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EARLY ARCHAIC SETTLEMENT IN THE SOUTHEASTERN UNITED STATES: A CASE STUDY FROM THE SAVANNAH RIVER VALLEY

David G. Anderson and Glen T. Hanson

Surveys and excavations conducted within the Savannah River watershed in recent years have yielded a wealth of information about organization and adaptive strategies of Early Archaic populations, both within the drainage and across the region. Specifically, excavations at Rucker's Bottom (9EB91) and the G. S. Lewis site (38AK228) have yielded large, complementary assemblages indicating watershed-extensive adaptation employing a mixed collector–forager strategy. Comparative analyses with assemblages from the surrounding region document an extensive use of expedient technologies, instead of the more formalized technologies thought to characterize the period. Analyses of local and regional resource structure, theoretical arguments about biocultural needs of hunter–gatherer populations, and evidence from the archaeological record, suggest that large drainage systems served subsistence/resource needs, while biocultural interaction (i.e., information and mating networks) operated both along and across watershed boundaries. A model of Early Archaic settlement is proposed, based on band/macroband mobility and interaction, that is thought to partially account for the variation from this period found on the South Atlantic Slope.

The Early Archaic period in the Eastern Woodlands of North America widely is viewed as a time of initial human adaptation to Holocene, postglacial climatic conditions. Accepting the placement of the Pleistocene/Holocene boundary at 10,000 B.P., a roughly 2,000-year span for the period is employed in most temporal models, based primarily on the stratigraphic occurrence and absolute dating of components found in caves, rockshelters, and alluvial floodplain deposits (Goodyear et al. 1979:96–106; Griffin 1967:178; Smith 1986:9–10; Stoltman 1978:714). The end of the period usually is equated with the onset of the Atlantic, or Hypsithermal episode, at about 8000 B.P. The Early Archaic commonly is interpreted as a "transitional" period in traditional cultural-historical or evolutionary-stage models. In its most typical expression, the period is viewed as one in which the (assumed) predominantly big-game hunting, focal adaptation of the Paleoindian period began to be replaced by a more generalized or diffuse "Archaic" hunting and gathering way of life (e.g., Cleland 1976:69; Stoltman and Baerreis 1983:255). The accumulation of extensive survey and excavation data from this period in the southeastern United States in recent years, largely due to CRM-funded research, permits for the first time the evaluation of such views, and the development of regional settlement models. In this paper evidence for early Holocene occupation on the southeastern Atlantic Slope is examined, and a settlement model is advanced. The complexity of hunter–gatherer adaptational systems has been recognized increasingly in the archaeological literature (e.g., Binford 1980, 1982; Jochim 1981; Kelly 1983; Price and Brown 1985; Wiessner 1982; Winterhalder and Smith 1981). The model of Early Archaic land use advanced here represents an attempt to deal with this complexity, although its exploratory nature must be stressed.

EARLY ARCHAIC RESEARCH IN THE EASTERN WOODLANDS

The emergence of reasonably secure assemblage and chronological information on Early Archaic occupations in the Eastern Woodlands dates to the 1950s and early 1960s, with the initiation of

David G. Anderson, Interagency Archeological Services Division, National Park Service, 75 Spring Street S.W., Atlanta, GA 30303

Glen T. Hanson, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia, SC 29208

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extensive excavations at deeply stratified rock shelter sites such as Graham Cave in Missouri (Logan 1952) and Russell Cave in Alabama (Miller 1956). Artifacts recovered from these and similar sites, dated with the then newly developed radiocarbon process, were used to develop cultural sequences. Major published reports from this period include the work at Stanfield Worley Bluff Shelter (DeJarnette et al. 1962) and Russell Cave (Griffin 1974; Miller 1956) in Alabama; at Modoc Rock Shelter in Illinois (Fowler 1959); and at the Rodgers Shelter in Missouri (Wood and McMillan 1976). The information potential of floodplain settings was demonstrated in the early 1960s with publication of Coe's (1964) *The Formative Cultures of the Carolina Piedmont.* Unlike the often-mixed strata of rockshelters, these locales offered the possibility of isolating areally extensive, successive single-component assemblages. This finding prompted a major shift in Archaic research strategy throughout the eastern United States. In recent years, floodplain excavations have dominated field data-recovery efforts, though work at rockshelter sites has continued. Major Early Archaic assemblages recovered from deeply stratified alluvial sites in the eastern United States in recent years include materials from the St. Alban's site in West Virginia (Broyles 1971); from Koster and other sites in the Illinois River Valley (Brown 1985; Streuver and Holton 1979), from several sites in the Shennandoah Valley of northern Virginia (Gardner 1974, 1977, 1983); from a number of sites in the Little Tennessee River valley (Chapman 1976, 1985); and from the Haw River sites in North Carolina (Claggett and Cable 1982), to cite some of the better known examples.

Two major, opposing positions are evident in the models used to evaluate Early Archaic assemblages in the southeastern United States at the present. In brief, Early Archaic settlement is thought to have been characterized by: (1) settlement systems emphasizing logistically based organizational strategies, incorporating variations of Binford and Binford's (1966) base camp/extraction-station dichotomy (e.g., Chapman 1985; Gardner 1977, 1983; Goodyear et al. 1979; House and Wogaman 1978; Morse 1971, 1977); or, alternatively (2) frameworks emphasizing a high degree of residential mobility (Anderson and Schuldenrein 1983; Claggett and Cable 1982). In subsequent sections of this paper, a model of Early Archaic settlement on the southeastern Atlantic Slope is proposed that incorporates aspects of both positions, but at the same time significantly departs from them. The specific focus for this research is the Savannah River basin of eastern Georgia and western South Carolina.

PALEOENVIRONMENTAL SETTING

Recent broad-scale paleoenvironmental analyses from the lower Southeast have demonstrated that a mixed oak-hickory hardwood forest was in place or rapidly emerging across the southeastern Atlantic Slope by ca. 10,000 B.P. (Delcourt and Delcourt 1983:269, 1985:19; Larsen 1982:208–222). South of 33 N latitude, roughly the latitude of the inner Coastal Plain along the Savannah River (see Figure 1), there is evidence to suggest that this hardwood canopy was in place considerably earlier, perhaps throughout much of the previous glacial cycle (Delcourt and Delcourt 1983:269, 1985). Only during the mid-Holocene Hypsithermal Interval, from ca. 8000–4000 B.P., did southern pine communities begin to emerge in the sandy interriverine uplands; this also was the period when extensive riverine swamps began to emerge (Delcourt and Delcourt 1983, 1985). The Early Holocene vegetational matrix on the southeastern Atlantic Slope was thus a homogeneous, mesic oak–hickory forest. In ecological terms, the vegetational matrix was mature, or fine-grained in structure (cf. Pianka 1978).

Paleoclimatic analyses suggest that seasonal temperature fluctuations only slightly different than today were in place over much of the northern hemisphere by ca. 9000 B.P. (Kutzbach 1983:274–275; see also Cable 1982:673–683). These apparent similarities in gross climatic conditions between the two periods permit, at least to some extent, the use of modern climatic data in the evaluation of the Early Holocene environmental matrix, and the range of probable responses to these conditions by Early Archaic populations. Early Holocene climate on the southeastern Atlantic Slope, like that today, probably was characterized by short, mild winters and hot summers. Seasonal temperature fluctuations are unlikely to have been pronounced, and the most marked climatic variation, then as now, probably was altitudinally determined, a reflection of the regional physiographic structure.

Along drainages, which in this area trend from northwest to southeast, from the Blue Ridge Mountains to the Atlantic coast, an almost 60-day difference in the length of the growing season (i.e., freeze-free days) occurs in South Carolina (Kronberg and Purvis 1959:2ff); this differential reaches almost 100 days in parts of North Carolina (Cable 1982:672). While a wide range of plant and animal resources probably were available, some seasonal differences in condition and availability would have occurred.

In particular, plant resources are assumed to have been limited during the winter months. With the advent of warmer weather, these resources would have appeared first on the Coastal Plain, and only somewhat later in the Piedmont and Mountains. Deer, almost certainly the principal game animal exploited by regional Early Archaic populations (Smith 1986:9–13), were dispersed widely over the landscape much of the year, aggregating somewhat only during the fall and winter (see Smith 1975:17–42). Deer currently are present in the southeastern woodlands in appreciable quantities, with densities of up to 10 or more animals per square mile (Larson 1980:166–172; Shelford 1963:28; Smith 1975:39–42). The extent to which these densities and behavior patterns occurred during the Early Holocene is debatable, but a roughly comparable incidence is likely. During the fall and early winter, deer are in prime condition; body weight and fat levels are at a maximum, and males are in antler (Smith 1975:36–39). Winter thus probably was the only period of the year during the Early Holocene when subsistence resources were limited in occurrence and distribution, and hence to some extent unpredictable.

EARLY ARCHAIC SETTLEMENT ON THE SOUTH ATLANTIC SLOPE

Expectations from General Theory

Modern ecological research has demonstrated that clear relations exist between environmental resource structure and animal foraging strategies. Coarse-grained, specialist strategies are favored in immature, or patchy ecosystems; fine-grained, generalist strategies, in contrast, are favored in mature, or more homogeneous ecosystems (Pianka 1978:263). Hunter–gatherer technological organization, including group mobility strategies, appears to be correlated roughly with basic ecosystem characteristics (Binford 1980; Kelly 1983). Logistical or collector strategies tend to occur where resources exhibit spatial or seasonal incongruity, in patchy, immature ecosystems, or in areas with pronounced seasonal-temperature differences. Foraging strategies, in contrast, are expected in more uniform environments (Binford 1980:12–16). From these arguments, one might predict that the emergence of a homogeneous hardwood canopy on the southeastern Atlantic Slope during the terminal Pleistocene would have seen the concomitant development of increasingly mobile, foraging adaptations over the same region.

Ecological theory also can suggest where within a landscape residential sites are likely to occur. The relations between foraging behavior, resource distribution, and residential location have been examined by Horn (1968) in a study of the nesting behavior of Brewer's blackbirds. As adopted by anthropologists, the model predicts optimal relations between a group's size and dispersion (i.e., its settlement pattern) and the occurrence of resources within a region (Dwyer and Minnegal 1985; Heffley 1981; Wilmsen 1973). Based on an examination of the distance foraging animals must travel to obtain food, Horn demonstrated that for evenly dispersed, predictable resources, use of a centrally located base is approximately only half as efficient as dispersed (regularly spaced) residential locations. Dwyer and Minnegal (1985) have noted that Horn's formulation did not take resource predictability into acount. In their restatement of the model, optimal foraging distributional patterns are correlated closely with resource patchiness, tying this model to the Pianka and Binford models discussed previously:

> (1) where resource attributes are less patchy [i.e., homogeneous], the "optimal" distribution of foragers is to be dispersed, and (2) where resource attributes are more patchy, the "optimal" distribution for foragers is to be aggregated [Dwyer and Minnegal 1985:116].

During the late Pleistocene in the southeastern United States, centralized settlements might be expected early on, when environmental change presumably was greatest. Increases in residential

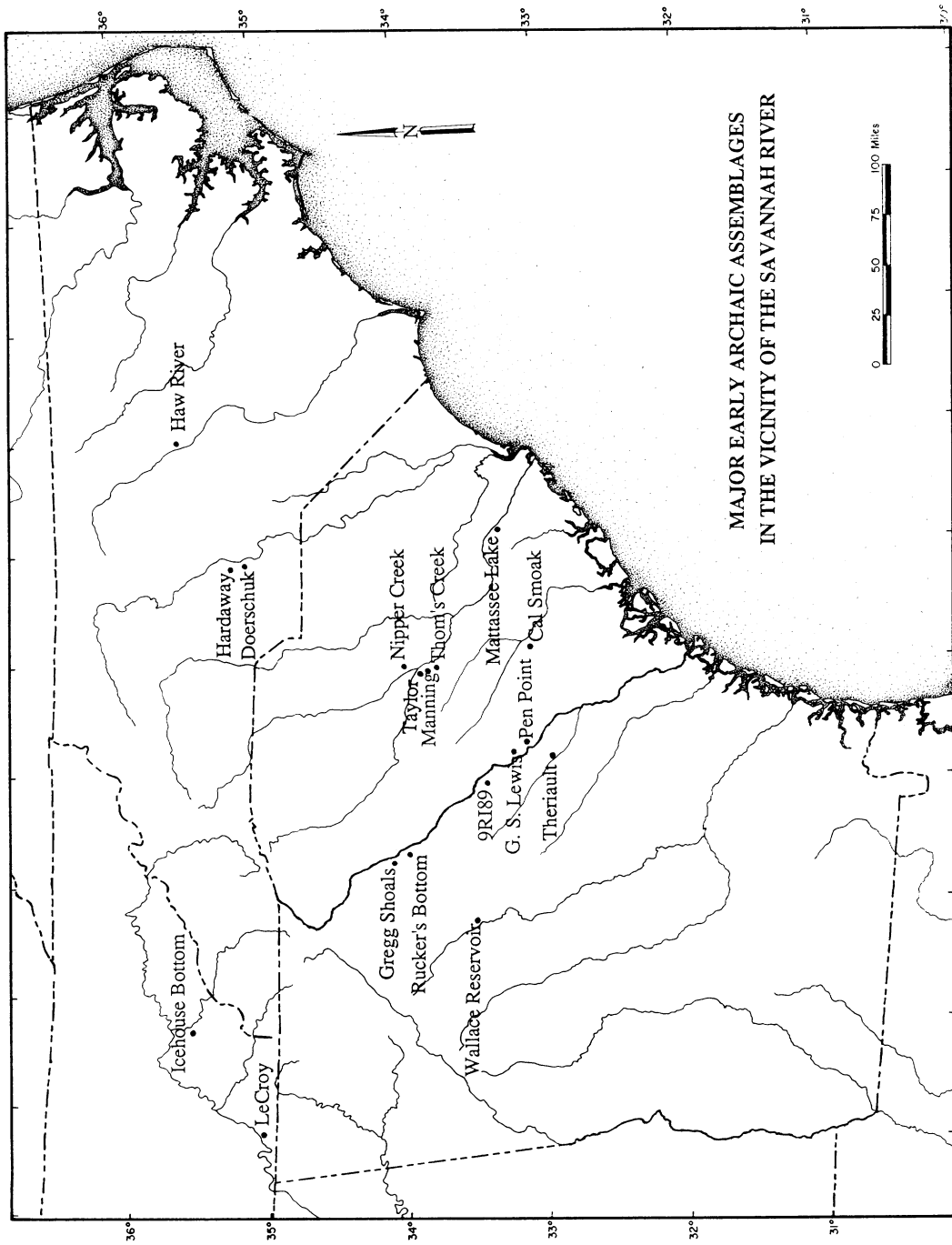

Figure 1. Major early Holocene assemblages referenced in the text.

mobility, in contrast, would emerge as the mesic forest canopy closed, leading to a more homogeneous regional environmental structure. Seasonal settlement correlates to Horn's model also are expected. During winter, a time of low plant availability and high deer aggregation, when resources were most patchy and unpredictable, base camps would be most likely. Over the remainder of the year, when resources were more evenly distributed and predictable, greater residential mobility would be expected. This, it will be argued, is the patterning evident in the archaeological record from the region during the Early Archaic.

Relations between regional population structure and group reproductive behavior also are pertinent. Using Monte Carlo simulation techniques, and incorporating hunter–gatherer demographic data, Wobst (1974, 1976) proposed minimal population values essential for the long-term maintenance of hunting–gathering societies. Wobst (1974:163) found that the minimum equilibrium size of hunter–gatherer populations—"the number of people which can consistently provide group members with suitable mates upon reaching maturity" (Wobst 1974:154)—was between 175 and 475 people. This research suggests that relatively large numbers of people must be in regular contact if local populations are to maintain their existence over time. Hexagonal territories, furthermore, would be highly effective in maintaining such networks, though these would be expected only in homogeneous environments (Wobst 1976:55–57). Open mating systems, in which mates are drawn from adjacent territories, tend to occur when regional population densities are low, and lead to clinal rather than fixed social boundaries. In contrast, closed mating systems, characterized by boundary maintenance behavior, tend to occur when regional population densities are relatively high, and large numbers of people are in close proximity (Wobst 1976:53–54).

Information sharing networks directed to the regulation of mating networks and subsistence resources form another critical aspect of hunter–gatherer life (Hayden 1982; Moore 1981; Wiessner 1982; Wilmsen and Roberts 1978:177–179). Mating networks extending over appreciable numbers of people appear to be essential to the long-term survival of human groups. Given differing regional population characteristics, this biological requirement will translate into larger or smaller geographic areas over which such networks must operate. Regional patterns of information sharing are also important in the organization of settlement and subsistence systems. This is especially critical where seasonal population dispersal occurs; effective information exchange can reduce markedly the risk of redundant land use (Brown 1985:206–209; Moore 1981). By disseminating information about its anticipated foraging behavior, a group may guarantee the exclusive use of these resources, since other groups (assuming cooperative interaction) would avoid those areas.

Uncoordinated territorial packing or land use is highly inefficient and can result in unanticipated and potentially serious shortages. Effective information exchange, however, can help circumvent this problem by promoting efficient patterns of land use. Periodic population aggregation is one mechanism by which information exchange is operationalized among mobile, dispersed foraging populations. As Moore (1981:213) has noted: "as the amount of shared information increases, [an] aggregated to dispersed seasonal pattern becomes increasingly effective in placing the seasonal camps in the region." Aggregation thus promotes increased resource accessibility during seasons of dispersal. This benefit may be sufficient motivation for such aggregation, even if it is not immediately cost effective. Aggregation would, in all probability, tend to occur in highly favored environments capable of sustaining, at least temporarily, large population aggregates. These aggregation loci, furthermore, would need to be readily accessible to the participating population (Conkey 1980).

The Regional Archaeological Record

On the South Atlantic Slope, Early Archaic components are recognized by the presence of diagnostic projectile points. These hafted biface forms, from earliest to latest, include Dalton/Hardaway-Dalton side notched (ca. 10,500–9800 B.P.); Taylor–Bolen side notched (ca. 10,000–9500 B.P.); Palmer–Kirk corner notched (ca. 9500–8900 B.P.); and a series of bifurcate forms, including MacCorkle, St. Albans, LeCroy and Kanawah (ca. 8900–8100 B.P.) (Broyles 1971; Chapman 1976, 1985; Coe 1964). The end of the Early Archaic in the region is characterized by the replacement of

these notched and bifurcate forms by square- and contracting-stemmed Stanly and Morrow Mountain point forms (Chapman 1985; Coe 1964; Goodyear et al. 1979:106).

The occurrence, relative temporal placement, and diagnostic utility of these hafted biface forms in the immediate South Atlantic region was delimited initially by Coe (1964) at the Hardaway and Doerschuk sites in Piedmont North Carolina. Subsequent excavations have provided extensive confirmation and some refinement of this sequence, which has been found to have general utility in Georgia and the Carolinas (Anderson et al. 1979; Claggett and Cable 1982; Michie 1969; Tippitt and Marquardt 1984). Sequence definition and refinement, and component identification tend to dominate ongoing research. Within the past ten years it has become evident that Early Archaic sites occur in a wide range of microenvironmental zones, and that extralocal lithic raw materials are common in assemblages (Anderson et al. 1979:91; Goodyear et al. 1979:105; Hanson et al. 1978: 105; O'Steen 1983:78–81). Trade between populations occupying relatively stable territories has been suggested as one explanation (O'Steen 1983:116); other scholars see it as indicative of extensive group mobility (Anderson and Schuldenrein 1983:201; Clagget and Cable 1982:687; Goodyear et al. 1979:199).

A General Biocultural Model

Figures 2 and 3 illustrate a general biocultural model of Early Archaic settlement on the South Atlantic Slope that we believe reflects both the character of the regional archaeological record and expectations derived from anthropological and ecological theory. Two levels of settlement organization are examined, corresponding to local (band-level) and regional (macroband) organizational systems. At the band level, which we interpret as coresidential population aggregates of from roughly 50 to 150 people, organizational and mobility strategies are examined. The focus for this analysis is the Savannah River basin, within which a hypothesized pattern of annual mobility is presented (Figure 2). A spatial model for the distribution of individual bands over the South Atlantic Slope, and macrobands over this part of the Southeast, then is advanced (Figure 3). Taken together, we believe that these models provide the scale essential to accommodate the probable geographic extent of Early Archaic adaptations in the region.

Band-Level Annual Mobility: The Savannah River Basin. A hypothesized model of Early Archaic settlement within the Savannah River basin encompassing settlement location, technological organization, and mobility strategies over the course of one year is presented in Figure 2. In brief, the hypothesized annual settlement round is characterized by the use of logistically provisioned base camps during the winter, and foraging camps throughout the remainder of the year. Annual movement was toward the coast during the early spring, back into the Upper Coastal Plain and Piedmont during the later spring, summer, and early fall, with a return to the winter base camp in late fall. The return to the winter base camp may have incorporated side trips to other drainages, for aggregation events by groups from two or more different drainages.

Winter months would have been the period of greatest resource unpredictability. Plant foods generally are unavailable, while deer, the principal animal resource, tend to be somewhat aggregated. Effective environmental structure thus would be patchy. Specialist strategies, by groups occupying settlements centrally located with respect to resources, are predicted in these conditions. Base camps provisioned by logistical forays thus are postulated. The placement of these winter camps in the Coastal Plain reflects the somewhat warmer average temperatures in that area, compared with the Piedmont (up to 8°C; Kronberg and Purvis 1959). Camp locations probably were quite variable, reflecting specific conditions within each drainage, including physiography, raw material availability, and fluctuations in food resources. In the Savannah River basin, winter base camps are thought to have occurred in the Middle and Upper Coastal Plain, near the high-quality chert sources that outcrop in these areas. The G. S. Lewis site, described below, is one possible example of such a winter base settlement.

With warmer weather, dispersal of deer occurred, and potentially exploitable plant resources appeared over large areas of the landscape. Regional resource structure during the spring, summer,

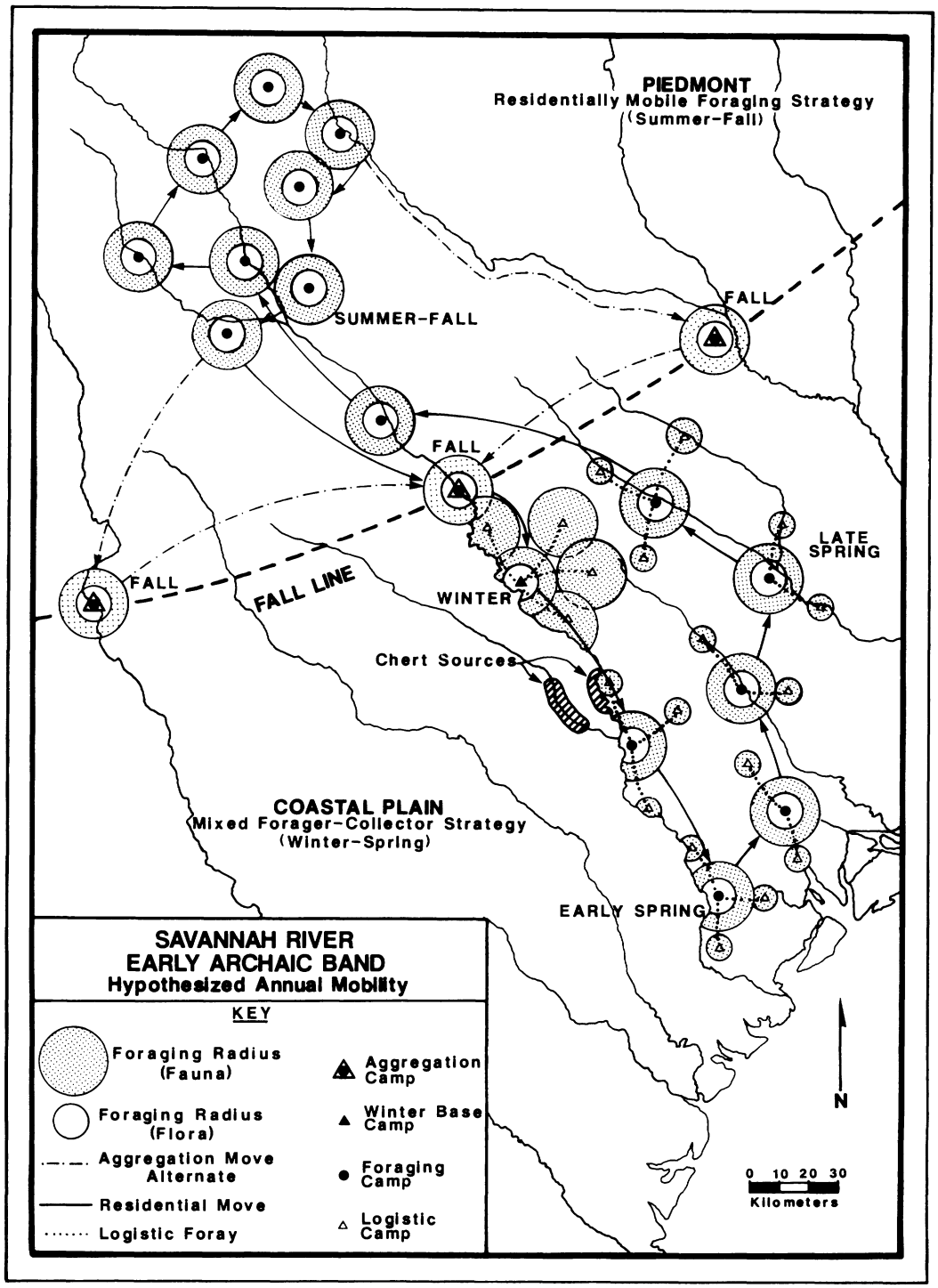

Figure 2. Hypothesized model of Early Archaic seasonal mobility in the Savannah River basin.

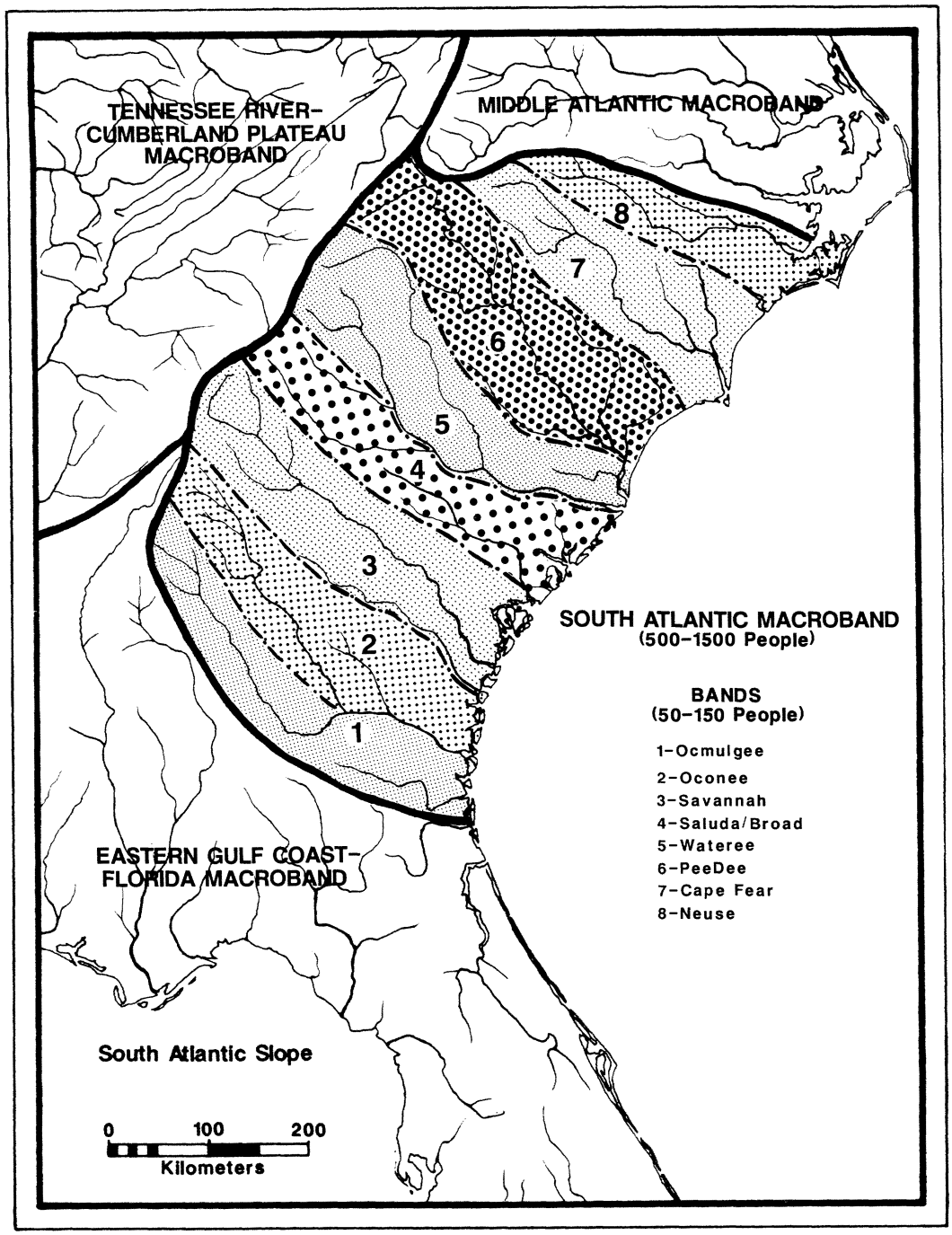

Figure 3. Hypothesized model of Early Archaic band-macroband distributions over the South Atlantic Slope.

and early fall thus could be characterized as fairly homogeneous and predictable, favoring a generalist foraging strategy by populations dispersed into small, regularly spaced camps. Whether group fissioning into family or extended family units occurred currently is unknown. The present model, for the sake of simplicity, posits movement by the entire group. Areally extensive excavation, it should be stressed, is essential if the size and composition of Early Archaic camps is to be determined for any season. Spring movement toward the coast is indicated in our model, since plant resources, given the longer freeze-free period, appeared there well before they did in the interior. Given somewhat lowered sea levels during the initial part of the Holocene (ca. 10–12 m or so; Colquhoun and Brooks 1986:278), the coast line would have been several km east of its present position; near-coastal sites, unfortunately, given subsequent sea level rise, have been inundated and are unavailable for study.

Foraging behavior, with brief logistical forays to supplement local resources, is posited for the warmer months of the year. During the later spring, population movement back into the Upper Coastal Plain is suggested, extending into the Piedmont by the summer months. A decreased emphasis on logistical strategies, as the weather grew warmer and plant and animal resources became more widely available, is inferred. The Rucker's Bottom site (described below) is a possible example of such a summer/fall foraging locus. Warm-weather foraging appears to have been constrained by the occurrence of lithic raw materials. In the Coastal Plain, for example, cherts only outcrop in the central portion of the drainage, and some degree of tethering is likely. As tool kits approached exhaustion, group movement probably had to incorporate either special logistical forays or actual movement to quarry areas. Given the relative ease with which procurement could be embedded within normal movement over the landscape, however, tool-kit replenishment is not thought to have been an overly critical factor influencing settlement. In the Piedmont, where lithic raw materials are widespread, this was not a factor.

Within the Coastal Plain, movement back and forth across major drainages during any given year is considered unlikely (even accepting the possibility of watercraft). Rivers in this region, even during the early Holocene, prior to the mid-Holocene emergence of the extensive cypress swamps characteristic of the area today, would have been deep with few or no shoals, precluding easy passage. In the Piedmont, in contrast, the rivers were shallow and rocky, and could be traversed on foot in many locations. Greater cross-river movement thus is expected in this zone.

In the fall populations moved downriver, anticipating the establishment of a winter base camp. Return to the exact location of the previous years' camp may have been unlikely, since resources in the immediate area of that settlement probably were still somewhat depressed. Occupation of another location, possibly on the opposite side of the river, is likely. In conjunction with this fall movement, side trips to aggregation loci in other drainages may have occurred, to facilitate information exchange and to maintain mating networks. Fall Line river terraces are posited aggregation loci, since the dramatic character of this macro-ecotone, where rocks and shoals first appear proceeding inland from the coast, would facilitate population rendezvous. The occurrence of rich Early Archaic assemblages, characterized by atypical concentrations of formal tools in Fall Line sites across the region, supports an interpretation that these areas saw use in special activities of some kind (Anderson 1979; Wetmore and Goodyear 1986).

Low population densities of between 50 to 150 people per drainage are proposed during the initial Early Archaic occupation of the region; this figure in all probability increased over time, leading to group fission and a concomitant decrease in annual range. The low incidence of diagnostics from this period found during archaeological surveys forms the primary argument against high population densities. Only 363 Early Archaic points were found during the intensive survey of the Wallace Reservoir on the Oconee River in central Georgia, for example, a discard or loss rate of roughly one artifact every five years over the period in question (O'Steen 1983). Even assuming that only a tiny fraction of the total remains were documented, high population densities are difficult to justify. Parenthetically, population density figures drawn from ethnographically modern hunter–gatherers do not appear relevant to pristine foragers filling up an empty landscape (Wilmsen and Roberts 1978:177–180).

A high incidence of the use of extralocal raw materials in the manufacture of Early Archaic

artifacts might be expected if low numbers of people were moving rapidly over the landscape. The almost exclusive use of local raw materials characteristic of succeeding Middle Archaic populations in the South Atlantic area (Blanton and Sassaman 1988; Sassaman 1983) may reflect increasing regional population densities and a corresponding decrease in annual range (Brose 1979; Ford 1974; Smith 1986:18–25). If these raw-material distributions are indeed an accurate indicator of regional settlement dynamics, a time-transgressive decrease in the use of extralocal raw materials should be evident over the course of the Early Archaic, as population increased and mobility decreased.

Macroband Aggregate Groups: Regional Population Structure. A hypothesized regional distribution of Early Archaic band-level groups over the South Atlantic Slope, is illustrated in Figure 3. The distribution of the constituent bands reflects, to some extent, regional physiographic conditions, particularly the northwest to southeastward trending flow of most major drainages, from the Appalachian Mountains to the ocean. The maintenance of viable populations required mating networks extending over an area comparable to that indicated in Figure 3 (Wobst 1974; see also Wright 1981). To maintain a minimal equilibrium population, given the population levels assumed here, several bands, probably from at least three to five major drainages, had to be in regular contact. The fluid movement of individuals, coupled with periodic aggregation of larger social groups at Fall Line locations, are suggested mechanisms by which this interaction was maintained. Major Early Archaic assemblages have been reported from a number of Fall Line areas in the region that may reflect aggregation sites, including Manning, Thom's Creek, Taylor, and Nipper Creek (Michie 1969; Wetmore 1986). To date, no such sites have been excavated within the immediate Savannah River drainage.

While a "social fluidity" model, postulating movement and interaction of individuals, much like the ethnographic !Kung (Lee and DeVore 1976), is a possible alternative strategy to periodic aggregation, we do not believe that it is viable given conditions during the Early Archaic. Periodic aggregation appears essential in very low-density settlement systems, where social groups move largely as units (Conkey 1980; Moore 1981; Wilmsen and Roberts 1978). The need to find and exchange mates in a cultural environment characterized by an extremely low population density is what drives our model, and presumably earlier Paleoindian settlement systems. As the landscape filled up over the course of the Paleoindian and subsequent Archaic periods, the strength of this driving force would lessen. Social fluidity may be an entirely appropriate mechanism for intergroup contact during the Middle Archaic and has, in fact, been inferred in some local models (Blanton and Sassaman 1988).

Hexagonal territories, the ideal arrangement of human band-level populations in Wobst's (1974) model, are not illustrated in Figure 3. Physiographic constraints, notably the size, orientation, and spacing of drainages and divides in the region, preclude the formation of such regular territories, given the model of riverine-extensive adaptation proposed here. As the regional population increased over time, intradrainage rather than drainage-extensive territories probably emerged, possibly by late in the Early Archaic period or in the succeeding Middle Archaic period. With increasing circumscription, territories more closely approximating idealized hexagonal arrangements may have appeared.

Given the postulated low regional population density, and the relatively homogeneous physiographic structure, open mating networks are expected. Only where distinct physiographic boundaries occur would there be potential for some social differentiation, or mating network closure, to occur. This is indicated in Figure 3 by the presence of separate macrobands to the north, south, and west of the hypothesized South Atlantic macroband. The presence of mountain divides, and a shift in drainage orientation, from the Atlantic to the Gulf coasts, differentiates what are labeled the "Tennessee River/Cumberland Plateau" and "Eastern Gulf Coast–Florida" macrobands in this figure. Only the existence of a discrete "Middle Atlantic" macroband is somewhat tenuous, since physiographic conditions along the Atlantic coast suggest that clinal rather than distinct social boundaries are probable. Rather than rigid macroband boundaries, these areas may reflect zones of decreased social interaction. Some degree of discontinuity in assemblages on either side of these areas is, however, expected.

Table 1. Early Archaic Assemblage Comparisons.

Sites[a]	Hafted Bifaces	Other Bifaces	Formal Unifaces	Expedient Unifaces	Cobble Tools	Total Tools	Curated-to-Expedient Index[b]
Theriault	26[c]	422	78	0	8	534	0.25
142 m^2/64 m^3	4.9%	79.0%	14.6%	0.0%	1.5%		
Gregg Shoals	3	4	7	0	4	18	2.50
9 m^2/3.6 m^3	16.7%	22.2%	38.9%	0.0%	22.2%		
Cal Smoak	3	12	12	62	1	90	0.20
37 m^2/5.6 m^3	3.3%	13.3%	13.3%	69.0%	1.1%		
9RI89	8	59	133	366	0	566	0.33
48 m^2/29 m^3	1.4%	10.4%	23.5%	64.7%	0.0%		
G. S. Lewis	39	56	36	59	44	234	0.65
404 m^2/80.8 m^3	16.7%	23.9%	15.4%	25.2%	18.8%		
Pen Point	20	34	35	61	13	163	0.58
33 m^2/3.3 m^3	12.2%	20.9%	21.5%	37.4%	8.0%		
Rucker's Bottom	28	66	10	101	32	237	0.23
160 m^2/48 m^3	11.8%	27.9%	4.2%	42.6%	13.5%		

[a] References: Rucker's Bottom (Anderson and Schuldenrein 1985); G. S. Lewis (Hanson and Sassaman 1984); Gregg Shoals (Tippitt and Marquardt 1984); 9RI89 (Elliott and Doyon 1981); Cal Smoak (Anderson et al. 1979); Pen Point (Sassaman 1987); Theriault (Brockington 1971). (Figures beneath site name indicate number of square meters and cubic meters excavated at that site.)

[b] Curated-to-expedient tool index is calculated by dividing curated tool frequencies (hafted bifaces and formal unifaces) by expedient tool frequencies (other bifaces and expedient unifaces).

[c] Paired figures for each tool class indicate (top) counts of items in each tool class and (bottom) percent of total tools at the site represented by each tool class.

A TEST OF THE MODEL: EARLY ARCHAIC ASSEMBLAGES FROM THE SAVANNAH RIVER BASIN

The Savannah River basin offers an ideal laboratory in which to evaluate this proposed model of Early Archaic settlement on the South Atlantic Slope. Hundreds of Early Archaic components have been reported from the Georgia–South Carolina–North Carolina area, including well over 100 from the Savannah River valley (Anderson and Schuldenrein 1983, 1985; Anderson et al. 1979; Elliot and Doyon 1981; Goodyear et al. 1979; Hanson et al. 1978, 1981). This is in marked contrast to the situation little more than ten years ago, when it was noted that "the Early Archaic and the lower portions of the Middle Archaic periods remain among the most poorly known in the entire Savannah River region" (Stoltman 1974:231). The marked increase in knowledge in recent years is due in large measure to CRM-mandated survey and excavation activity.

Seven Early Archaic sites have been documented in or near the Savannah River basin in recent years (Figure 1). Assemblage data from these seven sites are summarized in Table 1. This information includes materials from small scale excavations at three sites in the Coastal Plain (Theriault, Brockington 1971; Pen Point, Sassaman 1987; Cal Smoak, Anderson et al. 1979) and two sites in the Piedmont (Gregg Shoals, Tippitt and Marquardt 1984; 9RI89, Elliott and Doyon 1981). In addition, areally extensive excavations have been conducted at two sites, Rucker's Bottom and G. S. Lewis, in the Piedmont and Coastal Plain, respectively. These latter assemblages, among the most extensive from this time level in the Southeast, are described briefly below.

The Rucker's Bottom Site (9EB91)

Rucker's Bottom, on the western side of the river in the central Piedmont, was examined from 1980 to 1982 during the construction of the Richard B. Russell Reservoir. Situated on a low terrace/levee remnant, the site was located to the north of the confluence of Van Creek, a minor tributary

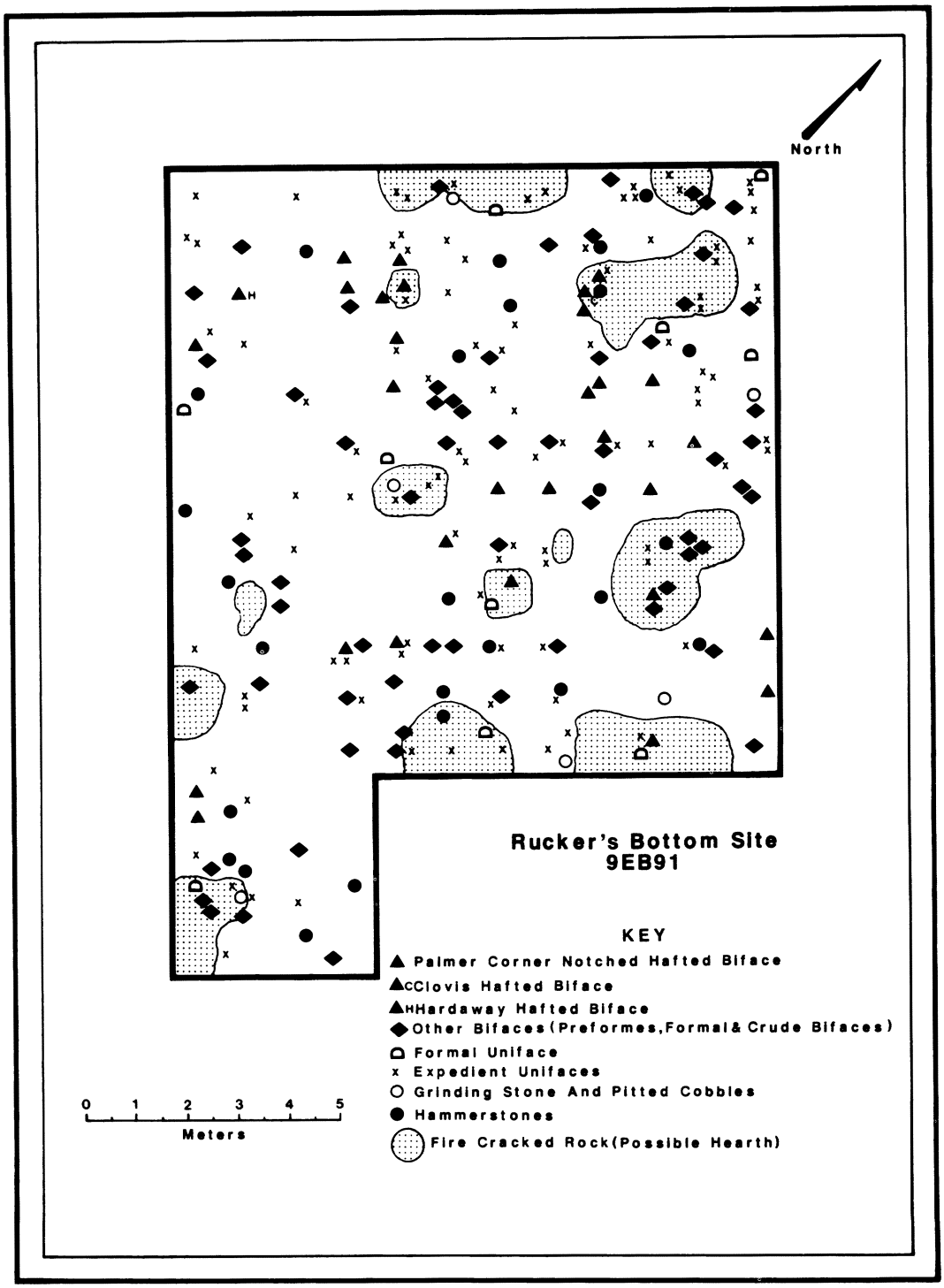

Figure 4. Distribution of tools and features in the early Holocene excavation block at the Rucker's Bottom site (9EB91), Elbert County, Georgia.

draining the adjoining uplands. Early Archaic materials were found along a 200-m section of the terrace, in stratified contexts at depths of from approximately 70 to 120 cm. Test pits and backhoe trenches were opened over the terrace to document the extent and geoarchaeological context of the deposits, and a 160 m^2 block unit was excavated and water screened through ⅛-inch mesh (Anderson and Schuldenrein 1983, 1985).

The spatial organization and assemblage composition of the Early Archaic assemblage was relatively uncomplicated (Figure 4). No obvious features were observed, although 14 diffuse scatters of cracked rock were evident that may reflect hearth remnants. The stone tool assemblage included projectile points, well-flaked bifacial core/tools, and a range of less well-executed, presumably expedient bifacial and unifacial tools. Formal unifaces, characterized by evidence for hafting and carefully retouched margins, were rare. Thirty-two cobbles and cobble tools were recovered, including two with grinding facets and four that were pitted; use of these objects for both lithic raw material reduction and plant processing activity is suggested. Debitage (N > 22,000 flakes) distributions suggest both tool kit maintenance (i.e., resharpening) and replacement (i.e., gearing-up) activities; much of the larger debris is from the production of flakes or crude bifaces, for use as expedient tools. Some spatial separation in the occurrence of hafted bifaces and most other flaked tool forms was evident, suggesting different patterns of use and discard for these categories.

Extralocal raw materials made up roughly 20 percent of both the debitage and flaked stone tool assemblages recovered at Rucker's Bottom, suggesting a fair degree of mobility or interaction for the populations using the site. Just over half of the 28 Palmer points (N = 15) found in the block were made of locally available vein quartz, while the remainder came from more distant sources, including eight of Allendale chert from the Lower Coastal Plain some 175 km downriver, and three points of a black chert of unknown origin, thought to originate near the Fall Line. Extralocal debitage was almost uniformly small flakes; only the vein quartz debitage, of material at hand in cobble form in the adjacent river channel, exhibited a greater size diversity. Site use focused on the maintenance and discard of tools of extralocal materials, as well as the manufacture, maintenance, and discard of tools of locally available materials.

The size, duration, and seasonality of specific occupations at Rucker's Bottom are difficult to ascertain given the comparatively small area examined, the minimal stratification within the Early Archaic deposits themselves, and the absence of preserved floral and faunal remains. The block assemblage appears, however, to reflect a palimpsest of small occupations. At least two Palmer components are suggested, based on the occurrence of these diagnostics in two clusters. Earlier Hardaway and Clovis components also are indicated, given the recovery of isolated examples of these types. Given the incidence of possible hearth areas in the excavation block, and the extent to which Early Archaic remains were found over the site, it is probable that several dozen similar artifact clusters, and possibly as many as 800 to 1,000 hearths may have been present on the terrace. While this feature/concentration density appears high, an accretion of roughly one hearth per year, or one artifact cluster per decade, over the 2,000 year span of the Early Archaic, easily could account for the site record. While repeated use of the terrace is indicated, the size of these occupations need not have been large.

Given the absence of well-defined hearths or evidence for structures of any kind, warm-weather occupations are suggested. This inference is supported by the assemblage data. The low incidence of formal scraping tools (i.e., steep-angled hafted unifaces) indicates a minimal amount of hide-working, an activity that probably took place in the fall and winter, when animal pelts were in prime condition. The presence of possible plant-processing tools also points to warm weather occupations, though the pitted cobbles could have seen fall/winter use. Taken together, the evidence suggests short-duration site use, by groups using a predominantly expedient technology, and characterized (given the incidence of extralocal materials) by a mobile, wide-ranging adaptation.

The George S. Lewis Site (38AK228)

This 28-ha, multi-component site is situated in the Upper Coastal Plain 35 km below the Fall Line on a terrace position directly adjacent to the Savannah River at its confluence with Upper

Three Runs Creek. During the spring and summer of 1984, a 150 × 30-m portion of the site was examined. Dense Archaic deposits were found on an eroded knoll 150 m from the river. Following the excavation of a 1 percent (44 m^2) sample to determine the areal extent and integrity of the Archaic deposits, a 376-m^2 block was excavated (Figure 5). Within the 80-cm-thick Archaic zone was a well stratified sequence consisting of preceramic Late Archaic, Middle Archaic/Late Archaic (MALA) (Sassaman 1985), Morrow Mountain, Kirk Corner Notched, and Dalton components. Lacking observed natural strata, excavations were conducted using arbitrary 10 cm levels; all fill was water screened using ⅛-inch mesh (Hanson 1985; Hanson and Sassaman 1984).

A backplot of diagnostic artifacts was used to determine the stratigraphic continuity of assemblages. These vertical associations of artifacts were used to reconstruct meaningful analytical units. The Kirk Corner Notched zone was distinct stratigraphically from the sparse Dalton zone below and Morrow Mountain zone above. Artifacts from the Kirk stratum are summarized in Table 1. Formal, presumably curated artifact categories at the G. S. Lewis site included 29 Kirk Corner Notched points (26 of Allendale Chert, 3 of vein quartz), 2 bifurcate points made of Piedmont metavolcanic material, 8 leaf-shaped, bifacially retouched chert microliths, 2 Edgefield Scrapers (Michie 1968), 6 hafted chert endscrapers, 36 formal unifaces, a chipped stone adze, a polished diorite adze and associated whetstone, and a pigment pallette stained with hematite (Figure 6). Cobble tools are well represented by 44 specimens, including battered cobbles (N = 36) and polished and/or abraded cobbles (N = 8). Expedient tool classes included 28 bifacial flake cores, 2 polyhedral core fragments, 59 expedient unifaces (i.e., functionally modified or "wear-retouched" flakes), and 28 Kirk Corner Notched preforms made of chert. Also noteworthy in the assemblage is the presence of a large quantity of hematite showing evidence of use as pigment, possibly for hide processing. Lithic debitage (N > 32,000 flakes) is uniformly small in size with little evidence for primary tool reduction. Overall, the lithic assemblage recovered from the Kirk zone at G. S. Lewis indicates a slightly higher level of curation than noted at other large scale Early Archaic excavations on the South Atlantic Slope, notably at Rucker's Bottom and Haw River.

The assemblage documents the technology of the hafted biface production system. Given the high incidence of preforms and a low incidence of initial stage reduction debris, we infer that hafted biface preforms entered the Lewis site in near finished form and subsequently were completed as corner-notched hafted bifaces. This organizational characteristic of the assemblage suggests that chert procurement was accomplished through logistic forays to the nearby outcrops downstream. Initial reduction occurred at these locations with preforms, and possibly flake cores returned to the base camp. Wood working, hide working, vegetal food milling, and stone tool maintenance are well represented in the assemblage by the presence of adzes and Edgefield Scrapers (Figure 6), unifaces and hematite pigment, mano and metate milling stones, and reedged hafted bifaces and hammerstones. The chipped adze and polished adze/whetstone attest to the importance of wood working at the site. Since few adzes have been recovered locally in Early Archaic contexts, these curated tools appear to have had specific functions not undertaken at most sites. We suspect that the occurrence of these tools is associated with heavy-duty wood working, specifically the construction of winter shelters.

Ninety-nine percent of the lithic assemblage from the Kirk zone at G. S. Lewis was manufactured from locally available Allendale chert, with only minor occurrences of fine-grained orthoquartzite, crystal quartz, and metavolcanics. The near absence of extralocal raw material relative to the abundance of Allendale chert, which outcrops within 15 km, differs greatly from the situation on Piedmont sites, where a greater incidence of extralocal materials typically is observed (Anderson and Schuldenrein 1983:204). The combination of raw material homogeneity, relatively high tool curation, and the high incidence of cobble tools suggest a more intensive, longer duration of occupation at Lewis.

Spatial patterns of artifact classes illustrate organizational patterns in the data when composite representations of the ten major tool classes are examined (Figure 5). Two distributional voids are evident. The eastern area appears to be outside the major occupation. The western area, in contrast, may represent the remains of a structure of some kind. Within this area hafted bifaces and grinding stones occur to the exclusion of the more plentiful unifaces, hammerstones, utilized flakes and

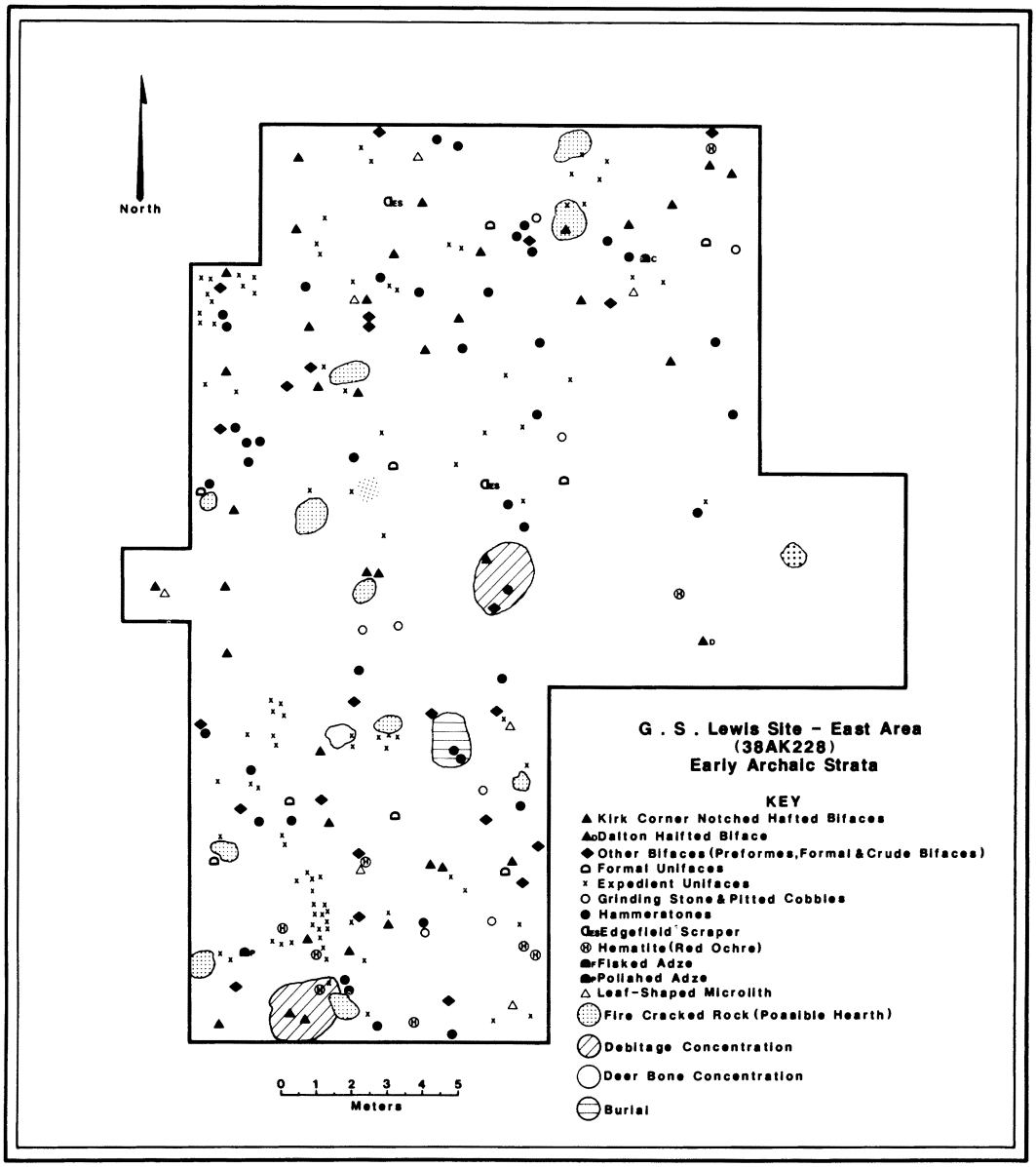

Figure 5. Distribution of tools and features in the early Holocene excavation block at the G. S. Lewis site (38AK228), Aiken County, South Carolina.

preforms, and the distribution of lithic debitage is very low in this area compared to the remainder of the site. Two faint charcoal stains, possibly the weathered remains of hearths or pits, also were noted in this area. The low artifact density area measures approximately 6 m on the east–west axis and 5 m on the north–south axis. Based on this evidence, we suggest that the area may have been used as a seasonal shelter.

A concentration of utilized flakes, hammerstones, hematite, and unifaces was observed in the southern portion of the block. This association may be a hide-working area similar to those noted by Kimball (1981) at the Rose Island site. Throughout the block, small concentrations of utilized

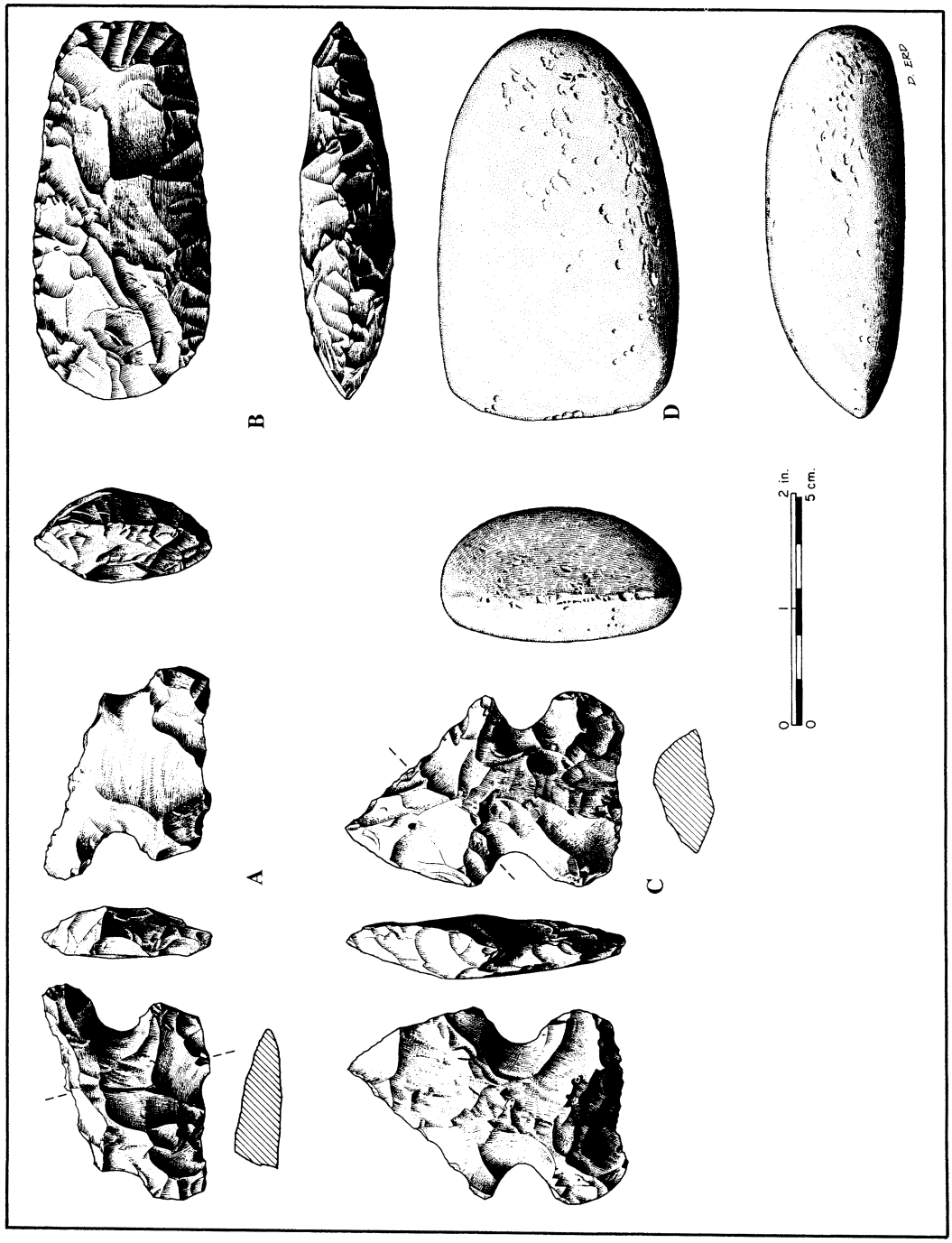

Figure 6. Unusual tool forms from the early Holocene levels of the G. S. Lewis site (38AK228), Aiken County, South Carolina. (*a*) and (*c*) Edgefield Scrapers; (*b*) chipped stone adze; (*d*) polished stone celt.

flakes were observed in association with bifaces, hammerstones, and unifaces that appear to reflect additional artifact maintenance and resource-processing areas. From these distributions, the G. S. Lewis Archaic assemblage is interpreted as reflecting recurring, extended visits, during which a diverse range of activities occurred.

Modern climatic information for the Upper Coastal Plain/Sandhill province indicates that during the winter months this area is relatively warmer and drier than the Piedmont, and drier than the lower coastal zone (Barry 1980). Additionally, white-tailed deer utilize the sandhills intensively during the late fall and winter months because of the abundance of scrub oak mast, offering a predictable, aggregated source of both food and hides. This combination of environmental factors, in conjunction with the archaeological evidence, forms the basis for the inference that G. S. Lewis represents a winter season base camp that may have been occupied for periods of two or three months at a time. Pen Point (38BR383, see Table 1), another Early Archaic site located 10 km downstream, may have seen a similar function in the system (Hanson and Sassaman 1984; Sassaman 1987). Other nonfloodplain/terrace sites from the Inner Coastal Plain are for the most part small artifact scatters with low assemblage diversity, particularly those within the Sandhills along minor tributaries. These sites are thought to represent contemporaneous logistic locations used for procuring white-tailed deer and oak mast, or later (spring/summer) foraging camps.

Interassemblage Comparisons

Considerable variation is evident over the seven Early Archaic excavation assemblages from the Savannah River area (Table 1). The artifact frequencies, proportions, and densities provide information about the nature and level of occupational intensity at each of these sites. Most of the assemblages are dominated by expedient tools (i.e., with a curated-to-expedient tool ratio less than 1.0); the only exception, Gregg Shoals, has an anomalously low incidence of expedient tools that may be due to the small area examined. The figures reinforce earlier comparative analyses documenting a general trend in Early Archaic assemblages toward expedient technologies and foraging adaptive strategies on the South Atlantic Slope (Anderson and Schuldenrein 1983; Claggett and Cable 1982). While this pattern generally emerges over the sample, the G. S. Lewis and Pen Point site data suggest an additional perspective that some sites in the upper Coastal Plain may have been used for longer durations as logistical base camps.

The G. S. Lewis and Pen Point sites possess distinctive assemblages that appear to reflect longer occupations than is suggested at the other sites in the sample. The assemblages from these sites have higher curated-to-expedient tool indices than noted at the other four sites, excluding Gregg Shoals from consideration (Table 1). The Lewis assemblage in particular contained tool classes (i.e., leaf-shaped microliths, chipped and polished adzes) that were not present in the other assemblages. These two sites may document a residentially stable, seasonally occupied base camp component in the Early Archaic settlement system, from which logistical forays were conducted to obtain lithic raw material and food resources. Such sites are thought to have been winter base camps.

Five of the seven sites, including Gregg Shoals, Cal Smoak, Rucker's Bottom, 9RI89, and Theriault, are characterized by either low artifact densities (i.e., Gregg Shoals) or a high incidence of expedient unifaces and bifaces relative to curated hafted bifaces and formal unifaces. Following arguments advanced by Binford (1979, 1980), we suggest that the level of expedient technological organization reflected in the curated-to-expedient tool index provides a measure of the site use and group mobility strategy. With the exception of Gregg Shoals, where no data for expedient unifaces was reported, the curated-to-expedient tool indices for these sites range from .20 (Cal Smoak) to .33 (9RI89). These sites are interpreted as different types of short-duration camps, occupied either as residential locations, or by logistically organized task groups. Two of the sites, Theriault and 9RI89, exhibit unusual assemblage characteristics indicative of logistic camps (see below); the remaining three sites are interpreted as palimpsests of short-duration, residential locations; following the proposed model, warm weather occupations are expected.

The Theriault site, which appreciably differs from the remainder of the assemblage because of the high incidence of other bifaces/preforms (Table 1), provides a signature of lithic quarrying

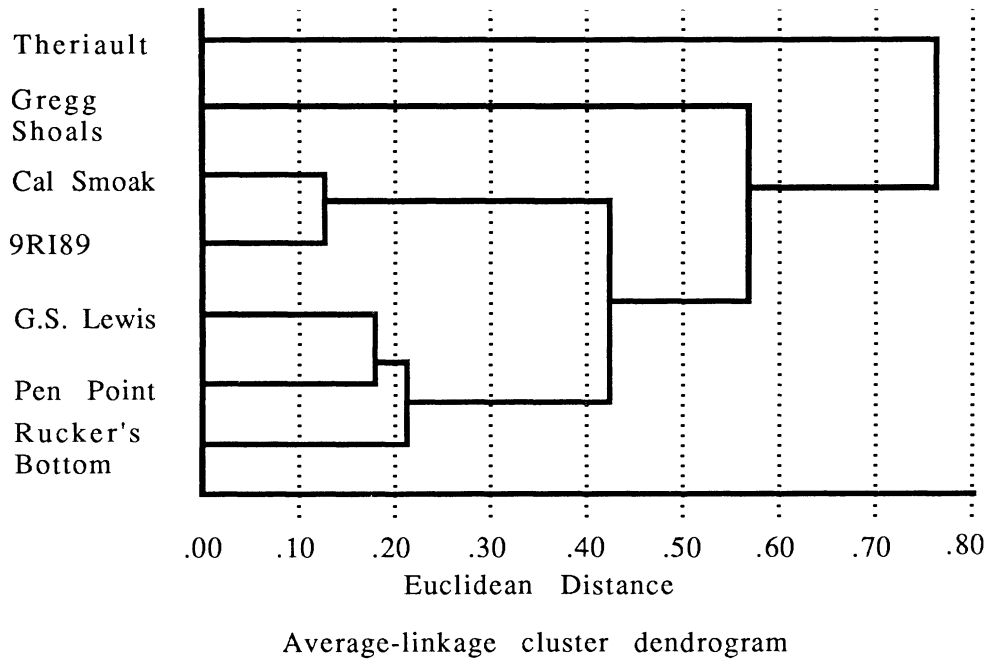

Figure 7. Average-linkage cluster dendrogram for Early Archaic assemblages from the vicinity of the Savannah River basin.

behavior. Located along Brier Creek in Burke County, Georgia, at one of the largest exposures of the Flint Ridge chert formation in the Savannah watershed, Theriault contains evidence for intensive quarrying behavior throughout prehistory. The low percentages of hafted bifaces and cobble tools and the high percentages of other bifaces at the site suggest that Early Archaic raw material procurement involved the production of preforms in large quantity, with only comparatively minor replacement and/or use of other tool forms, such as hafted bifaces or formal unifaces.

The final site in the sample, 9RI89, situated in the extreme upper reaches of the Coastal Plain just below the Fall Line, has an assemblage dominated by formal and expedient unifaces. Cobble tools were absent, while hafted bifaces and other bifaces were represented only incidentally. The site differs from the Early Archaic assemblages in the sample because 89 percent of the assemblage was composed of unifacial tools. Based on these data, particularly the high incidence of expedient unifaces, 9RI89 may have seen repeated use as a special-purpose foraging station or short-duration residential camp, from which specific floodplain and riverine resources (requiring a predominately unifacial assemblage for procurement and/or processing) were exploited intensively.

Comparisons using the curated-to-expedient indices were complemented by an examination of overall assemblage composition using Euclidean distance and average linkage clustering algorithms (Figure 7). In order to standardize the raw frequency data presented in Table 1 and to compensate for differential excavation areas, relative frequencies (i.e., percentages) were employed for each assemblage. The analysis indicates the presence of four site clusters, consisting of (a) a group of three sites (Pen Point, G. S. Lewis, and Rucker's Bottom), (b) a group of two sites (Cal Smoak and 9RI89, and (c) and (d) two isolated, single sites (Theriault and Gregg Shoals). Overall, the associations among the seven sites reflect intensively occupied sites with diverse assemblages (Pen Point, G. S. Lewis, and Rucker's Bottom), less intensively occupied sites with diverse assemblages (Cal Smoak and 9RI89), a specialized site with a relatively unique assemblage (Theriault), and a limited occupation site with low assemblage diversity (Gregg Shoals). This independent analytical approach

to the question of interassemblage variability thus closely approximates the patterns indicated by the curated-to-expedient indices.

Riverine-extensive, or at least geographically wide-ranging, adaptations are supported further by an analysis of Early Archaic hafted biface collections from the length of the Savannah (Figure 8). Lithic raw materials used to manufacture hafted bifaces, artifacts readily identified to period, occur at distances of up to 300 km from their source area at sites in the basin. A gradual, rather than a dramatic or step-like fall off in the occurrence of lithic raw materials occurs, suggesting minimal social boundaries. Based on analyses of diagnostic artifacts from riverine and interriverine contexts (Anderson and Schuldenrein 1983:201), extralocal raw material use appears greatest along rather than across drainages, suggesting that most group activities (except for possibly seasonal or annual aggregation events) occurred within individual drainages. Finally, evidence for raw material or finished artifact exchange is lacking completely. The assemblages recovered to date, even at quarry sites, suggest routine tool-kit maintenance, discard, or replenishment ("gearing-up") activity, rather than production for exchange.

The analyses of the seven excavated assemblages thus support the possibility of a base camp/foraging camp residential dichotomy within local Early Archaic settlement systems, as well as the existence of special-purpose resource-extraction camps. While these findings are in line with expectations of the model advanced here, further details about matters such as season and duration of site use, or the size of the resident groups, must await larger excavations, the recovery of preserved floral and faunal remains (or other seasonal indicators), and continued development of analytical strategies used to examine existing data.

MODEL SUMMARY AND ARCHAEOLOGICAL IMPLICATIONS

Four limiting factors, it has been argued, strongly conditioned the structure and operation of Early Archaic adaptations on the South Atlantic Slope: (1) environmental structure, specifically as it relates to seasonal and geographic variation in food, lithic raw materials, and other resources; (2) biological interaction, manifest in mating-network regulation; (3) information exchange, notably for mating-network maintenance and subsistence resource regulation; and (4) demographic structure, evidenced in population size and spacing. The case study presented for the Savannah River basin and the South Atlantic Slope viewed Early Archaic settlement in terms of empirical manifestations of these limiting factors. Biological interaction necessary for the maintenance of the population would have been maintained through regular multiband aggregation at Fall Line locations during a period of high resource density (i.e., autumn). Additional maintenance of this mating network could have been served by the movement of individuals or families between bands during other seasons of the year, though this pattern is not thought to become dominant until the succeeding Middle Archaic locally. Archaeological implications of seasonal aggregation would be the presence of archaeological sites on the Fall Line containing high lithic raw material and possibly assemblage diversity uncharacteristic of other sites in the particular band territory. Extralocal raw material might be expected in the form of finished products, such as formal unifaces or hafted bifaces, with little associated manufacturing debris.

Information exchange, necessary for subsistence resource regulation (i.e., preventing redundant use of particular landscapes), could have been maintained through social interaction at fall aggregations. Archaeological correlates of information exchange and territorial demarcation might be demonstrable through stylistic analyses of artifacts. Although many socially meaningful expressions probably occurred on nondurable artifacts, detailed examination of hafted biface attributes over several adjoining watersheds might yield evidence for group demarcation/interaction. Given a presumed open-mating system with a fairly fluid social network, clinal variation in style zones would be expected; stylistic differences might be observable only at major macroband boundaries, or over several watersheds marking individual band territories.

Demographic conditions extant during the early Holocene certainly are the most elusive factors to monitor through archaeological records. The model assumes low population densities of between 50 to 150 individuals within a band. These figures are based on the relatively sparse occurrence of

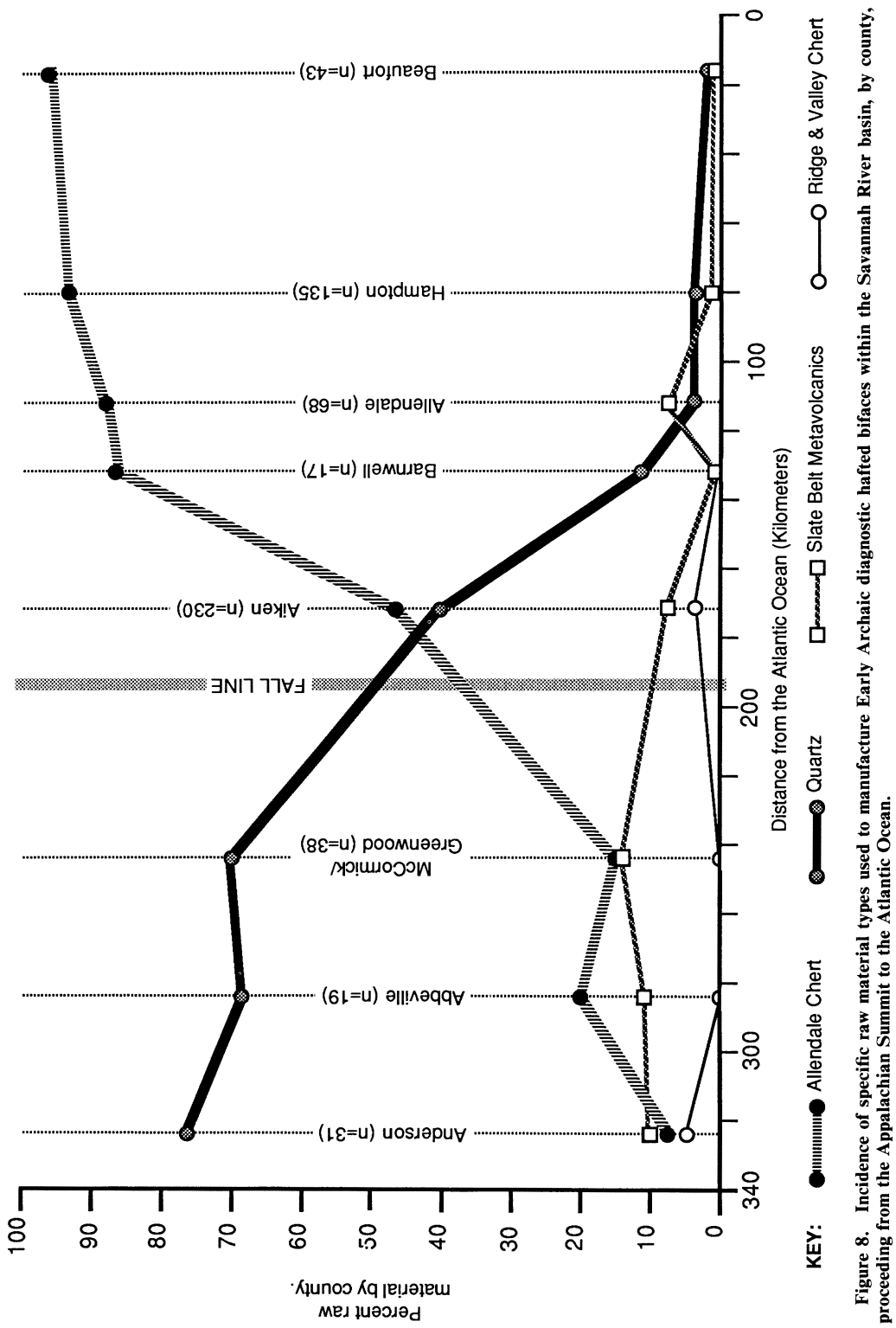

Figure 8. Incidence of specific raw material types used to manufacture Early Archaic diagnostic hafted bifaces within the Savannah River basin, by county, proceeding from the Appalachian Summit to the Atlantic Ocean.

large Early Archaic sites when compared to site densities in subsequent periods, simulation studies of hunter–gatherer population and mating networks, and ethnographic observations about hunter–gatherer group size. Further archaeological resolution of Early Holocene population size and spacing must await more detailed, regionally based analyses of artifact densities and stylistic attributes.

Ecological components in the model can be clarified through focused paleoenvironmental research. Evidence for a predominately deciduous canopy during the early Holocene in the lower Southeast permits the general characterization of resource structure, though finer-grained work is needed. Food resource distributions, differential lithic raw material occurrence, and seasonal fluctuations in temperature and precipitation account for aspects of the mixed forager–collector strategy proposed here. Archaeological correlates of this model have been examined through the documentation of watershed-extensive lithic raw material distributions, and the examination of assemblages over a series of excavated sites. Subsequent archaeological research may be focused best on areally extensive survey, expanded excavations at known sites, and continued modeling efforts to refine our understanding of Early Archaic site distributions and intra-assemblage variation.

While we do not recommend the wholesale adoption of this model without careful consideration of relevant limiting variables, we believe that the complexity of cultural systems must be recognized in archaeological analyses. Early Archaic populations in the Southeast possessed complex organizational and adaptive strategies, adjusting their movements and schedules to accommodate dynamic biological, social, and ecological factors.

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