AN INVENTORY OF HABITAT TYPES, ENDANGERED/THREATENED SPECIES, AND RECORD TREES ON FOUR TERRACE SITES ADJACENT TO THE CONGAREE RIVER FLOODPLAIN

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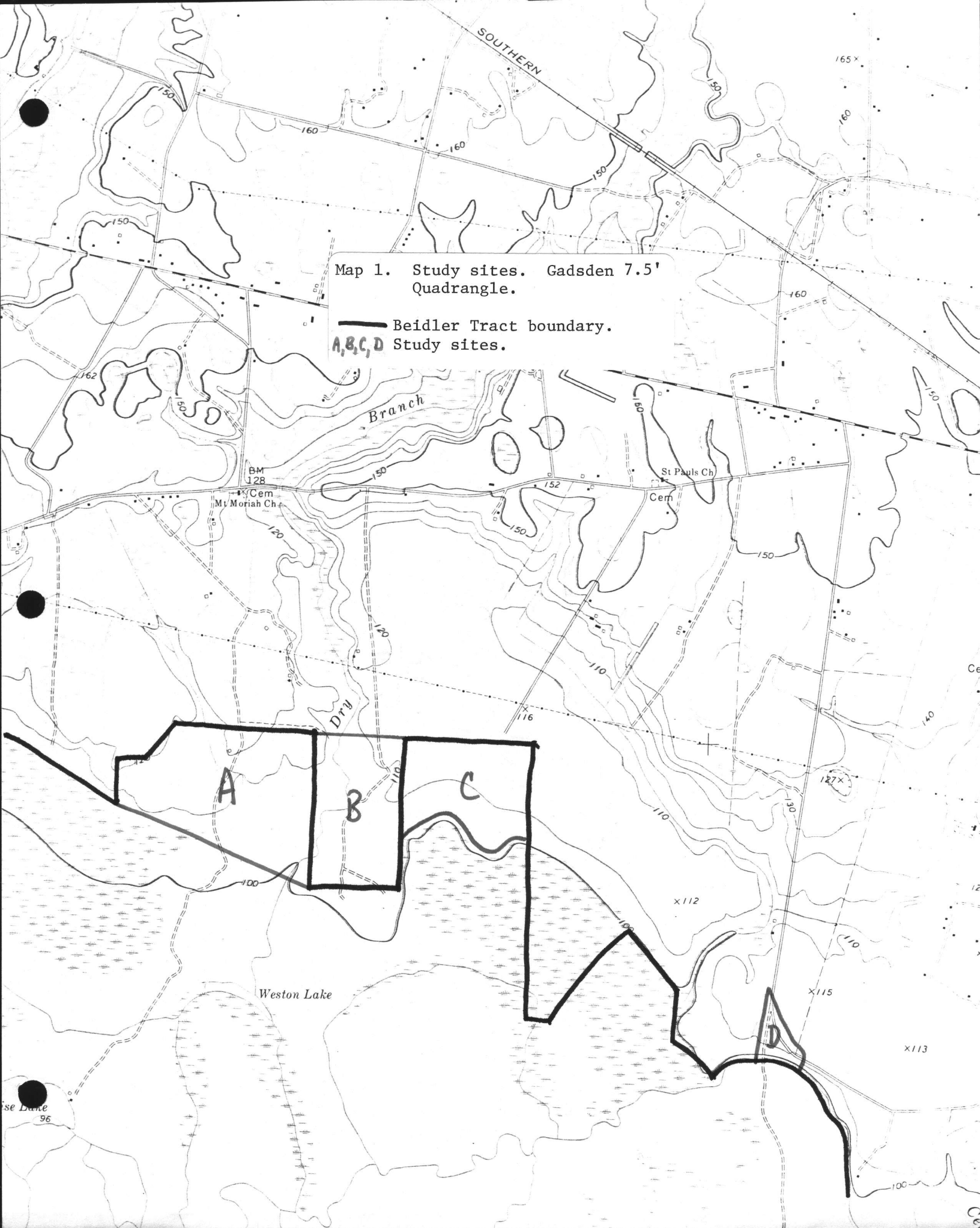
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INTRODUCTION

This report contains the results of a survey of four terrace sites adjacent to the Congaree River floodplain. These sites are located approximately fifteen miles southeast of Columbia, South Carolina (by way of S.C. 48 and Secondary Road 734) (see Map 1). The purpose of the survey was to search for: 1) endangered or threatened species of flora and fauna; 2) existing and/or potential record trees; and 3)potential habitat types of suspected endangered and threatened species.

Three of the terrace sites--A,C, and D--are within the proposed boundaries of the Congaree Swamp National Monument (the present-day Beidler Tract); the fourth terrace site--Site B--is privately owned. Sites A,C, and D total approximately 133 acres; Site B, which is proposed for later acquisition into the national monument boundaries, is about 110 acres in area. Site C and D are almost completely upland sites; but both Sites A and B contain considerable wetland acreage (floodplain)(see Maps 2-5).

This survey was carried out under contract with the National Park Service, Denver Service Center, Denver, Colorado.



Map 1. Study sites. Gadsden 7.5' Quadrangle.

Beidler Tract boundary.

A, B, C, D Study sites.

METHODOLOGY

Field work was carried out in June and July of 1978. Floristic and habitat information was gathered by the use of north-south transects. Habitat types with potentially higher probabilities of containing endangered and threatened species of flora and fauna (based on previous literature reports) were analyzed with greater intensity. Endangered, threatened, and uncommon species of flora and fauna were photographed or collected (where populations permitted) (see photographs on page 22). All larger than average trees were measured for comparison with record tree information. Finally, community type maps were drafted for each study area (study area and site are interchangeable terms in this text) (see pages 14-21 for Maps 2-5).

RESULTS

Because this survey was carried out in a short span of time during one season, endangered/threatened species may have been overlooked (plants not in flower or fruit) or may not have been present on the sites at the time of the survey (fauna). Consequently, the section entitled "Habitat Types and Potential Endangered/Threatened Species Occurrence" should be carefully considered, along with the actual reported endangered and threatened species.

Endangered/Threatened Species.

Site A. No endangered or threatened flora or fauna were observed here.

Site B. No endangered or threatened flora or fauna were observed here.

Site C. The Red-cockaded Woodpecker (Dendrocopos borealis), listed as endangered on the U. S. Fish and Wildlife Service's Federal list (U. S. Dept. of the Interior, 1977) and also listed as endangered in South Carolina, occurs in study area C. Of the five cavity trees located in the area, three seem to be actively used. The other two cavities, one of which was in a dead pine, appeared to be inactive. All judgements of activity of tree cavities were

based on points outlined by Jackson (1977). Four of the five cavities are clustered in the northcentral part of the study area; the fifth tree is approximately 200 feet southwest of the cluster (see Map 4). The odd tree seemed to be active, based on Jackson's (1977) method for determining activity. It seems strange that it is so far from the cluster of cavity trees, but Jackson (1977) has noted that cavity trees of the same colony may be as far as 1 kilometer (.62 miles) apart. Based on information in Chamberlain (1974) and in the proceedings of the symposium The Ecology and Management of the Red-Cockaded Woodpecker (1971), there appears to be only one colony of birds using these cavity trees; however, final determination of nest tree and bird density would have to be made during breeding season (Jackson, 1977).

Site D. Southern rein orchid (Habenaria flava) was found in this study area (see Map 5 for exact location). Habenaria flava is listed under the heading "Of Special Concern" by South Carolina botanists (Rodgers and Clark, 1977). Rodgers and Clark (1977) point out that taxa listed under "Of Special Concern" are those that are considered"...particularly vulnerable to increasing pressures on populations and habitats...." A sizable population of Habenaria flava was found here; a voucher specimen was collected.

Special Note. Service-berry holly (Ilex amelanchier), listed as "threatened" on the Federal list (U. S. Dept. of the Interior, 1977) and "threatened nationally" on the State list (Rodgers and Clark, 1977), was discovered in Congaree Swamp by Dennis (1967) and subsequently reported by Gaddy (1977). Based on Radford et al. (1968), Ilex amelanchier occurs on "wooded streambanks, mostly in sandhills." It would, therefore, potentially occur along Dry Branch (study areas A and B) or on the sandy bluffs of study area C. These areas were carefully searched, but no specimen could be found (it is not known where Dennis' specimen was collected). However, this plant is singled out here because the previous record of its occurrence, along with

the habitat requirements present, increase the probability of finding it in study areas A or B.

Existing/Potential Record Trees. No current record trees are located on any of the four sites nor were any new record trees located in the course of the survey. However, several large trees - some of near-record size - were found in study areas A, C, and D.

Site A. A beech tree (Fagus grandifolia) approximately 7 feet in circumference was found in the southwestern section of the study area in the bluff hardwoods community; current state record--9'2"C. In the southeastern portion of the study area, a tulip tree (Liriodendron tulipifera) with a circumference of approximately 11 feet was measured (this tree also occurred in the bluff hardwoods community); current state record for tulip tree--19'6"C. A red maple (Acer rubrum) with a circumference of approximately 10 feet was located in the floodplain community of study area A (this tree was found in the southcentral portion of the study area in bottomland hardwoods); current state record--13'2"C. Scattered large loblolly pines (Pinus taeda) ranging from 9 to 12 feet in circumference occur on a low pine ridge in the floodplain community (see southeastern corner of study area on Map 2); current state record--15'1"C.

Site B. No large trees seen.

Site C. Several large loblolly pines are located in the bluff hardwoods community of this study area. The largest is approximately 10 feet in circumference.

Site D. Two large swamp tupelos (Nyssa sylvatica var. biflora) are located along the edge of the bluff hardwoods community (but in the floodplain community). One tree was approximately 11.5 feet in circumference, the other was 10.5 feet; the current state and national record is 13'1'C and is located in the Beidler Tract.

Habitat Types and Potential Endangered/Threatened Species Occurrence. Maps 2-5 portray the existing community types of the four study areas. Below the community types of each study area will be discussed with special reference to: 1) species composition; 2) distribution; 3) maturity; and 4) potential for harboring endangered/threatened species of flora and fauna.

Site A. See Map 2. Six communities are present in this study area.

1) Mixed hardwoods-pine. This community occurs along the fringes of the study area and is dominated by upland hardwoods such as southern red oak (Quercus falcata), post oak (Quercus stellata), and hickories (Carya spp.), along with loblolly pine (Pinus taeda). The communities are estimated to be from 40-60 years old. Potential endangered/threatened species of flora and fauna include: North American sandalwood (Nestronia umbellula) and pigmy pipes (Monotropsis odorata var. odorata) (see Appendix for further description of each plant mentioned here).

2) Pine-Mixed hardwoods. Loblolly pine is the dominant tree with mixed upland hardwoods (see 1 above). This community is widespread in the study area and is normally a young community, although some canopy trees may be up to 50 or 60 years old. Potential endangered/threatened species: North American sandalwood.

3) Lowland hardwoods. Sweet gum (Liquidambar styraciflua), willow oak (Quercus phellos), and black gum (Nyssa sylvatica) are the dominants of this community, which is found in intermittent drains and low areas. The canopy trees seem to be between 40 and 70 years old. Potential endangered/threatened species are the same as those listed for the mixed hardwoods-pine community.

4) Pine (generally loblolly). This community may be sub-divided into two stand types: the upland and the bottomland pine communities. The upland community is dominated by loblolly pine; is very young (10-40 years); and is rather widespread (some of this community is composed of planted pines). On

the other hand, the bottomland pine community (see southeastern corner of Map 2 for location) is composed of both yound and old loblollies. Some of these trees may range up to over 200 years old (Stalter, 1971). Potential endangered/threatened species: none known.

5) Bluff hardwoods. Beech, sweet gum, swamp chestnut oak (Quercus michauxii), dogwood (Cornus florida), and ironwood (Carpinus caroliniana) dominate the bluff hardwoods (loblolly pines are present in the canopy of the other bluff communities, but in study area A the pines have been removed). The bluff hardwoods communities are second only to the floodplain communities in maturity, some of them possibly exceeding 150 years in age. Potential endangered/threatened species: bay starvine (Schisandra glabra), service-berry holly, Schwerin's lead plant (Amorpha schwerini), diminuitive skullcap (Scutellaria parvula), pigmy pipes, and smooth yellow violet (Viola eriocarpa var. leiocarpa). Several significant floristic elements though not endangered or threatened, were found in the bluff hardwoods communities. They are: pipe-vine (Aristolochia serpentaria), listed as infrequent by Radford et al. (1968); green adder's mouth (Malaxis unifolia), an uncommon orchid; and small green wood orchid (Habenaria clavellata), also uncommon.

6) Floodplain (bog and bottomland hardwoods with scattered large pines). The floodplain communities are of two types: 1) the bog communities adjacent to the bluffs, dominated by swamp tupelo (Nyssa sylvatica var. biflora), sweet gum, bays (Persea borbonia, Magnolia virginiana), and American holly (Ilex opaca); and 2) the bottomland hardwoods community, dominated by red maple, sweet gum, loblolly pine, green ash (Fraxinus pennsylvanica), and laurel oak (Quercus laurifolia). The floodplain community is very old [possibly up to 350 years (Gaddy et al., 1975)] and is characterized by large, tall trees. The bog hardwoods are somewhat smaller and are found on acidic soils fed by seepage from the bluffs. [For a more detailed explanation of this community,

which may be flooded annually, see Gaddy et al. (1975).] Potential endangered/threatened species may be: bay starvine, dwarf trillium (Trillium pusillum var. pusillum), nutmeg hickory (Carya myristicaeformis), wahoo (Euonymus atropurpurens), American climbing fern (Lygodium palmatum), stream bog moss (Mayaca fluviatilis), umbrella magnolia (Magnolia macrophylla), Florida adder's mouth (Malaxis spicata), diminuitive skullcap, green fringed orchid (Habenaria lacera), smooth yellow violet, and barren strawberry (Waldensteinia lobata).

Site B. From 1977 to 1978, this site was extensively logged with selective and seed-tree cutting throughout the site. Mapping and description of the present conditon of the communities would have been difficult or impossible, as some of the communities are no longer recognizable. Consequently, Map 3 lists the community types as they existed before the site was cut. Descriptions of community types may be taken from study area A; maturity and distribution information, of course, is not applicable. The severe cutting of Site B has probably lessened the short-range potential for endangered/threatened plants. Potential endangered/threatened species are service-berry holly (see Special Note under Endangered/Threatened Species) and the American alligator (Alligator mississippiensis). The alligator has been observed on nearby branches and creeks that feed into the Congaree floodplain; however, no alligators have been reported in the Beidler Tract or in the Dry Branch Area. The alligator is listed as endangered on the Federal list (U. S. Dept. of Interior, 1977).

Site C. See Map 4. Study area C was selectively cut in 1975, though not as severely as study area B. The community types in study area C are described below:

1) Mixed pine (open canopy). Loblolly and longleaf (Pinus palustris) pine grow together in open stands, ranging from 30 to 75 years old (the oldest longleafs may be over 75). This community formerly was dominated by large loblollies and longleafs [a longleaf pine 240 and one 300 years old were cut

from this site in 1975 (see Gaddy et al., 1975)]. Potential endangered/threatened species: none known.

2) Mixed pine (closed canopy). These communities are made up of thick growths of loblolly and longleaf pines that escaped cutting in 1975 due to their youth (estimated age to be from 20 to 50 years). Potential endangered/threatened species: none known.

3) Pine-mixed hardwoods (closed canopy). See description under Site A. Pine-mixed hardwoods communities in study area C are younger than those of study area A. Potential endangered/threatened species: North American sandalwood.

4) Pine-mixed hardwoods (open canopy). Same description as pine-mixed hardwoods in study area A except selective cutting has taken place.

5) Pine (generally loblolly). See description of this community type under Site A.

6) Bluff hardwoods. See description under Site A. Loblolly pines are found in the canopy of the bluff hardwoods in study area C, whereas the pines have been removed from the bluffs of study area A.

7) Floodplain (bog and bottomland hardwoods with scattered large pines). See description under Site A. Site C is dominated by the bog hardwood phase of the floodplain community.

Site D. The community types of study area D are described below:

1) Pine-mixed hardwoods. See description under Site A.

2) Pine (generally loblolly). See description under Site A.

3) Mixed hardwoods. Post oak, southern red oak, and hickories dominate this community. Potential endangered/threatened species: North American sandalwood.

4) Bluff hardwoods. See description under Site A. The bluffs of study area D are considerably steeper than those of the other terrace bluff hardwoods

communities, drastically increasing the erosional potential here. Same potential endangered/threatened species as under bluff hardwoods for Site (study area) A.

5) Floodplain (bog and bottomland hardwoods with scattered large pines). See description under Site A. Only a very small zone of seepage bog hardwoods occurs in study area D, with most of the floodplain community being dominated by bottomland hardwoods (no pines are present here). A bridge across Cedar Creek has altered siltation patterns here, killing several trees.

DISCUSSION

The Red-cockaded Woodpecker (Dendrocopos borealis), an endangered bird, and the southern rein orchid (Habenaria flava), a plant "of special concern" to South Carolinas botanists, were found on terrace Sites C and D respectively. The service-berry holly (Ilex amelanchier) has been collected from the Congaree Swamp area and may occur on one of the terrace sites. Sixteen additional species of endangered and threatened flora potentially occur on the terrace sites. One additional species of endangered fauna, the alligator (Alligator mississippiensis), potentially occurs in study area B. No record trees are found on the terrace sites; however, several large trees that may be records in the future were found.

In conclusion, terrace Site C is an important site with reference to endangered fauna, and Site D is important in terms of a plant of special concern. The community types that may be called critical areas are the bluff hardwoods and the floodplain communities, both mature communities. The bluff hardwoods community has the habitat potential for six endangered/threatened species of flora, and the floodplain may harbor as many as twelve endangered/threatened plant species and one endangered species of fauna, as well as having several near-record trees.

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APPENDIX

POTENTIAL ENDANGERED/THREATENED/OF SPECIAL CONCERN SPECIES

FLORA

Federal list (U. S. Dept. of Interior, 1977).

Endangered.

None.

Threatened.

Ilex amelanchier M. A. Curtis. (service-berry holly).
"Wooded streambanks, mostly in sandhills" (Radford et al., 1968).

Nestronia umbellula Raf. (North American sandalwood).
Dioecious, low colonial shrub. Parasitic on the roots of pines. Listed in Radford et al. (1968) for Richland County.

Schisandra glabra (Brickell) Rehder. (magnolia vine, bay starvine).
Monoecious, woody vine. Rich woods.

Trillium pusillum Michaux. var. pusillium (dwarf trillium, Carolina trillium).
"Alluvial woods" (Radford et al., 1968). No records for midland South Carolina exist, but Radford reported dwarf trillium from Wake County, N. C., a Piedmont/Fall Line county like Richland County.

Waldensteinia lobata (Baldw.) T.& G. (barren strawberry).
"Moist woods along...rivers" (McCollum and Ettman, 1977). Found in lower Piedmont counties in Georgia.

State List (Rodgers and Clark, 1977).

Endangered Nationally.

Carya myrsticaeformis Michaux f. (nutmeg hickory).
"Swamp forests" (Radford et al., 1968).

Threatened Nationally.

Ilex amelanchier (see Federal list).

Schisandra glabra (see Federal list).

Trillium pusillum var. pusillum (see Federal list).

Endangered Statewide.

Amorpha schwerini Schneider. (Schwerin's lead plant).
"Rocky river bluffs" (Radford et al., 1968).

Euonymus atropurpurens Jacquin. (wahoo).
"Stream banks and swamp forests" (Radford et al., 1968).

Lygodium palmatum (Bernh.) Swartz. (American climbing fern).
"Wet thickets in sandy or acid soil" (Radford et al., 1968).

Mayaca fluviatilis Aublet. (Stream bog moss).
"Streams and pools" (Radford et al., 1968).

Threatened Statewide.

Magnolia macrophylla Michaux. (umbrella tree).
"Alluvial woods" (Radford et al. 1968).

Malaxis spicata Swartz (Florida adder's mouth).
"Swamps, low woods, and streambanks" (Radford et al., 1968).

Scutellaria parvula Michaux. (diminutive skullcap).
"Low woods...on basic soils..." (Radford et al., 1968).

Of Special Concern.

Habenaria lacera (Michaux) Lodd. (green fringed orchid).
"Bogs..." (Radford et al., 1968).

Monotropsis odorata var. odorata Schweinitz in Ell. (pigmy pipes).
"Mixed deciduous woods..." (Radford et al., 1968).

Nestronia umbellula (see Federal list).

Viola eriocarpa var. leiocarpa Fernald & Wiegand. (smooth yellow violet).
"Alluvial woods and Slopes" (Radford et al., 1968).

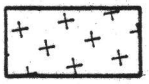
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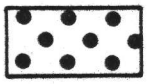
Endangered.

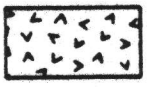
Alligator mississippiensis (American alligator).

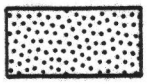
Map 2. Congaree Swamp National Monument:
Terrace Site A

LEGEND

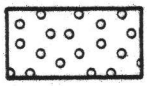

MIXED HARDWOODS-PINE

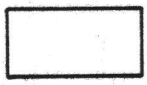

PINE-MIXED HARDWOODS


LOWLAND HARDWOODS


PINE (generally loblolly)


BLUFF HARDWOODS


FLOODPLAIN (bog and bottomland hardwoods with scattered large pines)


FIELDS and OPEN AREAS

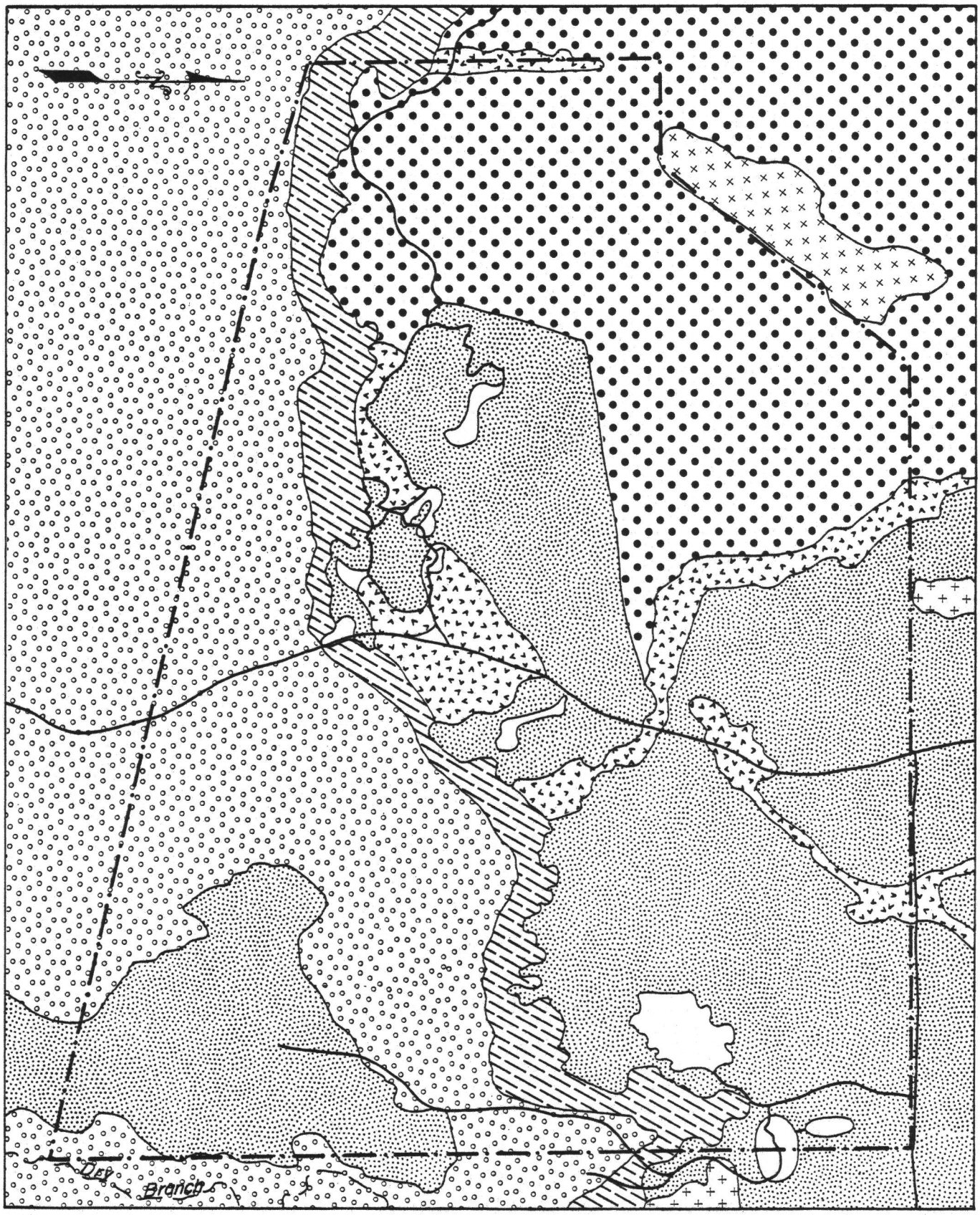
ROAD and JEEP TRAILS

STUDY AREA BOUNDARY

CREEKS

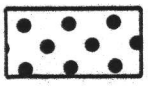
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Based on infrared aerial photography taken in 1976 by NASA. Scale distortion exists on the edges of the map. Property and study area boundaries are approximate.

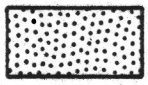

Deep
Branch

Map 3. Congaree Swamp National Monument:
Terrace Site B

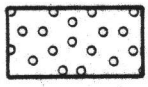
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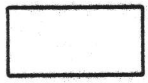

PINE–MIXED HARDWOODS


LOWLAND HARDWOODS


PINE (generally loblolly)


BLUFF HARDWOODS


FLOODPLAIN (bog and bottomland hardwoods with scattered large pines)


FIELDS and OPEN AREAS

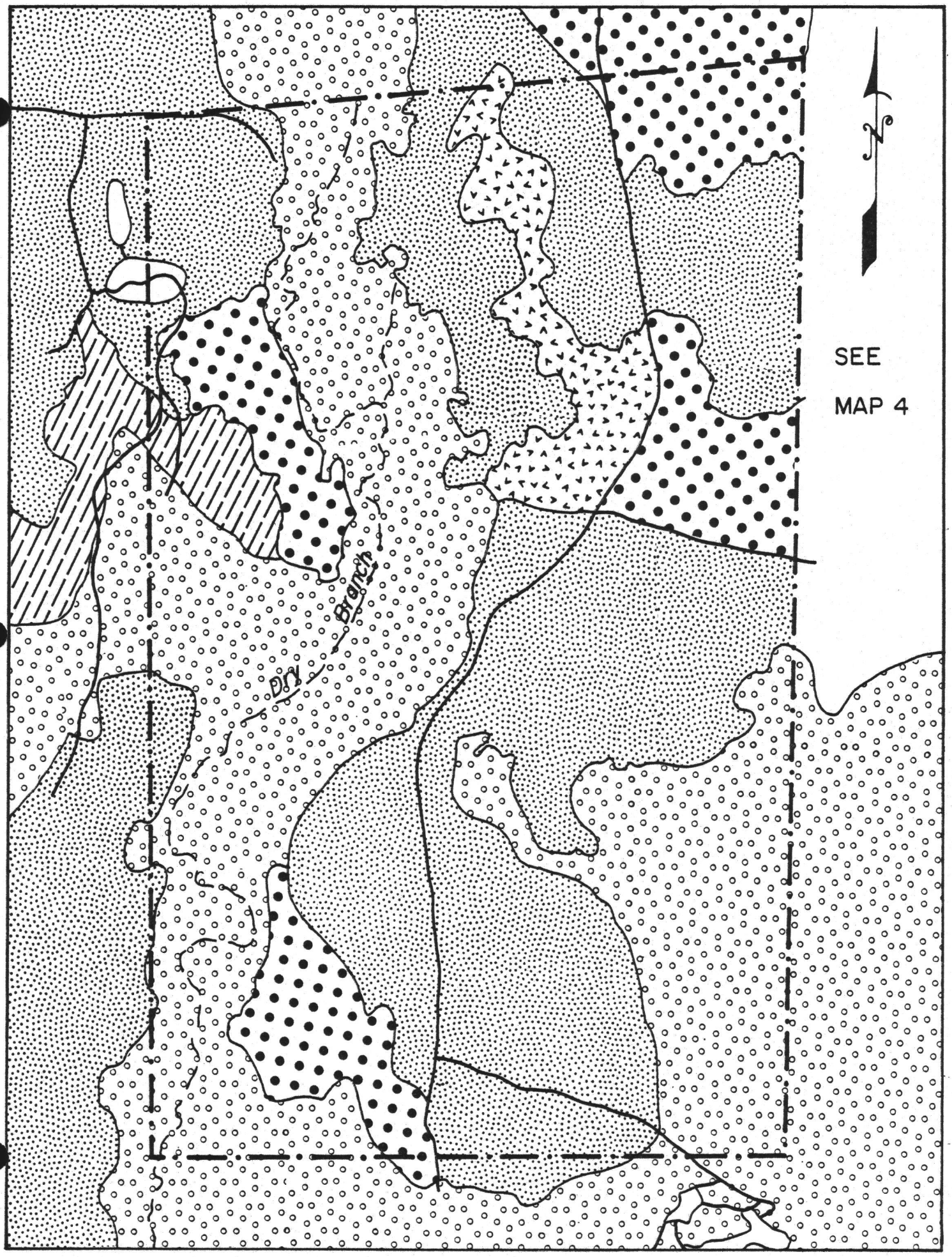
ROADS and JEEP TRAILS

STUDY AREA BOUNDARY

CREEKS

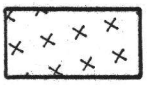
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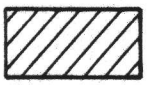
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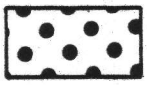

N
SEE
MAP 4
Dry
Branch

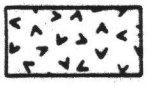
Map 4. Congaree Swamp National Monument: Terrace Site C

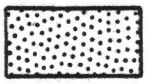
LEGEND


MIXED PINE (open canopy)

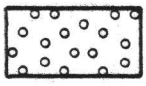

MIXED PINE (closed canopy)

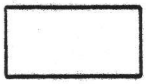

PINE-MIXED HARDWOODS (closed canopy)


PINE-MIXED HARDWOODS (open canopy)


PINE (generally loblolly)


BLUFF HARDWOODS


FLOODPLAIN (bog and bottomland hardwoods with scattered large pines)


FIELDS and OPEN AREAS


RED-COCKADED WOODPECKER CAVITY TREES

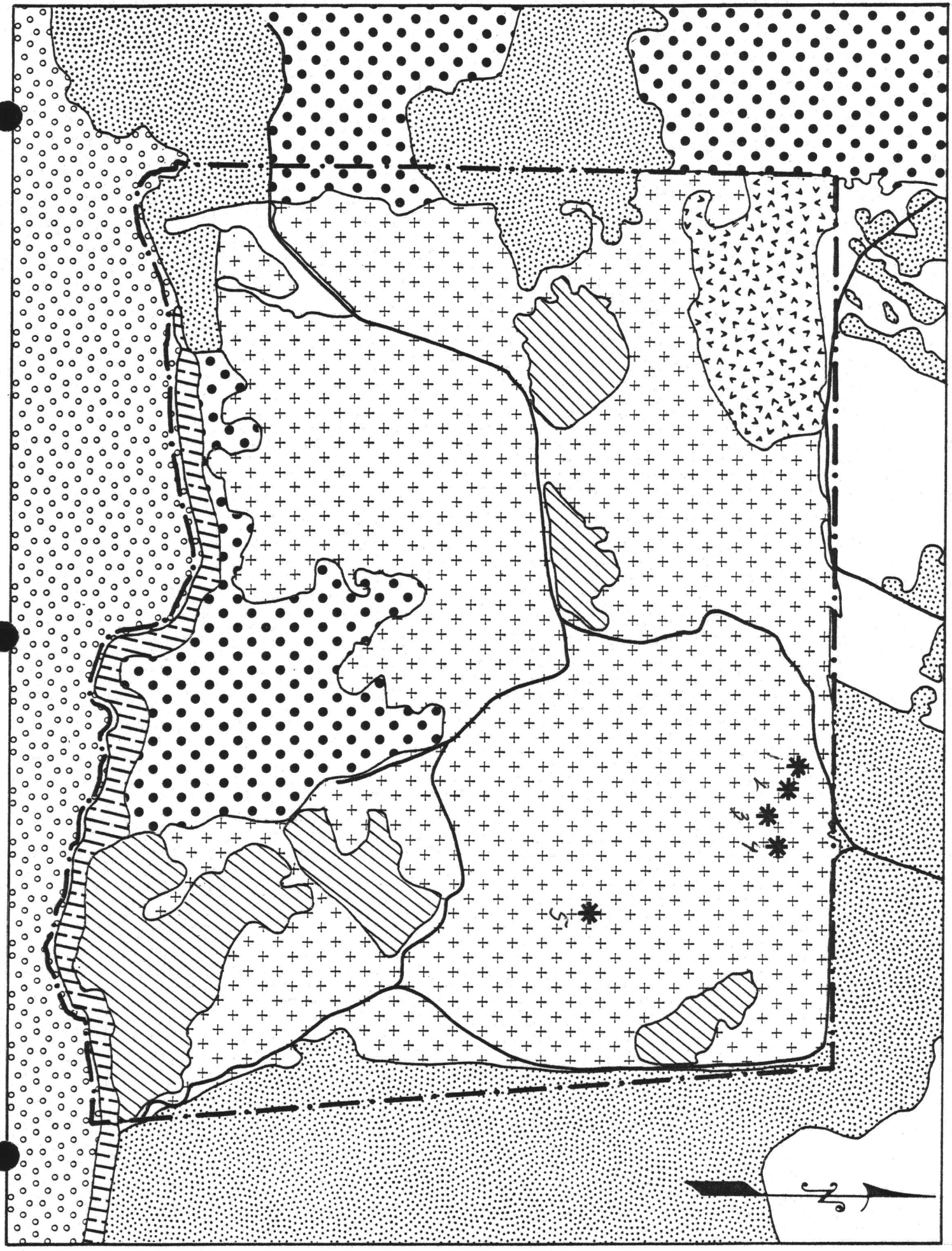
ROADS and JEEP TRAILS

STUDY AREA BOUNDARY

CREEKS

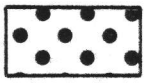
SCALE: 1 inch = 114 feet (6 inches = 1/8 mile)

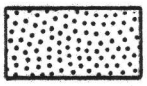
Based on infrared aerial photography taken in 1976 by NASA. Scale distortion exists on the edges of the map. Property and study area boundaries are approximate.

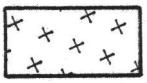


Map 5. Congaree Swamp National Monument:
Terrace Site D

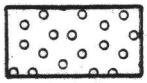
LEGEND

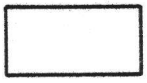

PINE–MIXED HARDWOODS


PINE(generally loblolly)


MIXED HARDWOODS


BLUFF HARDWOODS


FLOODPLAIN(bog and bottomland hardwoods with scattered large pines)


FIELDS and OPEN AREAS

* LOCATION for SOUTHERN REIN ORCHID
(Habenaria flava)

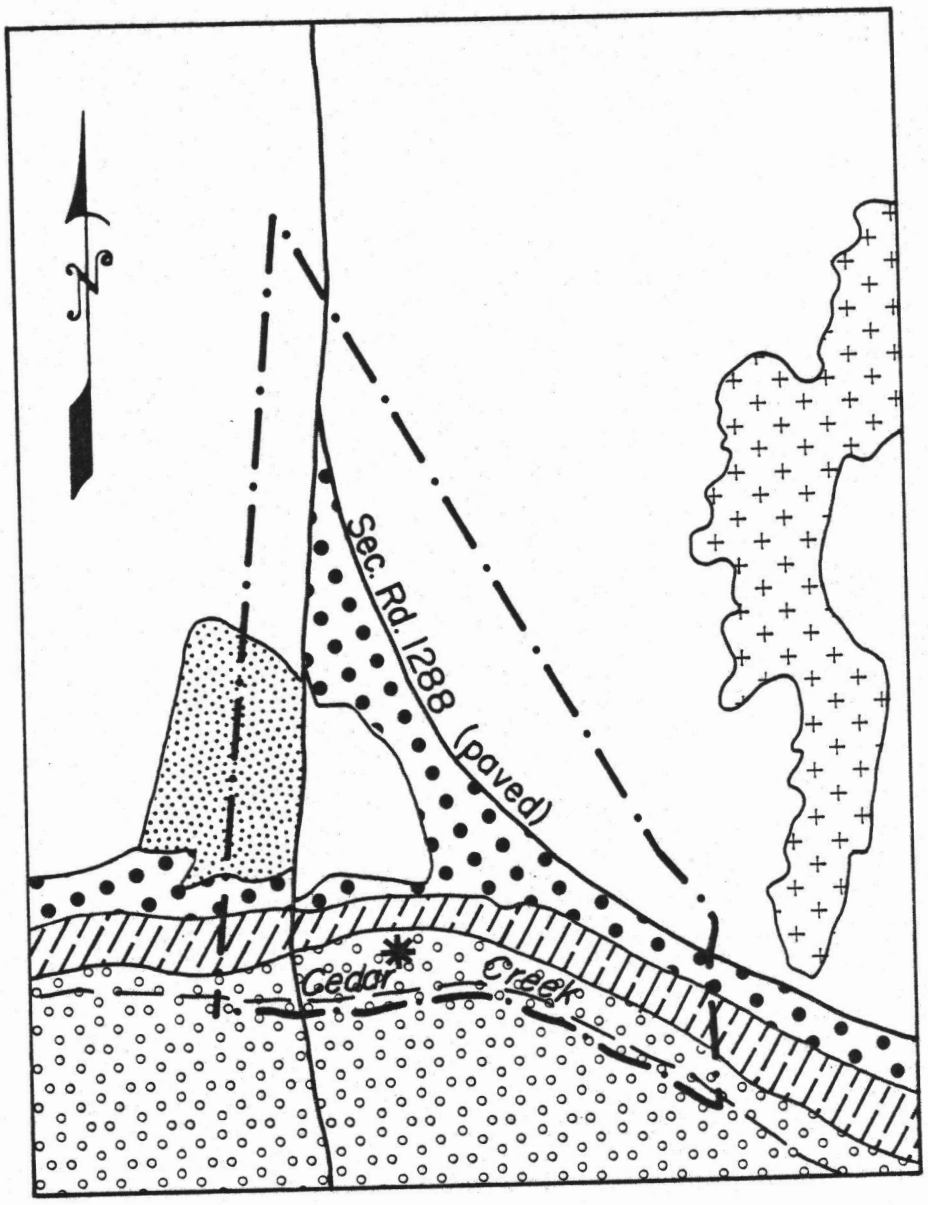
——— ROADS and JEEP TRAILS

—·— STUDY AREA BOUNDARY

— — — CREEKS

SCALE: 1 inch = 114 feet (6 inches = 1/8 mile)

Based on infrared aerial photography taken in 1976 by NASA. Scale distortion exists on the edges of the map. Property and study area boundaries are approximate.


Sec. Rd. 1288 (paved)
Cedar Creek