
Paul E. Brockington Jr.

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TEST PITS IN THE PIEDMONT: AN ARCHEOLOGICAL
SURVEY OF DUKE POWER COMPANY'S PROPOSED CATAMBA
TRANSMISSION LINES

by

Paul E. Brockington, Jr.
Research Manuscript Series 152

APPENDIX

THE ARCHEOLOGICAL TESTING PROGRAM AT SITE 38YK72

by

Veletta Canouts

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Prepared by the
INSTITUTE OF ARCHEOLOGY AND ANTHROPOLOGY
UNIVERSITY OF SOUTH CAROLINA
August, 1980
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Completion of this study project was made possible by the contributions and cooperation of many individuals. First, Mr. Robert A. Cloninger and Mr. Stan Berg of Duke Power Company assisted in many ways. They saved much project time by guiding us within the project areas, and they even served cheerfully as temporary archeological surveyors and test pit excavators.

Fieldwork was accomplished by the author, assisted by Ms. Claudia Wolfe, Mr. James O'Hara, and Mr. James Scurry. Laboratory cleaning, sorting, and analysis were also performed by these individuals. A number of the staff members of the Institute of Archeology and Anthropology also aided the successful completion of the project, including Mr. Darby Erd, illustrator, Mr. Gordon Brown, photographer, Mr. Kenneth Pinson, manuscript editor, Ms. Dorothy Alford, administrative assistant, and Dr. Robert L. Stephenson, Institute Director. All of these individuals are warmly thanked for their contributions.

A final word should be said about the enthusiastic cooperation of Duke Power Company in the performance of this archeological project. Although some private and public organizations and agencies are suspicious of those involved in various environmental impact review studies, and see themselves as, essentially, adversaries of the "environmentalists," this was certainly not true of Duke Power Company. All company individuals were very interested in the project and very cooperative. Detailed maps, aerial photos, and field assistance were generously supplied, aiding the project greatly. Duke Power even sent their own surveyors into the project areas to cut and mark overgrown areas so that we could be more efficient in locating our sample units. It was a welcome relief from the tedium of hacking our way through dense vegetation to come upon suddenly a recent cowbone hanging from a limb with a cryptic message inscribed: "Prehistoric Indian Joint."

All in all, Duke Power Company was concerned with protecting archeological sites and was helpful and cooperative in the accomplishment of this project. We congratulate them on their sense of responsibility and thank them for their cooperation.
ABSTRACT AND MANAGEMENT SUMMARY

Duke Power Company has proposed construction of two major electrical power transmission lines and three minor route changes for existing lines in York and Cherokee Counties, South Carolina. As part of the federally mandated consideration of the environmental impact of project construction, Duke Power Company contracted in August 1978 with the Institute of Archeology and Anthropology, University of South Carolina, to perform an inventory and assessment of cultural resources that may be impacted by the proposed construction.

Records were checked and field work completed by the Institute of Archeology and Anthropology in August of 1978. Although no archeological or historical sites were previously known for the areas under study, 27 prehistoric archeological sites were located during field work. Of these, 11 are located along the proposed right-of-way of the Catawba-Ripp transmission line, 15 are located within the proposed Catawba-Newport transmission line right-of-way, and 1 was located in a minor route change. The project areas and site locations are shown in Figs. 1, 2, and 3.

Analysis of artifacts and other data recovered was performed during the Fall of 1978 and the Spring of 1979. Assessments of the sites located were based on evaluations against criteria for inclusion in the National Register of Historic Places. Of the 27 sites located, 1 is recommended as eligible for the National Register, and 26 as not eligible (see Table 1). During December of 1979, the Institute conducted a three-day limited testing program at 38YK72 (Appendix). The site was mapped and surface and subsurface deposits sampled. These data provided estimates about the nature of the surface and subsurface artifact assemblages and information about the extractive activities that probably occurred there. With respect to this project, no further archeological work is recommended at the site.

The limited number of sites located, as well as the limited artifact inventories from each site, do not allow major substantive research contributions by the archeological project. Furthermore, detailed research studies beyond those necessary for adequate assessment of site significance are outside of the scope of work for this archeological project. The data recovered during this project, however, do confirm general patterns emerging from contemporary, larger scale, Piedmont archeological research projects (House and Ballenger 1976; Goodyear 1978, 1979; House and Woganman 1978; Taylor and Smith 1978; Brooks n.d.). In addition, data recovered will be curated in perpetuity at the Institute of Archeology and Anthropology and will be available for study by other scholars.

A methodological contribution was made by the present study in that the efficiency of several site discovery techniques for Piedmont archeological survey was evaluated, and recommendations for future survey studies made. By using a mixed strategy and by developing
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<tr>
<td>38YK59</td>
<td>Catawba-Pacolet Fold-in</td>
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<td>intensive controlled surface collection; small excavations at tower locations</td>
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*approximately between stations 227 & 50 and 234 & 00, and covering the entire width of the existing right-of-way.
detailed sampling methods and rigorous field control, baseline data on the cost-benefit of these survey techniques was obtained. These data should be useful in future management-oriented impact surveys, as well as in less applied research projects.
INTRODUCTION

Project Description

Duke Power Company is planning construction of two major, new electric transmission lines, as well as three minor route adjustments to existing lines, in York and Cherokee Counties, South Carolina. These transmission lines will provide for electric power distribution from, and to, the Catawba Nuclear generating station presently under construction in York County. Transmission lines are designated by their beginning and end points, and by the number of volts they normally carry.

The Catawba Nuclear-Ripp Switching Station 230 KV. line will run approximately 25 miles generally east-west from the Catawba Nuclear Station situated in eastern York County near Lake Wylie (Catawba River) to Ripp Switching Station in eastern Cherokee County (see Fig. 1). The Catawba-Ripp line will thus cross almost entirely interriverine uplands between the upper Catawba River and Broad River drainages. For the easternmost 4-5 miles the Catawba-Ripp line will parallel an existing transmission line; its remaining 20 miles will be over completely new ground. Moving west along the proposed line, the interriverine uplands become more hilly and generally rugged. More detailed physiographic data for the region are presented in a section below.

The Catawba Nuclear-Newport (East) (Newport B&W) 230 KV. line will extend approximately 5 miles in a general northeast to southwest direction from the Catawba Nuclear Station to Newport switching station (see Fig. 2). While this Catawba-Newport line also crosses primarily interriverine uplands, it is close to the Catawba River Valley and thus crosses several large tributary streams. This line parallels an existing line over its entire route.

Three minor route adjustments involving connection of existing lines to the Catawba Nuclear generating plant were also surveyed. These were proposed segments approximately one mile or less of the (1) Catawba-Allen 230 KV, (2) Catawba-Pacolet 230 KV, and (3) Catawba-Newport (Allison Creek B&W) 230 KV lines. These line segments are all located just west of the Catawba Nuclear plant (see Fig. 3).

Potential Impact to Archeological Sites

Construction and maintenance of these transmission lines may impact archeological and historical sites lying in their path. Potential impacts to archeological sites by transmission line construction have been discussed for this region by Brockington (1977).
FIGURE 1: Catawba Nuclear-Ripp Switching Station transmission line, showing archeological sites recorded.
FIGURE 2: Catawba Nuclear-Newport (East) transmission line, showing archeological sites recorded. Site numbers shown are all prefaced by "38YK."
FIGURE 3: Catawba Nuclear transmission lines, showing realignments or "fold-ins."
Impacts can be direct (primary) or indirect (secondary). Direct impacts occur usually during construction and include disturbances of ground by vegetation clearing, tower construction, and movement of heavy equipment. Equipment staging areas and worker facility areas should also be considered as potential impact zones. Indirect impacts usually occur after construction and over a longer period of time. Indirect impacts may include long-term erosions, vandalism due to increased access, maintenance construction, and future industrial, housing, or recreational development.

**Study Rationale**

The National Environmental Policy Act of 1969 mandates environmental impact review of Federally sponsored or licensed projects. Construction of the various transmission lines described above for this project is Federally regulated and thus must be reviewed for potential impact to archeological and historic sites. Review procedures for assessing and considering impact to archeological and historic sites are outlined by various rules and regulations promulgated under authority of the National Historic Preservation Act, Executive Order 11593, as well as the National Environmental Policy Act. In addition to Federal interest and consideration of archeological sites, the state of South Carolina, under its permitting authority, also considers impact to archeological sites in its decision to grant transmission line permits.

In compliance with these authorities Duke Power Company contracted with the Institute of Archeology and Anthropology (1) to assess the potential of the project areas for containing archeological sites, (2) to search existing records for evidence of historic or archeological sites that might be present in the project areas, (3) to conduct a field survey to discover and inventory archeological sites presently unknown, (4) to assess the significance in relation to National Register criteria of sites located, and (5) to develop a plan, if necessary, to mitigate any potential impact to sites recommended as significant.

Even though the goals of this archeological study were management-oriented (to solve problems and perform services for Duke Power Company), most archeological studies can also provide information of use to the community of research scholars. Care was taken in designing this study project so that contributions could be made to ongoing archeological research without any additional cost to Duke Power Company and without any diminution of the primary management oriented goals.

For most archeological survey projects adequate assessment of significance will provide descriptive and analytical data that in themselves contribute substantively to ongoing archeological research. Assessment of significance for this project, because of the nature of the archeological resources located, is based entirely on their potential for contribution to studies of history and prehistory. Several research problem domains for archeological studies in the South Carolina Piedmont
have been advanced in recent years (House and Ballenger 1976:145-150; Taylor and Smith 1978; House and Wogaman 1978). These are summarized in the section below describing survey methods. Evaluations of sites located in the project areas in terms of their potential contribution within these problem domains showed only one site to have significant potential. The descriptions and evaluations of the various sites, however, contribute important substantive information on the nature of archeological resources in the South Carolina Piedmont.

A major portion of the archeological research contracted for by Duke Power Company involved the development of a rigorous sampling strategy for site discovery to be executed during the fieldwork phase. This emphasis was selected for two important reasons.

First, such a strategy should allow the gathering of a representative sample of the archeological sites within the project area, reducing the time and cost of inventory activities without limiting (and perhaps increasing) assessment capabilities. In other words, if areas to be inspected were carefully chosen and inspection methods rigorously controlled, fewer areas would have to be inspected to predict site location and significance.

A second reason for developing a rigorous site discovery strategy was its usefulness for predicting time, cost, and recovery rates for future inventory and assessment projects in the Piedmont of North and South Carolina. Several other, similar, construction projects are under consideration by Duke Power Company for future development. The kinds of methods with the best cost-benefit ratio for archeological survey of those future projects need to be known. For example, should certain physiographic areas of high archeological probability be selected in the future? Are certain aspects of vegetation cover limiting for site discovery? Are test pits effective as a means of site discovery?

A mixture of site discovery methods was selected for use during fieldwork on the project. These methods were then field tested and evaluated against each other. In general it was found that rigorously developed sampling strategies for archeological survey in the North and South Carolina Piedmont are not advisable. Test excavations conducted for site discovery are not effective, except in very limited circumstances. What is effective for site discovery is close examination of the ground surface in unvegetated areas. Survey of highly vegetated areas, necessarily involving test pits for site discovery, has such high cost and low benefit that it is not advisable for general application in the Piedmont at this time. It may be necessary, however, for special, high-interest areas. Such high-interest areas may become known for a project through information gained from historical records research or from knowledgeable local persons. Such high-interest areas may also become known if future archeological studies succeed in correlating physiographic features with site locations.

Understanding the cost-effectiveness and biases of various survey methods in the Piedmont is a goal of archeologists both for pure research studies and for resource management studies. This project
has thus academic as well as management oriented interests. Similarly, success of studies of the correlation of site location and physiographic features in the Piedmont has both research significance and resource management importance. Recommendations are made in this report for directions that should be taken in future studies to increase the chances of success of these studies and gain better site location and significance predictability.
ENVIRONMENTAL BACKGROUND

Introduction

For especially the past two decades archeologists have been concerned with the mechanics involved in the evolution of cultural systems rather than simple description of technology and temporal placement. Increasingly, this research orientation has been manifested in studies of cultural adaptation to regional environments. From a natural environment viewpoint, these studies emphasize the gathering of an understanding of the number, kind, and distribution of animal, plant, and mineral resources available to earlier populations. Also important are the direct influences of climate, soils, and topography on part human groups. In this section, we will outline briefly the significant aspects of the Piedmont environment in terms of available natural resources, physiography, and climate.

Archeologists are also interested in environmental processes because these processes affect the formation of sites and their alteration through time. Certain kinds of climatic activity will affect vegetation patterns, affecting (indirectly) depositional and erosive patterns. Sites might thus be covered over and preserved or eroded away and destroyed. Changes in ground water levels, for example, could act to preserve or deteriorate archeological features such as firehearths or specimens such as bone.

Probably the most significant disturbing factor in the Piedmont has been the erosion of the uplands and the concomitant sedimentation of the stream valleys in historic times. These processes are associated with original European-African settlement in the 18th and 19th centuries. Extensive timberlands were cleared and farmed with very poor soil conservation practices. The result was severe erosion of upland areas and destruction of many sites there. Archeological sites in the stream and river valleys were often covered with several feet of this upland-derived material and are now extremely difficult to locate and to study.

Present Environment of the Project Area

The project area lies within the Piedmont Province as defined by Fenneman (1938). The Piedmont Province is an area of narrow river valleys and broad interriverine zones deeply dissected by numerous small streams and intermittent drainages. Elevations near the project area range from about 550 feet in the stream valleys to 850 feet above sea level on the ridge tops. Rocks of the area include mostly gneiss, schists, argillite, and granite. Other rocks are represented in minor quantities, including veins of quartz exploitable by prehistoric human groups.
Soils in the project area have been grouped into several distinct associations; these are, for the most part, deep, well-drained, sandy and silty loams with clay subsoils (United States Department of Agriculture 1967). These soils have a high erosion potential and have in the past been subject to significant erosion. Soils are generally moderate to high in fertility and are suited to cotton, corn, grain and legume agriculture.

The watershed area is today dominated by a mixed pine-hardwood forest, although the potential dominant vegetation of the area is oak-hickory forest, with some mixing of pine (Shelford 1963). A great variety of herbaceous plants is also present, especially in recently cleared or disturbed areas.

Fauna in the watershed area include most species of eastern mammals, birds, and reptiles (Shelford 1963). Trout were once abundant in streams and rivers of the area, as were perch, bass, catfish and others.

The project area has a generally mild climate with a mean annual temperature of 62°F. The average growing season is 221 days, with annual precipitation of 44.8 inches (United States Department of Agriculture 1967).

In general, the present environment of the project area is rich in resources exploitable by prehistoric and historic groups. Useful stone is available for prehistoric tool manufacture and for historic building. The oak-hickory forest present in prehistoric times produced a variety of wild plant resources, including, especially, nuts and acorns, although herbaceous plants, berries, and seeds were also probably intensively exploited for food by early groups. Soils are conducive to agriculture both by late prehistoric and historic Indian groups and by early European settlers and later peoples. Fauna were probably abundant in the area in prehistoric and early historic times; most important were probably deer, raccoon, beaver, bear, rabbit, fox, squirrel, turkey and various species of fish. Fur bearing mammals were important for their hides as well as their food value, and animal bones were probably frequently fashioned into tools by prehistoric groups.

*Past Environments*

The general picture of the environment of the project area indicates resources and constraints present today and in the recent past. Climatic change over the last 25,000 years, however, has been shown to have occurred, and to have resulted in environments significantly different than that of the present day (Watts 1971; Whitehead 1973; Carbone 1974). Following, in general, Olafson (1971) and Bryson, Baerreis, and Wendlund (1970), 4 major climatic episodes can be defined for the Southeast covering the last 25,000 years.
These are (1) the full-glacial from 23,000 to 13,000 B.C., (2) the late-glacial from 13,000 to 8,000 B.C., (3) the post-glacial from 8,000 to 3,000 B.C., and (4) the recent period from 3,000 B.C. to the present.

During the full-glacial period temperatures were much lower than today, especially in winter, with relatively more precipitation. Vegetation in the project area was probably more boreal, with pine, spruce, and fir species dominant, although there appear to have been open areas within the forest with extensive herbaceous growth. Faunal biomass was probably considerably lower than today.

The late-glacial episode shows evidence for a shift from a boreal forest type to a general northern hardwood forest. Oak and hickory were dominant by the end of the period. Pleistocene megafauna became extinct during this episode and present day faunal communities began to dominate.

From about 8,000 to 3,000 B.C., oak-hickory forests reached their maximum development in the Piedmont. Higher temperature and lower precipitation than today are hypothesized to characterize this period, but data from the Southeast in particular are lacking. Present-day faunal communities became dominant early in this episode.

The recent climatic episode is hypothesized to be characterized by a general increase in precipitation and decrease in temperature. It is also thought to have witnessed a general shrinkage in oak-hickory forest and a resultant slight loss of floral and faunal resource productivity, especially in the Piedmont uplands.

This brief summary of environmental variables and their changes through time provides a basis for correlation with changes in the demographic, settlement, and subsistence patterns of human groups occupying the project region. Such correlations represent attempts to look for causes of social and economic change in human populations and to analyze and understand general evolutionary processes. Of particular importance at the present time is the understanding of hypothesized differential utilization, with shifts through time, of the major environmental zones of the South Carolina Piedmont: the riverine and inter-riverine regions. These questions will be addressed in more detail in the following section.
PREHISTORIC AND HISTORIC BACKGROUND

Prehistory

Earliest evidence of human occupation of the Piedmont region indicates that man was present by at least 10,000 B.C. (Williams and Stoltman 1965; Michie 1977). The environment during this late glacial period would have been more boreal than today, with pine forest dominant and a much lower biomass available for human exploitation. Indications are that the general Piedmont area was sparsely occupied during this time (Michie 1977).

Beginning soon after transition to the post-glacial period, human occupation of the Piedmont became more intense, especially in the inter-riverine zone where recent archeological studies have been accomplished (House and Ballenger 1976; Goodyear 1978; Taylor and Smith 1978; Kelly 1972). Sites from this period appear to be primarily small, hunting and gathering camps in the uplands. Their appearance coincides with the trend toward dominance of oak-hickory forest in the region. In addition, most sites in this general climatic period seem to fall in the hypothesized maximum oak-hickory expansion of 5,000 to 3,000 B.C.

Sites dating after 3,000 B.C., in the recent climatic period, are fewer in number and appear to be restricted more to the major river valleys within the Piedmont. It is thought that during this period there is a general trend toward increasing sedentism, larger populations, and more labor intensive food producing strategies, including, after about A.D. 500, increasing reliance on corn agriculture (Coe 1964).

The detailed development and testing of these generalized patterns depend on future problem-oriented research in the region. Presentation of such generalized hypotheses, however, allows the development of preliminary criteria of site significance and the formulation of a basic fieldwork and analytic plan.

A general cultural-historical sequence has been formulated for prehistoric eastern North America (Griffin 1967). This general sequence has been refined and developed in more detail for the southeastern Piedmont by Coe (1964), Phelps (1964) and Wauchope (1966). Table 2, following Coe (1964) and others, presents this basic sequence as it might be expected to occur in the project area along with brief descriptions of general characteristics. Current research has focused not so much on further refinement of this cultural sequence as on determining the settlement-subsistence systems operative, particularly the nature of exploitation of the interriverside Piedmont during the long Archaic period (House and Ballenger 1976; Goodyear 1978; Taylor and Smith 1978; Cable, Cantley and Sexton 1978; Brooks n.d.; House and Wogaman 1978).
### TABLE 2

Archeological Sequence Expected in the Project Area  
(after Coe 1964 and Keel 1976)

<table>
<thead>
<tr>
<th>Date</th>
<th>Period</th>
<th>Phase</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.D. 1900</td>
<td></td>
<td></td>
<td>Replacement by European-American homesteads and farms</td>
</tr>
<tr>
<td>A.D. 1820</td>
<td>Euro-American</td>
<td>Protohistoric</td>
<td>Europeanization of native technology, economy and settlement patterns</td>
</tr>
<tr>
<td>A.D. 1650</td>
<td>Mississippian</td>
<td></td>
<td>Distinctive stone tools; distinctive pottery; sedentary villages; platform mounds; maize, beans, squash agriculture with hunting and gathering.</td>
</tr>
<tr>
<td>A.D. 1000</td>
<td></td>
<td></td>
<td>Uwharrie</td>
</tr>
<tr>
<td>A.D. 300</td>
<td>Woodland</td>
<td></td>
<td>Yadkin</td>
</tr>
<tr>
<td>200 B.C.</td>
<td></td>
<td></td>
<td>Badin</td>
</tr>
<tr>
<td>800 B.C.</td>
<td></td>
<td></td>
<td>Otarre</td>
</tr>
<tr>
<td></td>
<td>Savannah River</td>
<td></td>
<td>River</td>
</tr>
<tr>
<td>2000 B.C.</td>
<td>Archaic</td>
<td></td>
<td>Guilford Morrow Mountain</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Stanly Kirk Palmer Hardaway</td>
</tr>
<tr>
<td>10000 B.C.</td>
<td>Paleo-Indian</td>
<td></td>
<td>Clovis</td>
</tr>
</tbody>
</table>
House and Ballenger (1976: 84-87) postulate three different extractive strategies that may have been operative in the interriverine Piedmont during the Archaic. These include fall-winter deer hunting and nut collecting (both in the upland hardwood forest), and fishing and plant gathering (along stream bottomlands). House and Ballenger also hypothesize that the stream bottoms may have been used as base camps for extractive journeys into the uplands in search of deer and nuts in the fall and winter. In addition, House and Ballenger (1976: 117) see a general movement of people, during the Middle and Late Archaic especially, out of the interriverine zone during the late winter, spring, and summer to residences along major rivers to take advantage of migratory fish and floodplain plant resources. Further research has generally upheld this basic settlement-subsistence model, although data are meager, especially for the Early Archaic (Goodyear 1978; Taylor and Smith 1978; Cable, Cantley and Sexton 1978; Brooks n.d.; House and Wogaman 1978).

Data concerning Woodland and Mississippian period occupation of the Piedmont are sparse. Present indications are, however, that resource extraction continued in the interriverine zone, probably concentrated in the fall and early winter, although base camps were restricted to the major river valleys (House and Ballenger 1976; Goodyear 1978; Taylor and Smith 1978; Kelly 1972). During the Woodland and Mississippian periods there was apparently a trend toward increasing sedentism, larger population, and more labor intensive exploitation of the floodplains of major rivers.

It may be noted that, in postulating general Piedmont settlement-subsistence systems for the Archaic, researchers suffer from a lack of good data concerning occupation of major river valleys. Most research has focused on the interriverine zone, and recent work in river valleys has not been reported in detail (see Taylor and Smith 1978; Brockington 1977). In addition, general survey data from major river valleys are most probably biased because of difficulty in detecting the probably deeply-buried archeological sites there. This problem will be discussed in more detail in a later section.

**Ethnohistory**

The Ethnographic period refers to the time between first contacts and influence of Europeans and the ultimate destruction or removal of native Indian groups. In the South Carolina Piedmont the Ethnographic period generally extends from the sixteenth century through the nineteenth century. The major Indian group near the project area was the Catawba Nation. Detailed ethnohistoric studies of the Catawba have been recently presented by Brown (1966) and Baker (1975).

Earliest contact by Europeans with the Catawba may have been by the DeSoto expedition in 1540. The DeSoto chronicles describe, in particular, the Province of Cofitachiqui (Swanton 1952), apparently
a thriving, pristine Mississippian society. There is evidence that Cofitachiqui was located on the upper Wateree-Catawba River, just south of the project area (Baker 1975). Indian groups of the area were also contacted by the Spanish Juan Pardo expedition in 1566 and 1567 (Brown 1966; Baker 1975). After this, contact was apparently at a minimum for about 100 years when trade began to develop with Europeans operating out of Virginia, and later, South Carolina. An early account of the Indians of the South Carolina Piedmont is presented by Lawson (1952) in his diary of travels during 1700-1701. Speck (1946) presents an account of Catawba hunting, fishing and trapping techniques based on his interviews with elderly informants in the early twentieth century.

As detailed by Brown (1966), the Catawba Nation has a complex history of trading, wars, alliances and amalgamation with other groups. Most of these groups were Souchan-speaking, and the Catawba were thus set apart from the more numerous Iroquoian-speaking Cherokee to the northwest and the Muskogean groups to the south and west. Early accounts generally indicate that the South Carolina Piedmont, except for the Catawba and several smaller groups, was sparsely occupied during most of the Ethnohistoric period, and was reserved as communal hunting territory for the groups inhabiting its margins and perhaps several of the major river valleys.

Early European History

Trade in deer and other skins provided the first continuing contact by Europeans with Indian groups of the South Carolina Piedmont. This trade began early in the eighteenth century and, although there was early competition with traders from Virginia, Charleston soon dominated. By the mid-1700's, the value of deerskin exports from Charleston exceeded all other exports and provided enormous profits (Brown 1966: 109). Such trade necessarily put strong pressure on traditional economic pursuits of Indian groups and may have led to dramatic changes in their economy, demography and social organization. Through the early 1700's most Carolina traders came from Charleston by way of Congaree Fort near present-day Columbia, then eastward up the Wateree-Catawba system. No early trading centers near the proposed transmission lines are known.

European settlement of the central Piedmont area began in the 1730's along major rivers. The first settlement near the project area was at present-day Camden. These early settlers included farmers, merchants, craftspeople, and Indian traders. A major influx of settlers into the Piedmont began in the late 1750's as Scotch-Irish refugees moved into the area from settlements in Virginia and Pennsylvania because of attacks by Indians there during the French and Indian War (Oliphant 1964: 125). Scotch-Irish farms became dominant in the area by the late 1700's. Their major cash crop was tobacco, which was shipped overland to merchants in Virginia.
The introduction of new varieties of cotton and the development of the cotton gin at the end of the eighteenth century had dramatic effects on the economy of the Piedmont. Cotton agriculture was extremely productive and large areas of Piedmont forest were cleared for the first time. The plantation system became dominant over the family farm, emphasis on cotton replaced that on tobacco and diversified farming, and large numbers of African slaves were imported into the region (Oliphant 1964: 216-217; McMaster 1946: 36-37).

This cotton agriculture system was ecologically disastrous and self-destructive (Oliphant 1964: 216-217; Trimble 1974). Massive forest clearing and poorly designed tillage and conservation methods soon caused severe soil depletion and erosion. Cotton profits were so large, however, that plantation owners were able to make up for this loss by greatly expanding their holdings and their operations, first in adjacent lands in the Carolina Piedmont and then by wholesale migrations in the mid-1800's to new lands to the west, particularly Mississippi. Even though yields and profits continued to decline, new owners, sharecroppers, and tenant farmers were locked into the cotton system because of extremely low prices of other crops. Not until the first quarter of the twentieth century, with increased prices for legume crops, cattle and livestock and timber, and with the increased importance of manufacturing, did the cotton monoculture system change. The Piedmont today has a low population density and consists mostly of forest regrowth, pine plantations and scattered patches of farmland and pasture.

Impacts to Archaeology of Historic Land Use

The cotton agricultural system employed in the Piedmont in the nineteenth and early twentieth centuries resulted in tremendous erosion (see Trimble 1974). Cotton was planted in rows generally running down slopes to obtain better drainage necessary because of the clay substrate underlying the top 8-10 inches of soil. The heavy and sudden rains characteristic of the South Carolina Piedmont resulted after just a few years in complete loss of soil and formation of large gullies on the gentle hillslopes. Investment in terracing and contour farming was not profitable because of the high value of cotton in relation to the low value of land during the early 1800's. In addition, other crops, such as legumes which could have reduced erosion and allowed replenishing of soil nutrients brought such low prices that it was not economical to plant them. It was more profitable to farm an area intensively until the soil was exhausted or eroded and then buy, clear and plant new land. Abandoned land continued to erode.

Erosion of upland soils quickly clogged the streams and rivers of the Piedmont with large sediment loads. Large rainstorms quickly produced great runoff and major flooding occurred. This flooding, combined with direct hillslope erosion, covered the rich soils of the stream and river bottoms with up to several feet of silt with low productivity. Increased sediment loads caused the streams and rivers of
the Piedmont to aggrade, aggravating the flooding problem and causing a dramatic rise in the water table in stream valleys. Swamps were created in many of these stream valleys. Figure 4, after Trimble (1974), shows this development in a typical Piedmont stream valley.

The erosion of the uplands and sedimentation of the streams and river bottoms had dramatic effects not only on the agricultural productivity of the region as discussed in the preceding section, but also on the archeological record. This archeological record had been preserved in the soil for at least 10,000 years with minimal disturbance. During the 1800's, however, upland erosion dislocated and deflated artifacts and destroyed features indicative of past construction and other activities. Sedimentation of stream bottomlands covered over archeological deposits with up to several feet of silt and slopewash. While this sedimentation blanket may protect archeological deposits, it biases our understanding of them because it makes sites extremely difficult to detect, or to study if discovered.

Changes in agricultural practices and a shift to livestock and timber production as well as manufacturing have greatly decreased erosion in the Piedmont since the early 1900's and the region is recovering economically. The damage, however, and biases introduced to the archeological record cannot be changed. It is incumbent upon the archeologist, therefore, to search for areas within the Piedmont where erosion was not so dramatic and where effects on the archeological record are minimal. Such minimally affected areas, and the archeological sites within them, are thus extremely significant in understanding the cultural heritage of the region.
**STUDY METHODS**

**Research Design**

The research design for this study project was determined in large part by the management-oriented goals of (1) discovery and location of all or of a representative sample of the cultural resources present, and (2) assessment of the significance of these resources. Descriptive and analytical data recovered and produced in such a location and evaluation study would be of direct use to those involved in ongoing archeological research.

Although some archeological sites may derive significance because of their association with historically important persons, events, or movements, or because they exhibit unique styles of craftsmanship or architecture, evaluation of significance of most sites involves assessment of their potential contribution to ongoing research about past cultural systems. House and Ballenger (1976: 145-150) have recently suggested several research problem areas for which data from South Carolina Piedmont archeological sites are needed. These problem domains cover most archeological research questions in the region and pertain directly to the project areas under study here. They are summarized and discussed below.

**Culture-History**

Deep, stratified sites would be very useful in refining the prehistoric sequence established by Coe (1964) and others for the region. Such sites are probably most likely to occur in large river valleys because of periodic flooding and deposition, although smaller stream valleys could also yield stratified sites. Non-stratified sites with potential for independent dating (e.g., with charcoal for radiocarbon analysis) would also be significant for culture-history questions. Sites with large samples of stylistically diagnostic artifacts may be dated indirectly (e.g., through seriation studies) and may contribute importantly to our understanding of the range of variability of stylistic variables.

**Activity Analysis**

Previous research in the Carolina Piedmont (House and Ballenger 1976) has shown that many prehistoric sites exhibit artifact patterning indicative of past activities performed there. To attempt reconstructions and comparisons of past cultural systems, detailed knowledge is necessary of the range and character of prehistoric activities.
Lithic Procurement and Technology

Understanding stone utilization and procurement forms a basis for exploring many other questions because of the relationship, in non-metal using societies, between lithic technology and other basic economic and social variables. Sites with a large number of stone tools and manufacturing waste could contribute greatly within this problem domain.

Settlement-Subsistence Patterns

Individual sites can contribute to our knowledge of the functional differentiation of settlements hypothesized especially for the Archaic prehistoric period in the Piedmont. Activity analysis, in combination with direct subsistence data (bones, seeds, pollen) and information inferred because of site location near exploitable natural resources, can lead to an understanding of the character and variability through time of broad settlement-subistence patterns.

Adaptational Change and Anthropological Theory

Most of human existence of the last several million years is represented by adaptations involving hunting and gathering of natural, wild resources. Hunting and gathering groups existing today are limited in number and live in "marginal" environments, e.g., deserts, tropical forests, ice-covered areas. Archeological evidence indicates that modern hunting and gathering groups do not exhibit the range of economic, social, and ideological complexity of hunters and gatherers existing in the past in highly productive temperate forests. Detailed study of environmental diversity and change within the temperate forest habitat, in combination with further detailed study of human adaptations in the form of settlement-subistence patterning and social, political, and ideological organization, may lead to solutions to cultural evolutionary research problems of world-wide significance. Certain sites, or series of sites, may contain data crucial to understanding the processes involved in broad economic, social, and ideological transitions.

Historical Archeology

South (1977) has recently argued for more consideration of patterns in the study of historical sites and has called attention to the potential of historical sites for reconstructing past lifeways and for investigating evolutionary processes operating on historic populations. Such potential research is illustrated by Lewis (1976) in his use of historical period archeological data near Camden, South Carolina, to test aspects of a "frontier model" of expansion of British colonial society. An additional scientific problem domain in historical archeology is indicated by Carrillo (1976; n.d.) in his demonstration of potential correlation between refuse disposal patterns and ethnic identification at several eighteenth-nineteenth century house sites in South Carolina.
Refinement of Survey Methodology

Detailed study of certain sites may be justified by what it can tell us of the adequacy of survey methods. Survey information on the character and distribution of sites can itself make a substantive contribution, as long as such information is shown by more detailed studies to be representative.

The above problem domains will be used to evaluate the significance of sites located in the project areas. Thus, the problem domains form the basis for the research design by asking a variety of relatively specific questions about the sites, the data they contain, the environmental data they are related to, and the methods used to discover them.

Archival and Library Research

The first phase in the study project involved library and records research to identify presently known and recorded data and to estimate, in general, the potential for archeological and historic sites. The State Site Inventory files, maintained by the Institute of Archeology and Anthropology, were checked first. No sites were recorded for the project areas, although several sites were on file for York and Cherokee Counties. Contact with the staff of the South Carolina State Historic Preservation Officer indicated that no sites within or near the project areas were on, or under consideration for, the National Register of Historic Places.

The potential for discovering presently unknown sites was judged, however, to be high. Small prehistoric campsites are commonly found in areas of the Piedmont similar to the project areas (see House and Ballenger 1976; Taylor and Smith 1978; Goodyear 1978). The actual density, topographical distribution, and degree of preservation, however, could not be estimated for these potential sites. Field survey was necessary.

Library research also indicated that it would probably be difficult to locate sites in much of the project area. Dense ground surface cover, in the form of forest, scrub, and grass, was predominant in areas to be surveyed, with plowed fields and other open areas at a minimum. Previous Piedmont survey under such low surface visibility conditions had relied on exploratory excavation of small test pits over wide areas in an attempt to locate sites. This approach has produced mixed results. House and Ballenger (1976) and Taylor and Smith (1978) reported that relatively few sites were located by exploratory sub-surface test pits. Sites have been found with this approach, however, especially on small survey projects where test pits have been closely spaced (see, for example, Brockington 1978).
This test pit approach, however, has not been systematically evaluated as a discovery technique. Taylor and Smith (1978) abandoned initial attempts to use discovery test pits in surveying Russell Reservoir because of the low productivity in relation to the time and labor cost. Much of the cost for Taylor and Smith, however, was due to logistics problems relating to the accurate on-the-ground location and mapping of the test pits so that their distribution would conform to the sampling plan designed. Such logistics problems may not be great in surveys of the systematic, linear project areas represented by transmission lines.

House and Ballenger (1976) also used systematically placed test pits in their survey of the proposed Interstate 77 highway corridor. Again, the location and mapping of the test pits themselves was a high cost, and the approach resulted in few sites being discovered. House and Ballenger spaced their test pits widely and used relatively few of them. This could be seen to increase their logistics problems in the field relative to the discovery potential.

Library research thus indicated problems with using test pits to discover the typically low artifact density sites of the Piedmont. Review of previous large scale studies, however, left unresolved the efficiency of the approach if logistics-related costs could be reduced. Such cost reductions might generally be possible when working within long, narrow corridors typical of transmission line projects. In addition, library research indicated few recommended alternatives to the test pit approach for vegetated areas. Systematic clearing of small areas using a rake to remove surface vegetation has been attempted, but with largely unproductive results (Glen Hanson, personal communication; Pat Garrow, personal communication). Large scale Piedmont survey projects have relied primarily on inspection of small, eroded dirt roads or timbered areas and the relatively few cultivated fields that may be present in a survey area (Goodyear 1978; Taylor and Smith 1978; House and Ballenger 1976).

Such reliance on open areas, however, poses severe problems for environmental impact related archeological survey projects because of the typical small size and arbitrary boundaries of the projects. The areas actually inspected may often be too limited to assess adequately the archeological resources that may be present. In addition, it becomes extremely difficult to conduct problem oriented research and make meaningful substantive contributions with reliance on such a discovery approach because of the difficulties of fitting such open areas into a scientifically meaningful sampling plan.

The following section represents an attempt to overcome some of these sampling problems, while maintaining a rigorous and meaningful overall plan. The sampling design was also developed specifically to allow evaluation of the efficiency of the discovery test pit approach in comparison with other methods.
Sampling Plan

The overall plan structuring the sampling was to provide a mixed strategy of surface observation and exploratory test pits to meet the goals of (1) providing for adequate survey coverage, (2) substantive research results, and (3) methodological evaluation. Test pits would be used under tightly controlled conditions so that their cost-benefit as a discovery technique could be carefully evaluated. It was also decided to attempt to minimize the cost of the test pit approach as much as possible while maintaining a system of numerous, closely spaced pits.

A one-day reconnaissance of the project areas and inspection of aerial photos provided by Duke Power Company were very useful in designing the sampling plan. These early investigations allowed us to estimate ground cover conditions in different parts of the project area.

Ground surface visibility was highest for the Catawba-Newport East (Newport B&W) and the 3 short "fold-ins," Catawba-Allen, Catawba-Pacolet, and Catawba-Newport (Allison Creek B&W). This surface visibility was primarily the result of small patches of eroded areas associated with the existing transmission lines paralleling the proposed routes. These small eroded patches were most often the result of highway roadcuts across the project corridor and of small dirt access roads built within the existing corridors for maintenance purposes. Several small plowed areas existed within the project corridors in addition. The total percentage of ground surface that was visible for inspection was difficult to estimate accurately, but probably represented 7-10% of the project area.

Ground surface visibility was very low, however, for the Catawba-Ripp line. There were no plowed fields intercepted over its entire 25 mile route, and open areas without heavy grass or forest were very limited. Visible ground surface over the route was estimated to be less than 1% of the Catawba-Ripp project area.

It was noted during the short reconnaissance of the project areas that few, if any, areas of mature forest existed. The area was dominated by scrub forest, thick undergrowth, and dense pasture grass. These conditions would make difficult or impossible the use of a raking approach to clear leaf and needle mold and examine the ground surface.

It was decided to use opportunistic surface inspection to survey the Catawba-Newport East (Newport B&W) line and the three short fold-ins. A team of 2 surveyors would walk over the corridor (of variable width, but usually 100 feet) searching for areas where the surface of the ground was visible. These areas would then be carefully examined for artifacts. If artifacts could be found, they would all be collected and the site's size, shape, and artifact density recorded. A test pit would be excavated to record subsurface deposits and stratigraphy. Notes would also be taken on the environmental conditions at the site.
For the Catawba-Ripp line, surface observation would also be used whenever possible, but, because of the limited nature of surface visibility, the main emphasis would be on exploratory test pits. To be successful, such test pits would have to be numerous and relatively closely spaced. The test pit approach, however, is relatively labor intensive, and thus costly as a survey technique. Such a high cost makes sampling of the area necessary. With the use of a sampling plan with enough rigor to provide a representative estimate of the entire area, logistics problems greatly increase because of the difficulty of traversing the area, accurately measuring distance traveled, and finding the test pit location designated by the sampling plan. The need is thus for a sampling plan that can be quickly and easily implemented in the field while maintaining enough rigor to produce a scientifically adequate sample.

Correlation of site location with environmental features is not well developed in Piedmont archaeology. Certain environmental features only, such as hilltops, for example, could not be selected and surveyed intensively. All environmental settings would have to be included within the sample. For an adequate sample, these microenvironments should be selected in proportion to their total presence within the project area.

Such a strategy, however, is not without difficulty. It is very difficult to characterize interriverine Piedmont microenvironments. Ideal types, such as hilltop, valley bottom, and hillslope slope can be described, but on-the-ground breaks between these types are difficult to make. The situation becomes even more complex when attempting to include finer, but perhaps more meaningful types such as ridgetop, ridgenose, ridgeslopes, bluff, knoll, saddle (see Taylor and Smith 1978: 163). To implement a sampling strategy based on such a typology, features within a large area surrounding the project corridors would have to be typed, their proportions estimated, and then these proportions used in selecting microenvironments for study within the corridor.

After examining topographic maps of the project region and attempting to type landforms, it was decided that such a system was too subjective to be meaningful. We had no confidence in the utility of most of our distinctions, for example, among ridgetop, ridgenose, and saddle. Furthermore, it was felt that these distinctions would be even more difficult to make in the field, especially as the project corridor may intercept the landform types in a variety of different ways. Such difficulty in the field would also compound logistics problems involved in using the test pit approach to site discovery.

It was therefore decided to divide the project corridor for the Catawba-Ripp line into a number of logistically manageable units, take environmental data on these units, stratify the population of units on the basis of this data, and then sample within each stratum. It was thought that a 15-20% sample of the project area would be of sufficient size to recover an adequate sample of sites and their value ranges for ecological and cultural variables. That size sample should also be sufficient to test the usefulness of the test pit approach. If the
The approach was judged extremely useful, perhaps additional sampling or complete survey would be warranted. If the approach was judged to be relatively useless, perhaps another form of survey would be indicated.

Our procedure was as follows. We divided the 24.49 mile long corridor into 258 segments each 500 feet long. English system measures were used rather than metric so as to fit with topographic survey information recorded for the corridor by Duke Power Company. The corridor and the unit segments were drawn on U.S.G.S. 7.5 minute quadrangle maps for the project area, and environmental data were recorded for each unit. The variable list for each unit was as follows:

- **Study unit identification number.** A sequential number from 1 to 258. Engineering survey station numbers, used by Duke Power Company, were also recorded. These station numbers were obtained from detailed plan and profile drawings prepared by Duke Power Company.

- **Major drainage.** The major river drainage within which the study unit occurred, either the Catawba River or Broad River.

- **Major soil unit.** Four broad soil associations were mapped for the region by The Soil Conservation Service, U.S. Department of Agriculture.

- **Present vegetation.** Forested or non-forested.

- **Direction of slope facing.** East, northeast, north, etc.

- **Change in elevation along the corridor centerline.** The difference in feet between the beginning and end points of each 500-foot long study unit.

- **Change in elevation perpendicular to the corridor centerline.** Elevation change in feet, measured perpendicular to the corridor centerline, for 250 feet on each side of the study unit's midpoint.

- **Distance from unit midpoint to nearest water.** Measured in feet to nearest permanent stream or spring.

- **Number of streams within 1/2 mile.**

- **Number of streams within 1 mile.**

- **Distance to major river (Catawba or Broad), in miles.**

- **Elevation above sea level of unit midpoint.**
Using available U.S.G.S. quadrangle maps, as well as aerial photos and plan and profile drawings provided by Duke Power Company, values for these variables were recorded for each study unit. These were then keypunched and standard histograms produced for each variable. These histograms were carefully examined for obvious distribution breaks that could indicate points for sample stratification. No major breaks were observed. The variables with 2 or more qualitative states showed relatively smooth distributions. These distributions were not normal, however, but were skewed to various degrees as expected.

The next set of experiments involved inspections of distributions and sample statistics for groups of study units. The study units were grouped according to their values for a certain variable, and then these groups were compared in terms of their values on all the other variables. For example, the study units were divided into 2 groups, one within the Broad River Drainage and one within the Catawba River Drainage. These two groups were then compared for their values on all the other variables. Each of our study unit variables was analyzed in this manner.

The purpose of this analysis was to gain a subjective understanding of the interrelationships of the variables measured. More objective statistical methods, e.g., chi-square analysis, analysis of variance, correlation analysis, were not considered appropriate or very useful. First, we did not have a detailed understanding of the meaning of each variable and, in some cases, were unsure of the reliability of our measurements. Second, detailed statistical tests and analyses assumed certain distribution characteristics such as normality. Although transformations could perhaps have helped in meeting these assumptions, we were hesitant to manipulate such a limited data set so heavily. Third, our mixture of nominal, ordinal, interval, and ratio data would not have allowed statistical comparisons even in the best of conditions.

Comparisons of groups of study units did not produce any outstanding insights. Several of the variables were obviously interrelated, e.g., number of streams within 1/2 and 1 mile, while others appeared to be independent, e.g., slope direction. In general, we were able to conclude that there were no major differences among any of the study unit groups we created, e.g., between east facing and west facing slopes, for the variables we were measuring. We noticed that the Broad River drainage (to the west of the study area) was generally more rugged, with greater elevation changes within study units, and with greater percentage of forest cover.

As this preliminary analysis provided no real clues as to how to stratify our population of study units, we selected, based on intuitive grounds only, measures of elevation change within study units as our major stratifying variable. The reasoning behind this was that, in the absence of other indications, degree of slope was felt to have perhaps been the major variable for site selection by prehistoric groups. Water was generally available throughout the project area, reducing its probable importance as a site selection factor. Soil types, while probably very important in site selection because of the vegetation control, and thus
faunal control, they exert, were extremely difficult to measure for our study units. We had little confidence in their accuracy. Attempts to use broad soil groups for our analysis were not rewarding because of the limited variability of these over the project area. In addition, we had little confidence in the ability of present-day soil types to indicate prehistoric soil types for this heavily eroded area.

We first divided our study units into 2 groups: those in the Broad River drainage and those in the Catawba River drainage. This was done to increase our overall sample dispersion in accordance, particularly, with our management-oriented goals and the general distinction we had noticed in ruggedness between the two drainages.

Within each of these groups we first added together, for each study unit, the values of Change in Elevation Along Corridor Centerline and Change in Elevation Perpendicular to Corridor Centerline. This sum was interpreted by us as a general measure of the amount of slope in each study unit. Lower sums would indicate more "flatness" and higher sums more slope within each unit. In general, we expected to find archeological sites associated with "flatness".

We next divided the Broad and Catawba drainage groups into subgroups based on increments of 10 feet in the above sum. For example, 0-9 feet, 10-19 feet, 20-29 feet, etc., of total slope defined the subgroups of study units. A 20% random sample was then drawn from each subgroup. Because all fractions were evaluated as the next highest whole number, we ended up with a 26.7% total sample, 69 of the total 258 study units.

For each of these 69 study units selected we planned to excavate 6 exploratory test pits, each 30 cm square. These test pits would be placed on the corridor centerline exactly 100 feet apart. All the dirt fill of each pit would be carefully examined with a small hand trowel for the presence of artifacts. In addition, notes on the vegetation, soil, degree and direction of slope, and other environmental features would be recorded for each study unit.

This method of exploratory test pitting allowed us to locate study units by survey station numbers marked on wooden stakes by Duke Power Company engineers. Duke Power Company aided us tremendously by sending their survey engineers back into the field ahead of our party to locate precisely our study units within the corridor and to re-stake and re-mark them as necessary. We planned to locate a study unit, excavate a test pit at its origin, move 100 feet along the corridor and excavate a second test pit. We would continue this spacing until we reached the end of the study unit and excavated our sixth test pit. When 2 study units occurred together, the last test pit of one would serve also as the first test pit of the other.

This method would allow us to map exactly the locations of all our test pits, while at the same time would keep logistics problems to a minimum. Of course, our efficiency was greatly increased by the resurveying performed by Duke Power Company, as well as by the accompaniment at all times in the field by Duke Power Company staff familiar with the area.
In addition to test pits excavated in this manner, we planned to excavate others in order to test areas perceived in the field as having high potential. Also, we planned to examine carefully any cleared or plowed areas we discovered while surveying the corridor. Several possibly open areas were recorded from study of aerial photos, and these were listed as places to check for surface examination.

Fieldwork

Fieldwork proceeded almost exactly according to plan. A total of 8 working days with a four-person crew was necessary to complete the designed survey. In addition, a one-day reconnaissance preceded the survey, and one day of photography and test pit excavation at selected sites was spent after completion of the field survey.

Actual field procedures did not deviate from those detailed in our research design. Three days were spent examining the short "fold-in" transmission line segments and the Catawba-Newport (East) line. Sixteen sites were found in these proposed right-of-way, all of which were discovered in eroded or cultivated areas. Intensive collections were made at these sites, in an attempt to gather all artifacts observable. For all sites, however, ground cover restricted visibility, and prevented complete collection. Even though the collections are probably incomplete, we are confident that as representative sample as possible was collected. In addition, we are confident that no large or high-artifact-density sites were missed along the proposed Catawba-Newport (East) line, or the Catawba-Allen, Catawba-Pacolet, and Catawba-Newport (Allison Creek B&W) realignment segments. Small eroded areas, dirt access roads, and patches of cultivation were numerous and relatively closely spaced over the corridors. We do not recommend further discovery-related survey for these lines.

Five working days with a four-person crew were spent in surveying the proposed Catawba-Ripp line. This involved excavation as planned of 393 test pits, each 30 cm square, for the 69 study units selected for our initial sampling. In addition, we carefully examined the entire corridor for areas in cultivation, eroded areas, and other areas of surface visibility. These open areas were very limited within the proposed corridor, but contained all 11 sites found. Not a single artifact was encountered in any of the 393 test pits, even when a "surface" site was present nearby. These results were very disappointing and force us to reconsider the utility of such an approach for general Piedmont survey. It is highly probably that many sites are present in the corridor but simply could not be located by us.

Even though subsurface testing was ineffective, we do not feel that complete reliance on surface examination was adequate for this proposed corridor, or will be adequate for future projects in the region with similar ground cover conditions. New procedures must be developed. Possible alternatives are discussed in a concluding section of this report.
Laboratory work on the artifacts and other data recorded during the field survey was carried out intermittently during the Fall of 1978 and the Spring of 1978. Artifacts were cleaned, sorted, and catalogued, and prepared for permanent curation. Site records were completed and placed on file, and photography and drafting were accomplished as necessary for completion of permanent curation requirements and for use in the analysis and report preparation. Detailed comparisons of artifacts recovered were made with those from other collections and with those discussed and illustrated in archeological research literature concerning the region. Significance assessments for the sites were made on the basis of this study, and a plan was developed to mitigate impact to the one significant site located and to the undiscovered sites that may exist in the Catawba-Ripp corridor. Site descriptive data, significance assessments, and recommendations are presented in the following section.
RESULTS AND RECOMMENDATIONS

Site Data and Assessments

All of the 27 sites located during the field survey were discovered in unvegetated areas, and all artifacts collected were found on the ground surface. In general, the sites were monotonously similar, most consisting of a few quartz or slate flakes and fewer bifacial/unifacial tools (if these latter were present at all). All but one of the 27 sites were located in severely eroded areas, with no preservation of archeological deposits. The one exception, 38YK72, has suffered moderate erosion in some areas, but has potential for containing subsurface deposits. Its size and its preservation from complete erosion make it an exceptional site for the interriverine Piedmont.

Table 3 presents data concerning the 27 sites located during the study project. The sites can be classified into 3 major categories: (1) small scatters of flakes, and perhaps a few tools, with no artifacts present that are diagnostic of cultural-historical periods, (2) small scatters of flakes and a few tools, one or several of which are diagnostic of a cultural-historical period, and (3) larger, more dense flake and tool scatters.

Of the 27 sites found in the study areas, 15 contained no artifacts diagnostic of a defined cultural-historical period. These sites were small, and only one contained more than 17 total artifacts. All 15 of these sites are located in badly eroded areas with no archeological deposits preserved. The effects of past agriculture, timbering, and other disturbances on these sites has been so great as to limit greatly their research potential. No further work is recommended at any of these sites and none of them is recommended as eligible for the National Register.

Sites with artifacts diagnostic of particular cultural-historical periods have more research value because, as a group, they can provide data on changes through time in demography, technology, and settlement-subistence patterns. Twelve sites with at least one temporally diagnostic artifact were found. Of these, 9 were small and contained fewer than 25 total artifacts. All of these 9 are located in severely eroded and disturbed areas and suffer the same limits on research potential as described above for the undiagnostic sites. Data already collected from these 9 sites may have utility for future synthetic studies of Piedmont archeology, but gathering of additional field data would not be cost-effective, and no further work is recommended. These 9 sites are recommended as not eligible for the National Register.

Three sites located during the survey contained significantly larger numbers of artifacts, indicating great intensity of occupation
and perhaps better preservation of the archeological deposits. Two of the 3 sites, 38YK60 and 38YK61, are located on opposite bluffs overlooking Big Allison Creek (now part of Lake Wylie) (see Figure 5). While both of these sites produced large artifact collections, and 38YK61 contained artifacts representative of Early, Middle and Late Archaic subperiods, both sites are severely eroded and disturbed. No soil remains at either site, probably as a result of intensive cotton agriculture in the 19th and early 20th centuries. While erosion has now been checked, the effects of previous agriculture, timbering, and soil movement greatly limit further investigation potential. Artifact collections already recovered constitute a sample for future study of the sites; additional investigation would add only limited information. No further work is recommended for 38YK60 or 38YK61, and neither is recommended as eligible for the National Register.

One site, 38YK72, is recommended as eligible for the National Register on the basis of its potential to yield important information. 38YK72 is located on a broad terrace and slope overlooking Little Allison Creek to the west; it covers approximately 15,000 square meters of a large soybean field (see Figure 6). The site is unique among those discovered in this study project in that it still has soil present on its surface; this characteristic is rare for interriverine Piedmont sites. Test pits excavated at the site indicated that sub-plow zone deposits may remain at least partially intact. Thus, features may be present. At the very least, horizontal stratification (differential placement over the surface) is probably not greatly disturbed, allowing for isolation of temporal components and activity areas and comparisons of these among themselves and with other sites.

Site 38YK72 has the potential for answering questions within several of the problem domains listed above as determining the overall research design. These problem domains are culture-history, activity analysis, lithic procurement and technology, settlement-subistence patterns, and adaptational change. The multiple components (temporal) present, the moderate artifact density, and, above all, the preservation at the site, all contribute to the evaluation of high research potential for 38YK72. A plan to mitigate effects of transmission line construction to the site is presented in the section below.

Recommendations

Mitigation of Impact to 38YK72

Construction of the Catawba-Newport (East) 230 KV. transmission line will not totally destroy site 38YK72, even if the most destructive construction procedures were to be followed. Duke Power Company can take steps to reduce this impact further. If towers supporting the transmission lines can be placed outside the site, and heavy machinery routed so as to avoid passing over the site, impact will be minimal. Long-term, indirect impacts to the site should not be a problem. The
FIGURE 5. View of proposed Catawba-Newport (East) transmission line corridor, facing south. Tower and line construction will be in existing corridor to the east (left) of the two transmission lines shown. Site 38YK60 is in foreground, and site 38YK61 is on top of bluff across Big Allison Creek (now Lake Wylie).
FIGURE 6. View of 38BK72 facing southwest. Site covers a large area presently under cultivation on a terrace and slope overlooking Little Allison Creek.
site is already cleared and is maintained as an agricultural field. Vandalism, erosion, and new construction should be limited because of the farmer's interest in the site area.

Location of towers to avoid 38YK72 may be impossible, however, because of the necessity for an angle, or turn, in the transmission line near the site. In the event tower construction and some heavy equipment movement cannot avoid the site a five-point study program to recover data is recommended to mitigate their effects:

1. Prepare a detailed topographic map of the site area, especially showing its relation to Little Allison Creek to the west.

2. Conduct an intensive, systematic surface collection of the site area to evaluate presence and preservation of historical stratigraphy.

3. Conduct small, limited excavations at proposed tower locations to recover data that would be lost during construction.

4. Perform a detailed study of the data recovered.

5. Make available a report of the study to interested researchers.

Such a study program should not be time-consuming or expensive. A two-person crew could complete a detailed topographic map in 2-3 days, including drafting time. Intensive, systematic surface collection would take a crew of four persons 1-2 days. This surface collection should be done in a period of maximum surface visibility at the site, e.g., after agricultural disk ing and a heavy rain, but before grass, weeds, or crops begin to grow. Small excavations at tower locations should take a crew of 4 about 1 week. Study of data recovered and preparation of a research report should involve 1-2 persons for about 1 month.

Consideration of Undiscovered Sites along the Ripp Corridor

Although no significant archeological sites were found in the proposed Catawba-Ripp corridor, it is expected that many sites exist there which could not be discovered because of dense vegetation and the inadequacy of current archeological survey methods for such situations. Additional survey under present ground cover conditions is not recommended. It is extremely doubtful if such additional survey, because of its necessary reliance on small, scattered test pits to penetrate the vegetation cover, would result in the discovery of any additional sites.

Numerous small prehistoric sites are expected to still exist in the corridor, but because of their limited size and artifact content,
and especially their generally poor preservation, few would probably have enough research significance to qualify them for the National Register. On the other hand, the small amount of data from each of these numerous sites contributes to a pool of information concerning a large area.

Such a pool of information usually results from a survey project with the scope of the present study and provides important data concerning general patterns within a region. This pool of information can be construed to provide for mitigation of impact to the numerous, small sites that may be destroyed as a result of a construction project. It is unfortunate that such a pool of information did not emerge from the present study. Few sites were located, and, because of our lack of confidence in discovery methods, we are uncertain as to the representativeness of this small sample. Thus, substantive contributions to research by the survey project itself are very limited.

It may be possible, however, to solve this problem and, in doing so, test an approach to solving more general problems involved with methods of archeological survey in the Piedmont. Duke Power Company, in constructing the transmission line, will proceed in 3 major steps: (1) forest clearing, (2) disking and seeding the right-of-way with erosion-preventing grass, and (3) tower construction and line placement. Ideal conditions for observation of surface artifacts would occur after disking and before growth of grass cover and tower construction. There will, of course, be impact to the presently unknown archeological sites in the corridor by the forest clearing and disking, but no other feasible means exists for their discovery.

An examination of the corridor after disking would have several great benefits. First, probably all of the sites, rather than just a small, unrepresentative sample, would be recorded. This should allow much progress to be made toward development of a predictive model for site location in the interriverine Piedmont. In addition, it should provide data for a definitive evaluation of survey methods in the Piedmont—archeologists will see for the first time exactly what they are missing by relying on opportunistic surface inspection and test pitting.

Larger collections of artifacts from each site should result from inspection of the freshly disked corridor, allowing for better estimates of the original artifact density and site size. Larger and more representative artifact samples will also give archeologists better information on the range of technology of manufacture and use of stone tools and other implements; such samples could possibly allow better characterization and understanding of the more usual, small, and probably unrepresentative artifact samples.

Recording sites within the disked corridor and collecting artifact samples from them would also have the benefit of providing after-the-fact mitigation of impact to the corridor as a whole. Data recovered would be available to researchers working on a variety of archeological
problems. No other approach could provide such data.

Recording of sites within the disked corridor would also have the very useful benefit of allowing more detailed assessment of the destructive impact to archeological sites in the interriverine Piedmont of transmission corridor clearing and disked. Although a great amount of impact is currently assumed, such may not be the case. The intensive cultivation, severe erosion, and prior timbering episodes over most of the interriverine Piedmont may have so disturbed archeological sites present that construction of transmission lines has little further impact. If this is so, future archeological impact survey for transmission lines might concentrate on proposed tower locations as being the only areas of further impact.

For these reasons it is recommended that the Catawba-Ripp corridor be examined for archeological sites immediately after disked. Such a project should not involve extensive time or cost. A crew of 4 persons should be able to walk the corridor and record data in less than 2 weeks. As impact to any sites recorded would have already occurred, there would be no strict schedule necessary for study of the materials and preparation of a report. Such a report, however, should be prepared within a reasonable time to provide the results to those persons attempting related projects. As a follow-up to the present study, such a report would provide unique and much-needed data for those involved in management of Piedmont archeological sites, as well as for scholars interested in studies of the prehistory of the region.

Considerations for Future Archeological Surveys of Transmission Line Corridors in the Interverine Piedmont

Given the nature of archeological sites in the interriverine Piedmont, i.e., small, with low artifact density, the history of destructive land use practices, and the present heavy vegetation cover over much of the region, it is very difficult to locate sites during archeological impact surveys. Archeologists are in a poor position to predict locations of sites because of inadequate samples from previous studies. Research strategies are also greatly limited by these inadequate samples, and conclusions based on such data may be specious.

Another problem, especially for archeologists involved in culture resource management studies, is the lack of follow-up studies for projects that are not totally destructive of the resources. Archeological studies are usually done in advance of construction, with no monitoring during construction or follow-up inspections after construction. Although such an approach is definitely necessary and may be the only approach feasible for certain totally destructive projects, archeologists should be aware that a more flexible procedure may provide additional, much needed data, especially for projects where impact is not total. One data set that should emerge from the addition of monitoring and/or follow-up phases to a project is that concerning more detailed assessment of construction
and maintenance impacts to the archeological resources. Such assessments may allow for much more efficiency in future projects, as well as provide for a flexible and long-term management of the resources remaining after project construction is complete. Benefits of such monitoring and follow-up study phases also accrue to more problem-oriented archeological research because of the additional data that would be generated.

To allow for and to justify properly such monitoring and follow-up studies, archeologists, government regulators, and development agencies and industries may need to become more flexible in their interpretation of what constitutes adequate survey coverage, what should be the unit of significance assessment, and especially, what may constitute mitigation. The 3-step procedure of inventory, assessment, and data recovery (mitigation) in advance of construction may be too limited to accomplish the goal of adequate historic preservation. Monitoring and follow-up studies may be necessary for such preservation, and perhaps should be thought of as mitigating measures themselves. Emphasis on the site as the unit of study for assessment of significance and development of data recovery plans may not be appropriate for all areas or projects. An alternative would be development of mitigation plans based on the overall potential of the impact area. Actual data recovery could then be accomplished before, during, and after construction.

In view of the above comments a program for survey of future transmission line projects in the Piedmont is presented below. First, existing archeological site inventories, archives, and local libraries should be consulted to locate known sites and areas of high potential or interest. If possible, predictions of sites and high interest areas should be made based on topographic features and their established correlation with known archeological sites. Attempts should be made to contact local persons who are artifact collectors, amateur historians, or who otherwise may help in the location of sites. Such contact may include personal interviews, requests for assistance through the media, or presentations to local organizations. A second phase would involve identification of areas where surface visibility is good and a high survey efficiency would be possible. This identification should be made through study of detailed maps and aerial photos, a brief reconnaissance of the area, and, perhaps, an overflight.

A third phase would involve actual field survey of selected areas. Those areas with high surface visibility would be inspected, and areas of high interest or site potential would be tested, probably with subsurface excavations. A fourth phase would involve study of data collected and preparation of an interim management-oriented report. Such a report would assess sites known by that time, as well as additional project area potential, and recommend mitigation measures as necessary. Mitigation measures, if necessary, would require additional phases involving excavation/data recovery, monitoring and additional site recording during construction, follow-up studies after construction, and preparation of a final project report.
Of great interest in Piedmont transmission line studies is the potential of monitoring and follow-up studies for providing after-the-fact mitigation as well as useful information for future research projects. If significance can be construed as applying to the potential, undiscovered sites in a project area, then the only feasible mitigation of construction impact to this resource potential is, in many cases, through monitoring and follow-up studies.

The addition of monitoring and follow-up study phases to an archeological impact project should actually reduce the overall project cost. Each phase would be more efficient in that it would be targeted toward activities with a highly favorable cost-benefit ratio. Trudging through the forest, blindly excavating subsurface test pits in highly eroded areas, as was done in the present project, would be eliminated. In addition to eliminating such unproductive activity and thereby increasing efficiency, monitoring and follow-up studies should greatly increase the available data with a minimum effort. This would act also to increase the project efficiency.

The greatest benefit to adding monitoring and follow-up studies to archeological surveys in the Piedmont would be the long term increase in the archeological data base. Perhaps no other approach offers a way out of the problems of inadequate samples now faced by archeologists studying the prehistory of the region.
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APPENDIX

THE ARCHEOLOGICAL TESTING PROGRAM
at Site 38YK72

by

Veletta Canoute
In order to begin to document the impact of transmission line construction on archeological sites, the Institute of Archeology and Anthropology conducted a limited testing program for three days in December of 1979 after tower construction had been completed. Twenty-five one-meter square collection units were randomly located within the transmission line right-of-way, north of Tower #27. Five of the units were then excavated to sterile soil. A discussion of the testing program follows. With respect to the Catawba-Newport transmission line project, no further archeological work is recommended at this site.

Methodological Problems

Because the site was only cursorily collected on the initial survey and not formally tested, it is not possible to quantify, or even qualify with any reasonable certainty, the condition of the present artifactual materials and their distributions relative to their condition and distribution prior to tower placement. This information is necessary in order to understand and recognize those changes actually attributable to the short-term, direct impact of transmission line construction.

The construction variables may be reconstructed with some degree of confidence. The four tower pods were sunk to a depth of eight feet. The crane used to set the tower was transported on wide, balloon tires. After construction, the area around the excavation was smoothed and planted with millet to control erosion. Andrew Cloninger furnished this information and ventured to guess that these activities occurred during a dry period in the fall of 1978. Briefly, the site would seem to have been affected by surface disturbance due to machine traffic, perhaps some compression due to heavy loads (although wide, balloon tires would tend to equalize this pressure), disturbance of artifacts lying in the first 20 cm below the surface during construction of the tower pods, and the possible collection of diagnostic artifacts by crew members.

Impact to archeological sites by transmission line construction has been described as limited and minor relative to other developmental projects. Intensive collection and post-holing or small-scale excavation are believed to provide adequate means for sampling the information potential of Piedmont surface sites and for satisfying mitigative requirements in most cases (Brockington 1977a: 4,7). However, before the results of such sampling strategies can be substantiated, better information about the data potential of the sites before (and after) project impact is required. Two problem areas are extremely important: lateral displacement of artifacts and the relationship of surface to subsurface materials.
The site of 38YK72 was first recorded in August of 1978 during an archeological survey for Duke Power's Catawba Nuclear-Newport (East) 230 kV transmission line. Situated on a slight rise, 30 m north of an intermittent drainage and 150 m east of Little Allison Creek, the site yielded a wide variety of lithic tool forms and raw materials. At least six temporal components have been defined through diagnostic bifaces and the presence of pottery. Paul Brockington identified Guilford, Savannah River, Otarre, and Woodland affiliations. Veletta Canouts and William Marquardt from the Institute of Archeology and Anthropology, accompanied by Andrew Cloninger from the Duke Power Company, visited the site in November of 1979 and recovered a Palmer basal fragment from an earlier Archaic component. A Morrow Mountain biface was recovered from the site during the testing phase in December of 1979.

The site locational data from the survey show that archeological materials occur commonly on top of ridge systems that parallel the higher ranked drainages or creeks in the Piedmont. Although Site 38YK72 is but one of many occurrences, it has a higher density and greater variety of materials than other sites located in the transmission line corridor. In addition, the archeological record at this locus apparently has a greater integrity than many Piedmont sites since the topsoil has not been eroded away completely.

Because of the density of Archaic materials relative to other inter-riverine Piedmont sites, the presence of a later ceramic component which might signal features, and limited soil disturbance which might permit observations of artifact associations, the site was considered potentially eligible for nomination to the National Register of Historic Places. In the event that the proposed construction could not avoid the site, Brockington recommended a five-point study program to document the site more fully. Because this site was the only one selected for testing, it assumes a unique significance relative to understanding the archeological record of the area.

No archeological testing ensued prior to the construction of a transmission tower at the southern edge of the site area in the fall of 1979. Up to that point, site disturbance had been confined to the cultivation of soybeans and probably some indirect impact, in the form of vehicular and pedestrian traffic, from the construction of two transmission lines on the western boundary of the site, nearer Little Allison Creek. Some studies of the effects of plow disturbance on archeological materials have been undertaken recently (e.g., Talmage et al. 1977; Roper 1976). They reach the conclusion that although materials are mixed and dragged laterally, their relative positions, that is artifact concentrations and associations, appear to reflect the original site patterning. Few, if any, such studies have been undertaken to record the impact of transmission line construction on archeological sites.
Latf1"al Displacement

Artifact assemblages of surface sites situated in the Piedmont have been displaced laterally by deforestation, cultivation, and soil erosion, to mention a few agents. What then is the data potential of these sites prior to project impact? For example, 38YK72 has been plowed and is still under cultivation. As mentioned earlier, studies have begun to ask questions about the effects of discing in dragging and breaking artifacts. But to interpolate information from these general studies to conditions at a particular site in the South Carolina Piedmont is very questionable. More studies are needed in order to contend with regional and local variability with reference to soil type, type of cultivation, type of machinery, length of cultivation, etc. (James Michie, personal communication).

To address this problem at Site 38YK72, a portion of the site needed to be disced and materials plotted before and after discing. For purposes of comparison, a similarly controlled experiment to measure vehicular and pedestrian traffic on a site should be conducted, preferably just prior to tower construction elsewhere in this or a similar area. Unfortunately, poor weather conditions stayed plowing at 38YK72, and these data still need to be collected and quantified in other testing programs.

Relationship of Surface to Subsurface Materials

The investigation of mixed deposits may be better considered with respect to the relationship between surface and subsurface deposits. Leaving aside until later the issue of in situ archeological deposits, the first question addressed is whether the composition of the surface assemblage is an accurate representation of the subsurface assemblage and the total assemblage. The next question to follow is whether the surface patterning, with reference to density, artifact associations, and spatial isolates, reflects the subsurface patterning. This question bears directly on feature or provenience data from undisturbed subsurface deposits.

These are important questions that relate to the amount of information that can be retrieved from surface data. Subsurface testing is a very labor intensive proposition. The degree to which it is to be employed depends upon the nature of the site, the research problem under investigation, and in cultural resource management studies, the effects of project impact on the site. The latter is of major concern in this study.

Investigations into these relationships are just beginning in the South Carolina Piedmont and elsewhere. The I-77 investigations offer a starting point (House and Ballenger 1976; House and Wogaman 1978). In a preliminary testing phase, Winthrop College students
under the direction of Veletta Canouts (1976) excavated Site 38YK25A and there made an attempt to identify and deal with the horizontal and vertical vectors of disturbance. Preliminary results indicated a close correspondence between the content of the surface and subsurface assemblages — that is, a similar range and proportion of artifacts. Furthermore, the area of greatest artifact concentration on the surface also turned out to have the greatest amount of subsurface materials.

A more thorough testing program was initiated at the Windy Ridge site, 38FA118 (House and Wogaman 1978). This study suggests that there is indeed spatial patterning in subsurface deposits that have been disturbed. In this case, disturbance was limited to a possible tree fall and plowing which took place 30 to 40 years ago. An intact sandy loam zone was discovered below the plow zone and above the subsoil (House and Wogaman 1978: 36).

Although the investigations were conducted in two stages, to attempt to maximize the potential for isolating activity sets, the time constraints did not allow the analysis interval needed to recognize distributional patterns. The Stage I and Stage II results produced some information on sampling biases, however. For example, Morrow Mountain bifaces seemed to cluster in Stage I but in opening the Stage II block excavation outside the cluster area, a high number of Morrow Mountain bifaces was recovered. The suggestion is that both data sets may indicate a concentration of bifaces further east, a "tip of the iceberg" effect (House and Wogaman 1978: 122).

As interesting as these results are, they cannot be related back to a controlled surface collection, especially a plowed surface. Contour maps of controlled surface collections of plowed sites have produced spatial patterns (see Goodyear 1975: 18-19). But few studies have compared surface and subsurface data. Many such studies are needed before a generalizing (quantifiable) stage is reached in which the surface occurrences will help predict subsurface occurrences (see Goodyear 1975 for a discussion outlining long-term investigation and integration of information retrieved from discrete sites).

If it should be ascertained that transmission line construction and maintenance activities do not cause very severe impact and if disturbance factors can be controlled and surface data relied upon to indicate the nature of the subsurface remains, the extent of archaeological testing (or mitigation) can be circumscribed. Surface data are more readily accessible both in survey reconnaissance and intensive survey.
FIELD STRATEGY

The Institute of Archeology and Anthropology planned a three-day testing program for Site 38YK72. Under the direction of Veletta Canouts, assisted by Michael Harmon from the Institute and Andrew Cloninger and Stan Berg from Duke Power, field investigations were conducted from December 19 through December 21, 1979. A total of 70 person hours was spent in the field, mapping the site and sampling the surface and subsurface deposits.

The site of 38YK72 is located on a second rank drainage, Little Allison Creek which now flows into Lake Wylie, an artificial lake produced by the Wylie Dam across the Catawba River. The site itself occupies some 25,000 square meters of a broad sloping terrace. Artifacts appear on the surface for a distance of 125 m east of Little Allison Creek to the base of a small knoll and from an intermittent drainage just south of Tower #27, 200 m north to an east-west running fence (Fig. 7). The depth of the topsoil suggested the possibility of sub-plow zone features to Paul Brockington (p. 34). Soil probes, during a visit to the site in November 1979, revealed sandy loam deposits, 20-30 cm in depth.

At that time, the soybean staff had been plowed under. Tower #27 was in place at the southern edge of the site, and the tower pods were surrounded by grass planted to control erosion. Erosional gullies occurred downslope along the western edge of the 230 kV transmission line right-of-way. Stony, depleted soils lay underneath the 500 kV transmission line paralleling the project line further downslope. A relatively high number of artifacts were visible there. While their number may have been due to slope wash, the same area yielded a high number of artifacts during the first survey when the fields were in soybeans.

Because of the limited testing program, activities were confined to the right-of-way near the tower pod, as it was the primary area of impact. Without plowing, which ground conditions did not permit, surface visibility was rather disparate. No plowing meant also that controlled data on artifact movement could not be gathered. Therefore, the field strategy focused on the relationship between surface and subsurface assemblages at a ratio of 25 surface collection 1x1 m squares to 5 subsurface 1x1 m excavation units. Cold weather and stony, wet ground interfered with the efficiency of the testing program.

A datum was first set up near the northwest corner of Tower #27 (Fig. 8). The southwest corner of 15 collection squares was located north of the tower using a table of random numbers to determine vectors and distance. The coordinates were chosen to conform to the right-of-way boundaries, approximately 23 m either side of the centerline. The extra help provided by the Duke Power representatives facilitated the operations, and a second datum was set up approximately 60 m north of Datum 1; both datums had a 180° sweep and a 50 m radius.
FIGURE 7: Catawba-Newport (East) Transmission line: 38YK72.
FIGURE 8: Testing Area at 38YK72.
Ten more squares were located south of Datum 2.

Thus, the squares were randomly located over a 2750 square meter area within the southeast quadrant of the site, approximately a .9% sample, or about .1% of the total site area. A stratified, unaligned sample would have insured better dispersion over the area. However, the efficiency of this method may not have been realized with such a small sample. The simple random sample was faster and easier to employ under the circumstances.

Each 1x1 m square was cleared of vegetation, and except where noted, a 100% collection was made of all surface materials. Clearing effected between 25% and 100% surface visibility, with half the squares exhibiting 90% or better visibility and three-fourths, 50% or better. Points for a contour map were recorded while the surface collection was underway: 20°/10 m intervals around Datum 1 and 40°/10 m intervals around Datum 2 (Fig. 2).

Based on a cursory field examination of the collections, the squares were stratified according to potential artifact counts and location: Group 1 - 16, 20, 23, 24; Group 2 - 14; Group 3 - 7, 12; Group 4 - 1, 3, 4, 5, 8, 9, 13, 15, 21, 22, 25; and Group 5 - 2, 6, 10, 11, 17, 18, 19. One square (underlined) was selected from each of these groups, using a table of random numbers were appropriate. One and one-half days were spent excavating these units. The deposits were screened (%" mesh) with a power sifter. The rocky matrix in Sample Squares #2 and #7 and the wet clay encountered in the remaining squares caused difficulty. In order to clean the screen and keep it operating, much more of the matrix than originally anticipated had to be sacked and returned to the laboratory. Water screening to facilitate the initial sorting of these materials was conducted at the Institute in Columbia, South Carolina, during the first part of January.

Each excavated unit displayed a unique soil profile. There are few Piedmont site excavations to aid in assessing their archeological potential (cf. Cable and Michie 1977; House and Wogaman 1978; Canouts 1976). Most Piedmont soils have been heavily deflated and exhibit truncated soil profiles. The typical Cecil sandy clay loam, which comprises the testing area, exhibits the following horizons: 1) A horizon, 0-15 cm of dark brown, sandy loam; 2) B horizon, 15-35 cm of yellowish-red, friable clay loam; and 3) C horizon, 35+ cm red, firm clay (U.S. Department of Agriculture 1965: 16).

All five excavated units contained between 10-15 cm of the fine, brown loamy topsoil. As expected from its slope position and nearby erosional gullies, Sample Square #7 had the least amount of topsoil. A transitional coarse grained clay strata containing mineral stains, probably manganese oxides, which occurred in Sample Square #7, was absent from the adjacent Sample Square #2. Similar mineral stains were observed in Sample Square #25 on the eastern edge of the site where the topsoil was once again shallow.
Sample Squares #14 and #24, located midfield, had by far the greater topsoil depth of 15 cm. No clay was encountered below the tilled soil in Sample Square #14. Instead, the excavators shoveled easily through a decomposing, granitic matrix. The parent soils derive from amphibolite, minor schists, and gneiss (Butler 1966: Plate 1). The higher elevation on which the square was located results from the underlying geologic formation which gives the illusion of, and even substance to, a greater soil depth.

Only in Sample Square #24 were there a few centimeters below the brown loamy tilled horizon A and above a stained, brown clay horizon C where subsurface features might have remained partially intact (Fig. 9). However, no soil changes were observed. The extent of this stratum is impossible to predict since the soil profiles appear to be so highly variable.

One anomalous feature was noted in the south profile of Sample Square #25. A moderately compact, mottled clay-filled half circle appeared at the bottom of the excavation. The top of the feature began 18 cm below the surface and widened to 40 cm in diameter, 40 cm below the surface. Although the fill was more mottled and slightly less compact than the surrounding clay matrix, the texture was remarkably similar. Another faint stain appeared in a quarter circle at the base of the southwest corner. As no cultural or organic associations were noted and as neither feature originated at the surface, some kind of naturally decomposing geologic feature is suggested. There is a very slight possibility that they may be culturally derived from earlier historic activities indicated by a few late nineteenth and early twentieth century items occurring in the area.

In all, about 1.5 cubic meters of soil were excavated. Fifty centimeter square units were excavated to between 20 to 35 cm into subsoil, once the bottom of the A and B horizons had been reached. All the artifacts were recovered in the A horizon or plow zone, in the first 10 to 15 cm. Except for Sample Squares #7 (1 level) and #24 (3 levels), the plow zone was removed in two levels, which have been collapsed into one for the analysis of the surface to subsurface artifact ratios.

**Testing Results**

The testing results emphasize the diversity of the artifacts from 3BYK72: their number, type, and raw material. These data will contribute to a discussion of the vertical relationship between surface and subsurface cultural deposits. Distributional data which might indicate horizontal differences relative to occupational density or activity loci could not be quantitatively generated from the limited surface collection and even more limited subsurface excavation. In an effort to supplement the data base, the uncontrolled surface collections from the survey and testing phases are included.
FIGURE 9: Profile of Sample Square #24.
<table>
<thead>
<tr>
<th>RAW MATERIAL</th>
<th>Chunks</th>
<th>Bifacially Worked Chunks</th>
<th>Primary flakes</th>
<th>Secondary flakes</th>
<th>Biface Thinning Flakes</th>
<th>Utilized Flakes</th>
<th>Bifaces</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quartz (qtz)</td>
<td>16</td>
<td>4</td>
<td>9</td>
<td>129</td>
<td>25</td>
<td>26</td>
<td>209</td>
<td></td>
</tr>
<tr>
<td>Rhyolite (rhy)</td>
<td>2</td>
<td>3</td>
<td>21</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Felsic Tuff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Basalt (bst)</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Chert</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Argillite (arg)</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td>18</td>
<td>4</td>
<td>12</td>
<td>158</td>
<td>41</td>
<td>3</td>
<td>30</td>
<td>266</td>
</tr>
</tbody>
</table>
The general surface collection introduces some artifact diversity. A total of 272 artifacts was collected: flaked stone tools, utilized flakes, debitage, and stone and pottery sherds (Tables 4 - 6). Six temporal periods were identified by diagnostic bifaces (Table 6, see Table 2). Table 4 provides a comparison of flaked stone to type of raw material. Raw material identification follows the description of lithic types by Novick (1979). The major discrepancy between Novick and the discussion by House and Wogaman (1978: 53-57) concerns the identification of "Carolina Slate." Although the debate is not over, the more generally acceptable typology assigns a volcanic origin to the "Carolina Slate" (Derting 1980). As used here, banded and unbanded varieties of rhyolite are comparable to what has been called "Carolina Slate."

Ubiquitous quartz has the greatest representation, on the order of five times the second ranked rhyolite. The remaining lithic types might be considered almost rare. But all are available locally. The most exotic, non-local type is the Tennessee Ridge-and-Valley chert which was manufactured into a Palmer biface. The other two gray chert specimens may have been imported from further north, as well (Novick 1979: 432).

---

**TABLE 5**

**SURFACE COLLECTION: STONE AND POTTERY FRAGMENTS**

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Plain, coarse quartz tempered sherds (1 with a blackened interior)</td>
</tr>
<tr>
<td>1</td>
<td>Worked steatite sherd</td>
</tr>
<tr>
<td>3</td>
<td>Unworked schist fragments</td>
</tr>
<tr>
<td>1</td>
<td>Unworked, weathered rhyolite fragment</td>
</tr>
<tr>
<td>1</td>
<td>Unworked small quartz cobble</td>
</tr>
<tr>
<td>1</td>
<td>Unidentified, weathered green fragment</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

The descriptive typology used to analyze the debitage conforms basically to that employed by House and Wogaman (1978: 58-60) with the following modifications. A bifacially worked chunk category has been added. Apparently, the number of bifacially worked chunks recognized at Site 38YK72 is the result of working with variable quality quartz. These quartz chunks have had several flakes removed but have not been reduced to a blank or preform stage. Their bifacial reduction pattern eliminates their consideration as cores.
### TABLE 6

**HAFTED BIFACES FROM THE SURFACE OF 38YK72**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>RAW MATERIAL</th>
<th>TL</th>
<th>HL</th>
<th>BW</th>
<th>HW</th>
<th>THICKNESS</th>
<th>WEIGHT</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palmer</td>
<td>chert</td>
<td>21.1</td>
<td>8.9</td>
<td>24(?)</td>
<td>22.2</td>
<td>8.2</td>
<td>14.1</td>
<td>broken blade</td>
</tr>
<tr>
<td>Morrow Mt</td>
<td>quartz</td>
<td>41.6</td>
<td>13.7</td>
<td>22.6</td>
<td>17.7</td>
<td>10.6</td>
<td>7.7</td>
<td>broken tip</td>
</tr>
<tr>
<td>Guilford</td>
<td>quartz</td>
<td>44.9</td>
<td>TW 20.3</td>
<td>12.3</td>
<td>10.6</td>
<td></td>
<td></td>
<td>broken tip</td>
</tr>
<tr>
<td>Guilford</td>
<td>quartz</td>
<td>49.1</td>
<td>TW 20.6</td>
<td>9.4</td>
<td>9.9</td>
<td></td>
<td></td>
<td>broken tip</td>
</tr>
<tr>
<td>Guilford</td>
<td>quartz</td>
<td>43.3</td>
<td>TW 22.2</td>
<td>8.5</td>
<td>7.7</td>
<td></td>
<td></td>
<td>concave base</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz river cobble</td>
<td>53.1</td>
<td>14.9</td>
<td>42.7</td>
<td>24.6</td>
<td>13.7</td>
<td>35.0</td>
<td>broken tip</td>
</tr>
<tr>
<td>Savannah R</td>
<td>banded rhyolite</td>
<td>49.0</td>
<td>14.5</td>
<td>20.8</td>
<td>50.5</td>
<td>9.4</td>
<td>24.8</td>
<td>broken tip, one side corner notched</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>50.1</td>
<td>9.9</td>
<td>33.8</td>
<td>19.6</td>
<td>11.8</td>
<td>19.3</td>
<td>broken tip and broken corner of base</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>55.9</td>
<td>12.8</td>
<td>44.7</td>
<td>20.0</td>
<td>19.0</td>
<td>47.0</td>
<td>broken tip</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>38.2</td>
<td>9.8</td>
<td>32.2</td>
<td>19.8</td>
<td>14.9</td>
<td>19.1</td>
<td>broken tip</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>54.8</td>
<td>12.3(?)</td>
<td>39.1</td>
<td>18.7(?)</td>
<td>11.8</td>
<td>21.4</td>
<td>broken base and tip</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>58.8</td>
<td>12.5</td>
<td>27.6</td>
<td>15.6</td>
<td>10.9</td>
<td>18.0</td>
<td>whole</td>
</tr>
<tr>
<td>Savannah R</td>
<td>quartz</td>
<td>60.5</td>
<td>9.7</td>
<td>36.6</td>
<td>18.4</td>
<td>15.5</td>
<td>27.6</td>
<td>whole</td>
</tr>
<tr>
<td>Otarre</td>
<td>quartz</td>
<td>44.0</td>
<td>11.8</td>
<td>32.1</td>
<td>15.5</td>
<td>8.6</td>
<td>14.0</td>
<td>broken tip</td>
</tr>
<tr>
<td>Otarre</td>
<td>quartz</td>
<td>43.0</td>
<td>10.2</td>
<td>28.5</td>
<td>18.2</td>
<td>10.5</td>
<td>13.7</td>
<td>broken tip</td>
</tr>
<tr>
<td>Unnamed Woodland stammed</td>
<td>rhyolite</td>
<td>30.1</td>
<td>TW 26.5</td>
<td></td>
<td>8.3</td>
<td></td>
<td>7.2</td>
<td>broken base and tip</td>
</tr>
<tr>
<td>Unnamed stemmed (NM?)</td>
<td>quartz</td>
<td>25.4</td>
<td>TW 27.1</td>
<td>8.5</td>
<td>5.3</td>
<td></td>
<td></td>
<td>broken base</td>
</tr>
</tbody>
</table>

**KEY:**  
- **TL** Total Length  
- **HL** Haft Length  
- **BW** Blade Width  
- **HW** Haft Width  
- **TW** Total Width  

All measurements in mm and gr.  
(after House and Wogaman 1978: 63)
House and Wogaman's (1978: 59) flake category encompasses primary, secondary, and biface thinning flakes. Primary flakes are decortication flakes which exhibit an outer cortex. Secondary flakes correspond to the other flake category and are interior or intermediate reduction stage flakes. Biface thinning flakes or flakes of bifacial retouch result from the last stages of manufacture and resharpening. The model of a biface reduction system was originally presented in House and Ballenger (1976: Fig. 15). In the analysis, flakes which had questionable thinning flake attributes were assigned to the secondary flake category.

The high correlation that holds between off-site raw materials acquisition and smaller flake size is readily apparent from Table 4 (e.g., House and Ballenger 1976: 131). In contrast, all stages of biface reduction are represented by quartz. The amount of on-site quartz was quite high. Over 100 kg of quartz rock from Sample Squares #2 and #7 were discarded in the laboratory. One Savannah River biface was manufactured from a quartz cobble, and at least one quartz cobble, which would have been extracted from a stream bed, was collected on the surface. However, most quartz artifacts were derived from quartz-veined bedrock. Although no on-site rhyolite source was observed, one unworked fragment found on the site and the number of debitage classes represented suggest a complete manufacturing sequence. Indeed, the rhyolite is more locally available than was recognized when this material was identified as "Carolina Slate" (House and Ballenger 1976: 126; House and Wogaman 1978: 54-55). The greater ratio of biface thinning flakes to other flakes probably relates to the better technological qualities of rhyolite, and as a consequence, better morphological attributes exhibited by the biface thinning flakes.

The general surface collection was a biased sample, and these data patterns are only suggestive. Comparison of the surface and subsurface assemblages incorporates the quantitative data from the Sample Squares. The nature of the general surface assemblage is quite different, in analytical terms, than the controlled surface and subsurface assemblages. That is, general surface collections often consist of only those materials which are unquestionably cultural artifacts. Quartz artifacts present a special case in such collective policies. Quartz is not a good medium on which to distinguish cultural use patterns and natural fractures. Plowing quartz artifacts and natural quartz rock together obscures the distinction even further. To compensate, the analysis of quartz artifacts from the Sample Squares allowed a greater range of variability. This decision was prompted by the fact that the wide dispersal of the Sample Squares did not permit an evaluation of continuous or even concentrated artifact distributions and by the fact that evidence of continued occupation suggested a high incidence of cultural remains relative to natural deposits.

A rather high percentage of Sample Squares yielded no surface artifacts (Table 7). It is encouraging to note that a few artifacts were recovered in the subsurface excavation of one of these squares, Sample Square #25 (Table 8). Frequency estimates based on 28 prehistoric artifacts for a 25 square meter area is approximately one artifact
<table>
<thead>
<tr>
<th>Provenience</th>
<th>Chunks</th>
<th>Bifacially Worked Chunks</th>
<th>Primary Flakes</th>
<th>Secondary Flakes</th>
<th>Biface Thinning Flakes</th>
<th>Historic Artifacts</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 qtz</td>
<td>1 arg</td>
<td>1 brick frag.</td>
</tr>
<tr>
<td>2</td>
<td>1 qtz</td>
<td>1 qtz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no artifacts</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td>no artifacts</td>
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<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>no artifacts</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>1 qtz</td>
<td></td>
<td></td>
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<td>no artifacts</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
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</tr>
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<td>7</td>
<td>2 qtz</td>
<td>1 qtz</td>
<td>3 qtz</td>
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<td>no artifacts</td>
</tr>
<tr>
<td>8</td>
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<td></td>
<td></td>
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<td>1 qtz</td>
<td>1 rhy</td>
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<td>no artifacts</td>
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<td>Bifacially Worked Chunks</td>
<td>Primary Secondary</td>
<td>Biface Thinning Flakes</td>
<td>Other Stone</td>
<td>Pottery</td>
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<tr>
<td>2</td>
<td>2 qtz</td>
<td>1 qtz</td>
<td>1 bst 3 rhy 7 qtz</td>
<td>1 qtz 1 steatite sherd</td>
<td>1 unworked</td>
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<td>1 iron, round-</td>
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<td></td>
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<td>headed nail</td>
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<tr>
<td></td>
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<td></td>
<td>fragment</td>
<td></td>
<td>1 clear glass</td>
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<td>1 qtz</td>
<td></td>
<td>1 rhy 7 qtz</td>
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<td>steatite</td>
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</tr>
<tr>
<td>14</td>
<td>3 qtz</td>
<td></td>
<td>2 rhy 7 qtz</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td>1 qtz</td>
<td>1 qtz</td>
<td>8 qtz</td>
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<td>(one side worked?)</td>
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<td><strong>TOTALS</strong></td>
<td>9</td>
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<td>0</td>
<td>36</td>
<td>3</td>
<td>6</td>
<td>1</td>
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<td>5</td>
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per square meter. Density estimates based on cubic meters, given five squares each measuring 1x1x(1.3) m by volume is 57 prehistoric artifacts per .65 cubic meters, or almost 90 prehistoric artifacts per cubic meter. As some of the squares were selected on the basis of their high artifact potential and as the identification included questionable flakes, a lower estimate would be more reasonable. Two immediate influencing factors to consider are the effects of long-term artifact collecting on the site and the different spatial densities. With regard to the latter, the testing area was confined to the southeast quadrant of the site which exhibited a fair amount of surface material.

The assemblage diversity or range of artifact types decreases as the sampling fraction decreases: the biface and utilized flake categories of the general surface assemblage were missing from the controlled surface assemblage and the primary flake category was missing from the subsurface assemblage. Of the range of raw materials, felsic tuff and chert were missing from the controlled Sample Squares. Table 9 shows the proportional differences between the flaked stone debitage of the three assemblages. Interestingly enough, the controlled surface collection does not correspond very closely to either the general surface or subsurface assemblages. This lack of correspondence is probably due to the small sample size, for when the Sample Squares are combined, the match is much better.

In summary, specific reference is made to the numerical relationship between surface and subsurface assemblages in the five excavated units (Table 10). The comparison is limited to the number of flaked stone artifacts, as these were the only prehistoric artifacts recovered in the controlled surface collections. The surface to subsurface artifact ratio for these five sample units is 1:5. However, the variability is such that at a 95% confidence level it ranges from as low as 1:13 to as high as 1:3. Additional studies along similar lines should help reduce this variability if other site variables such as site depth and spatial differences relating to temporal period and activity loci can be controlled as well.
<table>
<thead>
<tr>
<th>DEBITAGE ASSEMBLAGE</th>
<th>Chunks</th>
<th>Primary Flakes</th>
<th>Secondary Flakes</th>
<th>Thinning Flakes</th>
<th>TOTALS</th>
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<tbody>
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<td>General Surface</td>
<td>18</td>
<td>12</td>
<td>158</td>
<td>41</td>
<td>229</td>
</tr>
<tr>
<td>Controlled Surface</td>
<td>7</td>
<td>1</td>
<td>9</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>Controlled Subsurface</td>
<td>9</td>
<td>0</td>
<td>36</td>
<td>3</td>
<td>48</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>34</strong></td>
<td><strong>13</strong></td>
<td><strong>203</strong></td>
<td><strong>51</strong></td>
<td><strong>301</strong></td>
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</table>

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<th>Flakes</th>
<th>Flakes</th>
<th>Flakes</th>
<th>Flakes</th>
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<tbody>
<tr>
<td>General Surface</td>
<td>8%</td>
<td>5%</td>
<td>69%</td>
<td>18%</td>
<td>100%</td>
</tr>
<tr>
<td>Controlled Surface</td>
<td>29%</td>
<td>4%</td>
<td>38%</td>
<td>29%</td>
<td>100%</td>
</tr>
<tr>
<td>Controlled Subsurface</td>
<td>19%</td>
<td>-0-</td>
<td>75%</td>
<td>6%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
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<th>Flakes</th>
<th>Flakes</th>
<th>Flakes</th>
<th>Flakes</th>
<th>Flakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Surface</td>
<td>8%</td>
<td>5%</td>
<td>69%</td>
<td>18%</td>
<td>100%</td>
</tr>
<tr>
<td>Sample Squares</td>
<td>22%</td>
<td>1%</td>
<td>63%</td>
<td>14%</td>
<td>100%</td>
</tr>
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</table>

TABLE 9
COMPARISON OF THE FLAKED STONE DEBITAGE
TABLE 10
SURFACE TO SUBSURFACE ARTIFACT RATIO:
PREHISTORIC FLAKED STONE

<table>
<thead>
<tr>
<th>SAMPLE SQUARE #</th>
<th>SURFACE ARTIFACTS (y)</th>
<th>SUBSURFACE ARTIFACTS (x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>1</td>
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<tr>
<td>24</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>25</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

\[ n = 5 \]
\[ \bar{y} = 10 \]
\[ \bar{x} = 50 \]
\[ \bar{y} = 2.0 \]
\[ \bar{x} = 10.0 \]
\[ s_\bar{y} = 2.35 \]
\[ s_\bar{x} = 4.85 \]
\[ \hat{R} = \bar{y}/\bar{x} = .20 \]

\[ s^2_\hat{R} = \hat{R}^2 (1 - f) \left( \frac{\sum y^2 + \sum y^2 - 2p \sum y \sum x}{n} \right) \]

Hanson, Hurwitz, and Madow 1953: 163

where \( V \) = Coefficients of Variation
\( p \) = Coefficients of Correlation
\( f \) = Sampling percent at .002
\( y \) = Number of Surface Artifacts
\( x \) = Number of Subsurface Artifacts

Computation form for standard deviation for calculator:

\[ s_\hat{R} = \sqrt{1 - f} \sqrt{\frac{\sum y^2 - 2\hat{R} \sum y x + \hat{R}^2 \sum x^2}{n - 1}} \]

Cochran 1963: 31

\[ s_\hat{R} = .10 \]

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THE STRUCTURAL POSE AT 38YK72

Up to this point, the analytical discussion has been confined to the methodological problems concerning the representativeness of the various assemblages. Before these relationships can be extended to other sites, the underlying structural pose must be considered. A structural pose is simply "the way a simple human society (is) appropriately organized at a particular moment for a particular purpose" (Gearing 1962: 15). Following Wilmsen's (1970) lead in archeology (cf. House and Wogaman 1978: 126 ff.), the assemblage and spatial patterning exhibited at this site will be discussed in terms of "structural poses," that is, the activity sets. Archeological identification of activity sets depends upon a functional analysis of the assemblages, the spatial distributions of the artifacts and features, and their temporal placement, all of which are difficult to assess at Site 38YK72.

The multicomponent nature of the site contributes to the high spatial and artifactual heterogeneity. The data base is the product of a number of distinct, perhaps continuous, occupational episodes. Some 7,000 years are represented by the diagnostic artifacts. Even though the primary adaptive strategy during that long period of time relied on hunting and gathering, use of the same space for the same purpose cannot be assumed. Archeologists have recently suggested that different occupational episodes can be spatially isolated. The characterization of the different artifact assemblages according to exploitative strategies and temporal periods, which is also receiving new emphasis, should help further to define these areas.

Although the controlled surface collections were not extensive enough to provide spatially discrete results, the general surface collection suggests possible spatial differences. The artifacts are scattered over a larger area than initially calculated during the survey when the field was covered with soybeans. The scatter is not uniform and becomes very sparse at the peripheries of the site. At least two broad areas of concentration have been recognized: Area 1 - an area of relatively flat relief north of Tower #27 where the testing phase occurred; and Area 2 - another relatively flat area underneath the 500 kV transmission line adjacent to Tower #5 (Fig. 7). Whether these level surfaces are natural or the result of transmission line construction is difficult to say. Some differences are reflected in the artifacts. In the first area, quartz artifacts predominate. The majority of the Savannah River bifaces were collected there as were all the steatite specimens. Area 2 contained more non-quartz artifacts. Since the topsoil is almost completely eroded from this area, the non-quartz artifacts may just be more visible. These data are far from conclusive.

-63-
For temporal placement, the only diagnostic artifacts distinguishing 6,000 years of Archaic occupation are the diagnostic bifaces which account for just over 5% of the surface flaked stone assemblage. The steatite and pottery sherds which generally signify Late Archaic and Woodland respectively add little information to the identity of these periods. If Savannah River and Otarre bifaces and steatite sherds are added together, they account for about 55% (15/27) of the diagnostic artifacts, or about 5% (16/356) of the total (surface and subsurface) prehistoric assemblage. This frequency is higher than the remaining periods added together and suggests a greater intensity of Late Archaic occupation, either by a larger group or through greater repetition of activities.

Site activities which cause site variability have been outlined in House and Wogaman's (1978: 126 ff.) discussion of inter-riverine Piedmont archeological sites. The two major hypotheses relate to the degree of habitation: whether the site was used for intensive settlement or used as a hunting and gathering camp. From an evaluation of the test implications for Windy Ridge (38FA118, a Piedmont ridgetop site located in Fairfield County, northeast of Winnsboro, South Carolina), House and Wogaman concluded that the site was a hunting-butcher ing camp for procurement of white-tailed deer. Since many test implications depended upon relative measures, Site 38YK72 will be compared, whenever possible, to Site 38FA118.

Unlike Site 38FA118, Site 38YK72 is located in a favorable habitation setting adjacent to a permanent creek. Like 38FA118, it displayed no structural or subsurface features, but 38YK72 did contain more ceramic and steatite sherds relative to the amount of surface survey and subsurface excavation which occurred at both sites. The remaining test implications characterize the flaked tool assemblage.

The debitage classes relate to the production of bifaces. To differentiate early stage biface reduction stages found at quarry and workshop sites from resharpening stages which would indicate maintenance activities, House (House and Ballenger 1976: 96-98) developed two indices: one of manufacture, ER = # of chunks + other flakes/ # of thinning flakes; and one of use, BD = # of bifaces/ # of other flakes. Treating the surface data as a single component yields the following results: ER = 4.59 and BD = .14 (excluding the bifacially worked chunks). The ER index of 38FA118 was .8; the BD index, .20. The ER index reflects primarily the quartz flaked stone as it comprises over 75% of the lithic assemblage at 38YK72. As House (House and Ballenger 1976: 99) noted, veined quartz may not be quarried but worked on an ad hoc basis at many extractive sites. Such a behavioral pattern would give a relatively high index of primary reduction. Furthermore, the number of broken bifaces at 38YK72 indicates a high rate of discard through use.

The range of tools at 38YK72 is fairly narrow: 3 utilized flakes; 20 hafted bifaces and biface fragments; and 10 other bifaces, including 1 knife and 2 blanks. All of the utilized flakes were of rhyolite.
One rhyolite thinning flake exhibited three utilized edges. Twenty-six bifaces were of quartz. While a decision not to conduct an edge wear analysis on these bifaces was based on the limited scope of work, quartz does not lend itself well to edge wear analysis because, depending on the grade of quartz, the edges usually exhibit a broken or crushed appearance rather than good concoidal fractures (Baker 1976; Dickson 1977).

A few preliminary observations were recorded, however. Only six of the bifaces were complete or almost complete. The remainder were broken stems, tips, or mid-sections. Interestingly, several bifaces displayed diagonal breaks across the blade between one-third and one-half of the way down from the estimate tip. Of the six broken Savannah River stemmed bifaces, three exhibited diagonal breaks, whereas only one was broken straight across. The Guilford bifaces and Morrow Mountain biface had their very tips broken. The other pronounced diagonal break found on the Palmer biface does not appear to be a use break (Keith Derting, personal communication). A slight imperfection in the chert probably caused it to break there when it was damaged by a fire or a plow. The use breakage patterns of the Savannah River bifaces do suggest heavy pressure such as would be exerted in butchering tasks.

In summary, the general tool assemblage manifested at 38YK72 compares favorably with that at 38FAll8. The data fit best the expectation of a hunting and butchering camp for the procurement of game animals; that is, the "artifact assemblage is dominated by the outputs of manufacture (of locally-available raw materials), use, resharpening, breakage and discard of stone butchering tools" (House and Wogaman 1978: 130-131). The site appears to have been most intensively occupied during the Late Archaic period. Its position next to Little Allison Creek, the presence of steatite and pottery vessels, and the early stage biface reduction debitage suggest a temporary campsite with associated support activities, such as cooking and tool manufacture and replacement.
CONCLUSIONS

The artifact data gathered at Site 38YK72 contributed significant information concerning prehistoric adaptation in the South Carolina Piedmont. An analysis of the assemblages and their spatial distributions reveals that 38YK72 was in all likelihood a Late Archaic campsite where animals (possibly white-tailed deer) were butchered. A more intensive settlement is not indicated due to the narrow range of artifact types and uses and the lack of features. Despite the number of temporal components found on the site, the general assemblage was remarkably homogeneous, which suggests that earlier and later occupants were performing a limited set of activities, probably also associated with game procurement. This site, then, comprises only one small structural unit within a larger subsistence-settlement framework. Other adaptive stances in the framework would include base-camps, plant collecting stations, fishing areas, etc. necessary to complete the full range of subsistence activities occurring on a year-round basis. Although white-tail deer were hunted primarily in the fall and early winter by later historic and protohistoric Indians (Smith 1975; Canouts 1971), there is no evidence to suggest that deer procurement was such an exclusive seasonal event in the Archaic period (House and Wogaman 1978: 22).

Very few archeological sites are recorded for York County; a total of 44 prehistoric sites was listed by Taylor (1979: 74). This site is the second open lithic scatter to be tested (Canouts 1976). Both sites were tested because construction activities threatened to impact the integrity of the sites. In the case of 38YK72, a tower for the 230 kV Catawba Nuclear-Newport (East) transmission line was erected on the southeast edge of the site (Fig. 7). As the site was not tested before tower placement, its direct impact on the condition and distribution of the artifacts could not be monitored.

This site is but one of many which will ultimately contribute information concerning artifact displacement and the reliability of surface evidence to predict the total site variability. Such information will, in turn, aid in assessing the degree of impact from this and similar projects. The present data set provides artifact frequency, density, and compositional measures for .1% of the total site area. In no way has the information potential of this site been fully recorded. However, no further investigation of this site is recommended in conjunction with the Catawba transmission line project. Although the site will continue to sustain impacts from cultivation and possible tower or transmission line maintenance, if the site continues to be managed as it has been, sufficient data should remain for future investigations.
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