
Veletta Canouts

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PREDICTIVE MODELING: AN ARCHEOLOGICAL ASSESSMENT OF DUKE POWER COMPANY'S PROPOSED CHEROKEE TRANSMISSION LINES

by

Veletta Canouts
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With Contributions by

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MANAGEMENT SUMMARY

Duke Power Company proposes to construct two 230 kV transmission lines in Cherokee County, South Carolina. As part of the federally mandated assessment of the potentially adverse impacts to archeological resources, the Institute has developed a two phase program to locate and evaluate archeological sites within the project corridor.

Phase I involved a two-day reconnaissance survey in February 1980 and a one-day field inspection, in September 1981, of the Cherokee Ford Ironworks already listed on the National Register of Historic Places. Because Phase I also involved the development of a predictive model of site occurrence, the area was surveyed systematically. Two transects and ten field check points along road rights-of-way provided fairly even coverage. Two archeologists traversed a little over 25% of the 21-kilometer long corridor. Shovel probing at 20-meter intervals was necessary due to extremely poor ground visibility. This technique was of limited utility and only five archeological loci were identified: two prehistoric sites; one historic site; and two historic isolated finds. The survey was judged to be less than 50% effective, and between 15 and 25 archeological loci are predicted for the corridor as a whole.

The archeological sites conform to general predictions about prehistoric and historic man-land relationships in the upper Piedmont, particularly along the Broad River drainage. Prehistoric flaking debris and a Middle Archaic biface dominated; lithic scatter fit hypothesized patterns of interriverine resource extraction. An abandoned homestead testifies to the decline of farming in the area.

A blast furnace located on Peoples Creek was once part of the Cooperville factory complex. Its National Register status recognizes the local production of iron in the "Old Iron District." Because of the position of the furnace relative to the proposed right-of-way, a plan to avoid or protect the site is recommended. In response, Duke Power Company proposes a mitigation plan to minimize potential adverse effects.

The significance of the five surveyed sites lies in their potential to predict site locations in the unsurveyed portions of the corridor and to contribute information about the effects of transmission line construction. A Phase II walk-over of the entire corridor is planned to gather these data. For these reasons, the sites are not recommended for nomination to the National Register of Historic Places.
CHAPTER 1

INTRODUCTION

The Institute of Archeology and Anthropology, University of South Carolina, designed a two-phase archeological program to assess the potential impact of Duke Power Company's proposed 230 kV Cherokee transmission line upon the archeological resource base (Brockington 1977, 1980; Canouts 1980). The project area is located in Cherokee County near the town of Gaffney, South Carolina (Fig. 1). The proposed lines will parallel the western bank of the Broad River, traversing several small drainages, i.e., Peoples Creek, Toms Branch Creek, Little London and London creeks, McKowns Creek, Quinton Branch, and Gilkey and Abingdon creeks, which drain into the Broad.

This Piedmont setting is characterized by a highly dissected surface due to intensive agricultural and timbering practices during the 18th and 19th centuries. Most of the area has been affected by severe erosion, resulting in deflated and truncated soil profiles on the ridgetops and alluvial buildup in the narrow drainages. Recent land management practices occurring in the project corridor include the commercial planting of pine, which serves, in part, to impede the erosional processes.

In February 1980, under agreement with Duke Power, the Institute conducted a background review and a 25% reconnaissance field survey (Chapters 2 and 3). The survey design involved systematic subsurface shovel probes and the collection of artifacts, but no test excavations. The reconnaissance survey located two prehistoric sites, one historic site, and two isolated finds. All three sites will be impacted by the proposed construction. None of these sites is recommended for nomination to the National Register of Historic Places (Chapter 4).

A second field investigation and subsequent assessment was undertaken in September 1981 on the Cherokee Ford Ironworks National Register property. The corridor crosses this National Register property at its northernmost extension. The archeological assessment recommends, if possible, a realignment west of the known isolated blast furnace and canal or the development of a preservation plan incorporating protective landscaping, fencing, and/or stabilization for the ruin (Chapter 5). The mitigation plan prepared by Duke Power is an acceptable alternative to rerouting the line (Appendix IV).
FIGURE 1. Project Vicinity Map
The Project Design

A linear corridor, extending for a distance of approximately 21.3 km (13.27 mi), connects Duke Power's Cherokee Nuclear Station with existing power lines: 9.5 km (5.97 mi) to the northwest and 11.5 km (7.3 mi) south. The width of the right-of-way varies. Double 230 kV transmission lines for most of the route will fall within an 82.3 m (270') right-of-way, with widths of 97.3 m (319') occurring along 7.2 km (4.5 mi) of the corridor where 33 kV lines are added.

The right-of-way will be cleared, tower pods constructed, and power lines strung from the tower scaffolding. Transmission line construction involves both direct and indirect impacts to archeological resources (see Smith 1977:23; Brockington 1977:3ff). Direct impacts occurring during construction include disturbance of the ground through clearing, disking, and moving heavy equipment. Indirect impacts include increased pedestrian traffic, vandalism, long-term erosion, maintenance activities, and future development of the area indirectly attributable to the presence of these facilities.

The possible extent of the direct impacts on archeological sites has received little attention (cf. Harmon 1980). It is thought to be limited and minor as compared with other types of developments (Brockington 1977; Don Sutherland, personal communication.) However, without documentation of artifact displacement, this assumption cannot be substantiated. A recent testing program on a site (38YK72) on the Catawba transmission line corridor was a beginning attempt to determine if adequate mitigation of surface sites in the Piedmont could be effected through intensive collection and post-hole or small-scale excavation (Canouts 1980; Brockington 1977:4,7). The problem of lateral displacement of artifacts due to clearing and tower construction was not addressed because construction had already begun. But the problem of lateral displacement of artifacts in conjunction with site recognition and boundary definition may be partially addressed with survey data obtained prior to construction.

The Archeological Program

The level of assessment has an important bearing on evaluating project impact and site significance. Based on a recent archeological survey of the Catawba transmission lines for Duke Power Company, Brockington (1980:40) suggested that the assessment of archeological resources in the Piedmont might be better accomplished by employing a combination of evaluative methods: a records check, interviews with local collectors, a high visibility reconnaissance survey, and inspection of high probability areas by surface and subsurface examination, succeeded by monitoring and follow-up studies during and after construction. The purpose of this study is to test the efficacy of such an approach.

In addition to the problems encountered in attempting to understand and assess the significance and research potential of the archeological resources, there are important methodological problems con-
cerning their recognition and discovery. That archeological data exist in a vacuum without reference to the investigator's problem orientation is not implied. However, field conditions affecting visibility and those natural processes affecting artifact placement in the environment play important roles in archeological assessments and interpretations.

Because of the length of many transmission lines and the occurrence of a number of upland lithic scatters in the Piedmont, statistical sampling techniques are now being applied in survey design. Survey sampling depends upon recognizing appropriate environmental variables which reflect the culturally adaptive biases in man-land relationships. As these biases become understood, archeologists become better able to build predictive models of site location. At present, "correlation of site location with environmental features is not well developed in Piedmont archeology" (Brockington 1980:26). Therefore, selection of environmental variables on which to base a sampling design still rests upon gross categorical distinctions that appear feasible relative to field logistics.

Further complications result from the problem of ground visibility. In order to implement a statistically random or stratified random sample, each site must stand an equal or known chance of discovery. Obviously, given differences in surface visibility, the probabilities of site discovery are not equal.

One way to increase the probability of site discovery is to shovel probe systematically or shovel test sampling units. This technique is labor intensive relative to the low number of sites discovered in this manner. However, the exact costs in terms of time, assessing significance, countering discovery biases, etc., have not been thoroughly documented. In an initial attempt to provide such documentation, Brockington (1980) test-pitted 69 study units in the Catawba transmission line corridor. Six test pits, 30 centimeters square, were dug in each unit for a total of 393 tests; no sites were discovered. However, further experimental studies are needed before a final determination of the effectiveness of shovel probing is reached (see Harmon 1980 for a recent discussion of this technique).

Another procedure to maximize site discovery is to concentrate on examining all visible ground surfaces. While it may be possible, with several studies, to begin to correlate environmental features, percentage of visibility, and site location, there are inherent biases in that modern historic and prehistoric cultural groups exploited many of the same landforms. Modern disturbances, which permit surface examination, may reflect a disproportionately higher percentage of sites.

Supplemental data may also be gathered from local informants who are cognizant of sites in the immediate area. Local collectors with artifacts often exhibit more diverse artifact inventories than obtained on sites today.

Recent investigations in the South Carolina Piedmont have disclosed numerous historic and prehistoric sites (House and Ballenger
perhaps not seemingly as spectacular as major settlements, these sites, nonetheless, represent a considerable time depth and spatial extent of limited or specialized human activities in one of this state's major geographic zones. Although some patterns of site distribution and artifact distribution are beginning to emerge, their archeological analysis and interpretation are still in the modeling and testing stages.

In order to begin developing a predictive model of site occurrence in this region, a model that will permit the use of survey sampling strategies with some degree of confidence, a two phase archeological program has been initiated:

**Phase I**

1. A background assessment of environmental and human adaptive processes which condition site location and discovery.

2. A field reconnaissance of the transmission line right-of-way, combining a systematic walk-over of portions of the line with opportune investigations in high visibility areas.

3. The development and assessment of a predictive model of site location and significance.

**Phase II**

4. Monitoring of the transmission line construction activities.

5. An assessment of the adverse impact upon archeological resources by transmission line construction.
CHAPTER 2

THE ARCHEOLOGICAL RECORD:
A BACKGROUND ASSESSMENT

The predictive value of a model of site occurrence depends upon the extent to which archeologists understand the environmental and cultural variables affecting human adaptation. Environmental variables as they are viewed in a framework of evolutionary ecology are influential in structuring the parameters of resource use given various exploitative strategies. Exploitative strategies incorporate the following: (1) demography involving population composition, size, and dispersal; (2) technology involving sources and means of energy procurement, processing, distribution, and consumption; and (3) socio-cultural factors involving organization and information flow. All of these are conditioned by historical behavior and the trajectories and/or processes of adaptive change, which are themselves the objects of considerable academic controversy.

The archeological record of a specific area is the consequence of adaptive decision-making that is based on specific environmental and historical information. For example: the type of tool used by a hunter will reflect his technical repertoire, i.e., a stone point, a bow and arrow, a musket, or a high-powered rifle. Where the tool is used will depend upon the (animal) resource being hunted and its habitat and behavioral responses. What remains at a kill and/or processing site will be dependent upon logistical factors, i.e., mobility, curate behavior, etc., of the hunter(s). This admittedly simple example, nevertheless, exhibits the underlying complexity of site formation processes. Add to these the environmental processes that act on materials after they have been deposited, and the problem of deciphering the archeological record today becomes even more complex. Although environmental and historical variables interact systemically, they have been arbitrarily divided for this general discussion.

Environmental Assessment

A border county on the North and South Carolina state line, Cherokee County, South Carolina, lies in the upper Piedmont. The Piedmont is an old degraded peneplain, one of several peneplains in the Appalachian region, that trends in a northeast-southwest direction through the Carolinas (Thornbury 1954:239-240). Major drainages, paralleling one another, flow southeast to the Atlantic. Almost all of Cherokee County is drained by the Broad River and its tributaries. The Pacolet River drains a small, lower portion of the county. The narrow streams and creeks dissect the county forming a medium textured
dendritic pattern (Strahler 1964). Hills and ridges, composed of metamorphosed sedimentary and volcanic rock, rise 30 to 100 m above the surrounding plain, 200 to 300 m above sea level (Jones 1962:1; Overstreet and Bell 1965:43ff).

A mosaic of soil types has developed from the diverse lithologic parent materials (Jones 1962). Oak-hickory forests probably obtained on these soils from the Holocene, 8000 B.C. (Whitehead 1965; Watts 1971, 1975, 1980) until extensive European land clearing altered the climax forests (Trimble 1974). Half of the county is reforested with mixed hardwoods and pines (Jones 1962: 2). This reforestation has slowed gullying from the winter and spring run-off. The climate is temperate, winters short and mild. The frost-free growing season averages 227 days (Jones 1962:2).

Environmental Potential

As previously noted, environmental potential depends upon the exploitative strategies employed. Two types of exploitative strategies may be distinguished, that related to subsistence economics and that related to industrial and technological enhancement or procurement. Although the formal economics, e.g., costs, marginal costs, labor, etc., can be graphed in much the same way for both (Schneider 1974; Rapport and Turner 1977), the substantive data are different enough to warrant separate treatment.

Economic considerations of energy efficiency demonstrate an evolutionary continuum from hunting and gathering to agriculture (Earle 1980). The relative mix of various strategies and their production rates are dependent upon population and environmental stresses. Unfortunately, the natural production of temperate forests, especially in the Southeast, is only now being researched relative to seasonal rounds, resource abundance, scheduling strategies, etc. (e.g., Ford 1979; Christenson 1980; Hanson 1980; House and Ballenger 1976).

Ethnohistorical reconstructions of the cultural ecology of aboriginal Indians around the Great Lakes (Yarnell 1964; Cleland 1966), in the Midwest (Christenson 1980), and in the Southeast (Canouts 1971; Larson 1970) show the number, variety, and preferences of plant and animal resources used for food, beverages, and medicinal and technological purposes. For example, a Midwestern breakdown for seasonal subsistence (plant) foods is as follow: 12 sap and cambrium foods; 17 bulbs and tubers; 11 greens; 3 flowering species; 51 fruits and berries; 5 seeds; 13 nuts; and 4 lichens (Yarnell 1964:74). A comparable study in the Southeast listed the following: 10 bulbs and tubers; 6 greens; 14 fruits and berries; 5 seeds; and 10 nuts (Canouts 1971).

The question of significant differences in the production of various deciduous climax forests in the interior has not been framed in terms of human ecology. Several factors may have contributed to a lower frequency and variety of plants in the Southeast, e.g., lack of species and subspecies identification in the ethnohistorical literature or perhaps a greater reliance on agriculture. Thus, the project
area in the upper Piedmont may have a higher potential for natural subsistence resources than indicated by the Southeast study.

The agricultural potential is probably more limited, although the dynamics of the southeastern Atlantic drainages have not been studied relative to prehistoric agricultural subsistence (cf. Smith 1978). However, a few observations can be made about the present day geomorphology and pedology as they affect agricultural production. Bottomlands in the county are seldom wider than 700 m (Jones 1962:1). Most land surfaces either slope or form ridgetops, which contribute to the picturesque rolling landscape.

The mixed alluvial soils are the most productive soils in the county. Using corn production as a fertility index, the soils encountered in the project corridor are almost uniformly low, 10 to 20 bushels per acre under unimproved conditions (Jones 1962:54-56). The northern and southern segments of the corridor differ. The northern uplands have Tatum association soil that are low in organic content (Jones 1962:4-5), whereas the southern uplands contain the Wilks-Lloyd and Lockhart associations, as well as the mixed alluvial soils found along Gilkey and Thicketty Creek (Jones 1962:6-8). These latter soils, especially the alluvial soils, are more productive than the Tatum series. It would be erroneous to assume that early agricultural production was better in the southern corridor, however. The effects of industry in the northern corridor must be considered.

At present, the archeological models of subsistence potential in South Carolina have not gone much further than the originally proposed riverine and interriverine dichotomy (House and Ballenger 1976; cf. Goodyear, House, and Ackerly 1979). The natural productivity of the uplands for fall nut and deer procurement and the spring and possibly summer harvesting of anadromous fish and cultigens have been emphasized. A beginning attempt to select environmental variables in order to quantify the relationships of site density, site size, tool diversity, and number of temporal components per site location is encouraging (Cable, Cantley, and Sexton 1978). Soil productivity was the single criterion used in the study. Three out of four test implications were supported, i.e., site density, tool number and diversity, and multicomponent diversity increased with increased soil productivity; site size did not (Cable, Cantley, and Sexton 1978:27ff.). At a more general level, variables pertinent to entire drainages have been selected for consideration: watershed size, stream rank and relative resource density, size of floodplains, etc. (Goodyear, House, and Ackerly 1979:132-145). Gathering comparative data from the upper Broad, while well outside this scope of work, would be a very useful research endeavor.

Consideration of technological and industrial exploitative strategies involves not only occurrence of resources but the economics of their use as well (e.g., Moss 1972). For example, while the Kings Mountain Geologic Belt contains many rocks and minerals only a few have been selected and worked (see also the Cultural Assessment section). Geologic, hydrologic, and biotic resources are all considered from a technological perspective.
Prehistoric inhabitants made use of at least three rock types in Cherokee County: the soapstone quarries on the Spartanburg/Cherokee County line (Ferguson 1979) and quartzite and rhyolite used in stone tool production. Other local materials were also used (Appendix II; Taylor 1979), but chipped stone tools manufactured from local quartzite and rhyolite predominate.

The sericite schist rock unit of the Kings Mountain Belt contains thin quartzite beds that outcrop in Cherokee County (Overstreet and Bell 1965:49, 51). Because this sericite schist underlies the northern segment of the corridor (Jones 1962:2, 6), quartzite may outcrop there, especially as this area is where the sericite schist and hornblende schist rock define an anticline fold in which most of the quartzite occurs (Overstreet and Bell 1965:51). Quartzite outcrops are thought to occur on the Draytonville and Saladback mountains, located just west of the project area (Jones 1962:2). Rhyolite, composed of feldspar and quartz, is the volcanic equivalent of plutonic rocks (Hurlbut 1959). Unclassified granites and felsic volcanic rocks are found throughout the Kings Mountain Belt (Overstreet and Bell 1965:54).

Historically, local magnetic ores and limestone were mined for iron production. The hornblende schist unit, which is found in eastern and southeastern Cherokee County, is characterized by metamorphosed ferromagnesium minerals, i.e., hornblende schist and chlorite schist (Overstreet and Bell 1965:44; Hurlbut 1959). A large quarried area lies between the project area and Cooperville (Fig. 15; Chapter 5). Gaffney Marble is found in a massive deposit just south of Gaffney where it is exposed in two beds, 50 cm and 1.5 m thick (Overstreet and Bell 1965:49). The limestone is so pure that it is used commercially (Moss 1972:316; Overstreet and Bell 1965:49; Jones 1962:3).

The narrow Piedmont streams have enough of a gradient to power waterwheels used in the iron furnaces and forges, textile mills, and grist and saw mills (Moss 1972; Mills 1826) and to generate electricity today (Jones 1962). The factory complex at Cooperville also contained canals used to transport the pig iron as well as power the furnaces (Moss 1970; Chapter 5).

Approximately 50 plant species were used in aboriginal technologies (Yarnell 1964; Canouts 1971). While many of these same species served to build and furnish the European homesteads, several were singled out for extensive and exhaustive use in various economic enterprises. Johnson grass was desirable for early cattle raising endeavors of the mid-1700s (Moss 1972:8). Hickory was preferred for processing charcoal for the iron furnaces (Bining 1938:75) and oak, specifically white oak, for making barrels (Moss 1972:318).

Although hickory was preferred, oak, ash, chestnut, and pine were also cut for the production of charcoal. An area known as the "Coaling Grounds" (Moss 1970), where the charcoal was processed, lies just south of Gaffney. The wood was stacked in cones, 8 m in diameter and 3 m high, and smouldered in big circular pits measuring 10 to 15 m in diameter (Bining 1938:71). Furnaces producing two tons of pig iron
used about 800 bushels of charcoal in a 24-hour period. This would account for as much as 5,000 to 6,000 cords of wood a year, equivalent to 240 wooded acres (Bining 1938:75). If the furnaces along the upper Broad (numbering around eight) operated for a period of 10 years, nearly 20,000 acres or between 8 and 10% of Cherokee County would have been deforested.

Environmental Parameters

The natural parameters of temperate forests relate primarily to seasonal and yearly cycles of resource occurrence and abundance. Temperate forest ecosystems are highly resilient, i.e., the biotic species can withstand a wide range of climatic fluctuations (Odum 1971:387). The most obvious parameters of biotic production and/or carrying capacity are caused by man's manipulation of the environment in order to develop and maintain simpler ecosystems, which, albeit highly productive, are very susceptible to environmental imbalances (Odum 1969).

While the effects of human population density and exploitative impact on the environment is not well understood for the prehistoric period, the impacts of early European land use have been so severe as to hinder attempts at environmental reconstruction. Still some observations about successional vegetation cycles and soil depletion are possible.

The natural climax forest in the upper Piedmont is oak-hickory (Oosting 1942). The normal ecological succession that would occur on an abandoned upland field is as follows (Oosting 1942:28-54): (1) closed pine stands at 10-15 years; (2) conspicuous oaks and hickories at 22 years (tree-size as early as 24 years); (3) a subdominant overstory of pine (due to height) and an understory of hardwoods at 75 years; (4) oak-hickory dominance at 100 years; (5) pine relics only at 150-200 years.

The bottomland succession is much like the upland, but more rapid (Oosting 1942:75). After 34 years, hardwoods appear in the overstory. Moisture significantly affects the facies. Maple-elm-ash dominate the bottomland forest; oak-hickory dominance is a post-climax phenomenon (Oosting 1942:75).

The major cause of prehistoric land clearing would probably have been fire, either intentional burning or lightning-caused. It is not known if or how the late prehistoric agriculturalists cleared their fields. Well-developed pine forests would be little affected by ground fire (Oosting 1942:77). Crown fires, on the other hand, would speed up the growth of the mixed hardwood forests because the hardwood stumps would survive. Clear-cutting of either pines or hardwoods works much the same way. The stand would tend towards an oak-hickory dominance rather than the destroyed parent stand (Oosting 1942: 78, 119). Pine apparently does not regenerate on cleared areas with a hardwood understory.
European clear-cutting for agricultural and industrial purposes was so extensive, however, that the soils were severely depleted (Trimble 1974). The A horizon has been partially or totally lost from the uplands (Oosting 1942:86-88). Active gullyng slows down the ecological succession and interferes with soil enrichment because of the poor development of the hardwoods.

The general farming areas in Cherokee County began to experience increased soil erosion in the 1800s (Trimble 1974:56). Cotton agricultural and industrial timbering took their toll. Extensive gullies in abandoned fields were a common sight after the 1830s despite repeated warnings about a fate similar to that of the midland plantations (Trimble 1974:57). Between 1880 and World War I, cotton production was pushed onto virgin upland slopes because of rising cotton prices (Trimble 1974:85). The up and down rows on the steep slopes began washing so quickly that in the 1930s, the United States Department of Agriculture reported that over 30,000 sq km had been destroyed by gullyng (Trimble 1974:84).

In the 1930s, the Civilian Conservation Corps planted a few acres of pines in Cherokee County to slow down the erosion (Jones 1962:2). The rate of erosion in forested areas is approximately 1/500 that in cleared or fallow fields (Trimble 1974:26). Since that time, conservation practices have reduced the sediment loads carried away in the drainages.

Site Transformation Processes

Natural and culturally modified environmental processes affect the expression of the archeological record. As seen, the European effects on the landscape have been so severe that artifacts lying virtually undisturbed for thousands of years are no longer in situ. Site discovery and assessment relate directly to horizontal and vertical vectors of artifact displacement.

Most of Cherokee County has been cultivated at one time. The different plow blades, the depth of the plowing, the direction plowed, etc., not only disturb the site, but affect its surface appearance. Although the horizontal movement of artifacts may not completely confuse their general relationships (Roper 1976), the vertical mixing of artifacts in the plow zone will change the surface assemblages from year to year (House and Schiffer 1975:174).

Today's soil horizon is truncated in most of Cherokee County; that is, the upland A horizon has been washed away through gullyng. Smaller artifacts may have washed away, also, leaving larger artifacts on the site and, thus, a biased archeological record (Harmon 1980). Poor soil development also contributes to problems with soil cracking and tree wind throws, which cause downward migration of artifacts (Canouts 1976).

Streams carrying heavy sediment loads during the period of acute erosion in the Piedmont filled their channels, no doubt burying arche-
ological sites. Since soil erosion has decreased, many streams are now degrading and breaking up this alluvium (Trimble 1974:118-120). But the streams are also migrating and may cut through archeological sites that were originally deposited on the stream banks.

Much of the land has been reclaimed through reforestation, and many sites will have no surface visibility. Many more sites will be found in cultivated fields because of greater visibility. Cultivated fields in productive soils should also have a higher incidence of sites, especially multi-component sites (see also Cable, Cantley, and Sexton 1978). Good land is usually kept in cultivation. For example, there was a tendency for early settlers to occupy abandoned Indian fields (Moss 1972:8). The high soil productivity would also have influenced the natural productivity of the biotic community exploited by hunters and gatherers.

Many farmers have extensive artifact collections from their own fields (Charles 1981; Appendix II). Amateurs who selectively collect surface artifacts also bias the archeological record (House and Schiffer 1975:175). Thus, it is important that surface collections by professionals be as rigorous as possible in order to overcome collection biases.

The major methodological concern of this archeological study is the impact of transmission line construction on archeological sites (Canouts 1979, 1980; Brockington 1980). Assessing these impacts cannot be complete with incorporating all of these site transformation processes in a predictive model of the relationship between surface and subsurface materials.

Cultural Assessment

Limited professional and amateur archeological investigations have been undertaken in Cherokee County and in the interior Carolina Piedmont as a whole (Taylor 1979). Legislative mandates to protect the public's cultural heritage and the continued interest of South Carolina's citizens in their own colonial and southern history have spurred recent efforts to document and assess the cultural resource base. Prior to this, active archeological interest in the area had been sporadic. Only one site, Cowpens National Battlefield, had been placed on the National Register of Historic Places (Table 1).

In the 1970s, several attempts were made to develop a state historic industrial complex, and a county recreation area has been built near the old Cherokee Ford Ironworks (Chapter 5). In 1976 that site was placed on the National Register. The National Park Service has been instrumental in developing historic and archeological attractions in the Kings Mountain National Military Park. The archeological excavation within the park is one of only two reported excavations in the county (Carrillo 1976). The other excavation, initiated by a group of student amateurs from Wofford College, was at a rock shelter located on the Broad River; subsequent efforts have been directed towards nominating this site to the National Register (Novick and Cantley 1979).
Planned surveys began in 1972, when an Appalachian survey located one log structure in the county (38CK4). Beginning in the mid-1970s, the Institute of Archeology and Anthropology, the South Carolina Department of Highways and Public Transportation, and Carolina Archaeological Services conducted a number of cultural resource management assessments involving highway corridors, power plants, and waste water treatment facilities (Taylor 1979). Recent assessment of the soapstone quarries on the Spartanburg/Cherokee county border resulted in a thematic nomination to the National Register and recommendations to preserve some of the quarries as parks (Ferguson 1979). The most ambitious state sponsored program has been directed toward contacting local amateur collectors to inventory their collections and associated sites (Charles 1981).

As a result of these studies, the Statewide Archeological Site Inventory files for Cherokee County contain 49 sites: 39 prehistoric components; 18 historic components; and 3 unverified entries (Table 2). These sites display a temporal and cultural complexity that is beginning to supplement the broad developmental sequence outlined for this region. Appendix I provides a general prehistoric and historic background for the upper Piedmont in South Carolina. The following discussion focuses specifically on the substantive archeological issues involved in building a predictive model of site occurrence of the county and the project area in particular. Based on man-land relationships, the model(s) emphasizes adaptive responses and their changes through time.

Prehistory

Subsistence-settlement models are used widely in prehistoric archeology. Paleoecological variables, such as climate, resource density and distribution, and seasonality, plus socio-economic factors, such as population density, technology, and scheduling strategies, are important modeling constructs. The most obvious and complementary patterning in the two data sets corresponds to the differences in upland or interriverine and riverine exploitation strategies. The
formulation of testable hypotheses, in the initial model-building step, addressed the differences in the tool assemblages and site structure between small extractive activities occurring in the interriverine zone and the sustaining, maintenance activities performed at base camps in the riverine zone (House and Ballenger 1976).

While the distinction between riverine and interriverine has not been well-defined, the riverine zone coincides with the principal river and perhaps its major tributaries in the drainage system, e.g., the Broad or the Catawba (Goodyear, House, and Ackerly 1979:131). The interriverine zone is comprised of the uplands and smaller drainages. Based on these criteria the riverine zone in the project area is composed of the Broad River and perhaps Thicketty and Gilkey drainages and their immediate environs. The land rises sharply away from the Broad River in the survey area. Thus, for the purpose of this discussion, except where the corridor crosses the Gilkey-Thicketty floodplain, the corridor is considered to transect the interriverine zone. How far the riverine zone extends into the interior is an arbitrary measure dependent ultimately upon an archeological explication of meaningful behavioral correlates.

Four functional site types, hypothesized thus far, have been used to compare location and assemblage variability: (1) intensive habitation; (2) less intensive habitation; (3) quarry/workshops; (4) biotic extraction (House and Ballenger 1976:81-83). All of these sites are found in the interriverine zone. The majority of sites in the interriverine zone may be labelled extractive (House and Ballenger 1976:106). Distinguishing quarry/workshop sites from biotic extractive locations and distinguishing animal from plant extractive activities on the basis of tools and debitage is proving difficult (House and Ballenger 1976:96ff.).

Habitation is a qualitative measure of the nature and duration of human occupation. Some less intensive habitation sites have also been identified in the interriverine zone (House and Ballenger 1976:115). The occurrence of extended habitation sites (perhaps no more than seasonal occupation) has been thought to correlate highly with riverine zones. Only one such site has been recorded on the upper Broad (Novick and Cantley 1979). One of only two rock shelters to be found in the state, the nature of its occupation may be considered unique.

Not all types of sites are found in all time periods in the interriverine zone. Perhaps these site types best record the Archaic occupation that spanned some 6,000 to 8,000 years (Appendix 1). The number of multi-component sites (9/49 = 18%) does suggest a stable pattern over a long period of time (Table 2).

The survey files have no record of Paleo-Indian sites in the county. These groups of highly mobile hunters and gatherers, to use Binford's (1980) organizational model, "mapped onto" their resources. Very few residential bases have been identified in the Southeast due, in part, to the length of time elapsed and to the low artifact density associated with temporary camps. Some extractive locations have been identified. Early tools show a marked preference for highly silicious
### Table 2

**Archeological Sites Located in Cherokee County**

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**Totals**

|          | 0 | 25 | 3 | 17 | 8 | 4 | 2 | 18 | 12 |

**Note:** The table documents the presence of various archaeological sites located in Cherokee County, categorized by their periods and periods of occupation.
raw materials that produce good concoidal fractures (Goodyear 1979). Differential geological outcropping of these silicious materials and the need for tools to be carried, maintained, and replaced contributed to a highly sophisticated and conservative technology (Goodyear 1979). Paleo-Indian tools and associated biotic resources are also rare. There was a rapid environmental transition at the end of the Pleistocene that changed the structure of the biotic resources. Whether large terrestrial (perhaps now extinct) herd animals or marine (even riverine) resources were preferred food items is unclear.

There are no known highly silicious outcrops in Cherokee County. The biotic resource structure of the riverine environment along the upper broad during this period has not been studied. Under limited stress conditions, e.g., low population density, the preferred camp sites and locations should correspond to preferred resource habitats. By comparison, the upper Broad resources would probably never have been as dense or diverse as resources further downstream. However, the Broad might have served as a route through the area. Occasional occurrences of early tools might be expected along the river. One Suwanee and early Dalton and Taylor points have been observed in the local collections from the Broad River area (Appendix II).

As the climate stabilized, settlement in the Piedmont became more logistically oriented. That is, locating base camps near seasonal resources, the Archaic groups positioned themselves over the landscape at small, specialized extractive locales. The procurement of white-tailed deer and acorns and hickory nuts has been hypothesized (House and Ballenger 1976:82-83). In the temperate forest, resource scheduling corresponded to seasonal abundance that was quite predictable, e.g., spring fish runs in the riverine zone and fall nut collecting in the interriverine zone.

At least three sites in the county have an Early Archaic component (Table 2). Some archeologists would argue that the earliest evidence of man in the Piedmont coincides with an Archaic settlement and would combine Suwanee, Dalton, and Taylor with Palmer and Kirk hafted bifaces. In this discussion Palmer and Kirk bifaces are assigned to the early Archaic; the others are considered to belong to a transitional stage. The Hall collection (Appendix II) is interesting from the standpoint of the sheer number of Palmer points and their manufacture from local quartz and rhyolite.

Quartz predominates in the manufacture of chipped stone tools during the Archaic (Appendix II; Taylor 1979). The quality of vein quartz, river cobble quartzite, and the quartz residuum found in the soil varies considerably. Whether quartz was used opportunistically or quarried is a question undergoing current research (House and Ballenger 1976; Ann Tippitt, personal communication). Whatever the results, the material was local, and although not as well-suited to knapping as chert, a quartz industry has been recognized in the Middle Archaic (Caldwell 1954; Goodyear, House, and Ackerly 1979). Over a third of the county's prehistoric sites date to the Middle Archaic (Table 2).
The transition from the Archaic to the Woodland is thought to relate to increased sedentism and/or population aggregation in energy rich environments (i.e., riverine zones). The impetus and processes of this change are not understood. Certainly, the settlements required increased organizational complexity in order to procure resources for a sedentary or semi-sedentary population. This organizational complexity would be reflected in greater functional diversity in the logistics of actual physical procurement, processing, and storage of resources and the socioeconomic trade relationships involving these same three activities. This diversity is translated as greater artifactual and feature diversity, if not at the site level, then at the level of the total subsistence-settlement system.

The major difference between the Woodland and Mississippian periods appears to be one of degree, involving the relative reliance on natural riverine resources and domesticates, increased population density, and more socioeconomic status differentiation. The structure of the resource base would affect these potential differences. In the upper Broad riverine zone in Cherokee County, these differences are expected to be negligible because of the constraints of a narrow floodplain.

Two sites with Woodland and Mississippian components are recorded in the county: one interriverine surface scatter and a riverine rock shelter (Table 2). Neither site has been adequately tested to determine functional differences between the two time periods. However, the excavated artifacts suggest that small-scale, extractive activities took place in both periods (Novick and Cantley 1979).

Because the Broad River is so near the project area, major habitation sites are not expected to occur in the transmission line corridor. Seasonal camps along the tributaries may occur if a simultaneous upland/riverine exploitation strategy was employed. The edge (upland/riverine), in this instance, would occur quite close to the confluence. There is every likelihood that the project corridor that parallels the Broad River could intersect such points. The most typical, prehistoric site that should be encountered, however, is an extractive site, probably not a quarry or workshop but a food procurement or processing station. As often as not, the site will date to the Archaic period, with a high probability of a Middle Archaic component.

Characterization of the artifact assemblage from an extractive site is more difficult (cf. Taylor 1979). Exhausted and broken bifaces and reduction and resharpening waste flakes predominate. House and Ballenger's (1976:96) attempt to derive debitage and biface indices to help distinguish manufacturing from use assemblages achieved only fair success. At a use (extractive) site, they predicted a high biface to other flake ratio.

The earliest and latest temporal assemblages contain the majority of the non-local raw materials (Novick and Cantley 1979; Cable and Michie 1977; Cable, Michie, and Perlman 1977; Appendix II). Although one of the few known soapstone quarries is located on the eastern edge
of the county, no soapstone artifacts have been recorded at these sites; soapstone was identified in sherd temper, however (Novick and Cantley 1979).

Pottery could be expected on a Woodland and Mississippian extractive site. Unfortunately, functional studies of ceramic pots lag far behind spatial and chronological identifications. The pottery along the upper Broad appears to be manufactured from the local clays and bears the closest resemblance to the Appalachian Summit tradition (Novick and Cantley 1979).

Ethnohistory

Early European accounts of the Piedmont Indians indicate that subsistence was based on riverine agriculture with multiple harvests and supplemental collections of wild plants, small game, and fish (Hudson 1970:20ff.). This pattern, which is like the riverine emphasis hypothesized for the later Woodland and Mississippian periods, would be hard to distinguish archeologically, unless European contact goods were present in the archeological assemblages.

Hudson (1970:23) speculates, further, that the Piedmont Indians, or "hill tribes" as he calls them, were less populous, more egalitarian, and less socially complex than the mountain Cherokee, the Creek, and the coastal tribes. Who were these "hill tribes"? How distinct were they in terms of language and cultural affiliations? Was their marginality due to a lack of ecological potential or lack of maximizing the ecological potential present? These questions have not been researched thoroughly.

When the Cherokee and Catawba first appear in the early records of the 17th century, explorers placed the lower Cherokee on the headwaters of the Savannah and the Catawba Indians on the Catawba River. The Broad River may very well have served as a boundary between the two groups; the Catawba name for the river translates as the Line River (Milling 1969:232). An earlier account, which agrees that the Cherokee were to be found west of the Broad, places the Catawba Indians east of the Catawba River. However, Milling (1969:232) contends that the Catawba towns were located in that neutral territory now comprising York and Chester counties.

Marginal areas and boundary situations are interesting social phenomena (Miller and Steffen 1977). The archeological manifestations of boundaries may assume many different forms depending on the population density and the economic base. In some situations, it is economically advisable to establish and defend territories complete with fortifications.

European contact affected the late prehistoric subsistence-settlement patterns and ultimately the interaction and very identity of these Indians. Bargaining for commodities, e.g., animal skins (Hudson 1970:31) and Indian slaves (Hudson 1970:39), with European traders quickly impacted former hunting territories and reinforced
traditional raiding forays by Indian war parties. Traditional southeastern warfare, most likely a means of achieving additional wealth outside of the society (Canouts 1977), readily accommodated the trafficking in skins and slaves.

As early as 1693, the Cherokees apparently complained that the Catawba were selling their kinsmen to English traders (Miller 1969: 233-234). Real animosity between the two tribes began during the French and Indian War of 1756: the Catawba fought the French, the Cherokee the English (Hudson 1070:38, 49ff.)

Archeological evidence of hunting and raiding parties should be rather ephemeral, especially in an area of low population density or in an area with no fortified towns. A major battle between the Cherokee and Catawba Indians is said to have taken place near Cherokee Ford on the Broad River (Johnson 1952); but this account is unsubstantiated. The boundary between the Indians and upcountry settlers was much more visibly fortified.

The Cherokee protected their territory west of the Broad against European settlers, until South Carolina established a line of forts in the middle 1700s. Fort Thicketty, on Thicketty Creek near the confluence with Goucher Creek (Johnson 1952), was the easternmost fortification (Moss 1972:3). By 1776, the continuous Indian raids forced the South Carolina upcountry settlers to unite against the Cherokee (Moss 1972:53). Whigs and Tories, accompanied by their Catawba allies, successfully destroyed the Cherokee villages located east of the mountains (Moss 1972: 55; Wallace 1934:166-167). At the end of the Cherokee War the Catawas were no longer a strong military force (Hudson 1-970: 51). The surviving Cherokee were assimilated by the Overhill Cherokees (Moss 1972:55).

History

The settling of the South Carolina upcountry is marked by conflict over sovereignty (territory) directly and indirectly related to the economic development of the area. Between 1750 and 1760, fearing French encroachment, the British government offered economic subsidies and tax incentives to settlers moving into the upcountry (Moss 1972: 5-6). These incentives coupled with the Cherokee treaty of 1751 increased the population nearly 50%. Prior to that time, English and Scotch-Irish immigrants had spread slowly up the Broad, along the Pacolet River and Thicketty Creek, positioning themselves near forts and "cowpens" for protection against the Indians (Moss 1972:3-4).

These early farmers planted corn, when possible, in fields abandoned by the Indians (Moss 1972:8ff.). Wheat and later cotton became the primary money crop of these subsistence farmers. Economically noteworthy are the round-up or cowpens associated with the early cattle raising industry. Johnson grass was excellent graze, and land was valued in proportion to its productivity (Moss 1972:9). Cowpens, log cabins, and surrounding fields of corn used to feed the settlement formed embryonic communities, three of which were located in the area
of Cherokee County: Hardin's Place, Grindal Shoals, and Hannah's Cowpens (Moss 1972:10).

Land grants issued by both North and South Carolina led to territorial disputes at the border. North Carolina claimed the upper Broad, north of the Pacolet River. The influx of immigrants caused a resurvey of the border westward to the Indian line or the northeast corner of present day Spartanburg County (Moss 1972:50,357). From 1769 until after the Revolutionary War, the territory was under the jurisdiction of the South Carolina Ninety Six regimental district (Moss 1972:358).

In their fight against the Cherokee in 1776, the settlers felt the first effects of the Revolutionary War. Both Whigs and Tories banded together to defeat the Cherokee, who had become disgruntled over the broken promises of the American revolutionary government (Moss 1972:53). The second war came to the upcountry in 1780 after Charleston fell to Lord Cornwallis (Wallace 1934:203ff.). The upcountry fight was between the settlers, the majority of whom had been loyalist sympathizers at the outbreak of the war. However, the Whig forces were soon joined by the fiercely independent mountain men of the Carolinas, Tennessee, and Kentucky.

Cherokee Ford on the Broad River adjacent to the project area was the site of at least two military maneuvers (see also Appendix III for an example of its use in the Civil War). It was the staging point for the Whig attack on Fort Thicketty. Assembling at Colonel McDowell's camp, 600 men marched from the Ford and surrounded the fort on July 30, 1780 (Moss 1972:59). Colonel Moore surrendered the fort without a fight. The captured munitions were returned to camp which was shortly moved south to Smith's Ford on the eastern bank of the Broad (Moss 1972:62; Mills 1826).

In September the Patriots, assembled at Hannah's Cowpens, decided to move against Major Ferguson (Moss 1972:66ff.). Crossing at Cherokee Ford, they engaged the Loyalists at Kings Mountain where they won a decisive victory (Wallace 1934:230; Moss 1972:68-70). Early in January, 1781, Hannah's Cowpens itself was the scene of the battle that marked the turning point of the war for the Patriots (Wallace 1934:257). Here a militia force defeated a professional army in a battle that was to be imitated again and again by American forces (Moss 1972:79).

Major Williams, who was killed in the battle at Kings Mountain, was buried there (Moss 1972:70). An archeological investigation to verify the location of his grave and three of his compatriots in the Kings Mountain National Military Park was unsuccessful (Carrillo 1976). In 1815, the bleached bones of both Patriots and Loyalists had been gathered from the mountain and buried in a mass grave (Carrillo 1976:36). No graves were discovered in the vicinity of the 1815 Chronical Marker commemorative.

The archeology of battle fields, bivouacs, and troop movements is difficult to document and reconstruct. More rewarding is the attempt
to document different behavioral patterns concerning the use of space and manifestations of material culture. The ethnic background and life styles of the upcountry farmers were reflected in their land use, architecture, and material objects. The archeological excavation of a 1788 German occupation at the Howser House, also in the Kings Mountain military park, was a beginning attempt to document possible differences in the material culture between German and British homesteads (Carrillo 1976:9). Studies of early colonies and forts have shown distinct ethnic patterns (South 1977).

After the Revolutionary War, the territory was divided into three counties: Spartan, Union, and York (Moss 1972:358). What was later to become Cherokee County corresponded to the "Old Iron District" that grew up on the upper Broad around Blacksburg and Gaffney (then in Spartan County) in the 19th century. The natural and human resources of the territory proved to be conducive to mining and later textile production, as well as agriculture.

The Revolutionary War interrupted the operations of the Colonial bloomeries and furnaces (Lander 1954:337). After the War, the majority of furnaces were rebuilt along the Catawba drainage in the Camden District (Pearse 1876:94). The panic of 1820 saw the decline of the Camden District and the rise of the Spartanburg District to undisputed leadership in iron production until after the Civil War (Chapter 5; Moss 1972:307ff.). The industry was monopolized by three companies located on the upper Broad, adjacent to the project area. Of the eight South Carolina furnaces in production in 1856 (Swank 1892:277), two were located on the creeks near the project area: one on Peoples Creek, the other on the south bank of London Bridge Creek (Moss 1970, 1972: 309; Mills 1826; Chapter 5).

The band of magnetic ore running from the headwaters of Peoples Creek to Kings Mountain was quarried for the furnaces. This complex banding of minerals also contained limestone and other metals such as gold and tin. The furnaces required limestone for flux. In addition, the quarrying of limestone became a commercial enterprise in its own right. Processing rock kilns were built adjacent to the quarries around Blacksburg (Moss 1972:316). Shaft mines were sunk for gold and tin but were mined only for a short period of time as the costs soon became prohibitive (Moss 1972:312ff.).

The forests were also mined for timber used in the furnaces and kilns. Several thousand cords of wood went into each furnace every year. At the same time, cooperage firms were established to make barrels used to haul the limestone (Moss 1972:318). Smaller businesses were already located on the Piedmont streams that were used to power these furnaces and the textile mills. An 1820 survey placed grist and saw mills on Peoples Creek and near the juncture of Gilkey and Thicketty creeks (Mills 1826).

The Scotch-Irish, mill-worker immigrants brought their knowledge of textiles with them to the upcountry in the 1700s (Moss 1972: 330ff.). Early textile centers below the Fall Line were augmented in 1815 when textile manufacturers from the Northeast set up a commercial
factory in the Piedmont county of Spartanburg. In partnership with the South's major economic crop, cotton, the textile industry flourished before, as well as after, the Civil War.

The greatest impacts from the Civil War affected the county's industries (Moss 1972:148-149). Exempting iron workers from the military and cutting the last of the oak and hickory for charcoal were among the measures employed to keep the forges in full 24-hour production. The textile mills were also commanded to accept farm goods for cloth and textiles. At the end of the war the government controlled 50% of the industrial production (Moss 1972:148).

Securing an available labor force for the iron and textile industries led to a new type of settlement: the company town. Cooperville and the Cherokee Ford Ironworks were built on the Broad River by the Nesbitt Manufacturing Company (Moss 1972:310; Chapter 5). Slave labor used in the forges (Moss 1972:311; Appendix III) was not suitable for the mills. After the Civil War, the mill owners enticed the mountain artisans from their isolated cabins to run the mills' machines (Moss 1972:331). These workers moved to the company villages, e.g., to Cherokee Falls and Gaffney adjacent to the project area. Outside of Gaffney, these were small villages in which half of the approximately 500 villagers were employed by the mills (Moss 1972:334). Mill villages have come under recent sociological and geographical archival study (Deborah Miller, personal communication).

In 1897 the residents of Gaffney finally succeeded in their campaign to establish a new county (Moss 1972:359). This move was made, no doubt, in order to retain an economic viability at odds with the development of Spartanburg and Rock Hill. Earlier attempts to create a county had failed because of the loss of lucrative industries to the respective counties, i.e., Spartanburg and York (Moss 1972:358-359). However, by the turn of the century iron manufacturing had been abandoned due to the depletion of the forests and the use of anthracite coal in "hot" furnaces (Lander 1954; Chapter 5). The mills continued to operate, experiencing a boom just after World War I (Moss 1972:353); but cotton farming soon declined due to overproduction and severely depleted soils.

Summary

The archeological record of Cherokee County has emerged through the interaction of man with his environment and with his society. For over 8,000 years, hunters and gatherers in the upper Piedmont seasonally occupied the riverine and interriverine zones in the upper Broad drainages. Their yearly, perhaps territorial, round left a record of complementary base camps and extractive sites. With the advent of agriculturally-oriented societies in the late prehistoric period, man's harvesting of the environment became pronounced enough to leave vestiges of younger ecosystems along the riverine zones (cf. Harper 1958) in addition to villages and specialized activity sites.

The introduction of a foreign European market system by early
European traders began a cycle of economic exploitation and conflict that drastically affected human and natural resources in Cherokee County up to World War I. Indians fought Indians for skins and slaves. Settlers moving into the upcountry fought Indians over access to cultivable and grazing lands. Colonial governments competed with each other over land grant rights. Settlers fought settlers to gain economic independence and create a new sovereign state. Americans competed with one another in the industrialization of their country and county, sacrificing the natural resources in order to maintain local and national supremacy. In the Civil War, Americans fought Americans, changing the conditions of human labor and foreign economic trade.

The environmental conditions had already changed. The lack of land and other resource management practices had drastically altered the productivity and resilience of the natural ecosystem. The last major push to produce cotton for the world market just before World War I led to its complete collapse. The ecosystem did not quickly recover from the accumulated effects of continuous overexploitation. As part of the environment, the archeology of Cherokee County suffered though these historic events while recording them.
CHAPTE 3

PHASE I: RECONNAISSANCE SURVEY

Field investigations of the proposed Cherokee transmission line were conducted on February 20 and 21, 1980. Veletta Canouts assisted by Michael Harmon from the Institute and R. Andrew Cloninger, Duke Power Company representative, field checked approximately 25% of the linear distance within the project corridor.

Survey Field Methods

A combination of logistical and archeological factors affected the field strategy. Because the transmission line corridor lies in presently undeveloped or underdeveloped areas, access and ground visibility were major concerns. Fortunately, county and state roads intersected the transmission line route at rather systematic intervals, e.g., between one and two kilometers apart. Survey points at these intersections resulted in almost even coverage of the line. Furthermore, the co-existence of roads and clearings resulted in higher surface visibility at these points (Figs. 2, 3, 4, and 5).

In order to compare the survey conditions and results of these isolated points with continuous coverage, two two-kilometer survey transects were plotted. While the resulting length of the transect was based primarily on logistical factors, the location of the transects involved archeological consideration. The corridor cross-sections the grain of the topography; that is, it cross-cuts the ridgetops and eight rank 2 and rank 3 drainages, which flow into the Broad (rank order calculated after Strahler 1964; see also Weide and Weide 1973). Like the roads, these drainages occur at regular intervals along the line (Figs. 2, 3, 4, and 5). Permanent water sources are correlated highly with human habitation. Yet the limited floodplain of these drainages and the proximity of the Broad River suggested that sites found in the corridor would more likely reflect the use and exploitation of the upland areas away from the river (Chapter 2).

The transects, designed to run between the drainages, were stratified on the basis of the two sets of power lines converging at Duke Power's Cherokee Nuclear Station. These two corridor segments differ in surface elevation, distance from the Broad, and width of drainage floodplains transversed by the transmission lines. The northern segment is between 50 and 60 m higher with steeper drainages nearer the Broad River. Transect I (Fig. 1) runs northwest and southeast between Toms Branch and London Creek in an area of previously recorded sites (Cable, Michie, and Perlman 1977). Transect II, which is twice the
Figure 2. Project Corridor: Map 1
FIGURE 3. Project Corridor: Map 2
Figure 4. Project Corridor: Map 3
distance from the Broad (Figs. 4 and 5), crosses the uplands between Abingdon and Gilkey creeks along the southern extension of the line.

The two archeologists traversed the two transects and ten field check points on foot. Using a combination of aerial photographs and engineering maps, Cloninger efficiently guided the team to the road check points and located the transmission centerlines along the forested transects. In four-person work days, the archeological survey team covered a total of 5.65 km, 26.5% of the entire corridor and sunk in excess of 650 shovel probes (Table 3).

Shovel probes were necessary because there were essentially no plowed fields in the right-of-way. Check point 5 was the only extensively cleared area that touched on the corridor (Fig. 1). The two archeologists, spaced between 25 and 50 m apart, shovel probed at average intervals of 20 m. The dirt removed through shovel probes, which averaged 30 cm in diameter and 30 cm in depth, was sorted using a trowel and shovel.

Survey Results

Three archeological sites were recorded on the South Carolina Statewide Archeological Site Inventory forms and are now on file at the Institute of Archeology and Anthropology (Tables 4 and 5). Because the archeological record in the Piedmont consists predominantly of quartz debitage scatters located on ridgetops, site definition was expected to be difficult in areas of low surface visibility. That is, isolated quartz flakes unearthed in a shovel probe may be either the natural quartz residuum found in the soils or culturally worked materials. The distinction between natural and culturally modified quartz flakes in the early stages of lithic reduction is not always clear.

Without recognizable biface thinning flakes or tools, areas showing quartz debris were not assigned site status. In at least two areas, several quartz chunks and flakes were recovered in shovel probes: at check point 9, near stake 1255, and Transect II, 25 m north and south of stake 2000 (Figs. 4 and 5). The topography of the former suggests a potential site location on a rise just west of the corridor. No other concentration of quartz was noted in the latter area, which parallels an intermittent drainage of Gilkey Creek.

Site definition at 38CK58 was also difficult (Table 4). The Broad River drainage is visible from the top of the ridge, looking north. There is every likelihood that a scattering of lithic debris continues to the river. The archeologists made four passes from the base to the top of the ridge. Recent disking of the area preparatory to planting pine seedlings has churned up the soil and rock (Fig. 6). At least one bifacially worked chunk and a secondary flake were collected (Table 5). However, the large soil clumps and the large amount of white quartz broken up by the machinery adversely affected the selective collection of cultural artifacts.
## TABLE 3
### CHEROKEE ARCHEOLOGICAL SURVEY SEGMENTS

<table>
<thead>
<tr>
<th>Field Check Points</th>
<th>Stake Number</th>
<th>Right-of-Way Elevation (ft)</th>
<th>Ground Conditions</th>
<th>Shovel Test</th>
<th>Interval</th>
<th>Length</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1</td>
<td>275</td>
<td>270</td>
<td>600</td>
<td>pasture/wooded</td>
<td>10</td>
<td>250</td>
<td>Figure 2</td>
</tr>
<tr>
<td>2</td>
<td>284</td>
<td>270</td>
<td>550</td>
<td>roadcut and drainage</td>
<td>-</td>
<td>200</td>
<td>Figure 2</td>
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<td>3</td>
<td>250+88</td>
<td>270</td>
<td>680</td>
<td>oak-hickory forest</td>
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<td>40</td>
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<tr>
<td>4</td>
<td>184</td>
<td>319</td>
<td>630</td>
<td>forested</td>
<td>20</td>
<td>2000</td>
<td>Figure 2 Transect I</td>
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<td>5</td>
<td>121</td>
<td>319</td>
<td>650</td>
<td>cleared</td>
<td>-</td>
<td>100</td>
<td>Figure 2 38CK58</td>
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<tr>
<td>6</td>
<td>Cherokee Nuclear Station</td>
<td></td>
<td></td>
<td>road right-of-way/</td>
<td>-</td>
<td>60</td>
<td>Figure 3</td>
</tr>
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<td>7</td>
<td>2268</td>
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<td>650</td>
<td>fallow corn field</td>
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<td>200</td>
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<td>8</td>
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<td>270</td>
<td>640</td>
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<td>150</td>
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</tr>
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<td>9</td>
<td>2155</td>
<td>270</td>
<td>525</td>
<td>pine seedlings/</td>
<td>20</td>
<td>500</td>
<td>Figure 4 Isolated Find</td>
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<tr>
<td>10</td>
<td>2133</td>
<td>270</td>
<td>580</td>
<td>high grass</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>-</td>
<td>270</td>
<td>450</td>
<td>forested</td>
<td>20</td>
<td>50</td>
<td>Figure 4</td>
</tr>
<tr>
<td>12</td>
<td>2031</td>
<td>270</td>
<td>550</td>
<td>forested</td>
<td>20</td>
<td>100</td>
<td>Figure 4</td>
</tr>
<tr>
<td>13</td>
<td>2016</td>
<td>270</td>
<td>550</td>
<td>pine forest</td>
<td>20</td>
<td>2000</td>
<td>Figure 4 Transect II</td>
</tr>
<tr>
<td>14</td>
<td>1960</td>
<td>270</td>
<td>430</td>
<td>pine forest and</td>
<td>-</td>
<td>-</td>
<td>Figure 5 Transect II</td>
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</table>

**TOTAL** 5650
### TABLE 4
**SITE DESCRIPTIONS**

<table>
<thead>
<tr>
<th>SITE</th>
<th>DESCRIPTION</th>
<th>CONDITION</th>
<th>AREA</th>
<th>RELATION TO PROJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>38CK58</td>
<td>An undefined prehistoric lithic scatter is located on a 210 m high ridgeslope, 1.5 km from the Broad River, between Little London and McKowns creeks. Residual quartz outcropping in a Tatum silty clay loam has been exposed by recent clearing activities. White quartz and a blue-gray schist were the major stone resources noted. Since the area has been disked, the quartz was shattered by machinery and spread over the slope. However, culturally modified flakes were identified in the lab.</td>
<td>Disking, clearing, and piling brush have affected at least the first 30 cm of topsoil.</td>
<td>ca. 100 m N-S by 50 m E-W</td>
<td>The site is located on the western boundary of the right-of-way, near stake 121.</td>
</tr>
<tr>
<td>38CK59</td>
<td>A Middle Archaic lithic scatter occurs one half kilometer from the Broad. This site is situated in an open forest with secondary growth of oak, hickory, sourwood, and pine (DBH 10-30 cm). Three quartz Morrow Mountain points were collected from the surface and subsurface quartz materials collected from 16 shovel probes sunk into a brown tan, very fine, sandy loam (Tatum series). Elevation is approximately 200 m.</td>
<td>Very little modern disturbance; probable site integrity.</td>
<td>ca. 55 m along staked centerline by 45 m</td>
<td>The site is located on a centerline at stakes 345 and 344+515</td>
</tr>
<tr>
<td>38CK60</td>
<td>A house mound is featured at this site. Lying just north of a roadcut at an elevation of 160 m, this site is located in an overgrown pine plantation one-half kilometer from Gilkey Creek. A standing stone chimney and covered well are all that remains intact. The house foundation and surrounding trash indicate a post 1900 occupation.</td>
<td>The site was probably abandoned when the area was planted in pine; very little disturbance since then.</td>
<td>ca. 40 m N-S by 30 m E-W</td>
<td>The site is located between the two centerlines near stake 1986+60.</td>
</tr>
<tr>
<td>SITE</td>
<td>Chunks/Shatter</td>
<td>Primary Flakes</td>
<td>Secondary Flakes</td>
<td>Biface Thinning Flakes</td>
</tr>
<tr>
<td>----------</td>
<td>----------------</td>
<td>----------------</td>
<td>------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>38CK58</td>
<td>3</td>
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<tr>
<td>38CK59</td>
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<tr>
<td>Surface</td>
<td>3</td>
<td>1</td>
<td>7</td>
<td>2</td>
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<tr>
<td>ST - 2</td>
<td></td>
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<td>1</td>
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<tr>
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</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>ST - 14</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

38CK 60
Glass: 1 blue; 2 clear
Porcelain: 2 19th/20th century
Stoneware: 1 feldspathic glaze and albany slip

IF Stake 216+63
Stoneware: 1 alkaline glaze

IF Stake 2133
Hand forged iron nut

Key
ST = shovel test
IF = isolated find
Unlike site 38CK58, site 38CK59 (Table 4; Fig. 8) can be assigned a definite cultural-temporal affiliation. Three Morrow Mountain points (Fig. 10) found on the surface date a Middle Archaic occupation (see Chapter 2 and Appendix I). Since the site was covered by humic leaf litter, a series of shovel probes was sunk three meters apart, along two perpendicular grid lines (Fig. 11). About one-third of the probes was positive, but contained little more than flake debitage.

Single component lithic scatters are rare in the Piedmont, and the absence of other bifaces here is intriguing. The occurrence of a high biface to debitage ratio could reflect a single, limited occupation, although the dense vegetation cover may have affected the discovery of the main site area. This dense cover may also have deterred artifact collectors. Except for the road cut and logged stumps, the area exhibits little evidence of disturbance since it was last cultivated or cleared, probably around the turn of the century. The diameter at breast height (DBH) of on-site white oak, post oak, and red oak averages 25 cm, and two of the logged oaks measure 54 and 57 cm at their bases.

The remaining cultural materials located on survey were of late 19th and early 20th century origin. A site number (38CK60, Table 4; Fig. 9) was assigned to the remains of a house foundation, about 20 feet square, with a standing stone and concrete chimney. A well covered by metal sheeting is located about 10 m southwest of the house, and sheet metal and trash lie in small ravines north of the site.

Although this site may not meet the "older than 50 year" criterion established for the National Register of Historic Places (36CFR60.6), its occurrence and condition were noted for both anthropological and archeological reasons. Reconstruction of land use patterns, past and present, help predict the long-range effects of land management practices and their environmental, economic, and social consequences. Furthermore, location of homesteads provides direct evidence of land modification in the area. For the purposes of this study, noting the condition of the site, which is in a wooded setting, furnishes a comparative framework in which to assess the adverse effects of clearing activities on material remains, e.g., displacement, breakage, and loss.

Two isolated historic artifacts were also noted on survey (Table 5). A piece of stoneware was found near stake 216+63 in a grass covered powerline corridor running at right angles to the project corridor. An intensive inspection of the immediate area failed to locate any additional artifacts. At check point 9, a hand forged iron nut was recovered from a shovel probe at stake number 2131. Two cast iron plow blades were later observed in the vicinity. This artifact may yield technical information for those interested in locally manufactured farm implements.

Prior to the survey, a check of the survey files had revealed the possible occurrence of recorded sites in the project corridor (Cable, Michie, and Perlman 1977; Bianchi 1974). At check point 3 the survey
FIGURE 6. Site 38CK58 Looking Northeast

FIGURE 7. Area of Former Site 38CK11
FIGURE 8. Site 38CK59 Looking Southeast

FIGURE 9. Site 38CK60 Looking South
FIGURE 10. Hafted Quartz Bifaces from 38CK59
(Scale 1:1)
team determined that the recorded sites were located further south along County Road 50. Fifteen prehistoric and historic sites were recorded within the fenced nuclear plant site (Bianchi 1974). No further work was recommended for the majority of these sites located in the areas of immediate construction (Bianchi 1974:7-10, 12), including 38CK11, 38CK12, 38CK13, 38CK14, and 38CK15, which lay close to the terminus of the proposed transmission lines. Extensive earth moving activities have since altered the landscape and destroyed the sites (e.g., 38CK11, Fig. 7).

Survey Evaluation

The archeological survey team located two prehistoric and one historic site in four-person days. Using a right-of-way width of 82.3 m, the site frequency for the 5.65 km covered is approximately one site per 15.5 ha. This figure is an extremely low frequency compared to two other archeological survey results (Table 6). Estimating the Gaffney By-pass right-of-way width at 30.5 m (M. Trinkley, personal communication) yields a site frequency of about one site per 2.7 ha. As the archeological team surveyed indirect impact areas, as well, total coverage is probably higher than the estimated 37.5 ha. An areal survey at the Cherokee nuclear plant site, ca. 18.2 ha, yielded a site frequency of one site per 1.2 ha.

While a high site frequency was expected for the Cherokee plant area adjacent to the Broad River, site frequency for the interriverine area covered by the Gaffney By-pass was also unexpectedly high. Since the Cherokee transmission line project area lies, between these two survey areas, in an intermediate zone paralleling the Broad River, it, too, might be expected to show this higher frequency. That it does not may be attributable to one or a combination of the following factors: (1) the degree of survey intensity; (2) ground cover conditions; and (3) a biased archeological record.

Survey coverage of the Cherokee transmission line corridor, while systematic, was not as labor intensive, relative to person-day coverage, as the others. In fact, it was about one-third the average intensity of most surveys conducted under conditions of variable ground visibility. Had the 82.3-meter width of Transects I and II been zig-zagged, coverage estimates would have been substantially lowered. Instead the two archeologists walked almost straight, parallel centerlines, shovel testing at systematic intervals. This procedure was followed because of the difficulty of finding the narrow, albeit clear-cut, centerlines after straying off into the densely wooded areas. More thorough coverage was effected in the rights-of-way at the ten check points, which comprised approximately one-quarter of the total sample size.

Coverage was not as seriously compromised as might be expected by this straight linear approach. Transects are more statistically efficient than other survey units such as quadrats for site discovery (S. Plog 1976:151). Relative to surface coverage, their extended perimeters allow a greater opportunity to locate sites positioned
TABLE 6
COMPARISON OF SURVEY DATA

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Person field days:</td>
<td>4</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Total area covered:</td>
<td>18.2 ha</td>
<td>37.5 ha</td>
<td>46.5 ha</td>
</tr>
<tr>
<td>Coverage per person day:</td>
<td>4.5 ha</td>
<td>4.1 ha</td>
<td>11.6 ha</td>
</tr>
<tr>
<td>Survey methodology:</td>
<td>pedestrian; shovel scrapes; emphasis on cleared areas</td>
<td>pedestrian; shovel testing at 15m intervals in areas of no ground visibility; dirt sifted through screen</td>
<td>pedestrian; shovel testing at 20 m intervals in areas of no ground visibility; dirt sorted with trowel</td>
</tr>
<tr>
<td>Total number of sites:</td>
<td>15</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>Site ground cover:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exposed</td>
<td>8</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Pasture/fallow</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Wooded</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site frequency ca.:</td>
<td>1/1.2 ha</td>
<td>1/2.7 ha</td>
<td>1/15.5 ha</td>
</tr>
<tr>
<td>Corrected</td>
<td>1/5.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
tangentially to the transect borders (S. Plog, F. Plog, and Wait 1977; Canouts and others 1977). The borders can be either the project corridor borders or the centerline borders.

In this case, the centerlines were viewed as narrower transects within the project corridor (Fig. 12). Depending on the shovel probe interval, the edges of sites 1 and 4 might be encountered. With more of the site area lying on the centerline, there is a greater chance of discovering site 2. Depending on the distance the shovel probe might be sunk from the centerline, site 3 may or may not be encountered.

Site discovery in areas of low ground visibility also depends on the shovel probe interval (see Harmon 1980). If the average site size in an area is 10 x 10 m, a shovel probe interval of 20 m would be ineffectual. Although there are few recorded sites in Cherokee county (Taylor 1979), and even fewer recorded site dimensions, the available data suggest that sites can measure anywhere from 25 to 150 m along an axis. If a site were located along the centerline, the chance of encountering it in shovel probes placed 20 m apart would be good, relative to the artifact density.

Low artifact density reduces the probability of site discovery significantly. An experimental, unpublished study in the Midwest indicates that the number of positive shovel probes in a known site area with a moderate to high artifact density is still relatively low (Lynch, 1980). Yet, shovel tests in the Midwest (Anonymous 1976; Canouts and others 1977; Lovis 1976), in the Northeast (McManamon 1980), and in South Carolina (Harmon 1980) have proven to be successful in locating and defining archeological sites.

The shovel testing interval for this survey was slightly higher than that for the Gaffney By-pass corridor (Table 6). However, since almost the entire proposed right-of-way was heavily vegetated, the slightly longer intervals seemed warranted for logistical reasons. In many situations where the topography looked promising or quartz chunks and flakes were recovered in a shovel probe, additional tests were sunk at intervals of 5 m. Thus, while the mode was the 20-meter interval, the statistical average for the entire survey was 8.7 m.

Shovel probes may account for anywhere from 10 to 90% of the total number of sites located on survey, depending on ground cover (Anonymous 1976; Canouts and others 1977; Harmon 1980). Only one shovel probe on the Cherokee transmission line survey yielded a positively identified cultural artifact, the iron nut at stake 2133. However, 38CK59 and 38CK60 were found in wooded areas during the systematic transects. Site 38CK59 was located on top of the ground where an archeologist intended to place a shovel probe. Site 38CK60 might possibly have been located by checking the unimproved road shown on the U.S.G.S. map. Such roads are usually indicative of historic homesteads. Using this same technique to locate site 38CK59, which was partially in a road cut, would have been chancy (Fig. 11). The road cut was overgrown, and biface number 3 was found only after close examination of the known site area.
SITE 38CK59

- NEGATIVE SHOVEL PROBE
- POSITIVE SHOVEL PROBE
- MORROW MT. BIFACE
- STAKE

NOTE: SHOVEL PROBE #3 HAD MORROW MT. BIFACE #1 ON SURFACE

FIGURE 11. Site Map of 38CK59
FIGURE 12

PROJECT SURVEY CORRIDOR SCHEMATIC

230 KV TRANSMISSION CENTERLINES

0 10 20 30 40 50 METERS
This systematic survey compares favorably with the other two survey results, where the majority of sites were found on exposed (cultivated, eroded, or construction) surfaces. The Cherokee plant survey located six historic sites that were above ground chimneys, grave stones, and a ferry slip, all near roads (Bianchi 1974; Fig. 13). An additional four historic sites in exposed areas contained prehistoric components. The remaining prehistoric sites were all located in disturbed soils near access roads. According to Bianchi (1974:3), all but an insignificant amount of area had a thick understory. Thus, it appears that site discovery correlated highly with historic activities leaving visible traces, e.g., nine sites were either historic or historic and prehistoric, and with recently disturbed areas (see Bianchi 1974:6).

All the sites on the Gaffney By-pass survey were located in exposed, cultivated, or disturbed surfaces (Cable, Michie, and Perlman 1977; Fig. 14). The majority of sites were located in clearings between Toms Branch and London creeks, many several hundred to a thousand meters from the centerline. The disproportionate location of all but two sites between these drainages is interesting, especially as 38CK59 was also discovered in the area. But this concentration appears to reflect surface visibility rather than any bias in prehistoric adaptive patterns. The high number of sites (12 prehistoric sites) correlates with the cultivated ridgetops in this area. The only other extensively cultivated area along the highway corridor (immediately north of 38CK29, Fig. 14) was not surveyed.

If the number of sites located in the Gaffney corridor is calculated at 5, the number of on-line sites (Fig. 14), and the unsurveyed area is subtracted (ca. 9 ha), the corrected site frequency is 1 site per 5.7 ha or between two and three times the frequency on the Cherokee transmission line corridor. This figure compares favorably to results from a Midwestern upland survey. Under conditions of variable ground visibility, the survey transects of stream ranks 2 and 3 in the Cache River drainage yielded estimates of 1 archeological locus per 6 to 10 ha (Canouts and others 1977). If these estimates are close approximations, the number of sites in the Cherokee survey segments should have totaled between 6 and 9.

Thus, the Cherokee transmission line survey is assessed to have been between 30 and 50% effective in locating archeological sites. Considering the ground cover, this is a fair representation. If the isolated finds are counted as archeological loci, as they were in the Midwestern survey, there is an even closer correspondence.

During the survey several potential site areas were noted: (1) check point 1 on a slope adjacent to Peoples Creek; (2) Transect I near stake 200; (3) check point 8 near stake 2155; and (4) Transect II near stake 2000. Mountain laurel and other dense underbrush contributed to extremely poor visibility along the deciduously wooded corridor comprising Transect I. However, more than one area looked promising in terms of site potential. Transect II, a predominantly pine forested corridor, was more open. In addition to the one interriverine area, there is a possibility that sites may have been buried by
FIGURE 14: Archeological Resources in the Vicinity of the Gaffney By-pass Route.
alluvial deposition along Gilkey Creek. If any one of these or similar areas in the surveyed segments prove to have sites, there will not be a great discrepancy between the expected versus the actual number of sites.

Summary

A two day archeological reconnaissance survey was conducted for the proposed 21.3 km, 230 kV Cherokee transmission line corridor. Two archeologists systematically walked and shovel probed, at intervals of 20 m, two two-kilometer transects and ten field check points totaling 5.65 km. Three archeological sites and two historic isolated finds were recorded. Because of the heavy vegetation cover, the survey is estimated to have been less than 50% effective in locating sites.
CHAPTER 4

PHASE I: PREDICTIVE ASSESSMENT AND RECOMMENDATIONS

The significance of the archeological resources located within the Cherokee transmission line corridor lies in their scientific potential for answering questions about site formation processes, specifically the impacts of transmission line construction. This question encompasses a number of problem domains concerning methodological and anthropological issues. Among them are the relationship of surface to subsurface assemblages; survey techniques; probability sampling; and subsistence-settlement models involving site location, site density, site type, and assemblage diversity. The results of such a study will be used to help manage cultural resources to determine the most effective ways of resolving research and logistical problems in order to protect sites and preserve site data.

The results of the reconnaissance survey aid in assessing the predictive capabilities of some of the problem domains prior to Phase I. Phase II will add considerably more information and test the predictions resulting from Phase I. Site 38CK59 is considered potentially eligible for the National Register of Historic Places insofar as it comprises one unit of a larger data set containing information about the occupation and exploitation of the upper Piedmont. But the primary information potential of this site and the four other archeological loci lies in the data that will be gathered from them in Phase II of the project, data that will be used to formulate mitigation programs for future transmission line construction projects.

Thus, the three archeological sites and two isolated finds recorded during the survey are not recommended for nomination to the National Register of Historic Places. Nor, by inference, are other sites predicted to occur in the corridor. (Chapter 5 provides information about the National Register property already identified in the project corridor—the Cherokee Ford Ironworks.) Their information potential also lies in the data they will provide in Phase II. Further eligibility criteria will be considered in that phase. How many sites may be involved is the subject of the Phase I survey.

Predicting the total number of sites that might be found within the Cherokee transmission line corridor on the basis of the archeological reconnaissance survey is difficult for two reasons. First, the ground cover hindered site discovery, and the survey was judged to be 50% effective. Second, the sample size of approximately 25% of the total corridor was not derived statistically. Given these considerations, however, an educated guess may be attempted in calculating the expected minimum and maximum number of sites.
The survey segments were representative. The transects were stratified on the basis of the two sets of lines and the selection of interriverine zones. The field check points occurred at one- to two-kilometer intervals. With a 50% effective coverage ratio, counting 38CK58, 38CK59, and 38CK60 yield a site total of about 24. The Midwestern transect data (1 locus per 6-10 ha; Canouts and others 1977) on which the effective coverage ratio was assessed yields a figure of 20 to 30 loci in the corridor (200 ha). If the two isolated finds are added, a better coverage ratio results, and the total number of archaeological loci could be calculated at ca. 20.

Using the transect data alone, two sites and one isolated find, which occurred in the two transects, yield an estimate of 15 loci. The estimate is higher for the interval data. Site 38CK58 and an isolated find were located at two of the ten field check points. Although approximated, if the field check points are figured at two-kilometer intervals and the coverage at 150 m (1650 m total—Table 3), the number of sites calculated for the corridor (21,000 m) is between 26 and 28. The survey bias toward interriverine zones and the greater number of sites expected there may have inflated these figures (Chapters 2 and 3).

In a previous survey of the Duke Catawba transmission lines in York County, 27 sites were found in open, cleared areas along the project corridors (Brockington 1980). These lines, which totaled approximately 52.5 km or two and one-half times the total of the Cherokee lines, were also sampled. Unfortunately, all of the recorded sites were found in areas that were part of the sampling design. The entire route was covered, however. Sixteen sites were recorded along 12.5 km of line with between 7-10% good visibility; the remaining eleven were recorded along 40 km with 1% good visibility (Brockington 1980:22). Based on these estimates, the cleared areas totaled about two kilometers or less than 5% of the route, and these areas contained all of the sites. The problem of estimating the total number of sites for the project is also complicated by the fact that these exposed areas may be biased towards preferred (prehistoric and historic), habitable land.

Brockington's assessment concluded with the following:

These results were very disappointing and force us to reconsider the utility of such an approach [subsurface test pits] for general Piedmont survey. It is highly probable 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 conditions. New procedures must be developed. (Brockington 1980: 27).
It is interesting to note that the ratio of sites to distance covered is comparable for both projects: Catawba at 27 sites per 52.5 km or 1:1.94 and Cherokee sites at 3 sites per 5.65 km or 1:1.88. The systematic transects on the Cherokee survey probably compensated for the lower ground visibility, as there were no cleared fields within the Cherokee corridor.

Using the above data, a reasonable projection of site frequency for the 21.3 km along the Cherokee transmission line corridor may lie between 15 and 25 archeological sites or loci, 5 of which were located on survey and 1 which is located on National Register property (Chapter 5). The location of these sites, their temporal periods, and the nature of the assemblages are even more difficult to predict because of the limited number of recorded sites. The survey sites do conform, however, to general patterns already seen in the archeological record (see Chapter 2).

Two of the sites are prehistoric, one historic. This corresponds closely to the ratio of prehistoric sites (28) to historic sites (12) recorded in the county (Table 2). Sites with both prehistoric and historic components were excluded from the count since the surveyed sites were single component. The historic site (38CK60) was located on slightly more productive soils near Gilkey Creek. Given that the northern segment was a more industrialized area in the 1800s and houses were located in company towns, finding an isolated homestead from this period might have a low probability. Site 38CK60 has been reforested with pine, which suggests that farming had become unprofitable, probably for both environmental as well as economic reasons.

The two prehistoric sites (38CK58 and 38CK59) were located in the northern segment of the line in interriverine settings. Sites or activity loci with a few quartz flakes are very common in the Piedmont. Oftentimes, there are no diagnostic artifacts. Of particular interest at 38CK58 is the quartz residuum noted in the disked soils. A large quantity of quartz was milky white and exhibited little weathering. A substratum quartz vein may have been disked over or bulldozed.

The survey collection from 38CK58 was not large enough to evaluate the primary reduction debitage to finished tool ratio. But if quartz were being quarried, there might be a number of quartz debitage loci in the immediate vicinity. Whether or not they are Morrow Mountain I or II (Table 5; Fig. 10; Appendix II), the three exhausted bifaces and two biface thinning flakes from 38CK59 suggest a biotic procurement or processing (butchering site), which was what was expected (Chapter 2).

Although a number of chunks and shatter pieces were tallied, quartz shatter is not easily identified. The secondary and thinning flakes, which are more numerous, are more easily identified. Furthermore, the biface discard index, reflecting tool use, falls within the same range as those classified as extraction sites on the I-77 survey (House and Ballenger 1976:97, 106). The complementary early reduction (workshop) index was also high, unreasonably so, given the high inci-
dence of bifaces and the range exhibited by the I-77 sites (House and Ballenger 1976:98). The small sample and limited surface area are probably biasing the calculation.

Site 38CK59 dates to the most common temporal period in Cherokee County: the Middle Archaic. Five prehistoric sites in the immediate area of this site were recorded by the Gaffney By-pass surveyors (Cable, Michie, and Perlman 1977). Of the two sites that contained diagnostic points, both dated to the Middle Archaic. One site had Late Archaic Savannah River points as well.

These five sites are found within one kilometer of the Broad River; 38CK59, within one-half kilometer and 38CK58, within about one kilometer. Although a higher proportion of interriverine than riverine extractive sites were expected, the number of prehistoric sites in this northern segment versus the southern segment is suggestive. The southern corridor is between two and a half and three kilometers away from the Broad. It may be that the resource structure enhanced by the nearness of the Broad and/or an upland/riverine exploitative strategy is influencing the site density along the northern corridor. If quartz is outcropping in this area, it might also be having an effect. In this case, Phase II should yield evidence of more prehistoric sites along this segment of the corridor.

The floodplains are better developed along the Broad and Gilkey and Thicketty creeks in the southern segment of the transmission line route. Although the rapids at Cherokee Ford are fordable and would be conducive to fishing, the floodplains along the southern corridor might have been generally preferred in a riverine exploitative strategy. The sites may now be buried under sediment deposits (Chapter 2). The number of specialized hunting and gathering secondary loci that might be associated with a major habitation area is also speculative. The expected density of materials should be low because of the ease of returning tools and goods to base camps or hamlets.

Since the lack of ground visibility affects site discovery (Chapter 3), the suggestion that there may be more extractive sites in the northern corridor may have increased the probabilities of finding even the two sites recorded there. No prehistoric sites were located in the southern corridor, though some potential areas were noted on Transect II (Chapter 3). One of the most critical problems with the lack of surface visibility was recording the surface distribution of artifacts in order to assess the degree of subsequent artifact disturbance and the relationship of surface to subsurface assemblages (Canouts 1976, 1980). Neither 38CK58 or 38CK59 were amenable to a surface assessment; the former because of the severity of the land clearing activities, the latter because sub-surface testing was necessary. Site 38CK60 contained the only above-ground, intact remains.

Specific questions that will be addressed in Phase II include the following:

1. How many sites are in the corridor? Where are they located? How far do they extend?
2. How many sites are impacted by tower placement?

General observation about construction activities should be made. If possible, on-site inspection and interviews during actual construction would be beneficial. Information on types of machinery, surface and sub-surface displacement, and weather conditions would be useful in assessing the site results. Finally, opportunistic and systematic artifact collections should be taken at each site. Prior to the Phase II walkover, a systematic recording procedure should be developed in order to expedite data gathering and insure uniform results.
17. The Isolated Blast Furnace: "Ellen"
CHAPTER 5

CHEROKEE FORD IRONWORKS:
NATIONAL REGISTER PROPERTY

In what is now Cherokee County, the iron industry of South Carolina developed and flourished for 100 years between the late 18th and late 19th centuries. Slate containing magnetic ore, which ran through the Spartanburg District, oak-hickory forests, and Piedmont streams provided all the necessary elements for operating the bloomeries, furnaces, and forges that manufactured pig iron for domestic use, i.e., cast iron cookware, stoves, and grillwork, and military purposes, i.e., munitions for the Revolutionary and Civil wars. To mark this important historic era, the site of the Cherokee Ford Ironworks (38CK2) was nominated to the National Register of Historic Places in 1976. The proposed 230 kV Cherokee transmission lines of the Duke Power Company pass through the western corner of the National Register property. Federally licensed projects, which affect National Register properties, must be reviewed by the Advisory Council on Historic Preservation (Historic Preservation Act 1966, as amended 1976, 1980: Section 106). An archeological assessment of the potential impact to this property and recommendations have been prepared.

Archeological Background

The National Register listing recognizes the pinnacle of pig iron production during the 1830s and 1840s. The Nesbitt Iron Manufacturing Company, one of the three companies dominating the upper Broad manufacturing area, established a company town near the confluence of Peoples Creek and the Broad River in 1835. Called Cooperville after Dr. Thomas Cooper, president of the University of South Carolina and a major stockholder in the company, this factory complex included forges, furnaces, offices, a rolling mill, a network of canals, and a tramway (Moss 1970, 1972). When Benson J. Lossing traveled through South Carolina gathering materials for his Pictorial Field Book of the Revolution, he sketched the scene at Cherokee Ford (Lossing 1852:654).

In 1970 several meetings were held to discuss the feasibility of developing this historic industrial complex as a state park (Fig. 15). Present at these meetings were representatives from Spartanburg, Wofford College, the Deering Milliken Corporation, Burlington Industries, and the Institute of Archeology and Anthropology. An initial proposal set aside 340 acres to preserve the Cherokee Falls site (Stephenson 1970). The isolated furnace and canal situated on Peoples Creek, while not located on Burlington property, were included in the proposal, as well.
Although there was no action taken on this proposal, Burlington Industries, Inc., did lease approximately 100 acres to the Cherokee County Recreation District, which constructed an athletic playground just north and west of the complex in 1975 (A-95 State Application Identifier 01-01345). The historic acreage was left undeveloped. In 1976 approximately 690 acres were nominated and placed on the National Register of Historic Places (Fig. 15).

Cherokee Ford was undoubtedly important in other time periods. Both prehistoric and historic events were noted in the nomination. Whether there was a Broad River or Catawba River boundary line between the Cherokee and Catawba Indians is disputable, but certainly the shoals at Cherokee Ford made it well suited for fish weirs or river crossings. On at least two occasions the Whig forces found themselves using the Cherokee Ford crossing, first to press on and capture Fort Thicketty and later that same year, 1780, to join battle at King's Mountain where they won a decisive victory (Moss 1972; Wallace 1934). However, the primary concern remains the ironworks complex.

When the ruins were examined in September of 1970, they lay covered by dense undergrowth that has protected them to date. Mr. Jack Blanton of Gaffney, South Carolina, has amassed a large number of documents pertaining to these and other ironworks in the district. Several years ago, Dr. Huey from Clemson visited the Cooperville complex and constructed civil engineering plans of the principal cornerstones (Jack Blanton, personal communication). There is a great deal of local interest in the area, but until a well-directed program is planned to investigate, record, and stabilize these ruins, they are best left undisturbed.

Project Design

The 230 kV transmission line right-of-way is 270 feet wide where it enters the National Register property at the A.T. & T. Co. line (Fig. 16). The corridor then extends for approximately 3600 feet where it folds into an existing Duke Power transmission line. The two angle towers are located near the isolated furnace and canal (Fig. 16).

Acquiring the right-of-way, in this case, means only an easement. The land will remain the property of the owners; the Corrine R. Montgomery et al. holdings include the blast furnace and canal.

Prior to construction, the surface vegetation will be clearcut; larger trees will be cut off above ground. Towers will be constructed on four concrete pods and lines strung between them. Access will be restricted and activities limited to maintenance work.

Field Reconnaissance and Results

On September 1, 1981, Veletta Canouts, from the Institute of Archeology and Anthropology, and R. Andrew Cloninger, from Duke Power
Figure 15: The Cherokee Ford Ironworks: 1976 National Register Property Boundary.
FIGURE 16. Relationship of the Isolated Furnace and Canal (38CK2) to Duke Power Company Right-of-Way
(After Riverbend -- Tiger Fold-In to Cherokee Nuclear Station File No. 101-187, 1980)
Company, field checked the blast furnace and canal in order to determine their position relative to the project right-of-way and to observe their present condition. The furnace is situated on the south bank of Peoples Creek on a narrow alluvial terrace (ca. 25 m wide). The transmission line corridor runs along the top of a ridge, about 10 m above the terrace, on the west side of the furnace. The edge of the 270-foot right-of-way catches the furnace downslope (Fig. 16).

A ditch runs along the base of the ridge north of the furnace. It is about 1.5 m across and 2 m at its deepest point. It lies at the edge of a 150-foot right-of-way that divides to the north and crosses the old railroad bed (Fig. 16). A roughly circular pit, 15 m in diameter and 2 m deep, lies adjacent to the northeast corner of the furnace adjoining the ditch.

The site is covered by secondary growth. The rock masonry and an opening are visible on the north face of the furnace (Fig. 17). Rock has fallen from the east face, and the south face has a recessed area near the top. The west face is overgrown, as is the top. A small ditch, 1 m across and about 1.5 m deep, lies between the base of the ridge and the west wall. Dressed and undressed rock is found directly east of the furnace along the creek bank. At least three tiers extend for a distance of 15 to 20 m and mark the location of the furnace.

This furnace is in very good condition. Apparently an even better preserved furnace is located on Cherokee Creek (Jack Blanton, personal communication). Another furnace located on Furnace Creek, a tributary of Peoples Creek, is in fair condition (R. Andrew Cloninger, personal communication). Although an attempt was made to relocate this furnace during the field inspection, heavy undergrowth along the creek banks hampered progress, and the search was abandoned.

A brief tour was made of the Cooperville complex. Heavy undergrowth and overburden obscured the foundations. Portions of the rock-lined canal system are visible, as are two walls. Further investigation would be necessary in order to determine the presence and condition of any blast furnace(s) against which the isolated furnace and canal could be assessed.

The corridor from the existing transmission line to Peoples Creek (ca. 250 m) had already been surveyed (Chapter 3). No archaeological materials were located at that time. On September 1st, the right-of-way was traversed downstream, east along Peoples Creek from the blast furnace to a point just before the creek bends northward (ca. 800 m). On the opposite or east bank is the marshy right-of-way of the abandoned A.T. & T. line. For the most part, the center of the transmission line right-of-way runs through the creek bed. No above ground features were observed on the banks. Again, summer growth obscured visibility.
Archeological Evaluation

Financed for $100,000, this furnace is probably "Ellen," the first one built by the Nesbitt Iron Manufacturing Company in 1836. According to B. J. Moss (1970:34), Ellen was located one mile up Peoples Creek from Cooperville. However, an unscaled map of the area (Moss 1970:32-33) appears to place Ellen on a tributary of Peoples Creek. Another furnace, "Susan," is shown closer to Cooperville. Because the site is located one mile upstream (UTM Coordinates 04443503880960; U.S.G.S. Blacksburg South Quadrangle, 7.5 minute series, 1971) and because the one on Furnace Creek is called Susan (Jack Blanton, personal communication), the blast furnace at the site will be called Ellen in this report.

The available literature does not document the actual construction and operation of this or other furnaces in the complex. Although descriptions of furnaces from other iron ore districts and from earlier periods may help in understanding their workings, archeological excavations would be necessary in order to verify and detail the actual construction of those in Cherokee County.

The construction of blast furnaces was fairly standardized in the Colonial period. Their design, copied from the British, was a truncated pyramid, measuring about 25 feet square at the bottom and 25 to 30 feet in height (Bining 1938:77; White 1947:12). The inner chamber was usually built of sandstone, the exterior of limestone, with clay and coarse mortar fill between the two walls (Bining 1938:76, 78). The flue widened to its greatest point just above the bottom reservoir or hearth. Called a bosh, this widest point measured between 7 and 9 feet across (Pearse 1876:15; Bining 1938:78).

The dimensions of Ellen conform closely to the standard: ca. 20 square feet, as paced in the field (6 m square). Her height is more ambiguous, but she rises to just below the ridge, a little less than 30 feet (10 m). The outside blocks appear to be limestone. Limestone was hauled into Cooperville from the Limestone Springs Quarry, four miles away (Moss 1970:35, 1972:316). The haul road or tramway later served as the old railroad bed from the Broad River to Gaffney. That abandoned railroad bed runs in front of the furnace (Fig. 16).

The furnaces were commonly situated adjacent to a bluff on a river or creek bank. The furnace was fueled from the top, probably through a protective door (Bining 1938:77; White 1947:12). With the top of the furnace near the bluff edge, it was an easy task to bridge the gap and load alternating baskets of charcoal, ore, and limestone, which was used as a fluxing agent.

Water was required to power the waterwheels. Water diverted into small ditches could drive wheels up to 44 feet in diameter if they were fitted with overshots (Bining 1938:82). The earlier blast furnaces were fired by double bellows attached to water wheel camshafts (Pearse 1876:101; Bining 1938:78). The introduction of iron blowing cylinders in the late 1700s improved the air flow, controlling pressure (White 1947:13). The air was directed into an arched recess.
through a "tue iron" or turyere; access to the hearth was also through an arch in the furnace wall, usually on the opposite side (Bining 1938:78). Many of the blast furnaces of the early and mid-1800s used a trompe or water blast device which was developed about the same time as the iron blowing cylinders. Air trapped by water flowing through a hollow tube into a box was forced into the furnace through a small aperture (White 1947:13). Although the air was damp and the pressure low, this technique was used extensively in the southern forges (White 1947:13).

Ellen stands against the side of a hill. The large ditch paralleling the hill may have been used to channel water to power a waterwheel. The top of the furnace is not readily visible. One arched recess is located in the middle of the north face (Fig. 17). A dirt embankment at the opening makes it impossible to determine whether the recess is flush with the base of the wall. However, the interior slopes downward, probably to the floor. If the furnace is typical, the hearth would be fired through this opening. Whether the back face had an opening cannot be discovered without archeological testing.

A furnace in blast required the efforts of a dozen men (i.e., fillers, founders, guttermen, an ore roaster, and laborers) who worked long, e.g., 12-hour shifts (Bining 1938:81). Since starting a furnace required several days, furnaces ran continuously for about nine months of the year; some occasionally ran longer (Bining 1938:82). During the periods of shut-down usually coinciding with extreme summer heat or with freezing temperatures, which affected the water power, the furnaces were repaired, and wood was cut for processing charcoal. The charcoal was usually stored in a thick-walled stone structure near the furnace.

When the furnace was in blast, the molten iron was run into the pig beds on an average of twice a day. The pig beds were casting beds of sand where the iron was fed into gutter molds (Bining 1938:80). Some of the hot iron was used in direct casting of hollow ware, the remainder being further refined by hammering out the impurities with large forge hammers weighing several hundred pounds (Bining 1938:80-84; Appendix III).

Little evidence of these activities is presently visible at Ellen. No slag heaps were noted in the underbrush, but slag fragments were observed along the creek bank. A light blue fragment was found in the immediate area. This color probably indicates the presence of manganese in the ore (Bining 1938:80; Overstreet and Bell 1965:48). Other slag on the site was dark, indicating a low graphite carbon content. The depression north of the furnace may mark the casting beds or the waterwheel mount.

The extent of repairs, the location of the casting beds and power source, and other artifacts and/or structures associated with Ellen's operation would require archeological excavations. There is little enough room on the terrace to engage in anything other than ore production. The casting of hollow ware took place at the Cooperville forge(s) (Appendix III). Since the furnace was part of the Cooperville
complex, the ore, limestone, and charcoal may have been secured and stockpiled in one area in Cooperville and shipped to Ellen as needed.

Ellen was a cold blast furnace, which means that the air was not heated (Moss 1970:37). Heated air, which was not necessary for charcoal-fueled furnaces, was required to burn anthracite coal (White 1947:15). Use of anthracite coal began in the 1830s and 1840s. With improved blowing engines, its use increased production, causing an economic decline in the District's manufacturing companies which did not have ready access (i.e., by rail) to the coal beds and were thus dependent upon wood that was being rapidly depleted in the "Coaling Grounds" around Gaffney (Moss 1970:64; Lander 1954:354).

It is not known how long Ellen operated, based on the present information. In 1850 the Swedish Iron Manufacturing Company purchased the Nesbitt Iron Manufacturing Company, which had gone bankrupt (Moss 1970:64). It continued to supply direct castings and bloomery bars to local customers. Tonnage figures are not available for Ellen, but the South Twin furnace(s) in the same complex produced 816 tons of iron in 1856 (Moss 1970:64). Although the need for munitions during the Civil War provided a brief respite, the end of the war saw the near collapse of the Magnetic Iron Company (which had bought the Swedish Iron Manufacturing Company shortly after the war began) and other companies hit by the loss of investments and slave labor (Moss 1972:311, 1970:64; also Appendix III). At the turn of the century, the "Old Iron District" was no longer viable, and South Carolina was one of only two states that totally abandoned the manufacture of iron (Moss 1972:312, 1970:65).

The study of Ellen and other furnaces falls under the rubric of industrial archeology. Just as early South Carolina inhabitants left their tool kits, so, too, have early industries left ruins for the archeological record. To paraphrase, archeologists must understand the technological processes involving industry's ability to organize labor, procure raw resources, and produce and distribute goods in order to understand "man's place in a manmade world" (Gorman 1979:190).

Bining's 1938 work on 18th century iron manufacturing offers probably one of the best detailed descriptions of the structure, materials, and operation of blast furnaces. It was reprinted in 1973 because of the demand in an area where very little else has been published. This discussion has relied heavily on Bining's interpretation. However, his is only one interpretation. Until other documents are consulted and/or field testing is conducted, Ellen's operation remains largely hypothetical.

Current interest in blast furnaces is reflected in the excavation of the Bluff Furnace site under the direction of Dr. Nicholas Honerkamp, University of Tennessee at Chattanooga (John Goldsborough, personal communication). Built in 1854, the furnace was destroyed during the Union occupation of Chattanooga. A group of concerned citizens is now in the process of reclaiming this National Register property (which is in much worse condition than Ellen) for a public park.
There is a great deal of local interest in restoring the Cherokee Ford Ironworks as an industrial landmark, following the lines of the model restoration of America's first ironworks at Saugus, Massachusetts, which were abandoned about 1675 (American Iron and Steel Institute n.d.). Before any restoration could be undertaken, an archeological program of excavation and interpretation would be necessary. Not only would the archeological data provide detailed information about the appearance and location of various structures and activity areas, but they would also add comparative information concerning the widespread, albeit localized, early production of iron in the southern states, particularly South Carolina.

Archeological Recommendations

The National Register boundaries were drawn in such a way as to encompass both the isolated furnace and canal and the factory complex on the Broad River (Fig. 15). As the furnace is part of the Cooperville establishment, its inclusion in the National Register listing is warranted. Furthermore, it, along with several other isolated furnaces on the upper Broad tributaries, forms a distinct data set. As such, the furnaces could be considered for a thematic nomination as isolates, much like the soapstone quarries on the Spartanburg/Cherokee county line (Pacolet Soapstone Quarries Thematic Resources, National Register of Historic Places, 1980). These furnaces can provide data about the iron industry and can also be restored for public viewing.

Ellen can provide valuable information about how furnaces were built for restoration efforts at Cooperville. Whether or not Ellen will be a focal point in a restoration plan will be decided later. Where the transmission line corridor is located relative to Ellen will affect this decision now.

We recommend that, if engineering and other logistical constraints permit, the right-of-way should be moved further away from Ellen. We further recommend that the route be moved westward and not eastward. Although the line does not now visibly affect the major industrial complex, if Ellen were to be included in the restoration, a tramway, bike path, hiking trail, or other surface might be planned to connect the furnace eastward to Cooperville.

At present such a route would pass over existing, functional rights-of-way: two state roads and three underground gas lines. None of these rights-of-way, however, are transmission lines with above ground towers and power lines. While there is a visual impact to be considered, public access to and through the transmission line right-of-way might be of greater concern. This consideration holds true for the present location if Ellen is ever restored for public viewing.

The placement of towers necessary to fold into the existing line may limit possible alternatives. If the line cannot be moved, then we recommend active efforts to preserve and, if possible, stabilize the furnace. A preservation plan should be developed and coordinated among the property owners, Duke Power Company, the State Historic
Preservation Officer, and the State Archeologist. Such a plan should include one or, preferably, a combination of the following: (1) landscaping; (2) fencing; and (3) long-term maintenance of the furnace in its present condition (See Appendix IV).

The initial reconnaissance survey was part of a two-phase program to assess the impact of transmission line construction on known and/or predicted archeological sites. The second phase will involve a pedestrian walkover of the line after clearing and disking have occurred. At that time, the effects of clear-cutting near the site can be monitored. Periodic monitoring of the site should follow. This monitoring can be done in accordance with maintenance line checks performed by Duke Power Company personnel and by interested members of the local historical society who wish to protect their county's history.

No other archeological or historical remains were observed in the present right-of-way located on the National Register property. If the line is relocated, the new alignment should be assessed for potential archeological resources. Any portion of the realignment that falls within the National Register boundaries should be surveyed prior to any clearing or construction activities.
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 interriverine zone where recent archeological studies have been accomplished (House and Ballenger 1976; Goodyear, House, and Ackerly 1979; 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 7, 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 the exploitation of the interriverine Piedmont during the long Archaic period (House and Ballenger 1976; Goodyear, House, and Ackerly 1979; Taylor and Smith 1978; Cable, Cantley, and Sexton 1978; House and Wogaman 1978).

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, House, and Ackerly 1979; Taylor and Smith 1978; Cable, Cantley, and Sexton 1978; 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, House, and Ackerly 1979; 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). 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.

66
<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>Uwharrie</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; distinctive ceramics; sedentism more evident; hunting, gathering, and some horticulture.</td>
</tr>
<tr>
<td>A.D. 300</td>
<td>Woodland</td>
<td>Yadkin</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; hunting and gathering.</td>
</tr>
<tr>
<td>200 B.C.</td>
<td></td>
<td>Badin</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; hunting and gathering.</td>
</tr>
<tr>
<td>800 B.C.</td>
<td></td>
<td>Otarre</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; hunting and gathering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Savannah</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; hunting and gathering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>River</td>
<td>Distinctive projectile points; ground stone tools; soapstone vessels; hunting and gathering.</td>
</tr>
<tr>
<td>2000 B.C.</td>
<td>Archaic</td>
<td>Guilford</td>
<td>Distinctive projectile points; hunting and gathering; large increase in number of sites.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Morrow</td>
<td>Distinctive projectile points; hunting and gathering; large increase in number of sites.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mountain</td>
<td>Distinctive projectile points; hunting and gathering; large increase in number of sites.</td>
</tr>
<tr>
<td>6000 B.C.</td>
<td></td>
<td>Stanly</td>
<td>Distinctive projectile points; hunting and gathering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kirk</td>
<td>Distinctive projectile points; hunting and gathering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Palmer</td>
<td>Distinctive projectile points; hunting and gathering.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hardaway</td>
<td>Distinctive projectile points; hunting and gathering.</td>
</tr>
<tr>
<td>10000 B.C.</td>
<td>Paleo-Indian</td>
<td>Clovis</td>
<td>Fluted projectile points; nomadic hunting (possibly of now-extinct animals) and gathering of wild plants.</td>
</tr>
</tbody>
</table>
Ethnohistory

The protohistoric 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 protohistoric 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 Cofitachique (Swanton 1952), apparently a thriving, pristine Mississippian society. There is evidence that Cofitachique was located in the upper Wateree-Catawba River (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 Souian-speaking, and the Catawba were thus set apart from the more numerous Iroquoian-speaking Cherokee to the northwest and 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 protohistoric 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-1700s, 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 1700s most Carolina traders came from Charleston by way of Congaree Fort near present-day Columbia, then northward up the Wateree-Catawba system.
European settlement of the central Piedmont area began in the 1730s along major rivers. These early settlers included farmers, merchants, craftspeople, and Indian traders. A major influx of settlers into the Piedmont began in the late 1750s 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 1700s.

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. 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.

Not until the first quarter of the twentieth century, with increased prices for legume crops, cattle and livestock, and timber, and with 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.
Two local collectors have been contacted in Cherokee County during the course of the statewide survey and analysis of private relic collections sponsored by the South Carolina Department of Archives and History and the Institute of Archeology and Anthropology, University of South Carolina (Charles 1981). The first collection consists of artifacts from the Broad River and Thicketty Creek areas. Most of the collection is from Thicketty Creek, although a few specimens have been collected from along the Broad River.

This collection is an excellent example of local artifacts with a wide range of types and materials represented. There are many mortars, cutting stones, hammerstones, chipped and polished axes, celts, unifacial tools and scrapers, perforators, and many fine bifaces. Artifacts range from the Paleo Indian period, represented by one Suwannee point made of Coastal Plain chert (Fig. 18), through the Mississippian period, with plentiful examples of all point types normally found in this region. One artifact, probably made from a small pebble, has been ground into a sharp point, roughly round in shape and about 1.5 cm in length. These points have not been recognized in other parts of the state.

Raw materials in the collection are typical of the Piedmont: quartz, rhyolite, argillite, schist, and several kinds of tuff, including a small amount of welded tuff. More of the red and yellow quartzite is seen here than in other areas of the Piedmont. This seems to hold true for the Broad River Valley. Ridge and Valley chert is fairly common and is usually associated with Early Archaic notched points or Woodland and Mississippian artifacts. A small amount of Coastal Plain chert is also seen, primarily in the Early Archaic assemblages. There are other unidentified raw materials present, some of which are metamorphic and some cherts that probably originated in the mountains.

This collection numbers in the tens of thousands of artifacts. Efforts are now underway to document the provenience of as much of the collection as possible and to reference future collections with site information.
FIGURE 18
INSTITUTE OF ARCHEOLOGY AND ANTHROPOLOGY
UNIVERSITY OF SOUTH CAROLINA

LANCEOLATE PROJECTILE POINT DATA SHEET

Owner Name  Hopper  
Type Name  Suwannee  
Specimen No.  

Location or Site of Find  Cherokee County, Broad River, Smith Ford  
Negative No.  

Contact Print  

METRIC ATTRIBUTES (mm)  X

<table>
<thead>
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<th>Metric Attribute</th>
<th>Measurement</th>
<th>Raw Material</th>
<th>Munsell Color</th>
</tr>
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<tbody>
<tr>
<td>Maximum Length</td>
<td>58</td>
<td>Coastal Plain Chert</td>
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</tr>
<tr>
<td>Estimated Complete Length</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Width</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basal Width</td>
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<td></td>
</tr>
<tr>
<td>Maximum Thickness</td>
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</tr>
<tr>
<td>Depth of Basal Concavity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Length of Fluting: Obverse</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reverse</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Edge Grinding: Left</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other:  

Fluting Technique:  
Manufacturing Technique: Percussion - Pressure  
Reworking: No  
Remarks: A fine point; thin and well made; very light grinding  

Sketch:  

Recorder  

Date  August 11, 1980
The other collection, although equally informative, is more modest (Table 8). The bifaces are particularly interesting in terms of the low density of Morrow Mountain I, Kirk, and Stanly relative to Palmer and Morrow Mountain II. Although these types seldom predominate in a given area, such scarcity is uncommon. Their distribution may be the product of collecting biases, but a demographic or economic shift during that period may also be a possibility.

These are fine collections for research and provide a valuable source of information about the prehistory of the Broad River Valley.
<table>
<thead>
<tr>
<th>ARTIFACTS</th>
<th>NUMBER</th>
<th>Quartz</th>
<th>Rhyolite</th>
<th>Chert</th>
<th>Coastal Plain</th>
<th>Ridge and Valley Chert</th>
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<tr>
<td><strong>BIFACES</strong></td>
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<tr>
<td>Taylor</td>
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<td>Palmer</td>
<td>59</td>
<td>52</td>
<td>3</td>
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<td>Kirk</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
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<td><strong>Sub-total</strong></td>
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<tr>
<td><strong>TOTAL</strong></td>
<td>514</td>
<td>438</td>
<td>57</td>
<td>3</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>
APPENDIX III

"Elmore"

The following is an excerpted account of an ex-slave, Emanuel Elmore, who grew up in the area (Turnage 1937):

"...We lived in Spartanburg County not far from old Cherokee Ford...

"...the Spartanburg Sharp Shooters. They had a drill ground near the Falls...

"I used to go and watch my father work. He was a moulder in the Cherokee Iron Works way back there when everything was done by hand. He moulded everything from knives and forks to skillets and wash pots. If you could have seen pa's hammer, you would have seen something worth looking at. It was so big that it jarred the whole earth when it struck a lick. Of course it was a forge hammer, driven by water power. They called the hammer 'Big Henry.' The butt end was as big an an ordinary telephone pole.

"The water wheel had fifteen or twenty spokes on it, but when it was running it looked like it was solid. I used to like to sit and watch that old wheel...

"At the Iron Works they made everything by hand that was used in a hardware store.... There were moulds for everything no matter how large or small the thing to be made was....

"Hot molten iron from the vats was dipped with spoons which were handled by two men.... The spoons would hold from four to five gallons of hot iron that poured just like water does. As quick as the men poured the hot iron in the mould, another man came along behind them and closed the mould. The large moulds had doors and the small moulds had lids....

"Pa had a turn for making covered skillets and fire dogs. He made them so pretty that white ladies would come and give an order for a 'pair of dogs,' and tell him how they wanted them to look. He would take his hammer and beat them to look just that way.

"Rollers pressed out the hot iron for machine and for special lengths and things that had to be flat. Railroad ties were pressed out in these rollers...."
Brief Description of the Proposed Project

In order to connect Duke Power Company's Cherokee Nuclear Station with the existing transmission system, it is proposed to "break" the existing Riverbend to Tiger 230 kV line (as shown in Figure 16) approximately 6 miles northwest of Cherokee Nuclear and "fold in" or connect these lines to the switchyard at Cherokee. By folding in this line, two lines will be created—the Cherokee to Riverbend 230 kV line and the Cherokee to Tiger 230 kV line. The lines will be supported by lattice type steel towers and will occupy a common right-of-way 270 feet wide.

The portion of the proposed right-of-way included in the National Register property is located approximately 2,000 feet southwest of county road 50, where the abandoned AT&T line corridor crosses Peoples Creek, and extending northwest in the existing Riverbend-Tiger 230 kV line. The remains of the "Ellen" iron furnace are located immediately adjacent to the right-of-way where the lines cross Peoples Creek, as shown in Figure 16.

A right-of-way easement for the proposed lines to Cherokee has been purchased and any relocation further west as suggested on page 62 would create significant alignment problems that would require engineering design changes and additional expenditures in the procurement of new right-of-way easements. As these factors would substantially increase the cost of the project, Duke Power Company proposes to build the lines on the original alignment while protecting the "Ellen" site during construction and mitigating any damage done to the site and surrounding area resulting from this activity.
In clearing the right-of-way adjacent to "Ellen" site, trees within the right-of-way will be cleared and the stumps removed. The ground will be smoothed, disked, and seeded with a ground cover of fescue and/or Sericea lespedeza. The trees on the edge of the right-of-way and adjacent to the "Ellen" site that are determined to be "danger trees" or trees that may fall into the tower or conductors will be marked and removed by hand cutting. An inspection of the site indicated that only a few trees on the edge of the bluff overlooking the furnace will need to be removed.

After line clearing is completed, the "Ellen" site, which includes the furnace remains, canal ditch, and railroad bed, will be designated to "no activity" area and flagged out to notify construction personnel to keep equipment and personnel out of the site. All construction personnel will be informed of the sensitivity of the area and made aware of the flagging before construction begins.

When construction is completed, all damage done to the seeded right-of-way will be repaired and re-seeded and the flagging around the "Ellen" site removed.

Prior to and during clearing and construction, on-site inspections can be made, if considered necessary, by personnel interested in the preservation of the site (i.e., the State Archeologist, State Historic Preservation Officer, and local historians). These inspections can aid in the preservation of the site by periodically monitoring the effects of construction on the site and by implementing changes or modifications to the preservation techniques if necessary.

Construction and operation of the Cherokee transmission lines is not expected to increase the accessibility to the "Ellen" site. Peoples Creek borders the site on two sides and is located between the site and county road 50. This situation will eliminate access into the vicinity by motorized traffic, with the possible exception of 4-wheel drive vehicles and trail bikes. However, by leaving the site in its natural condition, only foot traffic can gain access directly into the area. The other sides of the site are bordered by private land and access from these points will remain limited because no roads exist.

When the plans to develop the park located within the National Register property are formulated, Duke Power Company will work with the appropriate personnel to design and implement a landscape plan that will enhance the "Ellen" site while providing adequate screening from the transmission facilities. Until the park plans are developed, it would be best to leave the "Ellen" site undisturbed so that any landscaping could be designed to blend in with the overall design for the remaining park area.
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