An Archeological Survey of Congaree Swamp: Cultural Resources Inventory and Assessment of a Bottomland Environment in Central South Carolina

James L. Michie
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AN ARCHEOLOGICAL SURVEY OF CONGAREE SWAMP:
CULTURAL RESOURCES INVENTORY AND ASSESSMENT OF A
BOTTOMLAND ENVIRONMENT IN CENTRAL SOUTH CAROLINA

by

James L. Michie
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INSTITUTE OF ARCHEOLOGY AND ANTHROPOLOGY
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From its inception in 1978, the reconnaissance and intensive survey of the proposed Congaree Swamp National Park Monument has operated smoothly. Mr. Guy Taylor, Park Ranger for Congaree Swamp, introduced us to a bottomland environment of primitive roads, record-sized trees, virgin stands of timber, and several archeological sites. Without his helpful assistance we would have spent a considerable amount of time wandering around a complex network of silty clay roads that were often damp and wet. Appreciation is also extended to Mr. Marion Burnside, President of the Cedar Creek Hunt Club, for providing us with gate keys and considerable information concerning the swamp. Several members of the hunt club also contributed heavily to knowledge about the environment in terms of flora, fauna, and flooding. These people all added considerably to our knowledge of the floodplain.

I also extend a debt of gratitude to Mr. L. L. Gaddy for his assistance in providing us with specific environmental information concerning flora and fauna; to Mr. Rudolph Mancke for herpeto-faunal information; and to Dr. Robert Janiskee for specific data regarding many aspects of the swamp.

Within the Institute of Archeology and Anthropology, University of South Carolina, acknowledgements are extended to Dr. Paul E. Brockington, Division Head of the Environmental Impact Survey, for providing the research design and original contractual agreements with the National Park Service, and for other forms of assistance provided during the project. Appreciation is also extended for the artistry of Mr. Darby Erd, Scientific Illustrator; for the photographic talents of Mr. Gordon Brown; for the editorial abilities of Mr. Kenn Pinson; and, for the typing abilities of Ms. Mary Joyce Burns.

Last, and certainly not least, I extend appreciation to Mr. Tommy Charles and Mr. James D. Scurry, employees of the Institute of Archeology and Anthropology, who assisted in the field research.
CULTURAL RESOURCE MANAGEMENT STATEMENT

Congaree Swamp is a bottomland environment located in central South Carolina, contiguous with the northeast side of the Congaree River. With some 15,000 acres of silty clay soils, oxbow lakes, swales and sloughs, and meandering creeks, the area is relatively flat with little or no topographic relief. Given easily to periodic flooding, the area is not conducive to prolonged human occupation. Rather, the environment demands limited and specialized utilization.

Based on the historic portions of the archeological record, environmental utilization appears to have been oriented towards infrequent cultivation, cattle raising, timber removal, and the occasional manufacture of illegal whiskey. Additionally, there was also an apparent attempt at building a road through the swampy wilderness. Two dike systems, one complete and the other unfinished, attest to attempts of flood control for the cultivation of specific row crops, perhaps corn. A number of elevated earthen structures, probably cattle mounts, provided refuge for livestock during floods. Several large cypress trees exhibit elevated ax marks, suggesting that timbering was performed during floods in order to fell trees and allow them to float downstream to sawmills. The remains of two recent whiskey stills form another aspect of environmental utilization.

The archeological sites relative to the prehistoric period are limited in number and are apparently small in size. At least half of these sites are spurious in deposition and resulted in imported soils used to fill and maintain roadbeds. Another psuedo site is located on a sandbar in the Congaree River with evidence of transported pottery sherds. The remaining sites are regarded as viable representatives of aboriginal occupations. The majority of these sites are exceptionally small and are frequently represented by only a few flakes of bifacial retouch. As a portion of a larger cultural system, the sites are currently regarded as extraction camps and the results of brief occupation.

The continuous meandering of a dynamic river system has probably destroyed numerous cultural resources, evidenced not only by cultural materials that occur on a sandbar, but also by a mosaic of hundreds of oxbow lakes in various stages of filling. The incessant wandering of the river has certainly had an impact on archeological sites, especially if these oxbows have been forming during the last eleven thousand millennia.

The environment of Congaree Swamp is rich and diverse in terms of flora and fauna, but the lowlying, damp environment is frequently flooded, precluding sedentism. Human utilization appears in the form of limited activities which include the extraction of specific flora and fauna, the utilization of nutrient rich soils for cultivation, and the employment of browse and mast for livestock raising. Additionally, the secluded nature of the swamp encourages the manufacture of moonshine whiskey, and probably other related clandestine activities.
In order to assess the significance of the cultural resources, the criteria set forth by the National Register, in addition to other theoretical considerations and sources, were used. The pseudo-sites, 38RD173, 38RD175, 38RS176, 38RD177, 38RD178, and 38RD190 should be disregarded; however, their locations and site numbers should be retained in an attempt to prevent rediscovery and future interpretations. The prehistoric sites, 38RD197, 38RD187, and 38RD174 are represented by only a few lithic items and an occasional pottery sherd. These sites are exceptionally small and have a low potential for yielding additional data. Therefore, they are not included in a category of significance. The two remaining prehistoric sites, 38RD188, and 38RD179, are represented by greater numbers of cultural materials; they occupy a larger areal extent; and cultural continuity exists at 38RD179. Both of these sites appear to be relatively shallow without any stratification, and the cultural materials are diffused and scattered across a relatively large area. Because of the moist environment and cultural continuity, these sites have a high potential for yielding cultural materials and floral/faunal materials relative to site function. In order to address the significance of these sites more thoroughly, however, they should be subjected to a program of intensive testing for further evaluation and recognition of potential. These latter sites should be immediate concern for management.

In terms of the historic sites, the cattle mounts and dikes are determined significant. The other sites, such as the whiskey stills, 38RD198 and 38RD199, and the earthen bridge abutments, 38RD207, are not considered significant. The whiskey stills are recent in origin, probably dating to the 1960s, and have been destroyed by dynamite. The bridge abutments are represented by three eroded earthen structures that lie adjacent to large swales. There are no indications of the persons responsible for construction; there are no indications of time periods; and there are no existing remains of pilings, bridge timbers, or other structural remains. Without more substantive data, historical significance is limited.

The cattle mounts (38RD193, 38RD194, 38RD195, and 38RD196) and the dike systems (38RD191 and 38RD192) are all considered significant, especially on a level of local and state importance. These sites are associated with specific aspects of South Carolina history, and they are relevant to cultural patterns during the historic period. They are also unique to central South Carolina: they represent a previously unrecognized form of environmental adaptation; they provide a documentation of historical events; and they have a potential to educate the public about past lifeways, while they enrich and enhance the cultural heritage of South Carolina.
With the confluence of the Broad and Saluda Rivers in central South Carolina, the Congaree River is formed and flows southeast, meandering more than 50 miles, then forming the Santee River Basin. The floodplain of the Congaree River Valley is a swamp composed of mixed hardwoods with appreciable numbers of sweetgum that thrive in a moist and wet environment.

Although the floodplain is actually the Congaree swamp, a large tract of land representing some 15,000 acres, and owned by the Beidler family of Chicago, it is erroneously referred to as, "Congaree Swamp." This unfortunate colloquial term originated several decades ago when environmentalists sought to preserve the floral and faunal communities of the property. Although portions of the property have been subjected to timbering operations in past years, a great deal of the swamp remains uncut, and it represents one of the greatest unprotected forests in North America. Because of the virgin timber and the property's unique status, the National Park Service (NPS) for the past several years has been involved in assessing the extant resources. Among those studies, the NPS has recently requested an inventory and assessment of cultural resources in the form of a reconnaissance survey of the swamp and an intensive survey of specific upland areas. These surveys were designed for compliance with the National Historic Preservation Act of 1966, the National Environmental Policy Act of 1969, and Executive Order 11593 of 1971. This inventory and assessment of archeological sites is essential to the management of cultural resources, including future research and avoidance of adverse effects related to future development and utilization.

The Congaree River Valley, represented in part by Richland, Lexington, and Calhoun Counties, has never been subjected to any large scale archeological surveys. Several small scale surveys sponsored by the South Carolina Department of Highways and Public Transportation, and the South Carolina Electric and Gas Company, Inc., have allowed reconnaissance and surveys within the narrow corridors of proposed highways and transmission lines, but these surveys are limited in terms of spatial area and location. Although these surveys occasionally transect floodplains and swamps, the main routes are frequently directed across upland areas, thereby failing to yield comparative data from major environmental zones. Thus, the archeologist receives biased information concerning settlement patterns.

South Carolina is dissected by many large and mature river valleys. In the Piedmont provinces, the floodplains are relatively narrow, but within the Coastal Plain, the meandering river systems have wide, flat floodplains sometimes extending four or five miles. The large majority of soils are represented by flood deposited silts and clays. Remnants of oxbow lakes form mosaics of elliptical depressions, while extensive networks of swales and sloughs serve as drainage systems. These swamps are periodically flooded, and as a result standing water and high water tables retard accessibility for most of the year.
Because of a near absence of archeological data pertaining to the riverine environments of actively flooded bottomland swamps, the Institute of Archeology and Anthropology, University of South Carolina, decided to expand the knowledge of human behavioral systems, and subsequently submitted a proposed research design to the National Park Service. The resulting contract, oriented towards discovery and evaluation of historic and prehistoric cultural resources, and the eventual formulation of settlement/subsistence models, also address questions concerning the temporal placement of sites, site size, site function, and problems relating to culture history. Because the floodplain is composed of alluvial soils, and the soils are deposited periodically, the possibility of finding stratified sites or buried single component sites seem, highly probable. The discovery of such sites would contribute significantly to research goals.

Although the swampy bottomland constitutes the largest area of research, the NPS also requested an intensive survey of three separate upland areas lying adjacent to the swamp edge. These areas are termed Proposed Development Zones within which the NPS is considering the construction of reception centers. Prior to any construction or land clearing, these areas, according to the terms of the contract, would be subjected to testing and the implementation of a parallel research design.

Thus, during the weeks from early November 1978, through the first week of January 1979, several members of the Institute of Archeology and Anthropology conducted a reconnaissance survey of the bottomland swamp, and an extensive survey of the upland development zones. The project's Principal Investigator was Dr. Paul E. Brockington, Staff Archeologist and Director of Environmental Impact Surveys. The fieldwork was directed by James L. Michie, Staff Archeologist, with the assistance of James D. Scurry, Assistant Archeologist, and Tommy Charles, Field Assistant.
THE ENVIRONMENTAL SETTING OF THE CONGAREE SWAMP

Introduction

After conducting an extensive literature search concerning the environmental properties of the floodplain area, it became obvious that little specific information existed. The bits and pieces of information hardly formed a patchwork for the entire swamp from Columbia to the Santee River, and those small reports concerning hydrology, botany, and soils systems do not adequately set forth explicit statements of environmental conditions and the interactions of organisms. The vegetational analysis by Gaddy et al. (1975) is presently the only comprehensive report dealing with forest communities. The soils are represented in the Soil Survey of Richland County (Lawrence 1978), while information regarding hydrology is compiled in South Carolina Stream Flow Characteristics (Stallings 1967) and various annual reports from the Department of the Interior regarding Water Resources Data for South Carolina. For the most part, the latter publications are too general because of the broad nature of the subject matter. In the absence of specific literature the following sections will draw upon personal observations made during the survey, in addition to the information provided in publications.

Location and Soils

The Congaree Swamp is located in central South Carolina, approximately 14 miles southeast of Columbia in Richland County. The swamp is about ten miles long and varies from about two to three and a half miles wide, bordered on the northeast by sand hills, and on the east and northwest by property lines extending from the river to the sand hills (Fig. 1), and on the southwest by the Congaree River (Fig. 2).

The swamp is generally characterized by a slightly undulating topography in the form of a sediment accumulative floodplain given easily to inundation. The area is represented by river deposited silts and clays which are extensively dissected by numerous streams, creeks, oxbow lakes, shallow ponds and depressions, and a wandering network of narrow drainages regarded as swales (Figs. 3 & 4). Although the swamp fluctuates from total submergence during flooding to dryness during droughts, the lower elevations are usually wet or damp during normal conditions.

Based on elevation data obtained from United States Geological Survey topographic maps, the topography within the floodplain rises and falls from 90 feet to 102 feet (AMSL), and it should be emphasized that the 12 foot difference occurs over ten miles of swamp which indicates a relative insignificant topography. The northwestern portion ranges from 100 feet to 102 feet, while the southeast portion reflects a single contour line
Figure 1: Location of the proposed Congaree Swamp National Monument.
Figure 2: Congaree River in the Vicinity of the Project Area.

Figure 3: Interior of Congaree Swamp Illustrating Swampy Environment.
Figure 4: Exemplified profile through Congaree Swamp.
of 90 feet. Although the contour intervals are interpolated at 10 feet, field observation failed to discover any natural elevations of significance. The swamp is virtually flat, and while there are obvious differences in elevations, those differences vary only a few feet within any large area.

The floodplain soils are described by Lawrence (1978) as Congaree, Chastain, and Tawcaw, all of which are alluvial and constitute the greatest percentage of soils in the area. The Congaree series is described as:

"...deep, well drained, or moderately well drained moderately permeable soils that formed in loamy alluvial sediments washed from the Piedmont province. Slopes range from 0 to 2 percent.

Congaree soils are closely associated on flood plains with Chastain, Chewacla, Tawcaw, and Toccoa soils. They are at slightly higher elevations and are better drained than Chastain, Chewacla, and Tawcaw soils, which have gray colors above a depth of 20 inches. Toccoa soils have a coarse-loamy control section" (Lawrence 1978: 44).

The Chastain series is described as:

"...deep, nearly level, poorly drained, slowly permeable soils that formed in clayey alluvial sediment. These soils are on broad flood plains of the Wateree and Congaree Rivers. They are commonly flooded and are saturated with water for five months or more in recent years.

Chastain soils are closely associated on the landscape with the Chewacla, Congaree, Dorovan, Tawcaw, and Toccoa soils. Chewacla, Congaree, Tawcaw, and Toccoa soils are on higher elevations and are better drained..." (Lawrence 1978: 43).

The Tawcaw series is described as:

"...deep, somewhat poorly drained, slowly permeable soils that formed in clayey alluvial sediment washed in from the Piedmont province. These soils are on the flood plains along the Congaree and Wateree Rivers. Slopes are less than 1 percent.

Tawcaw soils are associated on the landscape with Congaree, Chastain, Toccoa, and Chewacla soils. Congaree, Toccoa, and Chewacla soils have a coarser textured control section than Tawcaw soils; in addition, Congaree and Toccoa soils are better drained. Chastain soils are more poorly drained than Tawcaw soils" (Lawrence 1978: 55).

The Congaree loam, composed mostly of silts and clays, is relatively level with a dark brown surface layer some eight inches
thick overlying multi-colored deposits of sandy loam, silty clay loam, clay loam, and loam. The structure of the soil has a high potential for yielding bottomland hardwoods and loblolly pine, in addition to pasture and row crops. Corn and soybeans are especially productive.

The Congaree soils have a tendency to parallel the channel of the Congaree River which presents the hazard of floods during the months from November to April. After flooding, the soils may also present problems with drainage thus affecting crop potential.

The Chastain soils, located at lower elevations and inland from the Congaree series, appear to occur in depressions and oxbow lakes that have filled with sediments. The surface layer is usually grayish brown silty clay loam about four inches thick. The underlying soils are also represented by silty clays which continue to depths of approximately seven feet where they rest on gray loamy sand.

Because of low elevation, the soils remain flooded for long intervals, and drainage is extremely difficult. While the soil may support certain adapted hardwoods, cultivated crops have a low potential.

The Tawcaw soils also occur inland from the Congaree series and represent a slightly higher elevation than the Chastain soils. These soils are predominately silty clay loam with a surface layer composed of dark brown soils about four inches thick which overlies about five feet of various deposits of silts, clays, and silty clay loams. The soil has a low potential for cultivation because of frequent flooding and high water tables, compounded with slow runoff and low permeability. However, with the construction of water control systems, such as dikes, the soil has a capability of yielding corn, soybeans, small grain, and pasture grasses.

Along the northern edge of the swamp boundary and adjacent with sandhills are several other soil types of low incidence. The Toccoa series of loam exists in the northwest edge associated with Johnston loam which blends in an eastward direction into Dorovan muck. Associated with streams as they enter the swamp are various other soils such as Rains sandy loam, Blanton sand, and Ailey loamy sand. These soils range from well drained to low permeability, and have low potential for cultivation. Frequent inundation resulting from flooding represents the greatest hazard.

Contiguous with the swamp's edge and rising into the sandhills is a variety of soils somewhat different from those represented in the swamp. The majority of these soils are Persanti, characterized by very fine sandy loam, deep and moderately well drained. These soils have a medium potential for row crops, hay, and pasture, but wetness, poor tilth, low permeability, high water tables, and slow runoff sometimes retard the seasonal planting dates. Smithboro loam occurs in isolated places contiguous with the Persanti soils. This soil also has about the same properties of Persanti especially in reference to cultivation and low permeability. Cantey loam also occupies areas adjacent to Persanti and Smithboro and possesses the soil character of those soils. Goldsboro sandy loam also occurs contiguously with the mentioned soils. Although
the soil has a high potential for row crops and pasture, it is somewhat encumbered with surface wetness and high water tables. Vaucluse soils are associated with the swamp edge and sometimes occur adjacent to streams as they enter the swamp. The soil is well drained, but it fails to offer deep root penetration for cultivated crops, and additionally, it has a tendency for severe erosion during cultivation.

These soils, then, present many problems for human utilization. The soils occurring in the swamp are subjected to periodical flooding, and in many instances drainage and runoff present a problem. The Tawcaw and Chastain series are especially problematical because of their ability to retain water for long periods of time. The somewhat higher Congaree series, however, drains more efficiently following rains and floods. The Congaree series appears to have been cultivated in Richland County prior to the 20th century, and the Calhoun County side of the river is still successfully cultivated. The Congaree soils when seen in profile frequently display varving and layering resulting from flood deposition, while the more inland soils, Tawcaw and Chastain, are more homogeneous. During flooding the velocity of water is reduced as it leaves the main channel, thus depositing heavier sediments near the river and finer sediments at greater distances (Foster 1971: 197). These higher elevations adjacent to the river are therefore expected.

The upland soils bordering the swamp are generally composed of sandy loam and are relatively level with only slight relief. Low permeability and slow runoff seems to characterize the majority of these soils which discourage grain and pasture crops. However, portion of the upland area is presently cultivated, and field observations during the survey indicated that soybeans, corn, and other specific row crops occurred in quantity. Based on old fallow fields that have since given growth to stands of pine, cultivation during the past decades appears to have been more extensive. The reason for the discontinuation of farming on the sandy loamy soils is presently unknown.

While the uplands display varying amounts of sand, the interior of the swamp within the boundary has failed to yield any sand ridges. The only existing sand is seen on point bars in the Congaree River, and along the bottoms of Cedar Creek and Tom's Creek. In fact, sand ridges occur infrequently in the swampy floodplain beginning several miles below Columbia and terminating at the Santee River, a distance of some thirty miles. Only two known sand hummocks occur within the swampy area: Muller's Barn Ridge, located across the river in Calhoun County; and Green Hill Mound, located about eight miles northwest of the monument boundary in Richland County. These ridges, possibly related to remnant dune complexes of the Cenozoic seas or more recent alluvial activities within the swamp, are rather large and rise some ten to fifteen feet above the swamp floor. Both of these ridges have yielded prehistoric and historic cultural materials, which will be discussed later. The USGS topographic maps and personal observations have not indicated any sand ridges. The local informants of Cedar Creek Hunt Club also reported the absence of sand ridges. The swamp floor is, therefore, relatively flat and the surface soils are represented entirely of loams in the form of silts and clays.
Hydrology

The Broad and Saluda Rivers flow from the Piedmont in a relatively straight path and merge on the Fall Line at Columbia. This confluence forms the Congaree River, and for a distance of little more than a mile, the river tumbles over rapids, shoals, and a small interspersed island before it enters the Coastal Plain. At this point the Congaree begins flowing in a meandering pattern across gradients composed of silts, clays, and sands, and through a broad floodplain until it reaches the Wateree River some 50 miles to the southeast. This confluence forms the Santee River which drains a major portion of South Carolina, some 14,600 square miles (Stallings 1967: 55).

The Broad River is formed at the base of the Blue Ridge Mountains at an elevation of about 4,000 feet and flows on a southerly course for about 166 miles until it reaches the Saluda River, having drained some 5,240 square miles. The Saluda is formed in the extreme northwestern portion of South Carolina and flows for a distance of about 145 miles, having drained about 2,510 square miles, when it reaches Columbia and the Broad River. The confluence of these two rivers drains about 8,500 square miles (U.S. Corps of Engineers 1974: 1). As the Congaree moves southeasterly, it is fed by additional streams which increase its volume. Although water data are not available for the lower extent of the river, a conjecture would suggest the river has drained approximately 9,000 square miles as it passes by the monument boundary and collects additional water from Cedar Creek and Tom's Creek.

During extreme discharge the Congaree River at Columbia yielded 364,000 cfs in August 1908 (U.S. Geological Survey 1978: 132), and a minimum discharge of only 588 cfs in January 1942 (U.S. Geological Survey 1971: 66). An average flow for a duration of 39 years is 9,366 cfs (U.S. Geological Survey 1978: 132). The discharge potential of the Saluda River is impeded by the reservoir at Lake Murray and at Lake Greenwood, while the Broad River flow is obstructed with several power plants. The maximum discharge mentioned above occurred in the absence of reservoirs and other hindrances, but even after the construction of the Lake Murray Dam, the flood of 1929 nearly equaled the discharge recorded in 1908. The impact of these maximum discharges and others of equal significance will be mentioned later.

Principal tributaries to the Congaree are formed in the sandhills of Richland and Calhoun Counties, flowing in a meandering pattern. Outside of the monument boundary, Congaree Creek is the largest stream, while Savany Hunt, Thom's, Big Beaver, Sandy Run, and Bates Mill Creeks constitute smaller creeks of Calhoun County. In Richland County, Gill's Creek and Mill Creek are the primary tributaries existing outside of the swamp, but within the boundary Cedar Creek and Tom's Creek represent two additional creeks of equal size.

Cedar Creek, the largest of the streams, originates in the sandhills and flows south for about fourteen miles gathering water from hinterland drainages. Prior to its entry into the swamp it merges with Meyer's Creek at the extreme northwest corner of the monument. From this point
the creek flows southeast following old river channels and oxbow lakes for a distance of nearly nine miles before it enters the Congaree River. During its meandering flow, the creek wanders north and south, occasionally coming in contact with the edge of the sandhills.

Tom's Creek, somewhat smaller, also originates in the sandhills gathering additional water from McKenzie Creek as they merge near the swamp edge. The creek enters the swamp perpendicular to the river and continues the southern flow until it separates and joins Running Lake Creek. The latter creek flows east and leaves the floodplain while the remaining portion flows south and joins with Cedar Creek near its confluence with the river.

These two creeks represent the only running water flowing through the monument boundary. The remaining waters in the oxbow lakes, ponds, depressions, and swales are fed either by the flooding of the Congaree or by increased heights in the water table. As a response to receding waters and drainage the meandering and wandering swales interlace the swamp floor, eventually draining off the waters to the river.

The Effects of Flooding in the Congaree River Valley

The floodplain of the Congaree River is inundated several times a year, usually during the winter and spring months. The severity of inundation, of course, depends on many variables. The extent and duration of rainfall are major causal factors. Extended seasonal rains occurring over major portions of the state will induce exceptionally high waters, even when the reservoirs serve as controlling systems. Severe rainfall in the Piedmont region will also bring appreciable amounts of water down the Saluda and Broad Rivers which drain about 8,500 square miles, thus affecting the area of Columbia and the Congaree River. Local storms will also induce flooding, but perhaps the most severe rainfall and subsequent flooding occur when tropical storms move in from the coast. Whether or not storms or hurricanes account for flooding, floods of great magnitude have been recorded, and the effects on humanity have been severe.

One of the first recorded floods occurred in September of 1701, when Lawson was traveling up the Santee River:

"...the overflowing of the freshes, which then came down, had made a perfect sea of, there running an incredible current in the river...

Santee River, at this time, (from the usual depth of water), was risen perpendicular 36 foot, always making a breach from her banks about this season of the year..." (Lawson 1709: 14).
The magnitude of this flood is expressed not only in depth, but also in width:

...and coming down with impetuosity fills those branches that feed these rivers, and causes this strange deluge, which oft-times lays under water the adjacent parts on both sides this current, for several miles distant from her banks... (Lawson 1709: 15).

In 1796, according to Drayton (1802), another large flood occurred in the area of the Santee and Congaree Rivers, destroying property and livestock:

...a similar one (flood) came down the same river; ever to be remembered by the mischief it effected. No bridge could withstand the fury of its torrent; rendered more impetuous by the weight of large trees and houses, which were borne down by its stream. A wooden bridge over Broad River, a few miles from Columbia; and another about seven hundred feet long over the Congaree River at Granby, upwards of forty feet high above the common level of the river, and made of whole piers were fastened by iron bolts into solid rock at the bottom of the river, were swept away in the general ruin. At Granby, the tobacco ware house was destroyed; together with one hundred and fifty hogsheads of tobacco which were therein. The Camden tobacco ware house, on the banks of the Watteree River, met the same fate. Dwelling houses, corn houses, cattle, horses, and hogs, were carried down by the violence of the current; and vast beds of sand, were strewn over fertile tracts of swamp land, to their irreparable injury. The collected waters, of almost all the rivers in the upper country, at length, effected a junction at the confluence of the Watteree and Congaree Rivers; pouring down their consolidated turbid stream, with destructive velocity; rising at the rate of three inches an hour, and continuing to rise for some days. At this time, the current in a great degree swept directly down the swamp, in a width in some places, more than five miles from the high pine lands on either side; undirected by the course of the river where it made a bend across the swamp; and only following it when the direction was with the stream. Much provision was destroyed; thousands of bushels of Indian corn, and many hundred barrels of rice. Some of the negro houses of the lower plantations on the Santee, were torn up, and were carried by the torrent entirely out to sea.

Several floods of appreciable magnitude happened during the 1800's, but perhaps the larger in recent history occurred in 1908, and again in 1929. The flood of early October 1929 resulted from
the effects of two tropical storms that passed through Georgia and central South Carolina. The first storm arrived in late September, saturating the surface soils, and flooding the Broad, Saluda, and Congaree Rivers. A week later the second storm arrived. Unable to accept additional water, the saturated soils drained unusual amounts of rain from the watersheds of the three major rivers. The discharge from these rivers equaled previous floods, and brought about widespread destruction to material culture and created disease through contaminated water. The accounts of this flood are recorded in The State newspaper:

...inhabitants along river banks in various sections of the state had deserted their homes and fled for safety as the waters continued to creep higher and bridges went down before the swirling streams in many places....

...a wrecking train between Beech Island and Ellenton on the C. & W.C. railway was very nearly lost Tuesday afternoon, when the fill which it was endeavoring to save began to slough off.

...Southern train service between Columbia and Charleston by this point (Orangeburg) has been halted due to high water at Kingsville, where the flood water from the Congaree is reported well over the tracks for some distance and up in the station.

...almost everywhere in both states (Georgia and South Carolina) today rivers continued to rise, flooding lowlands and sweeping away highways and bridges in their paths. So high was the water in several sections of South Carolina that the entire bridges were covered making it impossible to ascertain whether they had been washed away or not...at Chappells the water had risen over the tracks and was lapping at the windows of the railway station. Traffic over this route, between Columbia and Greenville has been halted....The Broad River was out of its banks at several places near Alston, causing Southern Railway trains between Columbia and Spartanburg to be detoured by way of Charlotte...an incomplete survey of highways in the two states today showed that more than 40 highways were closed in South Carolina....Crops in low grounds were ruined by flood water. Hundreds of acres in York County, South Carolina alone were reported flooded when flood gates of Duke Power Company had to be opened (The State, Oct. 9, 1929).

The intensity of the flood continued for several days, destroying personal property, livestock, and crops, not only within the flood plains, but also on the terrace edges of the Congaree and other rivers.
The magnitude of the flood swept down through the floodplains, often marooning people and destroying houses:

...three people were rescued from the seven mile wide Congaree River Swamp below Columbia by a searching party while no reports were available from another group which invaded the swamps near the same locality.... As the waters rose towards the road reports came from the Congaree River swamp that people and animals were marooned. From this vastness, Dr. J. C. Gasque of Columbia and Henry Milen rescued a Mr. and Mrs. Bush and an unidentified man. The husband and wife were found near the rivers edge on top of their house where they had been for two days without for food or water. The other man was picked up on the front porch where he stood in waist deep water. Scenes of desolution and destruction greeted the rescuers in every band in the region. Cattle, mules, hogs, dogs, and cats were drowned in numbers....Entering the water at Big Lake, some 14 miles below Columbia on the submerged Bluff Road, Doctor Gasque piloted his small craft approximately 11 miles through woods, swamps, and fields all flooded under water from 20 feet to a few inches ...eaves of houses in the section (below Columbia) were lapped by the waters, with more water to come from Columbia and above. Livestock, farm animals, hogs and chickens, with innumerable rabbits thrown in for wilderness sake were reported floating along helpless or drowned... Approximately 130 chickens were loaded in a boat and hogs into another, and the rescuers—the day without food or drink—make for dryer lands. On the same some cattle were saved, but the loss among live stock will be large and all crops are ruined.

...Doctor Hayne announced in Columbia that a test was made of drinking water other than found in deep wells and that this water in every instance was polluted. Fear that typhoid fever would result from drinking water brought forth an order of 5,000 units of typhoid bacteria (The State, Oct. 9, 1929).

This massive flood created a severe impact on people, livestock, property, and wildlife as well. The lowlands and swamps were completely submerged, often to depths greater than twenty feet, and the lower fringes of the floodplain terraces were inundated.

Floods bordering on this magnitude have appeared during other times, frequently destroying cultural innovations within lowlands and swamps. The bridge connecting Columbia with West Columbia was destroyed several times during the late 1700's. Even attempts at completing the bridge were often halted when portions were washed away during construction. One bridge was washed away in 1790, "Yesterday the bridge at Granby was entirely carried away by the fresh; the Saluda bridge was also seen to
pass by Granby today. The river has been higher than it has been known to be for 17 or 18 years” (Green 1932: 121).

In August of 1852, "the Congaree River rose to an unusual height six feet above the freshet of 1840, higher than the great Yazoo freshet of 1796" (Green 1932: 13). The sandy bluffs of the floodplain terrace were opened and eroded, destroying cotton fields with depths of water ranging from three to five feet. Subsequent to the erosion, several Indian burials were exposed (Green 1932: 13).

Not only did bridges, crops, and livestock suffer from the flood waters, but numerous ferries were also swept away. Green (1932) records an attempt to establish a new ferry over the Congaree slightly below Columbia in 1754, "Here there was high ground, so that the ferry could be reached at both ends even when the river overflowed its banks elsewhere." McCant's Ferry, also located near Columbia and within the Congaree River, was subsequently destroyed in the summer of 1928 during a flood (Green 1932: 115).

The floods mentioned above reflect extreme discharges (Tables 1 and 2), and represent floods of 50, 100, and 500 year frequencies. Floods of smaller proportions occur almost annually and frequently inundate the Congaree floodplain with several inches or several feet of water. The small floods of 1958, 1964, 1975, and 1979, for example, completely submerged major portions of the swamp, while many lowlying roads were also flooded. In 1975, several homes along the Congaree River were flooded to a depth of two feet, and the hunting lodge located in the monument area which is constructed on pilings, monitored flood waters in excess of four feet. A metal marker placed on one of the pilings attests to the flood elevation. During the floods of 1958 and 1964, portions of the Old State Road, located south of Columbia, were flooded with several feet of water thereby destroying many crops and endangering livestock.

The effects of flooding are usually severe on the cultural materials of humanity. Those who choose to exploit the rich bottomlands of swamps, either through cultivation or the raising of livestock, are faced with floods of varying degrees. Even with the recent construction of reservoirs, flooding is unavoidable, and its impact of human resources is destructive.

Naturally Induced Changes in the Congaree River Channel

Concomitant with flood waters is the inevitable alteration and modification of river channels. Even without the forces of abnormal discharge, a meandering river system will change significantly through erosion and deposition of sediments (Levey 1976). The soft soils and fine particles of the Congaree River floodplain are given easily to erosion which provides for a typical meandering pattern.

As rivers fall from the Piedmont, the channels cut through crystalline structures and follow a relatively straight path. Large obstructions
TABLE 1
RATES OF RISE AND DURATION
(Congaree River at Columbia)

<table>
<thead>
<tr>
<th>Flood (date of crest)</th>
<th>Duration (above flood stage)</th>
<th>Height of Rise (above flood stage)</th>
<th>Rate of Rise (flood stage to crest)</th>
<th>Time of Rise (normal to flood stage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 27, 1908</td>
<td>5 1/2 days</td>
<td>28.8 feet</td>
<td>0.32 ft./hr.</td>
<td>24 hours</td>
</tr>
<tr>
<td>Aug. 18, 1928</td>
<td>8 1/2*</td>
<td>18.5 feet**</td>
<td>0.40 ft./hr.**</td>
<td>24 hours**</td>
</tr>
<tr>
<td>Oct. 3, 1929</td>
<td>6 1/4 days*</td>
<td>18.1 feet**</td>
<td>0.45 ft./hr.**</td>
<td>28 hours**</td>
</tr>
<tr>
<td>Apr. 10, 1964</td>
<td>3 days</td>
<td>9.6 feet</td>
<td>0.24 ft./hr.</td>
<td>48 hours</td>
</tr>
</tbody>
</table>

* Indicates total time above flood stage during two separate flood crests.
** Relates to the second and highest of two flood crests.
Rates of Rise and Duration based on Special Flood Hazard Information Report (Corps of Engineers 1974).

TABLE 2
FLOODS SUGGESTING AND DEMONSTRATING APPRECIABLE MAGNITUDE IN THE CONGAREE RIVER VALLEY

<table>
<thead>
<tr>
<th>Location</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbia at Congaree River</td>
<td>1700 1754 1796 1840 1852 1908 1928 1929</td>
</tr>
</tbody>
</table>

Elevation above datum of 113.02:
- 152.8
- 150.5
- 150.1

Note: Elevations based on Corps of Engineers (1974: 9).

When the rivers enter the sandy Coastal Plain and leave the bedrock channels of the uplands, various obstructions alter the flow of water by diverting currents. Any unyielding objects, such as fallen trees or log jams, that impede the motion of flowing water will direct its currents into something more yielding. The evolution and development of meandering begins with an obstacle that directs the flow of water towards the opposite bank, and subsequently, the bank begins to erode which forces the river to change direction, thus affecting the opposite bank (Fig. 5). These changes generate additional erosion, and begin forming the structure of a meander. As the meander develops, the point bar formation begins to grow and accretion continues with erosion (Fig. 5). In its terminal stage the meander begins to close as the result of continued erosion at the base of the loop. When the loops form a confluence, the river acquires a new channel (Fig. 5) (Foster 1971: 194).

The formation of oxbow lakes and cut-offs may also result from increased velocity and force of water generated through flooding. The meanders usually form perpendicular to the general direction of the
Figure 5: The evolution of a River Meander.
river valley, and when the river rises and inundates the floodplain, the flow of water is seldom confined to the channel, but rather to the valley of the floodplain. Under these conditions the water rushes across point bars, occasionally dissecting portions of the point bars and creating new channels which form the cut-offs. Following the formation of new channels, successive floods and subsequent transportation of sediments begin filling the oxbow lakes.

Since 1825, at least seven major changes have occurred in the flow structure of the Congaree River. These changes involve the filling of oxbow lakes, meander cut-offs, and the disappearance of an island (Figs. 6-11). Chappel's Cut-off has partially filled and remnants exist as Saylor's Lake, which is located in Calhoun County (Fig. 6). Several miles downstream a cut-off is noted slightly south of the monument boundary. Between these two changes, Mill Creek has also changed its flow and runs in a channel several miles to the east, discharging into the river near Chappel's cut-off. A rather large island several miles below Big Beaver Creek is presently nonexistent, and a large cypress pond has since filled near an additional cut-off (Fig. 7), all located within the monument boundary. Slightly west of the monument, two additional cut-offs are noted, one of which is known as the Devil's Elbow and the other located at the old Bate's Ferry Bridge and presently supporting a portion of Highway 601 as it enters Calhoun County. A final change is noted with the disappearance of an oxbow lake located slightly north of the Devil's Elbow (Fig. 8).

In addition to these readily noted features, there are several indications of lateral movements in the river channel in terms of northern and southern migration. One appreciable migration is seen east of Mill Creek where the river has moved north cutting into a portion of Richland County. South of the northeast monument boundary, and associated with a cut-off, the river apparently bowed to the north, and the meanders adjacent to and slightly south of Scott's Quarter suggest further developments and extensions of point bars. West of the Devil's Elbow and east of the Old Cypress Pond, the entire system of meanders indicates further development and extensions of point bars in northern and southern directions (Fig. 7). These observations and others are confirmed by details provided on USGS topographic maps.

The river, then, has made significant changes since 1825, and based on these changes one could easily imagine greater changes during a period of five hundred years, and then a period of one thousand years. As evidenced by the impressive number of old filled oxbow lakes that appear throughout the swamp, a considerable amount of environmental change has occurred throughout the millennia. Without core samples and radiocarbon dates from the filled meanders, ancient river channels are not easily traced, and therefore difficult to reconstruct. Without any doubt the river has constantly migrated back and forth in its valley many times, and with each cut-off and channel modification the flora and fauna would be subjected to change. Such change would certainly affect patterns of human behavior with regard to environmental utilization. Even during recent times the alteration of the river channel isolated an earthen dike and a cattle mount. The dike and cattle mount were once situated adjacent to the Congaree. Further east, near the Wateree
River, another cut-off severed a major thoroughfare from Richland to Calhoun County (Fig. 8) which would have required the construction of another ferry or bridge to span the new channel. The location of Scott's Quarter on the 1825 Mill's Atlas is precariously situated on the edge of a developing meander (Fig. 7), and in all probability, the site has since been destroyed with the northern migration of the channel and the development of the meander.

Considerations for a Paleoenvironment

As W. A. Watts has pointed out, the "vegetational history...of the southeastern United States is very poorly known" (Watts 1971: 676), and Whitehead states equally, "comparatively little is known concerning Pleistocene vegetational and climatic changes in unglaciated eastern North America" (Whitehead 1965: 416). In addition, a review of southeastern paleoenvironmental literature reveals that South Carolina is poorly represented, especially in the areas of post-glacial studies (Michie 1979: 10).

The evidence suggesting conditions during pre-Wisconsin times is found at several localities in the Southeast and its adjoining areas. A locality near Washington, D.C. has yielded spores and pollen from swamp peats indicating the presence of Quercus (27.8%), Pinus (10.2%), Taxodium (10.1%), Carya (8.7%), Fagus (2.9%), Castanea (1.33%), and Liriodendrom (1.4%). The oak/hickory maximum was well developed during the Sangamon Interglacial. Pollen spores found above and below interglacial evidence suggest cooler conditions with the appearance of spruce, fir, and additional pine. Apparently the site is a near continuum of floral history ranging from the Illionian decline to the beginning of the Wisconsin (Whitehead 1965: 426).

On the Neuse River at Flanner's Pond, North Carolina, another interglacial site has yielded spores and pollen that parallel the site near Washington, D.C., suggesting a warm interglacial climate that produced hardwoods. Further down the coast, located at Myrtle Beach, South Carolina, the Horry Clays have produced similar evidence for the presence of oak, gum, hickory, ash, elm, cypress, and willow during the Sangamon. At Charleston, South Carolina, additional evidence is found at the Ladson Formation, a marine deposit, that suggests the presence of pine, oak, and hickory, representative also of the Sangamon (Whitehead 1965: 426).

But while Whitehead outlines the interglacial evidence, he cautions that the correlations of the four sites are not yet certain. "All appear to date from the Sangamon Interglacial, yet the pollen profiles, while clearly indicating temperate conditions, are dissimilar enough to preclude exact correlation" (Whitehead 1965: 426).

Following the Sangamon, the Wisconsin glaciers began to creep southward which changed the forests and climate of the southern latitudes.
Figure 6: Congaree River as it appears in Mill's Atlas, 1825.
Figure 7: Congaree River as it appears in Mill’s Atlas, 1825.
Figure 8: Congaree River as it appears in Mill's Atlas, 1825.
Figure 9: Congaree River as it appears on County Highway Map, 1975.
Figure 10: Congaree River as it appears on County Highway Map, 1975.
Figure 11: Congaree River as it appears on County Highway Map, 1975.
Although there are discrepancies in the interpretive data, "a major southward displacement of many boreal species and profound climatic changes can no longer be disputed" (Whitehead 1965: 419). The Carolina Bays of the Coastal Plain of North Carolina have produced some of the best data and pollen profiles that lend evidence for glacial vegetation in unglaciated regions of the south. A locality in Bladen County has been examined, and a fifteen foot soil profile has indicated the presence of a deciduous forest during the Sangamon; the presence of conifers during glaciation; and the decline of conifers at the fall of the Wisconsin. During glaciation, Pinus is the dominant genera, and the smallness of the pollen suggests a species of small pine, such as jack pine. Spruce is also present, but it represents only a small portion of the sample. Occurring below the glacial profile is evidence for oak, birch, and other deciduous species. In this horizon, pine percentages fall sharply, marking the appearance of an interglacial (Whitehead 1965: 420).

A more recent study of glacial profiles in the Carolina Bays has demonstrated the presence of northern elements, such as Lycopodium annotinum, Lycopodium lucidulum, Abies, Schizaea pusilla, and Sanguisorba canadensis, which are good indicators of cooler climates. The presence of weeds, such as Artemisia, Ambrosia, Corylus, and Compositae represent appreciable numbers. These weeds can be used to infer the structure of the vegetation that surrounds the Bays, and according to Whitehead, the presence of additional weeds, such as Polygonella, Plantago, Caryophyllaceae, and especially Polygonella, "is a good indicator of areas of uncolonized open sand. It thus seems probable that the coarse sands of the area supported an open vegetation during Wisconsin times, a community dominated by widely spaced pines with heliophytic herbs and shrubs as associates. Because much of the region is underlain by coarse sand, this community may have been widely distributed. Spruce and more mesic boreal elements may have grown along the shores of the lakes or on the poorly drained inter-bay areas" (Whitehead 1965: 421). But while some of these boreal, or northern elements are present, certain southern elements are also present. Occasional grains of cypress, poplar, sycamore, oak, and hickory constitute some of the southern elements. Because of these southern elements, a true boreal forest may not have existed in the coastal plain of North Carolina. But certain aspects of it were there, and they indicate a cooler climate and an open forest.

At another Carolina Bay site in Chowan County, North Carolina, located in the northeast portion of the state, pollen samples representing full-glacial have indicated a greater percentage of spruce and fir. Pine is also present and the smallness of the pollen grains indicate jack pine, or red pine. This assemblage of pollen is more suggestive of a boreal forest, and it is located in a higher latitude of North Carolina (Whitehead 1973: 625).

Further to the south, and located in central Florida, a lake bed has produced a profile of pollen that contains a spectrum of xerophytes, instead of boreal, or deciduous, elements. If this is a representative of Florida, "then the temperate forest taxa now present may have immigrated into Florida from the north during the late glacial and postglacial. This might suggest a Gulf Coast refugial area" (Whitehead 1973: 626). However, more data are needed before such an inference can be made.
The coastal plain of the south Atlantic states, therefore, begins to emerge as a diversified area during full-glaciation. The northern latitudes appear to have developed a boreal type forest with a greater amount of spruce and fir, while the areas to the south seem to have had greater percentages of pine and smaller percentages of spruce. Deciduous communities may have existed further to the south, and, within Florida, there may have been xeric conditions, producing xerophytic communities. The coastal plain of South Carolina and North Carolina may have been characterized with open communities of spruce and pine (perhaps jack pine), and heliophytic herbs and shrubs.

The piedmont of the south Atlantic states appears to parallel the flora of the coastal plain during full-glacial times. Watts (1970) has taken soil samples from sediments of two ponds in northwestern Georgia, located on the fringe of the piedmont. The basal clays, which have been assigned to the height of the Wisconsin with radiocarbon dates, have produced a pollen assemblage dominated by Pinus, with smaller percentages of Picea, Quercus, Ostrya, and herbaceous types. The Pinus is apparently jack pine, represented by small pollen and fossil needles.

The pollen percentages in the piedmont sites are quite similar to those found in the coastal plain sites of North Carolina, even though soil types are different. That the flora is so similar would preclude soil as a determinant for forests, and "no special explanation is necessary. The joint occurrence of spruce and pine needles in Georgia suggests that the trees grew in mixed stands on the upland around the lakes. However, the herbaceous pollen suggest some open herb communities" (Watts 1970: 25).

In consideration of the deciduous trees, "the hardwoods probably grew in special situations, such as gallery forests on alluvial plains within conifer forests. Possibly a predominantly pine/spruce forest contained scattered individuals or stands of hardwoods?" (Watts 1970: 26).

The piedmont of South Carolina and North Carolina have also produced certain boreal elements. A site located near Spartanburg, South Carolina, has yielded spruce and fir pollen from buried organic horizons. But "the greater abundance of boreal elements in the lower half of each section suggested that the sediments accumulated during a time of climatic amelioration, probably directly after a glaciation" (Whitehead 1965: 422).

The full-glacial affected most of the south Atlantic states as it brought about the displacement of many northern elements. The deciduous forests of the Sangamon were replaced with a dominant pine forest and lesser percentages of spruce. The northern latitudes contained a more typical boreal forest with greater percentages of spruce and fir, while the southern latitudes, such as South Carolina, North Carolina, and Georgia witnessed forests of pine and spruce, especially jack pine. Open forests of pine and spruce, with heliophytic herbs and shrubs as associates are proposed for the coastal plain of North Carolina and the piedmont fringe of northwestern Georgia. This spatial similarity in North Carolina and Georgia would certainly indicate that South Carolina
was endowed with an equivalent environment between 25,000 and 15,000 years ago.

Following a period of full-glaciation and its effect on the temperate areas, the retreating Wisconsin glaciers encouraged a climatic and environmental change in the Southeast. In the mid-south Atlantic states the pine/spruce forests began to give way to a developing deciduous forest. During these late-glacial times, oak and hickory began to play more important roles, and the hemlock-northern hardwoods began to appear. By postglacial times the hemlock and beeches were declining and regions became dominated by oak and hickory.

Dismal Swamp in southeastern Virginia has yielded evidence of a late-glacial and postglacial environment. Pollen diagrams from four widely spaced profiles are remarkably similar, and they were combined into a generalized diagram. These profiles were combined by "smoothing the individual curves from each profile, replotting each on an absolute time scale, then superimposing individual replotted curves and averaging the trends" (Whitehead 1965: 428). The pollen diagram produced four different zones, characteristic of time and changing environments. Zone 1 (ca. 12,000-10,700 B.P.) occurs in clay sediments below a peat layer, and it contains high percentages of pine, rising percentages of spruce, maxima of birch and alder, and high percentages of herb pollens. This evidence is more suggestive of glacial conditions than of late-glacial. Grass and sedge, although suggesting an open boreal forest, "were probably growing locally in moist habitats" (Whitehead 1965: 428). Perhaps the pine/spruce forest resulted from a lingering environment supported by a cooler climate of the more northern latitudes. Above Zone 1, and occurring within Zone 2 (10,700-8,300 years B.P.), the pollen begins to represent a hemlock-northern hardwoods environment. Pine and spruce begin to decline and the percentages of oak begin to rise with a maximum of beech, hemlock, birch, and alder. Zone 3 (8,300-3,500 years B.P.) and Zone 4 (3,500-years B.P. to the present) continue with a trend towards a maximum of oak, hickory, and sweetgum, and finally to the present dominance of a swamp forest of cypress (Whitehead 1965: 428).

The Carolina Bays of North Carolina have produced similar evidence for a hemlock-northern hardwood forest during late-glacial times. The late-glacial zone produces a transition from a pine/spruce forest, to one of oak and hickory, and a maximum of birch, hemlock, beech, elm, alder, and hornbeam. This zone has been radiocarbon dated at 10,224 ± 510 years B.P. The upper zones produce evidence of a forest dominated by oak, hickory, and sweetgum, with a later introduction and dominance of cypress (Whitehead 1965: 429).

In the areas south of North Carolina, the only evidence for post-glacial forests is seen in the investigations of southern Georgia, and central Florida (Watts 1971). At Lake Louise, located near Valdosta, Georgia, the sediments from two cores have yielded pollen that indicates an oak dominance, a rising percentage of pine, and a near absence of cypress during 8,510 ± 100 years B.P. Unfortunately, the area below the radiocarbon date is void of pollen. The second core, which was taken at the edge of the lake, failed to produce an immediate continuation of the
pollen. But rather it produced a radiocarbon date of 49,000 years B.P., indicating an interglacial. Watts (1971) believes the widely spaced hiatus resulted from a lowering of the water table due to the regression of the Pleistocene seas during the Wisconsin, causing the lake to become dry.

Following the oldest dated layer of postglacial sediments, Watts' pollen diagram for Lake Louise indicates a slow decline of oak and a rise of pine until about 6,700 years ago. At this time there is an appreciable rise in pine and a near sudden decline of oak, and cypress remains at a minimum. But during the next millennia, at about 5,000 years ago, the pine begins to stabilize as a dominant tree and the oak stabilizes, as a secondary member of the forest. During this time, cypress begins to increase its percentages, and it has continued to increase to the present. Both Pinus and Quercus have continued their status.

Mud Lake and Scott Lake, located in central Florida, have produced similar pollen profiles suggesting parallel forest developments that are compatible with the Georgia data. Mud Lake is strikingly similar to Lake Louise on at least three counts: a radiocarbon date of 8,160 years B.P. exists at the base of the postglacial sediments; a hiatus exists between the postglacial and Sangamon deposits; and the development of Pinus, Quercus, and Taxodium follows the same pattern of development. Quercus is the dominant tree and Pinus plays a secondary, but rising role. During the next three millennia the roles reversed and pine became the dominant tree and oak declined sharply. In addition, cypress percentages rose and developed to the present. Scott Lake, although represented by only the last 4,360 years, presents the same data as seen in the latter development of the other lakes.

Within these southern sites, hickory, sweetgum, blackgum, ash, hornbeam, and elm are represented in small percentages throughout most of the last eight millennia. Spruce, fir, and hemlock are absent from the data, and beech appears only in the Georgia site. During the eighth millennium B.P., forests of the southern latitude do not appear to have been a hemlock northern hardwood.

Watts (1971) dealt with an environmental reconstruction and, accordingly, he envisioned an open oak-hickory forest on dry sandy soils, and patches of prairie on the heavier and nutrient-rich soils. Because the dominant oak is not associated with mesic tree genera in the pollen diagram, the possibility of a species-rich broad-leaved mesic forest can be ruled out. Apparently a sclerophyllous or scrubby oak-hickory vegetation was present, with the extensive occurrence of herbaceous plants. The herbs are those that characterize the prairie in the upper midwest, such as those that are found in the Minnesota area where the combination of oak and herb pollen is believed to represent a mosaic of prairie and oak savannah, with oak groves around lakes and ponds. The Lake Louise assemblage has a much higher oak-herb ratio than the sites in western Minnesota, so that an interpretation of dry oak forest or scrub with prairie-like openings best fits the data (Watts 1971: 681-682). Watts also suggests that the data may be interpreted to suggest a Bluestem prairie, but Juniperus virginiana (red cedar), which is associated
with that type of prairie, is seldom seen in Florida, and additionally, the fossil record fails to present any evidence for red cedar or a diverse broad-leaved forest. Therefore, Bluestem prairie is not a likely candidate for the area of southern Georgia or central Florida. But the open sclerophyllous oak-hickory woods, and prairie patches, seem to characterize the environment during the eighth millennium B.P.

To summarize forest conditions, the area of South Carolina has undergone considerable change during the last 40,000 years. Unfortunately, however, the changes are not sufficiently known and the data that are presented can only provide a tentative appraisal of the ancient environments. A great deal of research is needed within South Carolina to allow basic considerations of overall vegetation, and even more is needed in order to define the major ecotones and the differences that existed in the physiographic provinces. Until this is accomplished, the paleoenvironment of South Carolina will remain tentative and sketchy.

The warm Sangamon Interglacial produced an environment similar to that of the present. Pine and oak apparently dominated the forests, cypress was abundant in areas of moisture, sea level was slightly higher, and the climate was somewhat warmer. The advance of the Wisconsin glaciers brought about a significant vegetational change, altering and changing the temperate forests of the Southeast. The full-glacial, lasting from about 25,000 to 15,000 years ago, produced appreciable differences in the vegetation of the south Atlantic states. The area of Virginia supported a forest, with higher percentages of spruce. Pine was also present in higher percentages, and fir was not uncommon. The area of southeastern North Carolina tended to support a dominant forest of pine (jack or red pine), and spruce, although present, was less abundant. Fir was rare, and northern elements constituted small percentages. Pollen sites in northwestern Georgia support, basically, the same evidence. An environmental reconstruction suggests that the pine/spruce forests were open, with communities of heliophytic herbs and shrubs. The few hardwoods that were present probably grew in special conditions, such as gallery forests on alluvial plains, or possibly as scattered individuals within the conifers.

The late-glacial, which lasted from about 15,000 to 10,000 years ago, was characterized by the gradual disappearance of the boreal elements, and by the appearance of beech, hemlock, birch, and alder. Additionally, oak and hickory were beginning to rise in number. In North Carolina the transition occurs a little earlier because of a more southern latitude. The forests were abundant with oak, hickory, and the other elements mentioned above, including other thermophilous species. Quite possibly the forests of the late-glacial were also open.

Following the late-glacial, the post glacial continued to develop oak, hickory, and other deciduous forest species. The areas of southern Georgia and central Florida have indicated an open forest of scrubby sclerophyllous oak and pine in the dry sandy soils, with occasional prairie-like openings.
Recent Physical Environmental Alterations

Prior to the arrival of the indigenous American some twelve thousand years ago, the physical environment was already in a constant state of change. The changes were induced by river meanders, hurricanes and storms, floods, lightning, fires, climatic changes, erosion and deposition, and a host of other variables. Naturally induced changes are always prevalent within any environment, but change is often accelerated through human activities.

The Indian utilized his immediate environment and thus effected some degree of change through hunting, fishing, food gathering, burning, and felling trees with primitive implements. The construction of simple dwellings, the manufacture of textiles from vascular plants, and the production of basketry and ceramics all represent some form of environmental utilization.

With the arrival of the European the bottomland was used for small plots of cultivation, earthen cattle mounds were erected, labor intensive dikes were constructed, and specific trees were probably used for occasional dwellings, barges, and dugout canoes. But during those prehistoric times, and until the 20th century, environmental modification was relatively insignificant. In 1895, the Santee River Cypress Lumber Company began purchasing portions of Congaree Swamp, and by 1910, the company had acquired a holding of nearly 15,000 acres. During this time environmental alterations sporadically accelerated with the selective removal of large cypress trees, many of which produced ring counts indicating ages varying between 500 and 700 years old. Following the cutting of cypress, the property remained unaltered for nearly fifty years, but in the early 1970's the first commercial harvesting of hardwoods was initiated. The cutting of nearly thirty-five different species resulted in large clear cut areas representing 20% of the property (Cely n.d.: 93-94).

During the mid 1900's the entire acreage of the Beidler Tract was leased to the Cedar Creek Hunt Club. Since its beginning the club has constructed, maintained, and utilized at least two different types of dirt roads: primitive and improved. The three entries into the swamp, known as the "north road," the "clubhouse road," and the "new road," appear to have been constructed with heavy equipment and are regularly maintained with imported soil, gravel, and other forms of fill. This does not imply that the entire length of each road is maintained with fill, but rather select areas such as depressions and the frequently trafficked portions. The greatest amount of maintenance seems to occur on the latter two roads, whereas soil, gravel, and bricks are used for fill. The "new road," as the name implies, was the last constructed road, and for a distance of nearly one mile the road is capped with a thin veneer of imported sandy loam. Improvement and maintenance seem to occur for the first several hundred yards, diminishing with increasing distance into the swamp. As the main roads penetrate deeper they become more primitive, and with moisture the roads are impassable.

From these main roads, small primitive roads branch off and lead to oxbow lakes, small cultivated fields, and hunting stands erected in
trees. Generally, the primitive roads are unimproved and represent uncut trails that are frequently accessible only with four wheel drive vehicles. Other primitive roads, however, seem to have been cut and then bevel-scraped to facilitate drainage. Occasionally, these roads are maintained and filled with soil taken from along the road edge, and in some areas the roads are capped with the adjacent soils. Patterns of maintenance, filling, and capping occur periodically.

At least two main primitive roads transect the swamp in an east/west direction and connect the main roads, all of which have spurs leading to small cultivated fields. These fields, often clear-cut and cultivated in specific crops designed to attract wild game, appear to vary in size from one to five acres.

The remaining area involving environmental modification is a large clear-cut area surrounding the Cedar Creek Hunt Club hunting lodge. In addition to the lodge, the area is also occupied with a large shed, a building for the preparation of game, and a large facility for cooking. Except for the cleared area, the architectural structures have little effect on the immediate environment.

Therefore, in terms of human modification to the physical environment, the area of the proposed National Park Monument is relatively unscarred. The small dirt roads, infrequent game fields, and the clubhouse area constitute an insignificant minority of the total acreage. While extreme logging operations have resulted in large clear-cut areas, eighty percent of the swamp in recent years has remained unaltered. That the swamp is virtually unmodified and composed of virgin stands of timber lends itself easily to biological studies. For the archeologist, however, the by-products of human behavior lie obscured beneath the humus.

Vegetational Communities and Forage Productivity

During the past several decades, Congaree Swamp has been frequently recognized in terms of its large and impressive trees, some of which have attained and surpassed state records and presently qualify as national records. But beyond the impressive nature of record-sized trees and virgin stands of timber, the swamp is a hydric floral community fully adapted to and representative of a floodplain environment.

By utilizing a series of ten meter wide transects, spaced approximately one kilometer apart, and extending in north/south directions, Gaddy et al. (1975) were able to separate the floral community into at least eleven different types. The transect data representing the mature forests are defined according to dominant canopy trees, and are set forth below and represented in Table 3. Accompanying these data is their relevance to forage productivity for mammalian populations.

The sweetgum-mixed hardwoods forest is the most common community within the swamp, representing approximately 28% of the total forest.
TABLE 3
TAXONOMY OF REFERENCED FLORA

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fagaceae</td>
<td>Quercus michauxii</td>
<td>swamp chestnut oak</td>
</tr>
<tr>
<td>Fagaceae</td>
<td>Quercus laurifolia</td>
<td>laurel oak</td>
</tr>
<tr>
<td>Fagaceae</td>
<td>Quercus falcata</td>
<td>cherrybark oak</td>
</tr>
<tr>
<td>Fagaceae</td>
<td>Quercus lyrata</td>
<td>overcup oak</td>
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<td>Fagaceae</td>
<td>Quercus shumardii</td>
<td>shumard oak</td>
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<td>Fagaceae</td>
<td>Quercus phellos</td>
<td>willow oak</td>
</tr>
<tr>
<td>Fagaceae</td>
<td>Fagus grandifolia</td>
<td>beech</td>
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<td>Ulmaceae</td>
<td>Ulmus americana</td>
<td>American elm</td>
</tr>
<tr>
<td>Ulmaceae</td>
<td>Planera aquatica</td>
<td>water elm (planertree)</td>
</tr>
<tr>
<td>Ulmaceae</td>
<td>Celtis laevigata</td>
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</tr>
<tr>
<td>Pinaceae</td>
<td>Taxodium distichum</td>
<td>bald cypress</td>
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<td>Pinaceae</td>
<td>Pinus taeda</td>
<td>loblolly pine</td>
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<tr>
<td>Pinaceae</td>
<td>Pinus plustris</td>
<td>longleaf pine</td>
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<td>Aquifoliaceae</td>
<td>Illex opaca (spp.)</td>
<td>holly (winterberry)</td>
</tr>
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<td>Aquifoliaceae</td>
<td>Illex decidua</td>
<td>possumhaw</td>
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<td>Oleaceae</td>
<td>Fraxinus caroliniana</td>
<td>Carolina ash</td>
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<td>Oleaceae</td>
<td>Fraxinus americana</td>
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<td>Nyssaceae</td>
<td>Nyssa aquatica</td>
<td>water tupelo</td>
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<tr>
<td>Nyssaceae</td>
<td>Nyssa sylvatica</td>
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<td>pignut hickory</td>
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<td>Carya aquatica</td>
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<td>Acer negundo</td>
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<td>Lauraceae</td>
<td>Persea borbonia</td>
<td>red bay</td>
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<td>Palmae</td>
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<td>Betulaceae</td>
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<td>Salicaceae</td>
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<td>Cyrillaceae</td>
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<td>ti-ti (swamp cyrilla)</td>
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<td>Annoonaceae</td>
<td>Asimina triloba</td>
<td>pawpaw</td>
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<tr>
<td></td>
<td>Arundinaria gigantez</td>
<td>great cane</td>
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<tr>
<td></td>
<td>Lindera benzoin</td>
<td>spicebush</td>
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<td></td>
<td>Woodwardia areolata</td>
<td>fern</td>
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<tr>
<td></td>
<td>Similax spp.</td>
<td>greenbriers</td>
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<tr>
<td></td>
<td>Euonymus americanus</td>
<td>strawberry bush</td>
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<tr>
<td></td>
<td>Vitis aestivalis</td>
<td>wild grape</td>
</tr>
<tr>
<td></td>
<td>Morus rubra</td>
<td>mulberry</td>
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<tr>
<td></td>
<td>Diospyros virginiana</td>
<td>persimmon</td>
</tr>
<tr>
<td></td>
<td>Ilex coriacea</td>
<td>gallberry</td>
</tr>
<tr>
<td></td>
<td>Calamus spp.</td>
<td>rattan (climb'g vines)</td>
</tr>
</tbody>
</table>

31
The community, grown on Tawcaw silty clay loam, is dominated by sweetgum, swamp chestnut oak, laurel oak, and white ash. The understory is dominated by hornbeam, while the seedling layer is comprised of laurel oak. Although this community differs slightly because of the moisture content of the soil (increased numbers of sweetgum on wetter soils), the community provides forage and denning opportunities for mammals. While sweetgum and ash provide little forage, laurel oak provides mast in the fall. Emergency foods are provided in the form of holly, water hickory, and American elm. Vines such as smilax, rattan, and wild grape attain large size because of the advanced age of the swamp, thereby providing excessive fruit yields for the mammalian populations.

The laurel oak-sweetgum community, similar to the above, represents about 20% of the property. Growing from a somewhat drier Tawcaw silty clay loam, laurel oak provides the dominant canopy, while sub-dominants are represented by elm, white ash, sweetgum, and water hickory. The understory contains dwarf palmetto, possumhaw, and hornbeam, while the seedling layer yields laurel oak. Forage production in this environment is similar to the sweetgum-laurel oak community, but with increased numbers of laurel oak mast yields are higher.

The riverbank hardwoods form approximately 12% of the forest communities and grow on the Congaree soils of the natural levees adjacent to the river and to Cedar Creek. In these areas of slightly higher elevations, sugarberry, sycamore, and cherrybark oak form the canopy, while box elder completely dominates the understory. The seedling layer is composed of hornbean, and cane represents the dominant shrub. While sugarberry, sycamore, elm, hickory, and ash fall to provide preferred foods for many mammalian species, the higher elevations provide a refuge for vertebrate populations during periods of flooding. If flooding is prolonged, the terrestrial species will utilize these food resources, and, during the fall months, mast is provided by the understory species in the form of laurel oak, spicebush, and pawpaw.

Communities of water tupelo and cypress constitute about 11% of the forest. These communities grow in Chastain soils representative of low depressions, and especially within filled oxbow lakes and lakes that are in a process of filling. Bald cypress and water tupelo form a dominant canopy, while Carolina ash, red maple, planertree, and swamp cottonwood form the dominant understory. The soils also support a seedling layer of cottonwood. These damp, poorly drained soils and the corresponding forest community offer little subsistence to mammalian quadapeds, but, because of the high abundance of insects, it does offer considerable food for woodpeckers.

The Dorovan muck, located in the northwestern portion of the property, supports a community dominated by swamp tupelo which forms about 10% of the property. These mucky soils are almost purely organic and are fed by natural springs that surface near the edge of the upland bluff. A thick understory is characterized by sweet bay, red bay, and titi, while the swamp floor supports ferns and other hydric plants. The understory, which also includes species of gallberry, winterberry, and holly offers subsistence to wildlife and den trees for many mammals, especially nongame birds.
Communities of ash and red maple, representing about 9% of the property, frequently grade into the cypress and water tupelo communities. Supported in wet flats and Tawcaw silty clay loam, the canopy may represent a variation of sweetgum, cypress, sycamore, red maple, water elm, and various ashes. Water elm forms the dominant understory.

Representing about 5% of the property is the overcup oak community. This species also grows in wet flats, and is frequently associated with bald cypress, water hickory, and American elm, which also provide the understory. This specific environment and the community of ash and red maple provide emergency foods to wildlife; however, the overcup is the best of all mast bearing trees. Dens for wildlife also appear frequently in these areas.

Another 5% of the forest is represented by the appearance of loblolly pine and mixed hardwoods, all of which survive on the slightly elevated Congaree soils. The canopy is dominated by old pines, mixed oaks, and hickories, while the understory may represent American holly. The seedling layer is frequently represented by various species of oak. Because of its elevation and mast producing quality, this community provides refuge and food for many mammalian species. By its virtue of a higher elevation, the soils and floral communities provide protection and subsistence for terrestrial mammals during floods. Even during periods of nonflooding, the mixed hardwoods provide considerable mast, while the large swamp chestnut oaks and sweetgum provide dens for raccoons, squirrels, woodpeckers, and other denning species. The most common shrub in this community, pawpaw, provides optimal mast.

Occurring on the inter-floodplain ridges are the cherrybark oak communities which also support sweetgum and chestnut oak. These species form the canopy, while codominants are beech, pignut hickory, willow oak, shumard oak, and occasional loblolly pine. The understory is usually dominated by American holly, pawpaw, and spicebush. These communities, however, form only approximately 3% of the total forest. The dominant cherrybark oak and swamp chestnut oak provide optimal mast during the fall season, and year round denning opportunities. Other understory species, such as strawberry bush, mulberry, persimmon, and wild grapes provide additional subsistence resources.

About 2% of the property is represented by the loblolly pine-swamp tupelo communities that thrive on portions of the Dorovan muck. Although pine and tupelo may occasionally form dominant canopies, the community frequently grades into predominant tupelo stands. Also contributing in sizable proportions to the canopy are sweetgum, swamp chestnut oak, and red maple. Red maple dominates the seedling layer, while ferns and mosses are frequently found on the ground.

Located in the adjacent upland area, and forming about 100 acres in the proposed development zones, are young forests of longleaf and loblolly pine. These forests represent secondary growths stemming from formerly cultivated lands, and for the most part fail to provide substantial food resources for the mammalian populations.
The hydric forests within the damp bottomland characterize the active floodplain which may be inundated several times a year. Additionally, this vegetation demonstrates a high degree of maturity and antiquity, represented in part by massive trees and closed canopies. While there are different types of canopy, in terms of vertical heights suggesting even-aged or uneven-aged forests, Gaddy et al. suggest that the difference is related to natural causes such as fire and wind-thrown damage, instead of changes induced by human occupation. At least 11,500 acres represent the uncut portions of the swamp, and at least 10,000 acres represent uneven-aged hardwoods and portions of relict canopies that attest to old growths. Although the species do not differ greatly from other river swamp environments in South Carolina, the Congaree Swamp is without question the most mature.

The maturity of the forest may be expressed in the size of specific species that have attained record size. Among these trees are: honey locust, ironwood, water elm, sycamore, water tupelo, cherrybark oak, swamp chestnut oak, white ash, shumard oak, American elm, willow oak, and red bay which are presently state records. National records are represented by: loblolly pine, overcup oak, possumhaw, laurel oak, and swamp tupelo.

**Fauna**

Throughout the past several decades considerable attention has been given to the floral communities of Congaree Swamp, but unfortunately hardly any attention has been extended to the mammalian and reptilian populations. The only mammalian data exist with Gaddy et al. (1975) and Dennis (n.d.), who list certain mammalian quadapeds, and a host of bird species.

Based on animal signs, such as tracks and scat, and on actual sightings, Gaddy et al. (1975) have recognized various animals (Table 4).

**Table 4**

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Common Name</th>
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<tr>
<td>Cervidae</td>
<td>Odocoileus virginianus</td>
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<td>Felidae</td>
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<tr>
<td>Meleagrididae</td>
<td>Meleagris gallopavo</td>
<td>wild turkey</td>
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</table>
Within the 15,000 acres of Congaree Swamp, 10,000 of which appear to represent uncut portions, the list of vertebrate species could easily be enlarged to include additional animals. Several members of the Cedar Creek Hunt Club have reported occurrences of other mammalian species (Table 5).

**TABLE 5**

PROBABLE EXISTENCE OF OTHER MAMMALIAN SPECIES

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<td>Leporidae</td>
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<td>Didelphiidae</td>
<td>Didelphis marsupialis</td>
<td>opossum</td>
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<tr>
<td>Cricidae</td>
<td>Ondatra zibethica</td>
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</tr>
<tr>
<td>Mustelidae</td>
<td>Mephitis mephitis</td>
<td>striped skunk</td>
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</tbody>
</table>

Prior to population pressures created by European settlers, the black bear (*Ursus americanus*) no doubt inhabited the area of Congaree Swamp, and may presently be found in limited numbers in the Wateree Swamp approximately 20 miles to the east (Issac Hayne, former Game Warden with South Carolina Wildlife and Marine Resources: personal communication).

While these species reportedly frequent the swamp, additional species such as *Cricetidae* (mice, rats, lemmings, and voles), *Canidae* (foxes), *Vespertilionidae* (bats), *Soricidae* (shrews), and *Glaucomys volans* (flying squirrels) are probably residents of the area. However, species identification must await future environmental studies.

The most exhaustive research concerning faunal identification was performed by John Dennis (n.d.a) under the encouragement of the Charleston Museum, South Carolina. By utilizing three main environmental zones—virgin timber stands, cutover areas, and the upland areas—Dennis was able to record many species of birds, which reflect the diversity of fauna within the rich environment. The census was conducted during October and June of 1967, and during May and June of 1968.

The employed field methodology consisted of walking mile long transects, and counting the avifauna (Table 6).

These species are not entirely common to the Congaree Swamp or the immediate upland areas. Many of these species are either summer or winter residents, while others are migratory. Frequency of species ranges from abundant to uncommon, others are rare.

In addition to these species, the bald eagle (*Haliaeetus leucocephalus*) was sighted on four different occasions circling above the Congaree
River, and feeding on dead fish on sand bars.

Prior to the appearance of the European settlers, the Carolina paroquet (Conuropsis c. carolinensis), and the passenger pigeon (Zenaudura spp.) were probably permanent and migratory species within Congaree Swamp. These species became extinct during the 1800's.

Controversy still surrounds the existence of the ivory-billed woodpecker (Campephilus principalis). "During the mid 1960's rumors were rife that the Beidler Tract (Congaree Swamp) contained perhaps the last ivory-billed woodpeckers that might be found in South Carolina" (Dennis n.d.b).

Herpetofauna of the Bottomland and Adjacent Areas

The bottomland environment of the swamp and the uplands ecotone provides a suitable habitat for reptilian and amphibian populations. Through an extensive study involving various habitats, Mancke (n.d.) has identified 41 species, representing 26 reptiles and 15 amphibians. The study has indicated that while certain species are present in the flood-plain, diversification is greater along the upland ecotone (Table 7).

Considerations for Ichthyic Communities

The ichthyic communities of Congaree Swamp are also unrecognized in terms of published information, and for the most part, the communities are known only to the members of the Cedar Creek Hunt Club.

Within the bottomland environment at least four different types of water systems exist: 1) flowing water from creeks; 2) old oxbow lakes characterized by black water; 3) more recent oxbow lakes characterized by brown water; and 4) standing water in swales and sloughs. Cedar Creek and Tom's Creek are basically dark water streams that flow from the uplands and continue through the swamp until they merge with the Congaree River. Cedar Creek, the largest of the streams, enters Wise Lake and then discharges, continuing on an uninterrupted flow through the swamp. During excessive rainfall, Weston Lake is also fed by hinterland drainage from the uplands, thereby supplying the lake with a change of water. While both of these old oxbow lakes contain dark water, floodplain inundations from periodical floods will cause river water to flow into these systems, thereby altering it for several days. The interchange between Cedar Creek and flood waters seems to bring about a diversity of fish species within the dark water oxbows (Table 8). The more recent oxbow lakes are fed by flood waters and drainage from swales and sloughs. These specific systems appear to support a somewhat different species list (Table 9).

These variable systems fluctuate not only with creek and rivers, but also with the rise and fall of ground water. During periods of
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<td>Cathartidae</td>
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<td>swallow-tailed kite</td>
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Tyrannidae

Hirundinidae

Corvidae

Paridae

Sittidae

Certhiidae

Troglodytidae

Mimidae

Minidae

Tyrannidae

Hirundinidae

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<td>-------------------------</td>
<td>------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td><em>Chelydra s. serpentina</em></td>
<td>Common snapping turtle</td>
<td>x</td>
</tr>
<tr>
<td><em>Sternotherus odoratus</em></td>
<td>Stinkpot turtle</td>
<td>x</td>
</tr>
<tr>
<td><em>Kinosternon s. subrubrum</em></td>
<td>Eastern mud turtle</td>
<td></td>
</tr>
<tr>
<td><em>Terrapene c. carolina</em></td>
<td>Eastern box turtle</td>
<td>x</td>
</tr>
<tr>
<td><em>Chrysemys s. scripta</em></td>
<td>Yellow-bellied turtle</td>
<td>x</td>
</tr>
<tr>
<td><em>Anolis c. carolinensis</em></td>
<td>Green anole</td>
<td></td>
</tr>
<tr>
<td><em>Leiopholisma laterale</em></td>
<td>Ground skink</td>
<td></td>
</tr>
<tr>
<td><em>Eumeces fasciatus</em></td>
<td>Five-lined skink</td>
<td>x</td>
</tr>
<tr>
<td><em>Eumeces inexpectatus</em></td>
<td>SE Five-lined skink</td>
<td>x</td>
</tr>
<tr>
<td><em>Natrix taxispilota</em></td>
<td>Brown water snake</td>
<td>x</td>
</tr>
<tr>
<td><em>Natrix e. erythrogaster</em></td>
<td>Red-bellied water snake</td>
<td>x</td>
</tr>
<tr>
<td><em>Natrix f. fasciata</em></td>
<td>Banded water snake</td>
<td>x</td>
</tr>
<tr>
<td><em>Storeria o. occipitomaculata</em></td>
<td>N. Red-bellied snake</td>
<td></td>
</tr>
<tr>
<td><em>Thamnophis s. sauritus</em></td>
<td>Eastern ribbon snake</td>
<td>x</td>
</tr>
<tr>
<td><em>Heterodon platyrhinos</em></td>
<td>Eastern hog-nosed snake</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Diadophis p. punctatus</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>S. ring-necked snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farancia a. abacura</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Eastern mud snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coluber c. constrictor</td>
<td>x Common</td>
<td></td>
</tr>
<tr>
<td>N. black racer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opheodrys aestivus</td>
<td>x Common</td>
<td></td>
</tr>
<tr>
<td>Rough green snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elaphe obsoleta spp.</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Rat snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lampropeltis g. getulus</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Eastern kingsnake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agkistrodon c. contortrix</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>S. copperhead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agkistrodon p. piscivorus</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Eastern cottonmouth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crotalus horridus atricaudatus</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Canebrake rattlesnake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thamnophis s. sirtalis</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Eastern garter snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storeria d. dekayi</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>N. brown snake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siren lacertina</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Greater siren</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambystoma opacum</td>
<td>x Abundant</td>
<td></td>
</tr>
<tr>
<td>Marbled salamander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Desmognathus auriculatus</td>
<td>x Abundant</td>
<td></td>
</tr>
<tr>
<td>S. dusky salamander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plethodon g. glutinosus</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>Slimy salamander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambystoma talpoideum</td>
<td>x Occasional</td>
<td></td>
</tr>
<tr>
<td>salamander</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bufo terrestris</td>
<td>x Common</td>
<td></td>
</tr>
<tr>
<td>S. toad</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acris g. gryllus</td>
<td>x Common</td>
<td></td>
</tr>
<tr>
<td>S. cricket frog</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Frequency</td>
<td>Notes</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------</td>
<td>--------------------</td>
</tr>
<tr>
<td><strong>Hyla c. crucifer</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>N. spring peeper</td>
<td></td>
<td>Common</td>
</tr>
<tr>
<td><strong>Hyla cinerea</strong></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Green treefrog</td>
<td></td>
<td>Occasional</td>
</tr>
<tr>
<td><strong>Hyla versicolor/chrysocelis</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Gray treefrog</td>
<td></td>
<td>Abundant</td>
</tr>
<tr>
<td><strong>Hyla gratiosa</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Barking treefrog</td>
<td></td>
<td>Occasional</td>
</tr>
<tr>
<td><strong>Rana catesbeiana</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bullfrog</td>
<td></td>
<td>Common</td>
</tr>
<tr>
<td><strong>Rana virgatipes</strong></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Carpenter frog</td>
<td></td>
<td>Occasional</td>
</tr>
<tr>
<td><strong>Rana c. clamitans</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Bronze frog</td>
<td></td>
<td>Common</td>
</tr>
<tr>
<td><strong>Rana utricularia</strong></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>S. leopard frog</td>
<td></td>
<td>Common</td>
</tr>
</tbody>
</table>
### Table 8
ICHTHYIC SPECIES REPORTED TO OCCUR IN CEDAR CREEK, WISE LAKE, AND WESTON LAKE

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serronidae</td>
<td>Chaenobryttus gulosus</td>
<td>Warmouth</td>
</tr>
<tr>
<td>Serronidae</td>
<td>Micropterus salmoides</td>
<td>Largemouth bass</td>
</tr>
<tr>
<td>Centrarchidae</td>
<td>Lepomis gibbosus</td>
<td>Pumpkinseed bream</td>
</tr>
<tr>
<td>Centrarchidae</td>
<td>Lepomis macrochirus</td>
<td>Bluegill bream</td>
</tr>
<tr>
<td>Esocidae</td>
<td>Esox niger</td>
<td>Eastern pickerel</td>
</tr>
<tr>
<td>Ictalauridae</td>
<td>Ictalurus punctatus</td>
<td>Channel catfish</td>
</tr>
<tr>
<td>Lepisosteidae</td>
<td>Lepisosteus spp.</td>
<td>Garfish</td>
</tr>
<tr>
<td>Amiidae</td>
<td>Amia calva</td>
<td>Mudfish (bowfin)</td>
</tr>
</tbody>
</table>

Drought, Weston and Wise Lakes appear to retain their levels, but the remaining oxbow lakes and sloughs suffer considerably, and during extended droughts the sloughs and swales become dry. These drought conditions were observed during the reconnaissance survey of November and December, 1978.

The species represented in Tables 8 and 9 are local and are available year round. Seasonal species would include shad (Alosa sapidissima), sturgeon (Acipenser oxyrhynchus), and striped bass (Roccus saxatilis). The former species, shad and sturgeon, were once present in greater numbers, but presently they are poorly represented.

While ichthyic species are present in Congaree Swamp and its adjacent tributaries, both qualitative and quantitative studies are virtually absent.

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### Table 9
ICHTHYIC SPECIES REPORTED TO OCCUR IN SLOUGHS, SWALES, AND OTHER OXBOW LAKES

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amiidae</td>
<td>Amia Calva</td>
<td>Mudfish (bowfin)</td>
</tr>
<tr>
<td>Lepisosteidae</td>
<td>Lepisosteus spp.</td>
<td>Garfish</td>
</tr>
<tr>
<td>Ictalauridae</td>
<td>Ictalurus spp.</td>
<td>Bullhead catfishes</td>
</tr>
<tr>
<td>Cyprinidae</td>
<td>Cyprinus carpio</td>
<td>Carp</td>
</tr>
</tbody>
</table>
Ever since prehistoric populations entered the Eastern United States, subsistence patterns have involved the exploitation of a considerable number of floral and faunal species. Prehistoric human sustenance is exemplified at many archeological sites with preserved remains in the form of large and small mammals, birds, reptiles, amphibians, fish, shellfish, and a diverse inventory of plant remains. But while people were extracting and utilizing these various food resources, at least two food items appear with impressive frequency and in great numbers: white-tailed deer and mast. Mast apparently had many uses, while the deer supplied not only a quantity of food, but a resource for bone and antler from which tools could be manufactured. These floral and faunal remains occur throughout the Archaic, Woodland, and Mississippian periods.

The Stanfield-Worley Bluff Shelter in Alabama, in terms of human occupation, spans a considerable range of time, and throughout the occupational debris white-tailed deer dominate the mammalian assemblage. Charred remains of hickory nuts were found in the refuse pits, while small pitted nutting-stones were found in many occupational levels and storage pits (DeJarnette et al. 1962). Parmalee (1962) states: "white-tailed deer provided the basic meat staple...."

In Pennsylvania, the Meadowcroft Rockshelter yielded a diverse inventory of mammalian food remains, of which 77% constituted white-tailed deer in the various cultural deposits. Hackberry seeds appear as the dominant fruit remains, but mast is also present (Adovasio et al. 1978).

The Eva site, an Archaic shell midden located in Tennessee, demonstrates that "deer bones constitute the most frequent species in all components" (Lewis and Lewis 1961: 23). Additionally, "...throughout the occupation of the site, deer meat was preferred and much of the technology was directed towards the hunting of deer and the utilization of bones, antler and hides as well as the meat" (Lewis and Lewis 1961: 23). Although floral remains are not specifically mentioned, there are incidences of nutting stones and other food processing implements attributable to the utilization of plant foods.

The Modoc Rock Shelter in southern Illinois represents a continuum of human occupation beginning with the Early Archaic, and continuing through the Archaic and Woodland periods. While Fowler (1959) does not provide quantitative data on mammalian species, the occurrence of bone and antler tools and the mention of deer both suggest a reliance on deer. Concomitant with charred nuts and seeds are food processing implements such as nutting stones and grinding stones, which again supports the premise of deer and mast providing substantial amounts of the diet.
Similar occurrence of white-tailed deer and mast remains are found in the coastal and inland shell middens of Georgia and South Carolina during the Late Archaic periods. Frequently these remains are attended with nutting and grinding stones, implements used in the processing of plant foods (Stoltman 1974; Williams 1968; Marrinan 1975; Michie 1979; DePratter 1976). In virtually all Eastern archeological sites where preserved floral and faunal exist, the pattern remains basically unchanged. Even during the early contact periods between Europeans and Indians the basic subsistence pattern continues. As John Lawson (1709b) traversed the Coastal Plain and Piedmont of South Carolina he noted:

We found here good store of Chinkapin-Nuts, which they (the Indian) gather in Winter great Quantities of, drying them; so keep these Nuts in great Baskets for their Use; likewise Hickerie-nuts, which they beat betwixt two great Stones, then sift them, so thicken their Venison-Broath therewith; the small Shells percpitating to the Bottom of the Pot, whilst the Kernel in Form of Flower, mixes it with the Liquor. Both these Nuts made into Meal, makes a curious Soop, either with clear Water, or in Meat Broth.

We met in our Way with an Indian Hut, where we were entertain'd with a fat, boil'd Goose, Venison, Racoon, and ground Nuts.

Next morning, we got our Breakfast; roasted Acorns being one of the Dishes. The Indians beat them into Meal, and thicken their Venison-Brooth with them...

At the House we lay at, there was good Entertainment of Venison....

Based on these examples, then, it would appear that deer and mast played an important role in the livelihood of prehistoric and historic indigenous Americans. These specific resources are available in a number of differing environments, but optimal conditions for the species involve bottomland environments and upland zones which produce forests of mixed hardwoods and pine. Of these two environments, the bottomland exceeds the upland in productivity of deer and mast.

Foods, Habitats, and Feeding Habits of White-Tailed Deer

The diet of white-tailed deer may be separated into six categories: 1) browse, 2) herbage, 3) fruits, 4) mushrooms and fungi, 5) agricultural crops, and 6) water. Among these items, browse, which consists of leaves and twigs, constitutes the major component of their diet (Table 10). Leafless twigs, however, are rarely used because of the high fiber content which deer are not well equipped to digest. Herbage, in the form of nonwoody plants with broadleafed herbaceous species are those...
TABLE 10
THE OCCURRENCE OF DEER BROWSE SPECIES IN
SOUTHERN FORESTS COMPARED WITH CONGAREE SWAMP

<table>
<thead>
<tr>
<th>Species</th>
<th>Common Name</th>
<th>Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer rubrum</td>
<td>Red Maple</td>
<td>x</td>
</tr>
<tr>
<td>Callicarpa americana</td>
<td>American beautyberry</td>
<td></td>
</tr>
<tr>
<td>Campsis radicans</td>
<td>trumpet creeper</td>
<td></td>
</tr>
<tr>
<td>Cephalanthus occidentalis</td>
<td>common buttonbush</td>
<td></td>
</tr>
<tr>
<td>Chionanthus virginicus</td>
<td>fringetree</td>
<td></td>
</tr>
<tr>
<td>Clethra alnifolia</td>
<td>sweet pepperbush</td>
<td>x</td>
</tr>
<tr>
<td>Cliftonia monophylla</td>
<td>buckwheat tree</td>
<td></td>
</tr>
<tr>
<td>Cornus florida</td>
<td>flowering dogwood</td>
<td></td>
</tr>
<tr>
<td>Crataegus spp.</td>
<td>hawthorn</td>
<td>x</td>
</tr>
<tr>
<td>Cryilla racemiflora</td>
<td>swamp cyrilla</td>
<td>x</td>
</tr>
<tr>
<td>Euonymus americanus</td>
<td>strawberry bush</td>
<td>x</td>
</tr>
<tr>
<td>Gelsemium sempervirens</td>
<td>yellow jessamine</td>
<td></td>
</tr>
<tr>
<td>Hydrangea arborescens</td>
<td>smooth hydrangea</td>
<td></td>
</tr>
<tr>
<td>Ilex vomitoria</td>
<td>yaupon</td>
<td></td>
</tr>
<tr>
<td>Ilex cassine</td>
<td>dahoon</td>
<td></td>
</tr>
<tr>
<td>Ilex coriacea</td>
<td>gallberry</td>
<td>x</td>
</tr>
<tr>
<td>Ilex decidua</td>
<td>possumhaw</td>
<td>x</td>
</tr>
<tr>
<td>Itea virginica</td>
<td>Virginia sweetspire</td>
<td></td>
</tr>
<tr>
<td>Juniperus virginiana</td>
<td>eastern redcedar</td>
<td></td>
</tr>
<tr>
<td>Nyssa sylvatica</td>
<td>blackgum</td>
<td>x</td>
</tr>
<tr>
<td>Liriodendron tulipifera</td>
<td>yellow poplar</td>
<td>x</td>
</tr>
<tr>
<td>Lonicera japonica</td>
<td>Japanese honeysuckle</td>
<td></td>
</tr>
<tr>
<td>Magnolia virginiana</td>
<td>sweetbay</td>
<td>x</td>
</tr>
<tr>
<td>Oxydendrum arboreum</td>
<td>sourwood</td>
<td></td>
</tr>
<tr>
<td>Persea borbonia</td>
<td>redbay</td>
<td>x</td>
</tr>
<tr>
<td>Prunus serotina</td>
<td>black cherry</td>
<td></td>
</tr>
<tr>
<td>Pyrularia pubera</td>
<td>buffalnut</td>
<td></td>
</tr>
<tr>
<td>Quercus alba</td>
<td>white oak</td>
<td></td>
</tr>
<tr>
<td>Quercus laurifolia</td>
<td>laurel oak</td>
<td>x</td>
</tr>
<tr>
<td>Quercus nigra</td>
<td>black oak</td>
<td></td>
</tr>
<tr>
<td>Quercus phellos</td>
<td>water oak</td>
<td>x</td>
</tr>
<tr>
<td>Rhododendron maximum</td>
<td>rosebay rhododendron</td>
<td></td>
</tr>
<tr>
<td>Rubus spp.</td>
<td>blackberry-dewberry</td>
<td>x</td>
</tr>
<tr>
<td>Sambucus canadensis</td>
<td>American elder</td>
<td></td>
</tr>
<tr>
<td>Sassafras albidum</td>
<td>sassafras</td>
<td></td>
</tr>
<tr>
<td>Smilax spp.</td>
<td>greenbriers</td>
<td>x</td>
</tr>
<tr>
<td>Symphoricarpos tinctoria</td>
<td>common sweetleaf</td>
<td></td>
</tr>
<tr>
<td>Vaccinium spp.</td>
<td>blueberry-sparkleberry</td>
<td></td>
</tr>
<tr>
<td>Viburnum spp.</td>
<td>viburnum</td>
<td></td>
</tr>
<tr>
<td>Vitis aestivalis</td>
<td>summer grape</td>
<td>x</td>
</tr>
</tbody>
</table>

Note: Information concerning deer browse species in Southern forests was obtained from Halls and Ripley (1961). Congaree Swamp data obtained from Gaddy (1975).
most frequently utilized. Other forms of herbage, such as grasses and sedges, are usually consumed infrequently, but during spring, and in the absence of other edible plant species, grasses will be used. Bracken, and other species of fern, are used in addition to dried leaves of both woody and nonwoody plants. The utilized fruits usually include the mast productions of oaks and hickories during the fall months, while yaupon, hawthorn, and partridgeberry supply fruits throughout the year. Many of the fruit bearing trees also provide browse. Mushrooms and fungi are highly savored, but supplies are not dependable. Agricultural crops provide considerable deer food, but during the prehistoric periods, especially the Archaic and Paleo-Indian periods, crops were nonexistent. The impact of deer feeding on Woodland and Mississippian crops is indeterminable at the present. Finally, water does not appear to be an important factor in considerations of deer habitat because moisture is supplied in many food items (Lay 1969).

In terms of major wildlife habitats, Stransky (1969) separates southern forests into five major categories: 1) upland hardwoods, 2) bottomland hardwoods, 3) shortleaf-loblolly pine-hardwoods, 4) longleaf-slash pine, and 5) prairie and marsh. The bottomland hardwoods, according to Stransky (1969), are the best of all southern forest habitats for the white-tailed deer. "Deer prefer bottomlands for a principal reason: the fertile, well-watered soils produce more food than upland soils" (Stransky 1969: 42).

The productivity of bottomlands exceeds the upland environments. For example, the bottomland oaks in Louisiana produce more acorns per tree than the upland oaks, and additionally, alternate productions of mast are always assured every year. Within the Alabama bottomlands browse productivity reaches 300 pounds per acre, while the uplands produce only 120 pounds per acre. Similarly, the Georgia bottomlands yield more browse, and in South Carolina the bottomlands contain more desirable browse than upland areas. Estimates have suggested that the carrying capacity in South Carolina bottomlands is one deer to every thirteen acres, compared with the ratio of one deer to every thirty to fifty acres in the upland forest of pine and hardwood. The longleaf pine forests only support one deer to about seventy-eight acres (Stransky 1969).

Within the mixed pine hardwoods, acorns and other mast are not as abundant, and they are only available for short periods of time in the fall and winter. Mast failures are more frequent, and during the fall and winter, browse plants lose leaves and twigs. In some areas browse may decline by nearly 85%, thereby limiting deer populations.

The upland hardwoods and the longleaf-slash pine forests provide a minimal supply of mast and browse. The principal trees of oak and hickory in association with southern pines, elm, gum, maple, and red cedar yield lower percentages of browse, but in good mast years food is fairly abundant. In north Georgia, deer browse yields are relatively low, producing only 33 to 42 pounds per acre. Low yields are also reported in the Ozarks (76 pounds per acre), but higher productions are noted in the Oklahoma Ouachitas (121 pounds per acre). The longleaf-slash pine forests are poorer in terms of deer habitat quality; browse and fruit yields are lower.
Even though the major forest types vary in carrying capacity, the bottomland hardwoods are certainly the best habitat for the white-tailed deer, followed in order by the mixed pine hardwoods, upland hardwood, and longleaf-slash pine forests (Stransky 1969). Congaree Swamp, therefore, offers a rich environment for the deer populations. Browse is plentiful, mast yields are high, and during the prehistoric periods the environment offered prehistoric hunters and gatherers an optimal return.

Seasonal Movements of White-tailed Deer

For the most part, white-tailed deer are territorial animals that seek solitude, cover, and better food in distant places. Unless specific pressures are brought to bear on deer populations, the deer will remain within their home ranges for considerable periods of time. However, deer are potentially mobile species, and when threatened by floods, fires, predators, or hunters they will temporarily vacate the immediate area. In some cases movements may be short term, but permanent departures may result (Downing et al. 1969).

Although Downing et al. (1969) do not mention the effects of floods and fires, such effects would be obvious. During periods of extended flooding the deer would be forced to leave their home range and seek refuge on higher ground. After the retreat of flood waters the deer probably return to the environment, but the effects of flooding on the food resource base are unknown. While fires would have a significant impact on deer populations and the availability of food, the successive stages of regrowth would provide considerable forage and browse, thereby increasing the amount of production available for the present.

The effect of animal predation on deer is relatively minimal, resulting in approximately 8% of all deer kills. Among such kills dogs and bobcats are the most responsible, while cougar and bear predation is extremely small. Automobiles and other vehicles of transportation render about 6% of the deaths, but human exploitation through the hunting media results in nearly 85% of the kills. Obviously, the effects of human predation are significant (Barick 1969).

All forms of hunting have a profound effect on deer populations. As Downing et al. (1969: 22) state, "Deer do not seem reluctant to make whatever movements necessary to escape a markedly unpleasant situation." When deer are hunted by means of guns, dogs, bows and arrows, etc., they quickly depart the immediate area, but given ample time they usually return. Some return within a few hours, while others take several weeks. In other cases, the excited deer have taken up permanent residence with other populations. The intensity and frequency of hunting appears to represent the main factor in movement. When deer are hunted they immediately take refuge within their home range, and with increased pressure they begin to depart. If specific deer are selected and continually chased by dogs, the chances of their returning are significantly reduced, and as Downing et al. (1969: 22) state, "the chase continued with fresh
dog packs, and the buck moved 7 miles from his home range. Instead of returning immediately, he worked his way back very slowly, taking two weeks to return...he stayed only 1 or 2 days before resuming his movements, becoming for a while a wanderer...the buck has not returned home, but has taken up residence in an area of higher deer population 3 miles from his home range."

Seasonal movements induced by an absence of food seems to occur more frequently in the northern latitudes than in the south. Northern deer have been known to stray more than six miles from their home range, but deer populations in the south usually remain on their home range. The mild southern winters have little effect on food yields and availability.

During the breeding season, movement seems to take place among the males. The extent of movement is presently unknown, but several studies indicate a venture of two or three miles outside of the home range. Although limited research suggests that deer will return after the rut, Downing et al. (1969: 23) state, "We suspect that when a great deal of movement takes place during the rut, a few individuals are apt not to return home."

Although some researchers regard the summer months as a time of relaxation for deer, Downing et al. (1969) present contradictory evidence. During the peak of the fawning season in June, deer wander from the home range, especially the young adults (1 to 2 years old). Track counts and telemetered deer indicate that two or three mile movements are known to occur. Not only is this behavior noted in white-tailed deer, but mule deer and black-tailed deer are known to wander extensively during the prefawning and fawning months of May and June. However, after the fawning season, deer return to their home ranges.

Therefore, in regard to seasonal movements, deer are potentially mobile and they are known to wander from their home range. Accounting for this behavior are: 1) pressure from hunters, 2) the rutting season, and 3) the fawning season. During any of these specific times deer may change residence, but the majority return to their home range.

Considerations for a Seasonal Extraction of White-tailed Deer

As it was noted earlier in this paper, deer respond to the resources provided by the environment. Browse appears to be the favorite food of deer, and in the absence of this food they will utilize other plant species and forms of food. During the spring and summer months, when browse is at its peak, the deer in practically every environment have little trouble finding food. However, in the poorer environments, such as the upland hardwood and longleaf-slash pine forests, deer, during periods of declining browse, are forced to use other food resources when they become available. The fall production of mast in the uplands provides a predictable resource, and in the absence of other foods, the deer congregate in the areas of mast. In the event of mast failure the
deer are forced to eat leafless twigs. However, in the richer environment of the bottomland hardwoods, resources are usually available throughout the year and the availability of browse and mast is more certain. Even during the fall and winter months browse is available in the form of redbay, sweetbay, greenbrier, hollies, strawberry bush, swamp cryilla, and red maple. Additional browse is provided by ferns and mosses, and mast production is high. Deer within this environment have a considerable inventory of resources from which to draw.

In the upland hardwoods the probability of deer congregating during the fall season is exceptionally high (Smith 1975), and prehistoric hunters could be expected to take advantage of the situation by exploiting mast producing areas. Similarly, deer become less cautious during the rutting season, which would give hunters an advantage in making successful hunts (Smith 1975). But while these conditions can yield a level of seasonal predictability, certain forecasts can be made for other times of the year. Browse, for example, reached its peak during the spring and summer months. Favorite foods of deer, such as summer grape, redbay and sweetbay, species of Vaccinium, greenbrier, and species of Rubus tend to cluster in specific micro-environments and would, therefore, attract deer in a predictable fashion.

White-tailed deer are exploitable throughout the year. Although upland zones and mixed pine hardwood forests yield browse and mast seasonally, the bottomland hardwoods of Congaree Swamp offer a higher yield of food throughout the seasons. Deer in southern forests are not given easily to migrations, and even though dispersal and movements apparently occur, the deer usually return to their habitat. Unlike the anadromous species of shad, sturgeon, and striped bass that appear briefly in their season, and unlike the seasonal migrations of birds and waterfowl, the deer remain yearlong residents. By this virtue of sedentism, deer are always available for exploitation.
Archeological research within the Congaree River Valley may be regarded as a patchwork of several small investigations, published articles, and unpublished research. Wauchope (1939) described several Clovis points from South Carolina, two of which were found in the upper portion of the Congaree valley. Following Wauchope's brief research, Dr. Chapman J. Milling, a Columbia physician, published a book regarding historic and protohistoric accounts of South Carolina Indians, portions of which pertain to the Congaree (Milling 1940). Based on some ceramic sherd obtained from the Thom's Creek site (38LX2), Griffin (1943) set forth the type description for Thom's Creek pottery.

In 1969, Robert L. Stephenson began recording sites within the valley, and in 1969, James Michie began excavating at the Thom's Creek site. This research provided certain stratigraphic information which confirmed basic cultural sequences set forth by Coe (1964) in North Carolina. In 1970, Michie began investigations at the Taylor site (38LX1) which lasted for nearly two years (1970). These excavations clearly demonstrated that early Archaic material culture can exist in an undisturbed context, and if large enough areas are opened, intra-site patterns of human behavior can be determined. In 1972, Michie spent several months excavating portions of the Buycke's Bluff site (38LX17), providing additional information concerning cultural sequences and geologic variability and its effect on the archeological record. These initial investigations in the late 1960's and the early 1970's served to indicate the relative importance of sites within the valley: sites can yield stratigraphy, and sites can yield relatively undisturbed patterns of human behavior.

In 1974, David G. Anderson, James L. Michie, and Michael B. Trinkley began excavations at the Manning site (38LX50) as a project associated with the Archeological Society of South Carolina, Inc. At that time, exploratory investigations were also being conducted for the purpose of discovering Old Fort Congaree. This research was conducted originally by James Michie, and later published by Anderson (1975). Following their work, Michael Trinkley also devoted considerable effort to locate the fort (Trinkley n.d.). During the efforts to locate the 18th century fort, Anderson, Michie, and Trinkley, conducted a field reconnaissance for the Southeastern Beltway (1974). The results of the survey prompted two additional surveys, one by Anderson (1974) and the other by Goodyear (1975). The Beltway surveys included intensive, controlled surface collecting and a small test pit on 38LX96, providing further information in the form of artifact patterning within sites of the Congaree River Valley near Columbia.
After completion of the Beltway surveys, several members of the Institute of Archeology and Anthropology became involved in the field reconnaissance and intensive survey of the proposed 12th Street Extension. Wogaman, House, and Goodyear (1976) did the reconnaissance, while Perlman, Cable, Cantley, and Michie (n.d.) intensively tested the Godley and the Manning sites. The intensive testing revealed that Manning has undisturbed architectural features, as well as undisturbed artifact bearing soils below the plow zone. The Godley site also produced similar information, but it additionally yielded two specific areas suggestive of living floors. These floors are represented by a hard, compact soil containing numerous specks of charcoal and fragments of cultural material. These features are oval in outline, approximately fifteen feet by ten feet.

In 1976, Marion Smith, also with the Institute of Archeology and Anthropology, surveyed a proposed route for a South Carolina Electric and Gas Company transmission line in the vicinity of Congaree Creek. In his proposal, Smith (1977) argued for mitigation of the adverse effects on one endangered site.

The Archeological Society of South Carolina in 1977 reopened the Manning site once again, and excavations are currently underway with new research objectives and altered field objectives which will yield data on past cultural systems. The site continued to produce cultural material to a depth of approximately 22 inches, and several large historic 18th century features have been found. The archeological materials, as it was discovered in 1974, exist undisturbed below an old plow zone.

Not only has the Congaree valley provided archeological resources for curious individuals, societies, and the Institute of Archeology and Anthropology, but it has served as a field school for the Department of Anthropology on two occasions. In 1970, Donald Sutherland, Professor of Anthropology, conducted excavations at the Thom's Creek site with several students (Trinkley 1975), and in 1976, Leland G. Ferguson excavated at the Manning site with a crew of students. Prior to Ferguson's investigation, the site was subjected to random sampling with the aid of William Ayres, also with the Department, and John House, associated with the Institute of Archeology and Anthropology. The sampling method provided the researchers with inter-site patterns which determined later excavation strategies. The efforts during the summer of 1976 substantiated the results of the 1974 Society excavations: the site has depth, and significant patterns exist through time and space.

The southwestern side of the valley has received most of the archeological attention, but in August of 1975, Michael Trinkley and James Michie excavated a large test pit on the northwestern side of the river at the Rainey Jones site (38RD10). The test indicated the presence of several cultural periods, and it demonstrated once again that certain sites have the potential of yielding material culture in an undisturbed context. Lying below the plow zone evidence of Middle and Early Archaic occupations was found.

Although research within the Congaree River valley has provided a patchwork, it has served to enlighten the archeological community. The Paleo-Indian stage is well represented at four known localities (Michie
1977). The transitional period from Paleo-Indian to Early Archaic is also represented by the occurrence of Dalton points at several sites near Columbia. Palmer points, and other representatives of the Early Archaic abound within the valley. The Middle and Late Archaic periods are expressed at almost every site, as seen also with the Woodland and Mississippian traditions. The archeological reports cited within the above paragraphs have referenced all of the cultural manifestations.

This history of past and present research has demonstrated that deep sites exist, and chronological knowledge may be obtained. Research has additionally provided intra-site patterns of human behavior whenever large areas are opened; for instance, compact living floors are present at the Godley site and potentially significant information may be obtained regarding the spatial patterning of artifact distributions within the plow zone of shallow sites. Finally, research has provided the archeologist with more cultural data concerning the various periods that have existed for the past twelve thousand years in South Carolina (Table 11).

**Paleo-Indian Period**

During some period of time prior to the tenth millennium B.C., nomadic hunters entered what is now the southeastern United States with an economy oriented towards the exploitation of now extinct mega-fauna and, in all probability, fauna that are presently surviving. In South Carolina these early people heavily utilized the resources of the Coastal Plain, the Fall-Line, and the lower fringes of the Piedmont. Settlement patterns suggest these people were living along major rivers and certain large creeks, and that they were avoiding physiographic regions of high relief and rugged terrain (Michie 1977). This study by Michie has recorded several Clovis fluted points from the Congaree River valley, especially within the upper portion near Columbia and the area of Congaree Creek.

Although South Carolina has failed to provide positive evidence of subsistence patterns substantiating mega-fauna exploitation, a coastal site near Myrtle Beach has recently yielded the remains of a juvenile mastodon and the tenuous association with stone tools (Michie 1976; Wright 1976). The site, located near the present day coastline, is buried under eight feet of Holocene sediments. Near the bottom of these sediments and within a matrix of peat, the animal bones were discovered. Geologic interpretations suggest that the young mastodon died in the shallow waters of an ancient pond. A similar area, located in central Florida, has also yielded the remains of proboscidea, two juvenile mammoths, directly associated with a Suwannee projectile point and chert debitage (Hoffman n.d.).

The exploitation of proboscidea is recorded in the Southwest at several localities, and the general pattern suggests that the animals were dispatched in moist, wet environments such as ponds and creek valleys. Not only were proboscidea hunted, but other mammalian species such as extinct camel, horse, tapir, slouth, and bison were also extracted from the late Pleistocene environment.
### TABLE 11

A CULTURAL SEQUENCE FOR THE HUMAN OCCUPATION OF THE CONGAREE RIVER VALLEY

<table>
<thead>
<tr>
<th>Chronology</th>
<th>Cultural Sequence</th>
<th>Subsistence</th>
<th>Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td></td>
<td>Industrial</td>
<td></td>
</tr>
<tr>
<td>1700</td>
<td>Historic</td>
<td>Agricultural</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>South Appalachian Mississippian</td>
<td>Developed Horticulture hunting and gathering</td>
<td></td>
</tr>
<tr>
<td>500 A.D.</td>
<td>Middle Woodland</td>
<td>Hunting and gathering with horticulture</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 A.D.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>Early Woodland</td>
<td>Hunting and gathering beginning of horticulture</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>Late Archaic</td>
<td>Shellfish extraction; hunting and gathering</td>
<td></td>
</tr>
<tr>
<td>3000</td>
<td>Middle Archaic</td>
<td>Hunting and gathering</td>
<td></td>
</tr>
<tr>
<td>6000</td>
<td></td>
<td>Generalized hunting and gathering</td>
<td></td>
</tr>
<tr>
<td>Early Archaic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9000</td>
<td>Paleo-Indian</td>
<td>Specialized hunting and gathering</td>
<td></td>
</tr>
</tbody>
</table>

Earliest Human Occupation in Congaree Valley?
The Paleo-Indian period occurred during the final phases of the Pleistocene (10000-8500 B.C.), when much of the state was cooler and supported a forest changing from open communities of spruce and jack pine to one of northern hardwoods (Watts 1970, 1971; Whitehead 1965, 1973). With the climatic/environmental change during the waning of the Pleistocene, the mega-fauna population diminished. As a result, the behavioral patterns and lithic industries of the Paleo-Indian began to change with the environment, and as the Holocene emerged, a new cultural tradition also emerged.

Archaic Period

With the beginning of the Holocene, the Pleistocene glaciers had retreated into Canada and environmental conditions were significantly different. The semi-boreal forests had disappeared, and the northern hardwood forest had risen, consisting of beech, hemlock, alder, birch, and similar other species (Table 11). These hardwoods lasted for a few millennia, but they too were replaced. By at least five thousand years ago the forests of South Carolina became dominated by oak, hickory, and pine, and this association has remained basically intact to the present. During these environmental changes of the Archaic period, subsistence and technology changed to meet the environmental variability.

The Archaic period is represented by at least three cultural/technological stages: the Early, Middle, and Late. The Early Archaic is basically a technological expression of the earlier Paleo-Indian period. Characterized by Dalton, Palmer, and the Kirk series of projectile points (Coe 1964), and specialized tool assemblages of end-scrapers, burins, pieces esquillees and blades, the Early Archaic lasted from 8500-6000 B.C., with subsistence directed towards the specialized hunting of white-tailed deer, as indicated by the high incidence of deer bones in the lower levels of Stanfield-Worley (DeJarnette et al. 1962). By the end of the Early Archaic, technologies were changing, and new projectile point types and tools began to emerge.

The Stanly and Morrow Mountain points, along with Guilford (Coe 1964), serve as temporal indicators for the Middle Archaic, which lasted from approximately 6000-3000 B.C. During this time people were utilizing more forest resources, while maintaining primary dependence on white-tailed deer. Instead of remaining primarily in the river valleys, as did the Early Archaic and Paleo-Indian groups, people began to exploit resources of the inter-riverine forests, in addition to the riverine. By at least 3000 B.C. technologies had changed, and those changes reflected in cultural material are known as the Late Archaic.

There is evidence that people were becoming more sedentary by 2000 B.C., reflected in several large shell middens of the coast and certain inland areas. Several large middens in the Savannah River valley, such as Stalling's Island (Claflin 1931), Groton Plantation (Stoltman 1974), and Bilbo (Williams 1968), demonstrate a Late Archaic dependence on shellfish in certain areas, while the coasts of South Carolina and
Georgia display shell rings and heaps of oyster shell (Michie 1973; Williams 1968; and Hemmings 1972). Technologies had changed to include the manufacture of Savannah River Archaic point types (Coe 1964), the utilization of steatite, and the alteration of bone and antler for tool production. The calcium content within shell heaps has preserved the bone and antler, while acidic soils of earlier non-shell sites quickly erode and deteriorate the organic cultural material. Quite possibly the technology of processing bone and antler for tools extends far back into the Archaic and Paleo-Indian periods, but such evidence has not been found in the soils of acidic archeological sites. Another cultural innovation of the Late Archaic period was the development of fiber-tempered pottery, which seems to occur with high frequency in the shell middens.

Even though subsistence appears to have been directed towards shellfish collecting in some areas, people in those areas and in non-shell midden sites continued to exploit the deer and resources available in the forest and stream. The traditions of the Archaic began to collapse at about 1500 B.C. as the cultivation of specific plant foods brought about another cultural tradition.

**Woodland Period**

The Woodland period, which lasted from approximately 1500 B.C. to about A.D. 800, probably had its roots in the traditions of the Archaic. With the development of new technologies, such as ceramic production, small triangular projectile points such as Badin and Yadkin (Coe 1964) that may have been associated when the bow and arrow appeared. Hunting and gathering continued as a subsistence base, but during this time the people probably implemented the cultivation of plants (Willey 1966).

With movement through time, ceramics developed various forms of size, shape, temper, and decorative motifs, while triangular points became smaller and more delicate in appearance. Pottery types are recognized by specific tempering and applied decorative motifs, such as sand and sherd tempering, as well as non-tempered varieties. Motifs appear as punctated, carved paddle stamped, net impressed, cord and fabric impressed, and plain may also exist (South 1976). Burial mounds begin to appear during the Woodland, and the presence of architectural features suggest an increasing trend towards sedentism. The Woodland sites are often larger than the Archaic sites, and many small sites are additionally noted, suggesting a diversity of cultural activities within differing environments.
Mississippian Period

The Mississippian Period, also known as the South Appalachian Mississippian as a regional complex, began approximately A.D. 800 and terminated with the European migration to the New World during the 17th and 18th centuries (Willey 1966). Prior to its collapse, the period is characterized by large truncated temple mounds and smaller burial mounds with subsistence based on cultivation of specific foods, especially corn. Although corn was a subsistence base, other flora and fauna of the forests and rivers were exploited. Settlement was oriented on the floodplains of large river valleys, and political systems were becoming more sophisticated.

Ceramic vessels became larger and decorations were applied with carved paddles of complicated designs. Large urns were frequently made for the storage of grain, and they were sometimes used for the interment of human remains. Although the majority was complicated stamped, these ceramic vessels also had decorative motifs of corncob impressed, textile impressed, incised, simple stamped, and burnished. Additionally, several varieties were plain in regard to design. Tempering was accomplished by shell, sand, and fiber, while some were non-tempered (South 1976).

Population seems to have increased during this period with an increase in sedentism. The villages were much larger and the increased productions of food supplies and forest exploitations provided sufficient biomass for a growing populous.

The Mississippian period, with its roots in the Woodland, and cultural affinities with traditions in the Mississippi valley, collapsed soon after it was introduced to the white Europeans who steadily emigrated from the Old World and pushed deeper into the Carolina frontier. The effects of diseases, wars, and the enterprising economy of the whites brought unbearable pressure on the indigenous Americans, and within decades the Mississippian period and its cultural systems were virtually destroyed.

Prehistoric Settlement Pattern Within the Congaree River Valley

Prehistoric settlement patterning in South Carolina is diverse, complex, and virtually unstudied. Although Goodyear (in press), House and Wogaman (1978), House and Ballenger (1976), Hanson, Most, and Anderson (1978), Taylor and Smith (1978), and Michie (1977), for example, have dealt with specific environmental provinces and time periods, settlement is, nevertheless, not well understood. Within the parameters of current knowledge, the settlement pattern within the Congaree River valley is vague and relatively unstudied.

The sites that have received attention are the large base camp oriented occupations with large lithic assemblages, and the sand ridges within the swamp which yield quantities of Mississippian cultural materials.
Although many other sites exist along the peripheral edges of the valley, those sites have received little or no attention except from relic collectors and brief mentions in the site files of the Institute of Archeology and Anthropology at the University of South Carolina.

Base camps are sites that yield a high volume and diversity of lithic materials relative to other kinds of sites. The Taylor site (38LX1), for example, has yielded hundreds of bifacial and unifacial tools representing the Paleo, Archaic, and Woodland periods. The earlier periods are well represented by Clovis, Suwannee, Dalton, Taylor, and Palmer points and related unifacial assemblages which include burins, end scrapers, pieces esquillees, gravers, and blades (Michie 1977). The Archaic is fully represented by a complete sequence of points, and small triangular points of the Woodland period occur with a high degree of diversity of form and shape throughout the 35 acre site. Ground stone implements, such as celts and grooved axes, are well represented along with hammerstones, grinding stones, abraders, atlatl weights, bola weights, nutting stones, and grinding stones. The Taylor site, then, appears to have attracted a great many people over a considerable length of time, and based on the lithic by-products of human behavior, activities seem to have been diversified.

Also occurring within the Congaree valley are much smaller sites that represent light scatters of lithic materials. Such sites occur over most of the peripheral zones, and while lithic inventories may indicate successive occupations through time and space, the inventories are limited generally to flakes of bifacial retouch and bifaces in various stages of resharpening while others are shattered. This does not necessarily indicate that all sites of this nature yield the same inventory, but in terms of site function, the by-product of human behavior would suggest a form of limited activity. A case in point would involve the Edenwood site (38LX135; Michie 1979) which was subjected to intensive testing for a period of about two weeks. The reconnaissance of earlier surveys (Smith 1977; Wogaman, House, and Goodyear 1976) and the excavation produced a limited lithic inventory consisting of shattered quartz cobbles, flakes of bifacial reduction, and several complete and broken projectile points. Although two end-scrapers and a shattered hammerstone were also recovered, the site, nevertheless, does not suggest diversified activities. Sites such as these occur frequently, and in fact, smaller lithic sites are known to occur at many localities within the Congaree valley. The function of these sites is not certain, and unfortunately, the majority of them have never received any interpretive attention. Their role in the broader cultural system probably involves many forms of activity associated with resource extraction (Michie 1979), but presently a great deal of research is required in order to set forth behavioral models.

Lithic sites within the Congaree valley exist on the north peripheral edges in Richland County, and on the southern peripheral edges in Lexington and Calhoun Counties. The large base camp oriented sites are located almost exclusively on the south side of the river and are situated, or
very closely situated, at the intersection of creeks and the river swamp and on the last portion of elevated ground before it descends into the bottomland environment. These major sites are: Taylor site (38LX1), Manning site (38LX50), Thom's Creek site (38LX2), Savany Hunt site (38CL13), Sandy Run site (38CL9), Big Beaver site (38CL30), and the Buycke's Bluff site (38CL17), all of which are located on the southern edge of the Congaree valley. One single site of this kind exists on the northern edge: Rainy Jones site (38RD10).

During the Mississippian period, occupation seems to occur sporadically in the valley with limited representation, and it too is not well known. The only appreciable occupation exists slightly below Columbia in Lexington County, and south of Congaree Creek. The site, 38LX68, is represented by a large number of pottery sherds and triangular-shaped projectile points, but its function within the broad cultural system is unstudied and unrecognized. Within the bottomlands of the Congaree swamp two large sand ridges, Mullers Barn Ridge and Green Hill Mound, were partially destroyed in the process of obtaining road fill for the adjoining swamp thereby exposing intrusive Mississippian burial urns. Unfortunately, however, the material was collected by relic hunters, and other than the knowledge of such events, little is known about the Mississippian period. Mullers Barn Ridge (38CL18) and Green Hill Mound (38RD4) may represent mortuary centers, or perhaps the sites are more complex in function.

The cursory information regarding settlement indicates that the overwhelming majority of large lithic sites, considered in terms of base camps, occur on the southern edge of the Congaree valley (Fig. 12) at locations involving the intersection of creeks and their entry into the bottomlands. Smaller sites occupy these peripheral zones and in all probability they represent extensions of the base camps in the form of extraction camps. Bottomland sand ridges have demonstrated the occurrence of Mississippian utilization through intrusive burials. Any consideration of future research designs would have to consider the present and somewhat limited knowledge of settlement in the valley.

**Historic Period in South Carolina**

Prior to the English settlement at Charles Town in 1670, Spaniards and Frenchmen initially explored and attempted colonization of inland and coastal areas. These sporadic and unsuccessful attempts at becoming rich and gaining a foothold on Carolina soil lasted for more than a century.

As early as 1520, the Spanish were sailing past the Carolina coast in search of potential lands suitable for settlement. The first effort to colonize the area was made by Lucas Vasquez de Allyon in 1526. The small colony located itself somewhere in the vicinity of latitude 33 degrees, and in an area contiguous with an estuary. Although the exact location is not known, the settlement was soon aborted because of summer fevers and a severe winter. De Allyon died of malaria, the black slaves
Figure 12: Location of Base Camps and Swamp Sand Ridges in the Congaree River Valley.
revolted, and the colony was thrust into mutiny. The battered colony, nearly starved, returned to Hispaniola (Savage 1956: 32-35; Wright 1976: 30).

The interior of Carolina was later traversed in 1540 by Hernandes de Soto, driven by illusions of wealth. Crossing the Savannah River near Silver Bluff and moving eastward, he arrived at one of the major tributaries of the Santee River Basin, if not the Santee River itself, where he encountered a Mississippian village. De Soto then turned north towards the Blue Ridge Mountains. His route, although questionable, may have involved the Congaree and the Broad Rivers as he eventually entered the region of Tennessee (Savage 1956: 36).

By 1565, the Spanish had established considerable influence and control in Florida, and they steadily pushed up the coast in attempts to establish additional colonies. As a result Pedro Menendez de Aviles built an outpost, Fort San Felipe, on Parris Island at Port Royal Sound in 1566, and later sent Juan Pardo to explore the hinterlands of Carolina to seek alliances with the indigenous Americans (Rogers 1973: 4). His route took a northern direction allowing him to reach the Blue Ridge Mountains; a route that paralleled the earlier directions of de Soto. The following year Juan Pardo returned to the interior, following the same route and camped near "one of two large rivers," which Savage (1956: 38) interprets as the Congaree River. Further interpretations by Savage suggest that Pardo moved up the Broad River and returned down the Wateree River, eventually back to Fort San Felipe.

About a decade later San Felipe was destroyed by embittered Indians, but the undaunted Spaniards soon erected a new fortification in the vicinity of the earlier fort. The outpost, however, was soon abandoned because of increased conflicts and contentions with the French, who were competing for Spanish claimed soil. Too few in number to defend the outlying and uncertain territories, the Spanish withdrew to Florida (Wright 1976: 36). Although the Spanish continued to claim territories from Florida through portions of South Carolina, and while several missions persisted up the coast until as recent as 1686, the Spanish were losing their stronghold (Rogers 1973: 5).

Concurrent with 16th century ambitions for settlement, the French also made attempts at colonization in the coastal areas. Jean Ribaut and a group of Huguenots attempted a small settlement at Port Royal Sound in 1562, but after several months of poor management, the colony disbanded. There is also evidence to suggest that a French fortification was constructed near the mouth of the Edisto River in the 1570's, but it too fell into abandonment (Wright 1976: 35).

The early attempts by the Spanish and French at colonization were all fruitless. While the Spanish traversed the interior of the state and passed near the Congaree River, they never succeeded in establishing any long term settlement. Characterized by poor management, a failure to cultivate the land, ineptness at hunting and food gathering, cruelty to the indigenous tribes, and poor support from the mother countries, the settlements were aborted, serving as a lesson for the later attempts by the English (Wright 1976: 38).
Nearly a century after the unsuccessful attempts at colonization, a small English colony under a charter granted to the Lords and Proprietors established a settlement at Albemarle Point near the present city of Charleston. The initial years of settlement paralleled earlier attempts of Spanish and French, especially in terms of subsistence. These settlers were inexperienced in methods of agriculture, and subsequently depended upon the indigenous Americans for major supplies of food. Subsistence farming, however, was later incorporated into a growing economy which was steadily expanding to include deerskins, furs, and timber (Wright 1976: 46). During the early years, tens of thousands of deerskins were shipped to England, in addition to pitch, tar, resin, and turpentine, materials necessary for construction and maintenance of English ships.

The utility of the growing colony was quickly realized by the mother country, and trade among the Indians, the colonists, and England soon flourished and reached large proportions. In the latter part of the 17th century, rice production became an important crop, and by 1700, Carolina was shipping 300 tons a year to England (Wright 1976: 73). Because rice production required considerable acreage of specific soils and certain environmental conditions, people began radiating out from Charles Town to acquire large bottomlands. The inland swamps near the coast were ideal for rice production for the lands provided fertile soils and an abundance of water, while the areas required a minimum of labor in land clearing. Although some rice cultivation occurred in the interior along major rivers, such as the Santee, the coastal areas were preferred. This important money crop lasted for nearly two centuries, but the increasing occurrence of floods and coastal hurricanes wreaked havoc on the crop. Subsequently, growers were brought to the edge of ruin (Wright 1976: 73-74).

As a competing crop, indigo in the mid-1700's was being shipped to England in large quantities. Developed during the beginning of the 1740's, it had reached a level of enormous production by 1750. Unlike its competitor, rice, the indigo plants could be adapted to many varying environments which included the upland areas. Free from floods, the crop continued in popularity. With an overproduction of rice during England's wars with Spain and France, and a reluctance to export the product, indigo gained a firm hold on the Carolina economy. The production of this product for clothing dye remained steadfast until the invention of the cotton gin in 1791 (Wright 1976: 79-80).

From their inception at the beginning of the 18th century, plantations represented a minority of the population. Although some planters may have received large acreage through arbitrary means of Royal grants, "it is said that generally only families with influence, who could get grants from the Royal governor of the province came into possession of these (valuable rice)lands, some of the grants containing several thousand acres" (Cook 1926: 80). The great landowners of the mid-18th century had become prosperous, especially in terms of rice, indigo, and forest products, and this prosperity coincided with slave labor. The small farmers, without large tracts of land, political influence, or slave holdings, failed to compete with their wealthy contemporaries. As a result, the small farmers moved inland (Wright 1976: 80).
Concomitant with back country migration, the planters of the lower coastal plain, fearful of Indian attacks and slave rebellions, stimulated the immigration of additional settlers to occupy buffer zones on the inland fringes of the plantations. In order to finance and entice immigration to the back country, a tax was levied against the purchase of imported slaves. Several inland areas were laid out into nine townships, scattered between the lower coastal plain and the fall-line, and representing some six square miles each. These townships attracted people from Germany, England, Scotland, and Switzerland, but many people from the east coast of North America saw an opportunity to acquire free land. Immigrants began moving into the areas of the interior, and by 1750 many townships were occupied. Subsistence and economies were oriented towards cattle and hog raising in the swamplands, and cultivation of specific crops in the upland area, such as corn, wheat, and indigo. Clothing was manufactured from wool and flax, and grist mills erected on streams produced flour and meal. The river systems were utilized for transporting hogs and cattle to market in Charleston, and in the absence of such transportation, Indian paths were converted into roads. Although separated from Charleston in terms of political and social unity, the back country began to open and settlement increased. But while this area opened, the Piedmont was closed. The lands to the north still belonged to powerful Indian nations such as the Cherokee and Creeks, people who resisted southern intrusions (Wright 1976: 84-88).

Although several decades were required to resolve the Indian problem, the Piedmont began to open up in the late 1760's. With constant negotiations, land purchases, wars, treaties, piedmont fortifications, and the near termination of the indigenous Americans, the up-country began receiving settlers.

Thus, in the mid-1700's, South Carolina grew in population, but the people in many ways were separated. The coastal areas represented a political and social unity bound with courts, plantations, and merchants, all of which had little contact with people in the back country. Those who lived in the upper Coastal Plain and Piedmont seldom had any representation in the form of courts and justice for criminal actions. In the absence of such a system, the back country people initiated a system of Regulars who represented a corporate group of vigilantes. Although the Regulars were sometimes successful in preventing cattle and hog thefts, and in bringing the criminal to justice, the Regulars themselves were sometimes arrested and taken to Charleston under charges of similar crimes. Charleston's neglect of the back country was a devastating mistake, especially when the interior was asked to defend the social and economic system of the coast at the outbreak of the War of Independence. Subsequently, specific areas of the state remained divided into Whigs and Tories, many of whom died unyielding to another's cause.

South Carolina, in retrospect, was initially sought after by the Spanish and French, and while these people tried colonization, their ineptness, lack of forethought, and greed proved detrimental. Even with the establishment of Charles Town and the concept of mercantilism, the Lords and Proprietors were looking for high return on their investments. The colonists depended heavily on the local indigenous Americans for
subsistence, and during that crucial time little assistance was provided by the mother country. Through trade systems with the interior for deer skins, and the later cultivation of large money crops such as rice and indigo, the coastal areas rose to wealth. The independent people of the back country, who cared little for the coastal powers, cleared forests, raised crops and stock, built ferries and roads, and developed the interior. The area of Congaree Swamp and its adjacent areas characterize the back country of the 1700's.

The Historic Period Within the Congaree River Valley

The first Europeans to pass through the Santee River tributaries were the Spanish in 1540, and again in 1566 and 1567. While there is a high probability that de Soto and Juan Pardo traveled north up the Santee River, their routes up either the Congaree or the Broad are questionable. Savage (1956: 38) suggests a route leading past the Congaree and Broad Rivers, while Baker (1975: 25) suggests the east side of the Wateree and Catawba Rivers. Baker's thesis considers the correlation between early descriptions of land forms, river valleys, and indigenous groups, comparing these data with extant topographies, river systems, and portions of the archeological record, all of which tend to support the east bank of the Wateree. But Baker does admit: "Frustrating ambiguities do exist among these accounts in regard to both terrain and peoples along this general route." (Baker 1975: 25). In all probability the Spanish traversed the east side of the Wateree and continued north past the present city of Camden and on up the Catawba River to the base of the Blue Ridge Mountains.

Nearly 150 years after the Spanish had left the area, Dr. Henry Woodward and Maurice Mathews followed the same route in the 1670's, and John Lawson in 1701, traversed the same passage which led him to the foothills of the mountains (Baker 1975: 25). These early explorers and travelers, however, were not especially interested in settlement, but rather they were motivated by rapacity, curiosity, and a need to record the terrain and its resources. These explorers also utilized the Santee-Wateree-Catawba route, and there exists little evidence to demonstrate an involvement with the Congaree River Valley. Although European deerskin traders had pushed deep into the interior prior to 1700, as evidenced by Lawson (1709), these traders were located in the Wateree drainage and there is no documentation to suggest contact in the Congaree Valley during the early years.

The Spanish, Woodward and Mathews, and Lawson followed a principal route that led through numerous Indian villages, all located on the east bank of the Wateree drainage. The path led from the village of Cofitachique on the Santee, north through the Congarees, who were then located on the Wateree, to the highland province of Xuala located at the base of the Blue Ridge. During these early times the area of the Congaree and Broad Rivers appears to have been sparsely occupied, if not vacant (Baker 1975: 24), which may account for the absence of traders and explorers.
After Lawson's travels, the Congarees, under considerable pressure from neighboring tribes, emigrated from the Wateree valley and relocated on the west bank of the Congaree near Congaree Creek sometime between 1701 and 1708 (Baker 1975: 62). Apparently taking advantage of an unfortunate situation of European immigration, the Congarees chose a strategic location in the center of the Cherokee trade route which led from Charles Town up the west bank of the Santee and Congaree, and up the Saluda to the Cherokee nation. The location of the Congarees would later provide a catalyst for European settlement in the Congaree valley.

In 1716, with increased Cherokee trade, an agreement was made between the English and Cherokee to establish a fort and trading factory at the location of the "Congarees" (Green 1932: 15-16). The fort was actually constructed two years later in 1718, on the west bank of the Congaree River and on the northwest bank of Congaree Creek. An earthen and stockade enclosure for the protection of trade goods, the fort lasted for four years. With increased Indian trade moving deeper into the interior, and with the English withdrawal from trade systems, the fort was abandoned in 1722 (Green 1932: 18).

With the creation of buffer zones in the form of townships, a small settlement named Saxe-Gotha was founded on the west bank of the Congaree River in the 1730's near Old Fort Congaree. This location, a few miles southeast of the present city of Columbia, encompassed six square miles, much of which lay contiguous with the Congaree River. The area is characterized by natural levees and river deposited sands, a bottomland environment subjected to inundation by large floods. This specific location was probably chosen because of its connection with the Cherokee trading path which provided access to Charles Town, and because it was the furthest point on the river to which one could travel before encountering the shoals and rapids of the Fall Line.

The immigrants were a mixture of Germans, Scots, English, and Welsh who arrived from Charles Town and who emigrated from areas of Pennsylvania, Maryland, and Virginia in search of better lands and a relief from the threat of Indian attacks. However, in the 1740's violent conflicts arose between the settlers who continued to push into the Piedmont interior and the Indians who felt that settlers and traders were invading Indian territory and cheating the Indian. As a result of closing Old Fort Congaree, and with the possibility of restoring additional trade, while providing protection for the settlers, a second garrison was erected slightly northwest of the original in 1748. The new fort often provided refuge for local settlers, and in 1751, several settlers from the Piedmont took refuge from raiding Cherokees and other northern Indians who had killed several people. The Cherokee had also entered the area of Saxe-Gotha and were killing cattle. In a response to these activities, a company of Rangers was enlisted from the settlers to contend with the problem (Green 1932: 16-17). With the establishment of several Piedmont fortifications, and more than a decade of fighting and treaties, the Indian problem throughout much of the Piedmont was terminated (Wright 1976: 84-93).
With the establishment of the New Fort Congaree in 1748, Friday's Ferry was constructed across the Congaree which enabled settlers to cross the river and populate the area of Richland County. The ferry became public in 1754, and a small number of people began to settle on the east bank. On the west bank the town of Saxe-Gotha slowly adopted the name of Granby, and with the growing population on the east bank, the name East Granby emerged. From this settlement in Richland County people began to move south and occupied the upland areas adjacent to the large floodplain of the Congaree.

Although there were a few people in the county in 1735, settlement on a larger scale did not develop until after 1740. The areas around Gill and Mill Creek, located west of the Congaree Swamp monument, were the first to have received increased settlement, while areas further southeast in the vicinity of the Wateree and Congaree were beginning to witness a few successful settlements. Within the ensuing years there was a steady flow of people into the lower portions of the county and by 1757, "there was a considerable population in the fork of the two rivers" (Green 1932: 32).

On the eve of the War of Independence, the settlers had divided themselves into groups with opposing political ideologies. Because Charles Town had failed to acknowledge specific problems of the interior, especially after taxes had been levied without any representation in the form of courts, judges, and justice for the criminal, many people remained apathetic to the cause for independence. Other people, however, sympathized with the merchants and planters of the coast, and tossed in their ballots for independence. The Whigs appeared to represent the larger body of ideology, while smaller numbers of Tories remained steadfast to the crown. Although there was a strong support of the Revolution, in terms of people and specific food products, there was little fighting in Richland County or within the counties on the western bank of the Congaree. Involvement came specifically in the form of food production on the farms and plantations which supplied corn, beef, pork, mutton, flour, potatoes, hay, and fodder, while private and public ferries transported troops to various destinations.

Other than brief skirmishes, only two small battles were waged in the Congaree Valley. In 1780, the British erected a fortification in the town of Granby, probably to control the flow of traffic across the ferry and into areas of the Piedmont. This fort was "besieged and relieved and taken and retaken during the Revolution" (Green 1932: 20). In 1781, the fort was attacked via the ferry and was captured from the British after two days of fighting. According to Green, however, the American command was lost and retaken several times.

About 30 miles southeast of the Granby garrison, the British had taken possession of the home of Rebecca Motte and had transformed it into a fortified garrison with a deep trench and an elevated parapet. The house was located in a strategic position overlooking the confluence of three roads that led to Camden on the Wateree River, northwest to Columbia, and south to Charleston. Additionally, the Camden road used McCord's Ferry to cross the Congaree. The post, therefore, checked any traffic moving to strategic locations. General Francis Marion, who
operated guerrilla forces in the coastal plain provinces and who had previously crushed the British fortification at Scott's Lake on the Santee River, besieged the post at Fort Motte. The siege resulted in a partial destruction of the house with fire, a short exchange of musket-fire, and a relatively quick surrender of the British (Savage 1956: 235-236).

In terms of major, decisive battles the area of Richland County was insignificant during the Revolution. Small encounters between Whigs, Tories, partisans and British seem to reflect the majority of fighting, and the Congaree Swamp monument had little or no involvement.

Subsistence and Economy

With the establishment of Fort Congaree in 1718, subsistence within the valley revolved around a system of trade that exploited the Indian trade and deerskins. In the small garrison the Cherokees, Congarees, and other indigenous groups exchanged skins for guns, munitions, blankets, and other goods (Green 1932: 15; Ivers 1970: 3). The small outpost probably exploited game and utilized domestic animals, in addition to food supplies transported from Charles Town.

The settlers who began arriving in the 1730's brought with them domestic animals which included cattle, horses, sheep, and hogs. Geese, whose down provided bedding, were also on the list (Green 1932: 138). Apparently many of the settlers arrived with only a small supply of essential goods which may have included a horse and cow, a minimum of cooking utensils, few clothes, bedding, an axe, and occasionally a flintlock rifle. With the axe the settler cleared the land and constructed a crude lean-to. Beds and other forms of furniture were constructed by hand, and original cabin floors were probably dirt covered with pine straw or other vegetal matter. Log cabins with stick-and-mud chimneys later replaced the primitive lean-to, but privation frequently characterized the settler (Wright 1976: 94-95).

Other immigrants arrived with a larger inventory of goods and livestock. "A surprising number had whipsaws with which they made clapboards and floorboards for their houses. Very soon simple dwellings of two rooms--with an ell for a kitchen, fireplaces at each end, a loft, and a porch across the front--replaced log cabins on the more prosperous farms" (Wright 1976: 95).

Cultivated foods such as corn, wheat, sweet potatoes, and peas began to appear on the emerging frontier, and in 1748, the first grist mill in Richland County was constructed on Mill Creek. In the following years several mills began to appear along the edge of the Congaree Valley, especially on the larger tributaries that could provide enough water to fill a mill pond and generate power for the mill. In addition to producing flour and meal, "some of the mills had sets of gang saws, by means of which boards and other forms of timber were cut. Where boards were planed, the work had to be done by hand" (Green 1932: 138).
In the mid-1700's, indigo was introduced into the area, but "it doesn't appear that Richland County exported much indigo, most of it being grown in the coastal region" (Cely n.d.: 91). The crop was cultivated in the sandy upland areas and within the fertile soils of the swampy lowlands. The crop yield was certainly greater in the bottomlands of the Congaree, but cultivation required tremendous amounts of expense and human labor in the form of earthen dams and dike systems to protect crops from annual floods. As Cely (n.d.) points out: "most planters were reluctant to reclaim the swamps because it involved investing a considerable number of expensive slaves working in a disease-ridden environment to construct the elaborate system of dikes required to protect the crop from periodic floods."

As a portion of the economic system, Green (1932) states: "Indigo very soon formed a considerable source of revenue. When William Howell died in 1757, his estate contained the item of a balance of 739 pounds, 1 shilling and 9 pence due for "indigo." Here and there in the papers relating to the settlement of estates are references to indigo seed or the crop. Arthur Howell, directs that his indigo crop be sold and the proceeds be used to pay his debts. The Weston family cultivated indigo extensively. Before the Revolution a large acreage, especially in the Congaree swamp, was devoted to its production, and for some years after the struggle it continued to be raised, although with diminished returns, as the bounty offered by England was no longer paid. In 1791 William Goodwyn's property, which was managed for him by his cousin, Jesse Goodwyn, produced twelve hogsheads of indigo valued at 75 pounds per hogshead. As late as 1815 the estate of Gale Hampton, which was managed by Conrad Murph... reported a small amount of indigo" (Green 1932: 139).

Rice was also cultivated on a small scale in the county, but being a crop that required considerable investment, acreage, extensive land clearing in bottomlands, slave labor, and dike systems, the coastal areas with appropriate environments were preferred (Cely n.d.: 92). Although references regarding the production of rice are practically nonexistent, Mr. Jack Braddy of St. Matthews, South Carolina, has stated that rice was grown within the Congaree Swamp Monument area. This information, according to Braddy, was given him by his grandfather many years ago. If rice was produced in the Monument area, there is no written record, and no evidence other than that provided by Braddy.

Following the War of Independence, indigo and rice production throughout South Carolina suffered because of the colonial severance with the British economy. Cotton, which adapted easily to the soils that yielded indigo, soon rose as a supplement to restore the economy. With the invention of Whitney's cotton gin in 1791, cotton experienced an unparalleled production.
The cotton plant was probably present in Richland County prior to Whitney's gin, but its production was oriented towards the production of personal clothing. Increased production is witnessed with the installment of a water powered gin on Mill Creek in 1795, and in 1799, Wade Hampton, a wealthy and energetic planter, probably yielded the county's first large crop which totaled 600 bags from a 600 acre field (Green 1932: 139).

Roads, Ferries, and Bridges

The original routes leading to various places in South Carolina were trading paths established long before the arrival of the Europeans. One such path led northward from Charles Town and passed slightly west of the Santee River, continuing up the west side of the Congaree, past the Saluda River to the Cherokees. With the development and extension of the Indian trade, these footpaths became horse trails, and with the appearance of the settler, the paths were widened to accept carts and wagons. With further expansions of settlement, roads branched off of the main trails, leading to houses, meeting halls, plantations, and to ferry crossings (Green 1932: 110).

One of the first roads in the Congaree valley was the old Cherokee trading path which later brought settlers to Saxe-Gotha from Charles Town. With settlement expansion and a need to ford the river, two ferries were constructed in the 1740's. Friday's Ferry, located at Saxe-Gotha and just below the Fall Line rapids, was constructed in 1748. In 1754, the ferry was made public. About the same period of time Joyner's Ferry was constructed in 1746, at the southeast corner of the county near the confluence of the Wateree and Congaree. The road leading to the ferry branched north from the old Cherokee trail, crossed the Congaree, and continued north to Camden. With the construction of these two ferries, one at each end of the river system, a road on the east side of the Congaree was developed, connecting the points of crossing.

Between these two ferries and roads lay the Congaree River Valley, and within decades, additional ferries were constructed. Many of these ferries were private and, subsequently, their locations were not specifically recorded in township or district records. Such examples by Green (1932) are mentioned as: Henry Weaver's Ferry; David Webb's Ferry, located in Saxe-Gotha (ca. 1770); William Howell's Ferry, located below Mill Creek; William Thompson's Ferry (ca. 1778); Patrick's Old Ferry, located near the present city of Columbia; Horseman's Ferry (ca. 1788); Thomas Howell's Ferry, located in the lower part of the county (ca. 1806); Issac Huger's Ferry, located in the lower part of the county which became public in 1787; and Daniel Zeigler's Ferry (ca. 1840) (Green 1932: 113-117 and Cely n.d.: 93). The last two ferries, Huger's and Zeigler's, were located within the boundaries of the proposed National Park Monument. Huger's was located at the eastern boundary, while Zeigler's was located in the central portion (Cely n.d.: 93). The exact location of both ferries is presently unknown.
By 1825, according to Green (1932: 119), most of the ferries between Columbia and McCord's Ferry had disappeared, or at least they did not appear on Mill's Atlas of 1825.

Shortly after the War of Independence an attempt was made at bridging the Congaree at Granby to provide safer passage. The private venture was washed away during the flood of 1791, but a more successful attempt was made in 1792. The bridge lasted for several years, but it too was destroyed by a flood in 1796. There was, apparently, another attempt in 1790, but it too collapsed with flood waters. Green (1932: 121) quotes from the Charleston City Gazette, April 5, 1790, "the bridge at Granby was entirely swept away...by flood waters...." Apparently there were three attempts in constructing a bridge at the location of Granby, and all were unsuccessful. However, in 1827, the Columbia Bridge Company erected the first permanent bridge across the Congaree (Green 1932: 119-121).

At the other end of the Congaree, McCord's Ferry remained in use for more than 150 years, and in 1923 it was replaced with a bridge. Unfortunately, the flood of 1928 destroyed the structure, but by 1930, it was replaced (Green 1932: 115). Currently, the only bridges spanning the Congaree occur at the locations of the earliest ferries: Friday and Joyner.
THEORETICAL BASE AND RESEARCH OBJECTIVES

Research Objectives

The ultimate goal of contemporary archeology is to utilize the extant by-products of past human cultural systems to their fullest potential in developing an understanding of paleo-human behavior, especially in terms of the broader aspects of those systems. Through such an orientation the archeologist attempts to develop and set forth patterns and models applicable not only to immediate areas, but also within larger geographic areas. In this sense the archeologist proceeds beyond the descriptive/historical traditions of recent years and searches for answers regarding social and economic behavior, such as settlement and subsistence patterns.

As recent as the 1950's and 1960's, archeological research was practically oriented towards a philosophy and ideology of culture history which concerned itself with constructing descriptive typologies of pottery sherds, projectile points, and other items of material culture. By utilizing principles of stratigraphy and seriation, and by comparing the results with other geographic areas, the archeologist was able to assemble a chain of cultural sequences reflective of time and space. This theoretical framework was intended to emphasize culture through the extant representatives of paleo-societies: the artifact record. These artifacts were viewed as culture's shared ideas, or as norms expressed in the specific form and decoration of material culture. The archeologist became almost totally consumed with lengthy descriptions of projectile points and other items of flaked stone, and considerable attention was directed at pottery sherds and decorative motifs. The theme of descriptive/historic archeology dealt primarily with form, while questions regarding function seldom entered into the picture. Culture history, although more complex than the example given, also sought answers to movements and migrations of people by developing models of diffusion, while it spoke of the rise and decline of prehistoric cultures. Indeed, the theoretical climate spoke more in terms of history than in terms of the processes that bring about cultural change. The normative framework of the past, although still beneficial to archeology, has recently declined as a total research direction. Culture process is currently a theoretical direction for the contemporary archeologist, and while it may embrace artifact chronologies and other traits of the culture history school, it moves far beyond the classification and description of normative behavior and it searches for nomothetic principles and laws which set forth explanations of human behavior (Binford 1962, 1964, 1965; Flannery 1967; Martin 1971).

These new goals in archeology may be obtained by setting forth hypothesis, regarding forms of human behavior, that can be used to test and predict those patterns. In the absence of existing hypotheses, new hypotheses may be generated from excavated data, environmental information regarding the past and present, and ethnographic data. Although a complete explanation of the archeological record may be a model for
which to strive, the utilization of hypotheses basic to the initial understanding of human behavior serves as a foundation. As South (1977) has pointed out, "the key to understanding culture process lies in pattern recognition. Once pattern is recognized, the archeologist can then ask why the pattern exists, why it is often so predictive it can be expressed as laws. In doing so, he can begin to build a theory for explaining the demonstrated pattern" (South 1977: 31).

In understanding ancient cultural systems we look towards questions regarding subsistence, environmental utilization, settlement patterns, technologies, social structure, and other components of the cultural system. In doing so, we never consider a singular site, or treat that site as an end within itself. Indeed, a single site is a part of a much broader cultural system, and we should always strive to associate that site, or sites, with the larger cultural system through pattern recognition. Frequently, there is an unfortunate inherent bias introduced into every archeological site that prevents an easy understanding of site function and other goals in archeology. The very fact that many technologies relied on perishable items, such as wood and fibers, introduce an overwhelming bias after their decay, and subsequently, the archeologist must study the remnants of technologies represented by shattered stone and fragments of pottery sherds. Although much can be learned from these technological fragments, and the patterning of material culture in the archeological record, there is, nevertheless, an inherent bias. The artifact record within Congaree Swamp is no different. However, these by-products of human behavior, the material culture, can contribute significantly to the understanding of settlement pattern, environmental utilization, site function, and patterns of subsistence.

**Hypotheses Considerations**

**Basic Observations and Hypotheses**

With the appearance of the indigenous Americans some 12,000 years ago, the Congaree Valley has continued to attract numerous groups that existed by hunting and gathering. Throughout the Paleo-Indian, Archaic, Woodland, and Mississippian periods, habitation sites were widespread and apparently diverse in size and function. Major occupations, in the form of base camps, were situated on moderately well drained soils and on sharply defined ecotones on the southern edge of the valley in Lexington and Calhoun Counties. Attending relative locations are smaller sites located along the peripheral edge that may have served as extraction camps. The north side of the river, in contrast, presents evidence for a less intensive occupation, yielding only one known base camp. Smaller camps do occur along the peripheral zones, but they appear less abundant.

The evidence for the Mississippian period occurs sporadically, and except for one large site on the southern edge of the valley, the period is poorly represented in comparison to the lithic sites of earlier time periods. The natural sand ridges within the swamp, Green Hill Mound and Mullers Barn Ridge, have both demonstrated Mississippian occupations in
the form of intrusive urn burials and apparent utilization as a habitation site.

During the historic period, settlement is oriented towards the southern edge of the swamp. The establishment of Fort Congaree in 1718; the 1740's development of Saxe-Gotha and its later expansion to include Granby; and the British fortifications of 1780 all demonstrate southern peripheral occupations in the early development of the historic period. The majority of roads, bridges, and ferries involved the polarities of the Congaree River, and for the most part, the bottomlands of Congaree Swamp were virtually unclaimed and unused for extended periods of time. Utilization increased during the 19th century, but it was apparently restricted to limited utilization in the form of cultivation and the erection of earthen dikes and cattle mounts, and for browsing cattle.

Occupation, therefore, has greatly involved the southern peripheral areas of the Congaree Valley, while the northern edge has never known a great deal of prehistoric or historic activity. The historic settlements involved, no doubt, the relocation of the Congaree Indians in 1708, an economic system fostered in part by the erection of Fort Congaree which involved the deerskin trade, and the location of the Cherokee trading path which offered accessiblility to the interior. Saxe-Gotha, Granby, and other frontier settlements were tied into the trading path and the convenience of the Congaree River by which large stores of goods could be transported to Charles Town. Exemplified by the location of ferries at the narrows below the Fall Line, the wide expanse of the swamp must have imposed logistical problems concerning transportation.

Congaree Swamp is basically a hydric environment consisting of moderate to poorly drained silty clay soils with varying degrees of slow permeability. Composed of a mosaic of filled and partially filled oxbow lakes, the bottomland is further dissected by swales and sloughs, and actively flowing creeks. During periods of annual flooding the bottomland is given easily to submergence, and with floods of greater magnitude the loss of livestock, the destruction of crops and homes, the loss of other material possessions, and the occasional loss of human lives is not uncommon. During normal discharge, and with encouragement from floods, the river continuously meanders across the floodplain creating oxbow lakes, cut-offs, and new channels that redistribute the silty clays through constant erosion and deposition. The relatively flat bottomland with high water tables and little elevational differences, tends to support hydric floral species which provide a rich environment for vertebrate species. These floral and faunal communities offer considerable resources for human exploitation, especially being a preferred habitat for white-tailed deer and for producing highly predictable yields of mast. The diversity of avifaunal, herpetofaunal, and ichthyic communities adds richness to a resource base available for human exploitation through species extraction, while yields of forage and mast provide diverse browse for domestic cattle. However, the predictable instability of Congaree Swamp, exemplified by flooding, offers a precarious existence to either indigenous Americans or white Europeans, but in terms of resource potential, the bottomland is given easily to short term occupation.
with species extraction and limited historic utilization through cultivation and cattle raising. However, in order to implement historic utilization certain strategies are required in order to protect valuable crops and cattle, and such strategies were implemented with the construction of earthen dikes and cattle mounts. Within this environment, then, prehistoric base camps and examples of long term occupation would not be expected, but rather occupations would tend to be associated with short term behavioral activities involving some form of extractions.

The upland areas adjacent to the swamp do not possess soils that are ideal for extended human occupations or highly successful land utilization. The soils range from moderately well drained to poorly drained, and even though surface soils are sandy loams, the shallow subsurface clays retard penetration of water which frequently results in prolonged saturation of the sandy loams. Such conditions are not favorable to cultivation and it produces only a medium potential for row crops, while it affects the seasonal planting dates. The upland areas in the vicinity of the project do not exhibit sharp breaks in the environment through clearly defined ecotones, but rather the uplands emerge slowly from the adjoining swamps and make slow transitions from one environment to the other. One exception to this, however, involves the third development zone located on a small bluff elevated about ten feet above the swamp floor and Cedar Creek.

In contrast, the southern edge of the river valley produces well defined ecotones, higher elevations, and an immediate change from the bottomland to the uplands. On the southern edge, sites are more numerous, both in terms of base camps and smaller sites probably oriented towards extraction. Based on these data, and the knowledge of only one recognized base camp on the northern edge of the Congaree valley, the potential of discovering sites that represent long term occupation in the form of base camps, either within the swamp or the adjoining uplands, is relatively low. The potential of discovering short term occupational sites, however, is much greater.

These basic observations elicit certain hypotheses relating to settlement and subsistence within the area of the proposed Congaree Swamp National Monument. The validity of the observations and hypotheses will be tested against the data obtained through intensive testing of the proposed upland development areas and the reconnaissance survey of the bottomland swamp.
INTENSIVE SURVEY OF THE PROPOSED DEVELOPMENT ZONES

Developmental Zone I

Effective Environment

The Proposed Developmental Zone I is located adjacent to the northern edge of Congaree Swamp, and in the immediate upland environment consisting of sandy loam soils and a dominant community of longleaf pines (Figs. 13 and 14). The slightly undulating topography is dissected by the Clubhouse Road and a small seasonal stream referred to herein as Upland Creek. In addition to providing access into the swamp and the hunting lodge, the road also provides access to the area of game disposal and a large cultivated field (Fig. 15) designed to attract wild game, especially white-tailed deer.

The community of longleaf pines forms a dominant canopy, and probably represents at least twenty or thirty years of growth since the area was cultivated. Various bushes and shrubs, with heights of about six or eight feet, occur sporadically throughout the area. With increasing distance towards the swamp, the pines begin to diminish in number while mixed hardwoods rise as a supplement. Although hardwoods occur on the slopes contiguous with Upland Creek, their frequency is less.

The soils within the area are considerably varied and represent: Persanti, Ailey, Smithboro, and Rains. The Persanti soils consist of deep, moderately well-drained, slowly permeable sandy loams with an appreciable mixture of clay. The surface soils are composed of a fine sandy loam which overlies a yellowish-brown sandy loam, continuing to a depth of about twelve inches below the surface. Beneath the sandy loam the soil becomes a reddish-brown clay with a firm plastic texture to a depth of about twenty inches. Although there is some color change the occurrence of clay continues uninterrupted for several feet.

The Smithboro soils, like the Persanti, occur on higher elevations and support the pine community. These soils are somewhat poorly drained and slowly permeable. The humus layer consists of a dark grayish-brown loam approximately six inches thick which overlies a mottled brown loam. At a depth of about ten inches the soil begins to acquire a clayey texture, which continues for a considerable depth. Constituting the slopes and lower elevations in the area of Upland Creek, the Ailey soils are relatively deep and well-drained, but have slow permeability. Dark, grayish-brown loamy sands represent the humus layer to a depth of about six inches where it is replaced with a light yellowish brown sandy loam which continues down to about thirty inches. Below this soil zone the sandy loam begins to acquire additional clayey deposits with increased frequency.
Figure 13: Proposed Development Zone I.
Figure 13: Proposed Development Zone I.
The Rains series of soils is very similar to the Ailey in depth and structure, but the Rains occurs in the lower elevations associated with Dry Creek. The poorly drained and moderately permeable Rains soils give support to a swampy environment composed of various hardwoods, especially tupelo and sweetgum. Although there has been some movement of soils through erosion and deposition, all four soils were originally deposited in a marine environment created by inundating seas (Lawrence 1978).

The effects of erosion and deposition are difficult to measure, especially when hundreds of thousands of years have passed since the original soil formation. Natural dissection has certainly had pronounced effects on the formation, and during cultivation, soils must have washed down the slopes towards Upland Creek and Dry Creek, possibly creating some of the sandy matrix of both Rains and Ailey soils. The effects of creek flooding during heavy rainfall must also account for some of the sand represented in the Rains soils as Dry Creek enters the swamp floor. However, without extensive geological studies involving sediment studies, the amount of topographical change would be difficult to monitor.

The above soils are broadly divided into well drained sandy loams forming surface deposits with a clayey-loamy subsoil, and poorly drained soils that have a loamy surface layer and a clayey subsoil. While there is good drainage on the slopes during rainfall, the subsoils prevent rapid water absorption thereby creating a prolonged period of dampness in the upper soils. The entire soil series is marine in origin, and while there have been floods of great magnitude in the river valley, there is no indication of alluvial deposition resulting from the Congaree River. Therefore, archeological sites should be relatively shallow, and they should be easily detectable through a program of testing and an inspection of disturbed areas.

Methods of Survey

The intensive survey of the Proposed Developmental Zone I was designed to include: 1) an inspection of all exposed and disturbed soils within the area, and 2) a testing program involving the excavation of aligned test pits. The comprehensive nature of such a program would allow detection of historic and prehistoric sites.

Through the terms of the contract, the following procedure was implemented in regards to testing:

"Extensive and complete examination of all unobscured surface in the development zones is proposed, with excavation of small (ca. 25 cm squares) subsurface tests in forested or grassed areas. These subsurface tests will be placed approximately every 50 meters along parallel transects spaced 50 meters apart. When sites are discovered, an attempt will be made to perform an intensive, controlled surface collection. In
addition, at least one 1-2 meter square test pit will be excavated at each site discovered in the development zones. In general, attempts will be made to gather data on site extent, character, and significance sufficient to determine eligibility for the National Register of Historic Places" (Brockington 1978).

In order to implement the research strategy, the Clubhouse Road was utilized as a base line and was marked with flagging tape at intervals of 50 meters. From these points of vantage a Brunton compass was used for east and west entries into the pine forest. At each 50 meter interval a 25 cm square was excavated to the depth of subsurface clays. In the absence of clay the pits were excavated to a depth of approximately 30 cm. The soil from each pit was carefully examined by hand, scattered for a second inspection, and then backfilled. During the aligned testing program, several wide firebreaks were discovered that offered additional inspection of the subsurface area. The firebreaks were completely walked, in addition to the road systems, the game disposal area, and the cultivated deerfield, all of which provided excellent visibility of the subsurface soils. The combination of these efforts revealed the presence of three archeological sites.

**Results of the Survey**

The testing program failed to disclose any archeological sites, but by walking the transects and the firebreaks three sites were discovered: 1) the remains of a whiskey still, 2) a near complete whiskey still, and 3) a small prehistoric site.

**38RD198 (Old Whiskey Still)**

The site is located approximately 200 meters south of the proposed boundary and about 25 meters west of the Clubhouse Road (Fig. 13). Apparently, the site represents the remains of an abandoned whiskey still, exemplified by scattered and broken Mason jars, buckets and pails, a section of pipe, and the remains of rusted and unidentifiable cans. These 20th century artifacts were confined to a relatively small area about three meters in diameter, and situated on the edge of a slight slope facing the road. According to Mr. Guy Taylor, Park Ranger, the still was operable in the last decade, but its detection by the principal leasee of the property caused its abandonment.

**38RD199 (New Whiskey Still)**

This site is also located approximately 200 meters south of the proposed developmental zone boundary, but it is situated about 50 meters east of the Clubhouse Road and within a pine thicket. The site is lying on the apex of a small ridge composed of Persanti soils, and it is represented by two large steel boilers, several 30 gallon steel drums, intact and broken Mason jars, sections of a black plastic hose, a wire
strainer, and charcoal which resulted from the boiler fires. The areal extent of the habitation appears roughly circular and scattered over a 10 meter area. According to Mr. Guy Taylor, this still represents the reestablishment of the Old Whiskey Still. The still was discovered by authorities and subsequently destroyed. Judging by the collapsed and distorted condition of the boilers, dynamite was probably used in destroying the major components, while axes were used to perforate the remaining containers. The site is 20th century, and according to Guy Taylor, the still functioned within the last decade (see Fig. 16).

38RD197 (The Firebreak Site)

This site is located west of the Clubhouse Road and about 50 meters north of the road leading to the game disposal area. The small occupation is exposed in a firebreak cut (Fig. 17) about 20 meters from the road and on the western slope of slightly elevated ridge. The site is situated between a contact zone of Persanti and Smithboro soils, both of which indicate a shallow layer of sandy loam resting immediately on a mottled clay. The firebreak is about 1 meter wide and extends to a depth of 20 centimeters. The firebreak also traverses the entire length of the slope, and although the area was inspected carefully for additional items of material culture, only the following artifacts were discovered in a 10 meter area:

1. fossiliferous chert thinning flake
2. blocky pieces of shattered quartzite (Fire cracked rock?)
3. small sand-tempered pottery sherds. Although one sherd exhibits incising its temporal placement is difficult because of its small size.

Without other diagnostic artifacts the site is difficult to access in terms of temporal placement and importance. The five artifacts could easily suggest several different occupations separated in time and space, but other interpretations could suggest a single component occupation.
Figure 16: The New Whiskey Still, 38RD199.

Figure 17: The Firebreak Site, 38RD197.
Developmental Zone II

Effective Environment

The Proposed Developmental Zone II is located adjacent to the northern edge of Congaree Swamp and approximately 500 meters east of Developmental Zone I also existing within an environment of longleaf pines and sandy loam soils. The entire area is relatively flat, and while there is a slight slope to the south the relief is hardly noticeable as the elevation falls 10 feet across a distance of about thousand feet. Predictably, the area provides little drainage. Firebreaks and old logging ruts are seen throughout the property and several roads provide access to hunting towers (Fig. 18).

The community of longleaf pines represents at least two stages of regrowth (Fig. 19). The trees in the center of the property are older, with diameters ranging from about 8 to 12 inches (dbh), while pines at the east and west boundary are about 4 to 6 inches (dbh). Within the community shrubs and bushes form occasional impassable clusters, while grasses and sedges in the more open areas dominate the forest floor. Unlike the previously discussed developmental zone, this environment does not demonstrate a quick transition from the uplands to the swamp, but rather the transition is slow as it grades from longleaf to loblolly mixed with occasional hardwoods, and finally to sweetgum, tupelo, and ferns. The ecotone is not contrasted sharply, but rather it is diffused over a large area.

The soils in this proposed development zone are similar to those in the previously discussed zone: Persanti, Smithboro, and Rains. However, the Cantey series appears as a new soil. This new soil is characterized by a deep, poorly drained, and slowly permeable loam. The humus layer is composed of dark gray loam which quickly blends into a sandy loam and continues to a depth of about 6 or 8 inches. Beneath the sandy loam a slowly permeable, sticky clay emerges as the dominant soil.

The northern portion of the property contains a combination of Smithboro and Cantey soils, while the northeast portion is composed almost entirely of Cantey. The central portion, extending past the west and east boundaries, is predominantly Persanti that eventually blends into the Dorovan muck of the swamp floor. A small area of Rains is isolated in the center of the property and is situated as a pocket between Persanti and Dorovan muck (Lawrence 1978).

Although the Persanti soils are usually well drained on slopes, the relatively flat terrain prevents easy drainage. Complementing the drainage problem are the Smithboro, Cantey, and Rains soils, all of which have moderate and poorly permeable basal clays and clayey loams. During rainfall the surface sands absorb water, but the underlying clays retard further absorption, thereby creating puddles of standing water in the logging ruts and primitive roads within the entire upland portion. After a mild rainfall in November the water remained on the surface for at least a day, and even after surface water disappeared, the sandy loams near the surface remained damp for several days.
Figure 18: Proposed Developmental Zone II.
Figure 19: The Immediate Environment at Developmental Zone II.

Figure 20: Typical Firebreaks that Dissect Developmental Zone II.
Method of Survey

The intensive survey of the Proposed Developmental Zone II was designed to include: 1) an inspection of all exposed and disturbed soils within the area, and 2) a testing program involving the excavation of aligned test pits. By following the research design set forth in the preceding section, a base line was established in the center of the pine forest with each control point spaced about 50 meters apart. A Brunton compass was used for determining the east/west directions and 25 cm squares were excavated at each 50 meter interval, including the intervals along the base line. In addition to excavating, a thorough inspection of all road beds, logging ruts, and firebreaks (Fig. 20) was given to the entire area. These procedures of investigation provided a relatively thorough coverage of the developmental zone.

Results of the Survey

The testing program and the reconnaissance of the exposed areas failed to yield any cultural material from either the historic or the prehistoric periods. The soils are all marine in origin, and for the most part the upper layers are loams and sandy loams that rest on shallow clays and clayey loams. River deposited alluvium is not present. If archeological sites exist, any by-products of human habitation would have to occur in the shallow surface soils. However, the intensive survey did not reveal any evidence of human occupation.

Developmental Zone III

Effective Environment

The Proposed Developmental Zone III is located adjacent to the northern edge of Congaree Swamp and about 2 kilometers east/southeast of Developmental Zone II. Situated in an upland environment of sandy loams and mixed pine hardwoods, the zone is contiguous with Cedar Creek Road on the north, the New Road on the west, and Cedar Creek on the south. The triangular-shaped property represents approximately 10 acres, but at least half the area was removed for road fill within the swamp (Figs. 21 and 22).

A great deal of the adjoining areas are presently under cultivation, and based on the various stages of pine growth within the property, it too was probably cultivated in the past. The northern portion of the property supports a small pine forest mixed with sweetgum, shrubs, and bushes that grow densely. The southern edge of the property gives support to an older forest composed of mixed pines and hardwoods such as oak, loblolly, longleaf, and sweetgum. Prior to the removal of soil the ecotone probably represented a continuation of the present mixed forest.
Figure 21: Proposed Developmental Zone III.
Figure 22: The Immediate Environment at Developmental Zone III. (Note soil removal for road fill)

Figure 23: Cedar Creek as it flows past Developmental Zone III.
The topography throughout the area is relatively flat, and before the soil was removed, the ground surface apparently sloped slightly prior to its steep descent into the swamp at Cedar Creek (Fig. 23). The adjoining areas demonstrate a similar land form. Persanti soil dominates the entire area and adjoining cultivated fields.

Method of Survey

The intensive survey of the developmental zone was limited because of the wide-scale removal of soil. Nevertheless, a base line was established in the center of the New Road and intervals were established every 50 m. At the first interval a test pit was placed about 10 m from the centerline of the road; the second was placed about 25 m; the third was placed at 50 m, while the fourth and fifth were placed at a distance of 100 m and 150 m, respectively. Immediately after the limited testing, a thorough search of the quarry area and its periphery was conducted.

Results of the Survey

The testing program and the reconnaissance failed to disclose any evidence of historical or prehistorical occupations. If any evidence ever existed, it was probably carried off into the swamp in the form of road fill.
Western Portion

Introduction

Although the bottomland is virtually the same everywhere, in terms of soils, tree stands, swales and sloughs, oxbow lakes, and a flat topography, the western section of the property is different in accessibility. At least three major roads dissect the property and penetrate deeply into the swamp (Figs. 24, 25, 26, 27). Branching from these roads are numerous primitive trails that lead to deerfields, while other roads transect the swamp in east/west directions and eventually connect the major roads. These east/west roads also provide access to other hunting towers and deerfields.

All of these roads provide miles of visible soils which have been considerably disturbed by vehicles, maintenance, and road construction. Additionally, the cultivated deerfields offer other exposures in the form of openly disturbed soils. These roads and deerfields, therefore, by the virtue of being natural transects and thoroughly dissecting the interior and peripheral areas of the swamp, were utilized as a method of research for site discovery. The eastern section is entirely void of roads and deerfields, and subsequently, other methods of site discovery had to be utilized.

The western portion is designated as the area of Congaree Swamp bounded on the east by the New Road, on the south by the Congaree River, on the west by the North Road, and on the north by the upland boundary (Figs. 25, 26). Prior to the survey, and during the field reconnaissance, we spoke frequently with the Park Ranger, Mr. Guy Taylor, and members of the Cedar Creek Hunt Club, in an attempt to locate archeological sites and specific land forms such as sand ridges.

Method Of Survey

The reconnaissance survey was designed to inspect all available, disturbed soils, and to conform with the terms of the contract:

"The remaining areas of the National Monument have a lower management priority at this time. It is proposed that they be sampled by the use of widely spaced transects, by examining existing roads and trails, and by examining aerial photographs and attempting to locate sand ridges. It is proposed that 8-10 transects be designed approximately perpendicular to the river. The origins of these could be reached by boat along the river, or by swamp trails and roads, whichever is more convenient. Once the origin is located on the ground, the transect will be walked using a compass. Particular
Figure 25: Map #1 indicating Archeological sites.
Figure 26: Map #2 indicating archeological sites.
Figure 27: Map #3 indicating Transect Locations and Cultural Sites.
attention will be devoted to discovery and testing of sand ridges within the swamp. In addition to transect and road/trail survey, attempts will be made to locate and test sand ridges that may appear on maps or aerial photos, as well as to locate site 38RD19 recorded for the area and the two historic sites indicated by Mill's Atlas (1825). At all sites discovered in the swamp, attempts will be made to excavate test pits and otherwise gather data sufficient for National Register determination, and purposive survey should allow coverage of the swamp sufficient for management at this time and for producing accurate, representative data useful to formulation of the settlement-subsistence model" (Brockington 1978).

Following the procedures set forth in the contract, every known road, trail, deerfield, and otherwise exposed piece of soil was examined on foot, while considerable time was spent walking through forested areas searching for site locations obtained through Mr. Guy Taylor and members of the Cedar Creek Hunt Club.

The conditions of the roads ranged from modern to primitive, but in all situations, the roads provided endless miles of transects and exposures to every conceivable environmental condition. The three main roads--North Road, Clubhouse Road and New Road--received various forms of maintenance which included extensive filling with gravel and dirt. The gravel is composed of crushed granite and small quartz pebbles, but the soil is locally transported from the adjacent upland areas or from the immediate swamp floor adjoining the roads. The excavation of soil within the swamp provided additional open areas for examination, and frequently provided stratigraphic profiles. The roads which connect the major roads are not well maintained but they do offer exposure, as do the barrow pits. The deerfields range in size from about one to five acres and appear to be cultivated annually in rye grass.

In addition to utilizing the exposed and disturbed soils, and the information provided through informants, considerable attention was also given to aerial photographs, modern topographic maps, and specific maps dating to the 18th and 19th centuries. These early maps used in research are:

- 1730--Map of the Province of South Carolina and Its Parrishes by Herman Moll
- 1757--A Map of South Carolina by DeBrahm
- 1773--A Map of South Carolina by Cook
- 1775--A Map of South Carolina by Henry Mouzon
- 1776--Approximation of Race and Density of Population of South Carolina by Robert Lee Meriwether
- 1786--1833 Canals, Roads of South Carolina by Henry Schenk Tanner
- 1825--Map of Richland County by Robert Mills
- 1822--Map of South Carolina by John Wilson
- 1823--A Geographical, Statistical, and Historical Map of South Carolina by John Drayton
Excepting the 1825 Mill's Atlas, which indicates a historic occupation within the swamp, the remaining maps fail to disclose any evidence of utilization or occupation of the area presently known as Congaree Swamp. Mill's map indicates that Adam's Quarter and Scott's Quarter were located adjacent to the Congaree River, but the reconnaissance survey failed to locate either occupation. If these habitation sites presently exist, then there is a high probability that both of them are buried beneath flood deposits that constantly accumulate. There is also the possibility that the habitations were washed away with river meanders.

The recent topographic maps did not reveal the presence of any sand ridges. Although there are some alluvial deposits in Cedar Creek and the Congaree River, two large sand ridges are known to exist outside of the property (Muller's Barn Ridge and Green Hill Mound).

Finally, the site recorded as 38RD19, which allegedly existed near the confluence of Cedar Creek and the Congaree River, was not found during the survey. Based on the description of the site and pertinent information regarding local terrain and highways, the site is probably located at the junction of Cedar Creek and the Old Columbia Highway. At this location there is a sand ridge overlooking Cedar Creek, and the site has yielded material similar to that described by Wauchope (notes on file with IAA). The environment at the confluence of Cedar Creek and the Congaree is represented by silts and clays, and in no way resembles the area described by Wauchope.

Therefore, the reconnaissance survey involving discovery and confirmation of sand ridges, historic sites, and 38RD19 failed to yield any information. However, the survey was able to locate other sites representing the historic and prehistoric periods.

Results of the Survey

Following an extended period of reconnaissance, the survey of the western section produced an inventory of historic earthen structures and small lithic scatters of the prehistoric period. Except for the large earthen mounds, the majority of archeological sites were relatively small and frequently represented by only a few lithic items. Site locations are provided in Figures 25, 26 and 27. Specific site data and location are recorded in Figures 28, 29 and 30.
Figure 28: Cultural materials.
Figure 29: Cultural materials.
Figure 30: Cultural materials.
Prehistoric Sites

38RD178

The site was discovered in the roadbed of the New Road, approximately 3,500 feet south of the upland terrace, and slightly south of a deerfield access road (Fig. 26). The surrounding area is represented by Tawcaw soils, stands of sweetgum and tupelo, and occasional depressed areas containing water. Considerable maintenance and roadbed filling has occurred throughout this section of the road, and the site, therefore, may represent lithic materials imported from the upland terrace at the location of Developmental Zone III.

Lithic Materials: (100% collection)
1 utilized quartz flake

38RD177

The site was discovered in the roadbed of the New Road (Fig. 26) approximately 4100 feet south of the upland terrace, and 700 feet south of 38RD178. The surrounding area is represented by stands of sweetgum, low depressions with standing water, and Tawcaw soils. Considerable road maintenance is also noted in this section of the road and the site could easily represent imported materials.

Lithic Materials: (100% collection)
1 light-yellow chert thinning flake with cortex
1 white and gray mottled, heat-treated chert biface fragment; fractured basal portion of Kirk stemmed projectile point (?).

38RD176

Lithic materials were found in the bed of the New Road approximately one mile south of the upland terrace (Fig. 26). The site is situated slightly north of a slough which crosses the road, and about 100 feet north of the road which eventually connects with the Clubhouse Road. Similar to the previous sites, this site is probably imported through road filling with upland soils. The immediate area represents a change from Tawcaw to Chastain soils, with low depressions and standing water throughout the vicinity. Associated flora would include cypress, tupelo, and sweetgum.

Lithic Materials: (100% collection)
1 chunk of light-yellow chert
1 light-yellow chert flake of biface retouch
1 white and gray mottled, heat-treated chert biface fragment; complete basal portion suggesting Kirk stemmed projectile point.

38RD175

Located approximately 1500 feet south of the above mentioned intersection, and at the junction of a deerfield road (Fig. 26), a small chert flake was found in the New Road. Because of road maintenance, there is a high potential for imported materials in the sandy clay matrix.
of the roadbed. The immediate environment consists of sweetgum, occasional sycamores, and infrequent oaks, while standing water appears absent.

Lithic Materials: (100% collection)
1 orange chert thinning flake

38RD188

The site was discovered about 500 feet east of the New Road and site 38RD175 (Fig. 26). Represented by scatter of rhyolite flakes, the site extends for a distance of about 175 feet in the roadbed while it parallels a large area of depression and standing water. The road is constructed across Tawcaw soils and there is no evidence of maintenance in the form of filling. Filling of ruts and holes is conducted by utilizing the adjoining soils, apparently through the use of a back-hoe. Some of the adjacent environment represents cut-over areas, but cypress, tupelo, and sweetgum still occupy the Chastain soils in the depression, and mixed oaks and sycamore represent uncut trees on the slightly higher elevation. Although inspection was given to the small borrow pits along the edge of the road, no cultural materials were found in the eroded profiles or soils. The site, perhaps, is located entirely on the surface and in no way does it appear to be buried.

Lithic Materials: (100% collection)
1 yellow chert flake of biface reduction
44 rhyolite flakes of biface reduction, the majority of which display scrubbed, prepared platforms.

Pottery: (100% collection)
1 highly abraded and plain sand-tempered sherd

Although there is a relatively high incidence of flakes that were struck from preforms and perhaps finished bifaces, nothing diagnostic was found to suggest a temporal placement. The rhyolite flakes and the single pottery sherd could easily be associated, but they could also represent separate occupations in time and space.

38RD187

The site is located about 1500 feet east of the previously mentioned site, 38RD188, and on the same access road to a large deerfield (Fig. 26). Several rhyolite flakes were found scattered across the dirt road constructed on the Tawcaw soils. On the immediate southern edge is another large depression composed of Chastain soils and supporting a principal community of hydric plants such as cypress, tupelo, and sweetgum, while the trees on the slightly elevated Tawcaw soils provide support to mixed oaks and sycamore communities. The site appears to extend in an east/west direction for approximately 100 feet, and based on the absence of cultural materials in the adjoining borrow pits, the site is also shallow.

Lithic Materials: (100% collection)
3 rhyolite flakes of biface reduction
Approximately 3000 feet east of 38RD187 (Fig. 26), and situated on elevated Tawcaw soils is a lithic scatter representing several time periods. The site, which rises about two feet above the surrounding Tawcaw soils, is located on the western edge of a slough and extends west for a distance of about 200 feet. Although several large borrow pits adjoining the road were examined for additional occupational debris, the slumped profiles and eroding soils did not yield any further evidence. Because the cultural material is scattered rather evenly over a relatively large area, the chance of finding debitage in the small borrow pits (i.e., 6 feet square and 18 inches deep) is small. If material was not found in these excavated pits, the chance of finding additional material in test pits would be reduced significantly. The question regarding the occurrence of archeological materials in these roadbeds that are maintained by scattering local soils will be discussed later. Quite possibly these sites are shallow, being confined, perhaps, to the first few inches of the surface soils.

Lithic Materials: (100% collection)
- 13 pieces of shattered quartz cobbles
- 9 rhyolite flakes of biface reduction
- 2 yellow chert flakes of biface reduction
- 1 varigated yellow-orange, heat-treated chert flake of biface reduction
- 1 varigated yellow-brown-orange, heat-treated distal portion (blade portion) of a projectile point. Probably Kirk variety of the Early Archaic.
- 1 white chert, heat-treated basal portion of a Kirk stemmed point.
- 1 silicified sandstone Morrow Mountain projectile point
- 1 dark red fossiliferous chert Yadkin projectile point
- 1 fractured rhyolite preform
- 1 quartz preform

Pottery: (100% collection)
- 3 highly abraded and plain sand-tempered sherds

The site was discovered at the intersection of the New Road and a small deerfield access road, located approximately 2,600 feet south of site 38RD175 (Fig. 26). The immediate area is represented by Tawcaw soils and mixed hardwoods with occasional stands of tupelo and sweetgum in depressed areas. Like most of the swamp, the area is relatively flat with no apparent change in the elevation. The site is represented by a single chert flake which may have been imported in road fill.

Lithic Material: (100% collection)
- 1 light gray, heat-treated chert flake of biface reduction

The area is located about 1000 feet north of the Old Dead River and slightly east of a cluster of deerfields (Fig. 26). In the roadbed
constructed on Tawcaw soils one silicified sandstone flake was dis­covered. The surrounding environment has been reduced significantly through extensive logging operations, but those trees that remain suggest that mixed hardwoods, primarily oak and sycamore, once constituted the forest. Although portions of the road have been maintained, the road fill was taken from the adjoining Tawcaw soils.

Lithic Material: (100% collection)
1 silicified sandstone flake of biface reduction

38RD190

The North Road transects the swamp in a north/south direction until it reaches the Congaree River where it then turns and parallels the river for a distance of several thousand feet. As the road turns east at the river, there is a large sand bar approximately 1000 feet long (Fig. 25), and during its exposure at low water the bar is about 200 feet wide. During the fall drought of 1978, a considerable portion of the bar was exposed, allowing the discovery of highly abraded, water worn Mississippian ceramics. The origin of the pottery and other related items is unknown. A search of the upstream river banks failed to reveal any eroding site; therefore, during the development of a meander, the entire site must have been washed away and certain cultural components deposited on the sand bar. The highly eroded nature of the sherds attests to prolonged exposure to river currents and possible travel across the river bottom, in addition to travel across the abrasive sands of the bar. Associated components, such as animal bone and vegetal matter, would surely have suffered greatly in the river current and sand bars, while heavier lithic items in the form of grinding stones, celts, and other weighty items are not easily transported, and subsequently may remain further upstream embedded in silts and clays on the river bottom. However, without any more knowledge than the material at hand, any assessment of the prior occupation is difficult.

Ceramic Materials: (50% recovery)
2 sand-tempered plain sherds; one incurring rim fragment of a bowl
3 Lamar sand-tempered sherds, complicated stamped
5 Complicated stamped sherds; too worn for identification
7 Sand-tempered sherds with a high incidence of sand inclusions; too worn for any identification
1 fragment of daub with hand and stick impressions

Historic Sites

38RD194 (Cooner's Cattle Mount)

The site is located about 200 feet east of a small dirt road that leads to the Brady property. Elevated about 5 feet above the former swamp floor of Tawcaw silty clay, the mount is rectangular in shape and measures roughly 52 feet in width and 96 feet in length. The surface is virtually flat and each of the four sides has about a 45 degree slope, producing a symmetry which suggests a well executed construction (Fig. 31).
Figure 31: Plan view and section through Cooner's Mount.
In contrast, the mount supports a mixed community of sweetgum and holly with a surface component of grasses, while the adjoining swamp floor sustains occasional cypress, mixed oaks, and infrequent sycamore, all of which blend with sweetgum in a complex of tree stands. The mount's antiquity (ca. 1840; Cely n.d.) is evidenced by the presence of several large sweetgum trees, one of which measures 24 inches (abh). The stump of a large cypress tree measuring about 48 inches (abh) occurs on the southeast slope and it appears to have been partially covered during the mount construction. Although the tree was cut at a later date, probably during the extensive removal of cypress during the early 1900's, its presence would suggest an uncut environment during the mount's construction.

In order to obtain stratigraphic data relevant to structure and actual height, an old intrusive pit was cleaned out and widened to 3x5 feet and excavated to a depth of 6 feet. Immediately below a thin humus of dark brown soil, mottled silty clay appeared and provided evidence for artificial deposition (Fig. 32). The mottling, created by successive deposition of separate soil loads, did not indicate the aboriginal method of basket filling. The sporadic occurrence of mottling suggests a combination of large and small soil loads, and thin horizontal bands of different soils suggest soil spreading to attain relative flatness during construction phases. Further evidence for historical association is the depression created by soil removal. Along the south and east periphery the depression still retains a degree of sharpness rather than highly eroded edges forming gentle contours.

Mottling continued to a depth of 5 feet and disappeared with the appearance of an old soil horizon. The former ground surface is represented by a brown silty clay containing numerous root holes, and with increased depth, the soil begins blending with yellowish brown silty clays. Throughout the excavation, attempts were made to find historic and prehistoric materials; however, material culture was not observed.

The physical evidence suggests that Cooner's Mount is an artificial structure. The method of construction, based on a single test pit, does not appear to represent aboriginal influences; while some antiquity is suggested by large trees, the area of soil removal is not highly eroded, nor partially filled; and the large cypress stump at the base of the mount further suggests construction prior to the early 1900's.

38RD193 (Old Dead River Cattle Mount)

The site is located approximately 3,000 feet southeast of the Old Dead River (oxbow lake), and about 150 feet east of the Old Dead River Dike (38RD192). Situated within the partial enclosure of the dike, the mount rises to a height of 3.5 feet above the swamp floor and measures about 45 feet wide and 80 feet long (see Figs. 33, 34, 35).

The immediate environment consists of Congaree silty clay soils and riverbank hardwoods representing dominant species of oak, sweetgum, sycamore, and occasional holly. In contrast, the mount supports a
Figure 32: Test Pit Profile at Cooner's Mount.
Figure 33: Cooner's Cattle Mount.

Figure 34: Old Dead River Cattle Mount.
Figure 35: Plan view and section through Old Dead River Cattle Mount.
similar stand of trees, but there is a high incidence of holly. Although several large trees may be seen in the surrounding environment, there is greater tendency towards smaller trees suggesting immaturity. This feature is noted not only in the surrounding forest, but trees on the dike and mount are generally small.

In 1825, the Congaree River flowed considerably closer to the dike system and the mount in a meander loop that incorporated the Old Dead River oxbow lake and the partially filled river channel that presently represents swales and sloughs. During the river's earlier pattern of flow, the property may have been owned by Paul Spigner, and he may have been responsible for the earthen structures. According to Cely (n.d.), "Another re-grant was a 370 acre tract on the river bank granted to Paul Spigner in 1839. This plat does show two cleared areas, each about fifteen acres in extent. Corn and cotton was probably grown here, and the dike enclosure for one of these fields still exists." If this is the location mentioned by Cely (n.d.), then the dike and cattle mount were probably constructed during the 1840's, relative to the construction of Cooner's mount. Because there are no other known dike enclosures on the Biedler property, and with the apparent young growth of trees in the vicinity of the dike and mount, these earthen structures are probably the same mentioned in Cely's (n.d.) report. The Cooner's mount has larger timber which may indicate it fell into disuse at an earlier date, while Spigners may have experienced extended utilization.

Unfortunately, rising water levels prevented testing of the mount, and subsequently nothing is known of its internal structure. Several attempts were made at crossing the swollen swales and sloughs, but the continued rains of December and the resultant flooding covered the dead trees which span the drainage systems. With the loss of natural crossings and a virtual inaccessibility of the area, the testing had to be abandoned.

38RD192 (Old Dead River Dike)

This site is located adjacent to the cattle mount (Fig. 26). The remains of the dike range in height from about 2 feet to 4 feet as it extends in an east/west direction on the northern edge and a north/south direction as it turns and parallels the old river channel. The dike is highly dissected from continuous flooding, and although it is difficult to trace for this reason, at least 300 feet were discovered. The soils, effective environment, and historical knowledge are recorded with the cattle mount (38RD193).

38RD195 (Big Lake Cattle Mount)

The cattle mount is located about 800 feet east of the New Road and about 200 feet north of a partially filled oxbow lake, referred to as Big Lake (Fig. 26). The mount has a relatively low profile, elevated only 2 feet above the swamp floor, and it extends in a northeasterly direction for about 75 feet with a width of about 35 feet. Surrounding the mount is a slight depression which may represent the location of soil removal for the earthen structure (Fig. 36).
Figure 36: Plan view and profile of the Big Lake Cattle Mount.
The setting is similar to those of the other earthen structures; the soil is Tawcaw silty clay. Trees present include mixed oaks, sycamore, sweetgum, and other hardwoods. The size of the trees on the mount indicates that it may have been used recently.

A test pit was placed near the center to obtain data regarding internal structure and stratification. This pit was excavated to a depth of 3 feet. Beneath a thin humus layer, the soil is a slightly mottled tan silty clay which varies from 11 to 13 inches in depth. This soil horizon overlies a dark brown silty clay of varying thickness which terminates on an original ground surface at a depth of 2 feet. This former ground surface is represented by a dark brown silty clay containing numerous root molds. These three different soil horizons demonstrate an artificial earthen structure through its reverse stratification. The dark brown soil lying unconformably on the old original surface is void of root molds and it represents a deposition of humus soils from the adjoining area of depression. The tan clays seen on the surface of the mount represent the deeper soil horizons of the Tawcaw soil series (Fig. 37). No cultural materials were recovered during the excavation of this test pit.

38RD196 (Brady's Cattle Mount)

Although the Brady Cattle Mount is presently located outside of the National Monument property, on the land of Mr. Jack Brady, it was briefly surveyed for comparative data. The mount is situated on the north edge of a large pasture and approximately 600 feet northwest of the Congaree River (Fig. 26). Constructed of silty clay loam, the mount rises to a height of about 6 feet and measures about 90 feet long and 50 feet wide. The mount is surrounded by a barbed-wire fence (Fig. 38).

It was constructed in the early 1900's by Jack Brady's grandfather for the explicit purpose of providing an elevation for cattle during flood stages. This earthen refuge has constantly been maintained and utilized by cattle ever since its construction, and during the recent flood of January 1979, Brady used a boat and motor to herd his cattle up on the mount.

An inspection of Mill's Atlas (Mills 1965) indicates that Brady's Mount is located adjacent to Scott's Quarter, but there is no association between the two.

Brady's Mount is located on Congaree soils, and the vegetation is riverland hardwoods, especially oaks, sycamore, and sugarberry. The mount, because of its continued utilization by cattle, is virtually barren (Fig. 38). This area was the last visited during the survey, and time would not permit testing.

38RD191 (North Boundary Dike)

This large earthen structure is located adjacent to the northeast boundary and approximately 2000 feet due west of Cedar Creek and parallel
Figure 37: The Big Lake Cattle Mount, Site 38RD195.

Figure 38: Brady's Cattle Mount, Site 38RD196.
with the North Road (Fig. 25). Dense undergrowth prevented an exact
determination of the length of this feature. My estimate would be that
the dike extends in a straight line for a distance of 2000 feet. The
structure begins at the edge of the uplands east of Cedar Creek, and
continues due south in broken segments ending in the flat bottomland
(Fig. 39).

The dike, although badly slumped through time, is still about 6
feet high, while the base is nearly 20 feet wide. Several large oak
trees which grow on flattened portions of the apex indicate that this
feature is probably quite old. The immediate environment consists of
mixed oaks, hardwoods, and loblolly pine. This changes as the dike
enters the swamp with the trees present reflecting the more hydric
conditions (Fig. 40).

The earthen structure was built prior to 1840 by James Adams, but
was never completed. As Cely (n.d.) states, "As late as 1839, much of
the land in the tract was unclaimed and unused. In that year over 4,000
acres of the 15,000 acre tract (Beidler tract) was regranted to the
James Adams family. A plat of this regrant shows no signs of cleared
land or fields. James Adams, Sr. evidently had plans to cultivate part
of this tract, since his will of 1841 mentions the hope that his children
will continue the dike construction he started. His children never
finished this project, as evidenced by the incomplete dike existing
today" (Cely n.d.: 93).

Eastern Portion

Method of Survey

The reconnaissance of the eastern portion was conducted by estab­
lishing a series of transect lines spaced 2400 feet apart and oriented
in a north/south direction. These lines were connected to points on the
Congaree River which provided access by boat and motor. By using a
Brunton compass as a guide, methods of discovery involved inspecting the
root and soil matrix of overturned trees; the eroded banks of swales,
sloughs, and creeks; the rootings of wild hogs; freshly eroded flood
channels; stumpholes; and any other area that would yield exposed soil
and profiles. Small excavations with a shovel were attempted, but the
clayey texture of the soil and its frequent dampness proved too time
consuming. Additional problems were encountered in trying to walk the
transects: the numerous occurrences of swales and sloughs, large wet
depressions, muddy soils, and shallow ponds frequently retarded any deep
penetration into the swamp. Occasionally, however, natural crossings
were found on logs, but fallen trees did not always occur conveniently
and at times we had to abandon the transects and search over hundreds of
yards for a crossing. At several such locations, crossings could not be
found and subsequently the transects were abandoned.
Figure 39: Eroded section through the North Boundary Dike, 38RD191.

Figure 40: Improved Primitive Road connecting the North Road with the Clubhouse Road.
Logistical problems involving penetration resulted in relatively short walks that ranged from about one quarter of a mile to about one mile (see Fig. 27).

**Results of the Transect Survey**

Although a total of eight transects was walked, and while considerable attention was given to exposed soils, evidence of either historic or prehistoric occupations could not be found. The area yielded only silty clay soils, an environment similar to the western portion, and a great deal of dissection with creeks, swales and sloughs, and filled or partially filled oxbow lakes. Sand ridges were not present in the flat terrain.

At two separate locations cypress trees were noted that displayed large scars created by axes. The scars, located about eight feet high, consisted of two cuts, each occurring on opposite sides of the trees (Fig. 41, 42). In both cases the trees were relatively large with rotted and hollow cores, and a thin outer surface. Apparently the cut marks on the trees occurred during the 1900's removal of cypress. Discovering a hollow core, the tree was abandoned by the lumber company. The height of the axe marks strongly suggest that timbering was done during periods of high water. This would further suggest that people were taking advantage of flood conditions in order to cut through the narrow portion of the cypress just above the wide basal buttress, while flooding would have provided easier access to the cypress. In reference to logging operations, Cely states, "The cypress tree was girdled by ax, allowed to 'dry out', then cut and floated down the river to the sawmill" (Cely n.d.: 93).

The second indication of human activities within the eastern portion is the recent discovery of three earthen embankments which suggest bridge abutments. These structures were discovered by Mr. Guy Taylor, Park Ranger for the property, during late summer. The earthen embankments are man-made, but there is uncertainty concerning the date of manufacture and the persons responsible. Although Issac Huger reportedly constructed a road through the eastern portion of the property, it would be difficult to state with any certainty that the structures are the results of Huger's activities. Conversely, the structures could easily be related to forms of logging operations during the turn of the century or any other activity during the past two centuries.

The areas immediately contiguous with the structures are highly dissected from annual flooding and there is no evidence of elevated causeways or any form of road construction. Consequently, there is no indication of pathways leading either to or from the earthen structures which prevents any interpretation of travel direction.

The earthen embankments are located approximately a mile north of the Congaree River and about 1000 feet northeast of Transect Line #7.
Figure 41: Ax Marks on Cypress Tree in the eastern portion of the swamp.

Figure 42: Ax marks on Cypress in eastern portion of the swamp.
near the northern boundary of the property (See Fig. 27). The structures are aligned, roughly, in a north/south direction and appear to have traversed two moderate sized swales. Although slightly eroded from flooding, the embankments suggest an original form that would measure about 15 feet in width and 40 feet in length with an elevation of about 4 feet above the floodplain. The base of the earthen ramp rises from the floodplain at about a 30 degree angle and then truncates at the apex (Figs. 43, 44 and 45) for at least half the distance of the structure. Immediately adjacent to the two southerly structures are moderate-sized depressions which may represent borrow pits. However, with demonstrated local dissection, the depressions may represent nothing more than flood scouring.
Figure 43: Earthen structures in eastern portion of the swamp.

Figure 44: Earthen structures in eastern portion of the swamp.
Figure 45: Plan view and sections of earthen Bridge Abutments.
EVALUATION AND INTERPRETATION OF THE CULTURAL RESOURCES

The Effect of Change on the Prehistoric Data Base

Probability of Pseudo-sites

A total of 11 occupational sites was found within the boundaries of the proposed National Park Monument. However, at least six of the sites are currently regarded as spurious occupations: 38RD190, 38RD178, 38RD177, 38RD176, 38RD175 and 38RD173.

The Sandbar site, 38RD190, is situated on an alluvially deposited sandbar in a meandering river system given easily to rapid change. For this reason the site is potentially redeposited, and any consideration for cultural deposition would be tenuous. The remaining sites are all located on the New Road and within areas that have been maintained and filled with imported soils. These soils, as previously mentioned, were obtained from the upland area at the proposed Developmental Zone III. However, additional soils were also obtained from areas contiguous with the road, and it is therefore difficult to ascertain the origin of the lithic materials. Although inspection was given to the small borrow pits, we could find no evidence of a site. But, then, this also held true in other areas that yielded sites of unquestionable cultural deposition.

Because the lithic materials were discovered in a roadbed composed of imported soils, and because occupational debris could not be found in the adjoining borrow pits, these five sites have been eliminated from further evaluation and cultural interpretations.

Questions of Stratigraphy

The remaining sites were all discovered on surface soils, and there was no indication of buried sites on either the upland terraces or within the bottomland. The elevated uplands would not necessarily be expected to produce stratigraphic sites resulting from alluvial deposition, but successive inundations of the floodplain would normally generate stratification.

Deposition within the floodplain appears to be highly variable and related to the immediate channel of the Congaree River. During flood stage the greatest amount of velocity, erosion, and deposition occurs within the river channel, and as the river rises and flows over its banks, the heavier sediment particles quickly precipitate. With increasing distance from the river, finer sediments begin to precipitate and eventually trees deflect the current and reduce flow to a minimum.
After the flood waters have traversed several miles of swamp, the flow is negligible and the majority of sediments has been deposited on the levees.

In its present location the Congaree River would have little depositional effect on areas located any distance from the channel. Such a model would explain shallow sites, but it would be too presumptuous to assume a stable river channel during the prehistoric period. Demonstrated by the mosaic of filled and partially filled oxbow lakes which exemplify the swamp, the Congaree has meandered across the valley creating new soils and new floral environments. During such movements the Congaree continues to build levees, and following the river's departure, those levees remain as slightly elevated areas adjoining the depressions of oxbow lakes. These elevated areas were occupied by indigenous Americans. The absence of alluvial stratification during human occupation would suggest: 1) that settlement occurred after the formation of an oxbow lake, and 2) that the river had made a significant shift away from the immediate area. If this is true, then it would further suggest that sites were situated on the north edge of an old meander, thereby providing the distance necessary for the reduction of water currents and non-deposition of suspended silts and clays.

**Relict Levees and Associated Archeological Sites**

In a dynamic system of meandering river channels, few land forms remain unchanged for any extended period of time. After the formation of levees and oxbows, the river departs and begins scouring through other deposits and formations. During this process of change and predictable loop development, the river is constantly destroying the topography and associated archeological sites.

Although sites can be destroyed through any manner of dissection involving creeks, swales, sloughs, and flood induced channels, two models of major attrition are suggested: 1) primary attrition, and 2) secondary attrition. The model of primary attrition (Fig. 46) involves a developing youthful meander and contiguous levees which form along the concave banks. As the meander evolves towards maturity the concave bank is continuously eroded and the river pushes inland destroying any archeological sites. The latter model (Fig. 46) involves a fully developed oxbow with associated, but inactive levees on which human occupation has occurred. Being severed from an active river channel the levees received little or no deposition and remained virtually unchanged. However, with the formation of a later meander in the immediate vicinity there is a high probability that it will dissect and erode the filled or partially filled oxbow, adjacent land forms, and subsequently the archeological record.

The examples depicted in Figure 47 illustrate singular situations, but with large and extensive river valleys, dissection is compounded, and few land forms remain unchanged. As a result of extensive meandering through time, former levees have little opportunity to remain intact,
Primary attrition of archeological sites through meander development.

Secondary attrition of archeological sites through meander development.

Figure 46: Secondary attrition of Archeological Sites through meander development.
Figure 47: Hypothetical model of Dynamic River Systems Change.
(Lobeck 1938: 214-230; Foster 1971: 192-196) and those that survive are probably few in number. These specific land forms are herein referred to as relict levees.

Unfortunately, outside of considerable expense, there are obvious difficulties in determining relative ages and relative occurrences of the relict formations. However, by knowing these data, predictions could be formulated concerning potential site locations. Such data could eventually lead to relative ratios concerning the number of relict levees and the number of archeological sites, data which would be beneficial in determining the degree of utilization and occupation in the unstable environment of river swamps.

Given the geologic knowledge of river systems it would appear that relict levees do not occur frequently. The archeological data retrieved from the reconnaissance survey also indicate that habitation sites are limited in number. The infrequent number of sites is not necessarily reflective of uncommon utilization, but rather it may reflect the incessant meandering of river channels in the Congaree River.
GENERAL OBSERVATIONS CONCERNING THE CULTURAL MATERIALS

Introduction

The extant by-products of human activity during the prehistoric period are represented entirely by thinning flakes, several pieces of shattered quartz cobbles, bifaces (preforms or projectile points), and a few badly eroded pottery sherds. These remains of material culture are not only few in number, but there is even less information in relation to diagnostic indicators of time and space. Within the small inventory of sites, only one occupation has demonstrated any degree of continuity.

The limited number of archeological sites and their associated lithic/ceramic assemblages, although poor in number, display a high degree of similarity which suggests a parallel in behavioral function. The absence of a diversified inventory of stone tools and large ceramic collections indicates limited occupation and activity, whereas, small groups of people gathered to conduct a specific form of behavior. Such behavior is partially exemplified in the remains of cultural materials.

Shattered Quartz Cobbles

The shattered remains of quartz cobbles have been found throughout the Piedmont, Fall-Line, and Upper Coastal Plain provinces of South Carolina in association with Archaic sites (e.g., Ferguson and Widmer 1976; House and Wogaman 1978; Michie 1979). Cracked quartz cobbles are commonly regarded as the by-product of continuous exposure to heat through cooking (House and Smith 1975). For example, cobbles are heated and then immersed in a container of water to raise the liquid to a boiling point. During this process and with the exchange of temperatures, the cobbles collapse and are subsequently discarded. In an attempt to qualify fire-cracked rock, House and Smith (1975) conducted a number of experiments, but the results indicated that qualification was difficult: "Fire-cracked rock is one of several kinds of non-descript prehistoric lithic debris which are very difficult to distinguish and relate to specific kinds of cultural behavior" (House and Smith 1975: 80).

A high incidence of cracked cobbles was recently found at a Fall-Line site near the Congaree River suggesting alternative explanations. Although many of these cobbles exhibited a reddened hue along the planes of fracture, others failed to yield traits of fire-cracking. Several portions of the cobbles displayed abraded marks of attrition on the cortex, thereby, suggesting alternative utilization in the form of hammerstone (Michie 1979: 27). Based on this evidence, then, cobbles not only shatter with heat transfer, but also with direct percussion against other lithic materials. Quartz cobbles may have been multi-
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<td></td>
<td>11.5</td>
<td>19.4</td>
<td>3.0</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>26.4</td>
<td>20.4</td>
<td>4.3</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>12.6</td>
<td>7.1</td>
<td>2.1</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>9.6</td>
<td>14.1</td>
<td>1.8</td>
<td>-</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>11.3</td>
<td>9.6</td>
<td>1.7</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: A - Intact flake; B - Proximal portion; C - Medial portion; D - Distal Portion

TABLE 13
METRIC DATA REGARDING MATERIALS FROM 38RD179
(Flake Debitage)

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Rhyolite</td>
<td>21.7</td>
<td>19.6</td>
<td>2.8</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>12.0</td>
<td>7.2</td>
<td>2.5</td>
<td>6.3</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>20.8</td>
<td>21.7</td>
<td>9.6</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>17.0</td>
<td>13.3</td>
<td>2.5</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>13.4</td>
<td>14.0</td>
<td>3.5</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>23.0</td>
<td>20.7</td>
<td>5.7</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>11.4</td>
<td>10.0</td>
<td>1.7</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>18.5</td>
<td>34.6</td>
<td>4.4</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>19.1</td>
<td>20.0</td>
<td>2.1</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Chert</td>
<td>21.2</td>
<td>17.6</td>
<td>4.1</td>
<td>8.3</td>
<td>heat-treated</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>22.0</td>
<td>15.8</td>
<td>3.4</td>
<td>-</td>
<td>heat-treated</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>17.6</td>
<td>18.2</td>
<td>3.0</td>
<td>-</td>
<td>heat-treated</td>
</tr>
</tbody>
</table>

TABLE 14
METRIC DATA REGARDING MATERIALS FROM 38RD187
(Flake Debitage)

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Rhyolite</td>
<td>25.6</td>
<td>20.3</td>
<td>3.3</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>15.0</td>
<td>10.0</td>
<td>1.6</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>18.3</td>
<td>23.6</td>
<td>3.0</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 15

METRIC DATA REGARDING MATERIALS FROM 38RD179
(Biface Data)

<table>
<thead>
<tr>
<th>Point</th>
<th>Material</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>THK.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Chert</td>
<td>20.4</td>
<td>16.5</td>
<td>18.4</td>
<td>17.3</td>
<td>7.3</td>
<td>heat-treated</td>
</tr>
<tr>
<td>B</td>
<td>Chert</td>
<td>31.6</td>
<td>44.7</td>
<td>-</td>
<td>-</td>
<td>10.7</td>
<td>heat-treated</td>
</tr>
<tr>
<td>C</td>
<td>Chert</td>
<td>20.8</td>
<td>24.2</td>
<td>-</td>
<td>-</td>
<td>4.5</td>
<td>fire-burned</td>
</tr>
<tr>
<td>D</td>
<td>*Sandstone</td>
<td>20.1</td>
<td>34.1</td>
<td>-</td>
<td>-</td>
<td>10.6</td>
<td>deteriorated</td>
</tr>
<tr>
<td>E</td>
<td>Rhyolite</td>
<td>58.0</td>
<td>33.1</td>
<td>-</td>
<td>-</td>
<td>12.5</td>
<td>preform frag</td>
</tr>
<tr>
<td>F</td>
<td>Quartz</td>
<td>38.4</td>
<td>58.3</td>
<td>-</td>
<td>-</td>
<td>12.5</td>
<td>preform</td>
</tr>
</tbody>
</table>

*Silicified sandstone or orthograde quartzite
functional, and used dually as hammerstones and heating stones. Additionally, functions could also be extended to the processing of plants, roots, and nuts, but without specific data generated from experimentation, interpretations would be tenuous.

Several of the broken cobbles from Congaree Swamp do exhibit slight reddened hues along fracture planes and within the interior, but other fragments fail to produce any indication of heat induced discoloration. The majority of fragments appear to represent the interior of cobbles, and while several fragments do exhibit cortex, wear patterns demonstrating the utilization of hammerstones were not observed. This would not necessarily argue against the possibility of hammerstones because there are only a limited number of cortical fragments available for study. In fact, the entire sample is too small for any serious functional interpretations. These shattered quartz cobbles are problematical, and in terms of suggesting site function, they have only a limited value at the present.

Flakes of Biface Reduction

The flake debitage is composed almost entirely of thin, lamellar flakes with prepared platforms, and with the absence of cortex. These flakes of biface reduction and retouch constitute: 1) rather large flakes suggesting the reduction of preforms, and 2) small flakes suggesting the resharpening of dulled bifaces (projectile points/ knives) (Tables 12, 13, 14 and 15). An analysis of the flakes failed to produce any attributes suggestive of wear damage from utilization. These flakes, then, appear to represent nothing more than the by-products of biface reduction and resharpening.

Bifaces (Projectile points/knives)

A total of six bifaces were recovered on sites exempt from a spurious status. These bifaces represent: 1) two preforms, and 2) four complete or fractured projectile points/knives. Although the preforms are not diagnostic indicators of time or space, the remaining bifaces are indicative of Archaic and Woodland occupations (Table 16).

The latter portion of the Early Archaic period is represented by two Kirk points, both of which are heat-treated. The basal fragment depicted in Figure 29 exhibits considerable lateral reduction through resharpening, and its utility was probably terminated after fracturing. The blade portion of the other point is well formed and displays a wide variety of discoloration resulting from heat-treating. Flake removal is relatively well controlled and several flake scars display a ribbon-like appearance characteristic of the Coastal Plain Kirk points. Although
TABLE 16
BASIC PROJECTILE POINT CHRONOLOGY FOR SOUTH CAROLINA
AND REPRESENTATIVE TYPES FOUND IN CONGAREE SWAMP
(Sources: Coe 1964; Michie 1965, 1977)

<table>
<thead>
<tr>
<th>Point Type</th>
<th>Cultural Association</th>
<th>Relative Ages</th>
<th>Survey Representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clovis</td>
<td>Paleo-Indian</td>
<td>10000 B.P.</td>
<td></td>
</tr>
<tr>
<td>Suwannee</td>
<td>Paleo-Indian</td>
<td>9000 B.P.</td>
<td></td>
</tr>
<tr>
<td>Dalton</td>
<td>Early Archaic</td>
<td>8000 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Hardaway</td>
<td>Early Archaic</td>
<td>7000 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Taylor</td>
<td>Early Archaic</td>
<td>7000 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Palmer</td>
<td>Early Archaic</td>
<td>6500 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Kirks</td>
<td>Early Archaic</td>
<td>6500 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Stanly</td>
<td>Middle Archaic</td>
<td>5000 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Morrow Mountain</td>
<td>Middle Archaic</td>
<td>4500 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Guilford</td>
<td>Middle Archaic</td>
<td>4500 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Savannah River</td>
<td>Late Archaic</td>
<td>2000 B.P.</td>
<td>x</td>
</tr>
<tr>
<td>Badin</td>
<td>Woodland</td>
<td>A.D. 500</td>
<td>x</td>
</tr>
<tr>
<td>Yadkin</td>
<td>Woodland</td>
<td>A.D. 1200</td>
<td>x</td>
</tr>
<tr>
<td>Clements</td>
<td>Mississippian</td>
<td>A.D. 1400</td>
<td></td>
</tr>
<tr>
<td>Pee Dee</td>
<td>Mississippian</td>
<td>A.D. 1600</td>
<td></td>
</tr>
<tr>
<td>Caraway</td>
<td>Mississippian</td>
<td>A.D. 1700</td>
<td></td>
</tr>
</tbody>
</table>

The basal portion is detached, these physical features suggest a strong relationship to the Kirk time period. This particular point apparently never experienced lateral reduction from resharpening, and fracturing obviously occurred in the initial stage of manufacture.

The single Morrow Mountain point representing the Middle Archaic period demonstrates a high degree of resharpening through extensive lateral reduction. Its parent material, silicified sandstone, has deteriorated significantly, and only rough outlines of flake scars are seen.

The Woodland point, a small Yadkin, has been subjected to fire after manufacture which has resulted in pot-lid fractures across the surface and reddened discoloration. A small portion of the tip and basal edge have recently broken, probably due to automobile traffic on the dirt road.

Hafted bifaces have long been referred to as projectile points, and while some types may actually be projectiles, many of the Archaic bifaces probably functioned as cutting implements. Michie (1973) has demonstrated that the Early Archaic Dalton points could have been used for butchering, which is evidenced by wear pattern studies involving the butchering of white-tailed deer. Similarly, wear pattern studies involving the processing of bone and antler indicates that certain Late Archaic coastal points were utilized in the manufacture of socketed bone points and bone pins.
The extreme lateral reduction seen in many other Archaic points also lends support to a concept of cutting tools rather than projectiles. The lateral edges of many Archaic points exhibit varying degrees of wear and patterns of wear which suggest a multi-functional use of bifaces in processing various materials (Michie 1979).

The lithic assemblage from Congaree Swamp sites does not suggest any activities involving diversification, but rather the activities seen oriented towards the utilization of bifaces which could include: 1) the butchering of animals, 2) the extraction and processing of vegetal matter, or 3) the maintenance of hunting weapons, such as spear shafts and bone points. The Morrow Mountain point is too deteriorated to yield any evidence of wear patterns and the basal portion of the Kirk is too fragmented for any determination. However, the blade portion of the other Kirk exhibits micro-patterns of wear along the lower lateral edges. The wear is illustrated with slight shattering partially covered with polishing along the high points of the edge. Such patterns would suggest that the edge was drawn across a material of moderate hardness capable of shattering an initially sharp edge; and with continued cutting, the collapsed edge failed to yield any further, and began to dull with increased polish. Similar patterns of wear have been noted on the coastal bifaces mentioned earlier, suggesting bone processing, while Wilmsen (1970: 72) has noted parallel patterns of wear resulting from a tool being drawn across either bone or wood. The exact cause of wear involving the Kirk is presently unknown; however, it does involve some form of cutting.

The two preforms, one manufactured from quartz and the other from rhyolite, do not indicate any form of utilization through wear patterns. The quartz preform is thinned appreciably on one surface, while the other surface still retains the cortex of a cobble. The rhyolite preform is bifacially flaked, and apparently while it was being reduced into a hafted biface, it collapsed and was discarded.

The chert Yadkin point does not exhibit any form of wear, nor any evidence to suggest its function. Because of its late temporal association, it may have functioned in a system that utilized the bow and arrow. Also associated with a late time period is the sand tempered pottery; however, based on such a small eroded sample of sherds, its temporal affiliations and functions are tenuous.

Based on the limited amount of lithic data, it would appear that small groups of people were entering Congaree Swamp with tool kits composed of preforms, hafted bifaces, and quartz cobbles that could have functioned as hammerstones for reducing preforms and resharpening dulled bifaces. An alternative explanation of the cobbles may suggest hammer stones. Although functional interpretations are tenuous on the basis of limited archeological materials, the data would seem to support: 1) short term occupations by small groups of people, 2) a limited activity involving bifaces and the maintenance of bifaces, and 3) specialized activities exemplified by a specialized tool kit. In these terms, then, the sites probably functioned as extraction camps for either floral or
faunal resources. Their role in a larger and broader cultural system involved people who radiated out from any number of base camps situated on the southern edge of the Congaree River valley, or perhaps the base camp (38RD10) located not far from the swamp.

Historic Utilisation

Unfortunately, little information exists concerning the earthen structures within Congaree Swamp and there is hardly any indication that the bottomland provided permanent residence for local settlers during the 18th and 19th centuries. Excepting John Cely's (n.d.: 91-95) brief report in Congaree Swamp: Greatest Unprotected Forest on the Continent, and the indications of 19th century homes situated along the river on Mill's Atlas, there is little information. As Cely (n.d.: 92) has pointed out, The plats for the Beidler Tract usually indicated "impassable swamp" or "all cane swamp." Further comments regarding the ownership of swamp lands are reflected thusly: "Because land was granted to someone, laid out, and surveyed didn't mean that it was used. Often the land remained in its natural state, unclaimed and unused." "Regrants" were common occurrences. Many of the old plats indicate the uncertain ownership of adjacent land by the remarks, "vacant" or "owner not known" (Cely n.d.: 92).

In Edwin L. Green's book, A History of Richland County, there is a mention of cattle-raising and the utilization of swampy bottomlands for browse, but there is no mention whatsoever of cattle mounts, dikes, or earthen bridge abutments. Other local and county histories of South Carolina mention cattle-raising as a profitable industry, but again there is no mention of environmental adaptations in the form of earthen structures in the vicinity of Richland County. Several references may be found concerning Coastal and Lower Coastal Plain dike systems for rice production (Savage 1956; Wright 1976); however, there are no references to the Upper Coastal Plain. With the absence of such information, therefore, it is difficult to talk about the historic earthen structures within Congaree Swamp. These sites appear to represent a unique adaptation to a bottomland environment, and such a circumstance elicits questions concerning the reasons for construction and for utilizing an inhospitable environment.

By the very virtue of elevated earthen structures within a swampy, bottomland environment, someone is attempting to contend with problems created by flooding. Therefore, these elevated structures appear as no surprise, even with predictability in an area with no natural elevations. All of the cattle mounts and other earthen structures that occur in the Congaree River Valley are found in the lower portion of Richland County where there is an absence of natural ridges. In the areas north and west of the Beidler Tract, sand ridges appear and cattle mounts disappear. The name, "Muller's Barn Ridge," given to a feature located due west of the Beidler Tract and across the river in a large expanse of swamp, testifies to its use. Green Hill Mound is situated northwest of
the property, and based on the absence of trees and the presence of fallowed ground, it too has been subjected to cultivation. Both of these large ridges still have remnants of wooden structures, while the peripheral zones exhibit remnants of wire fences that attest to the confinement of livestock. Swamp utilization, then, demanded an area of elevation, and in the absence of such natural ridges, artificial ridges were constructed in order to take advantage of a rich environment.

The bottomlands provided a nutrient-rich soil that yielded high returns of forage, browse, and mast, not only for the local deer populations, but also for the cattle and hogs. The value of such an environment is recorded by several authors:

"The chief range types seemed to be the "firm" or "feeding" marshes of the islands and estuaries, the savannahs and cane swamps of the inner coastal plain, and the cane breaks and "peavine pastures" of the piedmont" (Dunbar 1973: 126).

"Some cash was had from the fat cattle when rounded up from the swamps and driven the weary miles to Charleston" (Gregorie 1954: 20).

"From the first settlements in South Carolina down, even to the present time, a period of more than two hundred years, stock raising for market has been a profitable pursuit in all the State, and especially in the lower or eastern portions of the State, in which Marion County is located. Intersected as it is, by the Pee Dee and Lumbar Rivers, with numerous inland creeks, swamps, and bays, it afforded a splendid and extensive range for cattle and hogs. Luxurious bodies of reeds were in the swamps and low grounds of the three rivers, and in the inland swamps and bays of the county; the uncleared uplands everywhere covered with a heavy annual crop of nutritious grass in summer for cattle to browse upon, the swamps, and especially the river swamps, teeming with acorns, and the pine woods bearing every year quantities of mast—pure mast. The enterprising and sagacious settler quickly saw the money in it, and at once utilized the bounties of nature around him, which he could do without much labor. All he had to do was watch and attend his stocks of cattle and hogs, and feed them just enough to keep them gentle. The range was sufficient to maintain and fatten for market large droves of cattle and hogs with little or no expense or labor" (Sellers 1902: 29).

The bottomland swamps must have provided extensive range and food for both cattle and hogs, while securing an economic advantage for stock raising. The extensive swampland and its mast and browse capability would have encouraged a measure of utilization because: 1) it allowed the enterprising farmer to cultivate larger areas of his property by
utilizing acreage normally used for pasture; 2) it reduced the expense of having to provide feed for cattle and hogs; 3) it reduced the necessity of human labor and thereby provided additional time for other farm related activities; and 4) it allowed the use of land that was commonly regarded as precarious for human settlement. With this interpretation, the astute and perspicacious settler of the 19th century took full advantage of the swampland vegetation and allowed his cattle and hogs free range in Congaree Swamp.

During the same period of time there were two attempts directed towards cultivating portions of the bottomland swamp. The Old Dead River Dike (38RD192) and the North Boundary Dike (38RD191) demonstrate a labor intensive movement applied towards controlling the adverse effects of flooding. In all probabilities, the optimistic farmer had plans to use the nutrient-rich soils of the floodplain for specific crops, especially corn.

The soils of Richland County are diverse in composition and physical structure, and the majority of them have moderate to severe limitations in terms of agricultural potential. The total acreage for the county is approximately 434,845 acres, but only 39,885 acres possess soils that have few limitations restricting their use. At least 131,010 acres have moderate limitation that reduce the choice of crops or that require special conservation practices, and the remaining 263,950 acres have severe limitations. There soils are limited because they require special conservation practices, very careful management, and the cultivation of specific crops. However, out of 263,950 acres, at least 115,930 acres have limitations beyond any practical method of improvement. These soils, then, are generally restricted to specific crops through careful management and soil conservation (Lawrence 1978: 31,79).

The variables precluding cultivation appear multi-faceted. Special conservation must be employed to reduce the threat of erosion: some soils require special chemical treatments; other soils require drainage ditches to remove excess water. Soil erosion in the past years has been a major factor in the loss of crop production, and at least 30% of the soils have been subjected to erosion. The result of erosion on slopes greater than 2% has a significant effect on the soils because it washes away important nutrients and frequently exposes a fragipan or clayey subsurface layer that retards root penetration of crops. The exposure of fragipan also has a significant effect on plowing because of its compact and often cemented nature. Corrective measures are labor intensive and the soils must be terraced. Drainage is another factor severely affecting cultivation and crop production. In many of the areas the dense compact subsurface clays retard water and subsequently the fields remain wet for extended periods of time. With wet conditions, crops are either drowned or they cannot be planted during the appropriate time of the growing season. The saturation of soils not only affect crop failure, but it also affects soil tilth. The structure of soils is also an important factor in the germination of seeds and in the infiltration of water into the soil. Granular and porous structures provide for good
tilth, but frequently the soils of the county must have regular additions of crop residue and other organic materials.

The 19th century farmer was certainly aware of soil problems. In some areas, the soil doubtlessly required little attention and the farmer could reap considerable rewards from his fields, but in other areas, the land certainly yielded less, with lower grades of crops. The inland areas of Richland County appear to be more suited for specific crops, and these areas require less attention in the form of land management and conservation.

The area immediately adjacent with Congaree Swamp is composed of various soil types, many of which have a moderate potential for productivity through proper management. However, without management, especially drainage, there is limited productivity. Persanti, Cantey, and Goldsboro soils constitute the majority of types and all of them possess a medium potential through proper management. This potential, unfortunately, is retarded by extended wetness because these soils fail to dry rapidly. The clayey loams that underlie the surface soils do not allow rapid permeation, and subsequently, the crops are damaged or drowned and tilth becomes difficult. However, if the soils are adequately drained by ditches, they can achieve a moderate level of production. The Smithboro and Rains soils, which are related to the above mentioned, are wetter and more problematical. Even with apparently sufficient drainage they frequently remain too wet for most crops.

Comparatively speaking, crops of cotton when grown under management attain quantities that range from about 700-800 pounds per acre on the Persanti and Goldsboro soils, and fall down to about 450 pounds per acre on Rains soils. The Smithboro and Cantey soils cannot be successfully managed for cotton. High yields of cotton are grown on the deep, sandy, and well-drained soils that exist on the ridge tops in the interior of Richland County. In these areas, cotton production reaches approximately 1000 pounds per acre (Lawrence 1978: 76-77).

Corn yields appear highest on the Goldsboro soils with production ranging about 125 bushels per acre. Rains will yield somewhat less at about 110 bushels, while Persanti supports about 100 bushels. Smithboro reduces production to about 90 bushels, and Cantey cannot be managed for corn. Wheat also grows best on the Goldsboro soils, reaching 60 bushels under good management. Persanti yields are much lower with yields measured at only 35 bushels, and the Smithboro and Rains soils fail to support the crop because of wetness (Lawrence 1978: 76-77).

The soils adjacent to Congaree Swamp, consequently, require considerable management in order to attain a moderate level of production. Such management requires that drainage ditches be cut across the soils to allow rapid drying. With adequate drainage these soils are well-suited to row crops (especially corn), but cotton and wheat fall short of good yields. These soil conditions limit the amount of productivity of well-suited crops when they are not managed. Such may have been the case during the 19th century because there are no indications of old drainage ditches dissecting the properties contiguous with Congaree Swamp.
The soils of the floodplain are composed mainly on Congaree, Tawcaw, and Chastain. The Tawcaw and Chastain series represent low areas and depressions; these soils are not suited for any type of cultivation because of constant wetness. The Congaree series, however, is somewhat higher in elevation and it has a tendency to dry after flooding. If this soil can be managed successfully, it is highly suited for the production of corn, and yields can be expected in the range of 125 bushels per acre (Lawrence 1978: 76). Although this is the most ideal soil for corn, cultivation and crop protection becomes a labor intensive project. In order to prevent periodical inundation, dike systems are required to control the adverse effects of flooding. Additionally, the compact sediments of the soil need regular additions of crop residue to improve porosity for cultivation. Without these efforts the rich soil has little value for agriculture, as exemplified by the dikes.

In an effort to maximize corn production, the Old Dead River Dike (38RD192) was constructed in a nutrient rich floodplain with the hope of retarding flood waters. Unfortunately, the results of this endeavor have not been recorded and we have no knowledge of its success or failure. Perhaps the reluctance of James Adams' children to complete construction of the North Boundary Dike (38RD191) reflects an attitude concerning bottomland utilization. These labor intensive movements, paired with the cost efficiency of the project, may have returned considerably less than the investment.

These cultivation efforts within the swamp may have resulted from continued crop failure on the upland soils, or at least from problems related to soil management. These extant problems occur in the form of poor tilth, poor permeability of subsurface clay, extended wetness because of slow drying soils, inadequate drainage, and an absence of natural fertility. Such conditions may have forced the farmer into the swamp in search of more productive soils. The remains of an unfinished dike system, however, may attest to the complications of utilizing a bottomland environment. Any utilization of a floodplain required elevated soils, and the presence of earthen structures within the swamp demonstrates that the economic system of the farmer and the cattle raiser needed protection from the floods on the Congaree River.

In summary, the bottomlands in the vicinity of the proposed National Park are extensive and they possess a great deal of richness in terms of the environment. During the Historic period these swamps were used for cattle raising and limited cultivation for corn. The high yields of browse and mast supplied more than an adequate amount of food for cattle and hogs. These livestock were provided with free range on lands that were generally vacant and without ownership, and such freedom allowed the farmer to divert more activities towards cultivation while it released pastureland and the expense of providing hay and grain. The only investment required for bottomland cattle raising was the erection of earthen structures for protection. The fertile Congaree soils also attracted the farmer and tempted cultivation, but these undertakings required considerable labor in the construction of dikes, and the soils needed constant management. Bottomland cultivation probably proved too expensive and time consuming, and may have yielded less than the original investment.
Significance of the Cultural Resources

Introduction

In an attempt to set forth certain standards for the evaluation of the significance of the cultural resources, the National Register of Historic Places has developed the following criteria, which appear under 36 CFR PART 60.6:

"National Register Criteria for Evaluation. The quality of significance in American history, architecture, archeology, and culture is present in districts, sites, buildings, structures, and objects of State and importance that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and

(a) That are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) That are associated with the lives of persons significant to our past; or

(c) That embody the distinctive characteristics of a type, period, or method of construction, or that represents the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) That have yielded, or may be likely to yield, information important in prehistory or history."

A brief overview of the above criteria quickly indicates that the people responsible for setting forth standards for the evaluation of cultural resources were interested in a broad coverage through the implementation of generalizations rather than trying to cover an impossible host of specifics and an endless number of variables. While criteria (a) and (b) deal with "events," "broad patterns," and persons associated with patterns and events, a theme that leans toward a tone of specifics, the other criteria are striving for a general coverage. Additionally, criterion (c) seems to beg for some sort of typological and particularistic overture, exemplified in "artistic values," "the work of a master," and "type, period, or method of construction." While the latter criterion mentions "prehistory," a continuing emphasis is placed on the historic time period and on the related assemblages, exemplified by "broad patterns of history," "lives of persons," "methods of construction," and "information important in prehistory or history." The criteria, therefore, are relatively broad and general in scope, and seem to strive for the recognition of typologies and the aesthetic qualities of material possessions, while it associates people with those materials and events.
The limitations of the criteria are evident, and such inadequacy is pointed out by several authors concerned with cultural resource management (Moratto and Kelly 1978; King, Hickman, and Berg 1977) in an attempt to set forth better criteria for the determination of significance. Following along a path of improvement, Moratto and Kelly (1978) have developed a list of specific typologies to improve communications between archeologists concerning significance:

**Historical significance** - "A cultural resource is historically significant if it can be associated with a specific individual event or aspect of history, or, more broadly, if it can provide information about cultural patterns during the historic era" (1978: 4).

**Scientific (research) significance** - "Scientific significance involves the potential for using cultural resources to establish reliable facts and generalizations about the past" (1978: 5).

**Ethnic significance** - "A cultural resource that holds religious, mythological, spiritual, or other symbolic importance for a discrete group of people is said to be ethnically significant" (1978: 10).

**Public significance** - "The term public significance refers to those benefits that accrue to a society through the wise stewardship of its archeological resources" (1978: 12).

**Monetary significance** - "Estimating the potential worth of cultural resources is one way to evaluate their significance for CRM purposes" (1978: 17).

The majority of the above themes need little explanation, but the typology concerning scientific significance is relatively broad and it should be expanded upon. Moratto and Kelly (1978) separate the significance into two separate categories: 1) values to the social sciences, and 2) values to other sciences. The former category deals specifically with contributions to "major theoretical and specific issue," especially in regard to questions involving patterns of settlement and location, the development of agriculture and its origins, particulars concerning population, and other questions relevant to cultural processes. In their outline of social science values, the authors draw heavily on additional criteria set forth by Schiffer and House (1977), who place significance in a realm of research oriented questions. Such categories of significance are defined as:

**Substantive significance** - "...describe and explain the events and processes that occurred in the past. The questions that orient those inquiries are substantive questions; they relate to particular times and places and they are known as idiographic" (1977: 250).

**Anthropological significance** - "Here investigators must discern the extent to which study of specific resources might be able to contri-
bute to testing general anthropological principles, especially those relating to processes of long-term culture change and ecological adaptation" (1977: 253).

Social scientific significance - "Closely related to, and perhaps not distinct from, anthropological significance is social scientific significance. The later category of nomothetic questions is found in the context of social science generally and thus may also include specifically anthropological questions" (1977: 253).

Technical, methodological, and theoretical significance - In an abstract form, this category begs for technical, methodological, and theoretical advancements in archeology when other research values are relatively low. Sites, therefore, have significance although substantive, anthropological, and social scientific significances are lacking (1977: 254-256).

The values of archeological resources to other sciences are evident in contributions through avenues of interdisciplinary research. In this frame of reference, archeology has an opportunity to contribute to a variety of sciences, such as botany, physics, geology, and many others.

The significance of a cultural resource, therefore, is manifold and such measures of significance extend much further than the generalizations outlined in the Code of Federal Regulations. Through careful considerations which monitor contemporary movements in archeology, the various authors cited above present thoughts, guides, and goals for those who are involved in the management of cultural resources and determinations of significance. By utilizing such criteria, the archeologist is in a better position to establish significance determinations, not only for the community of archeologists, but also for the client who requests determinations. In the following section of this report arguments will be made for establishing significance for several of the resources on these bases.

Pseudo-Sites

The first to be evaluated in terms of significance are those small lithic scatters that appear in the roadbed of the New Road. In all probability these sites do not reflect aboriginal occupation and environmental utilization, but rather archeological materials that have been transferred into the swamp as a result of borrowing soils from the upland areas contiguous with the swamp edge. These sites are represented by 38RD173, 38RD175, 38RD176, 38RD177, and 38RD178. By the very fact that these materials are probably imported, any further discussion is unwarranted; the sites, therefore, are without significance. However, an argument should be made for retaining the site designations, not only in the report, but also in the statewide Site Inventory Record of the Institute of Archeology and Anthropology. In the event of future research and investigations, archeologists and various people concerned with the National Park should be made aware of these specific sites.
for an obvious reason: these sites should be recognized as spurious occupations and they should not be rediscovered and reevaluated.

The Sandbar Site, 38RD190, should also be placed in the category of pseudo-sites because the site constitutes nothing more than archeological materials that have been transported and subsequently deposited by a river system. Without integrity, such a site fails to qualify for significance; therefore, there is no managerial concern. For reasons listed above, the site should retain its designation in the report and within the inventory files of the Institute.

Considerations of the Significance of Prehistoric Sites

The prehistoric sites that remain are currently regarded as true representatives of aboriginal occupations. These sites are relatively small, and for the most part, are characterized by scatters of lithic materials and a rare occurrence of pottery sherds, all of which occur in a shallow context. The numerical values of the cultural materials range from a single flake discovered at 38RD174 to an inventory of 46 flakes and a pottery sherd recovered from 38RD188. Based on quantity and diversity of the materials, and the apparent absence of depth and stratification, the small sites may appear to have little utility and scientific value in understanding cultural processes and patterns of past human behavior. However, if these sites are viewed in a context of "what can they contribute to the understanding of cultural systems within the region of a river valley," then the sites may acquire a level of significance.

In this situation the key to site significance lies not in categories of ethnic, monetary, public, social, or historical enlightenment, but rather, some of the sites have an opportunity to contribute to substantive and scientific significance through research oriented questions. What, then, can these sites offer the advancement of archeological understanding on a basic level of "establishing reliable facts and generalizations about the past," and "explaining events and processes that occurred in the past?"

In pondering the research potential of archeological sites, two avenues of thought quickly arise: a consideration of philosophy, and a consideration of pragmatics. Explicitly, a consideration of philosophy assumes an academic position that all sites may be important, and, given sufficient attention, the smallest sites have a potential of yielding information about the past. However, there is a practical consideration for time and expense versus the return of information. In this thought, the archeologist must ask certain sets of questions to test the practicalities of research: Will the return of information generated from excavation exceed the current status of knowledge obtained from surface collections or limited testing? Will this knowledge provide a better understanding of site function through intrasite patterns? Will it enhance the understanding of its parent cultural system? Does the site have data sufficient enough to address questions of subsistence and
social systems? Concomitant with these questions are questions of a broader nature that precede research: Exactly what are the problems to be attacked? Is there adequate information within the sites to solve the problems?

Unfortunately, there is little archeological information regarding questions about floodplain utilization, and the reconnaissance survey of Congaree Swamp is the only representative of aboriginal habitations within a Coastal Plain bottomland environment. By this very fact, the occupations within the swamp are difficult to deal with in terms of establishing specific priorities and research oriented questions. Although some thoughts have been advanced in the preceding section of this report, the sites, nevertheless, cannot be understood by data recovered from a reconnaissance survey. Explicit knowledge can only be attained through intensive subsurface excavations, while a measure of relative value may be gained through a rigorous program of intensive testing.

If these sites were subjected to excavation what would the results yield? As it has already been discussed, there would be little expectation of finding deeply stratified deposits. In the absence of cultural-historical problems, the shallow sites would be expected to contain some degree of spatial integrity through the horizontal distribution of cultural materials and related occupational disturbances. The study of such distributions could add greatly to the knowledge of specific activities and site functions, especially through the implementation of lithic analysis involving wear pattern studies and the reasons for biface reduction. Further knowledge concerning site activity may be gained through the discovery of fire hearths and refuge pits. Charcoal and the remains of flora and fauna, including pollen, also have an opportunity to add significantly to environmental utilization and reconstruction, while radiocarbon dates provide for parameters of time.

A further utilization of the data involves determinations of hunting and extraction strategies during various periods of time, especially during the broad time range of the Archaic. Some indication of activity has already been hypothesized which suggests that human occupation in the swamp was oriented towards the extraction of mammalian species, particularly the white-tailed deer. The high incidence of deer browse and dependability through predictability of such browse would provide an optimal environment for the exploitation of white-tailed deer. This hypothesis could be tested through controlled excavation, which hopefully would yield additional information concerning hunting strategies, technologies, and the group efforts of hunters within a system geared towards the extraction of white-tailed deer.

Not only is the environment an ideal habitat for deer, but it also supports a wide variety of vegetal species suitable for human consumption. The mast bearing trees, such as oak and hickory, provide an optimal return of food for both man and animal on a scale of greater dependability. Evidence in the form of food remains could add greatly to the
understanding of food gathering strategies, technologies, and group efforts involved in a system of food procurement.

A locational analysis of the various sites may shed additional light on settlement systems and patterns within the swamp. As it was mentioned earlier, the sites tend to be located on old river levees, elevated slightly above the surrounding terrain. Specific location may involve any number of explanations: a selection for drier soils, or a position relative to target resources, for example. Perhaps these specific locations involved the exploitation of an environment now significantly altered with the filling of oxbow lakes. During the aboriginal occupations, an oxbow may have provided access to any number of terrestrial or marine resources. Through a program of multidisciplinary research incorporating soil studies, botany, mammalian osteology, palynology, and ethnobotanical studies, portions of the paleoenvironment may be reconstructed and add to our understanding of settlement location, while generating information for other sciences.

Through an intensive study involving archeological studies, and those of related sciences, we can begin to learn more about human activities within a swampy environment. Specific information gained from several of these sites can enhance the understanding of species procurement strategies, site function, settlement patterns, subsistence, and culture ecology. Attending these basic determinations are the development of hypotheses for application in other bottomland environments.

From this standpoint, then, the small sites within the area acquire a meaning of significance if they can yield specific information relative to site function. The question now centers around the ability of the sites to yield data adequate for site interpretation. Do these sites contain a sufficient amount of cultural materials to make research feasible, and would we expect to find cultural features and disturbances, such as fire hearths and refuse pits, which would yield food remains and ethnobotanical remains capable of determining activity and environmental reconstruction? These questions must be addressed before statements of potential significance can be set forth.

Although no one has, to my knowledge, ever set forth any criteria dealing with the amount of cultural materials necessary for activity or site function evaluation, it would appear that one would need a large enough sample for qualitative and quantitative statements. For example, if someone is attempting a wear pattern analysis of bifaces, it would seem ludicrous to study a shattered portion of a single projectile point. Similarly, if some researcher wanted to study patterns of biface reduction through the remains of extant debitage, a sufficient amount of thinning flakes representative of the variation would be required for any definitive statement. To recapture a specific activity with only a few thinning flakes would be comparable to a physical anthropologist making determinations of population genetics based on one skeleton. Comparable situations exist not only with lithic studies, but also with ceramics and other facets of material culture. Simply, an assemblage of only a few items is not adequate enough to make any reliable determinations.
Cultural features can greatly elevate the significance of a site, but then features are often not preserved in the acidic soils of South Carolina. As House and Ballenger (1976: 146) have pointed out in regard to the Piedmont province, "...prevailing acidic soil conditions make it unlikely that significant quantities of direct subsistence data are preserved." Anderson, Lee, and Parler (1979) relate similar problems in the Coastal Plain, where features leach out of the acidic soils. The upland areas that are constantly exposed to wetting and drying are not especially conducive to preservation. However, the lower areas that are subjected to higher water tables and constant wetness through flooding are given much easier to preserving floral and faunal remains, particularly in a context where silts and clays have been deposited over the materials. The relatively impermeable soils remain saturated with water for longer periods of time which retard leaching and decomposition. Given these conditions, then, there is a high probability that if cultural disturbances exist in the swamp, associated materials in the form of animal bone, pollen, plant remains, and other organic materials are preserved.

The upland area adjacent to the swamp would have a low probability of preservation. The sandy loam soils are highly acidic and relatively permeable, conditions encouraging rapid decomposition of organic materials and leaching of stained soils. In this environment one would not expect to find any preservation of floral and faunal remains in cultural deposits, and the deposits themselves are probably severely leached.

Based on the above information, sites with greater integrity would exist within the bottomland of Congaree Swamp, and not on the adjacent sandy uplands. Using this information a level of significance can be established for the sites found within the property.

38RD197 - This site exists on the periphery of the swamp and is situated on a soil formation composed of sandy loam. The artifact inventory is low (5 items) and there is a low probability of extant cultural deposits. The four lithic items and the small pottery sherd were found scattered in a firebreak approximately one meter wide and over a distance of ten meters. Although the firebreak covers the entire area of the small hill and contiguous slope, no other cultural materials could be found. The site is extremely small, and without the expectation of features it would appear to be insignificant and of no immediate concern for management.

38RD187 - This small site exists within the bottomland of the swamp and is represented by only three rhyolite thinning flakes. These flakes were found scattered over a relatively large area that allowed excellent visibility. If more materials were present they would have been seen and recovered. This low density site is also considered insignificant and of no concern for management.

38RD174 - This small site also exists within the floodplain and is represented by only one small silicified sandstone flake. This flake was discovered in a roadbed which lies adjacent to two large deer fields.
Although the road and the fields were searched thoroughly, no other cultural materials could be found. In the absence of other cultural materials this site is also considered insignificant and it, too, is of no concern for management.

38RD188 - This large scatter of predominately rhyolite flakes occurs in the floodplain east of the New Road. Cultural materials in the form of thinning flakes were found scattered in a roadbed for a distance of about 50 meters. Because of this high concentration of materials and the probability that materials exist in the soils adjoining the roadbed, the site has a potential for yielding a greater diversity of cultural materials. The size of the site would also suggest that occupation was not a single event that occurred at a moment in time, but rather long term or multiple visitations. With varying periods of occupation, there is an increased probability of cultural deposits in the form of fire hearths and refuse pits. This site, then, is considered significant because it has a potential for yielding pertinent information relative to site function and other cultural problems outlined earlier. The site at this period of time is especially important to planners and managers who may consider modifications and alterations of the immediate environment.

If this site becomes endangered, I recommend a program of intensive testing to determine the validity of the suppositions concerning the physical content of the site, and to establish reliable facts about its occupation.

38RD179 - This scatter of lithic materials, which includes biface fragments, shattered quartz cobbles, and thinning flakes, is located a considerable distance from the preceding site and near the end of a dirt road. The cultural materials were found in the roadbed and scattered for a distance of about 75 meters. Although the distribution is not dense, it does occur for a relatively long distance, suggesting that the soils adjoining the road also contain cultural materials. That the site was temporally occupied is demonstrated by a multicomponent assemblage which suggests that, during various sequences of occupation, there is a high probability for cultural disturbances. Because the site is multicomponent and scattered across a relatively large area, archeologists may be able to isolate various time periods and different activity loci through a program of excavation. Such a study may also monitor a shift in site function and environmental exploitation, and it may be able to determine why this specific area was reoccupied at different intervals of time.

This site is also considered significant, and if it becomes endangered I would recommend a program of intensive testing to determine the validity of the suppositions concerning the physical contents of the site, in addition to establishing other facts and generalizations about the occupation.

In summary, therefore, three sites are not considered significant: 38RD197, 38RD187, 38RD174. Determinations of nonsignificance are based on the extremely small sample of cultural materials. If these sites
were subjected to intensive testing, there is little likelihood of learning more than is already known about them. On the other hand, the other sites, 38RD178 and 38RD179, have a better potential to contribute to the knowledge of bottomland occupations. With these sites, we can begin to develop some understanding about swamp utilization and the activities that were conducted within floodplain environment. By looking at the internal components of the sites, some preliminary statements can be made regarding site function, settlement and subsistence systems, and other facets of past human behavior. This program of inquiry will lend itself to solving substantive and scientific problems while it develops hypotheses for other bottomland environments.

Considerations for the Significance of Historic Sites

The historic sites that exist within the boundaries of the proposed National Park are all representative of historic environmental adaption, and some of them are considered significant in the understanding and recognition of events and processes, and in establishing facts and generalizations about the past. However, other sites are not considered significant and these will be discussed first.

The whiskey still sites, 38RD198 and 38RD199, are 20th century occupational sites that are hardly ten years old. Both of the sites are badly destroyed. The first site, 38RD198, is represented by nothing more than several shattered Mason jars, a rusted bucket and pail, a small section of pipe, and several badly rusted tin cans. The other site, while containing more evidence for moonshine operations, has been badly destroyed by dynamite. Additionally, several main components of the distillery are absent. The heating system, the pumping equipment for freshwater, the condensing coils and cooling apparatus, are no longer present. Because these sites are relatively recent and void of integrity, they fail to qualify for significance.

The bridge abutments discovered in the northeast portion of the property represent an attempt at crossing the swamp. Based on the eroded condition of the abutments, and with the moderately large vegetation that grows from their soils, there can be little question about antiquity. However, the other components of the bridge are no longer present, and this reduces the integrity of the site. Unfortunately, all that exists are eroded earthen structures that lie adjacent to the swales in a linear pattern suggesting they were once connected by a roadway. That the embankments rise from the swamp floor and ramp upwards towards the water's edge to an elevation of about four feet would certainly argue for a structure designed to traverse the swales. Without some additional evidence, such as wooden pilings, bridge timbers, or roads, the abutments exist with little degree of significance. Until additional evidence is discovered which would link the apparent bridge with past events and processes, the abutments are not considered significant.
The remaining sites, the cattle mounts and the dikes, appear to have greater significance than those briefly discussed above. In the criteria set forth by the National Register, these sites are not "associated with events that have made significant contributions to the broad patterns of our history," and they are not "associated with the lives of persons significant to our past." The other criteria represented under 36CFR PART 60.6 are also difficult to apply to the sites. Because these sites are simply piles of soil with no material culture, they would not likely yield any "information important in history," nor can these sites be associated with "the work of a master," nor "high artistic values." These sites, therefore, have no association with the building criteria for historic structures.

These sites do, however, conform with criteria set forth by Moratto and Kelly (1978: 4) in regard to historical significance. Although it is difficult to assign the sites to "specific individual events," they are associated with "specific aspects of history" and they qualify on grounds of providing "information about cultural patterns during the historic eras." The documentation of these previously unrecognized sites and their relationship to the cattle raising industry and the cultivation of cash crops provides an insight into the utilization of bottomland environments. This complements a specific subsistence pattern during the Historic period, while it also provides a specific aspect of history in regard to local historical developments. These patterns are unique to the central portion of South Carolina, and especially the lower Congaree River Valley floodplain.

A second level of significance is found in public significance (Moratto and Kelly 1978: 17). As the authors have pointed out, "Archeology provides an engrossing educational medium at several levels; it affords economic benefits to the community from tourism, formal educational programs, and the funding of local research projects; and it enriches the community through the acquisition and interpretation of sites and materials for public edification and enjoyment." Furthermore, "Archeological resources, as part of the total environment, also have aesthetic qualities that may contribute to the wilderness 'experience' without being developed or otherwise interpreted."

The importance and significance of these sites are summarized as follows:

Cattle Mounts -

- They are associated with specific aspects of state and local history, and they provide information relevant to cultural patterns during the Historic period.

- They are a phenomenon, confined in South Carolina to the lower Congaree River Valley, and they represent a previously unrecognized form of environmental adaptation within swampy bottomlands.
They represent a portion, or a fragment, of local and state history formerly unrecorded in public literature and apparently unknown to historians. By this fact, the occurrence of the cattle mounts provides a grasp of historical events and processes in the absence of any written documentation.

Furthermore, these earthen structures represent a cultural resource with a potential to educate the public about past lifeways and thereby bring about an awareness and realization of historic events that occurred more than a century ago. Additionally, these large and impressive structures enrich and enhance the heritage of South Carolina, and by these virtues, they have considerable public significance.

Dikes -

They appear to be a phenomenon unique in the upper coastal plain and certainly represent the most inland known occurrence of dike systems in South Carolina.

They are also associated with specific aspects of local and state history, while providing information relative to cultural patterns during the Historic period.

They also represent a portion, or a fragment, of local and state history formerly unrecorded in literature available to the public, and apparently unknown to historians. By this fact, their occurrence provides a grasp of historical events and processes in the absence of written documentation.

Finally, these dikes represent a cultural resource with a potential to educate the public about past lifeways and thereby bring about an awareness and realization of historic events that occurred more than a century ago. These large and impressive earthen structures, which document an attempt at coping with bottomland cultivation, enrich and enhance the cultural heritage of South Carolina, and by these virtues, the sites have considerable public significance.
SUMMARY AND CONCLUSIONS

Congaree Swamp is a rich and extensive bottomland environment composed of silty clay soils, various drainages in the form of swales, sloughs, creeks, and remnants of old river meanderings which constitute oxbow lakes. The area within the swamp is virtually flat and it supports a hydric community of flora and fauna that thrives on its richness. The area is given easily to flooding which prevents any long term human occupation, and as a result exploitation and utilization have always been oriented towards short term habitation and limited activities.

The valley of the Congaree River has been steadily occupied for the past 12,000 years, and based on present settlement knowledge, the southwest portion of the valley has received the greatest amount of aboriginal occupation. During the Historic period people moved from the coastal areas and from North Carolina and Virginia into what is now Lexington County and founded the small community of Saxe-Gotha. Only after the construction of ferries did people begin to move into the area of Rich­land County. From the earliest times onward people selected the ridge tops overlooking the Congaree River and they traveled the old trading paths that led up the southwest side of the valley.

On the northwest edge of the valley, and in the vicinity of Congaree Swamp, the prehistoric occupations appear comparatively smaller. Only one large base camp is known to exist in the area, and while extraction camps occur frequently along the peripheral zones and within the floodplain, occupations are, nevertheless, notably more infrequent. During the mid-1700s people began crossing the Congaree for home sites and lands suitable for cultivation. Early settlements occurred along the edges of the valley, and activities were apparently associated with stock raising and the cultivation of row crops and specific grains, such as wheat. By the turn of the century several farmers had evidently experienced some difficulty with the poorly permeable soil and sought higher production on the nutrient rich soils of the floodplain. With this endeavor the farmer had to construct dike systems to contend with adverse effects of periodical flooding. However, the failure to complete one of the dikes may evidence complications inherent in bottomland cultivation. Perhaps the expense involved in such a project was greater than crop return. During the same period of time people began taking advantage of the rich browse and mast that occurred on vacant and unowned portions of the swamp through livestock raising. In order to utilize this environment, earthen embankments were built for the protection of cattle and other domesticated animals. Such utilization assured a minimum of labor and high returns at the stock market.

Although other activities probably occurred within the swamp, such as the construction of a road and associated bridges, it was not until the late 1800s that activities began to accelerate again. With the purchase of the property by the Beidler family, new exploitations emerged in the form of timber harvest. For several years these large
trees were felled during flood conditions, and the trees were floated down river to a sawmill. Following the removal of select timber, the land was then leased to, and has continued to remain under the general control of, the Cedar Creek Hunt Club.

Throughout the centuries of human occupation, the high predictability of flooding and the swampy bottomlands with their swales, creeks, and oxbow lakes afforded a precarious existence for human populations and sustained residence was impractical. These environmental conditions demand specific behavior in terms of exploitation and utilization, as evidenced by cattle mounts and dikes, and the elevated axe marks which still exist on dead or dying cypress. The occurrence of illegal whiskey stills exemplifies clandestine activities and demonstrates another form of human behavior, suitably performed in an area void of human residence. Although social and cultural values have changed significantly through the millennia, and even though the economic system has seen dramatic changes, the bottomland environment of Congaree Swamp continues to allow only specific and limited activity. The swamp offers a model for settlement and subsistence within the region of the Congaree River Valley that may be applied to other drainage systems of comparable characteristics.
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