen's root.
FAMILY: Euphorbiaceae.
FEDERAL STATUS: Not listed.
SOUTH CAROLINA STATUS: Statewide concern, endangered.
HABITAT: Grass-sedge wet depressions & bogs.
RANGE: FL to MS & SC.
SOUTH CAROLINA COUNTIES: Allendale, Bamberg, Barnwell (Aulbach-Smith et al. draft), & Hampton (Radford et al. 1968).
NEARBY GEORGIA COUNTIES: None.
FLOWERING/FRUITING DATES: May-Sept.
**Stylisma pickeringii** (Torrey ex M.Curtis) A. Gray

- **COMMON NAME:** Pickering's breweria.
- **FAMILY:** Convolvulaceae.
- **FEDERAL STATUS:** Category 2, candidate possibly appropriate for proposed listing.
- **SOUTH CAROLINA STATUS:** Statewide concern, threatened.
- **HABITAT:** Sandhills & sandy woods.
- **RANGE:** NJ, NC, SC, & GA.
- **SOUTH CAROLINA COUNTIES:** Lexington.
- **NEARBY GEORGIA COUNTIES:** None.
- **FLOWERING/FRUITING DATES:** June-Sept.

**Trillium pusillum** Michaux var. pusillum

- **COMMON NAME:** Dwarf or Carolina trillium.
- **FAMILY:** Liliaceae.
- **FEDERAL STATUS:** Category 2, candidate possibly appropriate for proposed listing.
- **SOUTH CAROLINA STATUS:** National concern, threatened.
- **HABITAT:** Alluvial or low woods & savannas (over calcareous soils?).
- **RANGE:** AL, GA, MS, NC, SC, & TN (KY?).
- **SOUTH CAROLINA COUNTIES:** Berkeley, Calhoun, & Dorchester.
- **NEARBY GEORGIA COUNTIES:** No information.
- **FLOWERING DATES:** March-May.
- **FRUITING DATES:** June-July.
Trillium reliquum J. D. Freeman

COMMON NAME: Relict trillium.
FAMILY: Liliaceae.
SOUTH CAROLINA STATUS: National concern, endangered.
HABITAT: Rich mesophytic woods on bluffs & ravine slopes.
RANGE: SC, GA, & AL.
SOUTH CAROLINA COUNTIES: Aiken & Edgefield (USFWS 1987a).
NEARBY GEORGIA COUNTY: Columbia.
FLOWERING DATES: March-April.
DESCRIPTION: Herbaceous rhizomatous perennial. Decumbent (s-curved) stems. Corolla brownish purple or yellow (USFWS 1987a).
Figure 45. *Trillium reliquum* (Relict trillium).
1. Flower and leaves.
SUMMARY

1. No taxa formally listed or proposed as endangered or threatened by the USFWS nor any taxa listed as endangered by South Carolina are known to occur on the SRS.

2. Eight USFWS category 2 taxa and 26 State listed taxa occur on the SRS.

3. Nine locations of Lindera subcoriacea (category 2) were found.

4. Thirty-three new locations of plants already known from the SRS were found and 24 previously known populations were relocated.

5. Twenty-four previously known populations were not relocated.

6. All plant populations found during this inventory were registered with the DOE SRS Automated Site Use System; DOE, as of December, 1987 considers these populations in the overall management of the SRS.

7. Three populations of Bumelia lanuginosa were found; they are the only known locations in the State.

8. A data base has been developed and is being maintained and stored on a VAX 11/750 at SREL. The data base contains the majority of information given in Chapters V and VI for each taxon. Additional data about selected references and collection dates are stored for each plant.

9. Population studies of three species have begun on the SRS: the smooth purple coneflower (Echinacea laevigata), Elliott's croton (Croton elliottii), and the awned meadowbeauty (Rhexia aristosa). All are category 2 on the USFWS list.

10. The following SRS locations have been added to the Set-Aside Areas program to allow preservations of known rare, threatened, or endangered plants.

a. Sarracenia Bay, bay #78 (Croton elliottii, Lobelia boykinii, Rhexia aristosa, Rhynchospora tracyi, & Sagittaria isoetiformis)

and Craig's Pond, bay #77 (Lobelia boykinii, Rhexia aristosa, Rhynchospora tracyi, Sagittaria isoetiformis, & Utricularia olivacea) combined area (Patrol Indices Q-25, R-25, R-26).

b. Woodward Bay, bay #67 (Croton elliottii, Rhynchospora tracyi, & Sagittaria isoetiformis)

and Mona Bay, bay #66 (Croton elliottii & Sagittaria isoetiformis) combined area (Patrol Indices O-27, P-27).

c. Meyers Branch drainage system (Lindera subcoriacea, 4 locations; Nestria umbellula, 2 locations; Patrol Indices U-10, U-11, W-15, W-16).

d. Thunder Bay, bay #83 (Rhynchospora inundata, Sagittaria isoetiformis, Utricularia floridana, & Rhynchospora tracyi; Patrol Indices U-21, U-22).

e. Little Cypress Bay, bay #64 (Croton elliottii; Patrol Index S-22).

f. Flamingo Bay, bay #3 (Coreopsis rosea; Patrol Indices E-15, E-16).

g. Unnamed tributary to Tinker Creek east of the intersection of Roads 8-1 and 8-11 (Nestria umbellula; Patrol Indices K-26, K-27).

MANAGEMENT IMPLICATIONS AND RECOMMENDATIONS

Management Implications for USFWS Listed Plant Species

Carex decomposita. This species is known from one SRS location, Steel Creek swamp, suggesting that it can tolerate water level fluctuations and water temperature increases. Because it is rhizomatous, burning also may be tolerated. The size of the Steel Creek swamp population is unknown and the species' population biology is poorly understood. Management techniques to enhance the size of this population will require further study.
**Croton elliotti.** This species is found in seven SRS Carolina bays and, according to Kral (1983a), appears to be rare only when the complex requirements for seed germination are not met. The seeds of *C. elliotti* lie dormant during wet periods, which explains the periodic occurrence of large stands of *Croton* (Kral 1983a). Mechanical soil disturbance also appears to promote its increase, the most luxuriant plants being found in places where spoil banks have been created or where pond edges have been plowed (Kral 1983a). Ditching and draining of SRS bays would severely impact their *Croton* populations. Burning may have some beneficial effect if done after seed dispersal.

**Echinacea laevigata.** This species occurs at one site on the SRS. It forms small stands in open, grassy woodlands; usually in low-grade upland hardwoods such as mixed oak-hickory-juniper where it occupies small clearings. Selective removal of trees would alter the habitat little and would promote development of this plant (Kral 1983b). Burning (not recommended for this sort of forest) would probably not eliminate these plants because they have deeply buried corms; in fact, fires may favor the increase of this species (Kral 1983b).

**Lindera subcoriacea.** This species is scattered in low, boggy areas of the Tinker Creek, Boggy Gut, and Meyers Branch drainages. It would be severely impacted by ditching and draining of the associated floodplains. Thinning the forest overstory or burning may enhance the populations.

**Lobelia boykinii.** This species is known to occur in only two SRS Carolina bays. Because it is rhizomatous it probably could tolerate burning. Ditching and draining would severely impact this species and possibly result in loss of the populations.

**Myriophyllum laxum.** This species was reported in the 1950s for the SRS, but has not been observed nor collected since. Because the plant is both submersed and emersed, it probably could tolerate water level fluctuations. Its water temperature tolerance range is unknown. Obviously, drainage of the habitat would result in destruction of the population.

**Nestronia umbellula.** This species is known from five sites on the SRS and, according to Kral (1983a), is a root parasite. Removal of host trees through logging can eliminate the species. Since most of the forest types where these shrubs are found are fire disclimax, or have fire in their history, periodic woods fires have no adverse effect so long as the hosts are not killed (Kral 1983a).

**Rhexia aristosa.** This species occurs in only two Carolina bays on the SRS. It is a shallow-rooted perennial so burning may affect regrowth of this plant. Ditching and draining the bays would severely impact the plants and probably result in loss of these populations.

A summary of predicted effects of selected management practices for the eight USFWS listed plants discussed above is given in Table 1.
<table>
<thead>
<tr>
<th>Table 1. Predicted effects of management practices on USFWS listed species.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Controlled Burn</strong></td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td><em>Carex decomposita</em></td>
</tr>
<tr>
<td><em>Croton elliottii</em></td>
</tr>
<tr>
<td><em>Echinacea laevigata</em></td>
</tr>
<tr>
<td><em>Nestoria umbellulao</em></td>
</tr>
<tr>
<td><em>Lindera subcoriacea</em></td>
</tr>
<tr>
<td><em>Lobelia boykinii</em></td>
</tr>
<tr>
<td><em>Myriophyllum laxum</em></td>
</tr>
<tr>
<td><em>Rhoxia aristro</em></td>
</tr>
</tbody>
</table>

\(^a\) From Kral 1983a.  
\(^b\) From Kral 1983b.  
\(^c\) Dependent on time of year.  
\(^d\) If done properly.  
\(^e\) Knox and Sharitz, best professional prediction.  
NA = Not applicable.  
NLE = No lasting effect.
Recommendations

1. Add Sunset Bay, bay #57 to the Set-Aside Areas program to preserve the habitat and resident populations of *Croton elliotii*, *Echinodorus tenellus var. parvulus* and *Ludwigia spathulata* (Patrol Index N-20).

2. Register all plant populations listed by the USFWS or South Carolina found in the future with the DOE SRS Automated Site Use System.

3. Mark the following populations with signs and rope-off these areas (given in order from highest to lowest priority):
   a. Tinker Creek floodplain, 1/8 mile east of bridge on Road 8-11, Kennedy’s Pond area (*Lindera subcoriacea; Patrol Index J-27*).
   b. Tinker Creek bluffs, 1/8 mile west of north end of Road 8-12, on a northeast-facing slope (*Rhododendron flammeum; Patrol Index J-25*).
   c. Chorus Bay, bay #60 (*Croton elliotii, Echinodorus tenellus var. parvulus, & Ludwigia spathulata; Patrol Index P-20*).
   d. Upper Three Runs Creek bluff west of Burma Road, between Road C and first powerline across Burma Road (*Bumelia lanuginosa; Patrol Indices J-11, J-11*).

4. Retain the following areas in the Set-Aside Areas program:
   a. Mill Creek Set-Aside, Site #5 (*Platanthera lacera*).
   b. SREL Natural Area #2 near the Savannah River--same as Set-Aside #6 (*Rorippa sessiliflora & Trepocarpus aethusa*).
   c. Boiling Springs Natural Area - Gantt Tract (*Carya myristiciformis*).

5. Retain the following area as a marked population with signs and rope:
   Burma Road (C-3) 3 miles north of junction with Road A; roadside area marked with yellow signs (*Echinacea laevigata*).

6. Continue field surveys to locate plants listed in Table 2. These are plants that may occur on site, but have not been reported.

7. Begin detailed ecological studies on the following populations (given in order from highest to lowest priority):

   - *Echinacea laevigata*
   - *Lindera subcoriacea*
   - *Croton elliotii*
   - *Nestronia umbellula*
   - *Rhhexia aristosa*
   - *Carex decomposita*
   - *Lobelia boykinii*
8. Continue field surveys to relocate the following plants (reported from the SRS but not found during the 1986-87 survey):

- *Myriophyllum laxum*
- *Astragalus villosus*
- *Carex oligocarpa*
- *Potamogeton foliosus*
- *Rorippa sessiliflora*
- *Trepocarpus aethusae*

9. Continue field surveys to locate additional sites for the following plants (now known from only one or two locations on the SRS):

- *Echinacea laevigata*
- *Carex decomposita*
- *Rhhexia aristosa*
- *Lobelia boykinii*

10. Add *Bumelia lanuginosa* to the State of South Carolina list with status unresolved, considered rare.
Table 2. Recommended taxa for future SRS surveys (given from highest to lowest priority based upon Federal and State status).

<table>
<thead>
<tr>
<th>Taxa</th>
<th>Federal Status</th>
<th>SC Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lindera melissifolia</td>
<td>E</td>
<td>NE</td>
</tr>
<tr>
<td>Lysimachia asperulaefolia</td>
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<td>Oxypolis canbyi</td>
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<tr>
<td>Stylosma pickeringii</td>
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<td>Quercus oglethorpendis</td>
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<td>Bacopa innovinala</td>
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<td>Lyonia ferruginea</td>
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<td>Spiranthes longilabris</td>
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<td>Amphicarpum muhlenbergianum</td>
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<td>Aristolochia tomentosa</td>
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<td>Delphinium carolinianum</td>
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<td>Helenium pinnatifidum</td>
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<td>Helianthemum georgianum</td>
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</tr>
<tr>
<td>Menispermum canadense</td>
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<td>U</td>
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<tr>
<td>Ruellia caroliniensis ssp. ciliosa</td>
<td>NONE</td>
<td>U</td>
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</table>

E = Endangered
PE = Proposed to be listed as Endangered
1 = Appropriate for proposed Federal list
2 = Possibly appropriate for proposed Federal list
3 = No longer considered for listing
NE = Nationally Endangered
NT = Nationally Threatened
RE = Regionally Endangered
SE = State Endangered
ST = State Threatened
SX = Extirpated from the State
U = Status unresolved, considered rare
NONE = Not listed
LITERATURE CITED


Rayner, D.A., C. Aulbach-Smith, W.T. Batson, C. L. Rogers and other members of the South Carolina Advisory Committee on Rare, Threatened, and Endangered Vascular Plants. 1986. Native Vascular Plants Rare, Threatened or Endangered in South Carolina. 24 pp.


ACKNOWLEDGMENTS

The authors are grateful to several people who helped in the preparation of this report. Robert McCartney and Jeannine Angerman located several plant populations and recommended other species for survey. Doug Rayner identified and verified several species and provided suggestions and information throughout the project. Cynthia Aulbach-Smith located several aquatic species and identified and verified others. Woodlanders Inc. of Aiken, South Carolina, provided cuttings of *Lindera melissifolia*. Trip Lamb provided color slides of *Trillium reliquum* for use in preparing illustrations in Chapter VI.

We appreciate the reviews of this report by Patricia West, Cynthia Aulbach-Smith, Doug Rayner, and several anonymous reviewers. Thanks to Lyndon Lee, John Nelson, Nora Murdock, and Thomas Patrick for suggestions and information, and to Jan Hinton, Karin Knight, and Miriam Stapleton for typing and proof reading the report. We also acknowledge field data used in this report which represent the combined collecting efforts of botanists at the SRS over the past 30 plus years. Specific collectors are cited throughout the text.

Special recognition is given to Sally Landaal for reviewing and editing this document and for coordinating the reinterpretation of the *Quercus* species.
APPENDIX I

PLANT LISTING BY FAMILIES

A. LISTING BY FAMILY OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

<table>
<thead>
<tr>
<th>FAMILY</th>
<th>TAXON</th>
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<tbody>
<tr>
<td>Agavaceae</td>
<td>Nolina georgiana</td>
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<tr>
<td>Alismatraceae</td>
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</tr>
<tr>
<td></td>
<td>Sagittaria isoetiformis</td>
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<tr>
<td>Apiaceae</td>
<td>Trepocarpus aethusae</td>
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<tr>
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<td>Coreopsis rosea</td>
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<tr>
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<td>Echinacea laevigata</td>
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<tr>
<td>Brassicaceae</td>
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<td>Campanulaceae</td>
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<td>Caryophyllaceae</td>
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<tr>
<td>Cyperaceae</td>
<td>Carex decomposita</td>
</tr>
<tr>
<td></td>
<td>Carex oligocarpa</td>
</tr>
<tr>
<td></td>
<td>Rhynchospora inundata</td>
</tr>
<tr>
<td></td>
<td>Rhynchospora traceyi</td>
</tr>
<tr>
<td>Ericaceae</td>
<td>Rhododendron flammeum</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
<td>Croton elliottii</td>
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<tr>
<td>Fabaceae</td>
<td>Astragalus villosum</td>
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<tr>
<td></td>
<td>Baptisia lanceolata</td>
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<td>Haloragaceae</td>
<td>Myriophyllum laxum</td>
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<tr>
<td>Hydrocharitaceae</td>
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<td>Juglandaceae</td>
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<tr>
<td>Lauraceae</td>
<td>Lindera subcoriacea</td>
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<td>Lentibulariaceae</td>
<td>Utricularia floridana</td>
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<tr>
<td></td>
<td>Utricularia olivacea</td>
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<tr>
<td>Melastomataceae</td>
<td>Rhexia aristosa</td>
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<td>Onagraceae</td>
<td>Gaura biennis</td>
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<tr>
<td></td>
<td>Ludwigia spathulata</td>
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<tr>
<td>Orchidaceae</td>
<td>Platanthera lacera</td>
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<tr>
<td>Potamogetonaceae</td>
<td>Potamogeton foliosus</td>
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<tr>
<td>Santalaceae</td>
<td>Nestromia umbellula</td>
</tr>
<tr>
<td>Sapotaceae</td>
<td>Bumelia lanuginosa</td>
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</table>
B. LISTING BY FAMILY OF ENDANGERED, THREATENED, AND RARE PLANTS THAT MAY OCCUR ON THE SRS

<table>
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<th>FAMILY</th>
<th>TAXON</th>
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<tr>
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<td>Aquifoliaceae</td>
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<tr>
<td></td>
<td><em>Scleria baldwinii</em></td>
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<tr>
<td>Ericaceae</td>
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<tr>
<td></td>
<td><em>Kalmia cuneata</em></td>
</tr>
<tr>
<td></td>
<td><em>Lyonia ferruginea</em></td>
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<tr>
<td>Euphorbiaceae</td>
<td><em>Stillingia aquatica</em></td>
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<tr>
<td>Fagaceae</td>
<td><em>Quercus oglethorpesis</em></td>
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<tr>
<td>Lauraceae</td>
<td><em>Lindera melissifolia</em></td>
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<tr>
<td></td>
<td><em>Litsea aestivalis</em></td>
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<td>Liliaceae</td>
<td><em>Hymenocallis coronaria</em></td>
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<td><em>Trillium pusillum var. pusillum</em></td>
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<td><em>Trillium reliquum</em></td>
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APPENDIX II

PLANT LISTING BY FEDERAL STATUS

A. LISTING BY FEDERAL STATUS OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

Endangered: None.

Threatened: None.

Proposed as endangered or threatened: None.

Category 2, candidates possibly appropriate for proposed listing:

Carex decomposita
Croton elliottii
Echinacea laevigata
Lindera subcoriacea
Lobelia boykinii
Myriophyllum laxum
Nestonia umbellula
Rhexia aristosa

Not listed:

Astragalus villosus
Baptisia lanceolata
Bumelia lanuginosa
Carex oligocarpa
Carya myristiciformis
Coreopsis rosea
Echinodorus tenellus var. parvulus
Gaura biennis
Ludwigia spathulata
Nolina georgiana
Paronychia americana
Platanthera lacera
Potamogeton foliosus
Rhododendron flammeum
Rhynechospora inundata
Rhynechospora tracyi
Rorippa sessiliflora
Sagittaria isoetiformis
Trepocarpus aethusae
Utricularia floridana
Utricularia olivacea
Vallisneria americana
B. LISTING BY FEDERAL STATUS OF ENDANGERED, THREATENED, AND RARE PLANTS THAT MAY OCCUR ON THE SRS

Endangered:

Lindera melissifolia
Lysimachia asperulaefolia
Oxypolis canbyi
Trillium reliquum

Proposed as Endangered:

Ptilimnium nodosum

Category 1, candidate appropriate for proposed listing:

Kalmia cuneata

Category 2, candidate possibly appropriate for proposed listing:

Carex chapmanii
Hymenocallis coronaria
Ilex amelanchier
Quercus oglethorpensis
Stylisma pickeringii
Trillium pusillum var. pusillum

Category 3C, candidates no longer being considered for proposed listing:

Elliottia racemosa
Litsea aestivalis

Not listed:

Agalinis aphylla
Amphicarpum muhlenbergianum
Aristolochia tomentosa
Bacopa innominata
Delphinium carolinianum
Halesia parviflora
Helianthemum georgianum
Lyonia ferruginea
Menispermum canadense
Ruellia caroliniensis ssp. ciliosa
Scleria baldwinii
Spiranthes longilabris
Stillingia aquatica
APPENDIX III

PLANT LISTING BY STATE STATUS

A. LISTING BY SOUTH CAROLINA STATUS OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

National concern, endangered: None.

Regional concern, endangered: None.

Statewide concern, endangered: None.

National concern, threatened:

*Echinacea laevigata*

Regional concern, threatened:

*Coreopsis rosea*
*Carya myristiciformis*
*Myriophyllum laxum*

Statewide concern, threatened:

*Echinodorus tenellus var. parvulus*
*Platanthera lacera*
*Rhododendron flammeum*
*Sagittaria isoetiformis*
*Utricularia floridana*
*Utricularia olivacea*

Status unresolved, considered rare:

*Astragalus villosus*
*Baptisia lanceolata*
*Carex decomposita*
*Carex oligocarpa*
*Croton elliotii*
*Gaura biennis*
*Ludwigia spathulata*
*Nolina georgiana*
*Paronychia americana*
*Potamogeton foliosus*
*Rhexia aristosa*
APPENDIX IIIA, continued

*Rhynchospora inundata*
*Rhynchospora tracyi*
*Rorippa sessiliflora*
*Trepocarpus aethusae*
*Vallisneria americana*

Not listed:

*Bumelia lanuginosa*
*Lindera subcoriacea*
*Lobelia boykinii*
*Nestronia umbellula*
B. LISTING BY SOUTH CAROLINA STATUS OF ENDANGERED, THREATENED, AND RARE PLANTS THAT MAY OCCUR ON THE SRS

National concern, endangered:

- Kalmia cuneata
- Lindera melissifolia
- Lysimachia asperulaefolia
- Ptilimnium nodosum
- Trillium reliquum

National concern, threatened:

- Carex chapmanii
- Hymenocallis coronaria
- Oxypolis canbyi
- Trillium pusillum var. pusillum

Regional concern, endangered:

- Helenium brevifolium

Statewide concern, endangered:

- Stillingia aquatica

Statewide concern, threatened:

- Bacopa innominata
- Lyonia ferruginea
- Scleria baldwinii
- Spiranthes longilabris
- Stylisma pickeringii

Extirpated from South Carolina:

- Elliottia racemosa

Status unresolved, considered rare:

- Agalinis aphylla
- Amphicarpum muhlenbergianum
- Aristolochia tomentosa
- Delphinium carolinianum
- Halesia parviflora
- Helenium pinnatifidum
APPENDIX IIIB, continued

*Helianthemum georgianum*
*Litsea aestivalis*
*Menispermum canadense*
*Quercus oglethorpensis*
*Ruellia caroliniensis ssp. ciliosa*

Not listed:

*Ilex amelanchier*
APPENDIX IV

PLANT LISTING BY COMMON NAME

A. LISTING BY COMMON AND SCIENTIFIC NAMES OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

Awned meadow-beauty  Rhexia aristosa
Beak-rush  Rhynchospora inundata
Beak-rush  Rhynchospora tracyi
Bog spice bush  Lindera subcoriacea
Cypress stump sedge  Carex decomposita
Dwarf bladderwort  Utricularia olivacea
Elliott’s croton  Croton elliottii
Few-fruited sedge  Carex oligocarpa
Florida bladderwort  Utricularia floridana
Florida false loosestrife  Ludwigia spathulata
Gaura  Gaura biennis
Green fringed orchid  Platanthera lacera
Little bur-head  Echinodorus tenellus var. parvulus
Loose water-milfoil  Myriophyllum laxum
Milk-pea  Astragalus villosus
Nailwort  Paronychia americana
Nestronia  Nestronia umbellula
Nutmeg hickory  Carya myristiciformis
Oconee azalea  Rhododendron flammeum
Pink tickseed  Coreopsis rosea
Pondweed  Potamogeton foliosus
Quill-leaved swamp-potato  Sagittaria isoetiformis
Sandhill lily  Nolina georgiana
Smooth purple cone-flower  Echinacea laevigata
Swamp lobelia  Lobelia boykinii
Tapegrass  Vallisneria americana
Trepocarpus  Trepocarpus aethusae
Woolly bumelia  Bumelia lanuginosa
Yellow cress  Rorippa sessiliflora
Yellow wild indigo  Baptisia lanceolata
### B. Listing by Common and Scientific Names of Endangered, Threatened, and Rare Plants That May Occur on the SRS

<table>
<thead>
<tr>
<th>Name</th>
<th>Taxon</th>
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<td>Baldwin's nut-rush</td>
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<td>Blue maiden-cane</td>
<td><em>Amphicarpum muhlenbergianum</em></td>
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<td>Canby's cowbane</td>
<td><em>Oxypolis canbyi</em></td>
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<tr>
<td>Carolina larkspur</td>
<td><em>Delphinium carolinianum</em></td>
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<tr>
<td>Chapman's sedge</td>
<td><em>Carex chapmanii</em></td>
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<tr>
<td>Dwarf or Carolina trillium</td>
<td><em>Trillium pusillum var. pusillum</em></td>
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<td>Giant spiral-orchid</td>
<td><em>Spiranthes longilabris</em></td>
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<td>Georgia plume</td>
<td><em>Eliottia racemosa</em></td>
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<td>Mock bishop's-weed</td>
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<td>Moonseed</td>
<td><em>Menispermum canadense</em></td>
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<tr>
<td>Oglethorpe oak</td>
<td><em>Quercus oglethorponsis</em></td>
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<tr>
<td>Pickering's brewaria</td>
<td><em>Stylisma pickeringii</em></td>
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<td>Pondberry</td>
<td><em>Lindera melissifolia</em></td>
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<td>Pond spice</td>
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<td><em>Trillium reliquum</em></td>
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<td>Rocky shoals spider lily</td>
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<td><em>Helianthemum georrianum</em></td>
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<td>Rough-leaved loosestrife</td>
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<td>Small-flowered silverbell</td>
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<td><em>Helenium pinnatifidum</em></td>
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<td>Stagger-bush</td>
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<td>Water-hyssop</td>
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<td>White wicky</td>
<td><em>Kalmia cuneata</em></td>
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<tr>
<td>Wooly Dutchman's pipe</td>
<td><em>Aristolochia tomentosa</em></td>
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</tbody>
</table>
APPENDIX V
PLANT LISTING BY FLOWERING DATES

A. LISTING BY FLOWERING DATE OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

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<th>FLOWERING DATES</th>
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<td>Lindera subcotacea</td>
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<td>March-May</td>
<td>Rhododendron flammeum</td>
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<tr>
<td>April</td>
<td>Carya myristiciformis</td>
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<tr>
<td>April-May</td>
<td>Baptisia lanceolata Nestromia umbellula</td>
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<td>April-June</td>
<td>Sagittaria isoetiforomis</td>
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<td>April-July</td>
<td>Rorippa sessiliflora</td>
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<tr>
<td>April-Oct</td>
<td>Utricularia floridiana</td>
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<tr>
<td>May-June</td>
<td>Astragalus villosus Carex decomposita Carex oligocarpa Lobelia boykinii Nolina georgiana Trepocarpus aethusae</td>
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<tr>
<td>May-July</td>
<td>Echinacea laevigata</td>
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<tr>
<td>May-Oct</td>
<td>Potamogeton foliosus</td>
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<tr>
<td>June-July</td>
<td>Bumelia lanuginosa</td>
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<td>June-Aug</td>
<td>Platanthera lacera</td>
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<td>June-Sept</td>
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<td>June-Oct</td>
<td>Gaura biennis Ludwigia spathulata Myriophyllum laxum</td>
</tr>
<tr>
<td>July-Sept</td>
<td>Croton elliottii Rhynchospora inundata</td>
</tr>
<tr>
<td>July-Oct</td>
<td>Coreopsis rosea Echinodorus teellus var. parvulus Vallisneria americana</td>
</tr>
<tr>
<td>Sept-Oct</td>
<td>Utricularia olivacea</td>
</tr>
</tbody>
</table>
B. LISTING BY FLOWERING DATE OF ENDANGERED, THREATENED, AND RARE PLANTS THAT MAY OCCUR ON THE SRS

<table>
<thead>
<tr>
<th>FLOWERING DATES</th>
<th>TAXON</th>
</tr>
</thead>
</table>
| March-April     | *Halesia parviflora*  
|                 | *Lindera melissifolia*  
|                 | *Litsea aestivalis*  
|                 | *Trillium reliquum*  
| March-May       | *Delphinium carolinianum*  
|                 | *Trillium pusillum var. pusillum*  
| April           | *Quercus oglethorpenensis*  
| April-May       | *Carex chapmanii*  
|                 | *Helenium pinnatifidum*  
|                 | *Helianthemum georgianum*  
|                 | *Ilex amelanchier*  
|                 | *Lyonia ferruginea*  
| May-June        | *Aristolochia tomentosa*  
|                 | *Helenium brevifolium*  
|                 | *Kalmia cuneata*  
|                 | *Lysimachia asperulaefolia*  
| May-Sept        | *Ruellia carolinensis ssp. ciliosa*  
|                 | *Stillingia aquatica*  
| June            | *Ptilimnium nodosum*  
|                 | *Scleria baldwinii*  
| June-July       | *Hymenocallis coronaria*  
| June-Aug        | *Elliottia racemosa*  
|                 | *Menispermum canadense*  
| June-Sept       | *Bacopa innominata*  
|                 | *Styliisma pickeringii*  
| Aug-Sept        | *Oxypolis canbyi*  
| Sept            | *Amphicarpum muhlenbergianum*  
| Sept-Oct        | *Agalinis aphylla*  
| Oct-Nov         | *Spiranthes longilabris*  

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APPENDIX VI

PLANT LISTING BY FRUITING DATES

A. LISTING BY FRUITING DATE OF ENDANGERED, THREATENED, AND RARE PLANTS FOUND ON THE SRS

<table>
<thead>
<tr>
<th>FRUITING DATES</th>
<th>TAXON</th>
</tr>
</thead>
<tbody>
<tr>
<td>April-June</td>
<td>Sagittaria isoetiformis</td>
</tr>
<tr>
<td>April-July</td>
<td>Rorippa sessiliflora</td>
</tr>
<tr>
<td>April-Oct</td>
<td>Utricularia floridana</td>
</tr>
<tr>
<td>May-June</td>
<td>Carex decomposita</td>
</tr>
<tr>
<td></td>
<td>Carex oligocarpa</td>
</tr>
<tr>
<td></td>
<td>Trepocarpus aethusae</td>
</tr>
<tr>
<td>May-July</td>
<td>Echinacea laevigata</td>
</tr>
<tr>
<td>May-Oct</td>
<td>Potamogeton foliosus</td>
</tr>
<tr>
<td>June-Aug</td>
<td>Astragalus villosus</td>
</tr>
<tr>
<td></td>
<td>Nolina georgiana</td>
</tr>
<tr>
<td></td>
<td>Platanthera lacera</td>
</tr>
<tr>
<td></td>
<td>Paronychia americana</td>
</tr>
<tr>
<td>June-Sept</td>
<td>Rhexia aristosa</td>
</tr>
<tr>
<td></td>
<td>Rhynchospora tracyi</td>
</tr>
<tr>
<td>June-Oct</td>
<td>Gaura biennis</td>
</tr>
<tr>
<td></td>
<td>Ludwigia spathulata</td>
</tr>
<tr>
<td></td>
<td>Myriophyllum laxum</td>
</tr>
<tr>
<td>June-Nov</td>
<td>Baptisia lanceolata</td>
</tr>
<tr>
<td>July</td>
<td>Nestronia umbellula</td>
</tr>
<tr>
<td>July-Sept</td>
<td>Croton elliottii</td>
</tr>
<tr>
<td></td>
<td>Lobelia boykinii</td>
</tr>
<tr>
<td></td>
<td>Rhynchospora inundata</td>
</tr>
<tr>
<td>July-Oct</td>
<td>Coreopsis rosea</td>
</tr>
<tr>
<td></td>
<td>Echinodorus tenellus var. parvulus</td>
</tr>
<tr>
<td></td>
<td>Vallisneria americana</td>
</tr>
<tr>
<td>Aug-Sept</td>
<td>Lindera subcoriacea</td>
</tr>
<tr>
<td>Sept-Oct</td>
<td>Rhododendron flammeum</td>
</tr>
<tr>
<td></td>
<td>Utricularia olivacea</td>
</tr>
<tr>
<td>Oct</td>
<td>Carya myristiciformis</td>
</tr>
<tr>
<td></td>
<td>Bumelia lanuginosa</td>
</tr>
</tbody>
</table>
### B. Listing by fruiting date of endangered, threatened, and rare plants that may occur on the SRS

<table>
<thead>
<tr>
<th>FRUITING DATES</th>
<th>TAXON</th>
</tr>
</thead>
<tbody>
<tr>
<td>March-May</td>
<td><em>Delphinium carolinianum</em></td>
</tr>
</tbody>
</table>
| April-May      | *Carex chapmanii*  
|                | *Helenium pinnatifidum* |
| May-June       | *Helenium brevifolium*  
|                | *Litsea aestivalis* |
| May-Sept       | *Ruellia caroliniensis ssp. ciliosa*  
|                | *Stillingia aquatica* |
| May-Oct        | *Helianthemum georgianum* |
| June           | *Ptilimnium nodosum*  
|                | *Scleria baldwinii* |
| June-July      | *Hymenocallis coronaria*  
|                | *Trillium pusillum var. pusillum* |
| June-Aug       | *Menispermum canadense* |
| June-Sept      | *Bacopa innominata*  
|                | *Stylisma pickeringii* |
| Aug-Sept       | *Aristolochia tomentosa*  
|                | *Lindera melissifolia*  
|                | *Oxypolis canbyi* |
| Aug-Oct        | *Lysimachia asperulaefolia* |
| Aug-Nov        | *Elliotitia racemosa* |
| Sept           | *Amphicarpum muhlenbergianum* |
| Sept-Oct       | *Agalinis aphylla*  
|                | *Halesia parviflora*  
|                | *Kalmia cuneata*  
|                | *Lyonia ferruginea*  
|                | *Quercus oglethorpensis* |
| Oct-Nov        | *Ilex amelanchier*  
|                | *Spiranthes longilabris* |
APPENDIX VII
SUMMARY OF FIELD NOTES FOR 1986 AND 1987
BY TAXON

_Astragalus villosus_  
Not relocated.

_Baptisia lanceolata_  
On May 22, 1987, 71 individuals in seven colonies were observed along the west side of Rd. 9 opposite Gate 22 and about 31 m south. The seven colonies were flagged. Some were very near the road, some as far as 27 m west of the road. Across the road and about 14 m south, 13 more individuals were found. One colony of 11 was flagged.

On October 16, 1987 about 15 plants were seen scattered on high ground between the east and west headwaters forks of Boggy Gut Creek, south of Rd. A-18. No fruits were observed. Twenty more plants were scattered along high ground near west fork of Boggy Gut Creek.

_Bumelia lanuginosa_  
A population was located July 31, 1986 northeast of the power line containing approximately 50 individuals; most plants 0.5-1 m high, some were marked with red flagging.

Population southwest of the power line was located November 21, 1986 consisting of about 90 individuals, most plants 0.5-1 m high, some marked with red flagging.

October 23, 1987, 13 plants were found and flagged at the end of Red Hill Road (north fork) on the bluffs of Upper Three Runs Creek west of Burma Road. Plants were about 17 m downslope from the road.

_Carex decomposita_  
On June 4, 1986 two individuals were located in the swamp delta.

_Carex oligocarpa_  
Not relocated.

_Carya myristiciformis_  
During fall, 1986 Dr. J. A. Quinn of Rutgers University visited the Boiling Springs Natural Area and collected fruit. Brian McCarthy of Rutgers University then tentatively identified these as fruit of _Carya myristiciformis_.

On November 4, 1987 two trees were flagged at the Boiling Springs Natural Area. There may be six or seven more trees of this species. **Location**: walk in past the sign; stay on the old road. As the road curves near and parallel to the creek, the trees are on the left.

_Coreopsis rosea_  
On July 3, 1986 a large number of plants was observed on the northwest rim between the _Panicum/_small tree line and the line of mature pines in Flamingo Bay; only a few were blooming. A
second area of plants was located along the north-northwest rim. No plants were observed in Karen’s Pond.

**Croton eelliottii**

On August 27, 1986 approximately 300 individuals were observed in both flower and fruit at Woodward Bay at the following locations: southwest to west rim, 70 plants; west rim, 100 to 150 plants; north rim, six plants; northeast rim (between the *Rubus* & *Panicum*), 40 to 50 plants; east and southwest and south rim, 20 to 30 plants.

On August 27, 1986 in Mona Bay, four plants were observed along the southeast rim and three plants along the northwest rim.

On September 18, 1986, 12 individuals were found along the west rim north of the fence in Sarracenia Bay in the roadway. Six plants were found in Little Cypress Bay on the southwest rim near the tree line. Three plants were observed in Bay #79.

On September 4, 1987 about 30 plants were found in Sunset Bay scattered along the northeast and southwest rims. About 15 plants were scattered along the north rim. In Chorus Bay, about 15 plants (total) were found in the north, south, and central areas.

**Echinacea laevigata**

On May 23 and 29, 1986 approximately 100 plants were counted within the marked area, but no more than nine were in flower on either day. Marked area has yellow signs labeled: “Protected Area: Do not disturb ground or vegetation within this area.” Similar total numbers of plants and flowering individuals were observed on May 28, 1987.

**Echinodorus tennellus**

var. *parvulus*

On July 1, 1987 many plants (too many to count) were observed scattered throughout Chorus Bay. Red flags were put in the most dense patches. Also a large population (too many to count) was found in the shallow depression near Rds. 2 and F.

On July 7, 1987 about 200 plants were observed flowering in Sunset Bay near mid-bay, about 8 m NNE of the depth pole.

On July 10, 1987 about 25 flowering plants were observed, scattered along the west rim of Janell’s Bay (#62) near the edge of the clear cut. Plants were 5 m west of a *Liquidambar* tree.

**Gaura biennis**

On October 7, 1987, 30-35 plants were observed west side of Rd. A scattered from about 0.2 m south of intersection with Rd. 2 to junction with Rd. A-1. Also on October 7, 1987 three plants were found along the east side of Rd. 2 about 0.2 mile northeast of the barricade on Rd. A.

**Lindera subcoriacea**

On October 17, 1986 nine individuals were located in the Tinker Creek floodplain (Kennedy’s Pond area). Most of the leaves had dropped and next year’s flower buds had formed. The shrubs were marked with red flagging.
On June 24, 1987 two plants were found about halfway between Rds. 8-11 and 8-12 in the floodplain on the south side of Tinker Creek. The plants were flagged and a tree on the deer trail directly south of the plants was flagged.

On July 30, 1987 five shrubs were found and flagged east of Meyers Branch and north of the Kovacic study area not far from the west-facing slopes up to planted pine areas. *Lindera benzoin* also observed near this area, soil pH was 4.73.

On August 28, 1987 one shrub was found and flagged in the Meyers Branch floodplain about 1/4 mile east of the bridge across Rd. 9. Four plants were found and flagged about 1/2 mile east of Rd. 9 bridge over Meyers Branch.

On October 16, 1987 two plants were located and flagged on the west side of the east headwaters fork of Boggy Gut Creek south of Rd. A-18. Two more plants were located and flagged beside an unnumbered road along the Meyers Branch drainage. This area was disturbed, one *Lindera* was chopped back and had sprouted.

*Lobelia boykinii*

On July 10, 1987 one plant was observed on the east rim of Sarracenia Bay about 14 m south of the fence in about 15 cm of water.

On July 13, 1987 two plants in flower were observed in Sarracenia Bay north of the fence on the west rim of the bay in about 30 cm of water. One flowering plant was observed in Craig's Pond in the east part of the bay about 10 m north of the fence in about 60 cm of water.

On September 2, 1987 about 15 flowering plants were observed in Craig's Pond south of the fence along the lower southwest rim.

*Ludwigia spathulata*

On July 1, 1987 a large population (too many to count) was relocated in the depression south of Rd. B-5. Twelve individuals were located in Chorus Bay scattered from the east to the northeast side of the bay. Red flags were set out. A large population (too many to count) was located in the depression near Rds. 2 and F.

On July 7, 1987 three small clumps of plants were observed in the middle of Sunset Bay; all were flagged. In Chorus Bay, another large patch (1 x 2 feet) was located north-northeast of the center pole near the Pine-Panicum border and flagged. About 25 additional individuals were scattered around the large patch.

*Myriophyllum laxum*

Not relocated.

*Nesotria umbellula*

On October 17, 1986 about three-fourths of the way upstream on the unnamed tributary to Tinker Creek, 60 to 70 plants were found in the west ravine of the creek. Further upstream more plants (too many to count) were observed on the west and east
sides of the creek on dry slopes. The majority of plants had dropped their leaves.

On July 30, 1987, 100-150 plants were observed along the west-facing slopes east of Meyers Branch, north of Kovacic study area.

On August 28, 1987 three plants were found on the north-facing bluffs of Meyers Branch about 1/4 mile east of the bridge on Rd. 9.

**Nolina georgiana**

On July 31, 1986 at 2.8 miles south of Rd. C along the east side of Burma Road, 20 to 30 individuals were located approximately 14 m beyond the steam pipe. At the same location, but west of the road, 20 to 30 individuals were located in the triangle formed by two drainage ditches. Many more individuals were observed south of the southern drainage ditch.

On October 16, 1987 numerous plants (too many to count) were observed on high ground between the east and west headwaters forks of Boggy Gut Creek south of Rd. A-18. About 34 dried flower stalks were noted. About 30 plants (three with dried flower stalks) were seen further down the Boggy Gut drainage, still between the forks.

On October 23, 1987 three plants were found at the end of Red Hill Road (south fork) on the bluffs of Upper Three Runs Creek west of Burma Road.

**Paronychia americana**

On September 24, 1987 plants were found on the east side of Rd. A-17, south of the RR tracks before Rd. A-17 turns northwest. The plants were in a flat depression and were associated with a *Monarda* population.

**Platanthera lacera**

Not relocated during 1986. Extensive evidence of feral hog rooting was observed in the Mill Creek floodplain during 1986. This damage may have eliminated the population in the Mill Creek Set-Aside.

**Potamogeton foliosus**

Not relocated.

**Rhexia aristosa**

On June 24, 1986 approximately 50 individuals were observed blooming in Craig’s Pond on the west rim on the SRS side of the fence.

On July 3, 1986, 40 to 50 individuals were observed flowering on the SRS side of the fence in Craig’s Pond.

On August 21, 1986, 10 to 15 plants (5 flowering) were observed along the west-northwest border, 5 to 6 plants on the eastern rim, and 2 individuals in the center of Sarracenia Bay. At Craig’s Pond, 15 plants were in flower along the north rim, and 30-40 plants were in flower south of the fence, 17 m south of the water level gauge.

On July 10, 1987 plants were flowering around the rim of Sarracenia Bay north of the fence.
On July 13, 1987 five plants were observed north of the fence in Sarracenia Bay. Six plants were observed northeast of the fence in Craig's Pond.

*Rhododendron flammeum*

On October 17, 1986 seven individuals were located on the bluffs along Tinker Creek at the end of Rd. 8-12, flower buds had formed for next year. Shrubs were marked with red flagging.

On June 24, 1987 nine individuals were found along the Tinker Creek bluffs between Rds. 8-11 and 8-12 on the south side of the creek. These were all flagged with red flagging. Two shrubs were found west of Rd. 8-12 about half way down an unnamed tributary to Tinker Creek.

On October 23, 1987 one small shrub was found about 7 m east of Upper Three Runs Creek at the end of Red Hill Road (south fork) off the west side of Burma Road.

*Rhynchospora inundata*

On August 28, 1987, 15 plants were observed along the southwest rim and north rim (near old RR grade) of Dunbarton Bay (#97).

On October 1, 1987 about 450 plants were observed completely surrounding Thunder Bay in water depths from 15-20 cm.

*Rhynchospora tracyi*

On May 23, 1986 a single individual was observed near the center of Sarracenia Bay.

On June 24, 1986, 40 to 50 individuals were observed in the center of Sarracenia Bay along the north side of the fence.

On August 21, 1986 four plants were observed in Craig's Pond south of the fence, 1/3 way in from the west rim.

On July 7, 1987 three plants were observed along the west rim of Sarracenia Bay north of the fence.

On July 10, 1987 about 50 plants were observed in Sarracenia Bay north of the fence along the east-northeast rim in 50 cm of water. Also plants too numerous to count were observed on both sides of the fence in Sarracenia Bay at the center of the bay.

On October 1, 1987 two plants were observed in the north area of Thunder Bay.

*Rorippa sessiliflora*

Not relocated.

*Sagittaria isoetiflora*

Twelve individuals observed blooming in Thunder Bay on May 29, 1986. Individuals were widely scattered in the southern quarter of the bay. Two individuals were observed blooming at Pond B on September 4, 1986. Plants not blooming were difficult to locate; therefore, no count of total individuals was made at either location.
On May 22, 1987 one individual was observed flowering on the east side of Sarracenia Bay near the north side of the fence.

On May 27, 1987 eight plants were observed flowering on the east edge of Sarracenia Bay near the north side of the fence in 6-8" of water. Two plants were seen flowering in Craig's Pond on the west side north of the fence in 15-20 cm of water. In Woodward Bay, one plant was blooming in the southeast area of the bay in mucky soil.

On June 4, 1987, 23 plants were blooming in Sarracenia Bay north of the fence scattered along the east to northeast rim in 15-20 cm of water. Five plants were blooming near the north side of the fence on the west rim in mucky soil. One plant was observed flowering on the southwest rim.

In Mona Bay, on June 4, 1987, 51 plants were flowering, scattered along the northeast to north rim in water 0-5 cm deep. Two more were found along the southeast rim.

On June 10, 1987, in Mona Bay, eight plants were flowering along the northeast rim. In Sarracenia Bay about 20 plants along the west rim north of the fence were observed flowering.

On June 18, 1987 in Pond B, five plants were flowering along the shore on the south end of Boat Dock Cove in 15-20 cm of water.

On July 1, 1987, three plants were observed flowering on the southwest rim of Mona Bay.

On July 7, 1987, 16 plants were observed flowering in Sarracenia Bay along the west rim north of the fence.

On July 10, 1987 about 40 plants were observed flowering along the east rim of Sarracenia Bay near the fence. A few plants were observed flowering on the west rim of Sarracenia Bay north and south of the fence.

On September 2, 1987, 12 plants were observed flowering in Craig's Pond south of the fence, scattered along the west side.

On October 1, 1987 five plants were observed flowering scattered along the southeast rim of Thunder Bay. About 17 plants were scattered throughout the north to northeast area of Thunder Bay.

* Trepocarpus aethusae

Not relocated.

* Utricularia floridana

On June 4, 1986 a large number of plants was observed in Boat Dock Cove very near to and southeast of the SREL boat dock in Pond B.

On June 10, 1987 many plants were flowering in Pond B in Boat Dock Cove.
On June 18, 1987 many plants were still flowering in Boat Dock Cove. About 30 plants were in flower east of Bowlings Island. Many plants were flowering west of the small islands (Herons Island?) near the middle of the pond in about 2 m of water. In Duck Cove, numerous flowering plants were scattered throughout. Plants were also scattered near the shore north of the Duck Cove mouth and near the shore across from Duck Cove and east of Long Bay.

On July 1, 1987 plants were observed throughout northern and southern areas of the bay in 30-50 cm of water. Only five plants were in flower.

On September 2, 1987 many flowering plants were observed in the outlet canal arm and in R Cove (inlet canal arm).

*Utricularia olivacea*

On September 30, 1986 four small mats were collected in the northwest arm of Pond B, water depth was about 2 to 3 m. No flowers were observed.

On October 7, 1986 two plants were collected in the north arm of Par, east of the bridge. Again no flowers were observed.

On September 2, 1987 many flowers were observed in Craig’s Pond from 1 m to 3 m north of the fence on the west side of the bay about 140 feet from the west pine border, in 15-20 cm of water.

*Vallisneria americana*

On June 4, 1986 a patch of plants was found in Par Pond between the SREL boat dock and Loyal Lair. Developing flowers were observed.

On August 28, 1986 large patches were observed on both sides of the DuPont boat dock.

On September 4, 1986 a large patch of plants was observed extending about 230 m along the west side of the old dam.

On October 7, 1986 large beds were observed at Nancy’s Nook.

On September 17, 1987 beds of various sizes of this plant were observed in Par Pond at these locations: Parrot Point, East Lake shoreline, Herde’s Inlet, Chris’s Cove, Callahan Slough, North Dave’s Lake, South Dave’s Lake, Gus’s Swamp, Nancy’s Nook, Fred’s Bay, Fairman’s Landing, Peggy’s Point and Golley Bay.
APPENDIX VIII

MANAGEMENT IMPLICATIONS FOR SOME ENDANGERED, THREATENED, AND RARE PLANT SPECIES THAT MAY OCCUR ON THE SRS

(Revised from Kral 1983a and 1983b)

Kalmia cuneata. This species is part of a fire disclimax and increases as a result of burns. It does not compete well with other shrub bog species, ultimately becoming over-topped and suppressed by them. Logging of the overstory would cause this species to increase as long as the logging was not accompanied by drainage or radical soil disturbance. Any of the conventional mechanical means of site preparation for forest planting would eliminate the species. Habitat loss has resulted from management schemes which involve mechanical clearing of the shrub layer in preparation for pine plantations accompanied by digging of drainage ditches, discing, and plowing. Even if the species survives the mechanical site preparation, it is subsequently shaded out by the rows of pine as their crowns close. Some populations in the sandhills have been damaged or destroyed by ponds formed by dams built on the streams along which it grows.

Lysimachia asperulaefolia. This plant inhabits highly organic, wet sands and has been maintained historically through creation of habitat by periodic woods fires. It may persist in savanna areas that are being invaded by woody species, but it will ultimately be crowded out unless burns reoccur. Similarly, it will not persist in dense stands of pines or hardwoods. The few remaining known populations would be maintained best by saving them from drainage, by removal of trees with minimal damage to substrate, and by periodic controlled burns. Establishment of pine plantations preceded by drainage and mechanical site preparation will destroy the species.

Lindera melissaefolium. This shrub is a plant of wet soils and is frequently found in standing water. Selective logging of the swamp hardwood overstory probably would affect it little. Clear cutting might raise flood levels to a dangerous degree. Drainage of the swamps it frequents would eliminate the habitat and the species.

Oxypolis canbyi. Several nationwide locations of O. canbyi have been lost in recent years. In many instances, the shallow, pineland ponds where this species occurs have been drained and converted to lowland pasture, cropland, or pine plantations or have been dredged and developed into stock tanks or reservoirs for irrigation water.