Cultural Resources Assessment of the Horn Lake Creek and Tributaries Project, DeSoto County, Mississippi

by

Gerald P. Smith

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Introduction

This project was conducted as an intensive survey of the area affected by channel improvements along Horn Lake Creek and two of its tributaries. A study corridor of variable width, but generally 100 feet (30 m) from each bank was examined. Field work was conducted during the period of Nov. 6 - Dec. 26, 1988, as weather and soil conditions permitted. Survey work was completed by Nov. 28, 1988, but completion of testing, mapping, and controlled surface collection of the one site found, a lithic scatter, was delayed until late December. All materials recovered are in the research collections of C. H. Nash Museum, Department of Anthropology, Memphis State University.

Environmental Setting

Horn Lake Creek is a small stream in northwestern Mississippi which drains into Horn Lake from the loess uplands, then ultimately into the Mississippi via the Coldwater/Tallahatchie/ Yazoo system. It was a meandering stream with a broad flood-plain until channelization during this century. Recent vegetation consisted of gum-cypress swamp forest in the flood-plain and oak-hickory in the upland portion of the drainage.

At the height of the last half of the Wisconsin glaciation, about 21,000 to 15,000 B.C., the Ohio River occupied the present Mississippi River valley east of Crowley's Ridge and was down-cutting previous valley fill in response to the lowered sea levels of the time. Recent studies in the mid-continent region suggest that temperatures during this period averaged about 12° C (22° F) below present (Brister et al. 1981:30), but remained above -40° C (-40° F) (Delcourt et al. 1980:13). Vegetation consisted of spruce-northern pine forest on the uplands, with beech, red maple, black walnut, sweetgum, and other hardwoods surviving in sheltered areas.

By about 15,000 B.C. a gradual warming trend began the final retreat of the Wisconsin ice sheet and the refilling of the Mississippi River valley with glacial outwash. It was also at this time that the Mississippi River cut through Crowley's Ridge at the Bell City-Oran (Missouri) Gap and joined with the Ohio River in forming a complex braided-stream pattern between Crowley's Ridge and the eastern bluff line. Filling of the valley ultimately reached a higher elevation than the present surface of most of the valley floor north of Memphis; this earlier surface survives in remnant form in such features as Malden Plain in southeastern Missouri and remnant braided-stream terraces in western Dyer and Lauderdale Counties in Tennessee (Saucier 1974). Renewed loess deposition in the uplands accompanied development of the extensive braided-stream formation with its large areas of bare soil. Valley filling continued until about 9000

B.C. when glacial retreat reopened the St. Lawrence River valley as the primary outlet for glacial meltwaters.

The Mississippi River appears to have been a braided stream full of mud flats from the late part of the last glacial advance until about 8000 or 9000 B.C. After that time it became the meandering, single or double channel type of stream we are familiar with today. The transition to a meandering stream began earlier downstream and somewhat later upstream. North of Memphis the river has maintained the same basic route, or meander belt, in which the individual channel shifts take place within a zone 10 to 15 miles wide, ever since the meandering pattern began.

South of Memphis, however, the river has had a history of drastic course changes at about 1500 to 3000 year intervals. In DeSoto County most of these earlier courses are within or under the modern course zone, but part of the first one is still discernable north and west of the present course of Coldwater River through the alluvial valley. This early meandering course, termed Meander Belt 1 by Roger Saucier (1974) left the present course of the river in the southwestern corner of the county and ran southward along the base of the bluffs in the present Coldwater/Tallahatchie/Yazoo route to the general vicinity of Vicksburg where all trace of it is lost. This meander belt remained active until about 5500 B.C., when the course shifted westward to its present route past the county.

At about 4000 B.C. the course of the Mississippi at the upper end of the valley made its final change to modern conditions when it shifted its course from west of Sikeston Ridge to its present location and its junction with the Ohio River shifted from near the present town of New Madrid, Missouri to its present location. In the latitude of about Osceola, Arkansas the course shifted westward to strike Crowley's Ridge near Forrest City, then ran southward across the present meander belt along the route now occupied by the Big Sunflower River to the Vicksburg vicinity. From there it followed a route west of both the present meander belt and the Atchafalaya River to a mouth near Morgan City, Louisiana. Subsequent changes beginning about 2000 to 3000 B.C. brought the route back to its present location as far south as Memphis, with a split flow from there producing one major channel along the present route from near the mouth of the St. Francis River and a second one from north of Clarksdale southeastward to and then along the Tallahatchie/Yazoo route to the Vicksburg area where they rejoined. The eastern channel was slowly abandoned by reduction of flow until it went out of use about 800 or 1000 B.C. and the modern meander belt became established as the one course past the county.

Climatic warming was also accompanied by resurgence of such deciduous forest species as oak, ash, hickory, beech, maple, walnut, and birch. Replacement of the northern

coniferous forest may have been virtually complete by as early as 10,500 B.C. This forest transition would have greatly increased the carrying capacity of the area for all modern game species, but removed the boreal forest habitat apparently favored by the mastodon. Continued warming to conditions somewhat cooler than present during the period between 10,000 to 5,000 B.C. led to a mesic deciduous forest, including a few conifers, beech, birch, elm, ash, maple, oak, hickory, walnut, and chestnut. Warming and drying of the climate peaked between 5,000 and 3,000 B.C. with conditions somewhat warmer and dryer than at present. During this period the species requiring cool, moist conditions were sharply reduced and the modern oak-hickory dominance was established in the upland portion of the drainage. Major habitat zones included floodplain, terrace, and upland areas.

The ecological effects of terraces are unknown for the premodern forest types, but they are of significance in the modern context. Review of terraces in adjacent drainages (Smith 1979a, 1979b, 1980) indicates that Grenada, Calloway, and Henry soils characterize the terraces, while Waverly and Falaya soils make up the current floodplain. The uplands are composed mainly of Memphis, Loring, and Grenada soils. Of crucial importance in this context is the tendency of shagbark and scalybark hickories to form groves on Grenada, Calloway, Richland, or Olivier soils on terraces, while the upland species are predominately those

too high in tanic acid for human use without processing. Other important terrace forest species would have been pin oak, red oak, cottonwood, sycamore, sweetgum, and persimmon. The variety of understory species includes vines, shrubs, herbaceous plants, and cane. Floodplain forests include tupelo, red gum, cypress, willow, and a variety of other tree species. As with the upland, cane is an important understory species, along with a wide variety of shrubs, vines and seasonal herbs.

Upland forests consisted of red and white oaks with upland hickories as the primary species. Major secondary species included elm, chestnut, yellow (tulip) poplar, sweetgum, and walnut in the canopy; and dogwood, cherry, mulberry, persimmon, sassafras, and winged elm in the understory. Again, a wide range of shrubs, vines, and herbs is present. Plant resources are thus generally diffuse in distribution, except for the seasonal occurrence of shagbark and scalybark hickory nuts in groves on terraces.

The primary game animals of the area are white-tailed deer, turkey, rabbit, black bear, oppossum, and raccoon. Ducks, geese, and passenger pigeons would have been important seasonal game species. Fish and turtles would have been available in permanent streams of the drainage such as Horn Lake, Rocky, and Cow Pen Creeks, as well as seasonal streams and ponds. Animal food resources may thus be characterized as diffuse in nature except for possible

seasonal concentrations of migratory birds.

Lithic resources occur within the drainage as chert and quartzite gravels outcropping from below the Pleistocene loess in the eastern portion of the drainage, in the bed of Horn Lake Creek, and at the base of the Mississippi River bluffs. Other key resources, such as ferruginous siltstone for grinding tools, are available locally and from outside the drainage. An outcrop of ferruginous sandstone was found in the south bluff overlooking Rocky Creek just above its confluence with Horn Lake Creek. Ferruginous sandstone and siltstone are readily available in a broad band stretching through west-central Tennessee and central Mississippi, occurring within 30 miles east of the drainage basin. The ferruginous siltstone was widely used in the region for atlatl weights, gorgets, celts, and a variety of generalized rough bifacial tools.

Resource distribution in the drainage thus includes those of diffuse distribution, such as most of the plants and game animals, and those of linear distribution such as lithic and aquatic resources. The key concentrated resources include fall shagbark and scalybark hickory nuts in the groves on Grenada and Calloway soils on terraces, and fall and spring migratory waterfowl in areas of seasonally standing water. Storable hickory nuts thus appear to be the most strategic resource in concentrated distributions in contexts adjacent to lithic, aquatic, and upland resources

at the beginning of the season when storable food supplies would be most crucial to the survival of nonagricultural human populations.

Agricultural activities tend to focus on better drained soils such as Collins, Memphis, Loring, or upland Grenada soils. Collins soils are usually too low in this drainage for effective use, but represent the general class of sandy soils particularly favored by agriculturalists using hand tools. Loess soils such as Memphis, Grenada, and Loring tend to be used effectively only by those equipped with iron or steel implements, usually operated with draft animals or machines to augment human physical strength.

Environmental factors would thus appear to favor several different subsistence-settlement considerations. The diffuse distribution of the primary game animals suggests that hunting activity would occur throughout the drainage with little point concentration other than a search for seasonal waterfowl. Sharp restriction of the distribution of shagbark and scalybark hickory resources suggest that areas of Grenada and Calloway soils on terraces would have been particularly important for fall gathering activities. Sandy soils are generally considered of particular importance to agriculturalists using only hand tools, provided that drainage conditions are suitable. The upland loessic soils would have been of particular agricultural interest to nineteenth-century Euro-American settlers with their iron plows, but not to prior occupants without such equipment.

General Summary

The cultures expectable in the Horn Lake Creek drainage fall within the basic framework of western Tennessee as outlined in studies of adjacent Mississippi River drainages (Smith 1972a, 1979c, 1980; Peterson 1979a, 1979b; Smith and Weinstein 1987) and adjacent portions of the Mississippi Alluvial Valley (Connaway 1977a, 1977b; Connaway and McGahey 1971; Ford 1963; Phillips 1970; Phillips, Ford, and Griffin 1951; Potts and Brookes 1981). The primary prehistoric cultural periods include Paleoindian, Archaic, Woodland, and Mississippian, each with various subdivisions based on time span and content.

Paleoindian components are characterized by a variety of large, fluted projectile point types; scrapers, perforators, and gravers often made on ribbon-like blades of flint or chert; and prepared cores from which blades were struck. Flakes and nonblade cores are also present, but not distinct from those of later periods. Subsistence is conventionally considered to have been based primarily upon hunting large game animals. Social and settlement systems are thought to have consisted of small bands of kinsmen following the movement of game animals, often Pleistocene megafauna. The estimated time span of this period is about 10,000 to 8500 B.C.

The Archaic period is a long post-Pleistocene period characterized by progressively increasing emphasis on plant foods as the primary subsistence base, along with increasing social complexity. Introduction of woodworking tools and grindstones, along with use of a variety of notched projectile points characterizes the Early Archaic. The points appear designed for use with spear throwers on swift-moving game such as deer rather than as thrusting spears usuable on slow-moving game unlikely to flee. The blade tools characteristic of the Paleoindian period seem to have gone out of use by the end of the Early Archaic. Lower-grade and/or smaller-sized raw materials locally available replaced the relatively uncommon grades and sizes of raw material necessary for the blade-based tools and weapons. The Early Archaic is generally thought to range from about 8500 to 5500 B.C.

Middle Archaic components in neighboring areas are characterized by stemmed projectile points, often large and formed by minimal flaking, and ground stone tools and ornaments. The period is particularly poorly known in the region. A time span of about 5500-3500 B.C. or even as late as 2000 B.C. is often cited for the period.

The Middle Archaic period is marked by the appearance of large, crudely shaped points in place of the earlier notched and barbed styles. Sites from this period are more common and probably indicate an actual population increase rather than just more frequent movement from place to place. Regionally distinctive styles of points appear

and suggest a more restricted movement of people within specific territories. Such point types as Denton and Bartlett are characteristic of the northern Mississippi delta and adjacent areas, while Eva and Morrow Mountain points are found in the Tennessee River Valley and Calf Creek points in the Ozarks. During much of the period the Mississippi River was in a course about 20 miles to the west of its present route past the county, leaving the present delta portion of the county as backswamp.

Excavations conducted by the Mississippi Archaeological Survey at the Denton site, near Lambert in Quitman County provide our best information so far about this period in the area. At the time of its occupation the site was on an active channel of the Mississippi River. The few surviving food remains include animal bones, persimmon seeds, and a wide variety of nuts.

Stone tools included the large Denton projectile point/knives, adzes, generalized chopping tools, drills, and a variety of utilized and slightly modified flakes used as tools. The site has also produced a variety of ground stone cutting tools, spear thrower weights, pendants, and beads but most are from the surface and may belong to any of the several later occupations of the site.

The Late Archaic is characterized by a variety of large-stemmed point types, ground stone tools and ornaments. Many sites of the period are much larger than those of previous periods. It was during this period that a series of incipient changes occurred in the subsistence and social

systems; changes that would continue through the rest of the prehistoric sequence. Among these were the beginnings of plant domestication, long-range trade in exotic raw materials and finished items, and increasingly complex social organization with definable status positions. Subsistence patterns emphasize exploitation of seasonally concentrated resources. Regional stylistic traditions of distinctive point types occur throughout the eastern United States, involving much smaller areas than in previous periods. The Nonconnah drainage lies at the frontier between one tradition centered in the northern Mississippi Alluvial Valley and another centered in the western portion of the Tennesse River valley.

The time span of the Late Archaic period varies considerably from one area to another, basically from the local end of the Middle Archaic to the beginning of the following period. The beginning of the period in the mid-south is variably placed at either about 3500 B.C. or 2000 B.C., depending on the assignment of the Benton complex; the 3500 B.C. date will be used here. The end of the period also varies according to the treatment and definition of the following period, usually Woodland.

The nonpottery-using Poverty Point cultural tradition of the Mississippi Valley has variously been considered part of the Late Archaic, a separate cultural period in its own right (Phillips 1970), or ambiguously labelled "Transitional" (Peterson 1979a, 1979b). The Poverty Point

related cultures will here be considered part of a separate Poverty Point period, thus placing the end of the Late Archaic at about 1500 to 1000 B.C. in the Midsouth.

The Poverty Point period is represented by a cultural phenomenon restricted to the Mississippi River Alluvial valley and adjacent areas. It is marked by a distinctive series of projectile point, tool, and ornament types and by fired clay objects of various styles apparently used in earth-oven cooking. Particularly distinctive items, other than the point types, are a microblade industry and insect-effigy stone beads. The focal site of the period in northern Louisiana was involved in extensive trade with contemporary cultures generally considered Late Archaic and/or Early Woodland, and is known to have utilized items from as far away as Indiana. The time span of the period approximates 1500-400 B.C., with some local variation.

The Early Woodland period in the Nonconnah Creek area is marked by the appearance of local ceramics, although complexes to the east, which are usually considered Late Archaic, had already been using pottery for several centuries. Point styles are derived from previous late Poverty Point styles. Burial mounds are thought to have come into use during this period. The local ceramic styles are typical of those of the lower Mississippi River valley, although the use of sandy ceramic paste and cordmarked surface finishes appear by the end of the period. A time span of about 400 B.C. to A.D. 100 would be the likely maximum for the period locally, with a span as short as 200 B.C. to A.D. 1

possible.

Other items used during the period include chipped-stone projectile points, drills, and chopping tools. Some chopping tools were also shaped by grinding and polishing, as were pendants and spear thrower weights. Nothing is yet known about architecture during this period in the county, but relatively permanent houses should have been in use on at least the major sites. Excavations carried out by the Mississippi Archaeological Survey at the Boyd site, near Clayton in Tunica County provide our best nearby information abour Early Woodland cultures. Analysis of bone remains from this site indicates that deer was by far the most important source of meat, followed by fish, turkey, and a wide variety of small animals and ducks. Remains from edible plants consist of persimmons and a variety of nuts. A far greater variety was certain to have been in use, but only relatively large, charred remnants have survived in identifiable form. Local burial customs are unknown, but burials in village areas and in mounds occur during this period in other parts of the Mississippi River valley.

Middle Woodland culture in the upland midsouth is most closely related to the Miller tradition derived from the upper Tombigbee River drainage. It is characterized by sand-tempered ceramics with plain and cordmarked surface finishes. Point styles appear to continue in use, while flat-topped mounds also appear at some major centers. An estimated time span for the period is about A.D. 100-400.

Occupations recognizable as Middle Woodland are quite rare in the county, even though there are numerous sites from this period to the north and south. Middle Woodland culture in the area includes two major ceramic traditions, one in the uplands and another in the delta. Ceramics of the upland tradition are made from clay mixed with sand and nearly always have cordmarked surfaces without decoration, while those of the lowland tradition are made from clay mixed with dry or fired clay pellets and include more plainware than cordmarking, with decoration fairly common on the plainware. The upland tradition is represented by five small camps and the lowland tradition by one possible village, all in the western part of the county.

Lithic artifacts of the period include small, thick stemmed and notched projectile points; long ribbon-like flint blades used as cutting tools; chopping tools; ground stone axe and chisel blades; gorgets; and grindstones for use with nuts and small seeds. Burial mounds were in use for the funerals of important people throughout the eastern United States during this period, but none in DeSoto County have been identified as Middle Woodland.

Many Woodland groups had become quite advanced in political and religious ceremonialism and complexity. One side effect of this advancement was the development of a trade network for exotic raw materials which included most of the United States east of the Rocky Mountains. Such items as conch shells from the Gulf Coast, copper from the Great Lakes area, mica from the eastern edge of the Appalachians, and

obsidian and flints from sources as far away as the Yellowstone National Park area and eastern Ohio were traded throughout the system for the use of the elite. Nearby evidence of this network has been found in the form of flint in the Middle Woodland occupation at Boyd and copper, conch shells, mica, and Indiana flint at the Helena Crossing Mounds.

Late Woodland occupation in the area is closely tied to the Mississippi River Alluvial valley and immediately adjacent areas. Characteristic artifacts include clay-tempered plain, cordmarked, and check-stamped pottery; and small, thin stemmed-to-corne -notched points probably used on arrows. Burial mounds continue in use. The approximate time span of the period is A.D. 400-900.

Knowledge of this period in the area is very incomplete. Only three sites in the county are known to have had occupations during the Late Woodland, although many sites to the south in Tunica and Coahoma Counties were in use. The Bobo Site in Coahoma County had a rectangular wall-trench type house seal under a mound, with a radiocarbon date of A.D. 890± 90 years. This house foreshadows Mississippian styles, but the ceramics are Late Woodland with a bit of Coles Creek trade ware.

The development of Mississippian culture brought major changes in ways of life to the central part of the United States. Rapid population increase accompanied a shift to large-scale corn agriculture. Towns appeared and society became much more complex. Political and religious leaders

arose with authority and influence extending throughout their town and tribe, able to weld formerly loosely organized tribes into centralized chiefdoms of considerable power. Among the more obvious surviving symbols of these leaders' authority is the organization of larger Mississippian centers around plazas dominated by flat-topped mounds for the temples, residences, and other structures reserved for the political and religious leaders of the ocmmunity and chiefdom. As time went on more and more of these positions came to be inherited within families rather than open for anyone to earn.

The growth of high status positions in the society led to a demand for luxury goods used at least in part is symbols of office so that people of power would be properly recognized by all. This demand led once again to a large-scale trade network to distribute copper, conch shell, exotic flints, and even finished products to the craft specialists and the elite who used them. Such items as copper headdresses and ear ornaments; engraved conch shell dippers; and elaborately painted, engraved, or modelled pottery vessels were produced for the use of the elite in both this life and the next. The trade network itself may well have played a major role in the development and spread of Mississippian culture as ideas originating in diverse localities came to be shared throughout the area of Mississippian influence.

The Early Mississippian period is marked by the arrival of Coles Creek influence in the form of the mound-and-plaza

town planning complex and a ceramic change to plain vessel surfaces with occasional incised or punctated decoration or red painting. Cordmarked or check stamped surfaces occur occasionally at the beginning of the period, but soon vanish entirely. The clay mixture in use continued to contain clay pellets or crushed potsherd fragments as tempering material. Coles Creek sherds are occasionally found on local sites, but the distinctive Coles Creek ceramic decorative styles were never adopted for local use.

Our best local data for the period comes from Chucalissa, a site in the southwestern corner of Tennessee. The Early Mississippian occupation at that site includes a series of houses arranged in rows, along with a few refuse pits, and possiby the first stages of a small platform mound on the site. Lack of charred plant remains and preserved bone have prevented investigation of diet or burial customs for this occupation of the site. A few decorated potsherds indicate trade relations with Coles Creek people to the south.

The houses were roughly square and built with a framework of saplings set into trenches outlining the house floor and then bowed over to support the roof and walls. Walls were then covered with mats or saplings and plastered with a mixture of clay and grass. The roof was thatched with grass which probably was long enough to hang far down over the walls and help protect them from rain damage. A small hearth was dug into the floor of the single room to provide a place for the fire.

Other occupations from the period are scattered through both DeSoto County, Mississippi, and Shelby County, Tennessee. The DeSoto County sites are concentrated in delta area, and include two apparent villages along with six hamlets or small villages. Both of the DeSoto County sites have small platform mounds, but also have Late Mississippian village occupations likely to have been responsible for all or part of the mound construction.

The Late Mississippian sites in DeSoto County represent the southern half of the territory of a group which also occupied most of Shelby County, Tennessee. Continuity of occupation of this territory by the same group from the Terminal Woodland through the end of the prehistoric record in the area is likely. Major changes evident in the archaeological record include continued population growth, introduction of the use of crushed mussel shell for tempering pottery clay, and continued increase in social complexity. Two developmental stages are definable for the local Late Mississippian period culture; the Boxtown Phase, A.D. 1200-1450 and the more famous Walls Phase, A.D. 1450-1600.

Corn agriculture supplemented by various other crops, wild plants, hunting, and fishing provided the basic diet. Charred corn kernels and cobs are plentiful on sites of the period. Charred remains also indicate that beans, squash, persimmons, and a variety of nuts were also important plant foods in the diet. Deer provided most of the meat,

but turkey, bear, raccoon, opossum, ducks, and fish provided important supplements to this part of the diet.

Housing consisted of single-room structures with pole framing, plastered walls supported on cane matting, and thatched roofs. In the Boxtown houses construction was begun by digging a set of trenches outlining the floor area, into which the bases of long slender poles were set. The poles were then bowed over and tied together to form the house framework. Framing for the Walls houses was started by setting relatively short posts into individual holes outlining the house, then placing a horizontal pole on them and finally separate rafter poles to form the roof framework. In both cases the walls were covered with cane mats to serve as lathing, then a heavy coating of clay-and-straw plaster. Crosspieces were then tied to the rafters and the roof thatch applied to them to complete the house structure. A clay floor and central hearth were added to the interior, which was then furnished with floor mats and built-in combination beds and couches around the walls. Various pots, baskets, and racks provided interior storage for food, clothing, tools, and other items.

The houses of high-ranking families were somewhat larger than the rest, and in the Walls phase were allowed to be built on mounds as a sign of status. At Chucalissa during the Walls phase the houses of most people were about 12 to 15 feet on each side, those of higher ranking families were about 14 to 20 feet on a side and placed on small platform mounds, while the chief's house approached 50 feet on a

side and was on a large platform mound which was periodically enlarged. The size of the chiefs house was made possible by use of a series of large interior cypress posts which helped support the weight of the roof. This house also had several large storage pits under the floor.

Towns the size of Chucalissa and many of those in DeSoto County were arranged around a town plaza with the chief's house and those of second-ranking families around it on their respective mounds. Only one family in each of these towns appears to have had sufficient status to add to the height of their mound over a period of time. The rest of the population lived beyond the town center. Fortifications including moats, earthworks, and stockades with bastions were commonly built around the largest towns of the period, but the extent of fortification of smaller towns remains unknown. Smaller hamlets served as outlying residential areas, perhaps used seasonally by those whose fields were beyond easy walking distance of town. Tribal centers are apparently represented by the largest sites with multiple large platform mounds and elaborate fortifications. The most likely site for the local tribal center is represented by mounds at DeSoto Park in Memphis and pre-Civil War army maps showing several large mounds in an area long since leveled by urbanization and military construction projects.

The development of larger and more complex social systems during the Late Mississippian included the beginnings of craft specialization and production of elaborate items

for the use of the elite. Many of these items, such as wood carvings, feathered capes, and basketry are now known only through brief accounts by the first explorers, but others have survived. Conch shell cups, elaborate copper ornaments, and fine pottery are among the kinds of things to have survived in the archaeological record. Most such items are found on the major central sites, but high quality pottery is found in the secondary sites as well.

Late Mississippian utility pottery is tempered with crushed mussel shell rather than fired clay fragments, and is more frequently decorated than earlier wares. By the time of the Walls Phase a finer variety of this ware had become important. This finer ware was used for bowls with modelled figures of birds, animals, fish, and humans on them and for water bottles with intricate engraved designs. Vessels with painted geometric designs are sometimes found in Walls Phase contexts, but are so rare as to be probable trade vessels rather than local products. Broken pieces of the finer ware are found throughout Walls towns, but are more common on areas inhabited by people of higher status, and are more common in their graves.

Early accounts of explorers who saw at least the last Mississippian culture in the area indicate that funerals of the elite were often quite elaborate. It was widely believed that life in the next world would largely continue that of this one, but without the hardships. Therefore it was important to send the deceased to the next world not only with food and water for the journey but also with

the necessary items to assure recognition of their status and proper treatment upon arrival. A funeral, often considered as a purely religious ceremony, can thus also be viewed as including a visible statement of the social status of the deceased. Analysis of the patterns of kinds and frequency of items found in graves on a site can provide insight into the social system as well as religion. At Chucalissa, for example, burials found in otherwise presumably high status areas of the site have the most and most elaborate grave goods. Within this pattern we find that quite different kinds of goods occur with different groups of burials, an implication of craft specialization and possible special rules about who may have been entitled to use certain kinds of objects. Further examination reveals that only in this part of the site do we find burials of men with artificially reshaped skulls. Since this is a custom that can be carried out only during infancy, if only high status individuals had it the implication is that high status must have been inherited because the future capabilities of an infant could not be predicted with reasonable accuracy.

Study of skeletal remains from a site can rarely indicate the cause of death of particular individuals but it can provide important insight into the general health and medical capabilities of the group involved. Skeletal remains from Chucalissa indicate that life spans rarely exceeded 35 years, which is normal in populations without modern medical care. There is little evidence of deformity, specific disease,

or poor nutrition which might have affected health or life span. The primary identifiable cause of death and injury appears to have been warfare, and is primarily present in skeletons of high status males. This evidence is in the form of broken bones in the left forearm from warding off blows from clubs or similar weapons and occasional skull fractures from successful use of those weapons. Other deaths appear to have occurred due to tuberculosis (one case), and one apparent execution. General health problems affecting the skeleton consisted primatily of abcesses and tooth decay, arthritis, and a subtropical form of yaws or a related disease. The final source of diseases in local Mississippian culture was the DeSoto expedition with its extensive inventory of Old World diseases from which the Indians had been isolated for thousands of years.

The appearance of the DeSoto expedition in the Midsouth in the spring of 1541 marks the end of prehistoric occupation in the area. The narratives from that expedition are all quite brief for its duration and geographic extent, but are all we have as eyewitness accounts of the local Mississippian cultures at their height. Narratives of primary value are those of Ranjel and Elvas, while the widely available account of the Inca is considered by far the least reliable. Early attempts to trace the DeSoto route, such as that of the DeSoto Commission report in 1939 or even the Lower Mississippi Valley Alluvial Survey report of 1951 were severely hampered by general lack of detailed archaeological data

or even any effective means to closely date the prehistoric archaeological materials then known. Recent research has made it possible to narrow down the rage of possibilities for the route even though we still cannot follow his footsteps.

DeSoto can be placed reasonably well in the general vicinity of Tupelo or Pontotoc for his winter camp of 1540-1541. From this camp the route lay generally westward until the expedition reached Quizquiz in early May. The location of Quizquiz cannot be determined from data on the east side of the Mississippi River, but the combination of recent archaeological research and the accounts of provinces west of the river suggest that Quizquiz and the crossing point were somewhere between Tunica, Mississippi and northern Shelby County, Tennessee. The best fit of current archaeological data with the accounts identifies Quizquiz either as including a group of sites in Tunica County near Commerce Landing or the Walls Phase sites in western DeSoto County. Key factors on the Arkansas side of the river include reasonably secure identification of the province of Casqui with a group of sites on the St. Francis river near Parkin, Pacaha with a group of sites near Nodena and Osceola, and the somewhat less secure identification of Aquixo with a group of sites between West Memphis and Horseshoe Lake. The numerous changes in the river channel since that time make the use of a modern map misleading, and may well have washed away DeSoto's actual camp.

The various accounts agree that the expedition crossed a large uninhabited area between the province of Chicasa

and Quizquiz, and caught the first village they came to by surprise. They then proceeded a league (about 3 miles) to a second village and another league to a third one where they first sat the Mississippi River. Camp was then set up outside the third village near the river while boats were built to cross the river. Boat construction apparently took about a month, during which time the expedition lived on supplies taken from the local populace. Four boats were built and used to ferry the men and horses across in several trips. Elvas notes that the boats were taken upstream about a quarter league to allow for the current, and that at the landing point the horsemen were able to disembark onto an open area of hard and even ground. Such a location as this would correspond well to a sandbar on the inside of a bend, but not to the high, steep cutbank typical of the outside of river bends. The expedition then went about a league and a half up a bayou or flood channel to an abandoned town of Aquixo, broke up their boats in order to salvage the spikes, and departed the area, never to return.

For the next century and a quarter the area was not visited by Europeans, but the damage had already been done. Detailed studies of the effects of Old World disease on New World populations at contact indicate that a population loss of 95% within a few decades was normal, and more severe losses were not unusual. This was the result of thousands of years of isolation from Old World tropical and subtropical disease which could not follow the ancestral Indians across

the Arctic tundra into the New World. Thus it was that when the French explorers Jolliet and Marquette passed through the once populous area in 1673 they saw only what appeared to be virgin forests from above the mouth of the Ohio all the way to the Quapaw villages at the mouth of the Arkansas River. They did encounter an otherwise unmentioned group they label as the Monsopelea, probably somewhere in western Kentucky, but describe them as Iroquois-looking in dress and make no mention of associated fields or villages.

The Jolliet-Marquette expedition was soon followed by other French expeditions, a French trading post for the Quapaw by 1686, and increasing travel up and down the river connecting French settlements established at New Orleans and in the Kaskaskia, Illinois area during the first quarter of the 1700's.

English traders had reached the Chickasaw and Choctaw from South Carolina by the 1720's, and were instrumental in the next 40 years of conflict between the French and Chickasaw. The vicinity of DeSoto County saw the gathering in 1739 of a French army at a new fort at Memphis, for the purpose of attacking the Chickasaw towns in the vicinity of Tupelo, an expedition never launched. Chickasaw raids on French river traffic and French raids on Chickasaw settlements in northeastern Mississippi continued until the French cession of the territory east of the Mississippi to England in 1763. English traders swarmed into the new territory and the post on Chickasaw Bluff at Memphis became a major trade center, with what is now the general route of US Highway

78 through the northeastern corner of the county as the main route eastward to the Chickasaw villages.

The next few decades saw continued expansion of European activities in the Memphis area. Ephemeral forts and their occupants continued a parade of political confusion overlying the continued use of the area as a trade center until the fianl establishment of an American garrison at Fort Pickering in the late 1790's. By the early 1800's the Chickasaws in northeastern Mississippi were complaining loudly about the rising tide of squatters flooding their territory. Several surviving homes in southern Shelby County, near the trade route, are known to have been built during the 1790's and more should be expected to have existed on both sides of the state line in the vicinity of the forts and trading path. The growth of settlement in the county, irregardless of the niceties of laws made far away, should be expected to have increased rapidly after the opening of West Tennessee to legal settlement in 1818.

Most of the primary towns and roads in DeSoto County were established by 1840, although the smaller towns often did not hasten into the formalities of a charter or government until later. Major routes through the drainage are US 61 leading into the Mississippi "Delta" area and U. S. 51/Hernando Road leading south through central Mississippi to Jackson and New Orleans. U.S. 51/Hernando Road was used extensively during the Civil War, but no significant military construction or battles took place in the area. Most of the drainage remained primarily rural in character until the early 1970's

when urban development around the perimeter of Memphis began to fill most of the central portion.

Drainage-Specific

Only one previous archaeological investigation (Gilbert/Commonwealth 1981) has been conducted in the Mississippi portion of the drainage. It resulted in the discovery of one prehistoric site, MM26-1 outside the impact area with 3 chert flakes, and a sheet midden, 22DS535, interpreted as a dump for hotel garbage from Memphis during the 1920-1940 period. The other sites recorded in the drainage include 22DS529, a former lithic scatter which produced only flakes before its destruction; 22DS530; 22DS531; and 40sy353. Sites 22DS530 and 22DS531 are near the headwaters of Rocky Creek. Site 22DS530 has Poverty Point and Early Woodland Period components and appears to have served primarily as a hunting camp since its assemblage is almost entirely points and chipping debris.

The collection from 22DS531 is severly lacking in all classes of debitage, but the stone artifacts consist of points, bifaces, and scrapers. The site includes point types indicating Middle Archaic, Poverty Point, and Early to Middle Woodland components; 10 of the 14 identified points are Poverty Point Period types. A large sample of baked clay objects included a few each of spherical, biconical, ellipsoidal, and cylindrical plain specimens as well as a large number of fragments. A ceramic sample of 29 sherds consisted of 28 with Early Woodland clay-tempered paste and one fiber-tempered specimen.

Site 40SY353 produced a large sample of chipping debris, some eroded Early Woodland clay-tempered paste sherds, and two biface fragments. It also appears to have served primarily for hunting-oriented activities.

Most land in the study area is in the hands of developers, however two long-term farm owners, Harry Rasco (personal communication) and John Barmer (personal communication) know of no sites in the vicinity.

Survey, Testing, and Analytical Methods and Results

Initial survey reveals that much of the area had already been disturbed and/or filled beyond reasonable hope of site survival or recovery by shovel testing. Rocky Creek above Interstate 55 has been impacted by placement of an interceptor sewer line and lagoon through the zone on the north side and a refilled gravel pit complex on the south side. Cow Pen Creek above about 120 meters north of Goodman Road has been covered by 1.5 to 2 meters of fill, with subsequent residential construction and yards extending to the bank on both sides. A large sector of the north bank between U.S. 51 and Cow Pen Creek has been destroyed by railroad and sewage lagoon construction.

Most of the remaining study area was in sporadically flooded bottomland forest and was investigated by 30x30x50 cm shovel tests and bankline checks and flood scour exposures as necessary. The north bank of Horn Lake Creek between State

Line Road and Horn Lake Road was mostly in cultivated fields, some harvested only and some plowed before heavy rains. The plowed area yielded the only site found in the survey, a thin lithic scatter on a possible loess terrace remnant of Richland soil.

The site was mapped to 20 cm contours, tied into a county roads marker on a nearby bridge, and surface collected on a total pickup basis within 6-meter squares. An interceptor sewer line forms the effective northern boundary of the site, with a large manhole at 52N48E serving as a convenient nearby reference point. The site approximates 90 meters E-W by 40 meters N-S in maximum extent. Table 1 provides the nature and distribution of the materials recovered. In summary, the surface collection included a Kent point, two Delhi points, a Pontchartrain, variety A (Smith 1979) point, a drill base, nine biface fragments, 5 severely eroded sherds, and a large amount of chipping debris and fire shatter.

A one-meter test pit excavated at 6N49E, within the zone of heaviest debris recovery, revealed only an approximate 16 cm-deep plow zone with undisturbed subsoil below it. The excavated soil was sifted through a 1/8-inch (3 mm) mesh screen. Materials recovered from the test pit, all from the plow zone, consisted of 22 flakes, 32 fragments of fire-shattered chert, and 3 broken rocks from the upper 10 cm along with 25 flakes, 19 fragments of fire-shattered chert, 4 broken rocks, a chipped-stone stemmed drill base, and a severely eroded clay-tempered potsherd. The upper subsoil consisted

TABLE 1. 22DS594: INVENTORY OF CONTROLLED SURFACE COLLECTION

SQUARE	FLAKES	FIRE SHATTER	BROKEN ROCK	CORES	CHIPPED STONE TOOLS	PREHISTORIC POTTERY	HISTORIC ARTIFACTS
0N0E	---	3	---	---	---	---	---
0N6E	---	2	---	---	---	---	1 chinaware
0N12E	1	3	---	---	---	---	---
0N18E	5	10	---	---	---	---	1 brick frag
0N24E	5	---	---	---	---	---	1 brick frag
0N30E	1	1	---	---	---	---	1 brick frag
0N36E	3	4	---	---	---	---	---
0N42E	9	4	---	---	---	---	---
0N48E	3	2	---	---	---	---	---
0N54E	14	9	---	---	---	---	1 brick frag
0N60E	2	4	---	---	---	---	---
0N66E	10	7	---	---	---	---	---
0N72E	---	---	---	---	---	---	---
6N0E	---	3	---	---	---	1 Thomas eroded	1 brick frag
6N6E	2	3	---	---	---	---	---
6N12E	2	5	---	---	---	---	---
6N18E	3	8	---	---	---	---	1 brick frag
6N24E	1	10	---	---	---	---	1 brick frag
6N30E	3	9	---	---	---	---	---
6N36E	6	12	---	---	---	---	1 brick frag
6N42E	14	10	2 chert	1	---	---	---
6N48E	15	11	---	---	---	---	1 brick frag
6N54E	18	10	---	---	1 Delhi	---	1 glass frag
6N60E	14	11	1 chert	---	1 biface frag	2 clay temper (tiny)	---
6N66E	9	8	2 chert	---	---	---	---
6N72E	19	9	---	---	---	---	1 brick frag
6N78E	---	---	---	---	---	---	---
12N0E	1	---	---	---	---	---	1 chinaware
12N6E	---	1	---	---	---	---	---
12N12E	2	4	---	---	---	---	1 crockery
12N18E	8	20	---	---	---	---	3 brick frag
12N24E	5	4	1 FeSS	---	---	---	1 brick frag

TABLE 1. (Con't)

SQUARE	FLAKES	FIRE SHATTER	BROKEN ROCK	CORES	CHIPPED STONE TOOLS	PREHISTORIC POTTERY	HISTORIC ARTIFACTS
12N30E	5	8	---	---	---	---	---
12N36E	8	12	---	---	1 biface margin Batesville Chert	---	1 brick frag
12N42E	7	7	---	---	1 Kent unfinish.	---	---
12N48E	13	22	1 chert 1 FeSS	1	---	---	---
12N54E	25	22	2 FeSS	---	---	---	1 brick frag
12N60E	17	18	1 FeSS 1 Chert cobble	---	1 Pontch A	1 Tchef. Plain	---
12N66E	6	8	---	---	---	---	---
12N72E	17	6	---	---	---	---	1 brick frag 1 screw-type med. bottle mouth frag.
12N78E	7	---	---	---	---	---	---
12N84E	---	---	---	---	1 tip	---	---
18N0E	---	---	---	---	---	---	1 sheet iron scrap
18N6E	---	4	---	---	1 biface frag	---	---
18N12E	1	3	1 chert	---	---	1 Thomas eroded	---
18N18E	4	9	1 FeSS 2 Chert	---	---	---	---
18N24E	5	5	---	---	---	---	2 snuff bottle frag
18N30E	5	5	1 chert	---	---	---	1 snuff bottle frag
18N36E	6	3	---	---	---	---	---
18N42E	4	3	---	---	---	---	---
18N48E	10	8	---	---	1 midsect. thin bif.	---	---

TABLE 1. (Con't)

SQUARE	FLAKES	FIRE SHATTER	BROKEN ROCK	CORES	CHIPPED STONE TOOLS	PREHISTORIC POTTERY	HISTORIC ARTIFACTS
18N54E	7	5	---	---	---	---	1 clear glass
18N60E	3	5	1 chert	---	1 drill base	---	---
18N66E	10	8	---	---	1 Dehli base 1 stem	---	---
18N72E	16	9	---	---	1 flat bevelled midsection	---	1 clear bottle glass 1 amber snuff bottle glass
18N78E	3	3	---	---	---	---	1 heavy china-ware
24N0E	---	---	---	---	---	---	---
24N6E	---	---	---	---	---	---	1 brick frag
24N12E	1	2	---	---	---	---	---
24N18E	2	3	---	---	---	---	---
24N24E	3	3	---	---	---	---	---
24N30E	8(incl 1 Novaculite	5	---	---	---	---	---
24N36E	1	3	3 chert 1 FeSS	---	---	---	1 amber bottle base frag
24N42E	1	2	---	---	---	---	1 brick frag
24N48E	3	3	---	---	---	---	---
24N54E	---	---	1 chert	1	---	---	---
24N60E	2	2	---	---	---	---	---
24N66E	5	7	---	---	---	---	---
24N72E	3	6	1 chert	---	1 thin biface	---	1 brick frag 1 amber bottle glass frag
30N0E	1	---	---	---	---	---	---
30N6E	---	---	---	---	---	---	---
30N12E	2	1	---	---	---	---	---
30N18E	1	2	---	---	---	---	---
30N24E	1	2	---	---	1 thin biface tip	---	---

TABLE 1. (Con't.)

SQUARE	FLAKES	FIRE SHATTER	BROKEN ROCK	CORES	CHIPPED STONE TOOLS	PREHISTORIC POTTERY	HISTORIC ARTIFACTS
30N30E	---	3	---	---	---	---	---
30N36E	1	3	---	---	---	---	---
30N42E	2	---	---	---	---	---	---
30N48E	---	3	---	---	---	---	---
30N54E	---	---	1 chert	---	---	---	---
30N60E	1	2	---	---	---	---	---
30N66E	2	---	---	---	---	---	---
36N0E	---	---	---	---	---	---	---
36N6E	1	---	---	---	---	---	---
36N12E	1	1	---	---	---	---	1 aqua med. bottle neck mold,w/turned eyes
36N18E	---	1	---	---	---	---	---
36N24E	---	---	---	---	---	---	---
36N30E	---	---	1 chert	---	---	---	---
36N36E	4	4	---	---	---	---	1 amber snuff bottle frag
36N42E	1	1	---	---	---	---	---
36N48E	---	1	---	---	---	---	---
36N54E	1	---	---	---	---	---	---

of approximately 25 cm of yellow-brown loess, with mottled grey and yellow-brown clay below it to the base of the deepest portion of the test pit, a 30 x 30 cm section at the northwest corner which was excavated to 80 cm below the surface. A 50 cm shovel test at 0N48E revealed only about 40 cm of plow zone and sterile subsoil. Most of the site will fall within the study corridor (Maps 2, 3, and 4), including the zone of primary artifact recovery.

Conclusions and Recommendations

The survey area overall was found to consist almost entirely of floodplain, in many areas already severely impacted by urban development. One archaeological site was found within the impact zone. The site is a lithic scatter with its primary occupation dating to the Poverty Point Period as indicated by point types, along with a few Early Woodland potsherds. The site appears to lack surviving midden deposits and has a maximum surface artifact density of only 1.36 items per square meter and only a total of three units with densitites over one item per square meter. The components present are those most commonly present on other sites in the drainage but outside the project area. It therefore appears that the site does not meet the requirements for eligibility for the National Register of Historic Places and does not require any further investigation.

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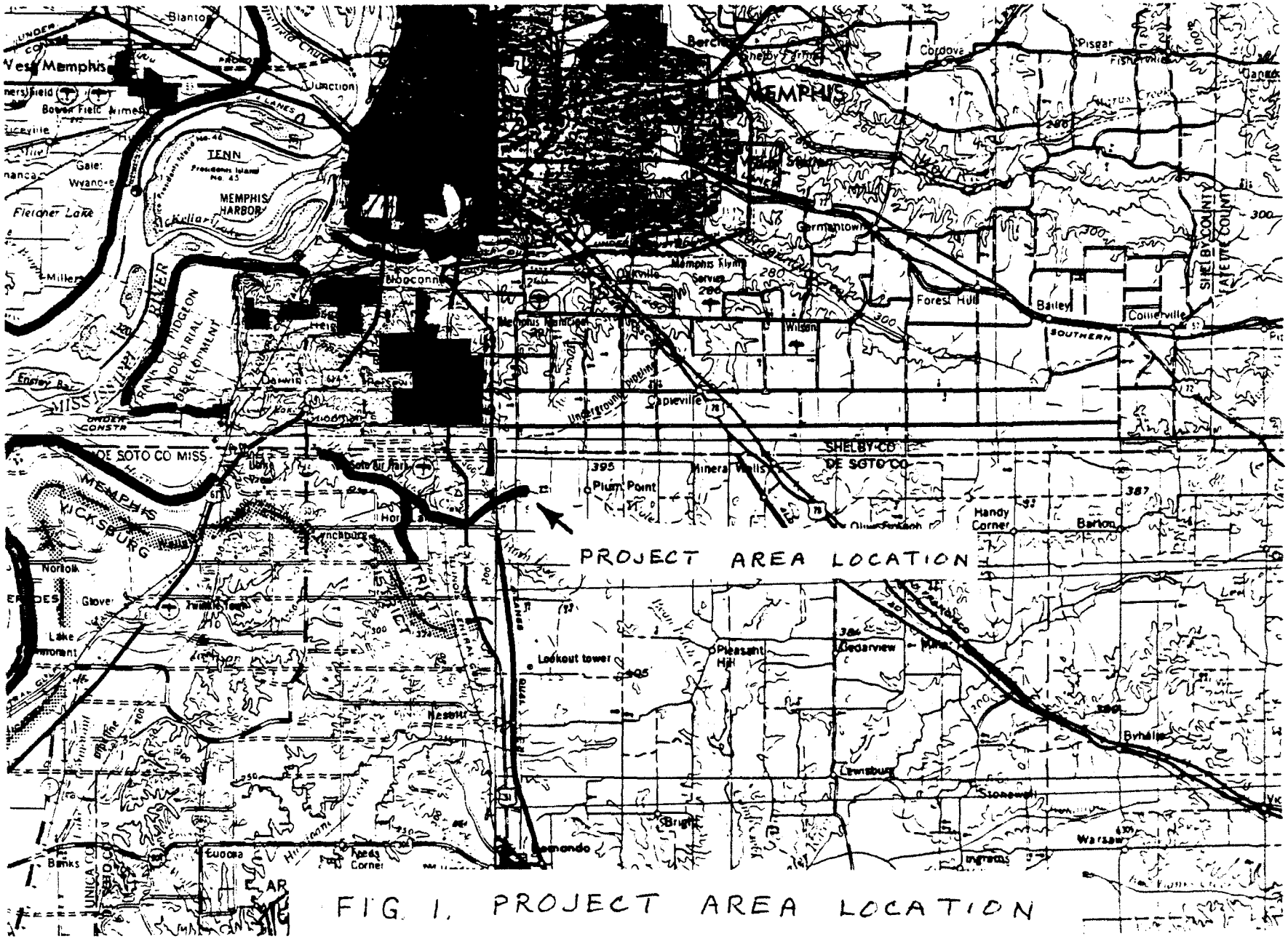


FIG. 1. PROJECT AREA LOCATION

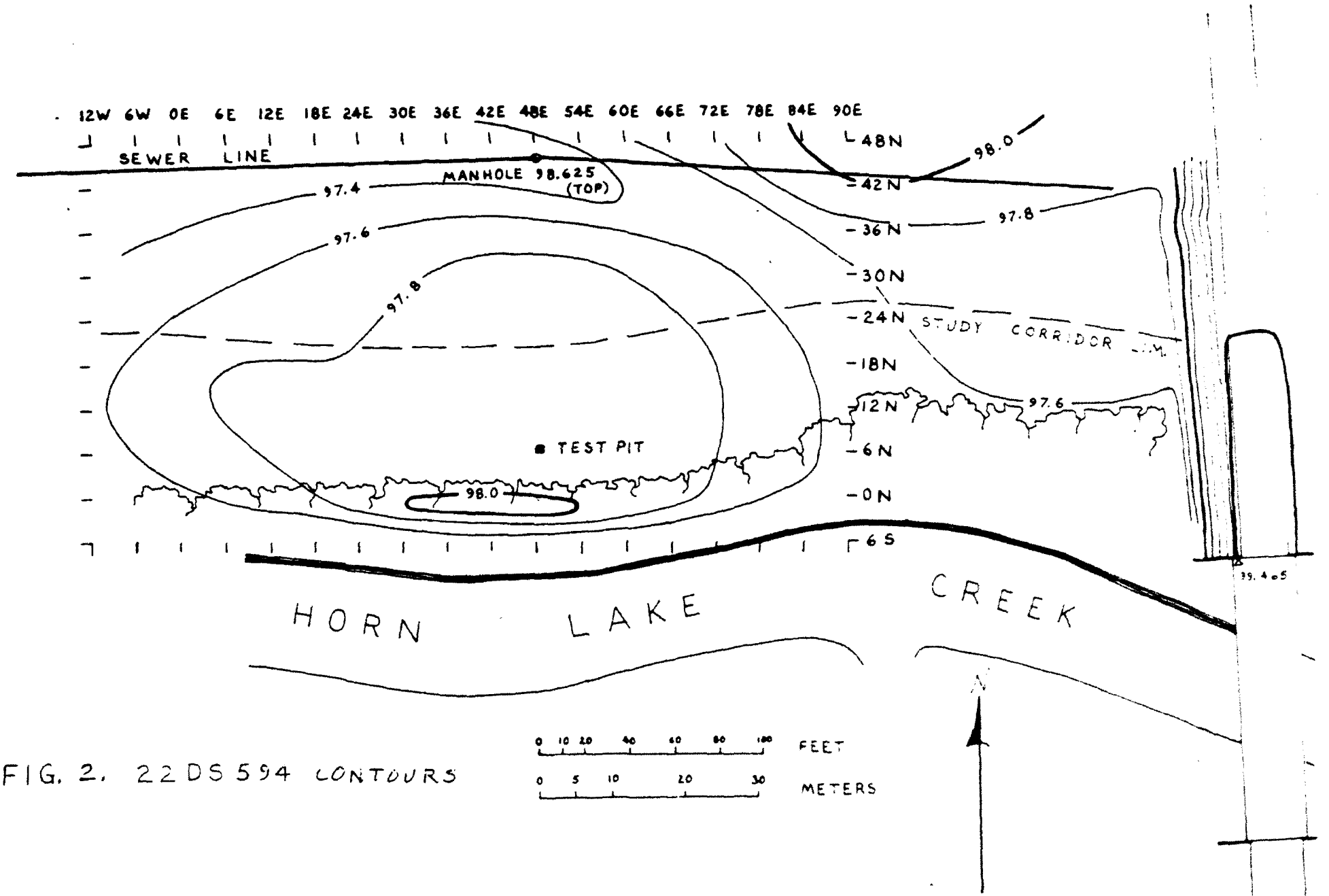


FIG. 2. 22DS594 CONTOURS

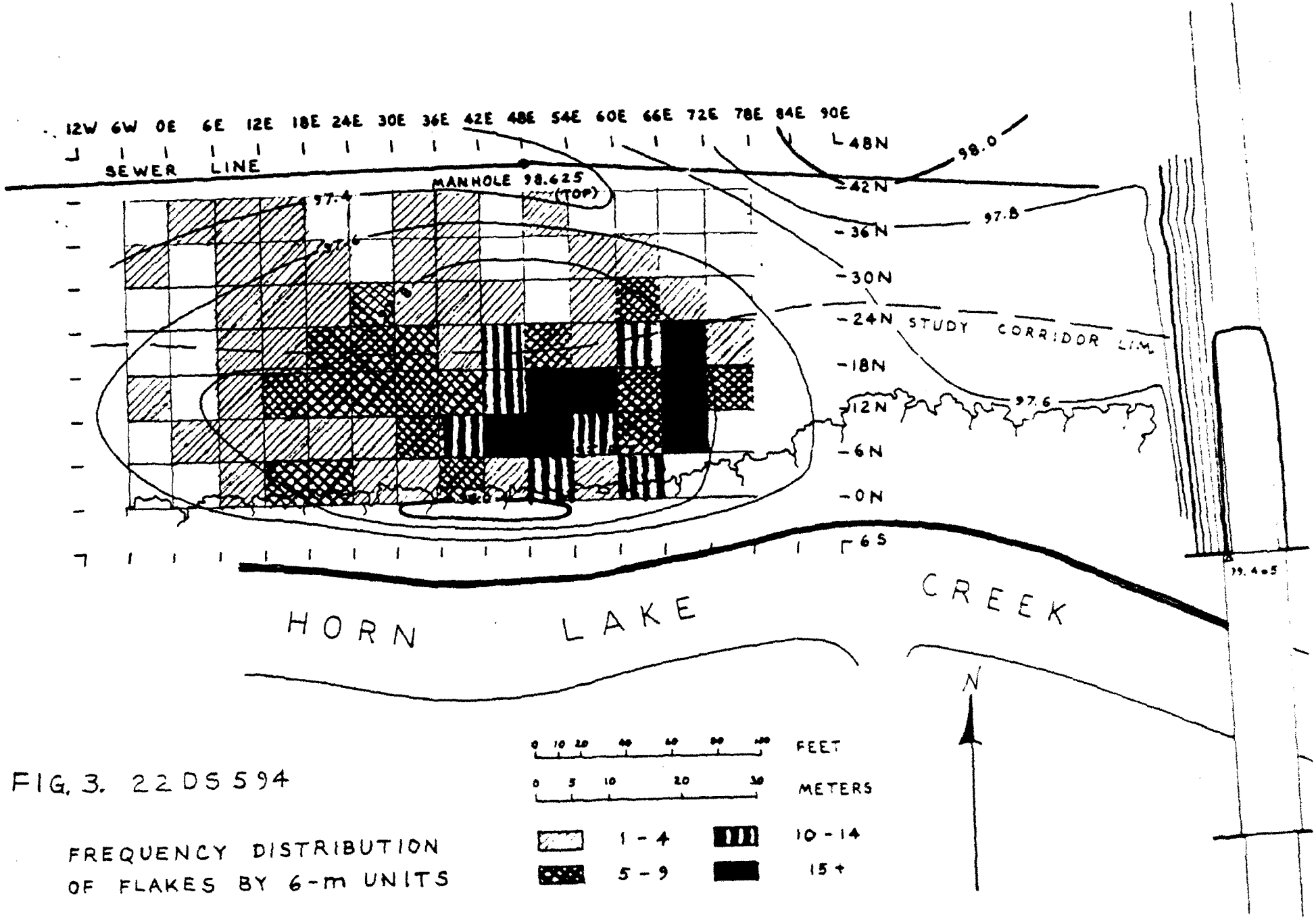


FIG. 3. 22DS594

FREQUENCY DISTRIBUTION OF FLAKES BY 6-m UNITS

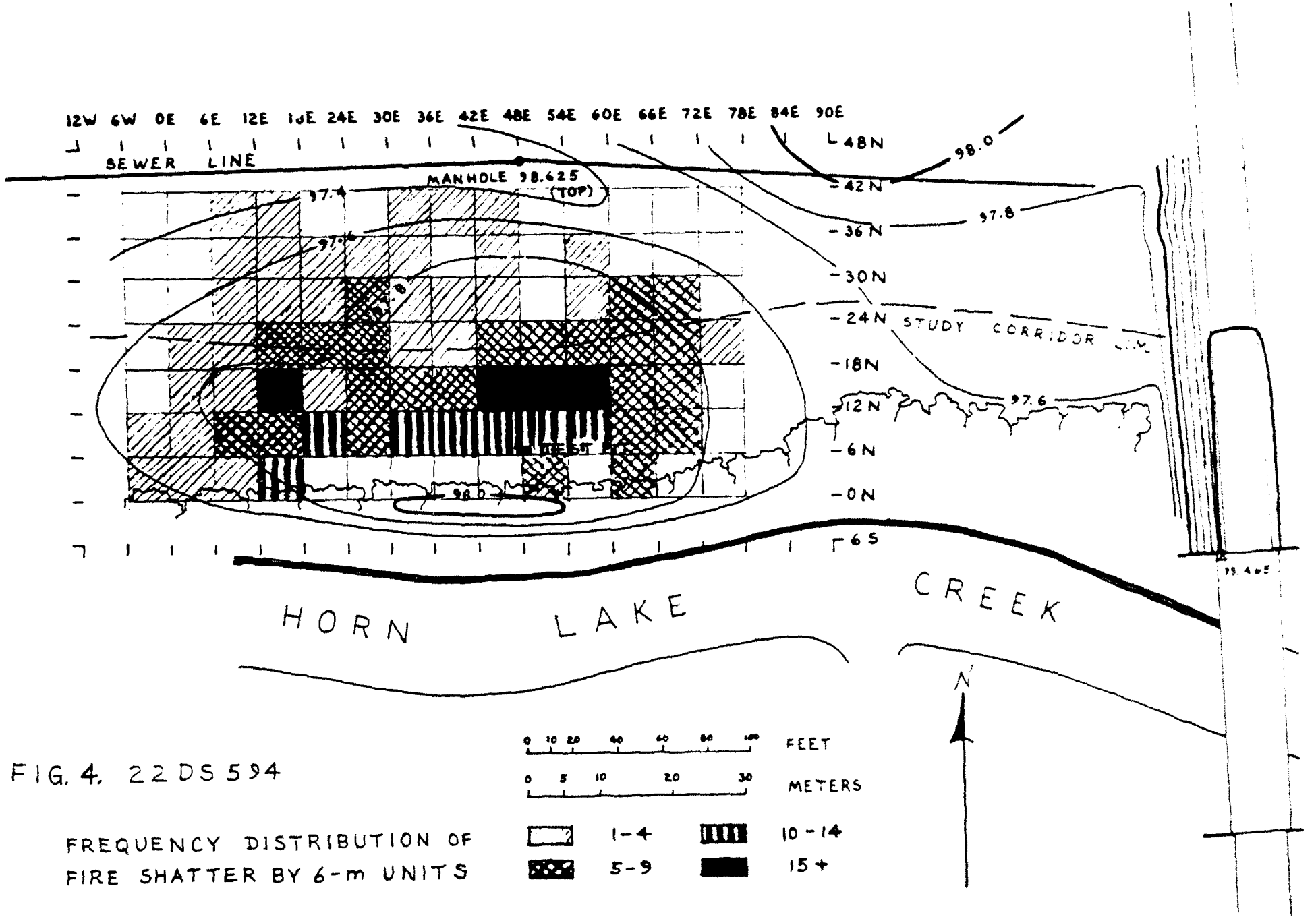


FIG. 4. 22DS594

FREQUENCY DISTRIBUTION OF FIRE SHATTER BY 6-m UNITS

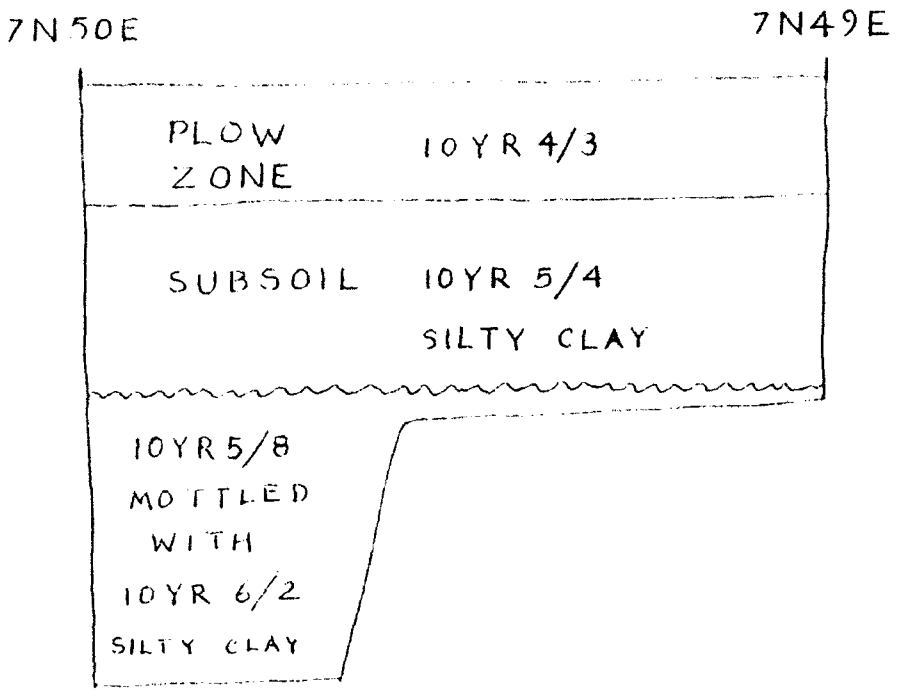


FIG. 5, NORTH PROFILE OF TEST PIT, 22 DS 594.

SECTION C

SCOPE OF WORK

Archaeological Intensive Survey, with testing, of The Horn Lake and Tributaries Project, Desoto County, Mississippi.

1. General.

1.01. The Contractor shall conduct a background and literature search and intensive survey level investigation of the Horn Lake and Tributariers Project, Desoto County, Mississippi. These tasks are in partial fulfillment of the Memphis District's obligations under the National Historic Preservation Act of 1966 (P.L. 89665); the National Environment Policy Act of 1969 (P.L. 91-190); Executive Order 11593, "Protection and Enhancement of Cultural Environment," 13 May 1971 (36CFR3921); Preservation of Historic and Archeological Data, 1974 (P.L. 93-291); and the Advisory Council on Historic Preservation, "Procedures for the Protection of Historic and Cultural Properties" (36 CFR, Part 800).

1.02. Personnel Standards.

a. The Contractor shall utilize a systematic, interdisciplinary approach to conducting the study. Specialized knowledge and skills will be used during the course of the study to include expertise in archaeology, history, architecture, geology and other disciplines as required. Techniques and methodologies used for the study shall be representative of the state of current professional knowledge and development.

b. The following minimal experiential and academic standards shall apply to personnel involved in cultural resources investigations described in this Scope of Work:

1. Archaeological Project Directors or Principal Investigators (PI). Individuals in charge of an archaeological project or research investigation contract, in addition to meeting the appropriate standards for archaeologist, must have a publication record that demonstrates extensive experience in successful field project formulation, execution and technical monograph reporting. The Contracting Officer may also require suitable professional references to obtain estimates regarding the adequacy of prior work.

2. Archaeologist. The minimum formal qualifications for individuals practicing archaeology as a profession are a B.A. or B.S. degree from an accredited college or university, followed by a minimum of two years of successful graduate study with concentration in anthropology and specialization in archaeology and at least two summer field schools or their equivalent under the supervision of archaeologists or recognized competence. A Master's thesis or its equivalent in research and publication is highly recommended, as is the M.A. degree.

3. Other Professional Personnel. All non-archaeological personnel utilized for their special knowledge and expertise must have a B.A. or B.S. degree from an accredited college or university, followed by a minimum of one year of successful graduate study with concentration in appropriate study.

4. Other Supervisory Personnel. Persons in any archeological supervisory position must hold a B.A., B.S. or M.A. degree with a concentration in archaeology and a minimum of 2 years of field and laboratory experience.

5. Crew Members and Lab Workers. All crew members and lab workers must have prior experience compatible with the tasks to be performed under this contract. An academic background in archaeology/anthropology is highly recommended.

c. All operations shall be conducted under the supervision of qualified professionals in the discipline appropriate to the data that is to be discovered, described or analyzed. Vitae of personnel involved in project activities may be required by the Contracting Officer at anytime during the period of service of this contract.

1.03. The Contractor shall designate in writing the name of the Principal Investigator. Participation time of the Principal Investigator shall average a minimum of 50 hours per month during the period of service of this contract. In the event of controversy or court challenge, the Principal Investigator shall be available to testify with respect to report findings. The additional services and expenses would be at Government expense, per paragraph 1.08 below.

1.04. The Contractor shall keep standard field records which will include, but are not limited to, field notebooks, state approved site forms, (prehistoric, historic, architectural), field data forms and graphics and photographs. Publishable quality site maps with precise boundaries and proposed impact boundaries will be submitted for each site.

1.05. To conduct the field investigation, the Contractor will obtain all necessary permits, licenses, and approvals from all local, state and Federal authorities. Should it become necessary in the performance of the work and services of the Contractor to secure the right of ingress and egress to perform any of the work required herein on properties not owned or controlled by the Government, the Contractor shall secure the consent of the owner, his representative, or agent, prior to effecting entry on such property.

1.06. Innovative approaches to data location, collection, description and analysis, consistent with other provisions of this purchase order and the Cultural Resources requirements of the Memphis District, are encouraged. Such approaches will require prior consultation with the Contracting Officer and/or his authorized representative.

1.07. No mechanical power equipment shall be utilized in any cultural resource activity without specific written permission of the Contracting Officer.

1.08. Techniques and methodologies used during the mitigation shall be representative of the current state of knowledge for their respective disciplines.

1.09. The Contractor shall furnish expert personnel to attend conferences and furnish testimony in any judicial proceedings involving the archaeological and historical study, evaluation, analysis and report. When required, arrangements for these services and payment therefor will be made by representatives of either the Corps of Engineers or the Department of Justice.

1.10. The Contractor shall supply such graphic aids (ex: profile and plan drawings) or tables as are necessary to provide a ready and clear understanding of spatial relationships or other data discussed in the text of the report. Such tables or figures shall appear as appropriate in the body of the report.

1.11. The Contractor, prior to the acceptance of the final report, shall not release any sketch, photograph, report or other material of any nature obtained or prepared under this contract without specific written approval of the Contracting Officer.

1.12. The extent and character of the work to be accomplished by the Contractor shall be subject to the general supervision, direction, control and approval of the Contracting Officer. The Contracting Officer may have a representative of the Government present during any or all phases of the described cultural resource project.

2. Study Area.

2.01. The Horn Lake Creek and Tributaries project is located below Southaven, in Desoto County, Mississippi. The project includes Horn Lake Creek, Cow Pen Creek, and Rocky Creek. The entire project is approximately 11 miles in length, right-of-way width varies.

Horn Lake Creek - The project begins at mile 13.25 and ends at mile 19.35. The right-of-way extends 100 feet (30 meters) from topbank on both sides.

Cow Pen Creek - The project begins at mile 2.74 and ends at mile 0. Between mile 0 and 0.62 the right-of-way extends 100 feet (30 meters) from topbank on both sides. Between miles 0.62 and 1.28, on the east side only, the right-of-way is 200 feet (60 meters) from topbank. From mile 1.28 and 1.8 the right-of-way extends 50 feet (15 meters), on both sides, from topbank. From mile 1.8 to 2.47 the right-of-way extends 50 feet (15 meters) from topbank on the east side only.

Rock Creek - The project begins at mile 2.1 and ends at mile 0. The right-of-way extends 100 feet (30 meters) from top bank, on both sides.

The entire project areas contains approximately 240 acres. Enclosures 1 and 2 shows the areas to be surveyed. The project can be located on the Horn Lake, Miss-Tenn, and Pleasant Hill, Miss-Tenn 7.5 minute quadrangle maps.

3. Definitions.

3.01. "Cultural resources" are defined to include any buildings, site, district, structure, object, data, or other material relating to the history, architecture, archaeology, or culture of an area.

3.02. "Background and Literature Search" is defined as a comprehensive examination of existing literature and records for the purpose of inferring the potential presence and character of cultural resources in the study area. The examination may also serve as collateral information to field data in evaluating the eligibility of cultural resources for inclusion in the National Register of Historic Places or in ameliorating losses of significant data in such resources.

3.03. "Intensive Survey" is defined as a comprehensive, systematic, and detailed on-the-ground survey of an area, of sufficient intensity to determine the number, types, extent and distribution of cultural resources present and their relationship to project features.

3.04. "Mitigation" is defined as the amelioration of losses of significant prehistoric, historic, or architectural resources which will be accomplished through preplanned actions to avoid, preserve, protect, or minimize adverse effect upon such resources or to recover a representative sample of the data they contain by implementation of scientific research and other professional techniques and procedures. Mitigation of losses of cultural resources includes, but is not limited to, such measures as: (1) recovery and preservation of an adequate sample of archaeological data to allow for analysis and published interpretation of the cultural and environmental conditions prevailing at the time(s) the area was utilized by man; (2) recording, through architectural quality photographs and/or measured drawings of buildings, structures, districts, sites and objects and deposition of such documentation in the Library of Congress as a part of the National Architectural and Engineering Record; (3) relocation of buildings, structures and objects; (4) modification of plans or authorized projects to provide for preservation of resources in place; (5) reduction or elimination of impacts by engineering solutions to avoid mechanical effects of wave wash, scour, sedimentation and related processes and the effects of saturation.

3.05. "Reconnaissance" is defined as an on-the-ground examination of selected portions of the study area, and related analysis adequate to assess the general nature of resources in the overall study area and the probable impact on resources of alternate plans under consideration. Normally reconnaissance will involve the intensive examination of not more than 15 percent of the total proposed impact area.

3.06. "Significance" is attributable to those cultural resources of historical, architectural, or archaeological value when such properties are included in or have been determined by the Secretary of the Interior to be eligible for inclusion in the National Register of Historic Places after evaluation against the criteria contained in How to Complete National Register Forms.

3.07. "Testing" is defined as the systematic removal of the scientific, prehistoric, historic, and/or archaeological data that provide an archaeological or architectural property with its research data value. Testing may include controlled surface survey, shovel testing, profiling, and limited subsurface test excavations of the properties to be affected for purposes of research planning, the development of specific plans for research activities, excavation, the development of specific plans for research activities, preparation of notes and records, and other forms of physical removal of data and the material analysis of such data and material, preparation of reports on such data and material and dissemination of reports and other products of the research. Subsurface testing shall not proceed to the level of mitigation.

3.08. "Analysis" is the systematic examination of material data, environmental data, ethnographic data, written records, or other data which may be prerequisite to adequately evaluating those qualities of cultural loci which contribute to their significance.

4. General Performance Specifications.

4.01. The Contractor shall prepare a management summary letter, draft(s) and final report detailing the results of the study and their recommendations.

4.02. Background and Literature Search.

a. This task shall include an examination of the historic and prehistoric environmental setting and cultural background of the study area and shall be of sufficient magnitude to achieve a detailed understanding of the overall cultural and environmental context of the study area. It axiomatic that the background and literature search shall normally preceed the initiation of all fieldwork.

b. Information and data for the literature search shall be obtained, as appropriate, from the following sources: (1) Scholarly reports - books, journals, theses, dissertations and unpublished papers; (2) Official Records Federal, state, county and local levels, property deeds, public works and other regulatory department records and maps; (3) Libraries and Museums both regional and local libraries, historical societies, universities, and museums; (4) other repositories - such as private collections, papers, photographs, etc.; (5) archeological site files at local universities, the State Historic Preservation Office, the State Archeologist; (6) Consultation with qualified professionals familiar with the cultural resources in the

area, as well as consultation with professionals in associated areas such as history, sedimentology, geomorphology, agronomy, and ethnology.

c. The Contractor shall include as an appendix to the draft and final reports written evidence of all consultation and any subsequent response(s), including the dates of such consultation and communications.

d. The background and literature search shall be performed in such a manner as to facilitate predictive statements (to be included in the study report) concerning the probable quantity, character, and distribution of cultural resources within the project area. In addition, information obtained in the background and literature search should be of such scope and detail as to serve as an adequate data base for subsequent field work and analysis in the study area undertaken for the purpose of discerning the character, distribution and significance of identified cultural resources.

e. In order to accomplish the objectives described in paragraph 4.02.d., it will be necessary to attempt to establish a relationship between landforms and the patterns of their utilization by successive groups of human inhabitants. This task should involve defining and describing various zones of the study area with specific reference to such variables as past topography, potential food resources, soils, geology, and river channel history.

4.03. Intensive Survey.

a. Intensive Survey shall include the on-the-ground examination of the project areas described in paragraph 2.01 sufficiently to insure the location and preliminary evaluation of all cultural resources in the study area and to fulfill report requirements described for intensive survey in paragraph 5.03j.

b. Unless excellent ground visibility and other conditions conducive to the observation of cultural evidence occurs, shovel test pits, or comparable subsurface excavation units, shall be installed at intervals no greater than 30 meters throughout the study area. Shovel test pits shall be minimally 30 X 30 centimeters in size and extend to a minimum depth of 50 centimeters. All such units shall be screened using 1/4" mesh hardware cloth. Additional shovel test pits shall be excavated in areas judged by the Principal Investigator to display a high potential for the presence of cultural resources. If, during the course of intensive survey activities, areas are encountered in which disturbance or other factors clearly and decisively preclude the possible presence of significant cultural resources, the Contractor shall carefully examine and document the nature and extent of the factors and then proceed with survey activities in the remainder of the study area. Documentation and justification of such action shall appear in the survey report. The location of all shovel test units and surface observations shall be recorded and appear in the draft and final reports.

c. When cultural remains are encountered, horizontal site boundaries shall be derived by appropriate archaeological methods in such a manner as to allow precise location of site boundaries on Government project drawings and 7.5 minute U.S.G.S. quad maps when available. Methods used to establish site boundaries shall be discussed in the survey report together with the probable accuracy of the boundaries. The Contractor shall establish a datum at the discovered cultural loci which shall be precisely related to the site boundaries as well as to a permanent reference point (in terms of azimuth and distance). If possible, the permanent reference point used shall appear on Government blueline (project) drawings and/or 7.5 minute U.S.G.S, quad maps. If no permanent landmark is available, a permanent datum shall be established in a secure location for use as a reference point. The permanent datum shall be precisely plotted and shown on U.S.G.S. quad maps and project drawings. All descriptions of site location shall refer to the location of the primary site datum.

d. The Contractor shall examine all cultural resources encountered in the intensive survey sufficiently well to determine the approximate size, general nature and quantity of architectural or site surface data. Data collection shall be of sufficient scope to provide information requested on state site forms.

e. During the course of the intensive survey, the Contractor should observe and record local environmental, physiographic, geological or other variables (including estimates of ground visibility and descriptions of soil characteristics) which may be variables useful in evaluating the effectiveness of procedures and providing comparative data for use in predictive statements which may be utilized in future Government cultural resource investigations.

f. When sites are not wholly contained within the right-of-way limits, the Contractor shall survey an area outside the right-of-way limits large enough to include the entire site within the survey area. This shall be done in an effort to delineate site boundaries and to determine the degree to which the site will be impacted.

g. Site Specific Investigations.

All cultural resources discovered within survey area shall be examined by methods consistent with the following requirements:

(1) Site Boundaries.

Horizontal site boundaries shall be derived by the use of surface observation procedures (where surface conditions are highly conducive to the observation of cultural evidence) or by screened shovel cut units or by a combination of these methods. The delineations of horizontal sites boundaries may be accomplished concurrently with the collection of other data

consistent with paragraph 4.03g.(2). Site boundaries shall be related to a site datum and permanent reference point as described in paragraph 4.03c.

(2) Surface Data Retrieval.

Surface collection of the site area shall be accomplished in order to obtain data representative of total site surface content. Both historic and prehistoric items shall be collected. The Contractor shall carefully note and record descriptions of surface conditions of the site including ground cover and the suitability of soil surfaces for detecting cultural items (ex: recent rainfall, standing water or mud). If ground surfaces are not highly conducive to surface collection, screened shovel test units shall be used to augment surface collection procedures.

Care should be taken to avoid bias in collecting certain classes of data or artifact types to the exclusion of others (ex: debitage or faunal remains) so as to insure that collections accurately reflect both the full range and the relative proportions of data classes present (ex: the proportion of debitage to implements or types of implements to each other). Such a collecting strategy shall require the total collection of quadrat or other sample units in sufficient quantities to reasonably assure that sample data are representative of such discrete site subareas as may exist. Since the number and placement of such sample units will depend, in part, on the subjective evaluation of intrasite variability, and the amount of ground cover, the Contractor shall describe, in the report, the rational for the number and distribution of collection units. In the event that the Contractor utilizes systematic sampling procedures in obtaining representative surface samples, care should be taken to avoid periodicity in recovered data. No individual sample unit type used in surface data collection shall exceed 36 square meters in area.

The Contractor shall undertake (in addition and subsequent to sample surface collecting) a general site collection in order to increase the sample size of certain classes of data which the Principal Investigator may deem prerequisite to an adequate site-specific and intersite evaluation of data.

(3) Subsurface Data Retrieval.

Unless it can be conclusively and definitely demonstrated that no significant subsurface cultural resources occur at a site, the Contractor shall install a minimum of one 1 X 1 meter subsurface test unit to determine the presence and general nature of subsurface deposits.

h. Subsurface test units (other than shovel cut units) shall be excavated in levels no greater than 10 centimeters. Where cultural zonation or plow disturbance is present, however, excavated materials shall be removed by zones (and 10 cm. levels within zones where possible). Subsurface test units shall extend to a depth of at least 20 centimeters below artifact bearing soils. A portion of each test unit, measured from one corner (of a minimum 30 X 30 centimeters), shall be excavated to a depth of 40 centimeters

below the last full level. All excavated material (including plow zone material) shall be screened using a minimum of 1/4" hardware cloth. Representative profile drawings shall be made of excavated unit.

i. Stringent horizontal spatial control of site specific investigations will be maintained by relating the location of all collection and test units to the primary site datum.

j. Other types of subsurface units may, at the Contractor's option, be utilized in addition to those units required by this Scope of Work.

k. Subsurface investigations will be limited to testing and shall not proceed to the level of mitigation.

l. All test units excavated shall be backfilled by the Contractor.

4.04. Analysis and Curation. Unless otherwise indicated, artifactural and non-artifactural analysis shall be of an adequate level and nature to fulfill the requirements of this Scope of Work. All recovered cultural items shall be cataloged in a manner consistent with state requirements or standards of curation in the state in which the study occurs. The Contractor shall consult with appropriate state officials as soon as possible following the conclusion of fieldwork in order to obtain information (ex:accession numbers) prerequisite to such cataloging procedures. The Contractor shall have access to a depository for notes, photographs and artifacts (preferably in the state in which the study occurs) where they can be permanently available for study by qualified scholars. If such materials are not in Federal ownership, applicable state laws, if any, should be followed concerning the disposition of the materials after the completion of the final report. Efforts to insure the permanent curation of properly cataloged cultural resources materials in an appropriate institution shall be considered an integral part of the requirements of this Scope of Work. The Contractor shall pay all cost of the preparation and permanent curation of records and artifacts. An arrangement for curation shall be confirmed by the Contractor, subject to the approval of the Contracting Officer, prior to the acceptance of the final report.

5. General Report Requirements.

5.01. The primary purpose of the cultural resources report is to serve as a planning tool which aids the Government in meeting its obligations to preserve and protect our cultural heritage. The report will be in the form of a comprehensive, scholarly document that not only fulfills mandated legal requirements but also serves as a scientific reference for future cultural resources studies. As such, the report's content must be not only descriptive but also analytic in nature.

5.02. Upon completion of all field investigation and research, the Contractor shall prepare reports detailing the work accomplished, the results, the recommendations, for each project area. Copies of the draft and

final reports of investigation shall be submitted in a form suitable for publication and be prepared in a format reflecting contemporar organizational and illustrative standards for current professional archeological journals. The final report shall be typed on standard size 8-1/2" x 11" bond paper with pageds numbered and with page margins one inch at top, bottom, and sides. Photographs, plans, maps, drawings and text shall be clean and clear. The final report shall be bound in a high quality professional type binding. The project title shall appear on the front cover.

5.03. The report shall include, but not necessarily be limited to, the following sections and items:

a. Title Page. The title page should provide the following information; the type of task undertaken, the study areas and cultural resources which were assessed; the location (county and state), the date of the report; the contract number; the name of the author(s) and/or the Principal Investigator; and the agency for which the report is being prepared. If a report has been authored by someone other than the Principal Investigator, the Principal Investigator must at least prepare a foreword describing the overall research context of the report, the significance of the work, and any other related background circumstances relating to the manner in which the work was undertaken.

b. Abstract. An abstract suitable for publication in an abstract journal shall be prepared and shall consist of a brief, quotable summary useful for informing the technically-oriented professional public of what the author considers to be the contributions of the investigation to knowledge.

c. Table of Contents.

d. Introduction. This section shall include the purpose of the report; a description of the proposed project; a map of the general area; a project map; and the dates during which the task was conducted. The introduction shall also contain the name of the institution where recovered materials will be curated.

e. Environmental Context. This section shall contain, but not be limited to, a discussion of probable past floral and faunal characteristics of the project area. Since data in this section may be used in the future evaluation of specific cultural resource significance, it is imperative that the quantity and quality of environmental data be sufficient to allow subsequent detailed analysis of the relationship between past cultural activities and environmental variables.

f. Previous Research. This section shall describe previous research which may be useful in deriving or interpreting relevant background research data, problem domains, or research questions and in providing a context in which to examine the probability of occurrence and significance of cultural resources in the study area.

g. Literature Search and Personal Interviews. This section shall discuss the results of the literature search, including specific data sources, and personal interviews which were conducted during the course of investigations.

h. Survey, Testing and Analytical Methods. This section shall contain an explicit discussion of research and/or survey strategy, and should demonstrate how environmental data, previous research data, the literature search and personal interviews have been utilized in constructing such a strategy.

i. Survey, Testing and Analytical Results. This section shall discuss archeological, architectural, and historical resources surveyed, tested and analyzed; the nature and results of analysis, and the scientific importance or significance of the work. Quantified listings and descriptions of artifacts and their proveniences may be included in this section or added to the report as an appendix. Inventoried sites shall include a state site number.

j. Conclusions and Recommendations. This section shall contain the recommendations of the Principal Investigator regarding all contract activities. Recommendations should be at a level sufficient to accomplish the objectives described in paragraph 4.03. Conclusions derived from survey activities concerning the nature, quantity and distribution of cultural loci, should be used in describing the probable impact of project work on cultural resources.

k. References (American Antiquity Style).

l. Appendices (Maps, correspondence, etc.). A copy of this Scope of Work shall be included as an appendix in all reports.

5.04. The above items do not necessarily have to be discrete sections; however, they should be readily discernible to the reader. The detail of the above items may vary somewhat with the purpose and nature of the study.

5.05. In order to prevent potential damage to cultural resources, no information shall appear in the body of the report which would reveal precise resource location. All maps which indicate or imply precise site locations shall be included in reports as a readily removable appendix (ex: envelope).

5.06. No logo or other such organizational designation shall appear in any part of the report (including tables or figures) other than the title page.

5.07. Unless specifically authorized by the Contracting Officer, all reports shall utilize permanent site numbers assigned by the state in which the study

5.08. All appropriate information (including typologies and other classificatory units) not generated in these contract activities shall be suitably referenced.

5.09. Reports detailing testing activities shall contain site specific maps. Site maps shall indicate site datum(s), location of data collection units (including shovel cuts, subsurface test units and surface collection units); site boundaries in relation to proposed project activities, site grid systems (where appropriate) and such other items as the Contractor may deem appropriate to the purposes of this contract.

5.10. Information shall be presented in textual, tabular, and graphic forms, whichever are most appropriate, effective and advantageous to communicate necessary information. All tables, figures and maps appearing in the report shall be of publishable quality.

5.11. Any abbreviated phrases used in the text shall be spelled out when the phrase first occurs in the text. For example use "State Historic Preservation Officer (SHPO)" in the initial reference and thereafter "SHPO" may be used.

5.12. The first time the common name of a biological species is used it should be followed by the scientific name.

5.13. In addition to street addresses or property names, sites shall be located on the Universal Transverse Mercator (UTM) grid.

5.14. All measurements should be metric. If the Contractor's equipment is in the English system, then the metric equivalents should follow in parentheses.

5.15. As appropriate, diagnostic and/or unique artifacts, cultural resources or their contexts shall be shown by drawings or photographs.

5.16. Black and white photographs are preferred except when color changes are important for understanding the data being presented. No instant type photographs may be used.

5.17. Negatives of all black and white photographs and/or color slides of all plates included in the final report shall be submitted so that copies for distribution can be made.

6. Submittals.

6.01. The Contractor shall, unless delayed due to causes beyond his fault or negligence, complete all work and services under the purchase order within the following time limitations after receipt of notice to proceed.

a. A management summary letter, of work conducted, and the findings of that work shall be submitted within 35 calendar days following receipt of notice to proceed.

b. Three (3) copies of the draft report will be submitted within 65 calendar days following receipt of notice to proceed.

c. The Government shall review the draft report and provide comments to the Contractor within 20 calendar days after receipt of the draft report.

d. An original and 20 bound copies of the final report shall be submitted within 20 calendar days following the Contractor's receipt of the Government's comments on the draft report.

6.02. If the Government review exceeds 20 calendar days, the period of service of the purchase order shall be extended on a day-by-day basis equal to any additional time required by the Government for review.

6.03. The Contractor shall submit under separate cover 4 copies of appropriate 15' quadrangle maps (7.5' when available) and other site drawings which show exact boundaries of all cultural resources within the project area and their relationship to project features, and single copies of all forms, records and photographs described in paragraph 1.04.

6.04. The Contractor shall submit to the Contracting Officer completed National Register forms including photographs, maps, and drawings in accordance with the National Register Program if any sites inventoried during the survey are found to meet the criteria of eligibility for nomination and for determination of significance. The completed National Register forms are to be submitted with the final report.

6.05. At any time during the period of service of this contract, upon the written request of the Contracting Officer, the Contractor shall submit, within 30 calendar days, any portion or all field records described in paragraph 1.04 without additional cost to the Government.

6.06. When cultural resources are located during intensive survey activities, the Contractor shall supply the appropriate State Historic Preservation Office with completed site forms, survey report summary sheets, maps or other forms as appropriate. Blank forms may be obtained from the State Historic Preservation Office. Copies of such completed forms and maps shall be submitted to the Contracting Officer within 30 calendar days of the end of fieldwork.

6.07. The Contractor shall prepare and submit with the final report, a site card for each identified resource or aggregate resource. These site cards do not replace state approved prehistoric, historic, or architectural forms or Contractor designed forms. This site card shall contain the following information, to the degrees permitted by the type of study authorized:

a. site number

b. site name

c. location: section, township, and UTM coordinates (for procedures in determining UTM coordinates refer to How to Complete National Register Forms, National Register Program, Volume 2.

d. county and state

e. quad maps

f. date of record

g. description of site

h. condition of site

i. test excavation results

j. typical artifacts

k. chronological position (if known)

l. relation to project

m. previous studies and present contract number

n. additional remarks

7. Schedule.

7.01. The Contractor shall, unless delayed due to causes beyond his control and without his fault or negligence, complete all work and services under this contract within the following time limitations.

Activity	Due Date (Beginning with acknowledged date of receipt of notice to proceed)
Begin Intensive Survey	5 calendar days
Submittal of Management Summary Letter	35 calendar days
Submittal of Draft Report	65 calendar days
Government Review of Draft Report	85 calendar days

Contractor's Submittal of Final Report	105 calendar days

7.02. The Contractor shall make any required corrections after review by the Contracting Officer of the reports. The Contractor may be required to submit the draft report more than once for review. In the event that any of the Government review periods are exceeded and upon request of the Contractor, the contract period will be extended on a calendar day for day basis. Such extension shall be granted at no additional cost to the Government.

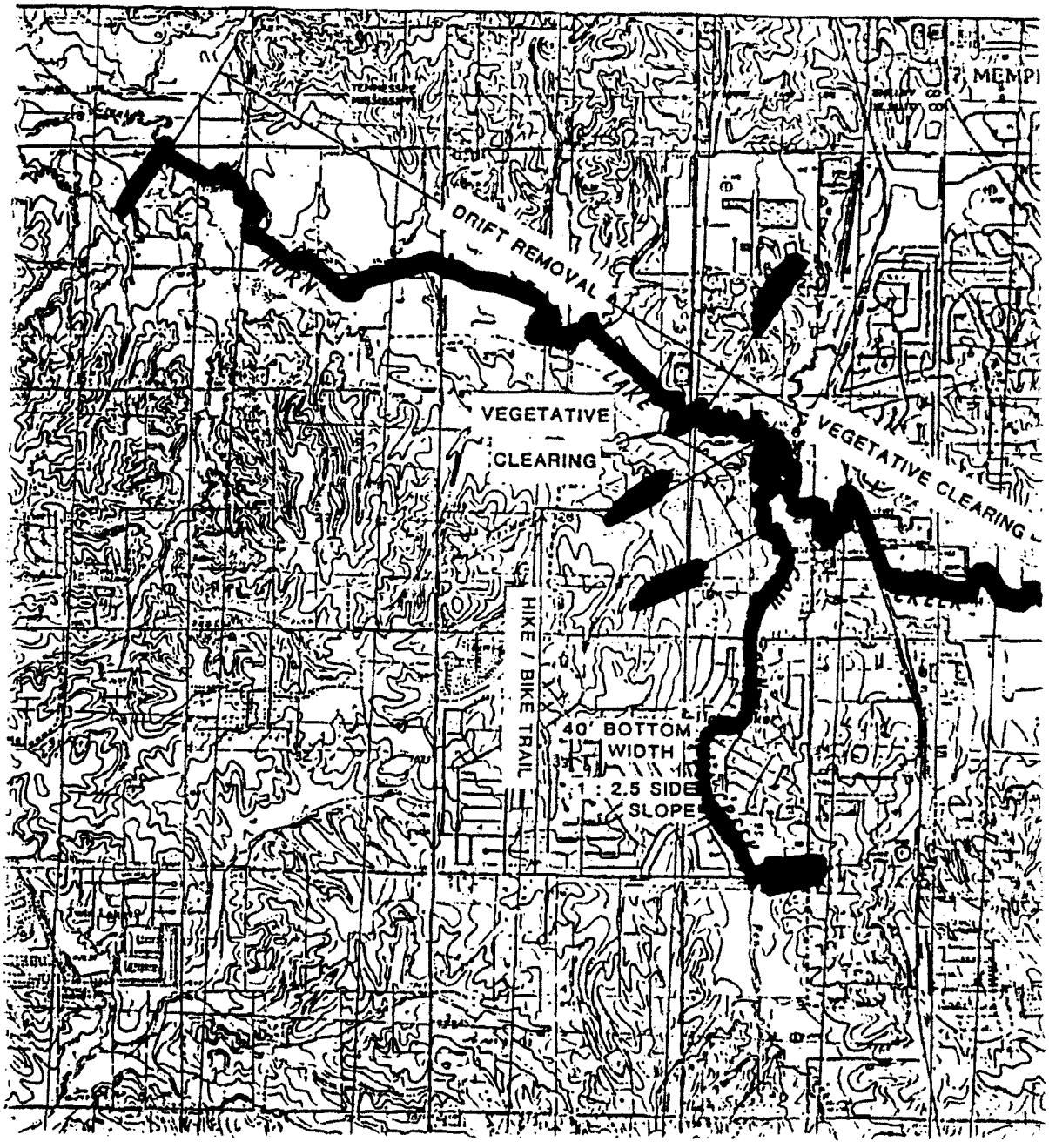
8. Method of Payment.

8.01. Upon satisfactory completion of work by the Contractor, in accordance with the provisions of this purchase order, and its acceptance by the Contracting Officer, the Contractor will be paid the amount of money indicated in Block 25 of the purchase order.

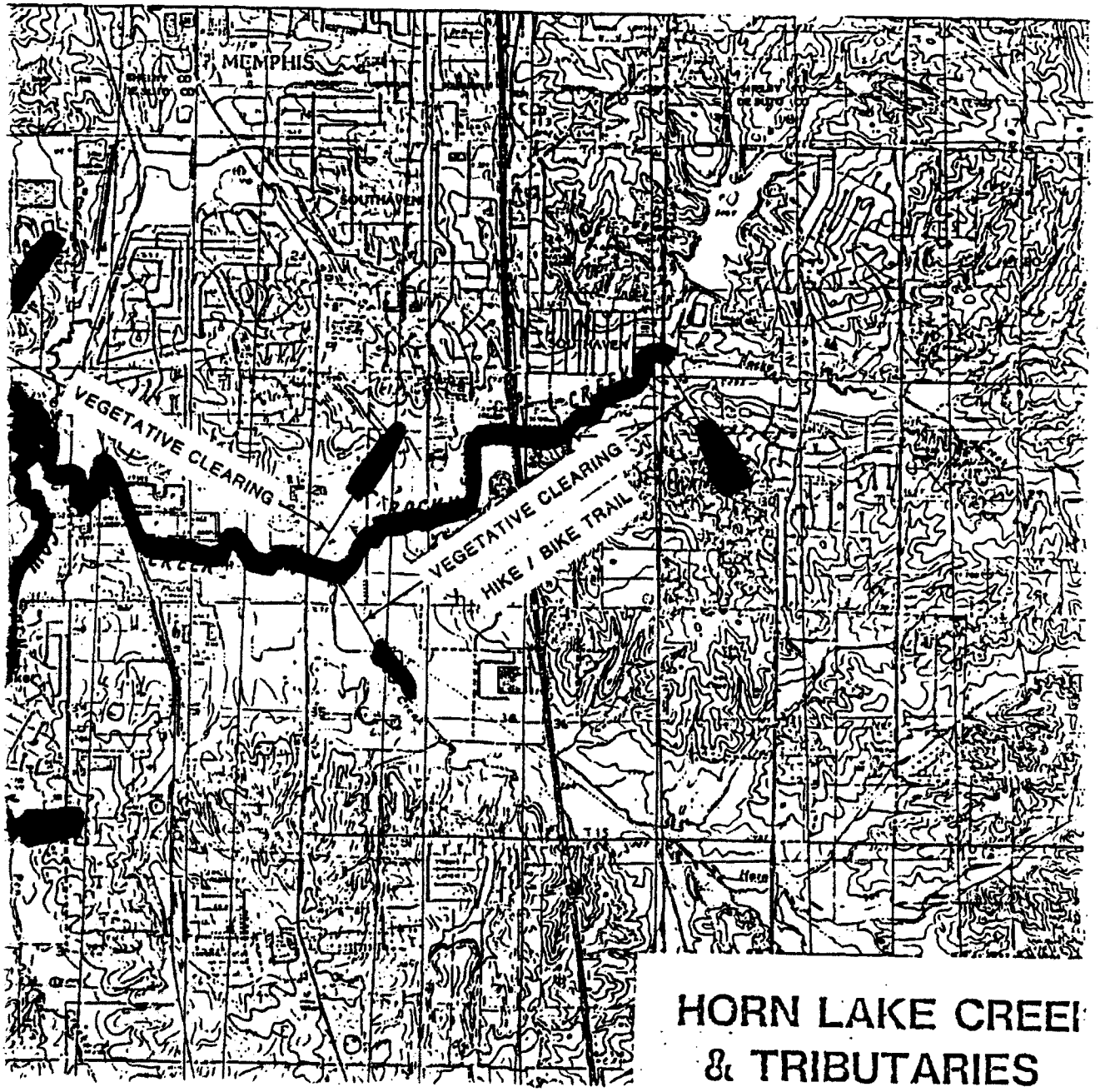
8.02. If the Contractor's work is found to be unsatisfactory and if it is determined that fault or negligence on the part of the Contractor or his employees has caused the unsatisfactory condition, the Contractor will be liable for all costs in connection with correcting the unsatisfactory work. The work may be performed by Government forces or Contractor forces at the direction of the Contracting Officer. In any event, the Contractor will be held responsible for all costs required for correction of the unsatisfactory work, including payments for services, automotive expenses, equipment rental, supervision, and any other costs in connection therewith, where such unsatisfactory work as deemed by the Contracting Officer to be the result of carelessness, incompetent performance or negligence by the Contractor's employees. The Contractor will not be held liable for any work or type of work not covered by this purchase order.

8.03. Prior to settlement upon termination of the purchase order, and as a condition precedent thereto, the Contractor shall execute and deliver to the Contracting Officer a release of all claims against the Government arising under or by virtue of the purchase order, other than such claims, if any, as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

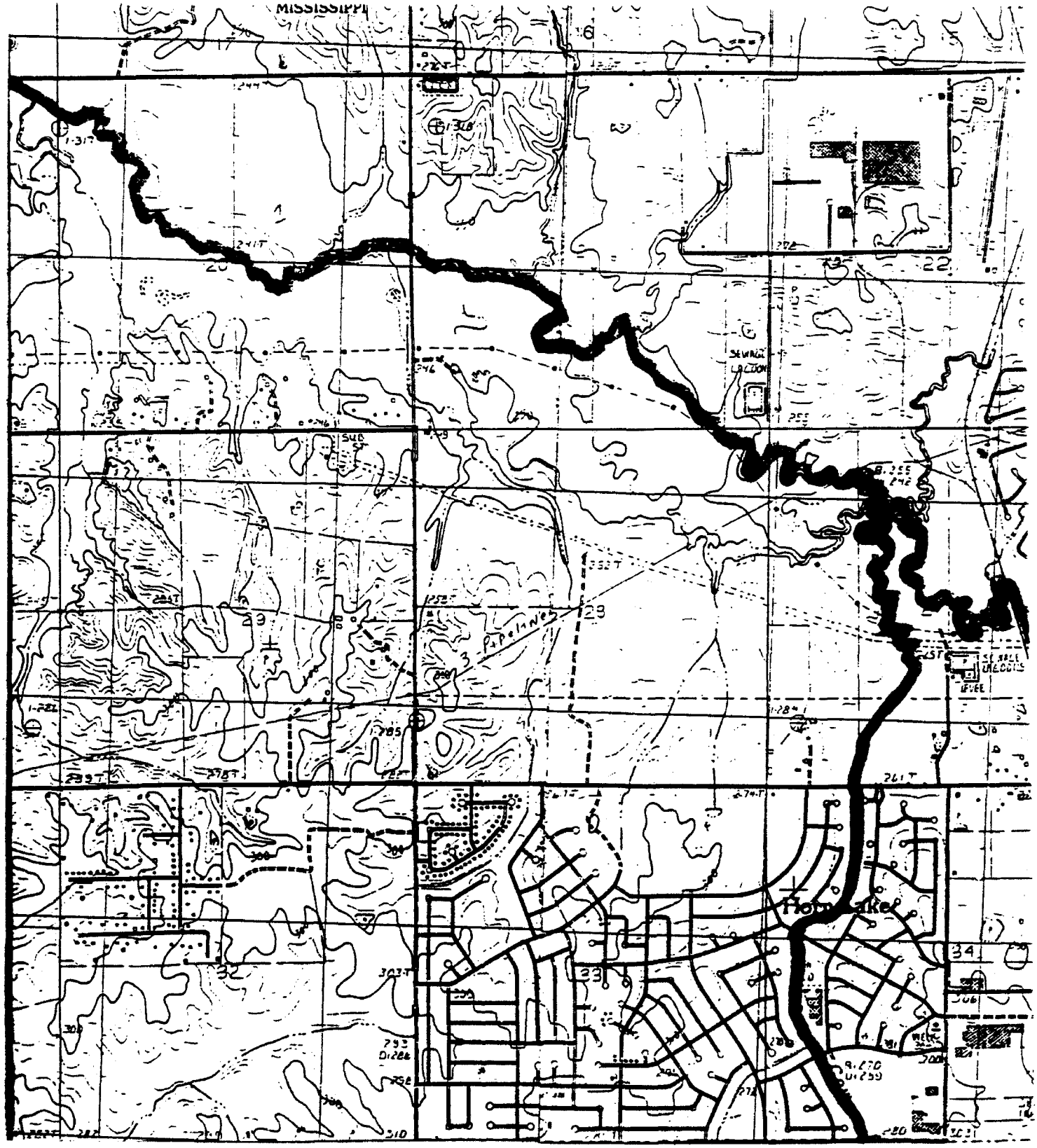
(1)


DRIFT REMOVAL
VEGETATIVE CLEARING
VEGETATIVE CLEARING
HIKE / BIKE TRAIL
40' BOTTOM WIDTH
1 : 2.5 SIDE SLOPE

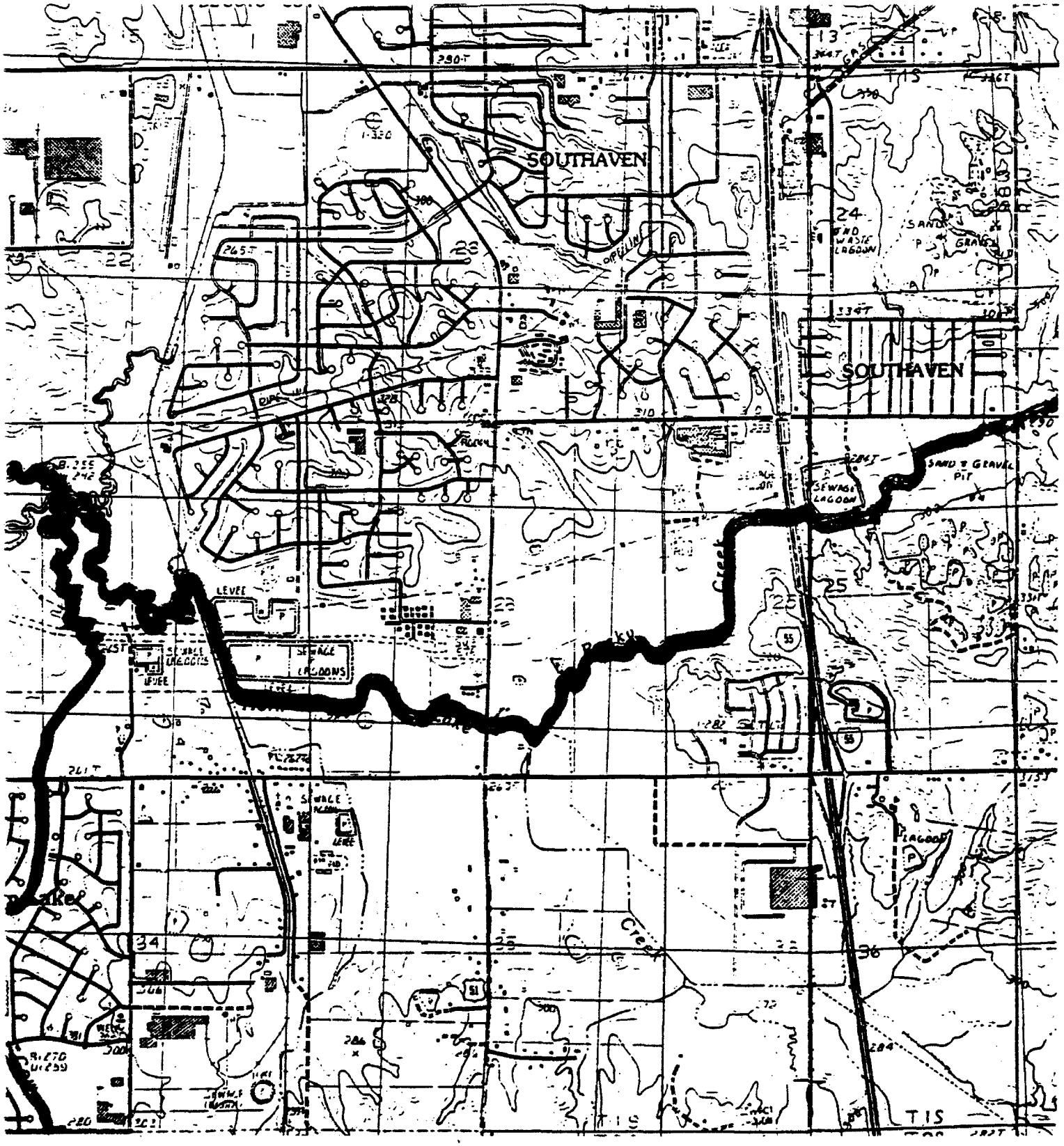
(2)



HORN LAKE CREEK
& TRIBUTARIES


MISSISSIPPI
Pipelines
Horn Lake

(2)


SOUTHAVEN
SOUTHAVEN
SEWAGE LAGOONS
SEWAGE LAGOON
SAND & GRAVEL PIT
LEVEE
Creek
Creek
T1S
T1S

VITA

NAME:	Gerald P. Smith
PERSONAL DATA:	Born: March 20, 1941, Lubbock, Texas Married: 1964 to Kay S. Smith
EDUCATIONAL DATA:	Southwestern at Memphis, Memphis, Tennessee, B. A. (Anthropology) 1963
	University of North Carolina at Chapel Hill, M. A. (Anthropology) 1965
	University of Missouri, Columbia, Missouri PhD (Anthropology), 1971
ACADEMIC HONORS:	Honorable Mention, Westinghouse Science Talent Search, 1959
	B. A. degree with Honors in Anthropology, Southwestern at Memphis, 1963
	Superior Performance in University Research Award, Memphis State University, 1984, 1985, 1988

PROFESSIONAL POSITIONS:

1962-63	Student Assistant, Chucalissa Museum, Memphis State University
1963-65	Research Assistant, Department of Anthropology, University of North Carolina, Chapel Hill
1965-66	Field Director, Hand Site Archaeological Project, Division of Archives and History, Virginia State Library
1967-68	Research Assistant, Department of Anthropology, University of Missouri, Columbia
1967-68	Site Archaeologist, Towosahgy State Park, Missouri State Park Board
1968-	Director, Chucalissa, Department of Anthropology, Memphis State University
1974-76	Acting Chairman, Department of Anthropology, Memphis State University, Summer
1980-81	Member, Tennessee Archaeological Advisory Council

PROFESSIONAL ORGANIZATIONS

American Anthropological Association
Society for American Archaeology
Southeastern Archaeological Conference
Plains Archaeological Conference
Society for Historical Archaeology
Mid-South Archaeological Conference
American Society for Photogrammetry and Remote Sensing

OTHER RELATED SKILLS

Photography: 35mm through large format technical and general; processing black & white negatives; printing black & white and Cibachrome color; aerial photography (oblique and vertical)

Private pilot's license with instrument rating, single engine, land based

PUBLICATIONS AND REPORTS

1965 Archaeological Survey of the New Hope Reservoir Area, North Carolina. Master's Thesis, University of North Carolina at Chapel Hill.

1967a Early Settlement, 1583-1667. Atlas of North Carolina, edited by Richard A. Lonsdale. University of North Carolina Press.

1967b Field Work in Missouri: Beckwith's Fort. Southeastern Archaeological Conference News-letter, Vol. II.

1969a Ceramic Handle Styles and Cultural Variation in the Central Mississippi Valley. Memphis State University Anthropological Research Center, Occasional Papers, No. 3.

1969b "Architectural Use of Daub" in Two House Sites in the Central Plains, edited by W. Raymond Wood, Plains Anthropologist, Memoir 6.

1969c "Perishable Remains" in Two House Sites in the Central Plains, edited by W. Raymond Wood, Plains Anthropologist, Memoir 6.

1969d Field Work at Chucalissa. Southeastern Archaeological Conference Newsletter, Vol. 13.

1971a Protohistoric Sociopolitical Organization of the Nottoway. Ph.D. Thesis, University of Missouri.

1971b Archaeological Resources of the Mississippi River Drainage in West Tennessee. In Archaeological Resources of the Lower Mississippi Valley, edited by Hester Davis. University of Arkansas for the U.S. Army Corps of Engineers.

1971c Poverty Point Period Occupations in West Tennessee. Paper presented at Mid-South Archaeological Conference, August, 1971.

1971d The Late Archaic through Early Woodland Periods in West Tennessee. Paper presented at Southeastern Archaeological Conference, November, 1971. Bullentin of the Southeastern Archaeological Conference, Vol. 15:109-118

1972a Archaeological Sites located in Dam 3 Reservoir Site, in Nonconnah Creek Basin Enviromental Directory, compiled by John W. Smith. Memphis State University for U.S. Army Corps. of Engineers.

1972b Archaeological Resources of the Mississippi River Flood Zone below Cairo, Illinois, in Tennessee, Missouri, and Kentucky. Subcontractor to Environtrol, Inc., for Mississippi River Commission.

1973a Chucalissa Revisited, Memphis State University.

1973b Archaeological Resources of the Eight Mile Creek Basin, Arkansas. Archaeological environmental impact study subcontractor for RAMCON, Research and Management Consultants, Memphis, Tennessee, for U. S. Army Corps of Engineers.

1973c Archaeological Resources of the Millington-Arlington Highway Study Corridor. Subcontractor to Harland Bartholomew and Associates, for Memphis and Shelby County Planning Commission.

1974a Summary of Current Archaeological Data in the Portions of the Forked Deer and Obion River Basins to be Affected by Corps Channelization and Proposed Reservoirs. For U.S. Army Corps of Engineers.

1974b Archaeological Reconnaissance of the Reelfoot-Lake No. 9 Project Impact Area, Fulton Co., Kentucky, and Lake Co., Tennessee. U.S. Army Corps of Engineers, Memphis District.

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