the area (Ackerly 1976, Garrow, Crocker, and Warner 1977, Smith 1977, Michie 1979). Four additional archeological sites were discovered through these projects. During the fall of 1975 intensive subsurface testing was conducted at two sites (38LX104 and 38LX112) in a powerline right-of-way near the Congaree River, documenting the presence of deeply buried artifact-bearing strata in the alluvial floodplain deposits (Ackerly 1976). Two powerline surveys conducted north of Congaree Creek (Garrow, Crocker, and Warner 1977, Smith 1977) located two new prehistoric sites and recovered additional information from a number of previously recorded sites in the area. One of these sites, Edenwood (38LX135), was the subject of intensive archeological subsurface testing operations in the spring of 1978, under the direction of James L. Michie (1979).

At Edenwood, Michie opened 37 three foot test pits, systematically dispersed over a 50 foot interval grid. The units produced evidence for Archaic and Woodland period site use, and the associated material culture assemblage was thoroughly documented. Michie (1979:49-51) interpreted prehistoric use of Edenwood as directed toward specialized hunting/butchering activities; his data set and interpretations are useful for and amenable to comparative analysis.

Prehistoric archeological investigations in the Congaree Creek locality, prior to the 1978 Beltway excavations, included block unit excavations at four sites (Thom's Creek, Taylor, Manning, and Sable), dispersed subsurface testing at five sites (Manning, Godley, Edenwood, 38LX104, and 38LX112), and general and/or controlled surface collections over 49 sites (including one historic site, and the excavated sites listed above). Locational and artifactual data currently exists, therefore, for 48 prehistoric sites in the general vicinity of lower Congaree Creek. Analysis, reporting, and synthesis of this vast data set is still only beginning. It is evident, however, that there is considerable potential for the testing of a variety of archeological research questions in the Fall Line/Upper Congaree River Valley environment.

PROJECT RESEARCH ORIENTATION

The 1978 data recovery operations along the Southeastern Columbia Beltway corridor were undertaken within the context of previous research. The four sites that were excavated were located in the middle of one of the most intensively studied archeological localities in South Carolina. Project research, therefore, was able to take direction and guidance from a considerable body of prior knowledge, speculation, and research design. The importance of the locality, and the research potential of the sites within the highway corridor itself, had been recognized in the first state archeological preservation plan drawn up in 1975 (Stephenson 1975b:98). From the extended record of fieldwork and reporting along Congaree Creek, a number of both general and specific research topics had been recognized, some of which were explicitly formulated to guide archeological investigation in the area (e.g. Goodyear 1975a, 1975b, 1976, Wogaman, House, and Goodyear 1976:33-39).

Project research during the Southeastern Columbia Beltway investigations was directed toward two major problem domains: site-specific research, and intersite or regional analyses. The latter emphasized cultural ecological relationships and settlement/subsistence system reconstruction. These problem domains are interrelated, with research at each level in a reciprocating feedback cycle. This orientation follows Goodyear's (1975b:12) general research design for highway archeology in South Carolina.

Single site analysis consists of the "intensive reconstruction of past activities on individual project sites", to paraphrase Goodyear (1975b:12) slightly. The primary goal of this kind of analysis is determining the nature of past site use, with intra-site research focusing on cultural identification and chronology, component recognition, activity analysis, and site-specific ecological associations. Functional and spatial analyses at the artifact and feature level form the basis for developing general inferences and conclusions concerning site reconstruction.

Intersite analyses, focusing on the relationship of site content and site use patterns to specific environmental parameters, forms the basis for what Goodyear (1975b:12) describes as cultural ecological analysis. The primary goal of this form of research is identifying and explaining the relationships of site use within the local and regional ecosystem. This form of analysis is common within archeology today, and has been variously termed settlement archeology, settlement/subsistence system reconstruction, and/or cultural ecology (e.g. Chang 1968, Struever 1968, Vayda 1969).

THE RELATIONSHIP OF PROJECT RESEARCH TO PREVIOUS INVESTIGATIONS

A number of local reports documented research topics amenable to investigation during the Southeastern Columbia Beltway Project, and were used to guide the present research. Wogaman, House, and Goodyear (1976:33-39) proposed four general problem domains to guide research in the upper Congaree valley/Fall Line environment. The first of these problem domains focused on "Human ecology in a Fall Line/floodplain environment" (Wogaman, House, and Goodyear 1976:33-35), and stressed the need to document human adaptation in this relatively rare macro-ecotonal setting. Specific topics for investigation included documenting prehistoric settlement in relation to local microenvironmental variability, that is, within the Fall Line area, followed by a general comparison of the overall use of this area with contemporaneous aboriginal use of other regions, such as the Sea Islands, lower Coastal Plain, or Piedmont.

The second problem domain advanced by Wogaman, House, and Goodyear (1976:35-36) concerned "Prehistoric cultural identification and chronology". The development of a more precise understanding of artifact variation and associations over time was stressed, with recommended analytical procedures including the investigation of (a) stratified deposits, (b) horizontal spatial associations and, (c) absolute dating.

The third major Fall Line problem domain focused on "Variability in prehistoric site function" (Wogaman, House, and Goodyear 1976:36-38), as discussed in the preceeding section. Intersite assemblage comparison in particular was directed toward the resolution of "base camp" or "maintenance" activity patterning, as opposed to "special activity station" or "extractive" patterning (cf. Binford and Binford 1966). Subsumed under such an investigation was the need to control for differences in site size, chronology, and associated environmental parameters. Of specific concern was the need to document and explain the apparent occurrence of seemingly similar artifactual assemblages in different environmental zones, a pattern indicated for the Middle and Late Archaic in the immediate area. Sites of this period, with assemblages suggesting intensive habitation, were noted in both the higher terrace areas, and by the lower lying, tributary/swamp margins, and the hypothesis was raised that the patterning might reflect differing seasonal camps (Wogaman, House and Goodyear 1976:37).

The final research problem domain proposed by Wogaman, House, and Goodyear (1976:38-39) concerns "Prehistoric lithic resource procurement". The incidence and nature (i.e. debitage categories and tool use patterns) of lithic raw materials on Fall Line sites could be examined, it was argued, towards the resolution of patterns of interregional exchange and site functional variability. One specific area of research included the resolution of raw material selection preferences during different periods. Another suggested avenue of research concerned the investigation of raw material utilization patterns within a settlement system.

Following Gould (1974), it was suggested that extralocal raw materials might be more commonly expected at base settlements, with local raw materials used on an *ad hoc* basis at extraction sites.

The four problem domains advanced by Wogaman, House and Goodyear (1976) are general in nature and designed to guide research in the Fall Line area. A number of specific research questions have also been developed, that relate to archeological resources in the upper Congaree River valley, and within the Congaree Creek locality. Goodyear (1975a, 1976) has suggested that distinct shifts in settlement patterning occur over time within the Congaree Creek area, and his inferences are amenable to examination employing the Beltway data set. According to Goodyear (1976:8-11), Early Archaic settlement made little use of the sandhills area, concentrating instead along the river and tributary terrace margins. The Middle Archaic saw an expansion of settlement, with use of both uplands and floodplain environments. Late Archaic Thom's Creek/Stallings components in the area tend to be rare, with associated settlement patterning poorly understood. Woodland sites, in contrast, are common, particularly in the terrace and upland zones, while Mississippian settlement shows a near opposite patterning, focusing on the lower floodplain environment, possibly for farming in the overflow area.

Hypothetical models of prehistoric settlement patterning over time have also been developed at other Fall Line/inner coastal plain localities in recent years, and are available for comparison with the upper Congaree data. These syntheses, based largely on field survey and limited test excavation, examine prehistoric Fall Line settlement along the Savannah (Ferguson and Widmer 1976, Cable et al. 1978, Hanson, Most, and Anderson 1978), and Lynches rivers (Cable and Cantley, n.d.). The project data, therefore, is amenable to analysis in relation to a series of models of Fall Line settlement.

Michie (1979:19,20,50) has suggested that the procurement and use of specific lithic raw materials by Fall Line populations has tended to vary over time. Use of Coastal Plain cherts, and the thermal alteration of these cherts to facilitate knapping, is suggested as common during the Early Archaic. Middle Archaic populations, in contrast, almost exclusively employed quartz, while during the Late Archaic, slate and quartz were the common raw materials employed. Michie's (1979:50) observations are general in nature, and refer only to apparent trends. A range of lithic raw materials can be documented for each period; the hypothesized selection preferences can, however, be tested.

Ferguson (1976:10) has proposed a number of specific test implications for the identification of site variability, and the identification of the biotic resources exploited at sites in the upper Congaree River/Fall Line environment. Four site types are proposed: intensive habitation sites, less intensive habitation sites, biotic resource extraction stations, and lithic resource extraction stations. The presence of fire-cracked rock, midden, a wide variety of tools, high artifact density, and favored location is expected at intensive habitation sites. Extraction sites, in contrast, would be expected to exhibit a narrow range of tool forms, a comparatively low artifact density, and (possibly) less favored location. Lithic resource extraction stations would be characterized by a proximity to the sources, and numerous rejected materials. Biotic resource extraction stations, and specific target resources, would be identified by specific locational characteristics and associated tool assemblages. All of the biotic resource extraction sites would be characterized by a low artifact density, with only a few specific tool types present. Deer exploitation sites would be characterized by cutting tools in optimum deer habitats, while acorn and hickory nut exploitation would occur under these canopies, with stone plant processing tools present. Comparison of these hypothetical assemblages with the Beltway project data sets could suggest patterns of site use in the Congaree Creek locality.

A second settlement model, focusing on prehistoric site variability and function in the Piedmont of South Carolina, developed by John House and Albert Goodyear, has potential for application in the Fall Line area (House and Ballenger 1976, House and Wogaman 1978, Goodyear, Ackerly, and House n.d.). Under this model, Archaic sites exhibit an essentially dichotomous distribution, with structurally different site types occurring in upland (interriverine) and lowland (riverine/floodplain) areas:

"We propose a settlement pattern model for the Middle and Late Archaic involving spring and summer residence along major rivers; a move to seasonal base camps in upland creek valleys in September to take advantage of deer concentration in upland hardwood zones, with some exploitation of other resources as well; and then a return to riverine-located winter quarters with permanent houses in about December when the coldest weather arrived, the deer rutting season came to an end, and the acorn mast in the hardwood forests began to be exhausted (House and Ballenger 1976:117)." Archeological test implications of intensive habitation, as opposed to extractive activity, are provided under this model, and are similar to those noted by Ferguson (House and Ballenger 1978:10-11). The Piedmont settlement model, although developed for a somewhat different environmental setting, offers a framework for examining riverine and upland site use, environmental zones found in the Beltway project area.

SUMMARY OF OBJECTIVES AND STRATEGY

The Southeastern Columbia Beltway project was guided by, and directed toward, the general and specific research topics outlined in the previous section. Whenever possible, inferences, hypotheses, and models developed by previous investigators were explored. The focus of the 1978 fieldwork was at the site level, and directed toward the collection of representative information about the archeological record on each of the four sites endangered by the proposed construction. Dispersed surface and subsurface artifact samples were collected from each site, with an emphasis on the recovery of feature and subsistence remains. Assemblage content, spatial distribution, stratification, and post depositional modification were examined at each site, toward the resolution of patterns of prehistoric land use, component identification, and absolute and relative chronology.

Intrasite analyses included the functional analysis of individual stone tools, with an emphasis on resolving particular site activities (cf. Wilmsen 1970, Hayden 1979). The presence/absence, incidence, and relative proportions of tool and debitage categories were also examined, directed toward the resolution of patterns of prehistoric site use, and toward testing site functional models such as those proposed by Ferguson (1976), Wogaman, House and Goodyear (1976), and others. Typology, seriation, radiocarbon analyses, and distributional information were employed, where possible, in the resolution of components, activity areas, and chronology on the project sites.

Project ecological analyses were directed toward resolving patterns of, and explanations for, past human adaptation to the Fall Line environment. The four sites investigated during the 1978 data recovery program provided the first multisite excavation assemblage from the Fall Line in the South Carolina area, and offered an opportunity to initiate comparative analyses directed toward the resolution of past adaptational systems. Subsumed under this were tests of the site functional models proposed by Ferguson (1976) and House and Ballenger (1976). The four project sites included two within the lower creek/river floodplain and two within the sandhills. One extensive scatter and one small cluster were examined in each area, and it was hypothesized that the archeological assemblages from each zone might reflect different adaptational strategies. A major contribution of this report, it is believed, is the demonstration that prehistoric use of the two major environmental zones in the project area, the upland sandhills and the riverine floodplain, was considerably different throughout much of prehistory.

A third area of project research focused on lithic raw material identification, procurement, and use. Given the considerable ambiguity evident in the literature regarding the identification of lithic raw materials used on South Carolina archeological sites (Novick 1978, 1979), a number of samples were submitted to a geologist for thin sectioning and technical description. Aboriginal procurement systems were also examined, through comparison of the relative incidence of raw materials and reduction/manufacturing stages on individual project sites. Raw material selection preferences over time were examined, following inferences proposed by Michie (1979). Lithic raw material use by aboriginal populations was also examined through the study of functional associations, for example, by comparing tool edge angle and morphology against raw material type, to see if selection in this direction occurred.

Aboriginal subsistence systems formed another major area of project research, a topic which can also be subsumed under ecological analyses. Extensive use of flotation accompanied the fieldwork, in a successful effort to recover ethnobotanical remains. The examination of ethnobotanical data, coupled with functional analyses of associated material remains, was considered of value in the resolution of site use patterns. Test implications proposed by Ferguson (1976) were used to help document specific subsistence activities on project sites. The heavy commitment to ethnobotanical subsistence information recovery also yielded charcoal samples useful for absolute (radiocarbon) dating.

A final goal of the Southeastern Columbia Beltway Project was the effective documentation and description of each site assemblage. Extensive illustrative and descriptive data are included in this report, together with summary measures of each site assemblage. Metric attributes of all formal tools, frequency, weight, and distributional data on major artifact categories, and the results of specialized soils analyses have been placed in a separate 400 page appendix volume. The descriptive analysis reported here and documented in both volumes incorporates not only the 1978 assemblage, but all artifacts recovered during previous fieldwork on each of the four sites.

The purposes served by the extensive use of description are substantive and methodological. First, and most important, other investigators are provided with a clear picture of the cultural contents of these four Fall Line sites. Second, by detailing the total project assemblage, other researchers can see how the various analytical and interpretive conclusions were obtained. Effective documentation also permits additional analyses of the assemblage by researchers who may be unable to work directly with the collections. This report strives to meet the professional responsibility for documentation of analytical results.

RESEARCH ASSISTANCE

A large number of people participated in the preparation of this report. Project coordination, field direction, and much of the final writing were accomplished by David G. Anderson. Herbert L. Whittier and Judith A. Newkirk assisted in the direction of the fieldwork during the 1978 field season; the crew members included John Albers, Chevis D. Clark II, David A. Clark, and Brett Riggs. Sammy T. Lee served as project backhoe operator, and Dr. Donald R. Sutherland provided a light plane for an aerial overflight of the four sites. Several volunteers, all members of the Archeological Society of South Carolina, worked on the project over one or more days: Jimmy Beatty, William Monteith, Jeannie Metropol, and John Paquet. Members of the local professional archeological community who visited the site and offered advice and commentary included John S. Cable, Charles E. Cantley, Albert C. Goodyear, Andrea Novick, James Sexton, Robert L. Stephenson (State Archeologist), Donald R. Sutherland (SHPO archeologist), Richard L. Taylor, and Michael B. Trinkley, the S. C. Department of Highways and Public Transportation's staff archeologist.

Artifact washing and cataloging was initiated by all of the field crew members, and was completed after the close of fieldwork by Chris Franzen, Lisa Novick and Noreen Weston. Much of the actual sorting and measurement of the project artifacts was accomplished by Donald E. Weston. Specialized analyses included lithic raw material thin sectioning and descriptions by Dr. Gerald Baum of the College of Charleston's Department of Geology; soils description, particle size, and pH analyses by Dr. Michael Katuna, also of the Department of Geology at the College of Charleston; and a detailed ethnobotanical analysis of flotation samples from all of the aboriginal features by Suzanne E. Harris of the Southeast Missouri Archeological Research Center, Naylor, Missouri. Five radiocarbon age determinations, from aboriginal features at 38LX5, were processed by Charles Tucek of Radiocarbon LTD, Lampasas, Texas. Dr. Albert Sanders and Mr. Peter Coleman of the Charleston Museum, examined the minute traces of bone material recovered from the sites.

In the actual preparation of the text, John S. Cable prepared the environmental overview, Donald E. Weston wrote portions of ~~both~~ the artifact sorting criteria, ~~and the concluding intersite comparative summary,~~ Suzanne E. Harris prepared the section on the ethnobotanical analysis, and Gerald Baum and Michael Katuna wrote the technical thin sectioning and soils analysis procedures sections, respectively. The majority of the text was written and integrated by David G. Anderson. Drs. James E. Fitting and James W. Mueller provided managerial review throughout the project, and coordinated final production of the report with Commonwealth's graphic, editorial, and reproduction staffs.

A draft of this report was formally reviewed by Dr. Joffre L. Coe (Research Laboratories of Anthropology, University of North Carolina), Dr. Dan F. Morse (Arkansas Archeological Survey), Dr. Robert L. Stephenson (State Archeologist and Director, Institute of Archeology and Anthropology, University of South Carolina), and Mr. Michael B. Trinkley (South Carolina Department of Highways and Public Transportation). A number of other people read all or part of the manuscript and provided commentary, including Paul Brockington, Albert C. Goodyear, Wayne Neighbors, and Lee Novick. The time and commentary these reviewers provided helped to shape the final report, but it should be emphasized that the analyses, interpretations, and conclusions remain those of the authors.

Finally, Mr. Michael Trinkley and Mr. Robert Ferrell of the Environmental Section of the South Carolina Department of Highways and Public Transportation, the contracting agency, provided advice and assistance throughout the project. Mr. Trinkley, staff archeologist for the Environmental Section, visited the sites on a number of occasions while the project was underway, and helped appreciably with the fieldwork. Mr. Trinkley also provided valuable commentary during the analysis and report preparation activity.

THE SOUTHEASTERN COLUMBIA BELTWAY PROJECT IN RETROSPECT

The Southeastern Columbia Beltway Project, sponsored by the South Carolina Department of Highways and Public Transportation, represents one of the first major excavation reports from the Fall Line area of the state. The field and analysis notes, together with the photograph and artifact collections from each site, have been collated, cataloged, and placed on file at the Institute of Archeology and Anthropology at the University of South Carolina, Columbia, South Carolina. A copy of all notes, photographs, and the assemblage catalog has also been filed with the South Carolina Department of Highways and Public Transportation, Columbia, South Carolina. The collections from the Southeastern Columbia Beltway Project form a major, well documented addition to knowledge about the prehistory of central South Carolina. It is hoped that this report will prove of value in guiding future investigations in the area.

CHAPTER 2

ENVIRONMENTAL SETTING

INTRODUCTION

As Hole and Heizer (1972) comment, understanding the adaptive responses of past human populations to the environment has become a major sphere of study in archeology. Simultaneously monitoring variability in archeological remains and in the environment through time and over space provides archeologists with the opportunity to examine change and diversity in past human behavioral systems in light of correlated change and diversity within their surrounding environments. The highly diverse microenvironmental setting of the four sites selected for mitigation on the Southeastern Columbia Beltway Project set up an excellent opportunity not only to observe changes in human adaptive systems over time, but also to observe synchronic functional variability in these adaptive systems. 38LX5 and 38LX106 are situated high on the southern side of the Congaree Valley slope in an area known as the White Sandhills (Cooke 1936). The sandhills are typified by extremely xeric edaphic conditions (Braun 1950), which support a Jack pine-scrub oak vegetational community today. Therefore, it is expected that these sites will represent adaptive responses to a xeric, upland environment. 38LX64 and 38LX82, in contrast, are located on the broad alluvial floodplain of the Congaree River, which is characterized by lush and diverse bottomland hardwood and swamp plant associations. Consequently, these sites should reflect functions directed toward the utilization of this very different environmental setting.

This section describes the principal aspects of the Congaree River Valley environment that are known to have been important to past human occupants of the Southeast Beltway sites. Included here will be descriptions of the river and floodplain morphology of the Congaree, and of the sandhill upland environment. Additionally, a consideration of paleoenvironments will be presented, as a basis for studying diachronic changes in past human groups.

THE RIVER AND FLOODPLAIN ENVIRONMENT

The four project sites are situated within the upper Congaree River Valley just below the confluence of the Broad and Saluda Rivers near the city of Columbia, South Carolina. The Broad and Saluda Rivers are two of the major drainages of the South Carolina Piedmont, originating on the eastern slope of the Blue Ridge Mountains. Through most of their courses, the banks of the rivers tend to be heavily downcut and steep, with very minimal floodplain and terrace development. At Columbia, these rivers come together to form the Congaree River. The river channels in the general area of the confluence are characterized by a zone of rocky shoals demarcating the drop-off from the resistant crystalline substructure of the Piedmont into the unconsolidated sands of the Coastal Plain physiographic province. This transitional zone has been called the "Fall Line" (Cooke 1936, Fenneman 1938), a term generated to describe the line of falls and rock shoals that occurs along all of the major drainages of the Atlantic seaboard as they descend from the higher, more resistant substructure of the Piedmont into the softer structure of the interior Coastal Plain beach terraces.

Just below the Fall Line, where the Southeastern Beltway sites are located, the Congaree River Valley undergoes a dramatic change. The riverbeds themselves broaden and flatten as the softer substrate of the Coastal Plain permits the formation of an extensive floodplain due to lateral planation of the river channels (see Colquhoun 1969:8-15). As the rivers begin to meander and emigrate in this medium, the adjacent floodplain becomes structurally complex, being composed of remnant meander scars, oxbow lakes and point bar accretions. These formations are progressively filled in and covered by the sand and clay overbank deposits which are transported to the floodplain by cyclical flooding. From an ecological standpoint, floodplains and their accompanying valley slopes are viewed as extremely rich and diverse biotic environments (cf. Whittaker 1975), and it is in this context that the artifactual material from the Southeastern Beltway prehistoric sites can be interpreted.

The forests of the Congaree floodplain can be divided into three types: swamp, bottomland, and ridge bottoms. Swamp forests occur in areas of excessively wet soils that are saturated continually except in cases of severe drought. Waggoner (1975) describes the following dominant arboreal species from the virgin cypress-gum swamp of the Congaree River Valley: bald cypress (*Taxodium distichum*), tupelo gum (*Nyssa aquatica*), water oak (*Quercus nigra*), and planar tree (*Planera aquatica*). At present, this forest association appears to be restricted to the area immediately surrounding Congaree Creek. The hardwood bottoms are situated on land that is subjected to frequent overbank flooding and is generally saturated or exceedingly wet during the late winter and spring. Dennis (1967) identifies the following dominant species for the hardwood bottoms association in the Congaree River Valley: red gum (Eucalyptus gum), cottonwood (Populus heterophylla), white ash (Fraxinus americana), American elm (Ulmus americana), American sycamore (Platinus occidentalis), hackberry (Celtis occidentalis), water oak (Quercus nigra), willow oak (Q. phellos), river birch (Betula nigra), red maple (Acer rubrum) and silver maple (A. saccharinum). The excessively wet soils of the tributary/swamp adjacent to 38LX64 contain this type of plant community. Ridge bottom forests occur on well drained terraces and ridges that are only infrequently subjected to flooding or saturation. As a consequence, less moisture tolerant species such as hickories and oaks tend to dominate. Langley and Marter (1973) list the following dominant species in a ridge bottom forest association on the Savannah River: white oak (Quercus alba), black oak (Q velutina), swamp chestnut oak (Q. michauxii), willow oak (Q. phellous), water oak (Q. nigra), mockernut hickory (Caryz tomentosa), pignut hickory (Carya glabra), sweetgum (Liquidamber styracifula), yellow poplar (Lirlodendron tulipifera), persimmon (Diospyros virginiana), sourwood (Oxydendrum arboreum), dogwood (Cornus spp.) ash (Fraxinus spp.) and loblolly pine (Pinus echinata). Both 38LX64 and 38LX82 are located on well-drained to seasonally wet soils capable of supporting this type of forest association.

THE WHITE SANDHILLS UPLANDS

The White Sandhills comprise the valley slope and adjacent uplands of both sides of the Congaree River Valley. The sandhills are heavily dissected, approaching the topography of the Piedmont uplands. Braun (1950) indicates that the porous, unconsolidated structure of the sandhills represents the most xeric soil conditions in the entire Coastal Plain. The upland ridge top vegetational community is dominated by a variety of scrub oak species (Quercus laevis - turkey oak; Quercus marilandica - blackjack oak; Q. incana - bluejack oak; and Q. shellata var. margaretta - post oak) and long leaf pine (Pinus palustrus). Other species of pine including slash pine (P. elliotti), shortleaf pine (P. echinata) and loblolly pine (P. taeda) are also abundant. Sites 38LX5 and 38LX106 are located on the top and slopes, respectively, of upland ridge tops. Some of the driest ridge tops may lack second story tree development, although it does not appear to have been the case in the project area. In severe cases, bald spots may occur which can support only a few herbaceous xerophytes and wire grass (Aristida stricta).

In contrast to the xeric ridge top-soils of the sandhills, the soils of local drainage heads and stream basins are not highly permeable and consequently are generally moist. 38LX5 is located adjacent to a spring head and drainage that is characterized by the Johnston soil series (Lawrence 1976). This series is composed of a dark gray to black, moderately permeable sandy loam which supports a water-tolerant hardwood community composed of a number of large nut-producing oaks such as *Quercus falcata*.

PALEOENVIRONMENTS

Until recently, the vegetational history of the South Carolina Fall Line was largely unexplored. Statements about paleoenvironments had to be extrapolated from work performed elsewhere in the Coastal Plain, Piedmont and Blue Ridge Provinces throughout the southeastern Atlantic Coast (Watts 1971, Whitehead 1972, 1973). Watts (1979) has recently reported on the results of pollen coring at White Pond, in the sandhills near Elgin, South Carolina, however, providing direct insight into the vegetational history of the Fall Line area. His results are summarized below.

At 19,100 radiocarbon years before present, the vegetation of the midlands of South Carolina consisted of stands of jack-pine and spruce with sandhill and prairies in locally xeric situations where water table levels were low and the sandy soil matrix allowed for high moisture permeability. Watts surmises that this type of environment may have supported extinct megafauna. Hardwoods would have been confined to the bottomlands and seasonally or permanently wet drainages in the uplands.

Around 15,000 years BP, oak and hickory began to become more abundant in the uplands as it gradually replaced the jack-pine-spruce parkland. By 12,800 years BP, the parkland was almost fully replaced by a broad-leafed forest similar in composition to that found in the northern hardwood forests of western New York. Oak dominated the forest, with substantial proportions of hickory, beech, and ironwood. Watts suggests that as much as 30 percent of the forest cover at this time was contributed by beech and hickory. Thus, by 10,800 BC, the uplands and floodplain of the Congaree River were typified by closed canopy hardwood forest. Local climate was probably cooler and moister than at present.

At approximately 7500 BC, the diverse mesic forest described above had been replaced by a mixed forest dominated by oak and "southern pines." Watts attributes this change to a longer and warmer growing season and a generally drier climate. It is possible that the oak species represent drought resistant scrub forms, but this is uncertain. The appearance of swamp species in the pollen record (blackgum and sweet gum) suggests that swamps were forming at this time in coastal river floodplains.

Unfortunately, radiocarbon dates were not available for the secession after 7500 BC. However, the predominant trend is for the continuance of an oak-pine forest up until the present, with the proportion of pine increasing at the expense of oak.

As can be surmised from this brief overview, the post-Pleistocene vegetation of the study area has undergone a number of shifts and changes in plant community structure and species composition. Prior to 7500 BC, vegetational change was fairly rapid and dramatic. By 7500 BC, however, the environment was beginning to stabilize into the modern pattern, probably with scrub oak and pine dominating in the White Sandhills and closed canopy hardwood communities remaining in the more mesic bottomlands and swamps of the Congaree River floodplain and terrace formations. Thus, adaptation for most of the period of human occupation in the study area can be viewed as a response to a gradually drying climate where change in vegetation was slight and directional.