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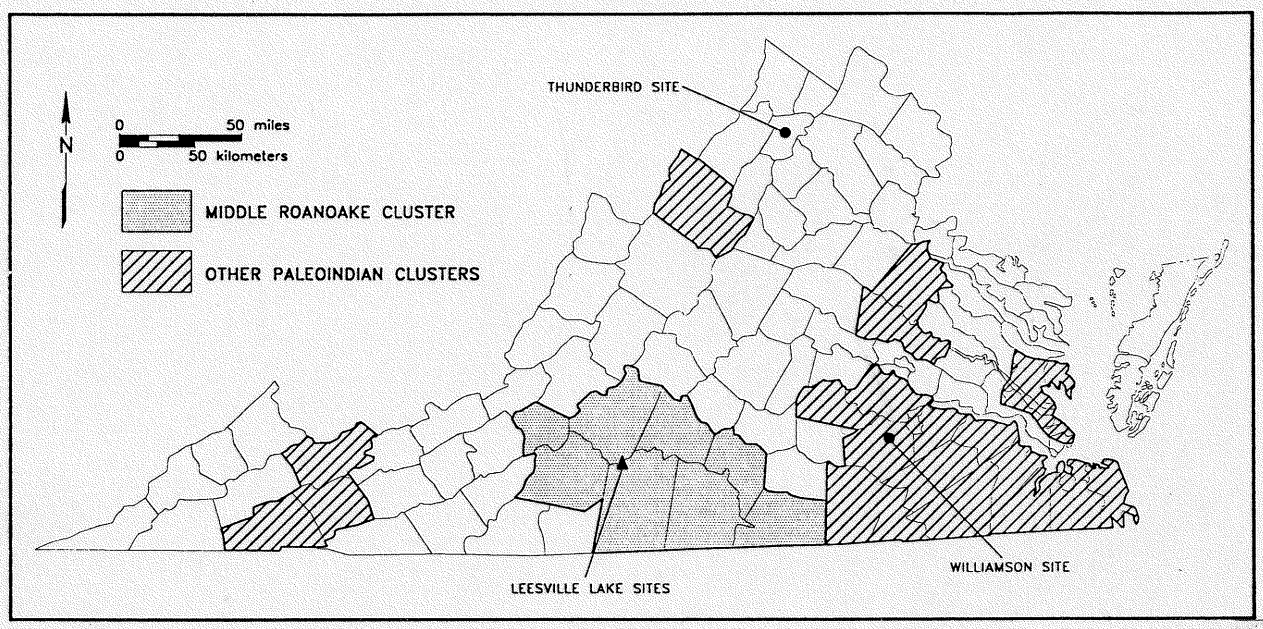
ARCHAEOLOGICAL ASSESSMENT OF SITES 44PY7, 44PY43, AND 44PY152 AT LEESVILLE LAKE PITTSYLVANIA COUNTY, VIRGINIA



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ARCHAEOLOGICAL ASSESSMENT OF SITES 44PY7, 44PY43, AND 44PY152 AT LEESVILLE LAKE PITTSYLVANIA COUNTY, VIRGINIA

Submitted to:

Virginia Department of Historic Resources
221 Governor Street
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Submitted by:

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ABSTRACT

Sites 44PY7, 44PY43, and 44PY152 on the southern shore of Leesville Lake in Pittsylvania County were subjected to archaeological evaluation. Sites 44PY7 and 44PY152 were confirmed to contain Early Archaic/Paleoindian horizons buried beneath 1.5 to 1.8 m of alluvium. Geoarchaeological analyses and a series of radiocarbon dates make the 44PY152 deposits among the best-documented early Holocene contexts in the region. Portions of these components have been lost to erosion, but each retains significant research potential. Site 44PY43 is a remnant of a Late Woodland village. Trenching failed to locate a palisade line, but numerous post features and possible pits were identified. This site also retains potential for recovering significant information on Late Woodland settlement in this section of the Roanoke River valley. Project results are discussed in the context of prevailing settlement/subsistence models for the region.

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Special recognition goes to a group of volunteers from the Fairfax Chapter of the ASV, organized by Mike Johnson. These folks donated a full week to the project, which happened to coincide with a period of very hot weather and some of the toughest water screening. We were all impressed at their willingness to stick it out, with only good-natured commentary about the rigors of the project.

The William and Mary field crew of Jonathan Danz, Jeff Irwin, and Jesse Zinn deserve a wealth of credit. They worked as a team with minimal daily supervision and persevered in spite of several floods, fluctuating water levels, unfriendly soil, low artifact density, and many hours on the road.

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CHAPTER 1: Introduction

Introduction

This report presents the results of an archaeological assessment of Sites 44PY7, 44PY43, and 44PY152 at Leesville Lake in Pittsylvania County, Virginia (Figure 1). The purpose of this study is to establish the significance and research potential of these three sites. The project was sponsored by the Virginia Department of Historic Resources, and conducted by the William and Mary Center for Archaeological Research (WMCAR) in cooperation with the Roanoke Chapter, Archeological Society of Virginia (ASV). Fieldwork occurred intermittently between March 22 and July 23, 1994.

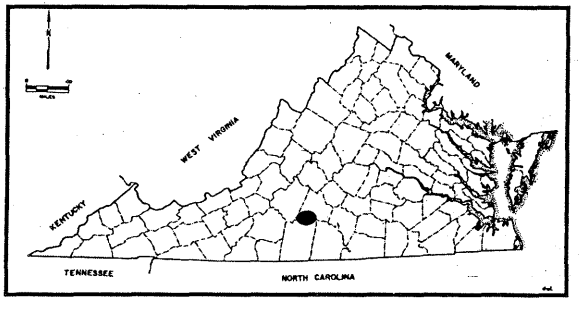


Figure 1. Project area location.

Two sites, 44PY7 and 44PY152, were reported as deeply stratified (Childress 1989, 1993). Collections and observations made by ASV members indicated that 44PY7 contains an unbroken sequence of occupations spanning the Paleoindian and Archaic periods and includes a final Late Woodland occupation. Site 44PY152 appeared to have a sequence spanning at least the Paleoindian through Middle Archaic period. Together these two sites potentially offered an opportunity to establish a stratified sequence analogous to that documented by Coe (1964) in North Carolina. The third site, 44PY43, represents the remnant of a Late Woodland village, and work was proposed to define the extent of what remains and recover a sample of artifacts.

The project demanded careful planning and coordination. The logistics of deep excavation, dense soils, and dramatic fluctuations in the lake level (Figure 2) all required special measures. These sites lie in or adjacent to the flood pool of Leesville Lake, the level of which fluctuates dramatically on essentially a daily basis as water is pumped in and out of the basin (Figure 3).

Project Area Setting

The three sites are 1.5–2.5 km downstream from Smith Mountain Dam and were identified in exposures along the shore of Leesville Lake (Figure 4). The normal pool elevation of Leesville Lake is 184.2 m, but as a pump-storage reservoir this level changes often. Erosion aggravated by these fluctuations has exposed and removed portions of each site.

Leesville Lake and adjacent Smith Mountain Lake are impoundments of the Roanoke River. Prior to dam construction, the river was confined to its narrow valley, which meandered around ridges of resistant bedrock (Figure 5–7). It breached the commanding elevation of Smith Mountain at Smith Mountain Gap, not more than 1.5 km upstream from 44PY7 (Figure 8). Tanker Creek enters the lake immediately west of 44PY7 after flowing from the adjacent uplands. Other unnamed, intermittent tributaries in hollows and coves also drain the nearby uplands. Figure 9 was created by overlaying 1956 USDA aerial photographs (see Figures 6 and 7) and the current USGS quadrangle. It documents with fair accuracy the relationship of the former river channel and present-day features. Note especially the position of 44PY43, which indicates considerable loss of village deposits.

The project area falls within the western portion of the Piedmont physiographic province. Generally speaking, this province has a rolling topography defined by a dendritic drainage system. Occasionally this landscape is punctuated by prominent ridges or knolls of resistant rock. Elevations in the immediate project vicinity range from a low of about 184 m at the floodplain to about 580 m at the crest of Smith

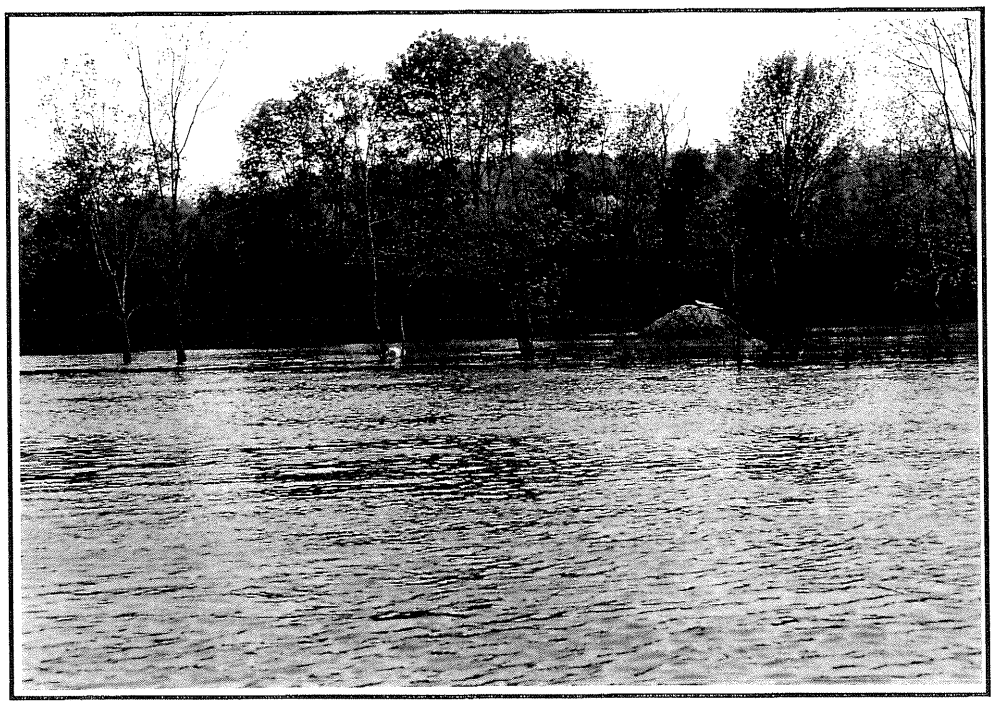


Figure 2. Site 44PY152, flood conditions (site area indicated by backdirt pile and sparse trees).

Figure 3. Beach at 44PY152 exposed by low lake levels.

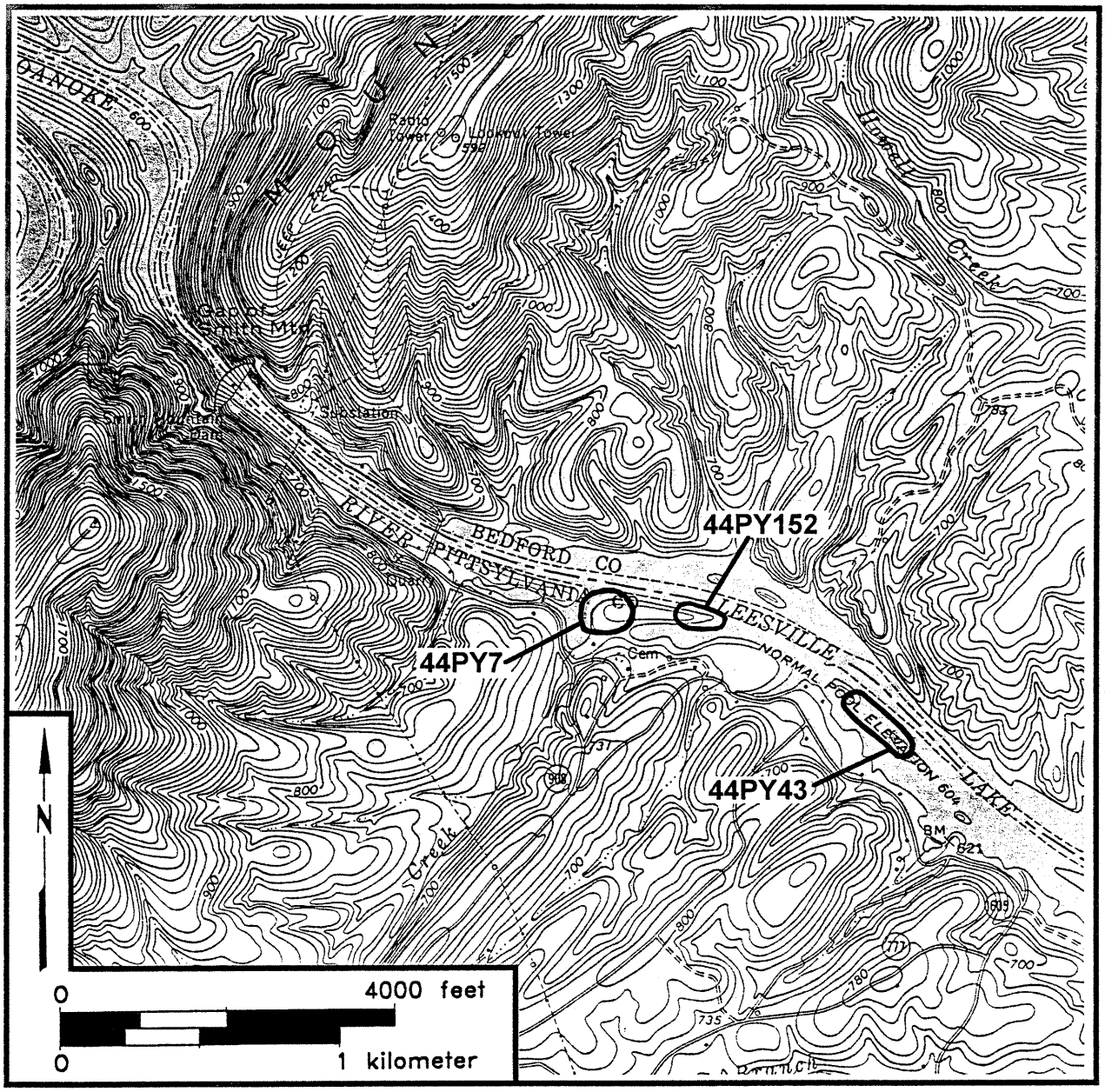


Figure 4. Project area and environs (U.S. Geological Survey [USGS] 7.5-minute Smith Mountain Dam topographic quadrangle 1967/photorevised 1984).

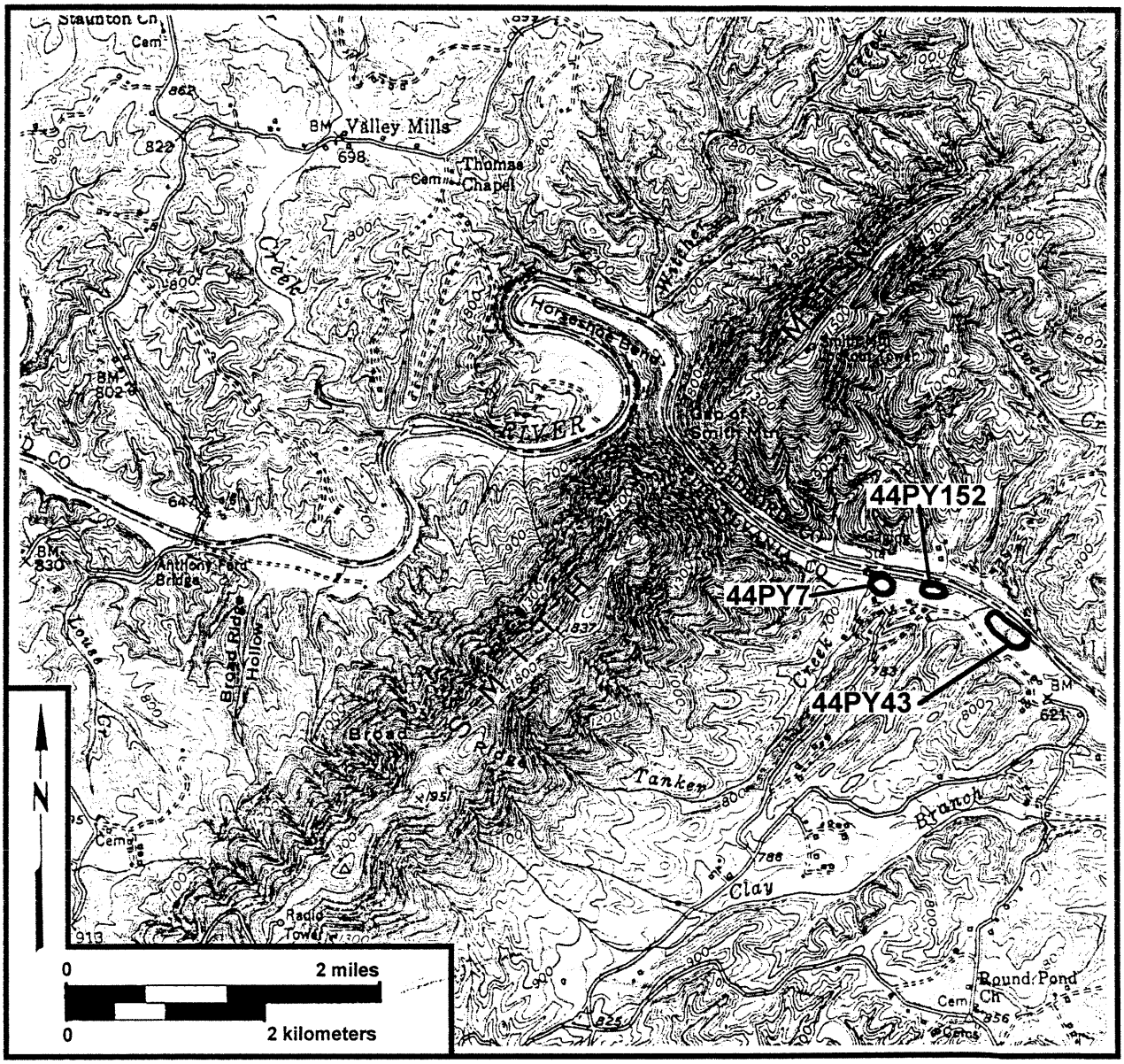


Figure 5. Project area (USGS 15-minute Moneta topographic quadrangle 1951).

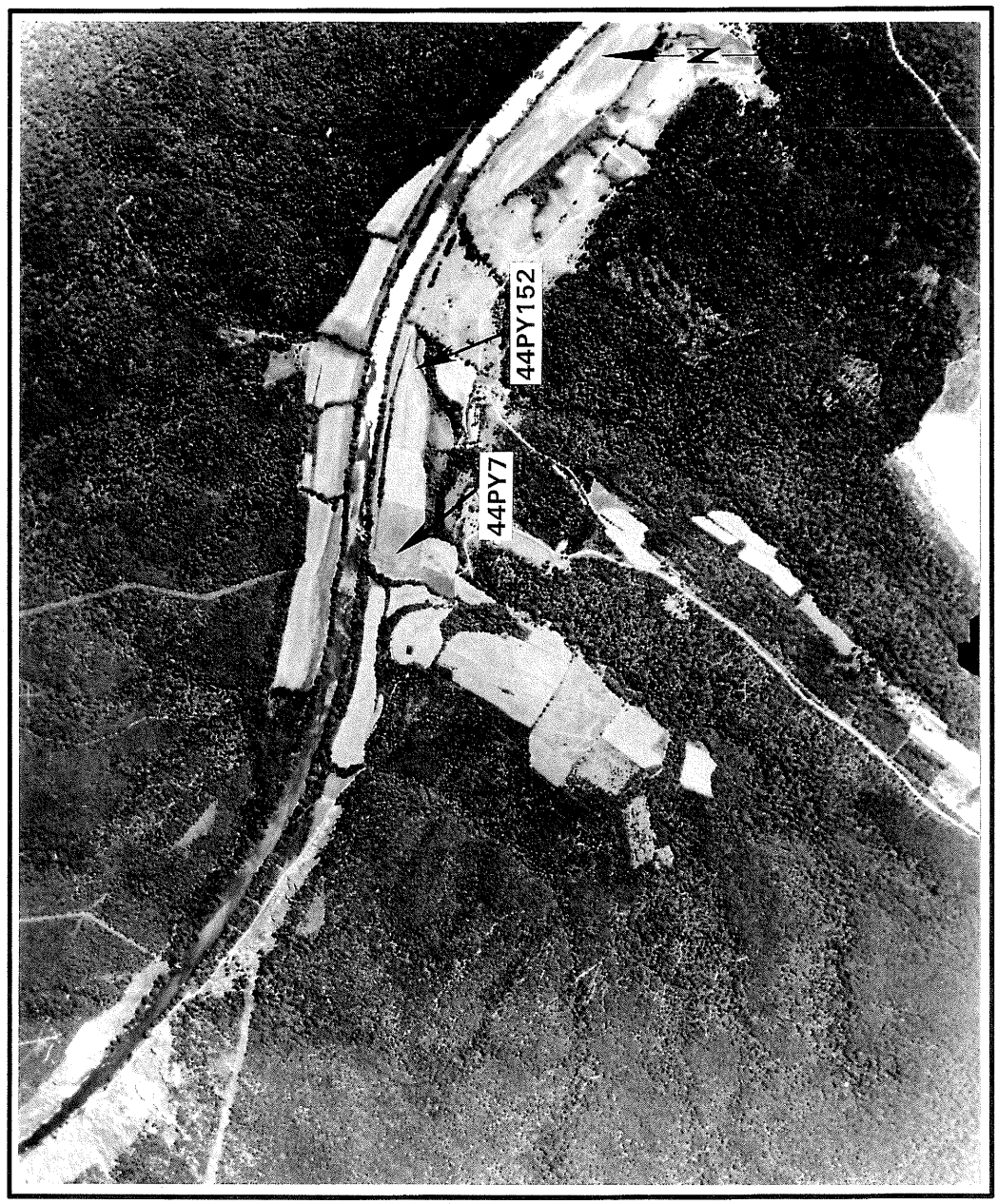


Figure 6. Aerial photograph showing Sites 44PY7 and 44PY152 before impoundment (USDA 1956).

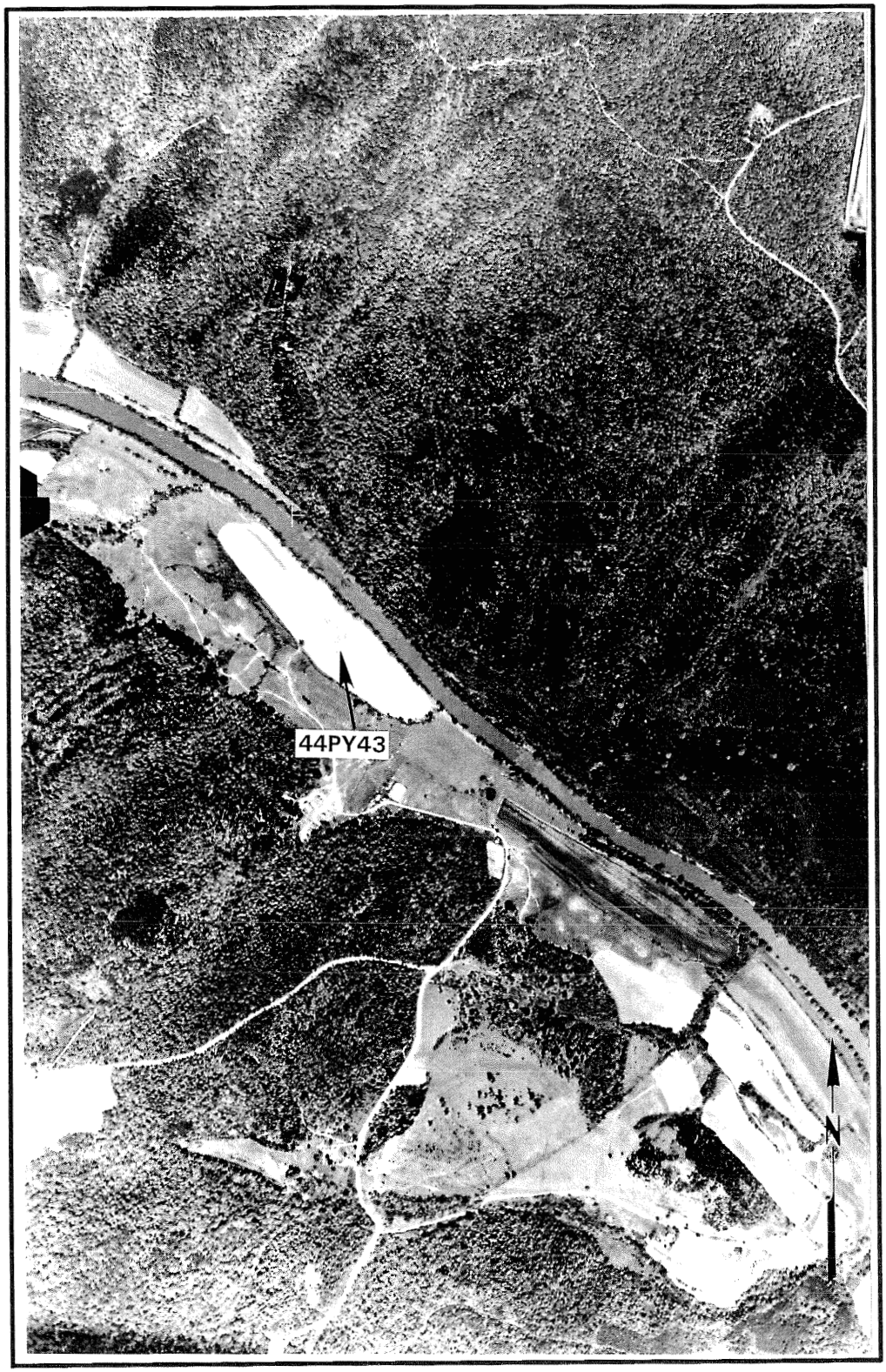


Figure 7. Aerial photograph showing Site 44PY43 before impoundment (USDA 1956).

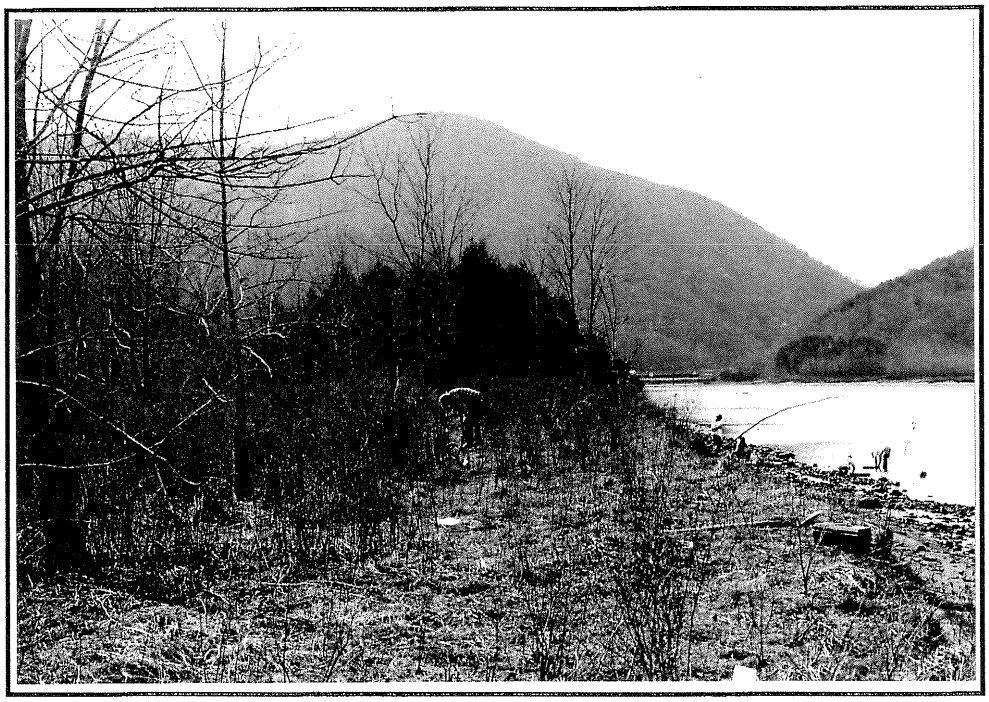


Figure 8. Smith Mountain Gap, looking northwest from 44PY152.

Mountain; average elevations in the surrounding uplands range from about 244 to 275 m.

Locally, the geology is dominated by strongly metamorphosed rocks such as schist (Conley 1985). Knappable lithic materials are scarce in these formations, but the river has transported cobbles of suitable stone into the area. Quartz and quartzite dominate the siliceous cobble load, but occasional pebbles of chert and jasper are also present. The Piedmont is characterized by red, clayey soils weathered from the igneous and metamorphic bedrock. The soil at each of the sites investigated is alluvial in origin, however, and classified as Chenneby loam (USDA Office, Rocky Mount, Virginia, personal communication 1994). It is described as a deep soil occurring in nearly level floodplains of large drainages, and it is subject to flooding from late fall to spring.

The three sites are located on former agricultural lands (see Figures 6 and 7) that have become overgrown with weeds and small trees. Extensive beach exposures are present at low water, but there is no visibility on the uneroded site surfaces. The constant threat of inundation has prevented any modern construction or improvements. The greatest threats to the sites presently are erosion and looting.

Research Design

The reports from avocational archaeologists about the potential of these sites are very impressive, particularly for the two deeply stratified sites, 44PY7 and 44PY152 (Childress 1989, 1993). The physical setting of the sites, too, is impressive, as it is consistent with other locations confirmed to have deeply stratified deposits (see Coe 1964). These factors were compelling enough to warrant an investigation to verify the true potential of the Leesville sites. Virginia is lacking a carefully excavated record from deposits analogous to those studied by Coe in North Carolina, but this group of sites has the potential to close that gap.

A good chronology is always appealing to archaeologists, and the potential of at least two of the sites to provide an extended sequence for Piedmont Virginia is clear. Attaining a record of this kind was only one of the goals of this project, however. It may be discovered that the local record mirrors that from the North Carolina Piedmont, and in the end only confirmation of the same general sequence would be obtained. The emphasis, instead, could be more oriented to asking questions that pioneers such as

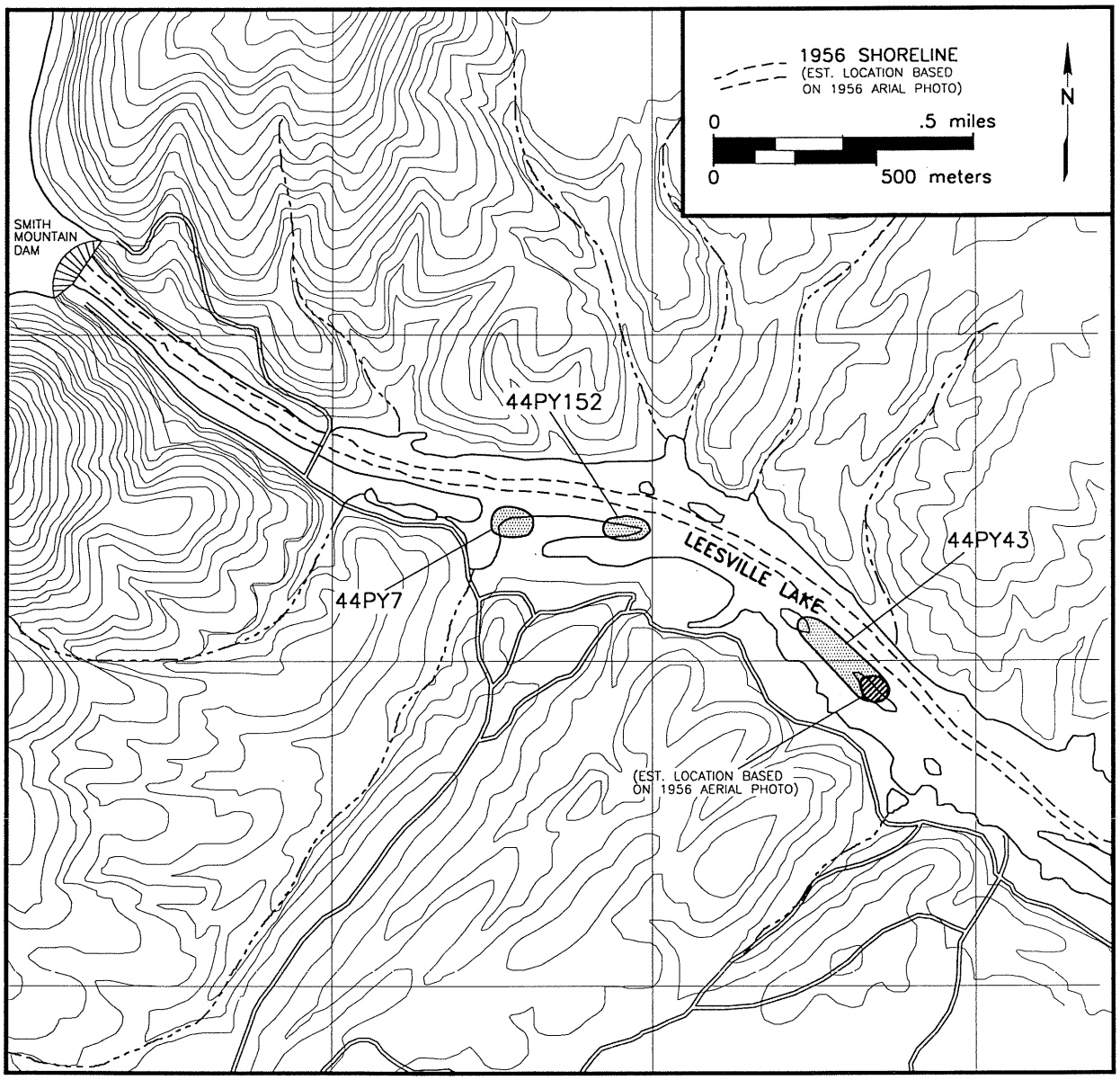


Figure 9. Composite plan showing river channel within Leesville Lake basin.

Coe did not pose. These lie in the realms of human ecology and sociocultural interactions.

With respect to human-environment relationships, deeply stratified cultural sequences offer the opportunity to examine patterns of cultural change in the context of environmental change. Deep alluvial deposits are conducive to study of depositional processes that can be linked to climatic patterns. For example, geomorphologists can document varying rates of sedimentation that reflect stream dynamics related to precipitation/runoff patterns. Within this sequence, physical and chemical signatures of stable versus unstable surfaces can also be identified. These data are important for formulating more accurate models of human adaptation in the region, and also for predicting the locations of other deeply stratified sites with early components.

Probably the most important potential contribution to purely culture historical research will be obtaining samples suitable for radiocarbon dating. In that many of the long sequences documented earlier are primarily relative as opposed to absolute sequences, firm dates for major components will be welcomed.

Finally, every effort was made to determine how much of the original site deposits have been lost to erosion. Clearly, significant changes have taken place in the Leesville Lake basin since the introduction of artificial controls. While even small portions of buried Paleoindian sites may ultimately prove important, their proper interpretation will depend on an appreciation of how representative the surviving portion is.

CHAPTER 2: Archaeological and Environmental Context

Environmental Context

Development of environmental context will concentrate on the project area, meaning specifically the Roanoke River basin in the western Piedmont, and this will allow for a more meaningful reconstruction of events and activities at the sites investigated. The disadvantage of such a focus, however, is the scarcity of relevant paleoenvironmental studies in the area. To overcome this, the findings of work in analogous settings outside the Roanoke basin and even Virginia will be consulted. Patterns documented for the Mid-Atlantic at large will, in the same way, augment more local observations. Finally, the emphasis here will be on the environment confronting the Paleoindian and Early Archaic inhabitants of the areas, since these components are the focus of the report.

Regional Patterns

The arrival of humans in this area, and the earliest occupations of two of the sites under study, appears to have coincided with the close of the last ice age or the Pleistocene between 12,000 and 11,000 B.P. This period was characterized by relatively rapid changes in the environment, driven in large measure by the northward retreat of the continental glacier. Although the project area and all of Virginia were unglaciated, the increasing distance from the ice front initiated a distinct "amelioration" of the general climate: average temperatures became higher, sea level rose, stream gradients were altered, and floral communities shifted.

In the Mid-Atlantic in general, one of the more telling impacts of this change was to vegetation, which can be sensitive to even minor changes in temperature and precipitation. Before about 12,000 B.P., predating any confirmed human presence, the dominant floral community was largely boreal in character, akin to what is present today several hundred kilometers farther north. This late Pleistocene forest consisted primarily of boreal conifers such as jack pine and spruce and, at the highest elevations, limited areas of alpine tundra (Delcourt and Delcourt 1985:18–19). By the end of the Pleistocene about 12,000 B.P., the warming climate had forced the boreal communities northward or to higher elevations, and they were gradually replaced with a forest dominated by mesic deciduous species such as hornbeam and beech, although oak, hickory, and white pine increased as well. Therefore, the forest encountered by the first human groups in the area around 11,000 B.P. was probably of this type. The climate warmed further still so that after 8500 B.P. floral communities had assumed a decidedly modern character, with oak-hickory dominated forests (Joyce 1988:200). After 4000 B.P., more distinct zonal changes are evident, with samples showing a dominance of pine in the Coastal Plain in contrast to the still-prevalent deciduous forests to the west. A standard caution bears repeating here, and that is to appreciate the variation that probably occurred within the typic forest communities described. Depending on local moisture and soil conditions, along with rates of migration peculiar to specific species, pockets of different forest types probably existed and changes often were time-transgressive in nature (Joyce 1988).

Hydrologic patterns (in turn dependent on precipitation patterns) were also affected through the transition from the Pleistocene to the Holocene, and figured significantly in sedimentation rates, habitation site selection, as well as modern preservation potential. Pleistocene precipitation may have been 20–50% less than today in Virginia (Boyd 1989:143). This lower rate was determined by the intrusion of dry, cold Arctic air at least until the end of the Pleistocene. There is also evidence of mass wasting of slopes in the Appalachian region at the end of the Pleistocene. Conners (1986) suggests that a response to the glacial retreat was an increase in rainfall as the polar frontal zone moved northward. The influence of greater rainfall on streams in the terminal Pleistocene was increased flooding and alluviation. By the early Holocene warmer, more stable climates produced a period of downcutting.

Joyce's (1988) analysis predicts changes associated with atmospheric shifts across the hemisphere. Westerly Pacific air patterns are proposed as dominant after the end of the Pleistocene. This pattern reduced rates of precipitation on average and is responsible for the suspected altithermal period across the Midwest and East until about 6000–5000 B.P. With the collapse of the ice sheet, which before had influenced circulation, a more meridional (north–south) air flow dominated. These conditions were more conducive to storminess and increased precipitation owing to the mixing of Gulf and Atlantic air masses, and were important in establishing the modern (late Holocene) climate. The potential for floods was, therefore, higher after 6000–5000 B.P., and the shift to these conditions may be marked by distinct depositional episodes. Similar depositional events may have marked the Pleistocene/Holocene transition.

Roanoke Basin Patterns

The best known research conducted on the Roanoke River is that of Coe (1964) near Roanoke Rapids, North Carolina, at the eastern margin of the Piedmont (Figure 10). He became interested in deeply stratified deposits for their obvious benefit in constructing regional sequences, and developed a basic predictive model for locating them:

> In areas where the rivers fall rapidly, however, such as along the fall line of the Carolina Piedmont, their beds are being cut rather than filled. In this situation the valleys are narrow and rocky and the high velocity of the water prevents the development of characteristic meander patterns. These rivers are usually confined to a relatively broad but shallow bed that is interspersed with outcropping rocks and small islands. As these streams move from one side of their confining valley to the other, they frequently pass places where fingers of resisting rock extend from the valley wall to the edge of the river. Behind these projecting rocks the river forms large eddies when it is in flood and deposits sand and silt at a faster rate than elsewhere along the narrow flood plains. Since these areas build up faster, their rate of flooding becomes progressively less until eventually a point is reached where they are higher than normal flood stage. It is a curious fact that many of these deposits which began building early in the Holocene are still preserved and have continued to build, at a progressively slower rate, to the present. It suggests that there has been comparatively little change in the courses of these rivers through the fall line since the end of the last glaciation and that there are many places where the remains of aboriginal man have been buried and preserved (Coe 1964:11).

The sequence of deposits at the Gaston Site, in just this kind of setting, is summarized in Figure 11. Coe interpreted the 4.5-m-thick deposit as representing four major events or "stages." The first he attributed to Pleistocene downcutting, the second to an early Holocene (?) backwater/swamp, the third to a major flood event or series of smaller events in rapid succession, and finally there was a period of relatively stability during which human habitation is documented in the slowly accreting sediments. Hearths estimated at 6000 years old occurred in the lower part of this fourth-stage deposit (approximately 150 cm below surface), and an upper midden or "humus" was dated at about A.D. 900. (30–50 cm below surface). The position of the dated features permitted Coe to estimate the rate of accumulation in the upper deposit at less than 30 cm/1,000 years.

Carl Miller (1962) directed a program of survey and excavation in the proposed John H. Kerr Reservoir during the late 1940s (see Figure 10). This impoundment is on the Roanoke River in Mecklenburg, Halifax, and Caroline counties, Virginia, about 125 km downstream from Smith Mountain Dam and 60 km upstream from the Gaston Site reported by Coe (1964). Curiously, Miller appears not to have sought deeply stratified sites, even though the successes of Coe were probably known to him. Descriptions from certain village excavations indicate, however, that at least moderately deep sand deposits occurred widely in the basin, and numerous Paleoindian sites were reported in the uplands. (Allegedly Miller explored sites in the Smith Mountain Lake basin [B. Childress, personal communication 1994]). No formal reports are known; however, records are likely still on file with the Smithsonian in Washington, D.C.)

These early studies were and still are significant indicators of the potential of Piedmont alluvial settings region-wide, but in this case they also document the general promise of the Roanoke basin. The investigations confirmed the presence of deep alluvial deposits containing stratified cultural material dating

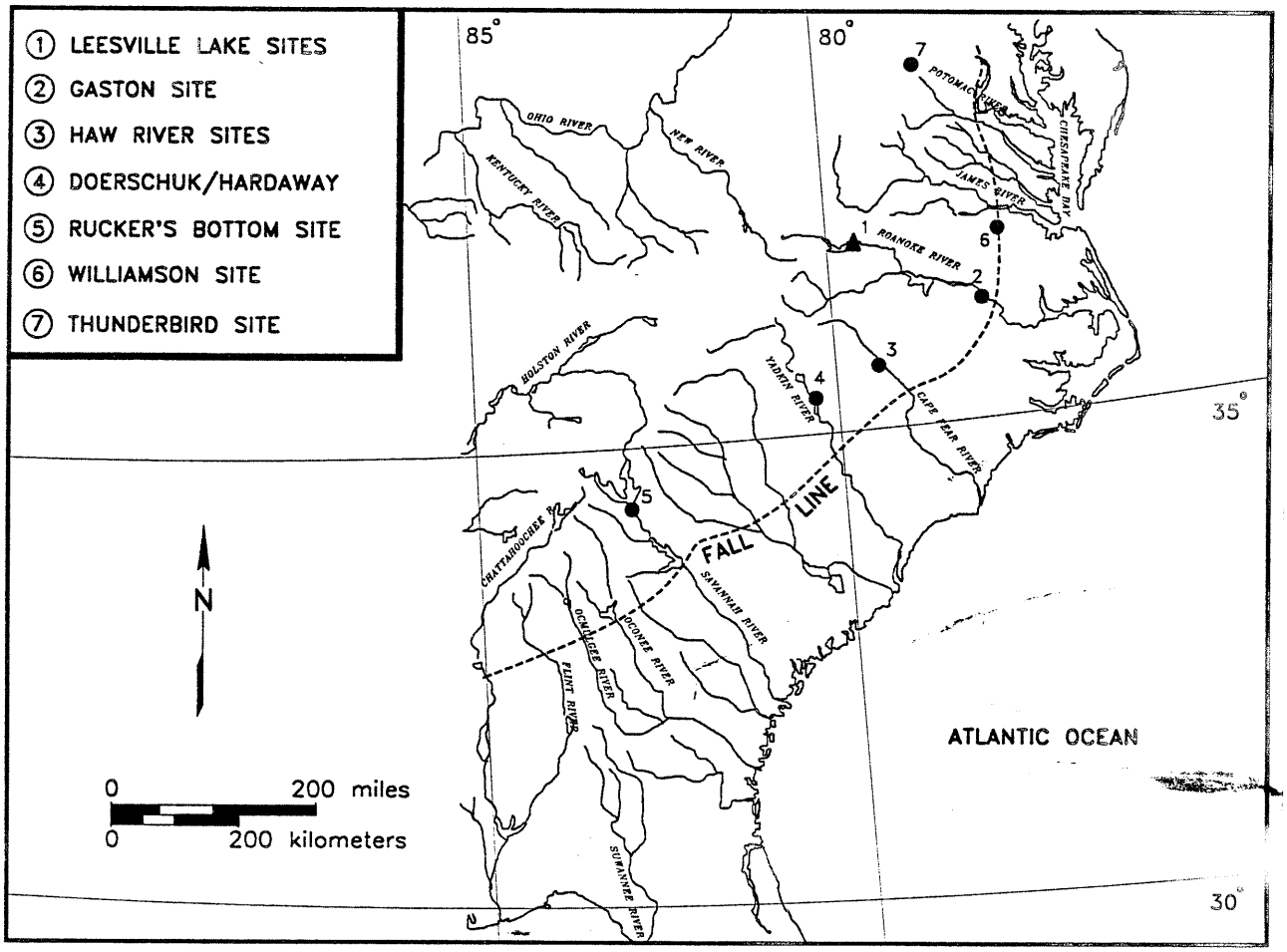


Figure 10. Locations of regional sites mentioned in text.

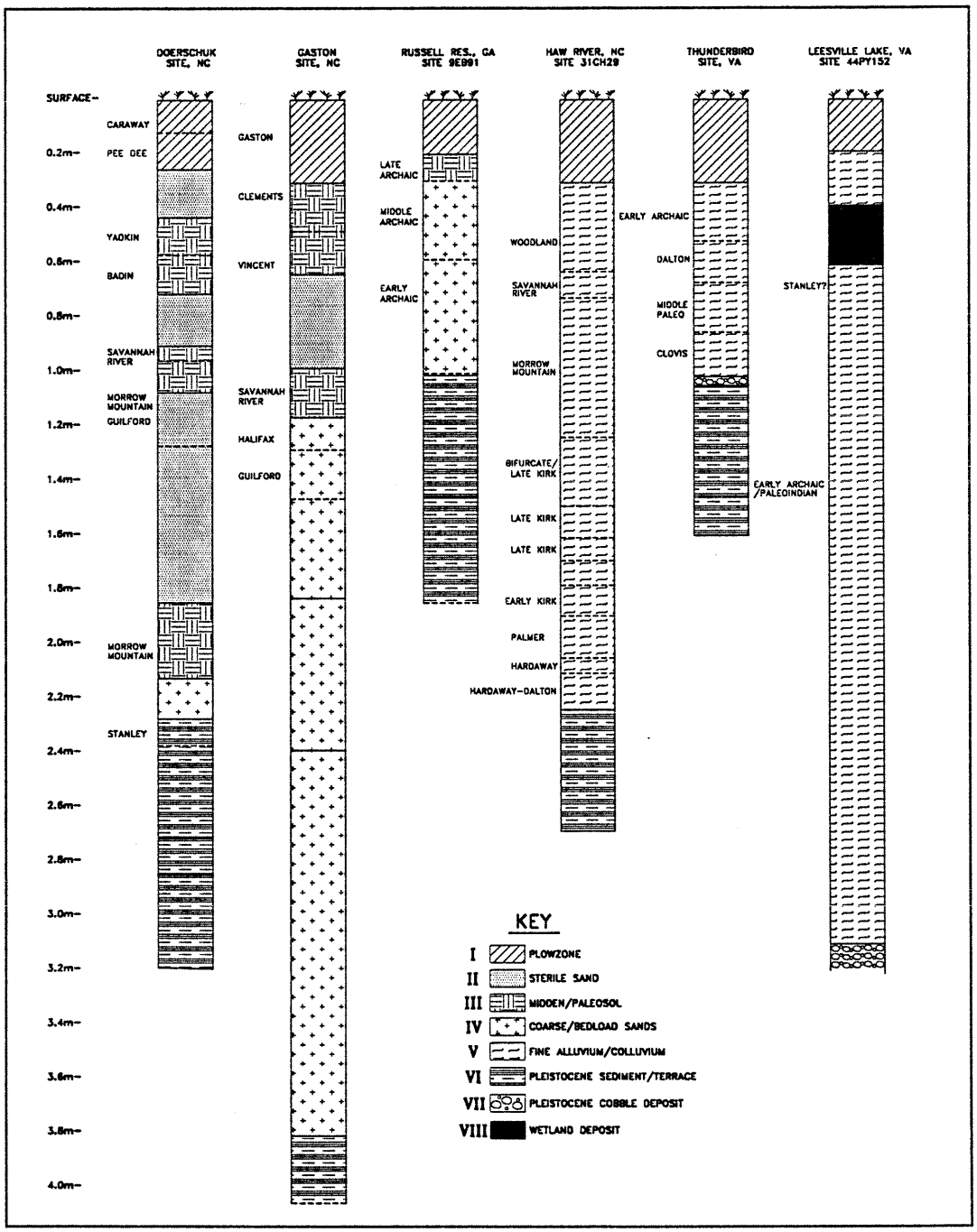


Figure 11. Comparison of stratigraphic profiles from comparable sites.

at least into the early Holocene, and one setting conducive to their preservation was described.

Regional Models of Fluvial Environments Emphasizing Piedmont Streams

Deeply stratified archaeological deposits other than those reported by Coe are not unknown to the Piedmont, but investigations of them over the last 20 years remain the exception rather than the rule. Those that have been examined, however, reveal additional depositional histories that inform better on the process of site formation and at least local environmental conditions.

Before moving on to more recent studies, another of Coe's Piedmont sites bears description. The setting of the Doerschuk Site on the Yadkin River in North Carolina is even more analogous to that at Leesville. The site lies just below "The Narrows," a gorge through which the river was constricted much like the gap at Smith Mountain. The drop in velocity as the stream debouches into a broader floodplain is conducive to alluvial deposition, and Coe identified this change in stream character as responsible for burial of successive prehistoric occupations there. The cultural deposits, extending back to about 7000 B.P., were 2.4–2.6 m deep. The stratigraphy of the site, marked by vertical separation of components, is indicative of an alternating cycle of rapid and gradual periods of sedimentation.

Complementing Coe's findings are results from federally funded projects on the Haw and Savannah rivers farther south. The Haw River excavations documented a 10,000-year sequence of occupation in alluvial deposits in the North Carolina Piedmont (Claggett and Cable 1982; Larsen and Schuldenrein 1990) (see Figure 10). The depth of the archaeological excavations was about 2.6 m, and the character of the deposits is summarized in Figure 11. They consist of a series of discrete graded beds created by flood episodes, the tops of which often exhibit evidence of weathering indicative of surface deposits. Apparently, the basin-like and less constricted nature of this section of the valley encouraged deposition of sediment, as would an eddy in a narrow valley as described by Coe at the Gaston Site. In general, the record indicates periods of relatively higher sedimentation for 10,000–9000 B.P., 7000–6000 B.P., and 4500–3000 B.P., as well as over the last 1500 years. A period of minimal deposition between 9000 and 4500 B.P. is suspected to relate in part to drier altithermal conditions. Through their detailed reconstruction, Larsen and Schuldenrein concluded that:

> In general, the variable deposition record contrasts with the fluvial models originally proposed by Coe (1964) that included continued postglacial incision of the Piedmont rivers into thick Holocene alluvial sequences. Our interpretations isolate a more dynamic environmental system as a backdrop to the cultural record of the North Carolina Piedmont. Repeated erosion and deposition were the norm, but it was the unique depositional environment at the Indian Creek fault zone that preserved an adequately dated stratigraphic record (Larsen and Schuldenrein 1990:177–178).

Trends identified at Rucker's Bottom on the Savannah River in the Georgia Piedmont were consistent with those identified on the Haw River, although the thinner archaeological deposits (approximately 1.1 m) there were less conducive to fine-grained correlations (Anderson and Schuldenrein 1985; Anderson and Joseph 1988) (see Figures 10 and 11). Reminiscent of Haw River, the Rucker's Bottom sequence was punctuated by periods of greater sedimentation for 10,000–8000 B.P., 5000–4000 B.P., and around 1500 B.P. Also, the long interval of lower sedimentation between 8000 and 5000 B.P. is interpreted as a consequence of the altithermal.

Considered together, these projects identify trends in the development of Piedmont river systems and even river systems of the southeast at large. Anderson and Schuldenrein (1985:707–708) compared deep alluvial sequences across the region, and made several relevant observations.

1. Depositional patterns differ between Piedmont and Ridge and Valley streams. Piedmont deposits tend to be thinner owing to their usual accumulation by overbank sedimentation, rather than abrupt and massive, "block-like" deposition. Early Archaic sedimentation in the Piedmont, however, is usually much greater and originates as coarse bedload material. Overall, the slower accumulations typical of the Piedmont are less conducive to in-place preservation of organic remains or "eco-facts."

2. Floodplain development in the Archaic period takes on a cyclical character region-wide. Periods of greater sedimentation alternate with periods of relative stability, with the latter marked eventually by soil formation and subsequent erosion.

3. The Early/Middle Archaic boundary is marked by "a dominance of pedogenic process." This is indicative of stable, broad floodplains and is very possibly linked to drier conditions during the altithermal.

Also important to the Leesville study are conditions at the Pleistocene/Holocene boundary. Anderson and Schuldenrein's observations at Rucker's Bottom were as follows:

> Early Archaic (and Paleoindian?) manifestations are confined to one surface and one subsurface context...underscoring the trend to higher energy fluvial environment and more diverse site paleogeographies with time. Sediment matrices incorporate strong bedload components and episodic alluviation is typical. The floodplain was essentially a down-scaled variant of the terminal Pleistocene hydrographic regime, with lateral accretion and periodic braiding and downcutting predominant fluvial processes... Over this interval alluviation initially dominates over pedogenesis as increasing sedimentation rates signal a passage to warmer and drier conditions and eventually slow as new pedo-sedimentary balances stabilize by Altithermal times (Anderson and Schuldenrein 1985:698).

This was also true of the Haw River sequence, where the earliest (Hardaway-Dalton) material was present within a Pleistocene silt that had been "exposed to erosional processes and weathering for as long as a millennium" (Larsen and Schuldenrein 1990:178). During the Early Archaic period, sandy overbank deposits were laid down, signaling renewed stream activity.

The Thunderbird Site is located along the Shenandoah River in the Ridge and Valley province, but its status as the only well-known stratified Paleoindian site in Virginia makes discussion of its context an important close to this section (see Figure 10). The total depth of the deposits is not great, ranging from 0.9 to 1.1 m (Gardner 1974) (see Figure 11). The earliest components are within sediments above a buried terrace capped by Pleistocene cobble deposits in an alluvial fan. By 12,000 B.P., a gray clay was deposited by overbank sedimentation over the cobble zone. Around 11,000 B.P., Paleoindian (Clovis) occupation was occurring just above the surface of the clay, with artifacts occurring in an alluvial B horizon. Through the Early Archaic period (or until about 9000 B.P.), gradual alluvial accretion continued on the terrace, successively burying artifacts of all periods predating that time. Through the last nine millennia, relatively little accretion occurred on the upper terrace to further bury the earliest components.

Between 9000 and 7000 B.P., the floodplain environment underwent significant changes. The river became incised into a more restricted channel, and massive sediment accumulation occurred on the newly exposed "bar plain" below the older terrace. A Middle Archaic (Stanly) component became buried beneath 1.2–2.1 m of alluvium there, after which time more gradual accretion ensued, with successive burial of Middle Archaic-Early Woodland components.

Archaeological Context

This section will focus on the results of relevant work elsewhere that contributes to understanding the Leesville sites and, again, the emphasis will be on the earliest components represented.

Paleoindian/Early Archaic Period (prior to 6500 B.C.)

Two sites/site complexes capture the most attention in Virginia and a great deal from researchers in neighboring states. The Williamson Site, just below the fall line in Dinwiddie County, was the first major Paleoindian site described in the state (McCary 1951). Many fluted points and formal flake tools have been collected from this site, the principal attraction to which was a source of knappable stone generally referred to as Williamson chert. In this respect, it is comparable to the Thunderbird Site described below. Excavations have attempted to identify intact deposits below the plowzone with only marginal success; the potential cultural deposits measure only 50–60 cm deep (Benthall and McCary 1973; McCary and Bittner 1978). While remnants of early cultural strata may survive, distinct occupational loci associated with diagnostic artifacts and radiocarbon dated contexts have yet to be documented.

The second of these is the Flint Run Complex, located along the South Fork of the Shenandoah River in Warren County, Virginia, within the Ridge and Valley physiographic province. William Gardner and his students have developed a settlement model based on their work at the sites, which boast evidence of relatively intensive Paleoindian activity. Underlying the model is a deterministic association with the jasper sources of the area. The model is based on recognition of five general site types: quarries, lithic reduction stations, quarry-related base camps, base camp maintenance stations, and hunting camps. The locations of sites other than quarries appear to have been selected to take advantage of conditions amenable to habitation such as proximity to water, "productive habitats," and natural shelter. The major sites of the complex are situated on floodplain features and terraces. Hunting camps tend to occur near stream mouths, on alluvial fans, or on bluffs adjacent to wetlands or floodplains.

Intensive excavation has been concentrated at the Thunderbird and Fifty sites where Paleoindian–Early Archaic material occurs in the shallow stratified deposits described earlier. The Thunderbird Site is extensive and is marked by a series of artifact concentrations indicative of both lithic reduction and habitation; it is identified as a quarry-related base camp. Occasional fluted and other point types diagnostic of the early components have been recovered, along with many bifaces in varying stages of manufacture, classic formal flake tools, informal tools, and owing to proximity to the jasper sources, copious amounts of lithic debris. Also, excavation within one of the concentrations has revealed possible evidence of a middle Paleoindian structure. The Fifty Site is smaller and is called a base camp maintenance station on an alluvial/colluvial fan. It yields an assemblage more indicative of general maintenance and subsistence activities, separated into at least two loci.

Through the two decades of work at the complex, a number of important observations are of interest:

1. The apparent catchment area or zone of exploitation for the Paleoindian population of this complex probably extends little beyond a 35-km radius, a condition related directly to the attraction of the local jasper sources. In this respect, the complex is an example of extreme "lithic determinism."

2. There appears to be significant continuity in settlement and technological patterns between the Paleoindian and succeeding Early Archaic stages. Beyond projectile points, the same formal tool types were used throughout the interval, and settlement selection often overlapped.

3. Notable shifts in the Early Archaic period, however, include the *addition* of a few tool forms (i.e., drill, adze, and chipped axe), a gradual reduction in tool size, expansion of group ranges and band territories, and concomitant increasing diversity of raw material use. Between 9000 and 8000 B.P., more marked changes in raw material use and tool kits are noted.

The influence of Gardner's work at the Thunderbird Site permeates Paleoindian/Early Archaic research across the region. Custer (1989), for example, embraces Gardner's scheme both in terms of the temporal extension of "Paleoindian" to include Early Archaic components until around 8500 B.P. as well as the quarry-oriented settlement model. He does, however, introduce important refinements by accounting for lithic-poor environments with an alternative model. The Flint Run model is referred to as "cyclical," by virtue of the regular return to a principal raw material source in the context of a seasonal round (Custer 1989:100–101). In contrast, regions without restricted sources of high-quality material would require a "serial" model in which lithic procurement and use were "embedded" in the course of the annual round and required no cycling back to a primary source (Custer 1989:101–102).

Elsewhere in the Piedmont, well-preserved early sites have been elusive, even in deeply stratified contexts. At the Gaston and Doerschuk sites where the deepest deposits were recorded, Coe only reached Middle Archaic levels, even though he speculated that earlier material would occur lower in the deposit (Coe 1964:20, 54, 87). Coe managed to recover transitional Hardaway and Early Archaic material only at the relatively shallow, hilltop Hardaway Site (Coe 1964:81–83).

Better success was achieved in the somewhat shallower alluvial deposits on the Haw River. Claggett

and Cable (1982:317–329) describe a Hardaway horizon at the base of the cultural deposits and just above a Pleistocene terrace surface, approximately 2.0–2.2 m below surface. Two diagnostic points and a suite of other formal tool types were present, although density overall was low. A Palmer occupation was identified within a 20-cm zone immediately above the Hardaway levels. The occupations appeared to be associated with relatively discrete lamellae. No Paleoindian components were identified in this deposit, however.

The only known Clovis fluted point from relatively deep stratigraphic context in the Piedmont was found in a block excavation at Rucker's Bottom on the Savannah River (Anderson and Schuldenrein 1985; Anderson and Joseph 1988). A Hardaway-Dalton point was also found in the same context. There was no vertical separation, however, between these early tools and numerous Palmer points and other formal tools at the base of the excavation. This juxtaposition is suggested to result from either (1) separate occupations on essentially the same surface, or (2) collection of the earlier tools by Palmer people who brought them to the site.

Joe McAvoy (1992) has made major strides in expanding our understanding of Paleoindian settlement in the fall line region of southeastern Virginia, primarily in the Nottoway River basin. His work expands the context within which the Williamson Site and other lesser-known chert sources can be understood. Perhaps most significantly, the distribution of sites that he documents requires a modification of the prevailing settlement models. While the local chert sources figured significantly in the settlement system, their marginal location relative to more productive environments for food resources (i.e., extensive wetlands) required special strategies. To accommodate this disjunction in critical resources, site types were less quarry-dependent than those described by Gardner for the Flint Run Complex, and base camps occur both near and distant from lithic sources. This physical constraint, he notes, also requires a certain degree of embedded procurement of lower-quality materials, thus demanding a model that has both cyclical and serial elements. The range of bands in this area, based on raw material distributions, is estimated to be within a radius of not more than 100 km.

Finally, Ben McCary's fluted point survey of Virginia has paid great dividends in understanding large-area patterns of Paleoindian settlement. Several "micro-clusters" of artifacts indicative of settlement foci have been identified across the state, often corresponding to known sources of knappable stone (Turner 1989:78–81). The principal area of concentration, however, occurs in south-central Virginia, encompassing a large portion of the Roanoke River drainage and extending as far west as Bedford County immediately adjacent to the Leesville Lake project area. Turner indicates that this extensive area may be divisible into two sections, one focused at the fall line and eastward toward Dismal Swamp, and another extending from Mecklenburg County westward across the Piedmont. It is the second subarea that includes the project area and much of the Roanoke basin.

Middle–Late Archaic Periods (6500 B.C.–1100 B.C.)

Archaic settlement region-wide displayed remarkable continuity in terms of settlement and subsistence, until around 7000 B.C. (Custer 1990:34). Changes in the climate associated with the advent of an essentially modern Holocene environment, as well as the contemporaneous overall rise in sea level due to glacial melting, facilitated the continued but very gradual change in available or desirable resources. The creation of freshwater wetlands and expansion of oak-hickory forests was part of this change in subsistence that began to focus more on seasonal collecting and mobility patterns with the decline of "megafaunal" resources. Populations began to expand into upland areas, with a shift toward the use of more readily available quartz and quartzite materials and a decreasing dependence upon chert and jasper materials (Gardner 1989).

Social organization during the Archaic period has been generally characterized as consisting of "macro" and "micro" social units congregating and splitting based on seasonal exploitation of resources and other special-purpose tasks (Gardner 1982; Custer 1989). Archaic sites occur as small, subsistence-related, limited-activity sites both in the uplands and along stream margins, as well as more permanent base camps typically adjacent to larger streams.

Woodland Period (1100 B.C.–A.D. 1607)

The Woodland period has been generally defined as beginning with the introduction of pottery in the region, perhaps as early as 1100 B.C. (Gardner 1982). This

period can also be characterized by increasing numbers of small permanent or semipermanent settlements. Factors instrumental in the increase in sedentism associated with the Early and Middle Woodland probably have their roots in the Archaic and the changing Holocene environment. These include increased efficiency and focus in exploiting localized resources, the development of social institutions that encouraged the production of surplus goods, and the stabilization of particular habitats that allowed for the radiation of important food resources. These factors, combined with a favorable habitat, the growth of storage technology, and the establishment of outlying exploitative camps that allowed for the expansion of the local resource base, would have been adequate for the establishment of a more sedentary lifestyle (Gardner 1982:56). The Early Woodland in the upper Roanoke area remains a somewhat elusive archaeological context, and Middle Woodland components are not well represented among the three sites investigated by this project at Leesville Lake. By the Late Woodland period, populations developed a subsistence strategy based on the cultivation of beans, corn, and squash (Gardner 1982). Settlement size varied from large villages to smaller hamlets, and the location of fertile soils became an increasingly important factor in settlement location.

Settlement during the Woodland period occurred most often on well-drained alluvial features proximate to the confluence of smaller tributaries and rivers. Holland (1960) noted that the most intensive pre-Woodland occupations tend to be located on the upper terraces, but subsequently the lower landforms were preferred. The permanence of occupations increased with time, but it was only in the latest Woodland period that a semblance of year-round settlement emerged.

Two models have been useful in examining Middle Woodland settlement (Blanton 1992). A logistical model of moderate to large base camps, likely seasonal, with associated procurement/foray camps, has been described by Binford (1980). Base camps are established by the corporate group and utilized on a seasonal basis, with smaller groups utilizing associated foray/procurement camps. This model would produce a series of similar, low-density artifact/feature/midden base camps and numerous, more widespread foray/procurement sites and special function sites.

A second model involves the seasonal fusion and fission of macro-band settlements into smaller base camps with associated procurement/foray sites. In many respects, the fusion/fission model represents the organization of band settlement into a tribal level society, with a greater integration of social units as per Sahlins and Service (1960). Such a system would center around "macro-social unit" base camps, which would appear archaeologically as sites with large numbers of features, high artifact density, and midden accumulation. The diversity of the material culture at these camps would be higher than at other base camps in the system as special purpose sites are integrated. This description is, of course, relative to the other base camp/foray site complexes utilized by segments of the society at other times of the year.

Eventually, large, internally dispersed villages and renewed clustering became more common in the later centuries, reflecting regional population trends, the risk of warfare, and the effects of horticulture. Late Woodland sites, especially the larger villages, are relatively common along the Roanoke River. Further inland in the project area, expectations for village sites are lessened, but smaller sites may be found on well-drained upland landforms and small stream floodplains. The sites of this period in the project area exhibit strong cultural affinities with the south and east, judging from the dominance of Dan River ceramics (Hantman and Klein 1992). Both 44PY7 and 44PY43 at Leesville Lake share components of this association.

Previous Research in the Project Area

Before the reports of Childress (1989, 1993), there is no indication of research in the project area devoted to early occupations. Through the statewide fluted point survey, seven fluted points are known from Pittsylvania County and 16 are recorded for adjacent Bedford County (Eastern States Archaeological Federation 1982). As noted earlier, Carl Miller apparently ventured into the area and explored local sites while he was conducting limited survey in the Smith Mountain Lake basin in the 1950s, but no published accounts exist.

Childress (1989) was prompted to report his observations at the Leesville Lake sites upon discovery of a unifacial "bipoint" that was potentially associated with a Paleoindian occupation. An impressive array of

diagnostic points and formal tools indicative of the Paleoindian/Early Archaic period were documented at the sites from surface (lake shore) contexts. Childress made systematic observations on the beach and in exposed profiles that indicated the potential for buried, intact cultural horizons dating to these early periods as much as 2.5–3.0 m below surface. While Early Archaic Palmer/Kirk points were most numerous, certain other formal tools and occasional fluted or lanceolate point finds indicated a Paleoindian presence.

Working with other members of the Archeological Society of Virginia, Childress probed 44PY7 and 44PY152 with bucket auger cores. The results confirmed a horizon of cultural material on both sites at no less than 1.5 m below the surface. While the material consisted almost entirely of microdebitage, the preponderance of fine materials like chert, crystalline quartz, and metavolcanics was at least suggestive of early components.

CHAPTER 3: Methods

Field Methods

Project methods were designed to gather information sufficient to assess the significance and research potential of each site. This called for limited excavation in selected, high-potential areas to recover a representative sample of material and to document site structure. Limits were also placed on the extent of testing by a small labor pool and the logistical challenges of fluctuating water levels, deep deposits, and dense soils.

Site 44PY7

Archaeological evaluation here was planned in two stages, but high water and overruns at the other two sites prevented completion of this work. The field testing plan consisted of the following:

1. A reference baseline and datum was established for horizontal and vertical controls.

2. One 1-×-2-m hand-excavated test unit was started in an area of artifact concentration on the beach at the foot of the eroding bluff. This was intended to examine the deepest deposits, which are exposed at the beach level by erosion; they appear to be the source of Paleoindian material. Excavation proceeded by natural strata, but these were subdivided as necessary to maintain sufficient control.

3. One unit approximately 2 × 2 m in size was also planned but never started through the entire deposit, beginning at the modern surface of the bluff top. The objective of this test was to recover a controlled sample of material from the deposit to verify the stratified nature of the site. The excavation would proceed by natural strata which, in turn, would be subdivided into 10-cm levels for control.

4. Limited auger testing was conducted. These tests involved water-screening through window screen 30-cm segments of 10-cm-diameter bucket auger samples. Tests were placed along the site grid to aid in determination of site boundaries and general stratigraphic relationships.

5. Geomorphological assessment of the deposits was planned concurrent with the archaeological investigation. In addition to simple visual inspection, special samples were to be collected for grain size and chemical analysis. In conjunction with the archaeological results, these data would not only reveal the origin of the deposits, but also should cast light on general environmental change since the end of the Pleistocene.

All profiles and any features encountered were to be fully recorded by means of measured drawings and color and black-and-white photographs. Unit fill was screened through .64-cm mesh, with the exception of a 10-liter sample randomly saved from each level for fine (window) screening. Descriptions of soils utilized standard Munsell color and USDA textural terminology (Kollmorgen Corporation 1975). Other special samples were also to be collected as warranted. For example, carbonized wood or other suitable material could be saved for radiocarbon assay.

Site 44PY43

The archaeological evaluation of this site was accomplished in two stages. All profiles and any features encountered were fully recorded by means of measured drawings and color and black-and-white photographs. No unit fill was screened, as the overburden of modern alluvium and plowzone was stripped to reveal features. Descriptions of soils used standard Munsell color and USDA textural terminology.

The field testing plan consisted of the following:

1. A basic compass and tape plan of the study area was prepared, showing the locations of test excavations.

2. The site area was shovel tested along two transects at 5- to 10-m intervals to define site limits and further assess stratigraphy; approximately 20 shovel tests were necessary for a basic assessment. The profiles of representative tests were recorded on standardized forms.

3. Two 1-m-wide trenches were hand-excavated through the plowzone in an attempt to identify a palisade line at the village edge, along with a sample of other related features. Any features identified were documented with photographs and scale drawings. A sample of features would possibly be tested to verify their function and age, depending upon time and other constraints.

Site 44PY152

This site consumed the greater part of the field effort. Work was begun here, at the less complex of the two deep sites, in order to orient ourselves to local conditions and refine our methods. More tenacious than expected soils and a series of floods led to a protracted period of work.

The archaeological evaluation at this site was accomplished in two stages. All profiles and any features encountered were fully recorded by means of measured drawings and color and black-and-white photographs. Unit fill was screened through .64-cm mesh, with the exception of a 10-liter sample randomly saved from each level for fine (window) screening. Descriptions of soils followed standard Munsell color and USDA textural terminology.

The basic field testing plan consisted of the following:

1. A reference baseline and datum were established for horizontal and vertical controls.

2. The site area was systematically cored with 10-cm bucket augers to define site limits and further assess stratigraphy. Segments of test fill measuring 30 cm in length were water-screened through window screen to recover artifacts. The area covered in this fashion measured approximately 100 × 25 m. The profile of each core was recorded on standardized forms.

3. One unit was excavated through the buried cultural horizon. The location for this unit was based on the results of coring and observations at the eroding bank. A VDOT backhoe was employed to remove approximately 1.5 m of sterile overburden in a 3.5-×-3.5-m unit. The unit then was stepped at the bottom to a 2-×-2-m unit. The objective of this test was to recover a controlled sample of material from the deposit to verify the stratified nature of the site. The excavation proceeded by natural strata, subdivided in turn into 10-cm levels for control.

4. A second unit, measuring 1 × 2 m, was opened on the beach adjacent to the toe of the eroding bank. The chosen location was at the estimated top of the buried horizon. It was hand-excavated in the same fashion as the larger unit.

5. Geomorphological assessment of the deposits was conducted following the archaeological investigation. In addition to simple visual inspection, special samples were collected for grain size and chemical analysis. In conjunction with the archaeological results, these data will not only reveal the origin of the deposits, but also should cast light on general environmental change since the end of the Pleistocene.

   Other special samples were also collected as warranted. For example, carbonized wood or other suitable material was saved and submitted for radiocarbon assay.

Laboratory Methods

The effort also included the full analysis of all cultural materials recovered. The WMCAR has developed a standardized classification system for prehistoric artifacts designed to establish the basic functional and temporal parameters of an assemblage. The information is managed using Paradox, relational database software. Artifacts will be temporarily curated at the WMCAR until final disposition is arranged.

Prehistoric Artifact Analysis

Prehistoric artifact analysis was designed to document basic temporal and technofunctional

parameters of the assemblages. For lithic materials, the goals were to refine our understanding of the reduction process(es) represented and the temporal and functional nature of the technologies represented. Virtually no perishable organic remains were recovered from prehistoric contexts. Beyond the categories described, all lithic debitage and tools were further identified according to raw material type.

Debitage. Primary/Reduction Flakes are placed in this category largely by default; in other words, they are identifiable as flakes but do not qualify as secondary/thinning, tertiary/retouch, or bipolar flakes. General identifying characteristics, however, are relatively obtuse platforms without lipping, a pronounced bulb of percussion, and a relatively thick cross-section. Flakes in this category are interpreted primarily as the by-products of early-stage reduction, owing largely to their tendency to exhibit simple platforms and pronounced features such as ripples and bulbs of percussion.

Secondary/Thinning Flakes are identified most readily by their acute, lipped, and generally multifaceted platforms. Such platforms are segments of biface margins removed on impact. Biface thinning flakes are also relatively thin and flat or slightly curved in cross-section. The bulb of percussion is diffuse. Two forms of this flake type commonly occur. One is the better-known, lipped flake with a multifaceted platform. The other resembles a fish scale in plan view; while often lipped, lipping is very slight, and the platforms typically are narrow and curvate or recurvate. These flakes are generally considered to result from thinning and resharpening relatively refined, mid- to late-stage bifaces.

Tertiary/Retouch Flakes are characterized by small, point platforms that usually are lipped, an outline that expands from the platform toward the termination, a thin cross-section, and small size (generally not more than 5 mm in the longest dimension). Tertiary/retouch flakes are recognized as the by-product of tool retouch or resharpening.

Bipolar Flakes are distinctive, but care must be taken to avoid classifying them as shatter or angular fragments, particularly if they are of quartz. They have virtually no bulb of percussion and often are long and narrow or wedge-shaped. Another distinctive feature is distinct radial lines below the points of force, and many times they exhibit crushing at opposing ends.

Flake Fragments/Shatter are non-diagnostic medial and distal fragments of broken flakes. Virtually any portion of a flake minus a platform should go into this category.

Angular/Blocky Fragments, as the name implies, are angular/blocky chunks of stone that are probably the byproduct of stoneworking but that cannot be identified as flakes or portions of flakes. These fragments are not to be confused with fire-cracked rock. They often occur when blocks or nuclei of poor quality or internally flawed material are struck.

Blade-like Flakes are at least twice as long as they are wide and have long, parallel ridges or arrises on their dorsal surfaces, perpendicular to the platform. Assigning debitage to this category should be done conservatively, with the intention of identifying purposefully struck, linear flakes. Some evidence of platform preparation/grinding is a valuable indicator of this.

Prismatic Blades are highly standardized blade flakes with prepared platforms, prismatic cross-sections, and a high degree of uniformity in form.

Tested Cobble/Nodules are pieces of raw material that are unmodified beyond the removal of only one or a very few flakes. Presumably, they represent pieces that were tested for quality and discarded.

Tools. Utilized Flakes are flakes or flake fragments (shatter) that were utilized "as is" for cutting, scraping, etc. As such, they exhibit no intentional modification for hafting or sharpening. Instead, there is incidental damage to the edges resulting from use, which appears as very fine flake scars. These scars are invasive not more than 2 mm from the tool margin. Damage from screening, trampling, etc. can mimic such use damage. To be conservative, all artifacts placed in this category must have regularized rather than intermittent or spotty damage to the edge.

Utilized flakes are subdivided according to the form of the utilized edge. Potential forms are straight, concave, convex, or denticulate. In some instances

more than one of the utilized edge forms may be present.

Retouched Flakes differ from utilized flakes only in that they were intentionally modified prior to use. Flake scars on their edges are regularized but are invasive at *least* 2 mm from the tool margin. The same subcategories of edge form apply as well.

Other Bifaces are generally regarded as preforms or generalized bifacial tools (i.e., knives). They lack modification for hafting. Following Callahan (1979), bifaces can be classified according to stage in the reduction process. Only the first four stages of his five-part scheme are recognized in the analysis.

Hafted Bifaces are formal tools more commonly known as projectile points/knives. They are bifacial and are modified for hafting. Diagnostic or potentially diagnostic (complete or proximal fragments) examples are coded separately from non-diagnostic pieces such as tips, ears, etc.

Other Formal Tools are formed tools other than hafted bifaces or other bifaces. Items in this category include drills and endscrapers. In most cases they exhibit modification for hafting.

Cores are the parent pieces from which potentially usable flakes are struck. Consequently, they are best recognized by the flake scars left by prior flake removals. Cores are classified here by the nature of the flake scar patterns evident on their surfaces. Random cores exhibit random flake removals. Lamellar cores are marked by regular, linear flake removals leaving parallel or subparallel flake scars. Bipolar cores are usually rather small and exhibit battering at opposing ends. One of the opposing edges is often a narrow, bifacial "crest," while the other is truncated and battered in appearance. Bifacial cores resemble thick, irregular bifaces (see Stage 2 of Callahan 1979). Tabular cores are those derived from plate-like cobbles or nodules. Flake removals are directed from the margins of the piece, which readily serve as platforms.

Other Lithic Artifacts. Formal Groundstone items were modified by pecking and/or grinding rather than by flaking. The degree of modification is extensive, to the point that the original form of the stone from which it was fashioned is obliterated. Typical artifacts include axes, celts, gorgets, steatite bowl fragments, etc.

Informal Groundstone includes artifacts that have been modified by pecking and/or grinding but have not been formally shaped; they retain in large part the form of the piece from which they were made, such as a cobble or slab. These artifacts include hammerstones, simple grinding slabs and manos, and artifacts that are only *possibly* modified by grinding/pecking.

Fire-cracked Rock is recognized as rough, blocky pieces of stone that have irregular fracture surfaces. In some cases, the stones may also be reddened from the exposure to intense heat. This material is counted and weighed.

Other/Unmodified Stone represents miscellaneous rock recovered incidental to collection. It bears no evidence of modification. Such material can be also referred to as "manuports." Other stone is counted and weighed.

Prehistoric Ceramic Artifact Analysis

Prehistoric ceramic artifacts were classified primarily by description along two dimensions: temper and surface treatment. Whether the artifact was a vessel or other artifact fragment was also noted; in the case of vessel fragments, the specific portion was identified. At the most basic level of analysis, ceramic sherds were not "typed" in the traditional sense, but instead grouped according to temper/surface treatment. Subsequently, their correlation with diagnostic types of the region was discussed. Key references consulted during the analysis were Egloff's (1990) discussion of ceramics in southwestern Virginia along the Clinch and Powell rivers, Holland's (1970) survey of southwestern Virginia, and Coe's (1964) descriptions of lower Roanoke valley ceramics.

Chronometric Analysis

Three carbon samples from Test Unit 2 were submitted to Beta-Analytic, Inc., for C-14 dating. The conventional ages, calendar years, and 1 sigma ranges are provided in Chapter 9. Discussions in the text rely most heavily on the conventional dates and the 2 sigma, 95% probability, calibrated ranges.

Calibrations of radiocarbon age determinations are applied to convert B.P. results to calendar years (Stuiver and Reimer 1993). The short-term difference between the two is caused by fluctuations in the

heliomagnetic modulation of the galactic cosmic radiation and, recently, large-scale burning of fossil fuels and nuclear devices testing. Geomagnetic variations are the probable cause of longer-term differences.

The parameters used for the corrections have been obtained through precise analyses of hundreds of samples taken from known-age tree rings of oak, sequoia, and fir up to 7200 B.P. The Pretoria Calibration Procedure program was used for these dendrocalibrations. It uses splines through the tree-ring data as calibration curves, which eliminates a large part of the statistical scatter of the actual data points. As a caveat, the calibrations assume that the material dated was living for exactly 20 years. The possibility of an "old wood effect" and the potential inclusion of younger material indicate that the age ranges and intercepts ages generated by the program must be considered as approximations.

CHAPTER 4: Site 44PY7 Results

Introduction

This site is at the former mouth of Tanker Creek on the downstream shore of its confluence with the river (see Figures 4–6). The primary site area is overgrown in tall weeds, but to the east is wooded (Figure 12). Site 44PY152 is located at the opposite (eastern) end of the same levee.

Very little work was conducted at 44PY7, as noted in the preceding chapter. In approximately four days on the site, between April 14 and 20, 1994, seven auger tests and three 10-cm levels in a 1-×-2-m unit were completed (see Figure 12). High water interrupted work on the beach unit, and it remains to be completed. Every effort should be made to continue excavation here as the early component at this site promises to be richer than that at 44PY152.

Preliminary Results

Auger Tests

Auger test results were generally consistent and similar to those from 44PY152; they are also in keeping with the results of an auger test recorded earlier by ASV members. In five of the seven tests, a sequence of two artifact-bearing horizons was documented (Figure 13). The uppermost of these tended to occur from the surface to a depth of about 60 cm below the surface and represents the Late Woodland occupation. Ceramic sherds and debitage dominated the materials recovered in this upper horizon.

The second and deepest horizon generally was documented between 120 and 180 cm below the surface. This horizon is believed to represent the Early Archaic and Paleoindian components recognized from beach collections and artifacts embedded on the scoured shoreline. Very small pieces of lithic debitage are virtually the only artifacts recovered.

Of the other two tests, Auger Test 1 showed only sparse evidence of the deeper component. Auger Test 2 revealed evidence just of the upper, Woodland occupation.

Most of the tests were terminated where cobbles prevented further augering, as was the case at 44PY152. The depths at which large cobbles were encountered ranged from 240 to 350 cm but averaged 246 cm below the surface.

Horizontally, the auger tests further served to define the area of greatest concentration in the buried, early horizon. The greatest quantity of material recovered from the deeper levels was in Auger Tests 4, 5, 6, and to a lesser extent 7, all of which were placed parallel to the lake bank (see Figure 12). Auger Tests 1, 2, and 3, more distant from the bank, produced the least material in lower levels.

Test Unit 1

This unit was placed just east of a large boulder exposed on the beach and just north of the toe of the eroding bank (see Figure 12). The location was chosen in consultation with ASV members, who had observed a higher density of early artifacts in this area, including a number that were embedded in the exposed matrix.

The soil matrix at this site is similar to that described later for 44PY152, in terms of color, texture, and the sequence of major stratigraphic units. Because Test Unit 1 was started on the beach, it encountered only a portion of the deposit, beginning about 1.5 m below the present surface. The first two levels of the unit removed light brown (7.5YR4/4) fine sandy clay loam. The observation was made that the clay fraction may increase with depth. The third and final level excavated was in brown (10YR4/4) fine sandy clay loam.

Three 10-cm levels were excavated in this unit before high water interrupted work. Immediately, a higher artifact density was encountered than in the 44PY152 beach unit. An attempt was made to remove

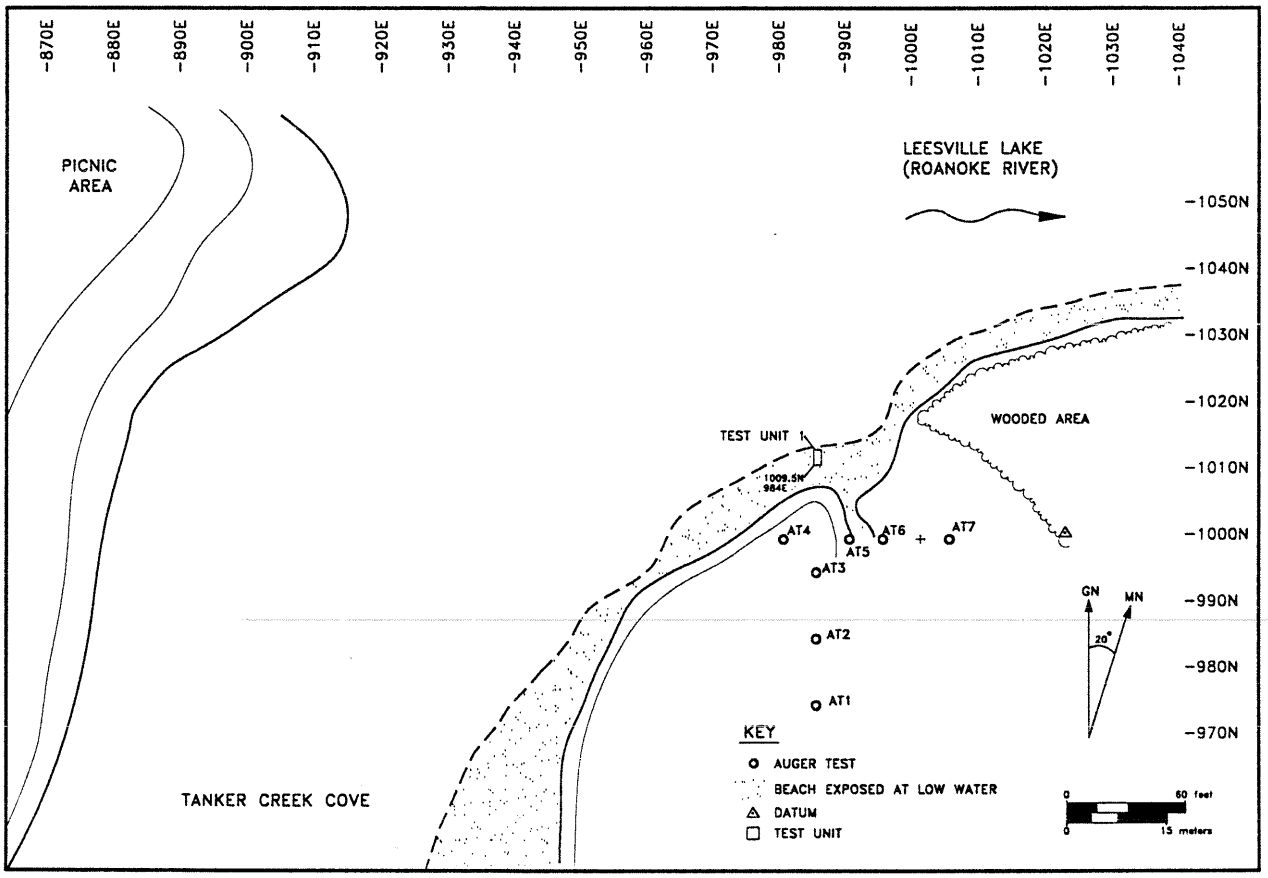


Figure 12. Site 44PY7, plan.

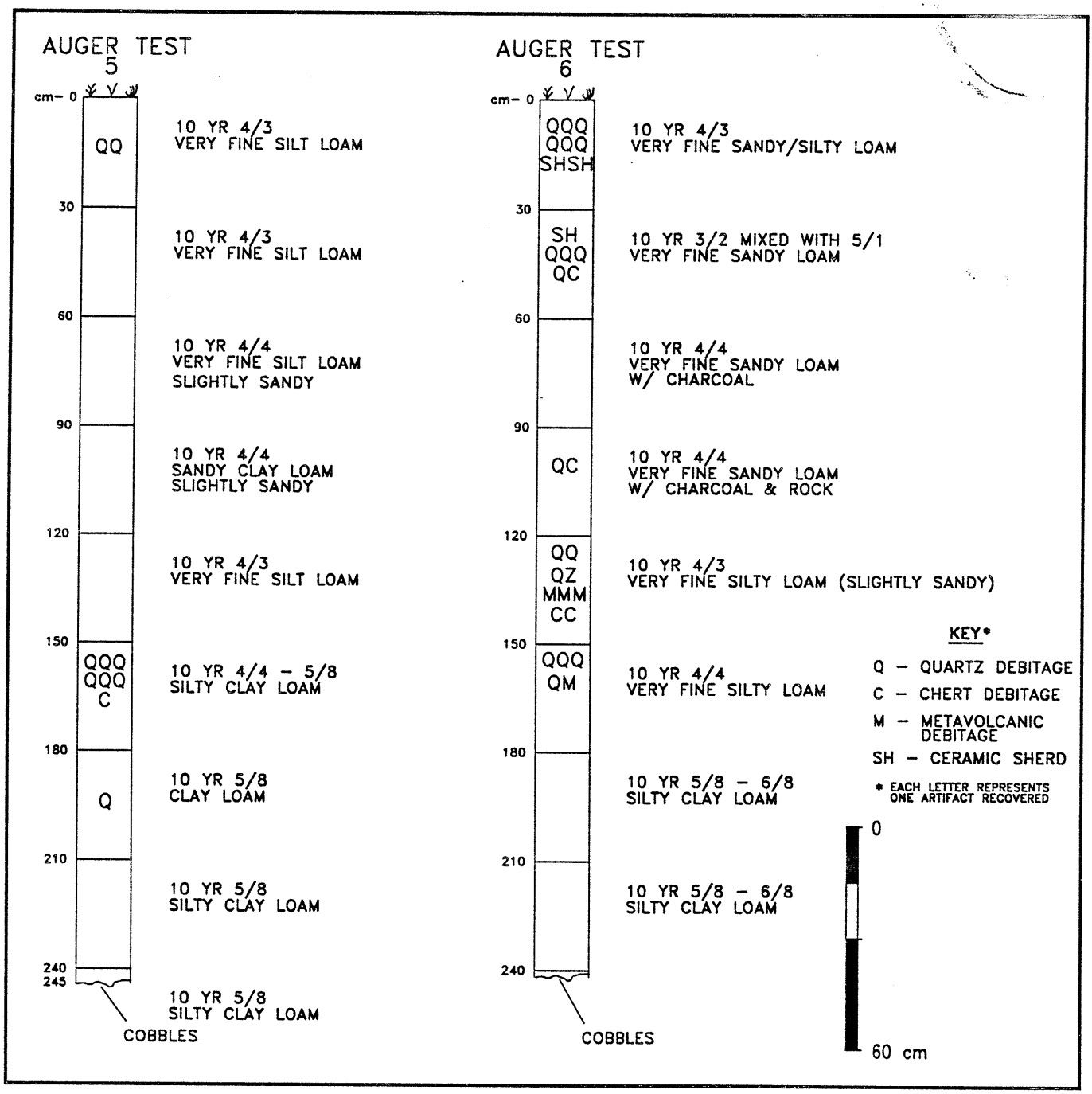


Figure 13. Site 44PY7, representative auger test profiles.

the recent veneer of secondarily deposited material on the beach prior to unit excavation, but in the uppermost level, a few Late Woodland sherds were recovered along with lithic debris (Appendix A). These indicate, and not surprisingly, some degree of contamination in the upper beach sediments, where artifacts of all periods are redeposited. The extent of mixing in this first level is difficult to measure, but the results should be used cautiously. This level produced the most material, with a total of 84 artifacts in the dry-screened sample.

The next two levels were free of obvious contamination from redeposited material, and they yielded 71 and 28 artifacts, respectively, from the dry-screened fill. The artifact recovery rate documents a decline in density with depth. This pattern is to be expected given the fact that the beginning surface of Test Unit 1 is at approximately 1.5 m below the levee surface, or at about the midpoint of the buried horizon identified in auger tests.

Materials Recovered

At total of 375 artifacts were recovered from auger tests and one partially completed test unit (see Appendix A). Most (n=17) of the ceramic sherds are from the upper strata sampled in auger tests, with four additional sherds from the first, mixed level of the test unit. The sherds are small but appear to be typical of the Late Woodland Dan River series.

Lithic artifacts consist entirely of debitage (85%, n=320) or fire-cracked rock (10%, n=38). Quartz dominates the raw materials overall. In the first two levels of the test unit, quartz represents 71–76% of the total, but in the lowest level this proportion falls to 39%. Quartzite and metavolcanic material occurs very rarely, with most of the non-quartz lithics represented by cherts, chalcedony, and jasper. The increase in the proportion of non-quartz materials in the lower level is intriguing, and while it invites some speculation, it is appropriate now only to note the similarity with 44PY152.

Discussion and Recommendations

Site 44PY7 deserves a complete evaluation. As expected from ASV reports, the artifact density in the early horizon appears to be higher than at 44PY152, and this horizon is also discrete in the stratigraphic column. The auger results indicate that very little of the concentrated area of early material remains unexposed on the lake shore. For this reason, completion of the work is relatively urgent.

CHAPTER 5:
Site 44PY43 Results

Introduction

The archaeological evaluation of 44PY43 was conducted form May 8 to May 11, 1994. The general purpose of work was to determine the site's spatial extent and state of preservation. A specific goal was to confirm the presence or absence of a palisaded Woodland village and associated features. Remnants of 44PY43 exist on two islands that have been created by the fluctuating levels of Leesville Lake (see Figures 4 and 5). The investigation was conducted on the downstream island. A two-stage field strategy was developed. To better define the limits of the site, surface collecting and systematic shovel testing were conducted. The second stage consisted of excavation of two trenches. These were placed on the basis of the distribution of prehistoric materials encountered in the previous investigations, thus providing details of site size and stratigraphy.

Results

Beach Observations

Remnants of 44PY43 exist on two islands, located about 140 m apart depending on the water level (see Figure 9). The artifacts encountered on the beaches of these islands have been eroded out of the bank. Clusters of fire-cracked rock and lithic debitage were seen in the eroded profile and coincide with the distribution of the artifacts on the beach. On the southwest side of the downstream island, a hearth has eroded from the embankment. Approximately 1 m below the ground surface, the hearth was significantly deeper than the Woodland features that had been observed, indicating that it may date from an earlier component and that the site is stratified.

Systematic Shovel Testing

Shovel testing was employed to confirm the vertical as well as the horizontal extent of deposits on the downstream island. The location for two transects of shovel tests was based on the distribution of material on the exposed beach and observations in the profile provided by erosion of the bank. The transects were 10 m apart, running east–west and consisting of seven shovel tests each. Shovel tests were excavated on the transects at 10-m intervals (Figure 14). The transects were oriented to reveal the highest concentration of cultural material, thus indicating the core/focus of the village and potentially the location of a palisade.

The soil profile encountered in shovel testing varied between transects. On the northern transect (Transect 1) the top layer was the plowzone, a dark brown, moist silty loam. Below that was a layer of yellowish to dark yellowish brown silty loam. The southern transect (Transect 2) had a layer of apparently flood-deposited soil on top of the plowzone, with the layers below that corresponding with the layers from the northern transect. The plowzone was 30–40 cm deep, and the possible flood deposit was generally 30 cm deep. Excavation of the shovel tests stopped when culturally sterile soil was reached, generally 60 cm below the surface.

The distribution of artifacts in the shovel tests on Transect 1 exhibited a pattern of a high concentration followed by a sharp decrease in cultural material (Figure 15). The higher concentration of artifacts to the west gives an estimate of the edge of the Woodland village or activity areas within it. The results of the shovel tests dictated the placement of the trenches, with the intent of intersecting the site boundary.

Trench Excavations

The final step in field investigations at 44PY43 consisted of the hand excavation of two trenches. Trench 1 measured 1 × 12.5 m, and Trench 2 was 1 × 2.5 m (see Figure 14). These trenches were intended to expose features beneath the plowzone.

Trench 1 was originally opened as a 1-×-5-m section with its north edge aligned with Transect 1.It was eventually extended an additional 2.5 m east and 5 m west. The southwest corner of Trench 1 was approximately 13 m from the western edge of the island. Relatively high artifact counts from Shovel

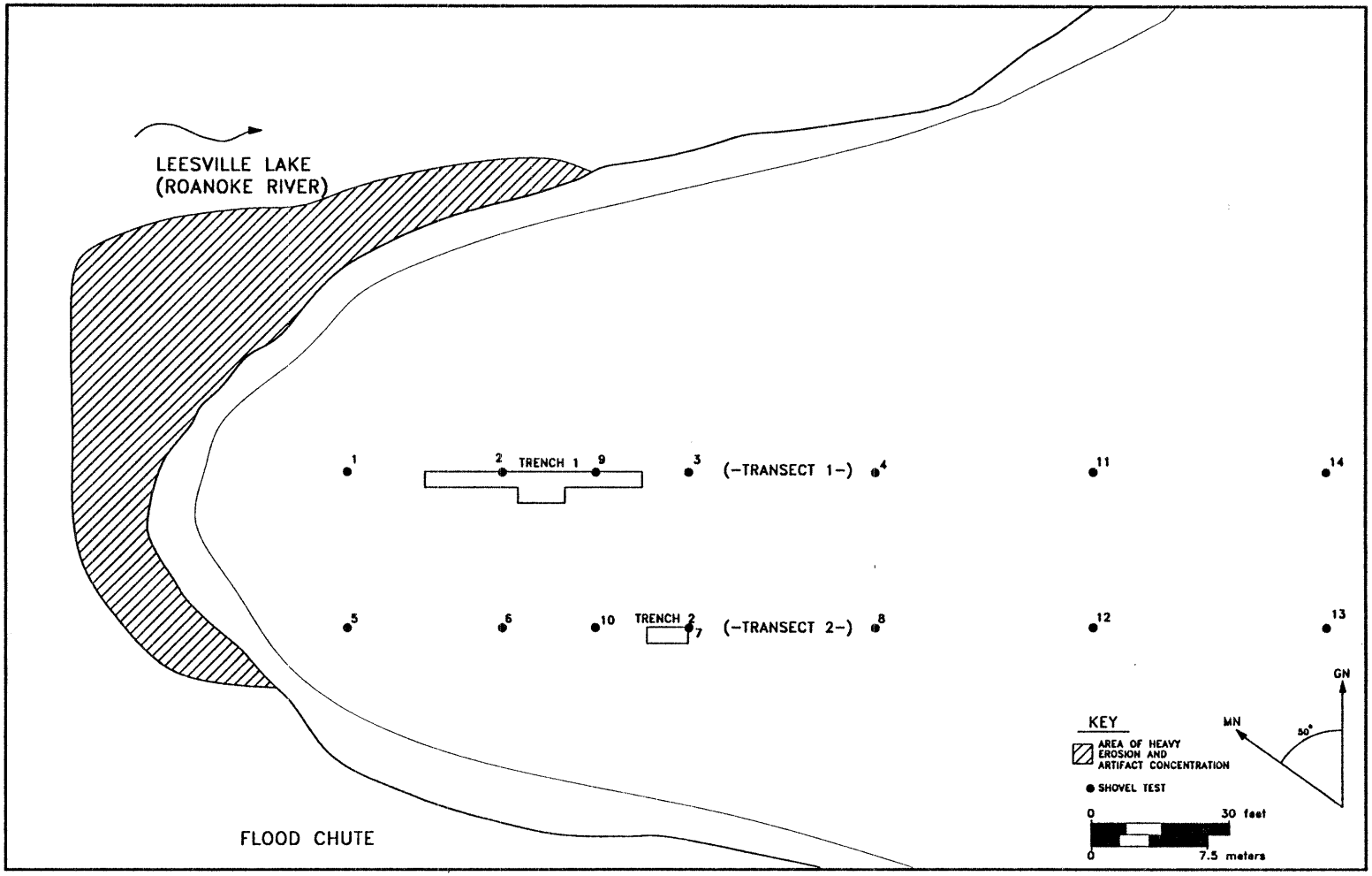


Figure 14. Site 44PY43, plan.

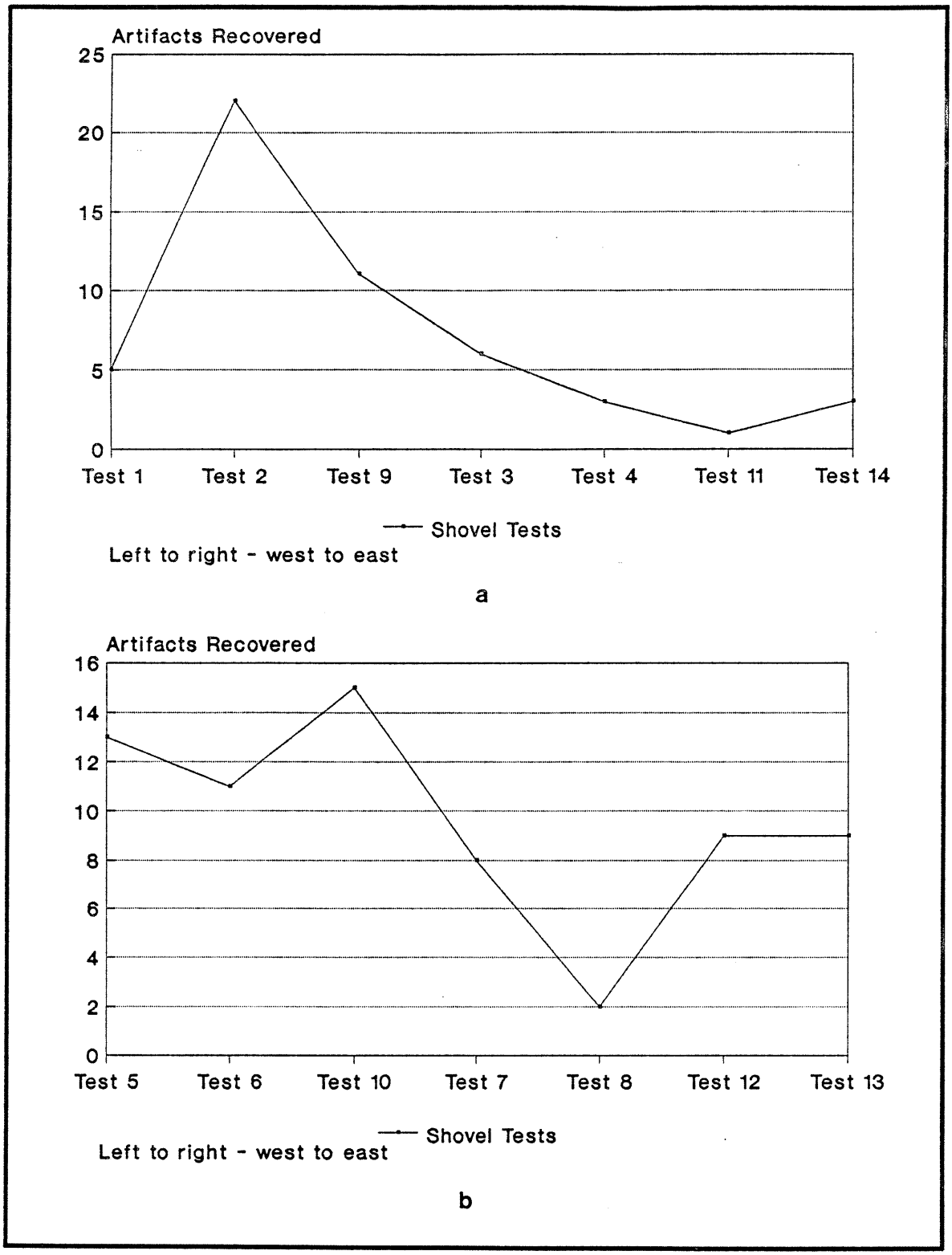


Figure 15. Site 44PY43, shovel test transect results (a - Transect 1; b - Transect 2).

Tests 2 and 9 originally dictated the placement of this trench.

This trench was excavated to approximately 45 cm below ground surface. The plowzone was stripped without screening to reveal any features below it. Ceramic sherds, lithic debitage, fire-cracked rock, and charcoal were evident in the plowzone as it was excavated.

Approximately 3–6 cm of the second layer were excavated with the intent of better exposing possible features. The soil of Layer B in the western 7.5 m of the trench was more compact and drier than the eastern 5 m but was the same yellowish brown color.

Trench 2 was a 1-×-2.5-m section with its north edge aligned with Transect 2. Relatively high artifact counts in Shovel Tests 6 and 10 dictated the placement of this trench.

Trench 2 was excavated to approximately 60 cm below ground surface. A 25-cm layer of yellowish brown soil was above the plowzone. This layer and the plowzone were removed to reveal any features in the layer below. Fire-cracked rock and lithic debitage were evident during the excavation of this trench. Soil texture and color remained consistent throughout the excavation of Trench 2.

Features

A total of 30 possible prehistoric cultural features were identified in Trench 1 (Figure 16). The edge of a possible hearth was the only feature identified in Trench 2. None of the features were excavated.

Post-like Features

Small Post-like Features. Fourteen of the 21 post-like features ranged from 5 to 10 cm in diameter. These were Features 5, 7, 11–13, 16, 19–24, 26, and 27. The majority of these appeared to be isolated, from the perspective of the narrow trench.

Four of the posts, starting about 6 m from the west end of Trench 1, were associated in a curvilinear pattern, indicating a potential structure outline (Potential Structure A). These were Features 19, 20, 21, and 22. Each was 5–7 cm in diameter and spaced 30–47 cm apart. The structure, if circular, would be only 2 m in diameter. As this would be unusually small, it is possible that the arc of posts is at one end of an elliptical structure. Features 23, 24, 26, and 27 also form a curvilinear pattern southeast of Potential Structure A. Potential Structure B is similar to A in its size and spacing of possible post molds. It would have to be an elliptical structure as its circular diameter also would be 2 m.

Large Post-like Features. The seven remaining post-like features ranged from 11 to 17 cm in diameter. These were Features 2, 6, 14, 15, 18, 25, and 29. Features 2, 5 and 6 formed a linear pattern, perhaps part of a more extensive feature. These stains ranged from 10 to 13 cm in diameter and were spaced 45 to 83 cm apart.

Other Features

Seven features were found in addition to the post-like features. Feature 1 was a large, somewhat rectilinear area of stained soil approximately 1.7 × .3 m, at the east end of Trench 1. The dimensions of this feature suggest a possible pit, burial, or a tree disturbance. No cultural material was evident in this feature. Feature 30 is also a potential pit feature. It was recorded at the eastern end of Trench 1 and measures approximately 50 cm in diameter. No artifacts were evident in the fill.

Features 3, 4, 8, 9, and 10 were amorphous in shape and had heavy concentrations of charcoal throughout. Feature 17 was also an amorphously shaped stain, with light charcoal flecking. These are probably tree disturbances.

The relatively high artifact counts from Shovel Tests 2 and 9 correlated with the locations of Potential Structures A and B. Cultural material tapered off to the east and the west of the potential structures. Features did not occur in the eastern 2.5 m of the trench, while toward to west, the occurrences of features remained steady at 5–9 features per 1-×-2-m section of the trench.

A portion of a potential hearth feature was observed at the west end of Trench 2 beneath the plowzone. It appeared as a subtle stain with some reddening of the soil from exposure to heat. No artifacts were directly associated. This anomaly is potentially a natural, tree-related disturbance.

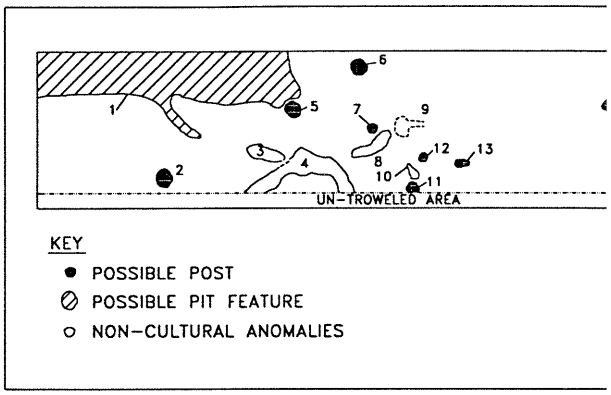


Figure 16. Site 44PY43, plan of features in Trenc

Materials Recovered

A total of 133 prehistoric artifacts were recovered from 44PY43 (see Appendix A). Of this material, 11.3% (n=15) was recovered in general surface collection of the beach and 88.7% (n=118) in systematic shovel testing.

The prehistoric materials recovered consisted of 10 (7.5%) formal or informal tools, eight pieces (6%, 612.5 g) of fire-cracked rock, 61 pieces (46%) of flaked stone debitage, and 54 (40.5%) ceramic sherds. The tools and tool fragments include seven projectile points, five of which were of recognizable types.

The earliest point recovered was the proximal end of a Morrow Mountain, dating to the Middle Archaic period (5300–3000 B.C.) (Coe 1964). A proximal fragment of a Jack's Reef Corner-Notched point was recovered, dating to the early Late Woodland period (655–1155 A.D.) (Ritchie 1971). A large Woodland triangular point was recovered along with two small triangular point fragments dating to the Late Woodland Period. An unidentified Archaic corner-notched point and a small triangular Woodland point were recovered on the upstream island of 44PY43.

The debitage recovered during Phase II testing consists of the following: one primary/reduction flake, four secondary/biface thinning flakes, one tertiary/retouch flake, 42 flake fragments and shatter, and 13 angular/blocky fragments. Quartz dominated the raw materials at this site (see Appendix A). Lesser quantities of chert, jasper, and chalcedony were present, especially among tools as opposed to debitage.

Ceramics recovered from shovel tests on 44PY43 consisted of 45% (n=20) eroded sherds and 55% (n=25) net-impressed sherds. Three percent (n=2) of the sherds were sand/grit-tempered, while 97% (n=52) of the sherds were sand-tempered. These characteristics indicate that the ceramics are representative of the Dan River series.

The cultural material on the surface was concentrated on the northwest portion of the beach. These artifacts were from the erosion of the bank caused by fluctuations of Leesville Lake. The abrupt drop in artifacts on the south and the east beaches indicates potential boundaries of the area of occupation.

Discussion and Recommendations

Site 44PY43 is a multicomponent prehistoric site, with occupation dating from the Middle Archaic through the Late Woodland periods. The site is mainly located on the northwest end of the downstream island, in the former floodplain of the Roanoke River. Investigations consisted of a general surface collection of the beach, systematic shovel testing, and excavation of two trenches. Due to the erosion of this site, determination of the extent of the entire site is not possible. The site extends at least 70 m southeast, as indicated by the shovel tests. As Figure 7 indicates, the site originally covered an area of approximately 80 × 95 m (5,500 m^2) (as determined from the soil stain evident in an aerial photograph).

The recovered cultural materials consist mostly of lithics and ceramics. The temporal affiliations of this site were determined through the presence of diagnostic projectile points and prehistoric ceramics. The Middle Archaic Morrow Mountain point, the unidentified Archaic corner-notched point, the Late Woodland triangular points, and the Late Woodland Jack's Reef point suggest a multicomponent site, also supported by the buried hearth eroding out of the southwestern beach of the downstream island. This evidence indicates that the remains are the result of episodic occupation.

Since the building of Smith Mountain Dam and Leesville Dam, erosion has seriously decimated 44PY43 to the point that less than half the site remains. However, the presence of possible structures and other features, along with a well-defined midden stain, hints at the possibility of a palisade that remains undiscovered. Evidence has been recovered suggesting that enough of the site is left to warrant further investigation. Future investigation would be most productive if extensive stripping of recent flood and plowzone deposits was undertaken. Understanding the nature of the community plan and feature types would be most important. It will be necessary, however, to choose a time for this work when water levels can be controlled.

CHAPTER 6:
Site 44PY152 Results

Introduction

Site 44PY152 is a multicomponent prehistoric site, located on the southern bank of Leesville Lake. The site occupies the easternmost point of an alluvial levee approximately 400 m long running west to east (see Figures 4–6). Fieldwork on 44PY152 was conducted between March 22 and May 8, 1994.

Soils on this landform consist for the most part of silty and sandy clay loams. Much of the site has been lost to erosion caused by fluctuating water levels during times of power generation at the Smith Mountain and Leesville dams. At the time of these investigations, vegetation on the site consisted of dense weeds and secondary growth, with wetland conditions beginning along the southwest border of the site. Ground surface visibility across the site ranged from 0% in the grassy areas to 100% along the exposed beaches.

The purpose of archaeological testing at 44PY152 was to document the spatial and temporal context of the site, to assess site function, to define any internal site patterning present, and to determine the site's state of preservation. A two-stage field strategy was developed. In order to establish the limits of the site, surface collection along the exposed beach and systematic auger testing were conducted. The second stage consisted of excavation of a series of larger test units. These were placed on the basis of the distribution of prehistoric materials encountered in the previous investigations to provide a controlled-volume sample of the site's assemblage and details of soil character and stratigraphy.

Results

The first step in the fieldwork consisted of establishing a reference grid across the site. A primary datum was placed at approximately 1000N 949.5E and given an arbitrary elevation of 100.00 m. Grid north was oriented at 20° east of magnetic north. Using this grid, a plan of the site was prepared (Figure 17).

Surface Collection

Surface collection was conducted along the site's northern exposed beach to help evaluate site boundaries as well as to locate concentrations of artifacts. Quartz debitage and fire-cracked rock were recovered. Artifact density encountered in surface collection was moderate to low. The only diagnostic artifact recovered during this project was from the beach (Figure 18a). Other non-diagnostic tools recovered during excavation are shown in Figures 18 and 19.

During a prior surface collection conducted by avocational archaeologists, four Paleoindian projectile points and two unifacial bipointed tools were recovered. Artifacts were often encountered embedded in the exposed matrix, appearing in places in association with cobble concentrations.

Systematic Auger Testing

Auger testing at variable intervals provided information on the vertical as well as the horizontal extent of deposits (see Figure 17). A total of 10 auger tests were excavated across the site, with most along the east–west baseline.

Stratigraphy encountered in auger testing remained consistent across the site and reflected little to no modern disturbance. In general, soils were a consistent silty to sandy clay loam that varied from brown (10YR4/3) to strong brown (7.5YR5/8). No abrupt or distinct breaks in stratigraphy were encountered, with the exception of a cobble deposit encountered between 195 and 285 cm below ground surface. Artifacts were concentrated approximately 120–180 cm below surface (Figure 20).

Of the 10 auger tests, nine contained prehistoric cultural material. Fifty-seven artifacts were recovered: one informal tool, 55 pieces of quartz and chert

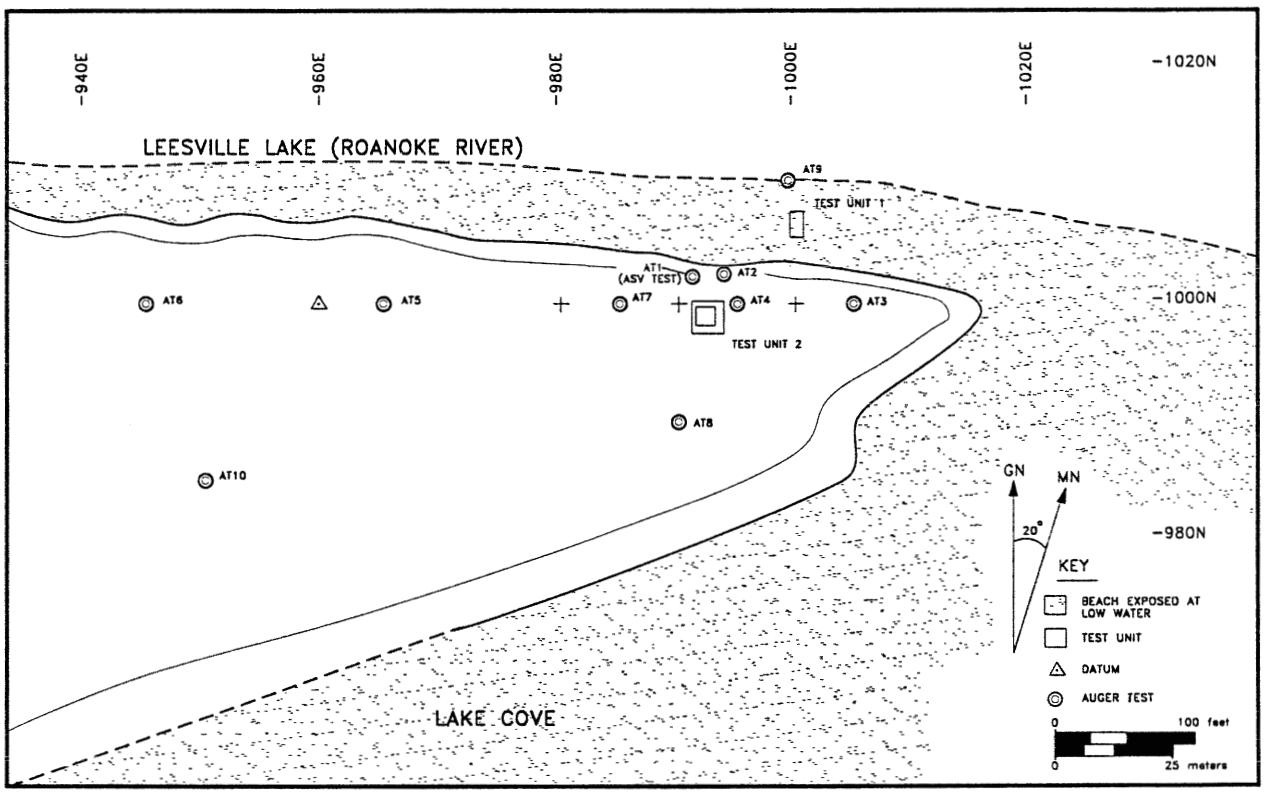


Figure 17. Site 44PY152, plan.

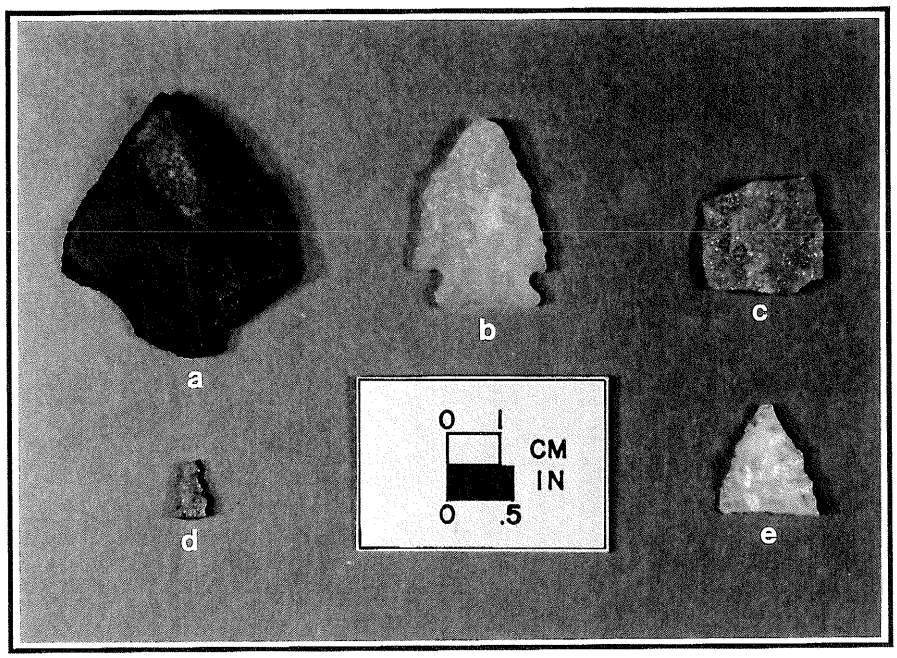


Figure 18. Formal tools recovered from 44PY152 (a - retouched flake, chert [beach surface]; b - Palmer hafted biface, metaquartz [beach surface]; c - hafted biface midsection, quartzite [TU 2, L 2]; d - hafted biface tip, quartzite [TU 2, L2]; e - hafted biface tip, quartz [TU 1, L 2]).

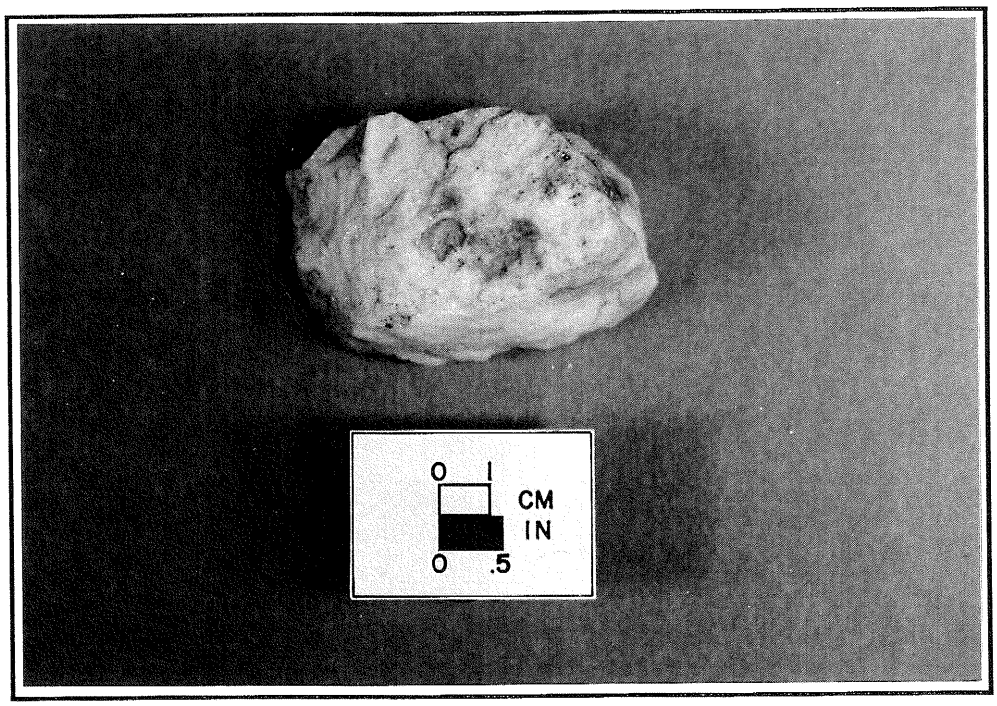


Figure 19. Quartz core/scraper plane recovered from 44PY152 (TU 1, L 2).

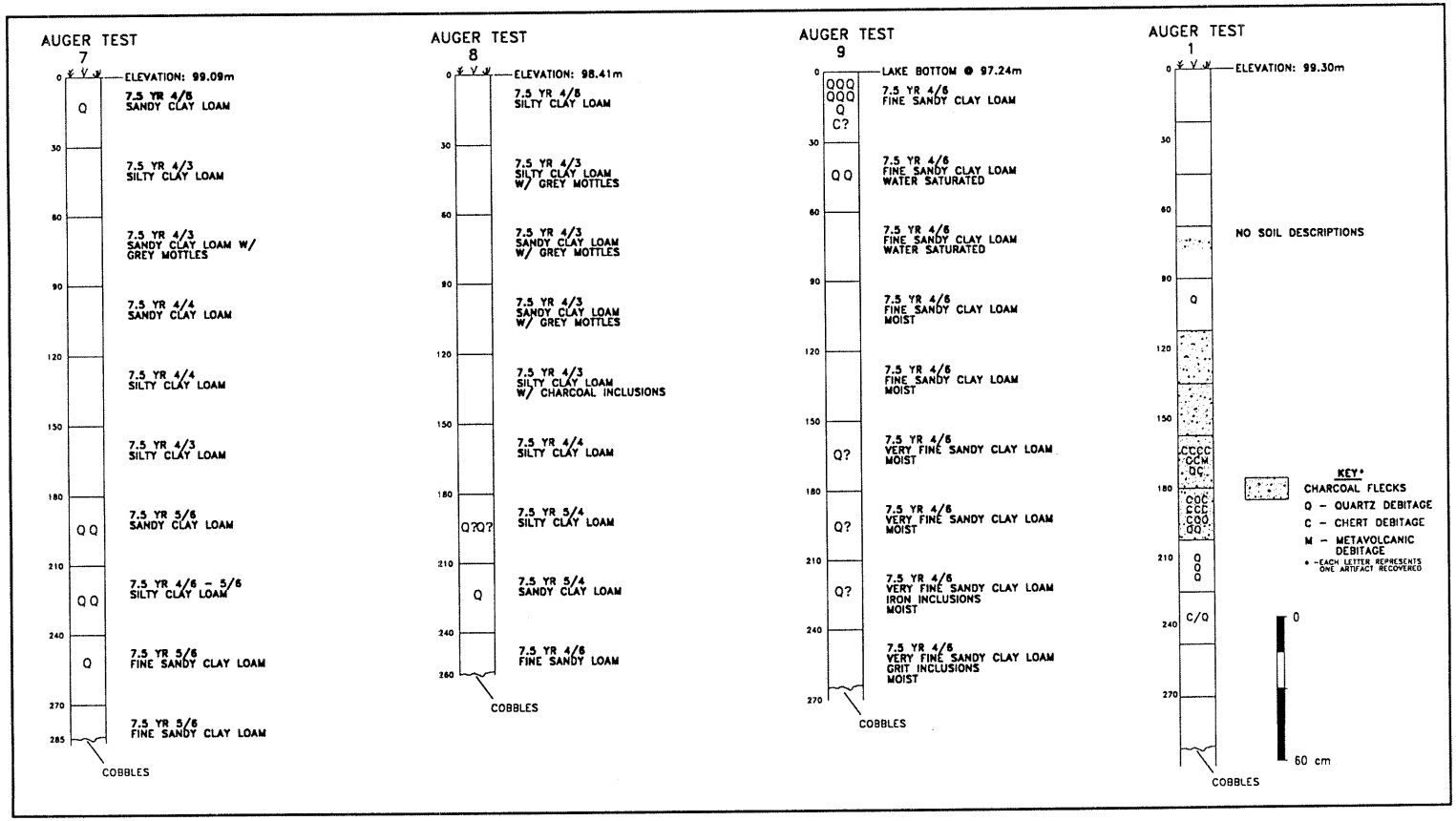


Figure 20. Site 44PY152, auger test profiles.

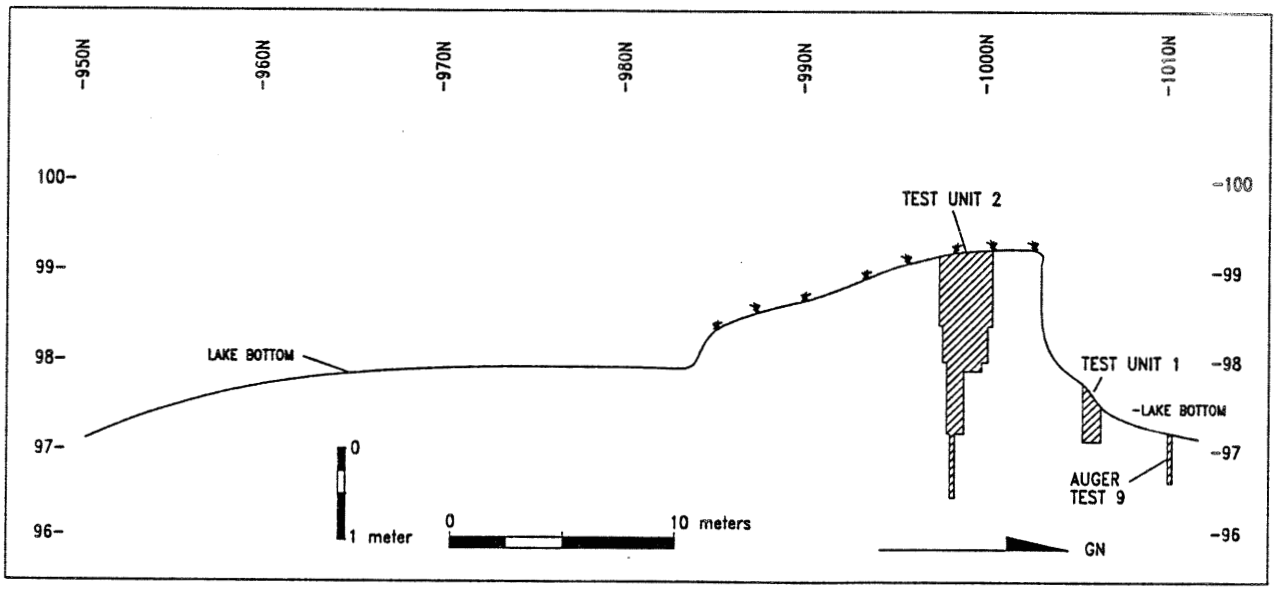


Figure 21. Site 44PY152, cross-section.

debitage, and one piece of fire-cracked rock (see Appendix A). The tests containing prehistoric artifacts are Auger Tests 1 and 3–10. The auger test results indicate that the site measures at least 70 m east–west × 30 m north–south.

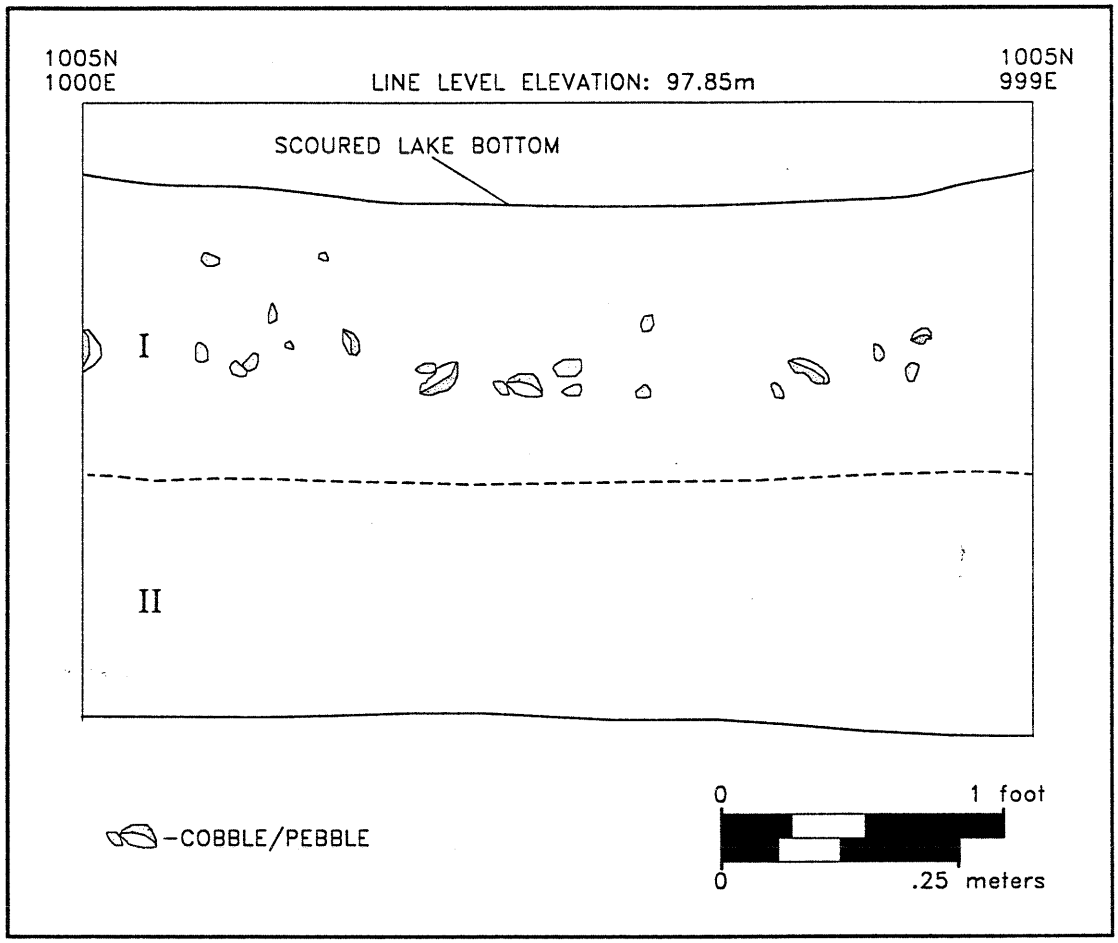
Test Unit Excavation

The final step in field investigations on 44PY152 consisted of the excavation of two test units: Test Unit 1 measured 1 × 2 m, and Test Unit 2 measured 2 × 2 m. These larger test units were intended to provide a better view of the site's stratigraphy and controlled-volume samples of the cultural materials present. Test Unit 1 was, therefore, placed at the area of the exposed beach with the highest concentration of debris, as indicated by the results of the surface collection and auger testing. Test Unit 2 was placed on the levee itself in similar fashion (Figure 21).

Test Unit 1 was placed with its southwest corner at grid coordinate 1005N 1000E and its long axis oriented north–south. The unit was 1 m north of the eroding levee's bank, on the portion of the beach that yielded possible Paleoindian tools and fluted projectile points during prior surface collection by ASV members. This area slopes sharply toward the original river channel.

This unit was excavated in six 10-cm levels to a depth of 57 cm below ground surface at the southeast corner of the unit (Figures 22 and 23). Level 1 was 9–13 cm thick, consisting of only the southern quarter of the unit due to the slope. Level 1 removed a layer of strong brown (7.5YR4/6) silty clay loam with common pebbles and small cobbles. (Level 1 in this unit corresponds vertically to the upper portion of Stratum V in Test Unit 2.) Level 2 removed an additional 10 cm of dark brown (7.5YR4/4) fine sandy clay loam with a high frequency of cobbles in the east-southeast quadrant (Figure 24). Level 3 removed an additional 10 cm of the same soil. Level 4 removed 10 cm of dark yellowish brown (10YR4/4) silty clay loam. Levels 5 and 6 removed yellowish brown (10YR5/4 and 5/6, respectively) silty clay loam.

Eleven pieces of lithic debitage were recovered from Level 1. Level 2 yielded 31 pieces of debitage along with a core fragment, an informal tool, and a formal tool (see Figures 18e and 19). Piece Plot 1, a hafted biface distal fragment, was also recovered in this level (Figures 25 and 26). Level 3 yielded 31 pieces of debitage and a hafted biface distal fragment. Artifact density in Level 4 was low; only 12 pieces of debitage were recovered. Artifact density continued to decrease in Levels 5 and 6; Level 5 contained only three pieces

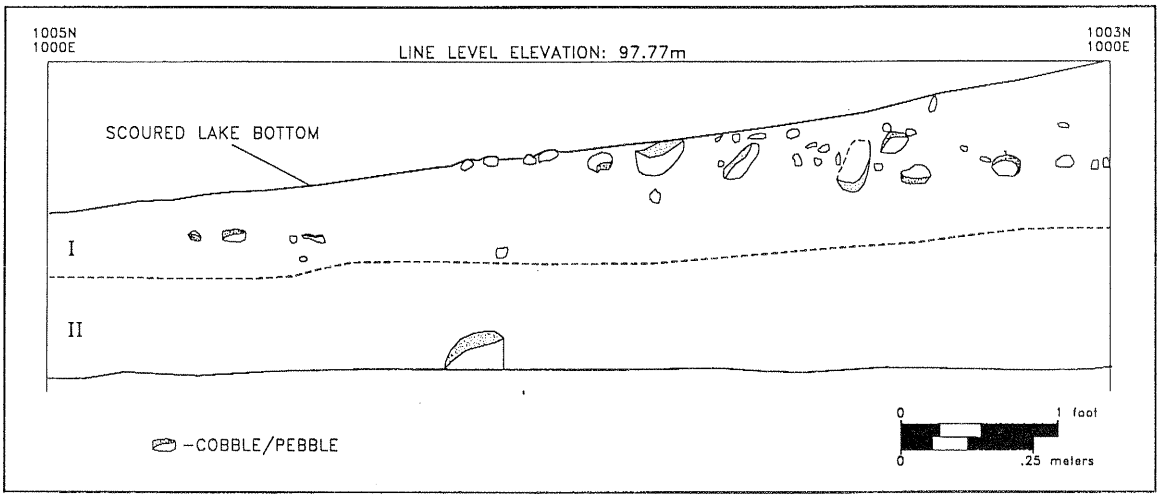


KEY

I - Top: Brown (7.5YR4/3) Silty Clay Loam with Occasional Vertical "Cracks" Having Strong Brown (7.5YR5/6) Edges and Filled with Brown (7.5YR5/2) Silty Clay; Below Cobbles: Brown (7.5YR4/4) Silty Clay Loam also with Occasional Vertical Cracks; Throughout: Numerous Small, Weathered Pieces of Metamorphic Stone and Larger Cobbles Predominantly Quartzite, Schist, and Granite with Small Pebbles of Chert and Jasper

II - Gradual Transition from Stratum I; Strong Brown (7.5YR5/6) Fine Sandy Clay Loam, Potentially Slightly More Clay with Depth; Vertical Cracks Tend to Terminate in Stratum II; Pebbles and Cobbles Scarce

Figure 22. Site 44PY152, Test Unit 1, south profile.



KEY

I - Top: Brown (7.5YR4/3) Silty Clay Loam with Occasional Vertical "Cracks" Having Strong Brown (7.5YR5/6) Edges and Filled with Brown (7.5YR5/2) Silty Clay; Below Cobbles: Brown (7.5YR4/4) Silty Clay Loam also with Occasional Vertical Cracks; Throughout: Numerous Small, Weathered Pieces of Metamorphic Stone and Larger Cobbles Predominantly Quartzite, Schist, and Granite with Small Pebbles of Chert and Jasper

II - Gradual Transition from Stratum I; Strong Brown (7.5YR5/6) Fine Sandy Clay Loam, Potentially Slightly More Clay with Depth; Vertical Cracks Tend to Terminate in Stratum II; Pebbles and Cobbles Scarce

Figure 23. Site 44PY152, Test Unit 1, east profile.

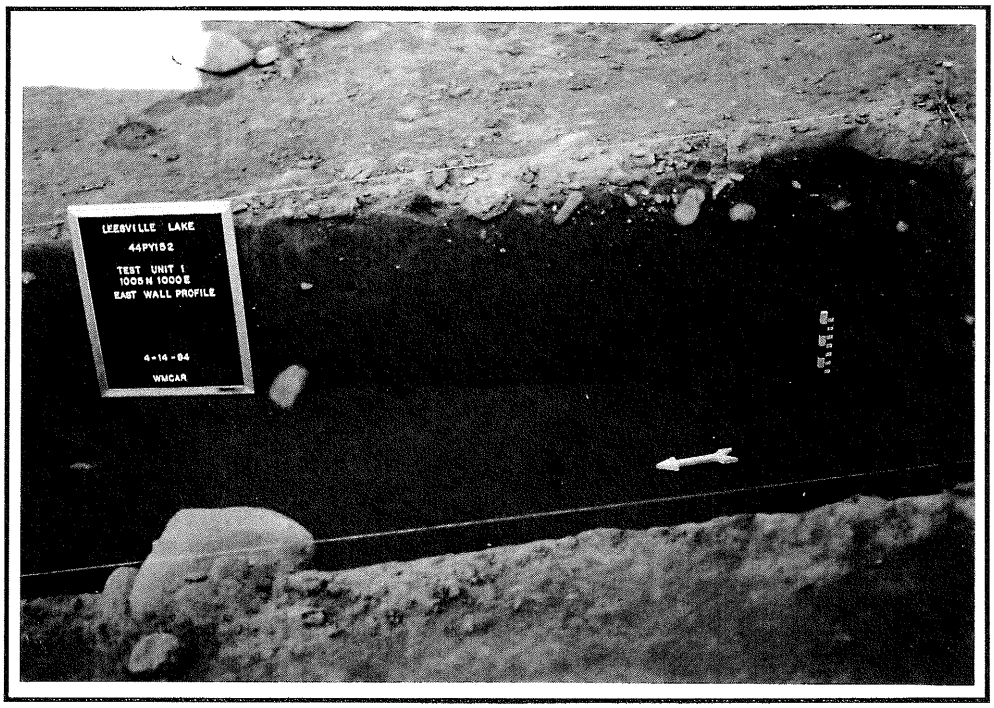


Figure 24. Site 44PY152, Test Unit 1, east profile view, showing remnant of cobble deposit at south end.

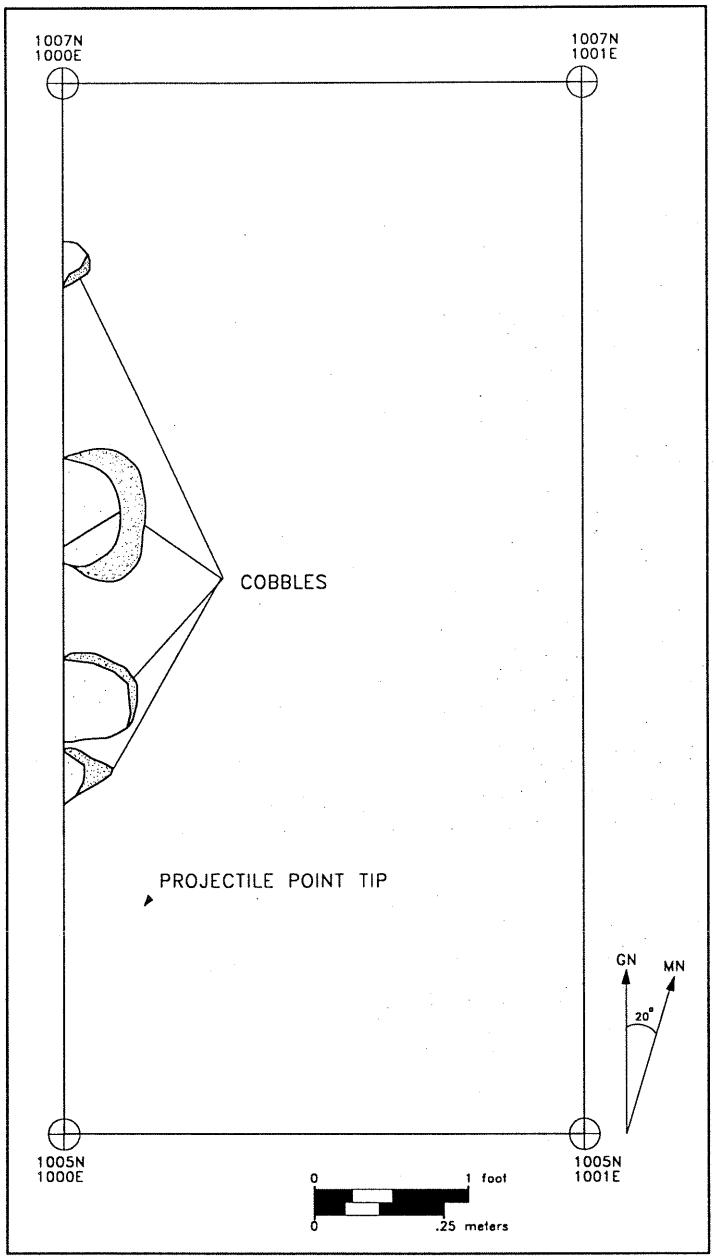


Figure 25. Site 44PY152, Test Unit 1, Level 2 plan.

Figure 26. Site 44PY152, Test Unit 1, Level 2, distal biface fragment (Piece Plot 1).

of debitage, and Level 6 contained only four pieces. Level 5 was the deepest level in this unit to yield artifacts in the .64-cm sample (see Appendix A), as the only material recovered from Level 6 is from the fine screen sample.

Test Unit 2 was placed with its southwest corner at 997.5N 991E, approximately 6 m south of the bank. The site surface in this location is level for the most part with only a slight slope to the south (see Figure 21). A VDOT backhoe was utilized to open a 3.5-×-3.5-m square to a depth of 80 cm below ground surface, which was continued as a 2.5-×-2.5-m square another 60 cm to a total of 140 cm below ground surface. It was at this depth that hand excavation of the unit began. (The hand excavation of this unit at "Level 1" started at the base of Stratum IV or at approximately 98.00 m.) Hand excavation in Test Unit 2 originally started out as a 2-×-2-m square. Levels 1 and 2 were excavated first in the northern half of the unit, then later in the southern half. Levels 3–8 were then excavated only in the southern half as a 1-×-2-m unit.

Test Unit 2 was excavated in eight 10-cm levels to a depth of 71 cm below the bottom of the backhoe unit (Figure 27) (see Chapter 9). Level 1 (north half) was 10 cm, at its thickest, of a layer of brown (7.5YR4/4) very fine sandy clay loam. A network of "cracks" filled with dark grayish brown (10YR4/2) sandy loam clay and having a border of yellowish red (5YR4/6) silty clay loam was common (Figure 28). Level 2 (north half) removed an additional 10 cm of brown (7.5YR4/3) silty clay loam with the filled "cracks" unchanged. The south half excavations of Levels 1 and 2 revealed the same soils. Levels 3 and 4 (south half) removed brown (7.5YR4/4) sandy/silty clay loam in which the filled "cracks" tended to increase in volume and frequency. The "cracks" were filled with dark gray (7.5YR4/1) silty clay with a border around the clay of yellowish red (5YR4/6) silty clay loam. Level 5 (south half) removed 10 cm of brown (7.5YR4/3) sandy clay loam, with the filled "cracks" unchanged in volume and frequency from Level 4 (south half). Levels 6 and 7 (south half) soils consisted of strong brown (7.5YR4/6) sandy clay loam with the filled "cracks" unchanged. Level 8 was excavated as a 1-×-1-m square in the southwest quadrant of the unit. An additional 10 cm of the soil in Levels 6 and 7 were removed. A geoarchaeological evaluation of this unit's profile is provided in Chapter 9.

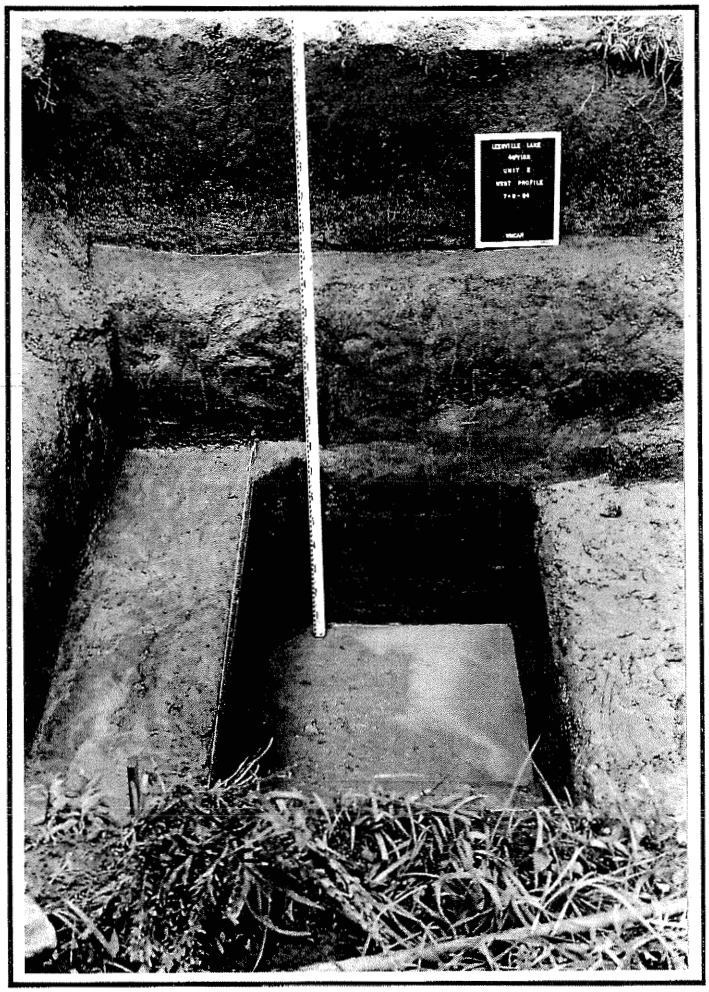


Figure 27. Site 44PY152, Test Unit 2, west profile view.

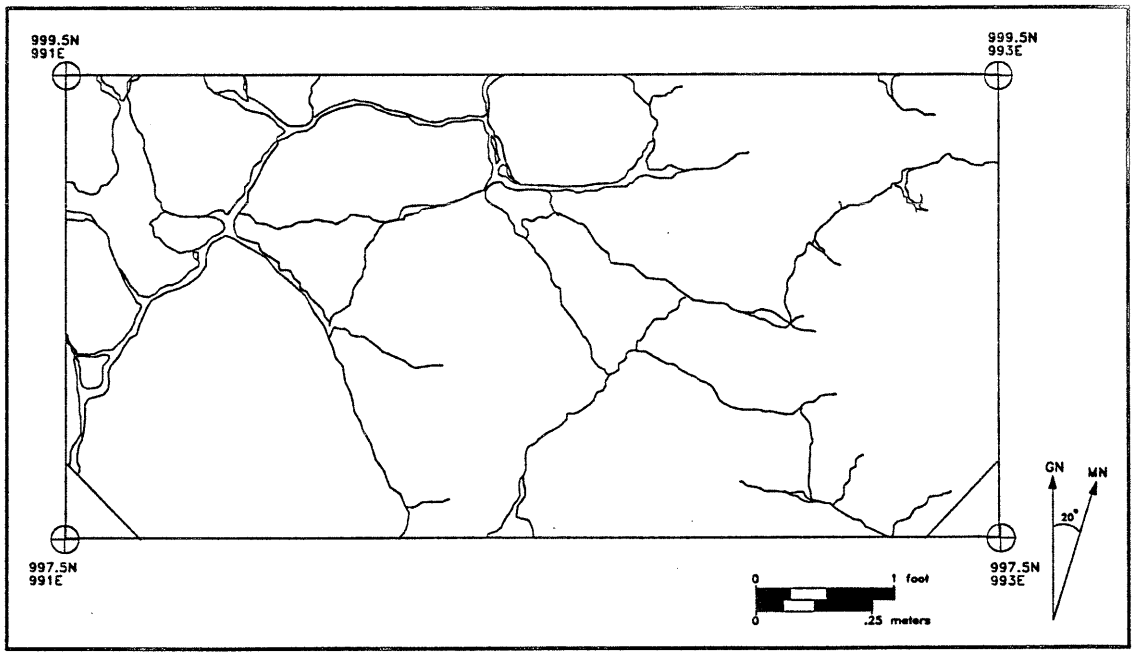


Figure 28. Site 44PY152, Test Unit 2, Level 2 plan showing fragipan "cracks."

Level 1 (north half) yielded a total of two pieces of lithic debitage, and Level 2 (north half) yielded two pieces (Figure 29). In Level 1 (south half), three pieces of debitage were recovered. Artifact density in Level 2 (south half) increased, with 11 pieces of debitage, 10 pieces of fire-cracked rock, and two hafted biface fragments recovered. Piece Plot 1 is a quartzite distal fragment, and Piece Plot 2 is a midsection of an unidentified Archaic hafted biface believed to be side-notched (see Figure 18c–d). In Level 3 (south half), six pieces of debitage were recovered. Thirty-six pieces of debitage and nine pieces of fire-cracked rock were recovered from Level 4. Recovered from Level 5 were 21 pieces of debitage and one piece of fire-cracked rock. Level 6 yielded 13 pieces of debitage, and Level 7 yielded eight pieces. No artifacts were recovered from Level 8.

A geoarchaeological assessment of the stratigraphy exposed in Test Unit 2 was conducted by Joseph Schuldenrein. His results are reported separately in Chapter 9 along with a discussion of radiocarbon dates.

Materials Recovered

A total of 279 prehistoric artifacts were recovered by the investigations at 44PY152. Of this material, 20.4% (n=57) was recovered from systematic auger testing, and 79.6% (n=222) from the two test units.

The materials recovered consist of 3 (1.0%) formal and informal tools, 21 pieces (106.6 g, 7.5%) of fire-cracked rock, one (0.3%) core fragment, and 251 pieces (89.9%) of flaked stone debitage. The tools recovered include three hafted biface fragments, none of which are of recognizable types. The debitage recovered during Phase II testing consists of the following: 0.7% (n=2) primary/reduction flakes, 7.5% (n=21) secondary/thinning flakes, 0.3% (n=1) tertiary/retouch flakes, 46.5% (n=130) flake fragments/shatter, and 33.6% (n=94) angular, blocky fragments/chunks (Figure 30).

The raw material most common in the assemblage is quartz, which comprises 68.8% (n=192) of the

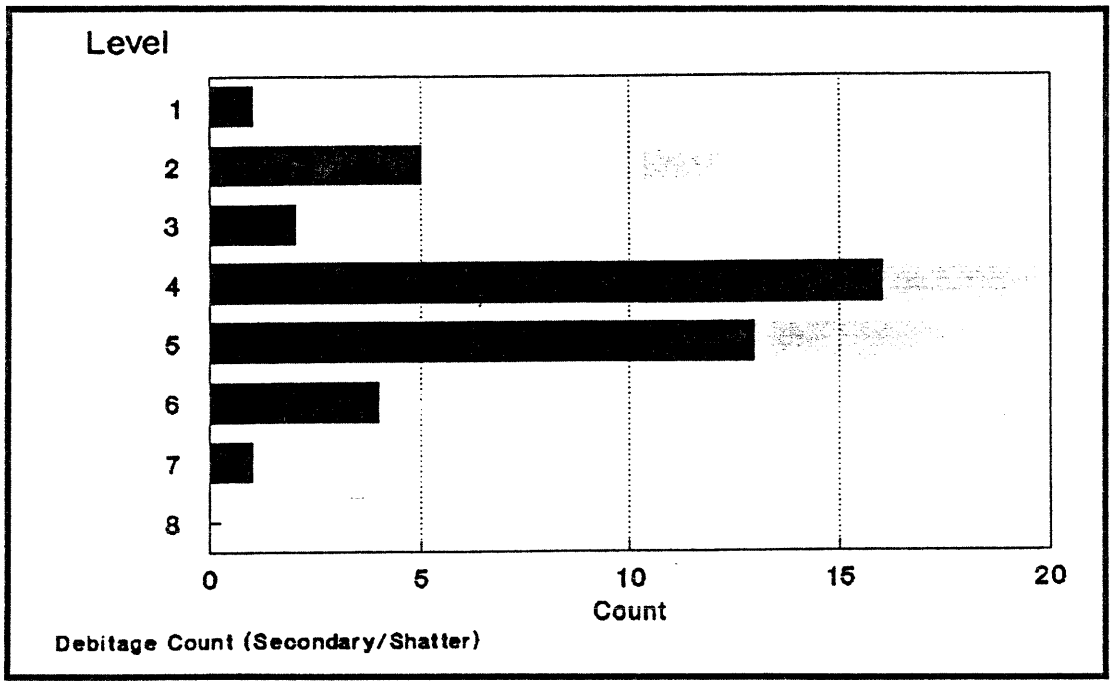


Figure 29. Site 44PY152, Test Unit 2, debitage by level.

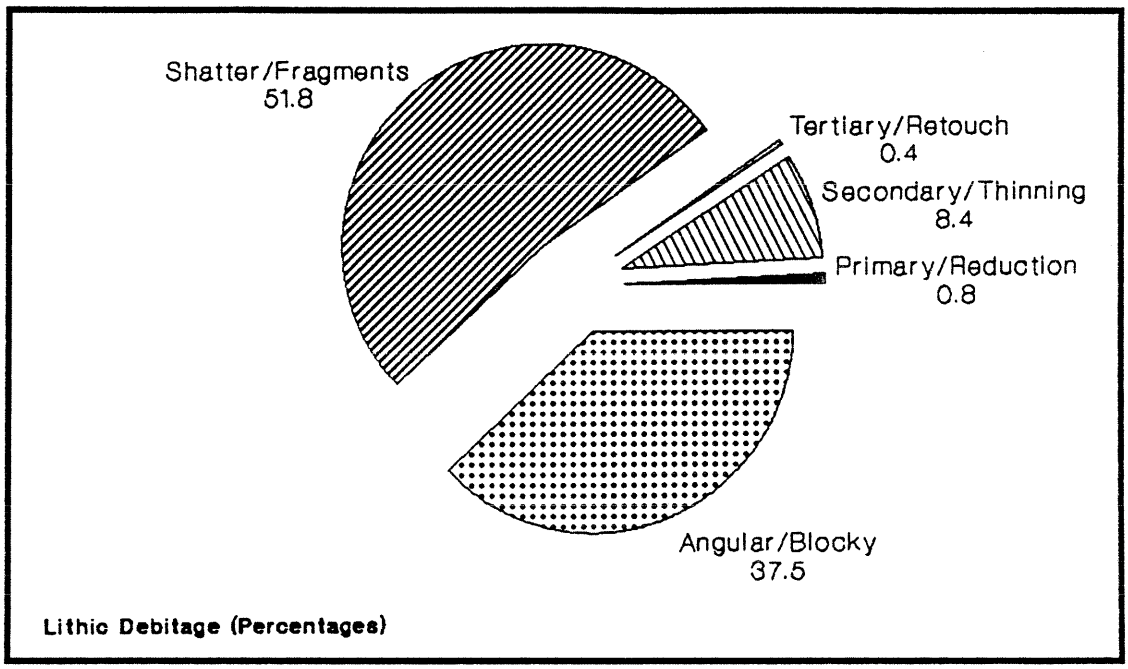


Figure 30. Site 44PY152, summary of artifact classes.

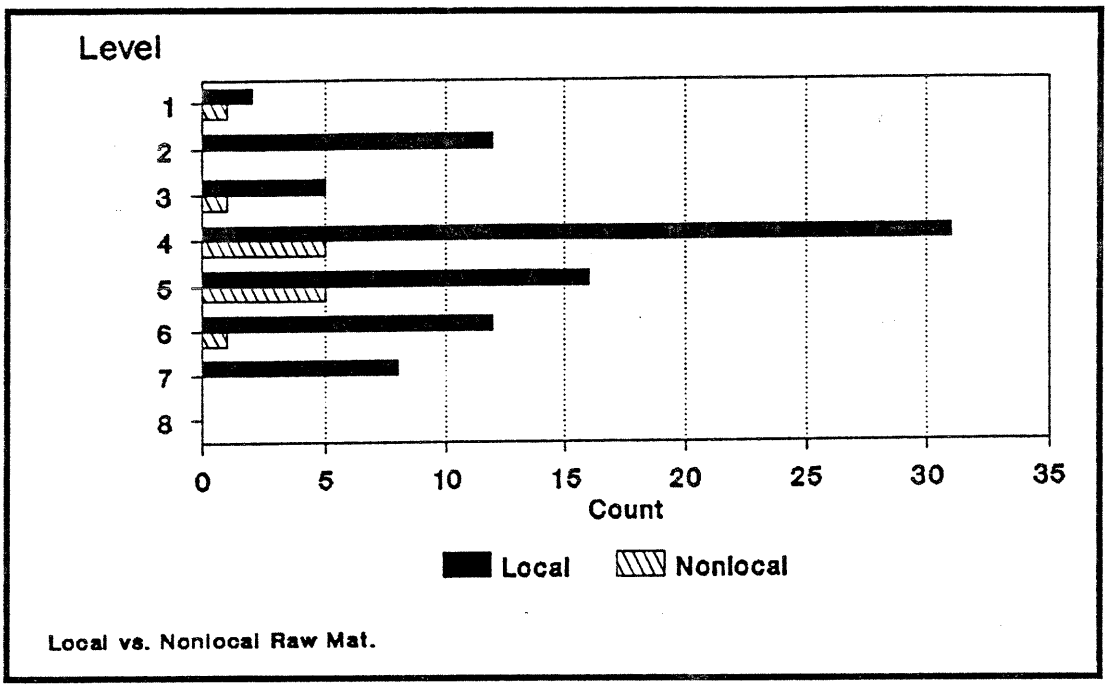


Figure 31. Site 44PY152, Test Unit 2, local vs. nonlocal raw materials by level.

flaked stone (Figure 31). The remainder is gray chert (8.9%, n=25), crystalline quartz (2.5%, n=7), black opaque chert (2.5%, n=7), quartzite (2.1%, n=6), unidentified chert (2.1%, n=6), argillite (1.4%, n=4), rhyolite (1.0%, n=3), chalcedony (0.7%, n=2), jasper (0.7%, n=2), unidentified material (0.7%, n=2), metavolcanic (0.3%, n=1), and vitric tuff (0.3%, n=1). The raw material distribution for tools is not significantly different than that for debitage with one exception: among the recovered tools, quartz accounts for 50% (n=3) and quartzite for 50% (n=3); among debitage, quartz accounts for 74.9% (n=188) and quartzite only 10.1% (n=3). Quartz and quartzite are materials available at this site as cobbles.

Discussion and Recommendations

Site 44PY152 is a multicomponent site, with artifacts dating to the Archaic and Paleoindian periods. The site is situated on the east terminus of a levee on the southern bank of Leesville Lake. Investigations consisted of a surface collection, systematic auger testing, and excavation of two 1-×-2-m units. Cultural materials were encountered up to 2.4 m below landform surface in auger tests. Based on the information collected, the site is a rough oval measuring at least 70 m east-west × 30 m north-south.

All of the artifacts recovered from this site are prehistoric lithics. The temporal affiliations of the excavated prehistoric components are indeterminate based on the artifacts, but the context is suggestive of the Early Archaic or Paleoindian periods. The radiocarbon dates discussed in Chapter 9 confirm this impression.

The recovered materials indicate a limited range of activities. Site 44PY152 is located only 20–30 m south of the original riverbed, and its location may have attracted hunters to water and game. The lithic assemblage suggests that at least informal tools were also manufactured on site, using locally available quartz cobbles. These are activities that would occur on a short-term camp site, probably related to exploitation of locally available animal and plant food resources.

Site 44PY152 has already been impacted by the fluctuating lake levels; indeed, it is possible that the majority of the original site has been destroyed by years of erosion. This is not to say that 44PY152 has nothing to offer. The deep deposits and potentially single-component nature of the buried horizon, together with early absolute dates, make it thus far unique in the state.

CHAPTER 7: Description of Surface-Collected Artifacts from 44PY7 and 44PY152

Introduction

The surface collection from the Smith Mountain sites represents over six years of monitoring by members of the Roanoke Chapter of the Archeological Society of Virginia. The author first realized the potential significance of the cultural deposits at 44PY152 when he recovered a large bipointed uniface on one of its lowest levels in November of 1988. Semi-controlled collection of the site followed with the gradual accumulation of evidence of the antiquity and depth of burial of the early components at both 44PY152 and 44PY7, which by late 1988 had also yielded evidence of early occupation (Childress 1989, 1993).

The large assemblage of stone tools recovered to date occurred primarily in a surface context as erosion cut deeply into the landform containing cultural strata. While this erosion episode began with the first operation of the Smith Mountain hydroelectric facility in 1966, the materials in this report have been, with a few exceptions, collected from 1988 to the present. In most instances, they were recovered on the deflated beaches flanking the receding levee and had been flushed from the depositional matrix during cycles of power generation by the electrical facility at Smith Mountain dam, which resulted in high-energy flooding of the site. The breakdown of the cultural deposits has accelerated further due to wind-driven wave action during periods of low water as well as cryoturbation during the coldest months of the year. In a few instances, individual artifacts and even clusters of artifacts have been recovered embedded in the primary matrix both in the vertical profile and on horizontal sections of the beach that have been swept clean of recent silt and sand deposits. While individual artifacts recognized in the field were plotted both horizontally and vertically as to the location of their recovery, there is no way to know how displaced they may have been from their original deposition save in the few instances when they were still embedded in the matrix. It may be of some significance, however, that in most cases, diagnostics such as projectile points occurred vertically in the approximate order of their hypothesized age, even in secondary contexts.

Type Categories

To date, Sites 44PY7 and 44PY152 have produced a total of over 900 flaked stone tools (including fragments) assignable to the late Pleistocene/early Holocene and approximately 3,000 pieces of debitage. While the number of some tool forms is small, the range of types is comparable to the largest, richest Paleoindian sites known in eastern North America. For comparative purposes, Meltzer (1988:34) compiled a list of artifact types common to the major eastern Paleoindian sites known at that time. Eighteen type categories were established, including some that lumped together many potentially different functional types such as utilized flakes. To accommodate the Leesville assemblage, several additional categories must be considered, including for curated tools: burins, limaces, and flared-bit chisel gravers; and for non-curated tools of local quartz and quartzite: rough bifaces, large core tools including scraper/planes, heavy cutting tools, and unifacial points/knives. Tables 1 and 2 describe the assemblage based on these categories. It should be noted, however, that the curated tools are highly accessorized—especially at 44PY152—making it difficult to assign many tools to any one exclusive class. In such cases, the tool is assigned to the category that appears to describe its primary function (or in some cases form). Another factor in considering the assemblage is the high proportion of fragmentary tools present. When its original form/function can be determined or reasonably inferred, a tool fragment is assigned and counted as a member of its original class unless there is compelling evidence to suggest that it was recycled to perform another function. Recognizable fragments of the same tool are counted as only one tool. In some cases, a tool may be assigned to a category with a "possible" qualification. All unifacially worked fragments whose

Table 1. Site 44PY152, summary of surface-collected tools and debitage.

Category:	Qtz.	Qtzt.	CQzt.	Cryst.	Chert	Knox	OFlint	Jasp.	SSlt.	Rhy.	Chalc.	Uncl.	Total	%
Projectile Points	13		3	1	4	1	4	4	7	1	2		40	10.5
Endscrapers	13		1		2	2	4	5		1	3	1	32	8.0
Side Scrapers	14	2	2	1	10	8	1		3	1	1		43	11.1
Bifacial Knives	6	1		2	5	1			2	2	1		20	5.0
Gravers	1			6	4	2	3	2	2	1	1		22 (7)*	5.5
Preforms	6							2				1	9 (5)	2.3
Cores	2				1			1					4	1.0
Pièces Esquillées				1									1	0.3
Drills					1	1	1						3	0.8
Choppers		1											1	0.3
Awls		1		1	2			1					5 (2)	1.3
Denticulates	2				3		1						6	1.5
Utilized Flakes	15	5	1	4	36	26	14	13	15	1	9	2	141 (24)	35.4
Spokeshaves	1			1	2	1							5 (2)	1.3
Hammerstones		1										2	3	0.8
Abraders		2										1	3	0.8
Anvils												2	2	0.5
Limaces	2				2	1		1					6	1.5
Chisel Gravers							1	1					2	0.5
Burins	3	1		1	1			1					7 (4)	1.8
Rough Bifaces	11		1										12 (1)	3.0
Heavy Cutters	4	2											6	1.5
Unifacial Point			1										1	0.3
Core Scraper/Planes	23	1											24 (1)	6.0
Tool Total:	126	17	9	18	73	43	29	31	29	7	17	9	398	39.4
%	31.7	4.3	2.3	4.5	18.3	10.8	7.3	7.8	7.3	1.8	4.3	2.3		
Debitage:	58	12	7	25	213	45	86	21	109	17	16	3	612	60.6
%	9.5	2.0	1.1	4.1	34.8	7.4	14.1	3.4	17.8	2.8	2.6	0.5		
Material Total:	184	29	16	43	286	88	115	52	138	24	33	12	1010	100.0
%	18.2	2.9	1.6	4.3	28.3	8.7	11.4	5.1	13.7	2.4	3.3	1.2		

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

* Numbers in parentheses indicate possible specimens included in total.

Table 2. Site 44PY7, summary of surface-collected of tools and debitage.

Category	Qtz.	Qtzt.	CQzt.	Cryst.	Chert	Knox	OFlint	Jasp.	SSlt.	Rhy.	Chalc.	Uncl.	Total	%
Projectile Points	5	2	1	3	16	3	2		9	1	3		44	9.7
Endscrapers	2	1		2	16	9	5	2	3		6		46 (5)*	10.2
Side Scrapers	9		1	1	10		2	5	1	1	3		33 (1)	7.3
Bifacial Knives		1		2	15	2	4	3	1		1		29 (1)	6.4
Gravers	1			2	10	6	1	5	5		5		36 (19)	8.0
Preforms	1				2								3 (1)	0.7
Cores					1	1							2 (1)	0.4
Pièces Esquillées					1						1		2 (1)	0.4
Drills	1			3	4				1				9 (1)	2.0
Choppers													0	
Awls	1			3	3	1	3		1		3		15 (9)	3.3
Denticulates	1			2	1		1			1			6 (2)	1.3
Utilized Flakes	2		3	25	64	28	35	17	10	3	25		212 (56)	46.9
Spokeshaves					2		1		1		1		5	1.1
Hammerstones													0	
Abraders												3	3 (2)	0.7
Anvils													0	
Limaces													0	
Chisel Gravers													0	
Burins				4	1	1							6 (3)	1.3
Rough Bifaces	1												1	0.2
Heavy Cutters													0	
Unifacial Point													0	
Core Scraper/Planes													0	
Tool Total:	24	4	5	47	145	51	59	28	32	6	48	3	458	17.5
%	5.1	0.9	1.1	10.4	31.7	11.3	13.1	6.2	7.1	1.3	10.6	0.7		
Debitage:	31	23	104	103	777	112	341	95	443	7	108	9	2153	82.5
%	1.4	1.1	4.8	4.8	36.1	5.2	15.8	4.4	20.6	0.3	5.0	0.4		
Material Total:	55	27	109	150	922	163	400	123	475	13	156	12	2611	100.0
%	2.1	1.0	4.2	5.7	35.3	6.2	15.3	4.7	18.2	0.5	5.6	0.5		

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

* Numbers in parentheses indicate possible specimens included in total.

original form or function cannot be determined are assigned to the utilized flake category.

Early Archaic and Paleoindian projectile points and fragments are combined into a single category, which is then subdivided into types in Tables 3 and 4. Again, point fragments are counted in the projectile point category and, if recognizable as types, are assigned to the total of that type.

A major problem inherent in quantifying the assemblages of many Eastern fluted point sites is the mixed constellations of tool forms often encountered, which combine virtually indistinguishable types from the early Paleoindian through the Early Archaic period. This is particularly acute on shallow, surficial sites such as Shoop, Williamson, and Wells Creek or on sites that have undergone heavy erosion such as Nucholls, Port Mobil, and Leesville Lake. With the exception of only a few tool forms other than projectile points, no individual tool from such sites can be assigned with complete confidence to the Paleoindian period. For this reason, Eastern fluted point sites can only be compared with certain qualifications—especially with those in the Southeast, which are much more likely to be multicomponent. At Leesville, the entire assemblage will be treated as a single analytic unit, although Paleoindian diagnostics will be noted. While the Early Archaic diagnostic component at Leesville is numerically dominant, it is by no means certain that the balance of other tool forms is in the same proportion. Future work at the site and further analysis of the current assemblage may clarify the relationship of some of the components.

Site 44PY7: Assemblage Description

Over 90% of the surface collection from 44PY7 was recovered from a deflated area of no more than 75 m^2. This location, at the head of the levee and adjacent to the mouth of Tanker Creek, is the most directly exposed to erosion of any part of the landform. Judging by the number of tools and debitage recovered from this limited area, the occupation was relatively concentrated with many overlapping residential loci.

Projectile Points

The surface collection from 44PY7 has yielded moderate numbers of diagnostic bifaces indicating fairly continuous reoccupation of the site from Paleoindian times through the Late Woodland period. For the purposes of this study, only material recognizable as diagnostic of the Paleoindian through the bifurcate period is considered, and indeed the utilization of the site seems most intense during this period. The Paleoindian period is represented by a single fluted point, which is not complete enough for a full metrical description. It appears that the lower levels of the site, which may contain a more extensive Paleoindian component, are somewhat protected from erosion by cobble deposits. The majority of the remaining diagnostic projectiles are more or less evenly divided between corner-notched types of the Kirk/Palmer series (n=21) and stemmed varieties of Kirk (n=14). Judging by the recovery of embedded specimens, there does not appear to be much stratigraphic separation of these types. Many of the specimens from this site are fragmentary, and it is particularly noteworthy that a large proportion (47.4%, n=9) of the Kirk/Palmer series specimens are represented by the lower part of the base minus the barbs. This type of transverse fracture in the constricted notch area indicates failure of the projectile at its point of maximum stress relative to the haft which would leave intact and in place only that part of the point directly fastened to the shaft. It may be inferred that such fractures usually occurred during hunting use, and the removal of the point remnant from its haft would probably have been deferred until return to the residential camp. Unlike the corner-notched series, the Kirk Stemmed specimens are sufficiently intact to make meaningful metric comparisons (Table 5).

It is noteworthy that the Palmer variant of the corner-notched series (n=6) is made exclusively of crystalline lithics, while the hypothesized later Kirk variant (n=13) is made predominantly of cryptocrystallines. This preference for cryptocrystallines apparently continued into the Kirk Stemmed series and the following bifurcates. Bifurcates rarely occur on the Leesville sites, and the two specimens from 44PY7 are the only examples that the author has noted among several thousand projectile points examined from the complex.

Bifacial Knives and Preforms

These two categories combined represent 7.1% of the total tool assemblage, and 87.5% are made of cryptocrystallines. Virtually all of the specimens are fragmentary, and while some of the examples are very

Table 3. Site 44PY152, summary of surface-collected projectile points.

Type	Qtz.	CQzt.	Cryst.	Chert	Knox	OFlint	Jasp.	SSlt.	Rhy.	Chalc.	Total	%
Fluted Point						2					2	5.0
Unfluted Lanceolate							1		1		2	5.0
Dalton				1 p.*	1 p.						2 p.	5.0
Hardaway S.N.	1		1								2	5.0
Palmer C.N.	7	3				1					11	27.5
Kirk C.N.	2			2			3	1 p.		2	10 (1 p.)	25.0
Stanly Stemmed								4			4	10.0
Untyped Stemmed	1							1			2	5.0
Unifacial Point		1									1	2.5
Unclassified Frags.	2	1	1	1	1						4	10.0
Total:	13	3	1	4	1	4	4	7	1	2	40	100.0
%	32.1	7.5	2.5	10.0	2.5	10.0	10.0	17.5	2.5	5.0		

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

* p.=possible

Table 4. Site 44PY7, summary of surface-collected projectile points.

Type	Qtz.	Qtzt.	CQzt.	Cryst.	Chert	Knox	OFlint	SSlt.	Chalc.	Total	%
Fluted Point					1					1	2.3
Palmer C.N.	2	1	2	1						6	13.6
Kirk C.N.	2	1			4 (1 p.)	1	1	4		13 (1 p.)	29.5
Untyped C.N.				1	1	1				3	6.8
Kirk Stemmed				1	10	1		2		14	31.8
Lecroy								2		2	4.5
Unclassified Frags.	1						1	1	2	5	11.4
Total:	5	2	2	3	16 (1 p.)	3	2	9	2	44	100.0
%	11.4	4.5	4.5	6.8	36.4	6.8	4.5	20.5	4.5		

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

* p.=possible

	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	76.0 *	28.0	44.5 **
Width:	33.5	15.7	24.1
Thickness:	9.5	5.7	7.5

* Total Length estimated by extending line of broken tip.
** Estimate based on extending line of broken tips on 3 specimens

Table 5. Site 44PY7, metric comparison of Kirk Stemmed points (n=9).

thin, they lack the degree of definition that would identify them as finished projectile points.

A single quartz specimen, which appears to be the base of an aborted Stage 5 preform, is of very high quality quartz with a glassy texture. End thinning at this stage of the specimen's production is primarily of the lateral type, with apparent platform preparation for end thinning from the base. A broad, short (14 mm) thinning flake has been driven from the base of the opposite face along with a smaller, parallel removal. This operation may have resulted in the preform's failure through perverse fracture along a fault in the material. The specimen achieves the remarkable width to thickness ratio of 6.3:1.

Two other transversely fractured bifaces are classified as preforms on the basis of what appear to be preparations for more advanced reduction. In one example, extensive flute-like end thinning has been accomplished from the base of both faces. In the other specimen, the distal portion displays tip beveling and polish, possibly as a polar cushion for extensive basal end thinning.

In other cases, it is difficult to determine whether a given biface was intended to be a preform or whether it is represented in its finished state as a knife, or even as an exhausted bifacial core. Use wear analysis and a determination of whether a broken specimen failed in manufacture or during use may shed some light on this problem.

Endscrapers

Other than utilized flakes, endscrapers are the most numerous category of tools at 44PY7 (n=46). They are made predominantly of cryptocrystalline cherts and flint (87.8%). Table 6 describes some key attributes of intact specimens. The collection has been broken down somewhat arbitrarily into four groups based on size and blank type. Group I includes endscrapers larger than 30 mm in length with steeply flaked bits (n=6). Group II includes typical endscraper forms between 20 and 30 mm in length that are manufactured on relatively thick flakes (n=7). Distal bits in this group also tend to have steep angles. Group III endscrapers are manufactured on small, thin flakes between 16 and 20 mm in length and have more acute bits (n=4). Group IV contains micro-endscrapers on very small, thin flakes between 11 and 15 mm in length (n=2). Bits are very thin but have moderate edge angles. These forms are remarkably similar to their larger counterparts, although relatively much thinner. Many endscrapers appear to have been damaged during use, given the high percentage of endscraper fragments present among the total for the site. Table 7 provides a summary of endscraper fragments.

Sidescrapers

Sidescrapers represent 7.3% of the tool assemblage from 44PY7. They display a variety of forms including several classic types familiar on Eastern fluted point sites. The majority, however, are made on irregular

Group:	I (>30 mm)	II (20–30 mm)	III (15–20 mm)	IV (11–15 mm)	Total
Shape					
Triangular	2	4	2	2	**10**
Subtriangular	1				**1**
Subrectangular	1	2	1		**4**
Oval	1	1			**2**
Irregular	1		1		**2**
Total:	**6**	**7**	**4**	**2**	**19**
Morphology					
Proximal Bulb	4 (2 indeter.)	5 (2 indeter.)	4	1 (1 indeter.)	**14**
Lateral Flaking	4	3	1	2	**10**
Hafting Notches	2				**2**
Blade-like Flake	1				**1**
Dorsal Surface					
Flaked	2	3	3	2	**10**
Keeled	2	1	1		**4**
Dorsal Cortex		1			**1**
Accessories					
Distal Spur (1)	2	1	2		**5**
Distal Spur (2)		1			**1**
Proximal Burination		2			**2**
Use Wear					
Stepflaking	5	7	4 (light)	2 (light)	**18**
Rounded & Polished	1				**1**

Table 6. Site 44PY7, attribute summary of intact endscrapers (n=19).

	Number	% of Total	Number w/ Spurs	Number w/ Hafting Notch
Distal Frags:	15	32.6%	5	
Basal Frags:	4	8.7%		3
Other:	7	17.4%		
Total:	**27**	**58.7%**	**5**	**3**

Table 7. Site 44PY7, summary of endscraper fragments (n=27).

flakes and blanks that show little standardization in manufacture. Many are quite small—perhaps indicative of a high degree of curation since large masses of cryptocrystalline lithics are rare on the site. It may be significant that a higher percentage of sidescrapers (33.3% vs. 10.9%) are made from coarser lithics such as quartz and quartzite than their smaller endscraper counterparts. Based on the numbers, size, and range of types recovered thus far, it appears that sidescrapers played a less prominent role through time at 44PY7 than they did at 44PY152.

Examples resembling classic Paleoindian types include the jasper specimen depicted in Figure 32a, which is one of a few tools recovered at Leesville that appear to be made on true blades. This specimen is a double edged concave-convex sidescraper with apparent use of the narrow end opposite the bulb of percussion. Use wear on the lateral edges is moderate step scarring with some undercutting, while the utilized end displays heavy rounding and polish. A double arris on the dorsal face indicates blade removals from a previous stage of core reduction.

Another concave-convex jasper sidescraper is depicted in Figure 32e. This specimen, however, is of the double alternate type, where both lateral scraper edges are employed in the same direction. This is effected by unifacially flaking each edge on opposite faces. The user had only to rotate the tool 180° on the longitudinal axis to bring the opposite side into play. There also appears to be some endscraper-like use indicated on the ends of the tool. Here again, the distal bits are on opposite faces, and to change edges, the tool had to be rotated 180° on the transverse axis. This strategy of rotation to bring into play an alternate working edge is evident on several tools from both 44PY7 and 44PY152 and includes, in addition to longitudinal and transverse axis rotation, rotation on the perpendicular axis. Such a strategy may have had the highest curatorial value in extracting maximum efficiency from a limited supply of high-quality material for tool blanks. Use wear on this specimen is indicated on the lateral edges by step fracturing and heavy undercutting, especially on the concave edge.

One of two "ear-shaped" sidescrapers recovered at 44PY7 is depicted in Figure 32h. The main working edge of this specimen is opposite the massive striking platform and bulb of percussion, which served as backing for the application of the tool. Heavy grinding was employed in this area to smooth the backing edges.

Two highly formalized sidescrapers of an unfamiliar type were recovered. Both are manufactured on a thick, ridged, hump-backed flake that tapers on one end to a narrow relatively thick bit, resembling a more massive version of the western chisel graver. Both tools are well made, one of a fine-grained quartzite/chalcedony and the other of chert. The chert specimen displays well-controlled retouch on both lateral edges, while the other specimen has fine retouch on only one edge. Both tools appear to display edge battering on part of their periphery, suggesting possible wedge application during their use history. This tool is one of several different distinctive forms found at Leesville Lake that do not appear to be well documented in the East but may be formal types with diagnostic value.

Gravers

The unusually large number of gravers (n=36) recorded for the site reflects the lumping together of graver spurs, small perforators, and flaked gravers into this category as well as a degree of uncertainty about a relative large number of specimens recorded as "possible" (52.8%, n=19). Several fine specimens were recovered, however, including two multiple gravers depicted in Figure 33m and n. Specimen "n" is manufactured on a small flake of high-quality Knox flint and displays very fine retouch with needle-sharp bits. A small notch has been placed on the periphery by striking a flake from the ventral face, with small step fractures revealing use or shear retouch in its interior.

The specimen in Figure 33m is an example of the "coronet" type of multiple graver often found on large Eastern fluted point sites. It was made on a flake of silicified slate by snapping off semi-circular indentations around its periphery, with no further retouch. Gramly (1982:40–41) has documented this manufacturing technique for gravers and other cutting tools in the Northeast. Several additional snap tools and snap accessories on other tools (usually to isolate a bit) have been recovered on 44PY7 and 44PY152.

Another notable single graver appears to have been worked on a large, prismatic block of translucent chalcedony. This crystal-like mass was heavily water-rolled prior to working and may have been obtained from river gravels adjacent to the site. After preparing a platform by removing the intersection of two facets, a delicately worked bit has been flaked against the intersection of two adjacent facets.

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Figure 32 (facing page). Unifaces from 44PY152 and 44PY7 surface collection (a–b, e–h - sidescrapers; c–d - limaces; i - raclette; j - drill; k - burin; l–n - microliths; o–p - bladelets; q - multi-use tool on microblade; r - exhausted microflake/blade core; s - concave/convex sidescraper; t - spokeshave; u - pièce ésquillée).

Drills and Awls

Drills recovered at 44PY7 are typically distinguished by casual unifacial execution on thick flakes with extended, heavy bits. Use wear on the tip is usually indicated by heavy polish and rounding. One exception is a bifacially executed microlithic twist drill of quartz crystal. Another remarkable, intact bifacial specimen is T-shaped with a very long narrow bit (length = 98 mm). It is superbly crafted of silicified slate. Little or no use wear is evident. Similar drills have been reported from the Hardaway Site (Coe 1964:72–73) and the St. Albans Site (Broyles 1971:31–32), where they are associated with the Kirk occupations.

Awls from 44PY7 are distinguished from drills by delicately flaked, very sharp, extended bits. Flaking is usually unifacial, but occasionally a specimen is worked on both faces. There is little standardization of form. Execution is often unobtrusive but expertly applied to take advantage of a fortuitous flake, as with the specimen in Figure 33r.

Utilized and Retouched Flakes

Utilized flakes, comprising 46.9% of the assemblage, are the most numerous tool category and appear to have played a very prominent role on the site. In addition to flakes displaying use wear, this category also includes retouched flakes, which encompass a wide range of forms and functions, many of which may be very task-specific. Tool forms include a variety of flake knives and edge-trimmed flakes, some accessorized with notches and beaks. Somewhat more formalized types include the angled, pointed specimen depicted in Figure 33v, which resembles the lancet or Mungai Knife. The specimen in Figure 33s is a strangulated blade with a complex array of graver bits.

Included among the utilized flakes at 44PY7 is a sizable microlithic industry with, in addition to microflakes, bladelets and microblade-like flakes (n=25) employed in a variety of ways. These specimens display use wear and/or shear retouch on their lateral margins or distal portions. Most microliths are made of high-quality lithics, with quartz crystal well represented. Similar industries have been noted at Ice House Bottom (Chapman 1977) associated with Early Archaic occupations and at the Brand Site (Goodyear 1974) associated with a Dalton occupation. Figure 32m–p illustrates several of these specimens.

Debitage

Debitage comprises 82.5% of the total cultural material recovered at 44PY7. The tool to debitage ratio is 1:4.7. While much lower than 44PY152, this ratio is still quite high and may be a reliable measure of the degree of lithic conservation practiced on both sites. It appears that high-quality lithic material was in low supply and carefully curated. At this stage of the study, debitage from 44PY7 and 44PY152 has not been extensively analyzed. Comparison of the two assemblages in this category remains limited until further work is done.

Table 8 compares debitage to utilized flakes with respect to the percentage of each lithic material type. Comparison of these categories may give some insight into the desirability or selectability of certain lithics. Discounting lithic types that comprise less than 1.5% of the utilized flake category (quartz, quartzite, chalcedony/quartzite, and Ridge and Valley rhyolite), it is not surprising that high-quality materials such as Knox flint (5.2% vs. 13.2%), jasper (4.4% vs. 8.0%) and chalcedony (5.0% vs. 11.8%) comprise significantly higher percentages of utilized flakes. Quartz crystal, while less tractable to work, rates near the top for use selection (4.8% vs. 11.8%). Chert's selectability is fairly consistent with its proportion of debitage. Perhaps the most surprising result of this comparison is the low selectability of silicified slate (20.6% vs. 4.7%).

Remarks

The general absence or at least non-recognition of hammerstones, anvils, or abraders suggests that tool manufacturing—especially primary reduction—was not a significant activity at 44PY7, or at least on the part of the site that has been exposed (although judging by much of the debitage, tool maintenance was practiced). Due to extensive later occupation of the site, formal tools at 44PY152 not diagnostic of early components

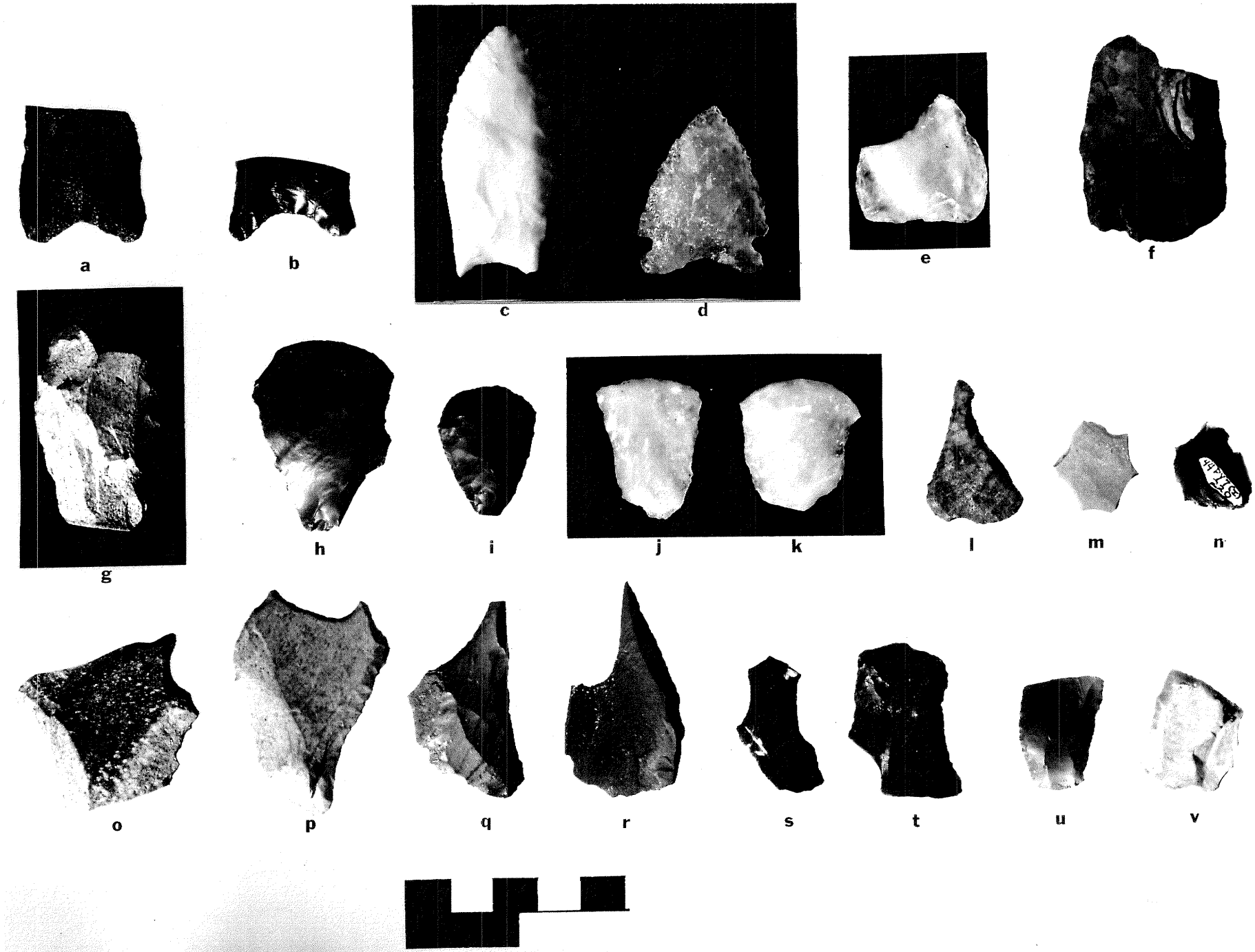
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Figure 33 (facing page). Projectile points and unifacial tools from 44PY152 and 44PY7 surface collection (a–d - projectile points; e–f - preforms; g–k - endscrapers; l - flared bit chisel graver; m–n - multiple gravers; o - graver; p - double graver; q–r - awls; s–t - strangulated flake/blades; u - microlithic sidescraper; v - lancet).

and made from coarser lithics such as quartz and quartzite may not have been noted from 44PY7 because they could not be confidently separated from tools of later periods. Certain categories of such tools, however, found in some numbers at 44PY152 do not appear to occur at 44PY7. Only one example was recorded in the large rough biface category. This specimen is the base of what must have been a very large, surprisingly thin biface (width = 54.3 mm, thickness = 12.0 mm). Large core scraper/planes are also conspicuously absent.

For the same reason as above, quartz and quartzite debitage may have been underrepresented in the collection; however, the frequency of its occurrence compared to its appearance in the tool category is similar to that at 44PY152—especially in the case of quartz, which occurs slightly less than one-third as often as debitage than it occurs as tools at both sites (27.5% vs. 30.0% at 44PY152).

Site 44PY152: Assemblage Description

At 44PY152, artifacts occur somewhat irregularly along a beach line of over 150 m in length. This feature is a narrow, deeply eroded levee remnant marked by a cobble base for most of its length and covers an area of about 2,000 m^2. Occupation loci seem much more widely spaced than at 44PY7, and recovered artifact density is much lower.

Projectile Points

Forty projectile points—10.5% of the tool assemblage—have been recovered at 44PY152. This includes virtually the entire population of points recorded at or adjacent to the site. The latest types represented are Stanly Stemmed and two examples of another unclassified stemmed type. A very small number ($n<10$) of later types including Morrow Mountain, Guilford, and Woodland triangles have been recovered adjacent to the site, both upstream and down, on the large redeposited sand bank in the inlet at the foot of the levee. It appears that, unlike 44PY7, the cultural deposits at 44PY152 are almost exclusively of Paleoindian-Early Archaic age.

Paleoindian. Early Paleoindian projectile points ($n=4$) comprise 10% of all points from 44PY152. They are evenly divided between fluted and unfluted (or weakly fluted) lanceolates. Table 9 provides metric data on these points, including the single specimen from 44PY7. Only two intact specimens are included in this rather small population; therefore, metric comparison is somewhat limited. Table 10 provides comparative data on the intact examples from 44PY152 and also compares all four specimens based on the average of the estimated range of dimensions for the two broken specimens listed in Table 9. Given the variation in length due to resharpening over the use life of a Paleoindian projectile, such an approach may be accurate enough to provide useful comparative information.

The considerable stylistic and manufacturing variation in the four specimens suggests corresponding temporal differences between the types. Specimen No. 1 (see Figure 33c) resembles many fluted points found in Virginia with its slight basal constriction. It is well made with sharp, very delicately flaked barbs. The lithic material is lustrous ivory-white flint with barely perceptible striations. This point is further described elsewhere (Johnson and Pearsall 1991:162).

Specimen No. 2 (see Figure 33b) consists of only a small part of the base and ears, although it appears to have been a very well made point. Unlike Specimen No. 1, it has prominent ears with a deep basal concavity. The base may have been the widest part of the point. This specimen is also described in Johnson and Pearsall (1993:47). The lithic material is a very high quality dark gray/brown flint. The quality of material of Specimens No. 1, 2, and 4 surpasses other materials found at the site, suggesting that they may have been heat-treated to improve their flaking properties. Specimen No. 2 displays a small potlid fracture on one of its ears, indicating that it was exposed to heat, although probably after or near completion.

Specimen No. 3. (see Figure 33a) is a considerably larger basal portion. It is made from a granular rhyolitic material that must have been difficult to work. It is plano-convex in cross-section and displays an almost unifacial effect. Weakly defined flutes have

Table 8. Site 44PY7, percentage comparison of lithics selected for utilized flakes vs. debitage.

	Qtz.	Qtzt.	CQzt.	Cryst.	Chert	Knox	OFlint	Jasp.	SSlt.	Rhy.	Chalc.	Uncl.	Total
Debitage: (N=2153)	1.4%	1.1%	4.8%	4.8%	36.1%	5.2%	15.8%	4.4%	20.6%	0.3%	5.0%	0.4%	99.7%
Utilized Flakes: (N=212)	0.9%	0.0%	1.4%	11.8%	30.2%	13.2%	16.5%	8.0%	4.7%	1.4%	11.8%	0.0%	99.9%
Variations ±:	−0.5	−1.1	−3.4	+7.0	−5.9	+8.0	+0.7	+3.6	−15.9	+1.1	+6.8	−0.4	
Percent Variation ±:	−35.7%		−70.9%	+145.8%	−16.3%	+153.8%	+4.4%	+81.8%	−338.3%	+336.7%	+136.0%		

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

Table 9. Sites 44PY152 and 44PY7, metric data on Paleoindian projectile points.

Specimen	VFP# (mm)	Length (mm)	Width (mm)	Thickness (mm)	Width:Thickness Ratio	Flute Length (mm)		Grinding	Material	Basal Concavity Depth (mm)
						Face 1	*Face 2*			
44PY152										
1.	#890	56	28	7	4.0:1	17	16	Yes	White Flint	3
2.	#897	20 br.**	27 br.	5.5 br.		12.5	12.5	Light	Gray/Brown Flint	5
	Estimated:	(50<70)	(27–29)	(5.5–8.0)	(5.3–3.4:1)					
3.		31 br.	30 br.	6.5 br.		10	17	Light	Black Rhyolite	4
	Estimated:	(52<70)	(30–31)	(6.5)	(4.8–4.6:1)					
4.		39	26.5	4.25	6.2:1	Thinning	7.5	No	Brown Jasper	2
44PY7										
1.	#931*	12 br.	20 br.	5.0 br.		12 br.	6	Heavy	Gray Chert	1.5

* Projected Virginia Fluted Point Number

** br. = measurement of a broken portion of specimen

Intact Specimens (N=2)	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	56	39	47.5
Width:	28	26.5	27.25
Thickness:	7	4.25	6.1
Width:Thickness Ratio	6.2:1	4.0:1	5.1:1

All Specimens (N=4)	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	61 *	39	54 *
Width:	30.5 *	26.5	28.3 *
Thickness:	7	4.25	6.1 *
Width:Thickness Ratio	6.2:1	3.9:1 *	4.8:1 *

* Based on estimates for broken specimens

Table 10. Site 44PY152, metric comparison of Paleoindian projectile points.

been removed from both faces, although basal end thinning may be a more appropriate term. The flute on the reverse, plano face has been truncated by subsequent shallow removals from the right side. A large potlid fracture on the right edge of the obverse face has somewhat constricted the point's outline, making it appear more triangular than it originally was. This point may be unfinished, although it displays intermittent edge retouch and light basal grinding.

Specimen No. 4 is an intact point of high-quality brown jasper. It is made on a very thin flake, with the reverse side displaying a portion of the original flake surface. The cross-section is plano-convex, suggesting a blade-like blank. Basal finish consists of a series of fine, parallel thinning flakes on the obverse face and an interline-like removal of two guide flakes followed by a short central, flute-like flake with a feathered termination on the reverse face. A termination scar resembling a reverse hinge fracture remnant is discernible on the base, suggesting that the blank was once longer and may have fractured during an earlier basal thinning attempt. If so, the blank must have been very thin to start with, and this initial failure may have induced caution in later fluting attempts. Indeed, the specimen is so thin that further fluting would have been unnecessary if it were being produced for a standard haft. Regardless of whether the point is reworked from a larger preform or is made on the original blank, the condition of the base makes it obvious that the knapper was being very careful to retain as much length as possible on a marginal blank. The specimen is well made; however, it lacks basal grinding.

Transition Paleoindian. This period is represented by four specimens (10%), two of which are not intact enough for certain identification.

A Dalton presence at 44PY152 is suggested by two ambiguous specimens. One consists of an ear made of silicified slate, found embedded within an exposed, former deeply buried stratum. The other specimen appears to have been badly broken and reworked into another tool, possibly a graver. It is made of a high-quality Knox flint. Elsewhere in the complex of sites on upper Leesville Lake, a Hardaway Dalton has been recovered from a similar landform about 1 km downstream from 44PY152.

Two Hardaway Side-Notched projectile points have been recovered from 44PY152. One vein quartz specimen consists of a basal corner including an ear and a small portion of the blade. The other specimen (see Figure 33d) is intact and made of quartz crystal.

Early Archaic. Corner-notched points of the Kirk/Palmer series comprise the entire Early Archaic collection from 44PY152. The two types combined are 52.2% (n=21) of the total projectile points recovered. Unlike their counterparts at 44PY7, most of the points in the corner-notched collection are relatively intact, and metric comparisons can be made. Table 11 provides a comparison of Palmer points.

As at 44PY7, the overwhelming majority of Palmers (90.9%) are made of crystalline lithics, while 80.0% of Kirks are made of cryptocrystallines. Only one Palmer basal haft fragment has been recovered at 44PY152; 72.7% of Palmers are essentially intact. A majority (60.0%) of Kirks at 44PY152 are intact (Table 12). The disparity of intact point percentages between the two sites may have interpretative significance. Nearly all Kirk/Palmers at 44PY152 are small and appear reworked, however.

The Stanly occupation marks the onset of the Middle Archaic period and is represented by four specimens of silicified slate. Two of these were recovered just across the inlet from the downstream end of 44PY152. One of the specimens found on the site was recovered embedded in the profile nearly 1 m above the Early Archaic-Paleoindian zone.

The unifacial point cited in Table 3 is included in the point category, although its use is uncertain. It is made on a leaf-shaped flake of translucent, fine-grained chalcedony/quartzite and displays broad flaking over its entire dorsal face with little or no edge retouch. The base is essentially unworked except for a single removal from the obverse face to reduce the thickness of the original striking platform and heavy grinding extending a considerable distance up the sides. The tip has sustained what at first glance appears to be damage, but closer examination suggests that it has been deliberately modified with small snap removals on each side and a small flake steeply driven from the tip. The resulting bit is somewhat chisel- or burin-like and displays use wear. This specimen may have been hafted or could have been hand-held, with the ground, blunt base serving as backing.

Preforms and Bifacial Knives

Nine preforms have been recovered at 44PY152 including five possible specimens. All appear to have been broken during manufacture and are missing their distal portions, although at least two appear to have been subsequently put to another use. Tables 13 and 14 summarize this group. Six specimens (66.7%) are made of vein quartz. Two others are of jasper (22.3%), and one specimen is of a heavily weathered material resembling argillite. Several were recovered on very low levels of the site, including two near the original river channel.

Preform No. 2 is made of brown jasper and is typical of middle stage preforms from the Thunderbird Site and other Eastern fluted point sites. It was recovered *in situ,* embedded in the clay matrix adjacent to the river channel. It was apparently broken during lateral thinning after a series of attempts failed to remove a step fracture hump on one face. The basal area displays intermittent heavy grinding probably indicative of platform preparation. Another jasper specimen, Preform No. 1, appears to have failed due to internal flaws in the material that made further reduction impossible.

Vein quartz Preform No. 3 displays one apparently successful fluting attempt with platform preparation for fluting the reverse face. The thinness of the preform may have made it more susceptible to perverse fracture while attempting the second flute. One interesting feature of this specimen is its very acute edge, which displays smoothing and polish, especially along one lateral margin. It is possible that the specimen was

	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	40.0	26.25	32.53 *
Width:	26.0	15.75	19.25
Thickness:	8.5	5.0	6.13

* Estimate based on extending line of 3 broken tips.

Table 11. Site 44PY152, metric comparison of Palmer Corner-Notched points (n=8).

	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	44.5	25.25	31.92 *
Width:	27.5	19.0	21.75
Thickness:	7.0	4.75	5.96

* Estimate based on extending line of broken tip on 1 specimen.

Table 12. Site 44PY152, metric comparison of Kirk Corner-Notched points (n=6).

Specimen No.	Stage	Lithic Material	Length (mm)	Width (mm)	Thickness (mm)	W:T Ratio	Cause of Failure
Preforms							
1.	4	Jasper	47.5 br. *	34.7	11.0	3.2:1	M.F. **
2.	4	Jasper	49.9 br.	36.6	12.7	2.9:1	S.F., H.
3.	5	Vein Quartz	39.7 br.	33.4	6.3	5.3:1	P.F.
4.	4	Vein & Crystal Quartz	29.3 br.	30.0	7.4	4.1:1	P.F.-F., S.F.
Possible Preforms							
1.	4	Vein Quartz	55.0 br.	34.0	8.0	4.0:1	P.F.
2.	6	Poss. Argillite	29.0 br.	32.8	7.0	4.7:1	P.F.-F.
3.	4	Vein Quartz	34.0 br.	30.3	7.5	4.0:1	M.F.
4.	5	Vein Quartz	31.6	31.0	7.0	4.4:1	Br.-Rew.
5.	3	Vein Quartz	32.0 br.	27.0	11.9	2.3:1	M.F., S.F.

** Abbreviations for causes of failure: M.F. = Material Flaw; S.F. = Step Fracture; H. = Hump; P.F. = Perverse Fracture; P.F.-F. = Perverse Fracture in Fluting or End Thinning; Br.-Rew = Broken and Reworked

* br. = measurement of a broken portion of specimen

Table 13. Site 44PY152, metric summary of preforms and possible preforms (n=9).

	Maximum	Minimum	Mean
Preforms			
Length (mm)	49.9 br. *	29.3 br.	41.9 br.
Width (mm)	36.6	30.0	33.7
Thickness (mm)	12.7	6.3	9.4
W:T Ratio	5.3:1	2.9:1	3.6:1
Possible Preforms			
Length (mm)	55.0 br.	29.0 br.	38.8 br.
Width (mm)	36.6	27.0	32.9
Thickness (mm)	12.7	6.3	8.8
W:T Ratio	5.3:1	2.3:1	3.7:1

* br. = measurement of a broken portion of specimen

Table 14. Site 44PY152, metric comparison of preforms and possible preforms.

considered too thin for further reduction and was employed as a knife on soft materials such as meat prior to fracture. Preform No. 4 appears to have failed during a fluting attempt. Most of its basal area is heavily abraded.

Possible Preform No. 1 is also of high-quality vein quartz and very thin, with a flattened cross section. A small, thick unreducible mass toward the distal end seems to have contributed to its fracture and apparent conversion to use as a scraper.

With one exception, bifacial knives at 44PY152 are fragmentary (n=12). The intact specimen is a narrow lanceolate made of rhyolite, which has been indented along the upper half of the blade by resharpening. This may be indicative of ultimate conversion to a drill. Eight (66.7%) of the bifacial knives are made of locally available crystalline materials, while three (25%) are made of silicified slate.

Endscrapers

Endscrapers are somewhat less prominent in the assemblage than at 44PY7 (8.0% vs. 10.2%). Table 15 describes the attributes of intact specimens. Only Groups I and II are included, however, as no specimens have been recovered at 44PY152 that would fit within the parameters of Groups III and IV. A larger percentage of endscrapers at 44PY152 are intact (56.3%) than are at 44PY7 (41.3%). A summary of endscraper fragments is given in Table 16.

Specimens made of cryptocrystallines are in the majority at 44PY152, although not as predominantly as at 44PY7 (56.3% vs. 89.1%). Several fine snubnosed specimens are made of vein quartz, including two with double proximal bits (see Figure 33k).

Other notable specimens include a discoidal type made on a large, thin flake of brown jasper. This specimen is similar to ones reported from the Hardaway Site (Coe 1964:78). Another chert specimen of note displays the remnant of a large bit on its proximal end. This apparent bifacially flaked accessory is suggestive of "socketed" endscrapers reported from south-central Indiana (Smith and Toth 1990:77–79).

Also included is a double alternate endscraper that replicates its proximal bit by rotation on the transverse axis. Alternate face flaking is also present on the lateral edges, producing a secondary double alternate sidescraper that can be rotated longitudinally for a same-side working edge or rotated transversely for an opposite-side working edge.

Sidescrapers

Other than utilized flakes, sidescrapers are the most numerous tool class at 44PY152 (11.1%, n=43). Intact curated specimens make up 58.1% of the total. Tables 17–19 provide a metric, lithic, and morphological summary of curated specimens. These specimens include more classic Paleoindian types than are present at 44PY7, and they are generally more robust. Eighty percent of the curated specimens are made of cryptocrystalline lithics as opposed to 58.1% of all sidescrapers. Nonetheless, a higher proportion of all sidescrapers at 44PY7 are made of cryptocrystallines than at 44PY152 (66.7% vs. 58.1%). This may be due to the presence at 44PY152 of a heavy tool industry utilizing local crystalline lithics. High-quality Knox flint dominates the assemblage of curated forms (40.0%).

Paleoindian-like types include classic specimens on blades or blade like flakes, "D-" or "ear-" shaped forms, convergent, and other distinctive types. One noteworthy form is represented by two Knox flint specimens made on large, relatively flat flakes that appear to display considerable core preparation. This form at least superficially resembles Old World specimens produced by Levalloisian techniques. Other researchers have noted a Levalloisian aspect to early Paleoindian industries (Frison and Bradley 1980:24; Dragoo 1973; Judge 1973:89, 166). As Judge (1973:166) has carefully pointed out, this implies no direct connection between these Old and New World industries other than describing an early, sophisticated lithic reduction technique common to both. The relative large size of these specimens is atypical of tools made from local high-quality lithics, and perhaps more significant is their lack of cortex. A sizable percentage of large curated sidescrapers made of cryptocrystallines display cortex (53.4%) presumably because it was difficult to reduce tools in this size range from the available lithic material without retaining a cortical surface. One of the Levalloisian specimens is by far the most massive cryptocrystalline tool in the entire assemblage. Assuming that regionally available lithic material of this quality is limited in size, this specimen appears to have been very carefully and skillfully extracted from its parent material, eliminating all traces of cortex. Furthermore, it appears that both

Group:	I (>30 mm)	II (20–30 mm)	Total
Shape			
Triangular	2	2	**4**
Subtriangular	3	3	**6**
Subrectangular	1	3	**4**
Oval	2		**2**
Discoidal	1		**1**
Irregular	1		**1**
Total:	**10**	**8**	**18**
Morphology			
Proximal Bulb	3 (6 indeter.)	4 (2 indeter.)	**7**
Distal Bulb		1	**1**
Lateral Bulb	1	1	**2**
Lateral Flaking	8 (2 on 1 side)	6 (1 on 1 side)	**14**
Hafting Notches	0	0	**0**
On Thin Flake	1	2	**3**
Double Alt. Bit	1		**1**
Dorsal Surface			
Flaked	2	3	**5**
Keeled	2	1	**2**
Blade-like Flake	0	0	**0**
Dorsal Cortex	2	0	**2**
Accessories			
Distal Spur (1)	2	3	**5**
Distal Spur (2)	0	2	**2**
Proximal Spur	1	0	**2**
Proximal Drill	1 possible (broken)	0	**1 possible**
Use Wear			
Stepflaking	7 (2 indeter.)	7 (1 indeter.)	**14**
Rounded & Polished	1		**1**

Table 15. Site 44PY152, attribute summary of intact endscrapers (n=18).

	Number	% of Total	Number w/ Spurs	Number w/ Hafting Notch
Distal Frags:	5	15.6%	3	
Proximal Frags:	4	12.5%		1
Indeterminate:	5	15.6%		
Total:	**14**	**43.7%**	**3**	**1**

Table 16. Site 44PY7, summary of endscraper fragments (n=27).

Type	Length (mm)	Width (mm)	Thickness (mm)
I. On Blade-like Flake (n=5)			
Maximum	65.5	30.75	8.75
Minimum	38.0 (snpd)	20.5	6.0
Mean	52.65 *	24.65	7.3
II. "D" or "Ear" Shaped (n=2)			
Maximum	55.5	42.0	10.0
Minimum	49.5	31.0	9.0
Mean	52.5	36.5	9.5
III. Convergent (n=1)			
	65.0	46.5	10.5
IV. On Levalloisian Flake (n=2)			
Maximum	58.0 (snpd)	66.5	10.75
Minimum	38.5 (snpd)	41.25	7.25
Mean	48.3	53.88	9.0
V. Pointed (n=1)			
	62.25	28.75	7.5
VI. Hendrix-like (n=1)			
	77.0	36.5	10.25
VII. Rectangular (n=2)			
Maximum	61.5	38.25	10.5
Minimum	54.25	38.0	10.0
Mean	57.88 br. **	38.13	10.25
VIII. On Large Irregular Flake or Block (n=3)			
Maximum	62.0	48.0	18.0
Minimum	40.75	30.75	7.0
Mean	49.75	39.58	12.25
IX. Other (n=2)			
Maximum	52.0	31.0	10.0
Minimum	51.0	25.0	7.75
Mean	51.5	28.0	8.88
X. On Small Irregular Flake (n=6)			
Maximum	36.75	27.5	7.5
Minimum	27.0	15.25	4.25
Mean	32.25	20.71	5.92

** br. = measurement of a broken portion of specimen

Table 17. Site 44PY152, metric summaries of curated sidescraper types (n=25).

	Length (mm)	Width (mm)	Thickness (mm)
Maximum	77.0	66.5	18.0
Minimum	38.0 (snpd)	20.5	6.0
Mean	54.32	35.08	9.77

Table 18. Site 44PY152, metric summary of curated sidescrapers, Types I–IX (n=19).

	Type										
	I	II	III	IV	V	VI	VII	VIII	IX	Total	%
Attribute											
No. of Working Edges											
Single	1	1						2	1	5	26.3
Double	4	1	1	2	1	1	2	1	1	14	73.7
										19	100.0
Double Alt.		1								1	5.3
Endscraper Bit	2									2	10.5
Edge Outline											
Convex or Straight	2	2	1	2	1	1	2	2	1	14	73.7
Concave									1	1	5.3
Concave/Convex	3							1		4	21.1
										19	100.0
Accessories											
Burinated									1	1	5.1
Graver	2	1								3	15.8
Beaked	2	1				1		2		6	31.6
Snap or Bend-Break Bit(s)	1								2	3	15.8
Other Attributes											
Backed	1									1	5.3
Cortex	2	2	1				1		2	8	42.1
Lithic Material Types											
Quartz						1				1	5.3
Quartzite							1			1	5.3
Chalcedony/ Quartzite					1		1			2	10.5
Chert	2							2	1	5	26.3
Knox Flint	2	1	1	1				1		7	36.8
Other Flint	1									1	5.3
Silicified Slate									1	1	5.3
Rhyolite		1								1	5.3
										19	100.0

Table 19. Site 44PY152, morphic and lithic summary of large curated sidescrapers (n=19).

specimens were once somewhat larger. They have both been medially snapped—apparently intentionally. The resulting sharp corners of the fracture plane display use wear and, in the case of the larger specimen, subsequent retouch on the ventral face to reshape one corner bit. Similar "bend break" tools have been described by Frison and Bradley (1980:91–97) for the High Plains and also for southwestern Ontario by Deller and Ellis (1992:69–70).

Another specimen is identifiable as a "Hendrix"-like type. This sidescraper bears a remarkable resemblance to specimens from Florida illustrated by Purdy (1981:18–19). In addition, it duplicates the heavy use wear on the distal end reported for many of the Florida specimens.

Gravers and Burins

Gravers at 44PY152 are a smaller component of the assemblage than at 44PY7 (5.5% vs. 8.0%); however, as a group they are more robust and carefully made. The majority of specimens are made by isolating a fortuitous spur by retouch (n=16). True gravers represent 27.3% of the total (n=6) and are made by continuous unifacial retouch, which generally extends around the margin of the flake. In some cases, the flake is distinctively shaped in the process (see Figure 33p), suggesting a specialized concomitant function. At least one jasper specimen worked in tandem with a small sidescraper. A sizable majority of gravers at 44PY152 are made of cryptocrystallines (68.2%, n=15). Of the remainder, six are made of crystal quartz (27.3% of all gravers). As at 44PY7, a substantial number of specimens are listed in the "possible" category of gravers (31.8%, n=7).

Burins are a problematic tool in Paleoindian assemblages; however, a number of the relatively simple dihedral type are present and display moderate to heavy use wear. Some burins are present as accessories on other tools such as sidescrapers and endscrapers, while others are manifested as primary tools. The yellow jasper specimen in Figure 32k is one such example that has been made by truncating the more massive end of a thick prismatic flake. Similar types have been documented at early sites elsewhere in the Roanoke basin by Miller (1962). Seven specimens (four of which are possibles) have been recorded from 44PY152 compared to six specimens (three possibles) from 44PY7. This is not a very large presence at either site, although similar functions appear to have been performed by other tools such as bend break accessories on sidescrapers.

Drills and Awls

Three drills and five awls have been recovered at 44PY152, a combined 2.0% of the total assemblage. Most specimens have been made of high-quality lithics (87.5%) and are usually unifacial (see Figure 32j). Two exceptions are a broken, slightly winged bifacial drill of Knox flint and a small drill of light gray flint, which has been fashioned by delicate pressure flaking on alternate faces of the flake. A classic Paleoindian awl of yellow-brown jasper is depicted in Figure 33q.

Limaces

The presence of limaces provided the first diagnostic indication of a Paleoindian component at 44PY152 (Childress 1989). Six have been recovered (including one possible specimen). In contrast, they have not been recorded for 44PY7. They vary widely in size and, to a lesser degree, in morphology and use wear. The basic attributes that all share is that they are elongated, bipointed forms that have been retouched and apparently used around their entire perimeter, and are functionally unifacial. It appears that limaces were all-purpose cutting and scraping implements. Tables 20–23 provide a summary and metric comparison of the specimens.

Two gray chert specimens are of the double alternate on-the-perpendicular-axis type (Nos. 1 and 2) (see Figure 32c–d). A characteristic of this type is asymmetry of edge angle and use on opposing lateral edges. The right lateral edge angle as the tool is pointed away is acute (29°–39°) and displays cutting use. The left lateral edge angle is steep (51°–77°) and displays scraping use wear. These use indications are consistent with previous interpretive studies of use wear associated with the angle of a working edge (Marshall 1985:191–195). In practical terms, this meant that the tool was rotated 180° on the same plane to duplicate its working configuration, with the proximal bit substituted for the distal bit. Continued resharpening and use tended to exaggerate the asymmetry of this configuration, producing the "S" shape displayed by exhausted Specimen No. 2. This specimen also shows the heaviest use wear of the group and possibly the entire assemblage. The left lateral edge, particularly on the distal half, displays heavy step fracturing and undercutting, while the right lateral edge on both

Specimen No.	Lithic Material	Length (mm)	Width (mm)	Thickness (mm)	Morphology	Dorsal Surface
1.	Chert	128.2	31.0	11.1	Double alternate-perpendicular axis	Flaked
2.	Chert	83.1.	21.0	8.9	Double alternate-perpendicular axis	Cortex
3.	Variegated Brown Jasper	39.7	21.1	8.4	Bulb bifacially flaked into bit	Flaked
4.	Knox Flint	39.8	18.7	6.6	Ends bifacially worked	Arris
5.	Vein Quartz	56.7	30.4	15.9	Double alternate-tranverse axis	Flaked
6.	Vein Quartz	62.7 br. *	25.3 br.	12.9 br.	Normal	Flaked

* br. = measurement of a broken portion of specimen

Table 20. Site 44PY152, summary of limaces (n=6).

	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	128.1	37.9	69.1
Width:	31.0	18.7	24.4
Thickness:	15.9	6.6	10.2

Table 21. Site 44PY152, metric summary of limaces (n=5).

Specimen No.	Distal Half Left Side	Right Side	Bit	Proximal Half Left Side	Right Side	Bit
1.	65°	35°	40°	29°	56°	34°
2.	77°	30°	40°	39°	51°	56°
3	46°	59°	50°	45°	52°	41°
4.	31°	29°	14°	15°	27°	17°
5.	52°	32°	50°	40°	46°	55°
6.	51°	41°	34°	Indeter.	Indeter.	Indeter.

Table 22. Site 44PY152, working edge angle measurements for limaces (n=6).

	Distal Half (n=6) Left Side	Right Side	Bit	Proximal Half (n=5) Left Side	Right Side	Bit
Maximum:	77°	59°	50°	45°	56°	56°
Minimum:	31°	29°	14°	15°	27°	17°
Mean:	53.7°	37.7°	38.0°	33.6°	46.4°	40.6°

Table 23. Site 44PY152, summary of edge angle measurements of limaces.

halves is heavily rounded and polished, with polish extending over the ventral surface. The latter attrition appears consistent with cutting of soft materials. Semenov (1964:101-106) describes hypothesized meat-cutting knives from Kostenki I with very similar use wear. Furthermore, the beveled left margins of the Leesville specimen would have provided sturdy backing for heavy application. The Kostenki I specimens also display backing retouch. Specimen No. 1 shows similar use wear although not nearly so pronounced.

It is interesting to note that, while the other limaces do not obviously display this asymmetric pattern, when their edge angles are compared in Table 23, the applied left side edge angle is consistently greater than the right side edge angle (with the exception of Specimen No. 3). (Note that Table 23 displays values for the tool oriented in one direction.) This pattern is clearly indicated in the mean statistics for the group. It appears that most of these tools were routinely rotated in use. Such an asymmetry may also be indicative of use and resharpening consistent with right-handed employment of the tool.

Specimen No. 5 is double alternate on the transverse axis, which means it was rotated 180° to employ an alternate proximal end with the ventral face up. Technically, the tool is bifacial, but in practical terms it is unifacial and was employed in much the same manner as the other limaces.

Specimen No. 4 is by far the thinnest of the group and displays retouch on the ventral face of each end. It is made of Knox flint.

Specimen No. 5 of variegated jasper is more rounded on the ends than the other specimens and

more closely resembles other scraper forms. It is the only example that includes an accessory, a bifacially worked bit on the bulb end. This feature displays heavy use wear.

The limace or "slug" form is well known in Paleolithic assemblages in the Old World; however, its presence in the Paleoindian tool kit has until recently been weakly documented or overlooked altogether. The Leesville Lake specimens bear little metric comparison to their apparently more specialized Northeastern counterparts, "flakeshavers," as documented at Bull Brook (Grimes and Grimes 1985). Nor is there any indication that, like the Bull Brook flakeshavers, the limaces from 44PY152 were hafted. The evidence, in fact, is to the contrary. Similar forms—often fragmentary—have turned up in assemblages from Eastern fluted point sites such as Plenge, Shoop, Williamson, Nuchols, and Quad. One reason for the rarity of their occurrence may be heavy curation, which led to their recycling into other tool forms after they had been greatly reduced in size.

Flared Bit Chisel Gravers

Another uncommon Paleoindian diagnostic present at 44PY152 is a variant of the chisel graver from western assemblages. Known by a variety of names such as flaring tip drill (McAvoy 1992:60-64) and mushroom-tipped graver (Painter and Mabe 1991), chisel graver appears to most aptly describe the function of this form. Two have been recovered at 44PY152. One jasper specimen (see Figure 33l) is delicately fashioned with fine unifacial retouch on a small triangular flake. The other specimen, somewhat more robust and elongated, is made on a blade of high-quality flint. It too is very finely flaked, especially in the area forming the bit. Both tools have been strangled, with the bits flaring and canted to one side. The lateral edges resemble spokeshaves, but the primary use wear is on the distal bit. The function of these tools is uncertain but appears highly specialized.

Flared bit chisel gravers are presently known from only a few Paleoindian sites in the Virginia Coastal Plain, including most prominently the Williamson Site. Site 44PY152 is the westernmost occurrence of this type known to the author; however, it is likely that the type occurs more widely in Paleoindian assemblages than is currently recognized.

Spokeshaves and Denticulates

Spokeshaves and denticulates are similarly minor but distinctive inclusions in the tool assemblages from 44PY152 and 44PY7. Five spokeshaves (1.3%) have been recorded from 44PY152. The same number has been reported from 44PY7 (1.1%). Additional examples have been noted as accessories on other tools. Most specimens are steeply flaked on a thick flake or block of high-quality stone (80.0% are made of cryptocrystalline lithics). The working edges of smaller intact specimens range from an arc of 64° defining a radius of 15 mm to an arc of 93° and a radius of 17.5 mm (see Figure 32t). Other specimens display much smaller arcs with larger radii.

Typical denticulates from both sites are unifacially worked on thin flakes. Examples range from broadly flaked, large-toothed specimens to finely serrated forms. A few employ snapping to create the working edge, and at least one specimen uses a combination of snapping and normal pressure flaking. Some examples are tiny microlithic tools. A majority (58.3%) are made of cryptocrystallines.

Cores

Cores are rare at both sites. In addition to a few exhausted microflake cores (two from 44PY7 [see Figure 32r] and one from 44PY152), one specimen from 44PY152 is worthy of note. It is a large rectangular core of brown jasper recovered from one of the lower levels of the site. Its dimensions are 103.3 mm in length, 66.6 mm in width, and 33.0 mm in maximum thickness. The specimen weighs 271.6 g. Broad flakes have been irregularly removed from one face and two sides, while the other face is nodular interior cortex. Considerable platform preparation is present, including heavy grinding and crushing. There is some indication that one edge was used as a scraper.

Pièces Esquillées

Pièces ésquillées bear mentioning mainly with respect to their general absence from both sites; however, a few (n=3, from both sites) have been recovered. Perhaps more are present but have not been recognized. The specimens recorded are somewhat rectangular, relatively thick flakes that display bipolar battering and edge crushing. Bipolar industries of any

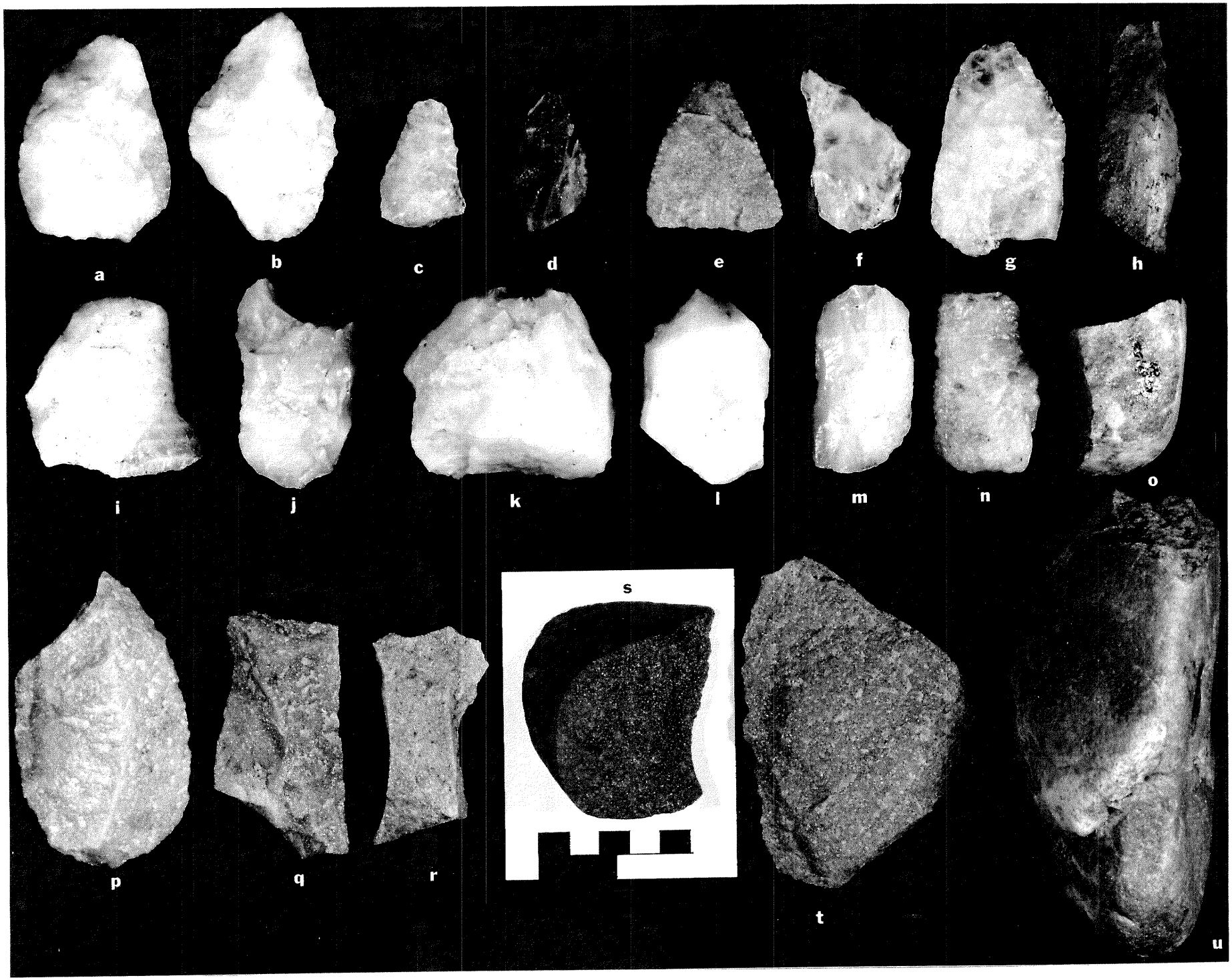
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Figure 34 (facing page). Tools of local quartz and quartzite from 44PY152 surface collection (a–c - bifaces; d - unifacial point; e - edge-trimmed, triangular, expanding flake; f–h - heavy cutters; i–j, m–n, p - sidescrapers; k–l - core scraper/planes; o - radially split cobble abrader; q–r - heavy cutters; s - wedge split cobble with bits; t - chopper; u - nosed cobble tool).

sort are generally lacking or unrecognizable at the Leesville sites.

If pièces ésquillées are tools, they may have been made primarily of local quartz, in which case they would be difficult to identify. On the other hand, some researchers believe that they are exhausted small cores—many worked from the remnants of other tools—that were used as a source for tool blanks when high-quality lithic materials were in short supply (Goodyear 1993). If this is the case, they should be present as there is every indication that the only local source of high-quality lithics is small nodular masses present in the river gravels.

Expedient Tools

Expedient tools of local lithics such as quartz and quartzite appear to have played a significant role at 44PY152 and comprise 10.5% of the total assemblage. They can be placed in three somewhat broad categories: core tools such as scraper/planes and choppers (Figure 34k–l); heavy cutters, often on elongated, heavy blade-like flakes or spalls (see Figure 34g–h); and rough bifaces (see Figure 34a–c). In addition, some non-curated tools of quartz and quartzite that fit morphologically or functionally into other categories have been placed elsewhere. Most of these tools would be difficult to distinguish in assemblages from later time periods. The fact that the early occupation at 44PY152 is a relatively pure one and that these tool types seem to predominate on the lower levels of the site supports a strong association with the Paleoindian component. This is reinforced by the recovery on the very lowest level of the site of an apparent work cluster of tools and debitage, including a biface (see Figure 34c), that were embedded in the clay matrix adjacent to the original river channel.

Bifaces in this category are typically large, thick, and of average-quality material. There are only three intact specimens; however, judging by their form, outlines are either roughly leaf-shaped with rounded or squared-off bases (see Figure 34a) or they are somewhat lenticular or diamond-like in shape (see Figure 34b). Tables 24 and 25 summarize the more intact specimens in this category.

Most examples were made by rough percussion flaking, though one relatively small fragmentary specimen displays finer retouch for a denticulated effect (see Figure 34c). The mean dimensions for the intact specimens are somewhat diminished by the smallest specimen in the assemblage. Looked at as a group, these are quite large tools.

Core scraper/planes (n=24) take on a variety of forms, ranging from hoof-shaped types to blocky rectangular or tabular shapes. Heavy bit-like projections or beaks created by the removal of large intersecting flakes are common accessories that are usually located on one end of the specimen, apparently for distal application (Figure 34l). Large spokeshave-like concavities are also present on a number of specimens. Use wear is difficult to detect on these specimens due to the quartzitic material of which they are made.

The overall variety of expedient tools defies description, and with the exception of some of the types described above, there appears to be little standardization in their manufacture. Lacking the co-occurrence of diagnostics, the early affiliations of such tools would be masked by their relatively crude material and workmanship. An early site manifesting such material would probably be assigned to a later period.

Hammerstones, Anvils, and Abraders

Hammerstones from 44PY152 fall into two categories. One type displays polar wear of the type described by McAvoy (1992:53–58) for some specimens from the Williamson Site. The other type of hammerstone consists of a disk-like, relatively flat, round cobble with continuous edge wear around the perimeter. The polar type is represented by two specimens. One is bell-shaped with heavy abrasion on the large end and a small area of light abrasion on the top pole. The other specimen is an odd lopsided shape that roughly describes a lobate ell. The opposite ends of this tool display heavy crushing rather than abrasion.

One of the disk-like hammerstones is somewhat dome-shaped, with the convex face displaying use

Specimen No.	Length (mm)	Width (mm)	Thickness (mm)
1.	46.9	36.0	10.9
2.	67.1	49.1	14.8
3.	72.4	48.2	15.9
4.	67.1 br. *	46.3 br.	10.8 br.
5.	60.7 br.	50.8 br.	20.7 br.
6.	41.5 br.	28.1 br.	10.4 br.
7.	79.6 br.	48.7 br.	15.7 br.

* br. = measurement of a broken portion of specimen

Table 24. Site 44PY152, metric comparison of rough bifaces (n=7).

	Maximum (mm)	Minimum (mm)	Mean (mm)
Length:	72.4	46.9	62.1
Width:	49.1	36.0	44.4
Thickness:	15.86	10.9	13.9

Table 25. Site 44PY152, summary of intact rough bifaces (n=3).

Specimen No.	Maximum Diameter (mm)	Thickness (mm)	Weight (g)
Disk Type			
1.	94.4	36.5	401.5
2.	76.2	38.6	291.0

Specimen No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Shape
Polar Type					
1.	88.5	44.4	36.4	264.5	Block El
2.	49.8	51.6	30.7	101.0	Bell Shaped

Table 26. Site 44PY152, metric comparison of hammerstones (n=4).

Specimen No.	Long Radius (mm)	Short Radius (mm)	Maximum Weight (g)	Weight (g)
1.	60.0	45.7	20.1	86.0
2.	44.7	38.8	26.1	88.3

Table 27. Site 44PY152, metric comparison of split cobble abraders (n=2).

wear encroachment, while the heaviest wear is around the edge. The other disk-like form displays abrasion only around the edge. Tables 26 and 27 describe the above specimens.

Two split cobble abraders have been recovered at 44PY152. Each represents a variation on a standardized form, which suggests functional similarity in their use. Specimen No. 1 (see Table 27) is a flat oval quartzite cobble that has been radially split to form an irregular pie-shaped chunk. Except for two or three shallow removals that have exposed a small area along one circumferential edge, the original water-rolled cortex remains intact. Light scuffing and abrasion are visible on the cortex around the circumference, and heavier cortical abrasion is visible along one face adjacent to its intersection with the exposed radial split plane. Specimen No. 2 (see Figure 34o) was made in a similar way, although the cobble was apparently somewhat thicker and not as flat. Perhaps to remedy this, the cobble was split along the plane of both faces, creating a flat, exposed surface for each and achieving a thickness comparable to Specimen No. 1. Water-rolled cortex remains only on the circumferential edge, which does not display any wear.

Anvils are represented by two specimens. The larger example is about 255 mm × 210 mm, while the other is 205 mm × 185 mm. Both are made on slabs of schist that display dimpling and crushing scars on both faces. The more heavily utilized surface of the smaller specimen contains a pronounced depression in the center surrounded by a regular series of smaller dimple scars in a geometric configuration reminiscent of the face of a clock. The other surfaces of both specimens display random patterns of scarring and dimpling. There is no obvious way to determine whether these specimens are associated with the early occupations of the site or whether they were used in a later period. They resemble anvils from other Paleoindian occupations (Gramly 1990:3); however, similar forms occur with much later components at other sites. Both specimens were recovered from low levels of 44PY152, although neither was in a primary, embedded context.

Utilized Flakes

While utilized flakes comprise by far the largest single category of tools at 44PY152 (n=141, 35.4%), their presence is not nearly as dominant as it is at 44PY7, where they make up nearly half (46.9%) of the total tool assemblage. This may reflect a greater scarcity of high-quality lithics for expedient use at 44PY152 since the percentage of debitage in the entire assemblage is also considerably less than at 44PY7 (60.6% vs. 82.5%.). Appearing to support a secondary connection between utilized flakes and debitage through the tool assemblage is the similarity at both sites of the ratio of the percentage of the tool assemblage that utilized flakes comprise versus the debitage percentage of the total assemblage. Thus, at 44PY152 utilized flakes comprise 35.4% of tools, and debitage is 60.6% of the total assemblage; at 44PY7 utilized flakes comprise 46.9% of tools, and debitage is 82.5% of the total assemblage.

The variety of tool forms contained within the utilized flake category is even greater at 44PY152 than at 44PY7 and includes some very distinctive types that appear to reflect standardization of manufacture and therefore may have some diagnostic value. Edge trimming of the fine, continuous, normal type is characteristic of flaking patterns on most of the retouched specimens.

One distinctive tool type (n=2) is made on an isosceles triangular, expanding flake. Unifacial edge trimming is displayed on the two lateral sides, and irregular trimming and use attrition occurs on the base, which is opposite the platform and bulb of percussion at the apex. Both specimens are similar in size and proportion and are very thin. One specimen, depicted in Figure 34e, is made of quartzite and has the following dimensions: length (altitude) = 48.8 mm; width (base) = 44.4 mm; thickness = 6.0 mm. The other specimen is of silicified slate with the following dimensions: length (altitude) = 58.9 mm; width (base) = 46.1 mm; thickness = 8.0 mm. Use wear suggests a cutting function on moderately tough materials.

An edge-trimmed raclette-like form is made on flakes displaying similar, complex core preparation and an identical beak-like accessory (n=2). Both flakes have a longitudinal axis that is skewed to the right of the angle of percussion. The distal end of each consists of a complex intersection of three core planes that form a relatively steep, diagonal working edge, which is offset to the right. This working edge distally terminates in a pronounced, rounded bit backed by the ridge between two planes. Both examples are made of exceedingly fine material. The thinner specimen is made on a large flake of Knox flint (length = 65.1 mm; width = 34.2 mm; maximum thickness = 6.1 mm). Another more robust specimen (see Figure 32i) is made of a distinctive banded jasper, the only lithic of this type recorded at these sites (length = 70.0 mm; width = 36.0 mm; maximum thickness = 8.0 mm). A notable feature of this specimen is that the beak displays thermal alteration indicated by a color change from yellow-brown to deep red.

Another raclette type is much more knife-like. Included in the assemblage are at least two that are made on long, very thin, blade-like flakes that have been edge-trimmed into forms with recurvate outlines. The larger of the two is made of a good grade of rhyolite. Its base is the most narrow part of the blade and has been trimmed both laterally and from the end to reduce the thickness of the platform and bulb of percussion. It appears that this specimen was halted. The dimensions are: length = 69.7 mm; width = 34.0 mm; maximum thickness = 6.9 mm. The second specimen is much smaller (length = 43.3 mm; width = 21.1 mm; maximum thickness = 5.2 mm) and is made of chert. It also appears to have been prepared for hafting.

Included in the utilized flake category at 44PY152 is perhaps the most convincing example of a true blade to be found in the assemblage. It is made of Knox flint and displays all of the attributes of the stricter classification of true blades: a prepared, faceted striking platform and clear indication of previous removals struck from the same edge. Its dimensions are: length = 61.5 mm; width = 21.5 mm; maximum thickness = 5.9 mm. No retouch is evident other than substantial use wear on the left margin. The right edge is backed by a fracture plane.

Components of a microlithic industry are present at 44PY152, although they are not so extensive as at 44PY7. Microblade-like flakes were apparently employed for a variety of tasks (see Figure 32o–q). Most are not extensively retouched other than occasional shear retouch or use attrition. A notable exception is the specimen depicted in Figure 32q. This diminutive tool (length = 35.1 mm; width = 10.8 mm; maximum thickness = 3.1 mm) has been carefully retouched and shaped around its entire perimeter to create a somewhat symmetrical outline. The right side displays steep sidescraper-like retouch, while flatter retouch is employed around the pointed ends. The left side has two snap removals to isolate a graver bit at the midpoint of the blade. The lithic material is an agate-like chalcedony.

Debitage

Debitage is numerically the largest component of the artifact inventory at 44PY152 (60.0%), although normatively this is a very low occurrence. Table 28 provides a percentage comparison of lithic material types from the debitage and utilized flake categories. In comparing the selectability of various lithics at 44PY152 with the results of a similar comparison at 44PY7, the best-quality lithics, including chalcedony (+146.2% selectability), Knox flint (+148.6% selectability) and jasper (+170.6% selectability), retain their high rate of selection for utilized flakes. Silicified slate retains its low appeal, although it does not score nearly as low as its rate of selectability at 44PY7 (-40.4% vs. -338%). Other categories either do not fluctuate significantly or make up a relatively insignificant portion of the total artifact inventory. It may be noteworthy that quartz crystal, while not a large proportion of the assemblage, fluctuates widely in selectability between the two sites (+145.8% at 44PY7 vs. -31.7% at 44PY152). This relatively low usage of

Table 28. Site 44PY152, percentage comparison of lithics selected for utilized flakes vs. debitage.

	Qtz.	Qtzt.	CQzt.	Cryst.	Chert	Knox	OFlint	Jasp.	SSlt.	Rhy.	Chalc.	Uncl.	Total
Debitage: (N=612)	9.5%	2.0%	1.1%	4.1%	34.8%	7.4%	14.1%	3.4%	17.8%	2.8%	2.6%	0.5%	101.1%
Utilized Flakes: (N=141)	10.6%	3.5%	0.7%	2.8%	25.5%	18.4%	9.9%	9.2%	10.6%	0.7%	6.4%	1.3%	99.6%
Variations ±:	+1.1	+1.5	−0.4	−1.3	−9.3	+11.0	−4.2	+5.8	−7.2	−2.1	+3.8	+0.8	
Percent Variation ±:	+11.6%	+75.0%	−36.4%	−31.7%	−26.7%	+148.6%	−29.8%	+170.6%	−40.4%	−75.0%	+146.2%	+160.0%	

Abbreviations for Lithic Types: Qtz.=Quartz; Qtzt.=Quartzite; CQtzt.=Chalcedony/Quartzite; Cryst.=Quartz Crystal; Chert; Knox=Knox Flint; OFlint=Other Flint; Jasp.=Jasper; SSlt.=Silicified Slate; Rhy.=Ridge and Valley Rhyolite; Chalc.=Chalcedony; Uncl.=Other

quartz crystal for utilized flakes at 44PY152 is reflected in its percentage comparison to 44PY7 for all tools (4.5% vs. 10.4%). Apparently crystal quartz was less favored as a lithic resource at 44PY152.

Remarks

In comparing the assemblages from 44PY7 and 44PY152, certain differences stand out and have been noted above. Similarities include a high rate of tool curation at both sites. There does not appear to be any significant local source for the high-quality lithics found at the sites. Lithic parsimony at 44PY7 and 44PY152 is revealed by the low ratio of debitage to tools (4.7:1 at 44PY7 and 1.5:1 at 44PY152). In a comparison table of Eastern fluted point sites compiled by Meltzer (1988:30), either component of the Leesville sites ranks among the lowest for debitage to tool ratio. (Note that Meltzer includes "primary tools"—hammers, anvils and abraders in the debitage category. The above calculations include these in the tool category, but their number is so small that the results are not significantly altered.) Site 44PY152's ratio is almost identical to the Shoop Site, which is noted among Eastern Paleoindian sites for the curation of its assemblage and for representing a band-level group at the extreme limit of removal from their primary lithic source (Witthoft 1952).

Site 44PY7's debitage:tool ratio is somewhat larger but still within the low range—falling between Vail and Debert, as well as sites with assemblages dominated by nonlocal stone. On the other hand, the debitage category at 44PY7 almost certainly contains *some* material from later periods, particularly the Woodland. The amount is probably very small since high-quality lithics are generally absent in Smith Mountain's later Archaic-period assemblages and only present in small amounts on the main concentrations of the Woodland site adjacent to 44PY7. Previous ASV auger tests (n=3) appear to confirm this distribution as no cryptocrystalline lithics were recovered in any of the cultural levels above the buried early occupation zone. The true ratio for 44PY7 may more accurately be placed at about that of Vail and Wells Creek.

One issue that remains at both sites is distinguishing the Paleoindian component from that of the Early Archaic in the surface assemblage. At present, this is possible with only a few diagnostic forms. While the Paleoindian presence as indicated by projectile points is rather small, it is by no means certain that this is a true measure of the overall balance of other lithic remains. There may be at least an indirect method of approaching the quantitative relationship between assemblages by examining patterns of lithic use in diagnostics of different periods. While all completed Paleoindian projectile points from both sites are of nonlocal cryptocrystallines, the overwhelming majority of the Palmer type, believed to mark the onset of the Early Archaic period, are made of crystalline local lithics—primarily quartz (94.1%). If combined with the transition Paleoindian period represented by Hardaway Side-Notched types (100% crystalline), there is a long hiatus—perhaps 500 years or more—when cryptocrystallines (5.3%) were seldom used for projectile points at Leesville Lake. The following Kirk Corner-Notched period manifests a resurgence in the use of cryptocrystallines (78.3%) which continues through the Kirk Stemmed period of the terminal Early Archaic. Nonlocal cryptocrystallines are the raw material for 83.8% of projectile points from the combined Kirk periods. (Interesting, however, is regional data presented by a researcher in the Mid-Atlantic [Stewart 1990] that seems to indicate exactly the opposite relationship in lithic use between Palmer and Kirk.)

If the apparent hiatus in use of cryptocrystallines for projectile points between 10,500 B.P. and 9,500 B.P. is reflected in the rest of the assemblage of that period, it may be inferred that a disproportionate number of the curated tools of high-quality lithics may be associated with the Paleoindian occupation. This assumption would rest on the likelihood that if high-quality lithic materials were available, they would have been used for projectile points, normally the most curated form in the assemblage. Such an assumption must be qualified by the fact that several high-quality cryptocrystalline endscraper types (see Figure 33i) generally associated with Palmer occupations have been recovered. Given the uncertainty about the degree to which the succeeding assemblages reflect their choices in lithics for projectile points, or the degree of decline in the production of many classic forms of curated unifaces through the end of the Early Archaic period, it is difficult to predict with confidence what percentage of the total curated assemblage is Paleoindian. Versus the Paleoindian-Early Archaic transition at 44PY152, a rough calculation reveals that 37.0% of curated tools made from high-quality lithics may be assigned to the early Paleoindian period. This is based on 14.8% of

all projectile points through the Early Archaic being assignable to the Paleoindian period and 39.1% use of high-quality nonlocal lithics for transition Paleoindian through Early Archaic projectile points versus 100% usage of cryptocrystallines for Paleoindian projectiles. Paleoindian use of high-quality lithics would be 2.5 times greater than the later groups. This does not include the ambiguous Dalton component, but if it did and Dalton were assigned to the Paleoindian period, an even higher proportion of curated tools at 44PY152 would be assignable to the Paleoindian period.

While the artifact inventory from these sites may not be large compared to some Eastern fluted point sites, its range of tool forms places it among the richest. The size and extent of the site remain unknown, and it cannot be assumed that the two components, 44PY7 and 44PY152, are temporally and functionally discreet from each other. The variety of tool forms present in the surface collection suggests occupation by band-level groups, presumably of all ages and sexes. Some characteristics of the tool inventories and their context, particularly at 44PY7, suggest at least a transient base camp. It seems likely that the activities performed at 44PY7 and 44PY152 were somewhat different, although they may have been functionally related. It appears that by the terminal Early Archaic, those qualities that made 44PY152 attractive to human occupation were greatly diminished, while 44PY7 continued to invite intensive human utilization.

CHAPTER 8:
Assessment of Lithic Raw Material Procurement and Use at 44PY152

Introduction

This contribution examines patterns of lithic raw material procurement at 44PY152 in terms of prevailing Paleoindian/Early Archaic settlement models in Virginia. Currently, the most widely accepted models are those based on Gardner's (1974) work, which ties Paleoindian groups to sources of high-quality cryptocrystalline material, around which they move. A cursory examination of the Paleoindian/Early Archaic artifacts found at 44PY152 and a preliminary identification of their sources indicate that a large amount of nonlocal material was obtained and used. This nonlocal material is cryptocrystalline cherts, chalcedonies, and jaspers, supposedly so highly prized by these people (Goodyear 1979; Gramly 1980). Since there appear to be no local (within a 10-km radius) primary sources of cryptocrystalline material, 44PY152 may represent an exception to the above-mentioned patterns. However, the presence of this material such a distance from primary sources would support the claims of how important cryptocrystalline material was at this time.

Research was conducted for this paper using the geological literature available for Virginia, such as geological maps and Department of Mineral Resources publications. Much geological work has been completed south of the site area; however, no geological quadrangles were available for the immediate area. This problem was solved by personal communication with Dr. Rick Berquist, a professor at the College of William and Mary, and Dr. Bill Henika of Virginia Tech, who had completed geological surveys of the area for the U.S. Geological Survey. An inventory of the artifacts that have been collected was provided by Mr. William Childress. This inventory lists the general categories of raw material from which the artifacts are made. Also, cobble samples were taken from Leesville Lake to determine what, if any, lithic materials would have been available from the river bed.

The data on which this assessment is based deserves further description. It consisted of a printed inventory of the beach-collected artifacts catalogued by Childress as of April 1994. (This accounts for discrepancy with the sample size cited in Chapter 7). It is not based on a sample recovered under carefully controlled conditions, but instead derives from opportunistic pedestrian sweeps at low water. At the same time, however, it is believed to be generally representative of the early assemblage at 44PY152. Only Early Archaic and Paleoindian diagnostics are regularly collected in this area, and Childress's searches are meticulous. There is some bias toward recognizable tools made of any material and other artifacts of cryptocrystalline materials—in other words, debitage and other non-formal items of quartz or quartzite are potentially under-represented. All raw material and artifact identifications were made by Childress. Both Early Archaic and Paleoindian artifacts are represented together in the sample; only artifacts diagnostic of later periods were excluded from consideration. The artifacts were not systematically examined by the author, leaving virtually all inferences based on the printed inventory.

Review of Paleoindian Settlement Models

Two major models currently dominate Paleoindian settlement pattern studies in the Mid-Atlantic Region of eastern North America. The first ties Paleoindian movement to cryptocrystalline resources and was put forth by Gardner (1974) on the basis of research at the Flint Run Complex in Warren County, Virginia. Since that time, researchers (Goodyear 1989; Custer et al. 1983; Turner 1989) have expanded on Gardner's original ideas. These studies as well as others (Gramly 1980) have well documented a Paleoindian preference for high-quality cryptocrystalline material. It is believed this preference was strong enough to have played a major part, along with availability of food resources, in determining the movements of Paleoindian groups (Custer et al. 1983). This very strong preference is the basis for what has been called "tethered nomadism" (Anderson 1990).

Custer, Cavallo, and Stewart (1983:269) characterize this as a "cyclical procurement pattern." The size of the catchment area and movements within it would be scheduled so that they were at a specific quarry when their tool kits needed replenishing (Figure 35).

Custer et al. (1983) also describe the serial lithic procurement model. This was proposed for areas where lithic sources are "more plentiful and are not widely separated" and where there are multiple secondary lithic resources with high-quality materials available (Custer et al. 1983:271). The major difference between these two models is that lithic procurement is directly tied to other activities in the serial model, such as food gathering, while there is more emphasis on specific lithic sources in the cyclical model.

Another important model associates early settlement patterns with large drainage systems, where subsistence and resource needs would have been met by moving up and down a particular river basin (Anderson and Hanson 1988:262). This model expresses a seasonal type of mobility where groups adjust their settlement types to the available resources. For example, during winter months a "logistically provisioned base camp" would be established, while "foraging camps" would be occupied for the remainder of the year (Anderson and Hanson 1988:267). In these cases, only lithic outcrops present within the drainage system would be exploited, rather than those outside these "home ranges." Cryptocrystalline materials can still be important in this model but they are less significant in determining the overall settlement pattern of a group.

The archaeological manifestations for these two models are quite different. In the tethered, or cyclical, model archaeological sites would be expected to be dominated by locally quarried material, but would also contain a small amount of nonlocal material which has been "over-utilized" and "over-resharpened" (Gardner 1983:51). However, in Anderson and Hanson's (1988:267) drainage system model, one would expect to find a "high incidence of the use of extralocal raw material" due to the rapid movement of a small number of people.

Identification of Potential Lithic Sources

For the purposes of this study, local material is defined as that found inside a 10-km radius, and nonlocal material is found outside that radius. A 10-km radius was chosen based on ethnoarchaeological studies done by Lewis Binford (1983), which generally place routine hunter-gatherer activities within a comparable area. The Leesville Lake area is dominated by the Blue Ridge Anticlinorium, and cryptocrystalline materials are locally rare (Conley 1985). This is an area that has experienced a great deal of tectonic activity, resulting in regional anticlinal structures and much folding and faulting. The formations making up the anticlinorium are the Candler, Ashe, and Alligator Back (Rader and Evans 1993). The Alligator Back and Candler formations run in a north–south direction through the Leesville Lake area and are separated by the Bowens Creek Fault, which also trends in a north–south direction through the site area (Henika, personal communication 1994). Quartzite and especially quartz, which together comprise over one-third of the archaeological assemblage, are abundant locally. Other than the quartzite and quartz, the formations are composed primarily of metamorphosed rock such as gneiss, gabbros and basalts, and metagraywackes formed from the tectonic activity mentioned above (Conley 1985). Because of their structure, these types of rocks, with the exception of basalt, cannot be used for flaked stone tools. The prehistoric groups inhabiting the area at Leesville Lake would have had to acquire lithic material other than quartz and quartzite from primary sources beyond a 10-km radius.

Cryptocrystalline materials, making up over half of the site assemblage, are not locally abundant. One must look west and north to the Ridge and Valley physiographic province in order to locate the gray to black chert making up the majority of cryptocrystalline material found at the site. To the southwest, Holland (1970) has documented eight formations containing black and/or gray chert. These include the Coconocheague and Copper Ridge dolomite, which outcrop in Smyth County; the Beekmantown formation, found in Smyth and Russell counties; the Lenoir limestone in Augusta County; the Mufreesboro limestone, found in Giles, Lee, Russell, and Tazewell counties; the St. Louis limestone, located in Giles, Tazewell, and Wise counties; the St. Genevieve formation, found in Scott, Tazewell, and Washington counties; and the Onondaga formation, which is found in Bland, Lee, Roanoke, Smyth, Washington, and Wise counties (Holland 1970). These chert outcrops are associated with the New River. Northwest of the site area, chert can basically be found in all of the westernmost counties at the border between Virginia

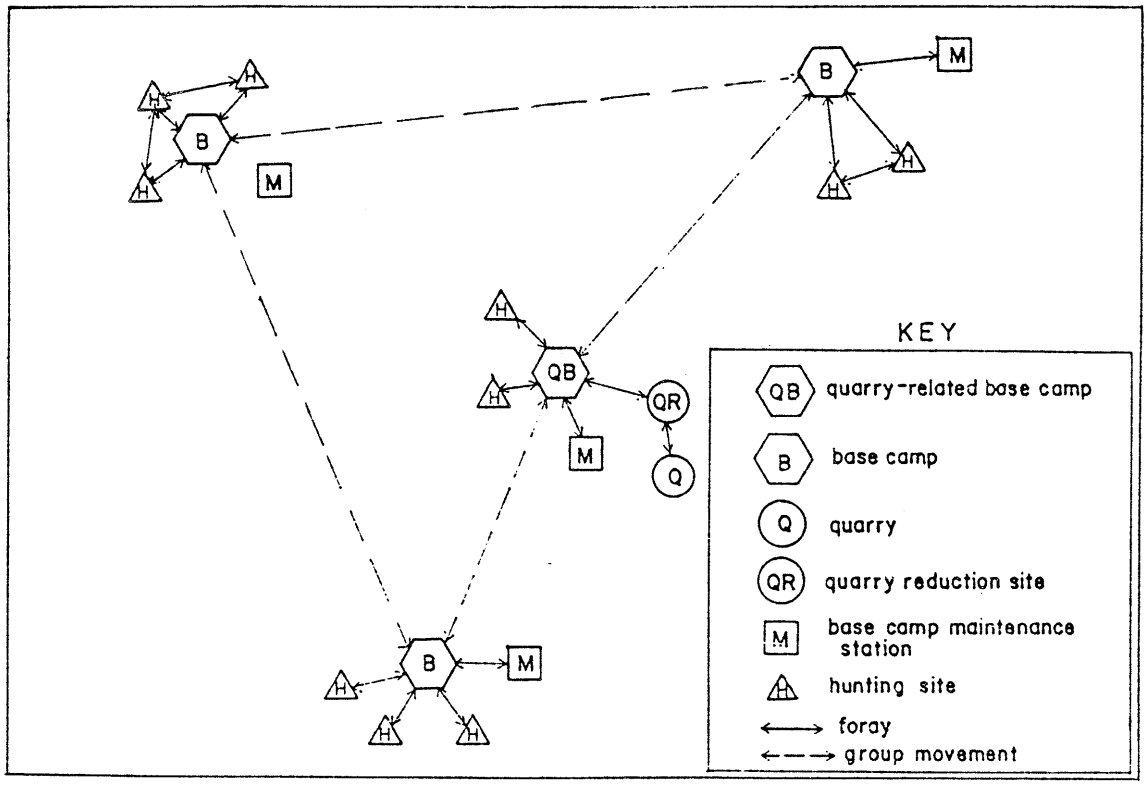

Figure 35. Cyclical lithic procurement model (from Turner 1989).

and West Virginia (Rader and Evans 1993) (Figure 36). This area comprises the Potomac River drainage of the Ridge and Valley province. The major river systems draining western Virginia, such as the New, Roanoke, Potomac, and Shenandoah, are all associated with chert outcrops, predominantly contained in limestone formations. The chert within these formations occurs: (1) as beds, as in the Copper Ridge Dolomite and Beekmantown formation, (2) as nodules, as in the Waynesboro Formation in Clarke County, or (3) as pebbles in a conglomerate, such as the Fincastle Conglomerate found in Botetourt County (Rader and Evans 1993).

A second variety of chert can be found 190 km to the east of the site in the interior Coastal Plain (McAvoy 1992). This chert is associated with the Williamson Paleoindian Site in Dinwiddie County. The chert outcrops are found in the Nottoway drainage system (see Figure 36). These cherts are predominantly comprised of lighter colors, such as variegated forms of white, cream, gray, blue, and brown (McAvoy 1992). None of this chert is known from the Leesville collections.

Jasper, the yellow to red variety of chert, is the second most abundant of the cryptocrystalline materials found in the assemblage. The jasper found at the site is yellow to yellow/brown in color, with only one occurrence of red jasper, presumed to be due to heat alteration. The closest known jasper sources containing material similar to that described are located 55 km west in Botetourt County and are known locally as the Arnold's Valley quarries (Childress, personal communication 1994). Other sources for yellow to yellow/brown jasper are found much farther north in Warren County, near the Thunderbird Site, and east again, in Dinwiddie County, where the Williamson Site is found (see Figure 36).

Chalcedony is another variety of cryptocrystalline material found at 44PY152. Chalcedony outcrops in all parts of the state, from the Coastal Plain province to the Ridge and Valley province of Virginia (Dietrich

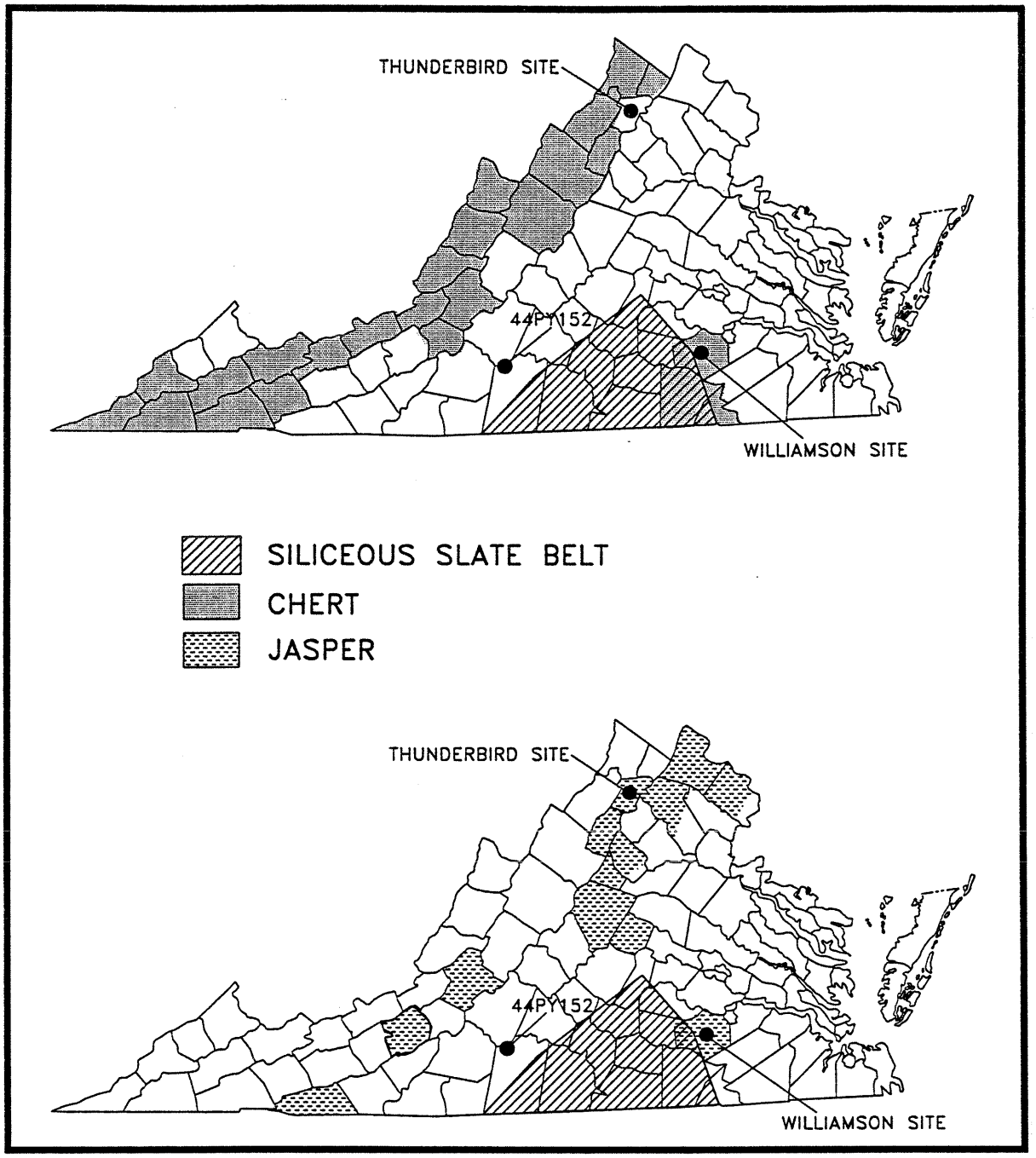

Figure 36. General distributions of lithic raw materials in Virginia.

1990). Chalcedony is a translucent form of chert and can be found in the areas already described as sources for chert as well as jasper (see Figure 36), but probably in more limited quantities.

Silicified slate, with its "chert-like knapping quality" (Gardner 1980:6), and rhyolite are the final components of the raw material assemblage. The most likely source of silicified slate is found directly to the southeast, in an area known as the Carolina slate belt. The Carolina slate belt is a belt of metamorphic rock that extends from central Virginia to central Georgia (Kish and Blacky 1982). There are no reported quarries in Virginia; however, there are potential quarries less than 100 km to the south, in North Carolina. There is only one occurrence of rhyolite in the assemblage. This material can be found in a number of areas west of the Coastal Plain province of Virginia, such as in the Mount Rogers formation in southwestern Virginia and the Catoctin formation in the northern part of Virginia (Rader and Evans 1993).

Finally, it is possible that the river at the site served as a secondary source for these nonlocal materials, especially cryptocrystalline material. Cursory examination of the river resulted in discovery of small chert and jasper cobbles.

Assessment of the 44PY152 Assemblage

A total of 298 lithic artifacts made up the inventoried beach assemblage from 44PY152. The assemblage consists predominantly of Paleoindian to Early Archaic artifacts, with occasional artifacts representing the Middle Archaic through the Woodland periods. Only the Paleoindian and Early Archaic materials are the focus of this discussion. Artifacts in the assemblage diagnostic to the Paleoindian period include four fluted points as well as tools such as endscrapers, sidescrapers, and gravers (Gramly 1990). Hardaway, Palmer, and Kirk points are evidence of later Paleoindian phases and the Early Archaic period (Gardner 1974).

Table 29 summarizes the artifacts from 44PY152 according to the materials from which they are made. The assemblage was divided into formal tools, made for specific purposes and probably designed to be curated, and informal tools, made and used expediently. These latter tools likely were made and used only at 44PY152. This distinction was made in an attempt to identify patterns of resource use, which will be discussed later.

Raw Material	Count	Percent
Chert	122	41
Jasper	24	8
Chalcedony	18	6
Quartz	95	32
Quartzite	14	5
Silicified slate	24	8
Rhyolite	1	0.4
Total	298	

Table 29. Site 44PY152, total artifacts by raw material.

Cryptocrystalline materials such as chert, jasper, and chalcedony make up 55% of the artifacts found at 44PY152 (see Table 29). The addition of silicified slate to the cryptocrystalline category increases the proportion to 63% of the total assemblage. Since primary sources of these materials are not found locally, well over half of the material at the site was either obtained outside a 10-km radius or at a closer secondary source.

Figure 37 shows the general primary source areas from which the various materials could have been obtained. The chert and "flint" constituting 41% of the total assemblage is predominantly gray to black, with only a few instances of lighter colors such as brown and tan. Chert found to the east in the southern Coastal Plain consists of mostly lighter colors such as cream, blue, and pink (McAvoy 1992). Therefore, an eastern source seems unlikely since darker cherts occur predominantly in the western part of Virginia. The jasper, comprising 8% of the total assemblage, is generally of the yellow to brown type and can be found in a number of the same areas as the black to gray chert. The same is true for chalcedony, which comprises 6% of the total assemblage. Silicified slate, 8% of the total assemblage, is found just to the southeast in the Carolina slate belt, and quartz and quartzite are found locally.

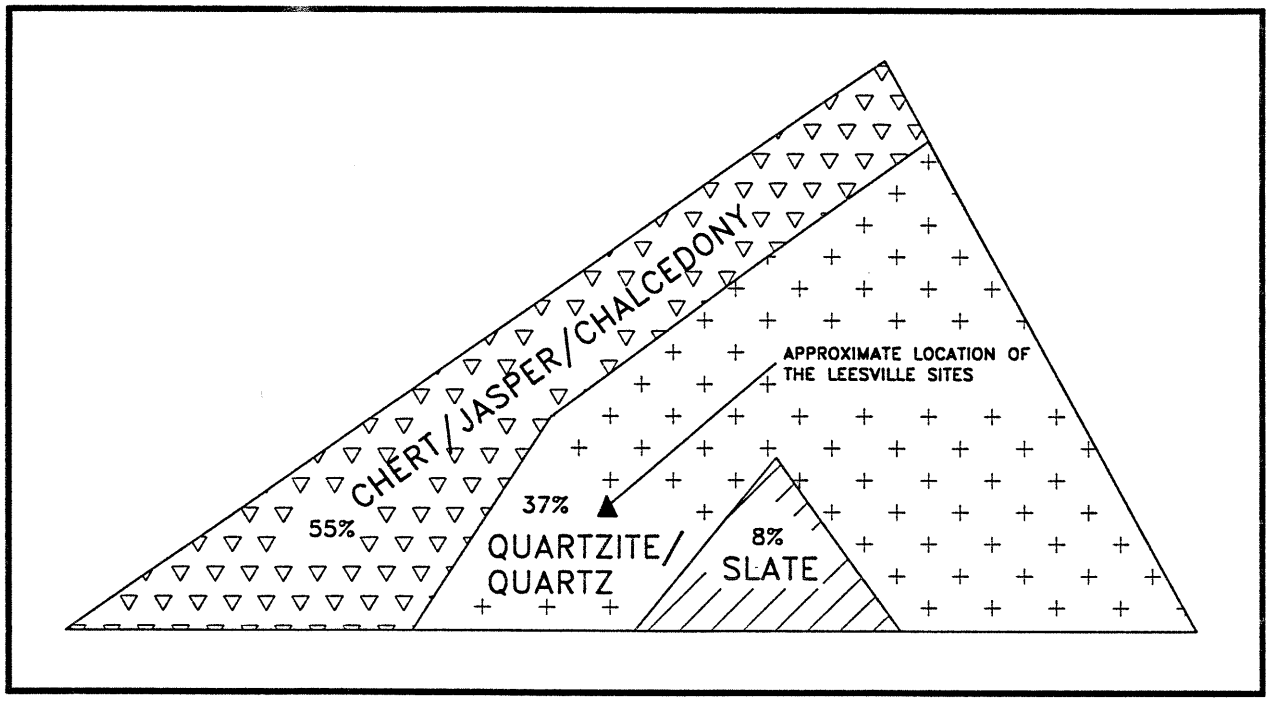

Figure 37. Proportions of materials from different areas represented at 44PY152.

Chert and "flint," jasper, and chalcedony comprise the cryptocrystalline portion of the assemblage. Within this group, black to gray chert and "flint" are by far the most abundant, making up 74% of the cryptocrystalline material. The closest source of this chert is found within the Roanoke River drainage, 50 km directly to the west of the site, in Roanoke County (Holland 1970). This formation contains "solid beds of chert" 3-15 m thick (Holland 1970:107). Jasper contributes 14% to the cryptocrystalline portion of the lithic material. The nearest source for jasper can be found in Botetourt County, approximately 55 km to the northwest. This area is north of the Roanoke River drainage and lies within the Potomac River drainage. Chalcedony, comprising 10%, is the last component of the cryptocrystalline material. As stated above, chalcedony generally occurs in the same areas as chert and jasper and, therefore, could be acquired at the same time as these materials.

Overall, there is less than a 1:1 ratio between local and nonlocal material, with local quartz and quartzite constituting only 37% of the total assemblage and nonlocal materials constituting 63%. These local materials are readily available in the river and in outcrops in the site vicinity. Quartz is especially abundant, occurring as huge boulders on the ground in uplands around the site.

Examination of individual artifact types and the material from which they are made can reveal evidence of group movements and settlement. To this end, the lithic artifacts are discussed in terms of formal and informal tool types. Figure 38 shows a graph of the ratios of local to nonlocal lithic material in the formal tool category. Cores, endscrapers, and sidescrapers all show between a .5:1 and a 1:1 ratio between local and nonlocal material, meaning that there is essentially an equal amount of local and nonlocal material in these categories. However, points, gravers, bifaces, and preforms differ significantly. Points and gravers are made primarily of nonlocal cryptocrystalline and silicified slate material, while bifaces and preforms consist of primarily locally available quartz material (Table 30).

Figure 39 shows a graph of local versus nonlocal ratios for the informal tools found in the assemblage. Surprisingly, a somewhat similar pattern to the formal tool ratios is evident from this graph. Retouched

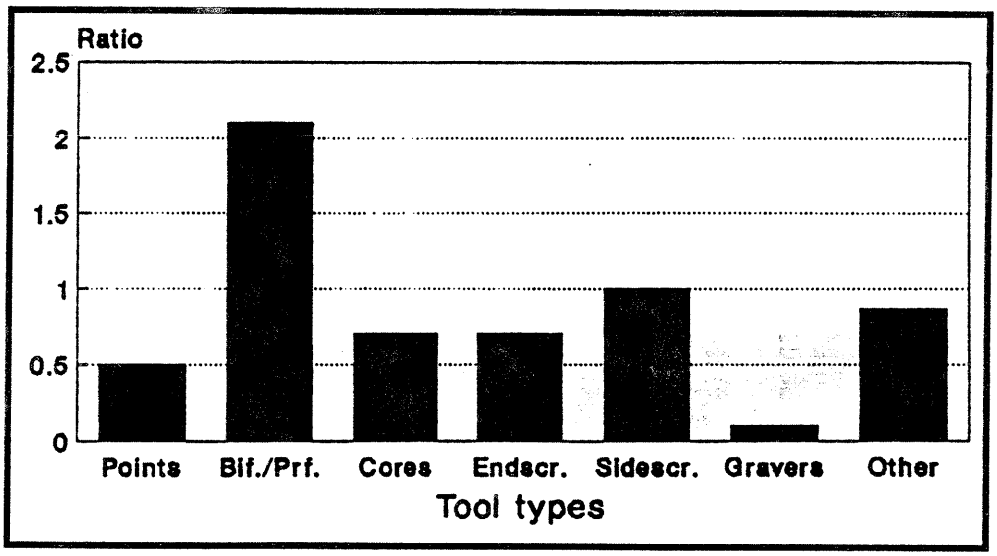

Figure 38. Site 44PY152, local vs. nonlocal materials among formal tools.

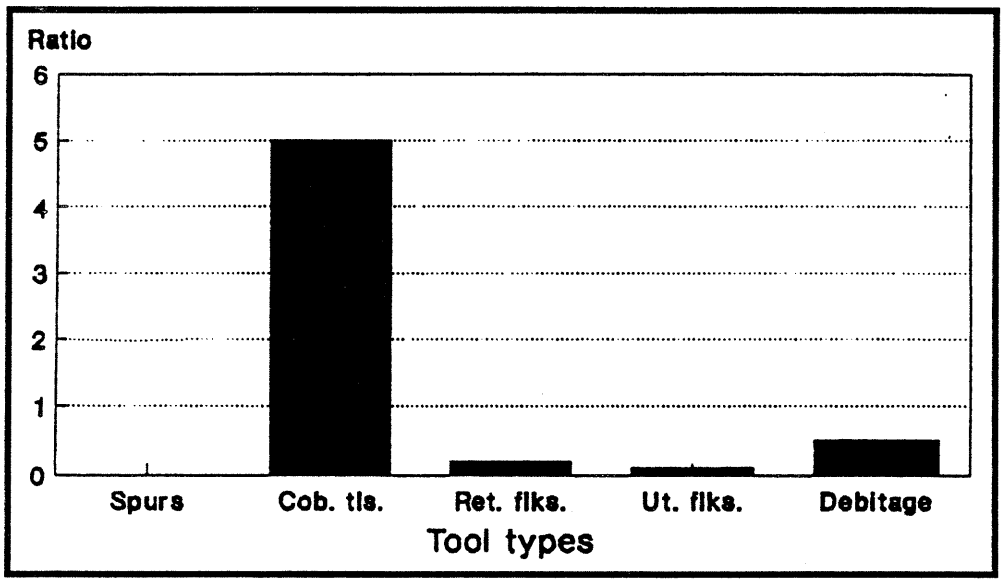

Figure 39. Site 44PY152, local vs. nonlocal materials among informal tools.

Tool Type	Chert	Jasper	Chalced.	Quartz	Q'zite.	Metavol.
Hafted Bifaces	8	5	4	10		4
Bifaces	5		1	13		
Cores	2	1		2		
Endscrapers	8	4	2	11		1
Sidescrapers	13	1	2	14	3	1
Gravers	7	2		1		1
Preforms		1		3		
Other(*)	16	3	4	20	4	5
Totals	59	17	13	74	7	12

* "Other" refers to spokeshaves, perforaters, awls, scraper planes, knives, limaces, drills, raclettes, and scrapers.

Table 30. Site 44PY152, formal tools by raw materials.

Tool Type	Chert	Jasper	Chalced.	Quartz	Q'zite.	Metavol.
Spurs			1	1		1
Cobble tools		1		1	4	
Retouched flakes	8			2		3
Utilized flakes	32	4	3	6		6
Burins		1		1		
Debitage(*)	23	1	1	11	3	3
Totals	63	7	5	21	7	13

* "Debitage" refers to blades, bladelets, spalls, flakes, reduction flakes, uniface fragments, chunks, and denticulates.

Table 31. Site 44PY152, informal tools by raw materials.

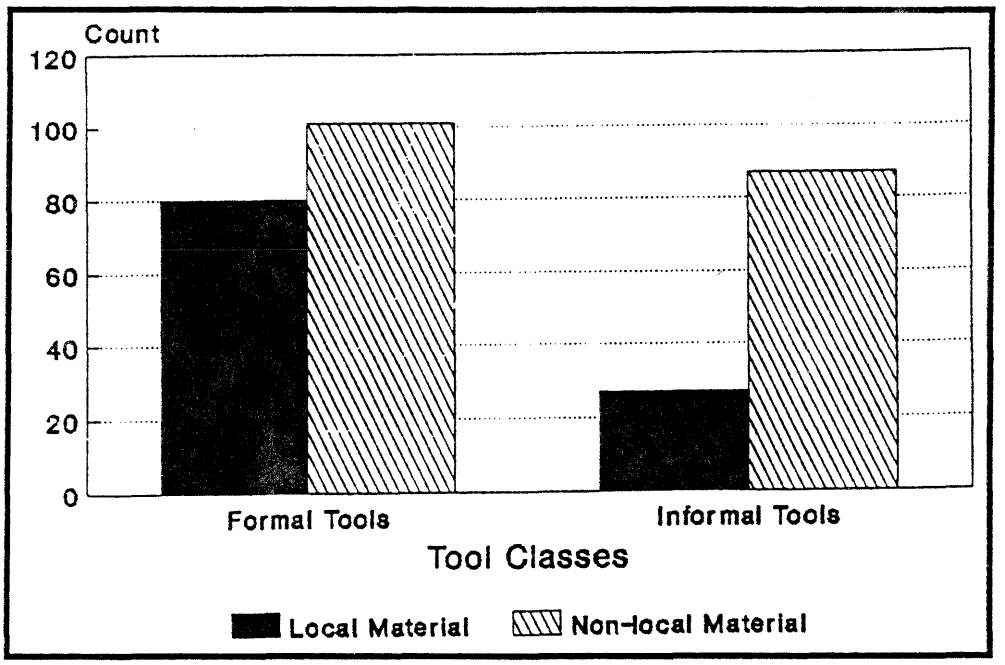

Figure 40. Site 44PY152, formal vs. informal tools by raw material type.

flakes, utilized flakes, and debitage show a less than 0.5:1 ratio with nonlocal materials predominating, while cobble tools show a 5:1 ratio with local materials dominating. Table 31 shows that cryptocrystalline materials, specifically chert and "flint," are the dominant materials for the individual informal tools with the exception of cobble tools and spurs.

Figure 40 shows a graph of the formal and informal tool counts according to local and nonlocal material. The overall pattern of the entire assemblage is also seen in this graphic. Nonlocal material comprises the majority of the lithics in the whole assemblage. Cryptocrystalline materials dominate in both tool type categories, with chert and flint followed by jasper and chalcedony. Silicified slate is the other nonlocal material (see Tables 30 and 31). Quartz is the dominant local material in the assemblage.

Conclusions

Although this assessment is based on surface-collected material, the thorough collection strategy and minimal number of components at the site give it merit. The findings can at least be a point of departure for future studies. From the analysis, two significant patterns emerge. First, it is most evident that cryptocrystalline material was extremely important to the people that inhabited this site. Studies by Gardner (1980), Goodyear (1989), and Gramly (1980) have shown that this pattern is quite typical of Paleoindian groups in eastern North America.

Secondly, patterns among tool types are surprisingly similar. Formal tools such as gravers and especially points, designed for completing specific tasks and generally curated, consist of predominantly nonlocal cryptocrystalline material. This pattern is expected because curated tools are those that are carried from place to place. Therefore, one would expect to find curated tools made of nonlocal, high-quality material at a site like 44PY152, where no primary sources of this high-quality material are present.

However, nonlocal cryptocrystalline material also predominates in the informal tool category. The fact that the informal tools consist primarily of nonlocal material is surprising because these tools usually are thought to be expedient. This means that they would be made as they were needed and then probably discarded. At 44PY152, the available material is quartz and

quartzite, yet the majority of informal tools are made of nonlocal chert and "flint."

At least two possibilities could account for this unusual pattern. The first is the possibility that the chert and other nonlocal material were present naturally in the river. Although small cobbles of chert and jasper currently can be found in the river, they are not abundant. A second, more viable possibility is that the informal lithics are made from the waste of resharpening and reshaping curated tools that were brought to the site. Lastly, it must be determined whether the tools are, indeed, informal in nature. If they are not, their different treatment may account for the observed patterns.

The major exception to this majority of nonlocal material is among formal bifaces and preforms, which consist mostly of local quartz and quartzite, as do the informal cobble tools (see Figures 37 and 38). Again, one would expect that the informal cobble tools would consist of local materials because large quartz and quartzite cobbles are present in the river and were likely readily available 10,000 years ago. Bifaces and preforms, however, are generally considered formal tools that would have been curated. An explanation of bifaces being made of local quartz is what is known as "gearing up" or "retooling." In this scenario, the group would have exhausted their supply of preferred material and would have had to resort to what was available in order to complete their daily tasks or prepare for the next move.

The patterns discussed are interesting in that they are contrary to many other Paleoindian sites, especially those in Virginia. How, then, does 44PY152 compare with other Paleoindian-Early Archaic sites in Virginia and how well does it "fit" with the major settlement models? There are two other well-documented Paleoindian sites in Virginia. The Williamson Site is located in Dinwiddie County in the southern Coastal Plain of Virginia while the Thunderbird Site is located in Warren County in the northern Ridge and Valley province of Virginia. Both of these sites are associated with cryptocrystalline quarries. The Thunderbird Site is located across a river from a high-quality jasper outcrop. Due to the site's proximity to this quarry, almost 99% (Joan Walker, personal communication 1994) of the lithic material recovered was yellow jasper. The Williamson Site is in close proximity to a high-quality chert quarry. This chert is known as Williamson chert (McAvoy 1992) or Cattail Creek chalcedony (McCary 1985). An analysis of the fluted points, preforms, blanks, broken tips of points and preforms, and tools found at Williamson revealed that 87% of these artifacts were made of Williamson chert (McCary 1985).

Site 44PY152 is not associated with a quarry of any kind, although it is possible that a secondary source in the river existed. A second difference follows from the first, being that the percentages of nonlocal and local material vary greatly between the quarry sites and 44PY152. However, the obvious preference for high-quality cryptocrystalline material is still demonstrated by all three sites.

Finally, how does the Leesville Lake site conform to the models of Paleoindian to Early Archaic settlement pattern described earlier? Anderson and Hanson's (1988) and Gardner's (1974) models both see availability of cryptocrystalline resources and availability of food resources as important factors controlling the movement of Paleoindian groups. Anderson and Hanson (1988) argue that all the needs of the group, including food, shelter, tool material etc., played a larger role in determining these movements, while Gardner (1974) feels that preference for high-quality lithic materials was the more determining factor.

Site 44PY152 fits quite well with Anderson and Hanson's (1988) settlement model. As shown in Figure 36, the site lies in an area surrounded by but separated from the source areas for materials found in the assemblage, the closest being 40 to 50 km away. Cryptocrystalline materials are found to the south and west, quartz and quartzite are found locally, and silicified slate is found to the southeast. This suggests some type of movement, similar to what Anderson and Hanson (1988) describe, in an east-west direction, possibly along the Roanoke River. This seems a somewhat likely possibility due to the presence of Smith Mountain Gap. This gap would have presented a prime place to avoid traversing Smith Mountain and the surrounding hills and valleys. Movement through the gap to the west would have taken the Paleoindian people to the chert, jasper, and chalcedony outcrops described earlier, while eastward movement along the Roanoke River would have taken them to the area where silicified slate is found. In this scenario, 44PY152 probably would have served as a stopping

point either to or from various primary lithic sources, but in the context of a seasonal round.

As a closing note, there is observed some discordance between the ratios of local and nonlocal materials in the surface-collected and excavated samples (see Chapter 7). Local material dominates the excavated sample from test units, while nonlocal material is more common in the surface collection. The best explanation now is to attribute the differences to sampling strategies. The excavated sample is deficient in tools, and debitage is poorly represented in the surface sample. Resolution will only come with the recovery of larger excavated samples and, perhaps, more attention to the collection and analysis of surface debitage.

CHAPTER 9: Geoarchaeological Observations at 44PY152

Prior to lake construction, 44PY152 was aligned with an elevated first terrace (T-1) of the river. The site preserves an intact alluvial stratigraphy with a Paleoindian/Early Archaic component in sealed geological contexts. The cultural horizons are beneath 1.5 m of alluvium in which a fragipan, or impermeable, indurated soil horizon, evolved over several millennia in a clay-rich, poorly drained substrate. Site 44PY152 is one of the few early prehistoric sites documented for the Piedmont province of the Mid-Atlantic region. Further, it furnishes one of the only regional prehistoric contexts that can be directly correlated with an Early Holocene alluvial history and soil chronology. Three radiocarbon dates were obtained from the site associated with key strata indicative of prevailing stream flow and sedimentation conditions.

Objectives

A one-day visit to the site was undertaken on July 22, 1994. At that time, a single test unit (Test Unit 2) was examined by the project geoarchaeologist to a depth of 2.4 m. Objectives of the field visit and subsequent analyses were:

1. Identifications of primary depositional and pedogenic units and horizons;

2. Correlations of archaeological levels with these units;

3. Baseline reconstruction and chronology of site formation environments.

4. Limited integration of the site sequence into regional models of alluvial geoarchaeology.

In addition to procuring radiocarbon dates, archaeologists collected soil and sediment samples for granulometric and geochemical testing. This report summarizes the observations of the general site stratigraphy and offers a provisional synthesis bolstered by the radiocarbon dates and the soil sediment analyses. The latter facilitate limited interpretations of the depositional and weathering environments contemporaneous with and subsequent to the primary Paleoindian/Early Archaic occupation.

Field Observations

Figure 41 illustrates the stratigraphy of Test Unit 2. Field levels refer to archaeological designations for excavation splits. The soil horizons refer to formal pedogenic horizons calibrated to one of three successive cycles of alluviation. Each cycle signifies sediment accumulation under variable stream energy environments. Soil formation signals stabilization of the surface and reduction in sedimentation. The termination of a cycle is marked by erosion, after which a subsequent cycle of alluviation is initiated by accumulation of a new body of sediment.

At 44PY152, three alluviation cycles were recognized, based on changes in parent sediment texture, structure, bedding, composition, boundaries, and weathering properties of the overlying sola (i.e., "A-B-C" horizonation) (Table 32). Observations were made on the south and west faces and were supplemented by examination of field photos that disclosed stratigraphic relations obscured during the day of inspection because of the field-saturated conditions of several horizons. Accordingly, the correlations between cycles, soil horizons, and field levels are summarized in Table 32 (compare with Figure 41).

Alluvial Unit	Soil Horizons	Field Levels
1	AB-Bwg-Cg	I, II, III
2	2E-2Btx-2BTX2	III, IV
3	3AB-3Bt	V, VI

Table 32. Site 44PY152, summary of natural stratigraphic units.

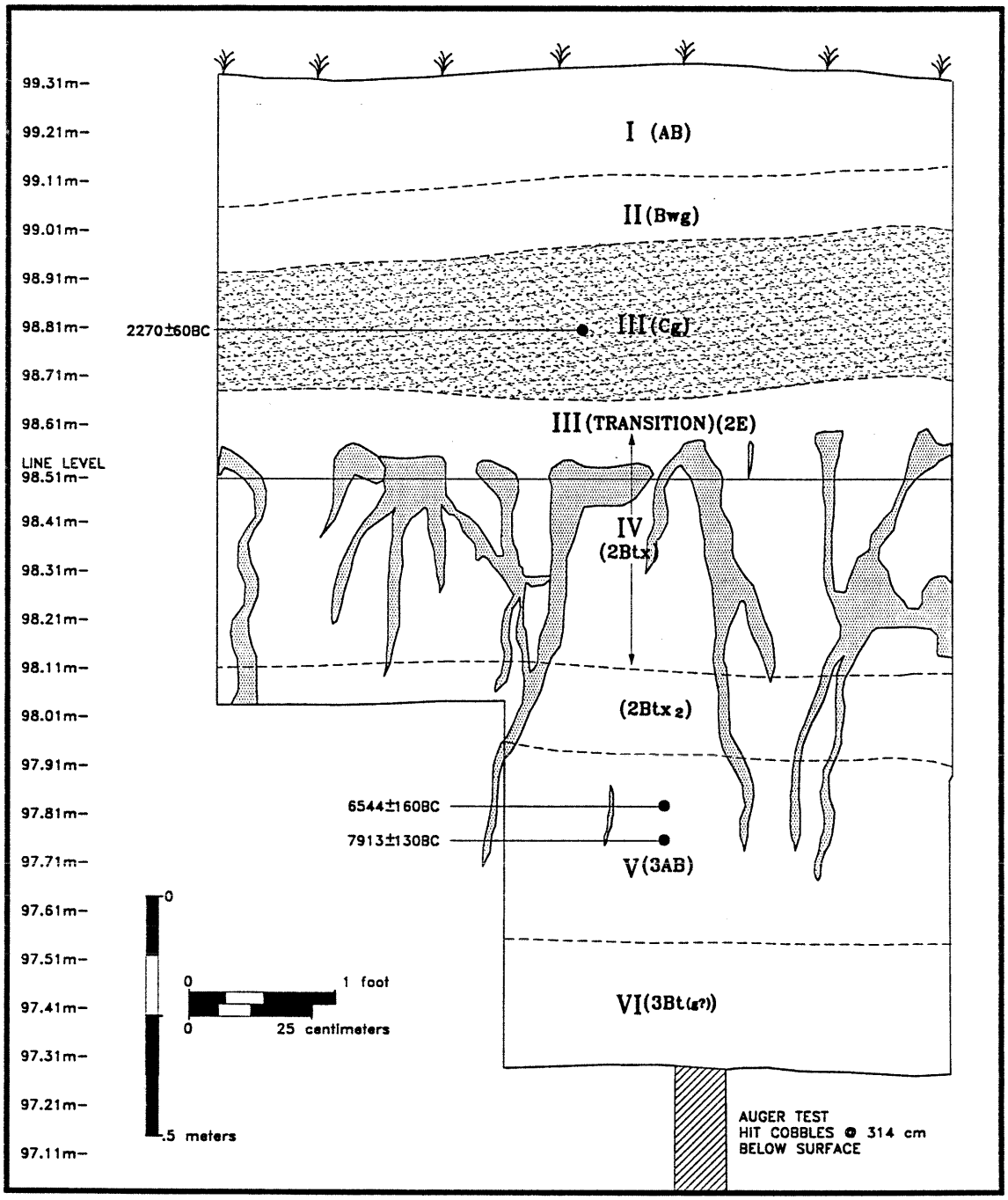

Figure 41. Site 44PY152, Test Unit 2, west profile (key on facing page).

KEY

I (AB): *10YR4/3 loamy sand, slightly sticky, granular to weak small subangular blocky, 10–30% roots/rootlets, micaceous inclusions, faint laminar bedding, abundant decomposed humic matter, mottled (0–20%), slightly sticky and plastic, fines upward (5 cm clay-rich, probably from near surface infiltration), lower contact clear and smooth*

II (Bwg): *7.5YR4/2 with 10YR4/2 and 5/2 mottles (bichromic succession - 50%/50%), mottled faces 50–60%, silty clay, major redux horizon, angular blocky to prismatic structures (small–medium), extensive pore structure, lower contact sharp/clear, some sandy cutans, compound peds (small angular blocky)*

III (Cg): *2.5Y5/2 gley matrix with 7/5YR4/2 parent matrix (40–60%), medium–large prismatics, slaking planes, abundant organic inclusions, extensive root network infilled with channel gleys, increased sand with depth, very plastic, moderately sticky, sandy cutans and infillings, compound peds into filament-like small prisms, upper portion of fragipan, preserved carbon in 2–15 mm ranges*

III Trans. *(2E)/IV (2Btx, 2Btx2):*
7.5YR4/3 to 4/4, sandy clay loam, medium prismatic structures, fragipan cracks are 2.5Y5/1, Fragic crack diameters diminish with depth as does frequency (2Bxt1 – 65%, 2Bxt2 – <20%), abundant to common manganese inclusions, mica within Bt horizon and in Fragic cracks, cracks lined with oxidation streaks along channel infillings, clay content increases by 5% from 2Bxt1 to 2Btx2, fining downward as matrix becomes less sandy, medium to coarse prismatic structures broken by Fragic inclusions and crack structures, extensive mica inclusions (< 1 mm), prominent siltans, breakage planes along Fragic cracks and at juncture of cracks and parent matrix, abundant burned roots and root casts with channel infillings, isolated pebbles—uniform 1–2 mm and well rounded, common to few pores, in general Fragic infilling is sandier than parent matrix, infilling also preserves matting of decayed roots (i.e., fibers), boundary to Stratum V is clear and smooth

V (3AB): *Cultural horizon (Paleoindian/Early Archaic), 7.5YR 4/3 silty clay, considerably finer than 2Bxt horizons (Cumulic horizon), very stiff discontinuous carbon inclusion/organic matter, medium to small columnar structures, moderate to very sticky, very plastic, charcoal flecking and manganese reduction, extensive root and root cast network, upward fining, sandy infillings channel voids, mottling primarily in root casts, fibrous preservation with redux overprint, minor and very diffuse Fragic cracks (1–2 mm dia.), lower contact abrupt and clear*

VI (3Bt[g?]):
only upper portion exposed, 7.5YR 4/4, stiff silty clay, extensively mottled, medium to small prismatic structures, extensively mottled as in upper Bg horizon

Figure 41. Site 44PY152, Test Unit 2, west profile.

Alluvial Unit 1 extends from the surface to .65 m and includes Field Levels I, II, and upper III. The basal portion of Field Level III is offset by an eluviation horizon ("2E") associated with the weathering profile of Alluvial Unit 2. Alluvial Unit 1 sediment is a loam to loamy sand. The solum is an "AB" horizon with granular to weak subangular blocky structures and an extensive root-rootlet network. It contains abundant humic matter and is mild to moderately sticky. The "AB" grades to a moderately weathered gleyed Cambic horizon ("Bwg") that is prominently mottled (50–60%) and has abundant oxidation-reduction streaks. Sandy cutans, compound, angular blocky peds, and significant clay enrichment (>5%) indicate the degree of weathering. The interface of the "Bwg" and "Cg" horizons is sharp and clear. The "Cg" consists of a dominantly gleyed clay matrix with medium prismatic structures. The sediment is highly plastic and contains abundant organic inclusions and silty infillings. Most significantly, the transition to the capping horizon of the Alluvial Unit 2 is sharp and abrupt.

Alluvial Unit 2 (2E-2Btx1-2Btx2 profile) is between .65 and 1.35 m in depth. It is sealed by the eluviated "2E" horizon that forms the top of the fragipan. It is distinctly blanched and indicative of forest cover under acidic soil forming conditions. The "2E" signifies the transition to the underlying weathering profile. Unit sediment textures are typically 4–6% sandier than those of Alluvial Unit 1. Fragipan cracks are vertical, and diameters diminish with depth, as do relative concentrations and densities. Fragic infillings are typically the sandiest of the profile and colors are offset from the parent matrix (2.5Y vs. 7.5YR chromas for the weathered solum). Manganese and micaceous inclusions are frequent. Decayed roots, rootlets, and organic matting are infrequently preserved. Lower contact is clear and smooth.

Alluvial Unit 3 is the deepest, ranging from 1.35 to >2.0 m. The top of Alluvial Unit 3 identifies the Paleoindian/Early Archaic cultural horizon. The upper soil horizon is cumulic "3AB" with abundant preserved macro- and micro-organic matter and matting structures. Sediment textures are the siltiest of all units. Medium to small columnar structures are common. There are sandy infillings, filaments, and voids as in Alluvial Unit 2, but there are no fragic structures. Horizon "3Bt" is the most deeply weathered and only argillic solum identified. It preserved irregular gley streaks, and the matrix is extremely stiff and mottled with pervasive oxidation and reduction streaks. Clay concentrations are 3–5% higher than those of the overlying Cambric "Bw" horizons.

Laboratory Results

Tables 33–34 and Figures 42 and 43 present the results of particle size and geochemical testing. The particle size distributions illustrate overall similarities in sediment sizes and sorting between Alluvial Units 1 and 2, which are dominated by sands and silts. Unit 1 is the most sandy, perhaps because it is the only parent material whose textures have been enhanced by intensive flooding and plowing in recent times. Units 2 and 3 typically feature relatively higher proportions of silt and clay. Sedimentation rates are slower, and soil profiles are deeper. High concentrations of clays in the "2AB" and "3Btg" horizons signify pronounced pedogenesis. The former is associated with the archaeological occupation.

Vertically, the grain size data suggest a mild coarsening upward trend that is often associated with vertical accretion. The subtle textural differences in sedimentology between horizons indicate long term incremental alluviation along the stream. Sedimentation rates tend to decline in such settings because bankfull discharge is inversely proportional to the height of the bank. Since textural differences between parent materials were relatively minimal and weathering gradients were subtle, the grain size data had limited interpretive value other than providing long term indications of a stream whose channel trench was becoming increasingly stabilized through time, given the apparent signature of a vertical accretion regime.

Geochemical analyses are somewhat more informative. Table 34 shows that some of the highest levels of potassium (K) and phosphorous (P) are associated either with the uppermost (i.e., "AB") or lowermost (i.e., "3AB") levels. Both elements are common indicators of human activity, typically bone ash, excrement, and food processing (Kolb et al. 1990; Schuldenrein 1989). Since the near surface soil preserves the geochemical compositions of historic landscaping, unusually high levels of these elements are expected. However, the sediment of "3AB" is dated to between 8494 ± 170 B.P. and 9863 ± 130 B.P. (Beta - 74736), and the parallel peaks in K and P concentration may reflect prehistoric activities related to food preparation and consumption, as well as a general trampling of the surfaces by ancient

Table 33. Site 44PY152, Test Unit 2, summary of particle size analysis.

Alluvial Cycle	Level	Depth (cm)	Sand	Silt	Clay	VC Sand	C Sand	M Sand	F Sand	VF Sand
1	I-1	0-10	55	32	13	.2	.4	4.9	30.0	19.5
1	I-2	10-20	43	40	17	.0	.3	2.5	18.5	21.5
1	II	25-35	41	41	18	.0	.5	2.7	17.1	21.1
1	III-1	40-50	36	42	22	.0	.5	2.7	14.7	17.8
1	III-2	50-65	40	36	24	.0	.7	4.0	17.8	17.2
2	III-T	65-75	46	34	20	.2	.5	5.1	22.1	18.3
2	IV-1	90-110	51	31	18	.0	.4	4.9	24.3	21.2
2	IV-2	110-116	47	33	19	.0	.2	4.0	21.8	21.4
2	IV-3	120-138	44	35	21	.0	.3	2.7	18.0	23.1
3	V-1	140-150	40	48	13	.0	.2	1.6	15.0	22.8
3	V-2	150-164	36	42	22	.1	.3	1.4	13.3	20.8
3	V-3	165-186	39	39	22	.0	.4	1.8	15.2	21.6
3	VI	185-204	42	35	23	.0	.2	1.9	18.4	21.1
3	AT1	105-235	47	32	21	.0	.2	2.2	22.0	22.3
3	AT2	235-265	52	32	16	.0	.4	2.1	24.6	24.4
3	AT3	265-295	52	31	17	.0	.6	3.0	24.2	23.9
3	AT4	295-314	53	31	16	.0	.8	3.3	24.0	25.2

Table 34. Site 44PY152, Test Unit 2, summary of soil chemical analysis.

Alluvial Cycle	Level	Depth (cm)	Ca	Mg	P	K	Mn	Zn	Fe	Al	Cu	B	pH	OM
1	I-1	0-10	193.1	39.20	1.5320	4.632	10.990	.7146	9.777	36.89	.2533	.0253	6.4	1.5
1	I-2	10-20	212.8	48.72	0.2724	3.208	6.498	.3542	6.325	44.57	.1604	.0127	6.4	1.1
1	II	25-35	212.2	53.85	-0.2242	2.978	2.959	.1379	5.057	52.42	.1140	.0127	6.2	1.1
1	III-1	40-50	222.1	60.52	-0.2664	3.365	2.426	.1628	5.245	58.88	.1688	.0177	5.9	1.3
1	III-2	50-65	196.8	59.33	-0.1846	3.543	2.255	.1696	7.187	59.04	.2111	.0101	5.8	1.3
2	III-T	65-75	163.5	55.47	-0.0604	2.863	2.032	.1627	7.833	56.84	.1984	.0051	5.8	0.9
2	IV-1	90-110	128.3	53.79	0.3407	3.386	2.532	.2067	8.811	48.33	.2132	.0076	5.7	0.8
2	IV-2	110-116	128.7	60.76	0.2924	3.208	3.958	.1945	8.815	52.40	.2744	.0025	5.6	0.8
2	IV-3	120-138	119.3	59.07	0.2084	3.010	3.798	.2257	9.212	51.83	.2322	.0101	5.6	0.8
3	V-1	140-150	127.3	60.95	0.2287	3.711	3.398	.2267	9.110	54.26	.2301	.0051	5.6	0.8
3	V-2	150-164	122.4	60.80	0.3919	3.480	3.065	.2237	8.636	50.55	.2195	.0025	5.7	0.7
3	V-3	165-186	126.4	62.32	0.7844	3.125	2.489	.2538	8.788	52.44	.2068	.0025	5.7	0.7
3	VI	185-204	158.4	77.33	1.6660	3.596	2.148	.2791	8.554	52.99	.1393	.0000	6.1	0.7
3	AT1	205-235	186.0	85.92	2.7760	3.491	2.838	.2792	8.813	61.47	.1245	.0152	5.9	0.7
3	AT2	235-265	183.2	78.59	2.3970	2.894	2.068	.2190	8.673	55.46	.1287	.0152	6.1	0.6
3	AT3	265-295	221.3	88.43	2.7690	2.685	1.662	.2391	7.776	47.67	.1266	.0101	6.5	0.6
3	AT4	295-314	233.0	91.72	2.3470	2.664	1.481	.2621	7.508	47.60	.1266	-.0025	6.7	0.6

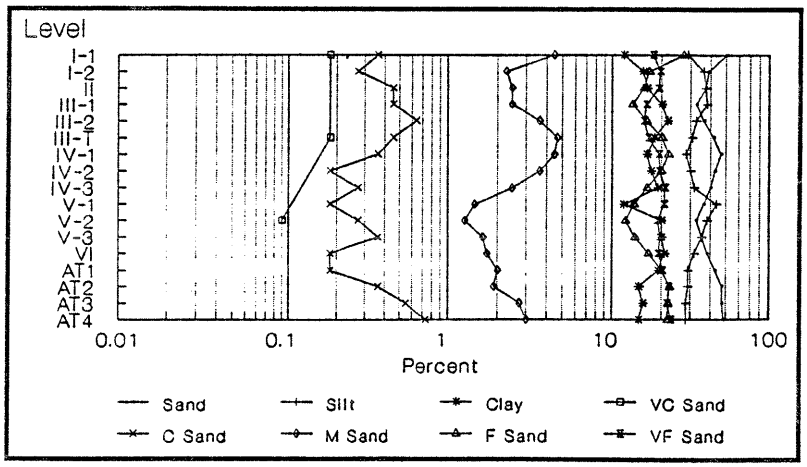

Figure 42. Site 44PY152, Test Unit 2, summary particle size analysis.

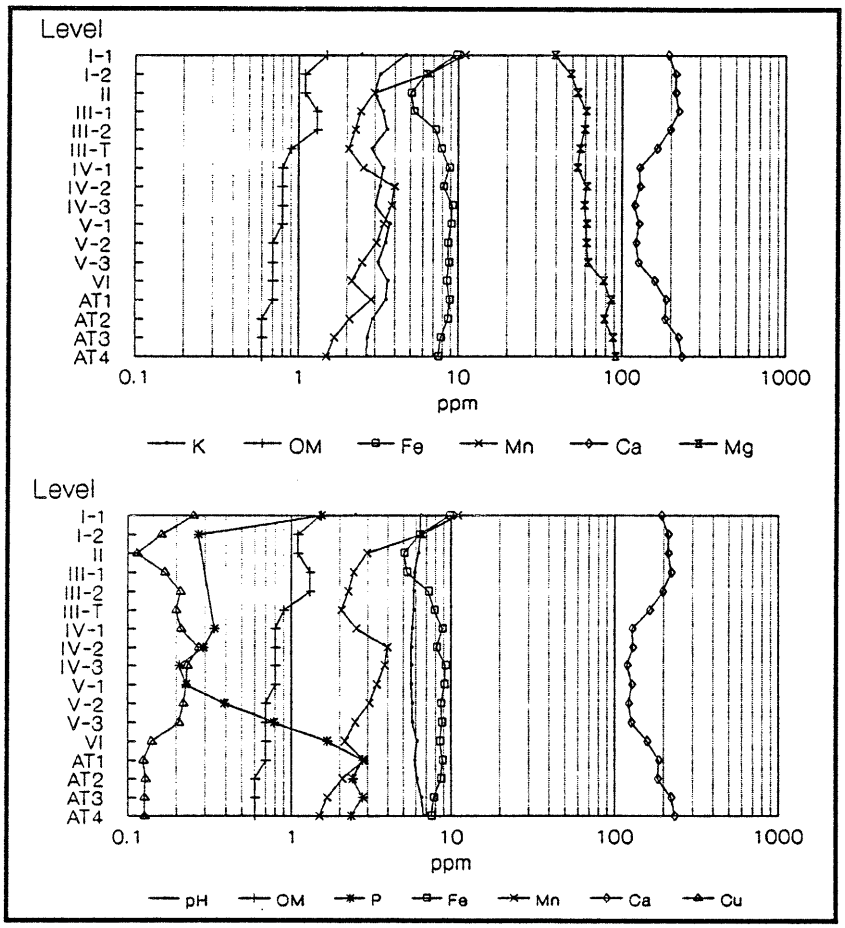

Figure 43. Site 44PY152, Test Unit 2, summary of soil chemical analysis.

Context	Beta Analytic Sample No.	Uncorrected Age (BC)	C13 Corrected Age (BC)	Calibrated Age(s) (BC) (1 Sigma)
Stratum III(*)	74735	2160 ± 60	2230 ± 60	2868, 2805, 2770, 2719, 2703
Stratum V(*)	74736	5800 ± 170	5810 ± 170	6544
Stratum V(**)	77373	6860 ± 130	6860 ± 130 (est.)	7913

* = Low carbon, humic acid assay
** = Accelerator mass spectrometer (AMS) assay

(Calibration after Stuiver and Reimer 1993)

Table 35. Site 44PY152, Test Unit 2, summary of radiocarbon assays.

occupants (Table 35). Significantly, the increasingly basic pH levels of the Alluvial Unit 3 horizons point to alkalinity, which is a by-product of bone decomposition.

Interpretations

Three alluvial units were recognized at 44PY152, each of which attests to discrete changes in the landscape of the site. Generally, however, there is a trend to channel stabilization through time, since geochemical and granulometric analysis point to a vertical accretion sequence as the occupation terrace (T-1) stabilizes as a landform. There is a subtle balance between soil formation and sedimentation that may allow for more complex reconstructions if additional field observation and analysis are undertaken.

Geoarchaeological observations center on the dominant cultural level, V, the "3AB" horizon. While it is somewhat disturbing that a relatively late determination of <8500 B.P. was obtained from the horizon, it must be emphasized that the humic component of the soil dated represents a "mean residence age" during which humic or organic materials entered the sediment from above (see Stein 1992). Ongoing incorporation of overlying humic matter—subsequent to abandonment and over the course of the site burial—would tend to artificially reduce the accurate age of the habitation. It is possible that humification can occur over more than 2000 years at sites where "cumulic upbuilding" is characteristic. Another radiocarbon sample later yielded a more consistent date of about 9900 B.P.

"Cumulic upbuilding" is key to understanding the process of site formation at 44PY152. The concept refers to the delicate balance between sedimentation and soil formation at the site. Generally, humification, or the process of "A-horizon" formation, attests to the reinforcing effects of human activity and stability of a surface. Humification is the product of organic enrichment of sediment by human activity and by degradation of the vegetation cover. Such surfaces are not generally subject to alluviation or sedimentation that would bury or seal in humic horizons. Therefore, situations in which soil formation dominates over sedimentation are "cumulic" and are those likely to preserve primary archaeological materials. Level V is precisely such a horizon, given its incorporation of significant artifice and humic matrices over a long term. The site remains one of the oldest examples of such soil formation in the outer Piedmont.

The antiquity of the archaeological soil ("3AB") is further corroborated by the fragipan of Level IV (Alluvial Unit 2: 2 Btx horizons). This is an almost classic fragipan capped by a typical leached horizon,

here the "2E" (Witty and Knox 1989). While the chronology of fragipan evolution remains poorly understood (Smeck and Ciolkosz 1989), research suggests that peak pedons form over the course of at least 2000 and more likely 12,000 years (Bilzi and Ciolkosz 1977; Schuldenrein and Vento 1993). These observations argue strongly that the reported radiocarbon date may be too young. Analogous sub-fragic contexts to the Paleoindian/Early Archaic horizon at 44PY152 are matched only by the Thunderbird Site in Virginia and the Memorial Park Site in Pennsylvania, both of which produced some of the earliest diagnostic prehistoric assemblages and independently collected radiocarbon dates (Foss 1977). These data suggest that the present site offers strong potential for extending our understanding of the geography and stratigraphic contexts of early prehistoric sites in the formerly unexplored portions of the Mid-Atlantic region.

CHAPTER 10: Summary and Conclusions

Occupational History

Components represented at the three sites varied. Site 44PY152 is unique in that only Paleoindian/Early Archaic occupations are well represented, along with scant evidence of Middle Archaic activity (Childress 1989, 1993). The longest record appears to occur at 44PY7, where essentially the entire sequence from Paleoindian through Late Woodland is evident in beach collections. At 44PY43, at least Archaic through Late Woodland components are present. With integration of the geoarchaeological observations from 44PY152, the following chronicle of occupation can be offered.

In the late Pleistocene, before 11,000 B.P., the Roanoke River was probably more active. The dominant fluvial activity was likely downcutting with occasional channel shifts, and deposition would have been more in the form of lateral accretion than overbank deposition. It was probably toward the end of this interval that the cobble bed underlying the sediments at 44PY7 and 44PY152 was deposited, thus beginning a point bar or similar depositional sequence. Depositional unconformities typically mark the Pleistocene/Holocene transition elsewhere, either in the form of weathered and sometimes eroded terrace surfaces as at Haw River and Gaston, or as terraces capped by cobble/gravel deposits as at Thunderbird.

At the end of the Pleistocene, stream dynamics changed throughout the region. At the Leesville sites, as at many others, a pattern of overbank deposition was initiated, and the basal sediments of the present terrace began to accumulate. Only the upper part of these relatively coarse sediments were encountered in the excavations; they are represented at 44PY152 as the strata including and underlying Stratum V. Samples indicate that this unit represents a typical fining-upward sequence that accreted gradually with periodic flooding. The only confirmed cultural deposits at Leesville correspond to Stratum V, which marks the upper portion of this lower unit and potentially signifies an early if not the first stable, vegetated surface in the sequence.

Although the excavations at 44PY152 did not recover diagnostic artifacts that establish the dates of the occupations, other evidence indicates that the Stratum V surface(s) were utilized between 11,000 and 9000 B.P. The majority of the artifacts at 44PY152 date from this period, particularly to the Early Archaic Palmer substage. William Childress and others have observed and collected this material embedded in strata exposed on the beach that correspond most closely to the Stratum V or lower deposits. Also, there were no other cultural horizons evident in auger or other tests, and rare artifacts from any later components have been observed *in situ* only in the upper portion of the deposit.

Two of the three radiocarbon dates for 44PY152 confirm the early Holocene age of the Stratum V deposits (see Table 35). The first attempt to date this stratum was based on a low carbon sediment sample that yielded a calibrated date of 6544 $\pm$ 170 B.C. (8494 $\pm$ 170 B.P.). This date was more recent than expected, but bulk samples of this kind are subject to a rounding down effect from contamination by percolation/leaching. Therefore, this sample gives only a minimum age for the deposit. A sample of carbonized wood from excavation of Level 4 in Stratum V was later submitted for accelerator mass spectrometry (AMS) assay. It returned a calibrated date of 7913 $\pm$ 130 B.C. (9863 $\pm$ 130 B.P.). This date is probably a more accurate one for the cultural material in Stratum V. Compared with results statewide, this determination is from exceptionally secure context and is among the earliest on record (Table 36).

The coarser sediment unit topped by Stratum V and underlain by a cobble bed appears from auger tests to measure 1.0–1.8 m thick. It is conceivable that occupation could have begun at any point in the history of this deposit, and indeed Childress and others have observed artifacts embedded in sediment seemingly lower than Stratum V. Neither auger samples throughout the unit nor excavated samples from the

Site	Location	Context	Uncorrected Age (BC)	Reference
Thunderbird	Warren Co.	Early Archaic	7950 ± 340	Gardner 1974
Daugherty's Cave	Russell Co.	Early Archaic	7840 ± 400	Benthall 1979
Fifty	Warren Co.	Early Archaic	7300 ± 300	Gardner 1974
44PY152	Pittsylvania Co.	E. Archaic/Paleo.	6860 ± 130	

Table 36. Summary of radiocarbon dates from archaeological contexts at Virginia sites.

upper 50 cm yielded artifacts below the Stratum V horizon, however. At this point in our investigation of the sites, it appears that occupation of any intensity began only after a stable surface (Stratum V) was present. Furthermore, both Paleoindian and Early Archaic components may well be compressed within the Stratum V deposit. A weakly bimodal artifact distribution within the horizon is indicative of potential (see Figure 29) vertical separation of the two components within this stratum. In this respect, the early deposit may be analogous to that at Rucker's Bottom, where a Clovis point occurred within a Palmer-dominated level.

Above Stratum V, no evidence of further occupations were discovered at 44PY152, although Childress (1989, 1993) has observed Middle Archaic (Stanly) points in the bank exposure about 1.0 m below surface. More substantial Middle and Late Archaic components are suspected at nearby 44PY7 above the earliest component and below the Late Woodland horizon. Middle Archaic artifacts are believed to occur within Stratum IV, a classic fragipan soil. It also exhibits a coarsening-upward trend indicative of a change in environment. This unit probably accumulated slowly and is capped by another soil likely formed under forested conditions (lower Stratum III). It would be reasonable to expect cultural material to be more common in this upper portion of the unit. Of note is the evidence a slowly aggrading sedimentary unit provides of a stable stream regime. Most likely, the nearby Roanoke River had become entrenched within a relatively fixed channel by this time and probably earlier.

A significant change is evident in upper Stratum III, which represents a lower-energy depositional environment. The gleyed, clayey, and darker character of this stratum is distinctive in the column and appears to represent a wetland/slough deposit. A similar deposit was observed in the same relative position in bank exposures upstream, downstream and across the lake from 44PY152, indicating that such conditions were widespread in the immediate area. A significant shift in the river channel that would create this environment is not likely given the other evidence for its entrenchment. Perhaps the channel was temporarily dammed. Regardless, these conditions prevailed around 4720 B.P. as the radiocarbon date for the stratum shows. Elsewhere, the onset of wetter conditions about this time has been interpreted as signaling the end of the altithermal (Larsen and Schuldenrein 1990).

Resumption of more typical overbank deposition occurred after this time. These most recent deposits overlie the clayey Stratum III and at most area sites contain Woodland material. Essentially modern conditions seem to have been in place then, probably beginning by 3000–2000 B.P.

Settlement Patterns

This discussion will address Paleoindian/Early Archaic settlement patterns to the extent that information allows. It is premature to begin thinking in concrete terms of a middle Roanoke Paleoindian settlement system or "complex," but the project results do lend themselves to some broader considerations within the context of region-wide observations. By

integrating site location, lithic raw material, and physiographic factors, an outline of a working model can be proposed for further evaluation.

At least two of the Paleoindian/Early Archaic site types described by Gardner (1974, 1989) and expanded upon by McAvoy (1992) are represented at Leesville Lake. Finds of isolated points or discrete scatters of artifacts are common in the basin, often dating from the transitional Hardaway-Dalton or Early Archaic (Childress, personal communication 1994). These would represent hunting camps in the current models. Site 44PY152 and probably 44PY7 represent base camp maintenance sites. Such sites are not associated with quarries and have little evidence of tool production, as their primary function was to support subsistence activities. The array of tool types at the two larger Leesville sites is consistent with a considerable range of subsistence- and maintenance-oriented activities. Such sites are expected to have often been reoccupied, perhaps on an annual basis. The greater density of early material at 44PY7 may indicate that it was reoccupied more often or that the occupations were somehow more intensive at times.

The locations of these sites are believed to have been strongly influenced by local topography. Smith Mountain Gap, through which the Roanoke River breaches Smith Mountain, is a natural conduit for travel in this area (see Figure 4). Its importance would have been magnified further, given the stream oriented travel that is believed to have characterized the period. To otherwise reach the other side of the mountain would require a demanding trek over the ridge or a lengthy detour around it. The position of the sites at one outlet of the gap, also near a stream confluence, would have made it an attractive and strategic one for base camps. In regions like the Piedmont, which are generally poor in cryptocrystalline stone sources, combinations of natural features such as exist at Smith Mountain Gap can be expected to have been the major determinants of site locations.

Defining the band or macroband range of the groups occupying these sites is still a challenge, but some clues exist. Raw materials utilized at the sites are nearly all available within the Roanoke drainage, but procurement from primary sources would require travel within a broad radius of Smith Mountain Gap, both westward into the Ridge and Valley province and downstream into the central Piedmont. Known chert-bearing formations are present no closer than 50 km west, and metavolcanic/silicified slate no closer than 70 km east (see Figure 36). Jasper procurement potentially required overland travel, outside of the Roanoke basin, into the Ridge and Valley province 50 km northwest. (The cobble load of the river adjacent to the sites does contain pebbles of chert and jasper, but they are not observed now in sufficient quantity or quality to account for all of the material at the site.) Lithic procurement patterns, therefore, indicate that the groups at Leesville participated in a band-level territory 50–70 km in radius. An estimated group range of this extent is consistent with those noted by McAvoy (1992:149) for southeastern Virginia but more extensive than noted by Gardner (1974) in the Shenandoah Valley.

Significantly, the region defined above on the basis of raw material sources corresponds almost precisely with an area of numerous fluted point finds (Turner 1989:79–80). This "macrocluster" potentially delineates a Paleoindian (and later, Early Archaic) band territory centered on the middle Roanoke River (Figure 44). Anderson (1990:170–171), in fact, suggests that the concentration in southern Virginia/northern North Carolina is one of several "loci of initial colonization" in the eastern United States. In the middle Roanoke area, future work should include an effort to expand the record of known sites to identify the full range that is expected, including quarries or workshops in lithic source areas.

Modeling the Locations of Buried Piedmont Sites

The results of excavation at Leesville Lake can be added to a growing list of Piedmont projects that confirm the presence of deeply stratified deposits in the floodplains of the province's major streams. They also reinforce an emerging appreciation of the physical conditions that contribute to their formation. Together, these observations permit refinement of a settlement model and identification of other locations where deeply stratified deposits may occur. The concentration here will be on potential Virginia sites since they have been rarely documented.

Piedmont sites with deep deposits in Georgia, North Carolina and, now, Virginia share one basic trait: a location that coincides with an abrupt and/or significant reduction in stream velocity. The Doerschuk Site in North Carolina and the Leesville sites are most alike and represent the most conspicuous locations of this kind. Doerschuk lies immediately downstream from

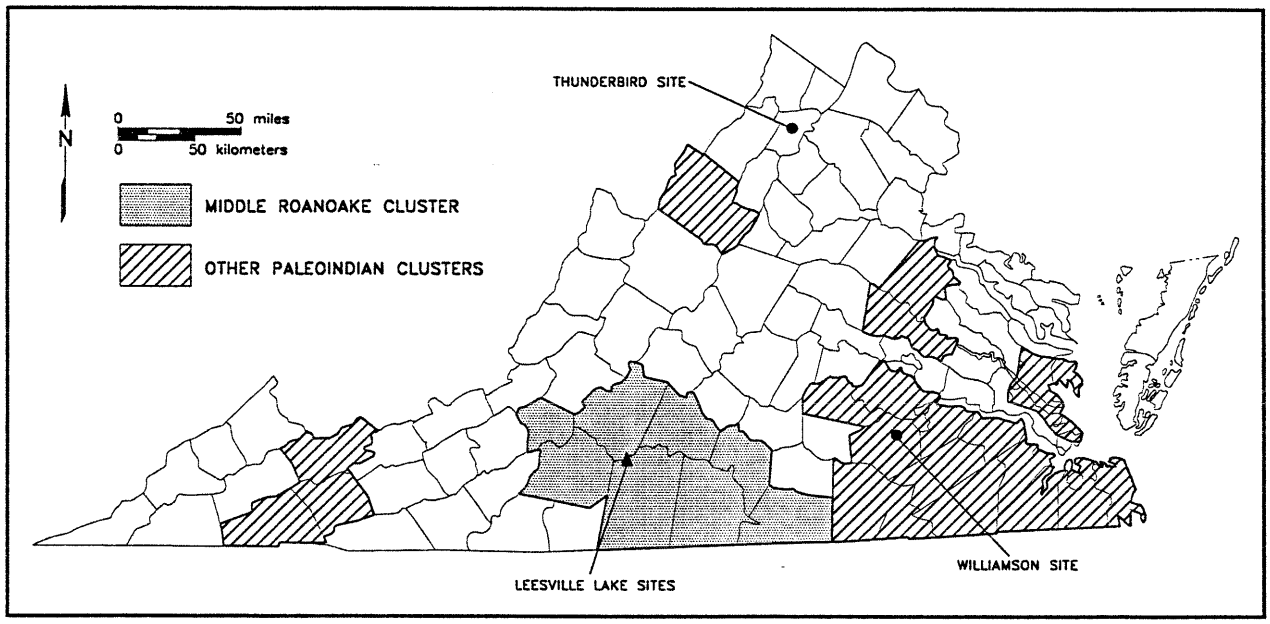

Figure 44. Principal Paleoindian artifact clusters in Virginia.

"The Narrows" and Leesville Lake just down from Smith Mountain Gap, both gorge-like constrictions of the rivers. Just as Coe (1964:14) surmised originally, the sudden reduction in stream velocity in these settings is such that sediment drops out of the streams and has been deposited at varying rates at least since the beginning of the Holocene.

The other sites are positioned at less apparent gradient changes. Coe (1964:84) accounted for the Gaston deposits with reference to a stream velocity change in an eddy formed downstream from a finger-like projection of resistant bedrock in the river. The Haw River sites lie in a broad basin formed by a structural change along a fault zone. Much like the effect of the fall line, stream energy becomes more dispersed within the basin.

In spite of the fundamental consistency in their settings, it is important to appreciate the differences in the actual deposits that underscore the significant influence of local conditions. The Gaston and Doerschuk sites, for example, boast the deepest deposits, yet neither of them has known cultural horizons extending beyond the Middle Archaic and each occurs in a different depositional environment. The Haw River sequence, on the other hand, is the most complete in terms of cultural history, but relatively shallow and undifferentiated pedogenically. Likewise, the Rucker's Bottom deposit is relatively thin, but the cultural sequence is essentially complete and it is the only Piedmont site to have yielded a Clovis point *in situ*. The irony is that the deepest deposits are often the least complete.

Also, the scarcity of diagnostic Paleoindian artifacts in these sequences is glaring. Just as evident is the repeated documentation of a depositional unconformity at the Pleistocene/Holocene transition. These traits of the deposits indicate, first, the major shift in stream character and, thus, depositional environments at the close of the Pleistocene. The evidence of these changes, in turn, suggests that many sites of late Pleistocene age were scoured and heavily eroded before the onset of massive Holocene deposition.

A summary of the main points for predicting site locations and forming expectations of integrity is as follows:

1. A change in stream velocity or gradient usually occurs just upstream from sites with deep

deposits. **At present this is the only common denominator.**

2. The source of the gradient change can vary tremendously, from obvious gorge-like constrictions to subtle structural changes at fault zones.

3. Areas known to have very deep deposits may not necessarily have the most complete cultural sequences. In fact, the lower-energy depositional environments may be less conducive to flood damage to or loss of cultural deposits (e.g., Haw River).

4. Sediments can vary in character from sandy to stiffer, silty texture.

5. Truly intact Pleistocene cultural deposits, separated from early Holocene deposits, are extremely rare in deep alluvial deposits. Potentially, shallower first terrace deposits like those at Thunderbird will remain a more promising source of preserved Paleoindian activity areas.

Piedmont locations in Virginia that meet the gradient change criterion are not scarce. Specific areas that would bear deep testing for stratified deposits and early components include:

1. The floodplain of the Rivanna River near Shadwell, southeast of Charlottesville, just below its passage through the South West Mountains.

2. The floodplain of the James River in the vicinity of Lynchburg.

3. The floodplain of Broad Run near Haymarket, where the stream passes through the Bull Run Mountains.

4. The floodplain of the Potomac River near Point-of-Rocks, just below the river's gap through Catoctin Mountain.

5. Locations at the eastern edge of the Piedmont/western Coastal Plain (at the Fall Zone), just below shoals such as exist near Fredericksburg on the Rappahannock, near Richmond on the James, and near Washington on the Potomac.

Recommendations for Additional Work

The three sites examined by this project all warrant further investigation. Brief summaries of suggested follow-up strategies are provided below.

It is essential before proceeding to emphasize that future plans must account for the challenges confronting archaeologists in the Leesville Lake basin. The most obvious one is the fluctuating water level. Levels can rise up to 2 m very quickly and with little warning, leaving units flooded and equipment stranded for indefinite periods. The spring and fall seasons are reputed to be better since the milder weather creates less demand for hydro-electric generation. Even then, however, outages in far-flung regions can bring the Smith Mountain plant on-line unexpectedly. Heavy rains, too, can require unanticipated releases of water in any season.

The second challenge is presented by the soils. The alluvium in this area is not sandy, but very heavy and clayey. Excavation is slowed by the density of the soil, but more demanding is screening. Fine-screening the soil is extremely difficult, but necessary to recover the small material characteristic of low-density sites like 44PY152.

Site 44PY7

This site was neglected over the course of this project but may well contain the most intensive early occupation levels, judging solely from beach observations of artifact density. For this reason, the original plan for evaluating the site should be completed, with an emphasis on recovering a screened sample from both a beach unit and a deep unit through the entire deposit. A complete sample from cultural horizons in a deep unit will be very important in fully understanding the occupations relative to local environmental change. Recovery methods should be consistent with those used at 44PY152 to facilitate comparison. Crucial elements of the work will be geoarchaeological assessment of the excavations, analysis of column samples, and radiocarbon dating. Additional work will be designed based on the results of this first phase.

Site 44PY152

This site merits additional investigation, but further work is not urgent. This project established the age and essential nature of the deposits, and the results indicate that the site is eligible for the National Register of Historic Places under Criterion D. The most pressing item is to backfill Test Unit 2 to prevent vandalism and erosion.

Site 44PY152 is an attractive location for future studies, however, because of its essentially single component nature, especially at the eastern end. Because damage to later cultural deposits would be negligible, deep backhoe testing is recommended here to efficiently ascertain the complete geomorphological and pedological context of the Stratum V horizon relative to long-term patterns of deposition and environmental change. This could be accomplished with a few continuous or broken trenches across the landform (north–south), extending as deeply as possible and, ideally, through the cobble deposit. The research team for this work would include a geoarchaeologist, and funding should be secured for detailed analysis of soil and radiocarbon samples.

Site 44PY43

A palisade line or distinct edge defining the extent of this village remnant was not identified. Two trenches exposed a number of soil anomalies below the plowzone in areas that shovel tests had identified as near the periphery of the artifact scatter. Several of them are possibly small post holes and two others may be larger pit features. None, however, was confirmed as cultural in origin by excavation, and indeed none exhibited characteristics that were unmistakably "cultural."

The density of material on the beach and in profiles, the obvious stain marking it in aerial photographs, positive shovel tests, and potential features below the plowzone are attributes that signify the research potential of the site remnant. A thorough investigation of the portion that survives should be sufficient to establish the date(s) and nature of this obviously prominent site.

The most urgent measure would be to determine the nature of the soil anomalies identified in the trenches opened during this project, and then to backfill the trenches. The most efficient means of evaluating the site further would be through extensive stripping, either by hand or with a machine, and excavation of a representative sample of features. Documentation of the complete plan of the site remnant would offer an important basis for reconstructing the overall site plan and comparing it to other contemporary and analogous sites. (Bear in mind that extensive stripping would lay the site bare to the erosive effects of high water and vandalism, such that investigation at this scale would be limited to one opportunity.)

Identification of Other Sites

As argued earlier, many locations in the Piedmont of Virginia hold promise for preserved stratified deposits. Their discovery is important for several reasons. Naturally, they are significant from a management standpoint since the stratified records they contain are important to any region's archaeology. The sequences constructed from such sites have long provided vital chronological frameworks and records of environmental change. As many as possible should be identified, evaluated, and preserved. Also, sites of this kind that can be found outside of impoundments like Leesville Lake will be more logistically conducive to detailed and long-term investigation.

At potential site locations, a program of deep augering and backhoe trenching should be conducted. Auger tests should be fine screened in standard segments, as should column samples from deep trenches. A geoarchaeologist should be available during the search to make periodic visits to each potential site.

The experiences described in this report should also be a reminder to archaeologists working across the region that, first, deeply buried, low-density sites do occur in floodplain deposits and, second, that conventional survey methods (i.e., shovel testing) may not be sufficient to identify them. **For these reasons, it is recommended that systematic augering and/or backhoe testing be a standard procedure on surveys in floodplain settings.** This is most true where sites occur below gradient changes or where standard shovel tests have not identified a site in an otherwise high-potential area.

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APPENDIX A

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
AT 1 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		1
				Provenience Total:		1
AT 1 270-300CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 2 000-030CM	Body Sherd	Eroded	Sand Tempered			3
AT 2 000-030CM	Body Sherd	Net Impressed	Sand Tempered			1
AT 2 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 2 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		9
AT 2 000-030CM	Fire-cracked Rock				3.70	3
				Provenience Total:		17
AT 2 030-060CM	Body Sherd	Eroded	Sand Tempered			7
AT 2 030-060CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		8
AT 2 090-120CM	Body Sherd	Net Impressed	Sand Tempered			1
AT 2 090-120CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
AT 2 090-120CM	Unident. Fragment	Eroded	Sand Tempered			1
				Provenience Total:		4
AT 2 120-150CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 3 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 3 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		3
AT 3 030-060CM	Body Sherd	Unidentifiable	Sand Tempered			1
AT 3 030-060CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		2
AT 3 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 3 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 3 180-210CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 3 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		1
				Provenience Total:		2
AT 4 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 4 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		8
				Provenience Total:		9

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
AT 4 030-060CM	Debitage	2ndry/Biface Thinning Flake	Noncortical	Metavolcanic		1
				Provenience Total:		1
AT 4 060-090CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
				Provenience Total:		2
AT 4 090-120CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
AT 4 090-120CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		10
AT 4 090-120CM	Fire-cracked Rock				38.40	2
				Provenience Total:		16
AT 4 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
AT 4 120-150CM	Fire-cracked Rock				30.40	2
				Provenience Total:		5
AT 4 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
				Provenience Total:		3
AT 4 210-240CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
AT 4 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		3
AT 4 240-252CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
				Provenience Total:		2
AT 5 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		3
AT 5 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		5
AT 5 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		6
AT 5 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		1
				Provenience Total:		7
AT 5 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 6 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
AT 6 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		6
AT 6 000-030CM	Unident. Fragment	Eroded	Sand Tempered			2
				Provenience Total:		10
AT 6 030-060CM	Body Sherd	Eroded	Sand Tempered			1
AT 6 030-060CM	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
AT 6 030-060CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		4
				Provenience Total:		6
AT 6 090-120CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
AT 6 090-120CM	Fire-cracked Rock				47.60	22

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
				Provenience Total:		24
AT 6 120-150CM	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
AT 6 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
AT 6 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		1
AT 6 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Rhyolite		3
AT 6 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Unidentified Material		1
				Provenience Total:		8
AT 6 150-180CM	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		3
AT 6 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Metavolcanic		1
AT 6 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		4
				Provenience Total:		8
AT 7 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 7 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		2
				Provenience Total:		2
SURFACE	Hafted Biface	Small Triangular Cluster	Proximal Fragment	Quartz		1
				Provenience Total:		1
TU 1 L.1 1\4"	Body Sherd	Cord Marked	Sand Tempered			2
TU 1 L.1 1\4"	Body Sherd	Net Impressed	Sand Tempered			2
TU 1 L.1 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
TU 1 L.1 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unident. Chert		4
TU 1 L.1 1\4"	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		1
TU 1 L.1 1\4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		20
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	1-74% Cortex	Unident. Chert		1
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		2
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		4
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		4
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Jasper		1
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Metavolcanic		1
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		29
TU 1 L.1 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		9
TU 1 L.1 1\4"	Fire-cracked Rock				4.40	3
				Provenience Total:		84
TU 1 L.1 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
TU 1 L.1 FINE	Debitage	Flake Frag./Shatter	Noncortical	Metavolcanic		1
TU 1 L.1 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		8

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
TU 1 L.1 FINE	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		1
TU 1 L.1 FINE	Debitage	Tertiary/Retouch Flake	Noncortical	Quartz		1
TU 1 L.1 FINE	Fire-cracked Rock				24.60	3
				Provenience Total:		18
TU 1 L.2 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		4
TU 1 L.2 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartzite		1
TU 1 L.2 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unident. Chert		2
TU 1 L.2 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unidentified Material		1
TU 1 L.2 1\4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		17
TU 1 L.2 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		31
TU 1 L.2 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		2
TU 1 L.2 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		9
TU 1 L.2 1\4"	Debitage	Tested Cobble/Nodule	>75% Cortex	Unidentified Material		1
TU 1 L.2 1\4"	Fire-cracked Rock				62.60	3
				Provenience Total:		71
TU 1 L.2 FINE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
TU 1 L.2 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
TU 1 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		5
TU 1 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		2
				Provenience Total:		10
TU 1 L.3 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		3
TU 1 L.3 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartzite		1
TU 1 L.3 1\4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unident. Chert		6
TU 1 L.3 1\4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
TU 1 L.3 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		1
TU 1 L.3 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		6
TU 1 L.3 1\4"	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		9
				Provenience Total:		28
TU 1 L.3 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
TU 1 L.3 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		6
TU 1 L.3 FINE	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		2
				Provenience Total:		10
				Site Total:		376

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
ST 01	Body Sherd	Net Impressed	Sand Tempered			1
ST 01	Body Sherd	Unidentifiable	Sand Tempered			1
ST 01	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
ST 01	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartz		1
ST 01	Fire-cracked Rock				45.10	1
				Provenience Total:		5
ST 02	Body Sherd	Eroded	Sand Tempered			3
ST 02	Body Sherd	Eroded	Sand/Grit Tempered			1
ST 02	Body Sherd	Net Impressed	Sand/Grit Tempered			1
ST 02	Body Sherd	Unidentifiable	Sand Tempered			2
ST 02	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
ST 02	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		2
ST 02	Debitage	Flake Frag./Shatter	Noncortical	Quartz		7
ST 02	Debitage	Tertiary/Retouch Flake	Noncortical	Gray Chert		1
ST 02	Fire-cracked Rock				390.80	4
				Provenience Total:		22
ST 03	Body Sherd	Eroded	Sand Tempered			2
ST 03	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		1
ST 03	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		1
ST 03	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
ST 03	Debitage	Primary/Reduction Flake	Noncortical	Quartz		1
				Provenience Total:		6
ST 04	Body Sherd	Eroded	Sand Tempered			1
ST 04	Debitage	2ndry/Biface Thinning Flake	Noncortical	Crystalline Quartz		1
ST 04	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		3
ST 05	Body Sherd	Eroded	Sand Tempered			1
ST 05	Body Sherd	Net Impressed	Sand Tempered			3
ST 05	Body Sherd	Unidentifiable	Sand Tempered			2
ST 05	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
ST 05	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
ST 05	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
ST 05	Fire-cracked Rock				20.70	1
				Provenience Total:		13
ST 06	Body Sherd	Eroded	Sand Tempered			1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
ST 06	Body Sherd	Net Impressed	Sand Tempered			4
ST 06	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
ST 06	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		1
ST 06	Debitage	Flake Frag./Shatter	Noncortical	Quartz		4
				Provenience Total:		11
ST 07	Body Sherd	Eroded	Sand Tempered			4
ST 07	Body Sherd	Net Impressed	Sand Tempered			1
ST 07	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
				Provenience Total:		8
ST 08	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
ST 09	Body Sherd	Eroded	Sand Tempered			2
ST 09	Body Sherd	Net Impressed	Sand Tempered			3
ST 09	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
ST 09	Debitage	Flake Frag./Shatter	Noncortical	Quartz		4
ST 09	Fire-cracked Rock				148.20	1
				Provenience Total:		11
ST 10	Body Sherd	Net Impressed	Sand Tempered			7
ST 10	Debitage	Angular, Blocky Frag/Chunks	>75% Cortex	Quartz		1
ST 10	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
ST 10	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
ST 10	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
ST 10	Fire-cracked Rock				7.70	1
				Provenience Total:		15
ST 11	Body Sherd	Unidentifiable	Sand Tempered			1
				Provenience Total:		1
ST 12	Body Sherd	Eroded	Sand Tempered			3
ST 12	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
ST 12	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
ST 12	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
ST 12	Rim Sherd	Eroded	Sand Tempered			1
				Provenience Total:		9
ST 13	Body Sherd	Net Impressed	Sand Tempered			5
ST 13	Body Sherd	Unidentifiable	Sand Tempered			3
ST 13	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		9

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
ST 14	Body Sherd	Eroded	Sand Tempered			1
ST 14	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartz		1
ST 14	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		3
SURFACE	Biface	Stage 2	Misc./Unident. Fragment	Quartz		1
SURFACE	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		1
SURFACE	Debitage	Flake Frag./Shatter	Noncortical	Jasper		1
SURFACE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
SURFACE	Hafted Biface	Jack's Reef Corner-Notched	Proximal Fragment	Bl. Translucent Chert		1
SURFACE	Hafted Biface	Large Woodland Triangular	Proximal Fragment	Gray Chert		1
SURFACE	Hafted Biface	Morrow Mountain	Distal Fragment	Quartz		1
SURFACE	Hafted Biface	Small Triangular Cluster	Complete	Gray Chert		1
SURFACE	Hafted Biface	Small Triangular Cluster	Midsection	Quartz		1
SURFACE	Hafted Biface	Small Triangular Cluster	Proximal Fragment	Quartz		1
SURFACE	Hafted Biface	Unident. Archaic Corner-Notch	Midsection	Banded Rhyolite		1
SURFACE	Informal Tool	Retouched Flake	Convex Edge	Quartz		1
SURFACE	Informal Tool	Retouched Flake	Straight Edge	Unident. Chert		1
				Provenience Total:		15
				Site Total:		133

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
AT 01 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 01 030-060CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 01 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
AT 01 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		2
AT 01 180-210CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 01 180-210CM	Debitage	Tertiary/Retouch Flake	1-74% Cortex	Gray Chert		2
				Provenience Total:		3
AT 01 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
AT 01 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
AT 01 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		3
AT 03 000-030CM	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
AT 03 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 03 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		3
AT 03 030-060CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 03 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 03 150-180CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 03 150-180CM	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		1
AT 03 150-180CM	Fire-cracked Rock				.30	1
				Provenience Total:		3
AT 04 000-030CM	Informal Tool	Retouched Flake	Straight Edge	Quartz		1
				Provenience Total:		1
AT 04 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 04 150-180CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
AT 04 150-180CM	Debitage	Tertiary/Retouch Flake	Noncortical	Quartz		1
				Provenience Total:		2
AT 05 090-120CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
AT 05 120-150CM	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
				Provenience Total:		1
AT 05 180-195CM	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
				Provenience Total:		1
AT 06 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 06 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		1
				Provenience Total:		1
AT 06 240-258CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
AT 07 000-030CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 07 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
AT 07 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
AT 07 240-270CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 08 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
AT 08 210-240CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 08 240-260CM	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
AT 09 000-030CM	Debitage	Flake Frag./Shatter	1-74% Cortex	Gray Chert		1
AT 09 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		10
				Provenience Total:		11
AT 09 030-060CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		2
AT 09 150-180CM	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
				Provenience Total:		1
AT 09 180-210CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 10 000-030CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
AT 10 030-060CM	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
				Provenience Total:		1
AT 10 210-230CM	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		1
BANK CUT 1	Debitage	Flake Frag./Shatter	Noncortical	Unident. Chert		2
				Provenience Total:		2
BEACH SURFACE	Basal Sherd	Unidentifiable	Shell Tempered			1
BEACH SURFACE	Biface	Stage 1	Misc./Unident. Fragment	Chalcedony		1
BEACH SURFACE	Biface	Stage 4	Misc./Unident. Fragment	Quartz		1
BEACH SURFACE	Body Sherd	Cord Marked	Sand/Grit Tempered			2
BEACH SURFACE	Body Sherd	Cord Marked	Shell Tempered			1
BEACH SURFACE	Body Sherd	Cord Marked	Shell Tempered			2
BEACH SURFACE	Body Sherd	Plain	Sand Tempered			1
BEACH SURFACE	Body Sherd	Unidentifiable	Sand Tempered			3
BEACH SURFACE	Body Sherd	Unidentifiable	Sand/Grit Tempered			1
BEACH SURFACE	Debitage	2ndry/Biface Thinning Flake	1-74% Cortex	Quartz		1
BEACH SURFACE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Metavolcanic		1
BEACH SURFACE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		26
BEACH SURFACE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Rhyolite		1
BEACH SURFACE	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Quartz		4
BEACH SURFACE	Debitage	Angular, Blocky Frag/Chunks	>75% Cortex	Quartz		4
BEACH SURFACE	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartz		9
BEACH SURFACE	Debitage	Flake Frag./Shatter	1-74% Cortex	Quartzite		1
BEACH SURFACE	Debitage	Flake Frag./Shatter	1-74% Cortex	Rhyolite		1
BEACH SURFACE	Debitage	Flake Frag./Shatter	1-74% Cortex	Unidentified Material		1
BEACH SURFACE	Debitage	Flake Frag./Shatter	>75% Cortex	Quartz		1
BEACH SURFACE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		95
BEACH SURFACE	Debitage	Flake Frag./Shatter	Noncortical	Vitric Tuff		1
BEACH SURFACE	Debitage	Primary/Reduction Flake	1-74% Cortex	Quartz		4
BEACH SURFACE	Debitage	Primary/Reduction Flake	1-74% Cortex	Unidentified Material		1
BEACH SURFACE	Debitage	Primary/Reduction Flake	>75% Cortex	Quartz		1
BEACH SURFACE	Debitage	Primary/Reduction Flake	Noncortical	Quartz		12
BEACH SURFACE	Debitage	Tertiary/Retouch Flake	Noncortical	Quartz		10
BEACH SURFACE	Fire-cracked Rock					25
BEACH SURFACE	Hafted Biface	Palmer Corner-Notched	Complete	Quartz		1
BEACH SURFACE	Hafted Biface	Unidentified Type	Complete	Quartz		1
BEACH SURFACE	Informal Tool	Retouched Flake	Endscraper	Vitric Tuff		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
BEACH SURFACE	Informal Tool	Retouched Flake	Straight Edge	Jasper		1
BEACH SURFACE	Informal Tool	Utilized Flake	Straight Edge	Quartz		1
BEACH SURFACE	Rim Sherd	Incised	Shell Tempered			1
				Provenience Total:		218
TU 01 L.1 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		1
TU 01 L.1 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
				Provenience Total:		2
TU 01 L.1 FINE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Black Opaque Chert		1
TU 01 L.1 FINE	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
TU 01 L.1 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		7
				Provenience Total:		9
TU 01 L.2 1/4"	Core	Lamellar		Quartz		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	>75% Cortex	Quartzite		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Black Opaque Chert		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unident. Chert		1
TU 01 L.2 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unidentified Material		1
TU 01 L.2 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		6
TU 01 L.2 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartzite		1
TU 01 L.2 1/4"	Debitage	Flake Frag./Shatter	Convex/Concave	Argillite		1
TU 01 L.2 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Black Opaque Chert		1
TU 01 L.2 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		4
TU 01 L.2 1/4"	Informal Tool	Utilized Flake	Denticulated Edge	Quartz		1
TU 01 L.2 1/4"	Other Formal Tool	Unidentifiable	Distal Fragment	Quartzite		1
				Provenience Total:		22
TU 01 L.2 FINE	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
TU 01 L.2 FINE	Debitage	Angular, Blocky Frag/Chunks	1-74% Cortex	Black Opaque Chert		1
TU 01 L.2 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		3
TU 01 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Chalcedony		1
TU 01 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		4
TU 01 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
TU 01 L.2 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		12
TU 01 L.3 1/4"	Debitage	2ndry/Biface Thinning Flake	1-74% Cortex	Gray Chert		1
TU 01 L.3 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Quartz		4

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
TU 01 L.3 1/4"	Debitage	Angular, Blocky Frag/Chunks	>75% Cortex	Quartz		2
TU 01 L.3 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Gray Chert		1
TU 01 L.3 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		3
TU 01 L.3 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		5
TU 01 L.3 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		12
TU 01 L.3 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Rhyolite		2
TU 01 L.3 1/4"	Debitage	Primary/Reduction Flake	>75% Cortex	Quartz		1
TU 01 L.3 1/4"	Hafted Biface	Unidentified Type	Distal Fragment	Quartzite		1
				Provenience Total:		32
TU 01 L.4 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
TU 01 L.4 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
TU 01 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
TU 01 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartzite		1
TU 01 L.4 1/4"	Debitage	Primary/Reduction Flake	1-74% Cortex	Metavolcanic		1
TU 01 L.4 1/4"	Debitage	Tertiary/Retouch Flake	Noncortical	Gray Chert		1
				Provenience Total:		11
TU 01 L.4 FINE	Debitage	Flake Frag./Shatter	Noncortical	Vitric Tuff		1
				Provenience Total:		1
TU 01 L.5 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
TU 01 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		1
				Provenience Total:		2
TU 01 L.5 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Crystalline Quartz		1
				Provenience Total:		1
TU 01 L.6 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		3
TU 01 L.6 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		4
TU 02 L.1 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Black Opaque Chert		1
TU 02 L.1 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		2
TU 02 L.1S 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Argillite		1
				Provenience Total:		1
TU 02 L.1S FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		2
				Provenience Total:		2
TU 02 L.2 PP#01	Hafted Biface	Unidentified Type	Distal Fragment	Quartz		1
				Provenience Total:		1
TU 02 L.2 PP#02	Hafted Biface	Unident. Archaic Side-Notched	Midsection	Quartzite		1

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
				Provenience Total:		1
TU 02 L.2N 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
				Provenience Total:		1
TU 02 L.2N FINE	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		1
				Provenience Total:		1
TU 02 L.2S 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		6
TU 02 L.2S 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		1
TU 02 L.2S 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
TU 02 L.2S 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		3
TU 02 L.2S 1/4"	Fire-cracked Rock				64.20	10
				Provenience Total:		21
TU 02 L.3S 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Argillite		1
TU 02 L.3S 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
TU 02 L.3S 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		6
TU 02 L.4 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Gray Chert		1
TU 02 L.4 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Unident. Chert		1
TU 02 L.4 1/4"	Debitage	Angular, Blocky Frag/Chunks	>75% Cortex	Quartz		2
TU 02 L.4 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		17
TU 02 L.4 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Unident. Chert		1
TU 02 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Crystalline Quartz		2
TU 02 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Jasper		1
TU 02 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
TU 02 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		8
TU 02 L.4 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Unidentified Material		1
TU 02 L.4 1/4"	Fire-cracked Rock				40.70	9
				Provenience Total:		45
TU 02 L.5 1/4"	Debitage	2ndry/Biface Thinning Flake	Noncortical	Jasper		1
TU 02 L.5 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		7
TU 02 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Argillite		1
TU 02 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Black Opaque Chert		1
TU 02 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Gray Chert		1
TU 02 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		6
TU 02 L.5 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Rhyolite		1
TU 02 L.5 1/4"	Fire-cracked Rock				1.40	1
				Provenience Total:		19

Provenience	Class	Subclass 1	Subclass 2	Raw Material	Weight(g)	Quantity
TU 02 L.5 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		1
TU 02 L.5 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		3
TU 02 L.6 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		4
TU 02 L.6 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Black Opaque Chert		1
TU 02 L.6 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		2
				Provenience Total:		7
TU 02 L.6 FINE	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		5
TU 02 L.6 FINE	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		6
TU 02 L.7 1/4"	Debitage	Angular, Blocky Frag/Chunks	Noncortical	Quartz		7
TU 02 L.7 1/4"	Debitage	Flake Frag./Shatter	Noncortical	Quartz		1
				Provenience Total:		8
				Site Total:		497